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

Dear Mr. Gill,

Subject: Negative Declaration for the Mitchell Single Family Residence at Kiholo Bay, Hawaii

The Office of Conservation and Environmental Affairs has reviewed the comments received during the 30-day public comment period which began on May 8, 1995. The Office has determined that this project will not have significant environmental effect and has issued a negative declaration. Please publish this notice in the next OEQC Bulletin.

We have enclosed a completed OEQC Bulletin Publication Form and four copies of the final EA.

Please contact Don Horiuchi at 587-0381 if there are any questions.

Very truly yours,

[Signature]

Roger C. Evans

Enc.
ENVIRONMENTAL ASSESSMENT
MITCHELL RESIDENCE

Accepting Agency:
Board of Land and Natural Resources
Department of Land and Natural Resources
State of Hawaii

June 1995
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FIGURE 1: Location Map
FIGURE 2: Site Plan
ENVIRONMENTAL ASSESSMENT:
MITCHELL RESIDENCE

Project Location: Kiholo, North Kona, Hawaii
TMK: 7-1-02: 4 and 7

Accepting Agency:
Board of Land and Natural Resources
Dept. of Land and Natural Resources
State of Hawaii

FIGURE 1 Location Map
ENVIRONMENTAL ASSESSMENT: MITCHELL RESIDENCE

Project Location: Kiholo, North Kona, Hawaii
TMK: 7-1-02: 4 and 7

Accepting Agency: Board of Land and Natural Resources
Dept. of Land and Natural Resources
State of Hawaii

FIGURE 2 Project Location
I. INTRODUCTION AND PURPOSE

The Estate of the late Paul Mitchell proposes to construct a single family residence on lands at Kiholo Bay, North Kona on the island of Hawaii. The site as indicated in Figure 1, is comprised of TMK 7-1-02: 4 and 7 in the ahupua'a of Puuwaawaa, North Kona, Hawaii.

A Conservation District Use Application to permit use of Conservation lands owned by the Estate of the late Paul Mitchell is being sought.

Use of the lands will be for residential purposes. A single family residence is to be built for private use by Mr. Mitchell's son, Angus Mitchell. The residence will not be used for rental purposes. Year-round use is not contemplated at this time as Mr. Angus Mitchell's primary residence is on Oahu. The owner stands ready to accept by restrictable covenant the conditions imposed by the Board of Land and Natural Resources.
II. DESCRIPTION OF EXISTING CONDITIONS AND THE PROPOSED PROJECT

The site is located approximately 1/2-mile west of the Queen Kaahumanu Highway, in an area that is surrounded by lava flows. It is approximately ten miles north, and a 15-minute drive from the Keahole Airport.

Several private landholdings and residences are located in the immediate Kiholo Bay area. Access to the site is via an unpaved roadway leading directly from Queen Kaahumanu Highway. A system of locked gates separate access to the project site and other private parcels along the shoreline.

The proposed action will involve both parcels which are entirely within the Conservation District. A bungalow-style residence that incorporates a wood frame with post on concrete piers is proposed. The roof structure will be an open beam 2 x 6 cedar decking with possible solar resistant, waterproofing membrane to which Hardi shakes will be applied. The residence will be constructed on-site by local construction industry workers.

The residence will include a kitchen, living and toilet facilities, bedrooms and sitting room. The layout of the structure is as noted on accompanying plans. The plans also indicate locations of equipment that will be incorporated into the living system. Ceiling fans and energy efficient fluorescent lighting and appliances are proposed for this project. An electric generator will provide power to the lighting system and refrigerator. Solar energy will be used to provide a backup power supply for some of the electrical systems. A solar energy system will require a photovoltaic unit, rechargeable battery bank, and inverter for AC current. Solar paneling will be located on the roof of the residential structure.

Electrical power, solar energy, water catchment and spring water, and waste recycling techniques will supply the essential water, power and waste disposal requirements for habitation of the residence. The late Mr. Paul Mitchell is internationally known for his pioneering efforts in the development and use of solar power. His Team Mana La (Racing with the Sun) has competed with much success in an all-solar powered vehicle race in Australia.

The water supply system will consist of either a site water distillation/rain catchment system or an imported water system. For a site water distillation/rain catchment system, fresh spring water will be collected and processed through a solar powered distiller for drinking. The spring water will be filtered for shower and washing purposes. An imported water system will receive water that is trucked in from off-site. All water disposed will be processed through a gray-water system utilizing solar evaporating tray units. All gray-water disposal systems will be made in compliance to the Department of Health standards.

The wastewater system will be an aerobic system that has received State Regulatory approval. An aerobic system consists of three components: an aerobic treatment unit, a disinfection unit, and a disposal system. Disinfection of the effluents will be accomplished by either the manual application of chlorination tablets or the utilization of an ultraviolet unit and holding tank. Sewage disposal systems will be made in compliance to the Department of Health standards.

Self-contained composting toilets which utilize no water, chemicals or leaching are also proposed to be utilized for this project.

No site grading is proposed to be accomplished for the project. All existing pond areas and grounds will be unaltered by the proposed construction. The ponds will be left in a natural pristine state. Some scrub vegetation will be removed for the siting of the residence.
III. DESCRIPTION OF THE AFFECTED ENVIRONMENT

The environment of the relatively remote site consists of kiawe thicket, pahoehoe outcroppings, coconut groves and two (2) large brackish water ponds.

A. Site - The site comprises two distinct parcels of land (TMK 7-1-02: 4 and 7) totalling 6.7 acres makai of the Queen Kaahumanu Highway in North Kona, Hawaii. It is located away from the shoreline of Kiholo Bay. The majority of the site, approximately 80%, consists of two large spring-fed brackish water ponds.

The site was previously a residential site with six to eight individual structures. The site is presently vacant with the exception of a single remaining structure and concrete housepads from the previous residential structures. Two foot-bridges span pond channels and provide the only access to the seaward portions of the site. These bridges will remain as the sole access to the makai portions of the site.

B. Topography - The site is generally flat with a few outcroppings of pahoehoe lava. The large brackish water ponds are at sea level with surrounding ground at slightly higher elevations. The highest elevations of the site are at the southern portion where pahoehoe outcroppings occur at 5.6 to 7.6 feet above mean sea level.

C. Existing Utilities - No water, sewer, electricity or drainage facilities exist for the immediate area of the project site.

D. Existing Flora - Site flora consists of the following exotic plant species:

- Beach Heliotrope (Messerschidia argentea)
- Ironwood (Casuarina equisetifolia)
- Coconut Palm (Cocos nucifera)
- Milo (Thespesia populnea)
- Keau (Hibiscus tiliacus)
- Naupaka-kahakai (Scaevola sericea)
- 'akī'aki (Sporobolus virginicus)
- Indian pluchea (Pluchea odorata)
- Kiiawe (Prosopis pallida)

The following aquatic species may be found in and around the ponds:

- Turf Algae (Cyanophytes)
- Widgeon Grass (Ruppia maritima)
- Bullrush (Scirpus validus)
- Sedge (Cyperus)

No endangered species of flora are known to exist on the site.
E. Existing Fauna - No birds were sighted during field surveys conducted on 9 February 1989 and 28 October 1994. However, it is reasonable to assume that at some time any of the bird species common to the island may visit the site. Such species would include mynah (Acidotheres tristis), house sparrow (Passer domesticus), house finch (Cardodacus mexicanus frontalis), cardinal (Cardinalis cardinalis), Japanese white-eye, (Zosterops japonica japonica), barred dove (Geopelia striata striata) and lace-necked dove (Streptopelia chinensis).

Mammals such as mongoose (Herpestes auropunctatus), mice (Mus musculus), and rats (Rattus rattus, R. norvegicus, and R. exulans) although not observed, probably visit the site.

Three adult green sea turtles (Chelonia mydas) were observed during a marine biology survey in February 1989. The project biologist theorized that these animals may be permanent pond residents. Other coastal pond fauna are identified in Table 5 of the Baseline Marine and Coastal Pond Surveys, Kiholo Bay, South Kohala, Island of Hawaii which is included as Appendix A.

F. Archaeological/Historical Sites - It has been determined that the seaward boundary of the private property is well away from the Ala Kahakai Trail System and the "Kiholo-Puako Trail" which is on Hawaii's Register of Historic Places. Na Ala Hele has requested that the Historic Preservation Program be notified should remains of the portion of the Kiholo-Puako Trail which extends from Kiholo Bay to Huchue Ranch be located as clearing and grubbing work proceeds at the project site. No other sites of archaeological or historical significance are known to exist on the subject property. However, as noted in the archaeological report, the potential for archaeological recovery of subsurface materials is good (see Appendix B). Present plans do not indicate disturbance of the subsurface through construction activity.
IV. RELATIONSHIP OF THE PROPOSED PROJECT TO LAND USE PLANS, POLICIES AND CONTROLS FOR THE AREA

State Land Use District

The property is within the State Land Use Conservation District, Resource Subzone H-6, Kiholo, Hawaii. The objective of this subzone is to properly manage areas of development to ensure the sustained use of natural resources in those areas.

Hawaii County General Plan and Zoning

The County of Hawaii Zone Map designates the project site as "open district" (O). The General Plan Land Use Pattern Allocation Guide Map (and Revision, April 1987) designates the site as "open."

The proposed residence is generally consistent with all land use plans, policies and controls for the area. Residential use within the State Conservation District will be a conditional use as defined by Title 13, Chapter 2 of the Administrative Rules of the Department of Land and Natural Resources, State of Hawaii.
V. POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATIVE MEASURES

As a function of this Environmental Assessment report, the potential environmental impacts on the site by the proposed improvements were evaluated. A key factor in the evaluation process was the character and ultimate form of the proposed development. Firstly, the single residence will ultimately stand on a combined site where six to eight residences once existed. Secondly, the development proposes to be almost totally self-contained, thereby requiring little or no power and water from outside sources, and discharging no sewerage or wastewater into the ground.

The following paragraphs identify the potential environmental impacts associated with the proposed project.

A. Noise - The introduction of noise on the site is attributed to short-term construction activities, and to long-term and permanent functions of residential use. Construction related noise is typically predictable and related to equipment, building and site work. While the County of Hawaii has no noise control ordinance, construction noise is typically tolerable due to its short duration, and is usually easily mitigated through control of construction activity and limitation of work to daytime hours.

The anticipated level of noise is further mitigated by the nature of the proposed construction. For the single family residence, no heavy construction equipment is expected to be used. To mitigate potential construction noise sources, construction equipment and machinery will be equipped with proper noise attenuating devices such as mufflers. In addition, equipment and machinery will be properly maintained to minimize noise levels at the site. Occasional occupation of the single family residence is not expected to require noise abatement.

B. Traffic - The effect of traffic on the site and the immediately surrounding environment is expected to be minimal. Construction activities are expected to generate traffic on roadways leading to the site and at the site on a temporary basis during the construction period. Use of the residence is expected to be periodic and not on a constant basis; therefore, the level of traffic generated by occupation of the residence will be intermittent and light. Traffic to the site will consist of private vehicles only.

C. Physical Geography - The natural topography of the site will not be altered. Consequently, no mitigative measures are warranted. On-site drainage will follow a natural course.

D. Flora and Fauna - No endangered flora or fauna species are believed to exist on the site. Localized fauna such as birds are not expected to be affected by the proposed improvements.

Some landscaping at the site will probably be accomplished. A direct impact of this will be an increase in the flora diversity and wildlife habitats at the site.
E. **Air Quality** - No significant impacts to air quality are expected to result from the proposed use of the site. Residential uses at the site are not expected to generate significant levels of fugitive dust or pollutant air emissions. Although construction equipment has the potential to generate pollutant emissions, the impacts are not considered to be significant due to the temporary nature of construction. In addition, bare earth areas on the site are pahoehoe lava or stony coral material; therefore, there is little potential for the generation of fugitive dust.

F. **Socio-economic** - No significantly adverse socio-economic impacts are expected to result from the construction of one single family residence.

G. **Visual** - The immediate visual impact of the improvements would be the appearance of new development. The construction of a new residence and landscaping at the site will be an improvement over the existing appearance of deteriorating structures on the site. Furthermore, the single family structure currently proposed is modest in size compared to other residences constructed on adjacent properties.

H. **Services and Facilities** - No adverse impacts to the demand for public services and facilities are anticipated to occur as a result of the proposed improvements. No public services and facilities will be required for the proposed project.
VI. ALTERNATIVES TO THE PROPOSED ACTION

No alternative use other than residential use has been contemplated by Mr. Angus Mitchell for the site. Mr. Angus Mitchell does not propose to use the residence for rental or commercial uses.

Alternatives to the proposed improvements were those relating to the construction of additional units. However, Mr. Angus Mitchell no longer wants to construct the type of structures initially proposed by the late Mr. Paul Mitchell. In this regard, the current proposal is for a more modest development by comparison.
VII. FINDINGS

The nature and type of uses proposed by the applicant pose only minor impacts. The benign use of the site represents a significant chapter in environmentally conscious residential construction. Consequently, this Environmental Impact Assessment notes the absence of significant adverse impacts.

It is the finding of this Environmental Assessment, that an Environmental Impact Statement (EIS) for the proposed action is not necessary.
VIII. LIST OF AGENCIES CONSULTED

Federal Agencies

U.S. Department of the Interior, Fish & Wildlife Service
U.S. Environmental Protection Agency, Region IX
Western Pacific Regional Fishery Management Council
National Marine Fisheries Service

State Agencies

Department of Business, Economic Development & Tourism
Department of Health, Clean Air Branch
Department of Health, Clean Water Branch
Department of Health, Noise & Radiation Branch
Department of Land & Natural Resources
Department of Land & Natural Resources, Division of Aquatic Resources
Department of Land & Natural Resources, Conservation & Resources Enforcement
Department of Land & Natural Resources, Division of Forestry & Wildlife
Department of Land & Natural Resources, Historic Preservation Division
Department of Land & Natural Resources, Land Management
Department of Land & Natural Resources, State Parks
Department of Land & Natural Resources, Water Resource Management
Department of Transportation
Office of State Planning, Coastal Zone Management Program

County Agencies

County of Hawaii, Planning Department
APPENDIX A

Baseline Marine and Coastal Pond Surveys
BASELINE MARINE AND COASTAL POND SURVEYS
KIHOLO BAY, SOUTH KOHALA
ISLAND OF HAWAII

prepared for

May 1998

University of Hawaii
Center for Marine Studies
Environmental Sciences

Wahl Group, Planning and Design
1365 Kalakaua Ave.
Honolulu, Hawaii
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SECTION 1.0  
INTRODUCTION

1.1 Scope of Services

The scope of services for the proposed project was developed to provide a baseline assessment of water quality parameters, and marine and coastal pond biological resources associated with the development of a private residence at Kiholo Bay, Island of Hawaii (Figure 1). The specific scope of services included the following:

- Qualitative underwater biological surveys encompassing nearshore marine waters and coastal ponds environments occurring within the project site;
- Assessment of represented coral, algae, fish and macroinvertebrates;
- Qualitative surveys of intertidal flora and fauna at representative coastal locations;
- Physical-chemical characterization of coastal pond and nearshore environments (temperature, salinity, dissolved oxygen); and,
- Preparation of a baseline environmental survey report including an impact assessment, recommendations and conclusion section.

1.2 Site Description

Kiholo Bay is located in the South Kohala District, roughly half way between Keahole Point and Waikoloa Harbor (Figure 1). The north or west coast of Hawaii Island extends from the district of South Kohala in the north to Kohala in the south. Between South Kohala and Anaehoomalu, the coastline fringes a shallow bight. This bight is divided by a narrow shelf sloping from the coastline to depths of more than 100 meters within a short distance from shore. Four principal open ocean bays, Puako, Waulea, Anaehoomalu and Kiholo, are located within this bight. The coastline consists of a series of open ocean bays dissected from, and lying between, relatively recent basaltic lava flow of the Mauna Loa series.

Dominant wave direction is from the north, but the coast is variably exposed to the effects of wave energy, ranging from minimal exposure on the north at Puako to maximal exposure on the south at Kiholo (Ray, H.D., 1977). The varying exposure of the
coastline greatly contributes to its topographical diversity. The leeward coast of Hawaii is protected from Hawaii's dominant northeast trade winds by high mountains and, at the same time, has been subject to the often catastrophic effects of lava flows and tsunamis. The Ko'a coast's maku'au regions are generally barren and are crossed by lava flows dating from prehistoric times to those formed by the eruption of Mauna Loa in 1984. Rainfall is less than 30 cm (12 inches) a year. There are no surface streams on the Ko'a coast, though substantial groundwater flows express themselves as ponds and springs along the shoreline.

Figure 1. Location of Kiholo Bay on Hawaii
to identify or enumerate cryptic species dwelling within the reef. All observations were recorded on waterproof Polyprop sheets and supplemented by underwater photographs utilizing a Nikonos II underwater camera. About 2.5 hours were spent in underwater surveys within Kiholo Bay.

Tides ranged from 0 to +1.2 feet during the diurnal surveys, which occurred between February 21 and 22, 1989. Surveys conducted during extreme high tide periods and at night would likely have accounted for additional species.

Macroalgal growth and coral coverage was determined by visual estimates of abundance or percent coverage.

Identification and enumeration of benthic macroinvertebrates were limited to individuals exceeding 2.0 centimeters (cm) in body length. Certain especially numerous, albeit smaller, invertebrates were occasionally recorded. Counts or population density estimates of certain benthic invertebrates were made with either a stainless steel grid of 0.25 square meter (m²) or an aluminum meter stick which was used to lay out grids 0.25 or 1 m²-quadrants. Rocks were turned over occasionally in an effort to identify cryptic species.

Fish identification and abundance estimates were made by the diver recording all species sighted during the underwater surveys. Rough counts of fishes were tabulated on Polyprop sheets, upon which a listing of the more common nearshore reef fishes expected to occur in the area had been previously typed. This permitted more time for observations and less time for data recording.

Semi-quantitative estimates of fish abundance were made using the following criteria for numbers of individuals sighted in a 30-minute period:
- Abundant = more than 50 individuals sighted;
- Common = 10 to 50 individuals sighted;
- Few = 2 to 9 individuals sighted; and
- Rare = only 1 individual sighted.

This census method is based upon the premise that more abundant species will be encountered first and more frequently during a specified time interval. Fish assemblages were recorded at several depths, which reflected different habitat types.

The sampling stations within Kiholo Bay were all influenced by low-salinity groundwater discharges. These cool, slightly brackish waters float atop and mix with the denser nearshore water, creating a schlieren effect which significantly restricted underwater visibility in most areas. This factor posed a visual impediment in all areas surveyed and likely accounted for some species being omitted from the data record. Similarly, prevailing wave action curtailed surveys in some areas and prevented a complete reconnaissance of the more wave-exposed inshore areas bordering the project site. However, sufficient data were collected to determine the major physical and biological features of the nearshore environment.

The intertidal zone on all prominent rocky headlands and beach areas was censused on foot during a single low-tide period. Macroscopic organisms were identified in the field and rough estimates of population sizes were noted.

2.2.2 Coastal Pond Environments

The two ponds occurring within the project site were surveyed qualitatively using mask and snorkel apparatus. Representative cross-sections of each pond were selected for detailed benthic invertebrate analysis.

Invertebrate surveys were limited generally to pond shorelines characterized by consolidated benthic sediments and exposed rock strata. The bottom surface area of both ponds was dominated by a deep, unconsolidated organic substratum. The bottom would not support the weight of the investigator, was subject to zero-visibility conditions upon slight disturbance, and could not be adequately censused. However, given the prevailing anoxic conditions associated with such areas, the invertebrate fauna is not likely to be significant. The presence of sea turtles in both ponds also posed a problem. They tended to swim ahead of the diver, producing zero-visibility conditions.

Representative biota were recorded on waterproof Polyprop sheets. When conditions permitted, written records were supplemented by underwater photographs.
3.1 Water Quality Surveys

The results of water quality analyses suggested that both the North and South Ponds are density and temperature stratified euryhaline coastal ponds (Tables 1.1 and 1.2).

3.1.1 North Pond

North Pond demonstrated a nearly transparent, cool (21.6 to 22.6 °C), slightly brackish (1.5 to 2.1 ppt) surface layer about 25 centimeters (cm) thick. As noted in Table 1, the surface layer throughout the pond was characterized by a salinity of 1.5 to 1.6 ppt, with slight mixing occurring in a shallow area near the discharge channel leading into South Pond (Table 1, Station 2.1). Dissolved oxygen values ranged between 6.42 and 6.18 ppm (86.1 to 95.1 percent of saturation).

A pronounced density and temperature boundary layer separates the brackish surface layer from the underlying higher salinity waters. The deeper waters are distinguished by higher temperatures (24.0 to 25.3 °C) and salinities (16.2 to 14.8 ppt) and demonstrated a pronounced translucent quality as compared with the transparency of the surface layer. Midwater samples had a dissolved oxygen range of 4.64 to 4.88 ppm. These midwater samples reflect the higher density bottom water and the influence of an anoxic benthic substrate. An unconsolidated benthic organic substrate dominates most of the pond's benthic surface area. Within the top few centimeters of the benthic mat, dissolved oxygen levels are low to anoxic (0 to 1.1 ppm). All samples within deeper portions of this organic substrate were anoxic.

No distinct point-source fresh or brackish water discharge was evident, with incoming groundwaters apparently of a diffuse, non-point character. Pond depths averaged about 1.0 meter deep, except near the exit to South Pond. At most coastal and euryhaline ponds, water depths varied by 4.0 percent of the tidal height. A range of approximately 1.6 cm was observed during the field surveys.

Water efflux averaged 12.9 cubic feet/second (cfs) (range, 11.4 to 11.9 cfs) at a site roughly midway between North Pond and South Pond [site of an existing floodbridge].

<table>
<thead>
<tr>
<th>Station</th>
<th>Date/Time</th>
<th>Depth (m)</th>
<th>Temp. (°C)</th>
<th>Sal. (ppt)</th>
<th>Diss. Oxy. (ppm)</th>
</tr>
</thead>
<tbody>
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<td>2.1</td>
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<td>1418</td>
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<td></td>
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<td>1.2</td>
<td>25.5</td>
<td>14.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1430</td>
<td>0.05</td>
<td>21.7</td>
<td>1.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1430</td>
<td>0.90</td>
<td>25.5</td>
<td>13.5</td>
</tr>
<tr>
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<td>1.2</td>
<td>25.6</td>
<td>14.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1435</td>
<td>0.05</td>
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<td>1.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1436</td>
<td>0.60</td>
<td>25.5</td>
<td>10.2</td>
</tr>
</tbody>
</table>

3.1.2 South Pond

South Pond demonstrated similar physical characteristics to North Pond, but prevailing salinities were higher, ranging from 5.1 to 5.6 ppt (Table 1, Stations 1.1, 1.2, 1.3, 1.4, 1.6). Surface temperatures ranged from 21.1 to 23.9 °C as a function of sampling time, with slighter higher temperatures evident during afternoon sampling periods. Dissolved oxygen values in the surface layer ranged from 1.6 to 2.1 ppm, with a slightly higher value (6.06 ppm) recorded within a narrow, shallow, ridge-like embayment of the main pond (Station 1.1). These dissolved oxygen values corresponded to 67, 91 and 85.2 percent of saturation, respectively.

Salinities were higher beneath the shallow, low-salinity surface layer than in North Pond, with a range of 12.0 to 19.6 ppt recorded between morning low tide and afternoon high tide periods. This may reflect the closer proximity of South Pond to the shoreline of Rieso Bay and the presence of a drainage canal.
Table 2. Water Quality Parameters, South Pond. Temperature, salinity and dissolved oxygen levels were measured for surface, mid-water and just off the bottom for six locations.

<table>
<thead>
<tr>
<th>Station</th>
<th>Date</th>
<th>Time</th>
<th>Depth (m)</th>
<th>Temp. (°C)</th>
<th>Sal. (ppp)</th>
<th>Diss. Oxy (ppm)</th>
</tr>
</thead>
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<tr>
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<td>19.9</td>
<td>0.00</td>
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<td></td>
</tr>
<tr>
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</tr>
<tr>
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<td>7.95</td>
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</tr>
<tr>
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<td>1.6</td>
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<td>23.0</td>
<td>4.0</td>
<td>6.95</td>
<td></td>
</tr>
</tbody>
</table>

which leads directly from South Pond to the ocean. During high tide periods, nearshore waters would likely enter the pond (though ocean to pond drainages was not observed during the study period).

A large portion of South Pond, like North Pond, is dominated by very deep, soft, unconsolidated, organic bottom deposits. Dissolved oxygen values within this material were zero throughout the pond.

Water quality associated with the narrow, rock-lined channel which connects the two ponds, showed less surface to bottom variability than either North or South Ponds. The channel waters reflect the mixing associated gradient between the two ponds. However, subsurface groundwater discharged within the channel contributed to a small, but discernible surface to bottom density and temperature gradient (Table 3). Temperatures ranged from 21.5 to 23.9 °C as a function of depth and sampling period. Afternoon temperatures averaged about 1.0 °C higher than morning temperatures. Salinities ranged from 3.9 to 4.8 ppt. Unlike the adjacent pond environments, this narrow, well flushed channel had a compacted sand and gravel substratum.

Water efflux from South Pond averaged about 39.0 cfs (range, 36.3 to 41.2 cfs) in the vicinity of the outlet to the ocean.

No detectable water currents were associated with either pond during early morning (windless) periods. A small but discernible wind-driven east to west surface patch was detectable in more open areas of South Pond during the afternoons of February 19th and 22nd. Improved surface drogues demonstrated current velocities ranging from near zero to no more than 1.2 cm/second.
3.1.3 Kiholo Bay

Nearshore waters of Kiholo Bay are influenced heavily by basalt groundwater discharges. Prevailing temperatures are, therefore, cool (mean, 23.3 °C) in relation to adjacent offshore waters and salinities are low (mean, 18.2 ppt); roughly half that of truly oceanic waters in Hawaii (Table 4). There was a discernible pattern of increasing temperature and salinity moving from inshore to offshore stations, though all stations demonstrated the influence of brackish groundwater discharges. The effect of groundwater discharges on nearshore water quality parameters is best exemplified in the salinity data (Table 4). Salinity values ranged from 15.1 to 22.0 ppt as a function of distance from shore and correspond to about 44 to 65 percent, respectively, of normal ocean water, which seasonally averages about 34 ppt in offshore Hawaiian waters.

Dissolved oxygen values were indicative of ample mixing associated with moderate inshore wave action and ranged from 7.2 to 7.7 ppm, or between 94 and 100 percent of saturation.

<table>
<thead>
<tr>
<th>Station</th>
<th>Date</th>
<th>Time</th>
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<th>Temp. (°C)</th>
<th>Sal. (ppt)</th>
<th>Diss. Oxy. (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
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<td>0.6</td>
<td>23.8</td>
<td>15.5</td>
<td>7.6</td>
</tr>
<tr>
<td>3.2</td>
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<td>0.5</td>
<td>23.8</td>
<td>16.3</td>
<td>7.7</td>
<td></td>
</tr>
<tr>
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<td>0952</td>
<td>1.2</td>
<td>23.9</td>
<td>17.7</td>
<td>7.6</td>
<td></td>
</tr>
<tr>
<td>3.4</td>
<td>0959</td>
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</tr>
<tr>
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<td>1005</td>
<td>1.4</td>
<td>23.8</td>
<td>18.1</td>
<td>7.4</td>
<td></td>
</tr>
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<td>1.3</td>
<td>24.0</td>
<td>22.0</td>
<td>7.6</td>
<td></td>
</tr>
</tbody>
</table>

3.2 Biological Surveys

3.2.1 North Pond

The flora and fauna of North Pond can be characterized as one of low biological diversity, and with few exceptions, low population density, a feature characteristic of most small lagoon and open coastal ponds in Hawaii's west coast. Contributing to the low diversity and density is the extensive anaerobic organic substrate which characterizes the North Pond.

3.2.1.1 Flora

Aquatic algae were sparse, being limited to areas of exposed rock and consolidated bottom sediments. Two species of unidentified blue-green bur algae (cyanophyta) were found on submerged rocks.

Well cropped stands of the brackish water monocysteladon, Rapo Marume (midge grass) were common along the extreme south side of the pond where firm, consolidated bottom sediments occur. These stands appeared to be feeding areas for three adult green sea turtles which occur in the pond. Sea turtles may be responsible for the cropped appearance of this plant.

Emergent vegetation had a patchy distribution around the pond perimiter and was composed of dense stands of the bulrush, Sphagnum vitellinum and occasional pockets of Cyperus (Sedge).

Riparian vegetation was dominated by a mixed assemblage of terrestrial exotic and native coastal plant species, including: khane (Paspalum pellitum); Indian pluches (Pleuchus obtusa); "shiki" (Stylidium sp.); lilo (Baptisia polyphylla); hau (Heliotrope circa); coconut palm (Cocos nucifera); and, ironwood (Casuarina equisetifolia).

3.2.1.2 Fauna

Three adult green sea turtles (Chelonia mydas) were observed over a three day period and are represented permanent pond residents. The number of turtles and their size was surprising, given the limited forage that is available.

The fish fauna was comprised of six (6) species, including: braccuda (Sphyromes bioculata); guttis (Guttis guttis); gaff (Cestus sp.); goatfish (Hippoglossidae); ahohalo (Acheilognathus); and, an unidentified burrowing goby ('o'opo) (Table 5). Ahihahalo and 'o'opo were the most common species; the latter occurring in densities of 4 to 11/fm in areas characterized by soft bottom sediments. Ahohalo were common around the perimeter of the pond, where overhanging terrestrial vegetation and emergent plants provided protective habitat.
Table 5. Coastal Pond Flora and Fauna, Koke'e Bay.

<table>
<thead>
<tr>
<th>DIVISION</th>
<th>GENUS/SPECIES</th>
<th>COMMON NAME</th>
<th>NORTH</th>
<th>SOUTH</th>
<th>CHANNEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHAEOPHYTA (BLUE-GREEN ALGAE)</td>
<td>-</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>MONOCOTYLEDON</td>
<td>Ruppia maritima</td>
<td>widgeon grass</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>REPTILIA (REPTILES)</td>
<td>Chelonia mydas</td>
<td>green sea turtle</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>OSTEICHTHYES (FISHES)</td>
<td>Sphyraena barracuda</td>
<td>barracuda</td>
<td>-</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Coris sp.</td>
<td>papio</td>
<td>-</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Mugil cephalus</td>
<td>mullet</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Acanthias rissoa</td>
<td>saba</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Hydrocynus tiburo</td>
<td>sawahole</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Malacanthus flavomaculatus</td>
<td>garfish</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>unident. burrowing goby</td>
<td>opah</td>
<td>-</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>CRUSTACEA (CRABS/SHRIMPS)</td>
<td>Palaemon debilis</td>
<td>opah huna</td>
<td>-</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Grapsus grapsus</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>MOLLUSCA (MOLLUSKS)</td>
<td>Theonella swinhoei</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Melania sp.</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Nerita hamiltoni</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Barracuda are the top trophic level predators within the pond; three of which were observed repeatedly over a 2 day period. These specimens ranged from about 15 to 16 cm in body length. Small (14 cm) papio comprised the other group of top level carnivores. Oftentimes, two schools of these species were observed. Juvenile (4 to 6 cm) and adult (15 to 40 cm) mullet were observed, occasionally, though their numbers were low. Juvenile garfish were noted occasionally in shallow water near the pond outlet.

Mollusks dominated the macroinvertebrate fauna. The

dissipative (1 to 2 cm) black endemic snail Nerita hamiltoni was found in densities of up to 400/m² on solid substrates such as rock and decaying terrestrial plant material. The small (4 mm) one of the most ubiquitous animals of Koke'e coast ponds, had a patchy distribution and was limited to areas of consolidated sediments. About fifty dead specimens were encountered for every live specimen observed. Shells of the limpet-like neritic snail Theonella swinhoei were numerous in and adjacent to submersed rock outcrops, though no live specimens were observed. The nukahana pond exhibits extensive lateral, wing-like shell development.

The crustacean fauna was comprised of three species: the shore crab (Gecarcinus); the blackish, usually curvilinear, crab (Hapaloplocampa dawsoni), which occurred intertidally and subtidally along rocky shores; and, the glass shrimp (Palaeomon debilis (opah huna)) which was restricted to shallow lagoon areas with a solid substrate. Population densities of opah huna ranged from 1 to 15/m² in areas of suitable lagoon habitat. They were most numerous in the channel connecting North and South Ponds.

3.2.2 South Pond

The flora and fauna of South Pond was, like North Pond, one of low diversity and low population density.

3.2.2.1 Flora

The flora of South Pond was dominated by extensive stands of the aquatic plant, Sargassum, which covered about 15 to 25 percent of the total pond area. Unidentified net-forming cyanophytes were conspicuous as a part of the epilithon community on submersed rock outcrops and on other solid substrates.

3.2.2.2 Fauna

A single specimen of the federally listed threatened green sea turtle (Chelonia mydas) was the largest and most conspicuous species occurring in the pond. It was routinely observed in deeper water along the eastern (mauka) side of the pond.

Vegetated sections around the pond perimeter and deeper waters associated with the outlet (makana) area hosted the highest diversity and density of fishes. A total of 27 species were recorded (Table 6). Fishes, with seven (7) species recorded (Table 6). Shallow water areas were dominated by several small barracuda and unidentifiable burrowing gobies (to'opu). Aerating snails (mollusks) was the only species observed in South Pond that was not observed in North Pond. Its range within the pond was restricted to the well-mixed waters adjacent to the makana outlet and in the narrow channel between the makaha and the ocean.
In contrast to North Pond, South Pond harbored numerous large schools of 100+ juvenile mullet. Mullets were less common than in North Pond, reflecting the shallow waters and limited amount of shoreline emergent vegetation which occurs in South Pond. This vegetation presumably provides protective habitat from roving barracuda. Burrowing 'o'opu dominated all areas characterized by deep, unconsolidated, benthic organic deposits with densities averaging about 3/m2.

The tiny H. borealis was the most abundant invertebrate with densities ranging from less than 100 to over 1,000/m2. Highest concentrations were generally associated with submerged terrestrial and aquatic vegetation. Mooma sp. was second in abundance but with a generally patchy distribution and was found in well-flushed, sandy substrates near the outlet area. Live mussels were outnumbered by dead specimens. The neritid small T. carnea was not observed in South Pond, despite its abundance location from North Pond where shells of this species were observed near the pond outlet.

The crustacean fauna of South Pond was limited to estuarine crabs (Megalopera polychaeta), which were found along all rocky shorelines. Grapsus grapsus, and open buns (P. abron) which were restricted in distribution to sandy, intertidal areas.

Adult dragonflies and dragonfly naides (symba) were the only terrestrial insect fauna associated with South Pond. Eleven aquatic naides were counted adjacent to an elongate mid-pool rock outcrop. They were not observed elsewhere in the pond.

3.2.3 Kiholo Bay Neoshore Waters

Kiholo Bay is characterized by a turbid subtidal zone with strong freswater influence occurring over geologically young lava rock. As a result of the low saline water and prevailing high turbidities, corals and other common inshore and intertidal invertebrates and fishes normally associated with West Hawaii waters were absent or present in exceptionally low numbers. The physiography of Kiholo Bay is one of flat to undulating lava, broad expanses of lava rocks and boulders and occasional small sandy patches. There is very little vertical relief apparent within the bay. Water depths throughout the area surveyed ranged from less than 1 to no more than 4 meters in depth.

The intertidal zone was dominated by an assortment of nerites (Nerita plus), Littorinas (Littorina glossa and L. valva), limpets (Siphonaria normalis), and two species of intertidal crabs (Grapsus grapsus and G. imbricatus). Though overall densities were low in comparison to other similar soft bottom settings (Table 6). The cock or estuarian mussel, Siphonaria normalis, often an indicator of low salinity waters, was especially common. Other than the greenish cast of Laminaria and other unidentified turf algae and an occasional growth of U. paniculata, the general environment was one of low biological diversity.

Coral reefs were exceptionally low in numbers and distribution with only two species recorded; Porites lobata and a few widely scattered colonies of Porites madorensis. Although small vegetative growth forms (resulting from storm-wave erasures of P. lobata) were observed within 100 meters of the shore, significant coral habitat was uncommon to at least 100 meters seaward of the shore.

Table 6. Checklist of Macronvertebrates, Kiholo Bay.

<table>
<thead>
<tr>
<th>PHYLUM/CLASS</th>
<th>GENUS/SPECIES</th>
<th>ZONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECHINODERMATA</td>
<td>Echinoidea (SEA URCHINS)</td>
<td>it, st</td>
</tr>
<tr>
<td>Echinoida</td>
<td>Echinometra pulchra</td>
<td>it</td>
</tr>
<tr>
<td>Diadema setosum</td>
<td>it</td>
<td></td>
</tr>
<tr>
<td>OPHELIDAE (KRITTLES STARS)</td>
<td>Ophelia pica</td>
<td>st</td>
</tr>
</tbody>
</table>

* Legend: it = intertidal; st = subtidal

The intertidal zone was dominated by an assortment of nerites (Nerita plus), Littorinas (Littorina glossa and L. valva), limpets (Siphonaria normalis), and two species of intertidal crabs (Grapsus grapsus and G. imbricatus). Although small vegetative growth forms (resulting from storm-wave erasures of P. lobata) were observed within 100 meters of the shore, significant coral habitat was uncommon to at least 100 meters seaward of the shore.
Table 7. Checklist of Marine Algae, Kiholo Bay.

<table>
<thead>
<tr>
<th>DIVISION/GENUS/SPECIES</th>
<th>ZONE*</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHLOROPHYTA (GREEN ALGAE)</td>
<td></td>
</tr>
<tr>
<td>Enteromorpha sp. ('ēle 'ēle)</td>
<td>st, it</td>
</tr>
<tr>
<td>Ulva fasciata (paka'īhaka)</td>
<td>it</td>
</tr>
<tr>
<td>RHODOPHYTA (RED ALGAE)</td>
<td></td>
</tr>
<tr>
<td>Hydrachnin brevicornis</td>
<td>st</td>
</tr>
<tr>
<td>Hydrachnin radiolatus</td>
<td>st</td>
</tr>
<tr>
<td>Lithophylax katamnus</td>
<td>st</td>
</tr>
<tr>
<td>Nereocystis fucoides</td>
<td>st</td>
</tr>
<tr>
<td>Porolithon endertii</td>
<td>st</td>
</tr>
<tr>
<td>Porolithon endertii</td>
<td>st</td>
</tr>
<tr>
<td>Spatulophyllum clypeatum</td>
<td>st</td>
</tr>
</tbody>
</table>

* Legend: it = intertidal; st = subtidal

These colonies showed evidence of major storm damage. As a result of the limited coral coverage, reef fish populations were correspondingly low to nearly non-existent.

Fleshy macroalgae were uncommon, with only occasional small patches of the former noticeable. Red coralline algae were well represented with seven species recorded, but consisted mainly of small fragments and vegetative growth forms, having broken loose apparently by storm wave action from deeper water areas on the outer reef (Table 7).

Subtidal macroinvertebrates were few and consisted of the burrowing sea urchin *Echinometra mathaei* and an occasional specimen of the block urchin, *Stomatopoma*. In contrast to other Kona coast locations, *E. mathaei* densities were exceptionally low in most areas, rarely exceeding more than 2 to 4/m². *E. mathaei* is normally not tolerant of low salinity water.

The fish checklist accounted for a total of fifteen species (Table 8). Representative of eight families and eleven genera were recorded during the surveys. Small schools of juvenile *Acropora* (Acropora hawaiiensis) and *Asthene* (Kahilii) collectively accounted for approximately 90 percent of all fishes observed. The absence of appropriate coral reef habitat and the influence of freshwater undoubtedly accounted for the paucity of fishes that was recorded. The prevailing poor visibility combined with the schlieren effect created by the

Table 8. Checklist of Fishes, Kiholo Bay

<table>
<thead>
<tr>
<th>FAMILY/GENUS/SPECIES</th>
<th>ABUNDANCE RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACANTHURIIDAE (SURGEONFISHES)</td>
<td></td>
</tr>
<tr>
<td>Acanthurus xanthurus (mānini)</td>
<td>A</td>
</tr>
<tr>
<td>Acanthurus dussumieri (pelani)</td>
<td>F</td>
</tr>
<tr>
<td>Acanthurus nigrofuscus (na'īlā'ii)</td>
<td>F</td>
</tr>
<tr>
<td>Zebrasoma flavescens (lau'i-pala)</td>
<td>F</td>
</tr>
<tr>
<td>ANDOSTOMIDAE (TRUMPETFISHES)</td>
<td></td>
</tr>
<tr>
<td>Andostomus chinensis</td>
<td>R</td>
</tr>
<tr>
<td>BLENNIIDAE (BLENNIES)</td>
<td></td>
</tr>
<tr>
<td>Callionymus variolus</td>
<td>R</td>
</tr>
<tr>
<td>CIFIDAE</td>
<td></td>
</tr>
<tr>
<td>CHEIODONTIDAE (BUTTERFLYFISHES)</td>
<td></td>
</tr>
<tr>
<td>Chaetodon honela (kitakapo)</td>
<td>R</td>
</tr>
<tr>
<td>Chaetodon quinquelaniatus (la'au-hau)</td>
<td>F</td>
</tr>
<tr>
<td>KUHLIIDAE (FLAPTAILS)</td>
<td></td>
</tr>
<tr>
<td>Kuhlia sandreus (hololokū)</td>
<td>C</td>
</tr>
<tr>
<td>LABRIDAE (WRAJSES)</td>
<td></td>
</tr>
<tr>
<td>Thalassoma duperrey (hōnaea lau-wili)</td>
<td>R</td>
</tr>
<tr>
<td>Anampses sp.</td>
<td>R</td>
</tr>
<tr>
<td>POMACENTRIDAE (DAMSELFISHES)</td>
<td></td>
</tr>
<tr>
<td>Abudefduf abdominalis (maso)</td>
<td>F</td>
</tr>
<tr>
<td>Chromis sp. (juveniles)</td>
<td>R</td>
</tr>
<tr>
<td>ZANCLIDAE (MOORISH IDOL)</td>
<td></td>
</tr>
<tr>
<td>Zoarces viviparous (kahilii)</td>
<td>F</td>
</tr>
</tbody>
</table>

TOTAL FAMILIES = 15
TOTAL GENERA = 11
TOTAL SPECIES = 15

See Methods section for symbol notation
mixing of water masses of differing densities also greatly reduced underwater visibility making it difficult for the investigator to census accurately these populations.

3.2.4 Avi fauna and Feral Mammals

A total of ten species of birds were identified within the proposed project site incidental to other field survey efforts. Only one indigenous species, the Great Frigatebird, was observed; the remaining birds all being exotic species (Table 6). An additional species, an unidentified scolopacids (wading bird), was observed during one low tide period within the shoreline intertidal zone.

The Hutang Manukia (Lonchura punctus) was the most abundant species, occurring in flocks of an estimated 40 individuals. The Tabua Dove (Geopelia striata) and Common Myna (Acridotheres tristis) were second in abundance. Three adult francolins were observed within the study areas. A solitary feral Mallard (Anas platyrhynchos) is an apparently permanent resident of South Pond.

Table 6. Avi fauna Checklist, Kiholo Bay.

<table>
<thead>
<tr>
<th>SCIENTIFIC NAME</th>
<th>COMMON NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lonchura punctus</td>
<td>Hutang Manukia</td>
</tr>
<tr>
<td>Cardinilla cardinalis</td>
<td>Northern Cardinal</td>
</tr>
<tr>
<td>Pardavis capillus</td>
<td>Yellow-billed Cardinal</td>
</tr>
<tr>
<td>Geopelia striata</td>
<td>Spotted Dove</td>
</tr>
<tr>
<td>Streptopelia chinensis</td>
<td>Gray Francolin</td>
</tr>
<tr>
<td>Cisticola chinensis</td>
<td>Common Myna</td>
</tr>
<tr>
<td>Acridotheres tristis</td>
<td>Mallard</td>
</tr>
<tr>
<td>Anas platyrhynchos</td>
<td>Great Frigatebird</td>
</tr>
<tr>
<td>Fregata minor</td>
<td>Japanese White-eye</td>
</tr>
<tr>
<td>Zosterops japonicus</td>
<td>unident., scolopacids</td>
</tr>
</tbody>
</table>

SECTION 4.0

DISCUSSION

4.1 Kiholo Bay

Other investigators (Brook & Brook, 1974; Diller, 1977) have reported that the nearshore environment within Kiholo Bay is neither significantly different in species diversity, nor in abundance from other areas surveyed off the Kona and Kohala coasts. While checklists of various locations differ in represented species, coral colonization patterns and associated fish and invertebrate populations are a relatively uniform feature of the entire West Hawaii shoreline.

In contrast, our February 1989 surveys indicated an extremely low diversity of algae, fish, corals and other invertebrates within the shallower, inshore reaches of Kiholo Bay. Evidence of recent coral destruction indicates that the bay has been subject to major storm-wave attack. According to local informants, destructive north Pacific storm waves adversely affected the entire Kona Coast during February 22 to 25, 1986 (Daniel, 1988). Also evidence of long-term wave surge and storm wave exposure is inferred by the limited distribution and abundance of epiphytic algae and encrusting invertebrates throughout the bay. Storm wave damage associated with the February 1986 storm waves and perhaps, later storm events may explain the abbreviated checklist compiled in our February 1989 surveys versus earlier (pre-1986) surveys.

Physical disturbance from storms is the most significant factor determining the structure and composition of Hawaiian coral reef communities (Diller, 1981). The frequency and severity of both short-term and long-term storm wave events significantly influence coral reef structure and organization. Diller (1977) cites the influence of short-term, moderate, wave events in shaping the creation patterns of Hawaiian reef environments. In the long term, these events promote ecological stability by maintaining well defined reef zones through differential mortality, fragmentation and transport. By contrast, severe or long-term storm wave action often returns a reef area to an earlier successional stage and recovery from such intense events is generally much slower. As such, many of the reef communities on the island of Hawaii have been described as physically dominated environments where reef communities reflect the severity of disturbance.

Our February 1989 surveys suggest that the nearshore environment of Kiholo Bay is a physically dominated coastal environment. This conclusion is based upon the prevailing low coral diversity and density, and the obviously recent storm wave action, which fragmented much of the inshore coral community. The absence of
pioneer coral species like Porites moluccensis is further evidence of recent and intensive storm wave impact.

In estimating the impacts of any development on the marine environment, the task is to distinguish or superimpose both direct and indirect development effects upon natural effects, nature when it comes to catastrophic changes, which can be brought by short-term physical disturbances.

Natural groundwater discharges throughout the intertidal and subtidal zones of Kiholo Bay also influence the structure and composition of biological communities (Brook and Brock, 1974). Although algae were poorly represented in our February 1979 survey, the bay, often an indicator of elevated nutrient levels associated with groundwater discharges, was occasionally found in intertidal and subtidal areas subject to groundwater influence.

The effects of groundwater discharges and storm waves on the bay's faunal communities have been described by several researchers, including those of the 1977-1978 study conducted by the Hawaii Institute of Marine Biology (Kolasa et al., 1978). The bay's water quality and flow rates are significant factors in determining the distribution and abundance of species within the bay.

4.2 Coastal and Archipelago Ponds

Anchialine ponds are situated in areas dominated by lavas that are generally within 100 meters of the shoreline. Anchialine ponds have been described as:

- a shallow body of water (less than 1 meter deep)
- having a unique biota
- being isolated from the sea
- having a complex ecosystem

Anchialine ponds are also characterized by the absence of surf conditions with the sea, but contain saline water that is characterized by its unique biota. Given the aforementioned definition, the 1979 surveys are not presently anchialine in character, but may have been so historically.

The Hawaiian anchialine pond ecosystem is dominated by crustaceans, fishes, mollusks, a hydrozoan, polychaetes, sponges, and benthic invertebrates. The anchialine ponds are characterized by the presence of unique biota that are not found in the adjacent saltwater environments.

Species diversity was associated with true marine areas. Salinity data reported herein suggests that no true marine area was censused during our February 1979 surveys. Short-term surveys within similar coastal settings at Kukio Bay, Makalawena, and Kona-Iki provided checklists of 52, 41, 74, and 32 species, respectively (Peck, 1986; Peck, 1984; Donald, 1964). Both these surveys and recent storm wave activity, though not to the extent of the bay, could be described as more severe than other areas.

Kolasa and Cheresky (1981) listed a total of 64 species of fish occurring in Kiholo Bay, based on a cumulative list of all published surveys and the results of other surveys conducted during a 1980 storm on the reef platform in the central section of Kiholo Bay.

Anchialine and coastal ponds are situated in areas dominated by lavas that are generally within 100 meters of the shoreline. Anchialine ponds have been described as:

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Naturally occurring anchialine ponds are restricted generally to porous substrates, such as recent laves or limestones adjacent to the sea. Anchialine habitats are widely distributed, having been reported from the Sinai Peninsula, Lebanon, near the Southern Red Sea, Aden Sea in the East Indies, Hawaiian Islands, Okinawa, Philippines, Funafuti Atoll in the Western Pacific, Fiji, and the Nuku Hiva Islands (Brock, 1985).

In the Hawaiian Islands, coastal and anchialine ponds are found along the west and southwest shoreline of Hawaii, southeast Maui, and Kauai (Brock, 1985; Wong, 1975). These ponds once figured prominently in Hawaiian culture but have lost this prominence with the decline of the culture (Brock, 1977). Five classes of anchialine ponds have been proposed, based on differences in human use and degree of isolation from the sea (Brock, 1977). Hohleus (1971) was the first to describe the shrimp fauna occurring in coastal ponds and proposed the term anchialine (from Greek anchialos, meaning near the sea) to describe these ponds.

The most complete description of coastal and anchialine ponds on Hawaii, encompassing some 318 surveyed ponds, is found in the Hawaiian Islands, U.S. Geological Survey (Hacek and Brock, 1974). Brock (1985) also provides an excellent overview on the status and future of anchialine ponds in the Hawaiian Islands. A detailed treatment of coastal and anchialine pond ecosystems is also found in the pond environmental impact statements, Waikoloa South Basin, Waikoloa, South Kohala District, Island of Hawaii (Corps of Engineers, 1985). A number of other recent environmental impact statements also provide an analysis of anchialine and coastal pond flora and fauna associated with proposed resort hotel complexes at Kohala Bay, Hualalai, Kohala-ki, etc. (Poh, 1986a; Poh, 1986b; Heber, Hartt & Ninose, 1986).

Conservative estimates have placed the number of anchialine and coastal ponds on the island of Hawaii at between 350 and 650 (Brock, 1986). The majority (approximately 410) are those recently filled at Waikoloa (northeast coast) and the actual number of anchialine ponds on the island is likely to be considerably higher than recent estimates suggest. Approximately 235 (75%) of the 318 coastal and anchialine ponds inventoried by Hacek and Brock (1974) occur in the North Kohala district.

In 1986, the U.S. Fish and Wildlife Service classified several anchialine pond organisms as Great 2 species under the Endangered Species Act. These include three shrimp (Aeolidia buskii, Pseudoeulimina brunnea, and Pseudoeulimina borbonica); a hydroid (Balanophyllum velanoides); a mussel (Montifera longa). Category 2 indicates that the organisms probably should be listed as endangered or threatened, but insufficient data prevents an assessment of their status for listing on the Federal List of Threatened and Endangered Species. These organisms are considered rare, but are not listed on the aforementioned list and are not currently proposed as candidates for listing.

**Hacekia** was the only Category 2 species observed during our February 1989 surveys of the coastal ponds at Kibolo. **Hacekia** is a diminutive (0.5 to 1.5 m) snail that was known formerly only from anchialine ponds at Hakalawe (Brock, 1985). However, recent information suggests that this species is more widespread than originally believed, and this species has been overlooked by researchers (Brock, 1986; personal communication). **Hacekia** occurred in densities exceeding 1,000/m² on solid substrates within the Kibolo coastal ponds during our February 1989 surveys.

Another phenomenon of anchialine ponds is the occurrence of morphological variants (ecotypes) within a species caused by environmental differences. Class (1975) has described variations in the shrimp *Aeolidia buskii* associated with local ecotypes that have been reported in other crustaceans (*Hamorina granulosa*) and mollusks (*Terebra*) (Hohleus, 1971; Hacek and Brock, 1974). Ecotypes in certain sections of each Kibolo pond were significantly outnumbered living species during our February 1989 surveys. Ecotypes of this species were not found at Kibolo; the prevailing ecotype having lateral, wing-like shell deformity.

Hacek and Brock (1986) identified and ranked a number of Kona Coast ponds and pond complexes on the basis of their importance as natural anchialine and coastal pond ecosystems. The ranking of the ponds was based on two criteria:

- **Class A:** Pond sites of exceptional natural value based on physical structure, diversity, and representative aquatic community, and new or endemic species.
- **Class B:** Pond sites of significant aquatic natural value whose importance is increased because of their high biodiversity or potential for future use.

The nearby lagoon (north and offsite of the proposed project site) was recommended as a Class A pond on the basis of it being an example of a lagoon receiving a small amount of fresh water that is suitable for use as a source of water for the proposed development. The lagoon receives water from a small stream that flows into the lagoon from the north and is then discharged into the ocean. This water is clean and contains a high concentration of nutrients, making it suitable for use in the proposed development.

The nearby Wolf Киола (also to the north and offsite of the study area) is an open coastal pond connected to the ocean and represents an intermediary stage between closed
(anchialine) ponds and inshore marine waters. Although sharing many physical features of an anchialine pond, Waianala'i is more species (McIndoe & Brock, 1974).

Both of the coastal ponds surveyed in February 1989 at Kiholo Bay remain in a pristine state, inasmuch as exotic species were not found within either pond. Aside from direct physical destruction by filling, exotic species are known to exert pronounced adverse effects on coastal and anchialine pond ecosystems, leading to their gradual demise. Brock (1985) hypothesized that exotic fishes introduced into an anchialine pond can initiate a change in ecological succession. The recent introduction of exotic fishes into the Kukio Bay anchialine pond complex resulted in a dramatic decline in pond crustacean densities and a buildup of pond sediments in less than three years, with discernable changes evident within a period of 23 months (Brewer and Brock, 1987).

SECTION 5.0
CONCLUSIONS AND RECOMMENDATIONS

Implementation of the proposed project would involve minor grading, vegetation removal, new construction and other minor changes to approximately 0.25 acre of land. There are no plans to alter the ponds or the adjacent shoreline.

Based on the physical-chemical water quality and biological data acquired in the baseline surveys, it is possible to predict what impacts, if any, might be expected to occur as a result of the proposed action.

Environmental disturbances to the coastal pond and marine environments at Kiholo Bay could potentially include:

- Structural modifications to ponds;
- Sedimentation of ponds and nearshore waters;
- Impacts on groundwater quality and quantity;
- Changes in groundwater and surface runoff patterns;
- Pollutants associated with heavy equipment operations and servicing;
- Landscaping in the vicinity of coastal ponds; and
- Increased human use of the region.

Each of these real or potential adverse impacts and proposed mitigation measures, if appropriate, are discussed below.

5.1 Structural Modifications to Coastal Ponds

Unlike other extensive pond complexes associated with coastal regions of North Kona or South Kohala Coast (e.g., Waikoloa, Kukio, Makaleha, etc.), only two discrete ponds occur on the proposed project site. Based on preliminary design plans, heavy equipment mobilization and land clearing operations would not take place closer than about ten feet from the closest pond (South Pond). This distance is sufficient to prevent any direct or indirect impact on the physical structure of the ponds. However, to insure that heavy equipment operations do not encroach accidentally upon this habitat, it is recommended that a buffer zone be established and demarcated with fluorescent (surveyor’s) tape prior to initiating heavy equipment operations. This requirement should be stipulated in the construction bid documents and construction contract.

5.2 Sedimentation of Coastal Ponds and Nearshore Waters

Sedimentation resulting from upland earthmoving activities is unlikely to pose a threat to physical or biological character
of the Kiholo Bay ponds or the nearshore marine environment because the prevailing ground cover to be graded is lava and has little soil cover. Additionally, the climate of the Kona Coast chance for heavy, sustained rainfall during the construction period is rather remote. The existing grade between the proposed construction site and the ponds is low and existing depressions in the lava and associated coralline soils would serve as natural containment basins for any fines. The extremely low permeability of the lava and associated materials would make pond or nearshore waters that should occur during the construction phase of the project.

Although wind-blow material could be carried seaward or landward by the prevailing winds, it is unlikely that the small quantities involved could pass any type of risk to either the water or biological quality of the ponds or nearshore waters. Any wind-blow materials reaching the nearshore environment would be in the silt-clay size range, would likely remain in suspension for some time, and would be diluted by prevailing water currents. It would be unlikely, therefore, that any local deposition could stress corals or other benthic invertebrates.

Similarly, the Kiholo ponds can be characterized as highly saline as a result of natural processes. Thus, any small or incremental additions of salt or particulate organic matter to the ponds are unlikely to produce any adverse effect on pond biota.

5.3 Impacts on Groundwater Quality and Quantity

Miner, though probably detectable, perturbations to groundwater quality could be expected in the form of dissolved nutrients from sanitary wastewater (grey water) and sewage tank effluent. Sewage tank effluent contains a mixture of nutrients and other contaminants. Such systems would not result in any water quality perturbation.

Fertilization of landscape vegetation could produce small quantities of nutrients or other pollutants which potentially could contaminate groundwater. Any nutrients associated with such discharges would be subject to mass dilution upon entering the terminal water lens and in the downgradient zone of the coastal zone.

Withdrawal of small quantities of groundwater or pondwater for irrigation, sanitary requirements and irrigation would have no significant effect on local groundwater resources or pond water levels, given the aforementioned daily efflux of basal waters in the Kiholo Bay area.
5.4 Changes in Groundwater and Surface Runoff Patterns

Surface runoff in the Kona Coast region occurs only rarely and only under conditions of intense rainfall. There is no evidence of any surface runoff areas in vicinity of the project site, except for the existing pond makahia-outlet channel to the ocean.

The proposed site plan allows for drainage from roads and paved areas to either be collected for drinking purposes or be drained directly into the ground. Given the relatively small developed areas involved and relatively small water volumes, no significant adverse affects on groundwater or pond water quality or biota are anticipated. Coastal and anialine ponds have, and have been, monitored and have not been affected by any noticeable changes in salinity. Such organisms would not be adversely affected by temporary reductions in pond salinity (Maciolek and Brook, 1974).

5.5 Potentials Associated with Heavy Equipment Operations and Servicing

Oil and fuels associated with heavy equipment operations and servicing ponds as a potential threat to groundwater quality by way of accidental contamination of the anialine pond adjacent to Honokohau Harbor are mentioned by Maciolek (1974) as a result of oil. It is recommended that all fueling of heavy equipment take place offshore, and that no servicing of equipment, which involves the addition or replacement of lubricants, be permitted on the project site.

5.6 Landscaping in the Vicinity of Coastal Ponds

Landscaping poses a potential threat to the existence of coastal ponds. Inasmuch as they now are surrounded by a dense, continuous vegetation, it is recommended that no landscaping in the immediate vicinity of the ponds be allowed to maintain their pristine character. The areas to be landscaped are to be consistent with the existing vegetation.

The effect of organic materials from terrestrial, riparian, and aquatic vegetation has been shown in other surveys to be a potential threat to the existence of coastal ponds. Inasmuch as they now are surrounded by a dense, continuous vegetation, it is recommended that no landscaping in the immediate vicinity of the ponds be allowed to maintain their pristine character. The areas to be landscaped are to be consistent with the existing vegetation.

Bay coastal ponds has been proposed.

5.7 Increased Human Use of Kiholo Bay

Increased human use of the area may be expected to result in increased harvesting and utilization of coastal pond and marine resources. Construction workers should be guided by the following principles:

- Construction workers should be guided by the following principles: Construction workers should be guided by the following principles: b. The green sea turtle is a threatened species and severe federal penalties can be imposed for harvesting Kiholo's turtle resources.

- Perhaps the greatest environmental threat resulting from increased use of the area is the greater opportunity for the introduction of exotic species to coastal ponds for habitat or aesthetic reasons. The ponde of absence of exotic species, and every effort should be made to maintain this pristine quality.

It is recommended that signs be placed adjacent to ponds to caution fishermen, visitors and guests not to place any fish or other organisms into the ponds for any reason.
SECTION 8.0

LITERATURE CITED


Photograph 1. Koholo Bay Shoreline (North to South Perspective).

Photograph 2. Koholo Bay Underwater Topography.

Photograph 3. Storm Damaged Porites Coral Colony.

Photograph 4. Rock-boring Echinoderms In Koholo Bay.
APPENDIX B

Archaeological Survey Report
Mr Will Chee  
Planner  
1585 Kapiolani Blvd.  
Honolulu, Hawaii

April 20, 1989

Dear Mr Chee:


SUMMARY

In February of this year the author and one assistant conducted a surface reconnaissance at the above location. This inspection covered the entire property; no cultural features were encountered.

I would like to present our survey findings at the above location in brief, letter form based on the exceptional circumstances related to the unique nature of the proposed development that is to take place at this site. We realize that this is a departure from the standard archaeological report format but present it on consideration of the following information.

Under normal conditions, impacts to cultural materials are unavoidable due to necessary, below grade changes that are a part of most all modern land change; I have in mind sewer or cesspool excavation, foundation work or a variety of other modifications. In this instance however, I have been told that the dwelling units planned for this site, and their attendant structures, will not be a significant factor relating to potential archaeological subsurface recovery at this site because no part of them will drop below grade.
Mr Will Chee  
4-20-89  
Page 2  
Kiholo Survey

Our reasons for this interpretation are as follows:

1) Survey results demonstrate that there is a total absence of surface features on the subject property.

2) The majority of the property consists of brackish ponds, and unless these ponds demonstrate signs of human modification (which they do not), they are not considered cultural resources under present CRM interpretations.

3) The land owner, (Mr Paul Mitchell) has indicated his desire to sustain occasional dwellings on this property by employing alternative (albeit not completely tested) energy sources, e.g. solar waste reduction systems, etc.—therefore no sewer lines, cesspools. Let it be known that he has achieved some degree of progressive success in this general area through substantial efforts relating to solar powered autos.

On the other hand, while the data presented above is accurate to the best of our knowledge, this brief report cannot be submitted without the following information presented.

There can be no doubt that this special area of Kakaha on Hawaii Island must be considered special both in terms of its geographical location as well as its association with the mythological and cultural history of the Hawaiian people. Kiholo was, without a doubt, a sure locus of significant precontact activity for at least 1000 years!

Paradoxically, while the above assumptions are most likely correct, previous archaeological activity in this area (e.g. Ching (1971), Rosendahl (1982), has produced very modest results.

This work notwithstanding, it remains (in our opinion) that significant archaeological subsurface potentials are present on the subject property.
Mr Will Chee  
4/20/89  
Page 3  
Kiholo report  

In sum, while we believe that these resources are most likely alive on the subject property, we do not believe that Mr. Mitchell's proposed plans will impact these potentials, for this proposed work will not extend below existing grade.

If there are any questions regarding this brief report, please feel free to contact me.

Aloha,

[Signature]

Joseph Kennedy  
Consulting Archaeologist
Ms. Claire Tom
Wil Chee Planning
Ala Moana Pacific Center
1518 Kapiolani Blvd. Suite 818
Honolulu, Hawaii 96814

May 23, 1995

Dear Ms. Tom:

Thank you for bringing to my attention an error of omission in a very brief document I prepared back in April of 1989.

That short letter report had to do with a preliminary archaeological examination I conducted of property then owned by Mr. Paul Mitchell at Kiholo Bay, island of Hawaii. The TMK number given at the top of my report was 7-1-02:4; this should have been expressed as TMK:7-1-02:4 and 7.

I regret any inconvenience this may have caused your office or the estate of Mr. Mitchell.

Sincerely,

[Signature]

Joseph Kennedy
Consulting Archaeologist
APPENDIX C

Agency Comments and Responses
17 May 1995

Mr. Gary Gill, Director
Office of Environmental Quality Control
220 South King Street, Fourth Floor
Honolulu, HI 96813

RE: Draft Environmental Assessment (EA) for a Proposed Single Family Residence
Paul Mitchell Trust, Kahalu'u Bay, North Kona, TMK 1-4-62, 4 and 7

Dear Mr. Gill:

Thank you for your comments on the draft environmental assessment (EA). Please note that the Department of Land and Natural Resources, Water Resources Management Division was contacted during the pre-assessment phase of the project. Wil Cher, Planning, Inc. (WCI) has also consulted with the Hawaii County Planning Department regarding permits for activity within the subject area. The U.S. Army Corps of Engineers is being contacted at this time so that any comments can be incorporated into the final EA.

With respect to item #2, the archaeological survey that was performed by Archaeological Consultants of Hawaii in February 1990 did cover the entire property, including parcel 7. Documentation to this effect will be included in the final EA.

Sincerely,

Don Hinkle
Director

cc: Alii Tom, Wil Cher, Planning
Patrick Fujii, Trustee, Paul Mitchell Trust
March 28, 1995

Ms. Claire Tom
MII Chee - Planning, Inc.
Ala Moana Pacific Center
1505 Kapiolani Blvd., Suite 618
Honolulu, HI 96814

Dear Ms. Tom:

Special Management Area (SMA) Use Permit Assessment
Application (SMAA 95-12)
Applicant: Patrick T. Fujiki for Paul Mitchell Trust
Proposed Construction of a Single-Family Residence

We have received your SNA Assessment Application for the
construction of a proposed single-family residence on parcel 4 at
Kiholo Bay. Upon reviewing your application, we have determined
that your proposal is exempt from the definition of “development”
established by Planning Commission Rule 9, SNA Rules and
Regulations. According to these rules, development does not
include “construction of a single-family residence that is not
part of a larger development.” Therefore, your proposal is
exempt from further SNA review but subject to requirements of the
County Building Code.

As you are aware the subject parcel is situated within the State
Land Use Conservation District. As such, any development on the
property is subject to review by the State Department of Land and
Natural Resources.

Should you have any further questions, please feel free to
contact Alice Kawaha of this office at 961-8388.

Sincerely,

VIRGINIA G. WATERS
Planning Director

cc: Mr. Patrick T. Fujiki, Trustee
West Hawaii Office
SMA Section
Ms. Dona Evans
Waiiohi - Pluming, Inc.
1585 Kapolei Blvd., Suite #218
Honolulu, HI 96814

January 9, 1995

Ms. Dona Evans:

Subject: Pre-Assessment Consultation for Environmental Assessment, THK: 7-1-021 4 & 7, Kiholo

Thank you for this opportunity to comment on the proposed development.

In addition to the Ala Loa and Ala Kahanai trails which join just north of the project area and pass south within the shoreline setback on the makai edge of the property, there are at least two and possibly three trails which approach the subject property from the southeast, east, and southeast. See map.

Number one is the old Kiholo access road, identified as site 1219, historic east trail, in the Archaeological Resource Report for the Queen Kahumanu Highway, DO 614.184.187 No. 72-3.

Number two is a pre-historic foot trail which approaches from the southeast along the edge of the 1869 lava flow, identified as site 1220 in the source noted above.

Number three is shown in THK: 7-1-021 6 approaching from Puu Anaholu, identified only as a trail.

Mr Ala Loa staff has explored portions of the first two, but did not determine where or if they cross or enter the subject property. The third trail has not yet been located on the ground.

It is possible that one or more of these trails crosses THK: 7-1-021 4 & 7 to access the shoreline or join the Ala Loa/Ala Kahanai. It would be prudent to determine this prior to constructing a dwelling across a traditional easement.

Very truly yours,

Howard D. Hochach
Acting Forestry and Wildlife Manager

Division of Forestry and Wildlife - Dept. of Land & Natural Resources - P.O. Box 4119 - Hilo, Hawaii 96720-4119
27 June 1993

Mr. Howard A. Heirich, Acting Forestry & Wildlife Manager
Division of Forestry & Wildlife
Department of Land & Natural Resources
P.O. Box 4649
Hilo, HI 96720-0469

SUBJECT: Environmental Assessment (EA) for a Proposed Single Family Residence
Paul Mitchell Tran, Kahala Bay, North Kona, TMRC: 7-1-02: 4 and 7

Dear Mr. Heirich:

Thank you for your comments during the pre-assessment phase of the proposed action. Please note that the applicant has cooperated with Na Ala Hele staff in the identification of the traditional public access route to traverse the coast adjacent to the subject property. Additionally, the EA acknowledges a previous request from Na Ala Hele that the Historic Preservation Program be notified should the trail be located at work proceeds at the project site. It should also be noted that the applicant proposes to utilize an existing building site for the location of the single-family residence.

A copy of the Final EA for the proposed action is available from the Department of Land and Natural Resources, Office of Conservation and Environmental Affairs, P.O. Box 531, Honolulu, Hawaii, 96809 (ATTN: Mr. Don Heirich). If you have any questions or comments with respect to the proposed action, please contact Claire Ton (583-0083). Thank you very much for your cooperation.

Sincerely,

Claire Ton

Weeho, Planning, Inc.
Land Use Strategies and Environmental Assessments
Na Hoku Panoa Centre
1800 Keeaumoku Street
Suite 500
Honolulu, Hawaii 96814
Phone: 808-548-9880
Fax: 808-548-9811
January 2, 1995

Wil Choo - Planning, Inc.
ATTN: Dona Evans

1585 Kapioihi Rd., Suite #210
Honolulu, Hawaii 96814

Dear Ms. Evans:

Subject: Pre-Assessment Consultation for Environmental Assessment, TMK: 7-1-02:4 & 7, Kiholo

Thank you for this opportunity to comment on the proposed development.

In addition to the Ala Loa and Ala Kahakai trails which join just north of the project area and pass south within the shoreline setbacks on the west edge of the property, there are at least two, and possibly three, trails which approach the subject property from the NE, E, and SE. See map.

Number one is the old Kiholo access road, identified as site 1313, historic cart trail, in the Archaeological Survey Report for the Queen Kahuana Highway, DU 624.41 847 No. 73-3.

Number two is a pre-historic foot trail which approaches from the NE along the edge of the 1859 lava flow, identified as site 1220 in the source noted above.

Number three is shown in TMK: 7-1-02:4 approaching from Puuanahulu, identified only as a trail.

Ma Ala Hele staff have explored portions of the first two, but did not determine where or if they cross or enter the subject property. The third trail has not yet been located on the ground.

It is possible that one or more of these trails crosses TMK: 7-1-02:4 & 7 to access the shoreline or join the Ala Loa/Ala Kahakai. It would be prudent to determine this prior to constructing a dwelling across a traditional easement.

If you have any questions or require assistance in accurately locating these trails please contact me at the Hawaii District Trails and Access Program, 933-4221.

Very truly yours,

[Signature]

Patrick A. Choo
Forestry & Wildlife Tech
Ma Ala Hele Program
37 June 1995

Mr. Patrick A. Thiele, Forestry & Wildlife Tech
Division of Forestry & Wildlife
Department of Land & Natural Resources
P.O. Box 4449
Hilo, HI 96720-0449

SUBJECT: Environmental Assessment (EA) for a Proposed Single-Family Residence
Paul Mitchell Trust, Kiholo Bay, Honaunau, THOC: 7-1-02, 4 and 7

Dear Mr. Thiele:

Thank you for your comments during the pre-assessment phase of the proposed action. Please note that the applicant has cooperated with Na Ala He'e staff in the identification of the traditional public access route used to traverse the coastal adjacent to the subject property.

Additionally, the EA acknowledges a previous request from Na Ala He'e that the Historic Preservation Program be notified should remains of the trails be located as work proceeds at the project site. It should also be noted that the applicant proposes to utilize an existing building site for the location of the single-family residence.

A copy of the Final EA for the proposed action is available from the Department of Land and Natural Resources, Office of Conservation and Environmental Affairs, P.O. Box 631, Honolulu, Hawaii, 96819 (ATTN: Mr. D. Horlick). If you have any questions or comments with respect to the proposed action, please contact Clay Tom (953-6083). Thank you very much for your cooperation.

Sincerely,

[Signature]
Clara Tom
27 June 1993

Mr. Don Hibbard, Administrator
State of Hawaii, Dept. of Land & Natural Resources
33 South King Street, 6th Floor
Honolulu, HI 96813

SUBJECT: Environmental Assessment (EA) for a Proposed Single-Family Residence
Paul Mitchell Trust, Kiholo Bay, North Kona, TMK 7 - 1 - 02: 4 and 7

Dear Mr. Hibbard:

Thank you for your comments during the pre-assessment phase of the proposed action. Please note that the archaeological survey that was performed by Archaeological Consultants of Hawaii in February 1993 did cover the entire property, including parcel 7 (see enclosure). It should also be noted that no cultural features were encountered on the site and survey results demonstrated a total absence of surface features on the subject property. These findings and the nature of the project proposed to be entirely above-existing grade, with none of an existing building site should pose no modification to existing ponds or drainage to any possible buried sites or cultural deposits.

A copy of the Final EA for the proposed action is available from the Department of Land and Natural Resources, Office of Conservation and Environmental Affairs, P.O. Box 621, Honolulu, Hawaii, 96810 (ATTN: Mr. Don Hibbard). If you have any questions or comments with respect to the proposed action, please contact Claire Tom (955-6085). Thank you very much for your cooperation.

Sincerely,

Claire Tom

20 December 1994

Dear Ms. Evans:

SUBJECT: Pre-Assessment Consultation for Environmental Assessment:
Construction of a Single-Family Residence
Kiholo, North Kona, Island of Hawaii
TMK: 7-1-02: 4, 7

Thank you for your letter of December 5, 1994 and the opportunity to comment on the proposed action to construct a single-family residence in the State Conservation District at Kiholo.

Incidentally, Archaeological Consultants of Hawaii undertook a re-examination survey of parcel 7 in 1993. In a letter report submitted to Will Choe on April 30, 1993, Kennedy noted an absence of hidden sites on the property. For reasons that are not made clear, it was Kennedy's opinion that, even though no significant historic sites were noted on the surface, there was still a potential of finding subsurface remains.

To our knowledge no archaeological survey has ever been conducted of parcel 7. At this point in time we would recommend an archaeological inventory survey of parcel 7 and check of parcel 4 to evaluate Kennedy's earlier survey results and speculation regarding buried sites or cultural deposits.

If you have any questions please contact Pat McCoy (527-0006).

Sincerely,

Don Hibbard, Administrator
State Historic Preservation Division

P(Hawaii)
Ms. Dana Evans
December 21, 1994
Page 2

Should you have any questions regarding this matter, please contact Ms. Erika Aroga, Engineering Section of the Clean Water Branch, at 566-4309.

Sincerely,

[Signature]

Kaiser

Dear Ms. Evans:

Subject: State Conservation District, Subzone H-6

The Department of Health, Clean Water Branch acknowledges the receipt of your letter dated December 4, 1994 and has the following comments:

1. The applicant should contact the Army Corps of Engineers to identify whether a Federal permit (including a Department of Army permit) is required for this project. A Section 401 Water Quality Certification is required for "Any applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters..." pursuant to Section 401(a)(1) of the Federal Water Pollution Act (commonly known as the "Clean Water Act (CWA)").

2. If the project involves the following activities with discharges into State waters, a National Pollutant Discharge Elimination System permit is required for each activity:
   a. Discharge of storm water runoff associated with construction activities, including clearing, grading, and excavation that result in the disturbance of equal to or greater than five (5) acres of total land area;
   b. Construction dewatering effluent;
   c. Non-contact cooling water;
   d. Hydrotesting water; and
   e. Treated contaminated groundwater from underground storage tank remedial activity.
27 June 1995

Mr. Denis R. Lau, P.E., Chief, Clean Water Branch
State of Hawaii, Department of Health
P.O. Box 3378
Honolulu, HI 96804

SUBJECT: Environmental Assessment (EA) for a Proposed Single-Family Residence
Paul Mitchell Town, Kiholo Bay, North Kona, TMIC 7-1-02: 4 and 7

Dear Mr. Lau:

Thank you for your comments during the pre-assessment phase of the proposed action. The
Army Corps of Engineers has been instructed and given the opportunity to comment on the
subject project. It should be noted that the applicant proposed to incorporate an evaporative
system for gray-water disposal and an aerobic wastewater disposal system. In addition, no site
grading or excavation is anticipated and the area of proposed use encompasses less than 1.0
acre.

A copy of the Final EA for the proposed action is available from the Department of Land and
Natural Resources, Office of Conservation and Environmental Affairs, P.O. Box 631, Honolulu,
Hawaii, 96812 (ATTN: Mr. Den Lau). If you have any questions or comments with
respect to the proposed action, please contact Claire Tom (935-5668). Thank you very much for
your cooperation.

Sincerely,

Claire Tom
December 20, 1994

Ms. Dora Evans
Wil Chan - Planning, Inc.
1545 Kapolei Boulevard, Suite 110
Honautihi, Hawaii 96814

Dear Ms. Evans:

Subject: Pre-Assessment Consultation for Environmental Assessment (EA), TMD No.: 7-1-02:4 and 7, Kiholo, North Kona, Hawaii

We have received your letter of December 14, 1994 requesting our comments during the pre-assessment consultation phase for the subject EA, and confirm that the subject parcels are located within the State Land Use Conservation District. We suggest that the draft EA include a map showing the project site in relation to the State Land Use Districts.

We have no other comments to offer at this time. We appreciate the opportunity to comment on this matter.

Should you have any questions, please feel free to call me or Bert Saruwatari of our office at 387-3222.

Sincerely,

ESTHER UEDA
Executive Officer

December 21, 1994

Ms. Dora Evans
Wil Chan - Planning, Inc.
Ahia House Pacific Center
1545 Kapolei Boulevard, Suite 8118
Honautihi, Hawaii 96814

Dear Ms. Evans:

Subject: Pre-Assessment Consultation for Environmental Assessment - Construction and Occupation of One Single-Family Private Residence, Kiholo, North Kona, Hawaii TMD: 7-1-02:4 and 7

The proposed construction of a single-family private residence at Kiholo, North Kona, Hawaii, will not have a significant impact on our transportation facilities.

We appreciate the opportunity to provide comments.

Sincerely,

Glen M. Okimoto
Acting Director of Transportation