MARYANNE W. KUSAKA
MAYOR

DEE M. CROWELL
PLANNING DIRECTOR

IAN K. COSTA
DEPUTY PLANNING DIRECTOR

TELEPHONE (808) 241-6677
FAX (808) 241-6699

COUNTY OF KAUAI
PLANNING DEPARTMENT
4444 RICE STREET, SUITE 473
LIHUE, KAUAI, HAWAII 96766

March 24, 1995

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

Subject: Final Environmental Assessment
Shoreline Setback Variance Permit Application
SSV-95-1
TMK: 2-8-20: 4 Poipu, Kauai
Fredrick G. Synder, Applicant

Attached is a completed "OEQC Bulletin Publication Form" to accompany the above referenced submittal that was sent to your office on March 22, 1994.

Should you have any questions, please contact Myles Hironaka of my staff at 241-6677.

DEE M. CROWELL
Planning Director

1995-04-08-KA-FEA-~~Sny~~ Snyder Poipu Makai Resort
CRM retaining/seawall

APR - 8 1995

FINAL ENVIRONMENTAL ASSESSMENT

FOR

POIPU MAKAI RESORT

POIPU, KAUAI, HAWAII

FEBRUARY 1995

SNYDER
&
ASSOCIATES
GEOTECHNICAL ENGINEERS

Project No. 9365

February 21, 1995

Planning Department
County of Kauai
4444 Rice Street
Lihue, Kauai, Hawaii 96766
Attn.: Dee M. Crowell, Planning Director

FINAL ENVIRONMENTAL ASSESSMENT

Subject: Slope Stabilization
Poipu Makai Resort
Poipu, Kauai, Hawaii
TMK: (4)2-8-20:4

Dear Mr. Crowell:

Attached are the original and four copies of the final Environmental Assessment for the subject project. This report was prepared to conform to HRS 343. Comments received during the OEQC commenting period and our responses to those comments are included in the appendix. Please review this submittal to see if it meets your requirements and then submit it to the OEQC for approval.

If you have questions or comments please contact me at 245-2818.

Very truly yours,

SNYDER AND ASSOCIATES - GEOTECHNICAL ENGINEERS

Frederick G. Snyder, P.E.
Principal Geotechnical Engineer
Professional Engineer Number 6524-C

Appendix

4374 KUKUI GROVE STREET, SUITE 102, LIHUE, KAUAI, HAWAII 96766 (808) 245-2818

FINAL ENVIRONMENTAL ASSESSMENT

Date: February 21, 1995

Project: Slope Stabilization
Poipu Makai Resort
Poipu, Kauai, Hawaii
TMK: (4) 2-8-20: 4

Owner: Poipu Makai Homeowner's Association

Applicant: Frederick G. Snyder
Snyder & Associates
4374 Kukui Grove St., Suite. 102
Lihue, HI 96766
(808) 245-2818

Approving Agency: OEQC (Office of Environmental Quality Control)

Agencies Consulted in Making the Assessment:

County of Kauai Planning Department
State of Hawaii Department of Land and Natural Resources
Division of Aquatic Resources
Division of Forestry and Wildlife
State of Hawaii Office of Environmental Quality Control
Army Corps of Engineers

Background:

The County of Kauai will allow shoreline stabilization for rocky shoreline in some cases. The County defers to the Army Corps of Engineers for the design standards for shoreline stabilization walls. The Army Corps of Engineers does not require a permit unless an action comes in contact with the ocean. In the case of this action no permit is required. Adjacent property owners, Poipu Palms to the west and The Makahuena to the east are have both given permission for this action to take place.

General Description:

Technical:

The proposed action is to construct a lava rock wall at the base of bluffs on a rocky shoreline in Poipu on the southeastern shore of Kauai (see Location Map). The land above the 10 to 12 foot high bluffs contains a condominium building. The bluffs were eroded by Hurricane Iniki in September, 1992. The proposed rock wall is located within the shoreline setback area. This location has prompted this Environmental Assessment.

The wall will not come in contact with sea water except in the event of heavy storm surge or tsunami.

The purpose of the wall is to protect the bluffs from erosion due to storm surge or tsunami. The wall is a continuation of a wall to be built on an adjacent piece of property and will extend for a distance of 100 feet along the shoreline. The wall will vary in height from 6 to 16 feet. The wall will be constructed using lava rock which will blend in with the surrounding bluffs and rock shelf and provide a somewhat irregular surface for storm wave reflection. The wall will protect the condominium from damage due to erosion of the bluffs.

Construction plans showing the location of the wall on the property and schematic cross sections of the wall are included in this report.

Socio-Economic:

The social consequences from this action are minimal. The rocky shelf below the bluffs will continue to be accessible to the public and the rock wall will present a minimal visual impact since it will be made of lava rock and will extend no more than 10 feet makai of the bluffs. There may be an impact to use of the area during the time of construction in the immediate area of the construction, however, there is significant rocky coastline to the east which will remain accessible.

Economically the project protects a condominium from damage due to erosion. This presents a significant economic benefit as the condominium will remain in serviceable condition allowing residents and tourists to live there.

Environmental Characteristics:

Environmentally the proposed action has minimal effect. Visually the wall presents a minimal impact. People on the rocky shoreline will notice a rock wall when they look at the bluffs but the wall will be made of lava rock and so will blend in well with the surrounding bluffs. From the ocean the wall will be less noticeable as the wall will tend to blend in with the bluffs. From above, the wall will not be seen due to the steepness of the bluffs.

Protection of the ocean from pollution during construction of this wall must be addressed. The rock wall will be constructed using cement for the mortar. Cement is highly alkaline and is highly toxic to marine life. Care must be taken not to allow cement in liquid or powdered form from entering the ocean. Once the concrete has hardened there is no danger of poisoning marine life.

Runoff from the wall should be handled in a way that minimizes the concentration of fresh water entering the ocean in any one area.

Summary Description of the Affected Environment:

The affected environment is a rocky shoreline and bluffs located at the sea on the Weliweli portion of Poipu west of Makahuena Point. Adjacent lots to the east and west contain

condominiums mauka of the bluffs and rocky shoreline makai of the bluffs. The proposed wall is located within 40 feet of the certified shoreline. The affected environment is the bluffs and the area at the base of the bluffs extending no more than 10 feet makai of the bluffs. The bluffs will be protected from erosion due to storm waves, surge or tsunami. There will be no effect during normal tidal conditions. No more than 10 feet of rocky ledge will be covered by the base of the wall. Much of this ledge was exposed from erosion caused by Hurricane Iniki.

Representatives of the DLNR stated that the surrounding ocean is a habitat for sea turtles and that the bluffs are suitable for Shearwaters but there are not any nesting at this location. They indicated that the proposed action would have no significant negative impact on the environment.

Identification of Major Impacts:

This action causes no major adverse impacts. That a portion of the action is within 40 feet of the shoreline could indicate that there might be an adverse impact, however, in this case the action provides a positive benefit by protecting bluffs from erosion. The erosion of the bluffs is potentially harmful to the surrounding environment due to siltification of the surrounding ocean. Additionally, should the condominium unit be damaged due to erosion during a storm or tsunami, debris from the damaged structure could cause damage to the surrounding ocean.

An adverse impact that the action could cause would be if, during construction, material were allowed to be washed into the ocean. This should not be allowed to happen. The contractor should take precautions not to allow this to happen and observation by a qualified field inspector should be required to insure that this situation does not develop.

Fresh water runoff could cause a problem in the adjacent ocean if the area is inundated with an excess of fresh water in any single location.

Mitigative Measures:

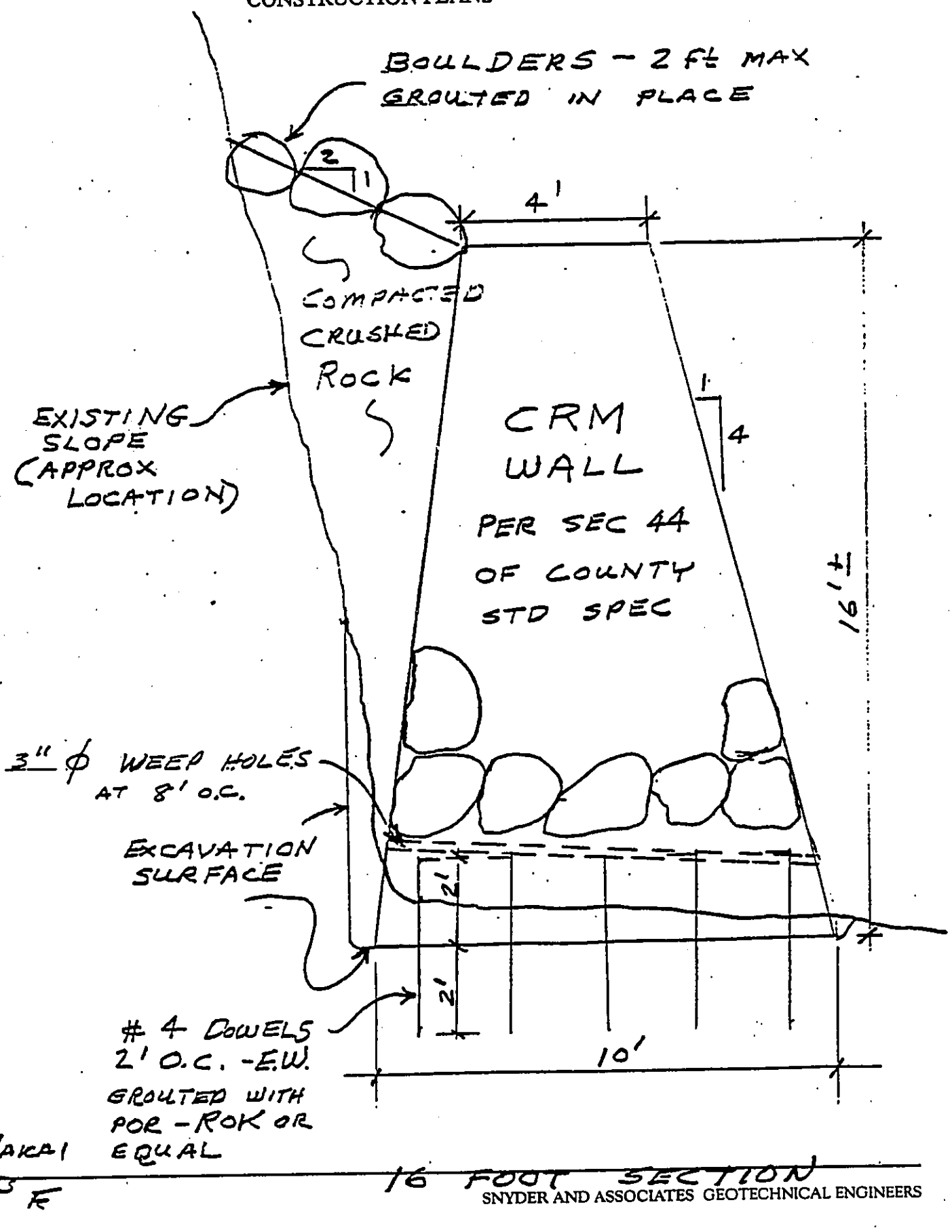
In order to protect the ocean from exposure to liquid or powdered cement the contractor will be pumping concrete from more than 50 feet mauka of the bluffs from a concrete transit truck. This means that there will be no mixing of concrete on site which will eliminate the hazard of powdered cement being blown into the ocean. The pumping apparatus also directs the concrete to where it is needed. Care will be taken not to splash concrete. Because the wall is more than 30 feet from the ocean it is unlikely that liquid concrete would fall into the ocean.

In order to prevent fresh water pollution of the ocean in this area the wall was designed with weepholes every eight feet for drainage. This will distribute the runoff from behind the wall and present a nearly normal influence of fresh water.

Summary:

In summary, the proposed action, provided proper construction practices are used, will have no adverse impacts and will provide positive benefits.

CONSTRUCTION PLANS

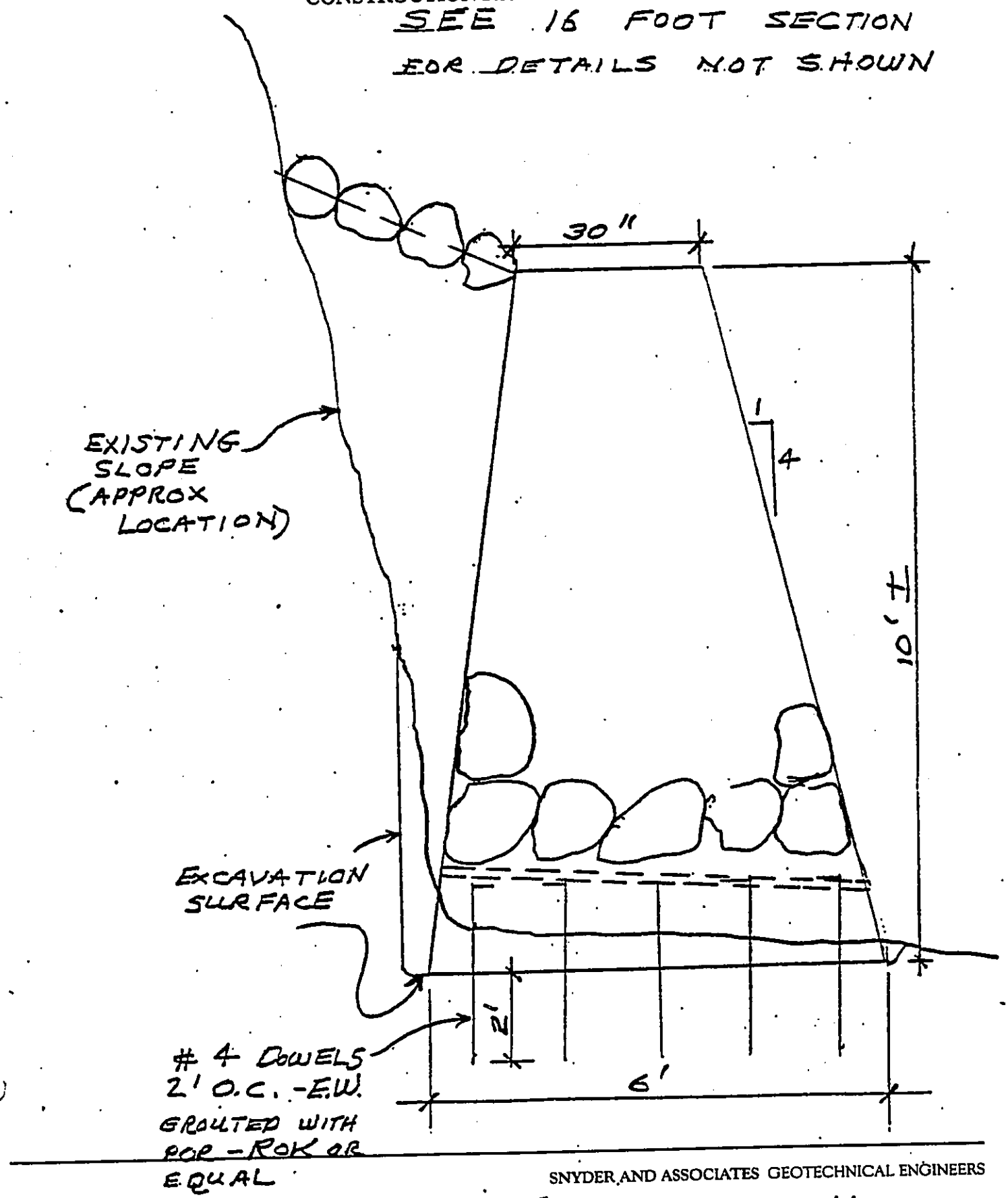


POIPU MAKAI
12-22-93 F

16 FOOT SECTION

SNYDER AND ASSOCIATES GEOTECHNICAL ENGINEERS

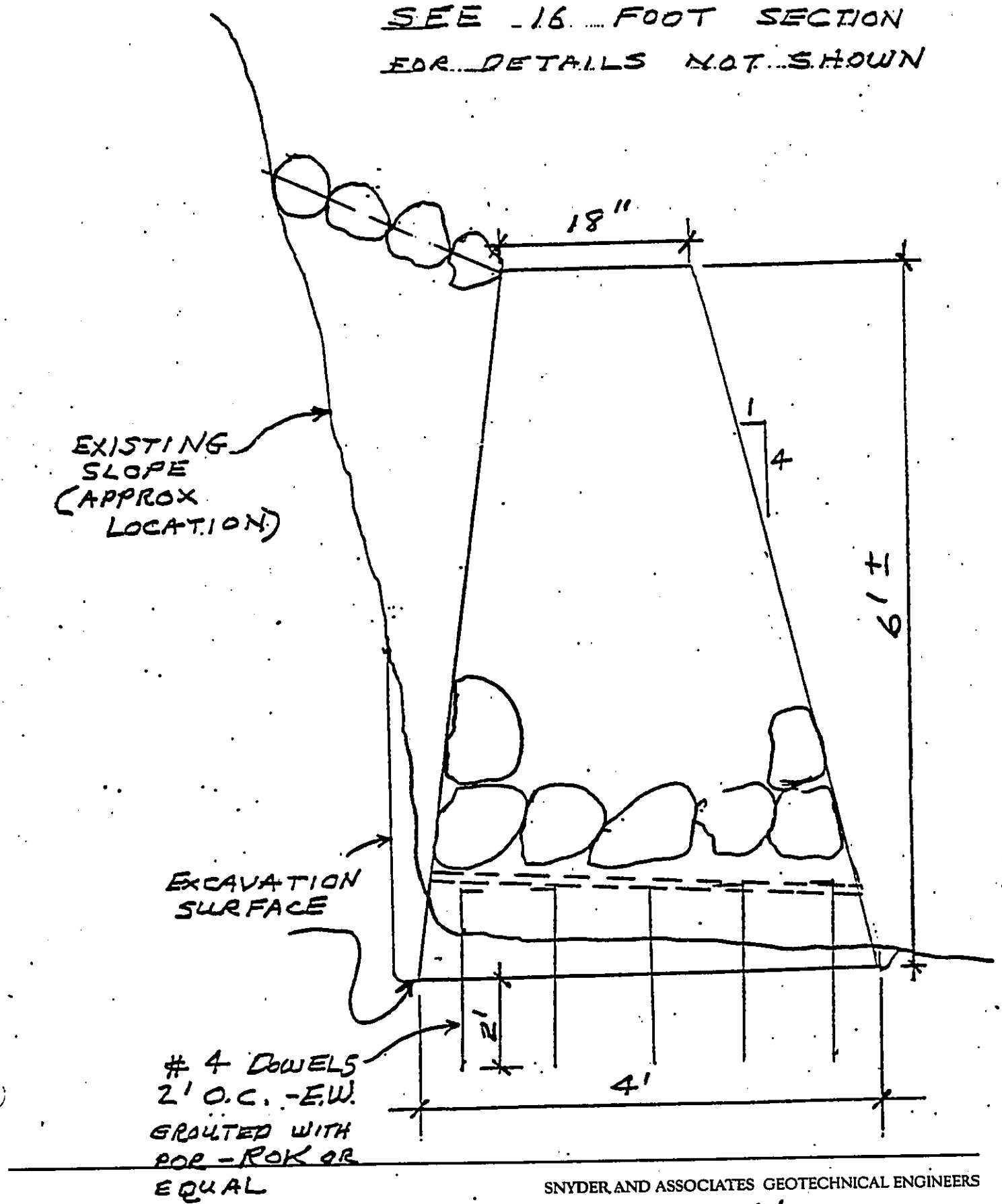
CONSTRUCTION PLANS



SNYDER AND ASSOCIATES GEOTECHNICAL ENGINEERS

POIPU MAKAI - 10 FOOT SECTION

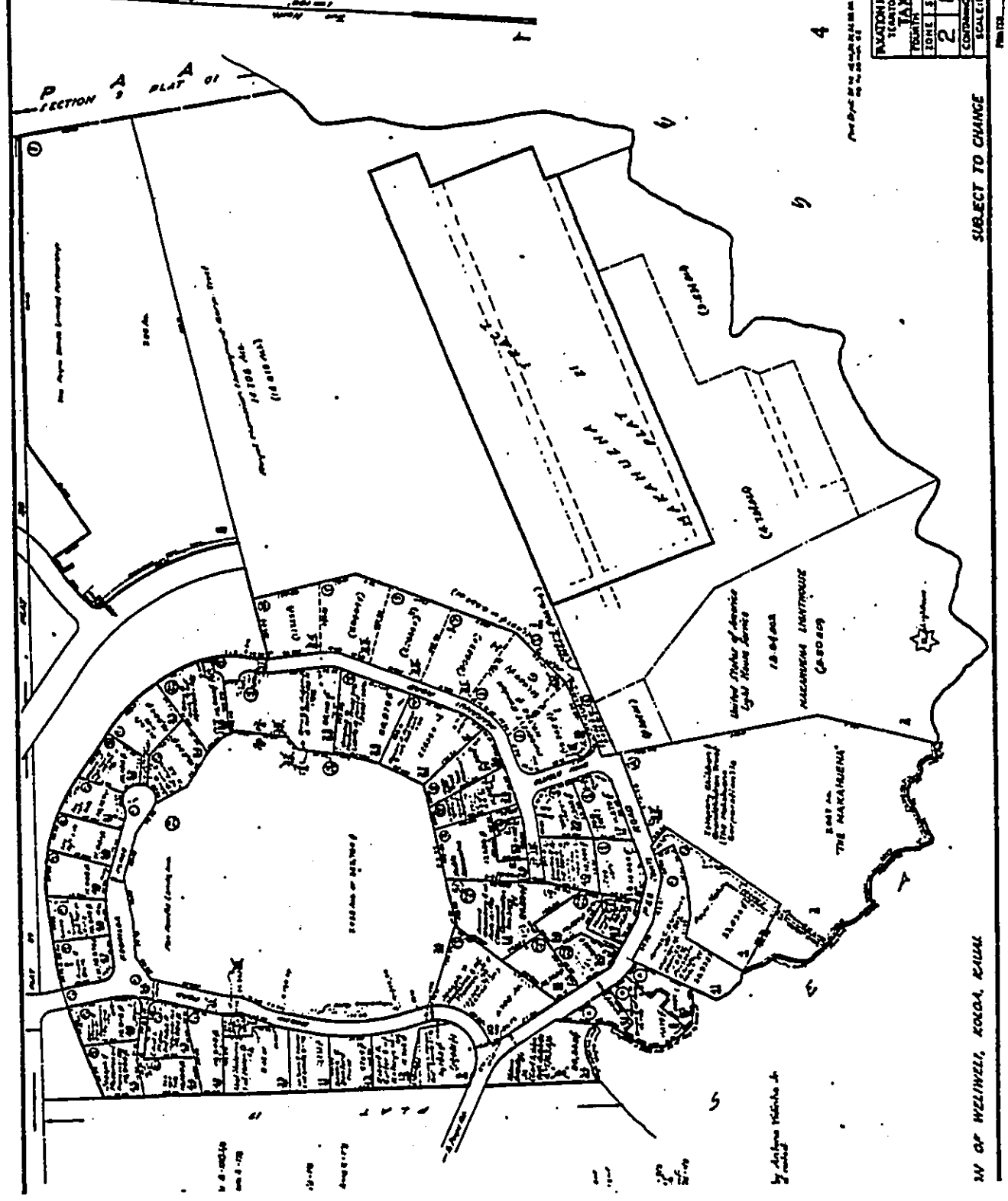
CONSTRUCTION PLANS



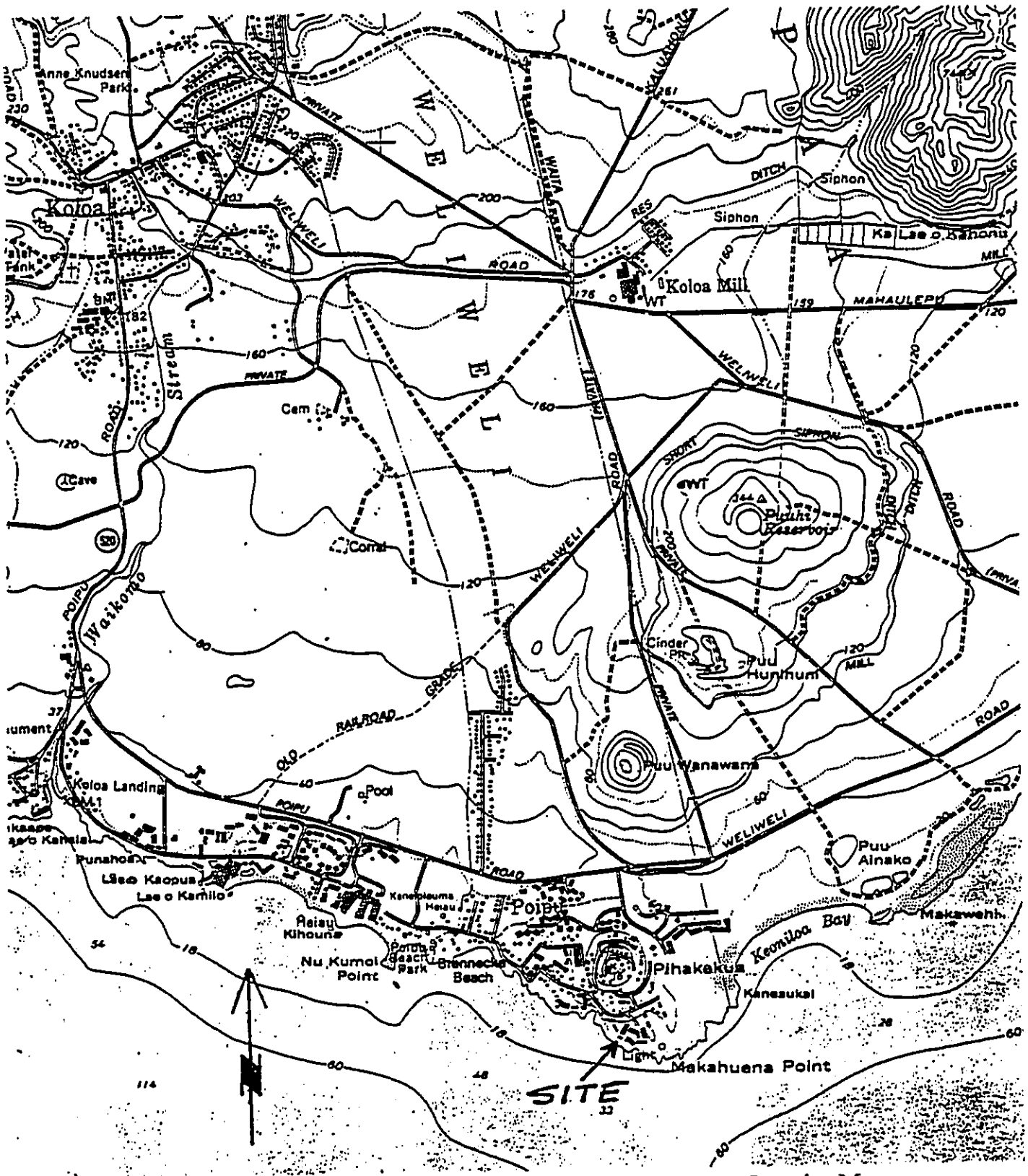
SNYDER AND ASSOCIATES GEOTECHNICAL ENGINEERS

6 FOOT SECTION

POIPU MAKAI



TMK Map
Figure 2



Location Map
~~Figure 1~~

Poipu Makai
February 21, 1995

EXISTING STRUCTURE

POIPU MAKAI

CATCH BASIN

EXISTING REMNANT

EXISTI

POIPU PALMS

16 FOOT SECTION

10 FOOT HIGH SECTION

6 FOOT HIGH SECT

(TOW SAME)

CERT SHORELINE

30'

40'

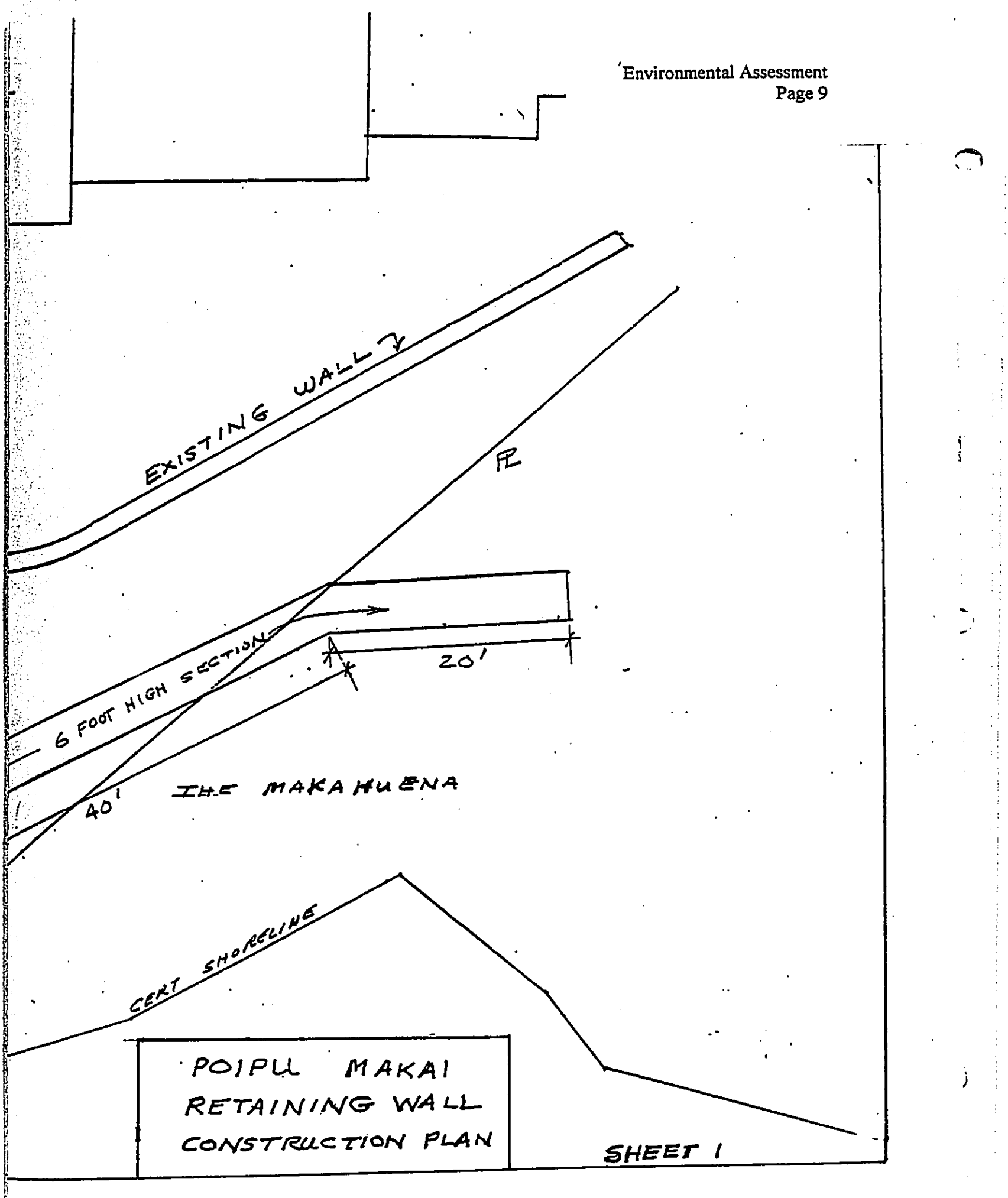
10'

CERT SHO

FREDERICK G. SNYDER
REGISTERED PROFESSIONAL ENGINEER
NO. 6524-C
HAWAII, U.S.A.

REV 6-21-94 FS

PO
RET
CON


EXISTING WALL
FL
6 FOOT HIGH SECTION
20'
40'
THE MAKAHUENA
CERT SHORELINE
POIPU MAKAI
RETAINING WALL
CONSTRUCTION PLAN
SHEET 1

POIPU MAKAI CONSTRUCTION NOTES

GENERAL

1. All construction and workmanship shall conform to the 1991 Uniform Building Code and to the provisions of the Clean Water Act.

2 These notes shall be used in conjunction with the plans and any discrepancies shall be brought to the attention of the Engineer.

3. Contractor must check dimensions, framing conditions, and site conditions before starting work. The Engineer shall be notified immediately of any discrepancies or possible deficiencies.

4. Conditions not specifically shown shall be constructed similar to the details for the respective materials.

5. The drawings and specifications represent the finished structure. All bracing, temporary supports, shoring, etc. is the sole responsibility of the Contractor. Observation visits to the job site by the Engineer do not include inspection of construction procedures. The Contractor is solely responsible for all construction methods and for safety conditions at the worksite. These visits shall not be construed as continuous and detailed inspections.

6. Design, materials, equipment, and products other than those described below or indicated on the drawings may be considered for use, provided prior approval is obtained from the Owner, Engineer, and the applicable governing code authority.

7. All conditions noted as existing are based on the best information currently available at the time of preparation of these drawings. The Contractor is to verify all conditions the drawings, the Engineer shall be notified immediately and additional drawings based on before starting work. Should conditions arise which are different from those shown on more accurate information will be prepared.

FOUNDATIONS

1. All filling, backfilling, recompaction, etc. is to be accomplished under the supervision of the Soils Engineer.

2. All excavations are to be inspected and approved by the Soils Engineer prior to the placement of any concrete or reinforcing steel.

3. Footings are to be carried a minimum of six inches into undisturbed bedrock.

4. All excavations, grading, compaction, etc. shall be accomplished and performed in accordance with Section 13 of the County Standard Specifications where not addressed on the drawings or directed otherwise by the Soils Engineer.

CONCRETE

1. All concrete shall attain a minimum compressive strength of 2500 PSI at 28 days.

2. Aggregates shall be natural sand and rock conforming to ASTM C33.

3. Cement shall be Portland Cement conforming to ASTM C-150, Type I or II, low alkali.

REINFORCING STEEL

1. Reinforcing steel shall conform to ASTM A615, Grade 40.

2. All bending of reinforcing steel shall conform to the latest edit in the Uniform Building Code.

CONSTRUCTION PLANS

KAUAI COUNTY STANDARD SPECIFICATIONS

SECTION 44 CEMENT RUBBLE MASONRY

44.1 DESCRIPTION

This work shall consist of furnishing and placing of cement mortar and rocks to the lines and grades shown on the plans and as specified under these specifications.

44.2 MATERIALS

A. Stone. Stone shall be clean, durable, free from seams or other imperfection. When tested under AASHTO Test Method T96, it shall show a wear not to exceed 50%. It shall have a minimum specific gravity of 2.4. The sizes and shapes shall be as shown on the plans or specified in the special provisions.

B. Mortar. Mortar for bedding shall consist of one part cement and not more than three parts fine aggregate. It shall meet the requirements as provided in Section 39, "Portland Cement Concrete." Hydrated lime may be added to the mortar and the quantity shall not exceed the recommendation of the manufacturer. The lime shall be treated as an addition to and not as replacing any cement. Sufficient water shall be used to provide a workable consistency. Mortar shall be used and placed in final position within 1½ hours after mixing.

44.3 DETAILS

Large flat stones shall be selected for the bottom or first course and shall be laid in a full mortar bed in practically horizontal position. Selected stones, roughly squared and pitched to lines, shall be used at all angles and end faces of walls. All stones shall be fully bedded in mortar and so placed as to break joints at least 6 inches.

Headers shall be as detailed on the drawings.

The face stones shall be well bedded without spalls. Natural flat surface or cut face of stones shall be used in the exposed face of the wall. Space between the backing stones shall be filled with spalls and mortar. Voids in any part of the wall shall not be permitted.

CONSTRUCTION PLANS

Weep holes 3 inches in diameter shall be provided in the walls at locations shown on the plans or at approximately 8-foot centers. Filter material conforming to the requirements of Section 28.2G, at least 2 cubic feet in volume, shall be placed at each weep hole.

Stones for the top course shall be wide enough to cover the top of the wall with the top face practically flat. They shall be set in full mortar bed.

Unless specified otherwise by the Engineer or in the plans and/or special provisions, jointing shall be made according to the following procedure. After the stones are placed, loose mortar shall be removed from the wall faces. The joints shall be cleaned of all mortar to a depth of 1 inch, wetted, and pointed with portland cement mortar mixed in the proportions of one part cement to one part fine aggregate or beach sand by volume. The pointed masonry shall be kept moist for a minimum period of 24 hours.

Cement rubble masonry walls shall be finished with a 2-inch mortar capping composed of one part cement to 2 parts fine aggregate or beach sand.

44.4 MEASUREMENT

Cement rubble masonry shall be measured for payment in cubic yards, which shall be computed based on the dimensions shown on the plans or ordered by the Engineer.

44.5 PAYMENT

Payment shall be made at the unit price bid per cubic yard as measured above, and shall be full compensation for furnishing all materials, labor, tools, and incidentals necessary to construct the work in place. Excavation for foundations shall be measured and paid for under Section 13, "Structure Excavation and Backfill."

APPENDIX

COMMENTS BY UNIVERSITY OF HAWAII

RESPONSE TO COMMENTS

v Frederick Snyder

University of Hawai'i at Mānoa

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

December 8, 1994
EA:0101

Mr. Myles Hironaka
County of Kauai
Planning Department
4444 Rice Street
Lihue, Hawaii 96766

Dear Mr. Hironaka:

Draft Environmental Assessment (EA)
Poipu Makai Resort - Slope Stabilization
Poipu, Kauai

The referenced project addresses construction of a lava rock shoreline stabilization wall at the base of coastal bluffs within the 40 foot shoreline setback area. The wall is intended to protect the adjacent property from erosion due to storm surge and will extend approximately 100 feet along the shoreline area. It will vary in height from 6 to 16 feet and will be designed to blend in with the surrounding rocky shoreline area.

Our review was prepared with the assistance of Charles Fletcher, Hawaii Institute of Geophysics; Jacquelin Miller and Tom Hawley, Environmental Center.

Wall Construction Characteristics

Hurricane Iniki demonstrated that failure of poorly constructed seawalls during storms poses hazards, because debris from the wall is carried inland, thus damaging structures behind the wall. This issue needs to be addressed in the Final EA.

The Draft EA describes the location of the seawall as a rocky ledge but provides no further specifications, such as width or height of the construction surface relative to mean sea level. How far from the shoreline is the proposed structure? Where, specifically, is the ocean in relation to the proposed wall? What is the elevation of the wall above mean sea level (msl) and will the wall be overtopped by either 10 or 20 year storm waves? The Draft EA does not describe the structural stability of the rocky ledge that is expected to provide the foundation for the sea wall. Since the strength of the foundation is critical to the structural integrity and stability of the seawall, this factor must be addressed.

Also, the Draft EA claims that the proposed wall follows the contour of the coast, but the diagram on Sheet 1 shows it to be distinctly angular. Since the coastline and the ocean are not shown on Sheet 1, however, the relationship between the wall and the coastline is unclear and needs to be clarified.

Wave Climate

The Draft EA does not discuss coastal processes in the vicinity of the proposed structure. It does mention that the bluffs were eroded during Hurricane Iniki, so we can assume that high waves can and do affect the site. In addition, tsunami runup was 8 feet in 1957 and 5 feet in 1960 (Loomis, H.G., 1980). While we realize that it may not be appropriate or reasonable to design a seawall to withstand extreme tsunami inundation, we are concerned that neither wave heights nor wave direction have been taken into account in the design of the proposed wall. This information must be included in the Final EA.

Safety and Accessibility

In the Draft EA, it appears that the proposed structure will create an abrupt precipice with a height ranging from 6 to 16 feet. What safety measures will be employed to ensure that residents or guests from the adjacent properties will not fall off the wall? What provisions have been made to facilitate access to the beach at the base of the bluffs? Also, is the shoreline area used for fish gathering or other recreational or cultural activities? Will the wall interfere with these prior uses or create safety hazards for people using the beach area? Would a different design, such as a terraced wall, be environmentally, socially and physically less problematic?

While it is unlikely that significant beach sand erosion will occur if this wall is constructed on a rocky shoreline, the structure must be designed to withstand stresses that will be placed upon it, and it must be safe and compatible with the communities in the area. The issues raised in this review need to be addressed carefully in the Final EA to ensure that permit decision makers are adequately informed.

Thank you for the opportunity to comment.

Sincerely,

John T. Harrison
Environmental Coordinator

cc: OEQC
Charles Fletcher
Jacquelin Miller
Tom Hawley

RESPONSE TO COMMENTS

Response to comments by John T. Harrison of the Environmental Center, University of Hawaii at Manoa as presented in his letter dated December 8, 1994. Our responses are presented in the same order as Mr. Harrison's comments appear in his letter.

WALL CONSTRUCTION CHARACTERISTICS

1. The quality of construction will be monitored by the design engineer to ensure that the finished wall will withstand heavy wave action. Many walls of this type of construction withstood the wave and breaker forces generated by Hurricane Iniki along the Poipu shoreline with little or no damage. The structure mauka of this wall is well above the height that could be reached by wave action generated by a hurricane. The apartment building would be endangered by further erosion of the bluff and the resulting undermining of the foundations of the building.

2. Under normal wave conditions the base of the wall will be about 30 feet inland from the makai edge of the shoreline shelf at its closest point. Much of the wall is further back than that. In addition, that portion of the rock shelf that is on the adjacent property to the east partially blocks wave action from much of the wall.

3. The base of the wall will be about 5 feet above mean sea level at its lowest point. For the six foot high portion of the wall (60%), the base is 9 feet or more above MSL.

4. The wall will not be overtopped by 10 or 20 year storm waves. The elevation of the top of the wall was chosen based on the observed heights of scouring due to wave action generated by Iniki.

5. The rocky ledge that the wall will be founded on is a very hard Pahoehoe lava flow. It will provide a very sound foundation for the wall.

6. The revised site plan dated 6-21-94, shows the relationship between the seawall and the certified shoreline for this property and adjacent properties.

WAVE CLIMATE

The height of seawall was selected to protect against waves similar to those generated by Hurricane Iniki. Scouring due to Iniki wave action was considered in the design. Since the wave surge from Iniki was directly from the south and the wind force came both east and west in sequence, the wave heights and direction provided a severe test for this shoreline.

SAFETY AND ACCESSIBILITY

1. Since the new wall will be built against the face of the bluff but will not reach to the top of the bluff, pedestrian access to the top of the wall will be very difficult. The existing rock wall at the

top of the bluff provides a barrier to people climbing on the bluff. Historically there has been no pedestrian access over this portion of the bluff.

2. The completed wall will in no way impede shoreline access. Access to the shoreline is by way of the easement and stairway along the eastern property line which is significantly removed from the construction area.

3. The wall will not interfere with fish gathering or other recreational or cultural activities. The position of the wall against the face of the bluff allows free access to the shoreline.

4. The wall is designed to minimize environmental, social and physical impacts on the shoreline area. The wall is designed to blend in with the existing terrain. Most of the wall is only six feet tall. Terracing would require encroachment toward the shoreline and increase the visual impact of the wall.

In summary, the subject wall has been designed to protect the condominium units occupying this property and to have minimal impact on the surrounding environment. Conservative engineering design has been employed and construction of the wall will be inspected to ensure that intent of the design is implemented.

TRUE NORTH
SCALE 1" = 40'

PEE ROAD

303°55' → 47.70

FD. 1/2" PIPE

248°25'
23.00

41.60
← 144°43'

FD. 1/2" PIPE

242°40' 46.18

FD. 1/2" PIPE

254°38' 37.82

FD. 1/2" PIPE

70.85

Pedestrian Easement
(5 ft. wide)

262°04'

FD. 1/2" PIPE

272°19' 49.07

FD. 1/2" PIPE

LOT A-2

33,036 SQ. FT.

Lot A-1
Poipu Palms Resort

202°43'
(120.90)
138.33

ROCK WALL

RETAINING WALL
STEPS

FD. 1/2" PIPE

114°21' ← 148.90

Shoreline Certified
December 10, 1993

FD. NAIL
(17.43 calc.)
(16.94 meas.)

Shoreline follows along the upper reaches of the wash of waves as located on November 16, 1994.

FD. 1/2" PIPE

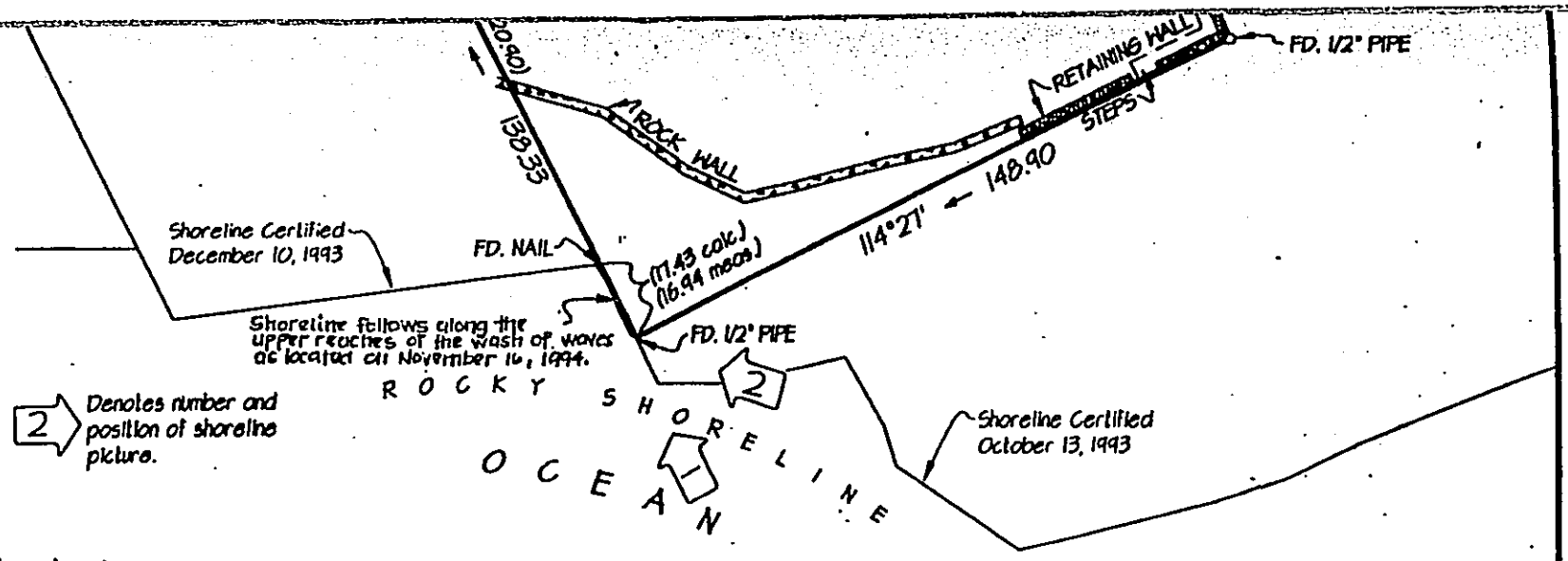
R O C K Y S H O

Denotes number and

31°50' → 287.25

Parcel 3
The Makahuena

2



The shoreline as located and certified and delineated in red is hereby confirmed as being the actual shoreline as of JAN 13 1995

Chairman, Board of Land and Natural Resources

SHORELINE SURVEY
LOT A-2
BEING PORTION OF
GRANT 1416 TO EKE OPUNUI
AT
WELIWELI, KOLOA, KAUAI, HAWAII

RONALD J. WAGNER
REGISTERED PROFESSIONAL LAND SURVEYOR
No. 5074
HAWAII, U.S.A.

Prepared for:
Poipu Makai Homeowners Association
c/o RHK Enterprises
P.O. Box 1605
Lihue, HI 96766

Nov. 29, 1994

0 20 40 80 120
Graphic Scale in Feet

Wagner Engineering Services, Inc.
P.O. Box 851 Honolei, HI 96714 (808) 826-7256

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

RONALD J. WAGNER
Registered Professional Land Surveyor
Certificate No. 5074

T.M.K. 2-8-20:04 (4 th Div.)

Project No. 0976