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GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
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WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES
JOHN P. KEPPELER, II
DONA L. HANAIKE

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LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

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OFC. OF ENVIRON. QUALITY CON...

REF:OCEA:SKK

APR 9 1992

FILE NO.: HA-3/24/92-2562
DOC. ID.: 494

MEMORANDUM

TO: The Honorable Brian J. J. Choy, Director
Office of Environmental Quality Control

FROM: John P. Keppeler II for William W. Paty, Chairperson
Board of Land and Natural Resources

SUBJECT: Document for Publication in the OEQC Bulletin
Environmental Assessment for Conservation District Use Application HA-3/24/92-2562 for a single family residence and related facilities at Kiholo Bay, North Kona, Hawaii, TMK: 7-1-02: 12

The above mentioned Chapter 343 document was reviewed and a negative declaration was declared based upon the environmental assessment provided with the CDUA.

Please feel free to call Roy Schaefer of our Office of Conservation and Environmental Affairs, at 587-0377, if you have any questions.

101

1992-04-23-HI-FEA-DeJoria Single Family Residence & Related Facilities CDUA

APR 23 1992

ENVIRONMENTAL ASSESSMENT

Proposed DeJoria Residence
Kiholo Bay, North Kona, Hawaii
TMK 3/7-1-2:12

Prepared By:
Sidney Fuke & Associates
and
Roy R. Takemoto

March 11, 1992

ENVIRONMENTAL ASSESSMENT

Proposed DeJoria Residence
Kiholo Bay, North Kona, Hawaii
TMK 3/7-1-2:12

Prepared By:
Sidney Fuke & Associates
and
Roy R. Takemoto

March 17, 1992

This Environmental Assessment was prepared pursuant to Chapter 343, Hawaii Revised Statutes and Chapter 11-200, Hawaii Administrative Rules (Environmental Impact Statement Rules, Department of Health, June 2, 1975).

CONTENTS

List of Exhibits

A. Grant of Non-Exclusive Easement
A-1. Assignment of Interest in Grant of Non-Exclusive Easement
B. Reconnaissance Survey of Physical, Biological and Archaeological Features (Juvik & Juvik Environmental Consultants, June 1982)
C. Letters from the County of Hawaii Department of Public Works relating to the Flood Hazard Zone
D. Baseline Biological Surveys of Coastal Ponds (Brewer/Brandman Associates, December 1990)
E. Archaeological Surveys
F. Individual Wastewater System Application to the Department of Health

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1 INTRODUCTION

1.1 Applicant

The applicant, Mr. John Paul DeJoria, owns the subject parcel and proposes to build a single family dwelling. The parcel is located in the Conservation District, Resource Subzone.

1.2 Approving Agency

Since the proposed use requires a Conservation District Use Application (CDUA), the approving agency is the State Department of Land and Natural Resources (DLNR). DLNR previously granted a Conservation District Use Permit to a prior owner of the subject parcel for residential use in 1983.[1] However, that permit has since expired.

1.3 Agencies Consulted

The following agencies were consulted in the process of preparing this environmental assessment:

- State
  - Department of Land and Natural Resources
    - Land Management
    - State Parks
    - Historic Sites
    - Forestry & Wildlife
    - Water Resources Management
  - Department of Health
  - Department of Transportation, Highways Division
  - Office of State Planning
- County
  - Department of Public Works
  - Planning Department
  - Department of Water Supply
- Federal
  - U.S. Army Corps of Engineers

2 GENERAL DESCRIPTION OF PROPOSED ACTION

2.1 Location and Ownership

The subject parcel (TMK 3/7-1-02:12), comprising 3.0 acres, is a beachfront property fronting Kiholo Bay, North Kona, Island and County of Hawaii (see Fig. 1). The applicant owns the parcel in fee simple.

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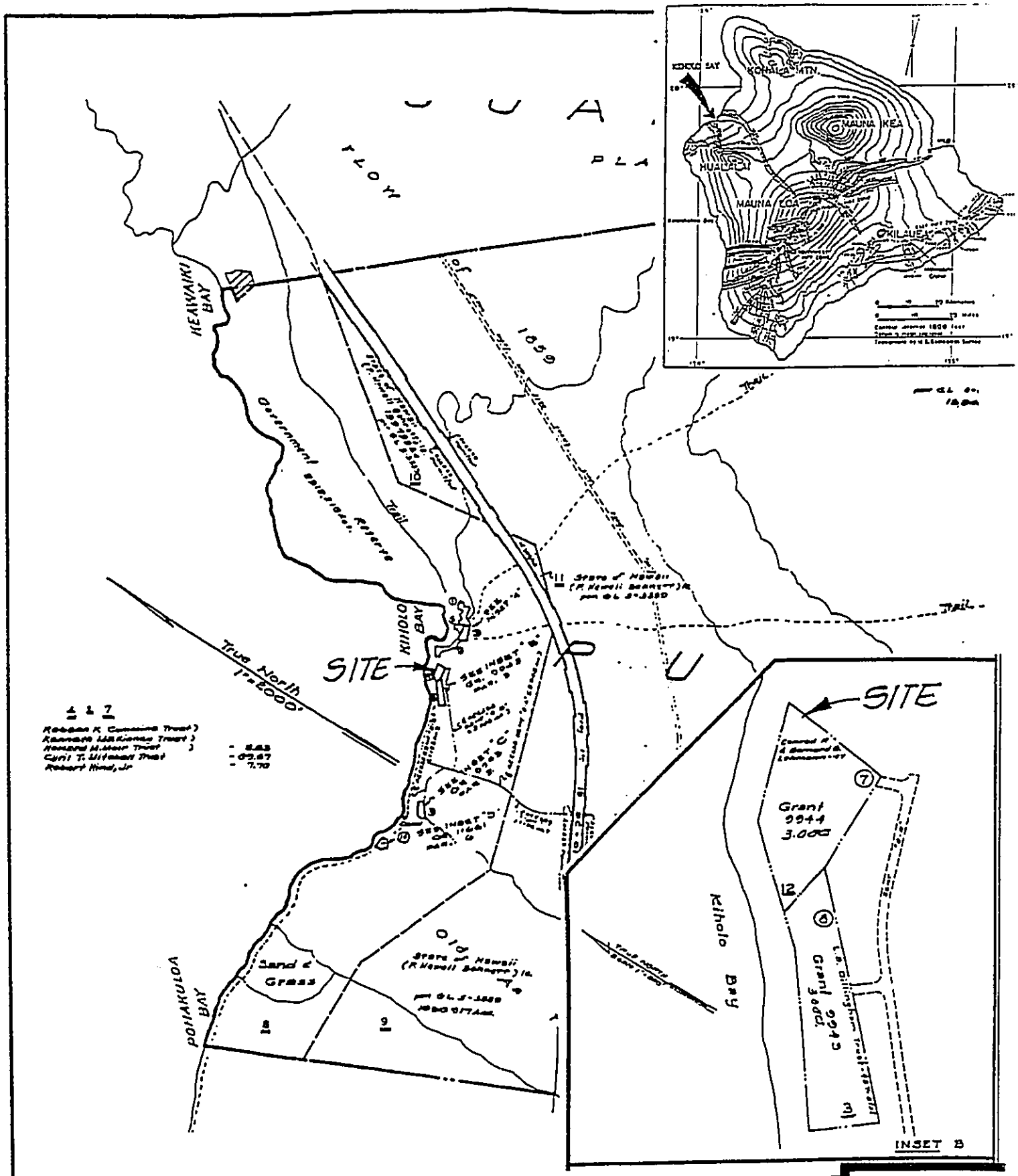
[1]File No. HA-10/19/82-1527. The Land Board granted time extensions in 1985 and 1987. Although construction began on a very limited basis (i.e., clearing and grubbing, setting of some foundation piers), the prior owner did not complete construction within the extended permit period (i.e., by 1988).



AQUA/WASTE ENGINEERS

P.O. BOX 1686, KAILUA-KONA, HI 96745 (808)329-8256

VICINITY MAP

T.M.K.: 7-1-2:12

FIGURE 1

L-2

SCALE: 1" = 200' DATE: January 30, 1992

2.2 Existing Uses

Subject Parcel. The site is presently vacant and overgrown with low shrubs, coconut trees, and scattered kiawe trees. A portion of the site was previously grubbed and graded by a prior owner. Primary features on the site include a grove of coconut trees and two anchialine ponds. The vegetation and ponds are described in later sections of this Environmental Assessment.

Surrounding Areas. Except for about ten existing private residences scattered around Kiholo Bay, the surrounding area is undeveloped.

2.3 Project Description

2.3.1 *Nature of the Request*

The CDUA requests two related approvals: 1) approval to construct a single family residence in the Resource Subzone of the Conservation District; and 2) amendment of the existing access easement over State property. The applicant seeks approval for the single family residence as a "conditional use" as defined in the rules governing the Conservation District, discussed in further detail in Section 4.1 of this Environmental Assessment.

2.3.2 *Conceptual Design*

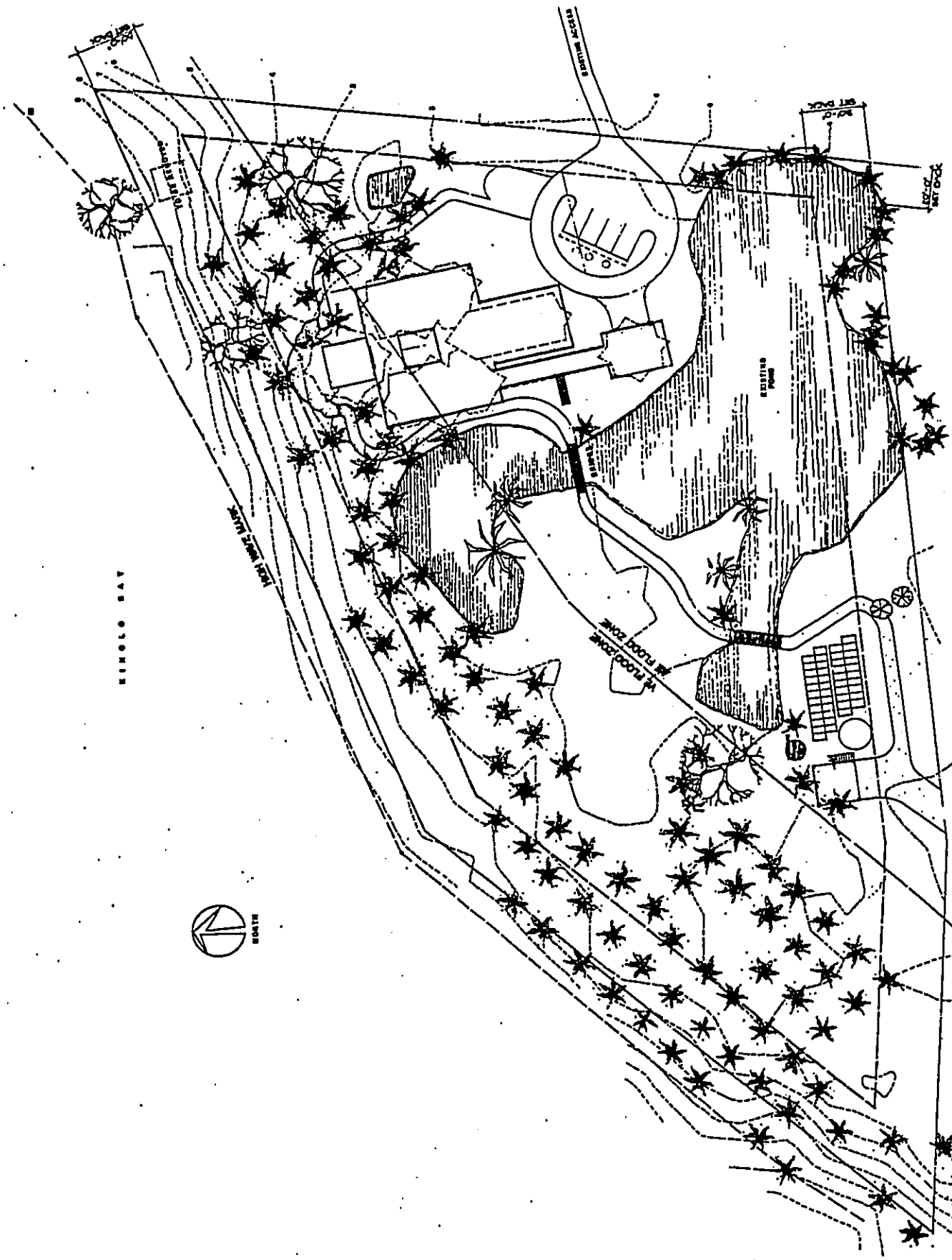
The applicant proposes to build a single family dwelling intended to be occupied intermittently throughout the year by the applicant and/or his caretaker. The applicant, who has an international reputation as a promoter and advocate of environmentally appropriate technologies, also owns an international solar energy company with leading edge solar voltaic technology. The applicant intends to construct a prototype residence embodying some energy-efficient, environmentally-sensitive design principles.[2] Some of the proposed design innovations include solar energy, daylighting, natural ventilation, xeriscape landscaping, reclaimed wastewater effluent for irrigation, and reverse osmosis treatment of brackish water powered by a solar voltaic system.

The site plan (see Fig. 2) consists of the main dwelling structure located towards the beach (but set back a minimum of 40' from the certified shoreline) and a separate accessory utility structure located about 250' away from the main residence which will be used to house the solar voltaic and water distillation equipment. An existing shallow pond separates the proposed dwelling and utility structures. A wooden walkway and small foot bridge will connect the two structures. The site is accessed from Queen Kaahumanu Highway along a one-half mile unimproved road which currently services other single family residences on Kiholo Bay.

The dwelling design has a tropical, Indonesian-inspired theme. Crafted entirely from the woods of Southeast Asia, the applicant will ship pre-assembled materials directly from Indonesia and bring in native craftsmen to supervise the construction. The importation of materials and labor will comply with

---

[2]These energy-efficient design principles have been advocated in a recent State-sponsored publication by Royle, K. and C. Terry entitled Hawaiian Design: Strategies for Energy Efficient Architecture, prepared for the Department of Business and Economic Development, State of Hawaii, 1990. See also Pearson, J., Hawaii Home Energy Book, Honolulu: University Press of Hawaii, 1978.


SITE PLAN
FLOOD ZONE
FLOOD ZONE
DEJORIA RESIDENCE
Kiholo Bay, North Kona, Hawaii
T.M.K.: 3-7-1-2:12
FIGURE 2

applicable State and Federal regulations.[3]

The dwelling will be a raised (for flood-proofing purposes), single-story structure embellished with a series of ornate wooden spires complementing a steep-pitched roof design (see Figures 3, 4, and 5). The total height of the structure will not exceed 35 feet above the finished grade. The floor plan consists of a net living area of approximately 2,960 s.f. including 3 bedrooms, living room, dining room, kitchen, storage, and 3 bathrooms (see Fig. 6). A lanai (approx. 3,670 s.f.) surrounds nearly the entire structure.

The accessory utility structure, approximately 1,500 s.f., will also be a raised structure with water distillation panels on the roof (see Fig. 7). This structure is located away from the main residence to provide adequate sound attenuation from noise produced by the back-up generator. A water tank and solar panels will be located adjacent to the utility structure (see the Landscaping Plan in Fig. 8).

All proposed improvements will be set back a minimum of 40' from the certified shoreline.

2.3.3 *Landscaping*

Most of the existing plants and trees will remain intact. Selective landscaping, especially around the main residence, will consist of drought and salt tolerant native species. A few coconut trees may need to be relocated to accommodate construction, but will be replaced onsite as part of the landscape design. See Figure 8 for a preliminary landscaping plan.

2.3.4 *Infrastructure*

Access Road. The Land Board approved the existing access to the site in 1983 (CDUP No. HA-1481).[4] However, this easement is unsuitable because it requires crossing an inland pond. The applicant proposes to amend the easement alignment. The existing and proposed easements are shown in Figures 9 and 10, respectively. Since the proposed access to the main residence has already been cleared by a previous owner, no clearing or grading will be required. The access road will remain unimproved and privately maintained.

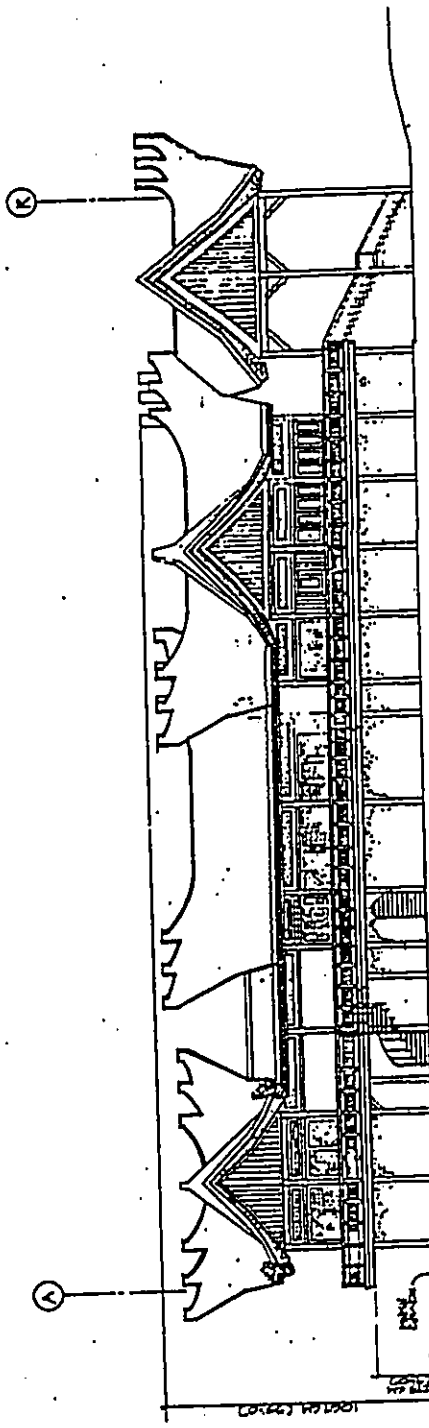
Wastewater. Under the State Department of Health's (DOH) rules governing wastewater systems, the subject parcel is in the Critical Wastewater Disposal Area prohibiting cesspools.[5] The proposed

---

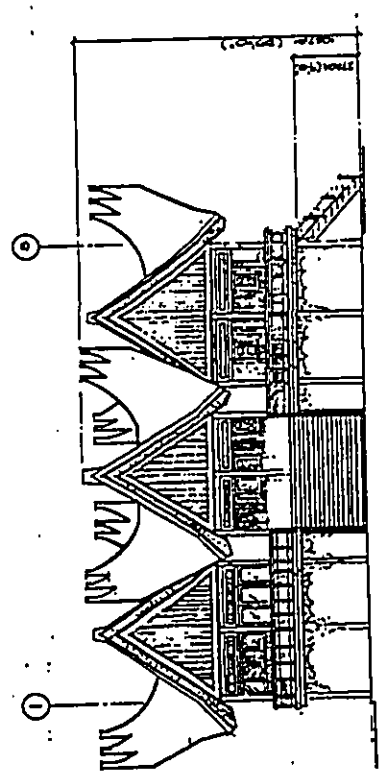
[3] In telephone conversations (2/13/92) with the State Department of Agriculture and the U.S. Department of Agriculture, the State indicated that foreign importation of wood is under federal jurisdiction. According to the USDA, there are no special requirements to import wood from foreign sources. Customs will inspect the shipment to ensure that it is insect-free. The applicant's attorney is currently addressing the immigration requirements to import the skilled labor.

[4] The Land Board granted a perpetual non-exclusive access easement by that certain Grant of Non-Exclusive Easement dated 10 May 1989 (L.O.D. #S-27,750) to the Lynns, Bakkens, and Lehman, an undivided 1/3 interest each. The Grant includes four easements (Easements 1, 2-A, 2-B, 2-C) which provide access from the Queen Kaahumanu Highway to the private lots (see copy of the Grant attached as Exhibit A). Lehman has assigned his 1/3 interest to the applicant by an Assignment of Interest in Grant of Non-Exclusive Easement (see Exhibit A-1). The record shows that the Land Board's signature was not sought and the Assignment was not recorded. However, as there is a valid assignment from Lehman to the applicant (DeJoria), the applicant "stands in the shoes" of Lehman and has the authority to process the CDUA to amend the access easement.

[5] Chapter 11-62, Hawaii Administrative Rules. Department of Health, Wastewater Systems, August 30, 1991.



SIDE - ELEVATION
SCALE: 1:100 CM



FRONT-ELEVATION
SCALE: 1:100 CM

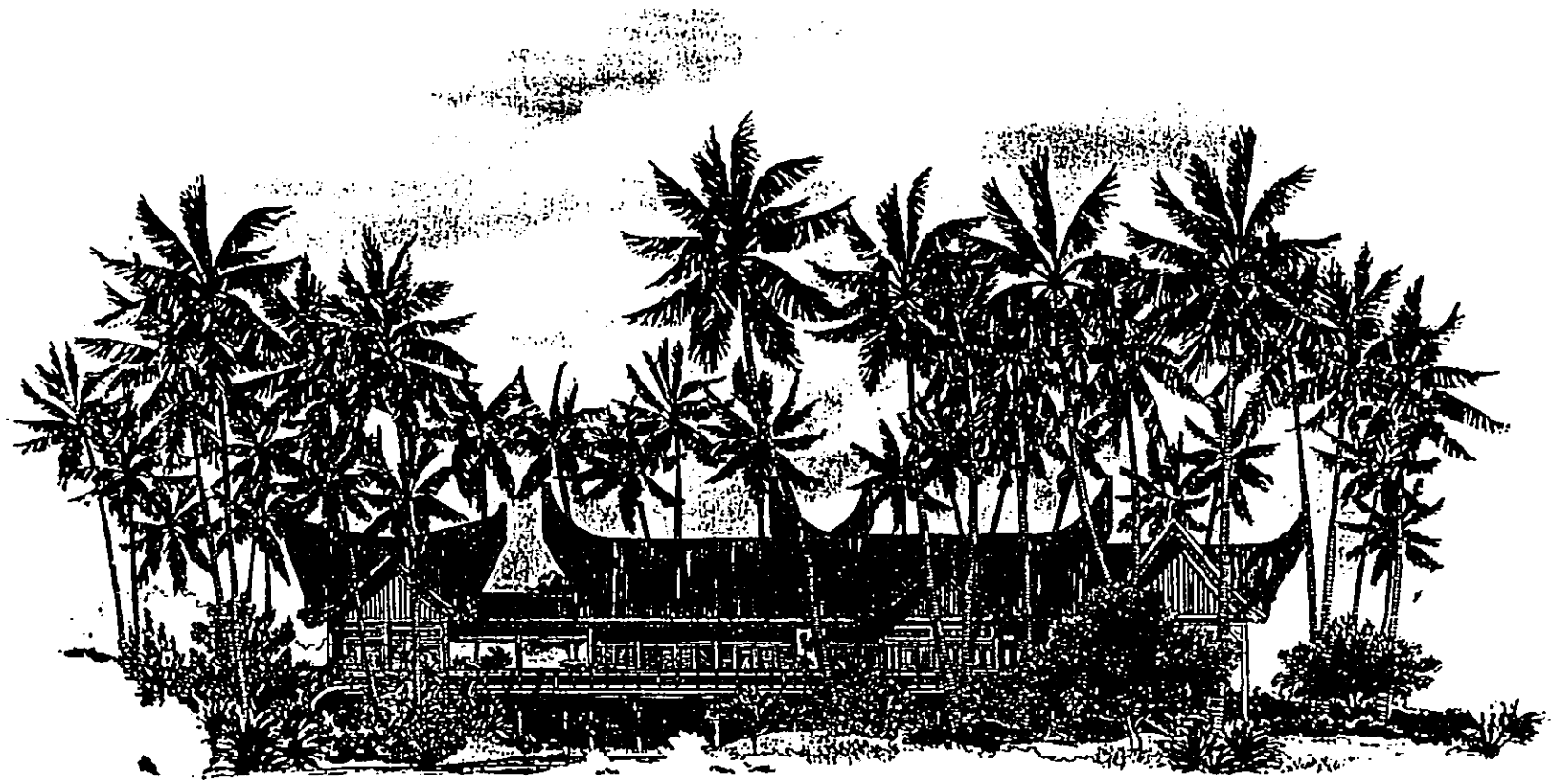
DEJORIA RESIDENCE

Kiholo Bay, North Kona, Hawaii

T.M.K.: 3-7-1-2:12

A-5

FIGURE 3



DEJORIA RESIDENCE

KIHOLO BAY, NORTH KONA, HAWAII

OKITA, KUNIMITSU & ASSOCIATES

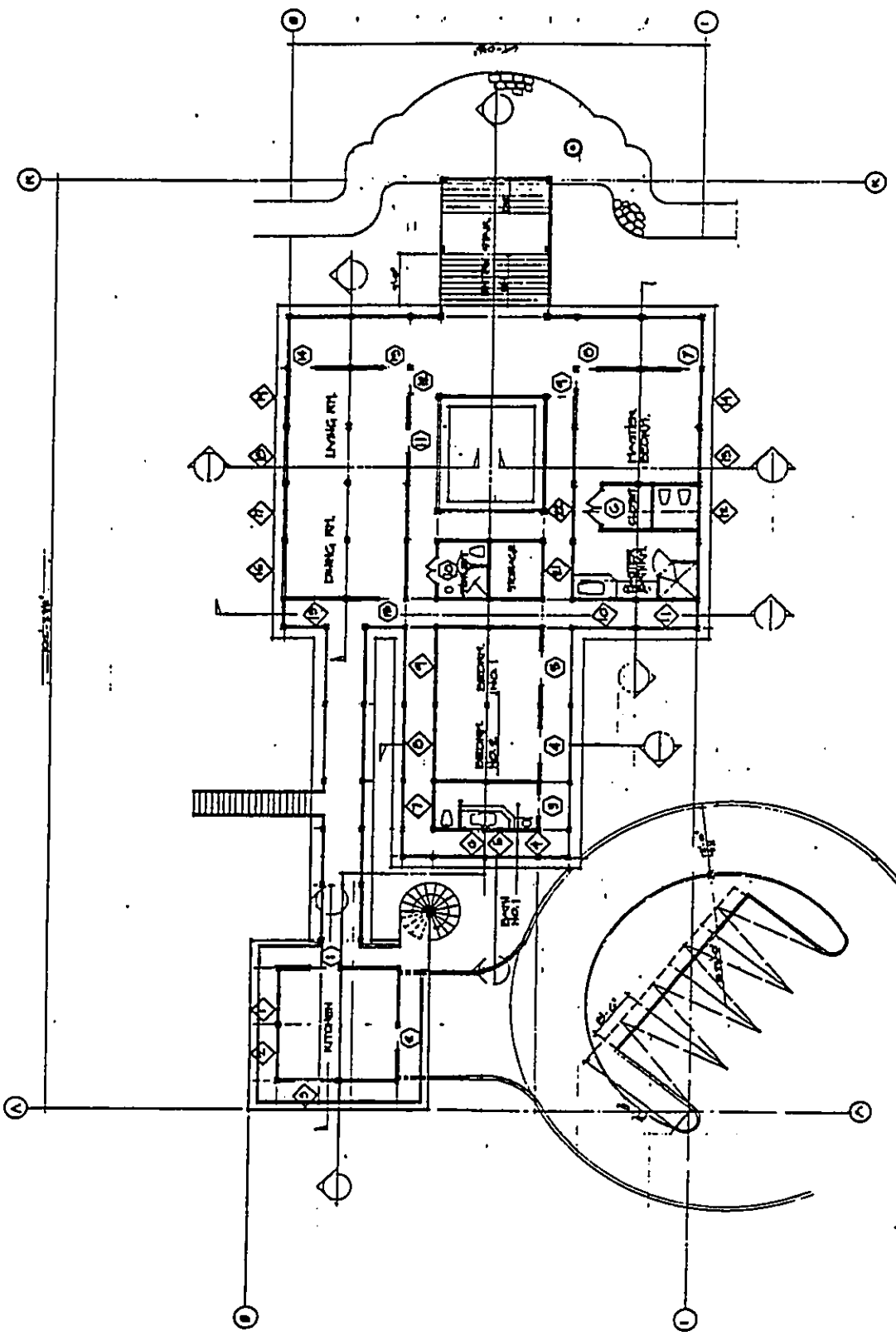
FIGURE 4

DEJORIA RESIDENCE

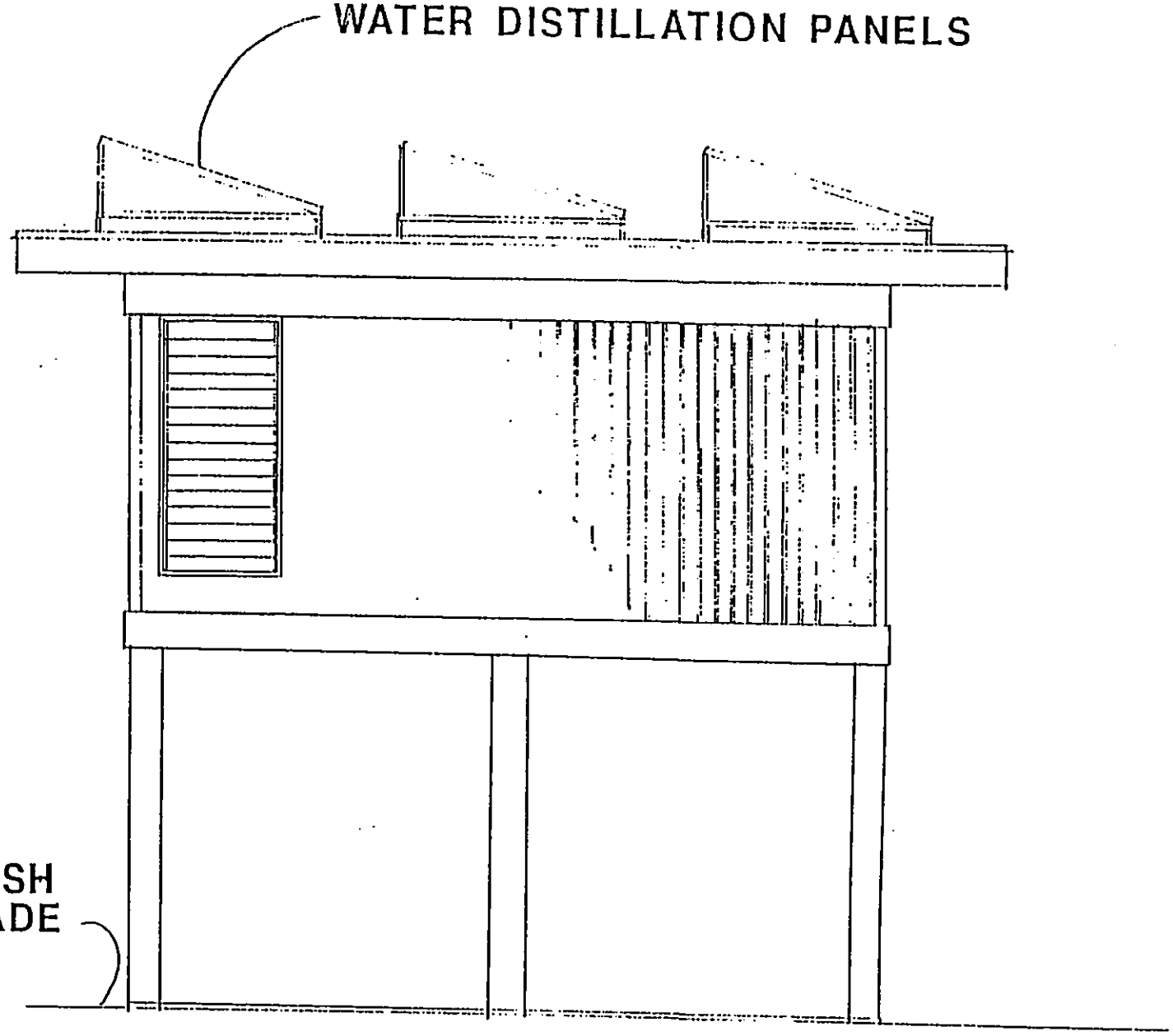
KIHOLO BAY, NORTH KONA, HAWAII

OKITA, KUNIMITSU & ASSOCIATES

FIGURE 5



A-3	Main Level Floor Plan	DEJORIA RESIDENCE Kiholo Bay, North Kona, Hawaii T.M.K.: 3-7-1-2:12		FIGURE 6



EAST EXTERIOR ELEVATION

DEJORIA RES.

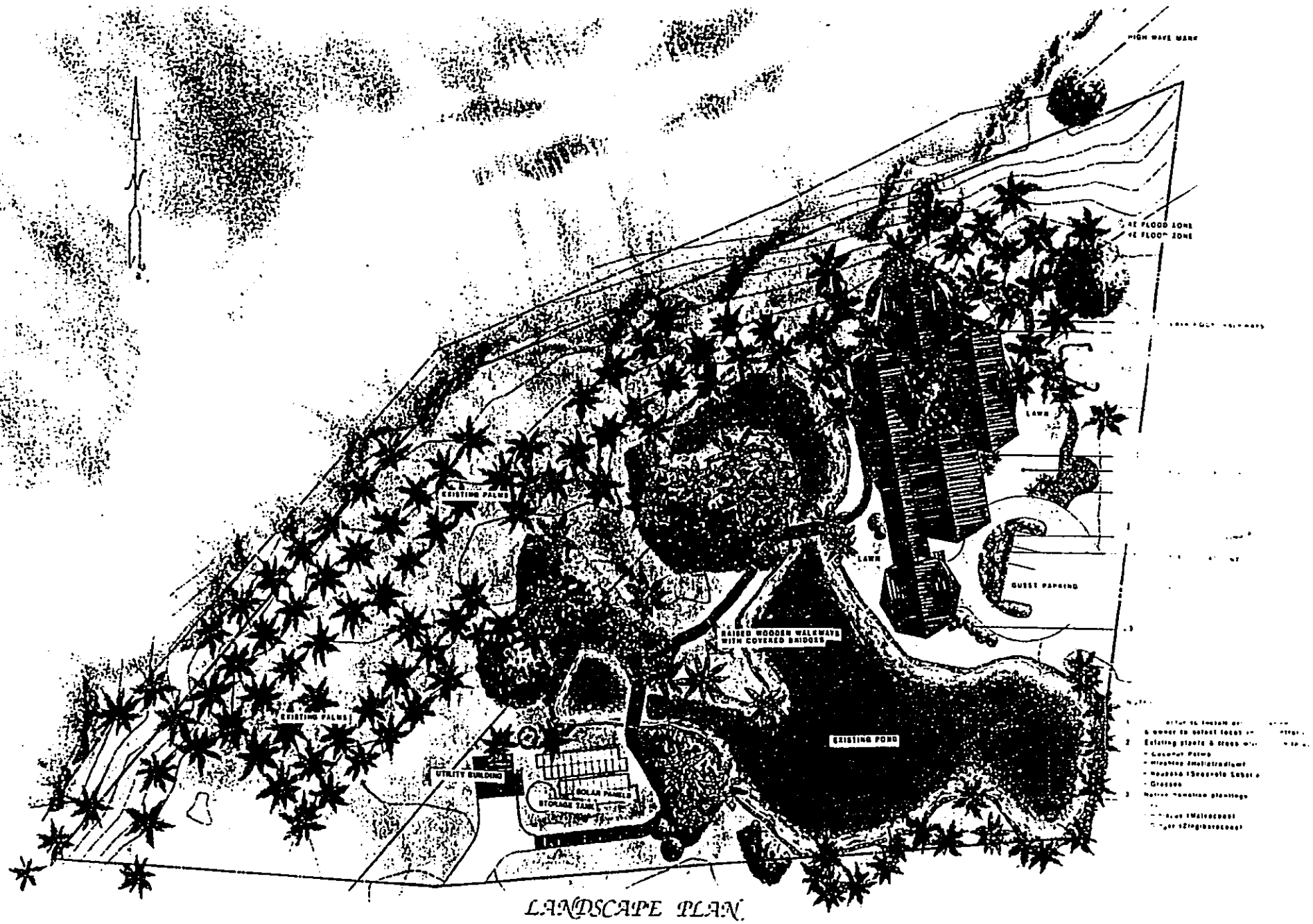
OKITA·KUNIMITSU & ASSOCIATES, INC.

PROJECT NO. 90-07?

DATE 12.12.91 BY

SHT. 5 OF 5

FIGURE 7



LANDSCAPE PLAN

OKITA, KUNIMITSU & ASSOCIATES

FIGURE 8

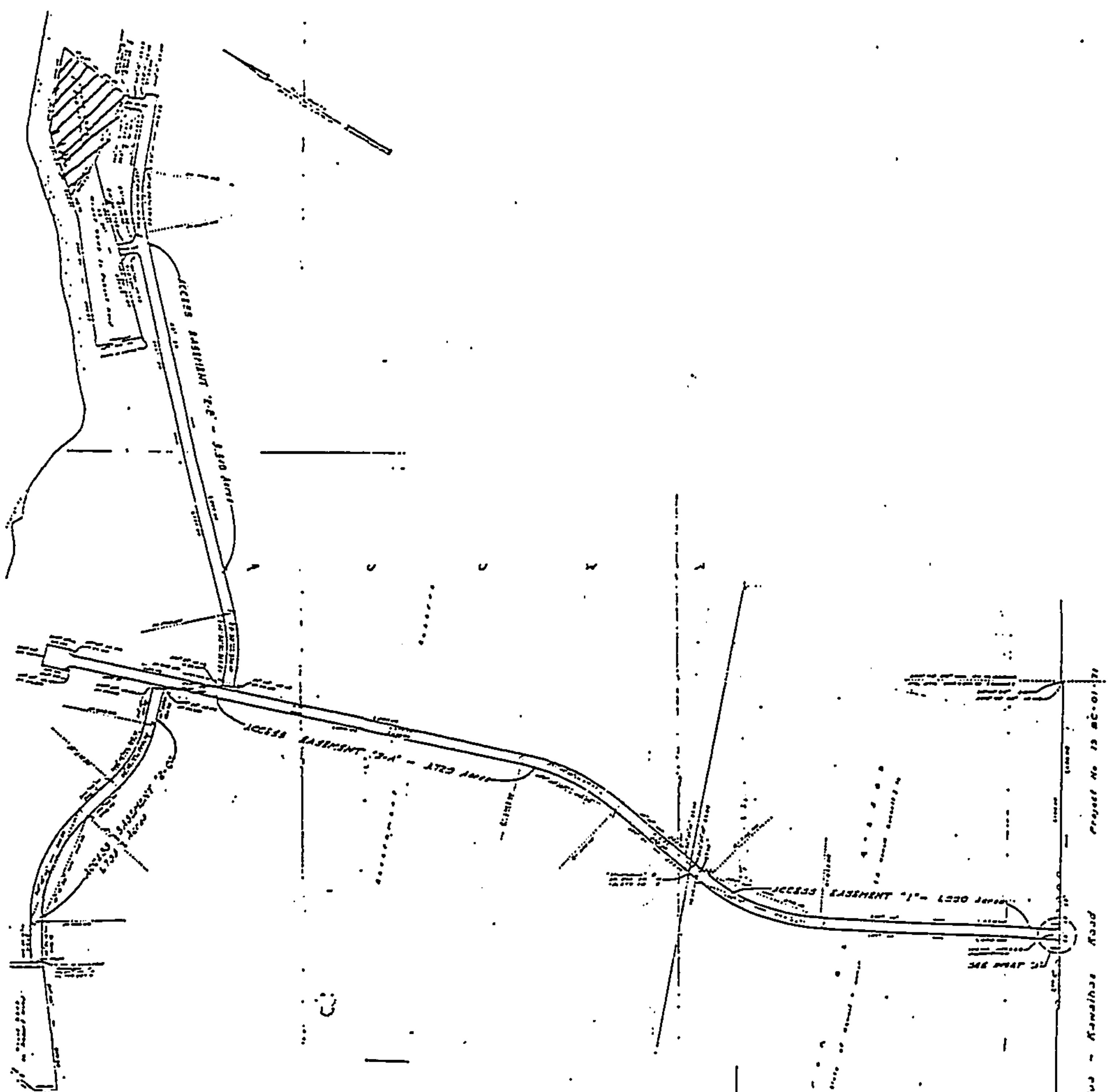
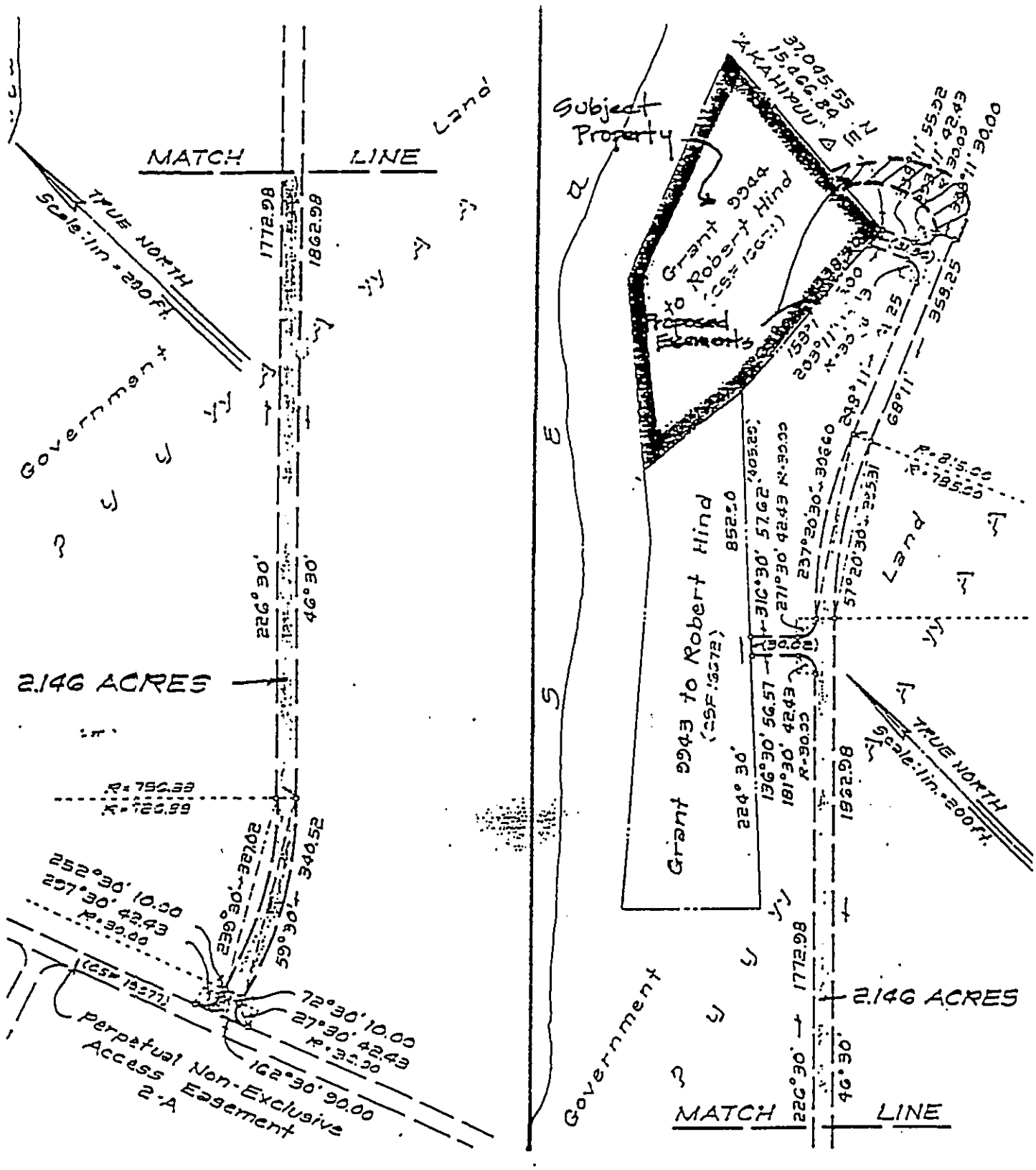


FIGURE 9

Access Easement as approved under CDUA: HA-1481 (1/27/83)



PERPETUAL NON-EXCLUSIVE ACCESS EASEMENT
EASEMENT 2-B

Puuwaawaa, North Kona, Island of Hawaii, Hawaii
Scale: 1 inch = 200 feet

JOB H-75(24)
C. BK G. K. Nakamura

FIGURE 10

TAX MAP

SURVEY DIVISION

wastewater system is a 1000 gpd aerobic treatment unit to treat all "gray" and "black" wastewater from the residence (see Fig. 11). This treatment system is one of three DOH-approved aerobic wastewater treatment units certified by the National Sanitation Foundation.[6] The treated effluent will be sterilized by ultraviolet disinfection and reused for landscape irrigation through a subsurface drip system (see Fig. 12). The treatment unit and irrigation system will be located in the vicinity of the parking area (see Fig. 13). The aerobic unit will be operated and serviced on a regular basis by a licensed wastewater treatment operator in compliance with the DOH rules. The construction plans for the proposed wastewater system have been submitted for DOH's review and approval (see Exhibit F).

Water. The water source for the potable water system will be the large anchialine pond. Brackish water from this pond will be pumped and treated by a 300 gpd solar distillation process and/or reverse osmosis powered by the solar voltaic system (see the site plan in Fig. 13). Other than an intake pipe inserted below the pond's surface level, there will be no structural change to the pond. The pump to draw the water from the pond through the intake pipe will be located on the pond's edge, rather than a submersible pump located within the pond. Since there will be no dredging, filling, or other alteration of the pond, a permit from the U.S. Army Corps of Engineers will not be required.[7] DLNR requires a pump installation permit only for wells; pumping from a surface water source does not require a permit.[8] Since the water system will serve only the applicant's residence, it is not a "public water system" as defined under the DOH's potable water systems rules, and therefore would not require DOH approval.[9] However, DOH will review the proposed system through the building permit process. The applicant will seek these approvals as part of or concurrently with the building permit when more detailed construction drawings have been prepared.

Electric/Gas/Telephone. The solar voltaic system will be the source of electricity to power lights, pumps, and small motors. A propane gas system will power the cooking elements, refrigeration and dryers. The applicant does not plan to have telephone service.

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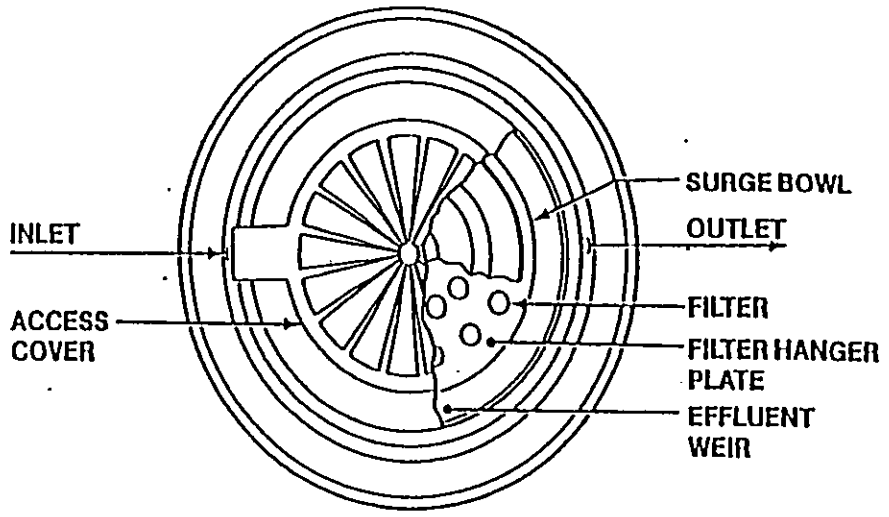
[6]§11-62-33.1(b)(2), Hawaii Administrative Rules, requires household aerobic units to be approved by the DOH director "based upon the 'Standard No. 40' for Class I units as set forth by the National Sanitation Foundation, dated May 1983."

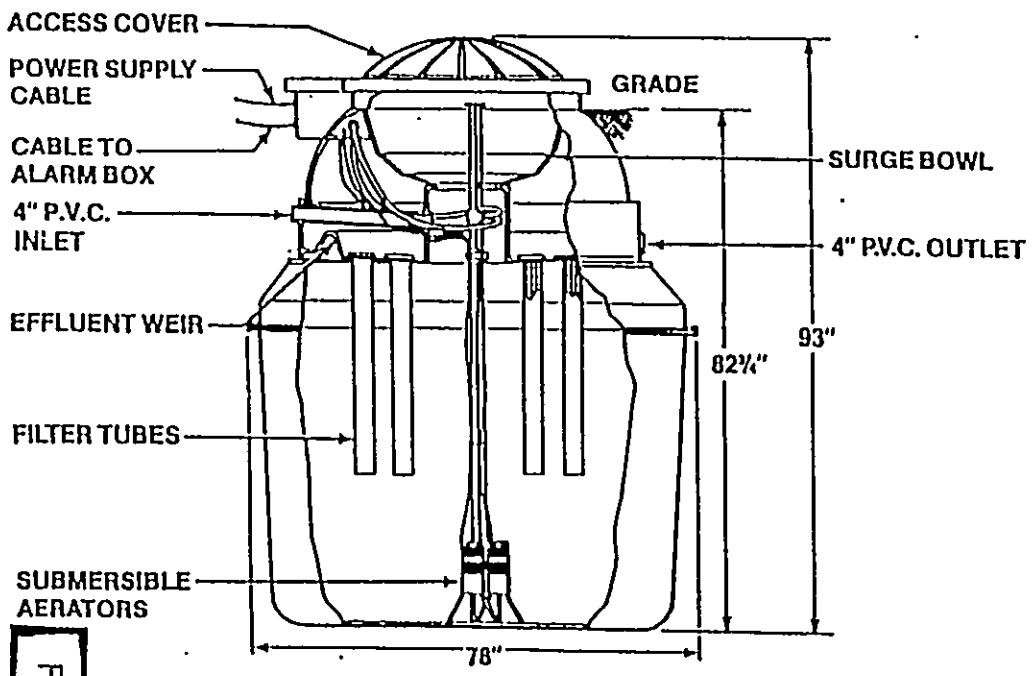
[7]Telephone conversation with the U.S. Army Corps of Engineers (Mr. Warren Kanai), 3/17/92. Anchialine ponds come under the Corps of Engineers jurisdiction pursuant to the Clean Water Act and Rivers and Harbors Act which authorizes the federal government to regulate "discharges" into "navigable waters" and other alterations to navigable waters. The Clean Water Act authorized the Corps to regulate one type of "discharge", i.e., dredging and filling. "Navigable waters" have been broadly construed to include isolated inland waters. Anchialine ponds, being tidally influenced, have been determined to be under the Corps jurisdiction, a prominent recent example being the anchialine ponds on the Hyatt Regency Waikoloa site (see, for example, Final EIS U.S. Department of the Army Permit Application for Waikoloa Beach Resort, September 1985). Since there is no proposed alteration, dredging, or filling, the Corps permit does not apply.

[8]Although by definition a pump installation permit may be applicable under §13-168-2, Hawaii Administrative Rules (see definitions for "pump installation" and "water source"), DLNR as a matter of policy has limited the pump installation permit to wells because of the infrequency to use surface waters (other than streams) as a drinking water source (telephone conversation with Mr. Ed Sakoda of the Division of Water Resources Management on 3/17/92).

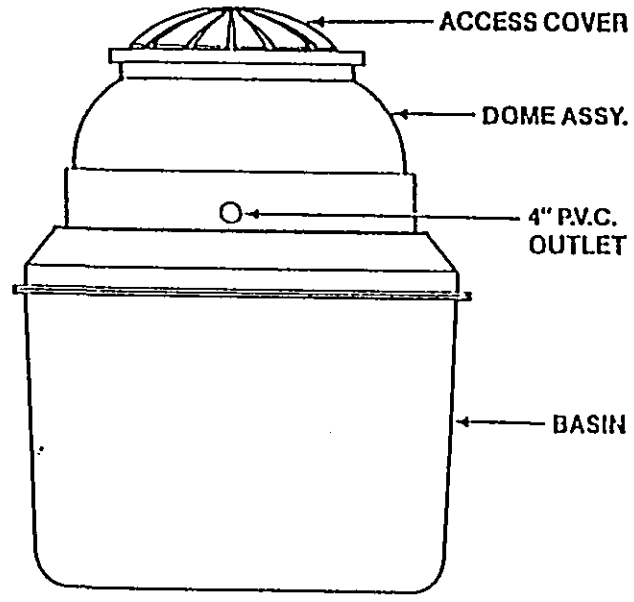
[9]§11-20-2, Hawaii Administrative Rules, Department of Health, Potable Water Systems, December 26, 1981. The County Department of Water Supply (DWS) does not review proposed individual private water systems (per telephone conversation w/ DWS engineer on 2/21/92).



PLAN VIEW



ELEVATION SECTION



OUTLET END ELEVATION

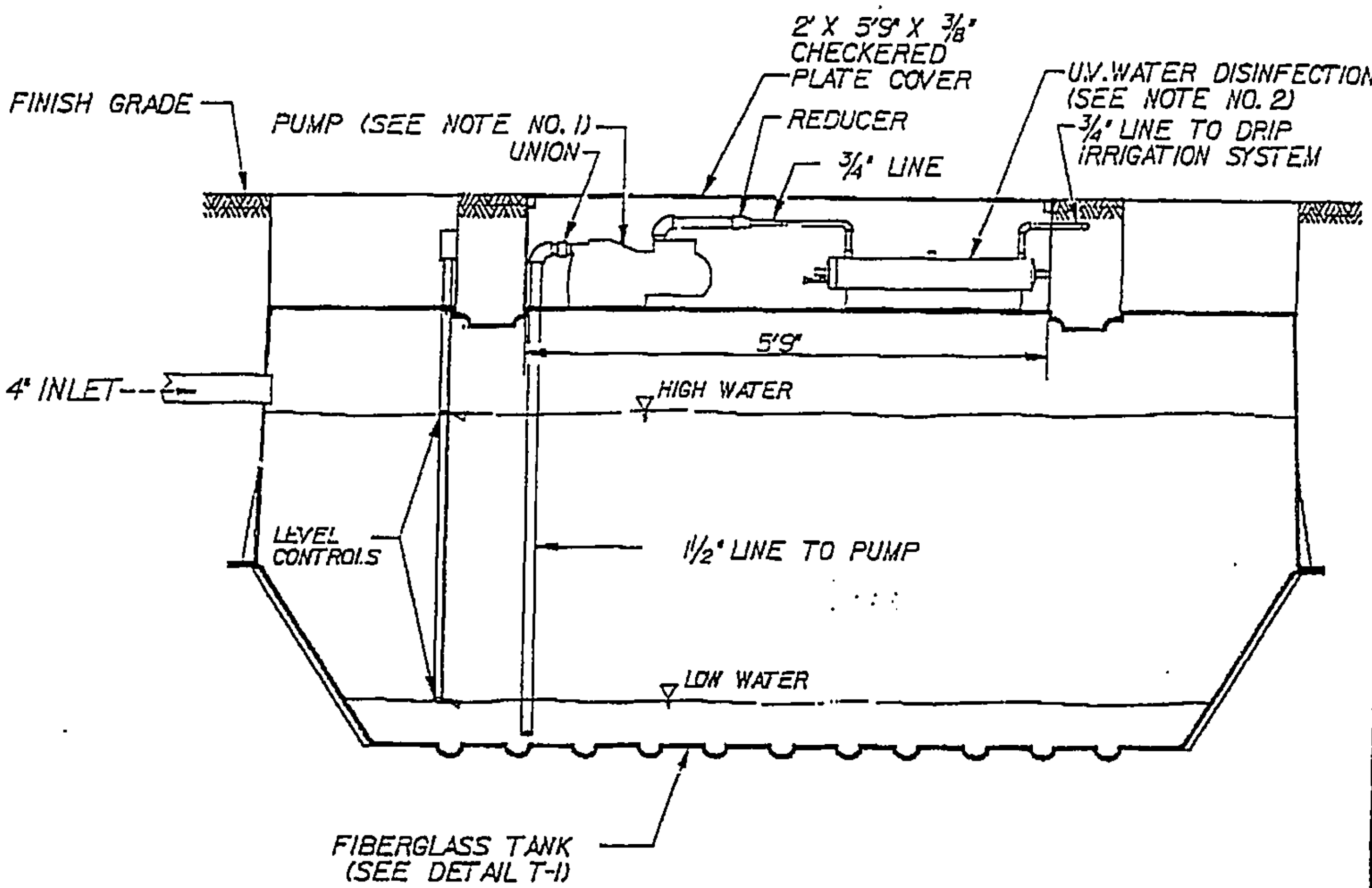
FIGURE 11

MULTI-FLO DAYTON, OHIO

1000 GPD
Multi-Flo Unit

REV'D	DATE	SCALE
		DATE 5-22-85
		DRN APVD:

DRAWING NUMBER A-1017



NOTE:

1. PUMP TO BE MYERS QUICK PRIME QP7. (SEE SPECIFICATIONS).
2. U.V. WATER DISINFECTION TO BE SANITRON ULTRAVIOLET WATER PURIFIER MODEL NO. S23. (SEE SPECIFICATIONS).

FIGURE 12

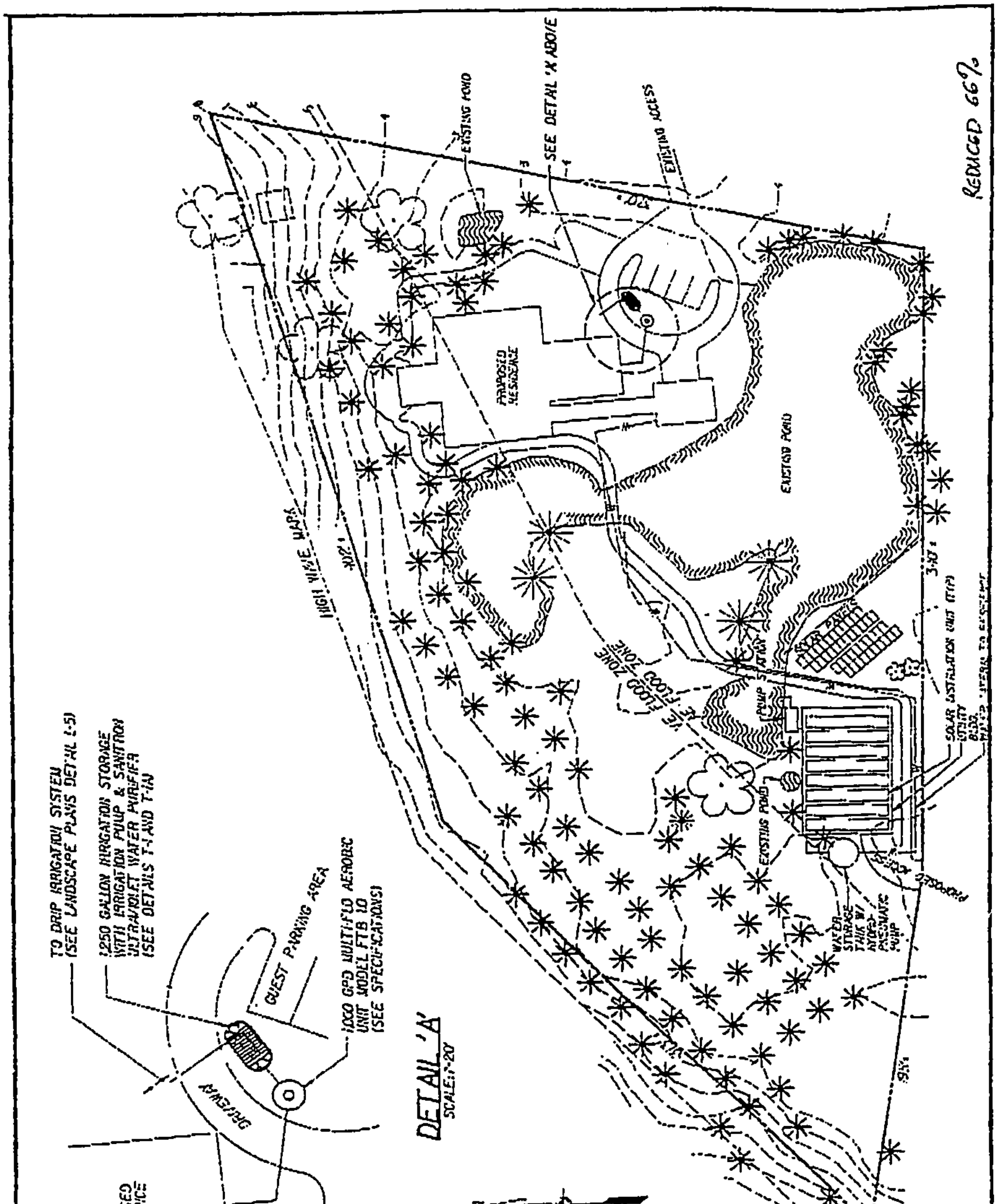
AQUA/WASTE ENGINEERS

P.O. BOX 1686, KAILUA-KONA, HI 96745 (808)329-5208

IRRIGATION STORAGE, PUMP & U.V. DISINFECTION

SCALE: 1/2" - 1'   DATE: February 24, 1992

T-1A



AQUA/WASTE ENGINEERS

P.O. BOX 1688, KAILUA-KONA, HI 96745

SITE PLAN

TMK: (3)-7-1-02:12

SCALE: 1" = 50'   DATE: March 13, 1992

FIGURE 13

2.3.5 *Timetable and Cost*

The applicant intends to begin construction within 60 days of receipt of all applicable State and County permits and complete construction within one year. The estimated cost of construction is about $300,000.

3 ENVIRONMENTAL SETTING, IMPACTS, & MITIGATION MEASURES

3.1 Physical Characteristics

3.1.1 *Climate*

The climate is arid-- the average annual rainfall is about 10" with wetter winter months during October through March.[10] Wind velocities are generally low (3 - 8 mph), predominantly ocean breezes during the day (WNW), switching to mountain breezes (ESE) during the evening.

3.1.2 *Topography & Soils*

The certified shoreline as of January 25, 1991 is shown in Figure 14. This certified shoreline and the seaward boundary of the subject parcel are not contiguous. The seaward boundary, as defined in the original Land Patent and shown in Figure 14, ranges from about 15' to 40' inland of the certified shoreline.[11] The State owns the land between the shoreline and the seaward boundary of the subject parcel.

A beach ridge 7-8' high above mean sea level undulates along the seaward boundary. The ridge consists of unconsolidated sand, gravel and cobble-sized basaltic material along with an admixture of coralline fragments. The subject parcel occupies the swale behind this beach ridge. The elevation of the subject parcel ranges from about 2' behind the ridge to about 4' near the existing access road. The proposed improvements will occur in the swale area behind the berm; the berm will be left intact.

According to the USDA Soil Survey, the substrate is unweathered pahoehoe lava (rLW).[12] The presence of anchialine ponds on the site indicates that the groundwater table is near to the surface.[13]

3.1.3 *Natural Hazards*

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[10]Department of Land and Natural Resources, Division of Water and Land Development, An Inventory of Basic Water Resources Data: Island of Hawaii, Report R34, 1970.

[11]The boundaries of the subject parcel are based on the legal description in Land Patent No. 9944 issued at a public auction on December 22, 1930 to Robert Hind.

[12]U.S. Department of Agriculture, Soil Conservation Service. Soil Survey of Island of Hawaii, State of Hawaii, December 1973.

[13]Juvik & Juvik Associates, J. Reconnaissance Survey of Physical, Biological and Archaeological Features on Two parcels at Kiholo Bay, Pu'u Wa'awa'a, North Kona, Hawai'i, June 15, 1982 (attached as Exhibit B).

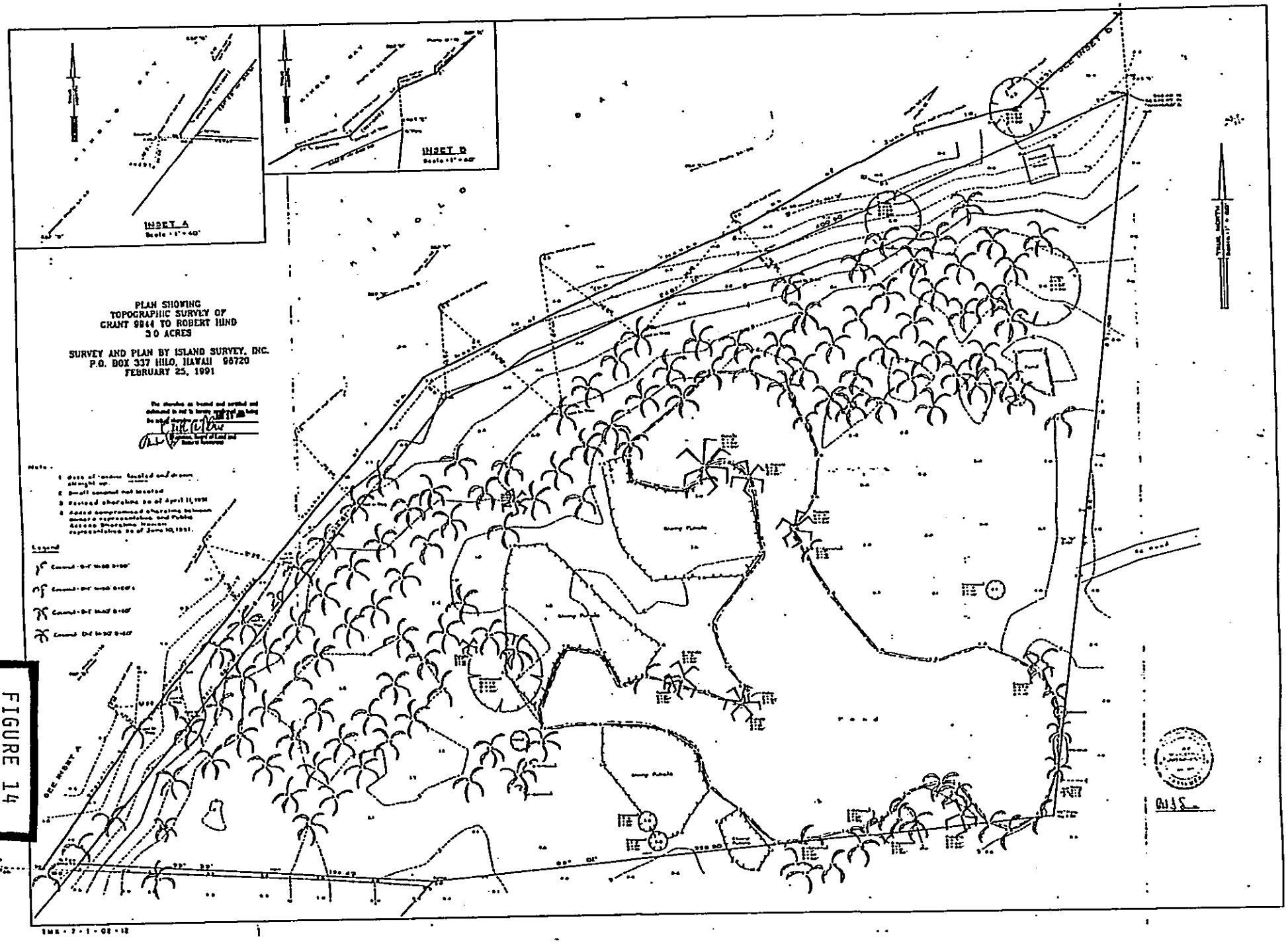
INSET A
INSET B
PLAN SHOWING
TOPOGRAPHIC SURVEY OF
GRANT 9844 TO ROBERT HIND
30 ACRES
SURVEY AND PLAN BY ISLAND SURVEY, INC.
P.O. BOX 337 HILO, HAWAII 96720
FEBRUARY 25, 1991

FIGURE 14

Flood Hazard. According to the Flood Insurance Rate Map (FIRM),[14] the makai portion of the property is within the VE Special Flood Hazard Area, which is susceptible to high velocity waters such as high surf or tsunami inundation, and most of the balance of the property is in the AE zone, which is susceptible to the 100-year flooding. The base flood elevation in both the VE and AE zones is 9' (referenced to the National Geodetic Vertical Datum of 1929). There are no regulatory floodways (defined as the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 100-year flood discharge can be conveyed without increasing the base flood elevation more than a foot) in the vicinity. Except for a small portion of the main residence, all proposed improvements will be in the AE zone (see the site plan in Figure 2). These improvements will be designed and constructed in accordance with the county's standards for the "flood fringe" (for the portion in the AE zone) and "coastal high hazard or tsunami area" (for the portion in the VE zone), such as raising the lowest floor above the base flood elevation.[15]

Volcanic Hazards. The subject parcel is in the Lava Flow Hazard Zone 4, which on a scale of 1-9 (zone 1 being the most severe hazard) is of moderate hazard.[16] Kailua-Kona and the Keahole Airport are in the same hazard zone. Hilo is in Zone 3.

3.1.4 *Flora/Fauna*

Terrestrial Flora and Fauna. Due to the arid conditions, the terrestrial vegetation is characterized by drought-adapted littoral species and deep-rooted trees capable of tapping the groundwater.[17] Of thirty-four plant species observed, one species is endemic to the Hawaiian archipelago (*Pa'u-o-hi'iaka*), eleven are indigenous, and the remaining twenty-two species are exotic or human introductions; none are designated as endangered, threatened or "candidate" species with respect to the U.S. Endangered Species Act. On the seaward margin of the subject parcel, the vegetation is dominated by many rows of regular spaced coconut trees, with occasional *hala* and clumps of *naupaka-kahakai* shrubs. The exposed pahoehoe lava at the mauka portion supports generally dense growth of *kiawe*, *haole koa*, and an understory of *ilima* and *hialoa*. There also some *kou* trees, date palms, a stand of ironwoods, and a small open area dominated by California grass. Table 1 lists the plant species observed on the site.

Observed vertebrate species included exotic birds such as the common mynah, Japanese white-eye, cardinal, and the barred dove. Because of the presence of the ponds, there is some probability that native endangered waterbirds, such as the Hawaiian duck, Hawaiian coot, and Hawaiian stilt, may periodically visit although there were no observed evidence (e.g., droppings, pellets, nests) of their presence. The *Hawaiian Water Birds Recovery Plan* has not designated Kiholo as either a "primary" or "secondary" endangered water birds habitat area.[18]

---

[14]Federal Emergency Management Agency, Flood Insurance Rate Map, Panel 481, September 16, 1988.

[15]Chapter 27 (Flood Control), Article 4 (Construction and Development Standards), Division 1 (Flood Fringe) and Division 3 (Coastal High Hazard or Tsunami Areas), Hawaii County Code. See also letters from the Department of Public Works attached as Exhibit C.

[16]Heliker, C. Volcanic and Seismic Hazards on the Island of Hawaii. U.S. Geological Survey, 1991.

[17]The terrestrial flora and fauna descriptions are based on the report by Juvik & Juvik Environmental Consultants, dated 15 June 1982, attached as Exhibit B.

[18]U.S. Fish & Wildlife Service, Hawaiian Water Birds Recovery Plan, Office of Endangered Species, Portland, Oregon, 1977.

TABLE 1

Checklist of plant species on two parcels at Kiholo Bay.
(TMK: 7-1-02-3,12)

Scientific Name	Common/Hawaiian Name	Status[1]
Trees		
Pandanus Odoratissimus	hala	I
Cordia subcordata	kou	P
Hibiscus tiliaceus	hau	P
Cocos nucifera	nui/coconut	P
Morinda citrifolia	noni	P
Casuarina sp.	ironwood	X
Prosopis pallida	kiawe	X
Leucaena leucocephala	ekoa	X
Messerschmidia argentea	tree heliotrope	X
Phoenix sp.	date palm	X
Shrubs		
Scaevola taccada	naupaka-kahakai	I
Schinus terebinthifolius	Christmas berry	X
Pluchea indica	Indian pluchea	X
Pluchea odorata	Pluchea	X
Atriplex semibaccata	Australian saltbush	X
Herbs		
Jacquemontia sandwicensis	pa'u-o-Hi'iaka	E
Ipomoea pes-caprae	pohuehue	I
Ipomoea congesta	blue morning glory	I
Sesuvium portulacastrum	akulikuli	I
Sida fallax	ilima	I
Waltheria americana	hialoa	I
Psilotum nudum	moa	I
Boerhavia diffusa	alena	I
Gynandropsis gynandra	African spider plant	X
Chenopodium album	emex	X
Xanthium saccharatum	cocklebur	X
Passiflora foetida	passion flower	X
Mollugo cerviana	Indian chickweed	X
Portulaca oleracea	purslane	X
Grasses and Sedges		
Cyperus laevigatus	makaloa	I(?)
Scirpus maritimus	makai	I
Brachiaria mutica	California grass	X
Pennisetum setaceum	fountain grass	X
Eragrostis tenella	Japanese lovegrass	X

[1]Status: E = Endemic; I = Indigenous; P = Polynesian introduction
X = Historic introduction

TABLE 1

The proposed landscaping plan will not significantly impact the terrestrial vegetation-- the coastal berm vegetation will remain intact, the coconut grove will be preserved with minimal relocation of a few trees, other existing vegetation will be incorporated as much as possible into the landscape design. The clearing of the vegetation around the perimeter of the pond and maintenance of the current depths of the pond will enhance the pond as a potential waterbird and anchialine habitat.

Anchialine Ponds. There are two anchialine ponds on the subject parcel-- a larger pond about 30,500 s.f. and a smaller pond about 500 s.f.[19] Anchialine ponds are distinctive features of the southwest coast of Maui and the west coast of Hawaii. These ponds occur in relatively recent lava flows and are tidally influenced by subsurface connections to the ocean as well as dilutions by groundwater inflow. The two ponds on the subject parcel, typical of other anchialine ponds, are habitats for several aquatic organisms classified as "Category 2" species under the U.S. Endangered Species Act. Category 2 designation means that the organisms should probably be listed as endangered or threatened, but insufficient information exists to justify an assessment of their status for listing on the Federal List of Threatened and Endangered Species. An extensive survey of the anchialine ponds on the Kona coast in 1974 identified 11 ponds of exceptional or significant natural value.[20] Neither of the two ponds on the subject parcel ranked in either category. However, a nearby pond located about 2 kilometers to the southwest (Luahinewai Pond) was included in the "exceptional" category on the basis of its depth, strong vertical salinity stratification, crustacean diversity, and its lush growth of R. maritima. The two ponds on the subject parcel are in the advanced stages of the natural senescence or aging process of these ponds. The ponds tend to fill from the accumulation of organic and mineral deposits originating from the aquatic organisms or wind-blown terrigenous sources. As sediments fill a pond, plant species encroach from the edges. The smaller pond is characteristic-- the edges are heavily overgrown with a dense stand of beach naupaka. The larger pond is heavily silted.

The proposed design preserves the two ponds-- there will be no dredging or filling. The design capacity of the proposed water system is 300 gpd. The large pond has a volume of about 228,140 gallons (assuming an average depth of 1 foot). A withdrawal of 300 gallons is about 0.1% the volume of the pond, an amount that should not significantly lower the water level.

Mitigation measures to ensure minimal impact include:

- do not allow treated wastewater effluent to percolate into the ponds;
- do not discharge rainfall runoff as a point source into the ponds;
- clear the dense naupaka to retard the senescence process of the anchialine habitat;
- do not introduce exotic or reef fish into the ponds since such introductions would result in the eradication of opae'ula leading to a rapid growth of epibenthic algae and an overall hastening of the pond senescence; and

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[19]The flora and fauna descriptions of the anchialine ponds are based on the report by Brewer/Brandman Associates, December 1990, attached as Exhibit D.

[20]Maciolek, J.A. and R.E. Brock, 1974. Aquatic Survey of the Kona Coast Ponds, Hawaii Island, SeaGrant Advisory Report UNIHI-SEAGRANT-AR-74-04. University of Hawaii, Honolulu.

- do not dredge the ponds as this would discourage the wading birds such as the Hawaiian stilt, tattlers, and plovers.

3.1.5 *Historic/Archaeological Resources*

Findings based on 100% archaeological reconnaissance surveys in 1982 with a follow-up in 1990 indicate no evidence of surface archaeological remains. The site has been extensively altered by earlier grubbing and clearing, especially in the areas proposed for the main residence and the utility building. Because of this previous site disturbance, exposed in some areas to the bedrock, and inspection of push piles from the earlier grubbing activities, the archaeologist concluded (and DLNR concurred) that subsurface remains are highly unlikely; therefore, subsurface test excavations are unnecessary.[21] Nevertheless, to minimize impact to potential archaeological resources, design and construction of the proposed improvements should comply with the following mitigation measures:

- avoid disturbance of the beach berm area; and

- monitor construction activities in the utility building area for potential subsurface archaeological remains; send a report of the monitoring activities, even if negative, to the State Historic Preservation Division; if historic sites or burials are found, stop construction in the immediate vicinity, notify the County Planning Department and the State Historic Preservation Office, and cooperate with these agencies to develop a mitigation plan, if needed.

3.1.6 *Water Resources*

Due to the relatively recent lava flows in the region (1859), there are no surface streams; however, substantial groundwater flows are evidenced by numerous ponds and springs along the coast. The groundwater underlying the project site is non-potable, brackish basal groundwater (see Fig. 15).

The Department of Health has classified the offshore coastal waters of Kiholo Bay as a Class AA embayment.[22] The basal groundwater flowing into the relatively protected northeast portion of Kiholo Bay forms a persistent layer of water of low salinity and low temperature.[23] This lens causes considerable turbidity and reduced visibility. Compared to the other relatively pristine embayments in this region (i.e., Puako, Anaehoomalu, Waiulua), Kiholo is most exposed to wave action as indicated by the types of coral species that are indicators of high wave energy and the rubble/basalt beach (rather than calcareous sand), especially in the southern portion of the bay fronting the subject parcel (see Fig. 16).[24] In terms of its relative value as a potential marine park for ecological and/or recreational uses,

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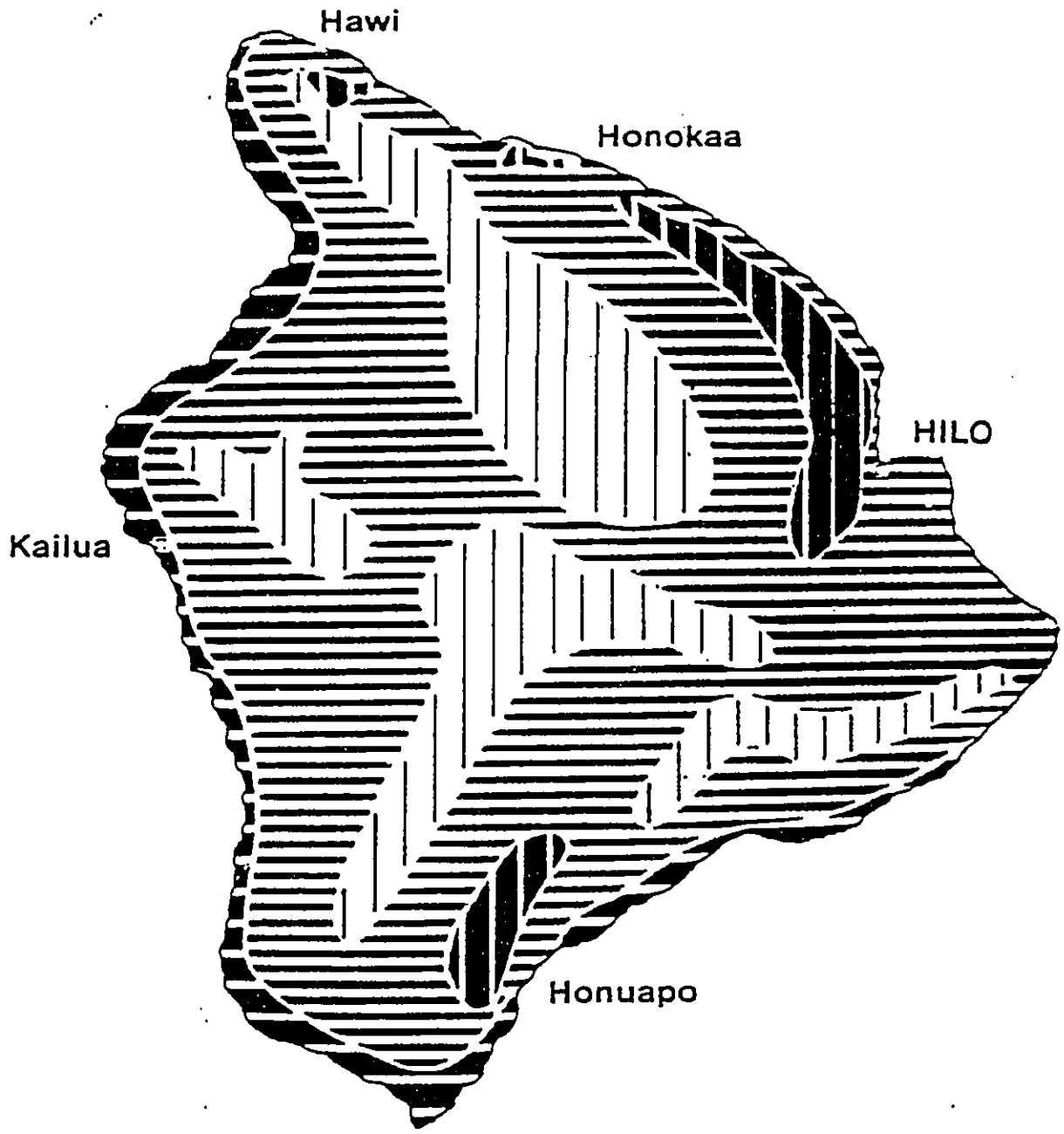
[21]Paul H. Rosendahl, Ph.D., Inc., Archaeological Reconnaissance Survey, Kiholo Bay Houselots, 10 June 1982, 16 April 1991 (update); see also letters from the State Historic Preservation Division, dated 7 January 1992 and 30 January 1992 (Rosendahl reports and DLNR letters attached as Exhibit E).

[22]§11-54-06 (Uses and specific criteria applicable to marine waters), Hawaii Administrative Rules, Department of Heath, Water Quality Standards, November 20, 1989.

[23]Kay, E.A., et. al., Hydrologic and Ecologic Inventories of the Coastal Waters of West Hawaii. Water Resources Research Center, University of Hawaii, Technical Report No. 105, April 1977, pp. 21, 73.

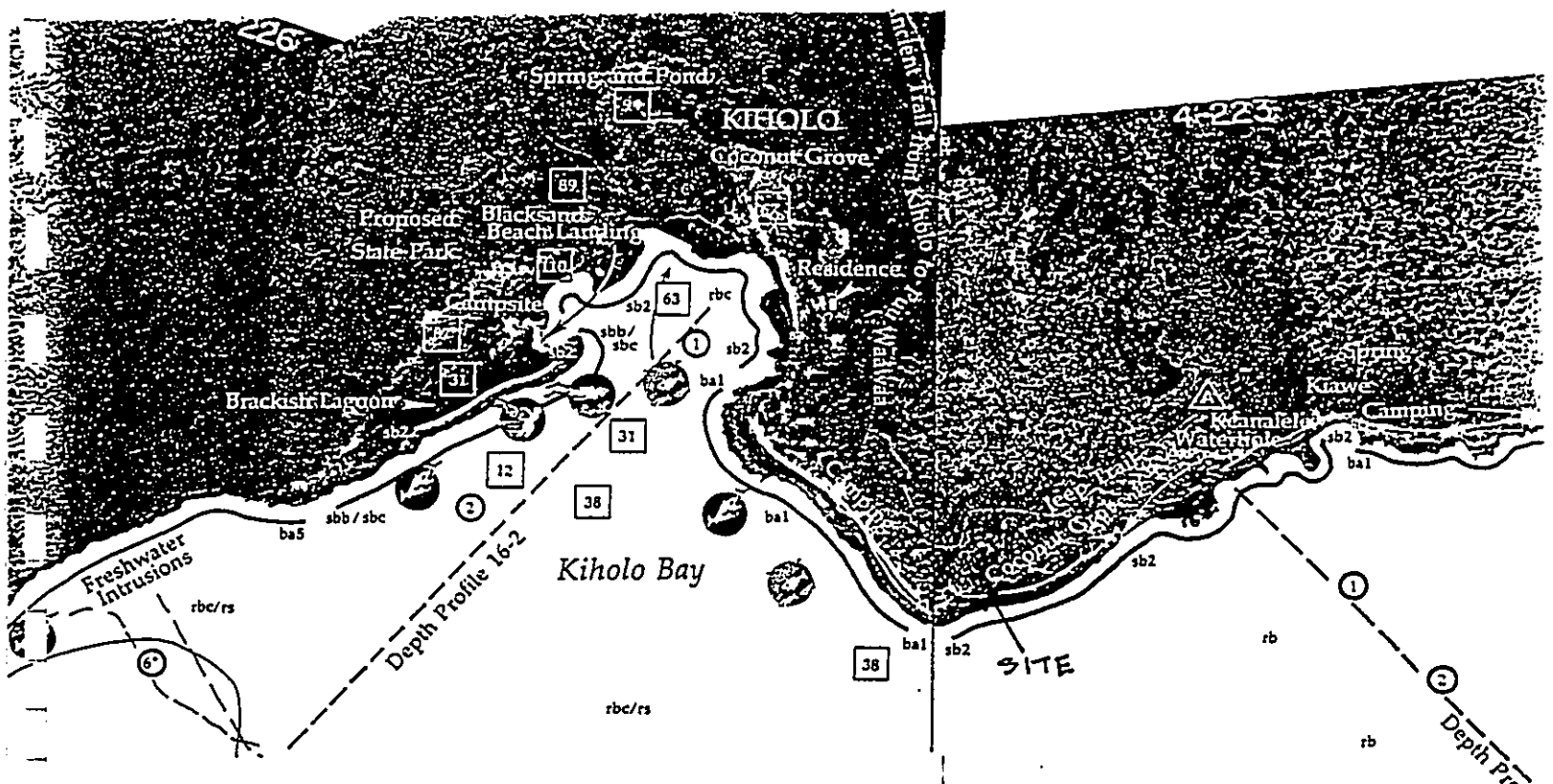
[24]Ibid., p. 48. See also, OCRA, Ltd., West Hawaii Coral Reef Atlas, prepared for the U.S. Army Corps Engineers, 1981, Maps #16 &17.



GROUND WATER RESOURCE AREAS

Source: USGS Bulletin 9
Stearns & MacDonald

FIGURE 15



MAP LEGEND

SHORELINES

Volcanic Rock Shorelines

- ba1 Wave cut notches, abrasion ramps, benches, sea level to 1 m above sea level
- ba2 Boulders and talus at the base of cliffs.
- ba3 Flowtops, 1 m to 3 m above sea level.
- Sea cliffs, 3 m to 10 m above sea level.
- Sea cliffs, 10 m above sea level.
- Tidepools or surge pools.

Beaches

- Storm beaches and sand deposits above high water line.
- White sand beaches.
- ba4 Dark sand beaches (composed of volcanic, detrital sediments).
- sb2 Black sand beaches.
- sbc Cobble beaches (50% stones).
- Boulder beaches.
- Limestone rubble/gravel beaches (usually with large admixture of sand).

Man-made Shorelines

- Boulder revetments, seawalls or breakwaters.
- Cement revetments, seawalls or piers.

SUBMARINE BOTTOMS

Basalt Dominant

- Pavements or consolidated rock bottom or outcrops.
- rbb Pavements with a close-set cover of large to massive boulders.
- rbs Pavements with a patchy sand cover on less than 50% of the bottom.

Basalt or Limestone Dominant

- Pavements with large sand pockets and/or a sand cover on more than 50% of the bottom.
- rbc Cobbles, small boulders and non-consolidated rubble with or without mobile movement

Limestone Dominant

- rcl Consolidated limestone pavement.
- rcs Loose bottom, mostly sand and algae with a mixture of gravel and rubble
- rc Areas of living coral exceeding 50% of bottom cover.

Soft Bottoms

- sc Large sand channels and sand deposits above a depth of -33 feet (-10 m)
- sd Large sand channels and sand deposits below a depth of -33 feet (-10 m)

CORAL COMMUNITIES

- LS Low surge; in shallow protected waters. Coral diversity is low.
- LD Low surge; in depths greater than 60 feet. Low coral diversity
- MS Moderate surge; in depths of +5 to -15 feet in protected waters and +15 to +30 feet in exposed waters. High coral diversity.
- MD Moderate surge; in depths of +30 to +60 feet (or deeper) in exposed waters. MD communities are uncommon in protected areas. Moderate coral diversity.
- HS High surge; in depths to +5 feet in protected waters and to +20 feet in exposed waters. Coral diversity is low to moderate.
- (L, M & H low, moderate and high surge conditions. S & D shallow and deep water depths.)
- d Other community types as described in narrative.

REEF USES

- Gill netting.
- Crabbing.
- Throw netting.
- Surround netting.
- Aquarium fish collecting.
- Shore fishing.
- Trolling.
- Diving and snorkeling.
- Torching.
- Octopus.
- Trapping.
- Opihi.
- Limu.
- Wana.

Abbreviated ORCA/DPC Field Observations

Site	Water Depth in Feet	Substrate Type	Community Type
1	10	rb	HS
2	15	rb	HS
3	20	rbs	MS
4	10	rs / rbc	MS
	20	co/ rbc	MD
5	20	rb / rbc	MS
	30-40	co/ rbc	MD
	60	co / rbc	MD

Source:
OCRA, Ltd., West Hawaii Coral Reef Atlas, prepared for U.S. Army Corps of Engineers, 1981, Maps #16 & 17

FIGURE 16

Puako and Anaehoomalu rank higher than Kiholo due to their superior water clarity, diversity of coral reef communities, and lower wave energy.[25]

A potential source of impact to the groundwater and coastal waters is the wastewater effluent disposal. Of concern is the nutrient content; the disinfection system will eliminate bacteriological constituents and the treatment system will remove most of the solids. The treatment system will be designed to remove nutrients at a higher level than secondary treatment. Any residual nutrients will be taken up by the plants through the drip irrigation system. Drip irrigation results in very little return flow to recharge the basal groundwater. Because of the minimal return flow and efficient nutrient removal/uptake of the treatment system combined with drip irrigation, the impact to the anchialine ponds and the coastal waters should be insignificant. Furthermore, should the effluent reach the groundwater, the probable area of coastal seepage is the southern portion of Kiholo Bay which is exposed to greater mixing and dilution by wave action. As a precaution, since the wastewater treatment system must be operated by a licensed operator under DOH's wastewater rules, DOH could require the operator to monitor the water quality of the anchialine pond(s) and report periodically to the DOH as a mitigation measure.

3.1.7 *Air Quality/Noise*

Except for the natural vog conditions, there are no significant existing or proposed point or mobile emission sources in the Kiholo Bay area. Therefore, there should be no degradation of the existing pristine air quality.

The potential noise impact will be confined to the construction period. The noise generated by construction equipment will be during the day and is a short-term, temporary impact that will cease upon completion of construction.

3.1.8 *Scenic Resources*

The undeveloped shoreline in the vicinity of Kiholo Bay is a significant scenic resource, evidenced by the location of a scenic lookout off the Queen Kaahumanu Highway overlooking Kiholo Bay. The proposed improvements will not be visible from the lookout since they will be shielded by the canopy of coconut trees (see Fig. 17 and 18). From the shoreline looking towards the proposed residence, the proposed residence will be quite inconspicuous due to the existing berm, landscaping, and existing coconut trees (see Fig. 19).

The size of the building is relatively scaled-down and in character with the open, wilderness shoreline. With a net living area of roughly 3,000 s.f., the proposed residence is about one-fifth the size of an existing large residence in the vicinity, and occupies less than 5% (including the lanai) of the 3.0-acre land area.

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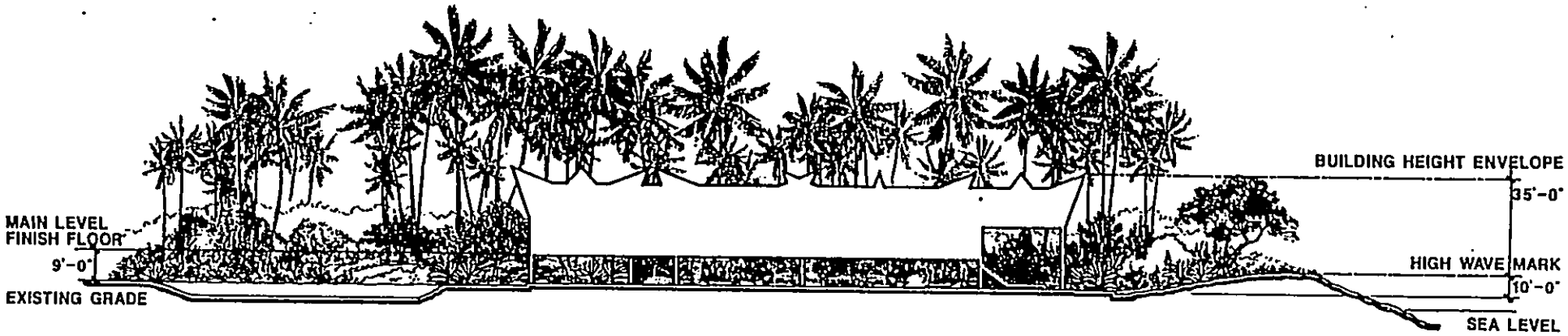
[25] Ibid., p. 94.



SECTION 'A'

SCALE: 1"=20'-0"

FIGURE 17

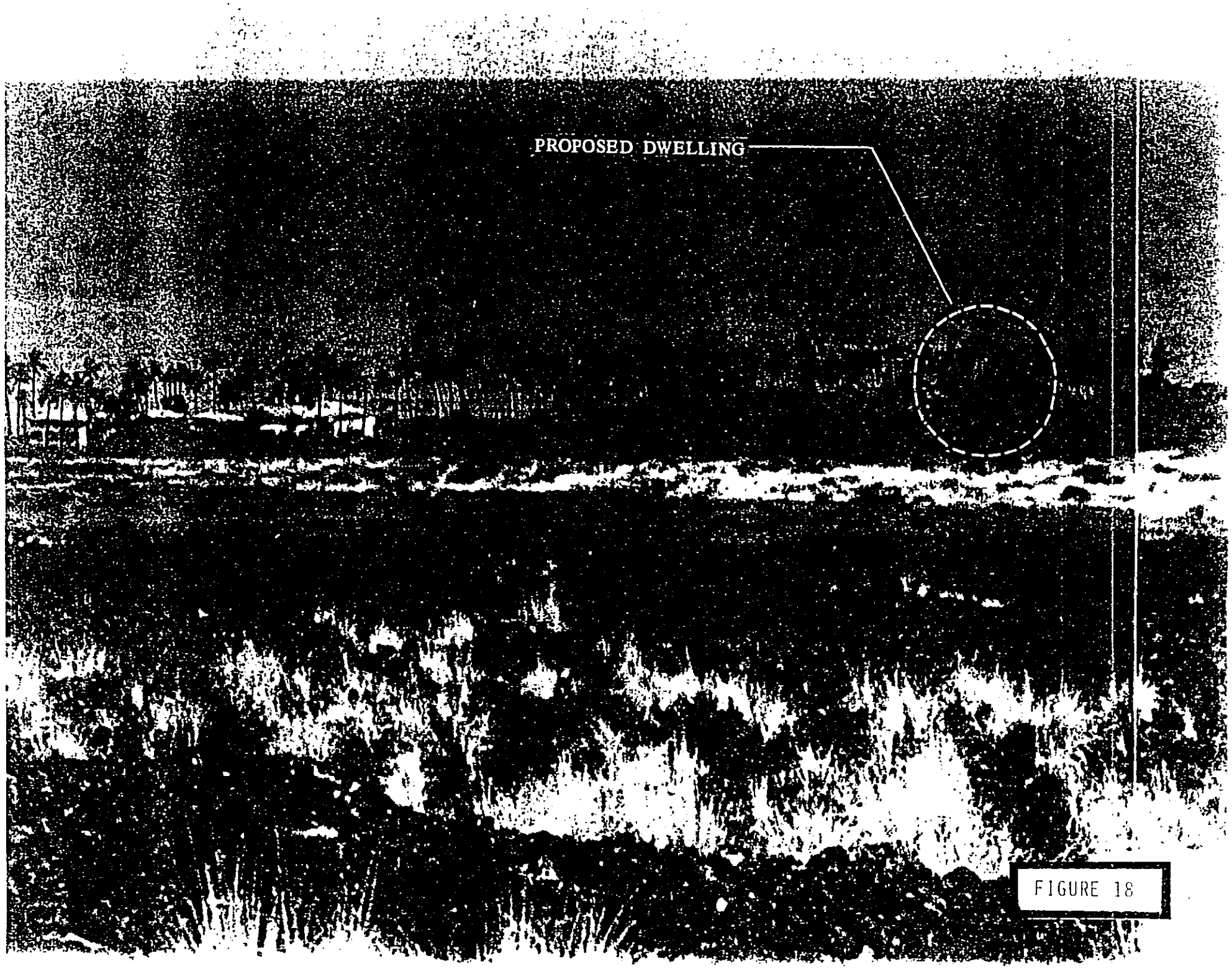


FIGURE 18

FIGURE 19

3.2 Socioeconomic Characteristics

3.2.1 *Shoreline Recreation and Public Access*

The Ala Kahakai Trail, one of the trails proposed under the Na Ala Hele program, traverses seaward of the subject parcel (see Fig. 20). The proposed project will not impact public access along this trail.[26] The current mauka-makai public access to the shoreline is along the same road that provides access to the subject parcel. Being a non-exclusive easement, the applicant will not and has no legal right to prohibit public use of this road. The proposed project, therefore, will not impact the public's access to Kiholo Bay.

Kiholo Bay attracts recreational users for swimming, snorkeling, spear fishing, lay netting, throw netting, pole fishing, salt gathering, hiking, and occasionally surfing.[27] The site is about a mile northeast of a significant pond, called Luahinewai, that is popular for swimming. The proposed residential use will not degrade the coastal water quality (see §3.1.6 above).

3.2.2 *Employment*

Although the applicant proposes to import craftsmen to construct the main residence, the number of craftsmen will be minimized and local labor will be used to supplement the imported labor. The applicant has informed local labor unions and will comply with immigration requirements.

3.3 Public Facilities and Utilities

Since the proposed project will be serviced by an unimproved road and self-contained water, wastewater, and drainage systems, the impacts on the public road, water, and wastewater systems are negligible. Telephone service is provided to existing residents by existing overhead telephone lines. The applicant will pay the telephone company to extend service, if desired, to the proposed residence. Since electricity will be solar-powered by onsite systems, there will be no additional demand placed on HELCO's system. Propane gas refills will be trucked in as required. The nearest fire station is near the Mauna Lani Resort, about 9 miles away.

4 RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS

4.1 State Land Use Law and Conservation District Rules

Of the four land use districts (Urban, Agriculture, Conservation, Rural) established by the State Land Use Law (Chapter 205, Hawaii Revised Statutes), the subject parcel is within the State Conservation District under DLNR's jurisdiction. DLNR's rules establish four subzones in the Conservation district: Protective, Limited, Resource, and General. The Land Board's policy allows conditional use residences

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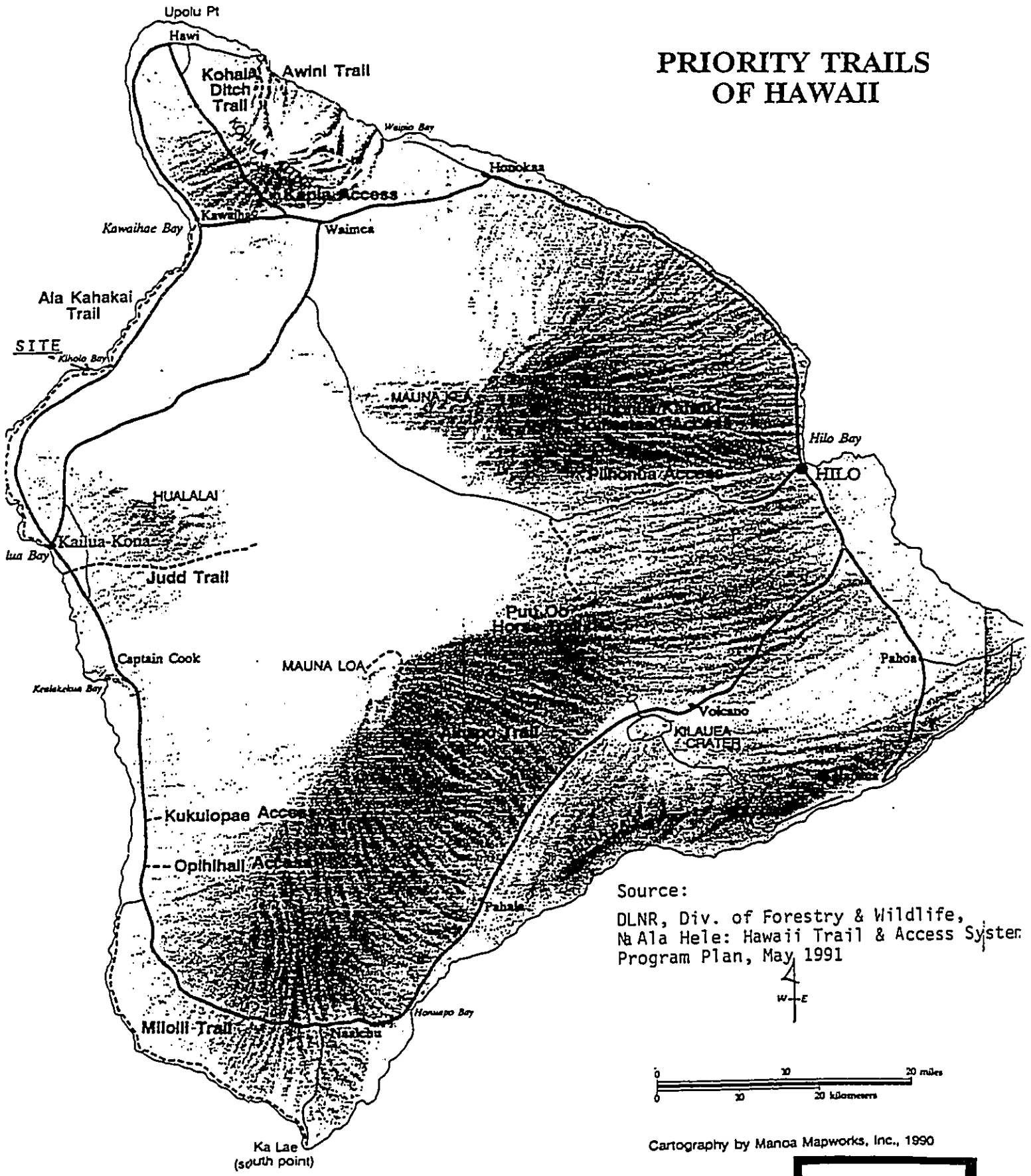
[26]Telephone conversation and fax communication with the Division of Forestry office in Hilo (2/13/92 w/ Mr. Rod Oshiro) confirmed that the trail passes seaward of the subject parcel. The Ala Kahakai trail is one of several priority trails identified by the Division of Forestry for inclusion in the Na Ala Hele program, the statewide trail and access system established by Chapter 198D, Hawaii Revised Statutes. See also, Department of Land and Natural Resources, Division of Forestry, Na Ala Hele: Hawaii Trail and Access System Program Plan, May 1991.

[27]Clark, J. Beaches of the Big Island. Honolulu: University of Hawaii Press, 1985, pp. 122-124.

PRIORITY TRAILS OF HAWAII



Source:

DLNR, Div. of Forestry & Wildlife, Na Ala Hele: Hawaii Trail & Access System Program Plan, May 1991

W — E

0 10 20 miles

0 10 20 kilometers

Cartography by Manoa Mapworks, Inc., 1990

FIGURE 20

in the Resource and General subzones. Since the proposed use is in the Resource subzone, it qualifies for consideration as a conditional use under the Board's current policy. The rules provide guidelines to review conditional uses.[28] The following discussion evaluates the proposed use in terms of these guidelines.

4.1.1 *All applications shall be reviewed in such a manner that the objectives of the subzone or subzones are given primary consideration (§13-2-21(b)(1)).*

The objective of the Resource subzone is "to develop, with proper management, areas to ensure sustained use of the natural resources of those areas."[29] Unlike the Protective subzone which includes valuable resources that are vulnerable to multiple uses (e.g., restricted watersheds, wildlife sanctuaries) and the Limited subzone which includes areas that pose hazards to human activities (e.g., flood zones, steep slopes), the Resource subzone includes areas with natural resources that are less vulnerable and able to tolerate human use, provided this use is properly managed under a multiple use concept to ensure the sustained use of these resources (e.g., natural areas used for parks, camping, hunting, fishing, other outdoor recreation, or commercial timber harvesting).

The significant natural resources in this particular Resource subzone include the black sand/pebble beach and berm system, scenic views of the shoreline from the Queen Kaahumanu Highway lookout, the recreational values of the embayment ecosystem, the Ala Kahakai Trail, the anchialine ponds, and potential archaeological resources. The proposed design mitigates against impacts to these resources as follows:

RESOURCE	MITIGATION MEASURE	CROSS-REFERENCE
Black sand/pebble beach and berm system	*Shoreline setback.* Since all proposed improvements are setback a minimum of 40' from the certified shoreline, there should be no impact to the littoral system of the sandy beach and berm system. The berm will be left intact and remain stabilized with the existing coastal strand vegetation.	§3.1.2 (Topography & Soils); §3.1.6 (Water Resources); §3.1.4 (Flora and Fauna)

[28] §13-2-21, Hawaii Administrative Rules (Standards; conditions; guidelines; compliance with laws). For purposes of this Environmental Assessment, the guidelines include the first two "guidelines" in §13-2-21(b) and the fifteen "conditions" in §13-2-21(a).

[29] §13-2-13, Hawaii Administrative Rules.

Scenic vistas of shoreline	*Height limit and floor area.* The residence will not exceed a height limit of 35' and will not be visible from the Queen Kaahumanu Highway lookout since the existing 50' coconut trees shield the view of the proposed residence from the lookout. The scaled-down floor area (<5% lot coverage) will blend with the open character of the area. *Minimal clearing of vegetation.* Minimal clearing of existing vegetation, especially the coconut grove and berm vegetation, will buffer any visual impact from the highway lookout as well as from the oceanside.	§3.1.8 (Scenic Resources)
Anchialine ponds	*Wastewater treatment and monitoring.* The nutrient removal by the treatment system coupled with the nutrient uptake by the drip-irrigated plants should result in minimal nutrient loading to the groundwater and coastal waters. DOH could require the licensed operator to monitor the water quality of the anchialine ponds. *Habitat enhancement.* The pond habitat will be enhanced by clearing the vegetation around the ponds, no pond dredging, no point discharge of surface runoff, and no introduction of reef or exotic species.	§3.1.4 (Flora/Fauna)
Ala Kahakai Trail and public access to shoreline resources	*No impact.* Since the Ala Kahakai Trail passes seaward of the subject parcel, existing public access to the shoreline will not be impeded in any way by the proposed use; no mitigation measures are required.	§3.2.1 (Shoreline Recreation and Public Access)
Archaeological resources	*Construction monitoring.* The applicant will hire an archaeologist to monitor construction of the utility building area for potential subsurface archaeological remains and to report the findings to the Historic Sites Division.	§3.1.5 (Historic/ Archaeological Resources)

4.1.2 *All applications shall be reviewed so that any physical hazard, as determined by the department shall be alleviated by the applicant when required by the board (§13-2-21(b)(2)).*

The subject parcel is in the flood hazard zone. The flood hazard will be mitigated as follows:

HAZARD	MITIGATION MEASURES	CROSS-REFERENCE

Coastal flood hazards	*Raised, flood-proofed structures.* All structures, including the residence and the utility building, will be built on reinforced stilts in conformance with the flood-proofing requirements of the Department of Public Works.	§3.1.3 (Natural Hazards)

4.1.3 *The use shall be compatible with the locality and surrounding areas, and appropriate to the physical conditions and capabilities of the specific parcel or parcels of lands (§13-2-21(a)(1)).*

By incorporating the suggested mitigation measures discussed in §4.1.1 and §4.1.2 above, the proposed use would be compatible with the locality and surrounding areas.

4.1.4 *The existing physical and environmental aspects of the subject areas, such as natural beauty and open space characteristics, shall be preserved or improved upon, whichever is applicable (§13-2-21(a)(2)).*

Mitigation measures that preserve or enhance the environmental aspects of the subject parcel include:

- Preserve or relocate as much as possible the existing coconut trees and berm vegetation;
- Clear and maintain the vegetation around the anchialine ponds according to the recommendations of DLNR or other agency.

4.1.5 *All buildings, structures, and facilities shall harmonize with physical and environmental conditions stated in this rule (§13-2-21(a)(3));*

The proposed scale and tropical design of the residence harmonizes with the physical and environmental conditions. DLNR would review any significant design changes pursuant to the requirement that the applicant submit final construction plans and specifications to DLNR prior to commencement of construction, as discussed in further detail below (§4.1.9).

4.1.6 *Use of the area shall conform with the program of the appropriate soil and water conservation district or plan approved by and on file with the department (§13-2-21(a)(4)).*

Not applicable.

4.1.7 *When provided or required, potable water supply and sanitation facilities shall have the approval of the department of health and the board/department of water supply (§13-2-21(a)(5)).*

DOH will review the proposed potable water system as part of the building permit process; the County Department of Water Supply does not review individual water systems. DOH must also review and approve the proposed individual wastewater treatment system (see §2.3.4 for a more detailed discussion).

4.1.8 *When provided or required, boat harbors, docks, and similar facilities shall have the approval of the department of transportation (§13-2-21(a)(6)).*

Not applicable (no dock facilities proposed).

4.1.9 *The construction, alteration, moving, demolition and repair of any building or other improvement on lands within the conservation district shall be subject to the building codes of the respective counties in which the lands are located; provided that prior to the commencement of any construction, alteration, or repair of any building or other improvement, four copies each of the final location map, plans, and specifications shall be submitted to the chairperson or an authorized representative, for approval; provided, further that any alteration or repair which does not change or expand on the existing land use shall not be subject to the above (§13-2-21(a)(7)).*

Since the proposed structures do not meet any of the exceptions under the County Building Code,[30] the design and construction of all proposed structures will conform with the County building code. The proposed design, although inspired by traditional Indonesian craftsmanship, will be modified as necessary to comply with the Building Code. The applicant will submit the Building Permit set of plans and specifications to DLNR for approval concurrently with the Building Permit application.

4.1.10 *Provisions for access, parking, drainage, fire protection, safety, signs, lighting, and changes in the landscape shall have the approval of the chairperson or an authorized representative (§13-2-21(a)(8)).*

As part of this CDUA, the land board must act upon the applicant's requests to amend the access easement over State land (see §2.3.4 for a more detailed discussion). A landscape plan is included in the CDUA for DLNR's approval. DLNR will have an opportunity to review and approve the design details for all proposed improvements prior to construction pursuant to the condition discussed in §4.1.9 above.

4.1.11 *Where any interference, nuisance, or harm may be caused, or hazard established by the use, the applicant shall be required to take measures to minimize or eliminate the interference, nuisance, harm, or hazard (§13-2-21(a)(9)).*

The proposed use will not interfere with public access, will not cause any nuisance to surrounding properties, will be designed to withstand potential flood hazards, and with the proper mitigation measures as proposed, will not harm the environment.

4.1.12 *Obstruction of public roads, trails, and pathways shall be minimized. If obstruction is unavoidable, the applicant shall provide roads, trails, or pathways acceptable to the department (§13-2-21(a)(10).*

The proposed use will not obstruct public access to the shoreline nor the alongshore public access via the Ala Kahakai Trail (see §3.2.1 for more detailed discussion).

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[30]All new structures inland of the shoreline are subject to the Building Code, Chapter 5, Hawaii County Code, unless it meets any of the exceptions listed in §5-2 and §5-8.

4.1.13 *Except in the case of public highways, access roads shall be limited to a maximum of two lanes (§13-2-21(a)(11)).*

No changes are proposed to the existing unimproved access road, which is a maximum of two lanes. The proposed access to the subject parcel will also be unimproved and less than two lanes. DLNR would dictate the maximum extent of the access easement through the description of the amended grant of access easement.

4.1.14 *Overloading of off-site roadways, utilities, and public facilities shall be minimized (§13-2-21(a)(12)).*

The proposed residence is self-contained in terms of water, wastewater, and power and does not rely on public facilities or utilities. The applicant's limited use of the access road should not cause any congestion.

4.1.15 *Clearing areas for construction purposes shall require prior approval by the chairperson, ground cover of slopes over 40% shall not be removed unless specifically authorized by the chairperson (§13-2-21(a)(13)).*

The areas to be cleared will be described in the construction plans and specifications submitted for DLNR's review as discussed above in §4.1.9. The subject parcel is level with no areas with slopes over 40%.

4.1.16 *Cleared areas shall be revegetated within thirty days unless otherwise provided for in a plan on file with and approved by the department (§13-2-21(a)(14)).*

The construction plans and/or specifications can include a requirement to the contractor that cleared areas not otherwise required for construction as shown on the construction plans shall be revegetated within 30 days.

4.1.17 *Upon approval of a particular use by the board, any work or construction to be done on the land shall be initiated within one year of the approval of the use and all work and construction shall be completed within three years of the approval of the use (§13-2-21(a)(15)).*

The applicant intends to comply with this time requirement.

4.2 Coastal Zone Management and Special Management Area (SMA) Permit

The objectives and policies set forth in the State Coastal Zone Management Act is binding upon all state and county agency actions within the SMA.[31] Since the subject parcel is within the SMA, DLNR must consider these objectives and policies upon its review of the CDUA. The County's review of the CZM objectives and policies may be limited. A single-family residence is exempt from the

[31] §205A-2, Hawaii Revised Statutes (objectives and policies); §205A-4(b), Hawaii Revised Statutes (binding upon agency actions within the coastal zone management area).

County's SMA Rules.[32] The County is in the process of reviewing the SMA application, and will issue a determination shortly (definitely before the 180-day CDUA time limit).

The proposed use complies with the CZM objectives and policies as follows:

4.2.1 *Recreational Resources*

Kiholo Bay provides significant coastal recreational opportunities (see §3.2.1). In recognition of these recreational values and the extensive State-owned land in the vicinity, the State is studying the feasibility of establishing the area as a State Park (see §4.3). The proposed residential use will not impact the coastal water quality for recreational uses, will not impede public access to or along the shoreline, and will be compatible with the plans for a State Park.

4.2.2 *Historic Resources*

Based on 100% reconnaissance surveys of the subject parcel, there are no known surface or subsurface archaeological resources. Suggested mitigation measures will protect unknown potential subsurface remains (see §3.1.5).

4.2.3 *Scenic and Open Space Resources*

Kiholo Bay is a significant scenic resource (see §4.4 below). The existing grove of coconut trees and landscaping will shield a view of the proposed residence looking makai from the Queen Kaahumanu Highway lookout and looking mauka from the shore (see §3.1.8).

4.2.4 *Coastal Ecosystems*

The suggested mitigation measures will protect the anchialine ponds (see §3.1.4). The proposed wastewater system, with certain monitoring requirements as suggested (see §2.3.4 and §3.1.6) should not impact the anchialine ponds or the coastal water quality.

4.2.5 *Economic Uses*

The economic objectives and policies provide for appropriate coastal-dependent development in suitable locations. The Kiholo Bay area is valued for its wilderness recreational values; large-scale coastal-dependent development would be inappropriate for this area. The proposed use is compatible with the wilderness characteristics of this area (see §3.1.8 and §4.3).

4.2.6 *Coastal Hazards*

The subject parcel is within the flood hazard zone. The proposed residence has been designed in conformance with the County's flood-proofing requirements and the Federal Flood Insurance Program (see §3.1.3). The County will verify compliance through the building permit process.

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[32] §9-4(10)(B)(i), Rules of Practice and Procedure, Planning Commission, County of Hawaii, January 1991.

4.3 West Hawaii Regional Plan

The State's West Hawaii Regional Plan, prepared by the Office of State Planning, encompasses the North Kona, South Kohala, and North Kohala judicial districts. The Plan recommends that Kiholo Bay be included within a proposed State park extending from Kapalaoa to Kiholo Bay along the wildland shoreline.[33] The Legislature has appropriated funds to study the feasibility of establishing a state park in the area proposed. The Division of State Parks has just begun baseline studies for recreation, aquatic, and archaeological resources. The expected timetable to complete the plan is within the next 2.5 years.[34] The State already owns most of the land within the park planning area. Private residences would be compatible with the park, provided the residence is not visually obtrusive and does not otherwise impact the natural resources and public access. The proposed residence meets these compatibility criteria, as documented in previous sections of this Environmental Assessment.

4.4 *Hawaii County General Plan and Zoning*

The Hawaii County General Plan Land Use Pattern Allocation Guide Map (LUPAG) designates the subject parcel in the "Conservation" zone, which includes lands in the forest and water zones, natural and scientific preserves, and lands within the State Conservation District. The General Plan identifies Kiholo Bay as one of several exemplary sites of natural beauty in the North Kona District to be protected through appropriate permit review processes and a recreation area to which public access should be established.[35]

The County zoning designation of the subject parcel as "Open" conforms with the General Plan. A single-family residence is not listed as a permitted use in the Open district.[36] Because DLNR has jurisdiction of all lands in the State Conservation District, the county's Open zoning requirements would apply only to those lands outside the State Conservation District.

4.5 Northwest Hawaii Community Development Plan

The subject parcel is within the planning area of the County's Northwest Hawaii Community Development Plan. A draft of this Plan is expected by the end of June 1992. Currently, there is no information available to assess the impact of the proposed action on the Plan's forthcoming recommendations.

4.6 Shoreline Setback

The shoreline setback line for the subject parcel, as established by the Land Use Commission, extends 40' inland from the certified shoreline. Since the seaward boundary of the subject parcel is a

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[33]Office of State Planning, State of Hawaii, West Hawaii Regional Plan, 1989, pp. V-10, V-30, V-34.

[34]Telephone conversation with planner with the Division of State Parks (Mr. Wayne Souza), February 11, 1992.

[35]§5(G)(1) (natural beauty as an economic asset) and §5(G)(6) (recreation), Ordinance 89-142, Hawaii County, An Ordinance Adopting the County of Hawaii General Plan and Repealing Ordinance No. 439, as amended. See also General Plan Support Document, included with the General Plan ordinance in a published document issued by the Planning Department, November 1989, p. 36 (listing of natural beauty sites and vistas).

[36]§25-224, Hawaii County Code.

ranges from 10' to over 20' inland of the certified shoreline (see §3.1.2 for discussion), the site plan conservatively delineates the setback line 30' inland from the seaward property boundary (see the site plan in Fig. 2). DLNR certified the surveyed shoreline on June 25, 1991 in compliance with the Planning Commission's rules;[37] the applicant has included a copy of the certified shoreline map as part of the CDUA (see Fig. 14). Since the applicant does not propose any improvements within the shoreline setback area, a shoreline setback variance approval is not required.

4.7 Other Permits and Approvals

At this time, the following are the permits and approvals (other than the CDUA) that would probably apply to the proposed project:

- DOH approval of the individual wastewater system-- the applicant has submitted the construction drawings for DOH's review and approval;
- Building Permit-- as part of the building permit process, the Department of Public Works will review the application for compliance with the flood hazard ordinance; the applicant will concurrently submit the building permit set to DLNR in compliance with CDUP requirements.
- Federal immigration approvals will be obtained to import craftsmen to supervise construction;
- U.S. Department of Agriculture does not have any special requirements to import wood from a foreign country, but will inspect the shipment as part of customs.

No permits are known to be required for the proposed water system-- the U.S. Army Corps of Engineers Permit, the DLNR pump installation permit, and the DOH potable water system permit do not apply (see discussion in §2.3.4).

5 DETERMINATION WITH SUPPORTING FINDINGS AND REASONS

The proposed single-family residence is not expected to cause significant impacts to the environment, pursuant to the significance criteria established by the Environmental Commission as discussed below;[38] therefore, the determination is to issue a negative declaration.

- *The proposed project will not involve an irrevocable commitment to loss or destruction to any natural or cultural resources.* The mitigation measures proposed in this Environmental Assessment will ensure against potential loss of subsurface archaeological resources and avoid destruction of the anchialine ponds. The clearing of vegetation around the perimeter of the anchialine pond will in fact enhance the anchialine pond habitat.

- *The proposed project will not curtail the range of beneficial uses of the environment.* The recreational uses of Kiholo Bay will not be curtailed by the proposed use. Public access to the shoreline (lateral and mauka-makai) will not be impaired.

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[37] §8-6(a), Rules of Practice and Procedure, Planning Commission, County of Hawaii, January 1991.

[38] §11-200-12, Hawaii Administrative Rules, Environmental Impact Statement Rules, Department of Health, June 2, 1975.

- *The proposed project will not conflict with the State's long-term environmental policies.* The proposed use will be compatible with the State's plans to establish a state park in the area. The scale of the proposed residence will not detract from the wildland values for this state park.

- *The proposed project will not involve substantial secondary impacts, such as population changes or effects on public facilities.* The proposed project is not part of any larger or phased development. The support facilities for water, wastewater, and electrical will be provided onsite and therefore not impact the demand on public facilities.

- *The proposed project will not involve a substantial degradation of environmental quality.* The proposed wastewater system will be designed to avoid impacts to the anchialine ponds and coastal waters. The DOH will review and approve the design of the proposed individual wastewater system.

- *The proposed project will not substantially affect any rare, threatened or endangered species of flora or fauna or habitat.* None of the flora and fauna species observed on the subject parcel, including the anchialine organisms, are considered endangered or threatened.

- *The proposed project will not detrimentally affect air or water quality or ambient noise levels.* The proposed project will not generate any significant gaseous emissions. The water and wastewater systems will be designed to not degrade the groundwater or coastal water quality. The proposed residential use will not detrimentally affect the ambient noise levels.

- *The proposed project is located in an environmentally sensitive area (e.g., flood plain, tsunami zone, coastal area), but will include mitigation measures to minimize potential adverse impacts.* The proposed project will be designed in compliance with the Department of Works' flood-proofing requirements to mitigate flood and tsunami damage. The scale of the residence and landscaping will harmonize the proposed project with this wild, scenic coastline. The anchialine ponds will be protected, and possibly enhanced, with the proposed mitigation measures.

EXHIBIT A

Grant of Easement

RECORDATION REQUESTED BY:

[illegible]

AFTER RECORDATION, RETURN TO:

[illegible]

RETURN BY: MAIL ( ) PICKUP ( )

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[illegible] 137

GRANT OF NON-EXCLUSIVE EASEMENT

THIS INDENTURE, made and entered into this 10th day of May, 1989, by and between the STATE OF HAWAII, by its Board of Land and Natural Resources, pursuant to the provisions of Section 171-13(2), Hawaii Revised Statutes, as amended, referred to as "GRANTOR," and CONRAD ROLAND LEHMAN, unmarried, holder of an undivided 1/3 interest, whose post office address is P.O. Box 86, Honaunau, Hawaii 96726, O.V. LYNN, JR. and LORETTA LYNN, husband and wife, as tenants by the entirety to an undivided 1/3 interest, whose post office address is c/o ROBERT D. TRANTOS, 75-5742-J, Hualalai Road, Kailua, Kona, Hawaii 96740, and DORIS JANE BAKKEN, life tenant to an undivided 1/3 interest, and EARL ELMER BAKKEN, reversionary grantee to an undivided 1/3 interest, whose post office address is c/o Roy A. Vitousek; Cades, Schutte, Fleming and Wright, Suite B-303, 75-170 Hualalai Road, Kailua, Kona, Hawaii 96740, altogether as tenants in common, hereinafter referred to as the "GRANTEES,"

WITNESSETH THAT:

The Grantor, and in consideration of the sum of TWENTY EIGHT THOUSAND AND NO/100 DOLLARS ($28,000.00), the receipt is hereby acknowledged, and of the terms, conditions, and covenants herein contained, and on the part of the Grantees to be observed and performed, does hereby grant unto the Grantees, the following non-exclusive and perpetual easement rights:

DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF LAND MANAGEMENT
P. O. BOX 621
HONOLULU, HAWAII 96809

Right, privilege and authority to use, repair, construct, maintain a roadway for ingests and egress and utility purposes

in, over, under and across a portion of the Government (Crown) Land of Puuwaawaa situated at Puuwaawaa, North Kona, Island of Hawaii, State of Hawaii, designated "Perpetual Non-Exclusive Access Easement" and described as follows:

1. Easement 1: containing an area of 1.196 acres, more particularly described in Exhibit "A" and delineated on Exhibit "B," both of which are attached hereto and made parts thereof, said exhibits being respectively, a survey description and survey map prepared by the Survey Division, Department of Accounting and General Services, State of Hawaii, designated C.S.F. No. 20,840 and dated September 21, 1988.

2. Easement 2-A: containing an area of 2.348 acres, more particularly described in Exhibit "C" and delineated on Exhibit "D," both of which are attached hereto and made parts hereof, said exhibits being respectively, a survey description and survey map prepared by the Survey Division, Department of Accounting and General Services, State of Hawaii, designated C.S.F. No. 20,830 and dated September 8, 1988.

3. Easement 2-B: containing an area of 2.146 acres, more particularly described in Exhibit "E" and delineated on Exhibit, "F," both of which are attached hereto and made parts hereof, said exhibits being respectively, a survey description and survey map prepared by the Survey Division, Department of Accounting and General Services, State of Hawaii, designated C.S.F. No. 19,978 and dated May 31, 1984.

4. Easement 2-C: containing an area of 1.122 acres, more particularly described in Exhibit "G" and delineated on Exhibit "H," both of which are attached hereto and made parts thereof, said exhibits being respectively, a survey description and survey map prepared by the Survey Division, Department of Accounting and General Services, State of Hawaii, designated C.S.F. No. 20,831 and dated September 8, 1988.

TOGETHER WITH the rights of ingress and egress to and from the easement area for all purposes in connection with the rights hereby granted.

TO HAVE AND TO HOLD the easement rights unto the Grantees, their successors and assigns, in perpetuity, subject, however, to the following terms, conditions and covenants:

1. The Grantees shall at all times with respect to the easement area use due care for public safety and agrees to

defend, hold harmless, and indemnify the Grantor, their officers, agents, and employees or any person acting for and on their behalf, from and against all claims or demands for damage, including claims for property damage, personal injury, or death, arising on, about or in connection with the exercise of the rights and privileges herein granted, caused directly or proximately by any failure on the part of the Grantees to use due care in accordance with the terms and conditions of this Grant, or arising out of or caused by any act or omission of the Grantees.

2. The Grantor reserves unto itself, its successors and assigns, the full use and enjoyment of the easement area and to grant to others rights and privileges for any and all purposes affecting the easement area, provided, however, that the rights herein reserved shall not be exercised by the Grantor in a manner which interferes unreasonably with the Grantees in the use of the easement area for the purposes for which this easement is granted.

3. All improvements placed in or upon the easement area by the Grantees and all maintenance and repair of the easement area shall be done without cost or expense to the Grantor and shall remain the property of the Grantees and may be removed or otherwise disposed of by the Grantees at any time; provided, that the removal shall be accomplished with minimum disturbance to the easement area which shall be restored to their original condition, or as close thereto as possible, within a reasonable time after removal.

4. Upon completion of any work performed in or upon the easement area, the Grantees and all maintenance and repair of the easement ares shall remove therefrom all equipment and unused or surplus materials, if any, and shall leave the easement area in a clean and sanitary condition satisfactory to the Grantor.

5. This easement or any rights granted herein shall not be sold, assigned, conveyed, leased, mortgaged, or otherwise transferred or disposed of, directly or by operation of law, except with the prior written consent of the Grantor.

6. The Grantees shall keep the easement area and the improvements thereon in a safe, clean, sanitary, and orderly condition, and shall not make, permit or suffer, any waste, strip, spoil, nuisance or unlawful, improper, or offensive use of the easement area.

7. Should future development necessitate a relocation of the easement granted herein, or any portion thereof, the relocation shall be accomplished at the Grantees' own cost and expense; provided, however, that if other lands of the Grantor are available, the Grantor will grant to the Grantees without payment of any monetary consideration, a substitute easement of similar width within the reasonable vicinity of the original alignment, which substitute easement shall be subject to the same terms and conditions as that herein granted and as required by law.

8. The Grantees covenants, for themselves, their successors and assigns, that the use and enjoyment of the land herein granted shall not be in support of any policy which discriminates against anyone based upon race, creed, sex, color, national origin, or a physical handicap.

9. The Grantees, in the exercise of the rights granted herein, shall comply with all of the requirements of the federal, state, and county authorities and shall observe all county ordinances and state and federal statutes, rules and regulations, now in force or which may hereinafter be in force including Section 13-2-21, Hawaii Administrative Rules of Department of Land and Natural Resources, as amended.

10. These easement rights shall cease and determine, without any action on the part of the Grantor, in the event of non-use or abandonment by the Grantees of the easement area, or any portion thereof, for a period of one (1) year.

11. Upon termination of the use, the easement area shall be restored to their original state, or as close thereto as possible, within a reasonable time and at the expense of the Grantees.

12. Grantees shall not construct, place, or maintain any building or structure over and upon the easement area.

13. Grantees shall implement a fire contingency plan acceptable to the Division of Forestry and Wildlife during and after the construction of the roadway corridor.

14. In the development of the easement Grantees shall exercise due care so that construction materials, petroleum products, human wastes, debris, and landscaping substances (herbicides, fertilizers, pesticides), are not permitted to fall, flow, or leach into the ocean, or otherwise adversely impact the anchialine ponds.

15. The location of all gates shall be approved by the Chairperson and maintenance and repair of all gates shall be performed by the Grantees their successors or assigns.

16. The Grantees shall be responsible for maintaining the stabilized portion of the temporary access until permanent access is constructed.

17. The Grantees shall provide a parking and turn-around area for 6-8 cars.

IN WITNESS WHEREOF, the Board of Land and Natural Resources has caused the seal of the Department of Land and Natural Resources to be hereunto affixed and the parties hereto

have caused this Indenture to be executed by their duly authorized officers as of the day and year first above written.

STATE OF HAWAII

Approved by the Board of Land and Natural Resources at their meeting held on April 22, 1988

By _____
Chairperson and Member
Board of Land and
Natural Resources

And By _____
Member, Board of Land
and Natural Resources

GRANTOR

_____
CONRAD ROLAND LEHMAN

_____
O.V. LYNN, JR.

_____
FLORETTA LYNN

_____
DORIS JANE BAKKEN

_____
EARL ELMER BAKKEN

GRANTEES

APPROVED AS TO FORM:

_____
Deputy Attorney General
Date: August 11, 1988

STATE OF HAWAII)
) SS:
CITY AND COUNTY OF HONOLULU)

On this 18th day of October, 1988, before me personally appeared DORIS JANE BAKKEN and EARL ELMER BAKKEN, to me known to be the persons described in and who executed the foregoing instrument, and acknowledged that they executed the same as their free act and deed.

Pamela Jean Simon
Notary Public, State of Hawaii
My commission expires: 4-13-91

36011

STATE OF HAWAII)
) SS:
COUNTY OF HAWAII)

On this 17th day of April, ~~1988~~ 1989, before me personally appeared CONRAD ROLAND LEHMAN, to me known to be the person described in and who executed the foregoing instrument, and acknowledged that he executed the same as his free act and deed.

Tina F. Ohta
Notary Public, State of Hawaii

My commission expires: 12-18-89

L.S.

36011

STATE OF HAWAII)
) SS.
COUNTY OF HAWAII)

On this 20th day of March, 1989, before me personally appeared LORETTA LYNN, to me known (or proved to me on the basis of satisfactory evidence) to be the person described in and who executed the foregoing instrument, and acknowledged to me that she executed the same as her free act and deed.

Roxanne Tejada
Notary Public, State of Hawaii
My commission expires: 4/7/89

STATE OF HAWAII)
) SS.
COUNTY OF HAWAII)

On this 27th day of February, 1989, before me personally appeared O.V. LYNN, JR., to me known (or proved to me on the basis of satisfactory evidence) to be the person described in and who executed the foregoing instrument, and acknowledged to me that he executed the same as his free act and deed.

Brenda G. Moriwaki
Notary Public, State of Hawaii
My commission expires: 8/30/91

STATE OF HAWAII
SURVEY DIVISION
DEPT. OF ACCOUNTING AND GENERAL SERVICES
HONOLULU

C.S.F. No. 20,840

September 21, 1988

(REVISED SEPTEMBER 1988)
PERPETUAL NON-EXCLUSIVE ACCESS AND UTILITY EASEMENT

EASEMENT 1

Puuwaawaa, North Kona, Island of Hawaii, Hawaii

Being a portion of the Government (Crown) Land of Puuwaawaa.

Beginning at the south corner of this easement and on the northwest side of Kailua-Kawaihae Road, Project No. 19 BC-01-71, the coordinates of said point of beginning referred to Government Survey Triangulation Station "AKAHIPUU" being 31,371.98 feet North and 14,145.04 feet East, thence running by azimuths measured clockwise from True South:-

1. Along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the left with a radius of 20.00 feet, the chord azimuth and distance being: 195° 11' 42.5" 27.54 feet;

2. 151° 41' 1062.32 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

3. Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the right with a radius of 815.00 feet, the chord azimuth and distance being: 171° 41' 557.49 feet;

4. 191° 41' 81.91 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

5. 248° 37' 10" 35.80 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

6. 11° 41' 101.44 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

EXHIBIT "A"

7. Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the left with a radius of 785.00 feet, the chord azimuth and distance being: 351° 41' 536.97 feet;

8. 331° 41' 1058.68 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

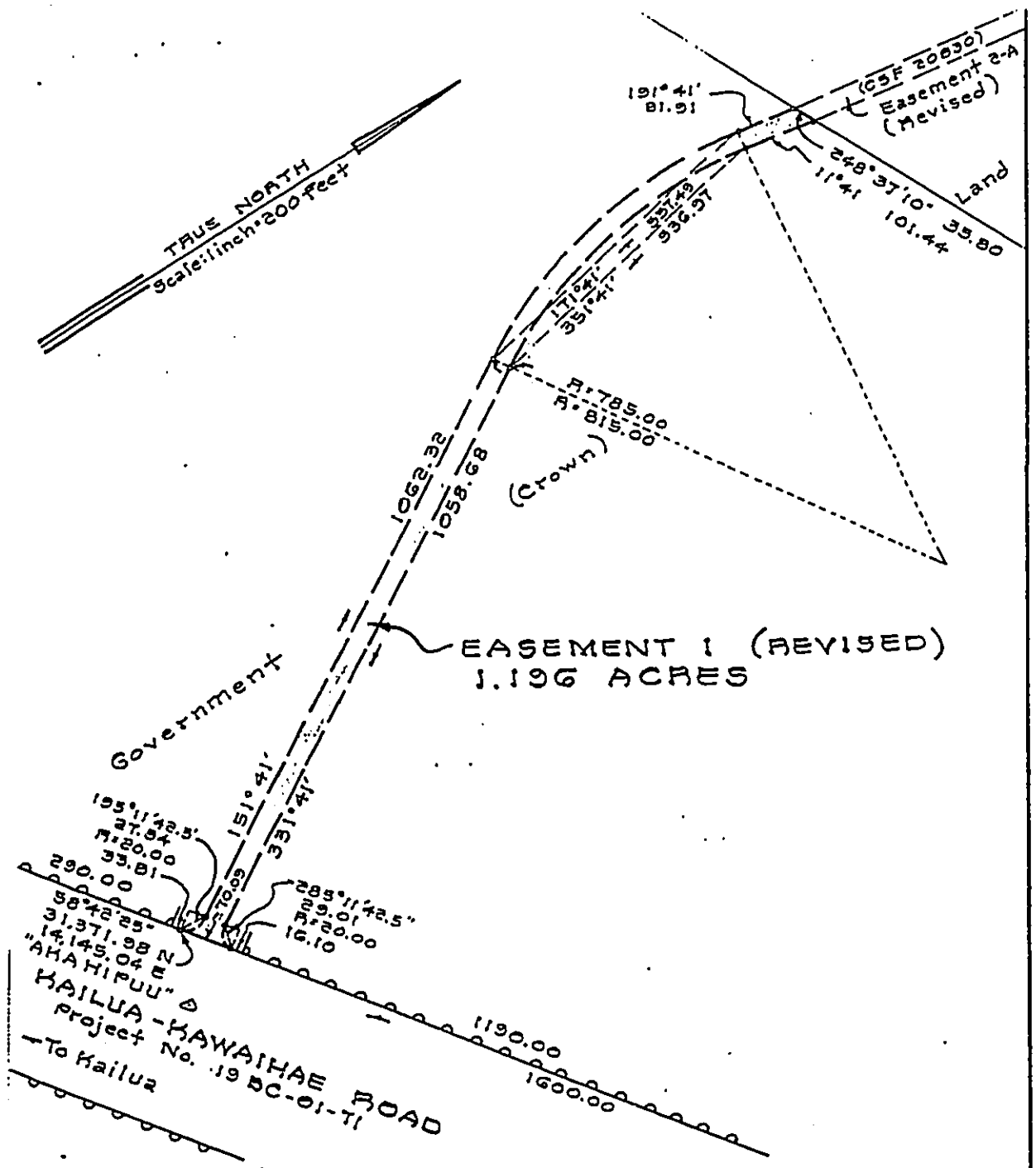
9. Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the left with a radius of 20.00 feet, the chord azimuth and distance being: 285° 11' 42.5" 29.01 feet;

10. 58° 42' 25" 70.09 feet along the northwest side of Kailua-Kawaihae Road, Project No. 19 BC-01-71 to the point of beginning and containing an AREA OF 1.196 ACRES.

SURVEY DIVISION
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
STATE OF HAWAII

By: Raymond S. Nakamura
Raymond S. Nakamura
Land Surveyor gm

Compiled from map furn. by
Wes Thomas & Assoc., and
Govt. Survey Records.



(REVISED SEPTEMBER 1988)

PERPETUAL NON-EXCLUSIVE ACCESS AND UTILITY EASEMENT

EASEMENT 1

Puuwaawaa, North Kona, Island of Hawaii, Hawaii

Scale: 1 inch = 200 feet

EXHIBIT "D"

JOB H-279 (88)
C.BK 18M CF 7, Hawaii

o o o denotes no vehicle access permitted
d h denotes access permitted

TAX MAP: T-1-02: Por. 1

SURVEY DIVISION
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
STATE OF HAWAII

C. S. F. No. 20,840

M.S.N. Sept. 21, 1988

STATE OF HAWAII
SURVEY DIVISION
DEPT. OF ACCOUNTING AND GENERAL SERVICES
HONOLULU

C.S.F. No. 20,830

September 8, 1988

(REVISED SEPTEMBER 1988)
PERPETUAL NON-EXCLUSIVE ACCESS AND UTILITY EASEMENT

EASEMENT 2-A

Puuwaawaa, North Kona, Island of Hawaii, Hawaii

Being a portion of the Government (Crown) Land of Puuwaawaa.

Beginning at the south corner of this easement, the coordinates of said point of beginning referred to Government Survey Triangulation Station "AKAHIPUU" being 32,965.61 feet North and 13,584.29 feet East, thence running by azimuths measured clockwise from True South:-

1. 191° 41' 445.83 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

2. Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the left with a radius of 985.00 feet, the chord azimuth and distance being: 177° 05' 30" 496.30 feet;

3. 162° 30' 2076.55 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

4. 182° 11' 6.80 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

5. Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the left with a radius of 35.00 feet, the chord azimuth and distance being: 137° 11' 49.50 feet;

6. 182° 11' 100.00 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

7. 272° 11' 100.00 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

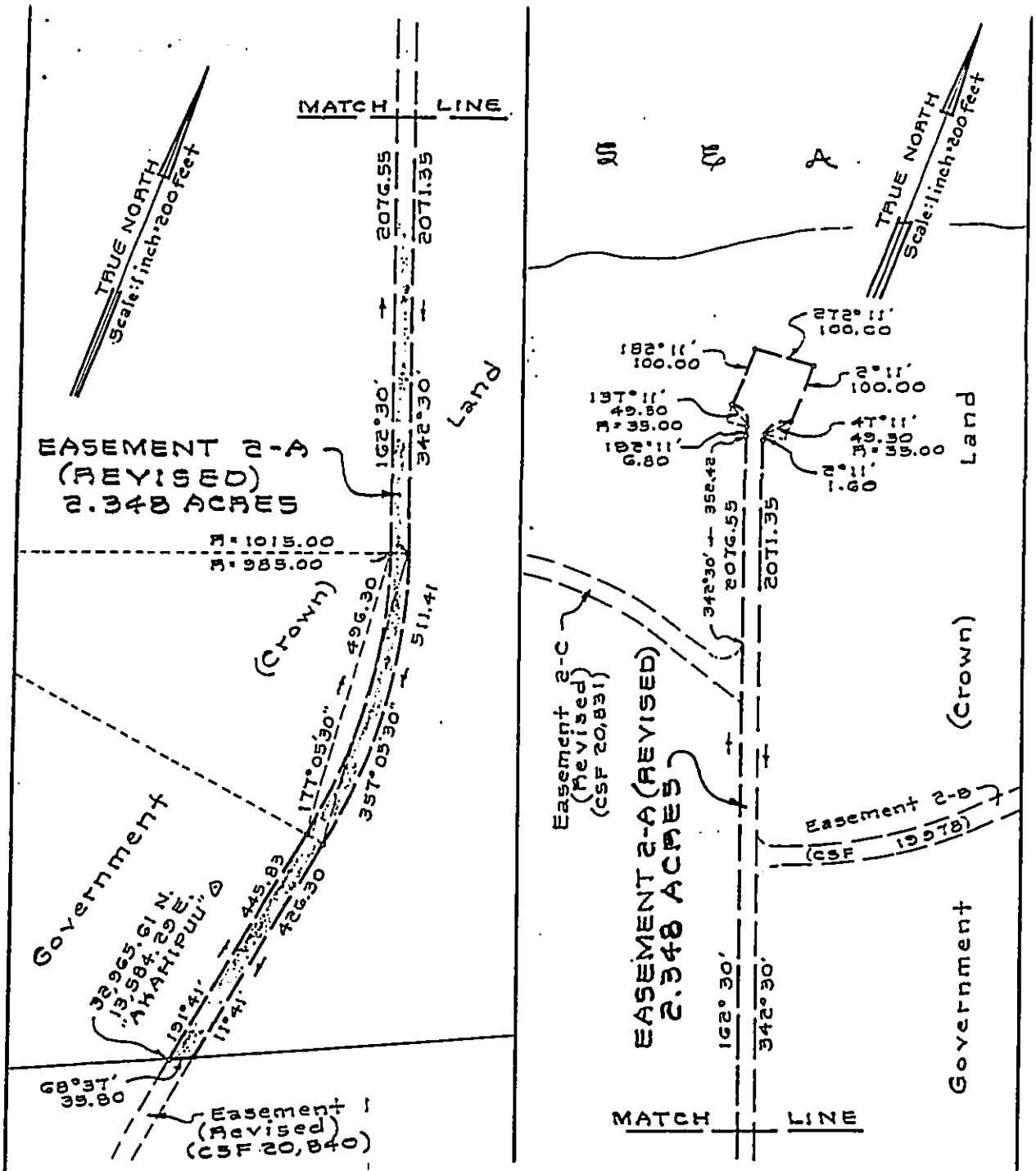
EXHIBIT "C"

8.	2°	11'	100.00 feet	along the remainder of the Government (Crown) Land of Puuwaawaa;
9.	Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the left with a radius of 35.00 feet, the chord azimuth and distance being: 47° 11' 49.50 feet;			
10.	2°	11'	1.60 feet	along the remainder of the Government (Crown) Land of Puuwaawaa;
11.	342°	30'	2071.35 feet	along the remainder of the Government (Crown) Land of Puuwaawaa;
12.	Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the right with a radius of 1015.00 feet, the chord azimuth and distance being: 357° 05' 30" 511.41 feet;			
13.	11°	41'	426.30 feet	along the remainder of the Government (Crown) Land of Puuwaawaa;
14.	68°	37'	35.80 feet	along the remainder of the Government (Crown) Land of Puuwaawaa to the point of beginning and containing an AREA OF 2.348 ACRES.

SURVEY DIVISION
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
STATE OF HAWAII

By: Raymond S. Nakamura
Raymond S. Nakamura
Land Surveyor gm

Compiled from map furn. by
Wes Thomas & Assoc., and
Govt. Survey Records.



(REVISED SEPTEMBER 1988)

PERPETUAL NON-EXCLUSIVE ACCESS AND UTILITY EASEMENT

EASEMENT 2-A

Puuwaawaa, North Kona, Island of Hawaii, Hawaii

Scale: 1 inch = 200 feet

JOB H-275(88)
C.BK 15M CF 7, Hawaii

EXHIBIT D

TAX MAP: T-1-02: por. 8

SURVEY DIVISION
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
STATE OF HAWAII

C. S. F. No. 20,830

M.S.N. Sept 8, 1988

STATE OF HAWAII
SURVEY DIVISION
DEPT. OF ACCOUNTING AND GENERAL SERVICES
HONOLULU

C.S.F. No. 19,978

May 31, 1984

PERPETUAL NON-EXCLUSIVE
ACCESS EASEMENT

EASEMENT 2-B

Puuwaawaa, North Kona, Island of Hawaii, Hawaii

Being a portion of the Government (Crown) Land of Puuwaawaa.

Beginning at the north corner of this easement and at the east corner of Grant 9944 to Robert Hind, the coordinates of said point of beginning referred to Government Survey Triangulation Station "AKAHIPUU" being 37,045.55 feet North and 15,466.84 feet East, thence running by azimuths measured clockwise from True South:-

1.	338° 11'	55.92 feet	along the remainder of the Government (Crown) Land of Puuwaawaa;
2.	Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the left with a radius of 30.00 feet, the chord azimuth and distance being: 293° 11'	42.43 feet;	
3.	338° 11'	30.00 feet	along the remainder of the Government (Crown) Land of Puuwaawaa;
4.	68° 11'	358.25 feet	along the remainder of the Government (Crown) Land of Puuwaawaa;
5.	Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the left with a radius of 785.00 feet, the chord azimuth and distance being: 57° 20' 30"	295.31 feet;	
6.	46° 30'	1862.98 feet	along the remainder of the Government (Crown) Land of Puuwaawaa;

EXHIBIT "E"

7. Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the right with a radius of 756.88 feet, the chord azimuth and distance being: 59° 30' 340.52 feet;

8. 72° 30' 10.00 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

9. Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the left with a radius of 30.00 feet, the chord azimuth and distance being: 27° 30' 42.43 feet;

10. 162° 30' 90.00 feet along Easement 2-A;

11. Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the left with a radius of 30.00 feet, the chord azimuth and distance being: 297° 30' 42.43 feet;

12. 252° 30' 10.00 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

13. Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the left with a radius of 726.88 feet, the chord azimuth and distance being: 239° 30' 327.02 feet;

14. 226° 30' 1772.98 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

15. Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the left with a radius of 30.00 feet, the chord azimuth and distance being: 181° 30' 42.43 feet;

16. 136° 30' 56.57 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

17. 224° 30' 30.02 feet along Grant 9943 to Robert Hind;

18. 316° 30' 57.62 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

19. Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the left with a radius of 30.00 feet, the chord azimuth and distance being:
271° 30' 42.43 feet;

20. Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the right with a radius of 815.00 feet, the chord azimuth and distance being:
237° 20' 30" 306.60 feet;

21. 248° 11' 268.25 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

22. Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the left with a radius of 30.00 feet, the chord azimuth and distance being:
203° 11' 42.43 feet;

23. 158° 11' 65.00 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

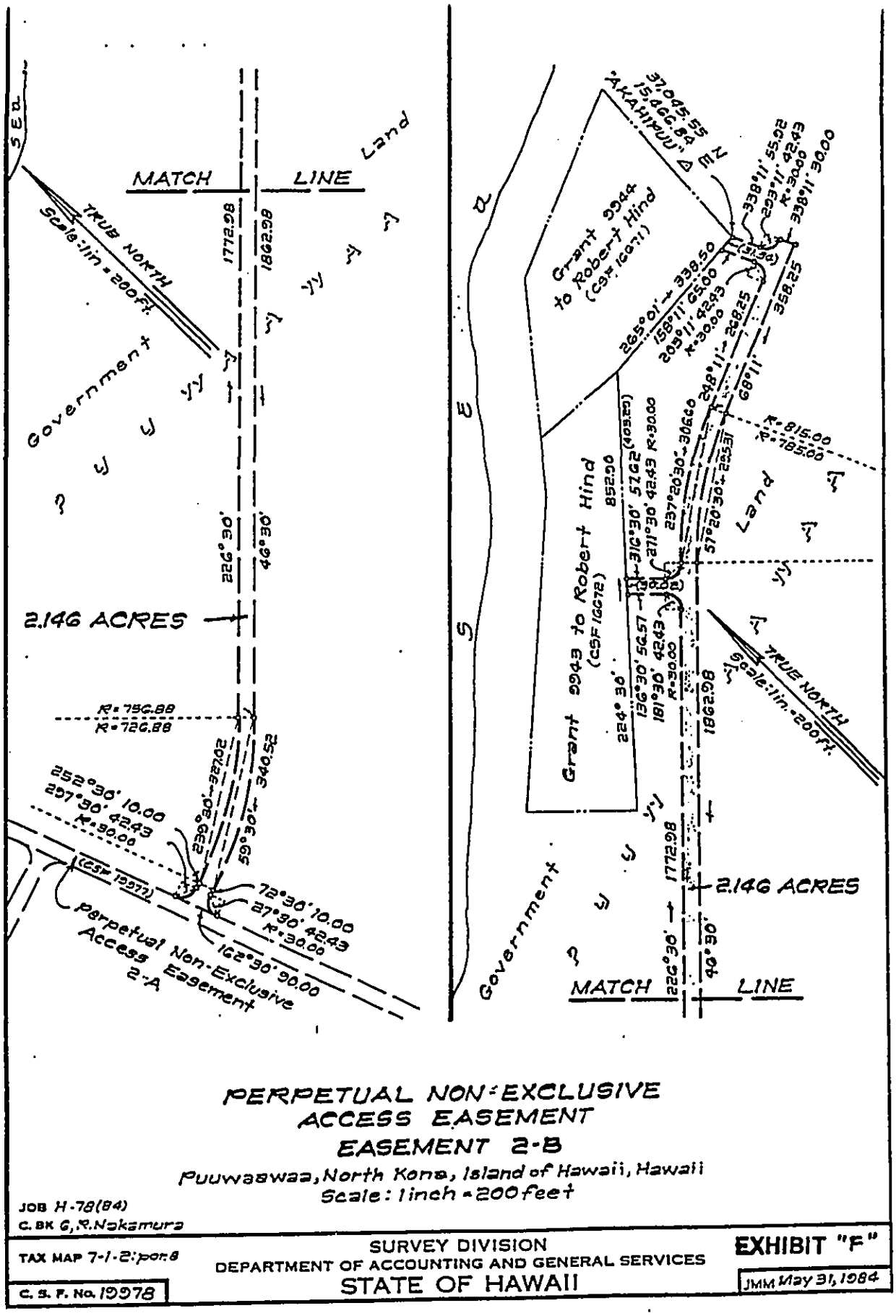
24. 265° 01' 31.34 feet along Grant 9944 to Robert Hind to the point of beginning and containing an AREA OF 2.146 ACRES.

SURVEY DIVISION
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
STATE OF HAWAII

By: Raymond S. Nakamura
Raymond S. Nakamura
Land Surveyor

pt

Compiled from map furn.
by Inaba Engineering,
Inc. and Govt. Survey
Records.



PERPETUAL NON-EXCLUSIVE ACCESS EASEMENT
EASEMENT 2-B

Puuwaawaa, North Kona, Island of Hawaii, Hawaii
Scale: 1 inch = 200 feet

JOB H-78(84)
C. BK 6, R. Nakamura

TAX MAP 7-1-2: por. 8

C. S. F. No. 19978

SURVEY DIVISION
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
STATE OF HAWAII

EXHIBIT "F"

JMM May 31, 1984

STATE OF HAWAII
SURVEY DIVISION
DEPT. OF ACCOUNTING AND GENERAL SERVICES
HONOLULU

C.S.F. No. 20,831

September 8, 1988

(REVISED SEPTEMBER 1988)
PERPETUAL NON-EXCLUSIVE ACCESS AND UTILITY EASEMENT

EASEMENT 2-C

Puuwaawaa, North Kona, Island of Hawaii, Hawaii

Being a portion of the Government (Crown) Land of Puuwaawaa.

Beginning at the west corner of this easement and on the southeast boundary of Grant 9945 to Robert Hind, the coordinates of said point of beginning referred to Government Survey Triangulation Station "AKAHIPUU" being 35,218.47 feet North and 11,679.79 feet East, thence running by azimuths measured clockwise from True South:-

1. 234° 00' 49.97 feet along Grant 9945 to Robert Hind;

2. 239° 14' 40" 302.19 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

3. Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the left with a radius of 215.00 feet, the chord azimuth and distance being: 229° 15' 05" 74.62 feet;

4. 219° 15' 30" 30.17 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

5. Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the right with a radius of 295.00 feet, the chord azimuth and distance being: 248° 11' 55" 285.50 feet;

6. 277° 08' 20" 196.11 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

Exhibit G

7. Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the left with a radius of 215.00 feet, the chord azimuth and distance being: 270° 48' 25" 47.42 feet;

8. 264° 28' 30" 176.07 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

9. Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the right with a radius of 615.00 feet, the chord azimuth and distance being: 278° 00' 45" 287.92 feet;

10. 291° 33' 73.46 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

11. Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the left with a radius of 30.00 feet, the chord azimuth and distance being: 227° 01' 30" 54.17 feet;

12. 342° 30' 115.89 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

13. Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the left with a radius of 30.00 feet, the chord azimuth and distance being: 137° 01' 30" 25.81 feet;

14. 111° 33' 146.48 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

15. Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the left with a radius of 585.00 feet, the chord azimuth and distance being: 98° 00' 45" 273.88 feet;

16. 84° 28' 30" 176.07 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

17. Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the right with a radius of 245.00 feet, the chord azimuth and distance being: 90° 48' 25" 54.04 feet;

18. 97° 08' 20" 196.11 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

19. Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the left with a radius of 265.00 feet, the chord azimuth and distance being: 68° 11' 55" 256.47 feet;

20. 39° 15' 30" 30.17 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

21. Thence along the remainder of the Government (Crown) Land of Puuwaawaa on a curve to the right with a radius of 245.00 feet, the chord azimith and distance being: 49° 15' 05" 85.03 feet;

22. 59° 14' 40" 300.81 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

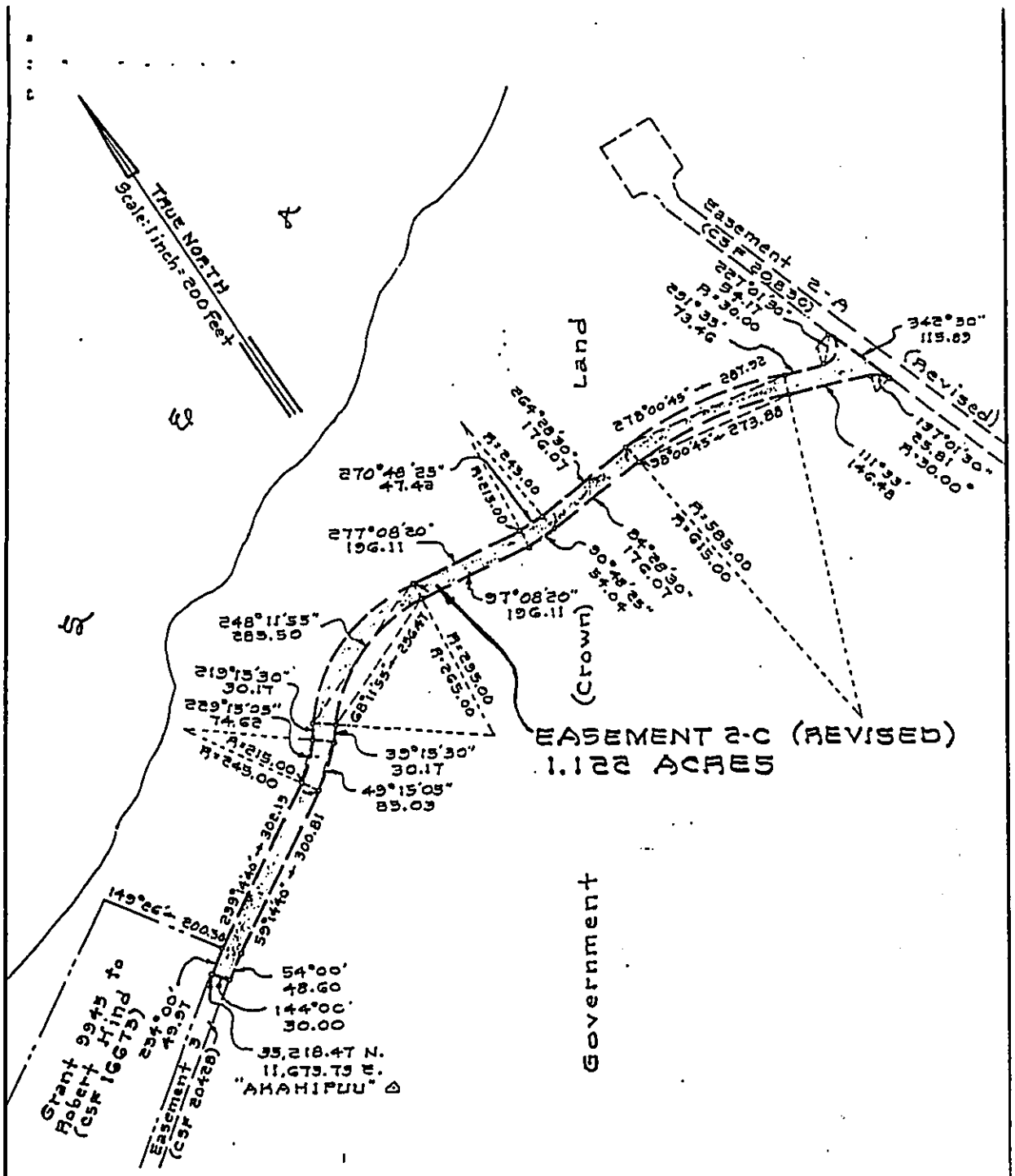
23. 54° 00' 48.60 feet along the remainder of the Government (Crown) Land of Puuwaawaa;

24. 144° 00' 30.00 feet along the remainder of the Government (Crown) Land of Puuwaawaa to the point of beginning and containing an AREA OF 1.122 ACRES.

SURVEY DIVISION
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
STATE OF HAWAII

By: Raymond S. Nakamura
Raymond S. Nakamura
Land Surveyor gm

Compiled from map furn. by
Wes Thomas & Assoc., and
Govt. Survey Records.



(REVISED SEPTEMBER 1988)

PERPETUAL NON-EXCLUSIVE ACCESS AND UTILITY EASEMENT

EASEMENT 2-C

Puuwaawaa, North Hona, Island of Hawaii, Hawaii

Scale: 1 inch = 200 feet

JOB H-275(88)
C.Bk 18M CF T, Hawaii

EXHIBIT H

TAX MAP: T-1-02: Por. 8

SURVEY DIVISION
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
STATE OF HAWAII

C. S. F. No. 20,831

R.S.N. Sept 8, 1988

EXHIBIT A-1

Assignment of Interest in Grant of Non-Exclusive Easement

EXHIBIT A-1

LAND COURT SYSTEM | REGULAR SYSTEM

AFTER RECORDATION, RETURN BY MAIL ( ) PICK-UP ( )

(DO NOT WRITE IN THIS SPACE)

ASSIGNMENT OF INTEREST IN GRANT OF NON-EXCLUSIVE EASEMENT

THIS INDENTURE made this ____ day of _____, 1989, by and between CONRAD ROLAND LEHMAN, unmarried, hereinafter called the "Assignor", and JOHN PAUL De JORIA, unmarried, whose residence and mailing address is 1670 Gilcrest Drive, Beverly Hills, California 90210, hereinafter called the "Assignee",

W I T N E S S E T H:

For TEN DOLLARS and other valuable consideration to him paid by the Assignee, receipt of which is hereby acknowledged, and in consideration of the covenants and

agreements of the Assignee herein expressed, the Assignor does hereby sell, assign, transfer, set over and deliver unto the Assignee, absolutely and forever, all of the following:

ALL right, title and interest of Assignor herein, being an undivided One-Third (1/3rd) interest in and to that certain Grant of Non-Exclusive Easement dated the _____ day of _____, 19___, executed by and between the STATE OF HAWAII, by its Board of Land and Natural Resources as Grantor, and Assignor and O.V. LYNN, JR. and LORETTA LYNN, husband and wife, DORIS JANE BAKKEN, life tenant, and EARL ELMER BAKKEN, reversionary grantee, as Grantees, which Grant of Non-Exclusive Easement was recorded in the Bureau of Conveyances of the State of Hawaii in Liber _____ at Page _____.

TO HAVE AND TO HOLD the same and the benefit of all rights, powers, promises, covenants and agreements which are in said grant of non-exclusive easement set forth and all of the right, title and interest of Assignor in said grant of non-exclusive easement unto Assignee, absolutely and forever.

The Assignee, in consideration of the premises does hereby promise, covenant and agree to and with Assignor and to and with the Grantor under said grant of non-exclusive easement, that Assignee will faithfully observe and perform all of the terms, covenants, provisions and conditions of said grant of non-exclusive easement which are on the part of the Grantee therein named to

be observed and performed and will also indemnify and save Assignor harmless from and against the nonobservance or nonperformance of the covenants and conditions contained in said grant of non-exclusive easement.

AND THE BOARD hereby consents to the foregoing assignment on the express condition that this consent shall not be deemed or construed to be a waiver of any term, covenant, condition or provision of said Grant of Non-Exclusive Easement nor a consent to any other assignment thereof, all rights of the Board under said Grant of Non-Exclusive Easement being hereby reserved.

The terms "Assignor", "Assignee", "Grantor" and "Grantee" as and when used herein, or any pronouns used in place thereof, shall mean and include the masculine, feminine or neuter, the singular or plural, individuals, trustees, partnerships or corporations, and their and each of their respective successors, heirs, personal representatives, successors in trust and permitted assigns, according to the context thereof. All covenants and obligations undertaken by two or more persons shall be deemed joint and several. The term "grant of non-exclusive easement" means the Grant of Non-Exclusive

Easement described herein together with all recorded amendments thereof, if any.

IN WITNESS WHEREOF, the undersigned have executed this instrument as of the date first above written.

CONRAD ROLAND LEHMAN

"Assignor"

JOHN PAUL De JORIA

"Assignee"

STATE OF HAWAII

By _____
Name: _____
Chairman and Member,
Board of Land and Natural
Resources

By _____
Name: _____
Member, Board of Land and
Natural Resources

APPROVED AS TO FORM
GOODSILL ANDERSON
QUINN & STIFEL
By _____

STATE OF HAWAII)
) SS.
COUNTY OF HAWAII)

On this 28th day of July, 1989, before me personally appeared CONRAD ROLAND LEHMAN, to me known to be the person described in and who executed the foregoing instrument, and acknowledged that he executed the same as his free act and deed.

Jena F. Okita
Notary Public, State of Hawaii

My Commission expires: 12-18-89

L.S.

STATE OF ~~HAWAII~~ California)
COUNTY OF ~~HAWAII~~ Los Angeles) SS.

On this 26 day of December, 1989,

before me personally appeared JOHN PAUL DeJORIA to me

NO. 201

GENERAL ACKNOWLEDGMENT

State of California
County of Los Angeles } SS.

On this the 26 day of December 19 89, before me,

Jamie L. Griffin,

the undersigned Notary Public, personally appeared

John Paul DeJoria,

X personally known to me
☐ proved to me on the basis of satisfactory evidence
to be the person(s) whose name(s) is subscribed to the within instrument, and acknowledged that he executed it.

WITNESS my hand and official seal.

Jamie L. Griffin
Notary's Signature

OFFICIAL SEAL
JAMIE L. GRIFFIN
NOTARY PUBLIC - CALIFORNIA
LOS ANGELES COUNTY
My Comm. Expires April 19, 1993

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to another document.

THIS CERTIFICATE MUST BE ATTACHED TO THE DOCUMENT DESCRIBED AT RIGHT:

Title or Type of Document _____

Number of Pages _____ Date of Document _____

Signer(s) Other Than Named Above _____

STATE OF HAWAII)
) SS.
CITY AND COUNTY OF HONOLULU)

me appeared _____ and _____, who, being by me duly sworn, did say that they are the Chairperson and Member, Board of Land and Natural Resources, and Member, Board of Land and Natural Resources, respectively; that the seal affixed to the foregoing instrument is the seal of said Board of Agriculture; that said instrument was signed and sealed in behalf of said Board of Land and Natural Resources; and said _____ and _____, acknowledged the instrument to be the free act and deed of said Board of Land and Natural Resources.

_____
Notary Public, State of Hawaii

My commission expires:

EXHIBIT B

Reconnaissance Survey of Physical, Biological and Archaeological Features

June 15, 1982

To: Mr. Christopher J. Roehrig
Roehrig, Roehrig & Wilson
Attorneys At Law
80 Pauahi Street
Hilo, Hawaii 96720

From: James O. Juvik, Ph.D.
Juvik & Juvik Environmental Consultants
223 Makani Circle
Hilo, Hawaii 96720

Subject: Reconnaissance Survey of Physical, Biological and Archaeological Features on Two Parcels at Kiholo Bay, Pu'u Wa'awa'a, North Kona, Hawai'i.

(TMK: 7-1-02-3,12)

On Saturday June 5, 1982, I undertook at your request, a field survey of the physical environment and biological character of the above parcels at Kiholo Bay.

Physical Environment

The two contiguous parcels (totalling about 6 acres) lie approximately 80-100 ft. inland from the Kiholo Bay shoreline and are surrounded by State owned land (see attached map). At least three privately owned houselots with residential structures occupy lands 1000-1500 ft. east of the subject parcels.

Topographically, the seaward boundaries of the subject parcels are separated from the Kiholo Bay shoreline by a beach ridge 7-8 ft. high (i.e., above mean sea level). The ridge consists of unconsolidated sand, gravel and cobble-sized basaltic material along with an admixture

of coralline fragments. The subject parcels occupy the swale behind this beach ridge.

The low lying areas of the parcels support two small anchialine (brackish water) marshes; one is approximately 3000 square feet and another 200 square feet (see map). There are several much larger anchialine ponds in the Kiholo Bay area (not in the parcels) where salinities have been reported to vary from 0 (fresh) to 5 parts per thousand (Maciolet and Brock, 1974). The presence of marsh areas on the subject parcels indicate that the groundwater lens underlying the area is near to the surface. Near the mauka boundaries of the subject parcels the substrate is composed of largely unweathered, prehistoric pahoehoe lava. (The 1859 Mauna Loa lava flow now forms the eastern end of Kiholo Bay approximately 2000 ft. to the east.) There are no developed soils in the area (U.S. Soil Conservation Service, 1973) except for a black, organic muck present in the marshes on the subject parcels.

Biota

The Kiholo Bay environment is characterized by extreme aridity. Average annual rainfall in the area is 10-20 inches (with a winter maximum). The terrestrial vegetation is thus restricted to drought adapted littoral species and deep rooted trees capable of exploiting groundwater. A list of the plant species recorded at the site on

June 5, 1982 is presented in Table 1. Thirty-four vascular plant species were recorded, of which one species (2.9%), the Pa'u-o-hi'iaka is endemic to the Hawaiian archipelago. Eleven additional taxa (32.4%) are considered indigenous, and the remaining twenty-two species (64.7%) constitute "exotic" or human introductions, either from the Polynesian or more recent historic period.

The most significant plant species on the subject parcels, as regards to cover and biomass, are coconut and kiawe trees and the indigenous, succulent shrub naupaka-kahakai. On the seaward margin of the parcels the vegetation is characterized by many rows of tall, regularly spaced (20 ft.) coconut trees, with occasional hala and clumps of naupaka-kahakai. The marsh areas are covered by makaloa, makai and akulikuli. The exposed pahoehoe lava at the mauka portion of the parcels supports generally dense growth of kiawe, ekoa and an understory of ilima and hialoa. Also occurring near the back border of the parcels are some intentionally planted Kou and date palms, a stand of ironwoods and a small open area dominated by California grass (probably fed by ground water). The general pattern of the vegetation at the site is indicated on the accompanying map. None of the species recorded from the site are currently designated as

endangered, threatened or "candidate" species with respect to the U.S. Endangered Species Act (Federal Register, 1980).

Vertebrate species encountered during the site survey included at least one gecko species (Hemidactylus sp.). Land birds observed on or around the subject parcels included the common mynah (Acridotheres tristis tristis) Japanese white-eye (Zosterops japonica japonica), Virginia cardinal (Richmondena cardinalis) and the barred dove (Geopelia striata striata), all of which are exotic species. This one day survey, however, could not be expected to adequatly characterize the local avifauna. As a consequence of the several large anchialine ponds in the general vicinity of Kiholo there is some possibility that at least three species of federally designated, endangered freshwater bird species may periodically utilize the area. These species include the Hawaiian duck (Anas wyvilliana), Hawaiian Coot (Fulica americana alai) and Hawaiian stilt (Himantopus himantopus knudseni). The Hawaiian Water Birds Recovery Plan (U.S. Fish & Wildlife Service, 1977) has not designated Kiholo as either a "primary" or "secondary" endangered water birds habitat area, however, Kiholo is located only twelve miles from the important breeding location at Makalawena. Thus, the occasional appearance of these species in the Kiholo area would not be unlikely.

Environmental Considerations

According to the site maps provided by your office there are plans to construct one single-family dwelling on each of the subject parcels. As pointed out earlier, a significant hydrologic feature is the presence of a shallow ground water lens lying near the surface in the swale behind Kiholo Bay. As such, care must be taken in the potential disposal of residental waste water (and solids) in the area. The waters of Kiholo Bay are classified by the State of Hawaii Department of Health as "Class AA water". It is the objective that waters in this class "remain in as nearly as natural, pristine state as possible, with an absolute minimum of pollution from any source." (Public Health Regulations, Ch. 37-A, Section. 3:A-1). It is recommended that the State Department of Health be consulted to determine an appropriate residential waste water disposal/treatment method compatible with the existing hydrologic setting and prevailing water quality standards of the area.

It is also recommended that the small marsh areas of the subject parcels (accounting for 4% of the land area) be maintained in their existing natural state for their potential value to local wildlife and the general ecological diversity of the area.

At present a number of jeep trails are found around Kiholo Bay. One of these jeep tracks runs along

the crest of the beach ridge fronting the subject parcels but on State owned land. If new public/private road easements are to be provided in the Kiholo area it is recommended that efforts be made to redirect vehicular traffic away from the beach ridge area. The existing jeep trail detracts from the aesthetic character of the beach environment, and perhaps more importantly the unconsolidated beach ridge material itself could be eroded by excessive vehicular activity. Both public and private road access to Kiholo Bay should terminate well behind the beach ridge.

Archaeology

Dr. Paul Rosendahl undertook an archaeological reconnaissance survey of the subject parcels and found no surface features of any kind. His report is here appended.

References Cited

Federal Register (1980), Vol. 45, No. 2, December 15.

Maciolek, John A., and Richard E. Brock (1974), Aquatic Survey of the Kona Coast Ponds, Hawai'i Island, UNIHI-SEAGRANT AR-74-04, University of Hawaii, Honolulu.

U.S. Fish & Wildlife Service (1977), Hawaiian Water Bird Recovery Plan, Office of Endangered Species, Portland Oregon.

U.S. Soil Conservation Service (1973), Soil Survey of Island of Hawaii, State of Hawaii, U.S. Government Printing Office, Washington, D.C.

Submitted [illegible]

James O. Juvik, Ph.D.

APR 19 1991

PHRI

Paul H. Rosendahl, Ph.D., Inc.
Archaeological • Historical • Cultural Resource Management Studies & Services
305 Mohouli Street • Hilo, Hawaii 96720 • (808) 969-1763 • FAX (808) 961-6998
P.O. Box 23305 • G. M. F., Guam 96921 • (671) 472-3117 • FAX (671) 472-3131

April 16, 1991
90-967

Sydney Fuke & Associates
100 Pauahi Street, Suite 212
Hilo, Hawaii 96720

Subject: Archaeological Reconnaissance Survey
Kiholo Bay Houselots
Puuwaawaa, North Kona, Island of Hawaii
TMK:3-7-1-02:3,12

Dear Mr. Fuke:

At the request of your client, Paul H. Rosendahl, Ph.D., Inc. (PHRI) recently carried out a field inspection of the above subject project area, comprised of two parcels c. 3.0 acres each. The purpose of the inspection, conducted on December 18, 1990 by Dr. Paul H. Rosendahl, was to confirm the findings and conclusions of an earlier reconnaissance survey of the parcels done by PHRI on June 5, 1982 (Rosendahl 1982) copy attached, and to confirm that the Rosendahl (1982) report would be sufficient for a CDUA application. Dr. Rosendahl and Harry MacDonald, your clients' representative, inspected the project area on foot. Although there had been some ground disturbance since the 1982 inspection, we confirmed that the findings of the earlier survey are accurate and that the conclusions are appropriate. Prior to the 1990 inspection, I met with Dr. Ross Cordy of the Department of Land and Natural Resources - Historic Preservation Program to discuss the Rosendahl (1982) report. He agreed with me that Rosendahl (1982) is sufficient for a CDUA application and that full archaeological clearance should be granted for both parcels.

If you have any questions, please feel free to contact me at my Hilo office (969-1763).

Sincerely yours,

Paul H. Rosendahl, Ph.D.
President and Principal
Archaeologist

Reference Cited

Rosendahl, P.H.

1982 Archaeological Reconnaissance Survey, Kiholo Bay Houselots, Puuwaawaa, North Kona, Island of Hawaii. PHRI Report Ms.60-0610822. Prepared for Juvik and Juvik, Environmental Consultants.

cc: Jeff Melrose, Island Planning - (letter only)

Attachment: PHRI Report Ms.60-061082 (copy)

PAUL H. ROSENDAHL, Ph.D., Inc.
Consulting Archaeologist

80-967

PROJECT 82-60

June 10, 1982

Report Ms.60-061082

Dr. James Juvik
Juvik and Juvik
Environmental Consultants
223 Makani Circle
Hilo, Hawaii 96720

Subject: Archaeological Reconnaissance Survey
Kiholo Bay Houselots
Puuwaawaa, North Kona, Island of Hawaii
(TMK:3-7-1-02:3,12)

Dear Dr. Juvik:

On Saturday, June 5, 1982, I conducted at your request an archaeological reconnaissance survey of the above subject project area. The purpose of this work was to determine the presence or absence of any archaeological sites or features of potential significance. This archaeological field work was carried out similtaneously with your own field work focusing on the environmental characteristics of the project area.

The project area is located in the nearshore area at the head of Kiholo Bay, in the land of Puuwaawaa, North Kona District, Island of Hawaii. The project area consists of two adjoining land parcels, each approximately 3.0 acres in size, and situated c. 100 ft. back from the shoreline. The irregularly shaped northern parcel--TMK:3-7-1-02:12 (Grant 9944 to Robert Hind)--has maximum dimensions of approximately 370 ft. (N-S) by 600 ft. (E-W), while the narrower southern parcel--TMK:3-7-1-02:3 (Grant 9943 to Robert Hind)--has maximum dimensions of approximately 205 ft. (NE-SW) by 850 ft. (NW-SE). With the aid of a 1"=200' scale plan map of the two parcels (Island Survey, Inc.; August 10, 1974), the various corner pins of both parcels were clearly identified in the field. With the exception of the seaward and the shared boundaries, the inland boundaries of both parcels were defined further by a bulldozer swath that had been cleared in the relatively recent past just outside the boundaries of both parcels.

As part of relevant background research, I checked with the Hawaii County Planning Department concerning the presence of any previously recorded archaeological sites within the survey project area, and reviewed John E. Reinecke's manuscript report on his 1930 survey of archaeological sites along the coast of West Hawaii Island. So far as could be determined, there were no previously recorded or known sites present within or immediately adjacent to the survey project area.

The terrain of the survey area was relatively flat. The vegetation cover varied from very open on the seaward side, to dense on the

P.O. Box 504 • Kurtistown, Hawaii 96760 • (808) 966-8038

interior and inland side. The dominant vegetation consisted primarily of intentionally planted coconut palms (Cocos nucifera L.), naupaka-kahakai (Scaevola sericea Vahl), kiawe (Prosopis pallida (Humb. and Bonpl. ex Willd.) HBK.), koa-haole (Leucaena glauca (L.) Benth.), and sedges and grasses.

On-site reconnaissance field work consisted of 100% coverage of the entire project area. Following a circuit of the project area boundaries, the interior area of each parcel was closely inspected by a series of pedestrian sweeps across the project area--from the seaward side to the inland side, and back again.

No archaeological sites or features of any kind were found either within or immediately adjacent to the limits of the survey project area. Based on the completely negative results of the reconnaissance of both land parcels, it is concluded that no further archaeological work of any kind is necessary or justified, and it is recommended that full archaeological clearance for both parcels be granted.

This conclusion and recommendation is given on the basis of the negative findings of the reconnaissance, and with the general qualification that during any development activity involving the modification of the ground surface there is always the possibility--however seemingly remote--that previously unknown or unexpected subsurface cultural features or deposits might be encountered. In such a situation, immediate archaeological consultation should be sought.

Thank you for the opportunity to work with you on this project. If you have any questions, please contact me.

Sincerely yours,

Paul H. Rosendahl, Ph.D.
Principal Archaeologist

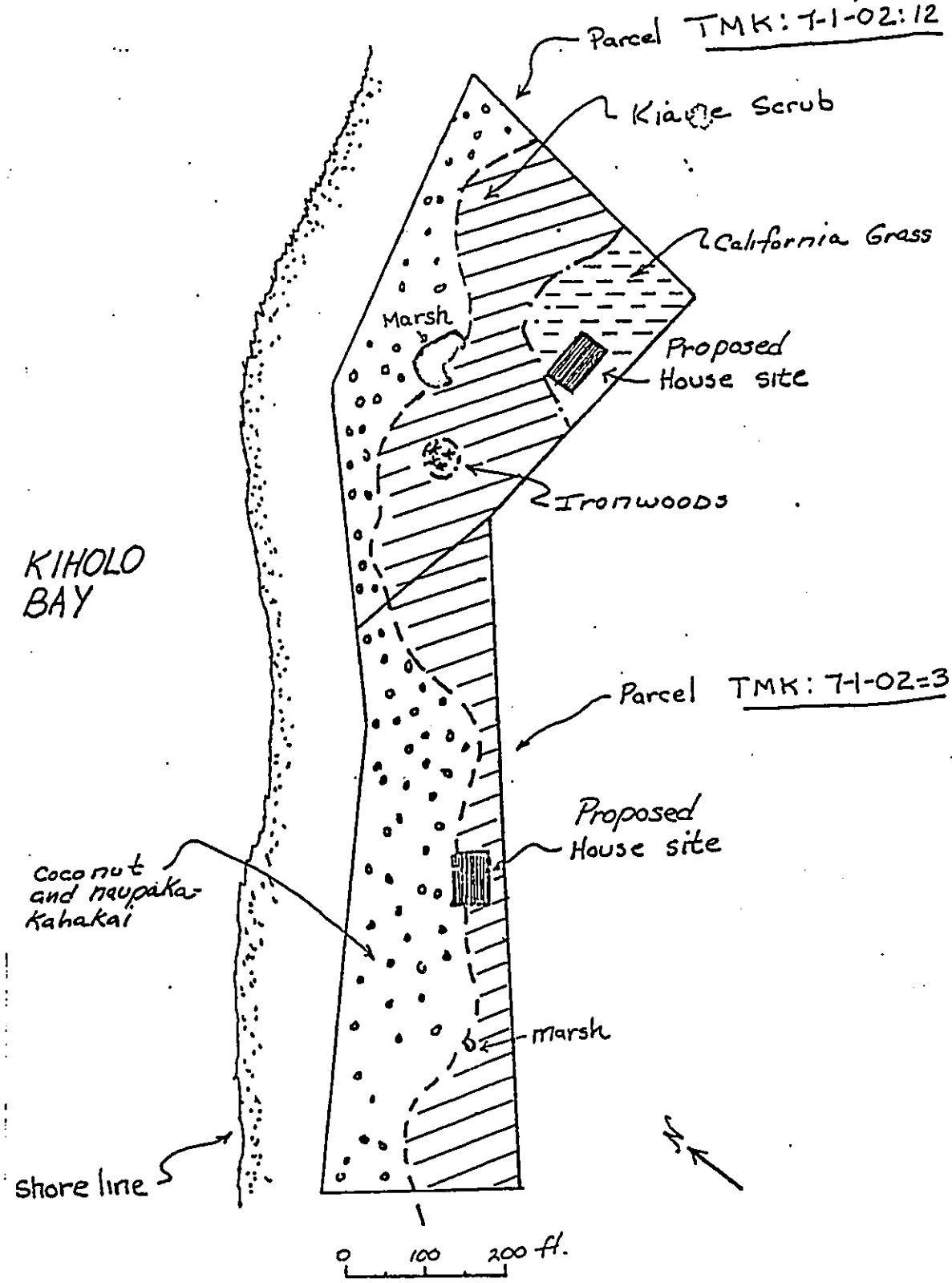
Encl.: Inv.No.60-061182

TABLE 1

Checklist of plant species on two parcels at Kiholo Bay.
(TMK: 7-1-02-3,12)

Scientific Name	Common/Hawaiian Name	Status[1]
Trees		
Pandanus Odoratissimus	hala	I
Cordia subcordata	kou	P
Hibiscus tiliaceus	hau	P
Cocos nucifera	nui/coconut	P
Morinda citrifolia	noni	P
Casuarina sp.	ironwood	X
Prosopis pallida	kiawe	X
Leucaena leucocephala	ekoa	X
Messerschmidia argentea	tree heliotrope	X
Phoenix sp.	date palm	X
Shrubs		
Scaevola taccada	naupaka-kahakai	I
Schinus terebinthifolius	Christmas berry	X
Pluchea indica	Indian pluchea	X
Pluchea odorata	Pluchea	X
Atriplex semibaccata	Australian saltbush	X
Herbs		
Jacquemontia sandwicensis	pa'u-o-Hi'iaka	E
Ipomoea pes-caprae	pohuehue	I
Ipomoea congesta	blue morning glory	I
Sesuvium portulacastrum	akulikuli	I
Sida fallax	ilima	I
Waltheria americana	hialoa	I
Psilotum nudum	moa	I
Boerhavia diffusa	alena	I
Gynandropsis gynandra	African spider plant	X
Chenopodium album	emex	X
Xanthium saccharatum	cocklebur	X
Passiflora foetida	passion flower	X
Mollugo cerviana	Indian chickweed	X
Portulaca oleracea	purslane	X
Grasses and Sedges		
Cyperus laevigatus	makaloa	I(?)
Scirpus maritimus	makai	I
Brachiaria mutica	California grass	X
Pennisetum setaceum	fountain grass	X
Eragrostis tenella	Japanese lovegrass	X

[1]Status: E = Endemic; I = Indigenous; P = Polynesian introduction
X = Historic introduction



MAJOR VEGETATION TYPES: KIHOLO

EXHIBIT C

Letters from the County of Hawaii Department of Public Works
Relating to the Flood Hazard Zone

Lorraine R. Inouye
Mayor
Bruce C. McClure
Chief Engineer
Laurence E. Capellas
Deputy Chief Engineer

Department of Public Works

25 Aupuni Street, Room 202 • Hilo, Hawaii 96720 • (808) 961-8321 • Fax (808) 969-7138

February 1, 1991

MR SIDNEY FUKE
100 PAUAHI STREET SUITE 212
HILO HI 96720

SUBJECT: FLOOD/TSUNAMI ZONE INTERPRETATION
TMK: 6-6-02: 22

This is to confirm our recent discussion regarding the subject matter. Attached for your information and use is our interpretation of the various designations as reflected on the Flood Insurance Rate Map (FIRM).

In response to your inquiries and as it relates to the requirements of Chapter 27, Flood Hazard Control:

1. No structures will be allowed within the "AE - Floodway" zone. Furthermore, if the existing rock wall did not receive the required permits prior to 1982, then it must be removed.

2. The existing gazebo complies with Chapter 27, Flood Hazard Control, and can remain within the "AE" zone if all other applicable approvals and permits are obtained. It is our understanding that there is an existing rock wall west or makai of the subject property. The portion of the rock wall within both the "AE" and "X" zones can remain. However, if the rockwall within the "VE" zone did not receive the required permits prior to 1982, then that portion must be removed.

3. Within the "VE" zone, a single-family residence can be constructed provided that it meets with the applicable Building, Zoning, and Flood Hazard code requirements.

We trust that this information responds to your inquiries. Please contact us if you have more questions.

ROBERT K. YANABU, Division Chief
Engineering Division

GO:byf

Enclosures

Lorraine R. Inouye
Mayor
Bruce C. McClure
Chief Engineer
Laurence E. Capellas
Deputy Chief Engineer

Department of Public Works

25 Aupuni Street, Room 202 • Hilo, Hawaii 96720 • (808) 961-8321 • Fax (808) 969-7138

May 10, 1991

MS LYNN H KAJIOKA
OKITA KUNIMITSU AND ASSOCIATES INC
1585 KAPIOLANI BLVD SUITE 1340
HONOLULU HI 96814

SUBJECT: DEJORIA RESIDENCE FLOOD ZONE DESIGNATION
Kiholo Bay, North Kona, Hawaii
TMK: 7-1-2: 12

As requested, we have determined that the subject property is located within Flood Zones "AE" and "VE" according to the Flood Insurance Rate Map (FIRM) dated September 16, 1988. "AE" and "VE" zones are areas of special flood hazards for which detailed engineering studies were done by the Federal Emergency Management Agency to determine the base flood elevations and to identify the floodways.

Any new construction or substantial improvements within the subject parcel will be subjected to the requirements of Chapter 27 - Flood Control, of the Hawaii County Code. We have enclosed copies of the following documents to give you the requirements.

1. Construction and Development Standards
2. Flood Hazard Areas Declaration
3. V-Zone Certificate
4. Example of Elevation Certification for Buildings in Flood Hazard Areas
5. Site Plan with the Flood Zones plotted on it.

Should you have any questions concerning this matter, please contact our Engineering Division at (808)961-8327.

ROBERT K. YANABU, Division Chief
Engineering Division

ON:byf

Enclosures

EXHIBIT D

Baseline Biological Surveys of Coastal Ponds

BASELINE BIOLOGICAL SURVEYS
OF
COASTAL PONDS

KIHOLO BAY
ISLAND OF HAWAII

Prepared for:

Island Planning
Post Office Box 5524
Hilo, Hawaii 96820

Contact:

Jeffrey Melrose

Prepared by:

Brewer/Brandman Associates
1188 Bishop Street, Suite 3411
Honolulu, Hawaii 96813-3314
(808) 522-9711

Contact:

William A. Brewer

December 1990

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BASELINE BIOLOGICAL SURVEYS OF COASTAL PONDS AT KIHOLO BAY, HAWAII

SECTION 1
INTRODUCTION

Kiholo Bay is located in the South Kohala District, Hawaii County, roughly half-way between Keahole Point and Kawaihae Harbor (Figure 1). Between South Kohala and Keahole Point, the coastline fringes a shallow bight. This bight is underlain by a narrow shelf sloping from the coastline to depths of more than 100 meters (m) (330 feet [ft]) within a short distance from shore. The coastline consists of a series of open ocean bays dissected from, and lying between relatively recent basaltic lava flows of the Mauna Loa series.

Dominant wave direction is from the north, but the coast is variously exposed to the effects of wave energy ranging from minimal exposure on the north at Puako, to maximal exposure on the south at Kiholo (Kay, et al. 1977). The leeward coast is protected from Hawaii's dominate northeast trade winds by high mountains, although the area has been subject to the often catastrophic effects of lava flows and tsunamis. West Hawaii's mauka regions are generally barren and are crossed by lava flows dating from prehistoric times to those formed by the eruption of Mauna Loa in 1950. Rainfall typically averages less than 30 centimeters (cm) (12 inches [in.]) a year. There are no surface streams on the Kona coast, although substantial groundwater flows express themselves as coastal ponds and springs along or near the shoreline.

The project site consists of an approximately 3.7 acre (160,000 square feet [sq ft]) parcel of previously disturbed (rough graded within the last 10 years) coastal land encompassing two ponds: 1) a roughly 0.7 acre (30,500 sq m), somewhat turbid, shallow coastal pond with a very irregular shoreline; and 2) a roughly 500 sq ft (46.5 sq m), heavily overgrown, anchialine pond demonstrating exceptionally clear water (Figure 2). The latter pond consists of approximately 100 sq ft (10 sq m) of open (unvegetated) water. The remainder is covered with a dense stand of beach naupaka (Scaevola taccada) that makes exact dimension definition of the pond almost impossible. Both ponds were subject to tidal influence and their depths varied with the prevailing tides. One finger-like extension of the larger pond continued to the base of the mauka side of the beach berm and fell within approximately 100 ft (30.5 m) of the present shoreline.

The larger pond was surrounded by dense vegetation that included mixed stands of coconut palms (Cocos nucifera), pandanus (Pandanus), kiawe (Prosopis pallida), milo (Thespesia populnea), koa haole (Leucaena leucocephala), ironwood (Casuarina equisetifolia), beach naupaka, hau (Hibiscus tiliaceus), and domesticated hibiscus (Hibiscus sp.). Understory vegetation was generally absent or sparse in areas that had tree cover. Open areas were dominated by beach morning glory (Ipomoea pes-caprae), various introduced grasses and herbs, and domesticated tomato and yam plants. For purposes of clarity, the larger pond will be denoted as Pond A and the smaller pond as Pond B.

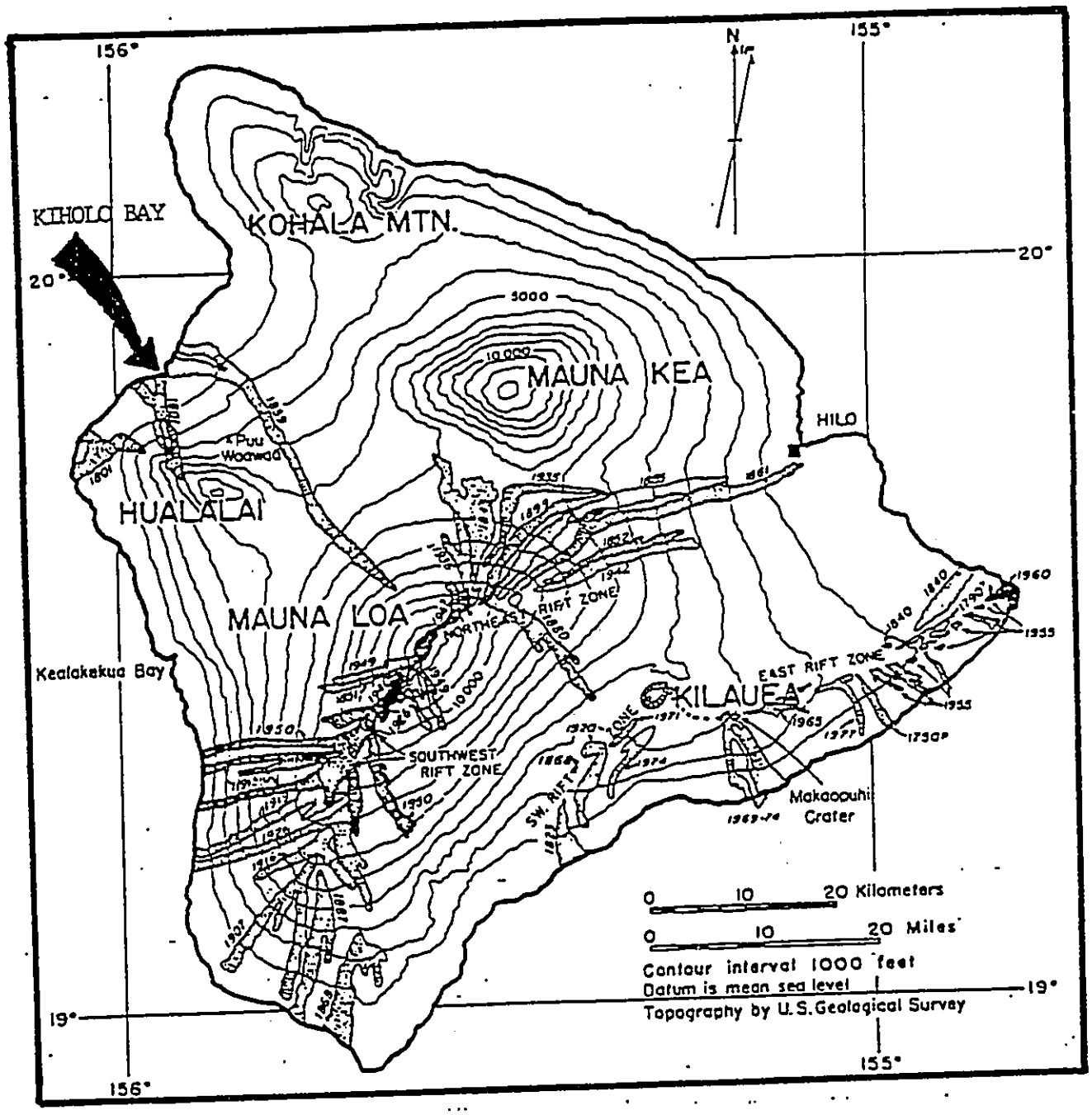


Figure 1. Project site location.

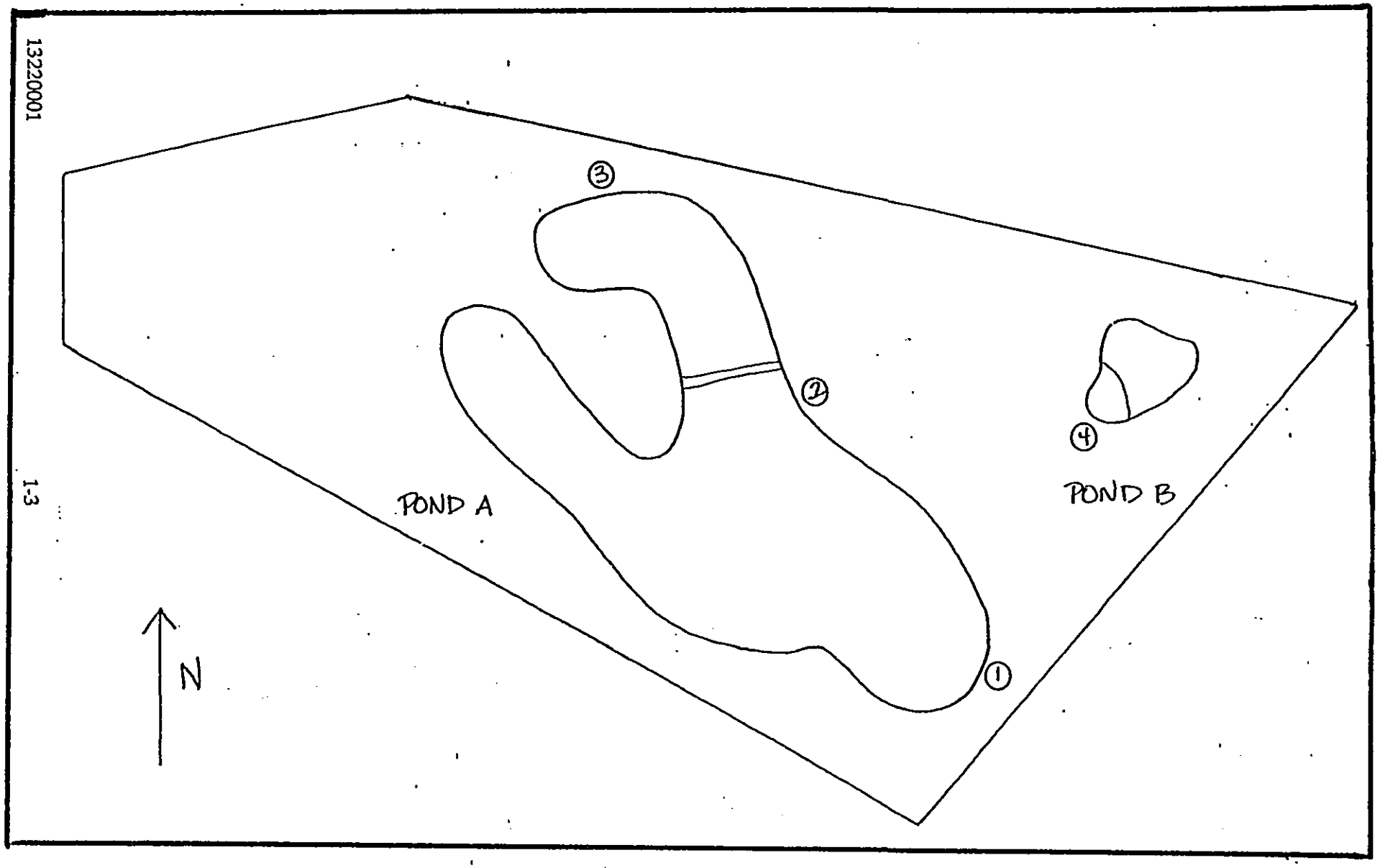


Figure 2. Water quality sampling stations.

SECTION 2
METHODS

2.1 PHYSICAL-CHEMICAL MEASUREMENTS

Salinity and temperature measurements were made with a Yellow Springs Instrument Company (YSI) salinity-conductivity-temperature meter equipped with a YSI Model 3300 nickel-platinum conductivity and temperature probe. All measurements were based on in situ readings from the shoreline. Based on manufacturer-supplied data, worst-case possible instrument and probe (combined) error for temperature and salinity are ±0.7 degrees Centigrade (°C) and ±0.2 parts per thousand (ppt), respectively.

Dissolved oxygen measurements were obtained using a YSI Model 51B dissolved oxygen meter equipped with a YSI Model 5739 pressure-compensated, polarographic sensor. The instrument was calibrated according to factory guidelines in a water vapor saturated chamber. Measurements were based on in situ readings from the shoreline. Manufacturer's data indicate a probable error accumulation (maximum worst-case situation) of ±0.52 parts per million (ppm).

Water quality sampling stations on Pond A were based on logistical considerations determined during preliminary field surveys. Mid-pond stations could not be sampled because of a deep layer of mucky, anaerobic deposits. However, selected shoreline stations reflected representative locations throughout the pond.

2.2 BIOLOGICAL SURVEYS

Biological surveys were conducted with mask and snorkel apparatus to qualitatively assess the major physiographic features, zonations patterns, and benthic assemblages occurring in Pond A. All shoreline and mid-pond locations were surveyed. Underwater surveys were limited to a depth of approximately 2-3 ft (05-1 m), the maximum depth recorded in Pond A. A combined terrestrial and wading survey of the pond perimeter was conducted prior to the underwater survey to denote any particularly important or significant features, habitats, or species within the pond. This survey encompassed approximately 70 percent of the pond's perimeter; the remaining areas were too heavily overgrown with vegetation to permit access. Except for the extreme northwest corner of Pond A where water turbidity was noticeably less (a possible site of springwater inflow), underwater visibility averaged less than 4 ft (1.2 m). Underwater observations were also compounded by fine sedimentary benthic deposits that were readily suspended by the slightest movement of the underwater observer.

The shallow water (5-12 in. [12.7-30.5 cm]), as a function of the tidal cycle and the smaller size of Pond B, made underwater mask and snorkel observations impossible. However, the extreme clarity of the water and the use of a nylon dip-net permitted an accurate sampling and assessment of the flora and fauna in the pond's roughly 100 sq ft (9.3 sq m) of open water habitat. Rocks occurring within the pond were also turned over and examined for the presence of cryptic species. A dense cover of beach naupaka and the resultant subdued light conditions did not permit observations to be made under the beach naupaka canopy that dominated most of Pond B's surface area.

SECTION 3
RESULTS

3.1 PHYSICAL-CHEMICAL MEASUREMENTS

The results of the water quality surveys are shown in Table 1. Sampling station locations are depicted in Figure 2. Both ponds A and B demonstrated a high degree of temperature uniformity between morning (high tide) and afternoon (low tide) periods. The predicted tidal pattern on December 7, 1990, is shown in Table 2.

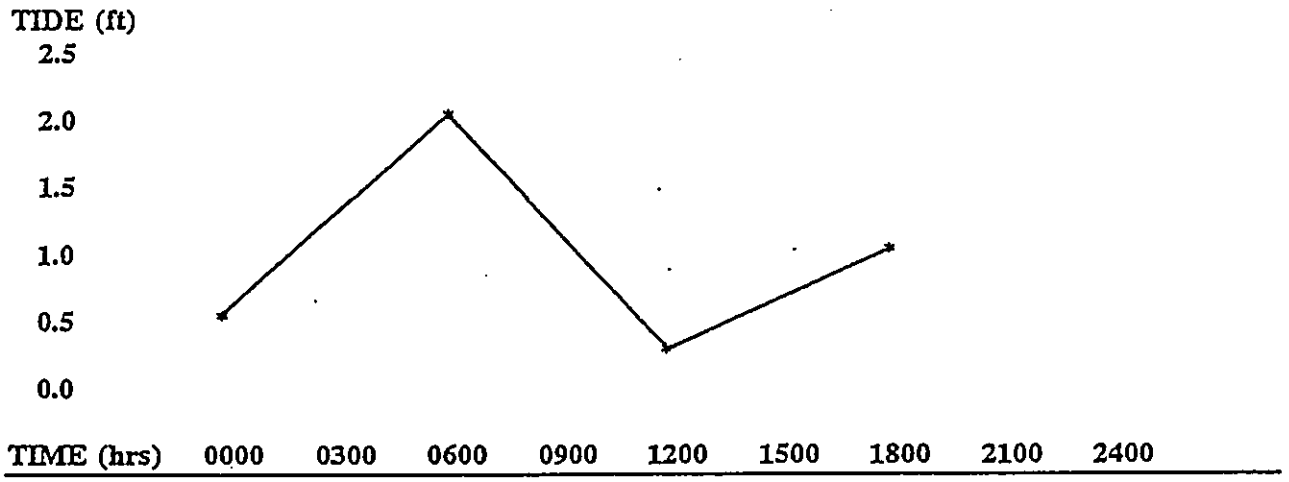
Pond A demonstrated a morning mean temperature of 22.1 °C, and an afternoon mean temperature of 24.7 °C. The temperature difference is the apparent result of solar heating, prevailing shallow waters, and some degree of tidal influence. By contrast, Pond B demonstrated a morning temperature of 21.5 °C. and an afternoon temperature of 23.4 °C. These differences suggest that Pond A, with its much greater surface area, offers greater potential for solar heating than Pond B which was heavily shaded by beach naupaka. This effect is demonstrated in the temperature variations recorded in the two ponds between morning and afternoon periods: Pond A demonstrated a temperature differential of 2.6 °C. between morning and afternoon samplings; Pond B, a slight differential of 1.9 °C.

TABLE 1
WATER QUALITY PARAMETERS, PONDS A AND B, KIHOLO BAY
DECEMBER 7, 1990

Station No.	Time (hrs)	Depth (in.)	Temperature (°C)	Salinity (ppt)	Dissolved Oxygen (ppm)
POND A					
1	0902	10-12	22.1	1.9	6.29
	1254	8-10	24.9	2.2	8.90
2	0908	5-6	22.1	1.9	6.10
	0910	20-24	22.0	1.9	5.80
	1300	10-12	24.9	2.1	7.60
3	0914	10-12	22.2	2.0	6.35
	1303	8-10	24.3	2.0	7.60
POND B					
4	0919	10-12	21.5	2.0	6.40
	1305	5-6	23.4	2.1	8.25

Salinities in both ponds were generally uniform, although a slight increase in salinity was noted in Pond A between morning and afternoon sampling periods. This increase was likely a result of tidal influence. Because of the prevailing shallow waters, there was no evidence of density stratification in either pond during high or low tide periods.

TABLE 2
PREDICTED TIDES -- KAWAIHAE HARBOR
DECEMBER 7, 1990



Dissolved oxygen values in Pond A demonstrated mean morning and afternoon values of 6.25 ppm and 8.03 ppm, or approximately 71 and 96 percent saturation, respectively. Pond B demonstrated morning and afternoon dissolved oxygen values of 6.40 ppm and 8.25 ppm, or approximately 72 and 96 percent saturation, respectively. The differences between morning and afternoon values is caused by the photosynthesis of phytoplankton, epiphytic algae, and in Pond A, submerged vascular plants. There was no discernible wind during either morning or afternoon periods to account for the increases in dissolved oxygen values.

Dissolved oxygen readings indicated anoxic conditions existed beneath the top few centimeters of the substratum of Pond A (data not reflected). The relative paucity of oxygen within the bottom sediments may account, in part, for the low diversity of benthic organisms observed on, or in association with the pond bottom.

3.2 BIOLOGICAL SURVEYS

3.2.1 POND A

Algae. Aquatic algae were limited to epilithic growths of unidentified chlorophytes (Chlorophyta) that were generally found on the few rock outcrops within the pond. These stands formed occasionally dense, low, well-cropped green turfs. The cropped appearance (which made identification impossible) is likely the result of grazing by the numerous mullet (Mugil cephalus)

that inhabit the pond. At least one species of an unidentified cyanophyte (Cyanophyta [blue-green algae]) was noted as a film-like growth on portions of the pond's silty substratum and on decaying, submerged vegetation. This cyanophyte appeared to be restricted to areas of reduced illumination. The submerged vascular plant Ruppia maritima (widgeon grass) occurred in occasional dense stands around the perimeter of the pond. The largest stand occurred in the light-limited area near water sampling station 2.

Invertebrates. The most ubiquitous invertebrate of the pond benthos was the small snail, Assiminea sp., that occurred in densities ranging from less than 100 to an estimated 2,100/sq m. This species is small enough (averaging approximately 0.4 cm [0.15 in.] in length) to graze on the unconsolidated bottom sediments and sparse algal growths of the pond substratum. Although constituting the most abundant invertebrate in Pond A, there were several large tracts of unconsolidated mud that were totally devoid of this, or any other benthic species. Although prevailing high water turbidities did not permit any type of distributional analysis, it is possible that anaerobic sediments in some areas of the pond are inhibitory to this species. A second, much larger (1-2 cm [0.4-0.8 in.]) snail, Melania sp., was of common to infrequent occurrence along the rocky perimeter on the pond's north side, although it was only rarely observed in areas of unconsolidated mud. This species is generally observed attached to shoreline rocks and submerged roots.

The small, red caridean shrimp, opae'ula (Halocaridina rubra), one of the most characteristic invertebrates of anchialine ponds, was not observed in the main pond proper, although a large aggregation was detected in a protected, shallow, root-infested inlet on the south side of the pond (directly opposite water sampling station 2). Several hundred individuals were observed in this area of exceptionally clear water. The water clarity at this location, as contrasted with most of the open water area of Pond A, suggests that this site may be influenced by fresh or brackish water springs. A single specimen of the much larger, red, predatory shrimp, Metabetaeus lohena, was identified in the same location. This was the only specimen of M. lohena (a carnivore and known predator of the smaller, herbivorous opae'ula) recorded in the pond.

Fish. The icthyofauna of Pond A was dominated by mullet. Individuals weighing up to an estimated 10 pounds (lb) (4.5 kilograms [kg]) roved throughout the pond but appeared to be most numerous along the south and southwestern pond shorelines. They were frequently observed feeding (with their heads partially out of the water) on the pond's noticeable surface film that most likely supports algae and other food value organisms. Although generally thought to be a herbivore, the absence of opae'ula from Pond A may be a direct result of predation by mullet. Although difficult to quantify because of turbid waters, a population of at least 20 to 30 individuals of potentially two or three age/size classes (specimens weighing an estimated 2-3 lb [1 kg]; specimens weighing an estimated 4-5 lb [2 kg]; and at least one specimen weighing an estimated 8-10 lb [4 kg]) reside in the pond. Juveniles were not observed, indicating that mullet are unable to reproduce in this low saline environment. Mullet recruitment probably occurs during severe storm-wave events when the beach berm is overtopped (or breached), or by occasional releases into the pond by local fishermen.

Although not observed during field surveys, the property manager (H. MacDonald) reported the presence of "large prawns" (observed only at night), a solitary barracuda (Sphyraena), and the finding of the carapace of a very large crab (possibly the Samoan crab, Scylla serrata) within the pond over the past few years.

3.2.2 POND B

This smaller, heavily vegetated pond demonstrated many of the classical physical and biological characteristics of the Kona Coast anchialine ponds, despite its being in an intermediate to advanced stage of senescence as a result of natural exogenous processes (vegetation encroachment, sand, and organic material infilling). Absent from the pond, however, were the orange to white mineralized crusts of Schizothrix sp., and the dark green, non-mineralized, crusty layers of Rhizoclonium sp.; both species are restricted to, and characteristic of young to intermediate-age anchialine ponds. The algal community of the small open water area of this pond was dominated by a single patch of the filamentous green algae, Enteromorpha (about 2 ft [0.6 m] in diameter), and at least one species of unidentified epilithic green algae that occurred as a green carpet on scattered basalt rocks.

Invertebrates. Opae'ula (H. rubra) were numerically the most dominant invertebrate in the unshaded portion of the pond, numbering in the thousands. Opae'ula tend to congregate in dense concentrations on the few, larger algae-covered rocks distributed across the shallow pond bottom. Opae'ula densities in these areas numbered up to an estimated 300/sq ft (3230/sq m). The carnivorous caridean shrimp, M. lohena, was not observed but, given the number of opae'ula present, it is likely to occur in limited numbers in this habitat. Other crustaceans recorded within the illuminated reaches of this shallow pond included the native palaemonid prawn, Macrobrachium grandimanus (opae oehaa), and a single Palaemon debilis (opae huna, ghost shrimp). Opae oehaa demonstrated the delicate, aberrant growth form characteristic of anchialine ponds (a much larger, robust form with unusually large chele is known to occur in some coastal ponds, but is more characteristic of coastal estuaries and streams).

The snails Melania sp. and Assiminea sp. were the only other invertebrates recorded in the pond. Melania demonstrated at least two variant growth forms commonly found on the Kona Coast: 1) a smaller, roughly 0.5 in. (1.3 cm) in length, smooth black shell type; and 2) a much larger (to 1.0 in. [2.54 cm]) chalky grayish to black, very thick shell type. Population densities of Melania ranged from approximately 70-200/sq ft (750-2150/sq m), with the smooth black shell type predominating. Approximately 20 percent of any given dip-net or grab sample was comprised of empty shells.

SECTION 4
DISCUSSION

This section provides a brief narrative on the general characteristics and present day status of anchialine pond resources in Hawaii (with particular focus on Kona Coast ponds), their distribution, and importance as habitat for certain unique endemic species. The physical and biological characteristics of the Kiholo Bay ponds, in relation to other anchialine pond systems, are also described.

Holthuis (1973) was the first to describe the shrimp fauna occurring in coastal ponds and also proposed the term "anchialine" (from the Greek anchialos, meaning near the sea) to describe these ponds. One of the first descriptions of anchialine ponds, encompassing some 318 surveyed ponds on the Kona Coast, is found in Aquatic Survey of the Kona Coast Ponds, Hawaii Island (Maciolek & Brock 1974). Brock (1985b) also provided an excellent overview on the status and future of anchialine pond resources in the Hawaiian Islands.

Anchialine ponds (although seldom studied) represent distinctive, natural features of the southwest coast of Maui and the west coast of Hawaii. Natural history studies have been largely limited to the comprehensive work of Wong (1975) on Maui's Cape Kinau, and the pioneering inventory of West Hawaii ponds by Maciolek and Brock (1974). The studies of Holthuis (1973), Banner and Banner (1960), Chace (1972), Barnard (1977), and Maciolek (1983) represent largely taxonomic descriptions of anchialine pond crustaceans, although a cursory description of physical environments and major pond biota for both Maui and Hawaii are provided in the 1973 study conducted by Holthuis.

Contributing to the paucity of scientific information on anchialine ponds is the relative isolation of the pond complexes, and the prevailing private ownership that characterizes much of North Kona and South Kohala Districts of Hawaii. About 87 percent of the known anchialine ponds on the island of Hawaii occur within these districts. More recent information on the natural history, distribution, and status of anchialine ponds is found in various baseline surveys and environmental impact statements prepared for major resort hotel complexes in West Hawaii (Brewer & Associates 1984, 1986; Brewer & Associates & R.E. Brock 1987; Brock 1985a, 1985b; and OI Consultants, Inc. 1985, 1986a, 1986b).

Conservative estimates place the number of anchialine ponds on the island of Hawaii at between 600 and 650 (Brock 1985b). The majority occur between Kawaihae and Kailua-Kona on the west coast. This estimate, albeit conservative, may underestimate the actual number of ponds. Studies by Brewer & Associates (1986) at Makalawena, Hawaii, identified 33 more ponds than originally inventoried by Maciolek and Brock (1974). However, this number may reflect the fact that the 1986 surveys were conducted during an exceptionally high (+2.6-ft) tide that probably enabled enumeration of small (to 0.79 m) ponds and pools that would otherwise not be visible during normal tidal periods. Based upon the 1986 surveys at Makalawena, that more than doubled the number of ponds thought to exist in the area, the actual number of anchialine ponds on the island of Hawaii is probably higher than Brock's 1985 estimate suggests (Brock 1985b).

Anchialine ponds are situated in areas dominated by lavas of recent origin and are generally within 500 m of the shoreline. They have been described as follows:

> "...generally small (less than 100 sq m), shallow (less than 1 m deep), and having rock basins. These basins are too porous to support ponded water above sea level and are filled with mixohaline water (average salinity 7 ppt), indicating an inland extension of the oceanic water table diluted by the outflow of sub-surface freshwater. Consequently, the ponds are restricted to depressions in lava flows that extend downward into the water table." (Maciolek & Brock 1974).

Anchialine ponds are also characterized by an absence of surface connections with the sea, although they contain saline water and undergo tidal fluctuations. They also harbor a distinctive biota. Anchialine ponds once figured prominently in Hawaiian culture but have lost this stature with the decline of the culture (Brock 1977).

Because anchialine waters are rare on ancient lavas, they are temporary features on a geological time scale (Maciolek & Brock 1974). Natural and immediate obliteration occurs when flowing lavas override and fill existing pond depressions. Natural successional processes also affect the physical *and biological status of anchialine ponds and pond complexes. According to Maciolek and Brock* (1974):

> "...natural disappearance of ponds is a senescence phenomena which results from the accumulation of organic and mineral deposits originating from aquatic production and wind-blown materials. As sediments fill a pond basin, emergent plants such as sedges, rushes, and grasses take root; succulents and vines encroach from the edges, and a damp, well-vegetated depression evolves."

This aging or senescence process is clearly evident in the two Kiholo Bay ponds studied during the December 7, 1990, survey.

Naturally occurring anchialine ponds are restricted to highly porous substrates such as recent lavas or limestone adjacent to the sea (Brock 1985b). These unique habitats are widely distributed, having been reported from the Sinai Peninsula in the Red Sea, Entedebir near the South Red Sea, Aldabra in the West Indian Ocean Fricke & Fricke, Solomon Islands, Okinawa, Philippines, Funafuti Atoll, and in the Hawaiian Islands. This unique habitat type has also been reported on Ascension Island, on the Azores in the Atlantic, and on Bermuda. Localities with the most numerous anchialine pond sites are in Fiji, the Ryukyus, and Hawaii (Brock 1985b).

In Hawaii, anchialine ponds have only been reported from Maui and Hawaii, although one of the most characteristic anchialine pond organisms, the tiny red shrimp opae'ula, has been reported on Oahu (or in the vicinity thereof) at Popoia Island in Kailua Bay, a borrow pit at Laie, Barbers Point, Campbell Industrial Park, and in a sinkhole near the proposed Ewa Marina. Near Haleiwa, a wetland area known as "Opae'ula" is presumably named after this shrimp.

Brock (1985b) has classified anchialine pond organisms into two groups -- epigeal and hypogeal. The epigeal fauna is comprised of species that require the well-illuminated part of the anchialine system; the hypogeal fauna occurs not only in the illuminated part of the system, but also in the interconnected water table below. These species are primarily decapod crustaceans, some of which are known only from the anchialine pond ecosystem.

Brock (1985b) described the Hawaiian anchialine pond ecosystem as dominated by a characteristic assemblage of organisms, including crustaceans (shrimps, amphipods), fishes, mollusks, a hydroid, sponges, polychaetes, tunicates, aquatic insects, algae and aquatic macrophytes. The red caridean shrimps have been described as being the most distinctive and striking faunal component. Five of the 10 species of hypogeal shrimp known worldwide are found in Hawaiian anchialine ecosystems; these species are H. rubra, M. lohena, Procaris hawaiana, Antecaridina lauensis, and Calliasmata pholidota. The first three species are known only from Hawaii, while A. lauensis has been collected in Hawaii, Fiji, Mozambique, and in the Red Sea. C. pholidota is known from Hawaii, the Ellice Islands, and the Sinai Peninsula (Red Sea). Only H. rubra and M. lohena were found within the anchialine pond system at the Kiholo Bay site.

A new shrimp species (Vetericaris chaceorum) was collected from an unusually deep anchialine pond "lava tube" at Lua O Palahemo, Ka Lae (island of Hawaii), and an unidentified shrimp similar to that collected at Ka Lae was reported at Cape Kinau, Maui (Kensley & Williams 1986; J. Maciolek, pers. comm., cited in Brock [1985b]). Halocaridina palahemo is thought to occur only in the lava tube system at Lua O Palahemo. The decapod crustacean Palaemonella burnsi is known only from three pools on Cape Kinau and Kaloko Pond, Hawaii.

Algae generally constitute an important component of anchialine pond systems. Wong (1975) lists 144 species of diatoms, microalgae, and macroalgae in the Cape Kinau ponds; however, only 7 species or species complexes were considered dominant. The pond system at Kiholo is considerably simpler in species composition than the Cape Kinau ponds, in part the result of their greater age and senescence.

The most common native fishes associated with Kona Coast anchialine ponds are aholehole (Kuhlia sandvicensis), mullet (M. cephalus), kupipi (Abudefduf sordidus), manini (Acanthurus triostegus), o'opu akupa (Eleotris sandwicensis), and o'opu nakea (Awaous stamineus). Gymnothorax hilonis, a particularly dark-colored eel, has only been recorded from Kona Coast ponds. An additional, unidentified eel, believed to be a blind ophichthid, was observed in 1972 and 1985 in an unusually deep anchialine pool at Ka Lae, Hawaii. Brock (1985b) suggested the latter to be an undescribed species believed to be restricted to this known anchialine pond habitat. With the exception of the mullet, none of the other native fishes cited above were observed within the Kiholo Bay site.

In 1985, the U.S. Fish and Wildlife Service classified several anchialine pond organisms as "Category 2" species under the U.S. Endangered Species Act. These organisms included three shrimp (M. lohena, P. hawaiana, and P. burnsi); a hydroid (Ostromouvia horii); and a snail (Neritilia sp.). The Category 2 designation means that the organisms should probably be listed as endangered or threatened, but insufficient information exists to justify an assessment of their status for listing on the Federal List of Threatened and Endangered Species. These organisms are considered rare, but they are not included on the aforementioned list, nor are they proposed as candidates for listing, at this time. Some of the aforementioned species may be more widespread and abundant than was originally thought. For example, Neritilia hawaiiensis, a diminutive (1.0-1.5 millimeter) snail was reportedly "...only known from anchialine ponds at Makalawena" (Brock 1985b). However, recent information suggests that this species is probably more widespread than present data indicate, however, because of its extremely small size it has probably been overlooked (Brock, pers. comm., 1986).

The Kiholo Bay ponds did not demonstrate any particularly unique or unusual physical or biological features. Although the two ponds were physically and biologically distinct, each demonstrated conditions more or less typical of other anchialine pond systems along the Kona Coast. Each pond harbored organisms (Melania, Assiminea, opae'ula) that are characteristic of Kona Coast anchialine pond systems, although the limited distribution of opae'ula in Pond A (found only in a small, possibly springwater-influenced pocket adjacent to the main pond) suggested that this pond is, through natural successional processes, losing its anchialine character. Melania and opae'ula were found in 62 and 61 percent, respectively, of the 318 Kona Coast ponds surveyed by Maciolek and Brock in 1974. By contrast, M. lohena (one individual found in Pond A), Assiminea (found in both ponds, but more characteristic of Pond A), opae huna (observed in Pond B), and opae oehaa (observed in Pond B) were found in only 31, 24, 21, and 12 percent, respectively, of the 318 ponds surveyed.

The results of the Kiholo Bay pond surveys also confirmed the apparent incompatibility of native fish and opae'ula, as was originally reported by Maciolek and Brock in 1974. The population of mullet in Pond A has resulted in the distribution of opae'ula being restricted to a single, isolated, shallow pocket on the south side of the pond where the mullet cannot access. Maciolek and Brock (1974) indicated that mullet (and other native fishes) were found in 10 percent of the ponds they had surveyed.

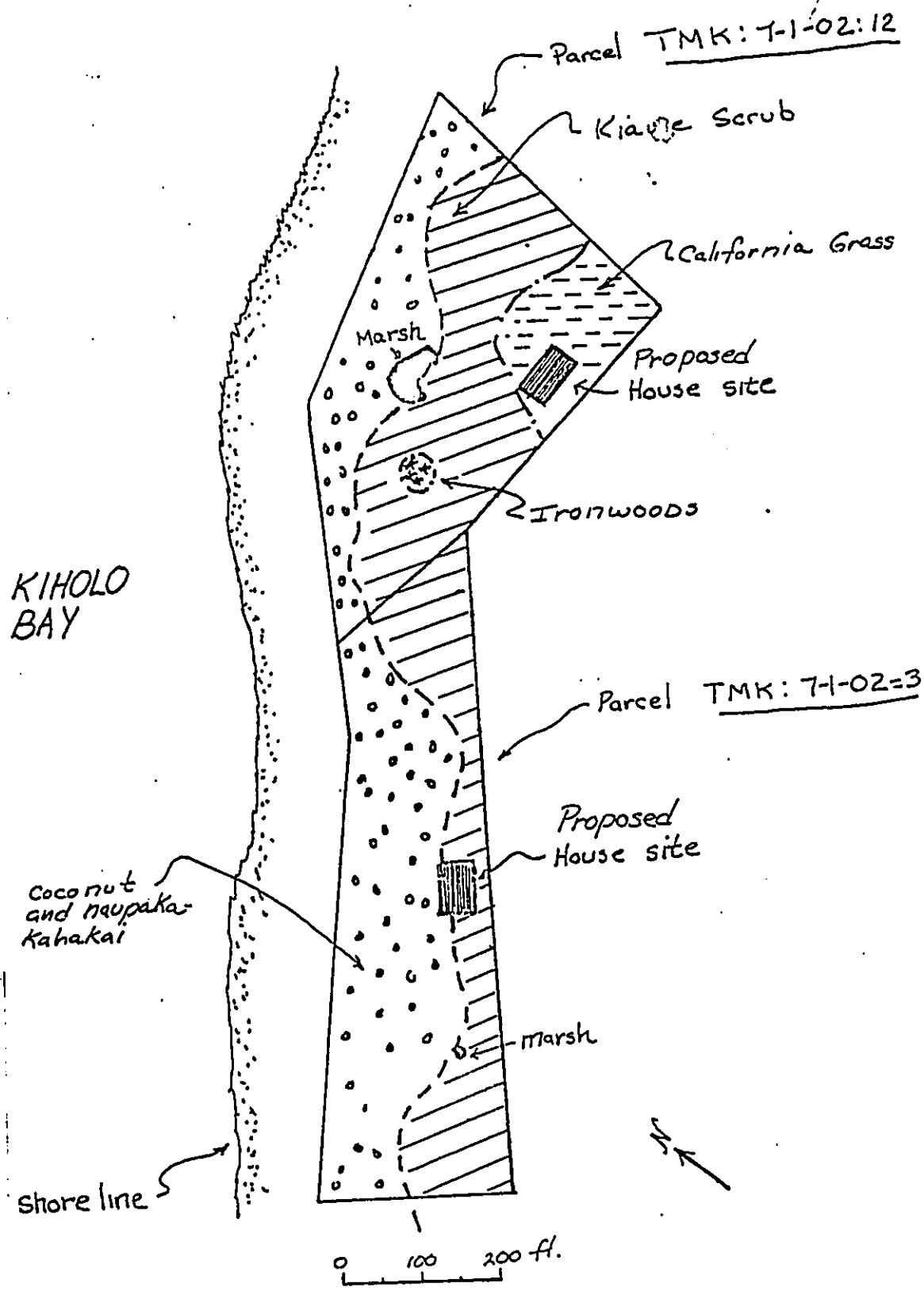
The results of the Maciolek and Brock (1974) surveys led to their definition of 7 ponds (or pond complexes) of "exceptional natural value" and 4 ponds (or pond complexes) of "significant aquatic natural value" on the west coast of Hawaii. Neither of the two ponds surveyed in this study were identified as ranking in either category, although Luahinewai Pond (about 2 kilometers northeast of the study site) was included in the "exceptional" category on the basis of its depth, strong vertical salinity stratification, crustacean diversity, and its lush growth of R. maritima.

TABLE 1

Checklist of plant species on two parcels at Kiholo Bay. (TMK: 7-1-02-3,12)

Scientific Name	Common/Hawaiian Name	Status[1]
Trees		
Pandanus Odoratissimus	hala	I
Cordia subcordata	kou	P
Hibiscus tiliaceus	hau	P
Cocos nucifera	nui/coconut	P
Morinda citrifolia	noni	P
Casuarina sp.	ironwood	X
Prosopis pallida	kiawe	X
Leucaena leucocephala	ekoa	X
Messerschmidia argentea	tree heliotrope	X
Phoenix sp.	date palm	X
Shrubs		
Scaevola taccada	naupaka-kahakai	I
Schinus terebinthifolius	Christmas berry	X
Pluchea indica	Indian pluchea	X
Pluchea odorata	Pluchea	X
Atriplex semibaccata	Australian saltbush	X
Herbs		
Jacquemontia sandwicensis	pa'u-o-Hi'iaka	E
Ipomoea pes-caprae	pohuehue	I
Ipomoea congesta	blue morning glory	I
Sesuvium portulacastrum	akulikuli	I
Sida fallax	ilima	I
Waltheria americana	hialoa	I
Psilotum nudum	moa	I
Boerhavia diffusa	alena	I
Gynandropsis gynandra	African spider plant	X
Chenopodium album	emex	X
Xanthium saccharatum	cocklebur	X
Passiflora foetida	passion flower	X
Mollugo cerviana	Indian chickweed	X
Portulaca oleracea	purslane	X
Grasses and Sedges		
Cyperus laevigatus	makaloa	I(?)
Scirpus maritimus	makai	I
Brachiaria mutica	California grass	X
Pennisetum setaceum	fountain grass	X
Eragrostis tenella	Japanese lovegrass	X

[1]Status: E = Endemic; I = Indigenous; P = Polynesian introduction
X = Historic introduction



MAJOR VEGETATION TYPES: KIHOLO

PAUL H. ROSENDAHL, Ph.D., Inc.
Consulting Archaeologist

90-967
PROJECT 82-60

Report Ms.60-061082

June 10, 1982

Dr. James Juvik
Juvik and Juvik
Environmental Consultants
223 Makani Circle
Hilo, Hawaii 96720

Subject: Archaeological Reconnaissance Survey
Kiholo Bay Houselots
Puuwaawaa, North Kona, Island of Hawaii
(TMK:3-7-1-02:3,12)

Dear Dr. Juvik:

On Saturday, June 5, 1982, I conducted at your request an archaeological reconnaissance survey of the above subject project area. The purpose of this work was to determine the presence or absence of any archaeological sites or features of potential significance. This archaeological field work was carried out similtaneously with your own field work focusing on the environmental characteristics of the project area.

The project area is located in the nearshore area at the head of Kiholo Bay, in the land of Puuwaawaa, North Kona District, Island of Hawaii. The project area consists of two adjoining land parcels, each approximately 3.0 acres in size, and situated c. 100 ft. back from the shoreline. The irregularly shaped northern parcel--TMK:3-7-1-02:12 (Grant 9944 to Robert Hind)--has maximum dimensions of approximately 370 ft. (N-S) by 600 ft. (E-W), whle the narrower southern parcel--TMK:3-7-1-02:3 (Grant 9943 to Robert Hind)--has maximum dimensions of approximately 205 ft. (NE-SW) by 850 ft. (NW-SE). With the aid of a 1"=200' scale plan map of the two parcels (Island Survey, Inc.; August 10, 1974), the various corner pins of both parcels were clearly identified in the field. With the exception of the seaward and the shared boundaries, the inland boundaries of both parcels were defined further by a bulldozer swath that had been cleared in the relatively recent past just outside the boundaries of both parcels.

As part of relevant background research, I checked with the Hawaii County Planning Department concerning the presence of any previously recorded archaeological sites within the survey project area, and reviewed John E. Reinecke's manuscript report on his 1930 survey of archaeological sites along the coast of West Hawaii Island. So far as could be determined, there were no previously recorded or known sites present within or immediately adjacent to the survey project area.

The terrain of the survey area was relatively flat. The vegetation cover varied from very open on the seaward side, to dense on the

interior and inland side. The dominant vegetation consisted primarily of intentionally planted coconut palms(Cocos nucifera L.), naupaka-kahakai (Scaevola sericea Vahl), kiawe (Prosopis pallida (Humb. and Bonpl. ex Willd.) HBK.), koa-haole (Leucaena glauca (L.) Benth.), and sedges and grasses.

On-site reconnaissance field work consisted of 100% coverage of the entire project area. Following a circuit of the project area boundaries, the interior area of each parcel was closely inspected by a series of pedestrian sweeps across the project area--from the seaward side to the inland side, and back again.

No archaeological sites or features of any kind were found either within or immediately adjacent to the limits of the survey project area. Based on the completely negative results of the reconnaissance of both land parcels, it is concluded that no further archaeological work of any kind is necessary or justified, and it is recommended that full archaeological clearance for both parcels be granted.

This conclusion and recommendation is given on the basis of the negative findings of the reconnaissance, and with the general qualification that during any development activity involving the modification of the ground surface there is always the possibility--however seemingly remote--that previously unknown or unexpected subsurface cultural features or deposits might be encountered. In such a situation, immediate archaeological consultation should be sought.

Thank you for the opportunity to work with you on this project. If you have any questions, please contact me.

Sincerely yours,

Paul H. Rosendahl, Ph.D.
Principal Archaeologist

Encl.: Inv.No.60-061182

APR 19 1991

PHRI Paul H. Rosendahl, Ph.D., Inc.
Archaeological • Historical • Cultural Resource Management Studies & Services
305 Mohouli Street • Hilo, Hawaii 96720 • (808) 969-1763 • FAX (808) 961-6998
P.O. Box 23305 • G. M. F., Guam 96921 • (671) 472-3117 • FAX (671) 472-3131

April 16, 1991
90-967

Sydney Fuke & Associates
100 Pauahi Street, Suite 212
Hilo, Hawaii 96720

Subject: Archaeological Reconnaissance Survey
Kiholo Bay Houselots
Puuwaawaa, North Kona, Island of Hawaii
TMK:3-7-1-02:3,12

Dear Mr. Fuke:

At the request of your client, Paul H. Rosendahl, Ph.D., Inc. (PHRI) recently carried out a field inspection of the above subject project area, comprised of two parcels c. 3.0 acres each. The purpose of the inspection, conducted on December 18, 1990 by Dr. Paul H. Rosendahl, was to confirm the findings and conclusions of an earlier reconnaissance survey of the parcels done by PHRI on June 5, 1982 (Rosendahl 1982) copy attached, and to confirm that the Rosendahl (1982) report would be sufficient for a CDUA application. Dr. Rosendahl and Harry MacDonald, your clients' representative, inspected the project area on foot. Although there had been some ground disturbance since the 1982 inspection, we confirmed that the findings of the earlier survey are accurate and that the conclusions are appropriate. Prior to the 1990 inspection, I met with Dr. Ross Cordy of the Department of Land and Natural Resources - Historic Preservation Program to discuss the Rosendahl (1982) report. He agreed with me that Rosendahl (1982) is sufficient for a CDUA application and that full archaeological clearance should be granted for both parcels.

If you have any questions, please feel free to contact me at my Hilo office (969-1763).

Sincerely yours,

Paul H. Rosendahl, Ph.D.
President and Principal
Archaeologist

Reference Cited

Rosendahl, P.H.

1982 Archaeological Reconnaissance Survey, Kiholo Bay Houselots, Puuwaawaa, North Kona, Island of Hawaii. PHRI Report Ms.60-0610822. Prepared for Juvik and Juvik, Environmental Consultants.

cc: Jeff Melrose, Island Planning - (letter only)

Attachment: PHRI Report Ms.60-061082 (copy)

Photograph 1. Central portions of Pond A (looking east to west).

Photograph 2. Central portions of Pond A (looking north to south).

Photograph 3. Pond A facing the beach berm.

Photograph 4. Open portion of Pond B.

SECTION 5
RECOMMENDATIONS

The proposed development will have little or no impact on the anchialine pond resources at Kiholo Bay, provided that wastewaters are properly treated and disposed of. Treated or untreated wastes and any on-site generated solid wastes should not be discharged into, stockpiled adjacent to, or allowed to percolate (through groundwaters) into either pond. Similarly, rainfall runoff waters should be allowed to percolate into the ground in a diffuse manner and should not discharge as a point source into or adjacent to either pond.

Development and use of the site may actually help preserve both pond systems if vegetation around the perimeter of both ponds can be removed, cut back, or periodically pruned. This is especially critical for the smaller Pond B. If the encroaching beach naupaka is not controlled it will soon occlude all solar illumination from the pond and reduce the biological productivity and overall habitat functional value for opae'ula and other anchialine pond organisms. Both ponds represent, or have the potential to represent important site amenities. Opening up the dense stand of beach naupaka that occludes most of Pond B would enhance its anchialine pond resource. Any such clearing should be performed by hand (machete). Heavy equipment operations in either pond should be avoided.

Exotic fish (koi carp, tilapia, mosquito fish, etc.) and reef fish from adjacent coastal waters should not be released into either pond. The introduction of exotic fish into anchialine ponds generally results in the eradication of opae'ula and leads to a rapid growth of epibenthic algae and an overall hastening of pond senescence.

Pond A is heavily silted as a result of what appears to be natural processes. Continued deposition of wind-blown sand and organic materials deposited from perimeter vegetation will continue to decrease the depth of the pond through infilling, and facilitate its transition to an upland environment. The thick, largely anoxic bottom sediments could be removed via a vacuum dredge, an action that has the potential to improve water quality, pond aesthetics, and the habitat quality for native anchialine pond organisms.

SECTION 6
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EXHIBIT E

Archaeological Surveys

JOHN WAIHEE
GOVERNOR OF HAWAII

JAN 1 ? RECD ?C

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES
KEITH W. AHUE
MANABU TAGOMORI
DAN T. KOCHI

90-967

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION PROGRAM
LAND MANAGEMENT
STATE PARKS
WATER RESOURCE MANAGEMENT

LOG NO: 4368
DOC NO: 3284C

January 7, 1992

Mr. Norman Hayashi, Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Hayashi:

SUBJECT: County of Hawaii, SMA -- DeJoria Residence at Kiholo Bay
Puuwaawaa, North Kona, Hawaii
TMK: 7-1-02: 12

We have received a November 21, 1991, letter from Dr. Paul Rosendahl of PHRI which provides further information on this parcel.

The letter indicates that extensive land alteration of the ground surface has taken place in the parcel -- as a result of grubbing and clearing with heavy equipment. PHRI had inspected the area and found no evidence of historic remains and found that the natural bedrock was exposed in several areas and thus was quite close to the surface. The map attached to the letter shows two-thirds of the parcel so altered, from the center to the east. These are the areas of the proposed housesite as indicated on the map.

Given this information, we agree that two-thirds of the parcel has been altered and contain no significant historic sites -- the area with the house site. However, the proposed utility building lies outside of the disturbed areas (as marked on the map). We would still recommend representative archaeological test excavations (only a few) in this western third of the parcel, to determine if significant historic sites are present. Again, the intent is to ensure study of any remnants of the known and important Kiholo coastal settlement (known from oral historical and historical records).

If the applicant has evidence that the western third of the parcel has also had its land surface altered, then that information can be submitted, and we can alter our comments. Otherwise, we believe testing is merited rather than monitoring, because monitors can only see the site being destroyed by construction and only minimal amounts of information can then be recovered.

Sincerely,

DON HIBBARD, Administrator
State Historic Preservation Division

RC:jle

cc: P. Rosendahl, PHRI

JOHN WAIHEE
GOVERNOR OF HAWAII

JAN 7 = RECD

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES
KEITH W. AHUE
MANABU TAGOMORI
DAN T. KOCHI

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CONVEYANCES
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HISTORIC PRESERVATION PROGRAM
LAND MANAGEMENT
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WATER RESOURCE MANAGEMENT

90-967

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

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January 7, 1992

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Hilo, Hawaii 96720

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Sincerely,

DON HIBBARD, Administrator
State Historic Preservation Division

RC:jle

cc: P. Rosendahl, PHRI

90-967

JOHN WAIHEE
GOVERNOR OF HAWAII

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES
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MANABU TAGOMORI
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AQUACULTURE DEVELOPMENT PROGRAM
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CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION PROGRAM
LAND MANAGEMENT
STATE PARKS
WATER RESOURCE MANAGEMENT

LOG NO: 4563
DOC NO: 3343C.

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

January 30, 1992

Mr. Norman Hayashi, Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Hayashi:

SUBJECT: County of Hawaii, SMA -- DeJoria Residence at Kiholo Bay
Puuwaawaa, North Kona, Hawaii
TMK: 7-1-02: 12

This follows up on our January 7, 1992, letter. Dr. Paul Rosendahl of PHRI spoke further with our office on this project. He indicated that the western third of the parcel had also been disturbed in the past -- although not shown on the project map, and he indicated that it was unlikely that historic deposits remained. However, he did state that as a precaution archaeological monitoring could be done. Also, he stated that there was a slight dune crest near the shore, which may not have been disturbed by prior construction. He suggested that it be recommended that the dune crest not be impacted -- and indeed the plans do not call for such alteration. We find this recommendation acceptable.

Given this additional information, we would now find that the entire parcel has been altered, making it unlikely that significant historic sites remain -- except perhaps in the dune crest along the shore. We believe that the project will have "no effect" on significant historic sites, if the dune crest area is avoided (which is consistent with the plans) and if archaeological monitoring of the ground disturbing activities in the proposed utility building area in the western third of the parcel be done as a precautionary measure. A report of the findings of the monitoring, even if negative, should be submitted to our office and your department. If intact historic sites are found or burials are found, then construction work should halt in the immediate vicinity, until your department and our office can review the situation and develop a mitigation plan, if needed.

Sincerely,

Ross Cordy

for DON HIBBARD, Administrator
State Historic Preservation Division

RC:jle

cc: P. Rosendahl, PHRI

90-967

LOG NO: 4563
DOC NO: 3343C.

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 8TH FLOOR
HONOLULU, HAWAII 96813

January 30, 1992

Mr. Norman Hayashi, Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Hayashi:

SUBJECT: County of Hawaii, SMA -- DeJoria Residence at Kiholo Bay
Puuwaawaa, North Kona, Hawaii
TMK: 7-1-02: 12

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Sincerely,

Ross Cordy

for DON HIBBARD, Administrator
State Historic Preservation Division

RC:jle

cc: P. Rosendahl, PHRI

EXHIBIT F

Individual Wastewater System Application to the Department of Health

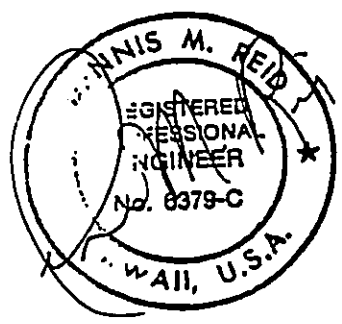
INDIVIDUAL WASTEWATER SYSTEM (IWS)

FOR

DEJORIA RESIDENCE

PORTION OF PUUWAAWAA, NORTH KONA, HAWAII
(TMK No. 7-1-02:12)

FEBRUARY 24, 1992



AQUA/WASTE ENGINEERS
P.O. BOX 1686, KAILUA-KONA, HI 96745
(808) 329-8266 FAX 326-7767

Reid & Associates Inc.

AQUA / WASTE ENGINEERS

P.O. Box 1686 • Kailua-Kona, Hawaii • 96745
Telephone: (808) 329-8266 • Fax (808) 326-7767
In Hawaii 1-(800)-634-3247

February 24, 1992

Mr. Dennis Tulang, Chief
Wastewater Branch
Five Waterfront Plaza
500 Ala Moana Blvd., Suite 250
Honolulu, HI 96813

SUBJECT: Individual Wastewater System (IWS) for the DeJoria Residence Project
Portion of Puuwaawaa, North Kona, Hawaii
(TMK: 7-1-02:12)

Gentlemen:

Submitted for your review and approval is the IWS design for the DeJoria Residence. The proposed development is for the construction of a three-bedroom house at the above referenced three acre site. The wastewater from the residence will be treated using a 1,000 gallon per day aerobic treatment unit. The effluent from the aerobic unit will be sterilized by ultraviolet disinfection and will be utilized through a subsurface drip system for landscape irrigation.

If you have any questions or desire additional information, please do not hesitate to call.

Sincerely,
AQUA/WASTE ENGINEERS

Margaret Purviance

Margaret Purviance,
Project Engineer

MP/mp
Attach.
File: 023-01-91
cc: Harold Matsuura, State Health Department, 75 Aupuni St., Hilo, HI 96720
Harry McDonald, P.O. Box 135, Paauilo, HI 96776

CONTENTS

DESIGN CRITERIA
TMK No. 7-1-02:12

1. LOCATION

   Below UIC Line
   Portion of Puuwaawaa, North Kona, Hawaii
   Lot Area = 3.0 acres

2. PROJECTED FLOW

   No. of Bedrooms: 3
   Total Daily Flow, GPD: 600

3. Multi-flo Aerobic Unit

   Minimum Volume, Gallons: 600 (use 1000)
   Effluent Quality: 5 mg/l BOD (5 day) & SS

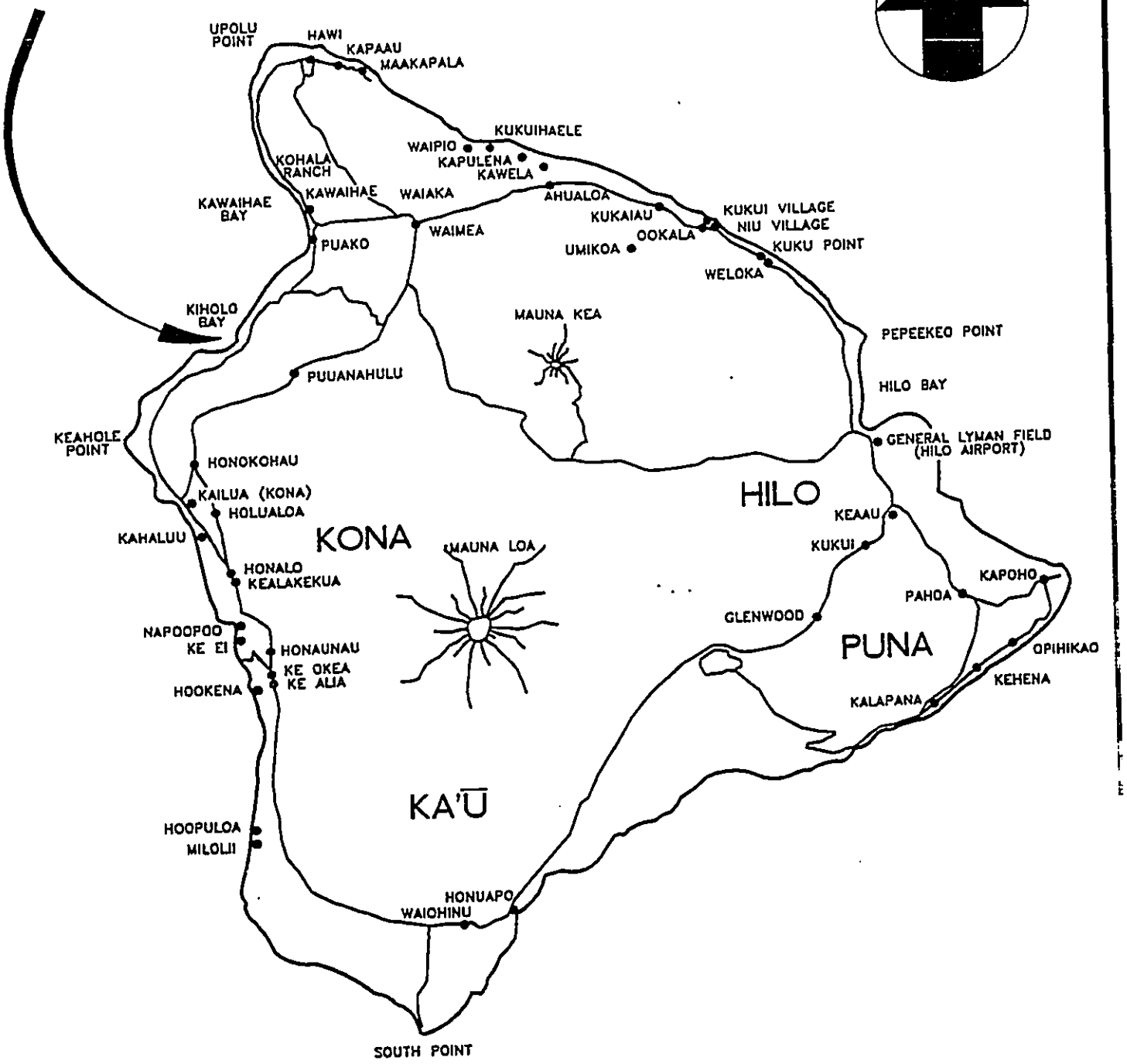
4. DISINFECTION

   Sanitron Ultraviolet Water Purifier

5. DISPOSAL SYSTEM

   Subsurface drip irrigation system

VICINITY
MAP
(SEE DETAIL L-2)



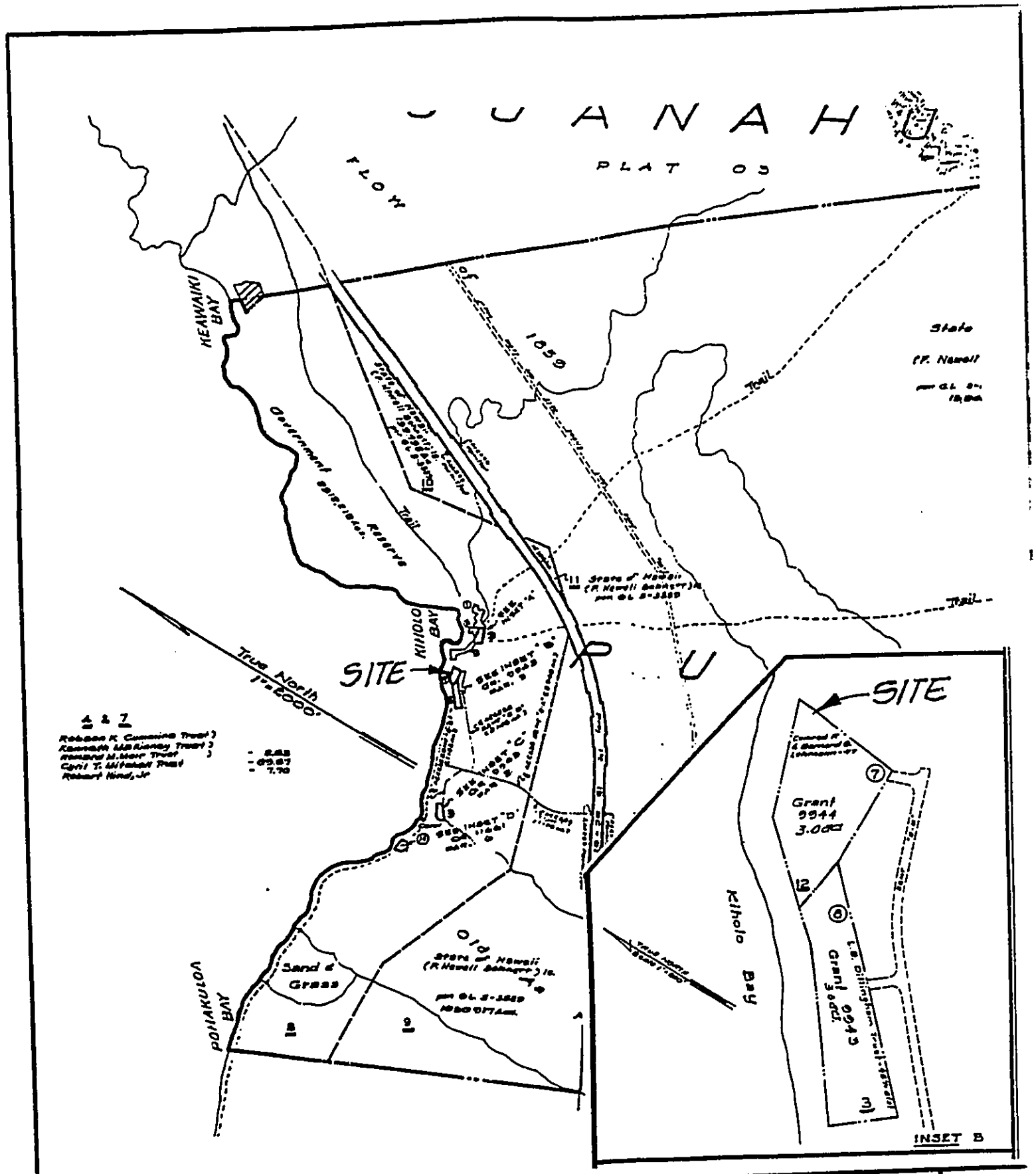
AQUA/WASTE ENGINEERS
P O BOX 2853, KAILUA-KONA, HI. 96745 (808) 329-8266

LOCATION MAP

SCALE : NONE

March 12, 1991

L-1



AQUA/WASTE ENGINEERS

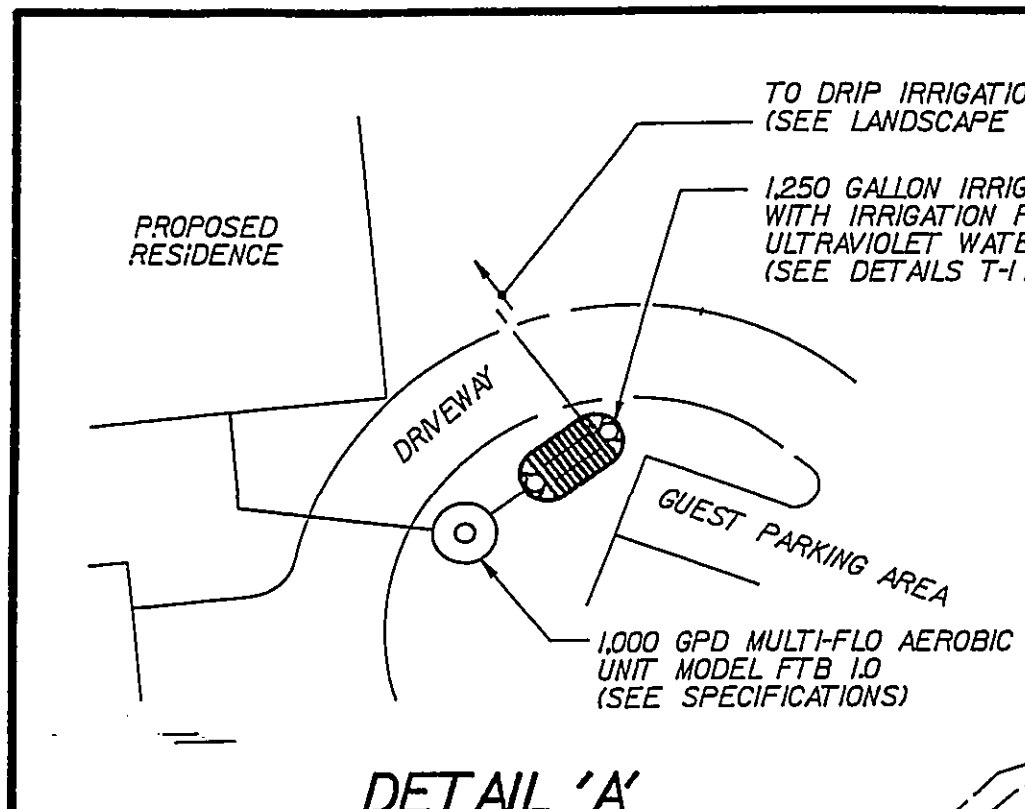
P.O. BOX 1686, KAILUA-KONA, HI 96745 (808)329-8266

VICINITY MAP

T.M.K.: 7=1=2:12

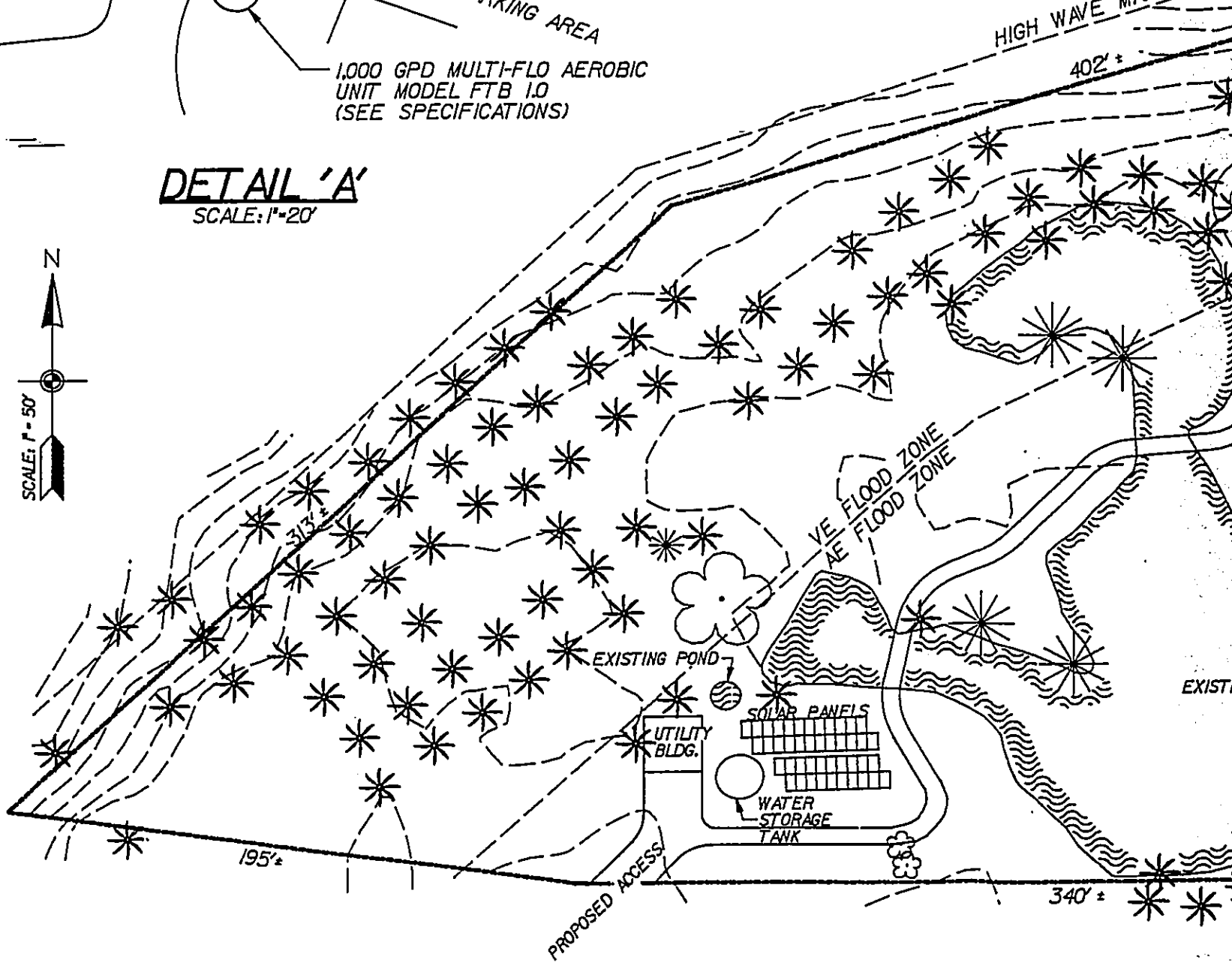
L-2

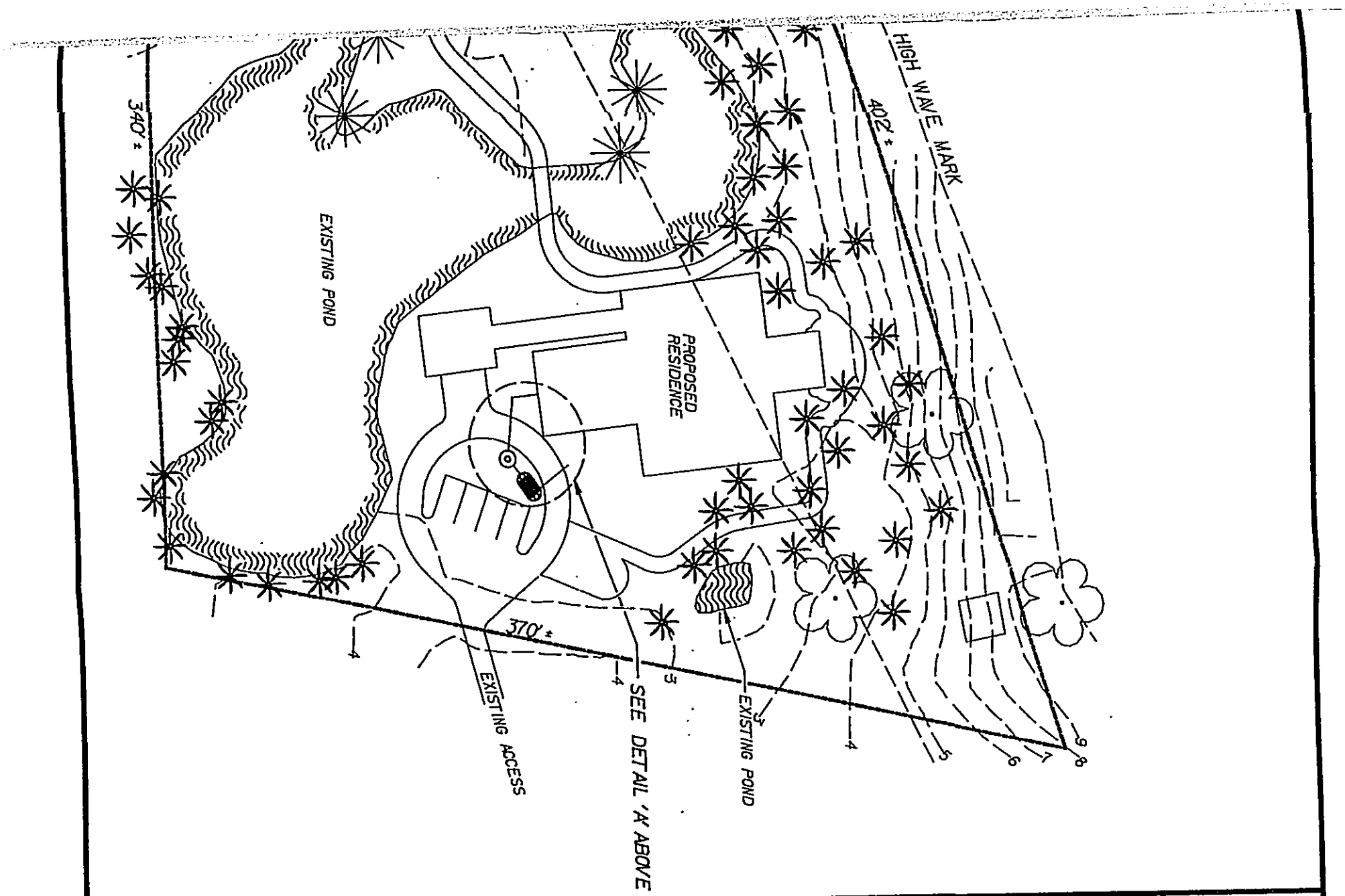
SCALE: 1" = 200' DATE: January 30, 1992



DETAIL 'A'

SCALE: 1"=20'





AQUA/WASTE ENGINEERS

P.O. BOX 1686, KAILUA-KONA, HI. 96745 (808)329-8266

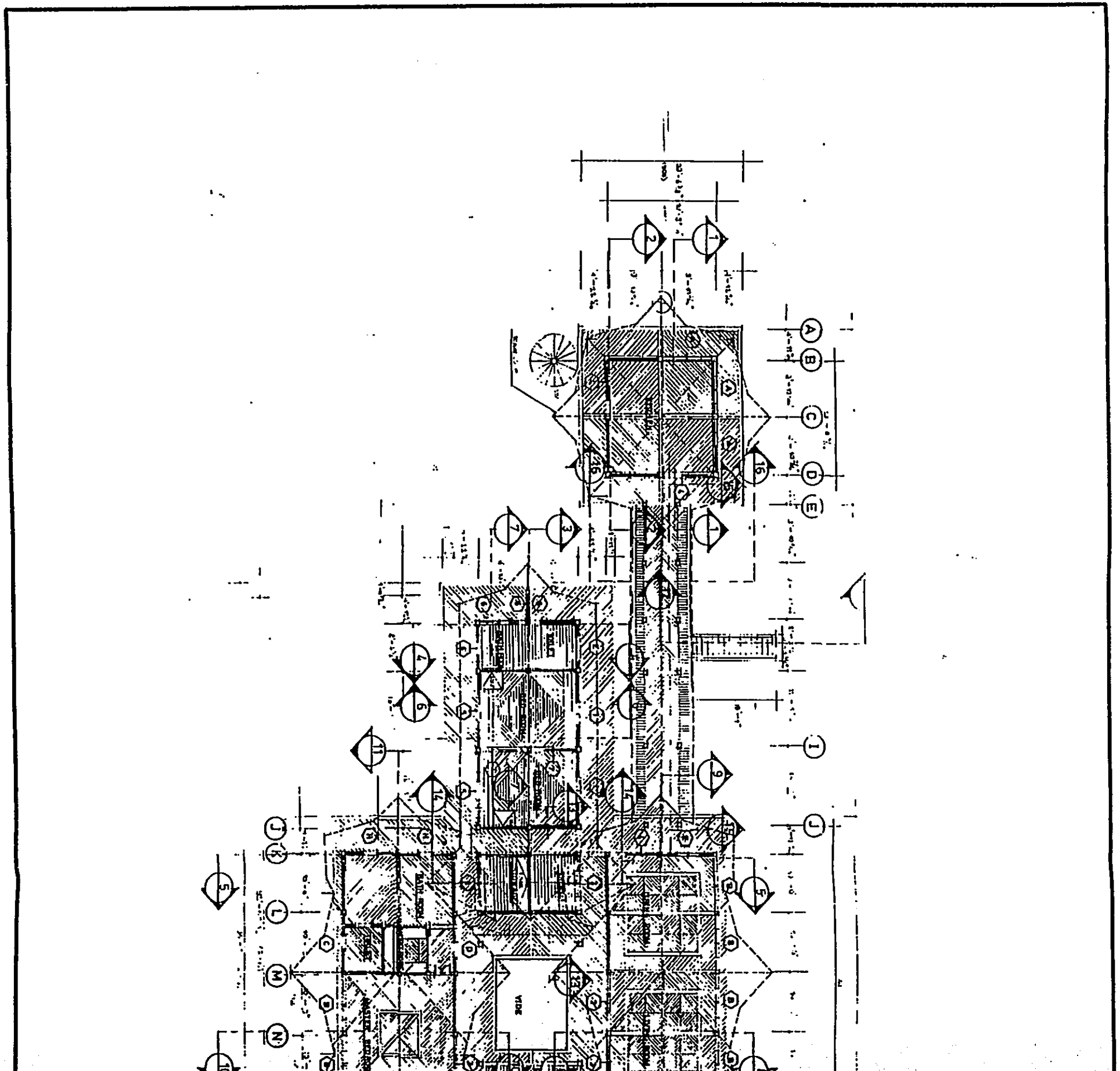
SITE PLAN

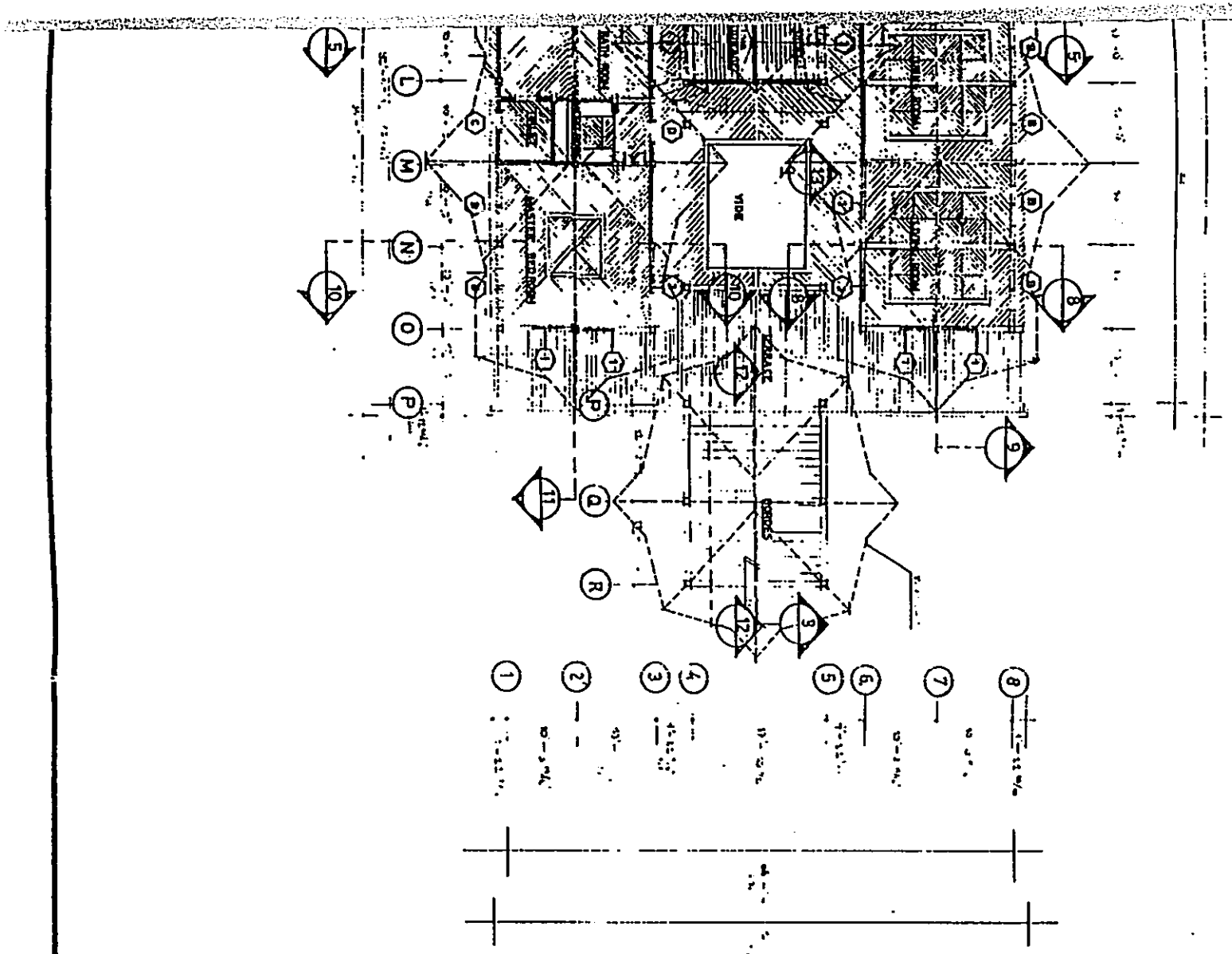
TMK 7-1-02:12

SCALE: 1" = 50'

DATE: February 24, 1992

L-3





AQUA/WASTE ENGINEERS

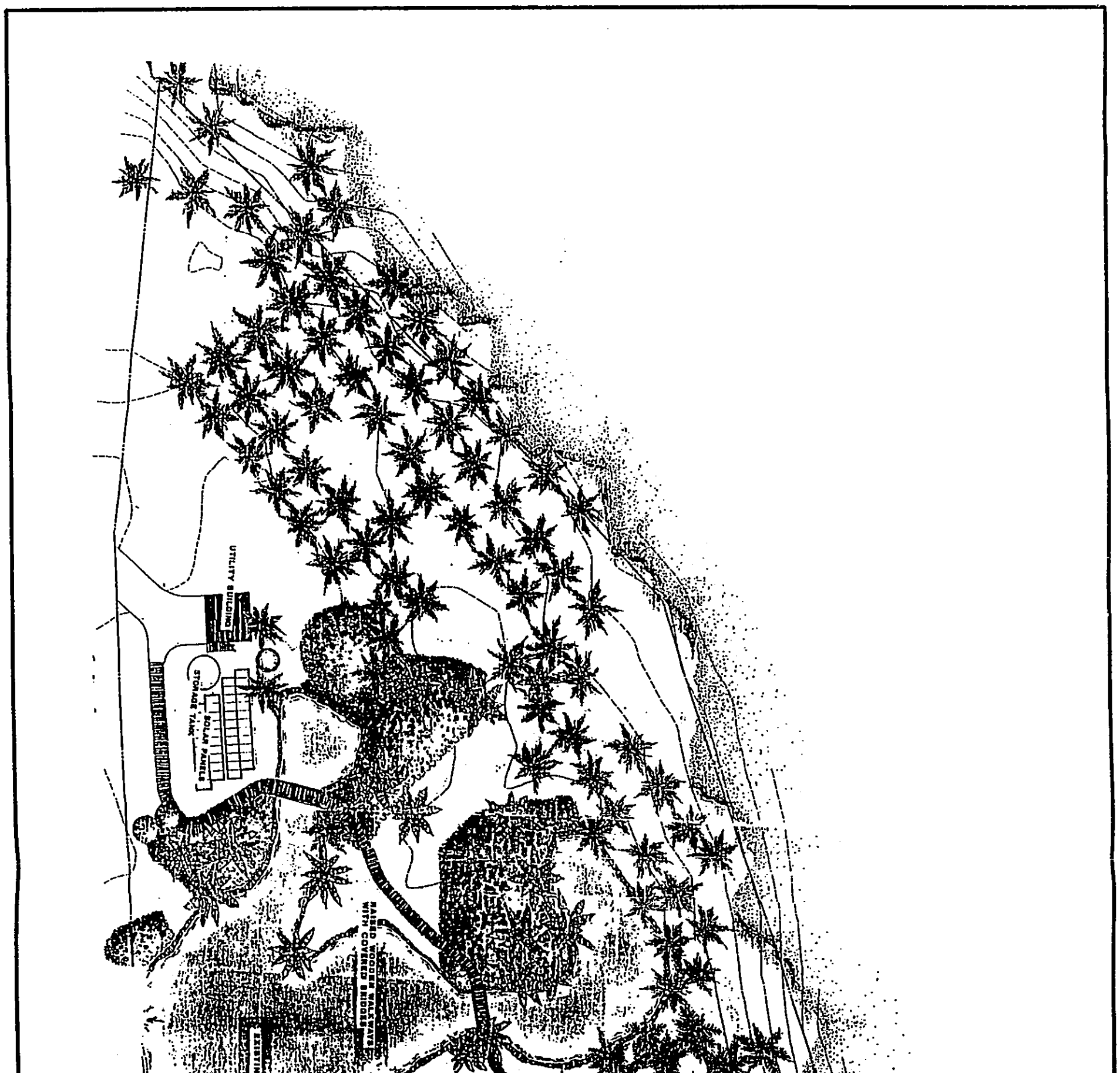
P.O. BOX 1686, KAILUA-KONA, HI. 96745 (808)329-8266

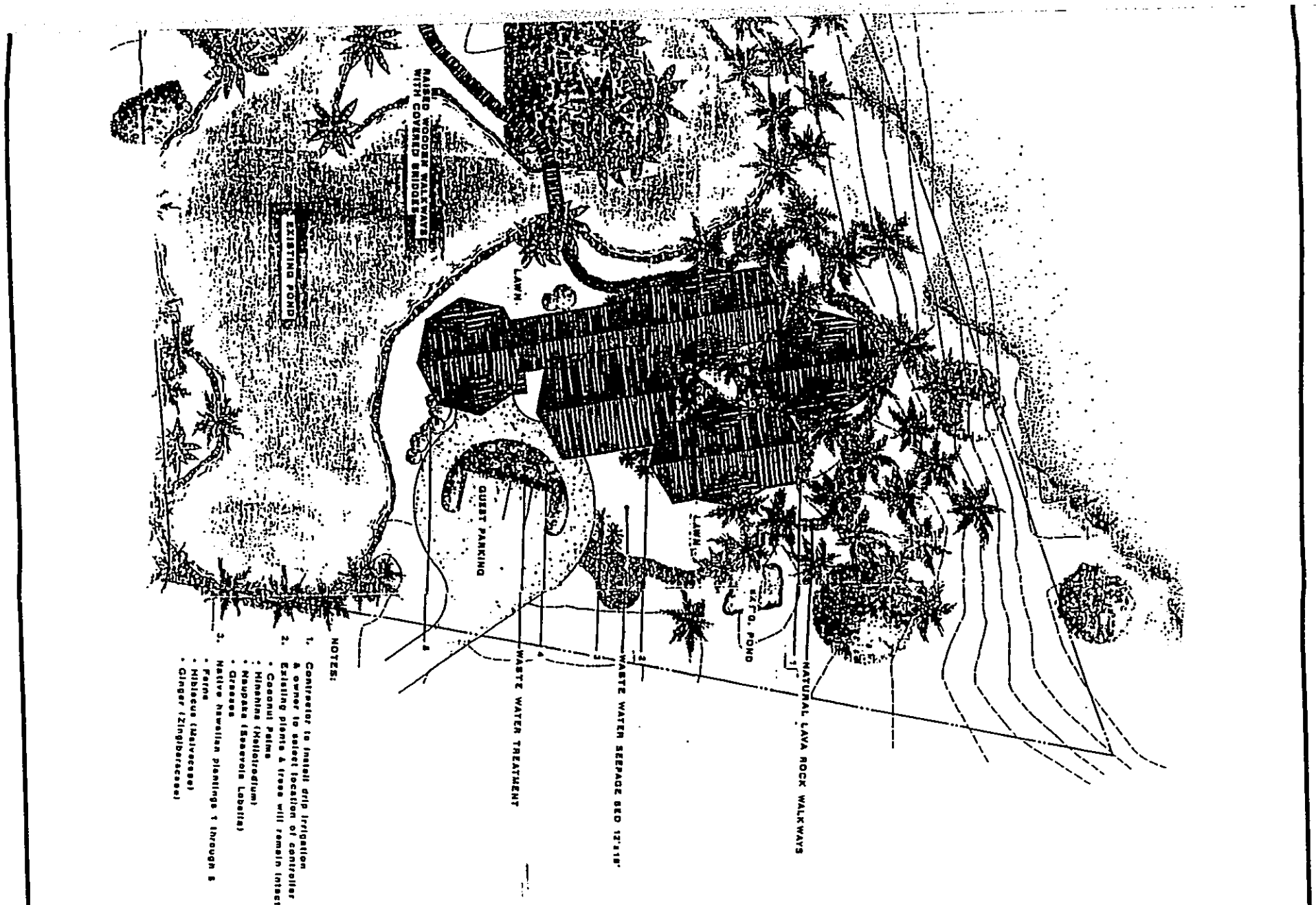
FLOOR PLAN
TMK 7-1-2:12

NOT TO SCALE

DATE: January 30, 1992

L-4


UTILITY BUILDING
STORAGE TANK
SOLAR PANELS
RAISED WOODEN WALKWAYS
WITH COVERED BRIDGES



AQUA/WASTE ENGINEERS

P.O. BOX 1686, KAILUA-KONA, HI. 96745 (808)329-8266

LANDSCAPE PLAN

TMK 7-1-02:12

SCALE: 1" = 50'

DATE: February 18, 1992

L-5

MULTI•FLO

Wastewater Treatment System—for Residential and Commercial Properties

Multi-Flo—Best for the User

- Consistent Effluent Quality
- Quiet, Odorfree Operation
- Unique, Reliable Internal Filtering System
- Minimal Space Requirements
- Eliminates Offensive Sewage Discharge
- Reputation and Credibility. 20 Years Experience. Thousands of Installations throughout the Country
- Installed and [illegible] Trained [illegible] Representatives

Multi-Flo—Best for the Environment

- [illegible] Sewage Contaminants
- [illegible] Water
- [illegible] System

[illegible]

Simply The Best

NSF

Certified to ANSI/NSF Standard 40 Class I

Waste Treatment Systems, Inc. • 2324 East River Road • Dayton, Ohio 45439 • 513/293-1100 • Fax 513/293-1186

MULTI-FLO

Features and Benefits

No Odors
Because the Multi-Flo utilizes an aerobic treatment process, there are no offensive rotten egg odors commonly associated with septic tanks.

Quiet Operation
[illegible]

Low Operating Cost
[illegible]

No Owner Maintenance
[illegible]

Low Installation Cost
[illegible]

Minimal Space Requirements
[illegible]

Easy Access for Service
[illegible]

Two (2) Year Warranty
[illegible]

Prevents Drainfield Failure
[illegible]

Several Plant Sizes Available
[illegible]

NSF [illegible] Class [illegible]
[illegible]

NSF

Certified to ANSI/NSF Standard 40 Class I

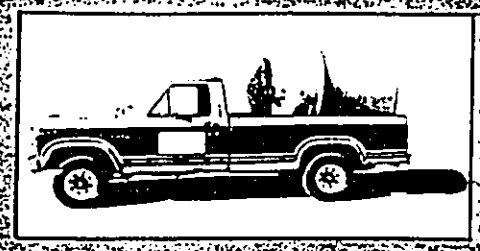
Waste Treatment Systems, Inc. • 2324 East River Road • Dayton, Ohio 45439 • 513/293-1100 • Fax 513/293-1186

MULTI-FLO

Simply the Best

Multi-Flo is a convenient alternative to a central sewage system or the septic tank and is ideal for the renovation of a failing on-site sewage system. And thanks to its durable, lightweight construction, Multi-Flo can be installed quickly and easily in any location, even those with limiting factors.

But most of all, Multi-Flo offers the highest quality of any wastewater treatment system in its class. It's simply the best.



Clean, Odorless Effluent

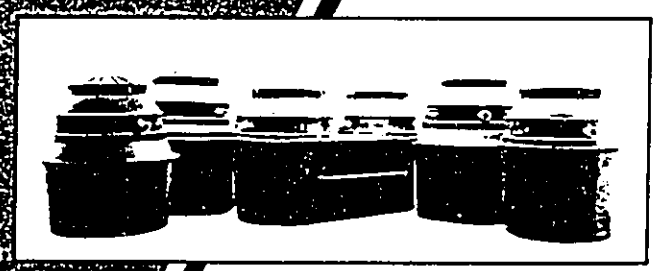
A unique feature of the Multi-Flo System is that the entire process takes place in a single tank. Multi-Flo has been Tested and Certified under N.S.F. standard 40 as a Class I System — the Highest Rating. Because of the high degree of treatment the Multi-Flo effluent is allowed by some states and local agencies for surface discharge as well as recycle and irrigation use.

Founded in 1970, Multi-Flo has set the standard in wastewater treatment. From the day of its inception, Multi-Flo was developed with the highest efficiency — consequently we have never had to change to meet standards required by N.S.F. Initially tested by N.S.F. in 1973, again in 1981, and most recently in 1991, we have always maintained those high standards to guarantee a Class I rating.

Multi-Flo has sold thousands of units across the country. This success is due not only to the outstanding product, but also to the people involved with Multi-Flo. We take pride in our product and stand behind it. Multi-Flo is a company built on reputation. We are committed to our product, our customers, and the environment.

Five Sizes:
500, 600, 750, 1000, and 1500 gallons per day.

Electrical Requirements:
120 volts/2.6 amps, single phase, 60 cycle.



NSF.
Certified to ANSI/NSF Standard 40
Class I

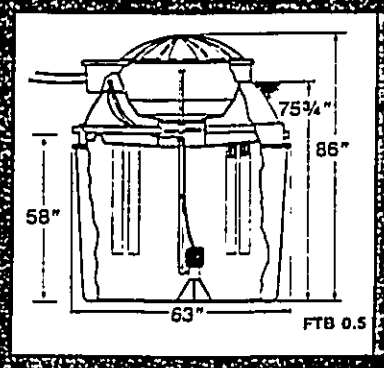
Waste Treatment Systems, Inc. • 2324 East River Road • Dayton, Ohio 45439 • 513/293-1100 • Fax 513/293-1186

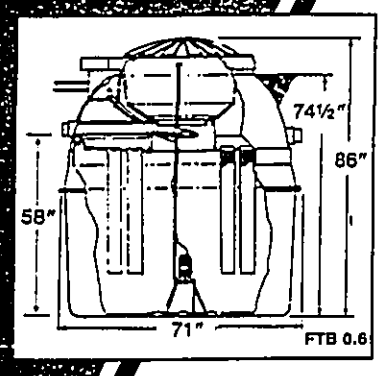
MULTI-FLO

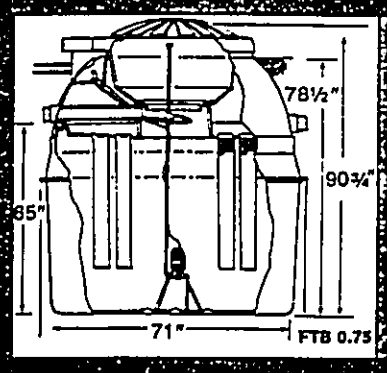
Specifications

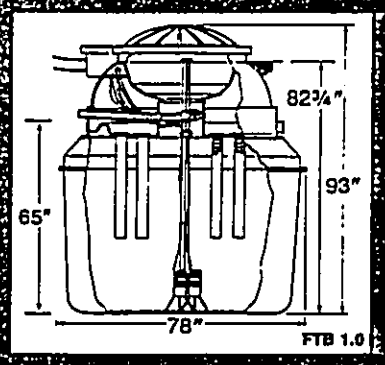
Wastewater Treatment (NSF Test Evaluation)

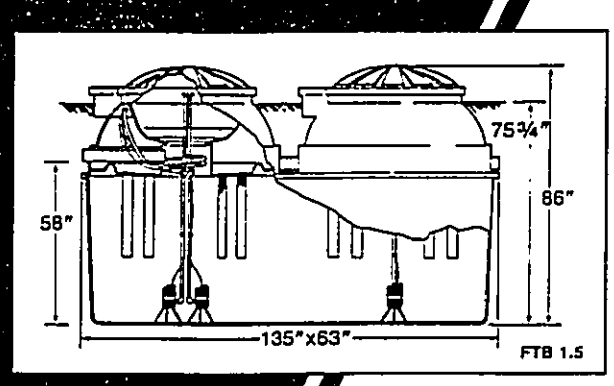
System Components and Materials

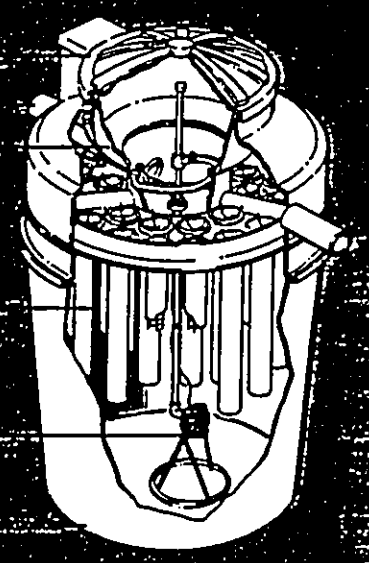












UNIT SPECIFICATIONS

ITEM	FTB 0.5	FTB 0.6	FTB 0.75	FTB 1.0	FTB 1.5
Treatment Gal/Day	500	600	750	1000	1500
Volume Gal	500	600	750	1000	1500
Bod Load/Day	1.5	1.5	1.5	3.0	4.5
Diameter	63"	71"	71"	78"	135"x63"
Total Height	86"	86"	90 ¾"	93"	86"
Grade to Inlet Invert	17 ¾"	16"	16"	17 ¾"	17 ¾"
Grade to Outlet Invert	19 ¾"	18"	18"	19 ¾"	19 ¾"
Excavation Depth	75 ¾"	74 ½"	78 ½"	82 ¾"	75 ¾"
No. of Aerators	1	1	1	2	3
No. of Filters	30	30	30	30	60
Shipping Weight	325 lbs.	350 lbs.	400 lbs.	550 lbs.	780 lbs.
Inlet Invert*	58"	58"	65"	65"	58"
Outlet Invert*	56"	56"	63"	63"	56"

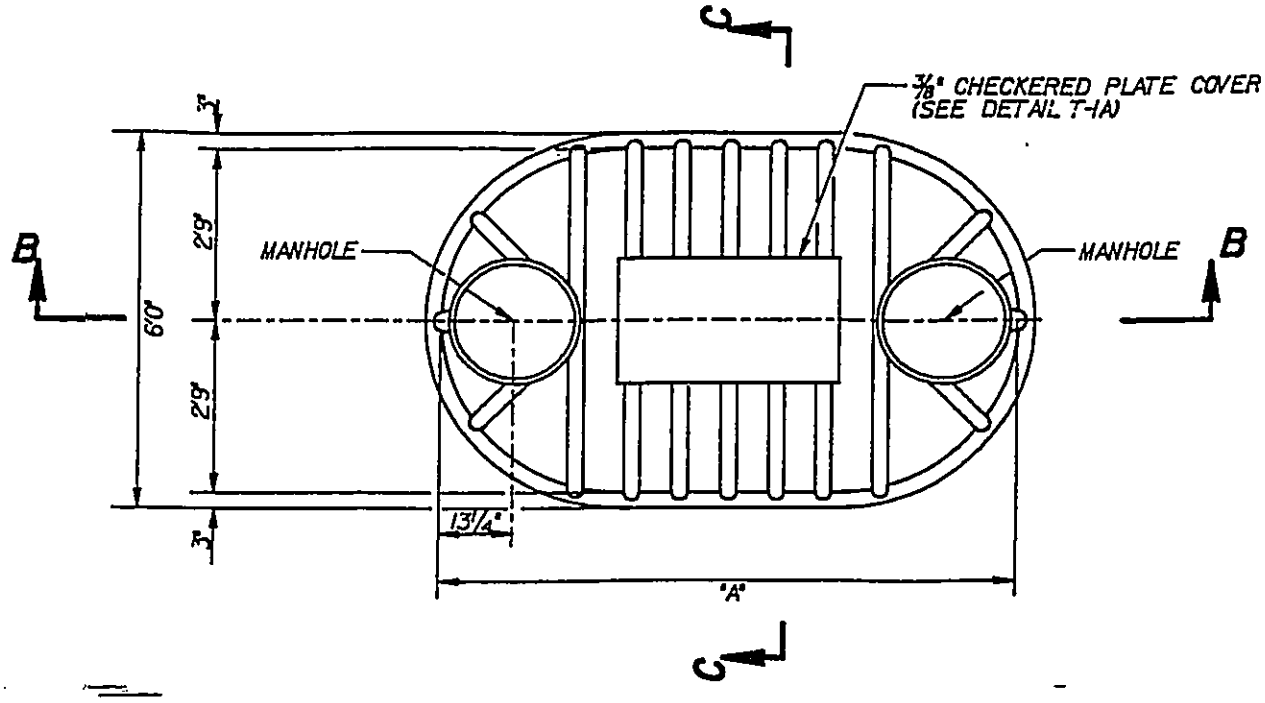
**From Bottom Excavation – See Drawing*

GENERIC ENVIRONMENTAL PRODUCTS
A DIVISION OF ANDERSON HAWAII, INC.
73-4862 ANINI ST. KAILUA-KONA, HI. 96740
IN HAWAII 1-800-852-7513
(808) 325-5955 FAX (808) 325-0840

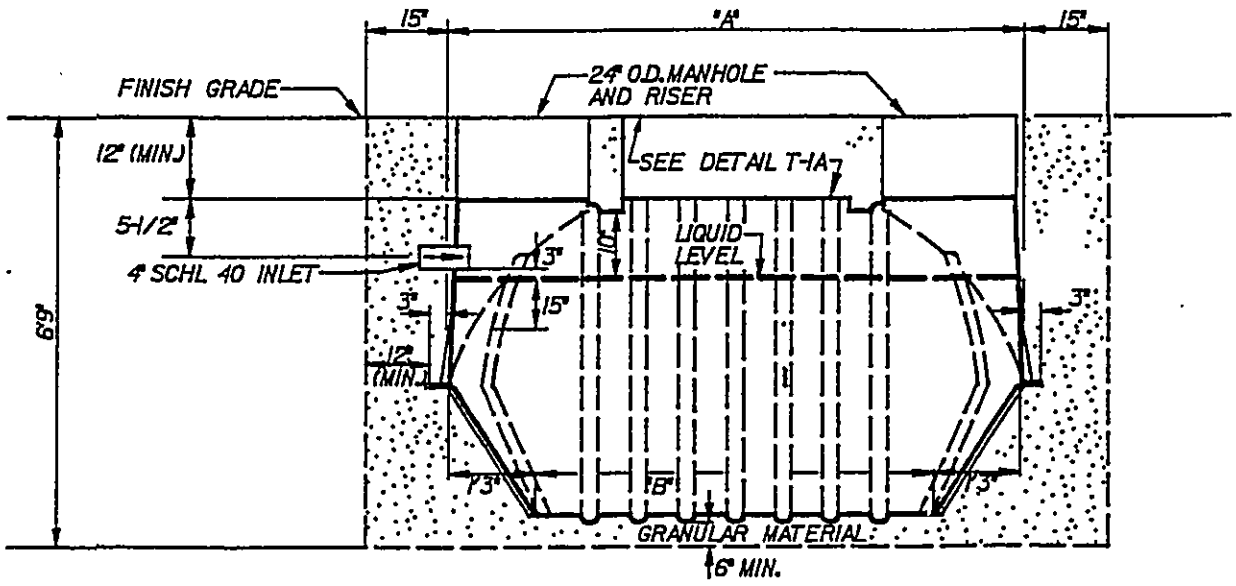
NSF

Certified to ANSI/NSF Standard 40
Class I

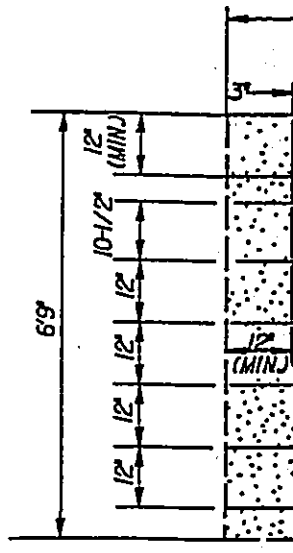
Waste Treatment Systems, Inc. • 2324 East River Road • Dayton, Ohio 45439 • 513/293-1100 • Fax 513/293-1186



PLAN VIEW



SECTION B-B



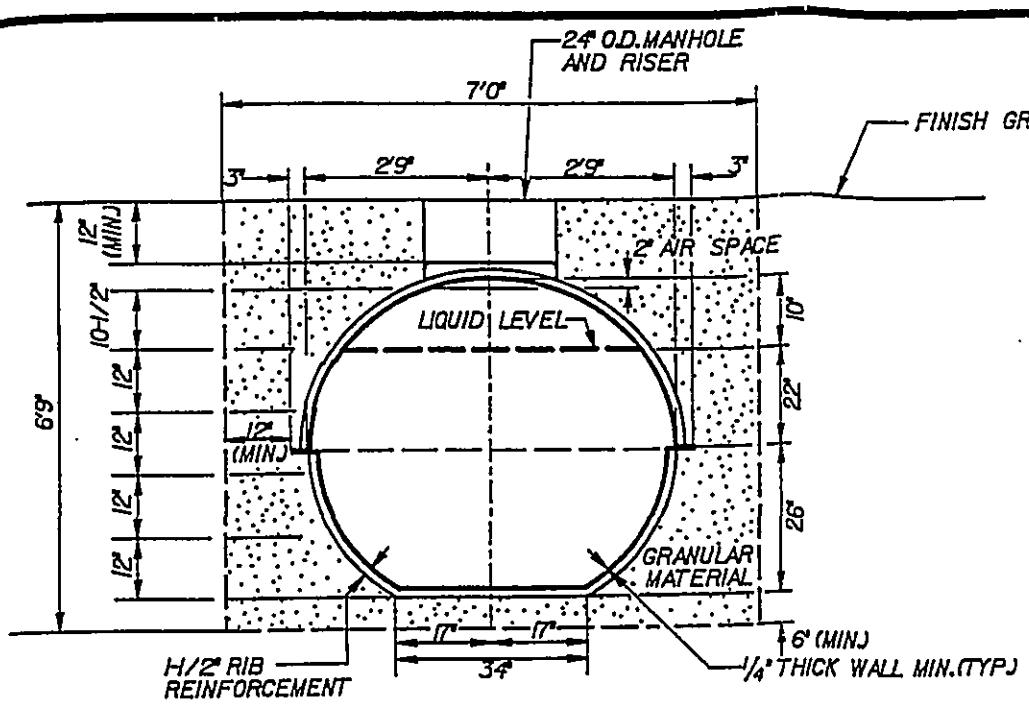
H/2 RIB —
REINFORCE

TANK SIZING S

TANK DESIGNATION	TANK CAPACITY (GALLONS
FES-7.5	750
FES-10	1000
FES-12.5	1250
FES-15	1500

NOTES:

1. FIBERGLASS TANK AS
   TEL (808) 325-5955
2. PROVIDE GRANULAR M
3. GRANULAR MATERIAL S
4. SUBSTITUTIONS OF OT
   REQUIREMENTS ARE
   FOR APPROVAL.
5. FILL TANK WITH WATE
   NO ROCKS SHALL EXC
   EXCEEDING ONE FOOT
6. FIBERGLASS TANK SH



SECTION C-C

TANK SIZING SCHEDULE

TANK DESIGNATION	TANK CAPACITY (GALLONS)	"A" EFFECTIVE LENGTH	"B" BOTTOM LENGTH
FES-7.5	750	7'-6 1/2"	4'-10"
FES-10	1000	9'-3"	6'-6 1/2"
FES-12.5	1250	11'-4"	8'-7 1/2"
FES-15	1500	13-4 1/2"	11'-8"

NOTES:

1. FIBERGLASS TANK AS PROVIDED BY DAVE ANDERSON OF GENERIC ENVIRONMENTAL PRODUCTS. TEL (808) 325-5955 FAX (808) 325-0840 IN HAWAII (800) 852-7513
2. PROVIDE GRANULAR MATERIAL BEDDING (#3 COARSE) FOR TANK.
3. GRANULAR MATERIAL SHALL BE DRAIN ROCK (#3 COARSE) (NOMINAL SIZE 3/4" TO 1-1/2").
4. SUBSTITUTIONS OF OTHER TANKS ARE ACCEPTABLE AS LONG AS MINIMUM VOLUME REQUIREMENTS ARE MET. CONTRACTOR SHALL SUBMIT TANK DRAWING TO ENGINEER FOR APPROVAL.
5. FILL TANK WITH WATER BEFORE BACKFILLING AGAINST TANK WITH GRANULAR MATERIAL. NO ROCKS SHALL EXCEED 4" DIAMETER. IF WATER IS UNAVAILABLE, BACKFILL IN LIFTS NOT EXCEEDING ONE FOOT AND COMPACT BY HAND.
6. FIBERGLASS TANK SHALL BE LOCATED IN NON-VEHICULAR TRAFFIC AREA ONLY.

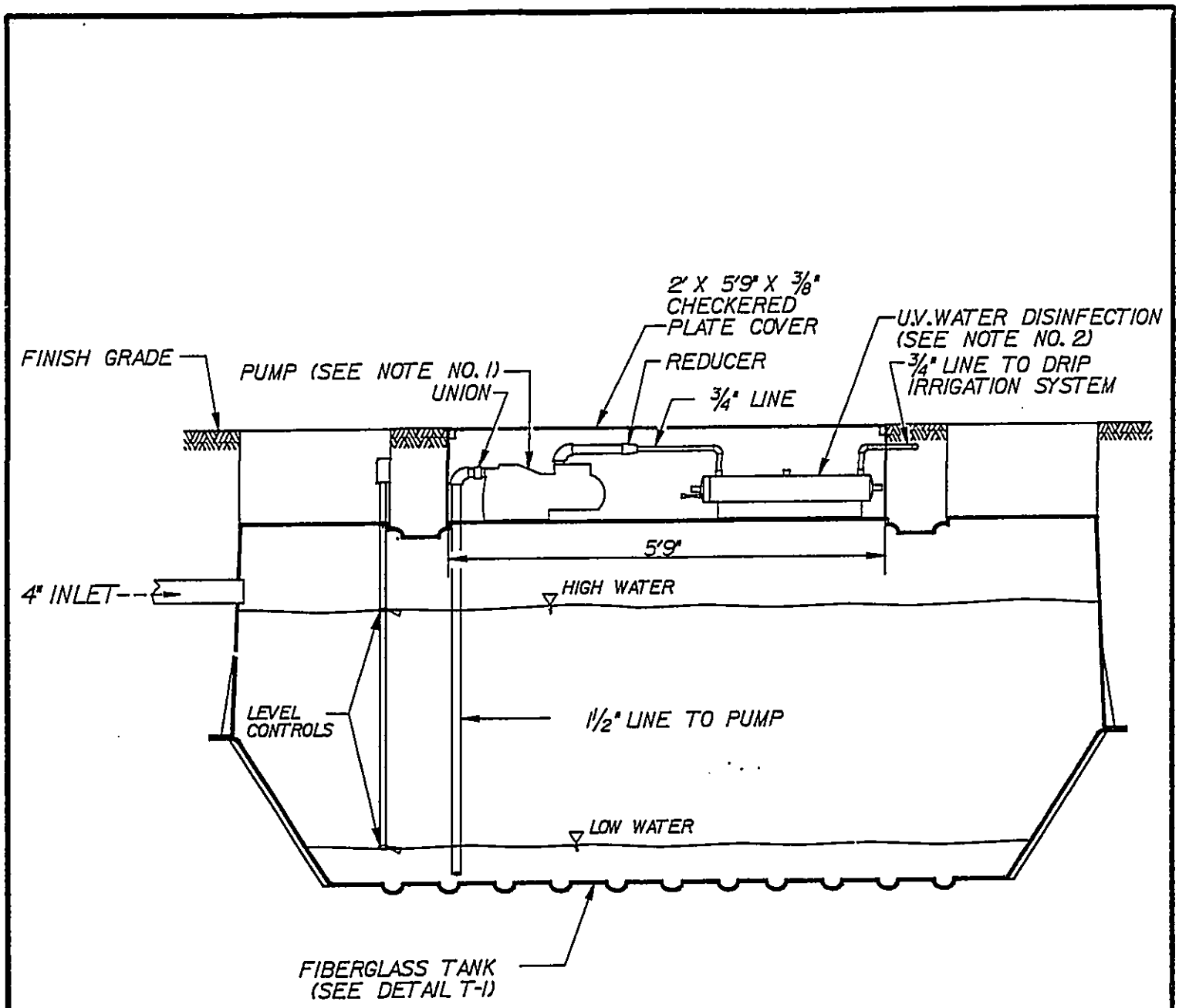
FIBERGLASS IRRIGATION TANK

750-1500 GALLONS

NOT TO SCALE DATE: February 24, 1992

T-1

AQUA/WASTE ENGINEERS
P.O. BOX 1686, KAILUA-KONA, HI. 96745 (808)329-9266



NOTE:

1. PUMP TO BE MYERS QUICK PRIME QP7. (SEE SPECIFICATIONS).
2. U.V. WATER DISINFECTION TO BE SANITRON ULTRAVIOLET WATER PURIFIER MODEL NO. S23. (SEE SPECIFICATIONS).

AQUA/WASTE ENGINEERS
P.O. BOX 1686, KAILUA-KONA, HI. 96745 (808)329-8266

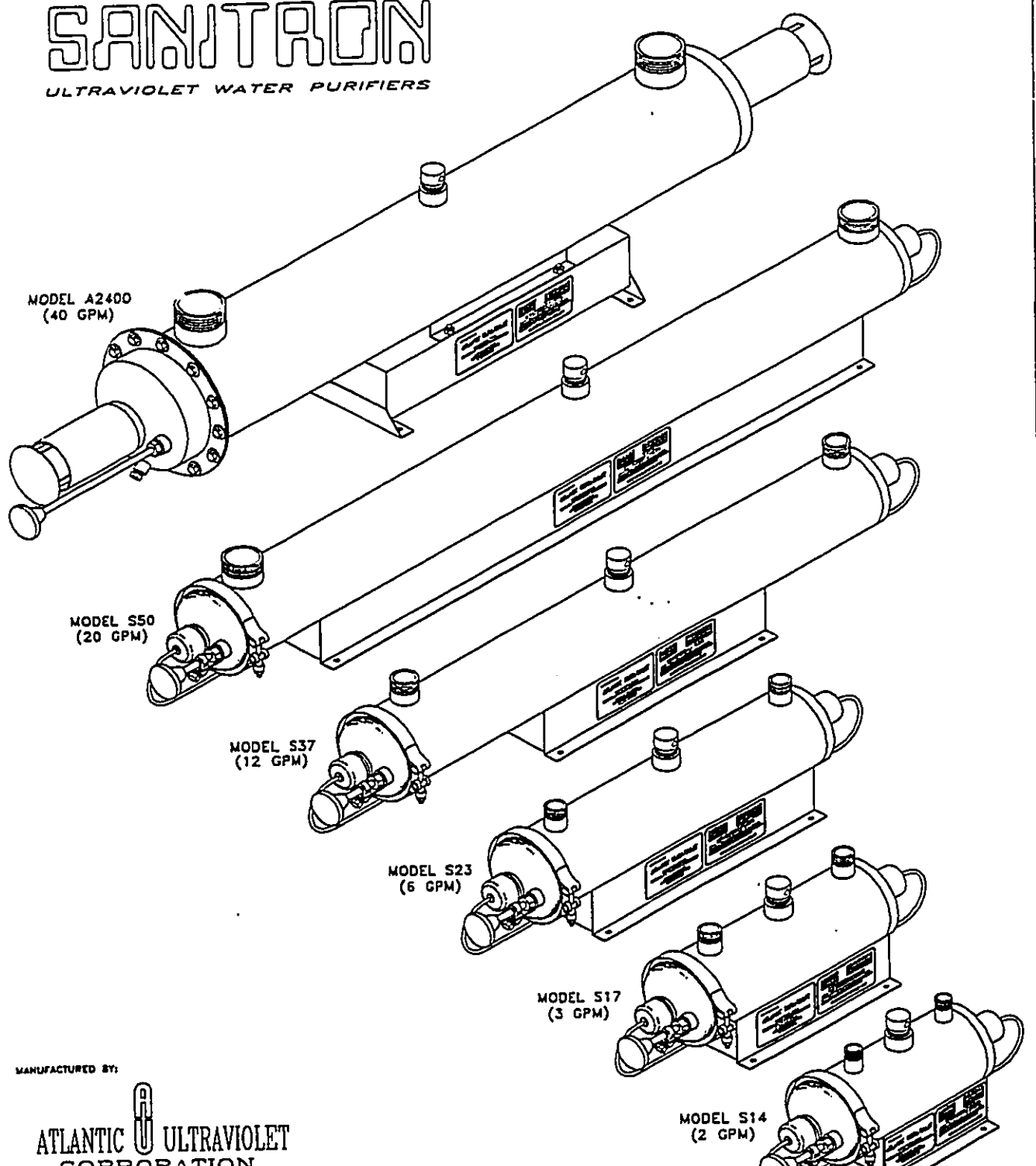
IRRIGATION STORAGE, PUMP & U.V. DISINFECTION

SCALE: 1/2" = 1' DATE: February 24, 1992

T-1A

SANITRON™

ULTRAVIOLET WATER PURIFIERS



MANUFACTURED BY:

ATLANTIC ULTRAVIOLET
CORPORATION
250 NORTH FEHR WAY
BAYSHORE,NEW YORK 11706
PHONE: (516) 586-5900
FAX: (516) 595-2609

GERMICIDAL ULTRAVIOLET

Ultraviolet water purification is a unique and rapid method of water disinfection without the use of heat or chemicals.

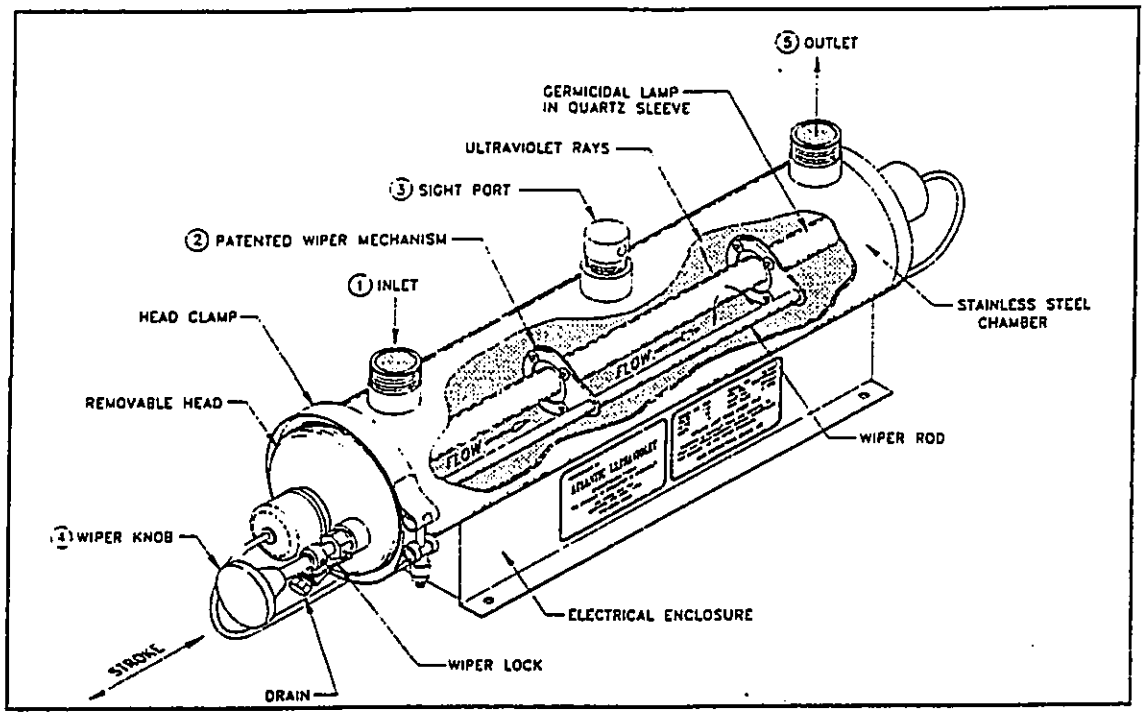
Sanitron water purifiers utilize germicidal ultraviolet lamps that produce short wave radiation that is lethal to bacteria, viruses and other micro-organisms present in common water.

These rays are shorter in wavelength than the shortest ultraviolet rays that penetrate the earth's atmosphere from the sun.

Germicidal lamps are widely used for air disinfection in hospitals, veterinaries and laboratories to protect personnel and prevent cross infection.

Pharmaceutical manufacturers, food processors and bottlers use germicidal lamps to prevent product contamination and in some instances for the cold sterilization of the finished product.

SANITRON Water Purifiers are manufactured under patents owned by Atlantic Ultraviolet Corporation.



PRINCIPLE OF OPERATION

① The water enters the purifier and flows into the annular space between the quartz sleeve and the outside chamber wall.

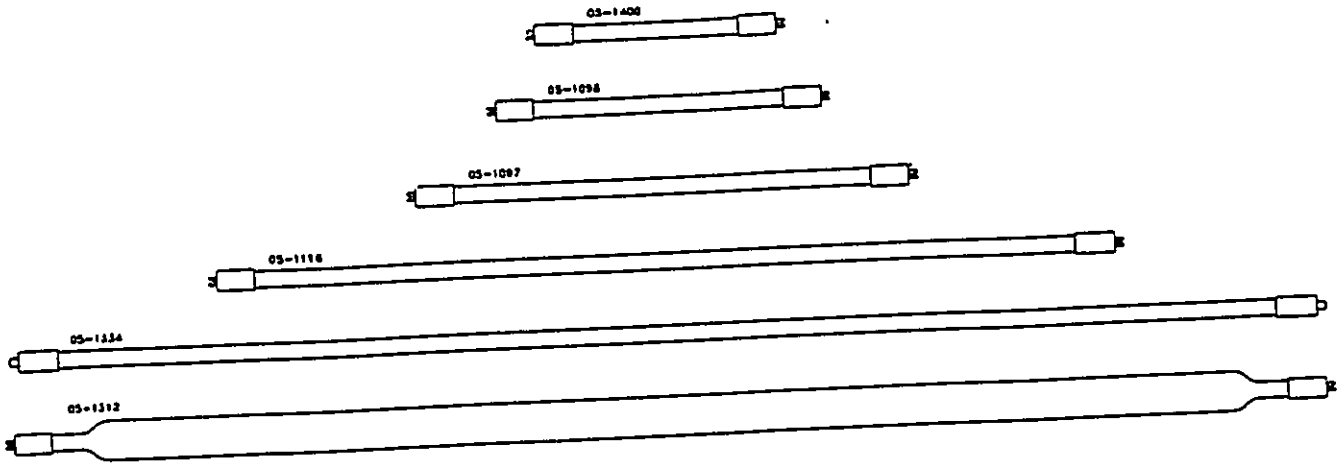
② The wiper segments induce turbulence in the flowing liquid to insure uniform exposure of suspended micro-organisms to the lethal ultraviolet rays.

③ The sight port enables visual observation of lamp operation.

④ The wiper assembly facilitates periodic cleaning of the quartz sleeve without any disassembly or interruption of purifier operation.

⑤ Water leaving the purifier is instantly ready for use.

GERMICIDAL LAMP DATA



LAMP NO.	PURIFIER MODEL NO.	NOMINAL LAMP LENGTH	POWER ① CONSUMPTION	ULTRAVIOLET OUTPUT ②	RATED EFFECTIVE LIFE
05-1400	S14	8 15/16" (227 MM)	10 WATTS	2.4 WATTS	10,000 HRS.
05-1098	S17	11 7/8" (302 MM)	14 WATTS	3.7 WATTS	10,000 HRS.
05-1097	S23	17 3/4" (451 MM)	20 WATTS	6.5 WATTS	10,000 HRS.
05-1116	S37	31 13/16" (808 MM)	36 WATTS	12.5 WATTS	10,000 HRS.
05-1334	S50	45 7/8" (1165 MM)	50 WATTS	19.3 WATTS	10,000 HRS.
05-1312 ☆	A2400 & LARGER	46 1/4" (1175 MM)	110 WATTS	45 WATTS	10,000 HRS.

① WATTAGE IS LAMP WATTS ONLY AND DOES NOT INCLUDE BALLAST LOSS.

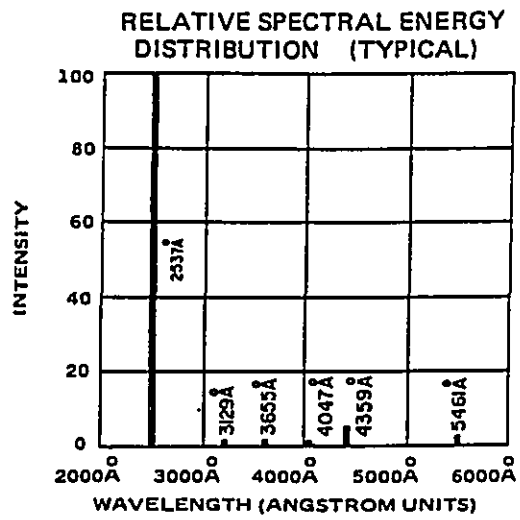
② MAXIMUM RATED OUTPUT AT 2537 Å.

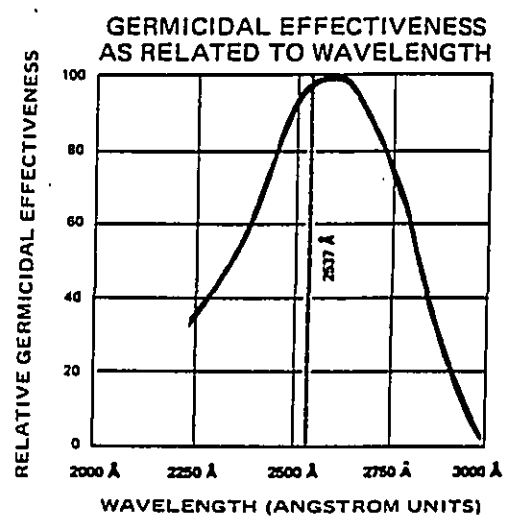
☆ PATENTED BY ATLANTIC ULTRAVIOLET CORPORATION.

The lamps listed above have been especially developed and selected for use with Sanitron Water Purifiers.

All Sanitron lamps are of the low pressure type which afford the maximum efficiency in producing the required germicidal rays. In addition to the obvious advantages of high efficiency and low power requirements, there is no possibility of the purifier overheating as is the case with some other lamp types. Consequently the need for additional equipment to combat overheating is eliminated.

CR SANITRON WATER PURIFIERS





EXPOSURE NECESSARY TO KILL

The dosage necessary to inactivate a micro–organism is a product of time and intensity. When used as directed Sanitron water purifiers will provide a dosage in excess of 30,000 microwatt seconds per square centimeter. (μWsec/cm^2)

Ultraviolet energy at 2537 Å required for complete destruction of some micro–organisms.

Organism	Type	Ailment/Symptom	uWsec/cm^2
Streptococcus	Bacteria	Strepthroat	3,800
Dysentry Bacilli	Bacteria	Diarrhea	4,200
Influenza	Virus	Flu	6,600
Staphylococcus	Bacteria	Boils	6,600
Fecal Coliform	Bacteria	Diarrhea	6,600
Salmonella	Bacteria	Food Poisoning	10,000
Legionella Pneumophila	Bacteria	Legionnaires Disease	12,300
Bacteriophage (E.Coli)	Virus	Diarrhea	6,600

SPECIFICATIONS - STANDARD MODELS

MODEL	GPM	GPH	INLET AND ⑤ OUTLET SIZE	REPLACEMENT LAMP(S)	POWER ⑥ CONSUMPTION	UNIT DIMENSIONS (INCHES)			SHIPPING DATA		
						LENGTH	WIDTH	HEIGHT	GROSS WT.	NET WT.	CU. FT.
SANITRON S14	2	120	1/2" NPT	051400	14 WATTS	16 3/8"	5 1/2"	4 5/16"	11 LBS.	7 LBS.	1.8
SANITRON S17	3	180	3/4" NPT	051098	18 WATTS	19 3/8"	5 1/2"	4 5/16"	12 LBS.	8 LBS.	1.8
SANITRON S23	6	360	3/4" NPT	051097	24 WATTS	25 3/8"	5 1/2"	4 5/16"	16 LBS.	11 LBS.	2.2
SANITRON S37	12	720	1" NPT	051116	40 WATTS	39 3/8"	5 1/2"	4 5/16"	22 LBS.	15 LBS.	3.0
SANITRON S50	20	1200	1 1/2" NPT	051334	54 WATTS	52 3/8"	5 1/2"	4 5/16"	31 LBS.	22 LBS.	3.9
SANITRON A2400	40	2400	2" NPT	051312	140 WATTS	50"	8"	13"	51 LBS.	38 LBS.	7.5
SANITRON A5000 ①	83	5000	2" NPT	(2) 051312	280 WATTS	50"	22"	16"	116 LBS.	85 LBS.	15
SANITRON A10000 ②	166	10000	2" NPT	(4) 051312	560 WATTS	50"	22"	33"	267 LBS.	174 LBS.	37
SANITRON A15000 ③	250	15000	2" NPT	(6) 051312	840 WATTS	50"	22"	50"	400 LBS.	263 LBS.	57
SANITRON A20000 ④	333	20000	2" NPT	(8) 051312	1120 WATTS	50"	22"	67"	534 LBS.	352 LBS.	77

① TWO A2400's CONNECTED IN SERIES, (1) INLET AND (1) OUTLET.

② TWO A5000's CONNECTED IN PARALLEL, (2) INLETS AND (2) OUTLETS.

③ THREE A5000's CONNECTED IN PARALLEL, (3) INLETS AND (3) OUTLETS.

④ FOUR A5000's CONNECTED IN PARALLEL, (4) INLETS AND (4) OUTLETS.

⑤ ALL INLETS AND OUTLETS ARE MALE PIPE THREADS.

⑥ TOTAL POWER CONSUMPTION INCLUDING BALLAST LOSS.

⑦ MAXIMUM RECOMMENDED OPERATING PRESSURE FOR ALL PURIFIERS IS 100 PSI.

⑧ PRESSURE DROP AT MAXIMUM RECOMMENDED FLOW RATE IS 5 PSI OR LESS.

⑨ ALL DATA SHOWN ABOVE IS FOR 118 VOLT 60 HERTZ. UNITS ARE ALSO AVAILABLE FOR 220 VOLT 50 HERTZ AND 12 VOLT DC. OPERATION.

ADVANTAGES OF THE SANITRON METHOD

EFFECTIVE—All micro-organisms are susceptible to Sanitron disinfection. Effluent is guaranteed to exceed United States Public Health Standards for bacterial purity.

ECONOMICAL—Hundreds of gallons are purified for each penny operating cost.

SAFE—No danger of overdosing, no addition of dangerous chemicals.

FAST—Water is ready for use as soon as it leaves the purifier—no further contact time required.

EASY—Simple installation and maintenance. Compact units require minimum space.

AUTOMATIC—Provides continuous or intermittent disinfection without special attention or measurement.

NO CHEMICALS—No chlorine taste or corrosion problems.

SPECIAL FEATURES OF SANITRON WATER PURIFIERS

STAINLESS STEEL CONSTRUCTION — Chamber, transformer housing and hardware are type 304 stainless steel for lifetime corrosion free service.

FUSED QUARTZ SLEEVE — Insures maximum lamp output regardless of water temperature.

QUICK LAMP CHANGE — Lamp can be replaced in less than a minute without shut down of water pressure or drainage of tank.

SIGHT PORT — Provides visual indication of lamp operation.

PATENTED DUAL ACTION WIPER MECHANISM—Facilitates periodic cleaning of quartz sleeve without interruption of purifier operation. No disassembly required.

REMOVABLE FLANGED HEAD — Units disassemble completely and easily in the event that repairs become necessary. No special tools or fixtures required.

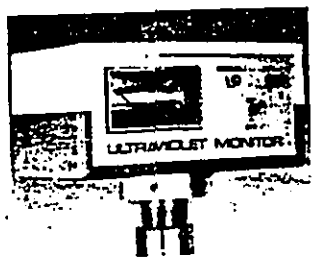
OPTIONAL EQUIPMENT — Complete range of optional equipment may be obtained at purchase time or added at any later date.

INSTALLATION AND MAINTENANCE

The purifier is installed as close as possible to the point of use. Connection of the inlet and outlet to water supply and plug into ordinary electrical outlet is all that is required.

Ordinary maintenance consists of cleaning the quartz sleeve with the manual wiper once monthly or more frequently where conditions dictate. Lamp replacement is recommended once every 10,000 hours of operation (almost 14 months of continuous operation).

SANITRON OPTIONAL ACCESSORIES

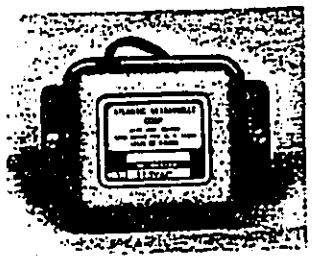


ULTRAVIOLET MONITOR

The electronic monitor visually indicates the level of germicidal ultraviolet available after penetration of the quartz sleeve and the liquid medium. The monitor also operates the solenoid valve and audio alarm.

SOLENOID VALVE

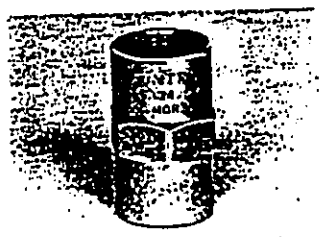
The solenoid valve will automatically stop the flow of water in the event of power failure or whenever the ultraviolet intensity measured at the monitor is inadequate to insure disinfection.



AUDIO ALARM

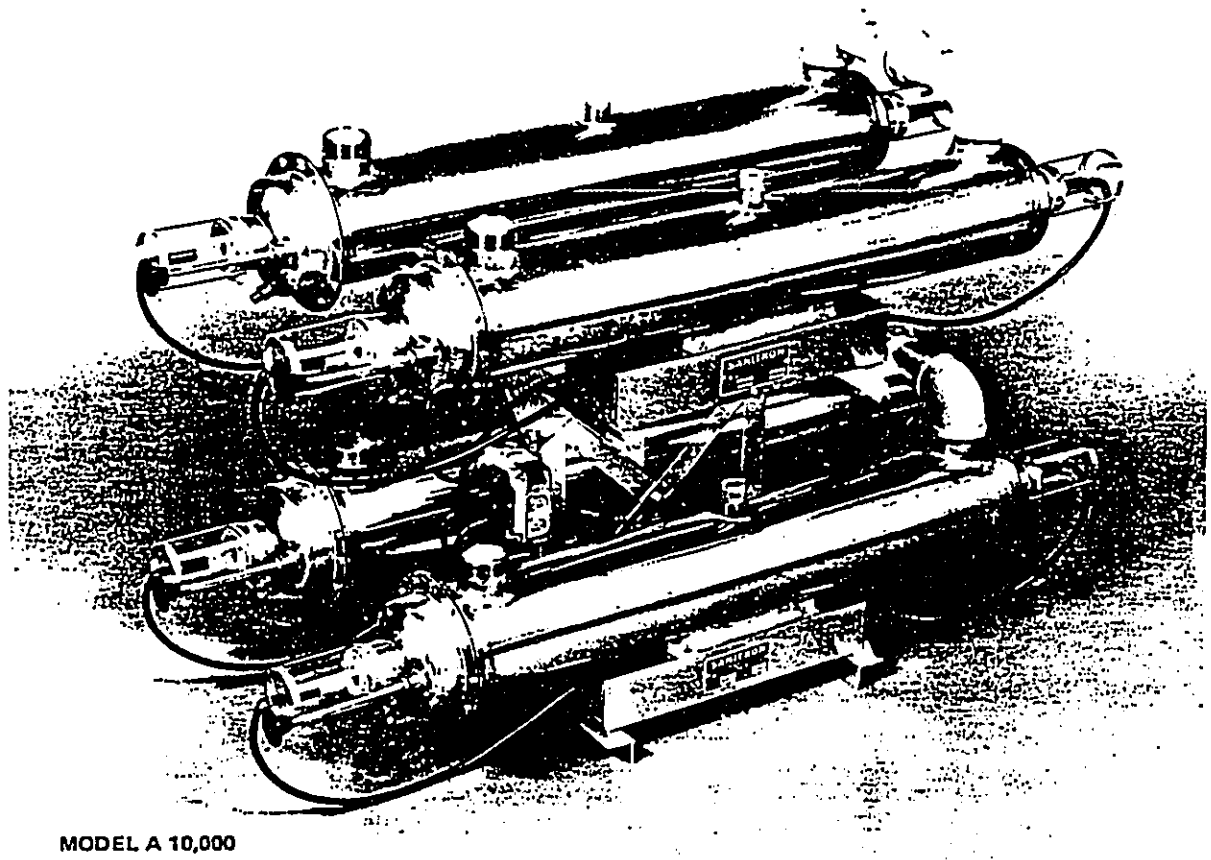
The audio alarm will alert the user of any malfunction detected by the ultraviolet monitor.

The audio alarm may be installed on the purifier or at a remote location.



FLOW CONTROL VALVE

The flow control valve automatically prevents the flow of water from exceeding the rated capacity of the water purifier.



MODEL A 10,000

SANITRON™

ULTRAVIOLET WATER PURIFIERS

MANUFACTURED BY:

ATLANTIC ULTRAVIOLET
CORPORATION
250 NORTH FEHR WAY
BAY SHORE, NEW YORK 11706
(516) 586-5900 FAX (516) 595-2609

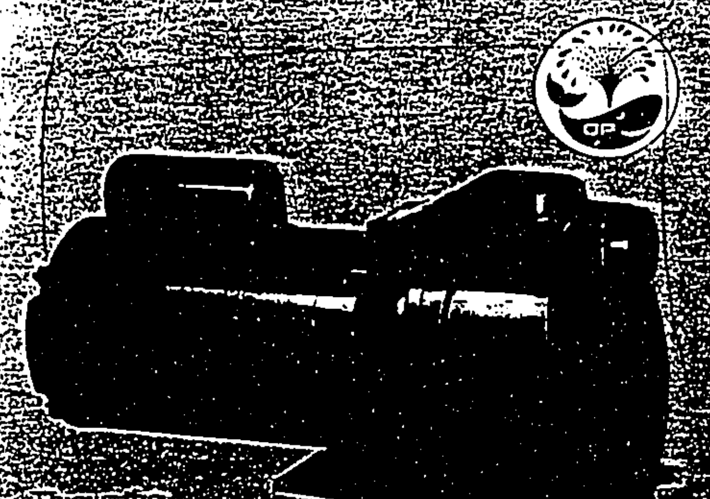
SOLD BY:

PRICES & OTHER DATA SUBJECT TO CHANGE WITHOUT NOTICE

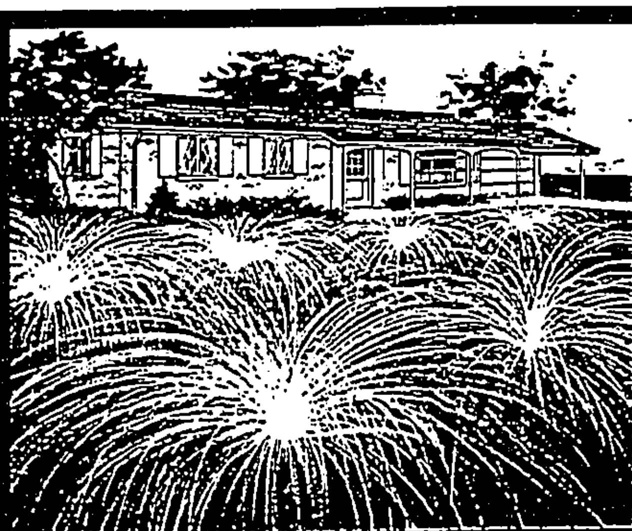
225/1
5/88

QUICK PRIME
A self-priming centrifugal pump from Myers®

FOR LAWN SPRINKLING, POOL FILLING, GARDEN IRRIGATION, CAR WASHING AND OTHER JOBS THAT REQUIRE LOTS OF WATER!



This is the Quick Prime, a new kind of self-priming centrifugal pump from Myers. It's designed for today's demanding jobs where a lot of water might be required over a long period of time... for pool filling, for lawn and garden sprinkling, for car washing, for other big cleaning and maintenance jobs. It's built for one purpose only — for continuous high performance service. And whatever the conditions, it never loses its prime. Here are some of the reasons why the Myers Quick Prime offers such outstanding performance characteristics.

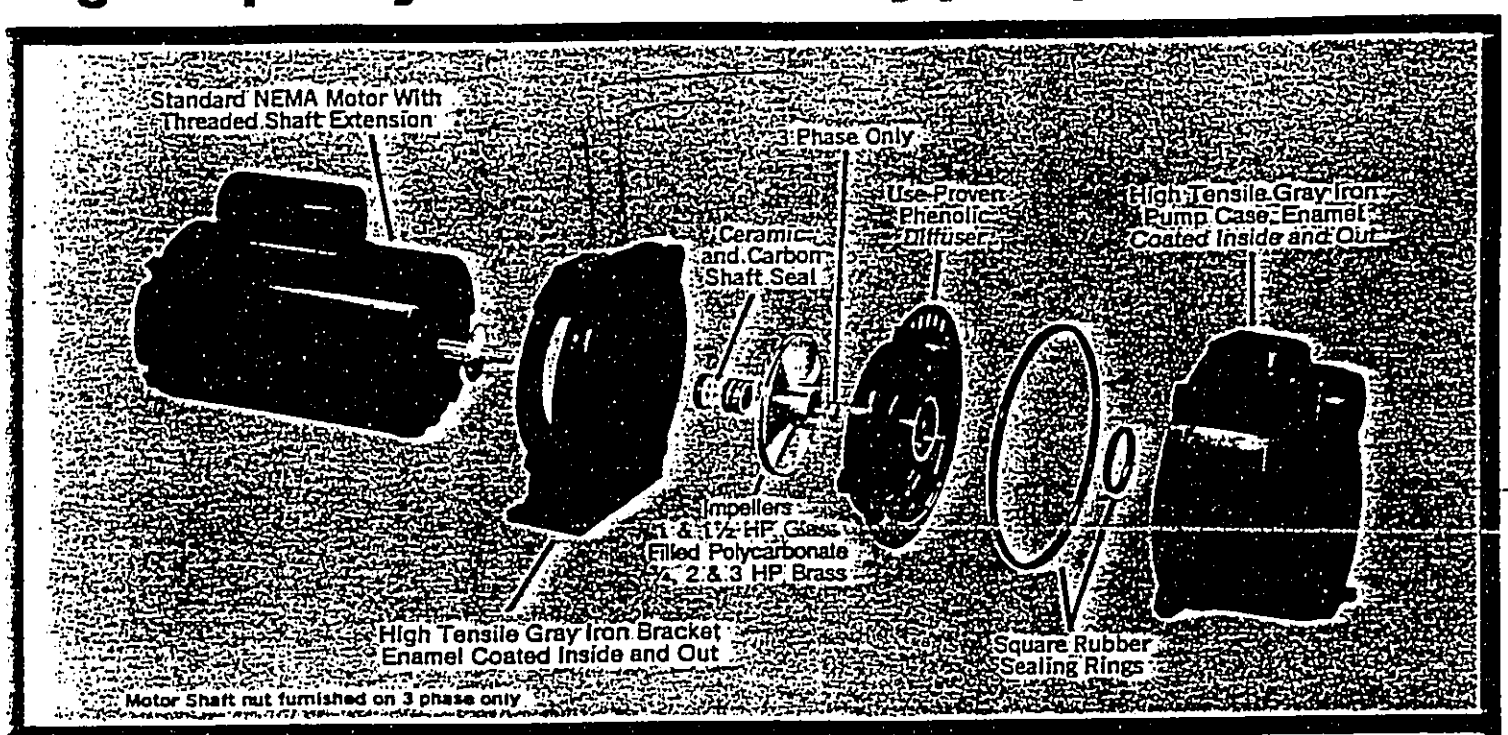


- Simple design for fast, efficient operation and easy servicing.
- Ruggedly built to meet the demands for long, hard, continuous service. Pump can operate continuously without overworking or overloading the motor.
- Manufactured to precise specifications to perform as rated.
- All impellers are made of corrosion resistant materials for long life.
- Proper impeller alignment for smooth, quiet running.
- Unique diffuser design for quick automatic prime. No additional water needed for repriming after installation.
- Common brackets, cases and gaskets on all sizes — simplified parts selection.
- Single and 3-phase options.
- Sizes: ¾, 1, 1½, 2 and 3 hp.

225/2
5/88

QUICK PRIME

high capacity continuous duty pumps from Myers



Catalog Nos. 1 Phase	Catalog Nos. 3 Phase	H.P.	Discharge Press PSI	Capacity in G.P.H. For Discharge Pressure & Total Suction Lift Indicated: 10 Ft.	15 Ft.	20 Ft.	25 Ft.	Pipe Sizes: Suct.	Disch.	Maximum Total Shutoff Hd.: Feet	PSI	1 & 3 Phase Approx. Wt. Lbs.
QP7	QP7-3	¾	20	2445	2290	2170	1995	1½"	1¼"	105	45.5	58
			25	2145	2010	1855	1650					
			30	1845	1635	1390	1080					
			35	1295	905	510	----					
			40	390	----	----	----					
QP10	QP10-3	1	20	3075	2935	2785	2355	1½"	1¼"	108	47	61
			25	2775	2610	2440	2245					
			30	2430	2250	2020	1755					
			35	1980	1660	1240	600					
			40	1145	300	----	----					
QP15	QP15-3	1½	20	4300	4165	3805	3015	1½"	1¼"	111	48	68
			25	3990	3750	3525	3015					
			30	3575	3300	3035	2700					
			35	3030	2620	2220	1495					
			40	2210	1555	----	----					
QP20	QP20-3	2	20	4735	4600	4230	3330	1½"	1¼"	118	50	74
			25	4480	4290	4020	3330					
			30	4110	3815	3505	3180					
			35	3510	3175	2820	2400					
			40	2850	2430	1950	----					
QP30	QP30-3	3	20	5580	5480	4920	3840	1½"	1¼"	121	52	87
			25	5575	5460	4920	3840					
			30	5390	5135	4720	3840					
			35	4865	4400	3940	3420					
			40	4075	3550	2910	2250					
			45	2875	1800	----	----					

(a). Single phase units are dual voltage. (115/230 v.) 2 & 3 H.P. are 230 only.
(b). All units are loaded within the motor service factor and are rated for continuous operation.

Myers "Quick Prime" Pumps are made for efficient operation and easy servicing. Unique Myers design permits all parts to be removed from the pump case without disturbing the suction or discharge piping.

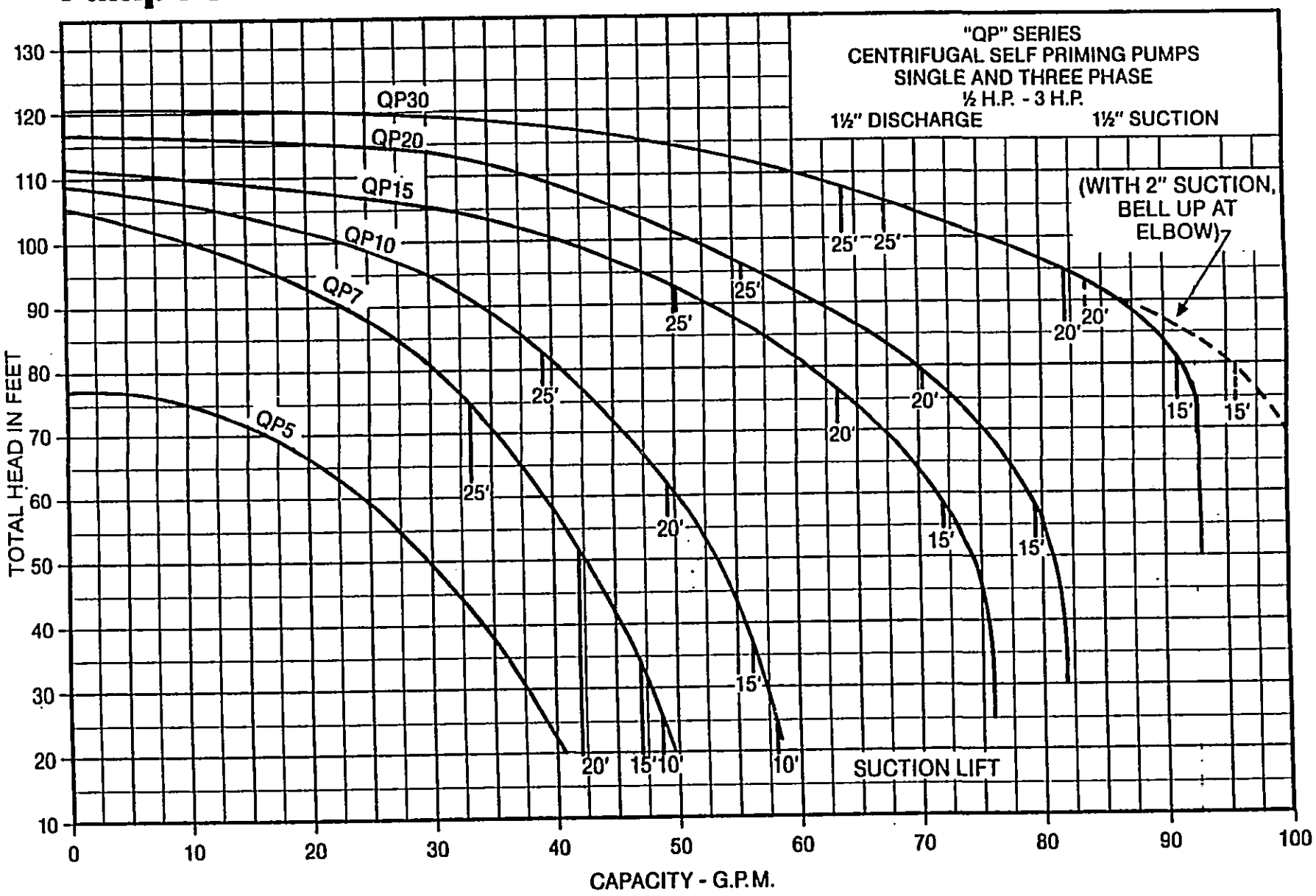
Myers "Quick Prime" Pumps are NEMA standard motor driven units with threaded motor shaft providing efficient, low cost water service for lawn maintenance, garden irrigation, pool filling, car washing, etc. Available in ¾, 1, 1½, 2 and 3 horsepower sizes, they are designed to deliver up to 45 gpm and operate on suction lifts to 25 feet. The chart indicates the gallons per hour each "Quick Prime" Pump will deliver.

All units are rated for continuous duty service. All parts are quality built and guaranteed by Myers. And they're backed by Myers reputation for performance and dependability established over 115 years of building fine quality pumps for home, farm and industry.

Myers, A Pentair Company
293 Wright Parkway
Ashland, Ohio 44805-1923
(419)289-1144 TLX: 98-7443

Pump Performance Curves

Myers



Myers

F.E. Myers, A Pentair Company
1101 Myers Parkway

SECTION	QP
PAGE	1

1/87

SITE EVALUATION/PERCOLATION TEST

Date/Time: MARCH 4, 1992 3:45 PM

Prepared by: MARGARET N. PURVIANCE

Owner: JOHN PAUL DESORIA

Address: c/o HARRY MCDONALD
P.O. BOX 135
PAAUILO HI 96776

Tax Map Key: 7-1-02:12

Elevation: 3 ft
Depth to Groundwater Table: 2± ft below grade
Depth to Bedrock (if observed): NOT OBSERVED ft below grade
Diameter of Hole: 12 in
Depth to Hole Bottom: 1.5 ft below grade
Hours of Water Saturation: 10 MIN. hr

Depth, inches below grade	Soil Profile (color, texture, other)
0-18"	VERY DARK BROWN SAND W/ LARGE 6"-12"ø ROCKS

PERCOLATION READINGS

Time interval	Drop in inches
3:45 - 3:46	>1

Percolation Rate (time/final water level drop): >1 min/in

As the engineer responsible for gathering and providing site information and percolation test results, I attest to the fact that above site information is accurate and that the site evaluation was conducted in accordance with the provisions of Chapter 11-62, "Wastewater Systems" and the results were acceptable.

REGISTERED PROFESSIONAL ENGINEER No. 6379-C

Engineer's Signature/Stamp

JOHN WAIHEE
GOVERNOR OF HAWAII

JOHN C. LEWIN, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
ENVIRONMENTAL MANAGEMENT DIVISION
FIVE WATERFRONT PLAZA, SUITE 250
500 ALA MOANA BOULEVARD
HONOLULU, HAWAII 96813

In reply, please refer to:
EMD-WWB

Date: 2-5-92

Subject: Individual Wastewater System for DEJORIA RESIDENCE

TMK: 7-1-2:12

I JOHN PAUL DEJORIA hereby certify that I am the owner(s) of the subject property and that the individual wastewater system serving the subject property shall be operated and maintained in accordance with all the provisions of the Operation and Maintenance Manual developed and submitted pursuant to Section 11-62-31.1(c)(1), Wastewater Systems.

(CHECK ONE ONLY)

____ Furthermore, I certify that as the owner of the septic tank system serving the subject property, the system shall be inspected at least annually by myself or my agent to determine whether or not the system is operating satisfactorily. Operation and maintenance guidelines of Section 20.5 of the Ten States Standards shall be followed. Any accumulated sludge or scum inhibiting the operation of the system shall be removed by a service possessing the proper county and state permits/certifications and authorizations.

X Furthermore, I certify that as the owner of the household aerobic unit serving the subject property, I shall at all times have the unit under an active service contract for the proper operation and maintenance. Any accumulated sludge or scum inhibiting the operation of the unit shall be removed by a service possessing the proper county and state permits/certificates and authorizations.

____ Furthermore, I certify that as the owner of the Individual Wastewater System, identified as a _____, serving the subject property, I shall at all times have the system operated and maintained in accordance with the operation and maintenance manual developed for the system. Any accumulation of sludge or scum inhibiting the operation of the system shall be removed by a service possessing the proper county and state permits/certifications and authorizations.

I further certify that upon sale or transfer of the subject property, provisions binding the new owner(s) to the Operation and Maintenance Manual and Service Contracts shall be included in the appropriate transfer documents.

Signed: _____ Dated: 2 Feb 92

10/16/91