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GOVERNOR OF HAWAII

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BUREAU OF CONVEYANCES
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CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
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HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

REF:OCCL:MC

FILE NO.: OA-3589

180 Day Expiration Date: October 18, 2011

MEMORANDUM

To: Gary Hooser, Director
Office of Environmental Quality Control

From: Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

Subject: Draft Environmental Assessment (DEA) for Conservation District Use Application (CDUA) OA-3589 for the Repair and Reconstruction of a Seawall at Kaluahole, Waikiki, Oahu, TMK (1) 3-1-003:001

The Department of Land and Natural Resources has reviewed the draft EA for the subject project, and anticipates a Finding of No Significant Impact (FONSI) determination. Please publish notice of availability for this project in the May 8, 2011 issue of the *Environmental Notice*. We have enclosed one hard copy of the draft EA document and one copy of the CDUA. The enclosed disc also includes the Draft EA, as well as OCCL's letter of acceptance, the project summary, and publication form.

Should you wish to provide comments regarding this project, please respond by the suspense date noted above. If no response is received by the suspense date, we will assume there are no comments. Please contact Michael Cain of our Office of Conservation and Coastal Lands staff at 587-0048 should you have any questions.

Enclosures: *Conservation District Use Application*
Draft Environmental Assessment
Disc: DEA, OEQC Pub Form, Project Summary

DRAFT

Environmental Assessment

for a

Conservation District Use Application
Kainalu Seawall, Diamond Head
Honolulu, Hawaii

TMK (1) 3-1-003: 001

March 2011

Prepared for:
The Kainalu
Tropical Sands Apartments, Inc
711 Kapiolani Boulevard, Suite 700
Honolulu, HI 96813

Prepared by:
PlanPacific, Inc
1001 Bishop Street, Suite 2755
Honolulu, HI 96813

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General Information

Applicant:	The Kainalu 2801 Coconut Avenue Honolulu, HI 96815
Owner:	Tropical Sands Apartments, Inc 711 Kapiolani Boulevard, Suite 700 Honolulu, HI 96813
Consultant/Preparer:	PlanPacific, Inc 1001 Bishop Street, Suite 2755 Honolulu, HI 96813
Approving Agency:	State of Hawaii Department of Land and Natural Recourses Office of Conservation and Coastal Lands 1151 Punchbowl Street, Room 131 Honolulu, HI 96813
Anticipated Determination:	Finding of No Significant Impact (FONSI)
Tax Map Key:	3-1-033: 001
State Land Use:	State Land Use Urban
Zoning (LUO):	A-2 Medium Density Apartment, R-5 Residential
Special Designations:	Diamond Head Special District, State Conservation District

Proposed Action

1.1 Environmental Assessment Requirements

The proposed action is to replace a damaged sea wall system located in the Conservation District along the "Gold Coast" in Waikiki. The property is the location of The Kainalu apartment building and is owned by Tropical Sands Apartments, Tax Map Key 3-1-033:001.

1.2 Technical Characteristics

Along the southern property line/shoreline, The Kainalu apartment building utilizes a Concrete Ruble Masonry (CRM) wall as a barrier between the building and the wave energy. The CRM wall was coated in a gunite cap (permitted in 2005) when the wall began to crack and crumble do to erosion. The gunite cap proved to be a temporary solution as erosion persisted and the wall continued to degrade. The wall, which was built as a planter box at the time of original building construction (1958) when the shoreline extended further seaward, currently rests above the sand. In the most damaged section, the sand has receded from the shoreline causing the wall to sag and crack while wave energy removes the resulting debris, leaving a hollow shell of a wall collapsing under its own weight.

The proposed solution is to replace the existing CRM wall with a more appropriate CRM barrier that would deflect wave energy back towards the ocean and be designed to withstand the test of time. The replacement CRM wall would have a foundation that is to be laid on the existing bedrock below the surface to provide stability in an area of erosion. The wall face itself would be rough surfaced due to the CRM construction, dissipating energy, and the top of the wall would include a re-curved wave deflector sending remaining wave energy back towards the ocean. Construction methods can be seen in **appendix 3**.

1.3 Economic Characteristics

As the proposed project takes place on public property, the seawall replacement will be privately funded by the property owner. The economic benefits of the seawall are negligible, but will provide short-term construction employment.

1.4 Social Characteristics

The beach that fronts the project location is public property and is regularly used by surfers, fisherman, and beachgoers. HPD law enforcement and Fire rescue have also been known to access the location in times of need as well. The current state of the wall is a potential hazard to all frequent the area as debris from the failing wall has scattered the shoreline and the potential for collapse is a real possibility. The proposed project would eliminate these potential hazards providing a safer atmosphere to the community.

1.5 Environmental Characteristics

The Kainalu Seawall is located along the southern shoreline of the Diamond Head property. The property itself houses a concrete co-op apartment build, which takes up majority of the property aside from minor landscaping. The property is exposed to wind and small waves approaching from the south with most of the ocean energy seen in the summer months. Incoming wave size is limited due to the outer reef where larger waves break and generally dissipate before reaching shore. One portion of the

shoreline still retains sand suitable to be a comfortable beach, however another has eroded to the point where the waves consistently connect with the wall, resulting in a bedrock and sand mixture as well debris from the failing section of the wall.

1.6 Time Frame

Seawall construction would start in the winter of 2011/2012 and would require about three months to complete. This Environmental Assessment along with the Conservation District Use Application is the first step in the process.

1.7 Funding and Source

The project would be completely funded privately by the property owner. No public funds such as those by the City or State would be used for the proposed project.

2 Description of Affected Environment

2.1 Project Site

The project is located at a shoreline property at the base of Diamond Head (**see figures 1 and 2, Location Aerial**). 2801 Coconut Avenue.

Figure 1. Small Scale Location Aerial

Figure 2. Large Scale Location Aerial

The project site consists of single lot zoned R-5 Residential and A-2 Medium Density Apartment with an area of 17,665 square feet, or about 0.406 acres. The area of proposed work would take place in an estimated 1,500 square feet.

According to building plans for the Kainalu, the existing wall was constructed before the Kainalu, indicated as an existing retaining wall on the 1958 plans **(appendix 4)**. Historical photographs indicate that, when the wall was constructed, the shoreline was located much further seaward than it is at present, and the beach was wider. The wall was originally designed as a planter box and was never intended to function as a seawall. Continued erosion of sand from the beach and shoreline retreat has begun to undermine the wall as a result of high wave and seasonal conditions (see **figures 5-9**, Photos of Shoreline Recession). In 2005, the City & County of Honolulu authorized the installation of a gunite coating over the wall intended as reinforcement (see **appendix 6**, 2005 SMA Permit). The State of Hawaii was not consulted and did not authorize the gunite, thus, parts of the gunite are an encroachment onto State owned land that require removal. Encroachments consist of two sets of stairs extending past the property line, a filled in portion of an existing planter box, and a large portion of the original retaining wall which was subterranean when the State acquired the bordering land and has since been revealed by erosion. Discussions and research with the Department of Land and Natural Resources Land Division has revealed that all of the structures that extend makai of the shoreline were conveyed to the State as part of a quit-claim deed in 1959. The State however views these as encroachments and they will be removed entirely during the construction process.

The continued erosion of sand appears to be causing differential settling, which in turn, is causing the wall and gunite to crack and pull away from the apartment building. It is feared that if erosion continues, the wall will collapse and seawater inundation of the Kainalu support pilings may cause the building to become unstable and collapse.

Shoreline along Southern property boundary.


Shoreline and public beach.


Shoreline and eroded section of beach.

Public beach and beach access.

Eroded section in 2007. People accessing shoreline to the East along rocks.


Eroded section in 2009 during high tide wave action.

Figure 3. Shoreline Photos

Crack on top surface. Wall is hollow under surface.

View West

View East

Cracking in gunnite coating. Wall is hollow behind surface.

Separation from building face.

Crumbling stairs to be removed.

Erosion under encroaching section to be removed

Figure 4. Photos of Wall Damage

1980

2002

2004

2009

Figure 5. Eastern Beach Erosion

Figure 6. Shoreline Recession Aerial 2010

Figure 7. Shoreline Recession Aerial 2004

Figure 8. Shoreline Recession Aerial Circa 1955

Figure 9. Shoreline Recession Aerial Circa 1949

2.2 Shoreline Use and Zoning

The proposed work to be done resides in an area landward of the property line, but seaward of the shoreline as determined by a site visit by the DLNR on October 19, 2009. "Shoreline" means the upper reaches of the wash of the waves, other than storm and seismic waves, at high tide during the season of the year in which the highest wash of the waves occurs, usually evidenced by the edge of vegetation growth, or the upper limit of debris left by the wash of the waves (HRS 205A-1). This puts the proposed

project in the State Conservation District, outside of the Special Management Area (see **appendix 7**, SMA Exemption Letter). The proposed project will be subject to HAR 13-5.

A shoreline certification will take place during the construction phase when the prohibiting encroachments have been removed.

The adjacent public property is actively used by the community as access along the shoreline to beaches and fishing areas, and to the ocean for surfing and diving sites.

Figure 10. Encroachments and

2.3 Flora and Fauna

Vegetation on the subject property consists primarily of potted plants and alien weeds. Faunal species including cats, rats, and mice that are common to urban environments are probably present at the site. Avifaunal species common to urban areas such as the ring neck dove and mynah are also likely to be present.

No federally protected, threatened or endangered species of plants or animals are known to inhabit the project area, nor has any critical habitat been identified.

2.4 Historical, Archeological, and Cultural Resources

A 1929 land court map indicates that the property has been developed residentially since at least 1929. Do to the fact that the property has been developed with a residential home since 1929, and subsequently redeveloped, it is unlikely that archaeological artifacts exists on the property. Any historic sites that might have been present would most likely have been destroyed during site development as private residences. Subsurface remains and artifacts are not a possibility since the existing residential building possesses a subterranean parking garage, thus unlikely destroying any artifacts that may have existed prior to construction.

3 Alternatives

3.1 Alternative 1: No Action

"No Action" would be an unacceptable alternative because erosion and further wall destruction would continue and create an unsafe environment for the property owners as well as those using the adjacent public property. The wall would eventually collapse, and sea water would eventually inundate the building foundation as well as the parking garage putting the building structure at risk. Debris from the collapsed sea wall would inevitable end up on the adjacent State land creating a hazard for the public.

3.2 Alternative 2: Remove Existing Wall System without Replacement

Removal of the existing wall without replacement would expose the building to the full effect of the oceans energy and inevitably result in severe damage to the building. Eventually erosion and wave energy would threaten the structural integrity of the building resulting in collapse. Negatively affected would be the property owners, neighboring property owners, and those who use the adjacent public property. Removal of the wall without replacement is not an economically viable or responsible alternative.

3.3 Alternative 3: Concrete Rubble Masonry (CRM) Seawall

A CRM wall is the preferred alternative (see **appendix 2** Engineering Drawings). Removal of existing seawall and replacement with a CRM seawall would require (1) removal of the current wall entirely, including both damaged and undamaged sections; (2) sand excavation for a new wall footing; (3) construction of a new CRM wall.

Removal of the existing wall and construction of a new wall would be difficult without moderately heavy equipment and a barrier to work behind. Installation of a temporary sand bag structure will be put in place to (1) protect the exposed building from wave run-up after the existing wall is removed; (2) function as an equipment platform to keep equipment out of the water during construction (3) function as a BMP barrier to prevent discharge into State waters. Equipment such as a Bobcat mini excavator will be required for demolition and removal of old wall material, as well as pneumatic tools and electric pumps for dewatering and removal of silt and sediment.

3.4 Alternative 4: Reinforced Concrete Seawall

As with the CRM alternative, a reinforced concrete wall will require the removal of the existing wall and installation of the new wall in similar methods. This would also be a viable alternative and reasons for choosing CRM over reinforced concrete are as follows:

- Longevity- The CRM has less rebar which will reduce corrosion over time.
- Ease of construction- CRM is easier to construct on uneven surfaces. CRM is also easy to mix on site while reinforced concrete would need to be pumped which risks complications.
- Duration- Reinforced concrete has longer cure times, increasing dewatering operations, labor, supervision, etc.
- Aesthetics- CRM will look better and be consistent with the original wall construction.

3.5 Alternative 5: Replacement of Damaged Sections Only

Replacement of only damaged sections rather than the entire wall would, in the short term solve the problems of the failed section of seawall and would be most cost effective. However, with continual erosion the replacement of other wall sections is inevitable. To replace sections of failing wall as they occur will not only cost significantly more in repeated initial setup cost, but will total more time that actual construction will be occurring, negatively impacting public use of the area as well as requiring that the residents of the property will waiting for the next phase of construction. Also, the permitting process will need to be repeated in each phase, resulting in an inefficient process for both the State agencies as well as the property owners.

4 Potential impacts and Mitigation

4.1 Flora, Fauna, and Habitat Impacts

No federally protected, threatened or endangered species of plants or animals are known to inhabit the project area, nor has any critical habitat been identified. In the construction area, removal of material from the collapsed wall will suspend sediment in the water. BMPs will minimize any temporary potential effects. Installation of a silt fence along the seaward/outside edge of the temporary sandbag structure will assist with prevention of discharge into State waters. Installation of dust barrier fencing along the northwest and south sides of the temporary sandbag barrier will assist in the prevention of any airborne particles. Demolition and removal of the existing wall structure will be done in phases to match the ability of dewatering/silt removal to minimize any seepage.

4.2 Historical, Archeological, and Cultural Resource Impacts

There are no historic sites in the immediate vicinity of the project area, nor have any archeological artifacts been noted. The resource that is the ocean and beach area will be impacted temporarily by the work area, protective sandbags, construction equipment during the construction phase. Alternatives 1 and 2, if chosen, will theoretically let destruction to take its course with the property, and inevitably severely impact the beach and ocean in the immediate area.

4.3 Mitigation

Under alternatives 3, 4, and 5, Best Management Practices will be utilized to minimize water pollution during construction. These practices include silt curtains or other barriers and sandbags to prevent potential runoff. Sand used in the temporary sandbags will be of consistent variety with existing sand. Unused construction material and any debris will be removed from the shoreline area.

5 Significance Criteria

The expected determination is a Finding of No Significant Impact (FONSI), and significance analysis is provided below.

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

The proposed project does not substantially change existing property configuration or use, nor will it cause loss or destruction of any natural or cultural resources. The project will protect the ocean resource from seawall failure and the erosion of soil material and debris into the ocean.

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

The proposed development site and its surroundings are currently zoned for residential use and the proposed work will allow the recognized use to continue. The proposed project will help prevent soil and debris from being deposited into the public ocean resource allowing for continued access by the public.

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 proposed project does not conflict with the Environmental Policies established in Chapter 344, HRS. The proposed project will not affect the State's natural resources, and it will maintain the quality of life for residents by maintaining the status quo of private properties and public resources.

4. Substantially affects the economic or social welfare of the community or state.

The proposed project will have no major affect on the socio-economic welfare of the community or the State other than provide income for consultants and contractors. However, the repairs will be a large financial burden to the property owners that will only increase if left unattended. Without repairs, severe damage would impact the property owners, neighbors, and those using the adjacent public property.

5. Substantially affects public health.

The only public health issue other than danger if left unattended is the potential for water pollution. The project is small and short term, and Best Management Practices will ensure to minimize any affects.

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

The proposed project is on a private lot with no public facilities and will not serve to

increase density in any way.

7. Involves a substantial degradation of environmental quality.

Without repair, there will be some local degradation to the adjacent beach as well as water quality. The proposed project will use Best Management Practices to mitigate any potential short term affects during the construction phase.

8. Is individually limited but cumulatively has considerable effect on the environment, or involves a commitment for larger actions.

The proposed project is individually limited, and will have an insignificant affect on the environment, and does not involve a commitment for larger actions.

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

There are no endangered plants or animal species located on the subject property.

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

Construction may produce the nearby waters to be turbid with silt, however, Best Management Practices will be used to minimize this. Temporary impacts on noise levels will occur due to the use of construction machinery but will not be of an unacceptable level. These impacts will be temporary and negligible.

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, freshwater, or coastal waters.

The proposed project is located in flood zone AE, the 100-year floodplain. Winter months in Hawaii are when the south side tides are lowest. Flooding or tsunamis are not anticipated but cannot be ruled out. Erosion has been the primary cause for the need to replace the existing wall and will likely continue independently of this project.

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

The proposed project is relatively small and located below an existing multi-story apartment building and will be replacing an existing wall. It will not affect any public scenic vistas or view planes identified by the County or State.

13. Requires substantial energy consumption.

The proposed project will not increase electrical demand. Construction activities will require fuel resources for machinery.

6 Permits and Approvals

The following are a list of related permits and approvals the client will be seeking concurrently:

Conservation District Use Application, State of Hawaii, Department of Land and Natural Recourses Office of Conservation and Coastal Lands

Certified Shoreline Approval, State of Hawaii, Department of Land and Natural Recourses Office of Conservation and Coastal Lands

Army Corps of Engineers **Nationwide Permit**

Dewatering Permit, State of Hawaii, Hawaii Department of Health

APPENDICES

APPENDIX 1. Survey Map

1

CONCRETE WALL, GATE AND TILE WALL

2

TILE WALL AND BUILDING FACE

3

BUILDING FACE

4

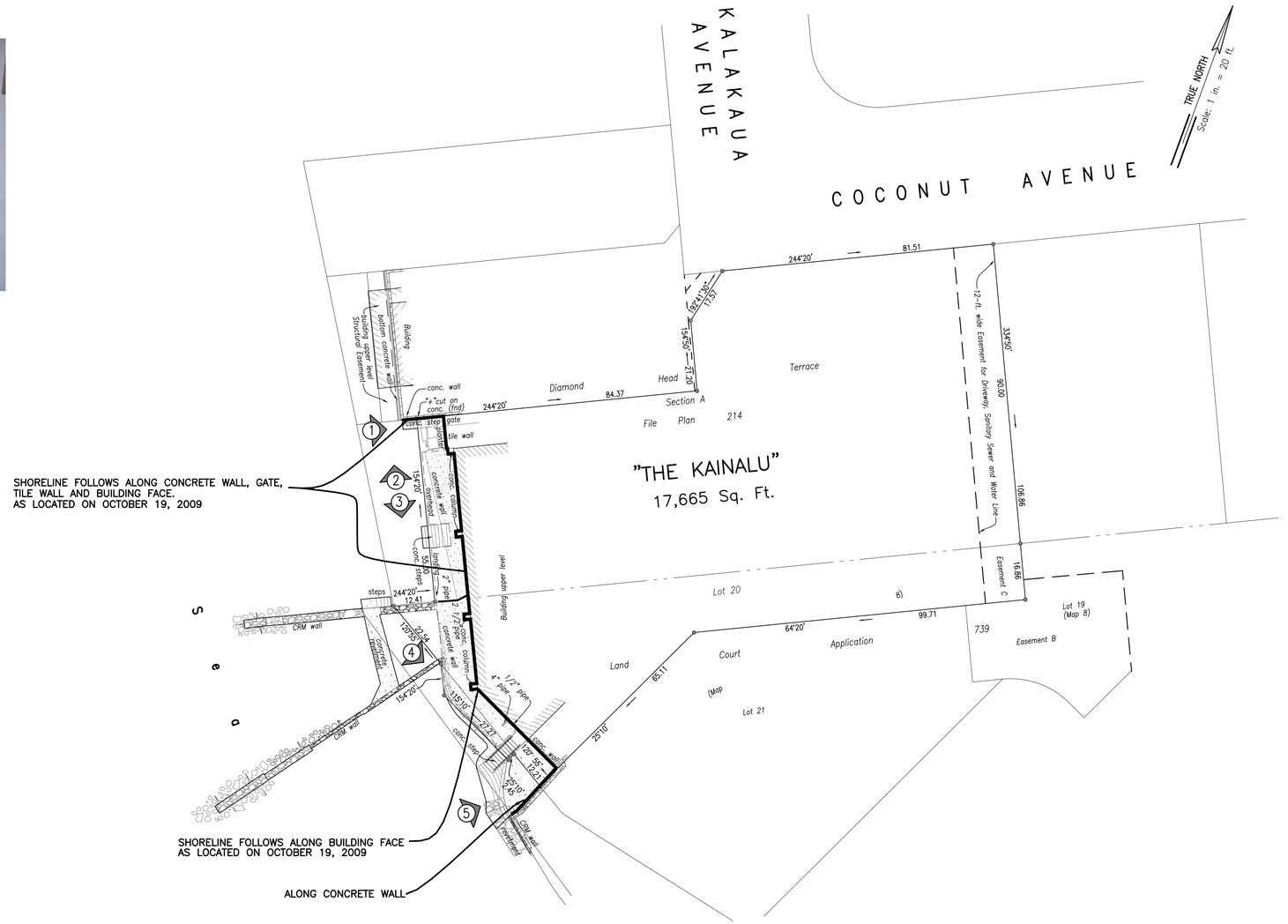
BUILDING FACE AND TOP BREAK

5

CONCRTE WALL

SHORELINE PHOTOS

TAKEN: OCTOBER 19, 2009 AT 9:30 AM



SHORELINE SURVEY MAP

"THE KAINALU"

BEING LOT 20 (MAP 8) OF LAND COURT APPLICATION 739,
LOT 64-A AND PORTIONS OF LOTS 63 AND 65
OF THE "DIAMOND HEAD TERRACE" FILE PLAN 214
ALSO PORTION OF ACCRETION TO LOT 20 OF LAND COURT APPLICATION 739

WAIKIKI, HONOLULU, HAWAII

Scale: 1 in. = 20 ft.

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

GARY S. TAKAMOTO
LICENSED PROFESSIONAL LAND SURVEYOR
No.7946
HAWAII, U.S.A.

This work was prepared by me or under my direct supervision

By: Gary S. Takamoto
Licensed Professional Land Surveyor
Certificate Number 7946
License Expires 4/10

Owner: Tropic Sands Apartments, Inc.

Property Address: 2801 Coconut Avenue
Honolulu, Hawaii, 96813

Rev. March 12, 2010
Rev. October 20, 2009
Rev. July 2, 2009

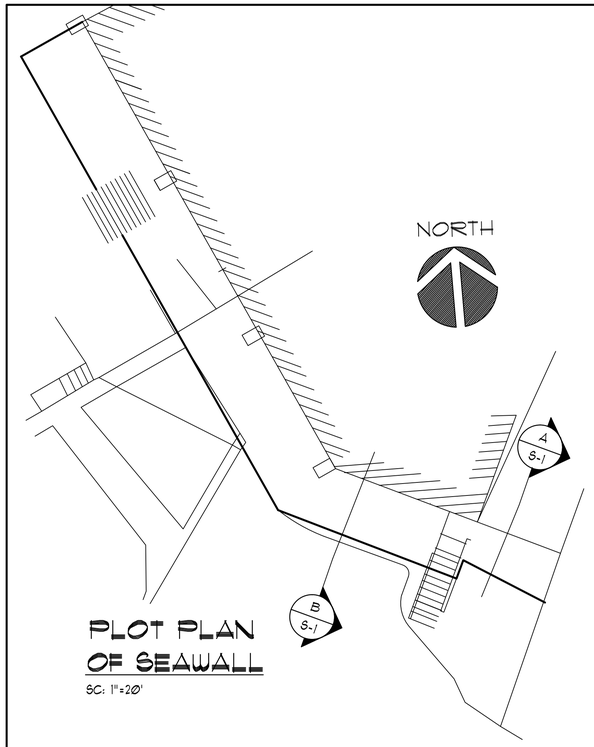
21" x 32" = 4.7 Sq. Ft.
FB No. 1831
March 1, 2008

FN: 08036shoreline March 12 2010.dwg

Tax Map Key: 3-1-33: 1
Job No. 08036

CONTROLPOINT SURVEYING, INC.
1150 SOUTH KING STREET, SUITE 1200
HONOLULU, HAWAII 96814

APPENDIX 2. Engineering Drawings



PLOT PLAN OF SEAWALL

SC: 1"=20'

GENERAL NOTES

1. ALL WORK SHALL CONFORM TO THE "STANDARD SPECIFICATION FOR PUBLIC WORKS CONSTRUCTION OF THE CITY AND COUNTY OF HONOLULU" (LATEST).

2. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE DRAWINGS AND SPECIFICATIONS.

3. LOCATE FOOTINGS ON SOLID NON-ERODABLE STRATA WHICH IS ESTIMATED TO BE AT -3.0' MSL. NOTIFY ENGINEER IF MORE THAN 12" DIFFERENT THAN ESTIMATE.

4. WEEPHOLES, 4 INCHES IN DIAMETER, SHALL BE PLACED AT CORNERS AND SPACED NOT MORE THAN 6 FEET ON CENTER

5. BACKFILL SHALL CONSIST OF CLEAN SAND, 3B FINE OR OTHER APPROVED NON-EXPANSIVE GRANULAR MATERIAL. COMPACTION SHALL NOT EXCEED 95%. BACKFILL SHALL BE WRAPPED IN A GEOTEXTILE FABRIC SUCH AS SUPAC 4NP. LAP FILTER FABRIC 2'-0" MIN.

6. ALL WORK SHALL BE PERFORMED MAUKA OF THE CERTIFIED SHORELINE.

7. DURING THE CONSTRUCTION PERIOD THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF THE BUILDING AND THE PROTECTION OF ADJACENT PROPERTIES, STRUCTURES FROM DAMAGE. THE CONTRACTOR SHALL PROVIDE ADEQUATE SHORING, BRACING AND GUYS IN ACCORDANCE WITH ALL NATIONAL, STATE AND LOCAL SAFETY ORDINANCES.

8. ALL ERECTION, SHORING AND EXCAVATION PROCEDURES SHALL CONFORM TO OSHA STANDARDS. ANY DEVIATION MUST BE APPROVED BY OSHA PRIOR TO ERECTION.

9. THE CONTRACTOR SHALL NOTIFY TANIMURA & SSOCIATES (PH. 536-7692) TWO (2) WORKING DAYS PRIOR TO BEGINNING ANY WORK WHICH WILL CONCEAL STRUCTURAL ELEMENT SUCH AS POURING CONCRETE (CONCEALING REINFORCING).

10. RAILINGS, LADDERS, OTHER EXPOSED METAL ITEMS AND THEIR APPERTENANCES SHALL BE STAINLESS STEEL. PROVIDE ASTM A316 STAINLESS STEEL WHEN AVAILABLE.

REINFORCED CONCRETE

1. ALL CONCRETE WORK SHALL CONFORM TO ACI 318-05.

2. ALL CONCRETE SHALL BE NORMAL WEIGHT (150 PCF) WITH AGGREGATES CONFORMING TO ASTM C-33. UNLESS OTHERWISE NOTED, THE COMPRESSIVE STRENGTHS OF CONCRETE AT 28 DAYS AND MAXIMUM AGGREGATE SIZES SHALL BE AS FOLLOWS:

	STRENGTH	AGGREGATE SIZE
ALL	5000 PSI	3/4"

3. MAXIMUM WATER-CEMENT RATIO SHALL NOT EXCEED 0.45. CONCRETE SHALL CONTAIN 5% SILICA FUME BY WEIGHT OF CEMENT AND 3 GALLONS OF CALCIUM NITRITE PER CUBIC YARD. IN ADDITION, TREMIE CONCRETE SHALL CONTAIN 10 FLUID OUNCES OF THE LIQUID ANTI-WASHOUT ADMIXTURE, RHEOMAC UW 450 PER 100 POUNDS OF CEMENTITIOUS MATERIAL. THE USE OF A SUPERPLASTICIZING ADMIXTURE IS RECOMMENDED FOR THE PUMP MIX.

4. ALL REINFORCING STEEL SHALL BE HOT-DIPPED GALVANIZED AND CONFORM TO ASTM A615 GRADE 60.

5. UNLESS OTHERWISE NOTED, SPLICES, LAPS, DOWEL EXTENSIONS AND EMBEDMENTS SHALL BE 45 BAR DIAMETERS MINIMUM.

6. ALL REINFORCING BARS MARKED CONTINUOUS (CONT.) ON THE PLANS SHALL BE LAPPED 40 BAR DIAMETERS MINIMUM.

7. STAGGER ALL SPLICES WHERE POSSIBLE.

8. REBARS SHALL BE SUPPORTED, BENT AND PLACED AS PER "MANUAL OF STANDARD PRACTICE FOR DETAILING CONCRETE STRUCTURES" ACI 315 (LATEST).

9. MINIMUM COVERFOR REBARS IN CAST-IN-PLACE CONCRETE SHALL BE 2".

10. AT TIME CONCRETE IS PLACED, REINFORCING SHALL BE FREE FROM MUD, OIL, LAITANCE OR OTHER COATINGS ADVERSELY AFFECTING BOND CAPACITY.

11. WHEN REBARS OR THREADED RODS ARE DRILLED AND GROUTED IN PLACE USE SIMPSON EPOXY-TIE ADHESIVE. HOLE DIAMETER SHALL BE AS PER MANUFACTURER'S RECOMMENDATIONS. HOLES SHALL BE BRUSHED AND AIR BLOWN TO REMOVE LOOSE PARTICLES. MANUFACTURER'S REPRESENTATIVE SHALL BE PRESENT TO SUPERVISE INSTALLATION OF FIRST BAR OR ROD.

12. APPLY A BROOM FINISH TO STEPS AND WALKING SURFACES IMMEDIATELY AFTER FLOAT FINISHING BY BROOMING WITH FIBER-BRISTLE BROOM PERPENDICULAR TO MAIN TRAVEL ROUTE.

CRM WALLS

1. ALL WORK SHALL CONFORM TO THE "HAWAII STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" (LATEST).

2. ALL STONES SHALL BE CLEAN AND FREE FROM DIRT OR LOOSE MATERIAL.

3. THE ENTIRE WALL SHALL BE GROUTED SOLID. GROUT AND MORTAR SHALL HAVE MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI AT 28 DAYS.

4. THE FIRST COURSE OF STONES SHALL BE SET INTO A 2" MINIMUM THICK LAYER OF FRESH BEDDING MORTAR WHEN NO CONCRETE BASE IS PROVIDED. WHERE A CONCRETE BASE IS PROVIDED, SET STONES INTO CONCRETE BEFORE THE CONCRETE SETS.

STEEL GRATING

1. GRATING SHALL CONSIST OF 1-1/4"x3/16" MAIN BARS @ 1-3/16" o.c. w/ 1/2"ø CROSS BARS @ 4" o.c.

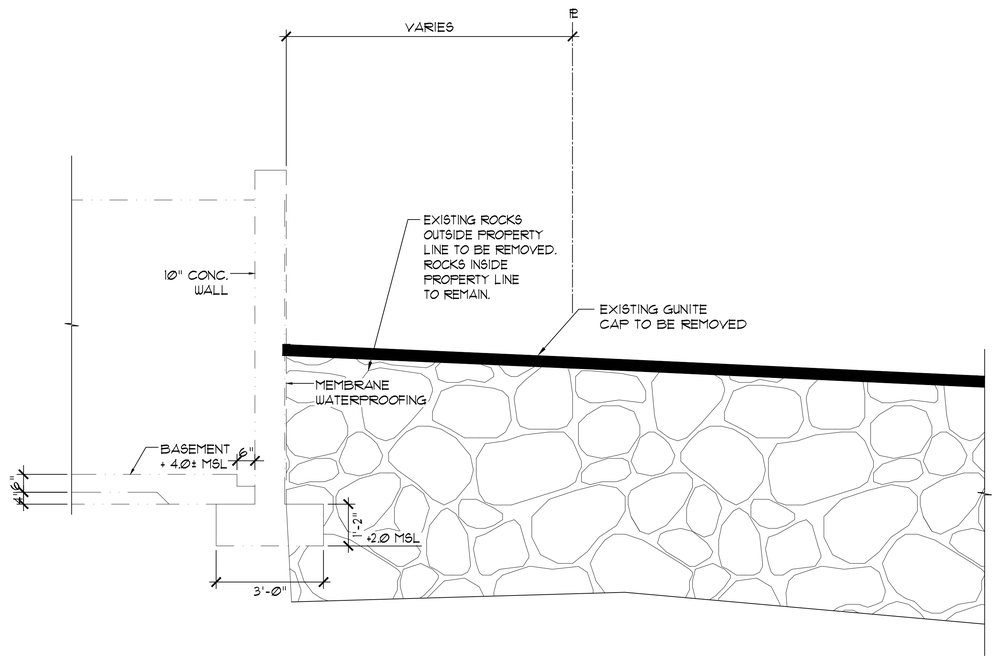
2. MAIN BARS SHALL SPAN FROM WALL TO WALL.

SCOPE OF WORK

1. REMOVE THE EXISTING CONCRETE STAIRS THAT EXTEND BEYOND THE BUILDING LINE ONTO THE BEACH.

2. EXCAVATE AND INSTALL THE NEW SEAWALL AND MISCELLANEOUS ITEMS SHOWN OF THESE DRAWINGS. (REMOVAL AND RE-INSTALLATION OF ANY ELECTRICAL CONDUITS SHALL BE THE RESPONSIBILITY OF THE CONDOMINIUM ASSOCIATION. CONTRACTOR SHALL COORDINATE WITH THE MANAGER AS REQUIRED.)

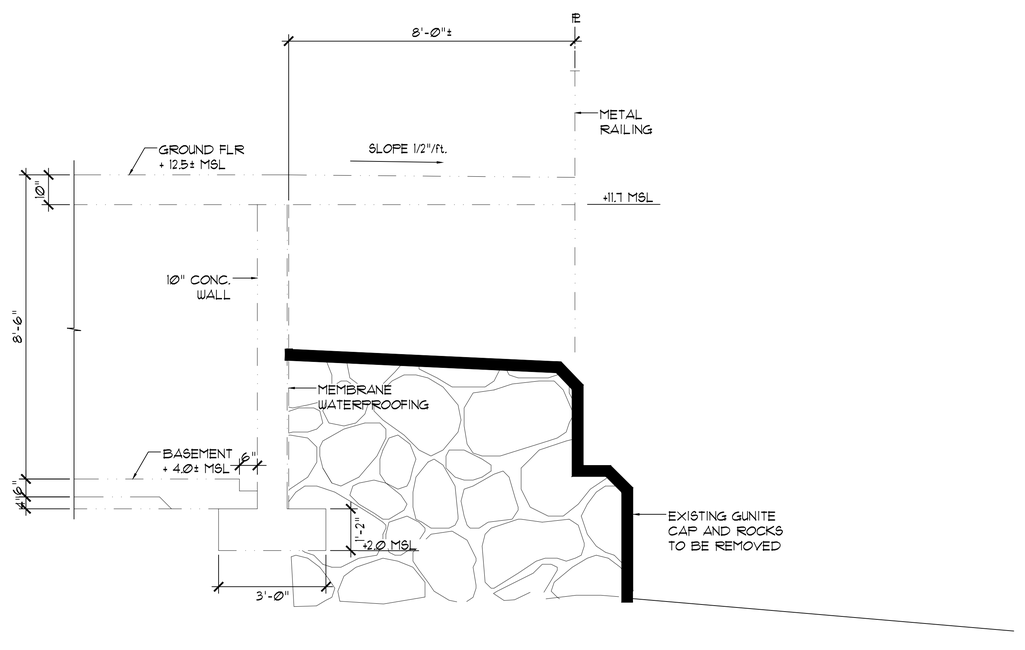
3. MOBILIZATION, DEMOBILIZATION AND CLEANUP.



EXISTING SECTION AT DRIVEWAY ACCESS

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

A / S-1



EXISTING SECTION AT BALCONY

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

B / S-1

REVISIONS	BY

THOMAS Y. TANIMURA LICENSED PROFESSIONAL ENGINEER No.4926-S HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION

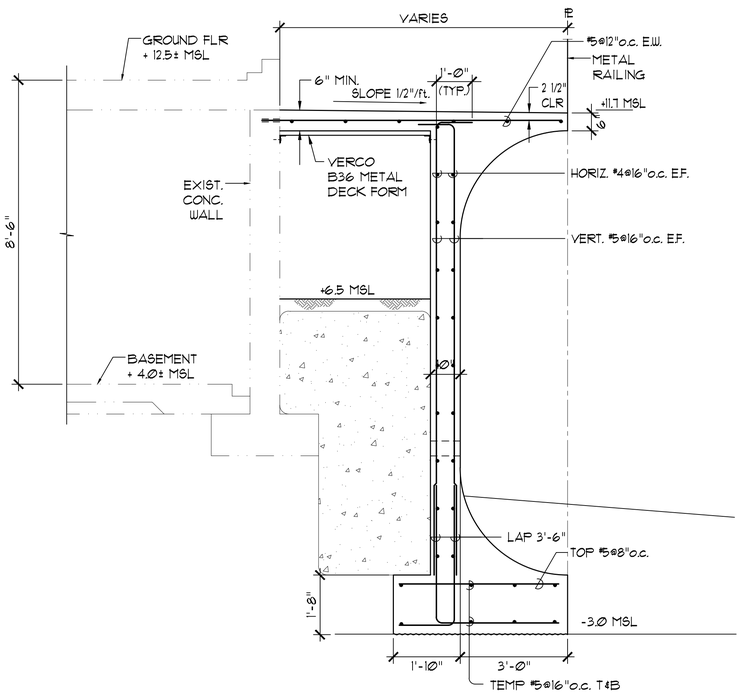
Expiration Date of the License: 04/30/12

KAINALU APARTMENTS SHORELINE PROTECTION
WAIKIKI-DIAMOND HEAD, OAHU, HAWAII
TMK: (1) 3-1-033:001

TANIMURA & ASSOCIATES, INC.
CONSULTING STRUCTURAL ENGINEERS
925 Bethel Street, Suite 309 • Honolulu, Hawaii • 96813
Phone (808) 536-7692 • Fax: (808) 537-9022

NOTES AND EXISTING PLAN & SECTIONS

DRAWN: TT
DATE: -
SCALE: AS NOTED
SHEET: S-1



SEAWALL SECTION AT DRIVEWAY ACCESS (A)

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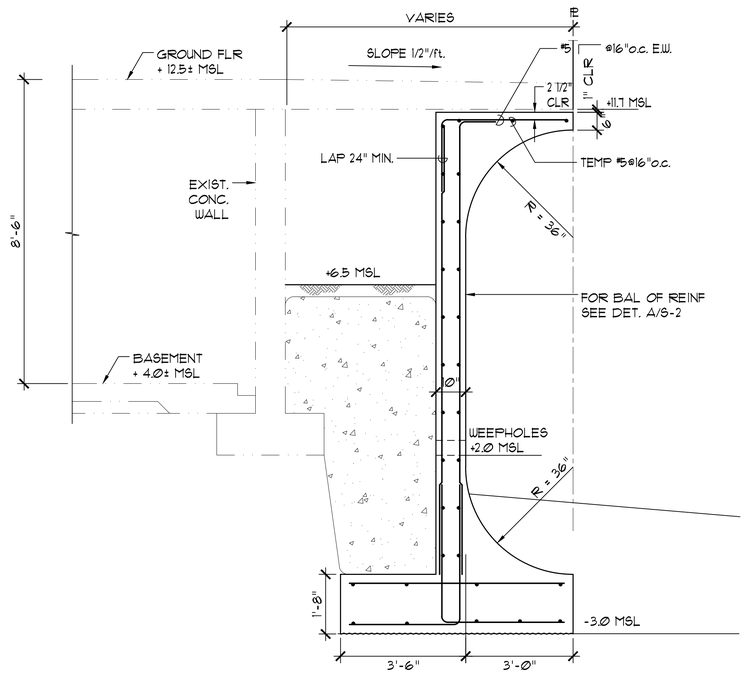

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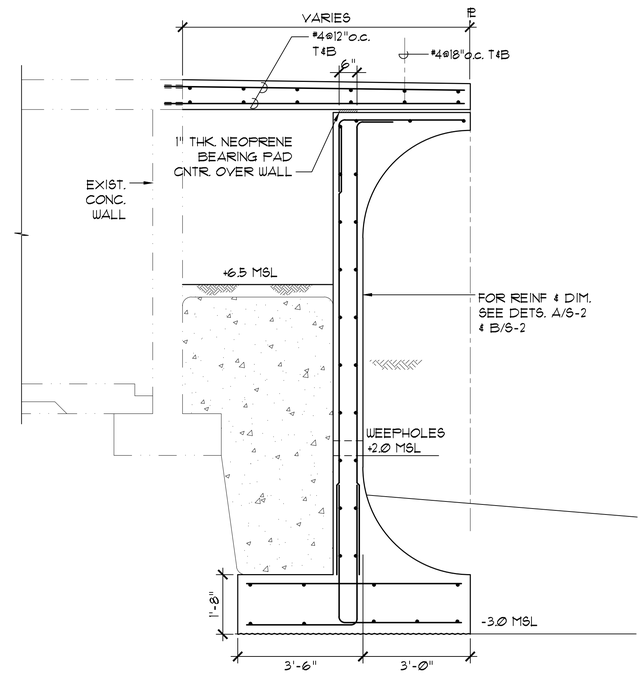

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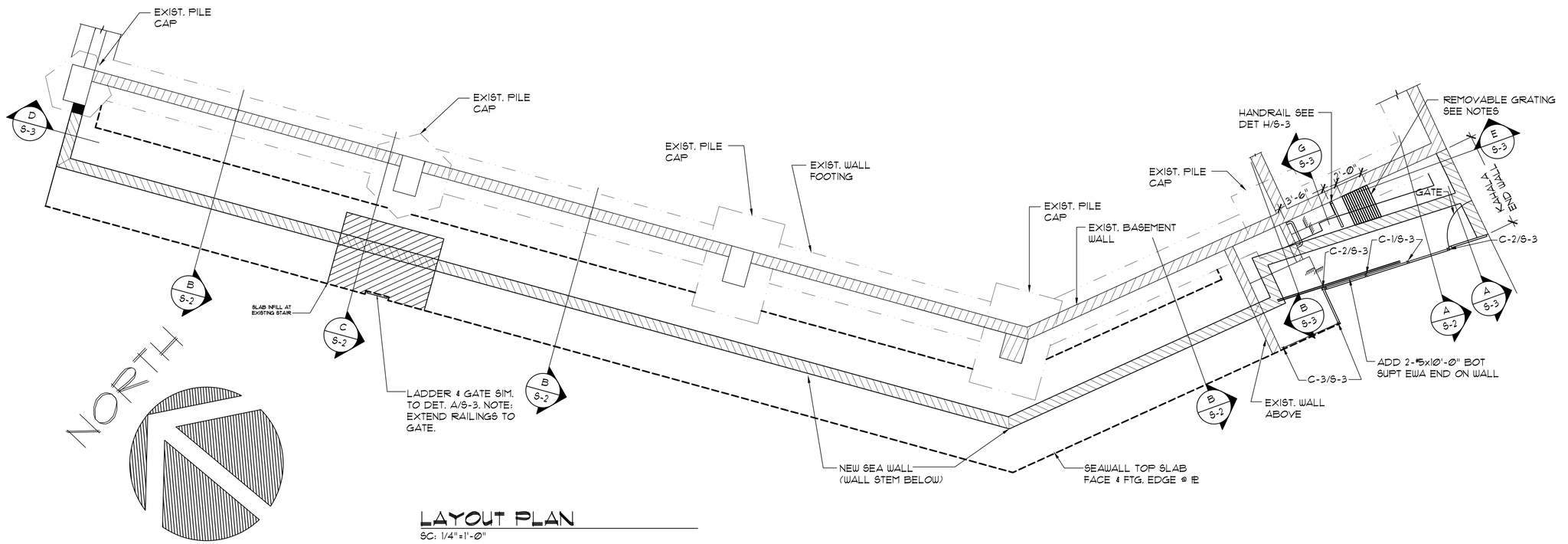

LAYOUT PLAN

SC: 1/4"=1'-Ø"

REVISIONS	BY

Y. TANIMURA THOMAS LICENSED PROFESSIONAL ENGINEER No.4926-S HAWAII, U.S.A.

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Ty Tanimura

04/30/12

Expiration Date of the License

KAINALU APARTMENTS SHORELINE PROTECTION

WAIKIKI-DIAMOND HEAD, OAHU, HAWAII

TMK: (1) 3-1-033:001

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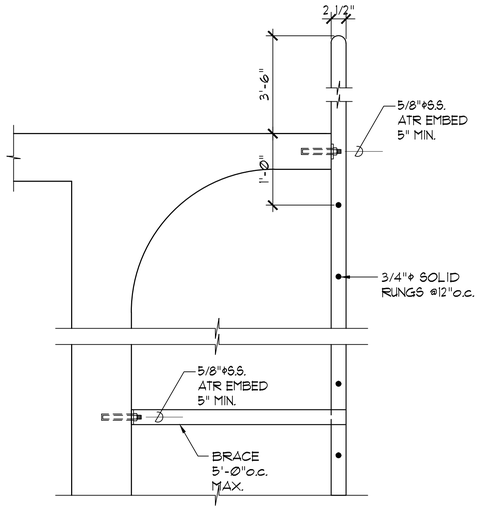
SEAWALL PLAN & SECTIONS

DRAWN: TT

DATE: -

SCALE: AS NOTED

SHEET: S-2



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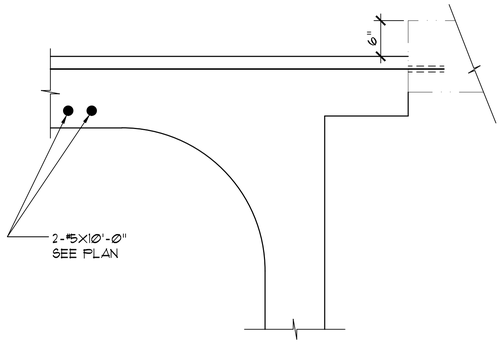
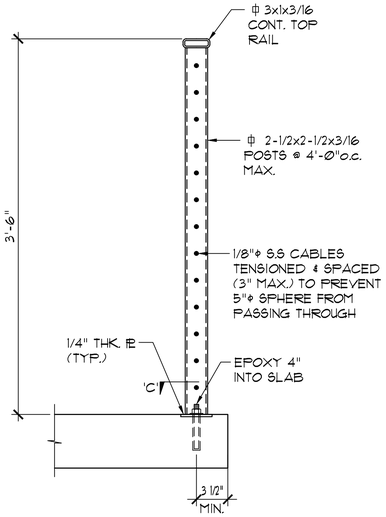
SC: 1"=1'-0"

A S-3



SECTION AT APT. EGRESS
SC: 1"=1'-0"

B S-3



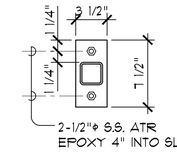
GATE NOTES:

1. GATE POST SHALL BE SIMILAR CONSTRUCTION TO FENCE POST w/ 'C-1' BASE.

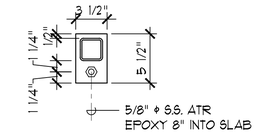
2. GATE FRAME SHALL BE FROM #2-1/2x2-1/2x3/16 w/ STAINLESS STEEL CABLES SIMILAR TO RAILINGS.

RAILING & GATE DETAILS & NOTES
SC: 1 1/2"=1'-0"

C S-3



DET. 'C-1'



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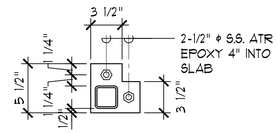

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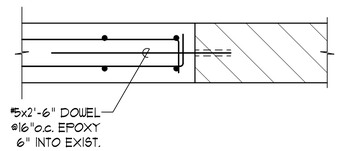
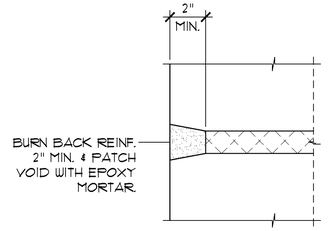


NOTE: CLEAN & ROUGHEN CONTACT SURFACE PRIOR TO POUR.

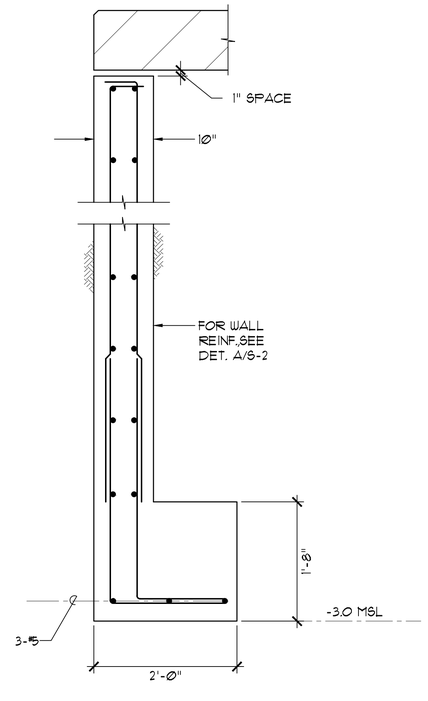
CONNECTION - NEW SLAB TO EXIST.
N.T.S.

K S-3



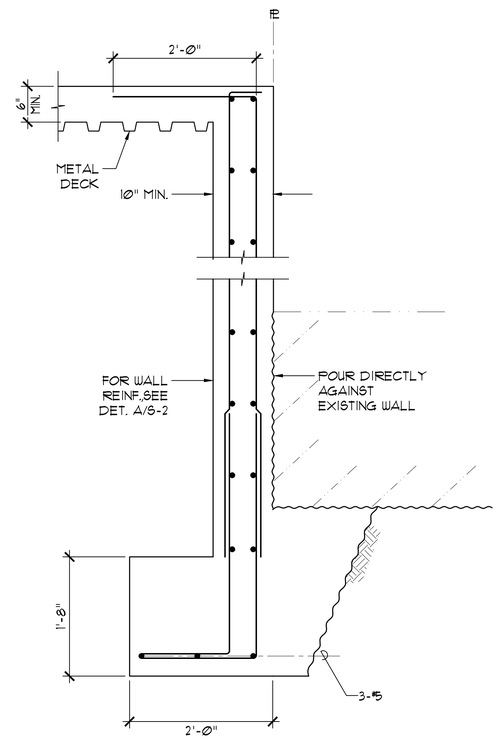
DETAIL
NOT TO SCALE

J S-3



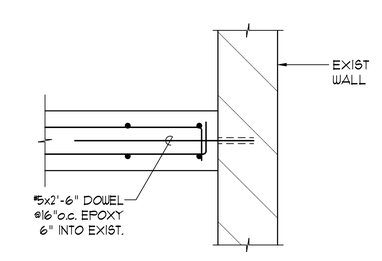
WAIKIKI END WALL DETAIL
SC: 1"=1'-0"

D S-3



KAHALA END WALL DETAIL
SC: 1"=1'-0"

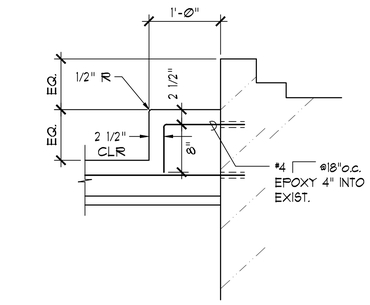
E S-3



NOTE: CONDITION AT FOOTING SIMILAR.

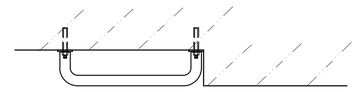
CONN. WALL/FTG. TO EXIST.
N.T.S.

F S-3

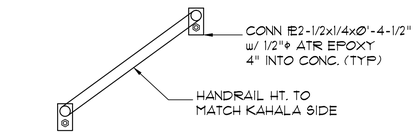


SECTION AT STEP
SC: 1"=1'-0"

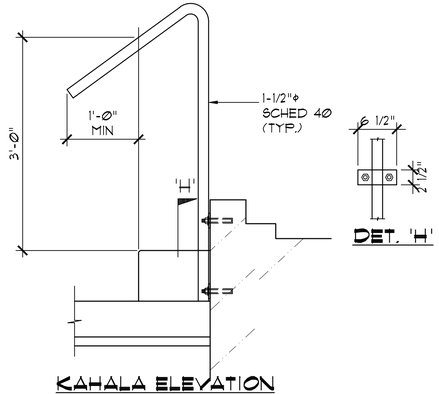
G S-3



WAIKIKI PLAN



WAIKIKI ELEVATION



DET. 'H'

KAHALA ELEVATION

HANDRAILS @ STEP
SC: 1"=1'-0"

H S-3

REVISIONS	BY

THOMAS Y. TANIMURA LICENSED PROFESSIONAL ENGINEER No.4926-S HAWAII, U.S.A.

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Ty Tanimura

04/30/12

Expiration Date of the License

KAINALU APARTMENTS SHORELINE PROTECTION
WAIKIKI-DIAMOND HEAD, OAHU, HAWAII
TMK: (1) 3-1-033:001

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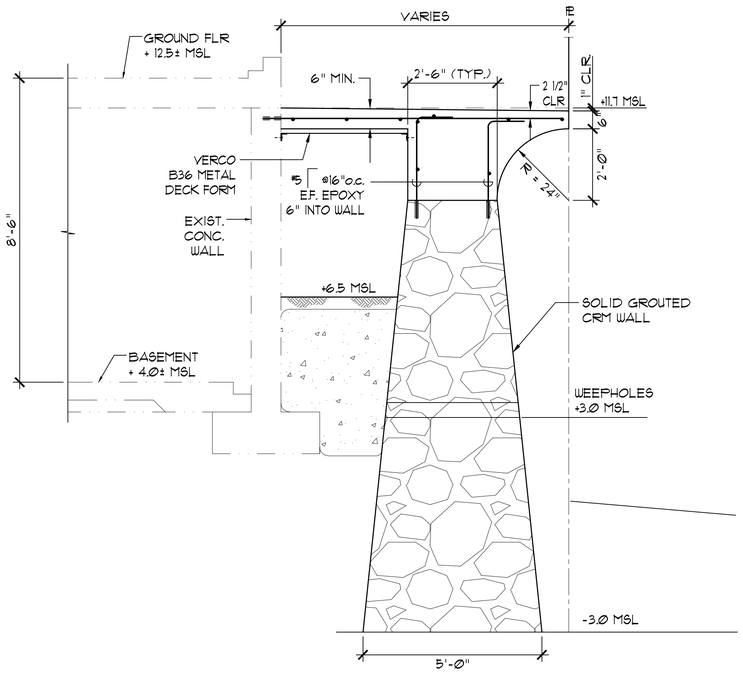
DETAILS

DRAWN TT

DATE -

SCALE AS NOTED

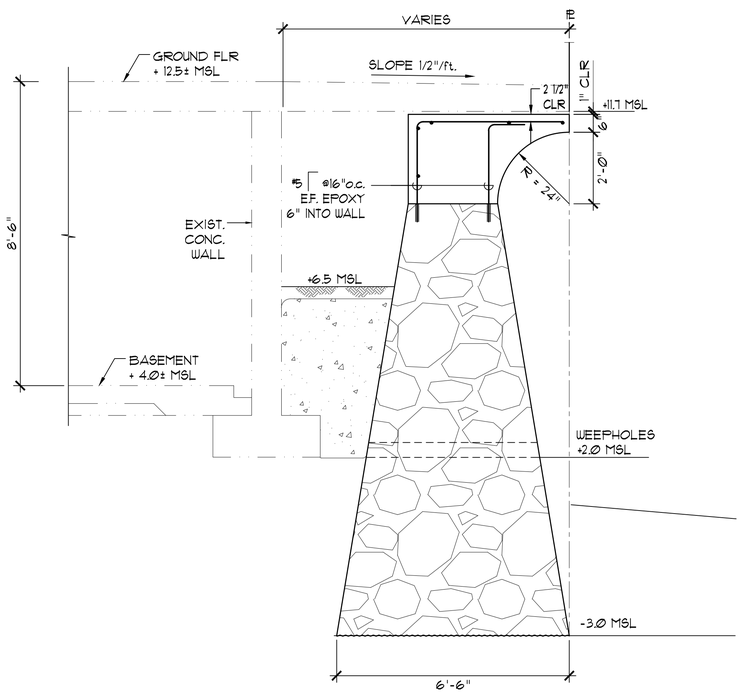
SHEET S-3



SEAWALL SECTION AT DRIVEWAY ACCESS

SC: 1/2"=1'-Ø"

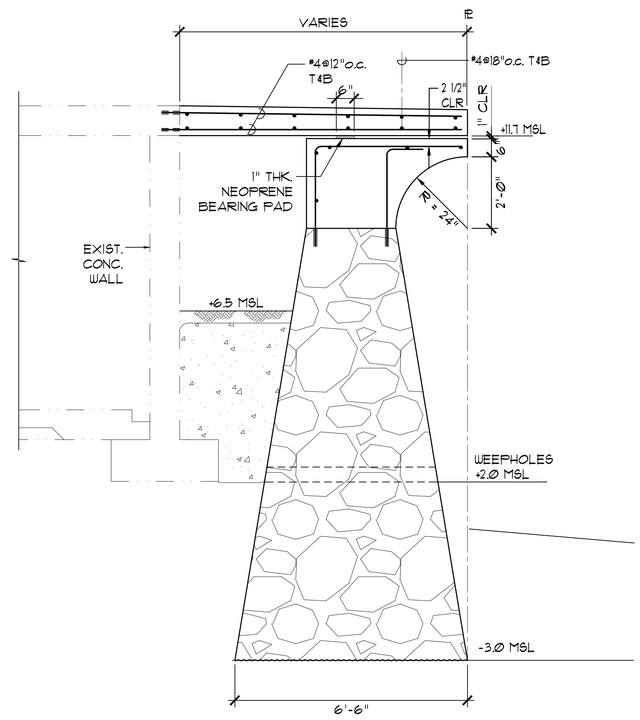
A
S-4



SEAWALL SECTION AT BALCONY

SC: 1/2"=1'-Ø"

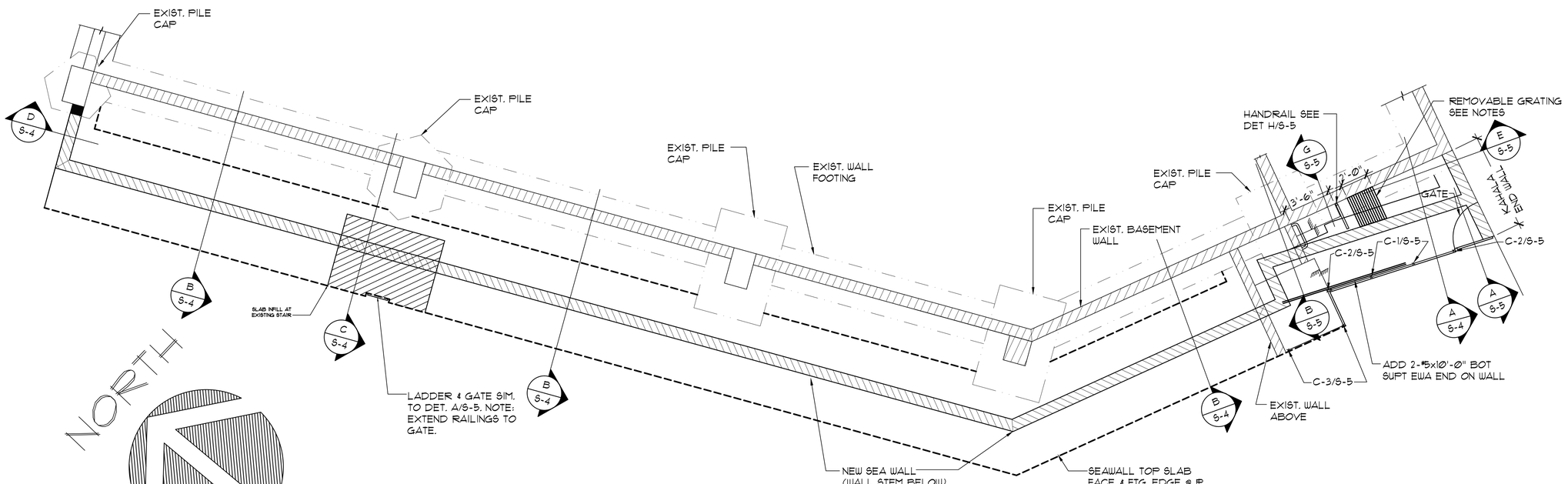
B
S-4



SEAWALL SECTION AT BALCONY

SC: 1/2"=1'-Ø"

C
S-4



LAYOUT PLAN

SC: 1/4"=1'-Ø"

REVISIONS	BY

Y. TANIMURA
HAWAII, U.S.A.
LICENSED PROFESSIONAL ENGINEER
No.4926-S

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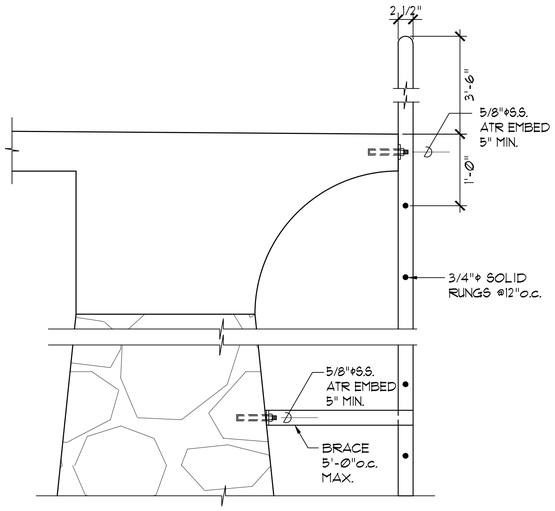
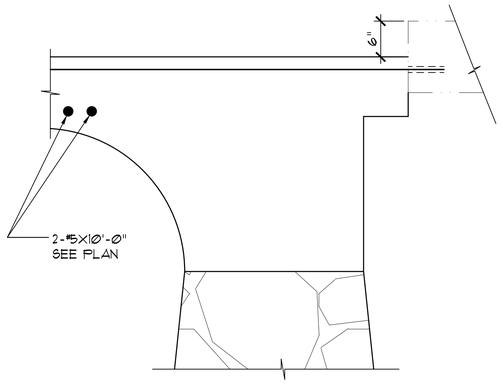
ALTERNATE CRM SEAWALL PLAN & SECTIONS

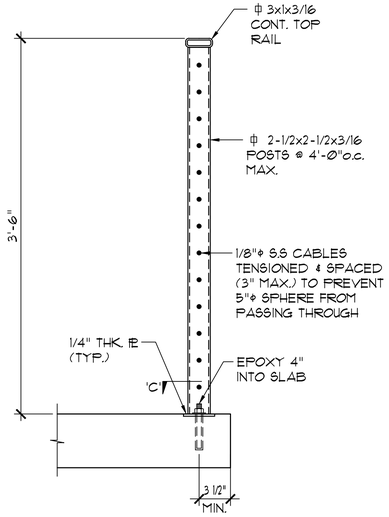
DRAWN
TT
DATE
SCALE
AS NOTED
SHEET
S-4

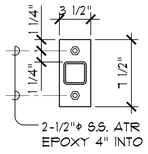


LADDER SECTION — A / S-5
SC: 1"=1'-Ø"

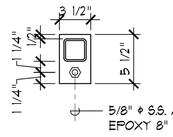


SECTION AT APT. EGRESS — B / S-5
SC: 1"=1'-Ø"

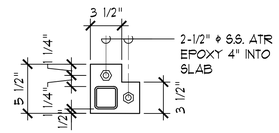




DET. 'C-1'



DET 'C-2'



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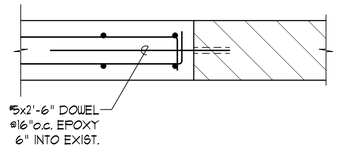
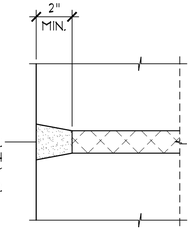


NOTE: CLEAN & ROUGHEN CONTACT SURFACE PRIOR TO POUR.

CONNECTION - NEW SLAB TO EXIST. — K / S-5
N.T.S.



GATE NOTES:

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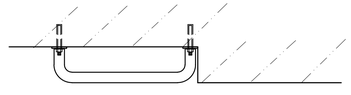
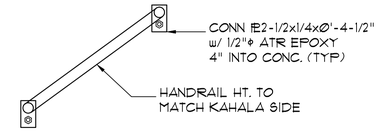
RAILING & GATE DETAILS & NOTES — C / S-5
SC: 1 1/2"=1'-Ø"

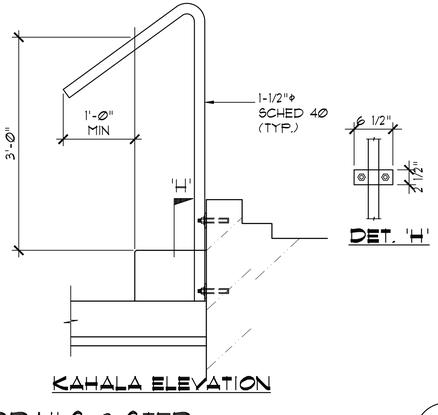
DETAIL — J / S-5
NOT TO SCALE



WAIKIKI PLAN



WAIKIKI ELEVATION



KAHALA ELEVATION

WAIKIKI END WALL DETAIL — D / S-5
SC: 1"=1'-Ø"

KAHALA END WALL DETAIL — E / S-5
SC: 1"=1'-Ø"

SECTION AT STEP — G / S-5
SC: 1"=1'-Ø"

HANDRAILS @ STEP — H / S-5
SC: 1"=1'-Ø"

REVISIONS	BY

THOMAS Y. TANIMURA LICENSED PROFESSIONAL ENGINEER No.4926-S HAWAII, U.S.A.

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ALTERNATE CRM & OTHER DETAILS

DRAWN: TT
DATE:
SCALE: AS NOTED
SHEET: S-5

APPENDIX 3. Construction Methods

The Kainalu

2801 Coconut Avenue
Honolulu, HI 96815

Construction of New CRM Seawall

Table of Contents

---

1. Description and sequence of work:

    a. During construction, a 150' long by 4' high turbidity barrier shall be placed just offshore of the proposed temporary shoreline protection barrier and work platform. The barrier shall be anchored with 100 lb. concrete blocks spaced at 10' intervals. The barrier shall be removed, replaced and/or reset as necessary to ensure its integrity.

b. Installation of 20 ea. 36" wide by 52" long by 1' high temporary coir sandbags against the side of the existing south groin to prevent sand from the beach on the northwest side of the groin from passing through the bottom of the existing failed groin. While the temporary shoreline protection structure is in place, wave reflection off the sandbags shall cause sand from the beach to move further offshore and against the existing groin. Because the bottom of the groin is open to water passing through it, the sand on the northwest side of the groin and vice versa will be conveyed through the underside of the groin to the other side depending on which way the current is running. In order to mitigate this the coir sandbags shall be placed to keep sand on its respective side of the groin and to keep the beach on the north side wide.

c. Installation of a temporary property protective sandbag barrier to:
   1) protect the unprotected building from wave run-up after the existing property protective structure is removed.
   2) function as an equipment work platform to keep the equipment out of the water during construction.
   3) function as a BMP barrier to prevent discharges into State waters.

d. Installation of a silt fence along the seaward and outside edge of the temporary sandbag property protective structure to assist with preventing discharges into State waters.

f. Installation of dust barrier fencing shall be installed at flanks of the northwest and south sides of the temporary sandbag barrier.

g. Demolition and removal of the old seawall shall be done in phases to match the ability of the dewatering/silt removal system to remove silt from the pumped water so that the water can be returned to State waters. All loose concrete not used for filler in the new seawall shall be removed from the property and

taken to the PVT landfill in Nanakuli. Dense basaltic rock from the demolition of the old seawall shall be cleaned and reused in the construction of the new seawall with prior approval from the structural engineer.

h. Installation of permanent vinyl shoring shall be installed along and against the seaward side of the basement wall footing and anchored to the side of the footing with stainless steel anchors set with epoxy. The vinyl shoring shall act to prevent undermining of the basement floor and the basement wall footing. The contractor shall request that the Kainalu structural engineer review, for concurrence, the shoring structural data prior to installation.

i. Installation of a temporary footing dewatering and silt removal system to clean the water before putting the water back into State waters. The dewatering pump shall be relocated as necessary to lower the water level in the phased work area. Excavation below the water table shall be done during low tides and the dewatering system shall be shut off to minimize overloading of the silt and sediment removal system.

j. Construction of the CRM wall footing shall be done in small sections in order to minimize the dewatering discharge rate into the silt removal system so that the system will produce clean clear water before its return to State waters. The CRM wall footing shall mean that section of the wall that will be constructed below the MHHW mark which we estimate shall be around 2' above mean sea level during the spring months. No dewatering shall occur during concrete placement below the water table.

k. Installation of the waterproofing membrane against the existing basement wall shall be done prior to the installation of the wall sections and/or prior to backfill.

l. Construction of the CRM wall sections above the MHHW line shall be done in phases after the installation of the footing sections.

m. Backfill of the new seawall shall be done in conjunction with the installation of the wall sections. The backfill for the wall shall consist of compatible beach sand mixed with the 6" minus rock recycled from the demolition of the old seawall.

n. Installation of the concrete wave return sections of the wall shall be done in sections after the backfilling is accomplished. A 1" thick neoprene pad shall be placed between the concrete wave return and the existing concrete floor above.

o. Repair of the 1st floor stair opening, after the old stair removal, shall be done in conjunction with the wall construction.

p. After construction of the wall, all sand shall be released from the bulkbags and the coir sandbags to the beach. All emptied bags shall be removed from the beach. The beach shall be cleaned and raked. All rocks and debris of any kind shall be removed.

See Exhibit A and B.

2. Materials of Construction: Quantity, size and type

a. 150' L x 4'h AER-FLO, Tough Guy floating turbidity barrier installed just offshore to prevent discharges into State waters.

b. 70 ea. 48'x48'x48' polypropylene Bulkbags used to create the perimeter of the property protective structure into which compatible beach sand shall be placed to create a raised platform for the equipment to operate from.

c. 40 ea. 36"w x 54" L x 1' H coir sandbags to help to absorb wave energy along the outside perimeter of the property protective structure.

d. 350 yards of matching beach quality sand to fill the Bulkbags, the coir sandbags, the work platform inside the Bulkbags and the backfill for the wall.
e. 400 square feet of vinyl shoring manufactured by Everlast Engineering Solutions or equal. See www.everlastengineering.com
f. 60 ea. 3/4" x 6" stainless steel epoxy embedded anchors.
g. 50 yards of 2' diameter basaltic stones for the base of the wall.
h. 440 cubic yards of dense basaltic one and two man stone to construct CRM wall.
i. 1200 square feet of waterproofing membrane.
j. 1300' lineal feet of #5 hot dipped galvanized rebar.
k. 200' lineal feet of #4 hot dipped galvanized rebar.
l. 150 yards of 5000 psi Mayco concrete pump mix.
m. 420 square feet of 1" thick neoprene material.
n. 400 square yards of 12oz. polypropylene non-woven geotextile fabric to be used between the seawall backfill and the seawall.
o. 150' x 3' high polypropylene silt fencing.
p. 50' x 6' high polypropylene dust fencing.

3. Equipment required:

a. Bobcat mini excavator with a hydraulic breaker or equal to break up the old seawall.
b. Case mini excavator or equal to remove the rubble from the demolished wall to be placed into the bucket of a
c. Bobcat 864 rubber track skid steer loader to move to dump truck located near the street.
d. Ingersoll Rand 125 cfm air compressor or equal to be stationed inside the parking garage to provide air for the air breaker tools that will assist in demolishing the rock wall.
e. 2" Electric submersible pump to dewater the footing trench.
f. 900 gallon frac tank to remove silt and sediment from water.
f. 2" Electric submersible pump to return water from the frac tank to the discharge point at the ocean.

4. Access to work site and staging areas:

    a. The access to the work site shall be through the existing gates between the property line and the building located at the Kahala side of the property.
    b. Contractor shall pre-determine the path the equipment shall take across the parking garage deck and shall request that the Kainalu structural engineer verify that the equipment loading shall not cause structural damage to the building. The structural engineer may require that some temporary strategically placed supports be added to carry the load.
    c. The equipment and materials staging area shall be located away from the beach at the Kainalu parking area. The Kainalu shall provide or make arrangements for adequate parking spaces for the construction equipment and materials for the duration of the job. The Kainalu must provide or make arrangements for day time parking for workers trucks between the hours of 8:00 am and 5:30 pm Monday through Saturday.

5. Sand Sieve analysis:

    a. A sand sieve analysis comparing the existing beach sand to the imported sand is provided. See Exhibit C.

6. Start and finish dates:

    a. The ideal start date shall be around the middle of March.
    b. The end date shall be around June 1st.

7. Work hours shall be between 8:00 am and 5:30 pm Monday through Saturday except on holidays.

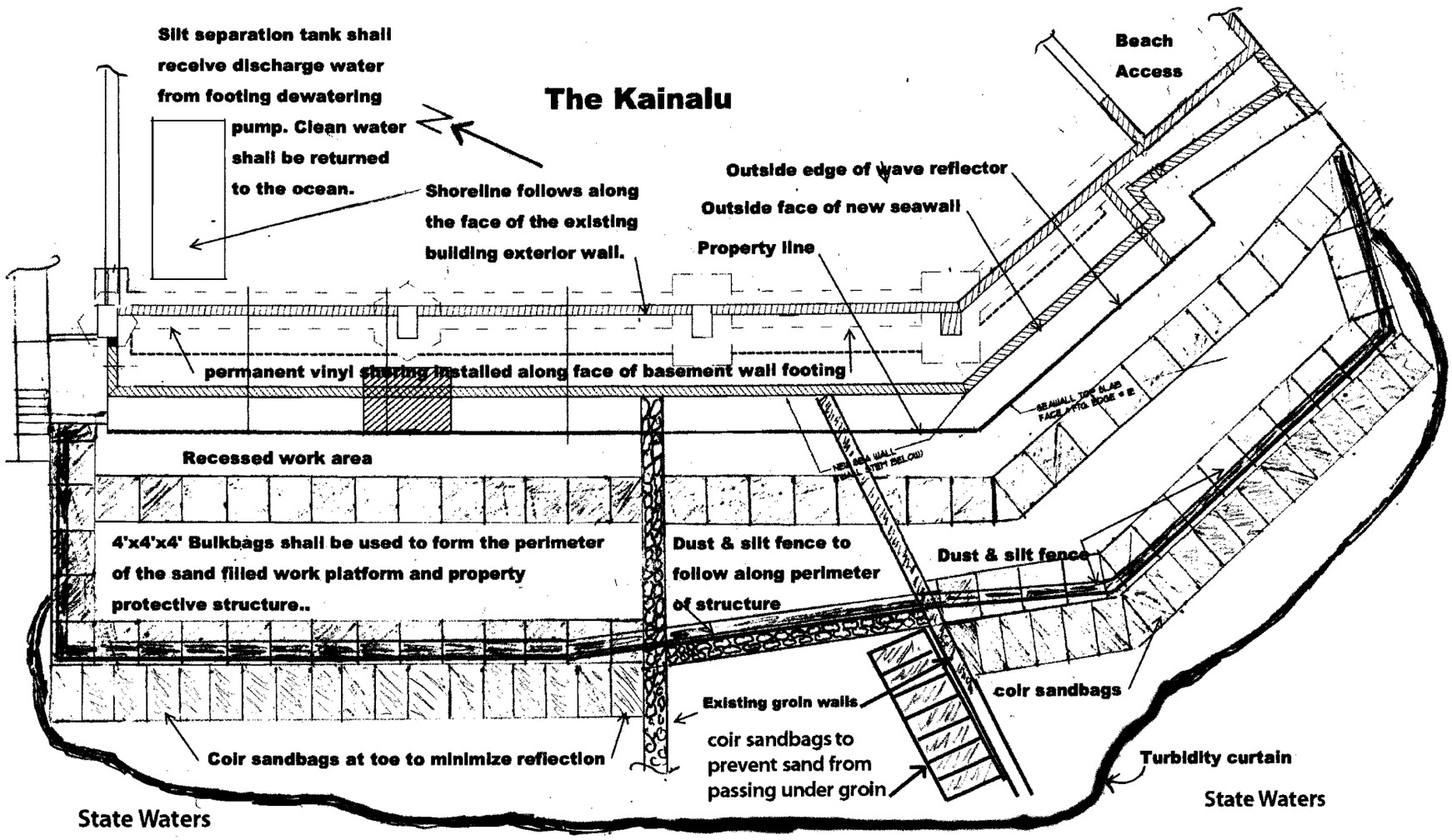
8. Noise permit; the contractor must acquire a noise permit from the State of Hawaii Department of Health, noise control section.

9. Dust control; a 6' high dust fence shall be erected at the northwest and south sides of the temporary sandbag barrier.

10. Best Management Practices:

    a. The applicant shall comply with all applicable State Department of Health (DOH) administrative rules.
    b. A turbidity curtain shall be deployed in the water surrounding the work area during all construction activities to prevent discharges into State waters.
    c. Excavation below the water table shall be done during low tides and the dewatering system shall be shut off to minimize overloading of the silt and sediment removal system.
    d. No dewatering shall occur during the placement of concrete below the water table.
    c. A silt fence shall be deployed along the perimeter of the temporary sandbag property protective structure and work platform to prevent discharges into State waters.
    d. A dewatering and silt removal system shall be deployed to ensure that all water being returned to the ocean is free of silt, sediment, is visibly clear, creates no turbidity plume and no scouring at the point of re-entry into the State waters.
    e. All equipment shall be fueled and repaired away from the work area on dry land; mauka of the shoreline.
    f. Oil absorption pads and booms shall be stocked at the worksite and shall be deployed immediately in the event of an accidental oil discharge. Used oil absorption pads and booms shall be wrapped or placed in heavy duty plastic sheeting or garbage bags and disposed of at PVT landfill in Nanakuli.

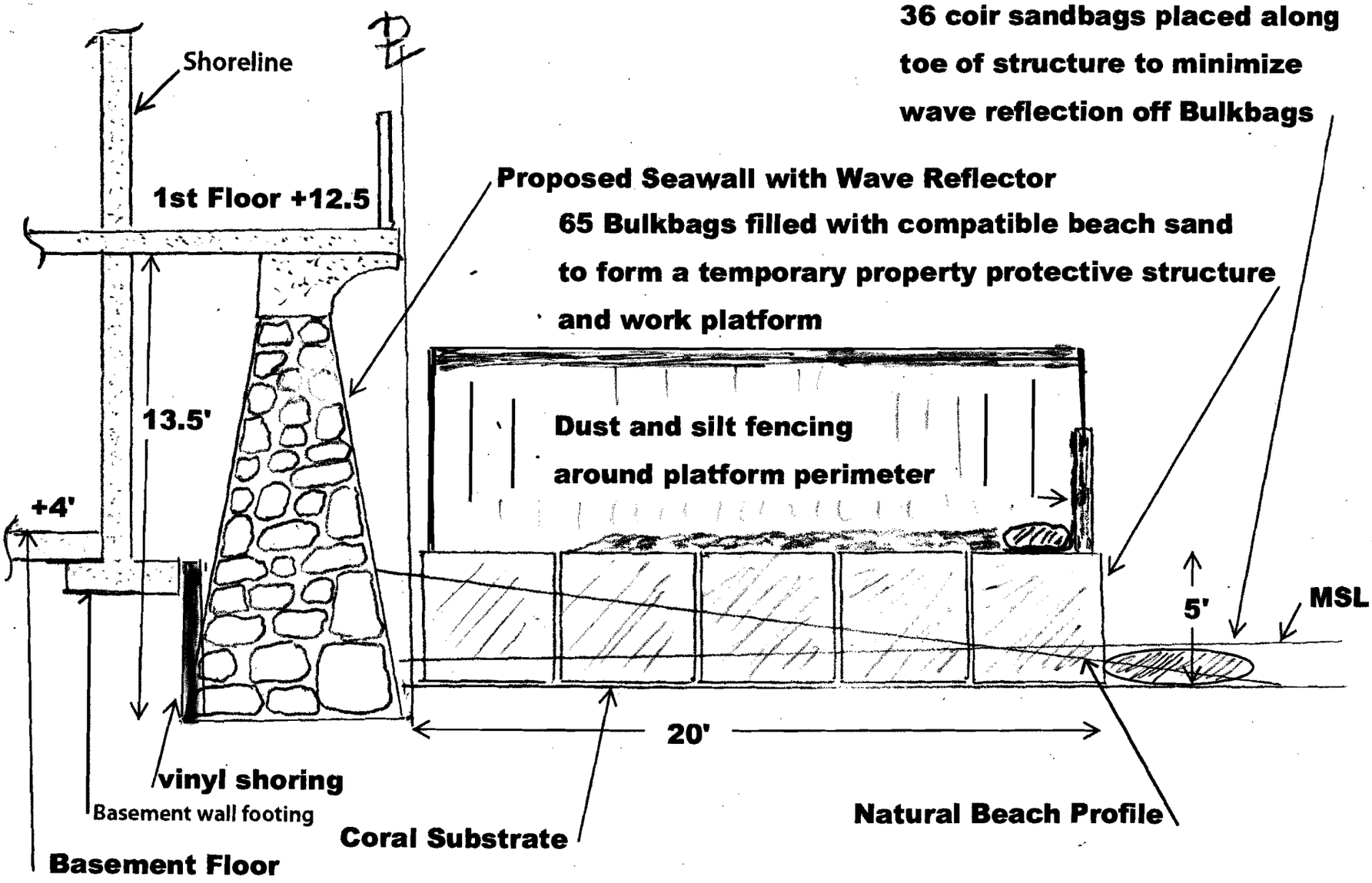
11. Exhibits:



Plan View of the Kainalu Temporary Shoreline Protection and Work Platform

Not to Scale

EXHIBIT A



The Kainalu Side View of Temporary Property Protection and Work Platform Structure

Scale: 1/4" = 1'

EXHIBIT B

AECOS, Inc.
45-939 Kamehameha Highway, Suite 104

CLIENT: Shoreline Restoration of Hawaii
41-669 Ahiki Street
Waimanalo HI 96795
ATTN: Joe Correa 808-259-6747 / 228-9391

AECOS Job No.:	**2010**
REPORT DATE:	3/9/2010
PAGE:	1 of 2

GRAIN SIZE ANALYSIS RESULTS

Date Sampled: 2/23-24/2010 Analyzed by: cl AECOS Log No.: **25977**
Date Received: 3/1/2010 Sample Type: sand

Fraction dry weight (mg)

size (mm)	>4.00	4.00 - 2.00	2.00 - 1.00	1.00 - 0.500	0.500 - 0.355	0.355 - 0.250	0.250 - 0.125	0.125 - 0.075	0.075 - 0.063	<0.063	TOTAL
phi	-2	-1	0	1						pan	
Kainalu	0.0	0.6	2.5	11.4	15.5	14.3	5.3	0.1	0.0	0.0	49.7
SROH Stock	1.1	1.0	3.5	18.7	5.6	7.1	4.6	1.3	0.1	0.1	43.1

Fraction Percent (%)

size (mm)	>4.00	4.00 - 2.00	2.00 - 1.00	1.00 - 0.500	0.500 - 0.355	0.355 - 0.250	0.250 - 0.125	0.125 - 0.075	0.075 - 0.063	<0.063	TOTAL
phi	-2	-1	0	1	0	0	0	0	0	pan	
Kainalu	0.0	1.2	5.0	22.9	31.2	28.8	10.7	0.2	0.0	0.0	100.0
SROH Stock	2.6	2.3	8.1	43.4	13.0	16.5	10.7	3.0	0.2	0.2	100.0

Percent Finer by Weight (%)

size (mm)	4.00	2.00	1.00	0.500	0.355	0.250	0.125	0.075	0.063
Kainalu	100.0	98.8	93.8	70.8	39.6	10.9	0.2	0.0	0.0
SROH Stock	97.4	95.1	87.0	43.6	30.6	14.2	3.5	0.5	0.2

Project: The Kainalu

SRH Stock = Shoreline Restoration of Hawaii Stockpile

J. Mello, Laboratory Director

EXHIBIT C

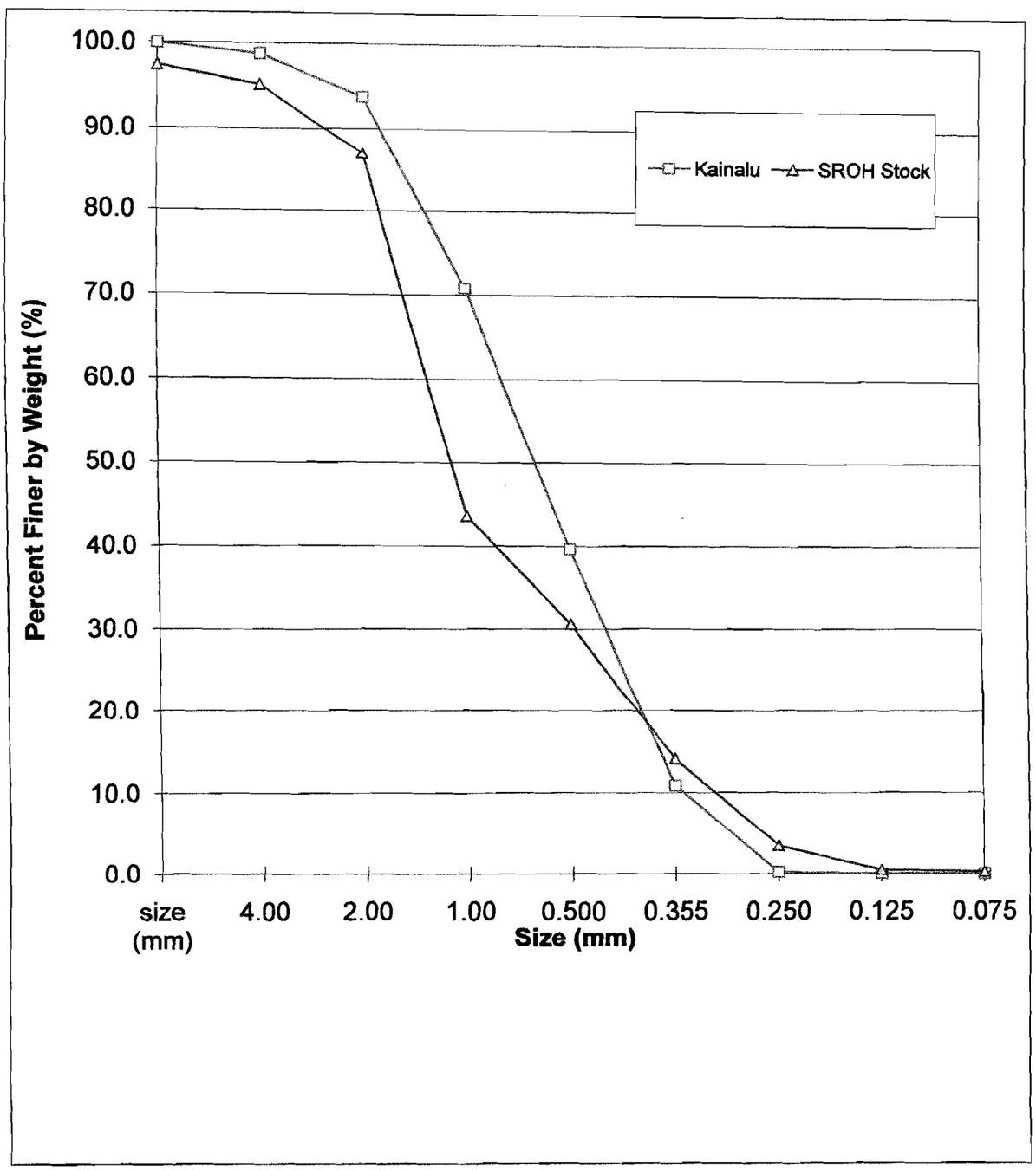
AECOS, Inc.
45-939 Kamehameha Highway, Suite 104

CLIENT: Shoreline Restoration of Hawaii
41-669 Ahiki Street
Waimanalo HI 96795
ATTN: Joe Correa 259-7966 /fax:259-8143

AECOS Job No.:	**2010**
REPORT DATE:	3/9/2010
PAGE:	2 of 2

AECOS Log No.: **25977**

GRAIN SIZE DISTRIBUTION



AECOS, Inc.

45-939 Kamehameha Highway Suite 104
Kaneohe, Oahu, HI 96744
Tel: (808) 234-7770 Fax: 234-7775

CHAIN OF CUSTODY FORM

PROJECT FILE No.:

LOG NUMBER: [25977]

CLIENT: Shoreline Restoration of Hawaii
ADDRESS: P.O. Box 188
41-669 Ahiki Street
Waimanalo, Hawaii 96795

CONTACT: Joe Correa
PHONE No.: ☎ 808-259-6747/228-9391
Purchase Order No.:

☒ RUSH
☐ SEE REVERSE
SPECIAL INSTRUCTIONS

	☑	SAMPLE ID	SAMPLED DATE	SAMPLED TIME	SAMPLE TYPE	CONTAINER(S)	REQUESTED ANALYSES	PRESERVATION
1		THE KAINALU			SAND		SAND SIZE FRACTION	
2		2-24-10					COMPARISON	
3								
4		SHORELINE						
5		RESTORATION			SAND		" "	
6		OF HAWAII						
7		STOCKPILE						
8		2-24-10						
9								
10								

CLIENTS PROVIDING SAMPLES TO THE LABORATORY SHOULD COMPLETE AS MUCH OF THE ABOVE FORM AS POSSIBLE. NOTE: NAME AND DATED SIGNATURE OF PERSON COLLECTING THE SAMPLE MUST BE ENTERED BELOW ↓. INFORMATION REQUESTED IN SHADED BOXES ABOVE TO BE FILLED IN BY THE LABORATORY.

SAMPLED BY:	DATE	RECEIVED BY:	DATE	RECEIVED FOR LABORATORY:	DATE
PRINT NAME: JOSEPH CORREA	20 3-1-10	SIGNATURE	20	SIGNATURE	20 3/1 2010
RELINQUISHED:	DATE	RELINQUISHED:	DATE	RELINQUISHED:	DATE
SIGNATURE: Joseph Correa	20 TIME	SIGNATURE OR INITIALS	20 TIME	SIGNATURE OR INITIALS	20 TIME 1506

COMMENTS:

PRECAUTIONS:

DISPOSAL:

USE (BLACK) INK

RETURN SAMPLE TO CLIENT ☐

APPENDIX 4. Original 1958 Building Drawing Sheets

83 PAGES

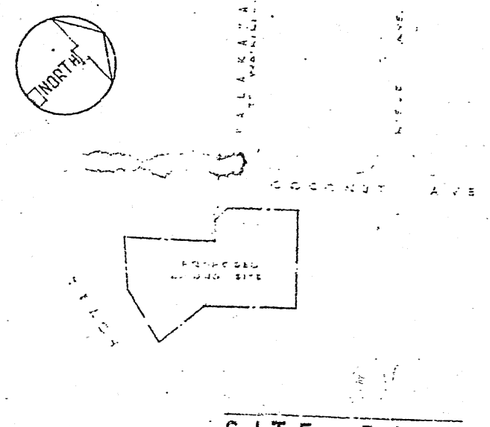
THE KAINALU

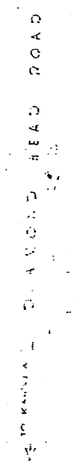
DIAMOND HEAD, HON., T. H.

Litor.

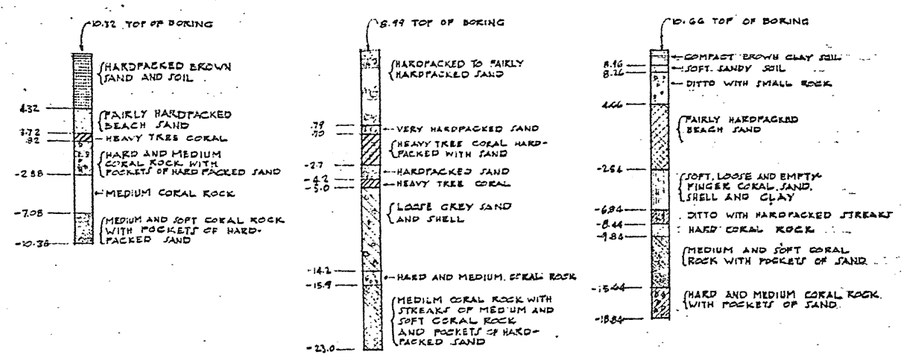
TAKASHI ANBE Phone 949-1025 A.I.A. ARCHITECT

JACK TANIYAMA — STRUCTURAL ENGINEER
WYNN NAKAMURA — ELECTRICAL ENGINEER





INDEX



TEST BORING No. 1

TEST BORING No. 2

TEST BORING No. 3

LEGEND

10.0 - - - EXISTING GRADE

NOTE:

All existing trees on building site are not shown. All plantings shall be moved, removed or harvested as directed.

EXISTING PLOT PLAN

SCALE: 1/8"=1'0"

EXISTING PLOT PLAN TEST BORING DATA	
BUILDING FOR: THE KAINALU	JOB NO 5711 DATE JAN
TAKASHI ANBE AIA ARCHITECT 1099 KAPIOLANI BLVD HONOLULU, T.H.	SHEET OF 2

SURVEY MON. C & C.

EXISTING LITE POLE TO BE REMOVED AND RELOCATED

EXISTING ELEC. POLE AND GUY WIRE TO BE REMOVED AND RELOCATED

DROP CURB ACCORDING TO C & C. SPECS.

COCONUT AVE

EXISTING DRIVEWAY

WARP CONC. TO MATCH EXIST'G DRIVEWAY

REMOVE EXISTING CURB

EXISTING DROP CURB

81.51 255° 20'

B.M. 9.99

EXISTING S.M.H. Top: 9.98 INV. 7.30

EL. 9.99

17.57 FROM 41° 30"

EL. 12.27

EL. 11.38

184° 30'

21.20

RAMP TO BASEMENT

DN 1:10

STAIRWAY #2

PROPOSED WALKWAY GATE SEE ATTACHED SHP DRAWGS.

PROPOSED ALUM. ROLL-UP GRILL DOOR W/ MOTOR OPERATOR SEE ATTACHED SHP DRAWGS.

102.10 244° 20'

EXISTING TILE WALL

CONC STEPS DN TO BEACH. VERIFY

CONC WALKWAY

TOP OF WALL EL. 9.95

EL. 10.0

SHOWER

145° 30'

55.29

EXISTING CONC WALL

EXISTING RETAINING WALL

PARKING DECK EL. 12.5

GROUND FLR EL. 12.67

DRIVE WAY N.W. 1/2 A.C. PAVING EASEMENT

DIAMOND HEAD

104.86 334° 50'

0.99 244° 20'

THIS PORTION TO BE REMOVED

EXISTING S.M.H. Top: 11.04 INV. 7.04

99.71 64° 20"

PROPERTY LINE

NOTE: PROPOSED AREAS ARE MARK ON RED LINES

NEW PLOT PLAN

SCALE: 1/8 = 1'-0"

LEGEND

EL. 10.0 --- FINISH GRADE

NEW PLOT PLAN

BUILDING FOR THE KAINALU

JOB NO. 5711

DATE JULY '82

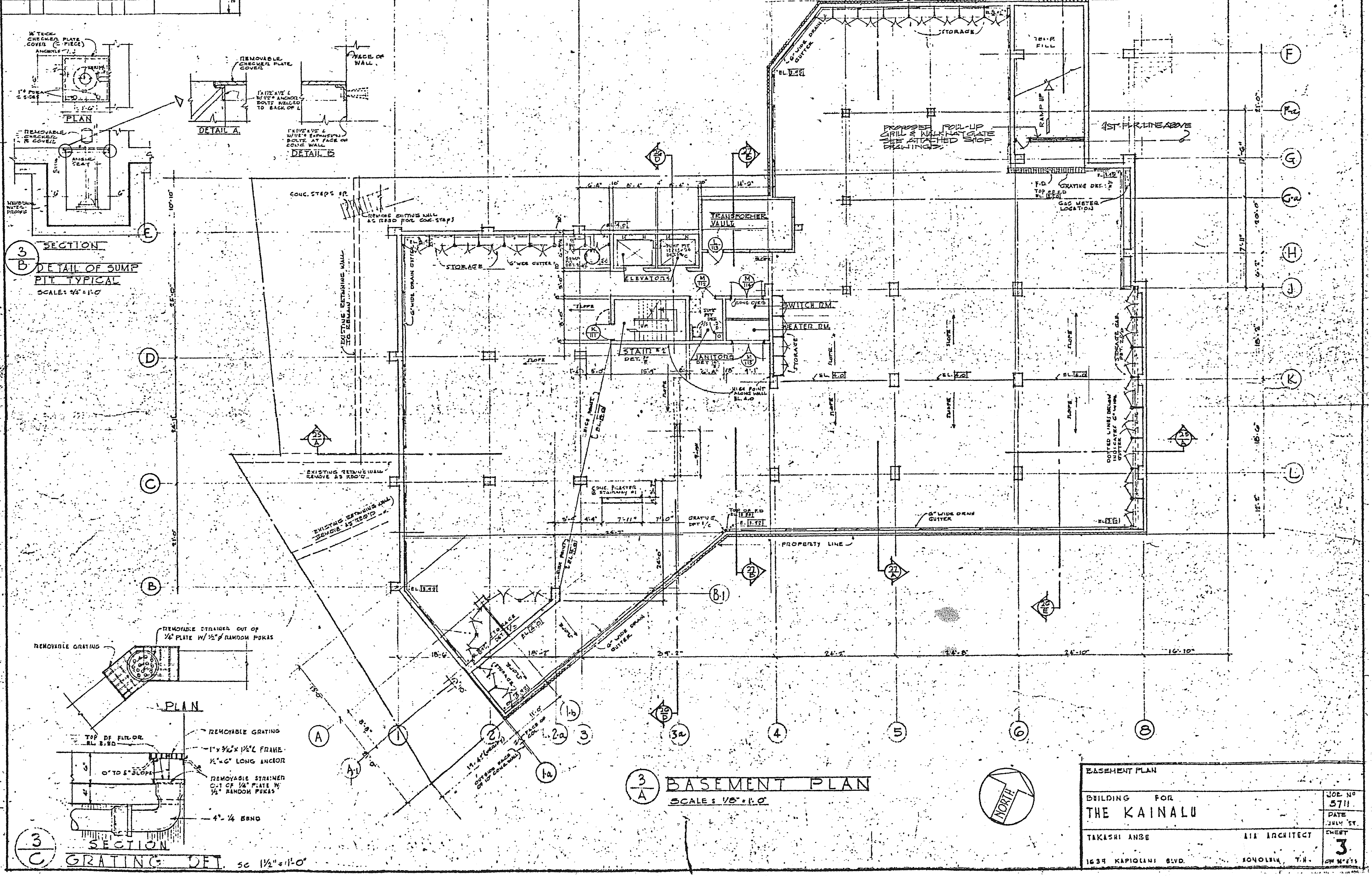
SHEET 2

TAKASHI ANBE A.I.A. ARCHITECT

1639 KIPIOLANI BLVD HONOLULU T.H.

DOOR SCHEDULE

DOOR LOCATION	TYPE	SIZE	THICKNESS	DETAIL	GLASS	REMARKS	UNIT
111	K	3'-0" x 6'-8	1 3/4	34/L			STAIR #2 · JANITOR · STORAGE
112	M	PAIR 6'-0" x 6'-8"	1 3/4	34/L			
113	L	3'-0" x 6'-8	1 3/4	34/L			
114	M	6'-0" x 6'-8	1 3/4	34/L			
115	M	6'-0" x 6'-8"	1 3/4	34/L			



3/A BASEMENT PLAN

SCALE: 1/8" = 1'-0"

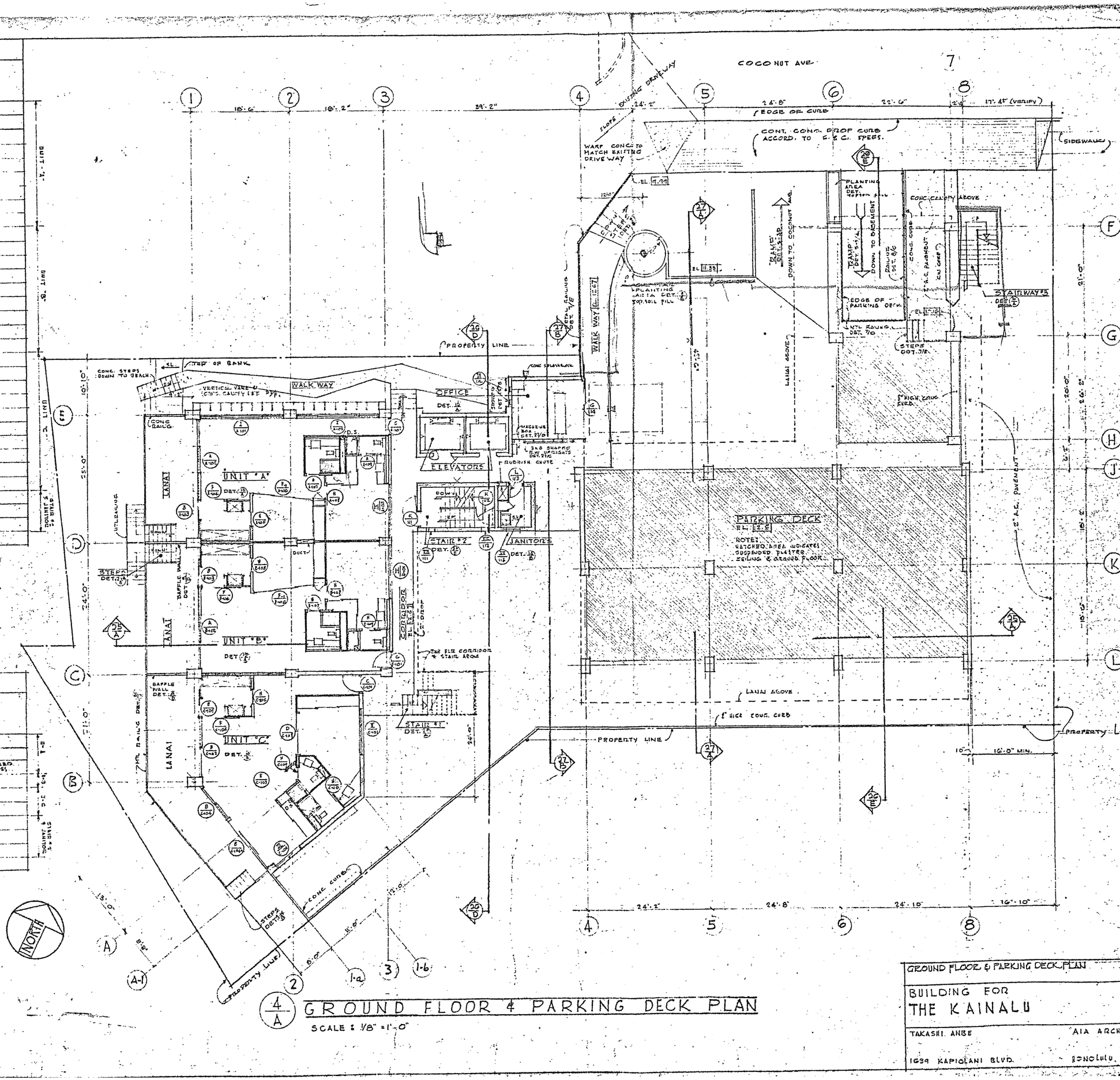
BASEMENT PLAN	
BUILDING FOR THE KAINALU	JOB Nº 5711
	DATE JULY '57
TAKASHI ANBE AIA ARCHITECT	SHEET 3
1639 KAPIOLANI BLVD. HONOLULU, T.H.	OF ... SHTS

DOOR SCHEDULE

DOOR LOCATION	TYPE	SIZE	THICKNESS	DETAIL	GLASS	REMARKS
A-101	C	3'-0" x 6'-8"	1 3/4"	3/3	—	
A-102	A	15 1/2" x 8'-3 1/2"		3/8	GLR PL.	
A-103	B	7'-7" x 8'-3 1/2"	-	3/8	GLR. PL.	
A-104	F	4'-0" x 6'-8"	1 3/8"	3/E		
A-105	H	2'-6" x 6'-8"	1 3/8"	3/8		
A-106	F,	11'-6" x 6'-8"	1 3/8"	3/F		
A-107	H	2'-6" x 6'-8"	1 3/8"	3/8		
A-108	H	2'-6" x 6'-8"	1 3/8"	3/0		
A-109	H	2'-6" x 6'-8"	1 3/8"	3/8		
B-101	C	2'-0" x 6'-8"	1 3/8"	3/3		
B-102	A	15'-5 1/2" x 8'-3 1/2"		3/8	CLR.R.	
B-103	B	7'-7" x 8'-3 1/2"		3/8	CLR PL.	
B-104	F	4'-0" x 6'-8"	1 3/8"	3/E		
B-105	H	2'-6" x 6'-8"	1 3/8"	3/8		
B-106	F,	11'-6" x 6'-8"	1 3/8"	3/F		
B-107	H	2'-6" x 6'-8"	1 3/8"	3/8		
B-108	H	2'-6" x 6'-8"	1 3/8"	3/0		
B-109	H	2'-6" x 6'-8"	1 3/8"	3/8		
C-101	C	2'-0" x 6'-8"	1 3/8"	3/3		
C-102	B	10'-5 1/2" x 8'-3 1/2"		3/C	CLR R.	
C-103	B	7'-7" x 8'-3 1/2"		3/C	CLR. R.	
C-104 & C-104A	B	7'-7 3/8" x 8'-3 1/2" & 11'-0" x 8'-3 1/2"		3/C	CLR. R.	
C-105	F	4'-0" x 6'-8"		3/E		
C-106	H	2'-6" x 6'-8"	1 3/8"	3/8		
C-107	E	16'-0" x 6'-8"	1 3/8"	3/D		
C-108	D	5'-0" x 8'-1 3/4"	1 3/8"	3/C		
C-109	H	2'-6" x 6'-8"	1 3/8"	3/8		
C-110	H	2'-6" x 6'-8"	1 3/8"	3/E		
111-112	K	5'-0" x 6'-8"	1 3/8"	3/K		
112	L	3'-0" x 6'-8"	1 3/4"	3/L		
114	G	11'-6 x 7'-6"		3/A		

WINDOW SCHEDULE

WINDOW LOCATION	TYPE	SIZE	DETAIL	GLASS	REMARKS
A-101	I	15'-10" x 6'-0"	3/A	CLR	
A-102	I	15'-8" x 6'-0"	3/8	CLR	
A-103	II	10'-0" x 7'-3 3/4"	3/C	OBSC	RAIN TAIL AS CALLED FOR IN VIEW TYPES
B-101	II	10'-0" x 7'-3 3/4"	3/C	OBSC.	DO
C-101	II	3'-0" x 7'-3 3/4"	3/C	OBSC.	DO
C-102	II	6'-0" x 7'-3 3/4"	3/C	OBSC	DO
111	III	14'-0" x 2'-0"	3/8	OBSC WIRE	
113	III	1'-0" x 2'-0"	3/8	OBSC WIRE	
113	III	3'-0" x 3'-2 3/8"	3/C	OBSC.	
114	II	1'-0 x 2'-11"	3/C	OBSC	



4/A GROUND FLOOR & PARKING DECK PLAN

SCALE : 1/8" = 1'-0"

GROUND FLOOR & PARKING DECK PLAN

BUILDING FOR
THE KAINALU

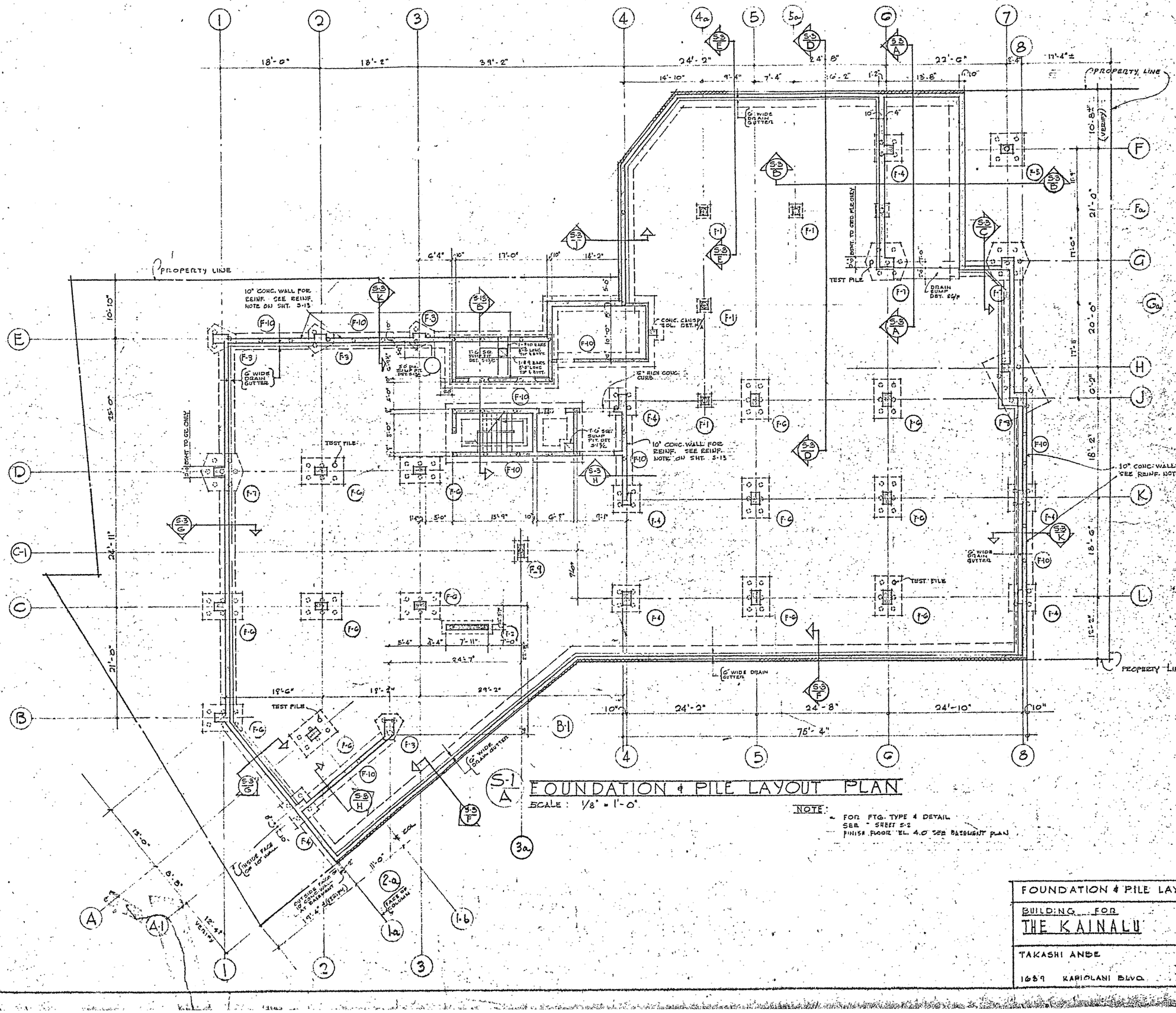
JOB NO. 5711

DATE JULY '71

TAKASHI ANBE AIA ARCHITECT

1639 KAPIOLANI BLVD. HONOLULU, T. H.

SHEET 4 OF 34 SHTS.



FOUNDATION & PILE LAYOUT PLAN

SCALE : 1/8" = 1'-0"

NOTE:
- FOR FTG. TYPE & DETAIL SEE " SHEET S-2
- FINISH FLOOR EL. 4.0' SEE BASEMENT PLAN

FOUNDATION & PILE LAYOUT PLAN	
BUILDING FOR: THE KAINALU	JOB NO. 5711
	DATE JULY '58
TAKASHI ANDE A.I.A. ARCHITECT	SHEET S-1
1689 KAPIOLANI BLVD. HONOLULU, T.H.	OF 14 SHEETS

APPENDIX 5. Technical Report

FINAL REPORT

Coastal Engineering Assessment
for Shoreline Protection at The Kainalu Apartments
Waikiki - Diamond Head, Oahu, Hawaii

TMK: (1)3-1-033:001

Prepared for:

The Kainalu Board of Directors
2801 Coconut Avenue
Honolulu, Hawaii 96815

Prepared by:

EKNA Services, Inc
615 Piikoi Street, Suite 300
Honolulu, Hawaii 96814

(EKNA Control No. 2656-00F#)

April 13, 2009

TABLE OF CONTENTS

Coastal Engineering Assessment
for Shoreline Protection at the Kainalu Apartments
Waikiki-Diamond Head, Oahu, Hawaii
TMK:(1)3-1-033:001

1. LOCATION AND PROBLEM IDENTIFICATION

The Kainalu is a multi-story apartment building on the outskirts of Waikiki in the Diamond Head area. Figure 1 shows the general site location, Figure 2 is a boundary map for the property, and Figure 3 is a recent aerial photograph.

The building is fronted by old groins that extend onto the shallow reef flat seaward of the property. A narrow sand beach fronts the building on the north side of the groins (Photo page-1), while waves break against the base of the building on the south side of the groins during high tide (Photo page-2). Rock masonry planter boxes were originally constructed along the base of the building (beneath the first floor lanai) and in the south corner of the property at a time when a dry sand beach fronted the property. Photo page-3 shows the planter boxes and stairs circa 1980 and 2004. As the beach was narrowed by erosion, the planter boxes were subjected to wave damage, and the Kainalu association of apartment owners (AOAO) became concerned about the integrity of the building's foundation. Therefore, about 3 years ago, the AOAO retained a contractor to encapsulate the planter areas with gunite in an effort to prevent wave damage.

Portions of the gunite cap on the south side of the groins encroach into the shoreline area seaward of the property boundary. Therefore, the gunite cap must be removed to address this encroachment problem. The continuing erosion fronting this portion of the property is also causing the gunite to crack because of differential settlement of the planter box structure (Photo page-4). Major structural damage to this gunite-covered structure can result in a safety issue for the residents and the general public who access this popular shoreline area. The gunite-covered structure is also causing wave reflection and splash that enters the residential unit directly above.

This coastal engineering report has been prepared to identify potential alternatives to mitigate the erosion and wave damage to the building on the south side of the groins, and to assess the potential littoral impacts due to the identified alternative measures. This coastal engineering assessment is intended to support an environmental assessment and special management area permit for shoreline protection for the Kainalu apartment building.

2. SHORELINE CHARACTERISTICS AND COASTAL PROCESSES

2.1 General

The Kainalu is situated at the extreme southern end of Waikiki, and is fronted by a shallow fringing reef flat. This Waikiki coastline is shielded by the island mass from the North Pacific winter swell and much of the Northeast tradewind waves that are present throughout the year. Therefore, the Southern swell predominates during the summer months, while locally-generated wind and Kona storm waves predominate during the winter months. As deepwater waves approach the Waikiki shoreline, they are transformed by processes of refraction, shoaling, and breaking. As waves approach the shore from an angle not perpendicular to the bottom contours, wave refraction effects cause the wave front to bend and align itself nearly parallel with the bottom contours. This effect tends to reduce the deepwater wave heights at the shore. Figure 4[1] shows an example of a refraction ray diagram, where converging rays indicate areas of increased wave energy and diverging rays indicate areas of decreased wave energy. The shoreline in the vicinity of the Kainalu (at the southern end of the refraction grid in Figure 1) is oriented facing towards the southwest, therefore, the offshore bathymetry contours cause the deepwater waves to refract and approach the shore from a southwesterly direction. The fringing reef fronting the Kainalu is very shallow (-1 to -3 feet MLLW) and provides much protection to the shoreline from large swell and storm waves.

Offshore Waikiki, the ocean bottom seaward of the 60-foot depth contour drops off rapidly to deep water at slopes steeper than 1V:15H. Shoreward of the 60-foot contour, the bottom rises more gradually to the shallow reef flats. Natural streams as well as previous dredging activities have carved out deep areas on the shallow reef flats. Figure 5 is excerpted from a study by NOAA[2] which mapped the shallow-water benthic habitats of the main Hawaiian Islands. The geomorphological structure fronting the Waikiki shoreline is classified as *Pavement*, which is flat, low-relief, solid carbonate rock with coverage of macroalgae, hard coral, zoanthids, and other sessile invertebrates that are dense enough to begin to obscure the underlying surface. Sand exists in the natural and dredged channels through the nearshore areas, as well as seaward of the *Spur and Groove* habitat,

[1] "Coastal Processes and Conceptual Design Considerations for Waikiki Beach Improvements", prepared by Edward K. Noda and Associates, Inc., prepared for State of Hawaii Department of Transportation, Harbors Division, July 1991.

[2] "Atlas of the Shallow-Water Benthic Habitats of the Main Hawaiian Islands", U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, National Centers for Coastal Ocean Science, Center for Coastal Monitoring and Assessment, Biogeography Branch, NOAA Technical Memorandum NOS NCCOS 61, September 2007.

which are alternating sand and coral (spur) formations that are oriented perpendicular to the shore or the bank/shelf escarpment. These spur and groove channels are conduits for offshore sand transport from the nearshore reef areas to the deeper areas seaward of the reef margin.

2.2 Project Site Coastal Processes

Waves and wave-generated currents are the primary forces that move sediment along the coast. Sediment transport in the littoral zone occurs as longshore transport or cross-shore (onshore-offshore) transport. In most cases, both types of transport will occur because of the varying wave characteristics. The Kainalu is situated at the juncture between the Waikiki embayment and the south-facing Diamond Head coast. There is very little sand within the littoral zone in this region. Sediment input to a littoral cell is primarily contributed by the streams and the fringing reefs, while sediment losses are primarily due to transport of the sediment into channels or “breaks” through the reef. The shallow reef flat is narrow and interspersed with channels that interrupt the continuous movement of sediment along the coast. The Kainalu is located at the head of one of these sand channels, as can be seen on the Figure 3 aerial photo. The sand channel can serve as a conduit for cross-shore transport, which is why there remains a narrow beach on the north side of the groins. The portion of the property on the south side of the groins faces more directly southward, and there is insufficient sand in the littoral zone to maintain a beach at this location.

Wave energy reaching the shore is limited by the depth of water over the shallow reef, as deeper water depth will allow more wave energy transmission. The shallow fringing reef provides considerable protection from deepwater wave energy. Waves initially break on the reef edge where most of their energy is spent. What energy remains propagates to shore as reformed waves which break on the shoreline. Large waves breaking at the edge of the reef will cause a rise in water level known as wave setup. The increased water levels during storms and high south swell can allow higher than normal wave energy to reach the shore. Thus, wave activity at the shoreline is greatest during large swell or storm wave conditions and high tides. Maximum water level during high south swell events can be on the order of about 4 feet above MLLW during high tide because of the contribution to water level rise from wave setup. Assuming MLLW depth of about 2 feet over the reef flat, the total depth is 6 feet, which would allow 3-foot waves to approach the shoreline. In the unlikely event that a hurricane directly impacts the south shore of Oahu, maximum stillwater

level is estimated to be 6.7 feet above MLLW [3], allowing 4.4-foot waves over the reef flat.

The building on the south side of the groins is situated directly at the waterline (i.e. there is no dry beach fronting the building to expend the energy of waves breaking at the shoreline). Therefore, waves break directly against the gunite-covered shoreline structures, causing significant wave scouring and overtopping/splash that reaches the first floor apartment unit. The balcony is situated directly above the gunite-covered planter boxes (see photo page-2 and page-3), and there is only a 4-foot gap between the top of the gunite structure and the balcony overhang. The balcony overhang elevation is about 12.7 feet above MLLW (about 11.7 feet above MSL). In addition to the wave damage to the apartment building (first floor apartment unit), damage to the gunite-covered shoreline structures will result in a safety issue for the residents and the general public that access this shoreline area. Continued erosion of the shoreline sediments beneath the gunite-covered structure will result in progressive cracking of the gunite shell due to differential settlement, and ultimate failure of this shoreline structure.

2.3 Historical Shoreline Changes

Figure 6 displays historical aerial photos of the coastline in the vicinity of the Kainalu, from 1949 to 2005. The 1949 photo shows a coastline that is nearly devoid of sand. Any dry sand beach along this stretch of shoreline would have been very narrow. The 1988 photo shows a fairly wide beach that has accumulated on the south side of the Natatorium, and a narrow beach in the vicinity of the Kainalu. This is consistent with the Waikiki Beach Improvement study by Edward K. Noda and Associates that indicated a gain in beach area for the 630-foot long reach between the Natatorium and the Colony Surf groin of about 41,000 square feet between 1952 and 1990. The 2005 photo shows the beach on the south side of the Natatorium continues to the stabilized by the Natatorium structure, but there is little evidence of dry sand beach along the coastline southward to the Kainalu.

Figure 10 is excerpted from a study by the University of Hawaii, Coastal Geology Group[4], which mapped the erosion rates for this Oahu coastline. For this project area, seven aerial photographs spanning the period February 1949 to December 2005 were used in the analysis, together with a 1927 topographic survey chart from the National Ocean Survey.

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[3]Hurricane Vulnerability Study for Honolulu, Hawaii and Vicinity, Vol. 2, Determination of Coastal Inundation Limits for Southern Oahu from Barbers Point to Koko Head, by Charles L. Bretschneider and Edward K. Noda and Associates, for U.S. Army Corps of Engineers, 1985.

[4]Coastal Geology Group, Department of Geology & Geophysics, SOEST, University of Hawaii at Manoa, published on website http://www.soest.hawaii.edu/asp/coasts/oahu/index.asp.

The low water mark was used as the historical shoreline, or shoreline change reference feature (SCRF), therefore, is indicative of beach erosion. The annual shoreline change rates indicated on the map are spatially smoothed, center weighted averages (using 5 transects) of calculated erosion rates. The transects are situated every 66 feet along the shoreline. The red bars on the shore-parallel graph indicate a trend of erosion, while blue bars indicate a trend of accretion. Although the reach from transects 98 to 107 is depicted with blue bars, this reach has sustained erosion, as identified by a negative scale on the graph, and the area description which states "The beach on the west side of Makalei Beach Park (transects 98-107) is eroding at 0.30 $\pm$ 0.18 ft/yr averaged along its length. The beach at transects 103-107 was lost to erosion between 1988 and 2005." The Kainalu is located at transect 107.

The prior studies confirm that a beach did exist at the Kainalu, but has since eroded in a process that can be described as a net long-term erosion trend along this coastal reach. There is insufficient sand that is generated on the nearshore reefs to build and maintain wide beaches.

3. CONSIDERATION OF ALTERNATIVES

3.1 Remove Existing Gunite-Covered Structures

Portions of the gunite cap extend seaward of the property boundary. Therefore, portions of this structure must be removed to address this encroachment problem. The gunite covers rock masonry planter boxes that were originally constructed on the dry beach area. Therefore, the foundations of the rock masonry structures do not extend to the reef platform below the waterline, and the gunite is cracking because of differential settlement to the foundation of this encapsulated structure. Although not originally designed and constructed as a shore protection structure, the existing gunite-covered structure presently functions as such, although not in an entirely desirable manner. As discussed previously, there is considerable wave overtopping/splash that reaches the first floor apartment unit, and wave energy is transmitted to the building.

Removing the gunite-covered structure entirely would expose the building foundation wall to breaking waves. There would also continue to be no shoreline access fronting this 50-foot shoreline reach. (In other words, the conditions that resulted in the loss of dry beach along this coastal reach will not be materially changed by removing the gunite-covered structure.) Therefore, removal of the gunite-covered structure and replacement with a more suitable shoreline protection measure is the more prudent action.

3.2 Beach Fill with Groin

Construction of a dry beach at the project site is an alternative that will require beach stabilization structures to minimize sand migration offshore and alongshore. Structures such as groins function by trapping or containing the beach, while structures such as breakwaters function by sheltering the beach from wave energy and/or modifying wave approach patterns such that the beach planform assumes a stable configuration. Old groins still remain in front of the Kainalu, effectively bisecting the property shorefront. The original purpose of the groins is unknown, but they may have been built in an attempt to stabilize a dry beach. It may be possible to maintain a beach on the south side of the groins by performing frequent nourishment. However, the groins are short, there is a convex-shaped seawall fronting the adjacent Diamond Head-side property, and the longshore transport direction may not be uniformly northwestward. Therefore, it may not be practicable to maintain a beach at this location without additional structures.

Structures should be designed for stability under extreme wave conditions. Offshore construction is more costly than onshore construction because of the higher risk factors associated with the marine environment, the environmental concerns related to construction in the marine environment, and the more difficult access to the construction site. Therefore, any offshore structure should be designed and constructed to require little or no maintenance. Catastrophic damage to structures due to extreme wave conditions can also pose a hazard to persons and property.

As discussed previously for the design hurricane wave event, maximum still-water level is estimated to be 6.7 feet above MLLW, allowing 4.4-foot waves over the reef flat. The armor stones required for stability under these conditions is about 1,400 pounds assuming a rubblemound structure slope of 1V:1.5H and 2-stone thick armor layer. These stones have an average diameter of 2 feet in size. Rubblemound structures are effective in dissipating wave energy and are not likely to suffer catastrophic failure because the structure can conform to differential settlement.

A major issue for this site is construction access. There is no land-side access to this shoreline area for heavy equipment, and the offshore reef platform is too shallow to allow barge access from the ocean-side. A groin would be easier to construct than an offshore breakwater because it could be built from the land-side. However, because of the large armor stone size required for structural stability under design wave conditions, a rubblemound rock groin is not a practicable solution for beach stabilization. A recommended solution is the use of gabions as the construction material. Gabions are baskets that are filled with small stones that can be stacked to build rubblemound

structures. Gabion units are typically supplied in stainless steel, Galfan, or galvanized and coated with durable, fusion bonded PVC (especially for use in coastal works, or where the atmosphere contains corrosive elements, or wherever abrasion may be prevalent). Although the PVC-coated wire is resistant to corrosion, any wire product is not a "permanent" construction material in an ocean environment. Broken wire baskets can become a safety hazard if not properly maintained. Therefore, gabions constructed using wire products require routine inspection and maintenance to maintain the integrity of the structure. Polymer rope gabions[5] are manufactured specifically for marine application, as the baskets are made with a polymer material that has a high tensile strength, high abrasion resistance, resistance to U.V. degradation, and does not rust. Unfortunately, this product may not be available in the United States.

Figure 8 depicts conceptual typical groin sections using armor stones and gabions. The crest height and width are the same using both construction materials, but the gabions have a narrower footprint because the baskets are stacked and side slope is not a concern for stability as in a rock slope. The baskets can be filled in situ with small stones that can be delivered and placed without the need for heavy equipment. Figure 9 shows a conceptual plan for beach fill with a gabion groin containment structure. The top-of-beach elevation is 6 feet above MLLW, with a 1V:6H beach slope. A gabion sill, with top elevation of 0.0 MLLW, extends across the toe of the beach to mitigate loss of sand. It may be necessary to place additional gabion units alongside the existing CRM groin for structural support.

3.3 Gabion Revetment

Another alternative is to construct a gabion revetment on the existing shoreline mauka of the gunite-covered structure, that would dissipate wave energy at the shoreline and therefore mitigate damages to the building due to wave impact and overtopping/splash. The gabions would prevent future scouring to the existing gunite-covered structure, and would enhance access along this portion of the shoreline. Exhibit 10 shows a conceptual plan for the gabion revetment. The crest elevation is 6 feet above MLLW (about 6"-12" lower than the top of the gunite-covered structure), and the crest width is about 6 feet wide. The gabion units would be stacked similar to the groin typical section.

3.4 Remove Existing Gunite and Replace with Gabion Revetment

The beach fill and the gabion revetment plans discussed above do not require the removal

[5]Manufactured by Garware-Wall Ropes Ltd., Geosynthethics Division, www.garwareropes.com.

of the existing gunite-covered structure as both could be constructed seaward of the existing shoreline. However, both would extend seaward of the property boundary and would require easements from the State for construction in the Conservation District area seaward of the shoreline. As it is unlikely that the State would allow construction of shoreline protection structures seaward of the property boundary, any new construction will require the removal of the existing gunite-covered structure within the limits of construction (i.e. landward of the property boundary). The original structures seaward of the property line that were deeded to the State in 1959 can remain, although the gunite cover must be removed as it was placed without the requisite permit approvals.

Figure 11 depicts typical sections for the gabion revetment beneath the balcony overhang and fronting the adjacent driveway. The limitations are (1) the low height of the balcony overhang, (2) the narrow width between the building foundation wall and the seaward property boundary line (the balcony defines the seaward extent of the property boundary). The stairway access that presently extends seaward of the property boundary is allowed to remain, and has been determined to be the property of the State[6]. However, the State has indicated that it will not maintain those structures seaward of the property boundary that existed at the time that the accreted lands were conveyed to the State. The gunite cap, which was installed without proper authorization from the State, is considered an encroachment and must be removed. This would allow the underlying planter areas and stairway seaward of the property boundary to be directly exposed to wave activity, which will result in accelerated damage.

Figure 12 shows the proposed conceptual plan for the gabion revetment that will extend across the property shorefront, located entirely landward of the property boundary. The gunite-covered structure located between the building wall and the property line will be completely removed and replaced with the gabions. While the gunite cap must also be removed from the 287 square foot area seaward of the property boundary, the underlying rock walls, terracing, and concrete steps will not be removed.

3.5 Remove Existing Gunite and Replace with Seawall

A cast-in-place seawall can be constructed along the seaward boundary to prevent wave energy from directly impacting the building wall. Figure 13 shows the proposed conceptual plan for a reinforced concrete seawall. The seawall will need to be formed in place and concrete pumped from the street level on the mauka side of the building. The base of the

[6]Letter dated August 8, 2008 from Morris Atta, Land Division Administrator, State of Hawaii Department of Land and Natural Resources, to Chris Pramoulmetar, Plan Pacific.

seawall will need to be excavated and placed on non-erodible material (the existing limestone reef), which is estimated to occur at elevation 2 feet below MLLW (3 feet below MSL). The extended footing will help to further reduce scouring at the base of the wall.

The seawall must be as high as possible to prevent wave overtopping and to minimize wave splash on the underside of the balcony. The conceptual seawall design does not physically connect to the balcony, but it is close enough and there is a curved lip at the top of the seawall to deflect water seaward and downward. Because the seawall cannot extend seaward of the balcony (property line), there will still be spray from breaking wave activity that can be blown onto the building and apartment above the seawall due to onshore winds.

4. POTENTIAL LITTORAL IMPACTS

The alternatives described above would have no impact to the existing littoral processes at the site. All plans address the present problems with wave impact/scouring and overtopping/splash damage to the building. However, the plans that require removal of the existing gunite-covered structure within the property boundary offer the least mitigation because of the very close proximity of the property boundary to the building lines.

None of the alternatives will directly affect the neighboring property on the Diamond Head side, nor would there be any impacts to the shoreline in the vicinity of the subject property. However, the plans that require removal of the existing gunite-covered structure within the property boundary (and also the removal of the gunite cover over the structures seaward of the property boundary) will expose the existing rock planters to wave damage. This will lead to potential scouring at the base of the neighboring wall, and possible cracking due to differential settlement or loss of stability. About 13 feet of the neighboring property's wall extends seaward of the Kainalu property line, and it is not known whether the footing of this wall extends deep enough to prevent potential undermining due to continued erosion of the areas that will be exposed after removal of the gunite. Any potential future damage to the neighboring wall will be the result of continuing erosion on State lands, and not caused by the installation of shoreline protection along the building frontage of the Kainalu. The rocks and concrete rubble on State lands could also pose a safety hazard to public access along this portion of the shoreline.

FIGURES

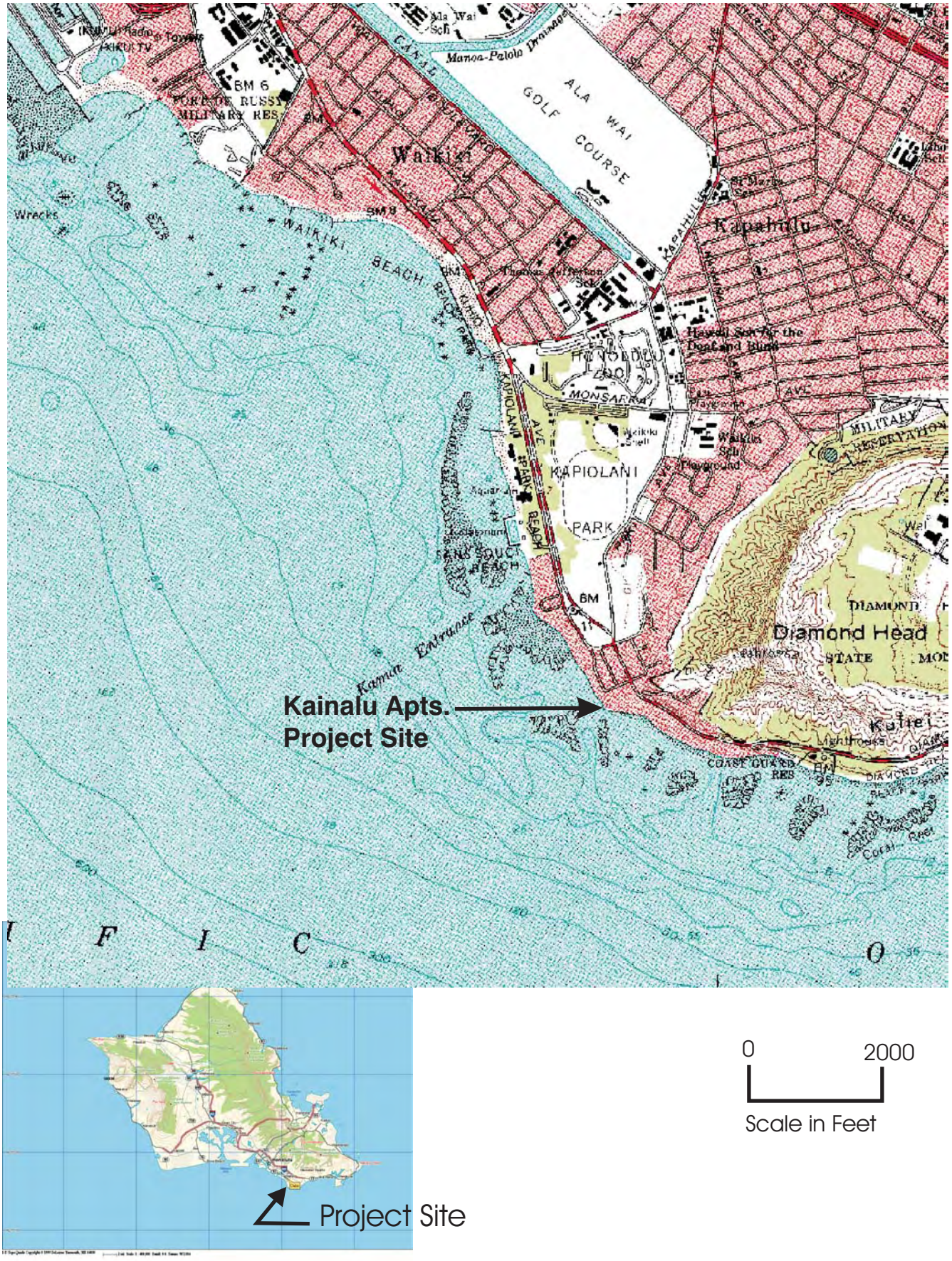
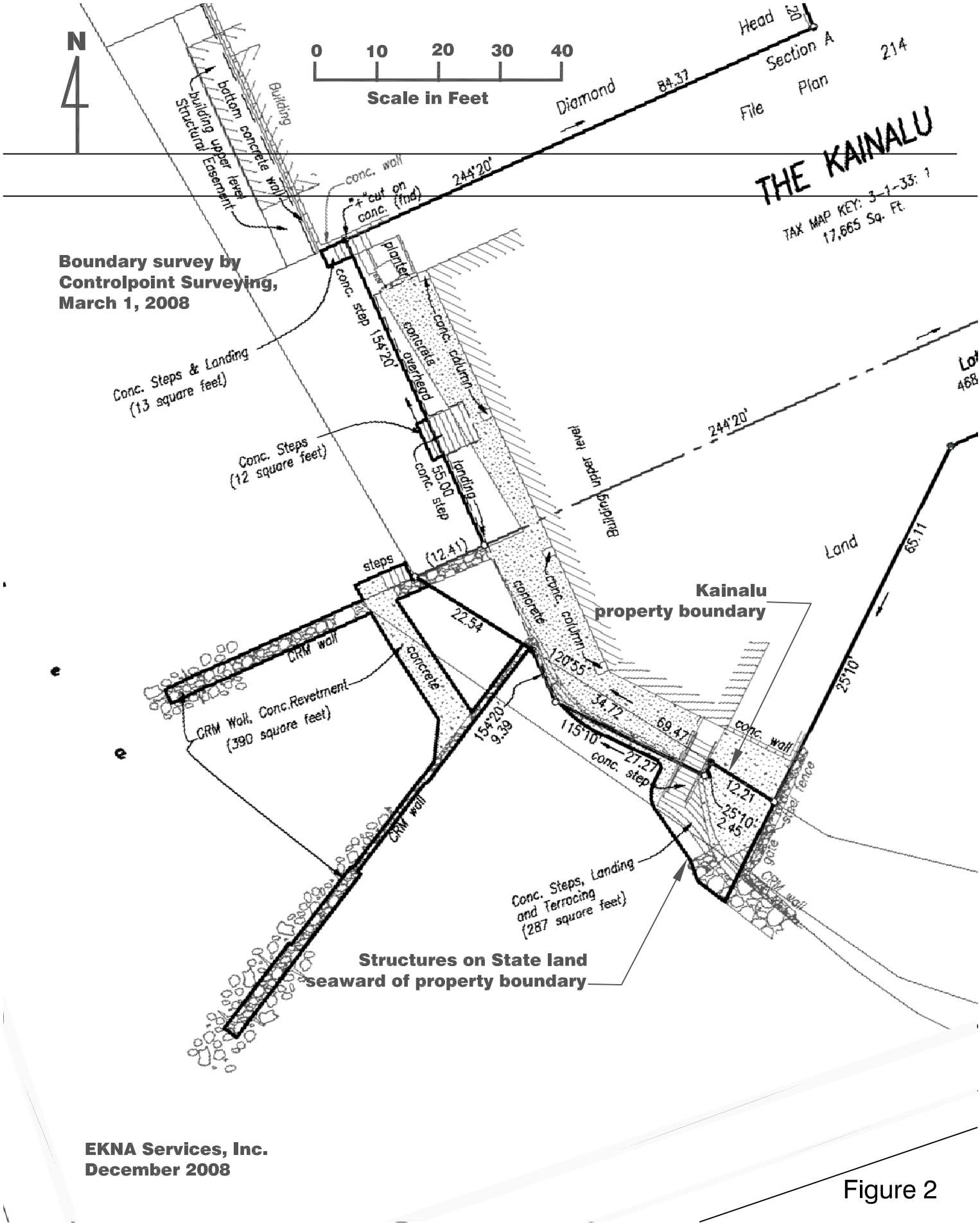

Kainalu Apts.
Project Site
Waikiki
Kapahulu
KAPIOLANI
PARK
Diamond Head
STATE
Kuliei
0
2000
Scale in Feet
Project Site

Figure 1

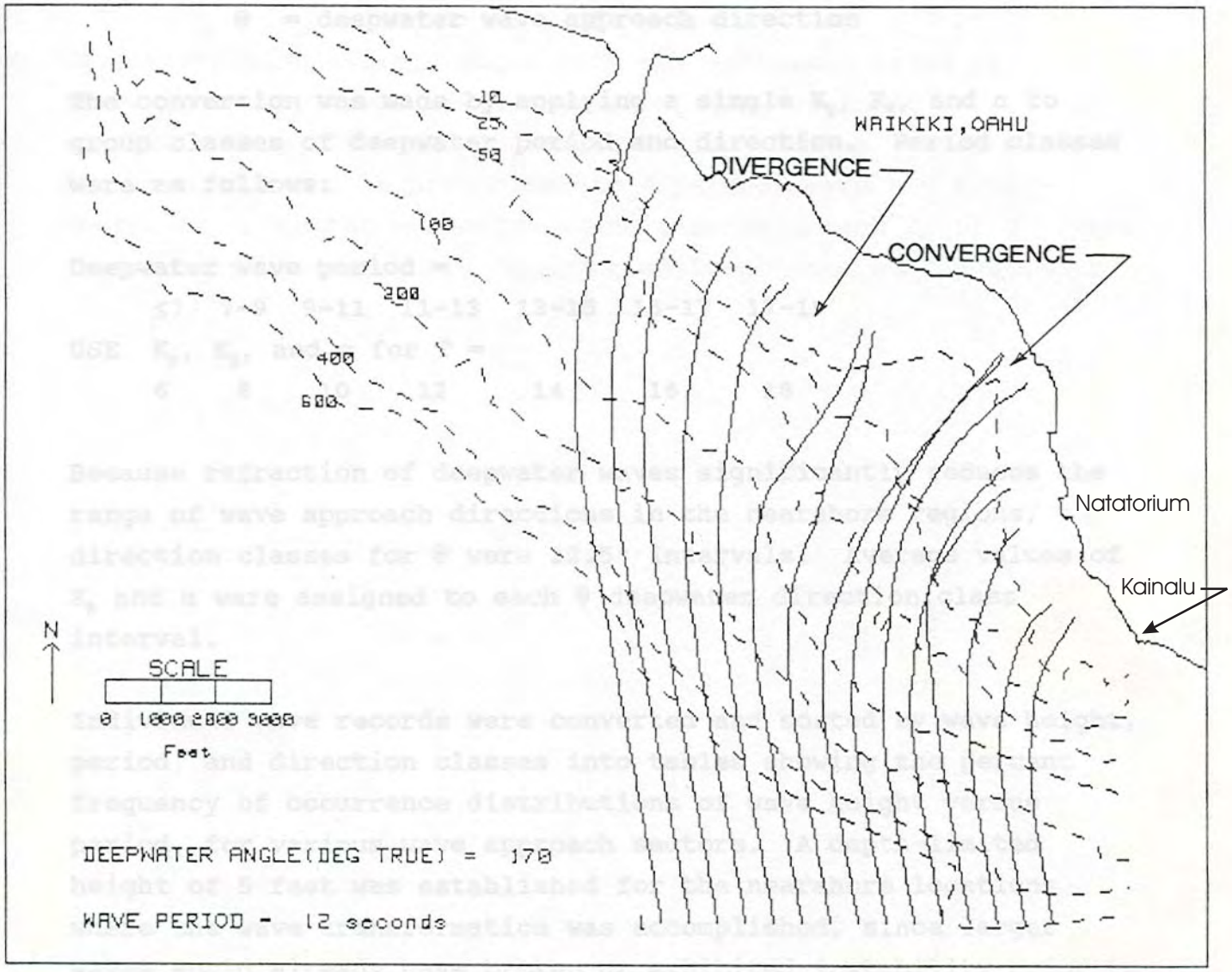


EKNA Services, Inc.
December 2008

Figure 2


0
100
Scale in Feet
N
Kalakaua Ave
Coconut Ave
Shallow
Reef Flat
(-1 to -3 ft MLLW)
Kainalu Apts
Old
Groins
Seawall
PROJECT
AREA
Sand Channel
Shallow
Reef Flat
(-1 to -3 ft MLLW)
© 2008 Tele Atlas
245 ft
Google
Pointer 21°15'28.41" N 157°49'07.22" W elev 29 ft Streaming 100%
Eye alt 864 ft

Figure 3



EDWARD K. NODA & ASSOC., INC.	WAIKIKI BEACH IMPROVEMENT PROJECT	6/91
HARBORS DIVISION STATE OF HAWAII, DOT	EXAMPLE OF REFRACTION RAY DIAGRAM	FIGURE 3-2

Figure 4

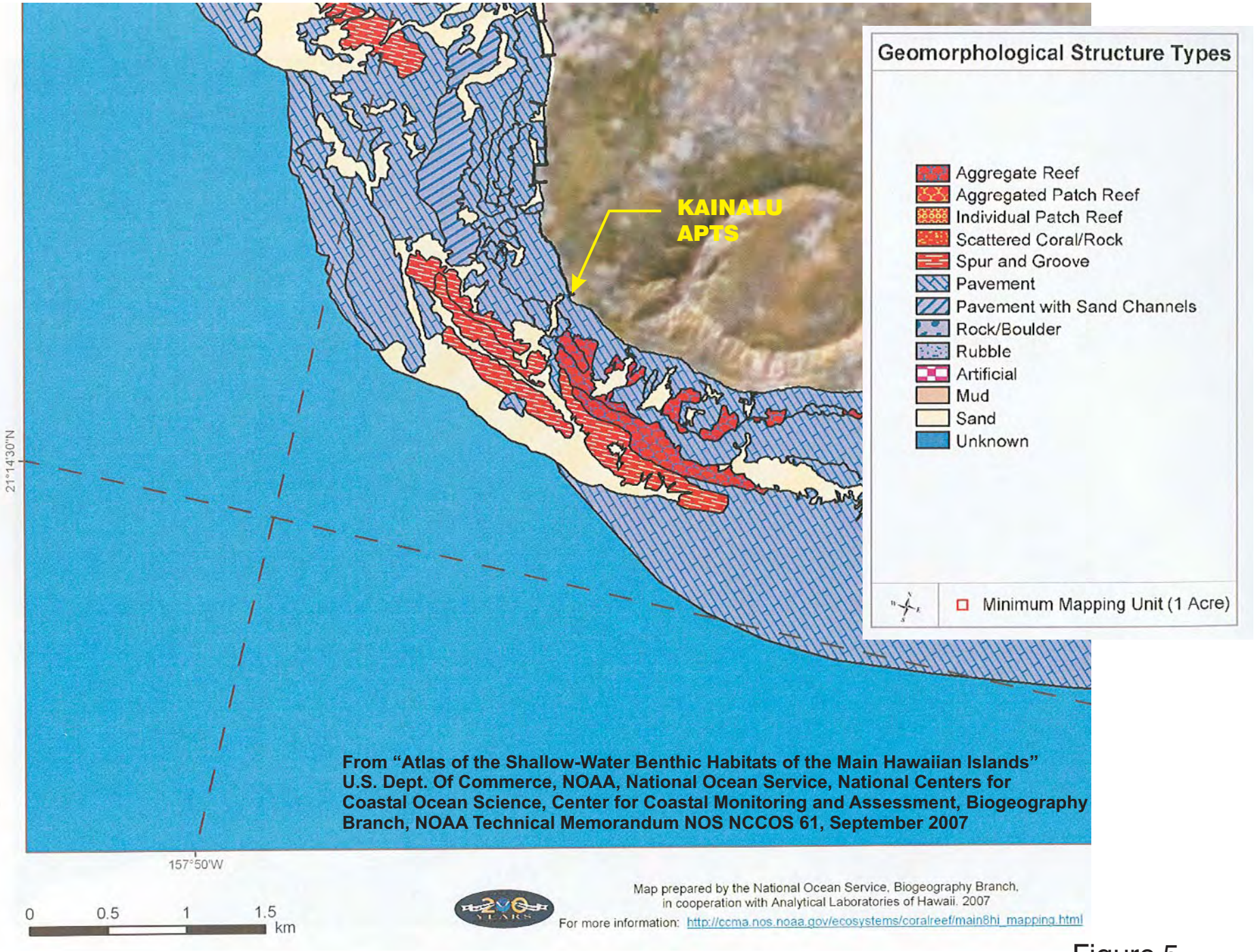

KAINALU
APTS
Geomorphological Structure Types
Aggregate Reef
Aggregated Patch Reef
Individual Patch Reef
Scattered Coral/Rock
Spur and Groove
Pavement
Pavement with Sand Channels
Rock/Boulder
Rubble
Artificial
Mud
Sand
Unknown
Minimum Mapping Unit (1 Acre)
21°14'30"N
157°50'W
0
0.5
1
1.5
km
From "Atlas of the Shallow-Water Benthic Habitats of the Main Hawaiian Islands"
U.S. Dept. Of Commerce, NOAA, National Ocean Service, National Centers for
Coastal Ocean Science, Center for Coastal Monitoring and Assessment, Biogeography
Branch, NOAA Technical Memorandum NOS NCCOS 61, September 2007
Map prepared by the National Ocean Service, Biogeography Branch,
in cooperation with Analytical Laboratories of Hawaii. 2007
For more information: http://ccma.nos.noaa.gov/ecosystems/coralreef/main8hi_mapping.html

Figure 5


1949 Aerial
KAINALU
1988 Aerial
KAINALU
2005 Aerial
KAINALU
0
500
1000
GRAPHIC SCALE IN FEET

Figure 6

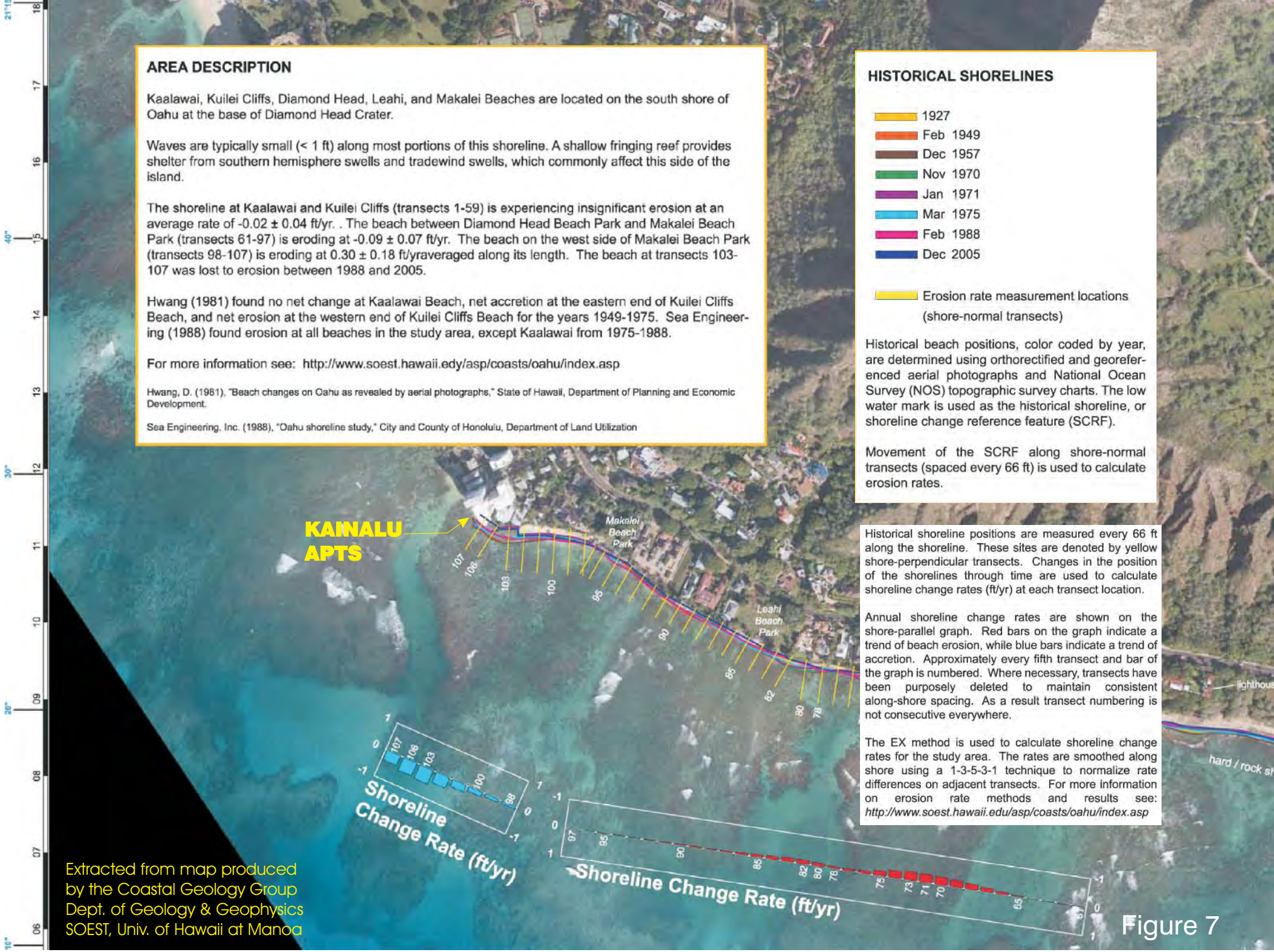
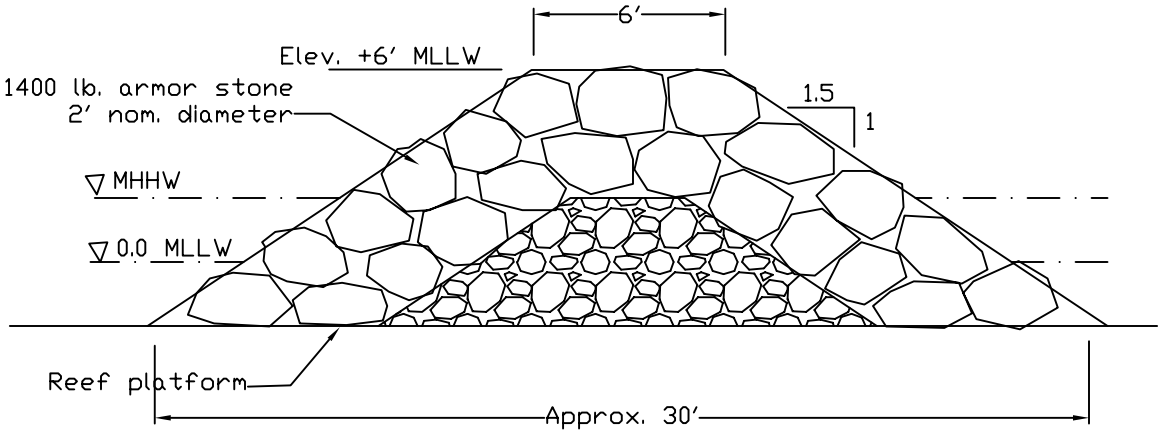
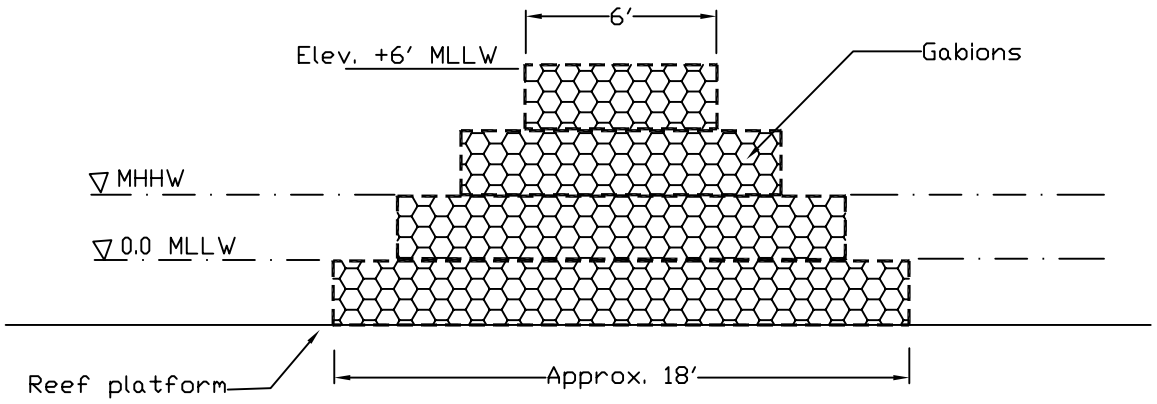

AREA DESCRIPTION
Kaalawai, Kuilei Cliffs, Diamond Head, Leahi, and Makalei Beaches are located on the south shore of Oahu at the base of Diamond Head Crater.
Waves are typically small (< 1 ft) along most portions of this shoreline. A shallow fringing reef provides shelter from southern hemisphere swells and tradewind swells, which commonly affect this side of the island.
The shoreline at Kaalawai and Kuilei Cliffs (transects 1-59) is experiencing insignificant erosion at an average rate of -0.02 ± 0.04 ft/yr. . The beach between Diamond Head Beach Park and Makalei Beach Park (transects 61-97) is eroding at -0.09 ± 0.07 ft/yr. The beach on the west side of Makalei Beach Park (transects 98-107) is eroding at 0.30 ± 0.18 ft/yraveraged along its length. The beach at transects 103-107 was lost to erosion between 1988 and 2005.
Hwang (1981) found no net change at Kaalawai Beach, net accretion at the eastern end of Kuilei Cliffs Beach, and net erosion at the western end of Kuilei Cliffs Beach for the years 1949-1975. Sea Engineering (1988) found erosion at all beaches in the study area, except Kaalawai from 1975-1988.
For more information see: http://www.soest.hawaii.edy/asp/coasts/oahu/index.asp
Hwang, D. (1981), "Beach changes on Oahu as revealed by aerial photographs," State of Hawaii, Department of Planning and Economic Development.
Sea Engineering, Inc. (1988), "Oahu shoreline study," City and County of Honolulu, Department of Land Utilization
HISTORICAL SHORELINES
1927
Feb 1949
Dec 1957
Nov 1970
Jan 1971
Mar 1975
Feb 1988
Dec 2005
Erosion rate measurement locations (shore-normal transects)
Historical beach positions, color coded by year, are determined using orthorectified and georeferenced aerial photographs and National Ocean Survey (NOS) topographic survey charts. The low water mark is used as the historical shoreline, or shoreline change reference feature (SCRF).
Movement of the SCRF along shore-normal transects (spaced every 66 ft) is used to calculate erosion rates.
KAINALU APTS
Makalei Beach Park
Leahi Beach Park
107
106
103
100
95
90
85
82
80
78
75
73
71
70
65
62
Historical shoreline positions are measured every 66 ft along the shoreline. These sites are denoted by yellow shore-perpendicular transects. Changes in the position of the shorelines through time are used to calculate shoreline change rates (ft/yr) at each transect location.
Annual shoreline change rates are shown on the shore-parallel graph. Red bars on the graph indicate a trend of beach erosion, while blue bars indicate a trend of accretion. Approximately every fifth transect and bar of the graph is numbered. Where necessary, transects have been purposely deleted to maintain consistent along-shore spacing. As a result transect numbering is not consecutive everywhere.
The EX method is used to calculate shoreline change rates for the study area. The rates are smoothed along shore using a 1-3-5-3-1 technique to normalize rate differences on adjacent transects. For more information on erosion rate methods and results see: http://www.soest.hawaii.edu/asp/coasts/oahu/index.asp
Shoreline Change Rate (ft/yr)
Shoreline Change Rate (ft/yr)
lighthouse
hard / rock sh
Extracted from map produced by the Coastal Geology Group Dept. of Geology & Geophysics SOEST, Univ. of Hawaii at Manoa

Figure 7



Rock Groin Typical Section



Gabion Groin Typical Section

Conceptual Typical Groin Sections

Figure 8

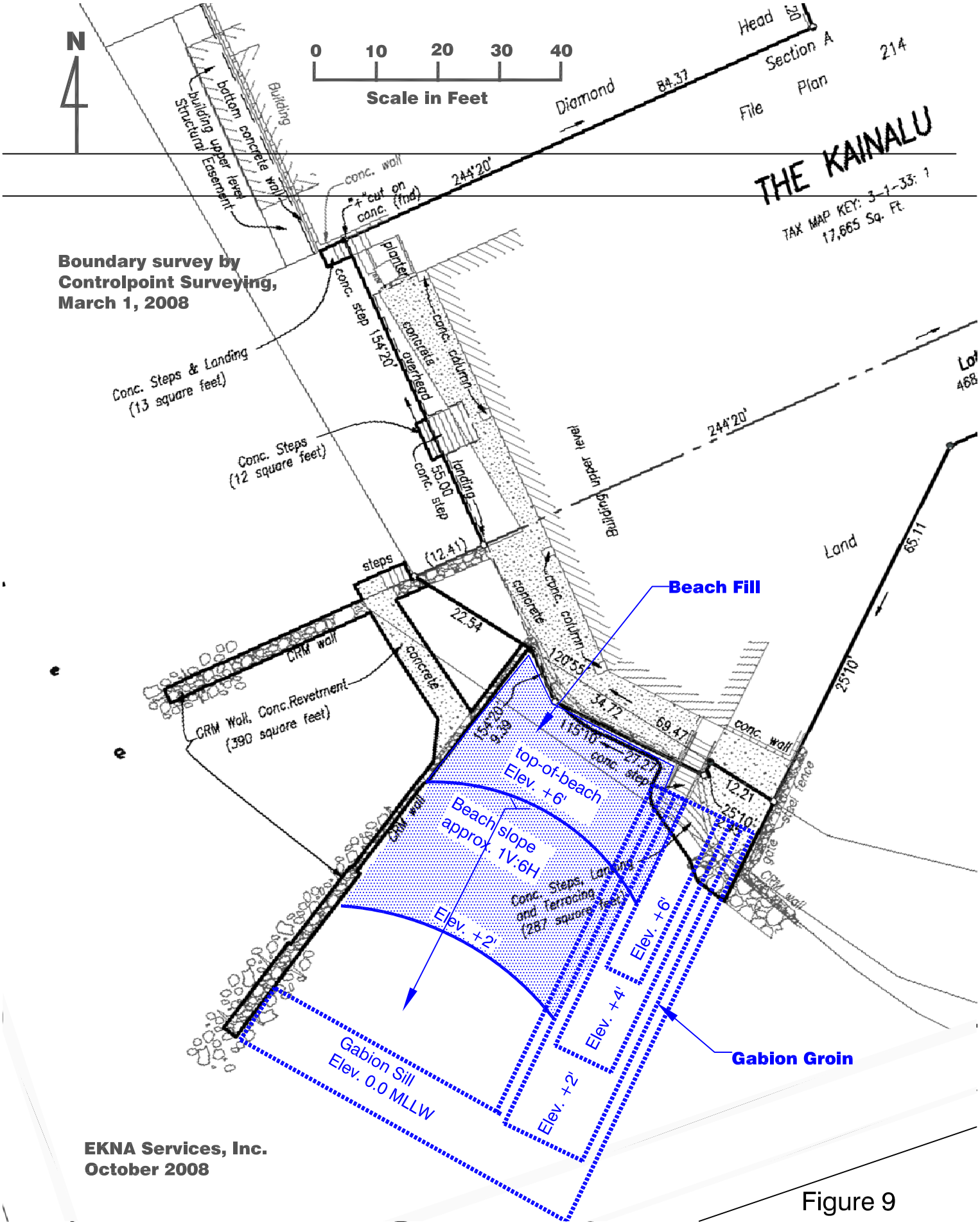

N
0 10 20 30 40
Scale in Feet
THE KAINALU
TAX MAP KEY: 3-1-33: 1
17,665 Sq. Ft.
Boundary survey by
Controlpoint Surveying,
March 1, 2008
Beach Fill
Gabion Groin
top-of-beach
Elev. +6'
Beach slope
approx. 1V:6H
Elev. +2'
Elev. +4'
Elev. +6'
Elev. +2'
Gabion Sill
Elev. 0.0 MLLW
Conc. Steps & Landing
(13 square feet)
Conc. Steps
(12 square feet)
CRM Wall, Conc.Revetment
(390 square feet)
Conc. Steps, Landing
and Terracing
(287 square feet)
EKNA Services, Inc.
October 2008

Figure 9

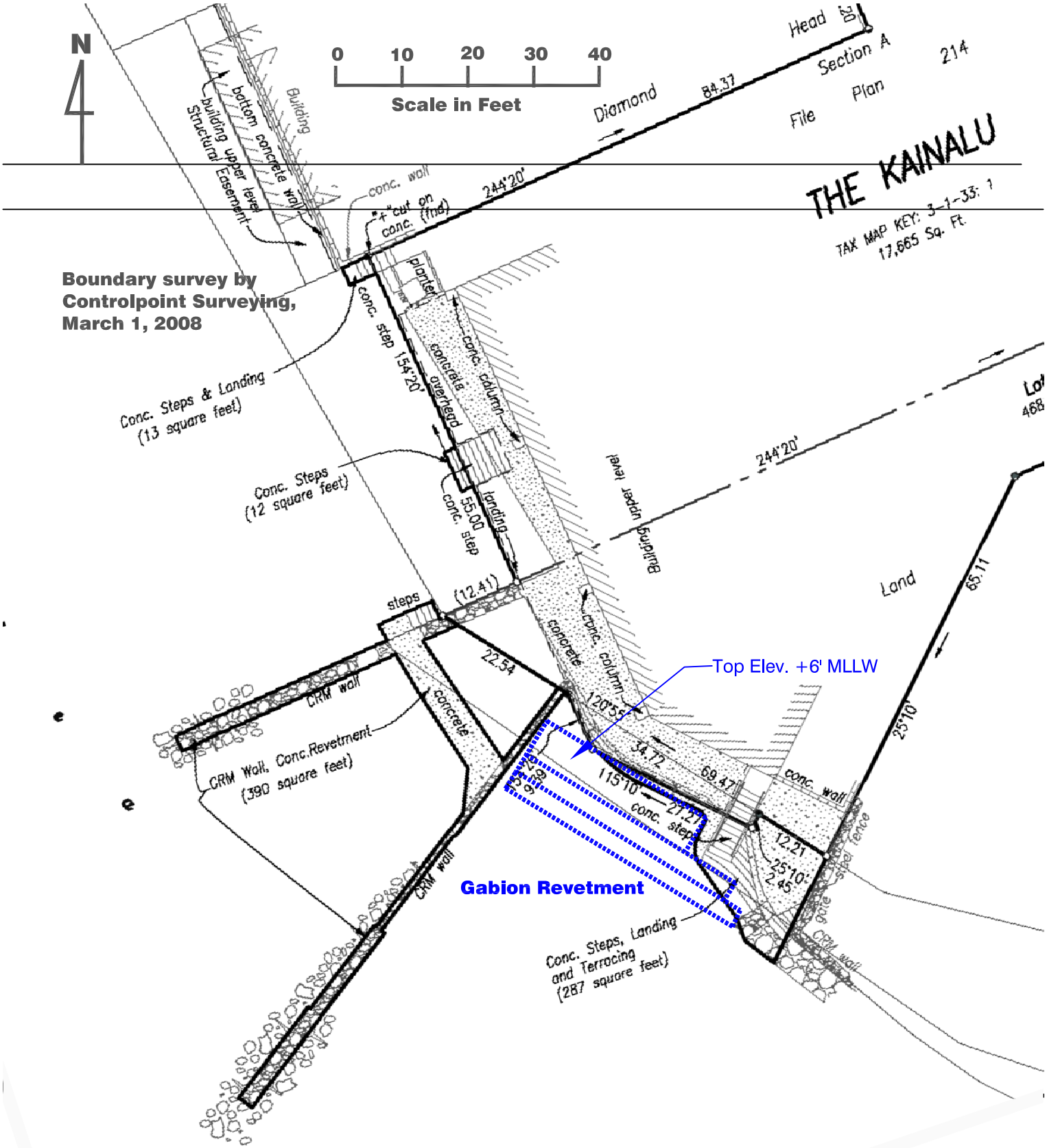
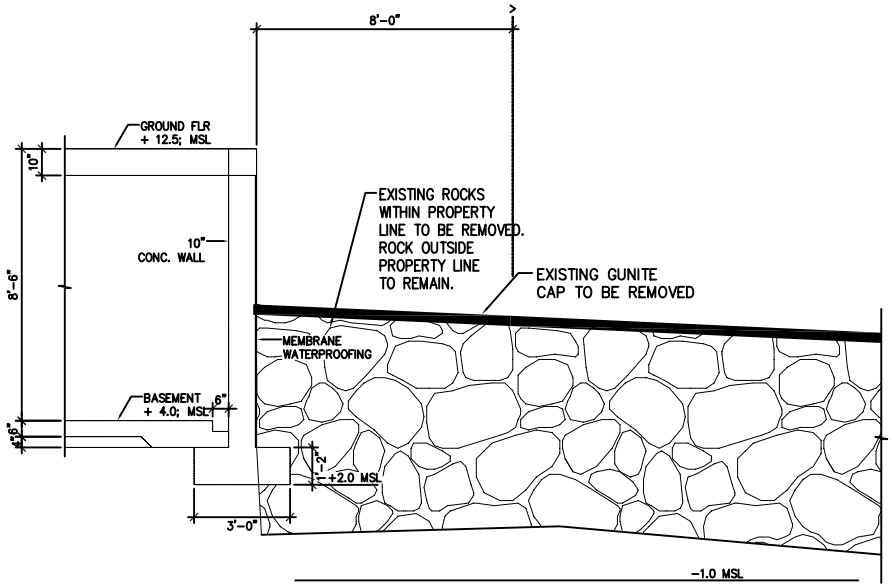
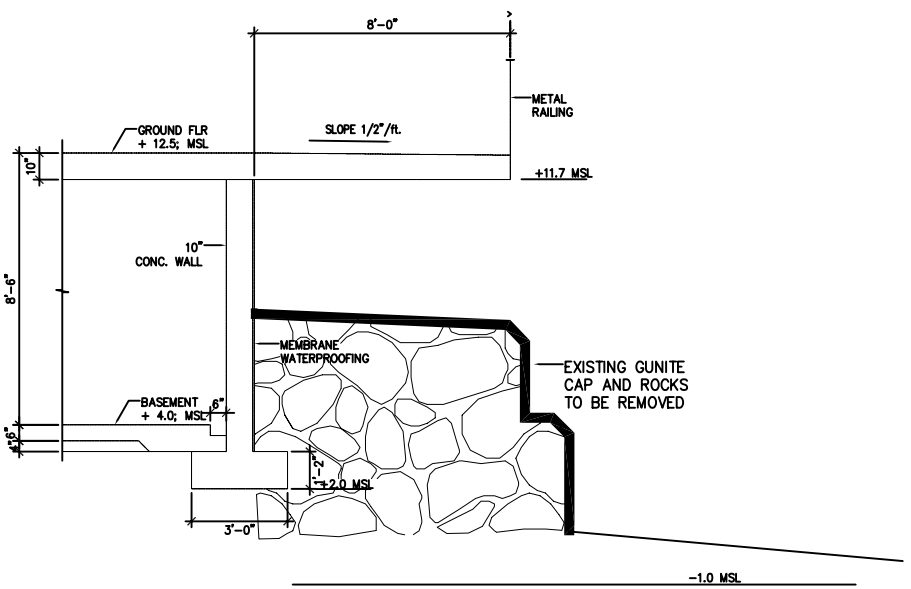

N
0 10 20 30 40
Scale in Feet
THE KAINALU
TAX MAP KEY: 3-1-33: 1
17,665 Sq. Ft.
Boundary survey by
Controlpoint Surveying,
March 1, 2008
Top Elev. +6' MLLW
Gabion Revetment
Conc. Steps & Landing
(13 square feet)
Conc. Steps
(12 square feet)
CRM Wall, Conc.Revetment
(390 square feet)
Conc. Steps, Landing
and Terracing
(287 square feet)
EKNA Services, Inc.
October 2008

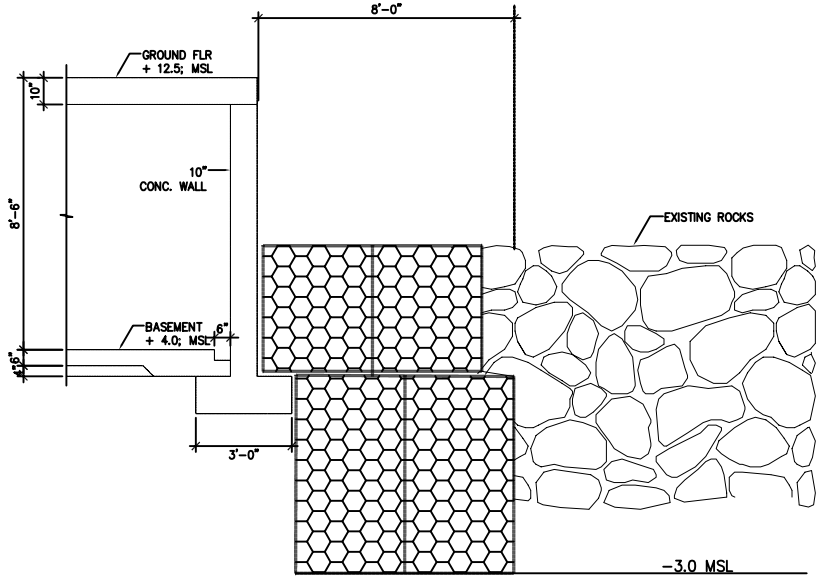
Figure 10



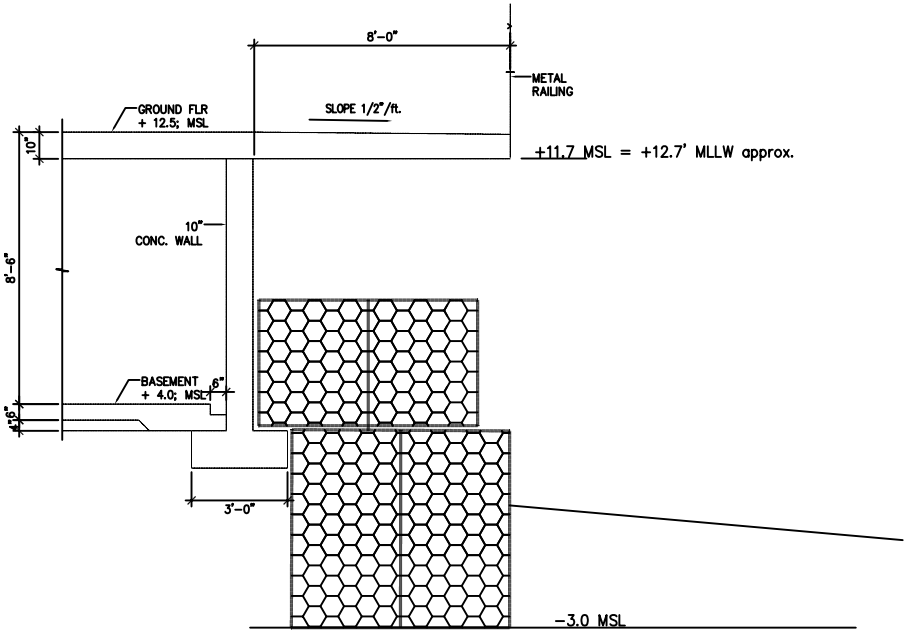
EXISTING SECTION AT DRIVEWAY ACCESS — A / S-1



EXISTING SECTION AT BALCONY — B / S-1



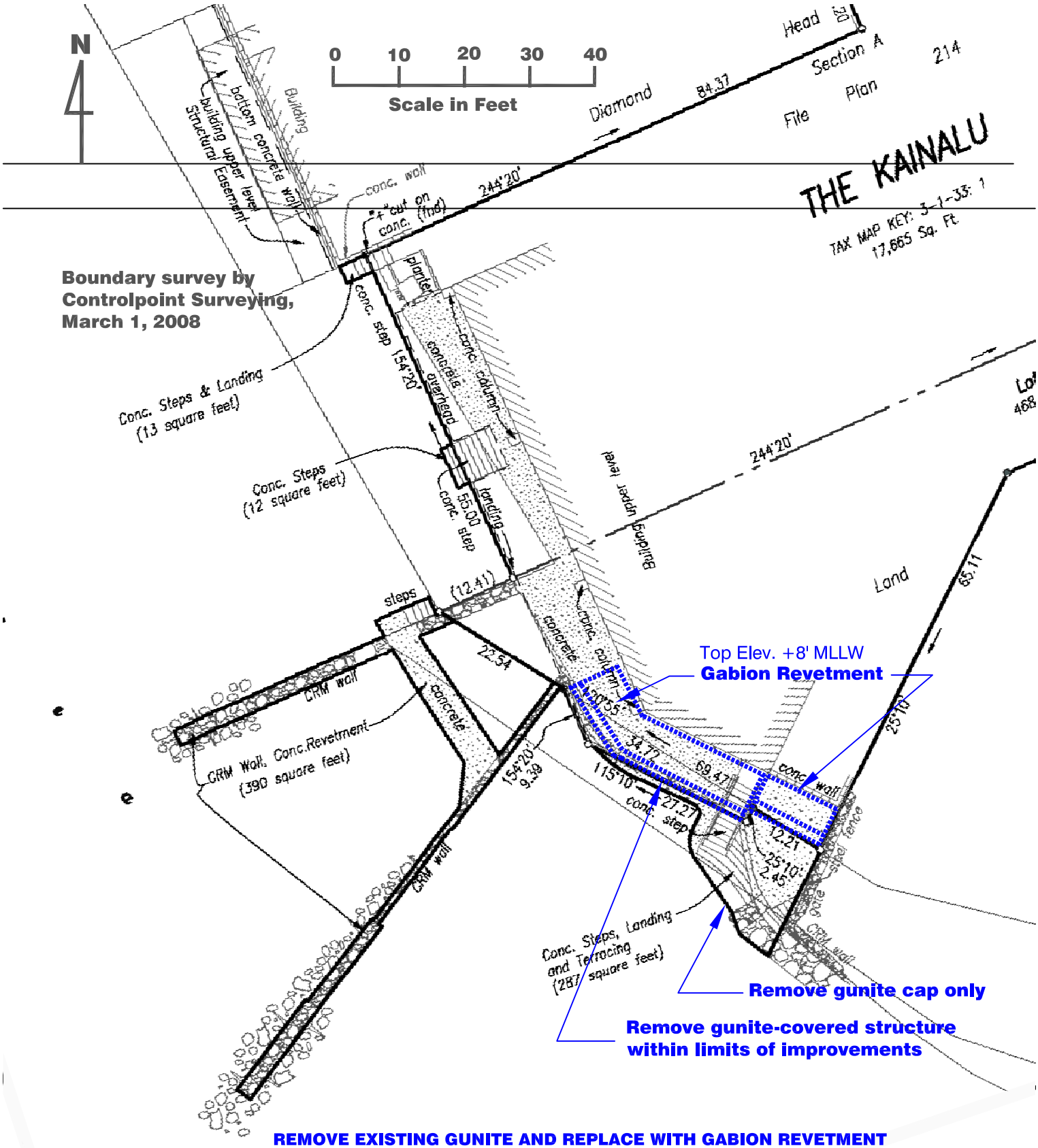
GABION SECTION AT DRIVEWAY — E / S-2



GABION SECTION AT BALCONY — F / S-2

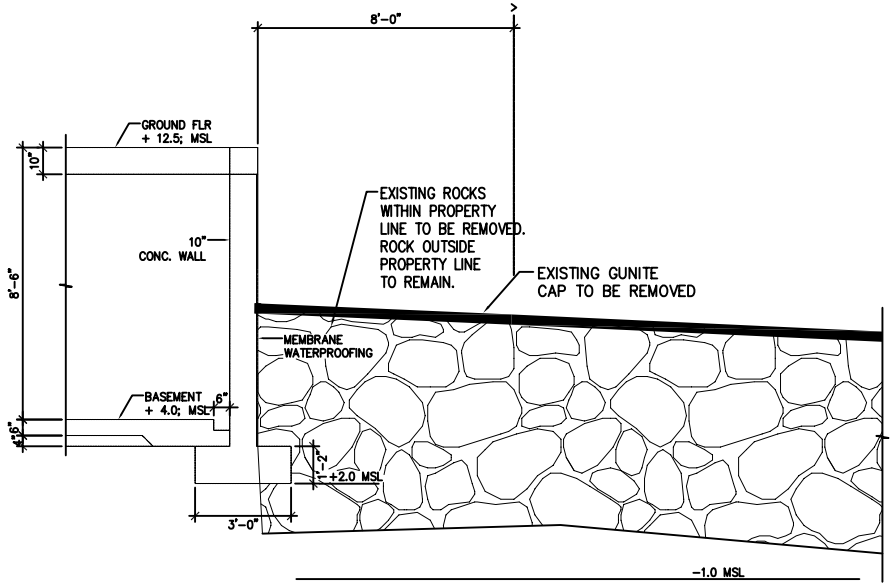
From Tanimura & Associates, Inc.
Scale: 1" = 6'

Figure 11



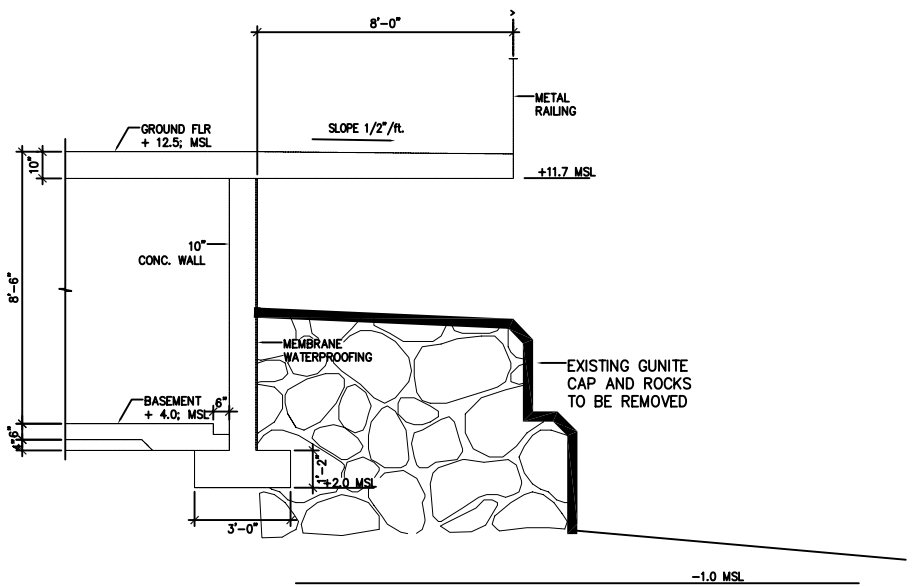
EKNA Services, Inc.
April 2009

Figure 12



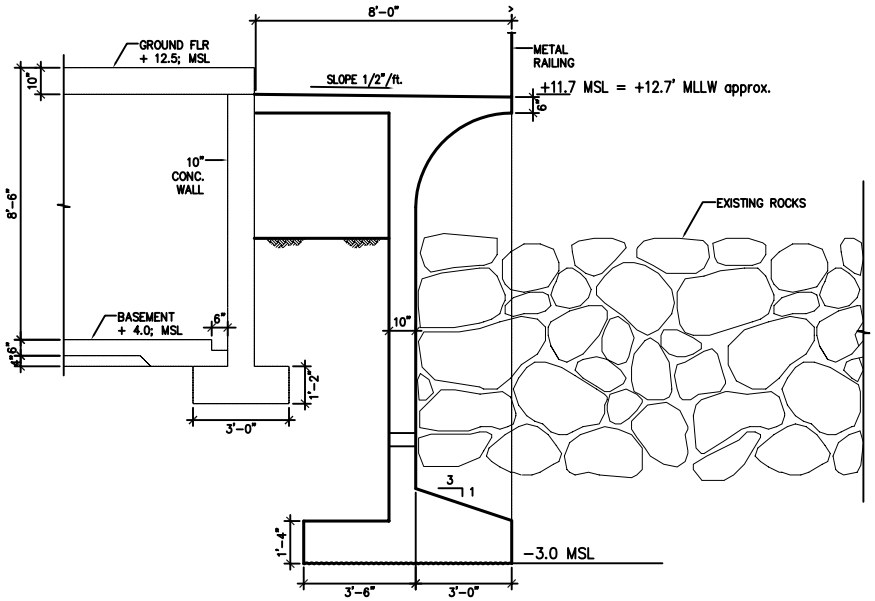
EXISTING SECTION AT DRIVEWAY ACCESS

A
S-1



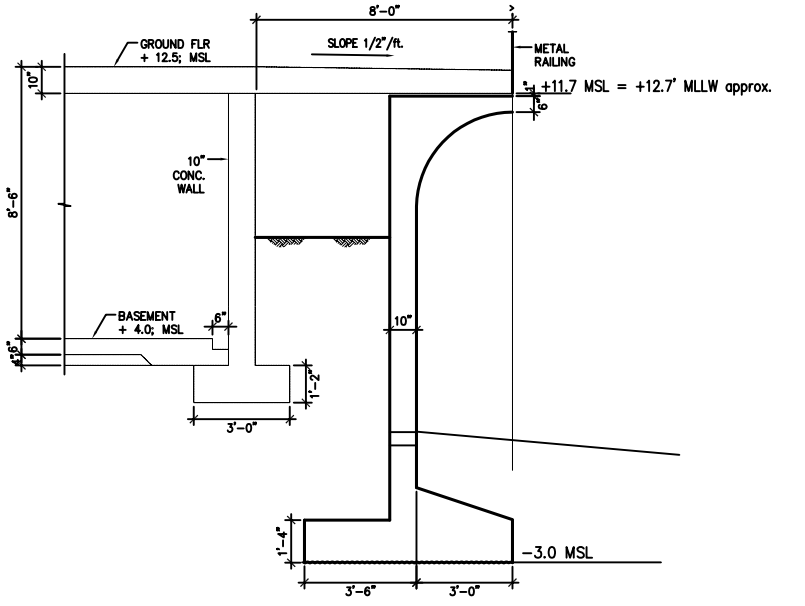
EXISTING SECTION AT BALCONY

B
S-1



SEAWALL SECTION AT DRIVEWAY ACCESS

C
S-2



SEAWALL SECTION AT BALCONY

D
S-2

From Tanimura & Associates, Inc.
Scale: 1" = 6'

Figure 13

GROUND PHOTOS

Property shorefront on north side of old groins. A narrow beach fronts this half of the building. Stairs lead to first floor apartment.

The Kainalu Apartments @ Waikiki, Oahu
2801 Coconut Avenue, TMK: 3-1-033:001
June 9, 2008, 4:30-5:30 pm
Tide approx. 0.9' MLLW

Property shorefront on south side of old groin. Gunite covers old planter boxes adjacent to the building, formerly fronted by a narrow beach. Stairs lead to first floor apartment.

The Kainalu Apartments @ Waikiki, Oahu
2801 Coconut Avenue, TMK: 3-1-033:001
June 9, 2008, 4:30-5:30 pm
Tide approx. 0.9' MLLW

Eastern stairs - 1980

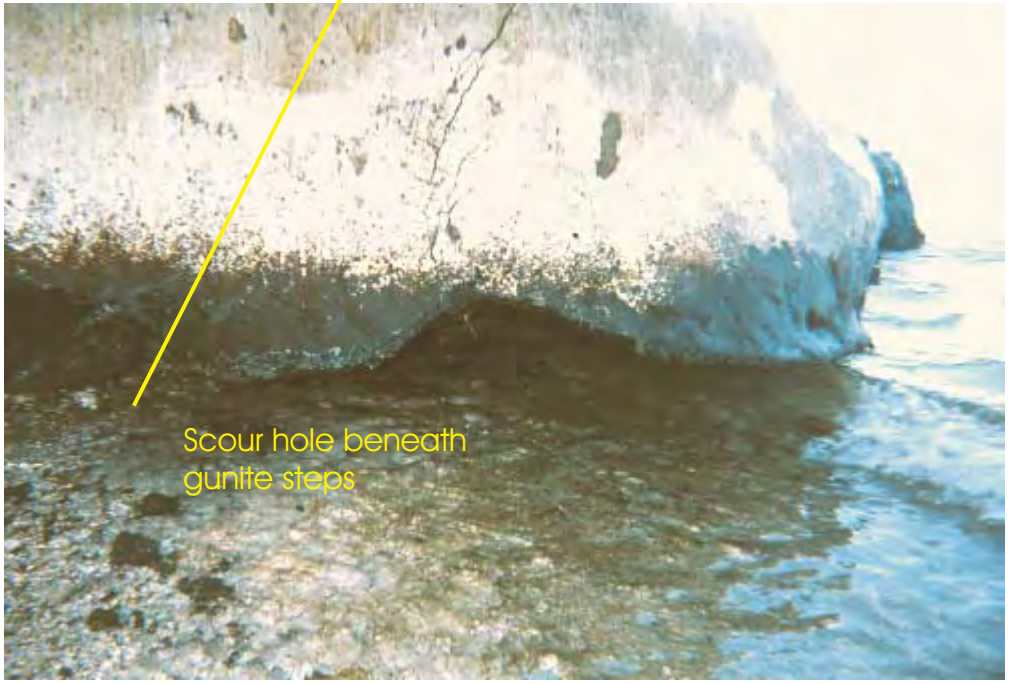
Eastern stairs - 2004

Photos showing the original rock masonry planter boxes and stairs prior to encapsulation by gunite.

The Kainalu Apartments @ Waikiki, Oahu
2801 Coconut Avenue, TMK: 3-1-033:001

Erosion of the remaining sand covering the reef flat fronting the building is causing continued damage to the gunite-covered structures. There is presently a scoured gap between the limestone reef and the base of the gunited stairs, and large cracks are developing in the gunite surface covering the planter boxes due to differential settlement.

Cracks in gunite



The Kainalu Apartments @ Waikiki, Oahu
2801 Coconut Avenue, TMK: 3-1-033:001
August 28, 2008, 9:00 am
Tide approx. 0.2' MLLW

APPENDIX 6. 2005 SMA Permit

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
TELEPHONE: (808) 523-4432 • FAX: (808) 527-6743
DEPT. INTERNET: www.honoluludpp.org • INTERNET: www.honolulu.gov

MUFI HANNEMANN
MAYOR

HENRY ENG, FAICP
DIRECTOR

DAVID K. TANOUE
DEPUTY DIRECTOR

(JP)

PERMIT :	SPECIAL MANAGEMENT AREA PERMIT (Minor)
File Number :	2005/SMA-25
Project (Valuation) :	Repair Seawall at "The Kainalu" ($29,204)
Applicant/ Landowner :	Tropic Sands Apartments, Inc.
Agent :	Hank Reese, Architect
Location :	2801 Coconut Avenue – Diamond Head
Tax Map Key :	3-1-33: 1
Zoning :	A-2 Medium Density Apartment District and R-5 Residential District
Date Received :	April 8, 2005
Date Accepted :	April 8, 2005

We have reviewed your after-the-fact request to repair an existing rock seawall on the site by applying 3 inches of gunite spray, and find that the wall lies within the Shoreline Management Area (SMA) established in Chapter 25, Revised Ordinances of Honolulu (ROH). The current replacement value of the seawall is $138,637. The repair work has a valuation of $29,204, which is less than 50 percent of the current replacement value, and will have no significant effect on the SMA. Therefore, a Minor Special Management Area Permit (SMP) is hereby ***APPROVED***, subject to the conditions listed below:

1. All work shall be in accordance with the approved application documents received on April 8, 2005, and other applicable statutes, ordinances, codes and regulations.

2. If the valuation of the repairs exceeds 50 percent of the current replacement value of the existing seawall, then the project must be returned to the Department of Planning and Permitting for further review under Chapter 25, ROH.

3. Any modification to the application documents and conditions stated herein shall be subject to approval by the DPP. For good cause, the Director may impose additional requirements and/or amend the above conditions.

A rock seawall and concrete beach access stairs (with railing) were constructed with the original 8-story apartment building in 1958. The existing seawall and stairs are located within the subsequently established SMA, and also encroach into the shoreline setback. Recently, the seawall has suffered damage, which the landowner repaired with a 3-inch layer of gunite spray. The total cost of the repairs was $29,204, which is 21 percent of the estimated $138,637 current replacement value of the seawall. Therefore, the work falls within the level of permitted repairs for a nonconforming structure within the shoreline setback (i.e., less than 50 percent of current replacement value).

The landowner/applicant was issued notices of violation (Nos. 2004/NOV-11-021 and 2004/NOV-11-061) for construction of a concrete seawall, and concrete stairway with railing, in the SMA and shoreline setback without an SMP, shoreline variance or building permit. The landowner has since established through historical documents (building plans dated July 1958 and historical photographs) that both the seawall and stairway were lawfully built when the building was approved for construction in 1958, a date which preceded the establishment of the SMA and shoreline setback. Therefore, the seawall and stairway are nonconforming structures.

Repairs to a nonconforming structure in the shoreline setback, which involve a cost less than half the current replacement value of the structure, are permitted under Chapter 23, Revised Ordinance of Honolulu. Therefore, a shoreline variance is not required for the repair of the seawall. So long as the existing beach access stairways were authorized by the original building permit for the apartment building, there is no violation. However, an after-the-fact Minor SMP and building permit are required for the seawall repairs.

Any party to this case wishing to appeal the Director's action must submit a written petition to the Circuit Court within 30 calendar days from the date of mailing or personal service of the Director's written decision.

If you have any questions or need additional information concerning this Minor Special Management Area Permit, please contact Jamie Peirson of our staff at 527-5754.

A copy of this approval should accompany your application(s) for building and/or construction permits.

Encl.: Receipt No. 56571
Historical photograph (original)

cc: Office of Planning (John Nakagawa)

G:\LandUse\PosseWorkingDirectory\jpeirson\2005SMA-25 Approval.doc

THIS COPY, WHEN SIGNED BELOW, IS NOTIFICATION OF THE ACTION TAKEN.

Barbara A Moon — For the Director — 4.21.05

SIGNATURE — TITLE — DATE

This approval does not constitute approval of any other required permits, such as building or sign permits.

APPENDIX 7. SMA Exemption Letter

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
TELEPHONE: (808) 768-8000 • FAX: (808) 768-6041
DEPT. WEB SITE: www.honoluludpp.org • CITY WEB SITE: www.honolulu.gov

MUFI HANNEMANN
MAYOR

DAVID K. TANOUE
DIRECTOR

ROBERT M. SUMITOMO
DEPUTY DIRECTOR

2010/ELOG-634(AA)

April 30, 2010

Mr. Kenji Salmoiraghi
PlanPacific, Inc.
345 Queen Street, Suite 802
Honolulu, Hawaii 96813

Dear Mr. Salmoiraghi:

Subject: Special Management Area Determination
2801 Coconut Avenue – Diamond Head
Tax Map Key 3-1-33: 1

This responds to your request, received March 29, 2010, for an "exemption" to obtaining a Special Management Area (SMA) permit for repairs to an existing seawall on the site. However, based on the information included in your request, it appears that the seawall is now located outside of our jurisdiction, since it is now seaward of the shoreline.

In accordance with Chapter 25, Revised Ordinances of Honolulu (ROH), the SMA is defined as "*. . . the land extending inland from the shoreline, as established in this chapter and delineated on the maps established by the council and filed with the council and agency pursuant to HRS Section 205A-23.*" [Emphasis added.] According to the State of Hawaii Department of Land and Natural Resources (DLNR), it has been determined that the property involves encroachments onto State land, as noted on the shoreline survey map attached to your letter. And, upon removal of these encroachments, the DLNR will certify the shoreline along the face of the building, landward of the seawall. Under ROH Chapter 25, the City's jurisdiction, and thus, this agency's authority is limited to those areas that extend inland from the shoreline. In other words, our statutory authority does not extend to those areas seaward of the shoreline. Inasmuch as the shoreline will be located such that the seawall will be located seaward of the shoreline, its repairs are no longer within the SMA. Therefore, we cannot "exempt" the proposed repair work, because the work is no longer subject to the SMA requirements of ROH Chapter 25. It appears to us that the proposed repair work can and should be authorized solely by the State. We have no objection or concerns regarding the proposed repair work, and see no reason why such work cannot or should not be so authorized.

We can confirm that the nonconforming status of the seawall was clearly established by the Department of Planning and Permitting with our approval on April 2, 2005 of an SMA Minor Permit (No. 2005/SMA-25) to allow repairs to the (nonconforming) seawall.

Should you have any questions concerning this matter, please contact Ann Asaumi of our staff at 768-8020.

Very truly yours,

David K. Tanoue, Director
Department of Planning and Permitting

DKT:cs

cc: DLNR (Office of Conservation and Coastal Land)