

2000-11-23-MO-PEA-Chu Single

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Family Residence

Final Environmental ~~Assessment~~

**Single Family Residence and Related
Improvements in the Limited Subzone**

*"He'ike 'ana 'ia i ka pono."
One has seen the right thing to do and has done it.*

Chu Family Residence

Island of Moloka'i
County of Maui
District of Waialua
Tax Map Key: (2) 5-7-3-68

October 2000

Assessment

The text of this final Environmental [REDACTED] is written in a format which allows the reader to easily distinguish changes made to the draft of the [REDACTED].

EA

The text of the Draft Environmental Assessment [DEA] remains unchanged. New information provided in response to the letters and concerns received by the applicant is underlined in the final [REDACTED].

EA

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FINAL ENVIRONMENTAL

Assessment

I. OVERVIEW

A. Nature of Proposed Action

Pursuant to Chapter 13-5, Hawaii Administrative Rules, the proposed action will require the filing of a Conservation District Use Permit application, since the construction of a single family residence and related improvements within the State Conservation District, "Limited Subzone", on property situated at Waialua, Moloka'i, State of Hawaii (TMK 2nd Division 5-7-0-5-068).

B. "Pursuant to Chapter 343, etc."

1) Identification of applicant

TMK: 2nd Division 5-7-003-068
Location: Waialua, Moloka'i
Applicant: Maile Chu Goo, Trustee
5846-B Kalaniana'ole Hwy.
Honolulu, Hawaii 96821

2) Identification of Approving Agency

Department of Land and Natural Resources
1151 Punchbowl St.
Honolulu, Hawaii 96813

3) Identification of Agencies Consulted in Making Assessment

- a) Department of Land and Natural Resources
- b) U.S. Department of Agriculture
- c) Department of Planning, County of Maui
- d) Land Use Commission, State of Hawaii

C. **Site Information Summary**

Location - Approximately 20 miles east of Kaunakakai, Island of Moloka'i, at Waialua. Project site is on the makai side of Kamehameha V Highway.

Project Area - Approximately 0.748 acre. Project site is a portion of TMK 5-7-03:68.

Project Site Characteristics - Level sandy shoreline; shallow waters protected by reef.

Land Use Designations - Conservation District, "L"; Flood Insurance Rate Map, V-14 and C.

Existing Use - The project site area is undeveloped.

Proposed Use - Single family residence.

II. **Major approvals to be sought:**

- Conservation Use Permit
- Approval for individual wastewater system
- Approval for Development in Flood Hazard Districts
- Shoreline Setback approval for landscaping within the 150 ft. shoreline setback area

III. **General Description of the Action's Technical, Economic, Social and Environmental Characteristics**

The proposed action involves construction of a single family residence in the State Conservation District, "L" Limited Subzone, at Waialua, Moloka'i. The project site is vacant and undeveloped, and encompasses an area of approximately 0.748 acres, approximately 60% of which is Flood Hazard Zone C with the remaining area Zoned V-14.

The proposed single family residence will consist of three (3) separate structures with a total floor area of approximately 3,000 sq. ft. as follows:

(a) A one-story dwelling with 1,000 sq. ft. being open lanai and 1,000 sq. ft. devoted to indoor living. Construction will be of Hawaiian type post and pier with 2"x4" framing; (b) A garage with toilet and shower for outdoor activities of approximately 500 sq. ft. Construction will be of 2"x4" framing on a concrete slab; © A gazebo and storage structure of approximately 500 sq. ft. for ocean activities will be on a concrete slab with 2"x4" framing and 6"x6" posts.

The structures will be sited so that the proposed owner's dwelling of 1,000 sq. ft. open decking and 1,100 sq. ft. enclosed living space will be in Flood Zone C, thereby avoiding the area zoned V-14. The enclosed garage storage structure is likewise sited in Zone C. The gazebo for ocean activities is to be sited closer to the shoreline in an area zoned V-14. See Gazebo Plan, Exhibit 25.

Ground elevations measure 6.83 and 6.25 in Zone C for the proposed site of the owner's dwelling. The structures are sited to preserve the eastern half of this parcel as open space.

The structures will be sited to minimize grading. They will be approximately 65 feet inland of the shoreline, well back of the 60-foot shoreline setback. Existing healthy trees and vegetation will be maintained. There will be no landscaping of the area makai of the property boundary.

Response to letter from Lauren Tanaka, DLNR, regarding three (3) structures rather than one (1) as best alternative.

The Chu family residence is designed to conserve, protect and preserve as much of the natural terrain as possible. We wanted to minimize grading and filling at the proposed project site. To create a building site suitable for a residence of 3,100 square feet under one roof, would require excavation of approximately 120 cubic yards for the dwelling and over 100 cubic yards of fill materials for the gazebo and garage. This "one roof" plan was therefore unacceptable.

In another scenario we considered placing the dwelling and garage under one roof with an even roof line and found that even this required considerable excavation and fill. The gazebo would have been separate in this alternative.

These two (2) alternatives also posed a problem with our desire to keep as much of the present vegetation as possible. Five (5) large Kamani trees and two (2) full grown coconut palms would need to be removed. We would also have lost approximately 2,000 square feet of pohuehue (beach morning glory) ground cover.

Having three (3) separate structures instead of one single structure, has some additional benefits:

As native Hawaiians who have had land tenure in East Moloka'i for many generations, we are concerned about the scale and character of recent residential construction in this rural area. In Puko'o a few miles west of our proposed project, sits a house of less than 3,000 square feet, and yet it towers menacingly over the adjacent ancient fishpond in which part of its foundation rests. It is one of the numerous recently constructed residences which may meet the building requirements, but which are

clearly out of character with the surrounding environment in both scale and circumstance.

Three (3) small structures totaling 3,100 square feet is more compatible with rural Waialua in contrast to one (1) structure of 3,100 square feet, or two (2) structures consisting of one (1) 2,600 square foot garage and dwelling and another of 500 square foot gazebo.

Another concern the Chu family has relating to scale and size has to do with the fact that a structure of 2,000 square feet or more would be an affront to the Church located several yards away. The Church of approximately 1,200 square feet is clearly the centerpiece of this rural neighborhood. Our Great-grandfather was the founding minister of this Church. He is also the person to whom this property, the proposed project site, once belonged. Out of respect for our revered Kupuna and the Church, the Chu family wishes to ho'oha'aha'a [humble] itself.

E noho iho I ke opu weuweu, mai ho'iki'eki'e. This old Hawaiian saying translates as "remain among the clumps of grass and do not elevate yourself." It means that we should not put on airs, show off, or assume an attitude of superiority. We believe that the design of our proposed single family residence reflects this humility and respect for our culture and ancestors.

A final advantage to separating the dwelling from the garage and gazebo is the enhanced access to the outdoors and from all of the living, work and recreational areas. This arrangement ensures natural cooling from the trade winds and shade provided by existing mature trees. Each of the three (3) structures will receive maximum natural light in daytime. These advantages support the sustainable building guidelines of the OEQC.

All things considered, the proposed Chu family residence consisting of three (3) separate structures clearly is the best alternative as it addresses the following needs:

- [1] Conserving, protecting and preserving as much of the natural terrain as possible.
- [2] Preserving present mature native trees and native ground cover.
- [3] Recognizing and being compatible with the scale and character of other residences in this rural community.
- [4] Enabling the Chu family to demonstrate respect for the position the neighborhood Church holds, and the role it plays, in this rural Community.
- [5] Designing a residence that takes advantage of the outdoors through the many direct openings (windows and doors) to the outside, allowing natural ventilation and lighting; and natural cooling through preservation of the existing shade trees.

The 3,100 sq. ft. proposed residence is less than the 3,500 sq. ft. allowed. The proposed structures will be of wood-frame construction, reflecting the simple design of existing residences in the area.

Other related improvements include:

- installation of a 5/8-inch water meter on the existing Maui County water line, as determined in consultation with Arnold Abe, Maui Water Supply Engineer;
- electricity and telephone hook-up with existing overhead power lines;

- installation of a 124 gallon propane tank for water heating and cooking;
- driveway approach according to rules and Regulations of the Department of Transportation will be at present access'
- installation of anaerobic waste water system of 1000 gallons according to Rules and Regulations of the County of Maui;
- installation of a ranch-type fence (round post and wire) along the highway, and on the east and west boundaries, leaving the beach side open

Response to letter from David Craddick, Department of Water Supply, County of Maui, letter dated Sept. 8, 2000.

The Department of Water Supply provided the applicant with detailed information on water source and system. Resource and Conservation. The suggested Best Management Practices coincide with the Sustainable Building Design Guidelines of the Office Of Environmental Quality Control [OEQC].

After contacting Arnold Abe, Engineer at the Department of Water Supply, it was determined that this proposed project will require the installation of a 5/8-inch water meter.

The proposed Chu family residence will utilize low-flow fixtures and devices as required under Maui County code subsection 16.20.675. This proposed project will not include automated irrigation systems and will utilize native plants adapted to and presently growing at the site. See

Flora on page 12 of the DEA for landscape plans that focus on promoting native and Polynesian-introduced plants while limiting intrusive exotics.

Although the subject property has not been declared a wetland habitat, the applicant will contact Ms. Kali Arce of UH Cooperative Extension Service for any information she may provide as landscaping gets underway. The applicants are aware that their proposed project is in a salt spray zone and that plants must be drought and salt tolerant. During winter months the ehukai can cause serious burn to plants not adapted to this coastal site on the windward side of Moloka'i.

The applicant appreciates the water conservation information provided by the Department.

Response to letter from Genevieve Salmonson, Office of Environmental Control, letter dated August 4, 2000.

The applicant and Leslie Segundo of the Office of Environmental Control discussed wastewater impacts as well as the Sustainable Building Design Guidelines.

After consulting the Department of Health and the applicant's architect, it has been determined that an aerobic wastewater treatment unit will be used at this proposed project. Although the aerobic unit is more costly than the more commonly used septic tank system, the property owners believe the aerobic system minimizes more effectively the wastewater impacts to the environment. A 1,000 gallon aerobic treatment unit, Navadic model M1200A, will be used.

Although some of the Sustainable Building Guidelines do not apply to this modest residential project, there are many items on the planner's checklist that this applicant can and will use. Some items listed were already incorporated into the early planning for this project. I.e. site selections, design, and preparation, building design, water use, landscape, and irrigation.

The applicant appreciates the set of Sustainable Building Design Guidelines provided by this office.

Response to letter from Jeff Mikulina, Sierra Club, Hawaii Chapter, letter dated August 6, 2000.

The proposed ranch type fence will not impede public beach access in this area. Present public access to this beach from Kamehameha Highway will not be affected by this proposed project. The public has always had and will continue to have full access to the shoreline from Kamehameha Highway.

Adjacent to this proposed project site is a beach access that, although privately owned by the adjacent neighboring property owner, will likely always remain open for public access. The reason being that this neighboring parcel is too narrow and too small for development of any kind. The community has always used this access to the shoreline and our proposed project does not change the character of this public access in any way.

Exhibit 16 of the DEA, an aerial photograph of the proposed project, shows the many miles of public beach access that begins where this

subject property ends. The proposed installation of a ranch-type fence on three (3) sides of this project will not impede public shoreline access and will not change the present nature of beach access that the public presently enjoys.

Photographs (exhibits 26, 27, 28) of the present beach access, which the public presently uses and will likely continue to use, are found in the EIS List of Exhibits, numbers 26, 27, 28. Exhibits 26, 27 and 28 show the neighboring property to the east of this proposed project. The photographs were taken from Kamehameha Highway. The proposed ranch-type fence will be located to the right of these photographs [not shown], running from the Highway and stopping at the makai boundary of the subject property. These photographs show the present "beach access" on the adjacent property which also serves as the beginning of several miles of shoreline access available for public use. See also aerial photograph, exhibit 16 under Exhibit.

Based on historic research, family records, and field investigations, numerous habitation structures, a church and a store previously existed within 100 yards of the project site. Residences and the Waialua Church with its recreational pavilion are present today.

Flora: Presently, invasive exotic vegetation intrudes upon the few indigenous species represented on this property (niu, naupaka kahakai, hau, false kamani and pohuehue). Java plum, mango, koa haole, castor bean, klu, passion fruit, kiawe, lantana and alien grasses are among the exotic vegetation that has taken hold. See Site Photographs.

The owners propose to selectively landscape and maintain the property using native vegetation. Through integration of native and Polynesian-

introduced plants, the owners will attempt to create and maintain a coastal community of plants in as natural a setting as possible for this size parcel. This type of landscape will require little or no irrigation.

Vegetation at present is dense, except for bare ground in extremely shady areas (under false kamani) and an open grassy (Bermuda) area that the family has traditionally used for picnicking. See Site Photographs.

Landscaping around the proposed structures will consist of pruning the existing false kamani, hau and niu. Trees in poor condition and/or posing a danger to passers by will be removed. Where appropriate, these trees will be replaced with milo, kukui, kou and loulou. The landscape will be further enhanced as efforts are made to limit and eventually exclude opportunistic exotics (lantana, castor bean, koa haole, kiawe, passion fruit, klu, Christmas berry, Java plum and mango) and replace them with naupaka kahakai, pohuehue, pohinahina, akia, ilima, kou, milo, loulou and kukui. Landscape focus will be on limiting intrusive exotics while promoting native and Polynesian-introduced plants suitable for this coastal site.

Fauna observed at this site. Indian mynah, doves, rats, feral cats and mongooses.

Response to letter from Paul Henson, Field Supervisor, Ecological Services, Fish and Wildlife Service, U.S. Department of the Interior, letter dated 07/14/00.

The U.S. Fish and Wildlife Service review of the DEA found that based on information from their files "no federally endangered, threatened, or

candidate species, significant wetlands, or other Federal Trust resources occur in the immediate area of the proposed project site."

U. S. Fish and Wildlife Services, however, provided a pamphlet detailing types of outdoor lighting that would minimize the risk of seabird fallout. The Service is concerned that the endangered dark-rumped petrel may nest on Moloka'i.

Although outdoor lighting for this project will be minimal, consisting of shielded fixtures at exterior doorways and open lanai, the pamphlet provides information of which applicants were totally unaware.

The applicants appreciate the information provided and are committed to avoiding the types of lights and lighting situations that would endanger young nesting petrels.

In a telephone conversation with Jay Nelson, Fish and Wildlife Biologist, the applicant was informed that the Service is especially concerned with projects where light glare projects upward or laterally and, therefore, it is recommended that large high intensity floodlights on building tops or poles be avoided. This proposed project does not include the types of lighting of concern to the Service.

Topography. The proposed structures will be situated approximately 75 feet inland of the shoreline. Ground elevations range from 6.83 to 7.65 feet above sea level at the proposed construction site. This location was selected to minimize grading and preserve the entire eastern half of the parcel as a single open space. See Exhibit 4.

Soil Survey. Soil is Kawaihapai (K14) type. Kawaihapai clay form with 0-2 percent slope is a very deep, well drained soil on nearly level drainage ways and alluvial fans. The surface layer is clay loam, and the subsoil is sandy loam with stratified layers of sand silt and gravel. The soil is neutral in reaction throughout the profile. Permeability is moderate. Runoff is slow, and the erosion hazard is slight.

Kawaihapai soils belong to hydrologic group B soils characterized by moderate infiltration when thoroughly wet. These consist of moderately deep or deep, moderately well drained or well drained soils that have moderately firm texture to moderately coarse texture. These soils have a moderate rate of water transmission (see Exhibit 12).

Shoreline description. The sandy beach is protected by an offshore reef. It is a shallow beach, safe for swimming and exposed to the Pailolo Channel, a 7.5 mile wide channel between Moloka'i and Maui. During the last 50 years, accretion has added in some places as much as 20 feet of sand to the shoreline. This may be the result of cattle (belonging to neighboring ranchers) which once freely roamed this property, being eliminated in the late 1950's. It was not unusual to see cattle laying on the sand here in 1950. Property owners intend to maintain accreted area in present state. See Site Photographs.

Response to letter from Don Hibbard, Administrator, Historic Preservation Division, DLNR, letters dated July 26, 2000 and August 23, 2000.

The State Historic Preservation Division provided a revised comment on the subject CDUA permit application after additional information was provided to them. In its revised comment the State Historic Preservation

Division states: "we believe that if the subject CDUA permit application is approved, there will be 'no effect' on significant historic sites." The Division recommends a precautionary condition be added to the subject permit, if approved.

"Should historic remains such as artifacts, burials, concentrations of shell or charcoals be encountered during construction activities, work shall cease immediately in the immediate vicinity of the find, and the find shall be protected from further damage. The contractor shall immediately contact the State Historic Preservation Division (587-0013), which will assess the significance of the find and recommend an appropriate mitigation measure if necessary."

Initially, letter dated July 26, 2000, the Historic Preservation Division found the DEA to be unclear as to the nature of sand deposits close to where the proposed gazebo is to be sited. Since sand dunes can contain significant historic sites such as subsurface cultural layers and human burials, the Division was justifiably concerned about sand deposits shown in photographs included in the CDUA.

First, there will be no construction on areas of accretion. Parts of the accreted shoreline are within the subject property's makai boundaries, however, most of it lies makai [outside] of the property line. Photographs in the CDUA show these sand deposits. Specifically, the property pin at the eastern/makai corner was at one time at the water's edge ^{it} and is now submerged in the recent accretions.

Under "shoreline description" of the DEA, it describes the shoreline as experiencing accretions during the last fifty (50) years. The DEA did not detail the extent of accretion in relation to the proposed structures. Details of the timing and extent of the accretion provided the Division with additional information needed to determine "there will be 'no effect' on significant historic sites."

After providing Ms. Sara Collins with the additional information regarding timing and extent of accretion, this applicant reviewed with the architect the placement of the proposed structures. None of the proposed structures will be situated on sand deposits. The proposed gazebo is situated on Kawaihapai soil in zone V-14. The area directly makai of it, beginning approximately twenty (20) feet away, is newly formed (50 years) sand deposits.

The Chu family after more than fifty (50) years of recreational use, has never found evidence of any historic remains on this property.

The applicants find it reasonable and agree to the precautionary condition that the State Historic Preservation Division be immediately contacted should historic remains/artifacts be encountered during construction.

IV. Summary Description of Affected Environment, Including Suitable and Adequate Location and Site Maps

Water, electricity, and the island's main highway are present at this project site. Other residences are in close proximity. The proposed Chu family residence is consistent with these shoreline properties.

The proposed main dwelling will be sited on a relatively level area requiring minimal grading. Trees and shrubs within the shoreline setback area will be retained as a visual buffer and to preserve the natural character of the area. There will be no landscaping of the area makai of the property boundary.

Historically, housing has existed in Waialua along both sides of the highway with houses to the west being only 15 feet from this parcel's west boundary. These houses are built on lots averaging 4,000 to 6,000 sq. ft. See Exhibit 2, Tax Map. The proposed Chu Family residence has a parcel of approximately 32,000 sq. ft. The proposed dwelling will be compatible with the neighborhood as it will be one of more than a dozen houses in this Waialua neighborhood. Its wood frame construction and composite shingle roof will be of earth tones to blend in with the environment. Landscaping along the proposed ranch-style (post and wire) fence will further preserve the natural view from the highway.

The Chu Family proposal is consistent with the history of this island community. It is reasonable and appropriate for the area and it includes plans to protect and enhance the natural resources. See Map of Structures within 2,000 ft. on either side of proposed projects, Exhibit 17.

V. Identification and Summary of Major Impacts and Alternatives Considered, If any

The property owners have no other alternatives for a beach side residence, as this is the only shoreline property they own. The owners have sited their structures to preserve as much of the

natural terrain as possible. The construction site has direct access to county waterlines, electricity, power lines and Kamehameha Highway. This is a relatively safe and protected beach area in very close proximity to other residences.

The family has owned this property for five generations and traces its use by family members throughout this period. This beach side property has served as a family camping, fishing and picnic area from the time of their kupuna to the present day keiki.

The proposed residence will allow this native Hawaiian family to occupy and care for their land, and also eliminate the public abuses the vacant property now receives, such as:

- sand removal
- unauthorized camping
- dumping of trash
- use as a public toilet
- hangout for drug users

The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community and region.

There are no habitats of endangered or threatened species. The near shore beach area will not be impacted by this proposed project. Expected storm water runoff will be a very minimal amount.

Landscaping will take place within the owner's boundaries and will be sensitive to the area's natural environment. Focus will be on preserving as much of the presently established vegetation as

possible, while invasive exotic vegetation will be removed to allow endemic vegetation to become reestablished. Landscape planting around the proposed structures will incorporate similar native vegetation found in the area. Landscaping along Kamehameha V Highway will serve as a visual buffer.

VI. Proposed Mitigating Measures, If Any

The proposed structures will be sited to minimize grading, to take advantage of existing highway access, and to preserve the eastern half of the property in open space. The proposed residence complies with County shoreline setback standards in accordance with Section 12-4-4, Rules Relating to Shoreline Areas of Moloka'i Planning Commission.

Landscaping will provide a visual buffer from the highway and increase growth of native plants while minimizing exotic invasive vegetation. Naupaka, pohuehue, and other endemics present will remain as a visual buffer from the shoreline. Landscaping will not take place makai of the property boundary. See Exhibit 25.

The design of the proposed structures are compatible with this beach side community. In some instances, it will be a notable improvement over existing

structures which do not address minimization of visual impacts and preservation of natural beauty.

VII. Determination

A. **Conclusions Based on Thirteen Significant Criteria**
Based on the thirteen (13) significant criteria (The Environmental Notice - Administrative Rules Section 11-200-12), this proposed single family residence will have no significant effect on the environment. The following conclusions are drawn from consideration of potential environmental effects:

- 1) The proposed single family residence will not involve an irrevocable commitment to loss or destruction of natural or cultural resources.
- 2) The proposed single family residence will not curtail the range of beneficial uses of the environment.
- 3) The proposed single family residence is not in conflict with the state's long-term environmental policies as stated in HRS Chapter 344, or any subsequent revisions.
- 4) The proposed single family residence will not effect the economic or social welfare of the community or state.
- 5) The proposed single family residence will not substantially affect public health.
- 6) The proposed single family residence will not involve substantial secondary impacts, such as population changes or effects on public facilities.
- 7) The proposed single family residence does not involve a substantial degradation of environmental quality.
- 8) The proposed single family residence is limited and will not cumulatively result in considerable effect on

the environment, nor does it involve a commitment for larger actions.

- 9) The proposed single family residence will not substantially affect rare, threatened or endangered species or its habitat.
- 10) The proposed single family residence will not detrimentally affect air or water quality, or ambient noise levels.
- 11) The proposed single family residence is located in an environmentally sensitive area, since it is beachfront property and one of its three structures is sited in an area prone to tsunami inundation. Enclosed structures will be sited above base flood elevation.
- 12) The proposed single family residence will not substantially affect scenic vistas and view plains identified in the County or State plans or studies.
- 13) The proposed single family residence does not require substantial energy consumption.

B. Compliance with Hawaii Administrative Rules

The proposed family residence is a permitted use in the "Limited" Subzone of the Conservation District, Hawaii Administrative Rules Section 13-5-23.

The proposed family residence complies with standards for a single family residence in accordance with Hawaii Administrative Rules Section 13-5-42.

In accordance with HAR Chapter 13-5 relating to "Single Family Residential Standards", compliance will be as follows:

- minimum lot size: (10,000 sq. ft. required)
TMK (2) 5-7-003-068 is a 0.748 acre parcel
- minimum set back: For Lots 10,000 sq. ft. to one acre: 15 front, 15 sides, 15 back required. As proposed all setbacks will meet these minimums. In addition the shoreline setback will be approximately 65 ft.
- maximum developable area: For lots 10,000 sq. ft. to one acre: 3,500 sq. ft. allowed. 3,100 sq. ft. is proposed.
- maximum height limit: 25 ft. allowed, 25 feet proposed.

C. The proposed single family residence complies with criteria for land uses in the Conservation District as follows:

The proposed land use is consistent with the purpose of the Conservation District. The proposed project is designed to minimize potential impacts on the area's natural resources. Structures will be sited in an area that minimizes grading, and is approximately 65 feet inland of the shoreline. Existing healthy trees will be maintained to preserve the natural character of the area and provide an appropriate visual buffer from the public highway and the shoreline. The design of the structures are of island-style wood frame construction. The proposed single family dwelling will serve as the primary residence of Moloka'i native Ululani Chu. Her occupancy will not preclude fishing and other ocean

activities by the public. In conclusion, the proposed project is reasonable and appropriate for the area and includes measures to protect natural resources.

VIII. Conclusions

The proposed action is an appropriate use for the area and will not adversely impact traditional uses of the beach by the public.

Potential environmental effects have been addressed through the design, siting and landscaping of the proposed project. Short-term and long-term effects of this project are in accordance with Environmental Impact Statement Rules, Section 11-200-12.

IX. List of Persons, Organizations, and Public Agencies Commenting on The Draft of EIS

- Lauren Tanaka, Land Division, Planning Branch, DLNR

- David Craddick, Director, Department of Water Supply, County of Maui

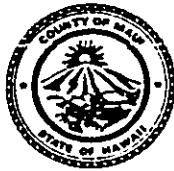
- Genevieve Salmonson, Director, Office of Environmental Quality Control, State of Hawaii

- Jeff Mikulina, Sierra Club, Hawaii Chapter

- Paul Henson, Field Supervisor, Ecological Services, U.S. Fish and Wildlife Service, U.S. Department of the Interior

- Don Hibbard, Administrator, Historic Preservation Division, DLNR

X. Reproductions of Letters Received Containing Substantive Questions,
Comments, or Recommendations



DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793-7109
Telephone (808) 270-7816 • Fax (808) 270-7833

September 8, 2000

Mr. Timothy E. Johns, Chairperson
Department of Land and Natural Resources
State of Hawaii
PO Box 621
Honolulu, Hawaii 96809

Subject: CDUA and Draft EA for the Chu Family Residence
TMK: (2) 5-7-03:068, Wailua, Molokai

Dear Mr. Johns,

Thank you for the opportunity to review this application. The Maui Department of Water Supply has the following comments.

Source and System

A 12-inch waterline and fire hydrants currently front the property. Fire protection appears adequate. Calculations based on the Uniform Plumbing Code (UPC) will be required from the applicant for proper sizing of the water meter serving the property. Prior to development, we suggest the applicant contact our engineering division at 270-7835 to discuss meter sizing.

The applicant should be aware that no guarantee of additional water is granted or implied as a result of these comments. Water availability is determined at the time of meter application.

Water Resource

This project overlies the Ualapue Aquifer. In order to protect Molokai's groundwater and surface water resources, DWS recommends that the applicant

"By Water All Things Find Life"

27-a

Timothy E. Johns, Chairperson
State DLNR
Chu Family Residence
September 8, 2000
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utilize Best Management Practices (BMPs) designed to minimize infiltration and runoff from all construction and vehicle operations. We have attached sample BMPs for principle operations and a list of references. Other sample BMPs for construction purposes are listed as follows:

- ▶ Limit construction to only dry period.
- ▶ Prevent cement products, oil, fuel and other toxic substances from falling or leaching into the water.
- ▶ Retain ground cover until the last possible date.
- ▶ Avoid fertilizers and biocides, or apply only during periods of low rainfall to minimize chemical runoff.
- ▶ Keep run-off on site.
- ▶ Construction drainage control features, such as berms.
- ▶ Maintain vehicles and equipment to prevent leakage of oil or other fluids.
- ▶ Cover open vehicles carrying soils, gravel or other particulate matter.
- ▶ Control noise by use of mufflers and other sound attenuating measures on excavation and other construction equipment.

Additional information is available from the State Department of Health.

Conservation

To further conserve Molokai's water resources, the applicant should refer to the attached documents and consider these measures:

- ▶ Utilize Low-Flow Fixtures and Devices: Maui County Code Subsection 16.20.675 requires the use of low flow water fixtures and devices in faucets, showerheads, urinals, water closets and hose bibs.
- ▶ Maintain Fixtures to Prevent Leaks: A simple, regular program of repair and maintenance can prevent the loss of hundreds or even thousands of gallons a day. Refer to the attached handout, "The Costly Drip". The applicant should maintain fixtures regularly to prevent leaks.
- ▶ Prevent Over-Watering By Automated Systems: Provide rain-sensors on all automated irrigation controllers. Check and reset controllers at least once a month to reflect the monthly changes in evapotranspiration rates at the site. As an alternative, provide the more automated, soil-moisture sensors on controllers.

"By Water All Things Find Life"

27-b

Timothy E. Johns, Chairperson
State DLNR
Chu Family Residence
September 8, 2000
Page 3

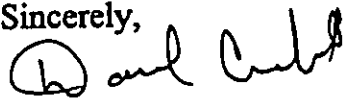
- ▶ **Use Climate-adapted Plants:** The project site is located in "Maui County Planting Plan" - Plant Zones 3 & 5. Please refer to the attached documents "Saving Water in the Yard" and "Some of Maui's Native and Polynesian Plants" for a plant zone map of Molokai. Native plants adapted to the area conserve water and further protect the watershed from degradation due to invasive alien species. Consider using climate-adapted and salt-tolerant native plants.

Wetlands

Given the special nature of the area, it is unclear in the Draft EA whether a wetland habitat for parts of this property been declared. We encourage the applicants to contact Ms. Kali Arce of UH Cooperative Extension Service at 567-6833 for more information on appropriate sources and propagation methods for Molokai native plants in this natural wetland area. Also, it has been suggested to us that the following U.S. Fish & Wildlife staff might be familiar with appropriate planting & design for Molokai wetlands: Glynis Nakai in Kihei at 875-1582 (manages Molokai Wetland Refuge), or Gordon Smith at 541-3441 (in charge of non-refuge wetlands).

Should you need more information, please contact our Water Resources and Planning Division at (808) 270-7199.

Sincerely,



David R. Craddick
Director

RS

xc: Maui DWS Engineering Division

Attachments:

- 1) "The Costly Drip"
- 2) Ordinance 2108 - An ordinance amending Chapter 16.20 of the Maui County Code, pertaining to the plumbing code"
- 3) "XERISCAPE - Water Conservation through Creative Landscaping"
- 4) "Saving Water in The Yard - What and How to Plant In Your Area"
- 5) "Some of Maui's Native and Polynesian Plants" - (Molokai Map)
- 6) Selected BMPs from "The Megamanual - Nonpoint Source Management Manual." Commonwealth of Massachusetts
- 7) Selected BMPs from "Guidance Specifying Management Measures For Sources of Nonpoint Pollution In Coastal Waters." U.S. EPA.

"By Water All Things Find Life"

27-C

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII



TIMOTHY E. JOHNS, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES
JANET E. KAWILO

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
Kakuhikewa Building, Room 555
501 Kamehale Boulevard
Honolulu, Hawaii 96807

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND RESOURCES
ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND
STATE PARKS
WATER RESOURCE MANAGEMENT

July 26, 2000

MEMORANDUM

LOG NO: 25905 ✓
DOC NO: 0007SC15

TO: DEAN UCHIDA, Administrator
Land Division

FROM: DON HIBBARD, Administrator
Historic Preservation Division

A handwritten signature in black ink, appearing to be "DH", written over the name "DON HIBBARD".

SUBJECT: (File No. MO-2995) Chapter 6E-42 Historic Preservation Review of a Conservation District Use Application (CDUA) for the Proposed Construction of a Single-Family Residence and Related Structures Waialua, Mana`e, Moloka`i
TMK: 5-7-003: 068

The applicant proposes to construct a single-family residence and related structures on family lands at Waialua, Moloka`i. In addition to the residence, planned improvements include the following: a garage with a toilet and shower; a gazebo; utilities hookups; installation of a propane tank and septic tank; installation of a fence. Our review is based on historic maps, aerial photographs, records, and reports maintained at the State Historic Preservation Division; no field inspection was made of the subject parcel.

We have no record of historic sites on this property nor has an archaeological inventory survey ever been performed. According to the application materials, the property is underlain by soils of the Kawaihapai type, a clay loam of alluvial origins. We note, however, that sand dune deposits appear to be present throughout the parcel, judging from the photographs in the application. Sand deposits can contain significant historic sites such as subsurface cultural layers and human burials. While the applicant states that at least some of the sands have accreted over the last 50 years or so (Figures 5-8), it is unclear how far inland the recent accumulations extend. Thus, the possibility exists that other areas of the parcel may have older sand deposits, containing historic sites. Unless the applicant can establish the recent nature of all sand deposits to be disturbed by construction, we recommend that action be deferred on the subject application until an archaeological inventory survey with subsurface testing is conducted on the portions of the parcel where

29-a

DEAN UCHIDA, Administrator
Page Two

excavation for concrete slabs etc. is proposed which would impact intact sand dune deposits. A report of findings should be prepared and submitted to our office for review and approval. Once we have information on what significant historic sites may be present, we can better advise your office and the applicant on what, if any, mitigation requirements may be needed.

Should you have any questions, please feel free to contact Sara Collins at 692-8026.

SC:jk

c: John Min, Director, Dept. of Planning, County of Maui, 250 S. High Street,
Wailuku, HI 96793
Cultural Resources Commission, Planning Dept., County of Maui, 250 S. High
Street, Wailuku, HI 96793
Barbara Haliniak, Chair, Molokai Planning Commission, PO Box 976, Kaunakakai,
HI 96748

29-b

STATE OF HAWAII
Department of Land and Natural Resources
Land Division
Planning Branch
Honolulu, Hawaii

July 31, 2000

REF:PB:LT

File No.: MO-2995

Ms. Maile Chu Goo, Trustee
Arthur K. Chu Revocable Trust
5846-B Kalaniana'ole Highway
Honolulu, Hawaii 96821

Dear Ms. Chu Goo:

Subject: Conservation District Use Permit Application (CDUA)
MO-2995 for the Chu Family Residence; TMK: (2) 5-7-03:
68, Waialua, Molokai

As part of the review process for CDUAs, both the application and draft environmental assessment (EA) are circulated among other government agencies, within the Department and to private organizations that may have programs or projects affected by the proposed action.

Both documents are available for public review and comments will be received up to August 7, 2000. All comments and the applicant's responses to those comments are to be included in a final EA. Five copies of the final EA will have to be submitted to our office, four of which will be sent to OEQC along with the Department's determination of the project's impacts. After the public review period ends on the 7th, we will have three days, or up to August 10, 2000 to request OEQC to publish our determination in the August 23, 2000 issue of their bulletin.

To date, the letter from the U.S. Fish and Wildlife Service (USFWS) is the only one we received requiring a response. You need to respond to the letter and include both in the final EA document.

The CDUA application requests approval of three structures and in an amendment to the application, the reason given was

30-a

"significant grading of the property and alteration of the natural terrain would be necessary to connect the three structures".

In order for us to review the proposed development as appropriate and consistent with the Conservation District, detailed justification is required when asking the Board to make an exception to our Rules.

What information did you get from the Architect that led to a decision that three structures rather than one is the best alternative. A comparative analysis of the two scenarios should be submitted for our review, including estimates as to the amount of material (in cubic yards) that will be excavated if there is one structure, how much if there are three structures.

If you are not able to justify the three structures as the best alternative, prior to taking the item to the Board, we may ask that you redesign the residence, garage, and gazebo into a single structure. Should you have questions, please contact me at 587-0385, Planning Branch of the Land Division.

Sincerely,



Lauren Tanaka



SIERRA CLUB, HAWAII CHAPTER

P.O. Box 2577
Honolulu, HI 96803
tel: 538.6616

Director: Jeffrey Mikulina
mikulina@lava.net
fax: 537.9019

Mālama i ka Honua

6 August 2000.

Arthur K Goo Revocable Trust
c/o Maile Chu Goo, Trustee
5846-B Kalaniana'ole Hwy
Honolulu, HI 96821

Department of Land and Natural Resources – Land Division
Attn: Lauren Tanaka
P.O. Box 621
Honolulu, HI 96809

RE: Chu Family Residence and Related Improvements

The Sierra Club, Hawaii Chapter, is concerned with the construction of the Chu Family Residence as it impedes access to the public shoreline. Page 4 of the draft Environmental Assessment describes the "installation of a ranch-type fence (round post and wire)" around the three sides of the project. Is public access to the beach from the highway available at this location or nearby? If not, the applicant should be required to provide such access.

We appreciate the opportunity to comment on this assessment and look forward to your response.

Sincerely,

Jeff Mikulina
Director, Sierra Club, Hawaii Chapter

cc: Office of Environmental Quality Control.



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Pacific Islands Ecoregion
300 Ala Moana Blvd, Rm 3122
Box 50088
Honolulu, HI 96850

JUL 17 10:11
JUL 14 2000

In reply refer to: JTN

Timothy E. Johns, Chairperson
State of Hawaii
Department of Land and Natural Resources
Land Division
PO Box 621
Honolulu, HI 96809

Re: Draft Environmental Assessment for Single Family Residence and Related Improvements in the Limited Subzone, Chu Family Residence, Island of Molokai

Dear Mr. Johns:

The U.S. Fish and Wildlife Service (Service) has reviewed the Draft Environmental Assessment for Single Family Residence and Related Improvements in the Limited Subzone, Island of Molokai (DEA). The applicant is the Arthur K. Chu Revocable Trust and the sponsor is the Hawaii Department of Land and Natural Resources. The Service offers the following comments for your consideration. The proposed action involves construction of a single family residence in the State Conservation District, "L" Limited Subzone, at Waialua, Molokai.

The DEA adequately describes the wildlife resources in the area and describes the impacts that the proposed project could have on these resources. In addition, the DEA mentions methods that could be implemented to reduce or mitigate potential project-related impacts. We have reviewed the information provided in our files and to the best of our knowledge no federally endangered, threatened, or candidate species, significant wetlands, or other Federal trust resources occur in the immediate area of the proposed project site.

The DEA makes no mention of use of outdoor lighting. However, the endangered dark-rumped petrel (*Pterodroma phaeopygia*) may nest on Molokai. If outdoor lighting is planned, this should be minimized to reduce the risk of seabird fallout. Please find enclosed a pamphlet that details types of outdoor lighting that will minimize risk. The Service appreciates the opportunity to comment on this DEA. If you have any questions regarding these comments, please contact Fish and Wildlife Biologist Jay Nelson by phone at (808) 541-3441 or by facsimile at (808) 541-3470.

Sincerely,

Donald Palanski
for Paul Henson
Field Supervisor
Ecological Services

Enclosure

BENJAMIN J. CAYETANO
GOVERNOR



GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

236 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186

August 4, 2000

Ms. Maile Chu Goo, Trustee
Arthur K. Goo Revocable Trust
5846-B Kalaniana'ole Highway
Honolulu, Hawai'i 96821

Dear Ms. Chu:

We have reviewed the draft environmental assessment for the Chu Family Residence and Related Improvements (Conservation District Use Permit Application No. MO-2995), Waialua, Island of Moloka'i, TMK (2) 5-7-03:68, and offer the following comments for your consideration and response.

1. **WASTEWATER IMPACTS.** Please consult with the Department of Health as to a system to minimize wastewater impacts to the environment. Please disclose the type of wastewater treatment unit that will be constructed.
2. **SUSTAINABLE BUILDING DESIGN GUIDELINES.** Enclosed for your information is a set of sustainable building design guidelines adopted by the State Environmental Council. Please consider using one or more of the methods described in the guidelines.

If there are any questions, please call Leslie Segundo at 586-4185. Thank you for the opportunity to comment.

Sincerely,

A handwritten signature in cursive script, appearing to read "Genevieve Salmonson".

GENEVIEVE SALMONSON
Director

Enclosure

c: Ms. Lauren Tanaka
State of Hawai'i - Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawai'i 96809

LIST OF EXHIBITS

1. Location Map
2. Tax Map showing subject location
3. Land Survey
4. Site Plan and Topographic Survey
5. Shoreline Certification Letter, DLNR
6. Shoreline Survey
7. Coastal High Hazard Area Certification
8. Flood Certification
9. Flood Plain Map
10. Certified Wetland Determination/Delineation Report
11. Wetland Determination Record, Vegetation Data
12. USDA Conservation Service Water Features
13. USDA Conservation Service Report on Hydric Soils
14. USDA Conservation Service Report on Building Site Development
15. USDA Conservation Service Report on Physical Properties of Soils
16. Aerial Photograph of Subject Property, Air Survey Hawaii
17. Drawing showing Location of Existing Structures in Area
18. House Elevation Plans
19. House Floor Plan
20. House Framing Plan (Floor and Loft)
21. House Framing Plan (Lanai, Roof, Stairs)
22. Carport and Storage Plan
23. Gazebo Plan
24. Existing Landscaping

25. Proposed Landscaping
26. Photograph of existing beach access through adjacent neighboring property
27. Another view of existing beach access through adjacent neighboring property
28. Another view of existing beach access through adjacent neighboring property
29. "Newell's Shearwater Light Attraction Problem", Forestry & Wildlife, Department of Land & Natural Resources
30. "Guidelines for Sustainable Building Design in Hawaii", Office of Environmental Quality Control
31. Ordinance No. 2108, Bill No. 6, Amendment to Chapter 16.20, Maui County Plumbing Code
32. "Some Maui Native & Polynesian Plants." Department of Water Supply, Maui County
33. "Xeriscape," Department of Water Supply, Maui County
34. "The Costly Drip," Department of Water Supply, Maui County

DOCUMENT CAPTURED AS RECEIVED

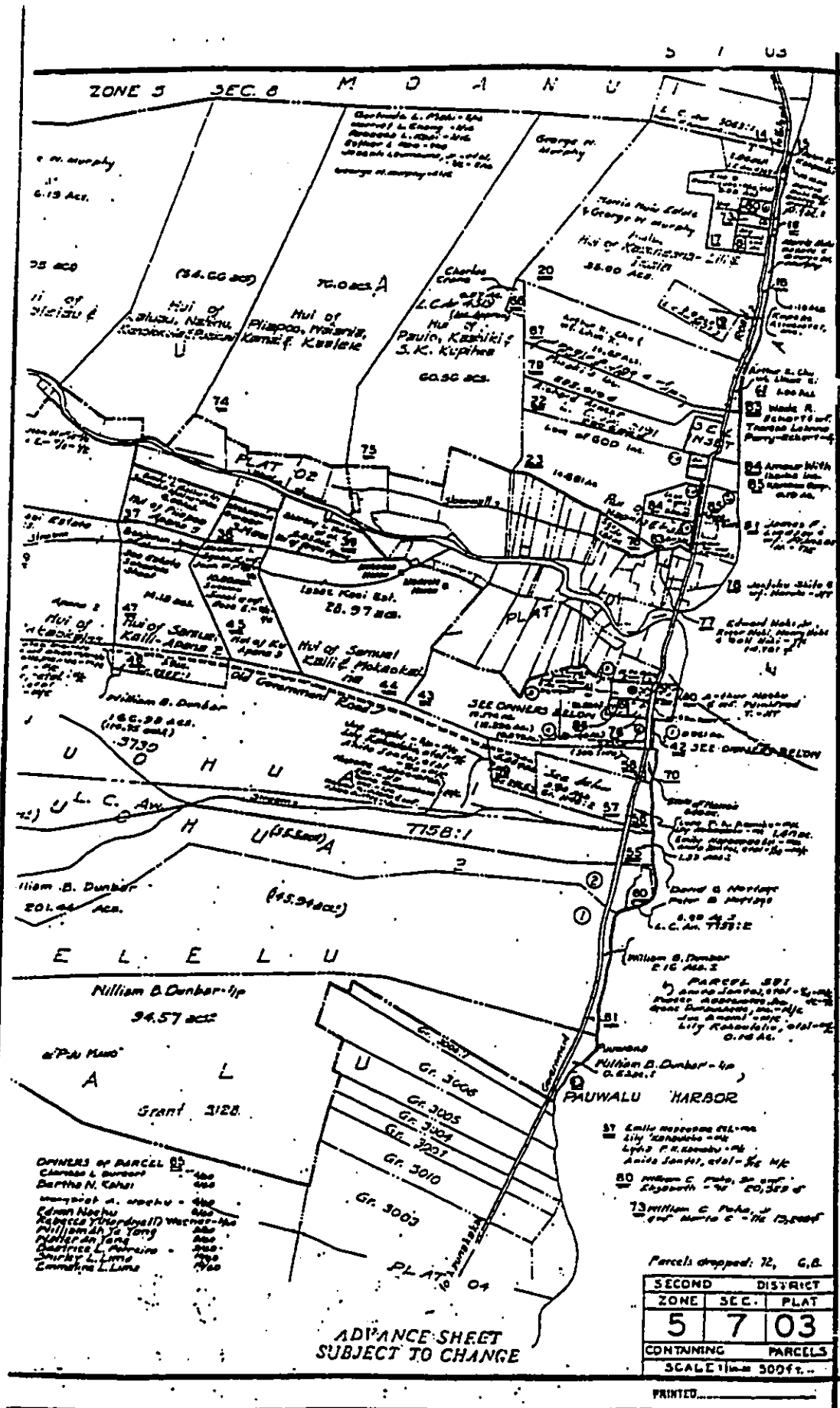
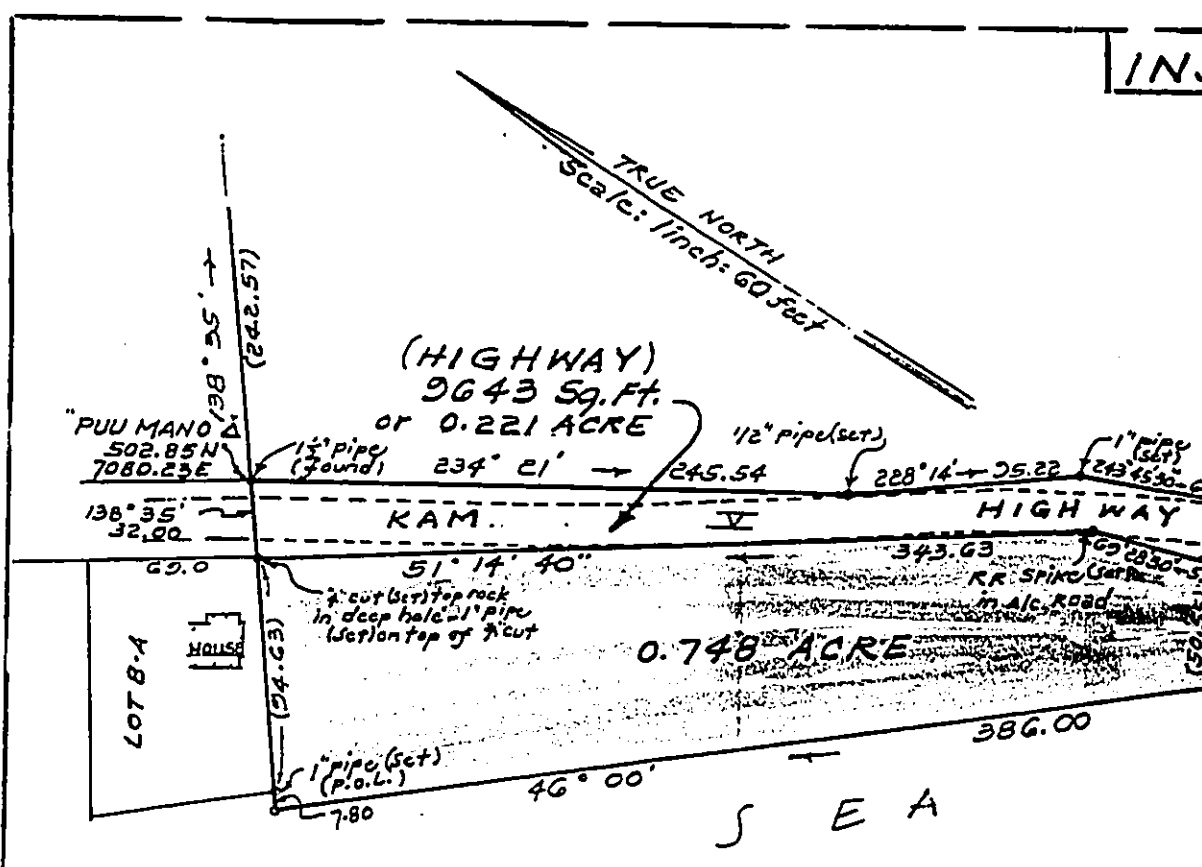
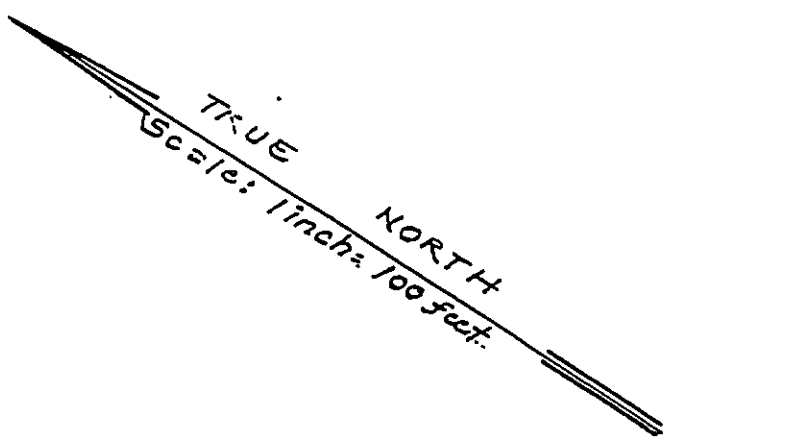
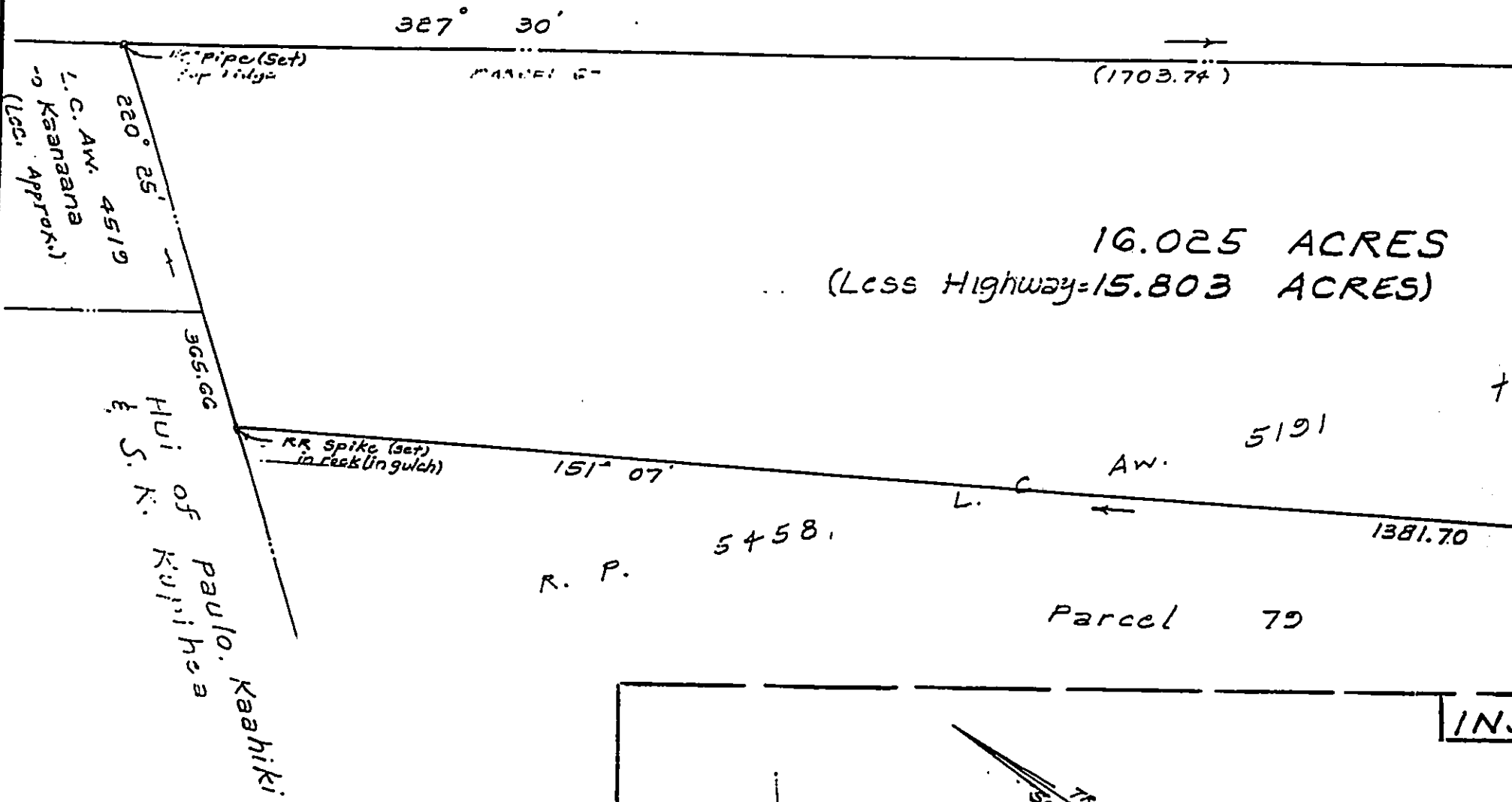


EXHIBIT 2

Hui of Kalaihean



Note:
 Field Survey - August 22 to 23, 1997
 surveying data - Map by R.L. Kekoa
 dated March 1938 - Azimuths referred
 to "PUUMANO Trig. Station - Shoreline
 survey not done at this time.

F.B. 83: 1-7

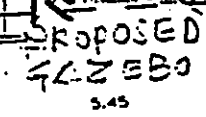
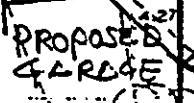
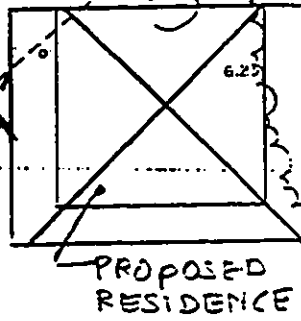
EXHIBIT 3

5191 to

KAMEHAMEHA

PARCEL B

0.748 Acre







Naupaka thicket

Naupaka thicket

RECORD SHORELINE / VEGETATION LINE

Tree Legend:

-  KAMANI
-  PLUM
-  KIAWE
-  NU

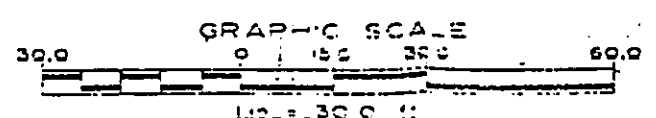
TOPOGRAPHIC SURVEY

PART B

Portion R.P. 5458, L.C.Aw. 5191
to Kahiana

Waialua, Molokai, Hawaii

30 March 1999 Scale: 1" = 30'



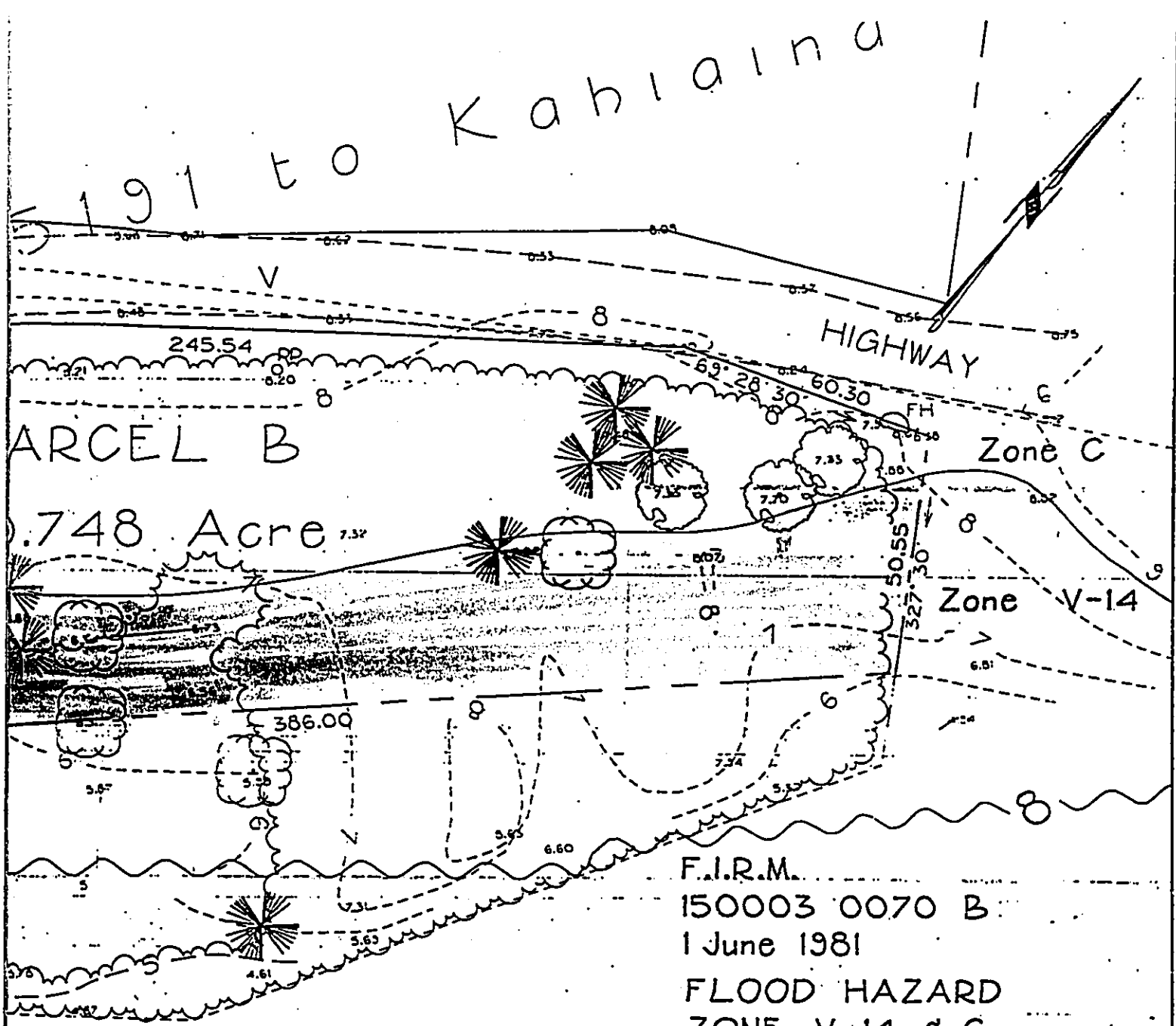
1:30,000

C.I. = 1"

SITE PLAN
Scale 1" = 20'-0"

Tax Map Key: (2) 5-7-03: 68

EXHIBIT 4

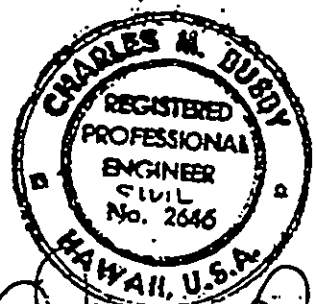
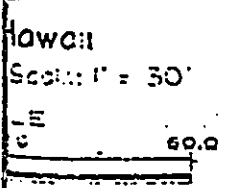


SURVEY

F.I.R.M.
150003 0070 B
1 June 1981
FLOOD HAZARD
ZONE V 14 & C
Flood Elev. are
as shown.

All Elevations are referenced
to NGVD 1929

C.Aw. 5191



Charles M. Busby

WORKSHEET WAI-E!
CHARLES M. BUSBY P.E.
HOOLEHUA, MOLOKAI
Ph 537-6333



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

AQUACULTURE DEVELOPMENT
PROGRAM
AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND
RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

MAR 30 1999

Ref.:LD-PEM

Mr. Robert Sing
P. O. Box 25353
Honolulu, Hawaii 96825-0353


Dear Mr. Sing:

Subject: Shoreline Certification Request
Applicant: Robert Sing
Property Owner: Arthur K. Chu Trust
Location - Island: Molokai District: Waialua
Tax Map Key: 5-7-03:68
Property Description: Part B, Por of RP 5458, LCAw 5191 to Kahiaina,
Waialua, Molokai
Land Division No.: MO-056

This is to inform you that the subject shoreline certification request has been certified. Four (4) copies of the certified maps are enclosed herewith.

Should you have any questions on this matter, please feel free to contact Patti Miyashiro at 587-0430.

Very truly yours,


DEAN Y. UCHIDA
Administrator

Enclosure

c: Maui Land Board Member
Maui District Land Branch (w/attach)
Survey Division (w/attach)

EXHIBIT 5

DOCUMENT CAPTURED AS RECEIVED

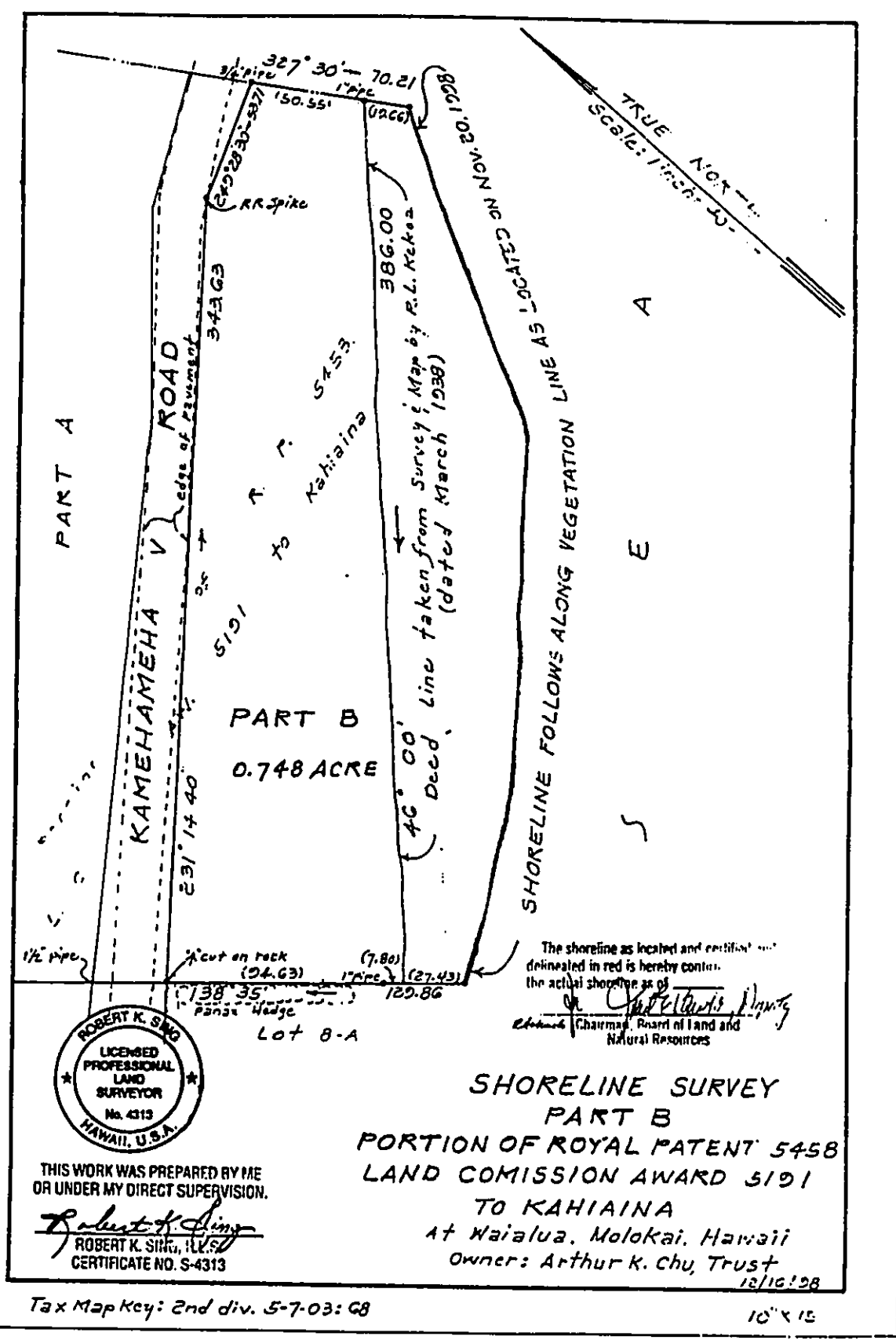


EXHIBIT 6

DOCUMENT CAPTURED AS RECEIVED

COUNTY OF MAUI
COASTAL HIGH HAZARD AREA CERTIFICATION
(FOR NEW CONSTRUCTION AND SUBSTANTIAL IMPROVEMENTS)

This form is to certify that the plans for any new structures, construction and improvements that will be constructed within the Coastal High Hazard Area conforms to the requirements of Section 19.62.060.G.6.a of the Maui County Code.

OWNER'S NAME TAK (2) 5-7-03:88

STREET ADDRESS OR P.O. ROUTE AND BOX NUMBER _____

CITY Waialeale ISLAND Molokai STATE HI ZIP CODE 96748

Provide the following from the proper Flood Insurance Rate Map (FIRM)

COMMUNITY NO.	PANEL NO.	SUFFIX	DATE OF FIRM	FIRM ZONE	BASE FLOOD ELEV./NOV. '29
150003	0070	B	1/06/81	V-14	8'

CERTIFICATION BY A LICENSED PROFESSIONAL ENGINEER OR ARCHITECT

I certify that based upon development and for review of structural design, specifications, and plans for construction that the design and methods of construction are in accordance with accepted standards of practice for meeting the following provisions:

All new construction and substantial improvements will be elevated on adequately anchored pilings or columns and securely anchored to such pilings or columns so that the lowest horizontal portion of the structural members of the lowest floor is elevated to or above the base flood level. The pile or column foundation and the structure attached thereto will be anchored to resist floatation, collapse, and lateral movement due to the simultaneous action of wind and water loads on all building components. Water loading values used for purposes of meeting this requirement are those associated with the base flood. Wind loading values used are those required by the uniform building code, as amended.

All new construction and substantial improvements will be located on the landward side of the reach of mean high tide.

All new construction and substantial improvements will have the space below the lowest floor free of obstructions or constructed with breakaway walls. Such space will not be used for human habitation, but will be useable solely for vehicular parking, building access or storage. Breakaway walls have a safe design loading resistance of not less than ten and no more than twenty pounds per square foot. Breakaway wall collapse is designed to result from a water load less than that which would occur during a base flood and the elevated portion of the building is designed so as not to incur any structural damage from wind and water loads acting simultaneously during a base flood.

Fill will not used for structural support of any building.

Any man-made alterations of sand dunes will not increase potential flood damage.

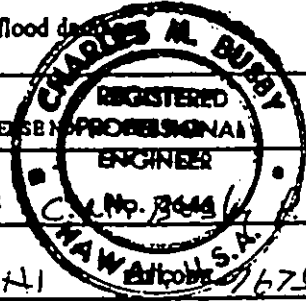
CERTIFIER'S NAME Charles M. Busby LICENSE NO. _____

TITLE Civil Engineer COMPANY NAME C.M. Busby P.E.

ADDRESS PO Box 246 CITY Kula STATE HI ZIP CODE 96753

SIGNATURE [Signature] DATE 3/06/03 PHONE 676-8333

Form FHDEVPT.93V



DOCUMENT CAPTURED AS RECEIVED

Form/FIDEVPT.93A

COUNTY OF MAUI

FLOOD HAZARD AREA CERTIFICATION

This form is to certify that the plans for any new structures, construction and improvements that will be constructed within a Special Flood Hazard Area conforms to the requirements of Section 19.62.060 of the Maui County Code.

OWNER'S NAME TMK (2) 5-7-03:68

STREET ADDRESS OR P.O. ROUTE AND BOX NUMBER _____

CITY Waialua ISLAND Molokai STATE HI ZIP CODE 96748

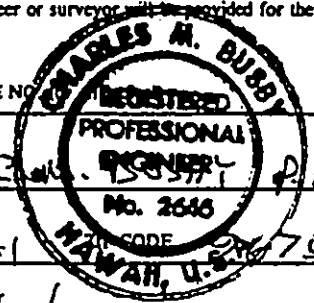
Provide the following from the proper Flood Insurance Rate Map (FIRM)

COMMUNITY NO.	PANEL NO.	SUFFIX	DATE OF FIRM	FIRM ZONE	BASE FLOOD ELEV./NGVD '29
<u>150003</u>	<u>0070</u>	<u>B</u>	<u>1/06/81</u>	<u>V-14</u>	<u>8'</u>

CERTIFICATION BY A LICENSED PROFESSIONAL ENGINEER OR ARCHITECT

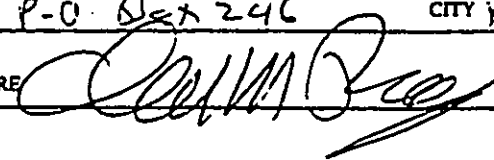
I certify that based upon development and/or review of the structural and engineering design, specifications, and plans for construction that the design and methods of construction are in accordance with accepted standards of practice for meeting the following provisions: (INITIAL ALL THAT DO NOT APPLY)

- Where base flood elevations have been determined but a floodway has not been designated, the cumulative effect of the proposed development when combined with all other existing and anticipated development will not increase the water surface elevation of the base flood by more than one foot at any point.
- New construction and substantial improvements will be adequately anchored to prevent flotation, collapse or lateral movement resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy.
- New construction and substantial improvements will be constructed with:
 - a. materials and utility equipment resistant to flood damage and,
 - b. electrical, heating, ventilation, plumbing, air conditioning, wastewater, and other service facilities designed or located so as to prevent impairment and the entry, accumulation or contamination of flood waters.
- New construction and substantial improvements will be constructed using methods and practices that minimize flood damage.
- New construction and substantial improvements within zones AH or AO includes adequate drainage paths to guide flood waters around and away from structures on slopes.
- New construction and substantial improvements (except those in AO) will have its lowest floor, including basement, elevated to, or above, the base flood elevation.
- New construction and substantial improvements in zone AO will have its lowest floor, including basement, elevated above the highest adjacent grade at least as high as the depth number specified in feet on the FIRM, or at least two feet if no depth number is specified.
- Nonresidential construction will be elevated to, or above the base flood elevation or, together with attendant utility and sanitary facilities, be floodproofed so that walls below the base flood level are substantially impermeable to the passage of water and have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.
- New construction and substantial improvements of fully enclosed areas below the lowest floor that are usable solely for vehicular parking, building access, or storage in an area other than a basement and which are subject to flooding are designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of flood water or, provide a minimum of two openings with a total net area of not less than one square inch for every square foot of enclosed area subject to flooding with the bottom of all openings no higher than one foot above grade.
- The proposed subdivision identifies the base flood elevation and any special flood hazard areas affecting the development. The elevation of proposed structures and pads are noted in the development plans. The subdivision will provide adequate drainage to reduce exposure to flood hazards and will have utilities, such as sewer, gas, electric and water systems, located and constructed to minimize flood damage.
- The subdivision will be filled above the base flood elevation and a certification by an engineer or surveyor will be provided for the final first floor and pad elevations.

CERTIFIER'S NAME Charles M. Busby LICENSE NO. 

TITLE CIVIL Engineer COMPANY NAME C.M. BUSBY P.E.

ADDRESS P.O. Box 246 CITY Kula STATE HI ZIP CODE 96757

SIGNATURE  DATE 30/06/97 PHONE 567-6333

Flood Plain Map

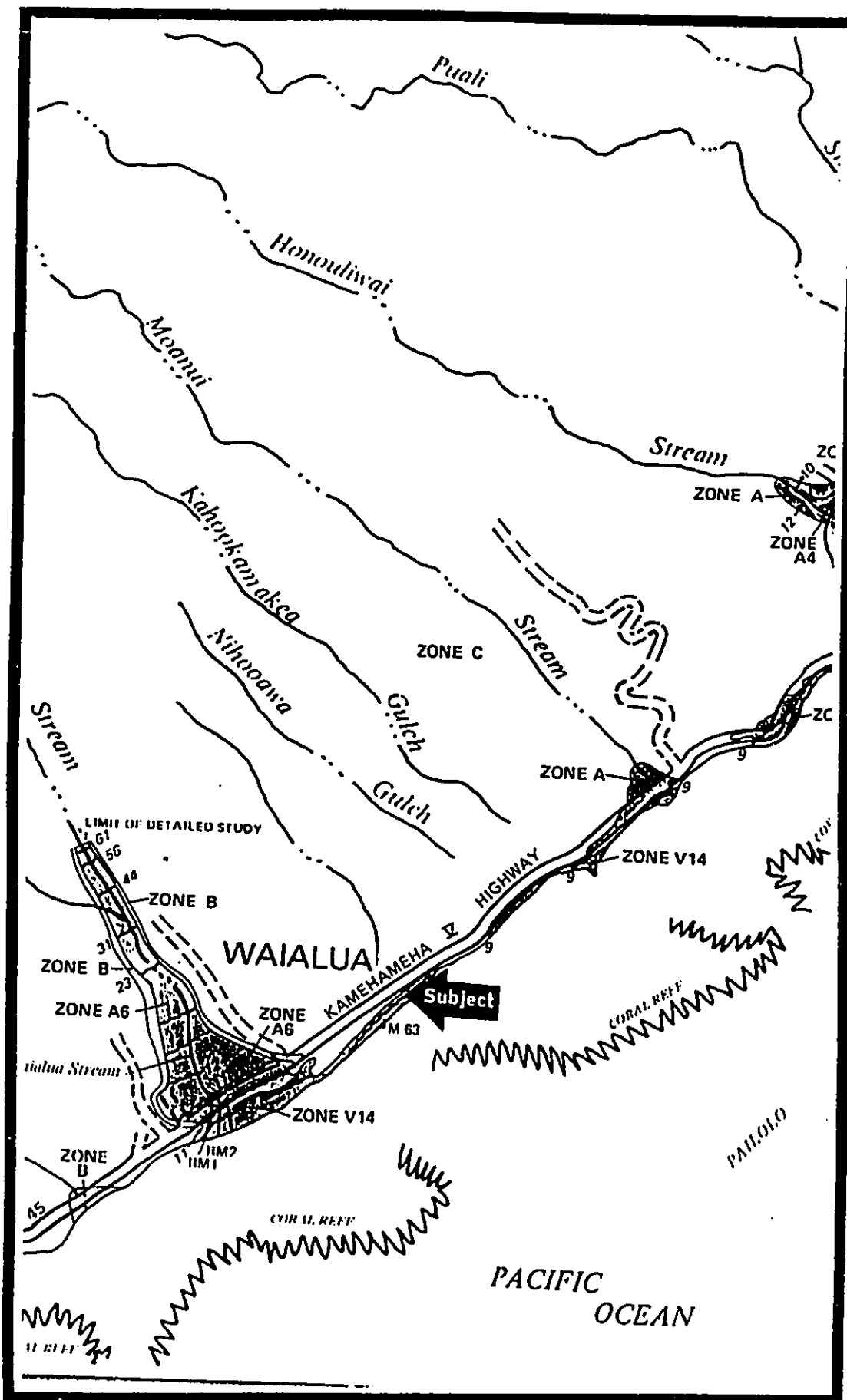


EXHIBIT 9

DOCUMENT CAPTURED AS RECEIVED

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-CPA-38
5-95

REQUEST FOR CERTIFIED WETLAND DETERMINATION/DELINEATION
(use when the client requests a certified determination/delineation)

OWNER	AGENT - (OPERATOR)
Name: <u>HALIIMILE GAO</u>	Name: <u>LUIGI MANERA</u>
Address: <u>58-46 B KALANIANSHOLE WY</u>	Address: <u>P.O. BOX 1718</u>
<u>HONOLULU 96821</u>	<u>KAUNAKAKAI HI 96748</u>
Phone: <u>808 377 5659</u>	Phone: <u>808 553 9045</u>

Are you a USDA program Participant? (If yes, AD-1026 should be on file.) Yes No

Have you previously received a wetland determination or delineation on this tract from the Natural Resources Conservation Service (formerly Soil Conservation Service) or the Corps of Engineers? Yes No

Location of property (description): Post Waihua Bridge TMK 5-7-3:68.

makee side of road

County: MAUI

State: HAWAII

Farm No.: _____ Tract No.: _____ Acres in tract _____ Map or aerial photo with the tract/area outlined

PURPOSE OF REQUEST FOR DETERMINATION/DELINEATION (Check one and explain)

Agricultural purpose(s): _____
(Such as: clearing for cropland, drainage, farm buildings, etc.)

Non-Agricultural purpose(s): _____
(Such as: commercial development, subdivisions, etc.)

Informational purpose(s): Single Family Dwelling

I certify that I am the owner or agent of the owner for the property previously described.

I grant the Natural Resources Conservation Service (or their designated agents) the right to enter the property previously described to ascertain the extent of wetlands on said property.

I understand that the information collected and the certified wetland determination/delineation is public information and may be released to the public or utilized in any of the agencies' data bases, or published on official wetland maps.

Signature of Owner:	Date:
Signature of Agent (As authorized by the owner): <u>[Signature]</u>	Date: <u>06-10-99</u>

U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of The United States knowingly and willfully falsifies, conceals, or covers up by any trick, scheme, or device a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statement or entry, shall be fined not more than \$10,000 or imprisoned not more than five years, or both.

526.43 NRCS-CPA-33 Wetland Determination Record, Vegetation Data Routine Method

U. S. Department of Agriculture Natural Resources Conservation Service NRCS-CPA-33 1096 WETLAND DOCUMENTATION RECORD VEGETATION DATA ROUTINE METHOD	1. Owner/Landowner requested by Luigi Manera	
	2. County/State Maui/Hawaii	
	3. Field Investigator Title Denise Light Soil Con. NRCS	
	4. Site Identification No. TMK5-7-3-68	Date 6/10/99
	5. (Tract No., Farm No., Site No.)	

CHECK APPROPRIATE INVESTIGATION TYPE	CHECK	SITE SIZE (Check Size)	CHECK
1. On-Site Evaluation	<input checked="" type="checkbox"/>	2. ≤5 acres	
3. Reference Site(Comparison Site)		4. >5 acres	<input checked="" type="checkbox"/>
5. Method of determination visual estimate	<input checked="" type="checkbox"/>	6. Transect	1
7. Comparison site: soil map unit	KTA	hydrologic condition	
8. Transect No. (One form per transect).	1		

List the 3 dominant species in each vegetation layer; list 5 species if only 1 or 2 layers are present

1. TREES			2. HERBS		
Dominant Species	% Cover	Indicator	Dominant Species	% Cover	Indicator
12 false kamani	55	not listed			
13 kiawe	40	FAC U-			
14 coconut	5	not listed			
3. SAPLING/SHRUBS			4. WOODY VINES		
Dominant Species	% Cover	Indicator	Dominant Species	% Cover	Indicator
18 naupaka	20	FAC U	han	20	not listed

1. % of observed dominant species that are OBL, FACW, or FAC	0 %	2. Hydrophytic vegetation criteria met	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
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Remarks: Sampled under canopy, mostly bare due to shade

(180-V-NFSAM, Third Ed., Amend. 2, Nov. 1996)

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**526.46 NRCS-CPA-36 Wetland Documentation Record, Hydrology
Data Routine Method**

<p style="font-size: small;">U. S. Department of Agriculture Natural Resources Conservation Service</p> <p style="text-align: right; font-size: x-small;">NRCS-CPA-36 10-96</p> <p align="center">WETLAND DOCUMENTATION RECORD HYDROLOGY DATA ROUTINE METHOD</p>	<p>1. Owner/Landowner _____</p> <p>2. County/State _____</p> <p>3. Field Investigator _____ Title _____</p> <p>4. Site Identification No. _____ Date _____</p> <p>5. (Tract No., Farm No., Site No.) _____</p>
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Do Normal Circumstances exist on the site?	Yes	No
Is the site significantly disturbed (atypical situation)?		<input checked="" type="checkbox"/>
Is the area a potential problem area? (If needed, explain on reverse.)		<input checked="" type="checkbox"/>

1. On-Site Evaluation 6/9/99	2. Reference Site Soil Map Unit _____
3. Surface drainage features evident (circle) Yes No	4. Subsurface drainage features evident (circle) Yes No

Attach description, location map, gradelines, x-sections, outlet conditions and date of installation.

Antecedent Moisture Conditions		
1. Prior month rainfall (in)	2. Normal (in)	3. Station name and number
4. Prior week rainfall (in)	5. Normal (in)	6. Current weather (rainy, sunny, etc.)

Recorded Data (Describe in Remarks):

_____ Stream, Lake, or Tide Gauge

_____ Aerial Photographs

_____ Other

_____ No Recorded Data Available

_____ Mapping conventions

Wetland Hydrology Indicators:

Primary Indicators

_____ Inundated

_____ Saturated in Upper 12 Inches

_____ Water Marks

_____ Drift Lines

_____ Sediment Deposits

_____ Drainage Patterns in Wetlands

Field Observations:

Depth of Surface Water: _____(in.)

Depth to Free Water in Pit: _____(in.)

Depth to Saturated Soil: _____(in.)

Seeps or Springs Yes No
(circle)

Secondary Indicators (2 or more required):

_____ Oxidized Root Channels in Upper 12 Inches

_____ Water-Stained Leaves

_____ Local Soil Survey Data

_____ FAC-Neutral Test

_____ Other (Explain in Remarks)

Other Observations:

Wetland Hydrology Criteria Met	Yes	No
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(circle)

Remarks: _____

WATER FEATURES
 soil

Map symbol and soil name	Hydro- logic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
KIA: Kawaihapai-----	B	Occasional	Very brief	NOV-APR	>6.0	---	---	---	---

WATER FEATURES

Endnote -- WATER FEATURES

This report gives estimates of various soil water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms. The four hydrologic soil groups are:

Group "A". Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group "B". Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group "C". Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group "D". Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups in this report, the first letter is for drained areas and the second is for undrained areas. Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes. This report gives the frequency and duration of flooding and the time of year when flooding is most likely. Frequency, duration, and probable dates of occurrence are estimated.

Frequency is expressed as "None", "Rare", "Occasional", and "Frequent". "None" means that flooding is not probable; "Rare" that it is unlikely but possible under unusual weather conditions; "Occasional" that it occurs, on the average, once or less in 2 years; and "Frequent" that it occurs, on the average, more than once in 2 years.

Duration is expressed as "Very brief" if less than 2 days, "Brief" if 2 to 7 days, "Long" if 7 to 30 days, and "Very long" if more than 30 days. The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding. Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods.

WATER FEATURES

Endnote -- WATER FEATURES--Continued

Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in this report are the depth to the seasonal high water table; the kind of water table, that is, "Apparent", "Artesian", or "Perched"; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in this report.

An "Apparent" water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

An "Artesian" water table exists under a hydrostatic beneath an impermeable layer. When the impermeable layer has been penetrated by a cased borehole, the water rises. The final level of the water in the cased borehole is characterized as an artesian water table.

A "Perched" water table is water standing above an unsaturated zone. In places an upper, or "Perched", water table is separated from a lower one by a dry zone. Only saturated zones within a depth of about 6 feet are indicated.

Ponding is standing water in a closed depression. The water is removed only by deep percolation, transpiration, evaporation, or a combination of these processes.

This report gives the depth and duration of ponding and the time of year when ponding is most likely. Depth, duration, and probable dates of occurrence are estimated.

Depth is expressed as the depth of ponded water in feet above the soil surface. Duration is expressed as "Very brief" if less than 2 days, "Brief" if 2 to 7 days, "Long" if 7 to 30 days, and "Very long" if more than 30 days. The information is based on the relation of each soil on the landscape to historic ponding and on local information about the extent and levels of ponding.

HYDRIC SOILS LIST
 MAPUNITS WITH HYDRIC INCLUSIONS
 soil

The "Hydric Soils Criteria" columns indicate the conditions that caused the mapunit component to be classified as "Hydric" or "Non-Hydric". These criteria are defined in "Hydric Soils of the United States" (USDA Miscellaneous Publications No. 1491, June, 1991). The "FSA Criteria" columns contain information needed for the Food Security Act determinations required by Section 512.11(b) (4) of the National Food Security Manual (August, 1991). See the "Criteria for Hydric Soils" endnote to determine the meaning of these columns. Spot symbols are footnoted at the end of the report.

Map Symbol Mapunit Name	Component (C) / Inclusion (I)	Hydric	Local Landform	Hydric Soils Criteria			FSA Criteria and Information		Acres	
				Hydric Criteria Code	Meets Saturation Criteria	Meets Flooding Criteria	Meets Ponding Criteria	Natural Condition of Soil		Needs On-Site
K1A: Kawaihapai clay loam, 0 to 2 percent slopes-	Kawaihapai (C)----- INCLUSION (I)	NO YES	Alluvial Flat	2B3,3	YES	NO	YES	Neither	YES	

HYDRIC SOILS CRITERIA CODES AND DEFINITIONS

Endnote -- HYDRIC SOILS LIST

The column 'Natural Condition of the Soil' indicates the following information: 'Wooded' indicates the soil supports woody vegetation under natural condition; 'Farmable' indicates the soil can be farmed under natural conditions without removing woody vegetation or other manipulation; and 'Neither' indicates neither of the above conditions are met.

1. All Histosols, except Folists, or

2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Aquisalids, Pachic subgroups, or Cumulic subgroups that are:

- a. somewhat poorly drained with a water table equal to 0.0 foot (ft.) from the surface during the growing season, or
- b. poorly drained or very poorly drained and have either:

- (1) water table equal to 0.0 ft. during the growing season if textures are coarse sand, sand, or fine sand in all layers within 20 inches (in.), or for other soils, or
- (2) water table at less than or equal to 0.5 ft. from the surface during the growing season if permeability is equal to or greater than 6.0 in./hour (h.) in. all layers within 20 in., or
- (3) water table at less than or equal to 1.0 ft. from the surface during the growing season, if permeability is less than 6.0 in./h. in any layer within 20 in., or

3. Soils that are frequently ponded for long or very long duration during the growing season, or

4. Soils that are frequently flooded for long or very long duration during the growing season.

NONTECHNICAL SOILS DESCRIPTION REPORT
soil

Map Symbol	Soil name and description
KLA	<p>Kawaihapai clay loam, 0 to 2 percent slopes</p> <p>This is a very deep, well drained soil on nearly level drainageways and alluvial fans. The surface layer is clay loam, and the subsoil is sandy loam with stratified layers of sand, silt, and gravel. The soil is neutral in reaction throughout the profile. Permeability is moderate. Runoff is slow, and the erosion hazard is slight. This soil is subject to occasional flooding, unless it is protected.</p>

BUILDING SITE DEVELOPMENT
 soil

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
KIA: Kawaihapai-----	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Severe: low strength, flooding	Moderate: flooding

BUILDING SITE DEVELOPMENT

Endnote -- BUILDING SITE DEVELOPMENT

This report shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are "Slight", "Moderate", or "Severe". The limitations are considered "Slight" if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; "Moderate" if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and "Severe" if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

SHALLOW EXCAVATIONS are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or bands to sloughing or caving is affected by soil texture and the depth to the water table.

DWELLINGS AND SMALL COMMERCIAL BUILDINGS are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

LOCAL ROADS AND STREETS have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

LAWNS AND LANDSCAPING require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

PHYSICAL PROPERTIES OF SOILS
 soil

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodability index" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind	Wind
								K	Kf	T	erodi- bility group	erodi- bility index
	In	Pct	g/cc	In/hr	In/in		Pct					
KIA:												
Kawaihapai-----	0-22	35-45	1.10-1.40	0.60-2.00	0.12-0.15	Moderate	1.0-2.0	0.17	0.17	5	---	---
	22-32	5-10	1.10-1.40	2.00-6.00	0.12-0.14	Low	---	0.17	0.17			
	32-54	5-10	1.10-1.40	2.00-6.00	0.12-0.14	Low	---	0.17	0.17			

PHYSICAL PROPERTIES OF SOILS

Endnote -- PHYSICAL PROPERTIES OF SOILS

This report shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

CLAY as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this report, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

MOIST BULK DENSITY is the weight of soil (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this report, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

PERMEABILITY refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

AVAILABLE WATER CAPACITY refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

SHRINK-SWELL POTENTIAL is the potential for volume change in a soil with a loss or gain of moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils. If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed. Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are "Low," a change of less than 3 percent; "Moderate," 3 to 6 percent; and "High," more than 6 percent. "Very high," greater than 9 percent, is sometimes used.

PHYSICAL PROPERTIES OF SOILS

Endnote -- PHYSICAL PROPERTIES OF SOILS--Continued

ORGANIC MATTER is the plant and animal residue in the soil at various stages of decomposition. In report J, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

EROSION FACTOR K indicates the susceptibility of the whole soil (including rocks and rock fragments) to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

EROSION FACTOR K_f is like EROSION FACTOR K but it is for the fine-earth fraction of the soil. Rocks and rock fragments are not considered.

EROSION FACTOR T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

WIND ERODIBILITY GROUPS are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion. Soils are grouped according to the following distinctions:

1. Coarse sands, sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.
2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control wind erosion are used.
3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used.
- 4L. Calcareous loams, silt loams, clay loams, and silty clay loams. These soils are erodible. Crops can be grown if intensive measures to control wind erosion are used.
4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control wind erosion are used.

PHYSICAL PROPERTIES OF SOILS

Endnote -- PHYSICAL PROPERTIES OF SOILS--Continued

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils are slightly erodible. Crops can be grown if measures to control wind erosion are used.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils are very slightly erodible. Crops can be grown if ordinary measures to control wind erosion are used.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils are very slightly erodible. Crops can be grown if ordinary measures to control wind erosion are used.

8. Soils that are not subject to wind erosion because of coarse fragments on the surface or because of surface wetness.

The WIND ERODIBILITY INDEX is used in the wind erosion equation (WEQ). The index number indicates the amount of soil lost in tons per acre per year. The range of wind erodibility index numbers is 0 to 300.

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AERIAL PHOTOGRAPH OF SUBJECT
PROPERTY, AIR SURVEY HAWAII,
22 Lagoon Drive, Honolulu, Hawaii 96819

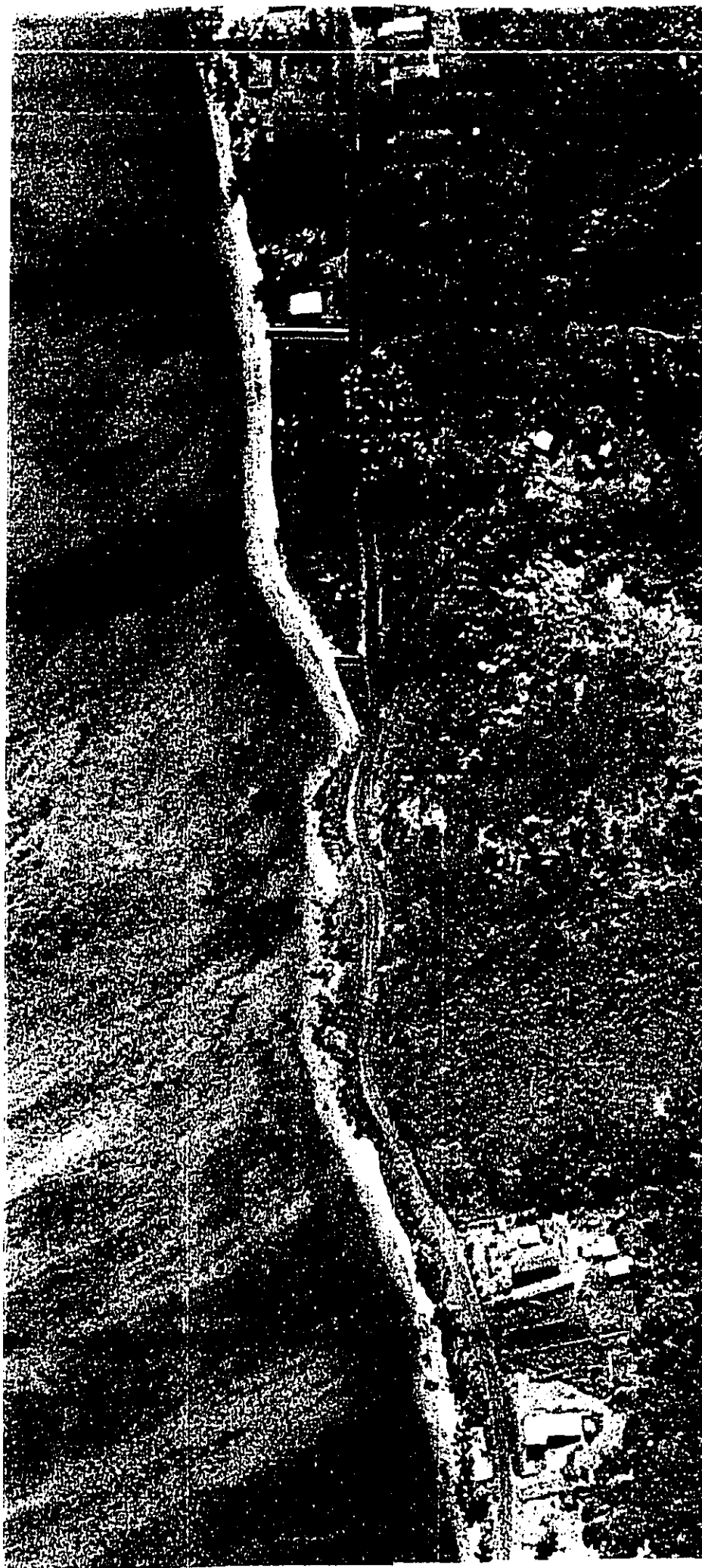
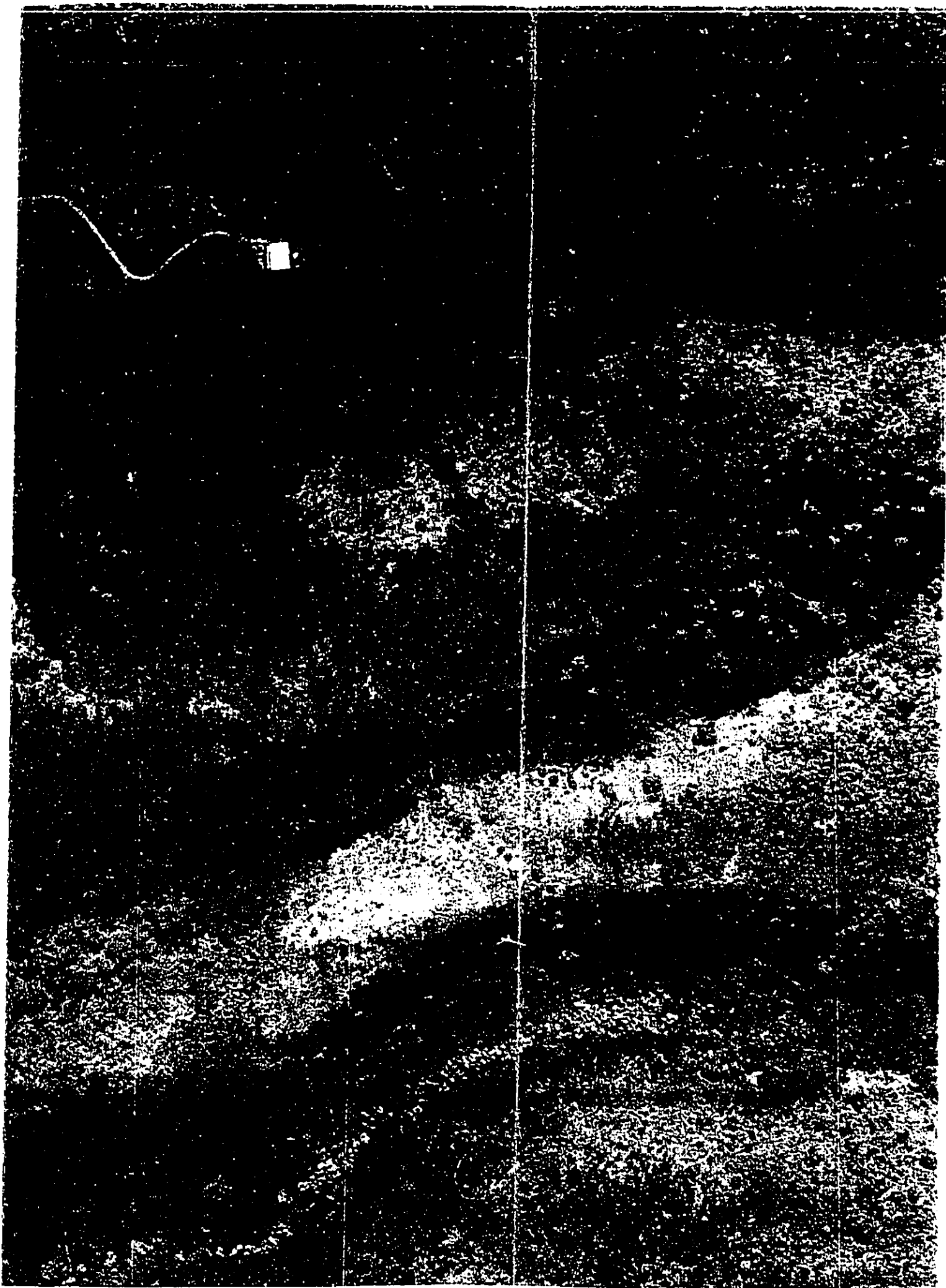
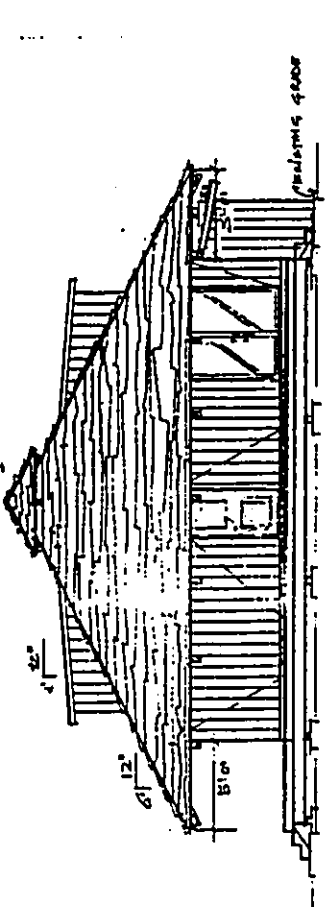
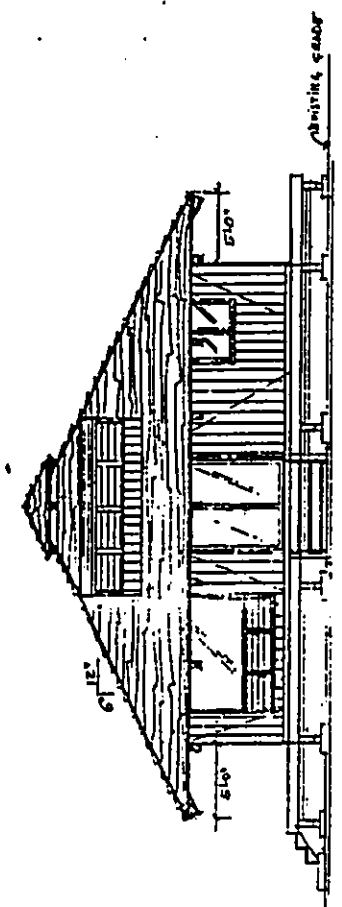
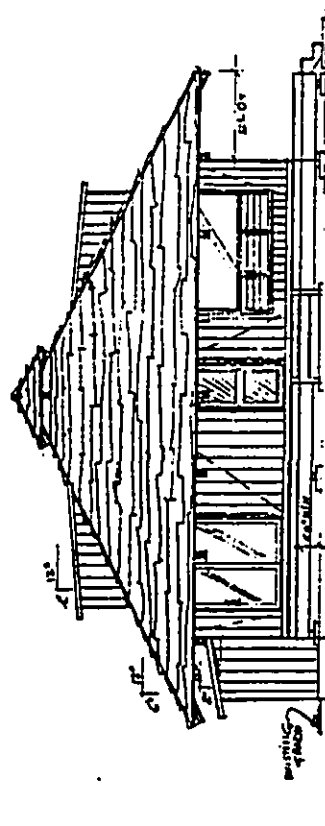
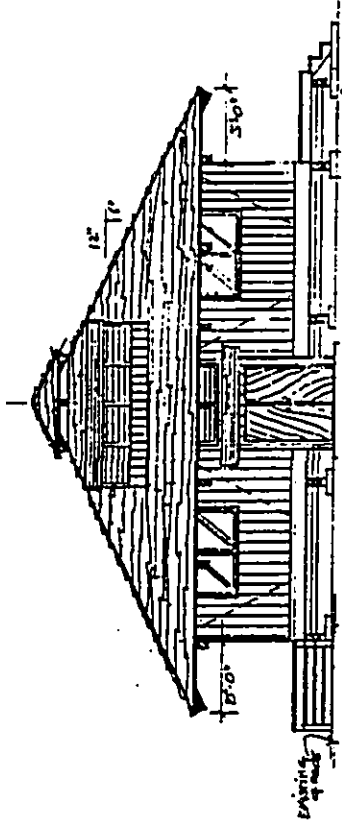


EXHIBIT 16

DOCUMENT CAPTURED AS RECEIVED





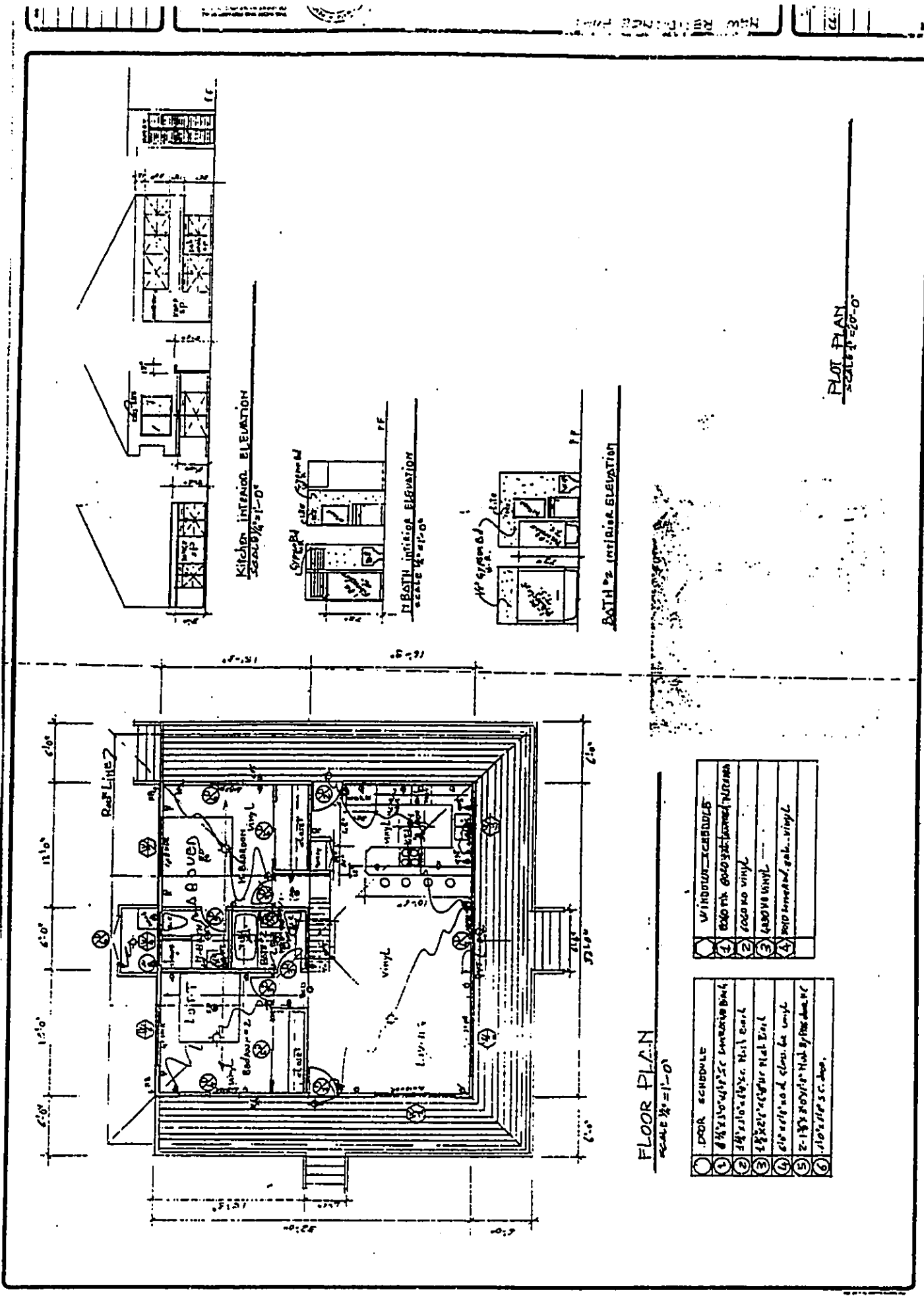


EXHIBIT 19

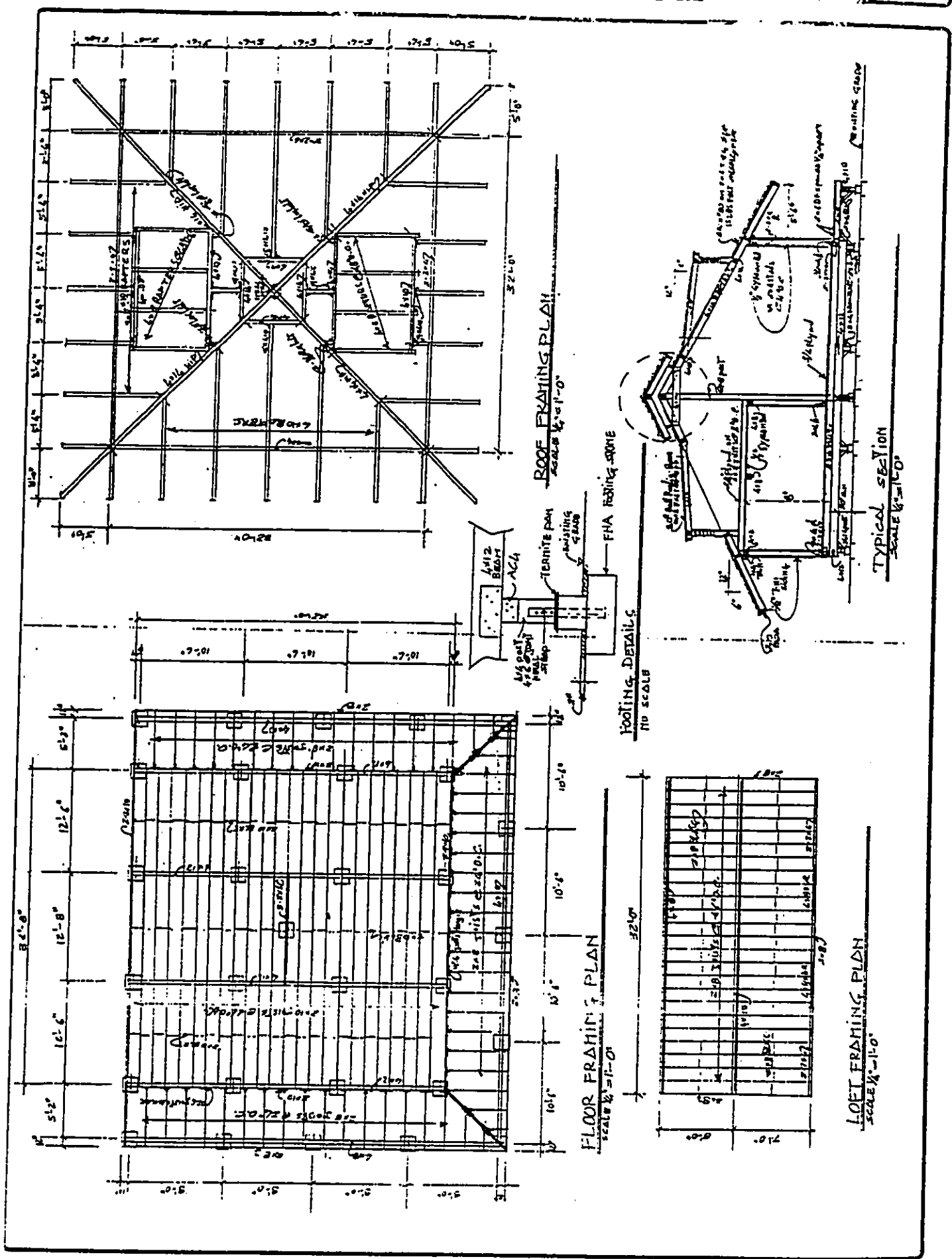


EXHIBIT 20

DOCUMENT CAPTURED AS RECEIVED

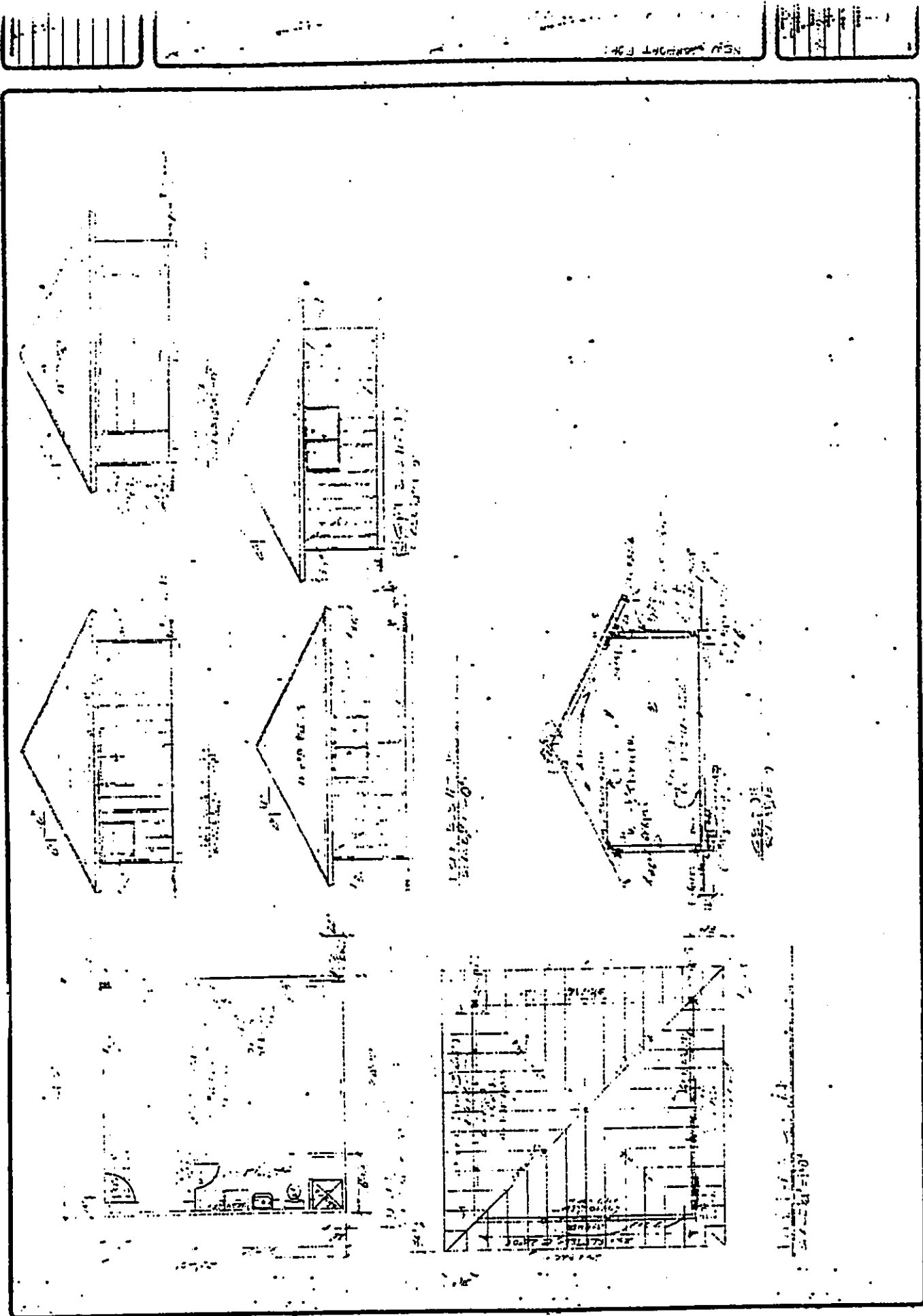


EXHIBIT 22

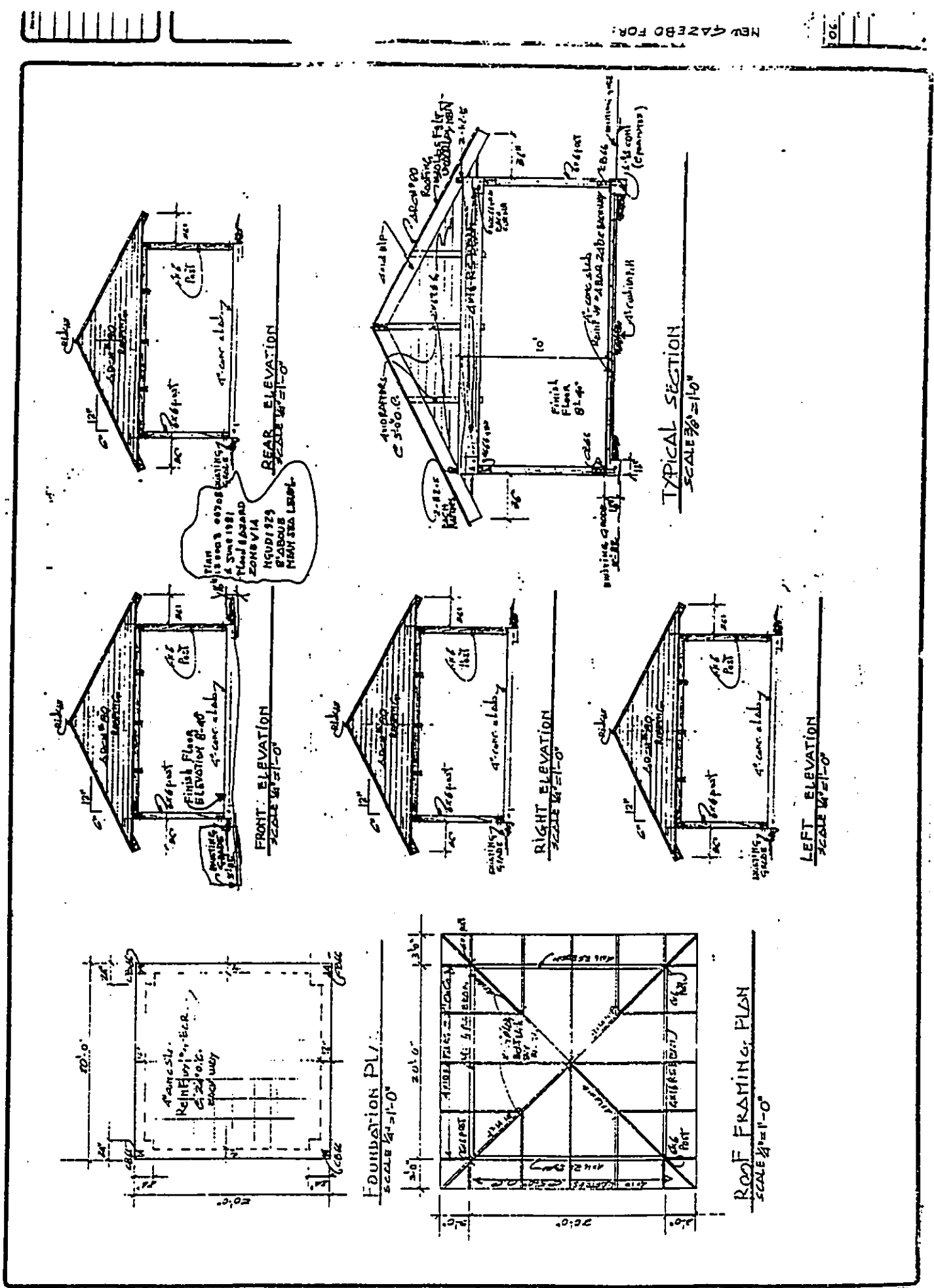
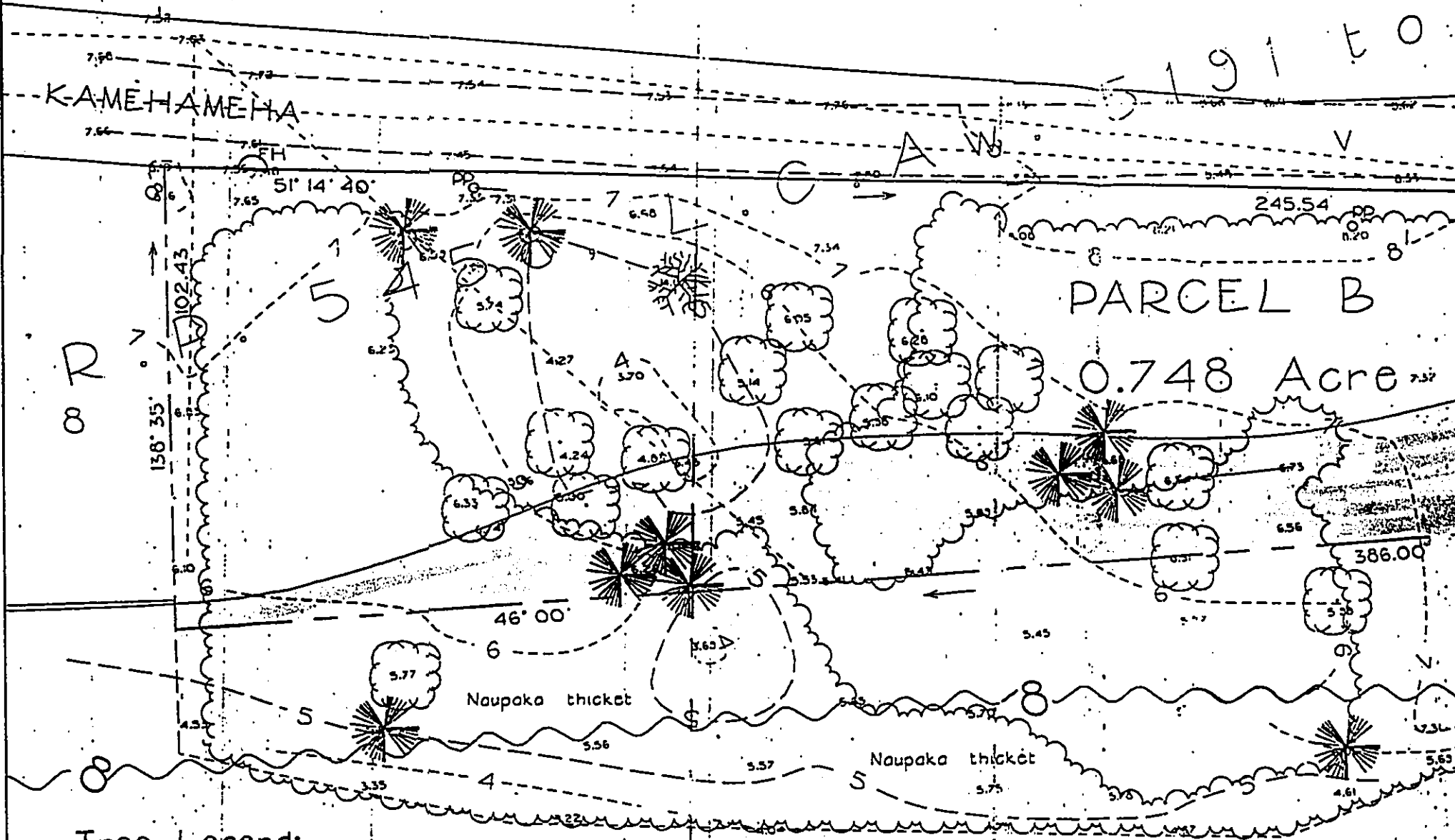






EXHIBIT 23



PARCEL B

0.748 Acre

Tree Legend:

-  KAMANI
-  PLUM
-  KIAWE
-  Tree

TOPOGRAPHIC SURVEY

PART B

Portion R.D. 5458, L.C.Aw. 5191

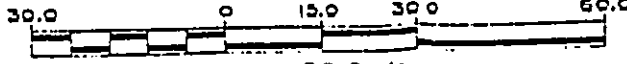
to Kahiana

Waialua, Molokai, Hawaii

30 March 1999

Scale: 1" = 30'

GRAPHIC SCALE



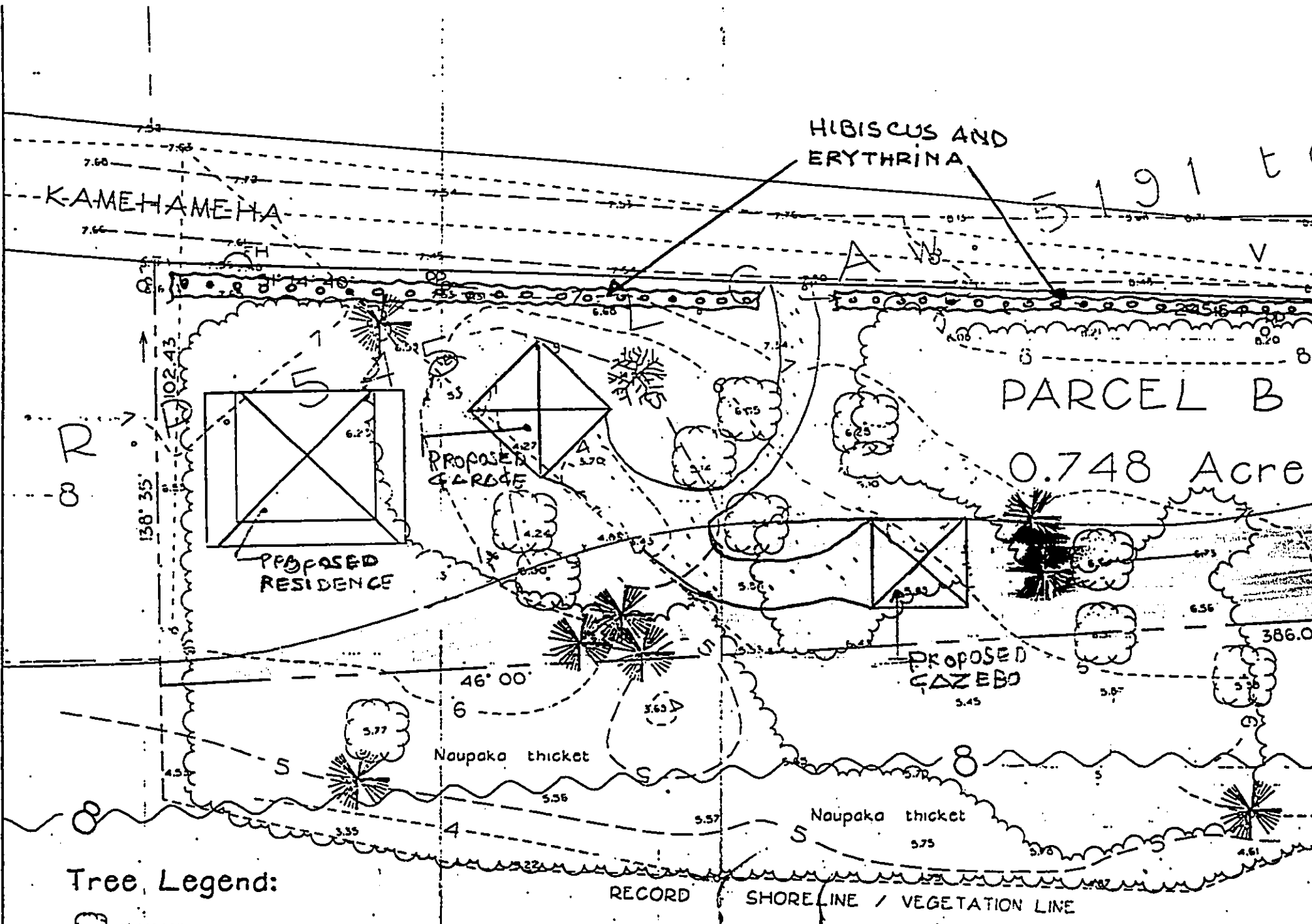
1:30 = 30.0' !!

C.I. = 1'

EXISTING LANDSCAPING

EXHIBIT 24

Tax Map Key: (2) 5-7-03: 68



PARCEL B
0.748 Acre

- Tree Legend:**
- KAMANI
 - PLUM
 - KIAWE
 - NU
 - ERYTHRINA/HIBISCUS

This plan reflects removal of 2 coconuts and 7 false kamani.

PROPOSED LANDSCAPING

TOPOGRAPHIC SURVEY

PART B
Portion R.P. 5458, L.C.Aw. 5191
to Kahiana
Waialua, Molokai, Hawaii

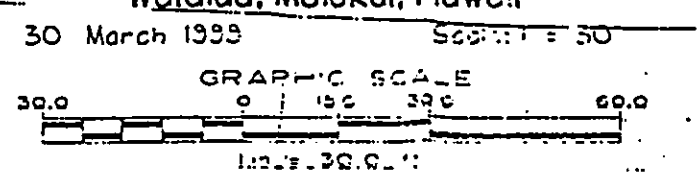
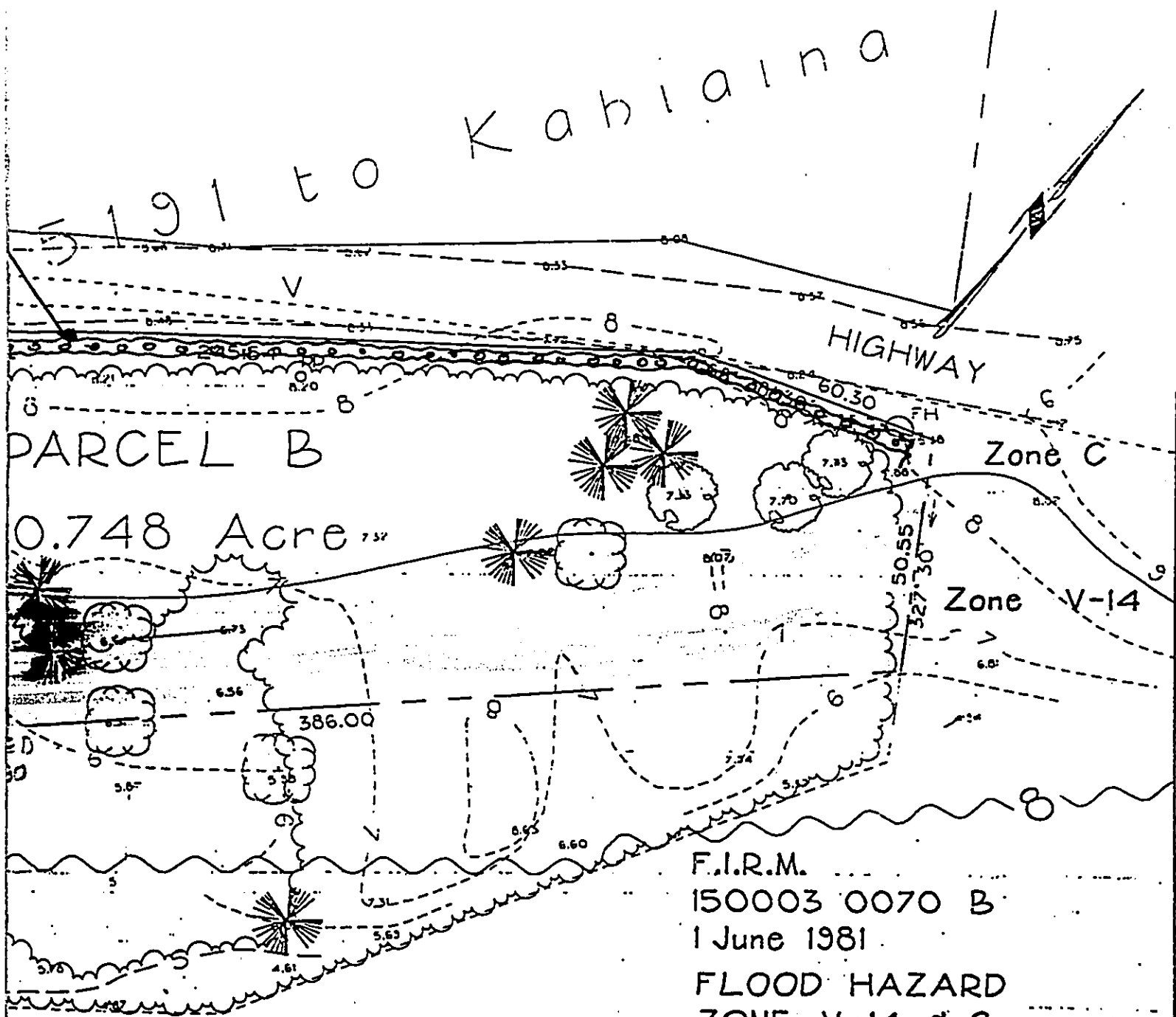


EXHIBIT 25 C.I. = 1'

Tax Map Key: (2) 5-7-03: 68



5191 to Kahiaina
 PARCEL B
 0.748 Acre

HIGHWAY

Zone C

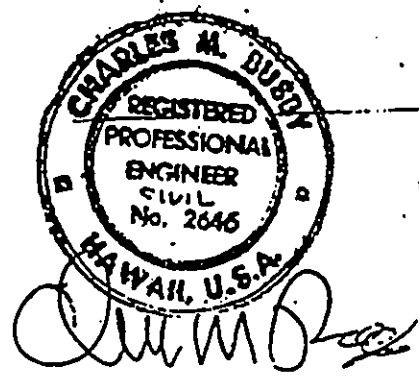
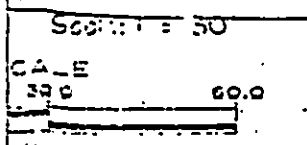
Zone V-14

F.I.R.M.
 150003 0070 B
 1 June 1981
 FLOOD HAZARD
 ZONE V 14 & C
 Flood Elev. are
 as shown.

All Elevations are referenced
 to NGVD 1929

SURVEY

B
 L.C.Aw. 5191
 inia
 , Hawaii



WORKSHEET WAI-EI
 CHARLES M. BUSBY P.E.
 HOOLEHUA, MOLOKAI
 Ph 557-6333

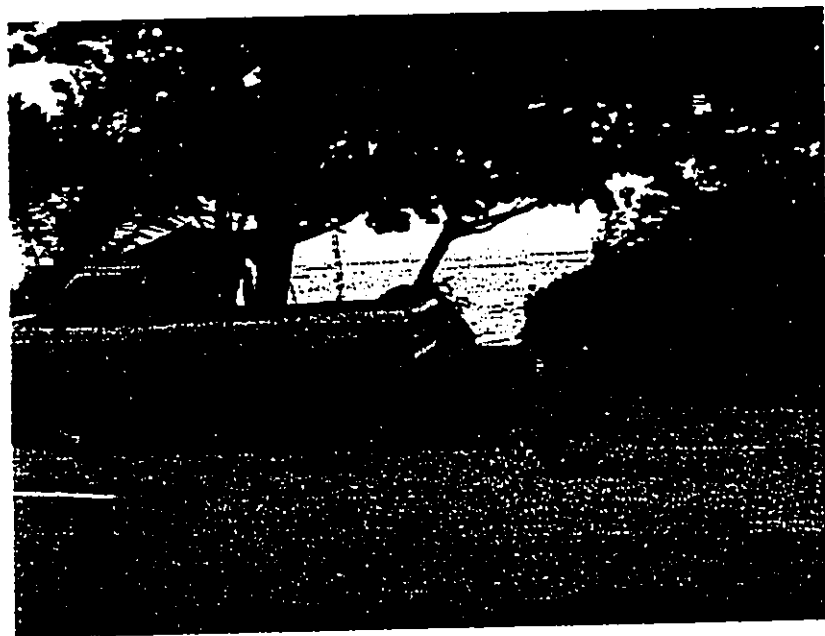


Exhibit 26. Photograph shows public use of public beach access on adjacent neighboring property. Photograph was taken July 2000.

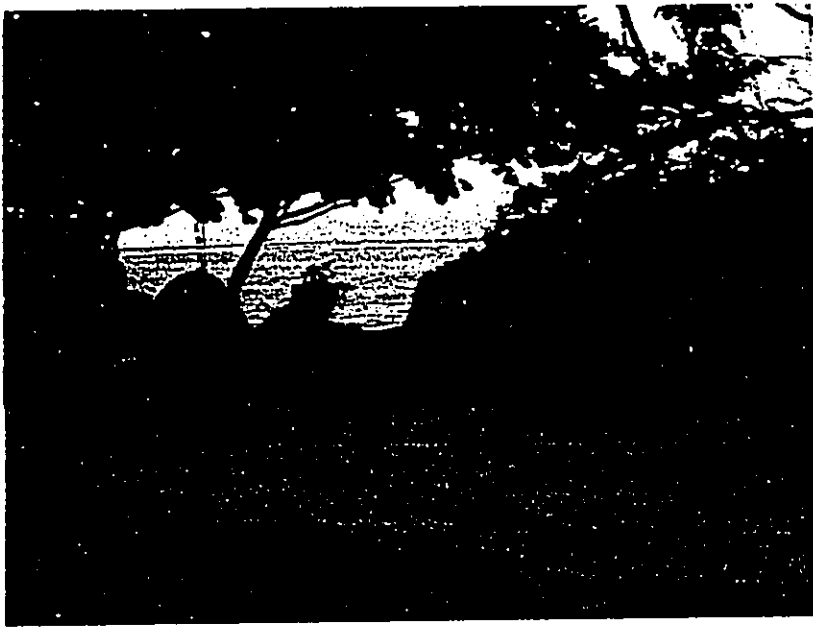


Exhibit 27. View of present public beach access on adjacent neighboring property. This photograph shows the beginning of public beach access which extends eastward for several miles.

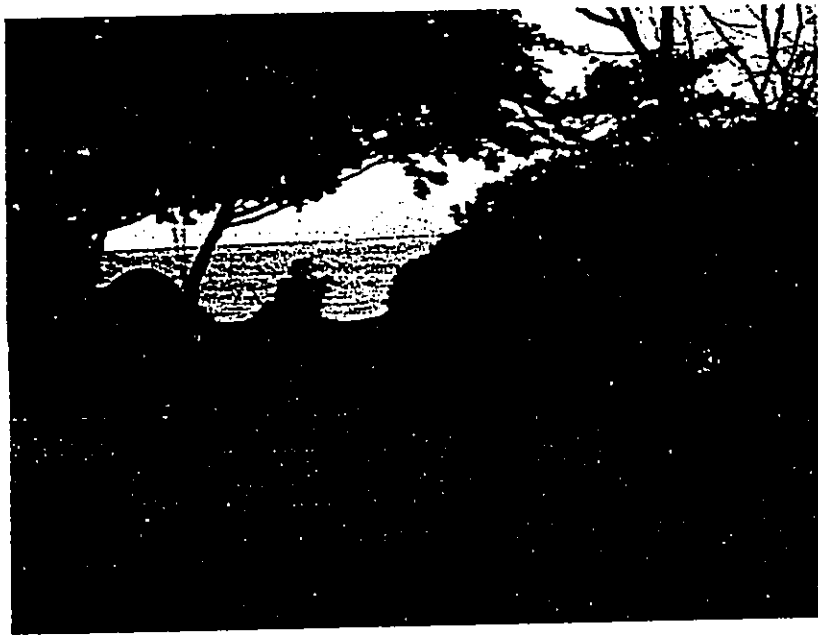


Exhibit 28. Another view of the present public beach access on adjacent neighboring property. Notice the tent under the Kamani tree on the left side of the photograph.

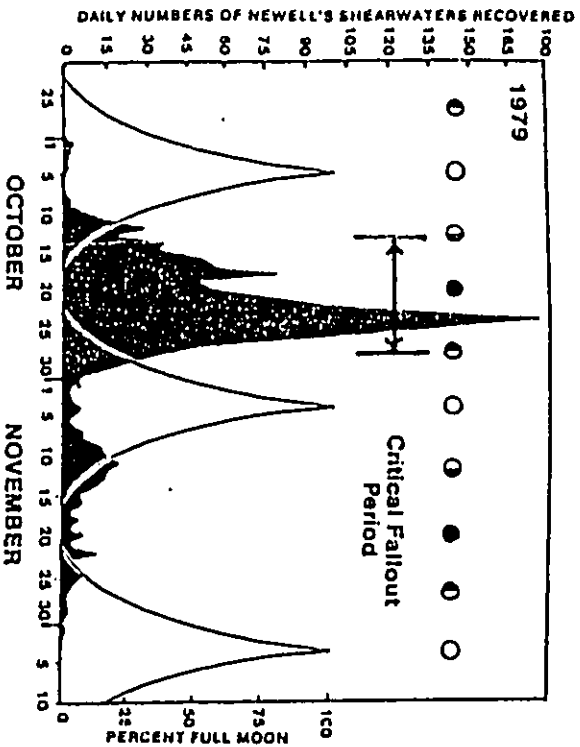


Figure 4. Relationship of shearwater "fallout" to the moon phases. The critical period of fallout occurs during the week before and after the new moon (darkest nights). Dowsing lights that are not absolutely necessary during that period could substantially reduce the annual shearwater fallout problem.

What To Do If Shearwaters Fall In Your Area

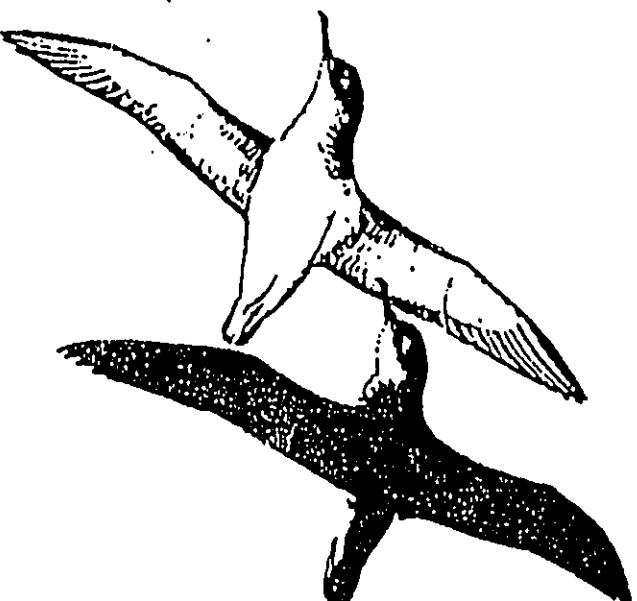
1. Collect birds as soon as possible; avoid losses to dogs and cats. They are generally docile birds and are easily handled. Take them to the nearest "shearwater and station" located at county fire stations and at a few private business locations around the island. If birds must be held overnight, keep them in ventilated cardboard box with a secure lid.
2. Do not release birds by tossing them into the air. They may have unseen internal injuries and could become more badly injured.

TECHNICAL ASSISTANCE IS AVAILABLE
FOR ADDITIONAL INFORMATION, CONTACT:

State of Hawaii
Department of Land and Natural Resources
Division of Forestry and Wildlife
P.O. Box 1671
Lihue, Hawaii 96766
245-4433

U.S. Dept. of the Interior
Fish and Wildlife Service
P.O. Box 87
Kilauea, Hawaii 96754
828-1413

The Nature Conservancy
of Hawaii
1026 Nuuanu Avenue, Suite 201
Honolulu, Hawaii 96813
537-4508



THE NEWELL'S
SHEARWATER
LIGHT ATTRACTION
PROBLEM

INTRODUCTION:

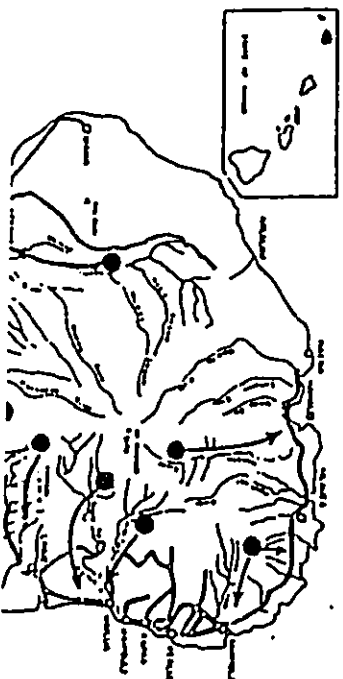
The future of a native Hawaiian seabird, the Newell's Shearwater, is threatened by the growth of new urban developments. Every year on Kauai, nearly 1,500 Newell's Shearwaters are attracted to bright urban lights, fly into unseen objects and fall stunned to the ground. Fortunately, 90% of them are recovered and successfully returned to the wild through the "SOS" (save our Shearwater) program which involves the cooperation of the general public.

This brochure is designed to describe the bird, its problems with lights and specifically what architects planners, resort managers and the general public can do to reduce or avoid the light attraction problem.

THE BIRD

The Newell's Shearwater once nested on all of the major Hawaiian Islands, but the mongoose, introduced to Hawaii, Maui, Mokuai and Oahu in the late 1800's is believed to have caused the extinction of shearwaters on those islands. Kauai is the last strong-hold for this unique native Hawaiian seabird.

Newell's Shearwaters nest during the spring and summer months in the interior mountains of Kauai. They dig a long burrow in the ground beneath dense vegetation and lay a single egg each year. The eggs hatch during July and August and the nestlings are reared within the burrow. The adult birds abandon the nestlings a week or two before they are old enough to fly. The nestlings become hungry, and leave the nesting grounds by themselves shortly after midnight. They head for the open ocean, and must depend upon their instincts to find food. They do not return to their nest, but fly south towards the equator where they will remain all winter on the open seas until the following spring.

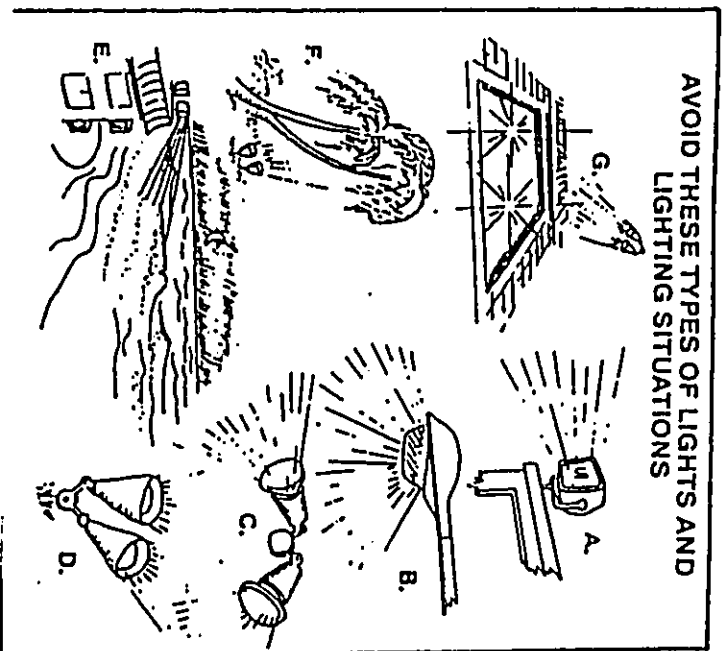


PREDATORS:

Dogs, cats, rats and feral pigs are known to kill some shearwaters and their young on the nesting grounds each year. The accidental establishment of a new predator to Kauai such as the mongoose, could cause the rapid extinction of this bird. Mongoose sightings on Kauai should be reported to wildlife officials promptly.

LIGHT ATTRACTION: Young shearwaters leaving their nests for the first time, do so only after dark. They are inexperienced and have a natural attraction to bright lights. Flying near urban areas, they become temporarily blinded by the lights and fly into unseen objects such as utility wires, trees, buildings and automobiles. Often times they are just confused and exhausted. Most often they are only stunned and fall to the ground, but about 10 percent of them die each year. The problem is growing because of the increased number of urban lights associated with new resort and residential developments. The greatest "fallout" problem occurs near coastal towns, particularly near river mouths.

AVOID THESE TYPES OF LIGHTS AND LIGHTING SITUATIONS



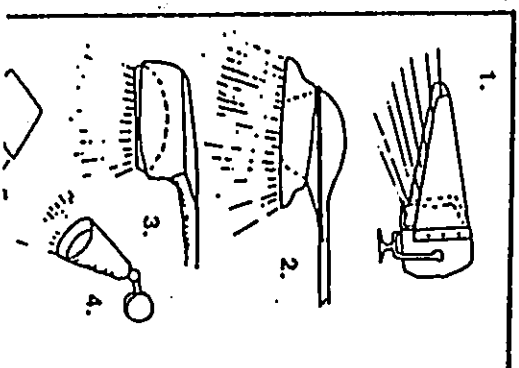
WHAT CAN WE DO TO HELP?

Architects and Planners

- Be aware of the light attraction problem during the planning stages of new development.
- Make every effort to avoid lighting situations where light glare projects upwards or laterally (see figure 2). Avoid large high-intensity floodlights located on building tops or poles whenever possible.
- Use shielded lights, cut-off luminaires, or indirect lighting whenever possible. (see figure 3).
- Avoid locating bright lights near utility wires or other objects that could be difficult for birds to see at night.

Hotel, Resort and Condominium Managers

- When converting to new exterior light fixtures, consider installing shielded lights, cut-off luminaires or indirect lighting.
- Consider installing shields on exterior lights that are known to attract shearwaters. Some light manufacturers offer ready made shields. In some cases inexpensive shields can be fabricated.
- Avoid using unnecessary lighting during the critical shearwater fall-out period: (October and November each year). Note: The heaviest fall-out occurs on and around the new moon, generally for only 10 to 12 days. (See figure 4). Dowsing unnecessary floodlights that light up the surf or shine upward upon buildings or trees for that short period, could significantly reduce shearwater fall-out.



Guidelines for Sustainable Building Design in Hawai'i

A planner's checklist

(Adopted by the Environmental Council on October 13, 1999)

Introduction

Hawai'i law calls for efforts to conserve natural resources, promote efficient use of water and energy and encourage recycling of waste products. Planning a project from the very beginning to include sustainable design concepts can be a critical step toward meeting these goals.

The purpose of the state's environmental review law (HRS Ch. 343) is to encourage a full, accurate and complete analysis of proposed actions, promote public participation and support enlightened decision making by public officials. The Office of Environmental Quality Control offers the following guidelines for preparers of environmental reviews under the authority of HRS 343 to assist agencies and applicants in meeting these goals.

These guidelines do not constitute rules or law. They have been refined by staff and peer review to provide a checklist of items that will help the design team create projects that will have a minimal impact on Hawai'i's environment and make wise use of our natural resources. In a word, projects that are *sustainable*.

A sustainable building is built to minimize energy use, expense, waste, and impact on the environment. It seeks to improve the region's sustainability by meeting the needs of Hawai'i's residents and visitors today without compromising the needs of future generations. Compared to conventional projects, a resource-efficient building project will:

- I. Use less energy for operation and maintenance
- II. Contain less *embodied* energy (e.g. locally produced building products often contain less *embodied* energy than imported products because they require less energy-consuming transportation.)
- III. Protect the environment by preserving/conserving water and other natural resources and by minimizing impact on the site and ecosystems
- IV. Minimize health risks to those who construct, maintain, and occupy the building
- V. Minimize construction waste
- VI. Recycle and reuse generated construction wastes

Exhibit 30

- VII. Use resource-efficient building materials (e.g. materials with recycled content and low embodied energy, and materials that are recyclable, renewable, environmentally benign, non-toxic, low VOC (Volatile Organic Compound) emitting, durable, and that give high life cycle value for the cost.)
- VIII. Provide the highest quality product practical at competitive (affordable) first and life cycle costs.

In order to avoid excessive overlapping of items, the checklist is designed to be read in totality, not just as individual sections. This checklist tries to address a range of project types, large scale as well as small scale. Please use items that are appropriate to the type and scale of the project.

Although this list will help promote careful and sensitive planning, mere compliance with this checklist does not confirm sustainability. Compliance with and knowledge of current building codes by users of this checklist is also required.

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X.	Occupancy and Operation	Page 11
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I. Pre Design

- ___ 1. Hold programming team meeting with client representative, Project Manager, planning consultant, architectural consultant, civil engineer, mechanical, electrical, plumbing (MEP) engineer, structural engineer, landscape architect, interior designer, sustainability consultant and other consultants as required by the project. Identify project and sustainability goals. Client representatives and consultants need to work together to ensure that project and environmental goals are met.
- ___ 2. Develop sustainable guideline goals to insert into outline specifications as part of the Schematic Design documents. Select goals from the following sections that are appropriate for the project.
- ___ 3. Use Cost-Benefit Method for economic analysis of the sustainability measures chosen. (Cost-Benefit Method is a method of evaluating project choices and investments by comparing the present and life cycle value of expected benefits to the present and life cycle value of expected costs.)
- ___ 4. Include "Commissioning" in the project budget and schedule. (Building "Commissioning" is the process of ensuring that systems are designed, installed, functionally tested, and capable of being operated and maintained in accordance with specifications that meet the owner's needs, and recognize the owner's financial and operational capacity. It improves the performance of the building systems, resulting in energy efficiency and conservation, improved air quality and lower operation costs. *Refer to Section IX.*)

II. Site Selection & Site Design

A. Site Selection

- ___ 1. Analyze and assess site characteristics such as vegetation, topography, geology, climate, natural access, solar orientation patterns, water and drainage, and existing utility and transportation infrastructure to determine the appropriate use of the site.
- ___ 2. Whenever possible, select a site in a neighborhood where the project can have a positive social, economic and/or environmental impact.
- ___ 3. Select a site with short connections to existing municipal infrastructure (sewer lines, water, waste water treatment plant, roads, gas, electricity, telephone, data communication lines and services). Select a site close to mass transportation, bicycle routes and pedestrian access.

B. Site Preparation and Design

- ___ 1. Prepare a thorough existing conditions topographic site plan depicting topography, natural and built features, vegetation, location of site utilities and include solar information,

rainfall data and direction of prevailing winds. Preserve existing resources and natural features to enhance the design and add aesthetic, economic and practical value. Design to minimize the environmental impact of the development on vegetation and topography.

- ___ 2. Site building(s) to take advantage of natural features and maximize their beneficial effects. Provide for solar access, daylighting and natural cooling. Design ways to integrate the building(s) with the site that maximizes and preserves positive site characteristics, enhances human comfort, safety and health, and achieves operational efficiencies.
- ___ 3. Locate building(s) to encourage bicycle and pedestrian access and pedestrian oriented uses. Provide bicycle and pedestrian paths, bicycle racks, etc. Racks should be visible and accessible to promote and encourage bicycle commuting.
- ___ 4. Retain existing topsoil and maintain soil health by clearing only the areas reserved for the construction of streets, driveways, parking areas, and building foundations. Replant exposed soil areas as soon as possible. Reuse excavated soils for fill and cut vegetation for mulch.
- ___ 5. Grade slopes to a ratio of less than 2 : 1 (run to rise). Balance cut and fill to eliminate hauling. Check grading frequently to prevent accidental over excavation.
- ___ 6. Minimize the disruption of site drainage patterns. Provide erosion and dust controls, positive site drainage, and siltation basins as required to protect the site during and after construction, especially, in the event of a major storm.
- ___ 7. Minimize the area required for the building footprint. Consolidate utility and infrastructure in common corridors to minimize site degradation, and cost, improve efficiency, and reduce impermeable surfaces.
- ___ 8. For termite protection, use non toxic alternatives to pesticides and herbicides, such as Borate treated lumber, Basaltic Termite Barrier, stainless steel termite barrier mesh, and termite resistant materials.

III. Building Design

- ___ 1. Consider adaptive re-use of existing structures instead of demolishing and/or constructing a new building. Consult the State Historic Preservation Officer for possible existing historic sites that may meet the project needs.
- ___ 2. Plan for high flexibility while designing building shell and interior spaces to accommodate changing needs of the occupants, and thereby extend the life span of the building.
- ___ 3. Design for re-use and/or disassembly. (For recyclable and reusable building products, see Section VII).
- ___ 4. Design space for recycling and waste diversion opportunities during occupancy.
- ___ 5. Provide facilities for bicycle and pedestrian commuters (showers, lockers, bike racks, etc.) in commercial areas and other suitable locations.
- ___ 6. Plan for a comfortable and healthy work environment. Include inviting outdoor spaces, wherever possible. (*Refer to Section VIII.*)

- ___ 7. Provide an Integrated Pest Management approach. The use of products such as Termi-mesh, Basaltic Termite Barrier and the Sentricon "bait" system can provide long term protection from termite damage and reduce environmental pollution.
- ___ 8. Design a building that is energy efficient and resource efficient. (See Sections IV, V, VII.) Determine building operation by-products such as heat gain and build up, waste/gray-water and energy consumption, and plan to minimize them or find alternate uses for them.
- ___ 9. For natural cooling, use
 - a. Reflective or light colored roofing, radiant barrier and/or insulation, roof vents
 - b. Light colored paving (concrete) and building surfaces
 - c. Tree Planting to shade buildings and paved areas
 - d. Building orientation and design that captures trade winds and/or provides for convective cooling of interior spaces when there is no wind.

IV. Energy Use

- ___ 1. Obtain a copy of the State of Hawai'i Model Energy Code (available through the Hawai'i State Energy Division, at Tel. 587-3811). Exceed its requirements. (Contact local utility companies for information on tax credits and utility-sponsored programs offering rebates and incentives to businesses for installing qualifying energy efficient technologies.)
- ___ 2. Use site sensitive orientation to :
 - a. Minimize cooling loads through site shading and carefully planned east-west orientation.
 - b. Incorporate natural ventilation by channeling trade winds.
 - c. Maximize daylighting.
- ___ 3. Design south, east and west shading devices to minimize solar heat gain.
- ___ 4. Use spectrally selective tints or spectrally selective low-e glazing with a Solar Heat Gain Coefficient (SHGC) of 0.4 or less.
- ___ 5. Minimize effects of thermal bridging in walls, roofs and window systems.
- ___ 6. Maximize efficiencies for lighting, Heating, Ventilation, Air Conditioning (HVAC) systems and other equipment. Use insulation and/or radiant barriers, natural ventilation, ceiling fans and shading to avoid the use of air conditioning whenever appropriate.
- ___ 7. Eliminate hot water in restrooms when possible.
- ___ 8. Provide tenant sub-metering to encourage utility use accountability.
- ___ 9. Use renewable energy. Use solar water heaters and consider the use of photovoltaics and Building Integrated Photovoltaics (BIPV).
- ___ 10. Use available energy resources such as waste heat recovery, when feasible.

A. Lighting

- ___ 1. Design for at least 15% lower interior lighting power allowance than the Energy Code.
- ___ 2. Select lamps and ballasts with the highest efficiency, compatible with the desired level of illumination and color rendering specifications. Examples that combine improved color rendering with efficient energy use include compact fluorescents and T8 fluorescents that use tri-phosphor gases.
- ___ 3. Select lighting fixtures which maximize system efficacy and which have heat removal capabilities
- ___ 4. Reduce light absorption on surfaces by selecting colors and finishes that provide high reflectance values without glare.
- ___ 5. Use task lighting with low ambient light levels.
- ___ 6. Maximize daylighting through the use of vertical fenestration, light shelves, skylights, clerestories, building form and orientation as well as through translucent or transparent interior partitions. Coordinate daylighting with electrical lighting for maximum electrical efficiency.
- ___ 7. Incorporate daylighting controls and/or motion activated light controls in low or intermittent use areas.
- ___ 8. Avoid light spillage in exterior lighting by using directional fixtures.
- ___ 9. Minimize light overlap in exterior lighting schemes.
- ___ 10. Use lumen maintenance procedures and controls.

B. Mechanical Systems

- ___ 1. Design to comply with the Energy Code and to exceed its efficiency requirements.
- ___ 2. Use "Smart Building" monitor/control systems when appropriate.
- ___ 3. Utilize thermal storage for reduction of peak energy usage.
- ___ 4. Use Variable air volume systems to save fan power.
- ___ 5. Use variable speed drives on pumping systems and fans for cooling towers and air handlers.
- ___ 6. Use air-cooled refrigeration equipment or use cooling towers designed to reduce drift.
- ___ 7. Specify premium efficiency motors.
- ___ 8. Reduce the need for mechanical ventilation by reducing sources of indoor air pollution. Use high efficiency air filters and ultraviolet lamps in air handling units. Provide for regular maintenance of filtration systems. Use ASHRAE standards as minimum.
- ___ 9. Locate fresh air intakes away from polluted or overheated areas. Locate on roof where possible. Separate air intake from air exhausts by at least 40 ft.
- ___ 10. Use separate HVAC systems to serve areas that operate on widely differing schedules and/or design conditions.
- ___ 11. Use shut off or set back controls on HVAC system when areas are not occupied.
- ___ 12. Use condenser heat, waste heat or solar energy. (Contact local utility companies for information on the utility-sponsored Commercial and Industrial Energy Efficiency

Programs which offer incentives to businesses for installing qualifying energy efficient technologies.)

- ___13. Evaluate plug-in loads for energy efficiency and power saving features.
- ___14. Improve comfort and save energy by reducing the relative humidity by waste reheat, heat pipes or solar heat.
- ___15. Minimize heat gain from equipment and appliances by using:
 - a. Environmental Protection Agency (EPA) Energy Star rated appliances.
 - b. Hoods and exhaust fans to remove heat from concentrated sources.
 - c. High performance water heating that exceeds the Energy Code requirements.
- ___16. Specify HVAC system "commissioning" period to reduce occupant exposure to Indoor Air Quality (IAQ) contaminants and to maximize system efficiency.

V. Water Use

A. Building Water

- ___1. Install water conserving, low flow fixtures as required by the Uniform Plumbing Code.
- ___2. If practical, eliminate hot water in restrooms.
- ___3. Use self closing faucets (infrared sensors or spring loaded faucets) for lavatories and sinks.

B. Landscaping and Irrigation (See Section VI.)

VI. Landscape and Irrigation

- ___1. Incorporate water efficient landscaping (xeriscaping) using the following principles:
 - a. Planning, Efficient irrigation: Create watering zones for different conditions. Separate vegetation types by watering requirements. Install moisture sensors to prevent operation of the irrigation system in the rain or if the soil has adequate moisture. Use appropriate sprinkler heads.
 - b. Soil analysis/improvement: Use (locally made) soil amendments and compost for plant nourishment, improved water absorption and holding capacity.
 - c. Appropriate plant selection: Use drought tolerant and/or slow growing hardy grasses, native and indigenous plants, shrubs, ground covers, trees, appropriate for local conditions, to minimize the need for irrigation.
 - d. Practical turf areas: Turf only in areas where it provides functional benefits.

- e. Mulches: Use mulches to minimize evaporation, reduce weed growth and retard erosion.

Contact the local Board of Water Supply for additional information on xeriscaping such as efficient irrigation, soil improvements, mulching, lists of low water-demand plants, tours of xeriscaped facilities, and xeriscape classes.

- ___ 2. Protect existing beneficial site features and save trees to prevent erosion. Establish and carefully mark tree protection areas well before construction.
- ___ 3. Limit staging areas and prevent unnecessary grading of the site to protect existing, especially native, vegetation.
- ___ 4. Use top soil from the graded areas, stockpiled on the site and protected with a silt fence to reduce the need for imported top soil.
- ___ 5. Irrigate with non-potable water or reclaimed water when feasible. Collect rainwater from the roof for irrigation.
- ___ 6. Sub-meter the irrigation system to reduce water consumption and consequently water and sewer fees. Contact the local county agency to obtain irrigation sub-metering requirements and procedures. Locate irrigation controls within sight of the irrigated areas to verify that the system is operating properly.
- ___ 7. Use pervious paving instead of concrete or asphalt paving. Use natural and man-made berms, hills and swales to control water runoff.
- ___ 8. Avoid the use of solvents that contain or leach out pollutants that can contaminate the water resources and runoff. Contact the State of Hawai'i Clean Water Branch at 586-4309 to determine whether a NPDES (National Pollutant Discharge Elimination System) permit is required.
- ___ 9. Use Integrated Pest Management (IPM) techniques. IPM involves a carefully managed use of biological and chemical pest control tactics. It emphasizes minimizing the use of pesticides and maximizing the use of natural process
- ___ 10. Use trees and bushes that are felled at the building site (i.e. mulch, fence posts). Leave grass trimmings on the lawn to reduce green waste and enhance the natural health of lawns.
- ___ 11. Use recycled content, decay and weather resistant landscape materials such as plastic lumber for planters, benches and decks.

VII. Building Materials & Solid Waste Management

A. Material Selection and Design

- ___ 1. Use durable products.
- ___ 2. Specify and use natural products or products with low embodied energy and/or high recycled content. Products with recycled content include steel, concrete with glass,

- drywall, carpet, etc. Use ground recycled concrete, graded glass cullet or asphalt as base or fill material.
- ___ 3. Specify low toxic or non-toxic materials whenever possible, such as low VOC (Volatile Organic Compounds) paints, sealers and adhesives and low or formaldehyde-free materials. Do not use products with CFCs (Chloro-fluoro-carbons).
 - ___ 4. Use locally produced products such as plastic lumber, insulation, hydro-mulch, glass tiles, compost.
 - ___ 5. Use advanced framing systems that reduce waste, two stud corners, engineered structural products and prefabricated panel systems.
 - ___ 6. Use materials which require limited or no application of finishing or surface preparation. (i.e. finished concrete floor surface, glass block and glazing materials, concrete block masonry, etc.).
 - ___ 7. Use re-milled salvaged lumber where appropriate and as available. Avoid the use of old growth timber.
 - ___ 8. Use sustainably harvested timber.
 - ___ 9. Commit to a material selection program that emphasizes efficient and environmentally sensitive use of building materials, and that uses locally available building materials. (A list of Earth friendly products and materials is available through the Green House Hawai'i Project. Call Clean Hawai'i Center, Tel. 587-3802 for the list.)

B. Solid Waste Management, Recycling and Diversion Plan

- ___ 1. Prepare a job-site recycling plan and post it at the job-site office.
- ___ 2. Conduct pre-construction waste minimization and recycling training for employees and sub-contractors.
- ___ 3. Use a central area for all cutting.
- ___ 4. Establish a dedicated waste separation/diversion area. Include Waste/Compost/Recycling collection areas and systems for use during construction process and during the operational life cycle of the building.
- ___ 5. Separate and divert all unused or waste cardboard, ferrous scrap, construction materials and fixtures for recycling and/or forwarding to a salvage exchange facility. Information on "Minimizing C&D (construction and demolition) waste in Hawai'i" is available through Department of Health, Office of Solid Waste Management, Tel. 586-4240.
- ___ 6. Use all green waste, untreated wood and clean drywall on site as soil amendments or divert to offsite recycling facilities.
- ___ 7. Use concrete and asphalt rubble on-site or forward the material for offsite recycling.
- ___ 8. Carefully manage and control waste solvents, paints, sealants, and their used containers. Separate these materials from C&D (construction and demolition) waste and store and dispose them of them carefully.
- ___ 9. Donate unused paint, solvents, sealants to non-profit organizations or list on HIMEX (Hawai'i Materials Exchange). HIMEX is a free service operated by Maui Recycling

Group, that offers an alternative to landfill disposal of usable materials, and facilitates no-cost trades. See web site, www.himex.org.

- ___10. Use suppliers that re-use or recycle packaging material whenever possible.

VIII. Indoor Air Quality

- ___1. Design an HVAC system with adequate supply of outdoor air, good ventilation rates, even air distribution, sufficient exhaust ventilation and appropriate air cleaners.
- ___2. Develop and specify Indoor Air Quality (IAQ) requirements during design and contract document phases of the project. Monitor compliance in order to minimize or contain IAQ contaminant sources during construction, renovation and remodeling.
- ___3. Notify occupants of any type of construction, renovation and remodeling and the effects on IAQ.
- ___4. Inspect existing buildings to determine if asbestos and lead paint are present and arrange for removal or abatement as needed.
- ___5. Supply workers with, and ensure the use of VOC (Volatile Organic Compounds)-safe masks where required.
- ___6. Ensure that HVAC systems are installed, operated and maintained in a manner consistent with their design. Use UV lamps in Air Handling Units to eliminate mold and mildew growth. An improperly functioning HVAC system can harbor biological contaminants such as viruses, bacteria, molds, fungi and pollen, and can cause Sick Building Syndrome (SBS).
- ___7. Install separate exhaust fans in rooms where air polluting office equipment is used, and exhaust directly to the exterior of the building, at sufficient distance from the air intake vents.
- ___8. Place bird guards over air intakes to prevent pollution of shafts and HVAC ducts.
- ___9. Control indoor air pollution by selecting products and finishes that are low or non-toxic and low VOC emitting. Common sources of indoor chemical contaminants are adhesives, carpeting, upholstery, manufactured wood products, copy machines, pesticides and cleaning agents.
- ___10. Schedule finish application work to minimize absorption of VOCs into surrounding materials e.g. allow sufficient time for paint and clear finishes to dry before installing carpet and upholstered furniture. Increase ventilation rates during periods of increased pollution.
- ___11. Allow a flush-out period after construction, renovation, remodeling or pesticide application to minimize occupant exposure to chemicals and contaminants.

IX. Commissioning & Construction Project Closeout

- 1. Appoint a Commissioning Authority to develop and implement a commissioning plan and a preventative maintenance plan. Project Manager's responsibilities must include coordination of commissioning activities during project closeout.
- 2. Commissioning team should successfully demonstrate all systems and perform operator training before final acceptance.
- 3. Provide flush-out period to remove air borne contaminants from the building and systems.
- 4. Provide as-built drawings and documentation for all systems. Provide data on equipment maintenance and their control strategies as well as maintenance and cleaning instructions for finish materials.

X. Occupancy and Operation

A. General Objectives

- 1. Develop a User's Manual for building occupants that emphasizes the need for Owner/Management commitment to efficient sustainable operations.
- 2. Management's responsibilities must include ensuring that sustainability policies are carried out.

B. Energy

- 1. Purchase EPA rated, Energy Star, energy-efficient office equipment, appliances, computers, and copiers. (Energy Star is a program sponsored by U.S. Dep. Of Energy. Use of these products will contribute to reduced energy costs for buildings and reduce air pollution.)
- 2. Institute an employee education program about the efficient use of building systems and appliances, occupants impact on and responsibility for water use, energy use, waste generation, waste recycling programs, etc.
- 3. Re-commission systems and update performance documentation periodically per recommendations of the Commissioning Authority, or whenever modifications are made to the systems.

C. Water

- 1. Start the watering cycle in the early morning in order to minimize evaporation.
- 2. Manage the chemical treatment of cooling tower water to reduce water consumption.

D. Air

- 1. Provide incentives which encourage building occupants to use alternatives to and to reduce the use of single occupancy vehicles.

- ___2. Provide a location map of services within walking distance of the place of employment (child care, restaurants, gyms, shopping).
- ___3. Periodically monitor or check for indoor pollutants in building.
- ___4. Provide an IAQ plan for tenants, staff and management that establishes policies and documentation procedures for controlling and reporting indoor air pollution. This helps tenants and staff understand their responsibility to protect the air quality of the facility.

E. Materials and Products

- ___1. Purchase business products with recycled content such as paper, toners, etc.
- ___2. Purchase Furniture made with sustainably harvested wood, or with recycled and recycled content materials, which will not off gas VOC's.
- ___3. Remodeling and painting should comply with or improve on original sustainable design intent.
- ___4. Use low VOC, non-toxic, phosphate and chlorine free, biodegradable cleaning products.

F. Solid Waste

- ___1. Collect recyclable business waste such as paper, cardboard boxes, and soda cans.
- ___2. Avoid single use items such as paper or Styrofoam cups and plates, and plastic utensils.

XI. Resources

Financing: Energy Efficiency in Buildings. U.S. Department of Energy, DOE/EE-0152, May, 1998 (Call Tel. 1-800-DOE-EREC or visit local office)

Building Commissioning: The Key to Quality Assurance. U.S. Department of Energy, DOE/EE-0153, May, 1998 (Call Tel. 1-800-DOE-EREC or visit local office)

Guide to Resource-Efficient Building in Hawaii. University of Hawai'i at Manoa, School of Architecture and Energy, Resources and Technology Division, Department of Business, Economic Development and Tourism, October 1998. (Call Tel. 587-3804 for publication)

Hawaii Model Energy Code. Energy, Resources and Technology Division, Department of Business, Economic Development and Tourism, November 1997 (Call Tel. 587-3810 for publication)

Photovoltaics in the Built Environment: A Design Guide for Architects and Engineers. NREL Publications, DOE/GO #10097-436, September 1997 (Call Tel. 1-800-DOE-EREC or visit local office)

Building Integrated Photovoltaics: A Case Study. NREL Publications #TP-472-7574, March 1995 (Call Tel. 1-800-DOE-EREC or visit local office)

Solar Electric Applications: An overview of Today's Applications. NREL Publications, DOE/GO #10097-357, Revised February, 1997 (Call Tel. 1-800-DOE-EREC or visit local office)

Green Lights: An Enlightened Approach to Energy Efficiency and Pollution Prevention. U.S. Environmental Protection Agency, Pacific Island Contact Office (Call Tel. 541-2710 for publication.)

Healthy Lawn, Healthy Environment. U.S. Environmental Protection Agency, Pacific Island Contact Office. (Call Tel. 541-2710 for this and related publications)

How to Plant a Native Hawaiian Garden. Office of Environmental Quality Control (OEQC), Department of Health, State of Hawai'i (Call Tel. 586-4185 for publication)

Buy Recycled in Hawai'i. Clean Hawai'i Center, Energy, Resources and Technology Division, Department of Business, Economic Development and Tourism, November 1997. (Call Tel. 587-3802 for publication)

Hawai'i Recycling Industry Guide and other recycling and reuse related fact sheets. Clean Hawai'i Center, Energy, Resources and Technology Division, Department of Business, Economic Development and Tourism, July 1999. (Call Tel. 587-3802 for publication)

Minimizing Construction and Demolition Waste. Office of Solid Waste Management, Department of Health and Clean Hawai'i Center, Energy, Resources and Technology Division, Department of Business, Economic Development and Tourism, February 1998. (Call Tel. 586-4240 for publication)

Contractor's Waste Management Guide and Construction and demolition Waste Management Facilities Directory. Clean Hawai'i Center, Energy, Resources and Technology Division, Department of Business, Economic Development and Tourism, 1999. (Call Tel. 587-3802 for publication)

Waste Management and Action: Construction Industry. Department of Health, Solid and Hazardous Waste Branch (Call Tel. 586-7496 for publication)

Business Guide For reducing Solid Waste. U.S. Environmental Protection Agency, Pacific Island Contact Office, Tel. 541-2710 (Call for publication.)

The Inside Story: A Guide to Indoor Air Quality. U.S. Environmental Protection Agency, Pacific Island Contact Office, Tel. 541-2710 (Call for this and related publications.) Additional information is available from the American Lung Association, Hawai'i, Tel. 537-5966

Selecting Healthier Flooring Materials. American Lung Association and Clean Hawai'i Center, February 1999. (Call Tel. 537-5966 x307)

Office Paper Recycling: An Implementation Manual. U.S. Environmental Protection Agency, Pacific Island Contact Office, Tel. 541-2710 (Call for publication.)

Acknowledgments

OEQC and the Environmental Council would like to thank Allison Beale, Gary Gill, Nick H. Huddleston, Gail Suzuki-Jones, Purnima McCutcheon, Virginia B. MacDonald, Steve Meder, Ramona Mullahey, Thomas P. Papandrew, Victor Olgay, Howard Tanaka, and Howard Wiig for their assistance with this project.

ORDINANCE NO. 2108

BILL NO. 6 (1992)

Draft 1

A BILL FOR AN ORDINANCE AMENDING
CHAPTER 16.20 OF THE MAUI COUNTY
CODE, PERTAINING TO THE PLUMBING CODE

BE IT ORDAINED BY THE PEOPLE OF THE COUNTY OF MAUI:

SECTION 1. Title 16 of the Maui County Code is amended by adding
a new section to Chapter 10 of the Uniform Plumbing Code to be
designated and to read as follows:

"16.20.675 Section 1050 added. Chapter 10 of the
Uniform Plumbing Code is amended by adding a new section,
pertaining to low-flow water fixtures and devices, to be
designated and to read as follows:

Sec. 1050 Low-flow water fixtures and devices. (a) This
section establishes maximum rates of water flow or discharge
for plumbing fixtures and devices in order to promote water
conservation.

(b) For the plumbing fixtures and devices covered in
this section, manufacturers or their local distributors shall
provide proof of compliance with the performance requirements
established by the American National Standards Institute
(ANSI) and such other proof as may be required by the
director of public works. There shall be no charge for this
registration process.

(c) Effective December 31, 1992, only plumbing fixtures
and devices specified in this section shall be offered for
sale or installed in the County of Maui, unless otherwise
indicated in this section. All plumbing fixtures and devices
which were installed before December 31, 1992, shall be
allowed to be used, repaired or replaced after December 31,
1992.

(1) Faucets (kitchen): All kitchen and bar sink
faucets shall be designed, manufactured, installed or
equipped with a flow control device or aerator which
will prevent a water flow rate in excess of two and two-
tenths gallons per minute at sixty pounds per square
inch of water pressure.

(2) Faucets (lavatory): All lavatory faucets shall
be designed, manufactured, installed or equipped with a
flow control device or aerator which will prevent a
water flow rate in excess of two and two tenths gallons
per minute at sixty pounds per square inch of water


Exhibit 31

(f) Any person violating this section shall be fined \$250 for each violation and shall correct all instances of non-compliance for which a citation is issued. Violation of this section shall constitute a violation as defined in section 701-107 Hawaii Revised Statutes and shall be enforceable by employees of the department of public works. The foregoing fine may also be imposed in a civil, administrative proceeding pursuant to Rules and Regulations adopted by the department of public works in accordance with chapter 91 Hawaii Revised Statutes."

SECTION 2. New material is underscored. In printing this bill, the County Clerk need not include the underscoring.

SECTION 3. This ordinance shall take effect upon its approval.

APPROVED AS TO FORM
AND LEGALITY:



HOWARD M. FUKUSHIMA
Deputy Corporation Counsel
County of Maui
c:\wp51\ords\flows4\pk

Some Maui Native and Polynesian Plants

For further information and additional native plant listings, see the Maui County Planting Plan. The plan was prepared by the Maui Arborist Committee, and it is available at the Volunteer Action office, Kahului Community Center, 275 Ulu Street, ph. 243-7325, for a \$15.00 donation.

Natural Vegetation Zones

- 1 - Wet areas on the windward side.
- 2 - Cool, dry areas in higher elevations (above 1,000 feet.)
- 3 - Low, drier areas that are warm to hot.
- 4 - Lower elevations that are wetter due to proximity to the mountains.
- 5 - Salt-spray zone in coastal areas on the windward side.

Elevation

- L - Sea-level to 1,000 feet
M - 1,000 to 3,000 feet
H - Higher than 3,000 feet

Common Name	Scientific Name	Ht	Zone of Self-Subsistence					Elevation		
			1	2	3	4	5	L	M	H
Koa	<u>Acacia koa</u>	60'	1	2		4			M	H
Kamani	<u>Calophyllum inophyllum</u>	60'	1			4		L	M	
Kukui	<u>Alerites moluccana</u>	50'	1			4	5	L	M	
Hala	<u>Pandanus tectorius</u>	35'	1			4	5	L		
Kou	<u>Cordia subcordata</u>	35'	1			4	5	L		
'Ōhi'a Lehua	<u>Metrosideros polymorpha</u>	25'	1	2		4		L	M	H
Kou haole	<u>Cordia sebestena</u>	20'	1		3	4	5	L	M	
Koki'o ke'oke'o	<u>Hibiscus waimeae</u>	20'		2		4			M	
Hala pepe	<u>Pleomele auwahiensis</u>	20'		2	3	4			M	
Wiliwili	<u>Erythrina sandwicensis</u>	20'		2	3	4		L		
Hao	<u>Rauvolfia sandwicensis</u>	20'		2	3	4		L	M	
'Ohe Makai	<u>Reynoldsia sandwicensis</u>	20'			3				M	
Olopuā	<u>Nestegis sandwicensis</u>	15'		2	3	4			M	
Mai'a	<u>Musa acuminata</u>	6-30'	1			4		L	M	
Kōlea	<u>Myrsine lessertiana</u>	15'		2		4			M	
Keahi	<u>Nesoluma polynesianum</u>	15'			3			L	M	
Hō'awa	<u>Pittosporum hosmeri</u>	12'		2		4			M	
Alahe'e	<u>Canthium odoratum</u>	12'			3	4		L	M	
Lama	<u>Diospyros sandwicensis</u>	12'			3	4		L	M	
Naio	<u>Myoporum sandwicense</u>	10'		2	3	4	5	L	M	H
Koki'o 'Ula'ula	<u>Hibiscus kokio</u>	10'	1			4		L	M	
'Awa	<u>Piper methysticum</u>	10'	1					L		

Exhibit 32

Common Name	Scientific Name	Ht	Zone of Self-Subsistence					Elevation		
			1	2	3	4	5	L	M	H
Pōhuehue	<u>Ipomoea pes-caprae</u>	1'					5	L		
Naupaka	<u>Scaevola coriacea</u>	1'			3	4	5	L	M	
'Uala	<u>Ipomoea batatas</u>	1'	1			4		L	M	
'Akulikuli	<u>Susuvium portulacastrum</u>	.5'	1				5	L		
'Ilima papa	<u>Sida fallax</u>	.5'			3	4	5	L		
Mau' u 'aki'aki	<u>Fimbristylis cymosa</u>	.5'			3		5	L		
Pā' ūohi' iaka	<u>Jacquemontia ovalifolia</u> subsp. <u>sandwicensis</u>	.5'			3	4	5	L		
Seashore Paspalum	<u>Paspalum vaginatum</u>	1"	1			4	5	L		

For further information and additional native plant listings, see the Maui County Planting Plan. The plan was prepared by the Maui Arborist Committee, and it is available at the Volunteer Action office, Kahului Community Center, 275 Ulu Street, ph. 243-7325, for a \$15.00 donation.

Natural Vegetation Zones

- 1 - Wet areas on the windward side.
- 2 - Cool, dry areas in higher elevations (above 1,000 feet.)
- 3 - Low, drier areas that are warm to hot.
- 4 - Lower elevations that are wetter due to proximity to the mountains.
- 5 - Salt-spray zone in coastal areas on the windward side.

Elevation

- L - Sea-level to 1,000 feet
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Common Name	Scientific Name	Ht	Zone of Self-Subsistance					Elevation		
			1	2	3	4	5	L	M	H
Mau' u 'aki' aki	<u>Fimbristylis cymosa</u>	.5'			3		5	L		
Pa' uohi' iaka	<u>Jacquemontia ovalifolia</u> subsp. <u>sandwicensis</u>	.5'			3	4	5	L		
Seashore Paspalum	<u>Paspalum vaginatum</u>	1'	1	2	3	4	5			

For further information and additional native plant listings, see the Maui County Planting Plan. The plan was prepared by the Maui Arborist Committee, and is available at the Volunteer Action office in the Kahului Community Center, 275 Ulu Street, ph. 243-7325, for a \$15.00 donation.

Vegetation Zones: The area a mature plant can grow naturally.

- 1 - Wet areas on the windward side.
- 2 - Cool, dry areas in higher elevations (above 1,000 feet.)
- 3 - Low, drier areas that are warm to hot.
- 4 - Lower elevations that are wetter due to proximity to the mountains.
- 5 - Salt-spray zone in coastal areas on the windward side.

Elevation

- L - Sea-level to 1,000 feet
- M - 1,000 to 3,000 feet
- H - Higher than 3,000 feet

For More Information about landscaping with native plants on Moloka'i contact:

Ms. Kali Montero, County Extension Agent
 University of Hawaii Cooperative Extension Service
 P.O. Box 317
 Ho'olehua, Moloka'i Hawaii 96729
 Ph: (808)567-6833

XERISCAPE
Water Conservation Through Creative Landscaping

Xeriscape Defined
Seven Water Conservation Fundamentals
Planning and Design
Soil Improvement
Efficient, Zoned Irrigation
Limited Turf Area.
Use of Mulches
Use Of Low Water-Demand Plants
Appropriate Maintenance
Community Water Management

Exhibit 33

Many have misread the term as xeroscape, which would imply noscape or no landscape plantings. Others have equated xeriscape landscaping with "rockscapes," many of which are not aesthetically pleasing and may not always conserve water or energy. Rockscapes are harsh, produce glare, and do little to prevent noise and air pollution, making them a poor substitute for Xeriscape landscaping.

Seven Water Conservation Fundamentals

The Xeriscape motto, "Water conservation through creative landscaping," provides the umbrella under which a wide variety of landscape water conservation activities may be taught and employed in a community. And although there are many landscape and horticultural techniques that conserve water, Xeriscape programming has focused on seven broad, fundamental areas.

1. Planning and Design
2. Soil Improvement
3. Efficient, Zoned Irrigation
4. Limited Turf Areas
5. Use of Mulches
6. Use of Low Water Demand Plants
7. Appropriate Maintenance

Planning and Design

Architects, planners, and homeowners are encouraged and taught to incorporate standard design elements of function, circulation, topography, exposure, seasonal color, texture, safety, etc. into existing landscapes and new designs with emphasis on conserving, limiting and/or reusing water. 40% to 60% of the water homeowners use goes for yard watering. Appropriate design and planning can provide these very necessary aspects of urban life and conserve water at the same time. Xeriscapes can ameliorate the impact of a severe drought and avoid the costly clean-up resulting from a "boom and bust" water policy. Tree-removal, replanting of landscapes and turfgrass fields are eliminated and real savings to Maui County.

Thayer and Richman (1984) suggest that designing water-conserving landscapes should be considered in two parts. First, the physical ecology of plants and plant communities must be integrated within the microclimates of the landscape. Logically, plants best adapted to the climate, temperatures, sun, wind, and physical nuances of the site thrive best and require the least expenditures for water, energy and maintenance. Secondly, landscape designers must accept that there is a "human ecology" of water use in landscapes. That is, the intensity of human

Not only are irrigation zones established to meet the physical or ecological water needs of plants, but Xeriscape landscaping also recognizes that human activity will impact plant water needs. Thayer and Richman (1984) describe this irrigation zoning to match man's activity as hydrozone planning, and they define four irrigation regimes (Figure 10-3).

The Principal Hydrozone represents the area with the greatest human activity and consequently the greatest water and energy use: sites in yards, parks, and play fields where people frequently, play, sit, walk, gather, or relax; places where people regularly contact plants.

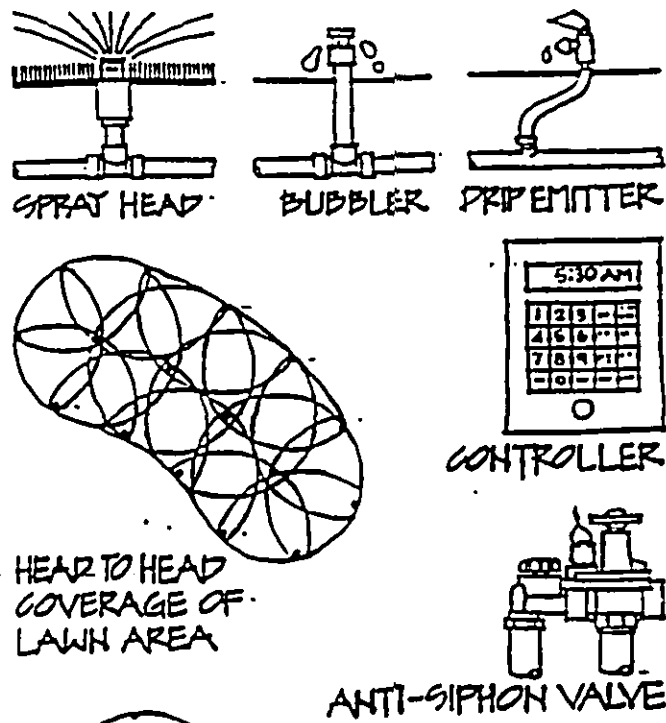
The Secondary Hydrozone is less physically impacted by humans, but is visually important: areas of passive activities space delineation or focal interest such as flower and shrub beds, entrances, prominent plantings, etc; areas of high visual impact, but seldom touched by humans.

Buffer zones, distant views, median strips, parkways, and embankments--these make up the third hydrozone, called the Minimal Hydrozone. In this case, plants are selected that need minimal supplemental water to survive the natural climatic conditions.

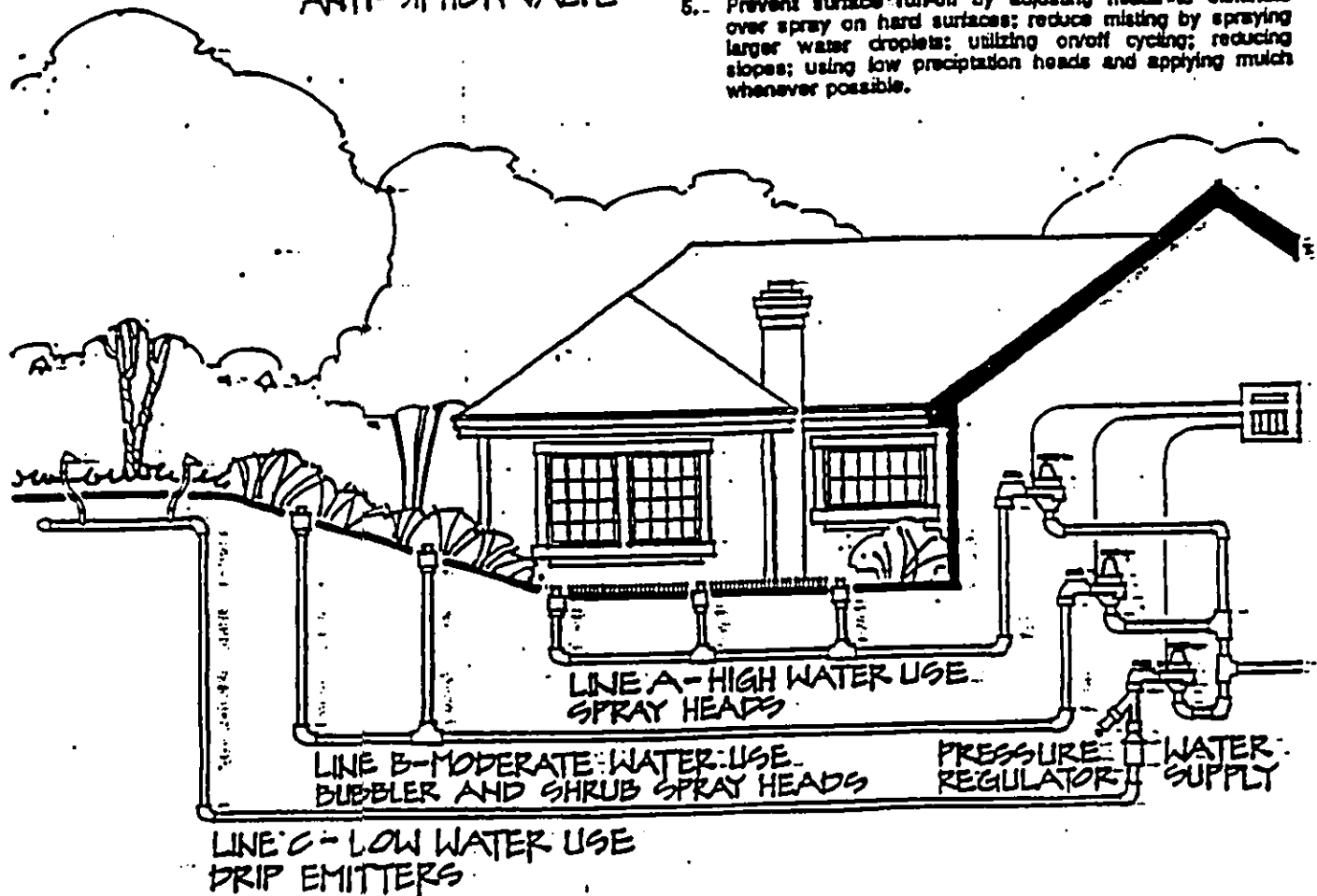
The Elemental hydrozone constitutes landscape plantings that require only natural precipitation to survive and seldom, if ever, incur human activity. Utility areas, mulched native plantings, and naturally sustainable, exotic vegetation belong to this hydrozone (Figure 10-4).

Flexible sprinkler heads and nozzles, adjustable delivery rates and coverage, modern valves, and automated controllers - these allow greater water conservation through zoned irrigation. On-off watering is easily programmed to match water infiltration rates into soils, thus avoiding surface runoff. Also, water is better applied to meet specific plant needs as impacted by seasonal human activity and changes in the weather.

Collection systems should be designed and constructed throughout the landscape to gather storm runoff from roofs, walks, drives, and slopes. By grouping high or moderate water-requiring plants near swales and collection basins, much of their water needs can be met by natural moisture accumulations rather than irrigation. On the other hand, drought tolerant species may succumb to frequent accumulations of water and should be located on southern exposures or at the tops of slopes. Because they often only require supplemental irrigation during establishment or during a severe drought, a permanent irrigation system may not be needed.



HEAD TO HEAD
COVERAGE OF
LAWN AREA



1. Separate irrigation lines into high, moderate and low water-use zones or areas and set an automatic valve at the head of each line. The same plant material on the north side of a structure or in a sheltered area will require less water than in a more severe exposure.
2. To help achieve uniform water distribution for turfgrass, overlap sprinkler spray patterns (100%) so that water from one head reaches out to the next nearest head (head-to-head coverage). Ask your irrigation supplier for low-galtonage sprinkler heads that have "matched precipitation rates."
3. Wire each valve into an automatic timer to control how many minutes each valve applies water. Select a timer that allows recycling, that is, several cycles of on/off "runtime" during each irrigation day. Heavy soils, clays, require several hours between short on periods to allow water to move deeper into soils. Sandy soils require less time between on times and may require mulching to enhance water retention qualities.
4. Prepare and follow an irrigation schedule by contacting a local landscape architect or irrigation specialist. Determine the precipitation requirements for your particular trees, shrubs, lawn and flower beds and program the timer to meet their individual water requirements. Settings will have to be changed seasonally to meet the plants demand for water.
5. Prevent surface run-off by adjusting heads to eliminate over spray on hard surfaces; reduce misting by spraying larger water droplets; utilizing on/off cycling; reducing slopes; using low precipitation heads and applying mulch whenever possible.

Figure 10-2... Five Steps to Efficient Irrigation

Likewise, the amount of turfgrass in a landscape may be reduced by increasing the hardscape. Patios, wooden decks, rocked and graveled walks limit the turf area while reducing the water requirement.

Use of Mulches

Mulches function to buffer soils against climatic extremes. In summer, they reduce soil heating and slow evaporation water loss from soil surfaces. They also reduce weeds and make those present easier to remove. Proper use of mulches reduces or prevents soil erosion. Organic mulches also contribute to the nutritional level and tilth of the soil as they breakdown.

These practical functions are important; however, many mulches are included in the landscape for their design flexibility and attractiveness, not simply because they save water, protect roots, and reduce maintenance.

Mulches are classified as organic, inorganic, and living. Organic mulches include plant refuse, such as chips and slash from tree trimming operations, saw dust, composted leaves and manures, peat moss, and graded bark products. Sized and washed rocks and gravels are popular inorganic mulches which come in many sizes, colors, and textures. Impervious sheet plastics covered with either organic or inorganic mulches were popular, but because sheet plastic prevents gas and water exchange between air and soil and creates a water-logged root environment, woven, porous plastics are now preferred. Mulches are applied 3 to 4 inches deep over bare soil and only 2 to 3 inches deep over woven fabrics. Living mulches include low growing groundcovers and low maintenance turfgrasses. They function well as mulches, but may be heavy competitors for water and nutrients under newly planted trees and shrubs. If used, select hardy, drought-tolerant species that resist common diseases. These species provide the best results and require less maintenance.

Use Of Low-Water-Demand Plants

Many beautiful and functional plants, both exotics and natives, are available that thrive with natural precipitation or small amounts of supplemental water.

Chapter Two lists tree characteristics including their water requirements ranging from dry (less-thirsty) to wet (very-thirsty).

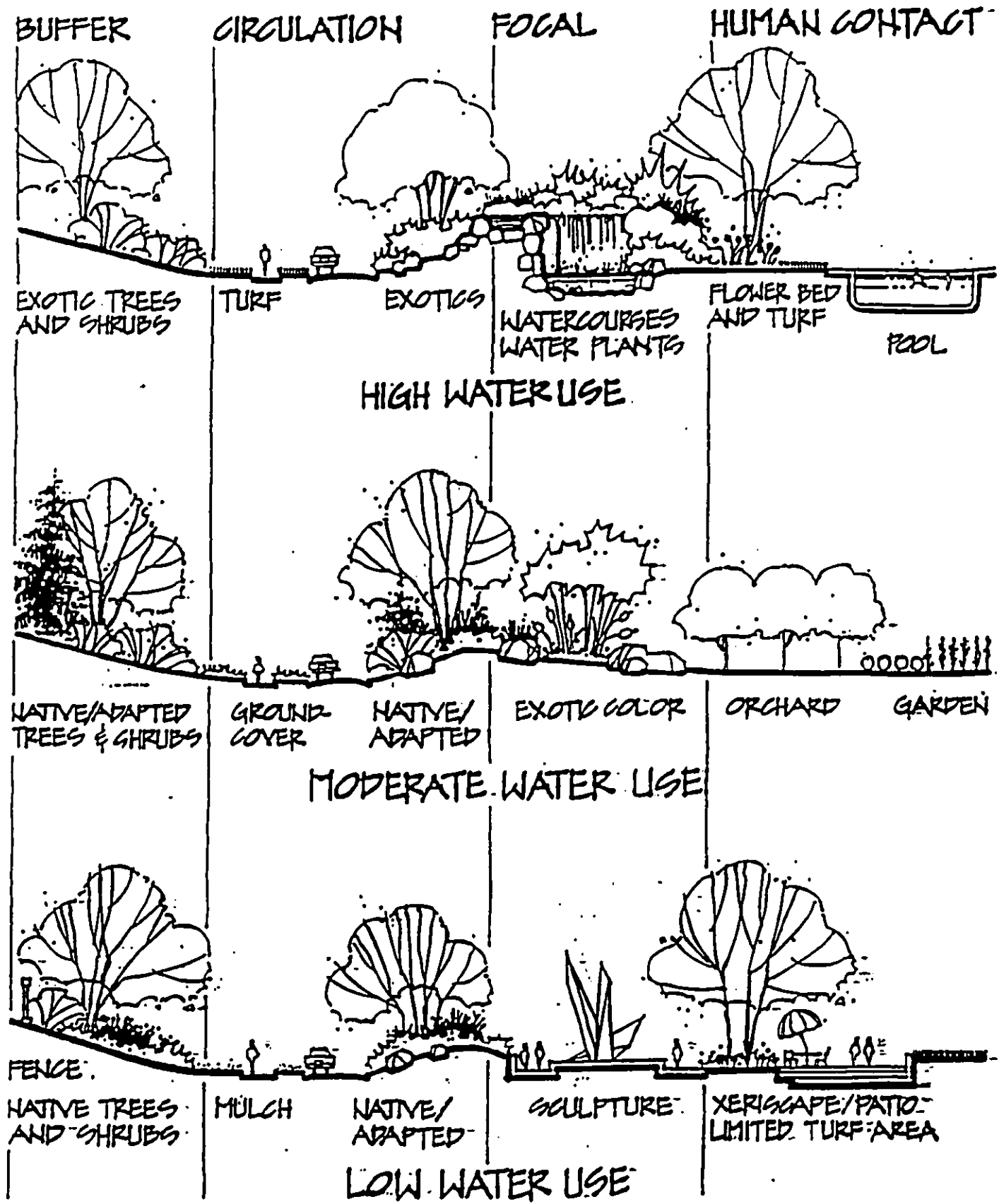


Figure 10-4. Water Use Relating to Human Use—Three Approaches

RECEIVED BY THE STATE OF CALIFORNIA

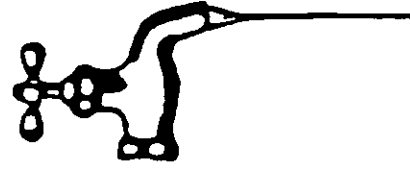
"THE COSTLY DRIP"



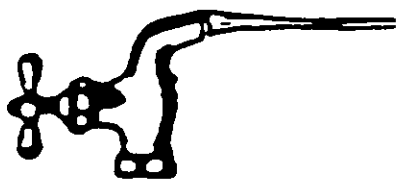
Slowly Dripping
Spigot Wastes
15 Gallons a day.



1/32" Leak Wastes
25 Gallons a day.



1/16" Stream Wastes
100 Gallons a Day.



1/8" Stream Wastes
400 Gallons a day.

Exhibit 34

**Maile Chu Goo, Trustee
5846-B Kalaniana'ole Hwy
Honolulu, HI 96821-2308**

November 16, 2000

State of Hawaii
The Office of Environmental Quality Control
236 S. Beretania St., Ste. 702
Honolulu, HI 96813

Dear Ms. Salmonson:

In response to your letter of August 4, 2000, regarding the Proposed Chu Family residence at Waialua, Moloka'i, TMK (2) 5-7-3-68 in the State Conservation District, "Limited Subzone", the following information has been made an integral part of the Final Environmental Assessment.

After receiving your letter, the applicant and Leslie Segundo of the Office of Environmental Quality Control discussed wastewater impacts as well as the Office of Environmental Quality Control's Sustainable Building Design Guidelines.

After consulting the Department of Health and the applicant's architect, it has been determined that an aerobic wastewater treatment unit will be used at this proposed project. Although the aerobic unit is more costly than the more commonly used septic tank system, the property owners believe that the aerobic system minimizes more effectively the wastewater impacts to the environment. A 1,000 gallon aerobic unit Nayadic model M1200A will be used.

Although some of the Sustainable Building Guidelines do not apply to this modest residential project, there are many items on the planner's checklist that this applicant can and will use. Some items listed were already incorporated into the early planning for this project, i.e. site selections, design and preparation, building design, water use, landscape, and irrigation.

The applicant appreciates the set of Sustainable Building Design Guidelines provided by this office.

Thank you for guiding us to the Department of Health which resulted in our decision to use the more costly, but more effective, aerobic wastewater treatment at this proposed project.

Sincerely,

Maile C. Goo, Trustee

**Maile Chu Goo, Trustee
5846-B Kalaniana'ole Hwy
Honolulu, HI 96821-2308**

November 16, 2000

Jeffrey Mikulina, Director
Sierra Club, Hawai'i Chapter
P.O. Box 2577
Honolulu, HI 96803

Dear Mr. Mikulina:

In response to your letter of August 6, 2000 regarding the proposed Chu Family Residence at TMK (2) 5-7-3-68, Waialua, Moloka'i, State Conservation District, Limited Subzone:

We appreciate the Sierra Club's goal to preserve public shoreline access. We also understand you do not have the resources to thoroughly study each and every proposed shoreline project as they come to your attention. The Chu Family is happy to provide the information needed to assure you that the "installation of a ranch-type fence around three sides of the proposed project" will not impede access to this shoreline. The following information has been made an integral part of the Final Environmental Assessment.

The proposed ranch type fence will not impede public beach access in this area, as present public access to this shoreline from Kamehameha Highway will not be affected by this proposed project. The public has always had, and will continue to have, full access to the shoreline from Kamehameha Highway.

Adjacent to this proposed project site is a beach access that, although privately owned by the adjacent property owner, will likely always remain open for public access. The reason access will continue is that this neighboring parcel is too narrow and too small for development of any kind. The community has always used this undevelopable access to the shoreline and our proposed project does not change the character of this public access in any way.

Exhibit 16 of the Draft Environmental Assessment, an aerial photograph of the proposed project, shows the many miles of public beach access that begins where this subject property ends. The proposed installation of a ranch-type fence on three (3) sides of this project will not impede public shoreline access and will not change the present nature of beach access that the public currently enjoys. Although this aerial photograph, exhibit 16, is several years old [it is the most recent available] it illustrates clearly the miles of unimpeded shoreline

accessible to the public. This aerial photograph remains current as this shoreline has experienced very little change throughout the years.

Please refer to Exhibits 26, 27 & 28 of the Final Environmental Assessment [attachments included here] as they show the present public beach access adjacent to this proposed project. These photographs show how the public has ready access to the shoreline, and that the installation of a ranch-type fence on three (3) sides of the proposed project will not intrude on the public use of the site shown here. Photographs were taken from Kamehameha Highway facing makai in July 2000. These photographs show the neighboring property to the east of our proposed Chu Family Residence. This "beach access" serves as the beginning of several miles of shoreline access available for public use.

A final Environmental Assessment is being forwarded to the Office of Environmental Quality Control. The additional information provided here is part of that final statement.

We hope the Sierra Club's interest in preserving shoreline access has been ameliorated by the information the Chu Family has provided you here. We fully support the mission of the Sierra Club and find it reassuring that your organization effectively promotes environmental protection in Hawaii.

E malama kakou i ka honua.

Aloha,

Maile C. Goo, Trustee

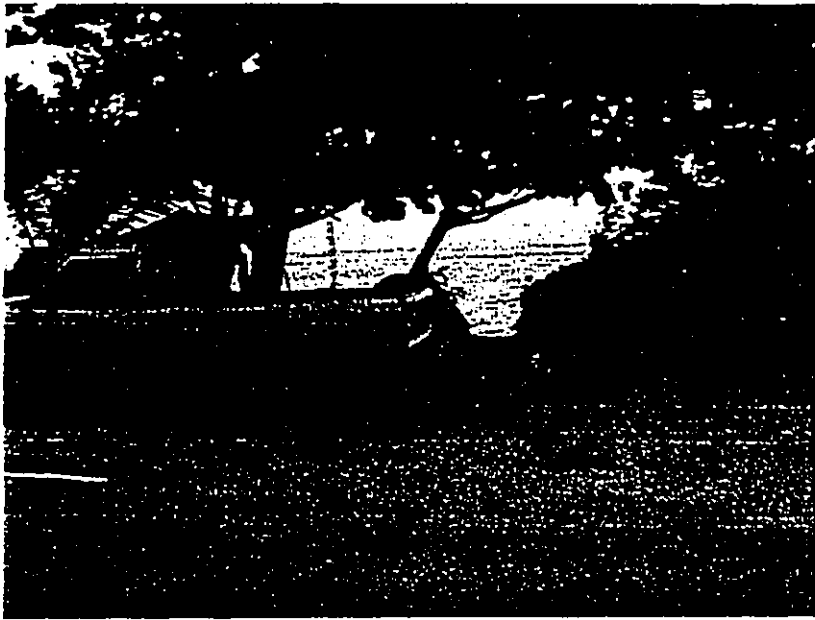


Exhibit 26. Photograph shows public use of public beach access on adjacent neighboring property. Photograph was taken July 2000.

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Exhibit 27. View of present public beach access on adjacent neighboring property. This photograph shows the beginning of public beach access which extends eastward for several miles.

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Exhibit 28. Another view of the present public beach access on adjacent neighboring property. Notice the tent under the Kamani tree on the left side of the photograph.

**Maile Chu Goo, Trustee
5846-B Kalaniana'ole Hwy
Honolulu, HI 96821-2308**

November 16, 2000

Paul Henson, Field Supervisor
United States Department of the Interior
Fish & Wildlife Service
Pacific Islands Ecoregion
300 Ala Moana Blvd., Rm. 3122
Box 50088
Honolulu, HI 96850

Dear Mr. Henson,

Thank you for taking the time to review the Draft Environmental Assessment [DEA] for the proposed Chu Family Residence at TMK (2) - 5-7-3-68, Waialua, Moloka'i in the State Conservation District, "Limited Subzone." The following information has been made an integral part of the Final Environmental Assessment.

The U.S. Fish and Wildlife Service review of the DEA found that based on information from their files "no federally endangered, threatened, or candidate species, significant wetlands, or other Federal Trust resources occur in the immediate area of the proposed project site."

U.S. Fish and Wildlife Services, however, provided a pamphlet detailing types of outdoor lighting that would minimize the risk of seabird fallout. The Service is concerned that the endangered dark-rumped petrel may nest on Moloka'i.

Although outdoor lighting for this project will be minimal, consisting of shielded fixtures at exterior doorways and open lanai, the pamphlet provides information of which applicants were totally unaware.

The applicants appreciate the information provided and are committed to avoiding the types of lights and lighting situations that would endanger young nesting petrels.

In a telephone conversation with Jay Nelson, Fish and Wildlife Biologist, the applicant was informed that the Service is especially concerned with projects where light glare projects upward or laterally and, therefore, it is recommended that large high intensity floodlights on building tops or poles be avoided. This proposed project does not include the types of lighting of concern to the

Service.

The Chu Family finds it reassuring that governmental agencies, such as the U.S. Fish and Wildlife Service, fulfill their missions with prompt and thorough reviews of developments such as you have done here. Mahalo for your work and for the information on outdoor lighting as it affects seabird fallout.

Aloha,

Maile C. Goo, Trustee