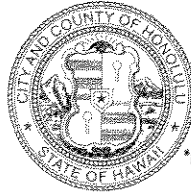


DEPARTMENT OF PLANNING AND PERMITTING  
**CITY AND COUNTY OF HONOLULU**

650 SOUTH KING STREET • HONOLULU, HAWAII 96813  
TELEPHONE: (808) 523-4414 • FAX: (808) 527-6743 • INTERNET: www.co.honolulu.hi.us

JEREMY HARRIS  
MAYOR



RECEIVED

'04 JUL -7 P2:41

ERIC G. CRISPIN, AIA  
DIRECTOR

BARBARA KIM STANTON  
DEPUTY DIRECTOR

KATHY SOKUGAWA  
ACTING DEPUTY DIRECTOR

July 2, 2004

OFFICE OF ENVIRONMENTAL QUALITY CONTROL

2003/ED-33(AM)

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

Dear Ms. Salmonson:

Shoreline Setback Variance  
Chapter 343, Hawaii Revised Statutes  
Environmental Assessment (EA)/Determination  
Finding of No Significant Impact

Landowner/Applicant : Bruce E. Clements  
Agent : Analytical Planning Consultants, Inc.  
Location : 68-003 Laau Paina Place - Waialua  
Tax Map Key : 6-8-9: 11  
Request : Shoreline Setback Variance  
Proposal : After-the-fact approval to retain a Concrete Rubble Masonry (CRM)  
seawall  
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 four copies of the Final EA. If you have any questions, please contact Ann Matsumura of our staff at 523-4077.

Sincerely yours,

ERIC G. CRISPIN, AIA

Director of Planning and Permitting

EGC:nt  
Attachments

doc309386

2004-06-23 EBA FONSI  
CLEMENTS AFTER-THE-FACT SEAWALL

JUL 23 2004

FILE COPY

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FINAL ENVIRONMENTAL ASSESSMENT FOR A  
SHORELINE SETBACK VARIANCE APPLICATION

---

**EXISTING SEAWALL**

68-003 Laau Paina Place, Waialua, Hawaii

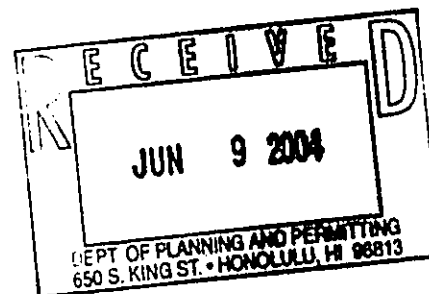
**ACCEPTING AUTHORITY:**

City and County of Honolulu  
Department of Planning and Permitting

**PREPARED BY:**

Analytical Planning Consultants, Inc.

May 2004



---

**FINAL ENVIRONMENTAL ASSESSMENT FOR A  
SHORELINE SETBACK VARIANCE APPLICATION**

**EXISTING SEAWALL**

**PROJECT LOCATION:**

68-003 Laau Paina Place, Waialua, Hawaii

**APPLICANT AND OWNER:**

Mr. Bruce Clements

**ACCEPTING AUTHORITY:**

City and County of Honolulu  
Department of Planning and Permitting

**PREPARED BY:**

Analytical Planning Consultants, Inc.  
928 Nuuanu Avenue, Suite 502  
Honolulu, Hawaii 96817  
(808) 536-5695

This document has been prepared  
pursuant to Chapter 343 HRS

**May 2004**

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**FINAL ENVIRONMENTAL ASSESSMENT FOR A  
SHORELINE SETBACK VARIANCE APPLICATION**

**EXISTING SEAWALL**

**PROJECT LOCATION:**

68-003 Laau Paina Place, Waialua, Hawaii

**APPLICANT AND OWNER:**

Mr. Bruce Clements

**ACCEPTING AUTHORITY:**

City and County of Honolulu  
Department of Planning and Permitting

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**May 2004**

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**FINAL ENVIRONMENTAL ASSESSMENT**

Existing Seawall TMK 6-8-09: 011, 68-003 Laau Paina Place, Waialua, Oahu, Hawaii

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**FINAL ENVIRONMENTAL ASSESSMENT**

Existing Seawall TMK 6-8-09: 011, 68-003 Laau Paina Place, Waialua, Oahu, Hawaii

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- Appendix A Justification for a Shoreline Setback Variance
- Appendix B Coastal Engineering Assessment by EKNA Services, Inc. April 2004
- Appendix C Seawall Design Parameters
- Appendix D Property Action and Date Timeline
- Appendix E Comment Letters on Draft EA and Response Letters

**FINAL ENVIRONMENTAL ASSESSMENT**

Existing Seawall TMK 6-8-09: 011, 68-003 Laau Paina Place, Waialua, Oahu, Hawaii

**1.0 GENERAL INFORMATION**

- A. Applicant:** Mr. Bruce Clements  
68-003 Laau Paina Place  
Waialua, Hawaii
- B. Recorded Fee Owner:** Mr. Bruce Clements  
Waialua, Hawaii
- C. Agent:** Analytical Planning Consultants  
928 Nuuanu Avenue, Suite 502  
Honolulu, Hawaii 96817  
Donald Clegg, President  
Phone: 536-5695 Fax: 599-1553
- D. Property Profile:**
- |                            |  |
|----------------------------|--|
| Location:                  | Waialua, Oahu, Hawaii                          |
| Site Address:              | 68-003 Laau Paina Place, Waialua, Hawaii       |
| TMK:                       | (1) 6-8-009: 011                               |
| Lot Area:                  | Lot 15-A 5,723 square feet (makai)             |
| State Land Use:            | Urban  |
| County Development Plan:   | North Shore                                    |
| Zoning:                    | R-5 Residential                                |
| Height Limit:              | 25 feet  |
| Special District:          | No   |
| Shoreline Management Area: | Yes  |
| Shoreline Setback:         | Yes  |
| Existing Land Use:         | Owner-occupied single family residential house |
- E. Agencies Consulted:**
- City & County of Honolulu, Department of Planning & Permitting
  - State of Hawaii, Department of Land & Natural Resources
  - State of Hawaii, Dept of Health's Office of Environmental Quality Control
- F. Permits Required:**
- Shoreline Setback Variance
  - After-the-Fact Building Permit

## FINAL ENVIRONMENTAL ASSESSMENT

Existing Seawall TMK 6-8-09: 011, 68-003 Laau Paina Place, Waialua, Oahu, Hawaii

### 2.0 LOCATION AND GENERAL DESCRIPTION OF THE PROPOSED PROJECT

#### 2.1 Location

The project site, TMK 6-8-09: 011 at 68-003 Laau Paina Place, Waialua, Hawaii, is located along the Mokuleia shore of Oahu in a small residential subdivision called Pine Wood Beach Tract makai of Farrington Highway. The project property is located west of the Mokuleia Beach Colony and east of Dillingham Airfield. A general location map for the project site is shown in Figure 1 and a tax map is shown in Figure 2.

The applicant purchased in 1988 two contiguous properties totaling 10,746 square feet: (1.) the subject property of this document TMK 6-8-09: 011, the makai or oceanside Lot 15-A of 5,723 square feet, and (2.) TMK 6-8-09: 023, the mauka or landward Lot 15-B of 5,033 square feet. The topography of the two lots is relatively flat. The project site's State land use designation is Urban and the City and County of Honolulu's zoning classification is R-5 Residential. Vegetation on the site consists of coconut trees, yard grass and various residential landscaping materials.

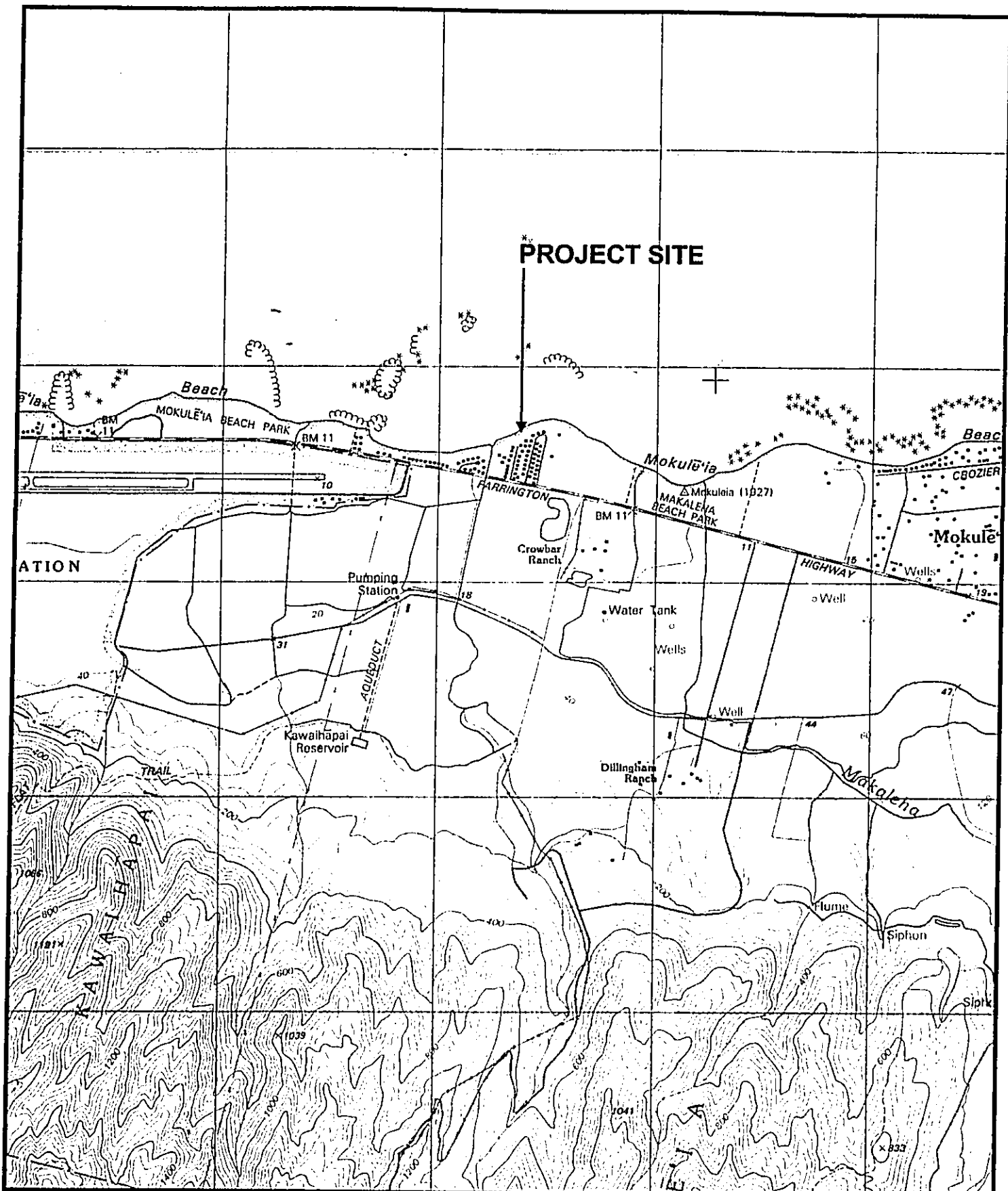
The vicinity of the project area is developed with single family residences along and near the shoreline. Many of these properties have individual vertical seawalls. To the east of the project site are two vertical seawalls, one fronting the adjacent single family residential property (TMK 6-8-09: 010) and next to that is the approximately 350-foot long seawall fronting the Mokuleia Beach Colony (TMK 6-8-09: 001). Adjacent to and along the west property boundary of the project site is a privately-owned right-of-way jointly owned by the property owners on Laau Paina Place and is not open to the public (TMK 6-8-09: 021). There is a public right-of-way off of Hoomana Place, just west of the stream. Further west of the project property are single family residences fronting the beach, about 15 properties have contiguous seawalls.

#### 2.2 Background

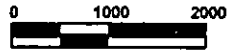
The project property contains a single family house constructed in 1939 that is original to the property. In 1963, the 10,756 square foot "Lot 15" was subdivided into Lot 15-A (5,723 square feet makai) and Lot 15-B (5,033 square feet mauka). In 1963, the original house was moved more towards the ocean, completely onto Lot 15-A (TMK 6-8-09: 011) to its existing location (Relocation Permit No. 208142). In Chapter 11 of the Rules Relating to Shoreline Setbacks and The Special Management Area, a "nonconforming structure" is defined as: "A structure or portion of a structure which was previously lawful but which is located within the shoreline setback as a result of subsequent beach erosion or as a result of changes in the law relating to the shoreline setback." Because the existing single family residence was constructed in 1939 and moved in 1963 to its present location, prior to the establishment of shoreline setback regulations, the existing structure does qualify as nonconforming.

In 1988, the current owner and applicant purchased the property. According to the applicant, he had the current concrete rubble masonry (CRM) seawall constructed sometime in 1989/1990 to replace a concrete wall that was already built along the shoreline when he purchased the property. A summary of building permit-related actions, dates and supporting materials are provided in Appendix D.





NORTH



SCALE IN FEET

Source USGS 1998

**Figure 1  
LOCATION MAP**

68-003 Laau Paina Place, Waialua, Oahu, Hawaii



## FINAL ENVIRONMENTAL ASSESSMENT

Existing Seawall TMK 6-8-09: 011, 68-003 Laau Paina Place, Waialua, Oahu, Hawaii

### 2.3 Proposed Action

The owner-applicant is seeking approval of an after-the-fact Shoreline Setback Variance and building permit for the existing concrete rubble masonry (CRM) seawall originally constructed in 1989/1990 because of ongoing long-term erosion along this shorefront. Without the seawall, erosion would significantly impact the shoreline frontage of the project property, possibly threatening the existing residential structure.

The seawall is located along the 83.74 foot wide shoreline frontage and continues for approximately 19 feet landward of the vegetation line to form a flank wall along the west property boundary. Along the east property boundary, the subject seawall dead ends with an existing seawall on the adjacent property (TMK 6-8-09: 010). About 13 feet in from the east property line, a few steps are built into the seawall from the subject property's front yard down to the beach.

Photos of the existing seawall and shoreline are shown in Figure 3 and Figure 4. The seaward face of the CRM seawall is covered with Naupaka vegetation, which has grown taller than the actual height of the seawall. The exposed height of the seawall (about 4 feet tall) is more clearly depicted in Figure 4.

Figure 5 shows the shoreline survey for the project site that was completed on January 21, 1995 when the existing seawall was already in place. The survey was certified by the Chairman, Board of Land and Natural Resources, on April 26, 1995.

A new shoreline survey was completed on February 4, 2004 and was then submitted to the Department of Land and Natural Resources on February 18, 2004. The "shoreline notice" for the proposed shoreline certification of the Clements' property was published in the May 8, 2004 edition of The Environmental Notice by the Office of Environmental Quality Control.

Figure 6 depicts the shoreline setback area, provides details regarding the shoreline structure, the location relative to existing structures on the property and the adjacent property's seawall to the east.

Figure 7 shows a cross section of the existing vertical CRM seawall which consists of large rocks grouted in place. The seawall is approximately 5 feet 2 inches wide at the base tapering to 18 inches wide at the top. The base of the wall is buried about 7-1/2 feet below existing grade. The property's front yard, which is landscaped with yard grass, plant materials and coconut trees, is almost level with the top of the seawall. The seaward face of the wall is sloped at a 20 degree angle and between 3 feet to 4 feet of the seaward face of the wall is exposed above the existing beach sand. Earth fill has been placed behind (landward of) the seawall. Built into the wall are 4-inch tile drains set in crushed rock wrapped in filter fabric. The seawall's design parameters and engineering calculations are provided in Appendix C.



View of Seawall from Ocean

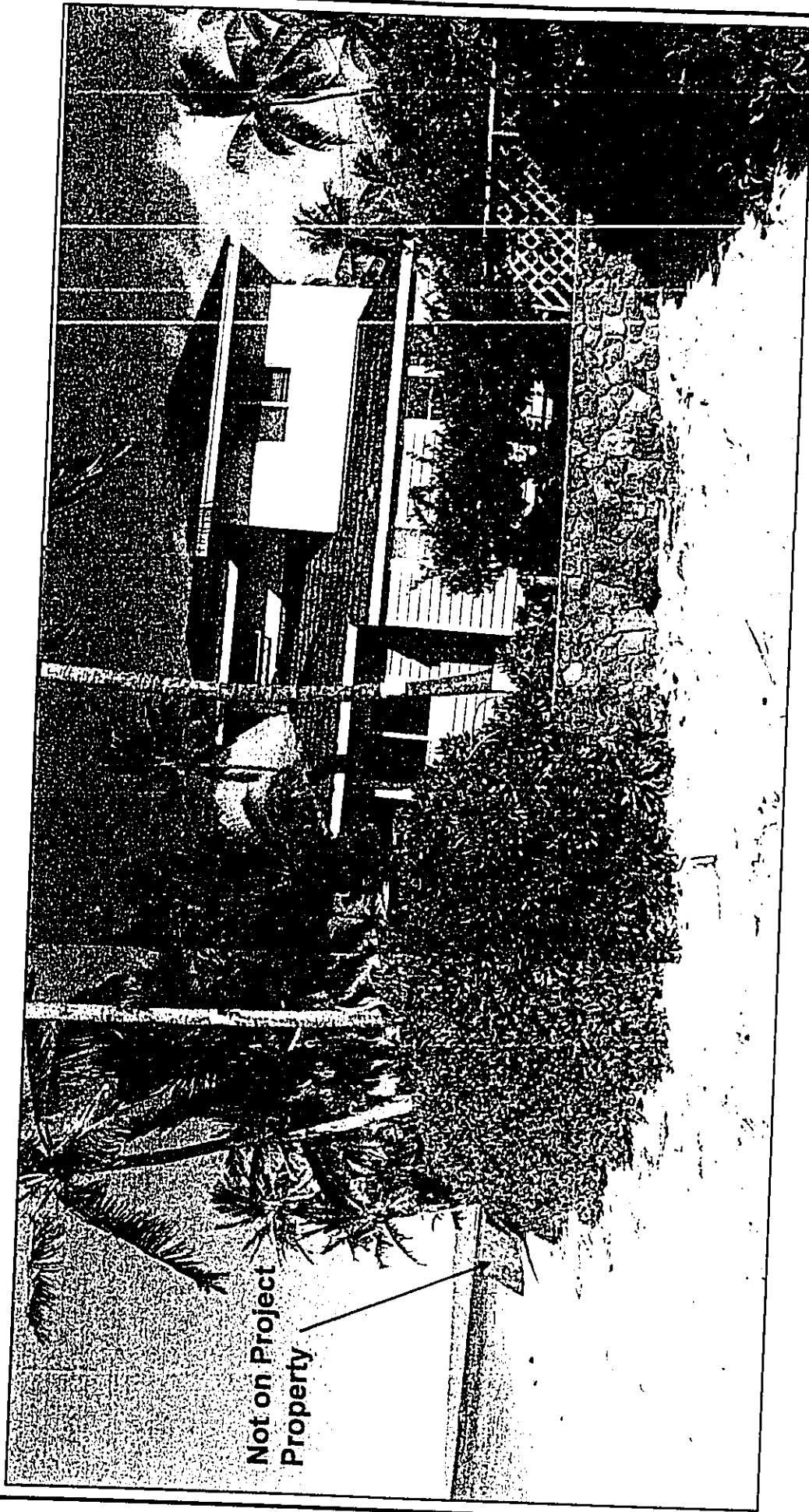


View of Seawall along Ocean Frontage



Stairs and Seawall

Figure 3  
VIEWS OF SEAWALL COVERED IN NAUPAKA FROM BEACH (September 2003)  
68-003 Laau Paina Place, Waiialua, Oahu, Hawaii



Not on Project  
Property

Figure 4  
VIEW OF SEAWALL COVERED IN NAUPAKA LOOKING TOWARD WAIALUA (September 2003)  
(Exposed/visible seawall beyond naupaka vegetation is not on the Project Property)  
68-003 Laau Paina Place, Waialua, Oahu, Hawaii

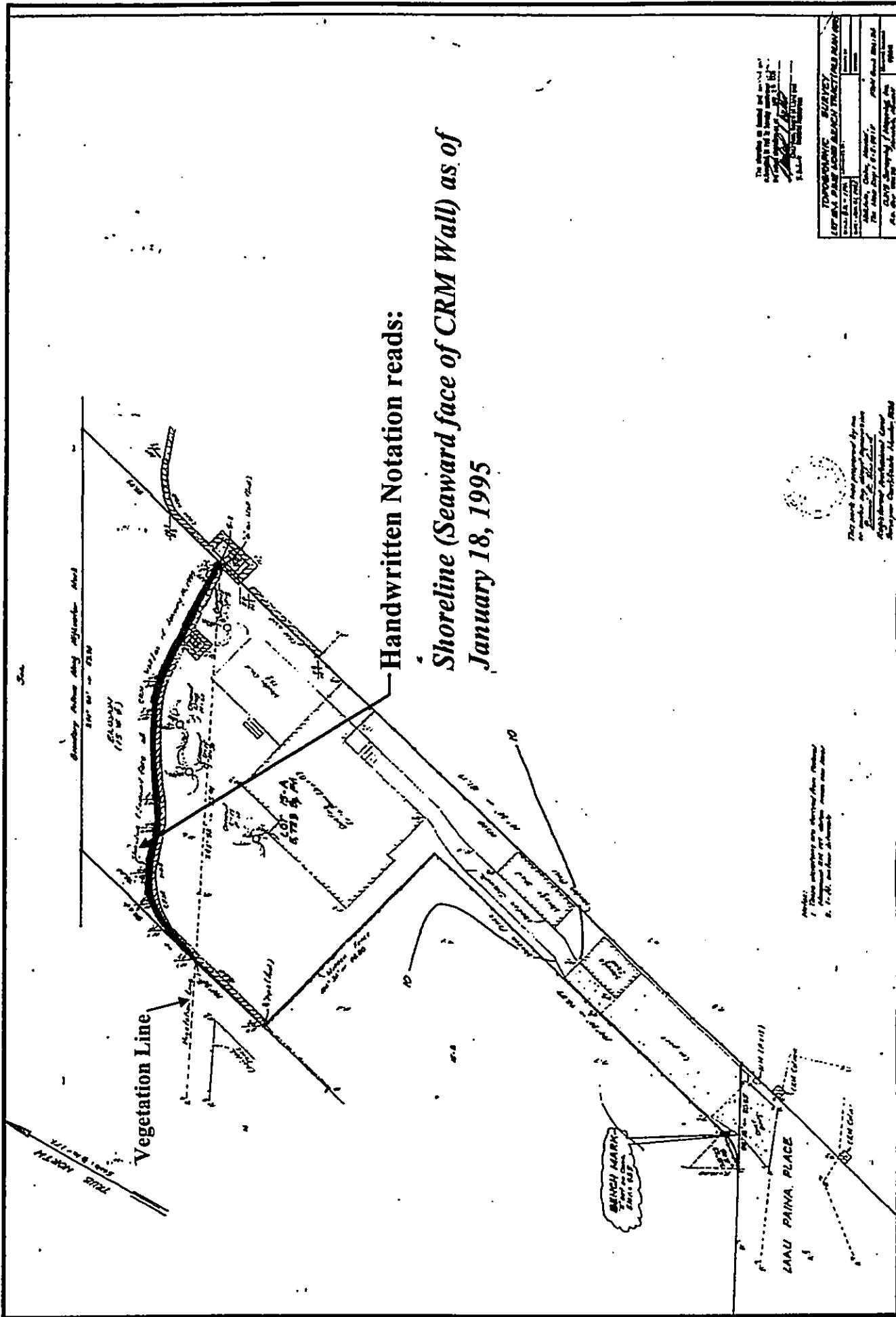


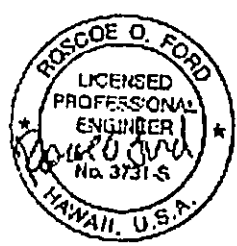
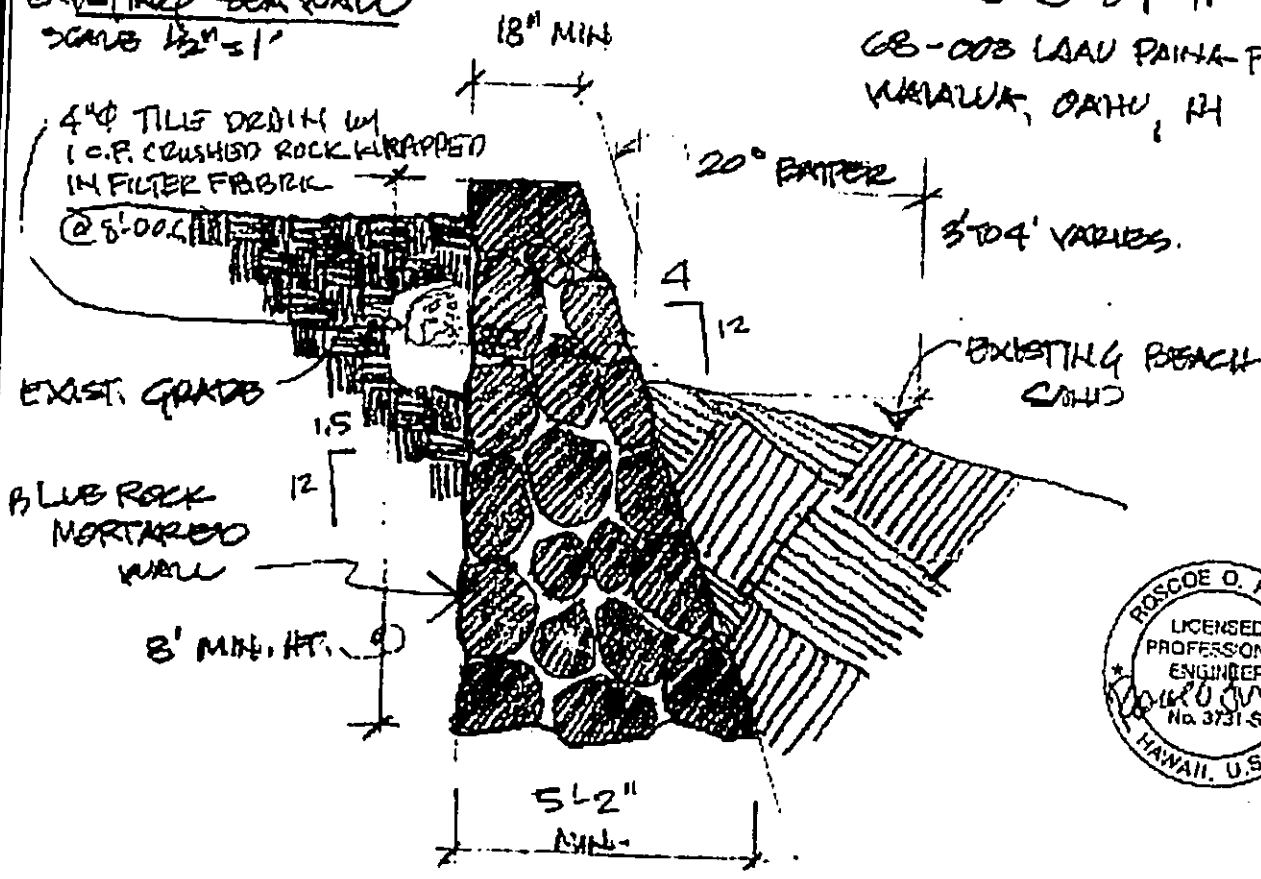
Figure 5  
 SHORELINE SURVEY - CONFIRMED APRIL 25, 1995  
 68-003 Laau Paina Place, Waiialua, Oahu, Hawaii

Not To Scale  
 See Full Size Plans



EXISTING SEA WALL  
SCALE 1/2" = 1'

BRUCE CLEMENTS RES.  
TMK 6-8-09-11  
68-003 LAU PAINA PL.  
WAIALUA, OAHU, HI



EXPIRES 4/30/04

This work was prepared by me or under my supervision and construction of this project will be under my observation

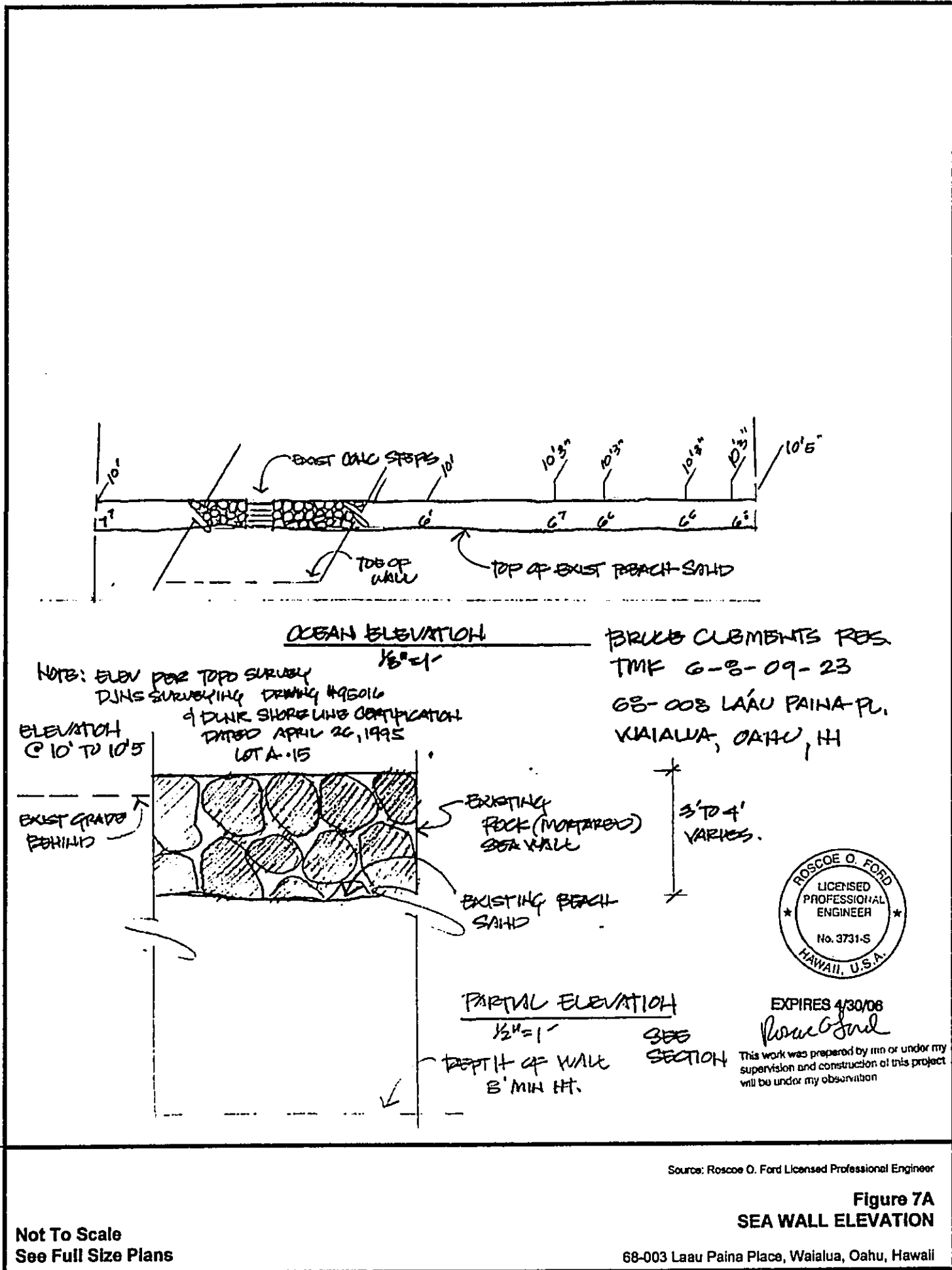
Source: Roscoe O. Ford Licensed Professional Engineer

Not To Scale  
See Full Size Plans

Figure 7  
SEA WALL DETAIL

68-003 Laau Paina Place, Waialua, Oahu, Hawaii





## FINAL ENVIRONMENTAL ASSESSMENT

Existing Seawall TMK 6-8-09: 011, 68-003 Laau Paina Place, Waialua, Oahu, Hawaii

### 3. ENVIRONMENTAL SETTING

#### 3.1 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)

The soils of the project area 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).

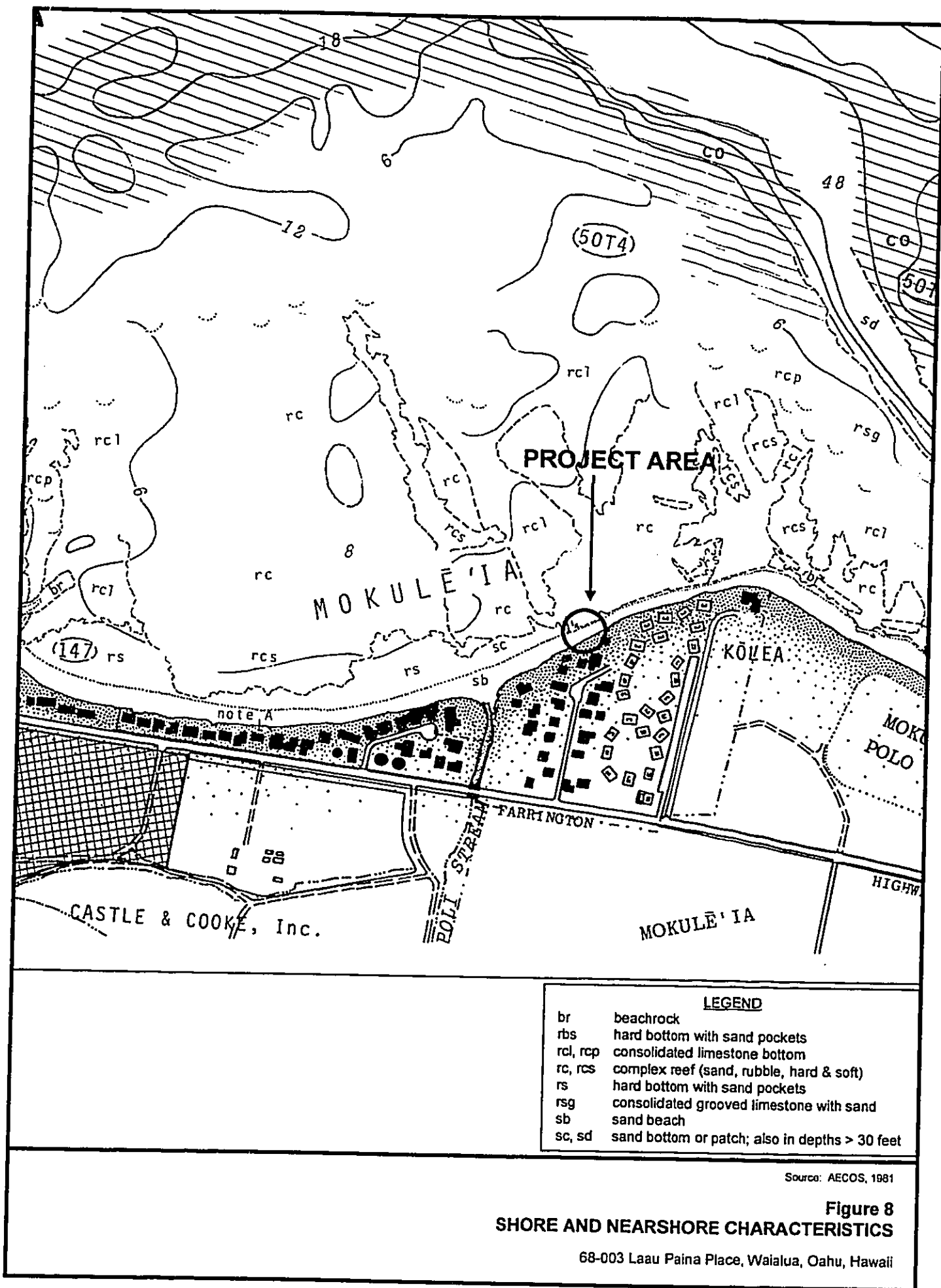
#### 3.2 Shoreline Characteristics and Coastal Processes

According to the April 2004 study, "*Coastal Engineering Assessment of Existing Seawalls at Mokuleia Oahu, Hawaii*" by EKNA Services, Inc. (Appendix B), there is no evidence that the existing seawall on the subject property Parcel 11 is accelerating erosion problems at the site. There is no indication of excessive escarpment or landward retreat of the unprotected shoreline adjacent to and west of the Parcel 11 seawall. The beach profile is uniform along this entire shoreline reach. These factors indicate that the existing seawall has had no adverse effect on the existing beach processes.

According to the EKNA Services report, the Mokuleia coast is 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 the shore. The reef headland fronting the Mokuleia Beach Colony, located just to the west of the Mokuleia Polo Grounds, creates the eastern-end boundary of this embayment. The subject parcel is on the west side of the Mokuleia Beach Colony.

The ocean bottom fronting the project site, seaward of Mokuleia Beach, rapidly reaches a depth of 6 feet and then descends gradually seaward to the limestone shoals offshore. Besides the sandy beach fronting the project property, the seaward shoreline characteristics are that of complex reef ("rc") and consolidated limestone bottom ("rcl"), as depicted in Figure 8. Seaward of the limestone shoal there are surge channels up to 10 feet wide with sand bottoms.

EKNA Services, Inc. conducted on April 9, 2004 a site visit during low tide and a 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



## FINAL ENVIRONMENTAL ASSESSMENT

Existing Seawall TMK 6-8-09: 011, 68-003 Laau Paina Place, Waialua, Oahu, Hawaii

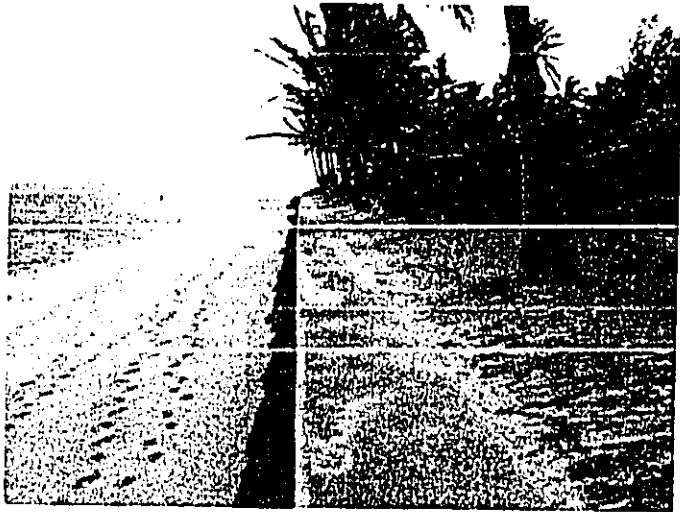
embayment. Breaking wave activity was evident across the entire bayfront. While not observable from shore, a review of aerial photos shows calm areas between breaker zones that indicate the deeper "channels" through the reefs fronting the embayment.

Figure 9 shows the approximately 350-foot long seawall front 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 Mokuleia Beach Colony seawall. Figure 10 shows the subject property's seawall, that is largely obstructed from sight by the naupaka vegetation, which ties into the adjacent property seawall to the east as well as extending landward about 20 feet along the subject property's western property boundary. Figure 11 shows the stream to the west of the project site, and adjacent shoreline reach further west of the stream. The parcel in Figure 11 on the west side of the stream mouth shows obvious erosion damage, and a nearly continuous line of seawalls protect the remaining shoreline with the embayment.

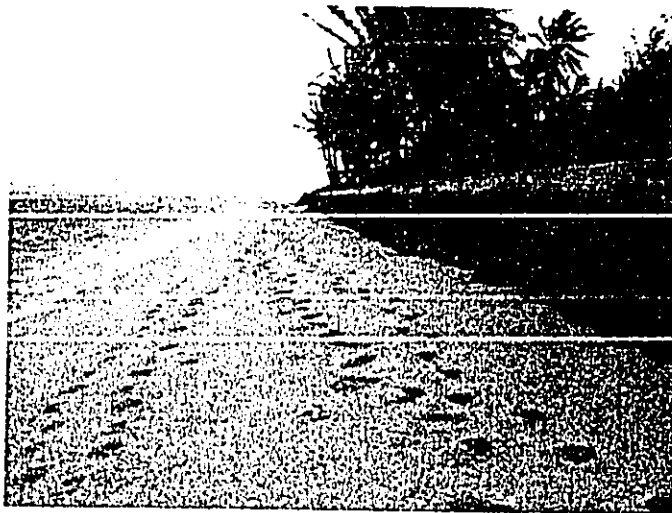
This coastal reach is exposed to winter North Pacific swell and predominant tradewind generated waves. It is apparent that during high tide, wave uprush reaches the base of the existing seawall. During storms and large winter swell conditions, wave runup and overtopping of the beach likely causes flooding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

The project site is sheltered from deepwater wave energy due to the shallow reefs that surround the embayment. The 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 wave energy reaches this shoreline reach.

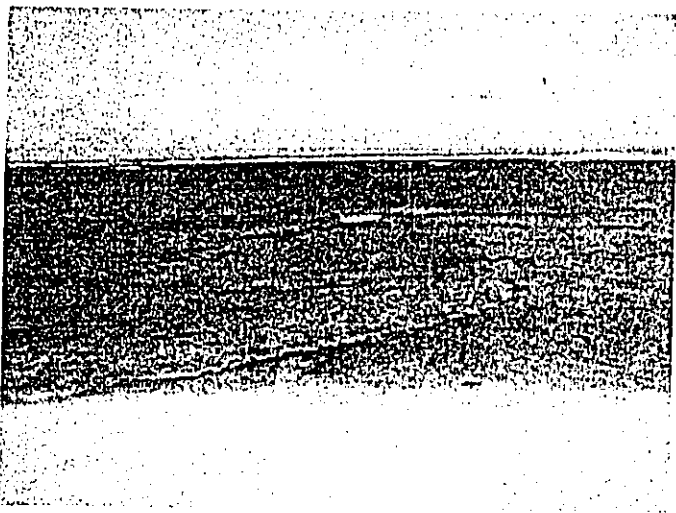
Normally along an exposed coastal reach, wave energy is the primary factor that drives nearshore currents in the surf zone. Waves approaching the shore at an angle will induce longshore currents and transport of beach material alongshore in the direction of breaking. However, the shallow reefs surrounding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



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

Source: EKNA Services, Inc.

**Figure 9**  
**PHOTOS OF MOKULEIA BEACH COLONY SEAWALL**

68-003 Laau Paina Place, Waiialua, Oahu, Hawaii



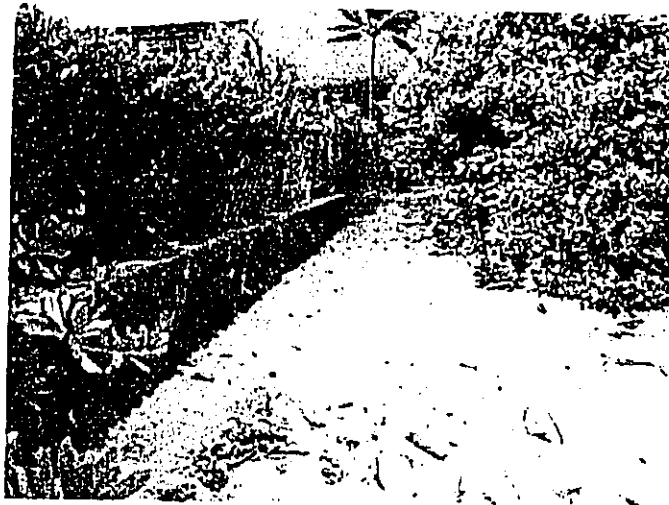
View westward from porch on Parcel 11.



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

Source: EKNA Services, Inc.

**Figure 10**  
**PHOTOS OF PROJECT SITE SEAWALL**

68-003 Laau Paina Place, Waialua, Oahu, Hawaii



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

SOURCE EKNA Services, Inc.

Figure 11

**PHOTO OF STREAM**

68-003 Laau Palua Place, Waiāluā, Oahu, Hawaii

## FINAL ENVIRONMENTAL ASSESSMENT

Existing Seawall TMK 6-8-09: 011, 68-003 Laau Paina Place, Waiialua, Oahu, Hawaii

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 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.

The shallow reef structure offshore of the eastern headland – fronting the project site – is broader and extends further 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.

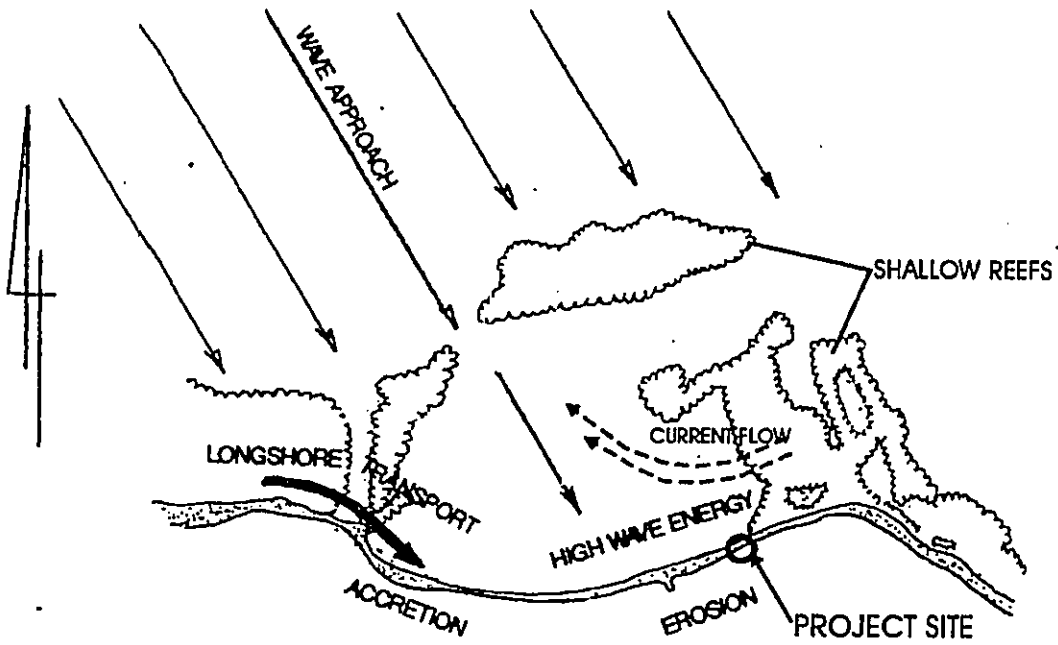
While net long-term erosion is evident, residents also indicated that seasonal fluctuation of beach width occurs. There is a pattern of erosion along the eastern part of the embayment during the winter and restoration of the beach width during the summer. The opposite occurs for the western shoreline 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.

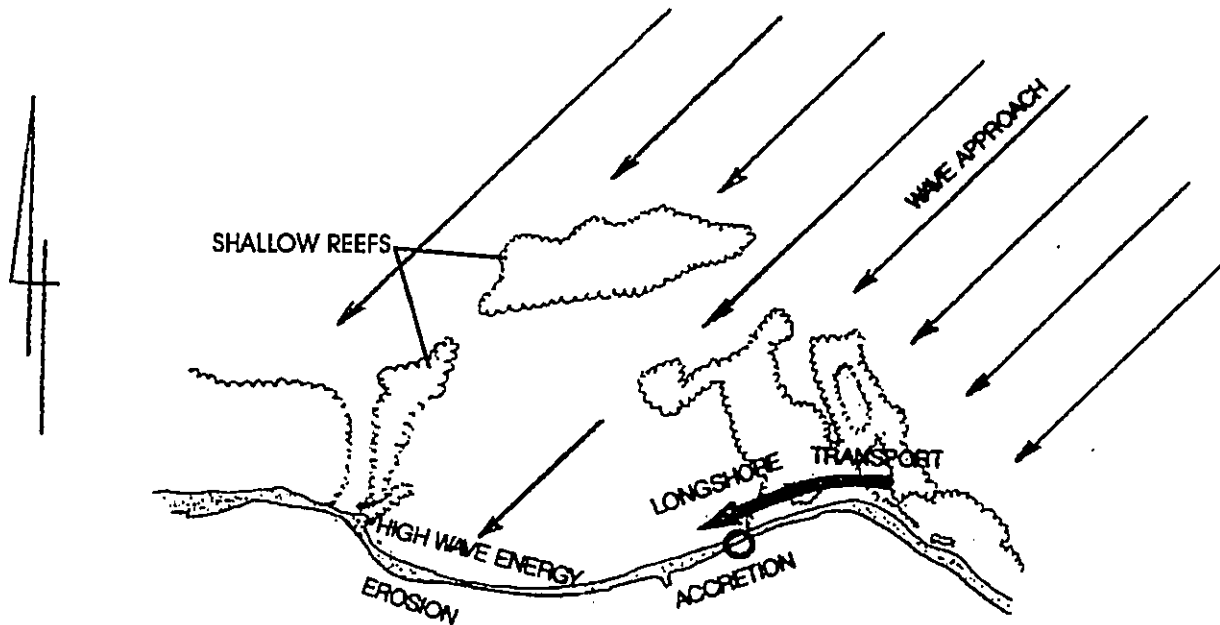
### 3.3 Potential Littoral Impacts

The following information is taken from the EKNA Services report, which states that the existing seawall has no effect on the existing littoral processes at this site. The seawall is functionally consistent with existing seawalls along this coastal reach. The existing seawall does not alter seasonal erosion/accretion patterns. There is no evidence that the seawall has 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.





WINTER NORTHWEST SWELL CONDITIONS



SUMMER NORTHEAST TRADEWIND CONDITIONS

Source: EKNA Services, Inc.

**Figure 12**  
**SAND TRANSPORT FIGURES**

68-003 Laau Paina Place, Waiatua, Oahu, Hawaii

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The seawall does not affect lateral access along the beach. While the 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 where there are no shore protection structures, it can be concluded that the long-term erosion trends is a natural process that will certainly not be reversed simply by instead constructing sloping porous-surfaced shore protection structures. According to the EKNA Services 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.

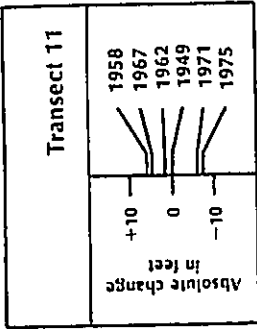
The erosion that is occurring along the Mokuleia shoreline can be described as “passive” erosion – it is not “active” erosion, which is induced or accelerated by shore protection structures. Passive erosion designates the process that occurs when a protective structure is built along an already eroding shoreline and erosion continues to occur. Such erosion is 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 probably long-term consequence of the existing seawalls at Mokuleia.

### 3.4 Oceanographic Characteristics

Historical aerial photographs depict the significant loss of shoreline along the Mokuleia coast. The subject property has lost to erosion approximately 1,504 square feet or almost 14 percent of the property's total 10,746 square feet. An area between 20 to 30 linear feet deep is now located seaward of the 1995 certified shoreline. Typically properties along this coastline that do not have shoreline structures experience some shoreline erosion and wave damage.

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. The report states that this section of Mokuleia Beach has experienced small long term changes and that data gathered at Transects 10 through 13 (See Figure 13, project site near Transect 11) experienced a net loss in the vegetation line of -8 to -12 feet. According to the report, major erosion occurred during 1967 to 1971 due to significant storm wave damage. 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.

**PROJECT SITE**



**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 13**

**MOKULEIA BEACH CHANGES AS REVEALED BY AERIAL PHOTOGRAPH**

68-003 Laau Paina Place, Waialua, Oahu, Hawaii

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In 1989, Sea Engineering Inc. prepared for the City's Department of Land Utilization 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. Additional erosion was further documented during the 1980's of about -7 feet at both Transect 10 and Transect 12, since the original Hwang study in 1981. A summary of the data gathered is shown in Figure 14.

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 unprotected houses are the ones that have only a few feet of vegetation between them and the beach. A number of the existing seawalls along Mokuleia Beach have been approved by the City and County of Honolulu, including the Mokuleia Beach Colony seawall, two properties east of the project site.

The 1989 *Shoreline Study* states that for the portion of Mokuleia Beach fronting the project site that, "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."

The general ocean and nearshore environment of the Hawaiian Islands is discussed in the study by Gerritsen.

### 3.4.1 Winds

The winds in Hawaii can be classified into four different groups: tradewinds, kona winds, tropical storms and tropical cyclones. The northeast tradewinds are the prevailing winds. Winds affect the direction and magnitude of surface currents in the ocean, as well as the currents in shallow coastal areas. The project area, located on the northwest coast of Oahu is exposed to the tradewinds.

### 3.4.2 Waves

The wave patterns in the Hawaiian Islands are generally categorized in five major types: tradewind waves, North Pacific swell, kona storm waves, south swell, and cyclonic or hurricane waves. The project site is exposed to North Pacific swell waves which can be hazardous and cause significant erosion.

### 3.4.3 FEMA Flood Insurance Rate Maps

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.

**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 <sup>2</sup>	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	-11	-7	2	-3	5	23							
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.

SOURCE: Oahu Shoreline Study - Part 1 Data on Beach Changes, 1988, Sea Engineering, Inc.

**Figure 14**

**MOKULEIA BEACH CHANGES IN VEGETATION LINE**

68-003 Laau Palua Place, Waialua, Oahu, Hawaii

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### 3.4.4 Natural Hazards in the Coastal Zone

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.

### 3.5 Marine Flora and Fauna

There are no known endangered species directly at the existing seawall site, either land or aquatic flora or fauna. 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."

### 3.6 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.

### 3.7 Coastal Use

Mokuleia Beach Park, west of the project area, is the most convenient public access point. The Mokuleia Polo Field was once the site of weekend polo matches. 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. 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

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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. The sandy beach fronting the project site 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. There is a public right-of-way to the beach off of Hoomana Place, just west of the stream.

### 3.8 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. The subject property does not contain any known archaeological or historic sites. No further construction in the vicinity of the existing seawall is anticipated and it is not likely that any historic sites would be found due to prior disturbances. The proposed action will have no effect on traditional cultural practices.

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

A February 11, 2004 letter from the State Historic Preservation Division stated that "there is no record of significant historic sites being found during construction of the seawall", and that the office "believes that no historic properties will be affected by this undertaking." A copy of the letter is in Appendix E.

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**4. SUMMARY OF IMPACTS AND MITIGATIVE MEASURES**

**4.1 Potential Short-Term and Long-Term Impacts and Mitigative Measures**

The previous construction of the existing seawall along the frontage of the subject property could have had some minor short-term effects on vegetation, water quality and noise conditions. Some landscaping, mainly yard grass, was removed or impacted by the construction activity, which was replanted after construction. Construction noise may have taken place during allowed daytime periods for construction, but it did not cause excessive noise levels off-site. During construction there is always the potential for runoff or soils to erode to ocean waters. The site was stabilized during the construction period to minimize potential runoff.

According to the "Coastal Engineering Assessment" report by EKNA Services, Inc., the existing seawall has no effect on the existing littoral processes at this site. The seawall is functionally consistent with existing seawalls along this coastal reach. The seawall does not affect lateral access along the beach.

The seawall will have a long-term positive impact in that it provides significant stabilization of the applicant's property, it reduces the potential for erosion, and should minimize potential erosion-related runoff into the ocean. The concrete rubble masonry (CRM) wall has been designed with volcanic rock material to mitigate its appearance and creates a more natural aesthetic compared to solid concrete walls found along Mokuleia Beach.



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### 5. ALTERNATIVES CONSIDERED

The Coastal Engineering Assessment (Appendix B) discusses various alternatives to after-the-fact approval of the existing seawall. Those alternatives include removal of the existing seawall, replacing the seawall with a sloping revetment structure, replacing the seawall with large geotextile bags filled with sand, and beach restoration and nourishment in place of the seawall.

Removal of the existing seawall is not a viable alternative since the house and related improvements existing on the parcel would be susceptible to erosion and wave damage. The house is approximately 15 feet at its closest point to the top of the seawall. The house was moved to its present location via a City approved May 2, 1963 Relocation Building Permit No. 2081472.

Replacing the seawall with a sloping revetment structure is also not a viable option because of the limited land area between the house and other improvements and the existing seawalls. The Coastal Engineering Assessment states that there is no reason to expect that a sloping revetment would halt the ongoing erosion along this coast.

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.

Beach restoration and nourishment is commonly cited as a preferred alternative, however, this alternative is costly and is not an economically viable alternative for an individual residential property owner. It has been observed that governmental agencies responsible for recreational beach resources can rarely afford to perform major and ongoing beach nourishment for public beaches.

If "no action" is taken to approve the existing seawall, and if the seawall were to fail in the future, the owner would have to apply for permits to replace it with a shore protection structure. Therefore, the "no action" alternative is not a viable option.

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### 6. FINDINGS AND REASONS SUPPORTING THE ANTICIPATED DETERMINATION

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). The Rules establish "significance criteria" for making the determination. The relationship of the proposed project to the thirteen criteria is provided below.

#### 6.1 Significance Criteria

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

The existing seawall does not change the overall pattern of continuing erosion along the Mokuleia coastline. Public access to the shoreline is available along the makai side of the property. The subject property does not contain any known natural or cultural resources. These statements are supported by the EKNA Services, Inc. report in Appendix B and the February 11, 2004 letter from the State Historic Preservation Office in Appendix E.

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

The existing seawall configuration does not curtail the beneficial use of the environment. The property is zoned residential and is committed to private residential use. The existing seawall protects the property from 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;**

The existing seawall does not conflict with long-term environmental policies or goals or guidelines of the State of Hawaii. The existing seawall is consistent with the longstanding history of government decisions made approving shore protection structure along this stretch of the Mokuleia coastline. There are existing approved seawalls on both sides of the property, although not directly adjacent.

**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.

**5. Substantially affects public health;**

There are no public health concerns relating to the existing seawall.

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**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.

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

The existing seawall will not create a substantial degradation of environmental quality. The seawall will prevent further erosion of the applicant's property. The report in Appendix B states that the existing seawall has no effect on the existing littoral processes at this site.

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

The existing seawall is located on a developed single-family residential lot in a small subdivision. The property on both sides of the project area are developed as residential properties and the property adjacent to the east of the project site has an existing vertical seawall. There is no commitment for a larger action as the 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 a single family residence was constructed on the site in 1939 and moved to its present location in 1963. There are no known rare, threatened or endangered species or its habitat at or near the existing seawall. The letter from the State Historic Preservation Office states that there are no known historic sites on the property.

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

The existing seawall does 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 existing seawall is located in Flood Hazard Zone AE with a base flood elevation of twelve feet. The seawall will protect the property from further erosion and will protect the house structure from wave energy and wave run-up. The existing seawall is not expected to increase the flood hazard for the surrounding properties or the subject property. 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.

**FINAL ENVIRONMENTAL ASSESSMENT**

Existing Seawall TMK 6-8-09: 011, 68-003 Laau Paina Place, Waiialua, Oahu, Hawaii

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

The existing seawall is covered with Naupaka landscaping. The 1987 Coastal View Study designates Mokuleia Beach Park as a "significant stationary view" and Farrington Highway as a "coastal roadway with intermittent coastal views". The project site is located over 4,000 feet or approximately 1 mile west of Mokuleia Beach Park, and the project site is not located on a designated "coastal roadway".

**13. Requires substantial energy consumption.**

Not applicable.

**6.2 Findings and Reasons Supporting Anticipated Determination**

The findings of this Environmental Assessment indicate that the existing seawall will not have a significant environmental impact.

A Finding of No Significant Impact (FONSI) is recommended to be issued for the proposed action.

**FINAL ENVIRONMENTAL ASSESSMENT**

Existing Seawall TMK 6-8-09: 011, 68-003 Laau Paina Place, Waialua, Oahu, Hawaii

**7. AGENCY AND PUBLIC CONSULTATION AND REVIEW**

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 Office of Environmental Quality Control
- State of Hawaii, Department of Land and Natural Resources

The project will require the following permits:

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

## FINAL ENVIRONMENTAL ASSESSMENT

Existing Seawall TMK 6-8-09: 011, 68-003 Laau Paina Place, Waialua, Oahu, Hawaii

### 8. 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 Coastal 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.
- City and County of Honolulu, Department of Planning & Permitting, Geographic Information Systems on-line database at <http://gis.hicentral.com> 2003.
- 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.
- Gerritsen, Franciscus. 1978. *Beach and Surf Parameters in Hawaii*. Sponsored by the University of Hawaii Sea Grant College Program.
- 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. 1988. *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.

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Existing Seawall TMK 6-8-09: 011, 68-003 Laau Paina Place, Waialua, Oahu, Hawaii

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**APPENDIX A**

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## FINAL ENVIRONMENTAL ASSESSMENT

Existing Seawall TMK 6-8-09: 011, 68-003 Laau Paina Place, Waialua, Oahu, Hawaii

### APPENDIX A

#### **Justification for a Shoreline Setback Variance under Revised Ordinances of Honolulu Section 23-1.8 (3) "Hardship Standard"**

The property owner will suffer hardship if the shoreline setback variance for the proposed seawall is not granted or if the seawall had to be removed. The application for such a variance fulfills the three criteria for hardship as set forth in ROH Sec. 23-1.8 (3) (A).

1. The applicant would be deprived of reasonable use of the land. The existing seawall was constructed because of ongoing long-term erosion along this shorefront. This need for protection against erosion is evident by the numerous existing seawalls in the vicinity of the project site. Many of those existing seawalls have received government approval; including the over 300 foot long seawall fronting the Mokuleia Beach Colony located less than 100 feet to the east of the project site. If the applicant's existing seawall was not present, the property owner could suffer severe erosion of the property due to storm waves, run-up and ongoing coastal erosion. The existing house is located (at its closest point) approximately 15 feet landward of the existing seawall. The house was moved to its present location via a City approved Relation Building Permit No. 2081472 dated May 2, 1963. The property is zoned residential and erosion of the property would eventually threaten the existing house and other structures on the property, thereby depriving the applicant of reasonable use of the land.
2. The applicant's proposal is due to unique circumstances. It has been documented that the Mokuleia coast has been undergoing long-term coastal erosion for over the past 50 years. This variance request is due to the erosion occurring at this section of the Mokuleia coast. Numerous other property owners on both sides of the subject property have built seawalls to protect their property and houses from erosion, and many of those walls have received government approval.
3. The proposal is the practicable alternative which conforms best to the purpose of the shoreline setback regulations. The Coastal Engineering Assessment reviewed a number of alternatives to the proposal. Although beach nourishment is commonly cited as a preferred alternative there are a number of drawbacks: it is extremely costly; sand would need to be brought in to a long stretch of shoreline – not just in front of the subject property; and periodic and on-going re-nourishment would likely be required. This would require a much larger action, permits and expenses than the applicant's request. Such an alternative is not the practical alternative for this single property owner. The Coastal Engineering Assessment report states that the existing seawall is functionally consistent with the other existing seawalls along this coastal reach. Therefore, the applicant's proposal is the practicable alternative.

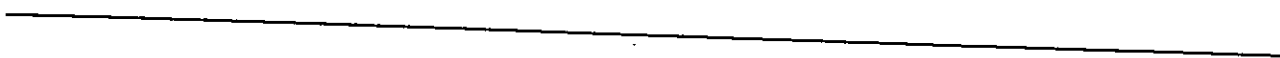


**FINAL ENVIRONMENTAL ASSESSMENT**

Existing Seawall TMK 6-8-09: 011, 68-003 Laau Paina Place, Waialua, Oahu, Hawaii

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**APPENDIX B**



**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<sup>1</sup>), 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<sup>2</sup> 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.

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<sup>1</sup>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.

<sup>2</sup>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<sup>3</sup>, 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

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<sup>3</sup>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<sup>4</sup> 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

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<sup>4</sup>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.

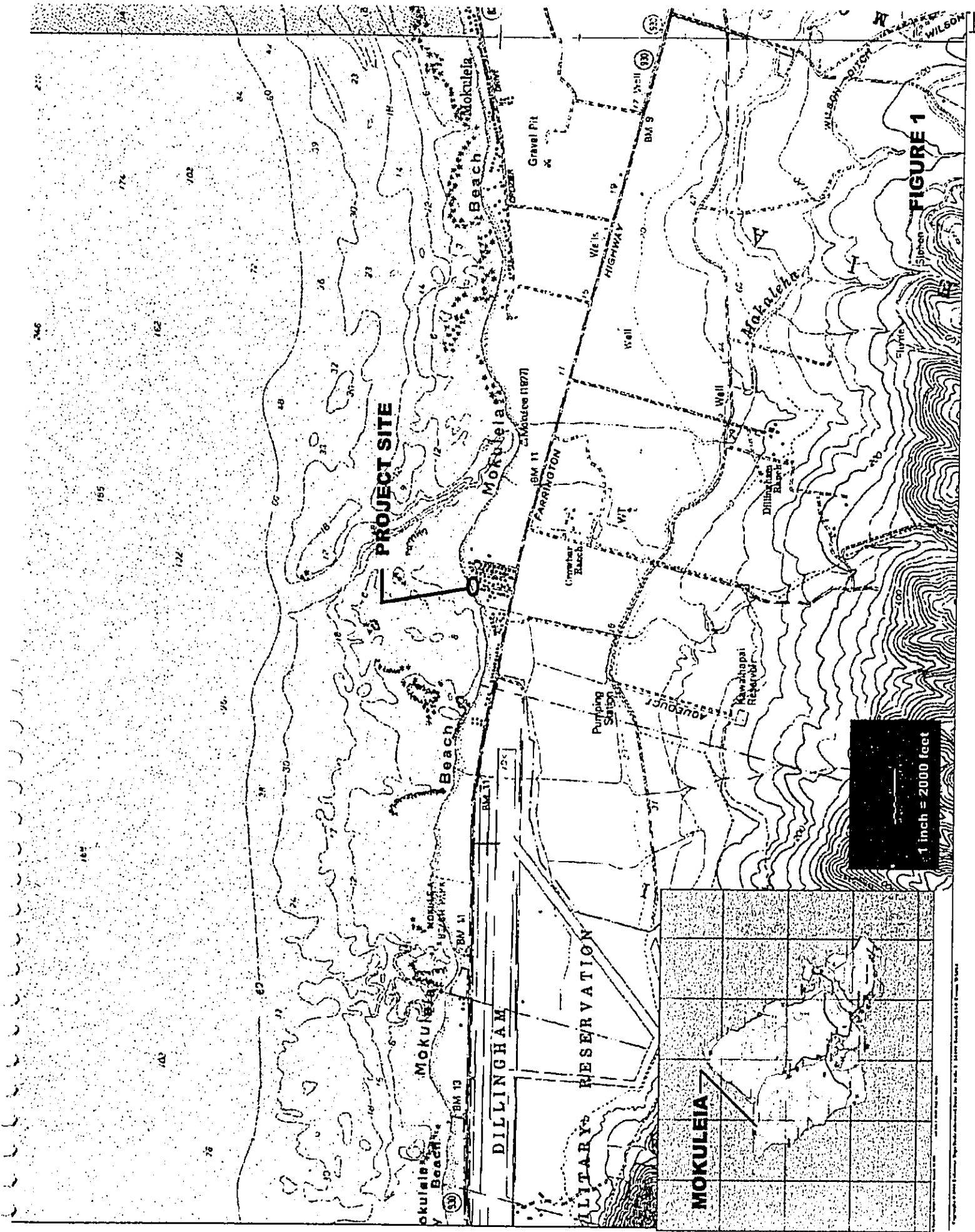
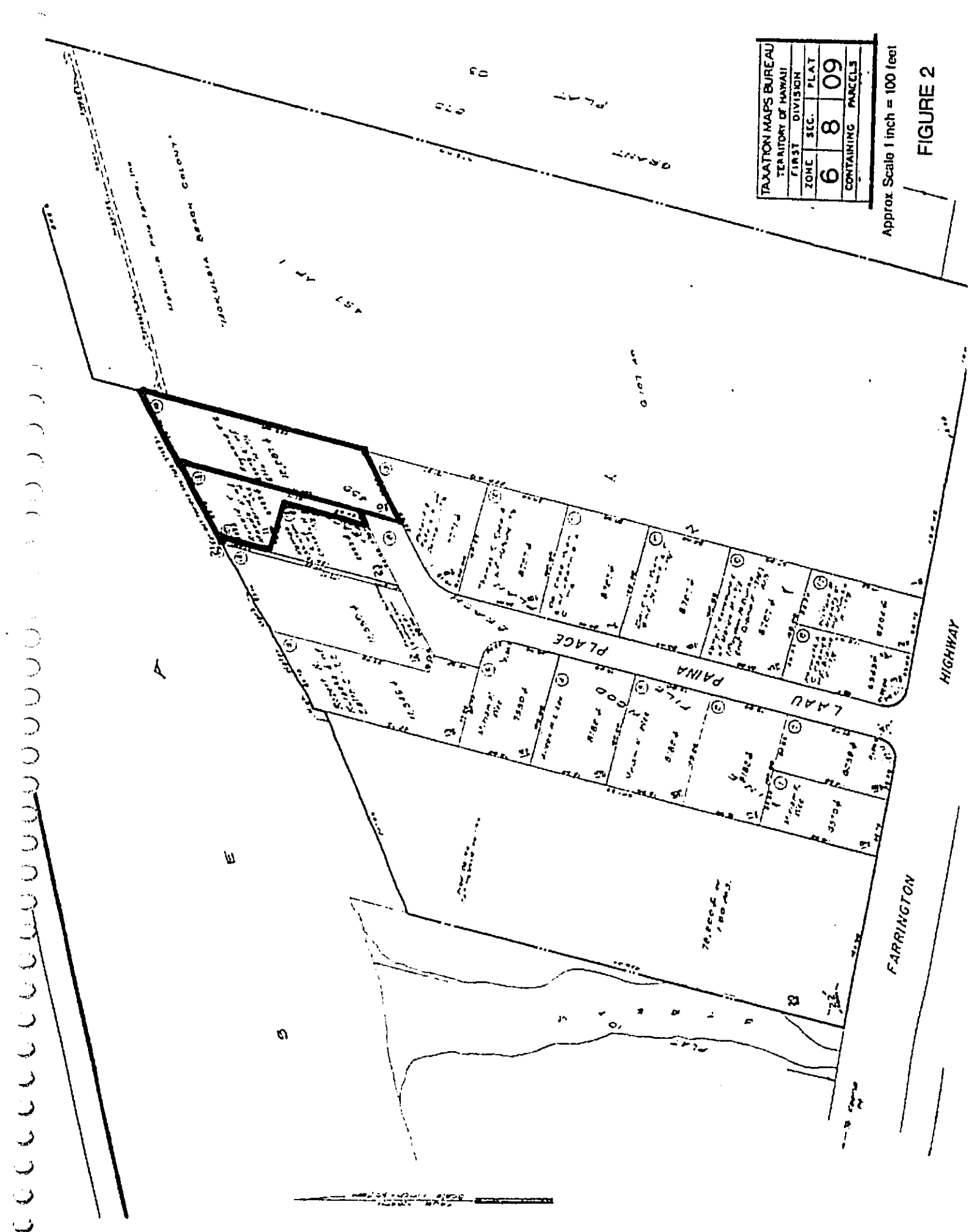


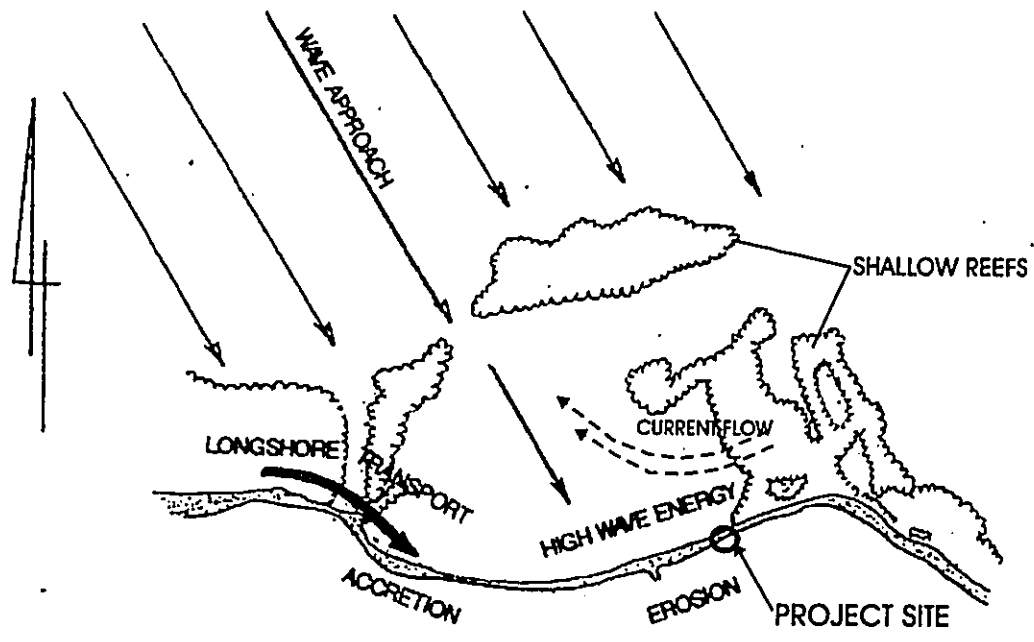
FIGURE 1

TAXATION MAPS BUREAU			
TERRITORY OF HAWAII			
FIRST	DIVISION	PLAT	
6	8	09	
CONTAINING PARCELS			

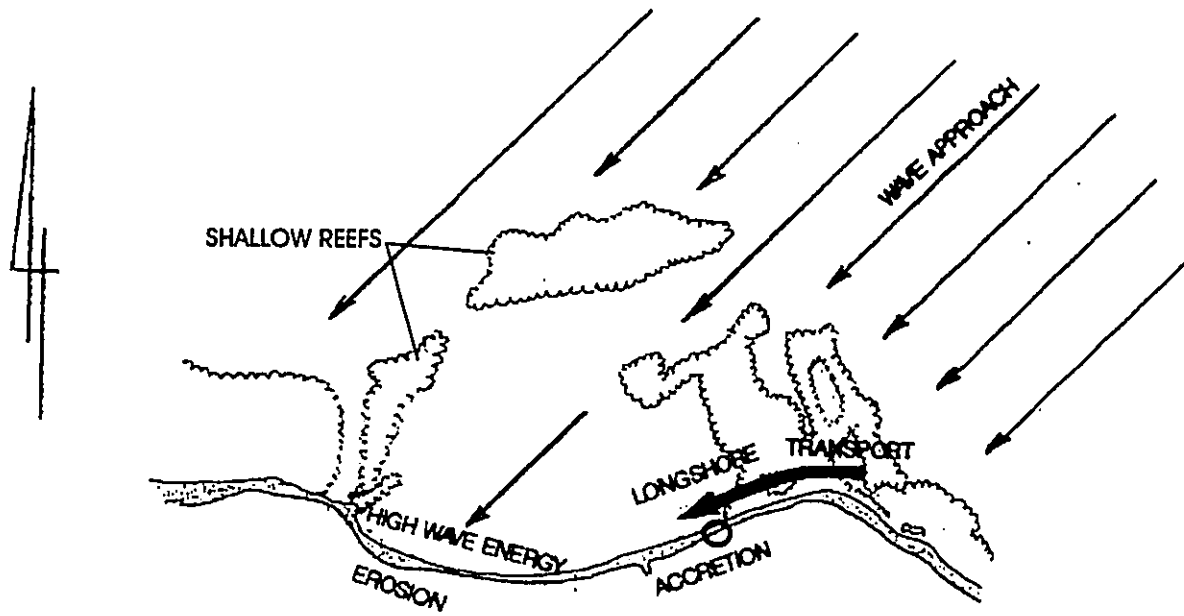
Approx Scale 1 inch = 100 feet

FIGURE 2





WINTER NORTHWEST SWELL CONDITIONS

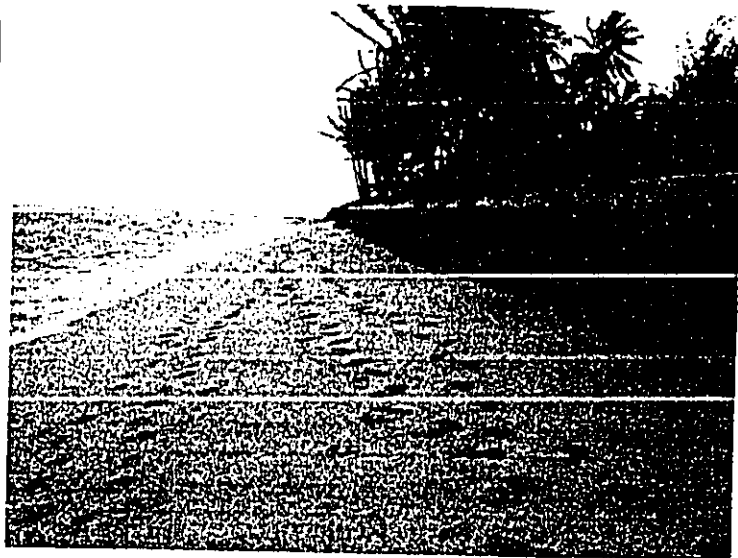


SUMMER NORTHEAST TRADEWIND CONDITIONS

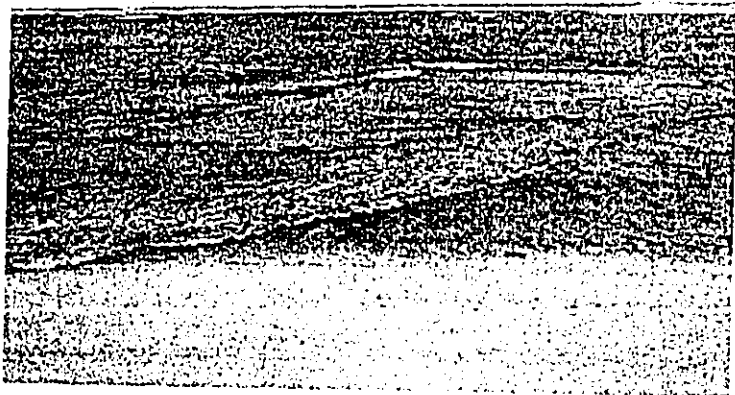
FIGURE 3



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.

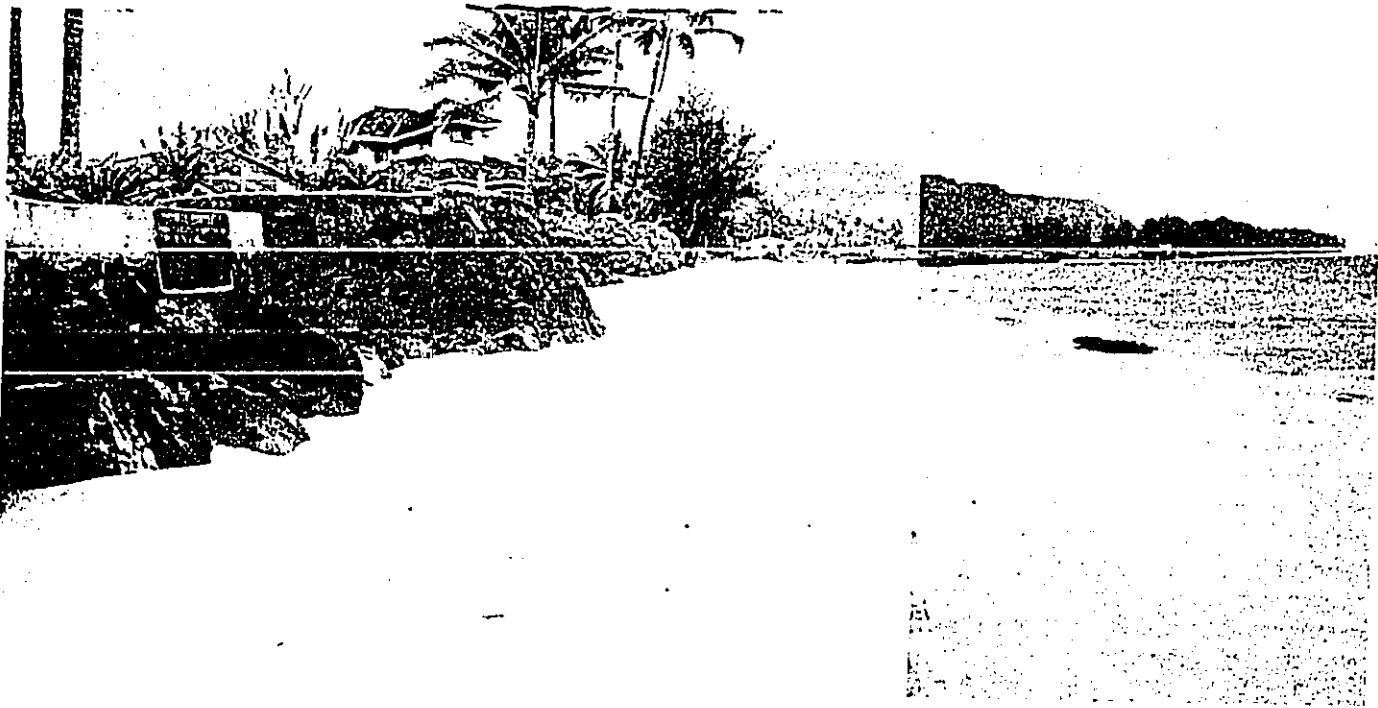


View offshore Parcel 10. Note the shallow reef and wave angle at the shoreline indicating eastward longshore transport.

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

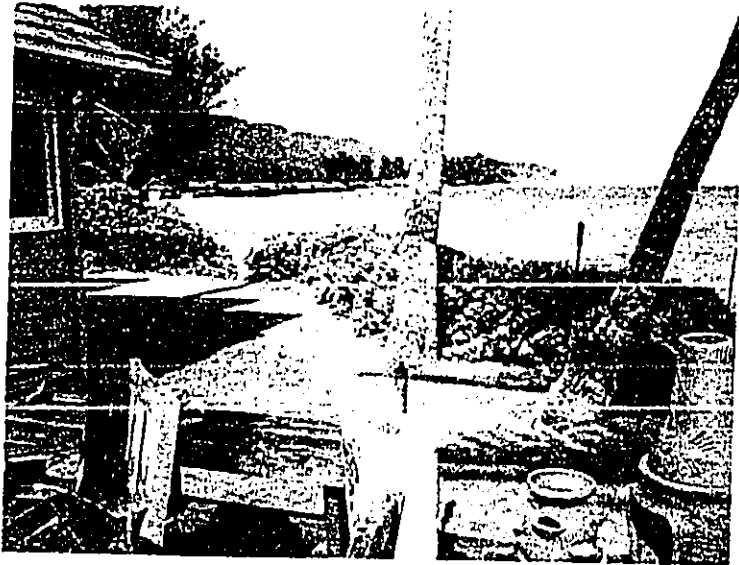
PHOTO page-1



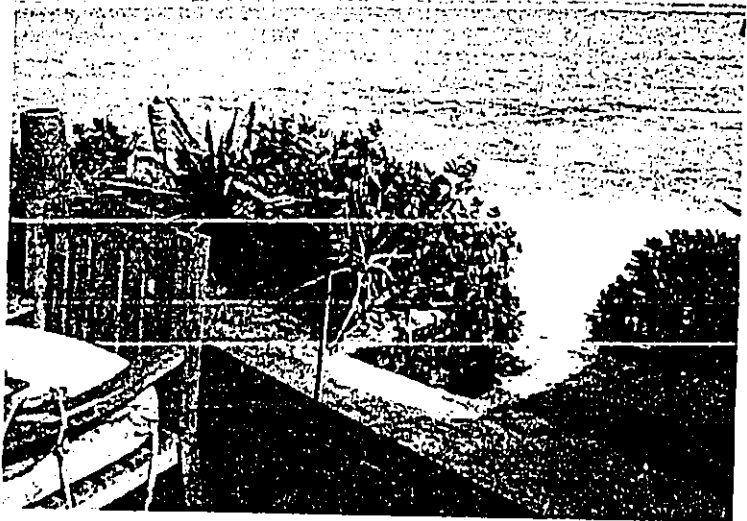
Views westward from west end of Mokuleia Beach Colony seawall. Parcel 10 is in the foreground. Parcel 11 is next to Parcel 10. (Sign is on the west end of the Mokuleia Beach Colony seawall. The sign permits the public to walk on the top of the seawall.)

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

PHOTO page-2



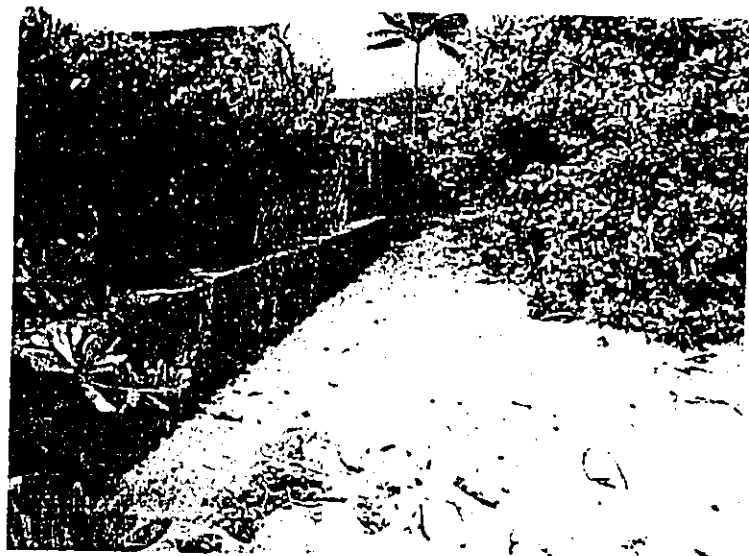
View westward from porch on Parcel 11.



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.

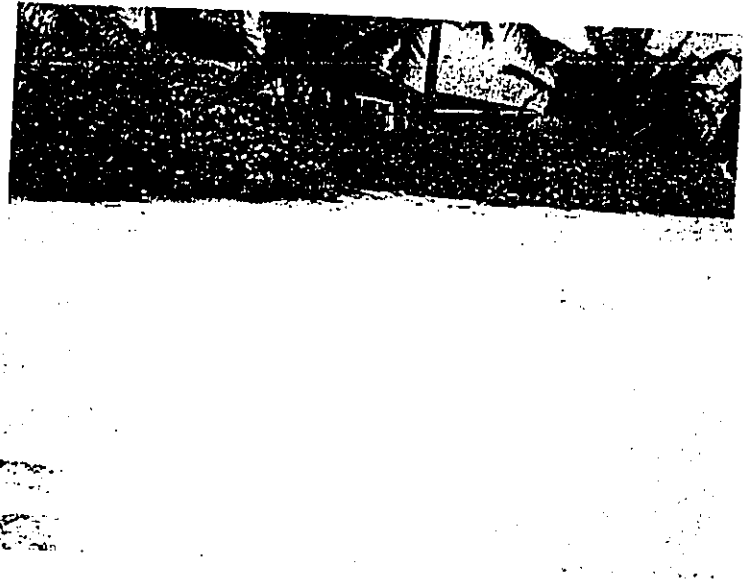
MOKULEIA  
PHOTO DATE 4-9-04  
TIME 09:00 AM  
TIDE APPROX. 0.0 MLLW

PHOTO page-3





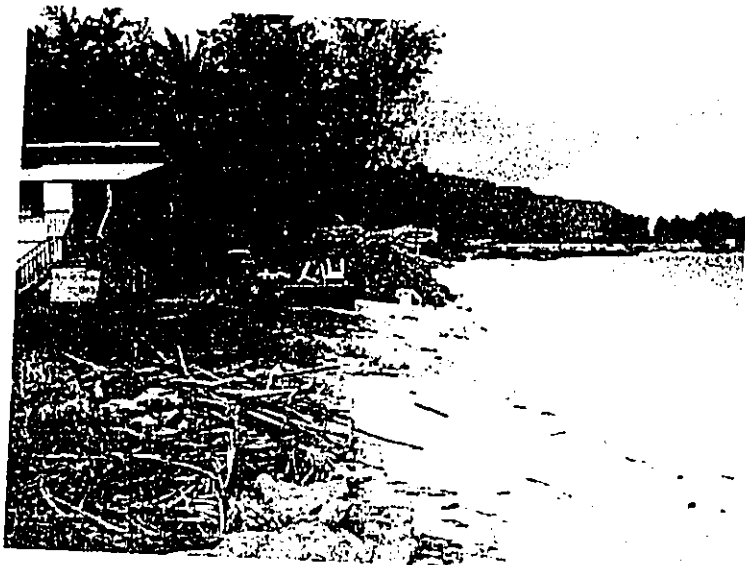
View westward from private right-of-way.  
Naupaka vegetation fronts Parcel 12.



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

PHOTO page-4



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.

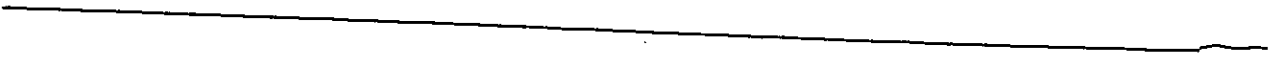
MOKULEIA  
PHOTO DATE 4-9-04  
TIME 09:30 AM  
TIDE APPROX. 0.0 MILLW

**FINAL ENVIRONMENTAL ASSESSMENT**

Existing Seawall TMK 6-8-09: 011, 68-003 Laau Paina Place, Waialua, Oahu, Hawaii

**APPENDIX C**

CCCCCCCCCCCCCCCCCCCCCCCCCC



EXISTING SEA WALL  
SCALE 1/2" = 1'

4" TILE DRAIN W/  
1 C.P. CRUSHED ROCK WRAPPED  
IN FILTER FABRIC

@ 5'-00"

EXIST. GRADE

BLUB ROCK  
MORTARED  
WALL

8' MIN. HT.

18" MIN

20° BATTER

3'-04' VARIUS.

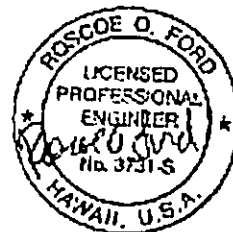
EXISTING BEACH  
COND

5'-2"  
MIN.

FRUCE CLEMENTS RES.

TMK 6-8-09-11

68-003 LAU PAINA PL.  
WAIALUA, OAHU, HI



EXPIRES 4/30/04

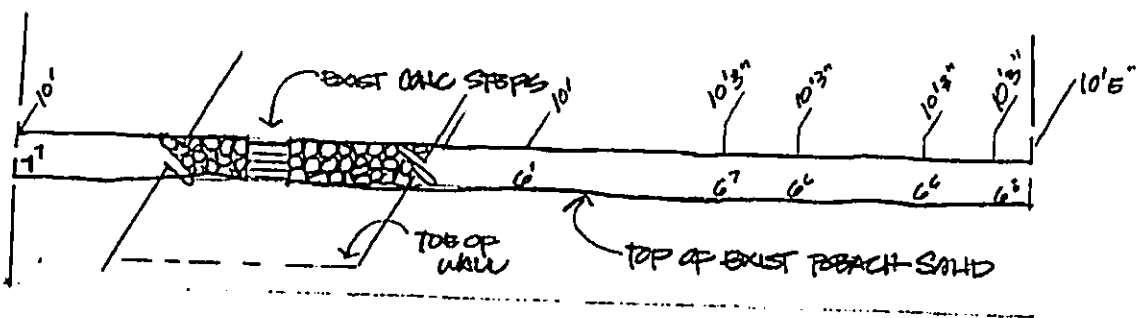
This work was prepared by me or under my  
supervision and construction of this project  
will be under my observation

Source: Roscoe O. Ford Licensed Professional Engineer

Not To Scale  
See Full Size Plans

Figure 7  
SEA WALL DETAIL

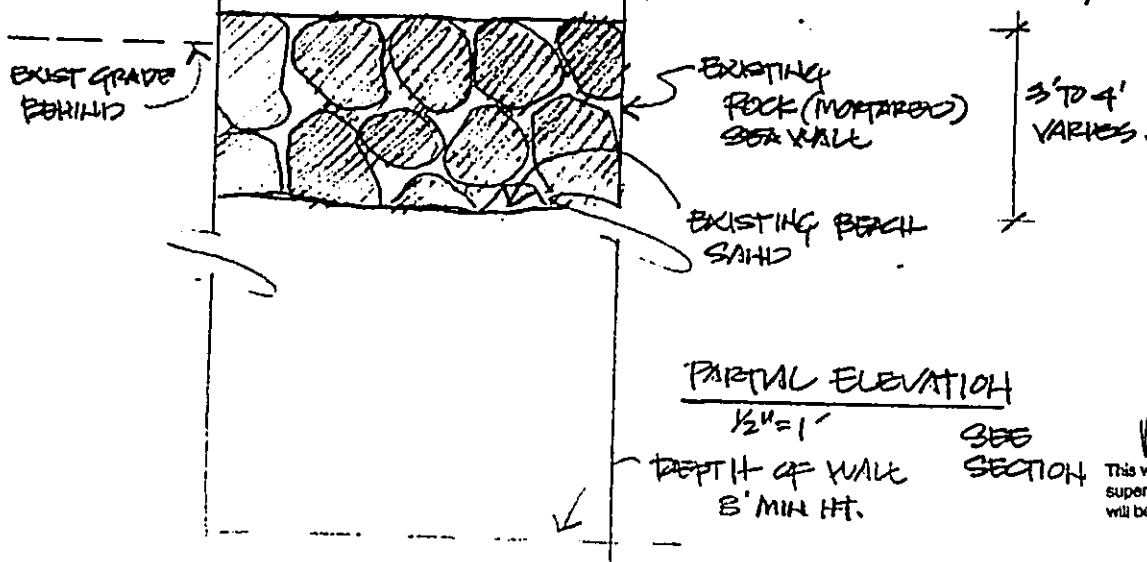
68-003 Lau Paina Place, Waialua, Oahu, Hawaii



OCEAN ELEVATION

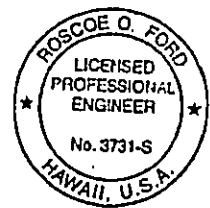
NOTE: ELEV FOR TOP SURVY  
 DINS SURVYING DRAWING #95016  
 & DLNR SHORELINE CERTIFICATION  
 DATED APRIL 26, 1995  
 LOT A-15

BRUCE CLEMENTS RES  
 TIME 6-8-09-23  
 68-003 LA'AU PAINA PL.  
 WAIALUA, OAHU, HI



PARTIAL ELEVATION

1/2" = 1'  
 SEE SECTION



EXPIRES 4/30/08

*Roscoe O. Ford*  
 This work was prepared by me or under my supervision and construction of this project will be under my observation

Not To Scale  
 See Full Size Plans

Source: Roscoe O. Ford Licensed Professional Engineer

Figure 7A  
 SEA WALL ELEVATION

68-003 Laau Paina Place, Waialua, Oahu, Hawaii

CRM Retaining Wall Design  
 Bruce Clements Residence  
 68-003 Laau Paina Pl.  
 TMK: 6-8-009:011

Assumed clayey gravel  
 soil with allow bearing =

$$\text{Pallow} := 1500 \cdot \text{psf} + 1500 \cdot \text{psf} \cdot 2.5 \quad \text{Pallow} = 3 \times 10^3 \text{ psf}$$

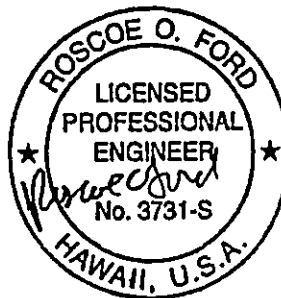
Passive resistance = 300 psf/ft. Friction factor = .40.  
 Active pressure = 35 psf/ft

Design Parameters

$$\begin{aligned} H &:= 8 \cdot \text{ft} & \text{top} &:= 18 \cdot \text{in} & \text{Fric} &:= .4 \\ \text{prock} &:= 145 \cdot \text{pcf} & \text{psoil} &:= 110 \cdot \text{pcf} & \sigma &:= 35 \cdot \text{pcf} \end{aligned}$$

Front side                      Soil Side

$$\text{slop1} := \frac{4.0}{12} \qquad \text{slop2} := \frac{1.5}{12}$$



This work was prepared by  
 me or under my supervision.

$$\begin{aligned} B &:= \text{top} + \text{slop1} \cdot H + \text{slop2} \cdot H & \text{Expires } &4/30/04 \\ B &= 5.167 \text{ ft} \end{aligned}$$

Stability

$$P_1 := \frac{H^2}{2} \cdot \text{slop1} \cdot \text{prock} \cdot 1 \cdot \text{ft}$$

$$M_1 := P_1 \cdot \left( \frac{2}{3} \cdot \text{slop1} \cdot H \right)$$

$$P_2 := \text{top} \cdot H \cdot \text{prock} \cdot 1 \cdot \text{ft}$$

$$M_2 := P_2 \cdot \left( \text{slop1} \cdot H + \frac{\text{top}}{2} \right)$$

$$P_3 := \frac{H^2}{2} \cdot \text{slop2} \cdot \text{prock} \cdot 1 \cdot \text{ft}$$

$$M_3 := P_3 \cdot \left( B - \text{slop2} \cdot H \cdot \frac{2}{3} \right)$$

$$P_4 := \frac{H^2}{2} \cdot \text{slop2} \cdot \text{psoil} \cdot 1 \cdot \text{ft}$$

$$M_4 := P_4 \cdot \left( B - \text{slop2} \cdot \frac{H}{3} \right)$$

$$i := 1..4$$

$\frac{P_i}{\text{kip}}$
1.547
1.74
0.58
0.44

$\frac{M_i}{\text{ft} \cdot \text{kip}}$
2.75
5.945
2.61
2.127

$$P := \sum_i P_i$$

$$Mr := \sum_i M_i$$

$$P = 4.307 \times 10^3 \text{ lb}$$

$$Mr = 1.343 \times 10^4 \text{ ft} \cdot \text{lb}$$

$$\text{Phorz} := \sigma \cdot H^2 \cdot \frac{\text{ft}}{2}$$

$$\text{Mot} := \text{Phorz} \cdot H \cdot .3333$$

$$\text{Phorz} = 1.12 \times 10^3 \text{ lb}$$

$$\text{Mot} = 2.986 \times 10^3 \text{ ft} \cdot \text{lb}$$

$$FSot := \frac{Mr}{Mot} \quad FSot = 4.498$$

Sliding

$$Phorz = 1.12 \times 10^3 \text{ lb} \quad Resist := Fric \cdot P$$

$$Resist = 1.723 \times 10^3 \text{ lb}$$

$$FSslid := \frac{Resist}{Phorz} \quad FSslid = 1.538$$

Soil Stress

$$a := \frac{Mr - Mot}{p} \quad a = 2.425 \text{ ft} \quad 3 \cdot a = 7.276 \text{ ft} \quad B = 5.167 \text{ ft}$$

$$\sigma_{toe} := \frac{P}{B \cdot l \cdot ft} \left[ 1 + \left( 6 \cdot \frac{\frac{B}{2} - a}{B} \right) \right] \quad \sigma_{toe} = 986.53 \text{ psf}$$

$$\sigma_{heel} := \frac{P}{B \cdot l \cdot ft} \left[ 1 - \left( 6 \cdot \frac{\frac{B}{2} - a}{B} \right) \right] \quad \sigma_{heel} = 680.567 \text{ psf}$$





**FINAL ENVIRONMENTAL ASSESSMENT**

Existing Seawall TMK 6-8-09: 011, 68-003 Laau Paina Place, Waialua, Oahu, Hawaii

Date	Action	Comments
9/24/1962	Letter requesting to subdivide TMK: 6-8-09: Parcel 11.  Request to move existing house onto ocean-front lot.	The owner in 1962 requested to subdivide the 10,756 square foot TMK 6-8-09: 011 into 2 separate lots. Parcel 11 became a makai Lot 15-A of 5,723 square feet. New TMK 6-8-09: 023 became a mauka Lot 15-B of 5,033 square feet. According to the subdivision application letter, there were 2 structures on the property. One of the dwellings was requested to be moved onto Parcel 11 / Lot 15-A fronting the ocean.
5/2/1963	Relocation Building Permit No. 2081472	Approved by the City Planning Commission
8/8/1963	"Approved" subdivision of Lot 15, File Plan 459, Pine Wood Tract at TMK: 6-8-09: 11	Subdivision Plan prepared by Walter P. Thompson dated September 19, 1962.
10/19/1981	Building Permit No. 160659	\$900 "Alteration"
1988	Current owner/applicant purchases the property	Purchase of TMK 6-8-09: 11 (Lot 15-A) and TMK 6-8-09: 023 (Lot 15-B)
1989/1990	Current owner has existing seawall constructed	Seawall is constructed sometime during 1989/1990.
12/13/1989	Building Permit No. 278632	Current owner completes \$23,000 second story addition, some interior alterations, and electrical work
1/21/1995	Shoreline Survey	April 26, 1995 Shoreline Certification by Board of Land and Natural Resources. Certified shoreline is seaward face of the existing seawall.
7-15/2003	Conditional Use Permit 2003/CUP-34	Current owner receives approval for a Conditional Use Permit for Joint Development of TMK 6-8-09: 011 and TMK 6-8-09: 023
-8/18/2003	Building Permit No. 555006 - "Approved" on 9/11/2003	\$8,000: Relocate existing carport and construct new driveway approach
December 2003	Draft Environmental Assessment and Shoreline Setback Variance application	Current owner wishes to apply for a Shoreline Setback Variance for the existing seawall. Draft Environmental Assessment is prepared.

**FINAL ENVIRONMENTAL ASSESSMENT**

Existing Seawall TMK 6-8-09: 011, 68-003 Laau Paina Place, Waialua, Oahu, Hawaii

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**APPENDIX E**



**FINAL ENVIRONMENTAL ASSESSMENT**

Existing Seawall TMK 6-8-09: 011, 68-003 Laau Paina Place, Waialua, Oahu, Hawaii

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**APPENDIX E**

**Comment Letters on the Draft Environmental Assessment  
and Response Letters**

CITY & COUNTY OF HONOLULU

1. Department of Planning & Permitting

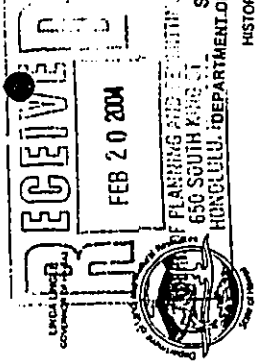
STATE OF HAWAII

2. Department of Land and Natural Resources  
Engineering Division
3. Office of Conservation and Coastal Lands
4. Office of Environmental Quality Control
5. State Historic Preservation Division

DEPARTMENT OF THE ARMY

6. U.S. Army Engineer District, Hawaii

---



STATE OF HAWAII  
 DEPARTMENT OF PLANNING AND PERMITTING  
 650 SOUTH KING STREET  
 HONOLULU, HAWAII 96813

PETER T. YOUNG  
 BOARD OF LAND AND NATURAL RESOURCES  
 COMMISSIONER OF WATER RESOURCES MANAGEMENT  
 DAN DIVISION  
 DEPUTY DIRECTOR - LAND  
 ERNEST Y. LAU  
 DEPUTY DIRECTOR - WATER  
 AQUATIC RESOURCES  
 BOARD OF LAND AND NATURAL RESOURCES  
 BUILDING OF ENVIRONMENTAL  
 COMMISSIONER OF WATER RESOURCES MANAGEMENT  
 COMMISSIONER OF WATER RESOURCES MANAGEMENT  
 FORESTRY AND WILDLIFE  
 DEPARTMENT OF LAND AND NATURAL RESOURCES  
 601 KAMOKILA BOULEVARD  
 HONOLULU, HAWAII 96813

HAWAII HISTORIC PRESERVATION  
 DIVISION REVIEW  
 FEB 11 2004  
 Log #: 2004.0389  
 Doc #: 0402EJ16

Applicant/Agency: Eric G. Crispin, Director  
 Department of Planning and Permitting  
 City & County of Honolulu  
 650 South King Street  
 Honolulu, Hawaii 96813

SUBJECT: Chapter 6E-42 Historic Preservation Review - Alter-the-Fact Approval for  
 Shoreline Setback Variance Draft Environmental Assessment for Existing  
 Seawall at 68-003 Laau Paina Place, Waiialua, O'ahu

Ahupua'a: Waiialua  
 District, Island: Waiialua, O'ahu  
 TMK: (1) 6-8-009:011

1. We believe there are no historic properties present, because:
- a) intensive cultivation has altered the land
  - b) residential development/urbanization has altered the land
  - c) previous grubbing/grading has altered the land
  - d) an acceptable archaeological assessment or inventory survey found no historic properties
  - e) other: This is an alter-the-fact approval for an existing seawall. There is no record of significant historic sites being found during construction of the seawall.
2. This project has already gone through the historic preservation review process, and mitigation has been completed \_\_\_\_.
- Thus, we believe that "no historic properties will be affected" by this undertaking.

Alpha.  
*Eric G. Crispin*  
 P. Holly McEldowney, Administrator  
 State Historic Preservation Division



PHONE (BUS): (808) 536-5495  
 FAX: (808) 594-1553  
 ANALYTICAL PLANNING CONSULTANTS, INC.  
 720 NUUANU AVENUE, SUITE 502 - HONOLULU, HI 96817

May 12, 2004

P. Holly McEldowney, Administrator  
 Historic Preservation Division  
 State of Hawaii  
 Department of Land & Natural Resources  
 Kakuhihewa Building, Room 555  
 601 Kamokila Boulevard  
 Kapolei, HI 96707

Dear Ms. McEldowney:

Subject: Draft Environmental Assessment  
 Shoreline Setback Variance for Existing Seawall  
 at 68-003 Laau Paina Place, Waiialua, Oahu, Hawaii  
 TMK: 6-8-009: 011  
 Response to Comment Letter

Thank you for your letter dated February 11, 2004. The following responds to the comments provided on the Draft Environmental Assessment for the subject property.

1. We acknowledge your comment that this is an after-the-fact approval for an existing seawall, and that the State Historic Preservation Office does not have any record of significant historic sites being found during previous construction of the seawall.
2. We acknowledge your comment that your office believes that "no historic properties will be affected" by this request.

Sincerely,  
*Donald Clegg*  
 Donald Clegg, President

LESLIE LAMBLE  
GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
LAND DIVISION

POST OFFICE BOX 671  
HONOLULU, HAWAII 96809  
February 12, 2004

PETER T. YOUNG  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSIONER OF WATER RESOURCES MANAGEMENT

DAN DANZON  
DEPUTY DIRECTOR, LAND

ERNEST W. LAU  
DEPUTY DIRECTOR, WATER

ADJUTANT GENERAL  
COMMISSIONER OF WATER RESOURCES MANAGEMENT  
CONSTRUCTION AND RESOURCES MANAGEMENT  
FACILITY DESIGN  
CONSTRUCTION ADMINISTRATION  
LAND ACQUISITION AND DEVELOPMENT COMMISSION  
STATE PARKS

RECEIVED  
FEB 17 PM 3:52

2003-ED-33.RCH

Honorable Eric G Crispin, AIA  
Director of Planning and Permitting  
650 South King Street  
Honolulu, Hawaii 96813

Dear Mr. Crispin:

SUBJECT: Review: Draft Environmental Assessment  
Shoreline Setback Variance  
Project: After-the-fact approval for seawall (CFM)  
Applicant: Bruce E. Clements  
Authority: CCOH Department of Planning and Permitting  
I.D. No.: 2003-ED-33  
Location: 68-003 Laau Paina Place, Kaneohe, Oahu, Hawaii  
TRK: (1) 6-8-009; 011

Thank you for the opportunity to review and comment on the subject matter

A copy of the document pertaining to the proposed project was transmitted or made available to the following Department of Land and Natural Resources' Divisions for their review and comment.

- Division of Aquatic Resources
- Division of Forestry and Wildlife
- Division of State Parks
- Engineering Division
- Division of Boating and Ocean Recreation
- Commission on Water Resource Management
- Office of Conservation and Coastal Lands
- Land-Oahu District Land Office

Enclosed please find a copy of the Engineering Division comment.

Based on the attached responses, the Department of Land and Natural Resources has no other comment to offer on the subject matter.

Should you have any questions, please contact Nicholas A. Vaccaro of the Land Division Support Services Branch at 587-0384.

Very truly yours,

DIERDRE S. MAMIYA  
Administrator

C: ODLO

DEPARTMENT OF LAND AND NATURAL RESOURCES  
ENGINEERING DIVISION

LAINAV

Ref: 2003-ED-33-CM7

COMMENTS

- We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zone AE.
- Please take note that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Zone \_\_\_\_\_.
- Please note that the correct Flood Zone Designation for the project site according to the Flood Insurance Rate Map (FIRM) is \_\_\_\_\_.
- Please note that the project must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), whenever development within a Special Flood Hazard Area is undertaken. If there are any questions, please contact the State NFIP Coordinator, Mr. Carol Tyson-Beam, of the Department of Land and Natural Resources, Engineering Division at (808) 587-0267.

Please be advised that 44CFR indicates the minimum standards set forth by the NFIP. Your Community's local flood ordinance may prove to be more restrictive and thus take precedence over the minimum NFIP standards. If there are questions regarding the local flood ordinance, please contact the applicable County NFIP Coordinators below:

- Mr. Robert Summinto at (808) 523-4254 or Mr. Mario Sio Li at (808) 523-4247 of the City and County of Honolulu, Department of Planning and Permitting.
- Mr. Kelly Gomes at (808) 961-8327 (Hilo) or Mr. Kiran Emter at (808) 327-3530 (Kona) of the County of Hawaii, Department of Public Works.
- Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.
- Mr. Mario Antonio at (808) 241-6620 of the County of Kauai, Department of Public Works.

- The applicant should include project water demands and infrastructure required to meet water demands. Please note that the implementation of any State-sponsored projects requiring water service from the Honolulu Board of Water Supply system must first obtain water allocation credits from the Engineering Division before it can receive a building permit and/or water meter.
- The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update.
- Additional Comments: \_\_\_\_\_
- Other: \_\_\_\_\_

Should you have any questions, please call Mr. Eric Yuasa of the Planning Branch at 587-0254.

Signed:   
ERIC T. HIRANO, CHIEF ENGINEER

Date: 2/10/04

PHONE (808) 487-536-545  
FAX (808) 594-1553



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

LINDA LINGLE  
GOVERNOR OF HAWAII



GENEVEVE SALMONSON  
DIRECTOR

**STATE OF HAWAII**  
**OFFICE OF ENVIRONMENTAL QUALITY CONTROL**

228 SOUTH KING STREET  
HONOLULU, HAWAII 96813  
PHONE: (808) 541-1118  
FACSIMILE: (808) 541-1118  
E-MAIL: OEQ@HAWAII.GOV

May 12, 2004

Eric T. Hirano, Chief Engineer  
State of Hawaii  
Department of Land & Natural Resources  
Engineering Division  
PO Box 621  
Honolulu, HI 96809

Dear Mr. Hirano:

**Subject: Draft Environmental Assessment  
Shoreline Setback Variance for Existing Seawall  
at 68-003 Laau Paina Place, Waialua, Oahu, Hawaii  
TMK: 6-8-009: 011  
Response to Comment Letter**

Thank you for your letter dated February 10, 2004. We acknowledge that your office confirms that the project site is located in the Flood Zone AE in accordance with the Flood Insurance Rate Map (FIRM).

Sincerely,

*Donald Clegg*  
Donald Clegg, President

March 8, 2004

Mr. Eric Crispin, Director  
Department of Planning and Permitting  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813

Dear Mr. Crispin:

**Subject: Draft Environmental Assessment for the Clements Seawall, O'ahu**

Thank you for the opportunity to review and comment on the subject project. We have the following comments.

1. For assistance in completing the assessment, please review the "Shoreline Hardening Policy and Environmental Assessment Guidelines" available at <http://www.state.hi.us/health/oeq/guidance/shoreline.htm>
2. Please consult with the adjacent neighbors.
3. Please describe if there are any impact to cultural resources.
4. Please check with DLNR to determine whether the 1995 shoreline survey needs to be updated.

Sincerely,

*Genevieve Salmonson*  
Genevieve Salmonson  
Director

c: APC, Inc.  
Bruce Clements

PHONE (808) 594-1533  
FAX: (808) 594-1533



**ANALYTICAL PLANNING CONSULTANTS, INC.**  
925 NUIUANU AVENUE, SUITE 502 • HONOLULU, HI 96817

May 12, 2004

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

Dear Ms. Salmonson:

**Subject: Draft Environmental Assessment  
Shoreline Setback Variance for Existing Seawall  
at 68-003 Laau Paina Place, Waialua, Oahu, Hawaii  
TMK: 6-8-009: 011  
Response to Comment Letter**

Thank you for your letter dated March 8, 2004. The following responds to the comments provided on the Draft Environmental Assessment for the subject property.

1. The "Shoreline Hardening Policy and Environmental Assessment Guidelines" were consulted during the preparation of the Draft Environmental Assessment. A Coastal Engineering Assessment report for the subject property was prepared by EKNA Services, Inc. in April 2004 and has been included in the Final Environmental Assessment.
2. The adjacent neighbors will be contacted and informed about the project during the Shoreline Setback Variance application process.
3. Further clarification regarding no anticipated impacts to cultural resources is included in the Final Environmental Assessment. The State Historic Preservation Office's February 11, 2004 comment letter regarding the Draft EA stated that the office "believes that no historic properties will be affected by this undertaking".

Sincerely,

*Donald Clegg*  
Donald Clegg, President



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

March 8, 2004

REPLY TO  
ATTENTION OF

Regulatory Branch

Mr. Eric G. Crispin  
Director of Planning and Permitting  
City and County of Honolulu  
650 South King Street  
Honolulu, HI 96813

Dear Mr. Crispin:

This responds to your request for review and comment on the after-the-fact Draft Environmental Assessment (DEA) and Shoreline Setback Variance Application to construct a seawall at 68-003 Laau Paina Place, Waialua, Hawaii (TMK 1-6-8-009: 011). We have reviewed the project information you provided with respect to the Corps' authority to issue Department of the Army (DA) permits under Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) and Section 404 of the Clean Water Act (33 USC 1344).

Any work or structures in or affecting navigable waters of the United States (i.e., seaward of the mean high water line) normally requires a DA permit pursuant to Section 10. In addition, any activity involving the discharge of dredged or fill material seaward of the high tide line normally requires a DA permit pursuant to Section 404. In order to clarify the location of the seawall with respect to these geographical limits of our jurisdiction, a member of my staff conducted a site visit on February 6, 2004.

Based on the project information you provided and the results of our site investigation, I have determined that the existing seawall lies landward of the high tide line; therefore, a DA permit is not required.

Should you have questions concerning this determination, please contact Mr. Peter Galloway of my staff (telephone (808) 438-8416; fax (808) 458-4060). Written inquiries should cite File No. 200400150 and should be sent to: Regulatory Branch (CEPOH-EC-R/P, Galloway); U.S. Army Engineer District, Honolulu; Building 230; Fort Shafter, Hawaii 96858-5440. A copy of this letter has been sent to the property owner, Mr. Bruce Clements.

Sincerely,

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

PHONE: (808) (808) 534-5695  
FAX: (808) 594-1533



**ANALYTICAL PLANNING CONSULTANTS, INC.**  
938 NUUANU AVENUE, SUITE 502 • HONOLULU, HI 96817

May 12, 2004

Gregory P. Young, P.E.  
Chief, Regulatory Branch  
Department of the Army  
U.S. Army Engineer District, Honolulu  
P.O. Shafter, Hawaii 96858-5440

Dear Mr. Young:

**Subject: Draft Environmental Assessment  
Shoreline Setback Variance for Existing Seawall  
at 68-003 Laau Paina Place, Waialua, Oahu, Hawaii  
TMK: 6-8-009: 011  
Response to Comment Letter**

Thank you for your letter dated March 8, 2004. The following responds to the comments provided on the Draft Environmental Assessment for the subject property.

1. We acknowledge your comment that based on an on-site investigation conducted by your office on February 6, 2004, the existing seawall lies landward of the high tide line and therefore does not require a Department of Army permit.

Sincerely,

Donald Clegg, President

LOCAL LANDS  
OFFICE OF PERMITS



**STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
OFFICE OF CONSERVATION AND COASTAL LANDS**

POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

PETER T. YOUNG  
CHAIRMAN  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSIONER OF WATER RESOURCES MANAGEMENT  
DAN DAVENPORT  
DEPUTY DIRECTOR - LAND  
ERNEST T.M. LAU  
DEPUTY DIRECTOR - WATER  
COMMISSIONER OF WATER RESOURCES MANAGEMENT  
SOLANGE REYNOLDS  
SOUTHERN AND OCEAN REGULATOR  
COMMISSIONER OF WATER RESOURCES MANAGEMENT  
MARCUS W. HARRIS  
DIRECTOR OF CONSERVATION AND COASTAL LANDS  
HONOLULU, HAWAII  
813-17-7444  
WATER RESOURCES MANAGEMENT

March 8, 2004

Mr. Eric Crispin, Director  
City and County of Honolulu  
Department of Planning and Permitting  
650 South King St  
Honolulu, HI 96813

Ref. OCCL: DE

**Subject: Review and comments on Draft EA for Shoreline setback variance application for TMK (1)-6-8-009:011 (Clements), Waialua, Hawaii.**

Dear Mr. Crispin:

The State of Hawaii Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands (OCCL) has reviewed the July 2003 Draft Environmental Assessment (EA) for Shoreline setback variance application for 68-003 Laau Paina Pl. Waialua, Hawaii. The subject dwelling was originally built in 1939 and subsequently moved makai to its' present location in 1963. The dwelling appears to qualify as a non-conforming dwelling because the existing dwelling was constructed and never prior to the establishment of shoreline setback regulations.

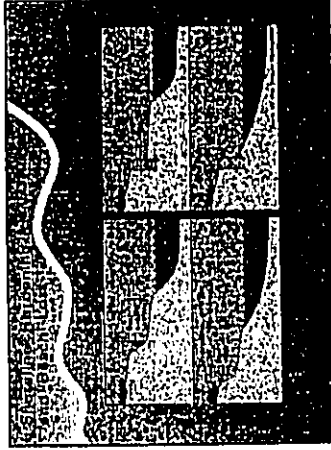
The owner is seeking approval of a shoreline setback variance and after-the-fact building permit for the existing concrete rubble masonry (CRM) seawall constructed in 1989/90. The Department has reviewed the project information provided and have the following comments:



**Section 3.2. Shoreline Characteristics**

There is a well-documented history of erosion in this vicinity as the draft EA points out. Erosion data indicates that central Mokuleia has been experiencing chronic erosion for an extended time<sup>1,2</sup>. During the period 1949 to 1988, the vegetation line at transect 11, which is near the subject property, receded landward with a net change of -8 ft. This erosion occurred primarily between 1967- 1971 with a net change of -12 feet and is at least partially attributed to high winter surf of December 1968 which was documented as some of the highest surf ever observed in Hawaii.

For the time period 1971 to 1975, the presence of seawalls may have caused the beach to narrow and disappear in some locations as seen by the erosion data notation "to seawall." Net change in the vegetation line in this region vary from +21 feet to - 21 feet from 1949 to 1988. Erosion data indicates a range in the position of the vegetation line from 13 to 26 feet, illustrating the dynamic nature of this coastline. While the presence of the seawalls were not the cause of the regional erosion they may have contributed to the local beach loss and narrowing.



It is desirable to minimize the amount of hard erosion control structures along the shoreline, if the subject structure had been relocated further mauka or designed as a sloping revetment rather than a vertical seawall, it may have been possible to maintain a dry sandy beach by allowing the natural migration of the shoreline to resupply sand to the beach face. It has been well documented that seawalls on a chronically eroding shoreline can lead to beach loss or narrowing by restricting the natural movement of the shoreline landward<sup>3</sup>. With a hard structure in place the beach may not maintain the original width as it

<sup>1</sup> *Beach Changes On Oahu as Revealed by Aerial Photographs*. 1981. Hwang, Dennis. Technical Supplement Number 22. Coastal Zone Management Project. Prepared for State of Hawaii Department of Planning and Economic Development.  
<sup>2</sup> *Oahu Shoreline Study (Part I)*. 1988. Sea Engineering, Inc. Prepared for The City and County of Honolulu, Department of Land Utilization.  
<sup>3</sup> *Beach Loss Along Armored Shorelines on Oahu, Hawaiian Islands*. 1997. Fletcher, H. Charles, et. al. . Journal of Coastal Research. Vol. 13, No. 1. pg. 209-215.

retreats landward and instead narrows. The Department attempts to mitigate negative impacts to the coastal system from shore protection structures by encouraging alternative erosion control measures in place of constructing seawalls and revetments. While it may be impractical to remove the existing wall, the Department feels the DEA should more accurately describe the negative impacts of the wall as well as the reason why other alternatives have been dismissed.

There are a variety of state-recommended alternative shoreline erosion control measures that can be taken to minimize the potential damage from erosion. Many of these measures aim to reduce the potential impact to the beach resource while still offering protection to the property. Some of these include dune restoration/plantings, relocation of structures, beach nourishment, Geobags and sandbags.

**Section 4. Summary of Impacts and Mitigative Measures**

The Department recognizes the complexities in dealing with shoreline structures and the potential impact to the shoreline. A position on shoreline structures and variances is clearly identified in the County ordinances, Chapter 23.1.5.b.1 of the Revised Ordinances of Honolulu (ROH) states, "Structures and activities are prohibited within the shoreline area, with the following exceptions:

- (1) "Minor structures and activities permitted under rules adopted by the department which do not affect beach processes or artificially fix the shoreline and do not interfere with public access, public views or open space along the shoreline. If, due to beach erosion or other cause, the director determines that a minor structure permitted under this section may affect beach processes or public access or has become located seaward of the shoreline, the director or other governmental agency having jurisdiction may order its removal."

Section 23-1.9 Conditions on Variances states:

- \*No variance shall be granted unless appropriate conditions are imposed:
  - (a) To maintain safe access to and along the shoreline or adequately compensate for its loss;
  - (b) To minimize risk of adverse impacts on beach processes;
  - (c) To minimize risk of existing legal or proposed structures falling and becoming loose rocks or rubble on public property; and
  - (d) To minimize adverse impacts on public views to, from and along the shoreline. (Added by Ord. 92-34)\*

The Department questions the DEA finding that the seawall will have minimal long-term effect on the shoreline processes at the project site. The purpose and function of the seawall is to prohibit the landward erosion of the shoreline, thus impacting the shoreline processes. If the seawall did not impact the shoreline

there would be no need to build one in the first place. The fact that many other surrounding properties have existing walls illustrates the regional scale of this problem but is not an adequate justification in it 'self for the granting of shoreline variance for this structure.

**Section 5. Alternatives Considered.**

5.1 The Department agrees that a no action alternative is not the best solution. However it should be pointed out that relocation of the threatened improvements was not considered nor was beach nourishment or dune restoration. These alternatives should at least be considered and other solutions justified based on these considerations.

5.2 A sloping revetment is preferred to a vertical seawall. The impacts of a sloping revetment to the coastal processes are less harmful than those of a vertical seawall. A revetment could be installed on the subject property but would likely take up valuable beachfront private property as it is difficult to get easements on state coastal lands for hard structures. The U.S. Army Corps of Engineers "Help Yourself guide to shore protection" offers recommendations for revetment slopes but the owner and engineer, working with regulatory agencies, ultimately agree on the design based on the existing conditions and design requirements. There are many examples of revetments around the state that have a wide range of slopes depending on the needs of the project site.

**Section 6. Findings and Reasoning Supporting the Anticipated Determination.**

The Department questions some of the findings supporting the anticipated determination. The DEA makes arguable assumptions that the presence of the seawall has little or no impact to the coastal resources. The findings are based on the justification that the protection of the private property and prevention of further erosion is a sufficient justification without mention of the (observed and potential) negative impacts that result from the presence of the structure.

For the purposes of this Environmental Assessment review, the Department questions the findings of significance criteria for section 6.1, 6.1.2, 6.3, 6.4, 6.7, 6.8, 6.11 and 6.2. This is based on the above mentioned concerns.

**Summary:**

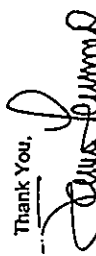
It is incumbent upon all government agencies to consider the effect of their actions on our beaches and to consider long-term measures to protect coastal development and beaches simultaneously. The cost of remedial shore protection is a significant problem for shore owners and government in of itself, but the loss of beaches is an even greater concern.

When evaluating erosion control alternatives, it is important to identify the priorities and purpose of the structures. From a coastal management standpoint, it seems logical and appropriate to protect and preserve the beach system by moving and/or minimizing the impact of structures sometimes compromising a portion of the private property. It should be realized that for many homeowners, the loss of the sandy beach puts the property owner at increased risk to coastal hazards. Beach loss also causes a significant devaluation of property values (not just oceanfront) as well as a material loss of the primary attraction and original intent of living on the coast.

While no simple solution to protect property and protect the beach exists, and each coastal segment must be evaluated independently, there are alternatives that should be considered in some cases. At the very least, recognition of the potential and actual impact of seawalls should be acknowledged and statements that seawalls will have "minimal long-term effects to the shoreline" should be recognized for their limitations.

Thank you for the opportunity to comment on this DEA. If you should have any questions, please contact Dolan E-ersole, Sea Grant Extension Agent at the Office of Conservation and Coastal Lands at 587-0439.

Thank You,

  
Sam Lemmo, Administrator  
DLNR, Office of Conservation and Coastal Lands

Cc: Oahu Board Member  
Oahu District Land Office  
Chairperson's Office  
Analytical Planning Consultants, Inc. 928 Nuuanu Ave. Suite 502. Honolulu, Hawaii 96817

PHONE (808) 536-5995  
FAX: (808) 594-1553



**ANALYTICAL PLANNING CONSULTANTS, INC.**  
923 NUUANU AVENUE, SUITE 502 • HONOLULU, HI 96817

Letter to Department of Land & Natural Resources  
Office of Conservation and Coastal Lands  
RE: TMK 6-8-9: 011  
May 12, 2004  
Page 2 of 3

May 12, 2004

Sam Lemmo, Administrator  
State of Hawaii  
Department of Land and Natural Resources  
Office of Conservation and Coastal Lands  
PO Box 621  
Honolulu, HI 96809

Dear Mr. Lemmo:

**Subject: Draft Environmental Assessment  
Shoreline Setback Variance for Existing Seawall  
at 68-003 Laau Paina Place, Waiāluā, Oahu, Hawaii  
TMK: 6-8-009: 011  
Response to Comment Letter**

Thank you for your letter dated March 8, 2004. The following responds to the comments provided on the Draft Environmental Assessment for the subject property.

1. **Correction.** The first paragraph of your letter makes reference to the subject Draft EA as being dated "July 2003". The cover of Draft EA is dated December 2003 and was published in the February 8, 2004 OEQC publication The Environmental Notice.
2. **Section 3.2 Shoreline Characteristics.** In April 2004, EKNA Services, Inc. prepared a "Coastal Engineering Assessment" for the subject property. Extensive comments from that report are now included in the Final EA and are provided below, as well as the entire report is included as Appendix B in the Final EA.  
  
According to the April 2004 study, "*Coastal Engineering Assessment of Existing Seawalls at Mokuileia Oahu, Hawaii*" by EKNA Services, Inc., there is no evidence that the existing seawall on the subject property Parcel 11 is accelerating erosion problems at the site. There is no indication of excessive escarpment or landward retreat of the unprotected shoreline adjacent to and west of the Parcel 11 seawall. The beach profile is uniform along this entire shoreline reach. These factors indicate that the existing seawall has had no adverse effect on the existing beach processes.

The following information is taken from the EKNA Services report which states that the existing seawall has no effect on the existing littoral processes at this site. The seawall is functionally consistent with existing seawalls along this coastal reach. The existing seawall does not alter seasonal erosion/accretion patterns. There is no evidence that the seawall has 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 following information is taken from the EKNA Services report which states that the seawall does not affect lateral public access along the beach. While the 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. The consequence of building shore protection structures is that the fronting beach will narrow if the coastal erosion continues.

3. **Section 4. Summary of Impacts and Mitigative Measures.** In April 2004, EKNA Services, Inc. prepared a "Coastal Engineering Assessment" for the subject property. The report concluded that the existing seawall does not affect existing littoral processes and does not interfere with public access along the shoreline.

4. **Section 5. Alternatives Considered.** In April 2004, EKNA Services, Inc. prepared a "Coastal Engineering Assessment" for the subject property, which included a discussion of alternatives. Extensive comments from that report are now included in the Final EA and are provided below.

Removal of the existing seawall is not a viable alternative since the house and related improvements existing on the parcel would be susceptible to erosion and wave damage. The house is approximately 15 feet at its closest point to the top of the seawall. The house was moved to its present location via a City approved May 2, 1963 Relocation Building Permit No. 2081472.

Replacing the seawall with a sloping revetment structure is also not a viable option because of the limited land area between the house and other improvements and the existing seawalls. The Coastal Engineering Assessment states that there is no reason to expect that a sloping revetment would halt the ongoing erosion along this coast.

While large geotextile sand bags have been used as temporary erosion control in several areas, including Lanikikai, 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.

Beach restoration and nourishment is commonly cited as a preferred alternative, however, this alternative is costly and is not an economically viable alternative for an individual residential property owner. It has been observed that governmental agencies responsible for recreational beach resources can rarely afford to perform major and ongoing beach nourishment for public beaches.

5. **Section 6 Findings and Reasoning Supporting the Anticipated Determination.**  
Section 6 of the Final Environmental Assessment has been revised in light of the April 2004, EKINA Services, Inc.'s "Coastal Engineering Assessment" for the subject property. The findings and reasoning supporting the anticipated determination are now based on a littoral processes study conducted by an engineer, which concluded that:

- There is no evidence that the existing seawall on the subject property Parcel 11 is accelerating erosion problems at the site.
- There is no indication of excessive escarpment or landward retreat of the unprotected shoreline adjacent to and west of the Parcel 11 seawall.
- The beach profile is uniform along this entire shoreline reach.
- These factors indicate that the existing seawall has had no adverse effect on the existing beach processes.
- The existing seawall has no effect on the existing littoral processes at this site.
- The seawall is functionally consistent with existing seawalls along this coastal reach.
- The existing seawall does not alter seasonal erosion/accretion patterns.
- There is no evidence that the seawall has caused aggravated erosion to the adjacent unprotected parcels.
- This entire coastal reach has been experiencing net long-term erosion over the past 50 years.

Thank you for providing your comments on the Draft Environmental Assessment. Please contact me if you have questions or require further information.

Sincerely,

  
Donald Clegg, President

DEPARTMENT OF PLANNING AND PERMITTING  
**CITY AND COUNTY OF HONOLULU**  
425 SEASIDE DRIVE, SUITE 100, HONOLULU, HAWAII 96813  
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DEPUTY DIRECTOR  
KATHY SCHEIDT  
ACTING DEPUTY DIRECTOR

March 9, 2004

2003/ED-33 (AM)

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

Dear Mr. Clegg:

CHAPTER 343, HAWAII REVISED STATUTES (HRS)  
DRAFT ENVIRONMENTAL ASSESSMENT (DEA)

Project Name : Clements Shoreline Setback Variance  
File No. : 2003/ED-33  
Location : 68-003 Laau Paina Place - Waialua  
Tax Map Keys : 6-6-9: 11

In accordance with the procedural provisions of Chapter 343, Hawaii Revised Statutes (HRS), all comment letters received during the 30-day comment period, which began with the initial publication of a notice of availability of the DEA in The Environmental Notice on February 8, 2004, require a response addressed directly to the commenter. The final EA must include all comment letters and responses to the letters, as well as appropriately revised text. Herewith, for your information and appropriate action are comments from Department of Land and Natural Resources' State Historic Preservation and Engineering Divisions and Office of Conservation and Coastal Lands regarding the subject draft environmental assessment.

In addition, enclosed herein are the Department of Planning and Permitting's comments on the DEA.

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Department of Planning and Permitting:

1. Section 2.1, Location, page 3: We note that there is right-of-way or easement, Tax Map Key: 6-8-9: 21, along the property's west boundary depicted in Figure 2, page 5. Please clarify the function of this easement. Is the easement privately owned or is it being utilized by the public as an access way to the shoreline? If it is a public right-of-way, discuss the impacts of the CRM wall on public pedestrian access to the shoreline. In addition, please provide more details of the subject property (e.g., topography).
2. Section 2.2, Background, page 3: Is there any documentation (e.g., aerial photos) to support the existence of the replaced concrete wall? Provide a description (e.g., dimensions) of the replaced concrete wall.
3. Section 2.3, Proposed Action, page 6: Inasmuch as the applicant is seeking approval of a shoreline setback variance, please expand your discussion on the status of the acquisition of a current certified shoreline survey. In addition, provide elevation drawings (dimensioned) of the subject CRM wall.
4. Section 3.1, General Description, page 12: Please add the following sentence in the last paragraph of the archaeological assessments section: "If additional construction or renovation plans should be considered in the future and should significant archaeological features be uncovered, immediate archaeological consultation will be sought with the Department of Land and Natural Resources State Historic Preservation Division in accordance with applicable regulations."
5. Section 3.3.3, FEMA Flood Insurance Rate Map, page 17: Does the CRM wall have any impacts on the regulatory flood?
6. Section 4.1, Potential Short-Term and Long-Term Impacts and Mitigative Measures, page 19: Inasmuch as preservation of open space along the shoreline is a primary objective of

Mr. Donald Clegg  
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the shoreline setback ordinance (Section 23-1.2(a)), discuss the impacts of the CRM wall on open space, visual impacts (lateral views of coastline as well as views of the coastline from Laau Paina Place), shoreline access as well as lateral beach access impacts. Furthermore, an evaluation of the project's impact on littoral processes should be prepared by a coastal engineer and included in the Final EA to support the assessment's findings and conclusions.

7. Section 5, Alternatives Considered, page 20: We recommend that an additional section be added in the Final EA, which specifically addresses the "Criteria for granting a variance," pursuant to Section 23-1.8, Revised Ordinances of Honolulu (ROH). This section should discuss how the three standards of hardship are met by the proposal.

Furthermore, expand on your discussion of the "no action alternative" in Section 5.1. Can the assertion "The property would suffer from erosion and could threaten the existing single family residence" be supported by scientific data? What is the viability of nonstructural alternatives (e.g., beach nourishment) versus a vertical seawall as a solution to the loss of shoreline area? We note that the revetment option was not selected because of the impact it would have on the property's rear yard. Exactly how much yard would be lost due to a sloping revetment? What is the distance (in lineal feet) between the existing dwelling and the CRM wall?

8. Section 6.1, Significance Criteria, page 22: Please expand on Item 12 and discuss the project's impacts on scenic vistas as noted in the City and County's Coastal View Study.

9. We note a typographical error (e.g., "5,023" square feet is mentioned in Section 2.1 versus "5,033" square feet mentioned in Section 2.2) as well as a misplaced page (page 10 appears before page 9) in the document.

Mr. Donald Clegg  
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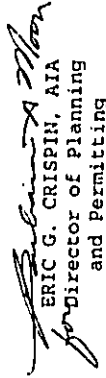


**ANALYTICAL PLANNING CONSULTANTS, INC.**  
923 NUUANU AVENUE, SUITE 502 • HONOLULU, HI 96817

If you have any questions, please contact Ann Matsumura of our staff at 523-4077.

May 12, 2004

Sincerely yours,

  
ERIC G. CRISPIN, AIA  
Director of Planning  
and Permitting

Eric Crispin, AIA, Director  
Department of Planning & Permitting  
City and County of Honolulu  
650 South King Street, 7<sup>th</sup> Floor  
Honolulu, HI 96813

EGC:pl  
Enclosures

Dear Mr. Crispin:

cc: Bruce E. Clements  
Office of Environmental Quality Control

**Subject: Draft Environmental Assessment  
Shoreline Setback Variance for Existing Seawall  
at 68-003 Laau Paina Place, Waialua, Oahu, Hawaii  
TMK: 6-8-009: 011  
Response to Comment Letter**

Thank you for your letter dated March 9, 2004. The following responds to the comments provided on the Draft Environmental Assessment for the subject property.

1. **Section 2.1, Location, page 3.** There is a privately owned right-of-way TMK 6-8-9: 021 along the subject property's west boundary. It provides access to the beach from Laau Paina Place. It is jointly owned by the property owners on Laau Paina Place and is not open to the public. There is a public right-of-way off of Hoomana Place, just west of the stream. The topography of the subject property is relatively flat. This additional information has been added to the Final EA.
2. **Section 2.2, Background, page 3.** At this time, the focus of the environmental assessment and shoreline setback variance is on the existing seawall. Prior shoreline structure(s) at the project site and fronting the Mokuleia Beach Colony were apparently located further makai of the existing seawall. Few exact details are available. Some research has been conducted into the Mokuleia Beach Colony's Special Management Area permit and Shoreline Setback Variance (1970's/1980's), which discussed the existence of prior shoreline structures in the vicinity of the Mokuleia Beach Colony. Currently for the project site, a survey of the shoreline has been submitted to the Department of Land and Natural Resources and is awaiting determination that the face of the existing seawall is the location of the certified shoreline.

3. **Section 2.3, Proposed Action, page 6.** A shoreline survey was conducted by licensed surveyor Jamie Alimboyoguen on February 4, 2004 and was then submitted by him to the Department of Land and Natural Resources on February 18, 2004. It is anticipated that a determination by the Board of Land and Natural Resources should be forthcoming by the end of May 2004. It is understood that a certified shoreline survey is required for the Shoreline Setback Variance application. An elevation drawing with dimensions of the seawall is provided in the Final EA.
4. **Section 3.1, General Description, page 12.** Information regarding archaeological and cultural resources that had appeared in Section 3.1 of the Draft EA now appears in "Section 3.8 Archaeological and Cultural Resources" of the Final EA. The sentence you provided in your comment letter has been added to Section 3.8 of the Final EA.
5. **Section 3.3.3, FEMA Flood Insurance Rate Map, page 17.** 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 wall will have little or no effect on the flood characteristics. This information is included in the Final EA.
6. **Section 4.1, Potential Short-Term and Long-Term Impacts and Mitigative Measures, page 19.** The City's "Coastal View Study" designates Mokuieia Beach Park a "significant stationary view". The project site is over 4,000 feet or approximately 1 mile east of Mokuieia Beach Park and is not located on a designated coastal roadway with coastal views. In terms of littoral processes, a "Coastal Engineering Assessment" report was completed in April 2004 by EKNA Services, Inc, which discusses in detail the project's impact on littoral processes. The report and its findings are included in the Final EA. That report states that "the existing seawall has no effect on the existing littoral processes at this site", and "the seawall does not affect lateral access along the beach".
7. **Section 5, Alternatives Considered, page 20.** In the Final EA, Appendix A contains a complete discussion of the justification and criteria for granting a shoreline setback variance. Also, Section 5 of the Final EA has been expanded to include a discussion of alternatives as presented in the April 2004 "Coastal Engineering Assessment" report prepared by EKNA Services, Inc. That same information is provided in detail below.  
  
Removal of the existing seawall is not a viable alternative since the house and related improvements existing on the parcel would be susceptible to erosion and wave damage. The house is approximately 15 feet at its closest point to the top of the seawall. The house was moved to its present location via a City approved May 2, 1963 Relocation Building Permit No. 2081472.

Replacing the seawall with a sloping revetment structure is also not a viable option because of the limited land area between the house and other improvements and the existing seawall. The Coastal Engineering Assessment states that there is no reason to expect that a sloping revetment would halt the ongoing erosion along this coast.

While large geotextile sand bags have been used as temporary erosion control in several areas, including Lanikai, 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.

Beach restoration and nourishment is commonly cited as a preferred alternative, however, this alternative is costly and is not an economically viable alternative for an individual residential property owner. It has been observed that governmental agencies responsible for recreational beach resources can rarely afford to perform major and ongoing beach nourishment for public beaches.


If "no action" is taken to approve the existing seawall, and if the seawall were to fail in the future, the owner would have to apply for permits to replace it with a shore protection structure. Therefore, the "no action" alternative is not a viable option.

8. **Section 6.1, Significance Criteria, page 22.** Item 12 in the Final EA has been expanded and includes a discussion of the City and County's 1987 Coastal View Study.

9. **Typographical Error.** The error has been corrected and now read 5,033 square feet.

Thank you for providing your comments on the Draft Environmental Assessment. Please contact me if you have questions or require further information.

Sincerely,

  
Donald Clegg, President