

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU  
630 SOUTH BERETANIA STREET  
HONOLULU, HAWAII 96843



October 15, 1991

FRANK F. FASI, Mayor

WALTER O. WATSON, JR., Vice Chairman  
JOHN W. ANDERSON, JR.  
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Manager and Chief Engineer

'91 OCT 22 AM 10:05

Mr. Brian J. J. Choy, Director  
Office of Environmental Quality Control  
State of Hawaii  
220 South King Street  
Fourth Floor  
Honolulu, Hawaii 96813

OFFICE OF  
QUALITY CONTROL

Dear Mr. Choy:

Subject: Environmental Impact Assessment for the Wailupe Well II,  
Oahu, Hawaii, TMK: 3-6-04: 1

We request that our proposed well project be published in the OEQC Bulletin as a Negative Declaration.

Attached are four copies of the assessment for your review.

If you have any questions, please contact Bert Kuioka at 527-5235.

Very truly yours,

KAZU HAYASHIDA  
Manager and Chief Engineer

Attachment

1991-11-08-0A FEA

FILE COPY

FILE COPY

NOTICE OF DETERMINATION  
NEGATIVE DECLARATION FOR THE PROPOSED  
\* WAILUPE WELL II PROJECT \*

A. Proposing Agency

Board of Water Supply, City and County of Honolulu

B. Accepting Authority

Not applicable to a negative declaration.

C. Description of the Proposed Action

The location of this project is at the end of Hao Street, along the western side of Wailupe Valley, in southeastern Oahu. The proposed project involves the connection of a well that was previously drilled to the County's water transmission system. The well site is located approximately 950 feet northwest of the mauka limit of the Aina Haina subdivision in undeveloped mountainous terrain. The well is located in Tax Map Key: 3-6-04:1. The state well number is 1845-01.

The major elements of work are: (a) installation of a pump and a control building at the well site; (b) paving of approximately 2,000 feet of road to provide access to the site from Hao Street; (c) installation of approximately 2,000 feet of water transmission main and underground utility lines along this access road; and (d) landscaping and irrigation of the project area.

D. Determination

The proposed project would not have a significant effect on the environment. The "Significance Criteria," Section 12 of Hawaii Administrative Rules Title 11, Chapter 200, "Environmental Impact Statement Rules," were reviewed and analyzed. Based on the analysis, the following were concluded:

1. no irrevocable commitment to loss or destruction of any natural or cultural resource would result;
2. the action would not curtail the range of beneficial uses of the environment;
3. the proposed action does not conflict with the state's long-term environmental policies or goals and guidelines;

4. the economic or social welfare of the community or state would not be substantially affected;
5. the proposed action does not substantially affect public health;
6. no substantial secondary impacts, such as population changes or effects on public facilities, are anticipated;
7. no substantial degradation of environmental quality is anticipated;
8. the proposed action does not involve a commitment to larger actions, nor would cumulative impacts result in considerable effects on the environment;
9. no rare, threatened or endangered species or their habitats would be affected;
10. air quality, water quality or ambient noise levels would not be detrimentally affected;
11. the project would not affect environmentally sensitive areas, such as flood plains, tsunami zones, erosion-prone areas, geologically hazardous lands, estuaries, fresh waters or coastal waters.

E. Reasons Supporting Determination

The Environmental Assessment (EA) for the proposed action and the results of the coordination undertaken with affected agencies and parties are attached to support the determination of a Negative Declaration.

Some of the actions associated with the proposed project are on the Comprehensive Exemption List for the City and County of Honolulu Board of Water Supply, as approved by the Environmental Council on January 25, 1979. Among the actions which are generally exempt from requirements regarding preparation of an EA are "alteration to water well pumping equipment" (Exemption Class #3) and "landscaping and installation of sprinkler system" (Exemption Class #4).

F. Name, Address and Phone Number of Contact Person

Board of Water Supply  
City and County of Honolulu  
630 South Beretania Street  
Honolulu, Hawaii 96843

Francis Fung, (808) 527-5203

RECEIVED AND ACCEPTANCE RECOMMENDED

By \_\_\_\_\_

\_\_\_\_\_  
Date

CONCURRENCE

By \_\_\_\_\_

\_\_\_\_\_  
Date

**WAILUPE WELL II**  
**ENVIRONMENTAL ASSESSMENT**

**CITY AND COUNTY OF HONOLULU**  
**BOARD OF WATER SUPPLY**

Prepared by  
GK & Associates  
for  
Shimabukuro, Endo & Yoshizaki, Inc.

September, 1991

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## 1.0 PROJECT DESCRIPTION

The location of this project is at the end of Hao Street, along the western side of Wailupe Valley, in southeastern Oahu (Figure 1). The proposed project involves the connection of a well that was previously drilled to the County's water transmission system. The well site is located approximately 950 feet northwest of the mauka limit of the Aina Haina subdivision in undeveloped mountainous terrain. The well is located in Tax Map Key: 3-6-04:1. The state well number is 1845-01.

The major elements of work are: (a) installation of a pump and a control building at the well site; (b) paving of approximately 2,000 feet of road to provide access to the site from Hao Street; (c) installation of approximately 2,000 feet of water transmission main and underground utility lines along this access road; and (d) landscaping and irrigation of the project area. A site plan is shown in Figure 2.

Portions of the access road are within an existing easement.<sup>1</sup> The surrounding property is owned by Volumes Company Limited.

## 2.0 ALTERNATIVES

### 2.1 NO ACTION

The proposed project is part of the Honolulu Board of Water Supply's long-range program for potable water development and service. As the population of southeastern Oahu increases, new water sources have to be utilized to meet the need for potable water. To abandon this project ("No Action") would mean that the Board of Water Supply might have to limit water service to the area. This is not a feasible alternative.

### 2.2 DELAYED ACTION

Delay of this project would only serve to increase the cost when construction ultimately begins. Delaying the project would not eliminate its necessity in the near future. This is not considered a feasible option.

### 2.3 ALTERNATE SITES

The BWS is responsible for management, control and operation of the municipal water system for Oahu. As part of this responsibility, the BWS identifies well sites for eventual production of potable water. A number of factors are considered in site selection, including hydrologic characteristics, elevation of the site in relation to the

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<sup>1</sup> Easement 85 on Land Court Application 656, Map 200.





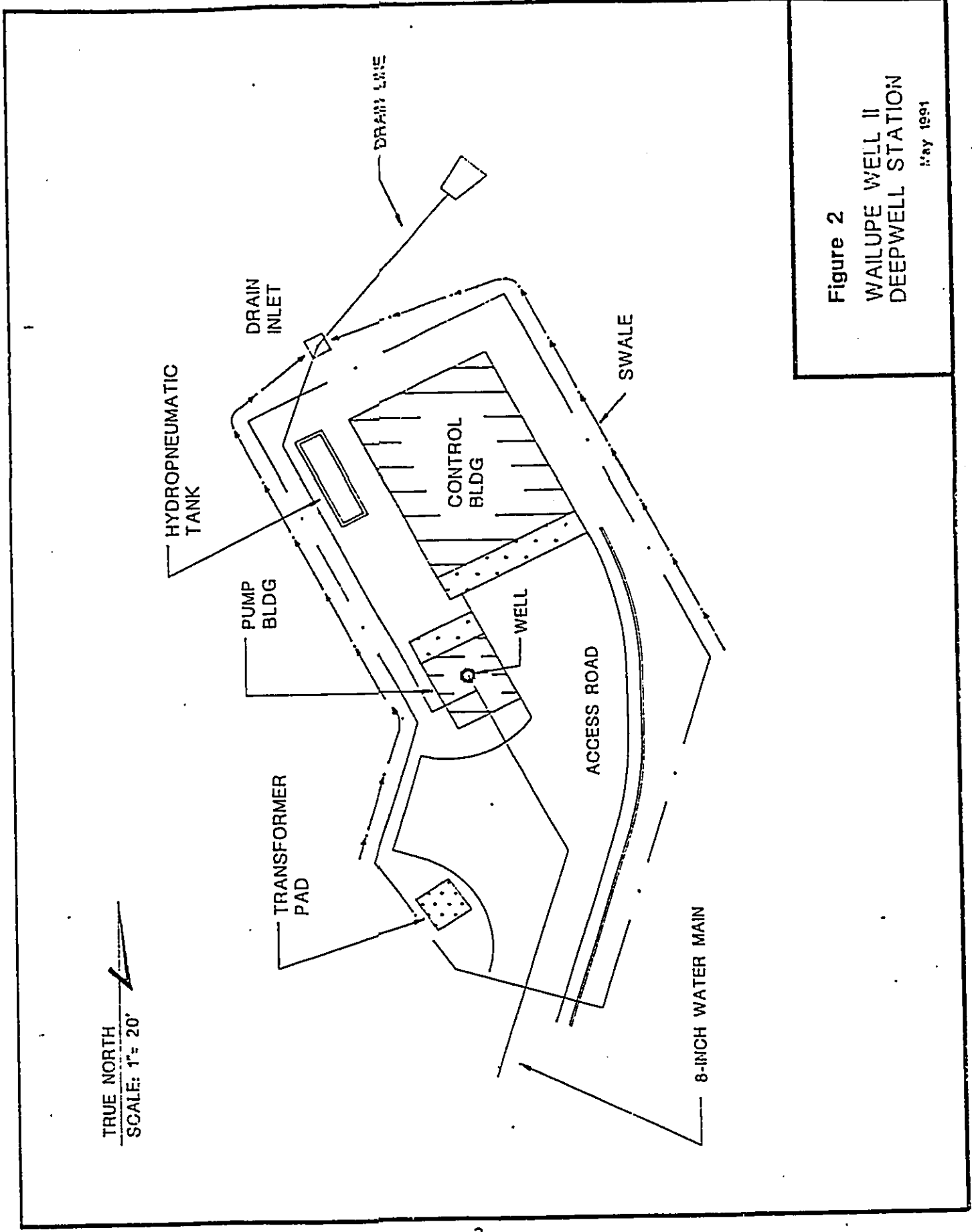


Figure 2  
 WAILUPE WELL II  
 DEEPWELL STATION  
 May 1991

distribution system, ease of access, and surrounding environment. The site for Wailupe Well II was selected and the well was drilled after consideration of these factors for all possible alternative sites. Abandoning this site after the well has already been drilled to develop an alternative site would be a waste of the previous investment in Wailupe Well II.

#### 2.4 ALTERNATIVE METHODS OF WATER PRODUCTION

Reliance on alternative methods of water production, such as desalinization, to service the needs met by this project, is infeasible because of high costs. Such alternatives are still undergoing research and pilot studies, and are regarded only as long-term possibilities in the BWS's master plan for potable water development and service.

#### 2.5 THE PREFERRED ALTERNATIVE

The proposed project is the preferred alternative because Wailupe Well II has already been drilled and tested; the well is part of an overall master plan for meeting the consumer demand for potable water; alternate sites for the well were thoroughly considered prior to drilling; alternative methods of water production may have long-term possibilities but are presently too costly; no action or delayed action would unnecessarily increase project costs or disrupt water service to consumers.

#### 2.6 TENTATIVE PROJECT SCHEDULE

Design Completion .....	December 1991
Begin Construction .....	July 1992
Complete Construction .....	June 1993

### 3.0 SUMMARY DESCRIPTION OF THE AFFECTED ENVIRONMENT

#### 3.1 EXISTING SITE AND LAND USE

An unimproved access road provides access to Wailupe Well II from the end of Hao Street, about 2,000 feet away. The well site occupies a small knoll (about 100 feet in diameter) which has been terraced in the lower western slope of Wailupe Valley. Both the access road and well site have been cleared of vegetation and rocks. Loose rocks are stacked along the sides of the road and the well site. The lower two-thirds of the access road will be within an existing easement which was obtained in the 1960's by a prior owner in anticipation of subdivision. The well was drilled in 1986 and capped after pumping tests.

The surrounding property is privately owned. The area is within the Urban State Land Use District, but is classified Preservation under the City and County of Honolulu

Development Plan and is zoned P-2, General Preservation, by the County. Utility installations of Type A, those having minor impacts on adjacent land uses, are a permitted use in the P-2 district. Type A installations specifically include water wells, tanks and distribution equipment.

The project area was heavily disturbed when this portion of Wailupe Valley was part of the Aina Haina Dairy. The site is presently overgrown with vegetation and vacant. The nearest developed area is the residences along Hao Street.

### 3.2 GEOLOGY AND TOPOGRAPHY

Wailupe Valley is located on the southeast flank of the Koolau Volcano, a shield volcano formed of thousands of thin basaltic flows. Koolau basalt forms the valley walls and underlies the colluvial deposits and valley fill.

Eruptions occurred at the main Koolau caldera and along rift zones emanating from the caldera. These rift zones are marked by intrusive dikes. A northeast trending dike system is found less than 1,000 feet to the west of Wailupe Well II. A dike from this system is exposed in the bed of Wailupe Stream at an elevation of 770 feet above mean sea level, approximately 2.5 miles inland of the coast. The extension of this dike or another with similar strike outcrops on Wiliwilinui Ridge, 0.8 miles seaward of the stream outcrop.

Chemical weathering and stream erosion carved Wailupe Valley at the end of the main shield building phase of volcanic activity. Deposition of talus material by gravity at the base of the valley's walls and its subsequent transport by Wailupe Stream gradually filled the lower valley floor with alluvium. The valley floor is mainly covered with unconsolidated non-calcareous sediments deposited by the stream.

The project site lies at the base of talus slopes along the western wall of Wailupe Valley. This area consists mostly of colluvium and alluvium transported from the steep valley slopes. Topography of the surrounding area varies from gradual (5%) to very steep slopes (50%). The well itself is on a small knoll which was terraced in the hillside. The access road slopes gradually (5-12%) up from the end of Hao Street for about 1,500 feet before switching back more steeply (20%) to reach the site of the well.

The State of Hawaii has been classified into four seismic zones according to the Uniform Building Code. Zone 0 is the least affected by earthquakes, while Zone 3 is the most affected. The island of Hawaii has been designated as Zone 3, and is the most active seismic area in the State. Maui is designated as Zone 2, while Oahu, Molokai and Lanai are designated as Zone 1.

### 3.3 SOILS

The predominant soil type is Lualualei extremely stony clay. There is limited topsoil mixed with a substantial amount of rocks transported from valley slopes. This soil type is rated poor for crops.

Runoff from bare soil is medium to rapid and water erosion hazard is moderate to severe. Wind erosion hazard is low to moderate. The shrink-swell potential is high, causing unstable soil conditions and soil "creep" in some nearby areas. Lualualei soils account for about 75% of the acreage which has been involved in mass movements (landslides, creep) on the island of Oahu.

In the immediate vicinity of the well, a layer of hardened clay covers the surface. This is presumably subsurface material from drilling of the well shaft.

### 3.4 CLIMATE AND AIR QUALITY

The average rainfall at Wailupe Valley School (State Key No. 723.6) between 1966 and 1983 was 42.8 inches. The location of this station is shown on Figure 1. Its elevation is about 180 feet. Most rainfall is associated with cyclonic storms during the winter months. Wailupe Stream, 150-600 feet east of the access road, flows intermittently after heavy rainfall but poses no flood threat to the elevated well site and access road. The valley slopes are well vegetated. When tradewinds blow, the area is quite windy, but the clayey soil is not particularly susceptible to wind erosion.

Temperature data collected at the Lower Aina Haina station (elevation 15 feet above mean sea level; State Key No. 723.7) over a three-year period indicate that September is the warmest month of the year with a mean daily temperature of 79 °F. The coolest month is March with a mean daily temperature of 72 °F.

### 3.5 WATER RESOURCES

#### 3.5.1 Groundwater and Wailupe Well II

The occurrence of basal groundwater from Kahala to Hawaii Kai is seen as a series of different head regimes that are associated with the northeast trending dike system. West of the dike system, water levels are about ten feet above mean sea level. East of the dike system, water levels drop to about three feet above mean sea level, and gradually decline in head southeast to Hawaii Kai.

Low water levels from Wailupe to Makapuu can be directly attributed to low rainfall in the area. In addition, the thin layer of sedimentary deposits in the coastal plain does not effectively retard the movement of basal groundwater to the sea, as demonstrated by the numerous small springs at the shoreline.

Wailupe Well II was drilled from a ground elevation of approximately 380 feet above mean sea level to a depth of approximately 110 feet below mean sea level. During aquifer testing in January of 1986, the initial static water level in the well was measured at 7.0 feet above mean sea level. Pump test results indicate that the specific capacity of the well is about 20 gal/min/ft of drawdown. Based on the classification system developed in Takasaki and Mink (1982), the aquifer beneath the site would be designated as a marginal dike zone for this specific capacity.

The current Water Commission groundwater allocation in the area between Diamond Head and Makapuu is 1.98 mgd. The design well draft for Wailupe Well II of 0.2 mgd will increase the allotment to 2.18 mgd. The sustainable yield for the area between Diamond Head and Makapuu Point is estimated to be 5 mgd (State Water Commission, 1979).

### 3.5.2 Wailupe Stream

Wailupe is a perennial stream which drains an area of 2.35 square miles. The Geological Survey maintains a crest stage gage station about one mile mauka of Kalaniana'ole Highway. Over the period 1958-1988, the annual maximum gage height was 2.96 feet and the annual maximum discharge was 949 ft<sup>3</sup>/sec (Nakahara et al., 1989).

Wailupe Stream has a length of approximately 8.1 miles, of which 2 miles have been altered. The stream channel near the project site has been lined; there is also an elevated culvert near the stream mouth. Observations during the stream channel alteration survey revealed no native fish or crustaceans in Wailupe Stream (Timbol and Maciolek, 1978). The predominant fauna were the exotic fishes *Misgurnus anguillicaudatus* (oriental weatherfish, loach, or dojo) and *Poecilia reticulata* (guppy). The stream was given an ecological quality status of III, moderate to low natural and/or water quality.

### 3.6 FLORA AND FAUNA

The existing vegetation consists of exotic shrubs and grasses characteristic of "summer drought" environments on the lower slopes of dry valleys. Heavy cattle traffic during the period when the area was in dairy use disturbed the native vegetation. Haole koa is dominant and guava, hau and Christmas berry are also common. Haole koa thickets border the lower reach of the access road. Where the road switches back steeply to the well site, exotic grasses predominate and the shrubs are not as tall. The lone endemic species is the 'ulei, widespread as a low shrub in open areas. This species occurs in dry areas of the Hawaiian Islands and is not considered endangered or threatened.

The introduced grasses and shrubs provide some degree of habitat for the typical array of exotic birds and mammals that one would expect at this elevation and in this

type of environment throughout the island. None of these are threatened or endangered species.

### **3.7 ARCHAEOLOGY AND HISTORICAL SITES**

Social Research Systems Co-op (1990) conducted a reconnaissance survey of Wailupe Well II and access road on August 2, 1990. Their report is included as Appendix A to this EA. While some ambiguous possible features suggesting agricultural planting were noted, no features of clear cultural definition or function were observed within the project area. The historical record appears equally ambiguous about prior use of this portion of Wailupe ahupua'a. Past use of the area as a dairy and construction of the access road to the well site may have had an impact on visible archaeological features. The surface evidence does not indicate the existence of any significant historic or archaeological features.

### **3.8 SOCIAL AND ECONOMIC ENVIRONMENT**

The following projections are from the Department of Business and Economic Development (1988). The resident population on Oahu is projected to rise 23 percent, from 811,100 in 1985 to 999,500 in 2010. Oahu's de facto population, which includes visitors present but excludes residents temporarily absent, is projected to grow to 1,094,700 in 2010. The civilian job count, which was 473,100 in 1985, is projected to increase to 720,600 by 2010. Most gains are expected in trade, services and diversified agriculture. Per capita personal income is projected to rise from \$12,400 in 1985 to \$16,800 (in 1982 dollars) in 2010, or 35.5%

### **3.9 RECREATIONAL LANDS**

Mauka of the project area portions of the Kuliouou Forest Reserve (Kuliouou 1) and portions of the Honolulu Watershed Forest Reserve (Wailupe and Kuliouou 2) constitute Unit C of the East Honolulu Hunting Unit (DLNR, 1979). The Oahu Recreation Map provided this description: "This unit consists mainly of exotic and native dry land vegetation and although it is open for wild pig and goat hunting, none have been seen for several years."

### **3.10 UTILITIES**

Electrical service to the area is provided by Hawaiian Electric Company. Distribution lines run to the end of Hao Street, 2,000 feet makai of the project site.

### **3.11 AESTHETICS/VIEWS**

The access road and well site provide excellent views of upper Wailupe Valley and ridgetops. Ocean vistas are somewhat obstructed by the valley's narrow configuration.

## **4.0 IMPACTS AND MITIGATING MEASURES**

### **4.1 SHORT-TERM IMPACTS**

#### **4.1.1 Air Quality**

Exhaust emissions during construction would be generated from construction machinery. Dust emissions may occur during trenching for installation of a water transmission main or pouring of A.C. pavement on the access road. Impacts should be minimized by keeping all equipment properly tuned and maintained, as well as by minimizing unnecessary idle time. To reduce fugitive dust emissions, exposed surfaces should be kept well watered whenever feasible.

#### **4.1.2 Noise**

The operation of construction equipment will raise ambient noise levels in the project vicinity. Construction equipment and on-site vehicles or devices requiring an exhaust of gas or air would have to be equipped with mufflers. In addition, all construction-related vehicles traveling on roadways must meet the vehicle noise level requirements set by the State.

#### **4.1.3 Water Quality**

The project will be confined to areas that are already cleared of vegetation and exposed to water and wind erosion. Paving of the access road will reduce the amount of bare soil and the potential for erosion. The risk of a major storm event (e.g., 50-year rainfall) occurring during construction is slight but can be mitigated by scheduling construction during the dry summer months and by adhering to the County grading ordinance. Adequate controls would be incorporated on-site, at the potential source of any problems associated with construction. Prompt revegetation of disturbed sites would provide long-term protection.

#### **4.1.4 Socio-Economic**

The construction project would create short-term benefits by providing a temporary source of a few jobs. Construction would also entail short-term adverse impacts on residents living at the end of Hao Street. This impact can be minimized by



quickly completing work on the water transmission main and access road near its junction with Hao Street and progressing upland away from existing residences.

## **4.2 LONG-TERM IMPACTS**

### **4.2.1 Land Use**

No additional land acquisition is necessary for this project. There will be no interference with any existing or proposed use of surrounding properties.

It is generally recognized that provision of enlarged public facilities may contribute to urbanization and growth. This project will allow the BWS to meet anticipated needs for potable water in an area that has already experienced urban development. Further urbanization is certain, but it will have to conform to County General Plan and zoning designations.

The BWS will continue to develop potable water sources and service to keep pace with the consumer needs which are generated as a result of the County's land use planning and development process.

### **4.2.2 Earthquake Hazards**

Even though Oahu is in seismic Zone 1, the second lowest hazard zone, the Board of Water Supply has adopted Zone 3, highest hazard, design standards for all its structures. The control and pump buildings will be designed and constructed in accordance with these standards.

### **4.2.3 Erosion, Sedimentation and Water Quality**

The water erosion hazard of bare soil of the Lualualei series is moderate to high. The access road and well site are already mostly cleared of vegetation and the soil is exposed. The thick vegetation bordering the site prevents runoff from concentrating. Nevertheless, a low probability rainfall event (e.g., 50-year storm) could cause severe erosion of the sloping access road. The project area is windy, but wind erosion potential is low to moderate because of the clayey soil.

The project will reduce the long-term potential for erosion by water and wind because the access road will be paved and the well site will be appropriately landscaped after improvements. Runoff and erosion control measures, such as interceptor ditches, will be incorporated in the construction plan to prevent a concentration of runoff from flowing down the paved road into residential areas at the top of Hao Street.

#### 4.2.4 Air Quality

Air quality in the general area is good because of brisk tradewinds and the lack of vehicular traffic. Bare soil along the access road and at the well site is exposed to strong tradewinds. Despite the existing potential for wind erosion, dust does not seem to be a problem, probably because of the clayey soil. Trenching of the soil for installation of a water transmission main should not increase the potential for wind erosion above its present level. The project contractor will be required to sprinkle exposed soil to reduce this hazard. The operation of heavy equipment for the duration of the project, about 15 months, will produce vehicular emissions, but strong tradewinds should maintain good air quality. The contractor will be required to observe all air quality regulations.

Paving of the access road will reduce the amount of exposed soil. Appropriate landscaping of the area around the well and access road will reduce the long-term potential for erosion.

#### 4.2.5 Noise

The project site is far enough from major traffic routes to be extremely quiet. The noise associated with this project will be limited to heavy equipment used in the paving of the access road and installation of a water transmission main. Because the well already exists, there is no need for a drilling rig and the much louder noise generated by drilling operations. Noise problems will be of short duration. They are most likely to occur when construction activity is located near the junction of the access road with Hao Street. As construction progresses away from Hao Street toward the well site, the distance from residences will increase and noise will be abated. The contractor will be required to follow all regulations for noise control.

#### 4.2.6 Water Resources

No surface water sources, wetlands or flood plains would be affected by the project. Groundwater resources tapped by Wailupe Well II can be developed without any significant impact on the long-term yield of potable water from the basal aquifer.

#### 4.2.7 Flora and Fauna

The access road and well site is already mostly cleared of vegetation. No threatened or endangered plants or animals occur in the surrounding area, which consists mostly of exotic shrubs and grasses. Vegetation bordering the well site and access road will not be significantly disturbed, and the area will be appropriately landscaped after construction.

#### **4.2.8 Archaeology and Historic Sites**

An archaeological reconnaissance of the site revealed no significant historic or archaeological features. Major disturbances of the site associated with its use as a dairy and by construction of the access road may have obliterated such features. Given the poor condition of the few remaining features and their ambiguity in age and function, archaeological research opportunities are extremely limited. Land disturbance associated with this project will be limited to the easement area and well site which have already been heavily altered by road construction and well drilling. Should any unanticipated artifacts or burials be encountered during the project, all work will be stopped temporarily while the State Historic Preservation Office is notified.

#### **4.2.9 Socio-Economic**

This project is part of the BWS's long-range program of water development and service to meet anticipated needs for potable water. The project will allow the BWS to provide for anticipated consumer needs in southeastern Oahu without restricting water service.

#### **4.2.10 Recreational Lands**

No recreational lands would be affected by this project. Hikers' and hunters' access to upper Wailupe Valley may be temporarily obstructed by the presence of heavy equipment along the access road during this project.

#### **4.2.11 Utilities and Public Services**

Wailupe Well II will be tied into the water transmission system which already exists on Hao Street. No public utilities will have to be relocated as a result of the project. Construction will occur away from public roads, so traffic will not be disrupted. The movement of heavy equipment to and from the site will not cause any serious problems because vehicular traffic on Hao Street is so light. No disruption of water services is anticipated as a result of the proposed action.

#### **4.2.12 Aesthetics/Views**

Except for the lower reach of the access road, the project site is shielded from view by thick vegetation. The presence of construction equipment during the project may temporarily disrupt localized views at the junction of the access road and Hao Street. No major clearing of vegetation is anticipated, and the project area will be appropriately landscaped after construction. A control building built near the well site will be low in profile and will not be visible from Hao Street. At no time will the project interfere with distant views of upper Wailupe Valley and ridge tops.

### 4.3 INDIRECT IMPACTS

The Wailupe Well II project is intended to provide additional capacity in the Aina Haina Service Zone. It is a response to increasing demand in the service area. It would not be a major factor in inducing additional urbanization of the area, as that is controlled by Development Plan and zoning designations.

### 4.4 CUMULATIVE IMPACTS

There are no other infrastructure improvement or significant development projects anticipated in the Aina Haina Service Zone in the near future therefore no cumulative impacts are expected.

### 5.0 LIST OF AGENCIES CONSULTED

The following agencies, organizations and individuals were consulted in preparation of the EA.

#### STATE AGENCIES

Department of Health  
Department of Land and Natural Resources

#### COUNTY AGENCIES

Department of General Planning  
Department of Land Utilization

### 6.0 LIST OF REFERENCES

Department of Business and Economic Development, State of Hawaii. 1988. Population and Economic Projections for the State of Hawaii to 2010 (Series M-K).

Department of Land and Natural Resources, State of Hawaii. 1979. Island of Oahu, Recreation Map.

Nakahara, R.H., J.J.S. Yee, I. Yamashiro, G.A. Tateishi, and J.A. Domingo. 1989. Water Resources Data for Hawaii and other Pacific Areas, Water Year 1988. Vol. 1, Hawaii. Prep. for U.S. Geological Survey, Water Resources Division in cooperation with the State of Hawaii Dept. of Land and Natural Resources, Division of Water and Land Development.

Social Research Systems Co-op. 1990. Wailupe Well II, 'Ili of Wailupe, Waikiki, island of Oahu. Draft II. Prep. for Shimabukuro, Endo & Yoshizaki, Inc. 10 p.

State Water Commission. 1979. Hawaii's Water Resources: Directions for the Future. A Report to the Governor.

Timbol, A.S. and J.A. Maciolek. 1978. Stream Channel Modification in Hawaii, Part A: Statewide Inventory of Streams, Habitat Factors and Associated Biota. Prep. for Stream Alteration Project Office of Biological Services, Fish and Wildlife Service, U.S. Dept. of the Interior.

**APPENDIX A**

WAILUPE WELL II  
'ILI OF WAILUPE, WAIKIKI, ISLAND OF OAHU

TMK 3-6-04

for

Shimabukuro, Endo & Yoshizaki, Inc.

by

Social Research Systems Co-op.

Richard Bordner

12/1/90

WAILUPE WELL II  
Ahupua'a of Wailupe, Island of O'ahu  
TMK 3-6-04

Abstract

Social Research Systems Co-op. conducted a reconnaissance survey of Wailupe Well II and access road on August 2, 1990. While some ambiguous possible features suggesting agricultural planting were noted, no features of clear cultural definition or function were noted within the project area. The historical record appears equally ambiguous about prior use of this portion of the ahupua'a.

Introduction

Wailupe Well II and associated access road will be constructed beyond the end of Hao Road in the ahupua'a of Wailupe, O'ahu. The access road runs for approximately 2000 feet, and the well site proper is a 100 foot diameter area.

Historical documentation of prior use of the area is sparse:

*Wailupe Stream formerly had a larger volume than at present, and there may have been lo'i. John K. Clarke says that the ground below the mouth of the gulch is too porous to hold water and that the stream seeps away underground. He has never seen any sign of terraces nor heard of taro being grown in this area.*  
(Sterling and Summers 1978:274)

From the limited documentation both traditional and from the land-use records the focal point of interest appears to have been on the fishpond system and exploitation of coastal marine resources, though the valley is certainly capable of both dryland and irrigated agriculture, as is hinted at in the land-use records:

*Unu of Kawauoha  
Hear ye, ye Land Commissioners: I am writing concerning my*



coconut trees which were planted by my kupunas. There were eight of them. Most of them have been cut down. My kupunas made the unu (altar) of Kawauoha and when it was completed they sacrificed a man and planted those coconuts. Here is this explanation--at teh time my kupunas were sent the pig by the wahine of Peleioholani, my kupunas received it and then sacrificed the pig and the man. This is the thing concerning these coconuts.  
Wailupe, 29 Dec. 1847 KALUA  
(Native Register v. 3, pp. 427-428)

On the ridges burials were likely placed into available caves, as is noted by Sterling and Summers:

Dec. 9, 1955...  
Eric Matsumoto, age 11, 705 Hind-uka...reported to him, took him [Rev. Blackman] to a burial cave back of their new property at Hind-uka, Aina-haina. (Sterling & Summers 1978:pp. 275)

While several Land Court Awards were given for Wailupe, L.C.A. 656 was given for the entire mauka portion of Wailupe, which was considered to be an 'ili of the ahupua'a of Waikiki, which extended over most of this section of the moku of Kona. Oddly enough the records insist that this L.C.A. of E. Kuhia only covered a houselot in downtown Honolulu below Puowaina in the district of Waiaao, Kawaialiao, next to the house of John Ii (who acted as one witness to the claim) on Beretania Street. The claim was made at the Fort of Honolulu on 8/25/1847, and witness testimony was given the following year. The Wailupe Fishpond proper was given as Land Grant 4729, for which no further description was available (though ownership is discussed below). At the 'ili boundary of Wailupe and Waiialae-iki, just mauka of the highway (then the government road) and the fishpond was L.C.A. 1032. A second portion of this award was at the other

end of Wailupe (East), also just mauka of the highway on the Niu-Wailupe 'ili boundary. This award was given to Opuni, but as with Kuhia's it appears to relate to a claim elsewhere, specifically a *houselot claim at Waiawa, on the West side of the stream, also 4 small patches at Kaaimalu and at Waiawa also.*

(Native Register v. 2 pp. 597)

There was also a complex trade and amalgamation of L.C.A.'s, with L.C.A. 1032 being incorporated into L.C.A. 9537 (of Mauna) which is listed only as a small house in Honolulu at Hotel Street (Native Register v. 4 pp. 474).

L.C.A. 2066.1 was located mauka of the highway and West of Wailupe Stream. This award was given to Kalua:

L.C.A. 2066            Kalua                            12/21/1847

*I, Kaio, hereby write my claim for land [held] from Kamehameha the First to Kamehameha Third. The claims are: Makole, from the upland to a kula where watermelon is grown, Paki, from the upland to a kula where watermelon is grown, also Pokii, from the upland to a kula where watermelon is grown. Also a pond for liberating fish [loko ho'oholo i'a]. Also, a small, very old claim, from my kupunas. It is Kaualaa, and the taro lo'i at Kaualea was dug by my kupunas.*

Wailupe, Waikiki, Oahu                            KALUA  
(Native Register v. 3 pp. 344)

L.C.A. 2066.1  
*Kamaka (W.) swears the claimant's land is in the 'ili of Wailupe, Waikiki, Oahu. It is 1 piece of potato ground, a garden plot.*

*It is bounded Mauka by Kumuhonua's land. Waialae, by Kama's land. Makai, by Kiamu's land. Honolulu, by Makaina's land.*

The claimant recieved it from Puihula in the days of Kamehameha First and held it till his death in 1848, when it came to claimant's son, Kaio, who now tills it.

(Foreign Testimony v. 3 pp. 258)

L.C.A. 6175.1 is an award makai of the highway and mauka of Wailupe Fish Pond. This award was given to Kamaha who was listed as residing in "Wailupe, Waikiki, Oahu" (Native Register v. 3 pp. 344).

L.C.A. 6175 Kamaha

Greetings to the Land Commissioners: I hereby state my claim over the land of Wailupe which the Mo'i has given to me. Therefore, I state the names and the explanation of the ko'eles and the pu'u ones which are called "earth" [a me na puu one i kapa ia he lepo. I believe he is differentiating between the common "sand-hill" ponds, and the large fish pond of Wailupe. Translator] Furthermore, I have just heard that some of my claim was penalized--its name is Makaina.

The Protected Trees

Keokea	Kapaaloa	Kaalolo
Kekuilei	Kalulu	Wawahiwaa
Kooku	Mulelehu	Luanui
Kailikahi	Kamokoa	Kapelehee
Kukala	Papapa	Kiloa
Kawela	Kaalolo 2	Kamaikeaho
Kalokoloa	Kaliu	

The Protected Fish

Kahoali'i	Waipao	Kaea
Kaheaai	Kaea 2	Kaohia
Laulaupoi		Hawaiiloa
Kauhilaepuu		Keoneuleku
Kumuhau		Kamuku
Ainaio Ouaua		Puolonaio
Kulawai Aowale		Puulaula
Kauaulua	Kaohai	Kamuliwai
Kahoowahaloko		

Those are the total of the names.

KAMAHA

(National Register v. 5 pp. 254)

L.C.A. 6175

Mr. Wm. Webster, Land Agent for the King, appeared and stated that the King had accepted of the large fish pond and one area of

*Kula land in the 'ili of "Wailupe", Oahu, as his share of said 'ili which by the Division of 1848 was to be divided 1/2 to Kamaha and 1/2 to His Majesty."*

*(Foreign Testimony v. 3 pp. 589)*

*L.C.A. 6175                      Kamaha*

*Kamaha's 1/2 land distribution.*

*1/2 Wailupe 'ili for Waikiki, Kona, Oahu. 12/6/1854.*

*Interior Dep't.*

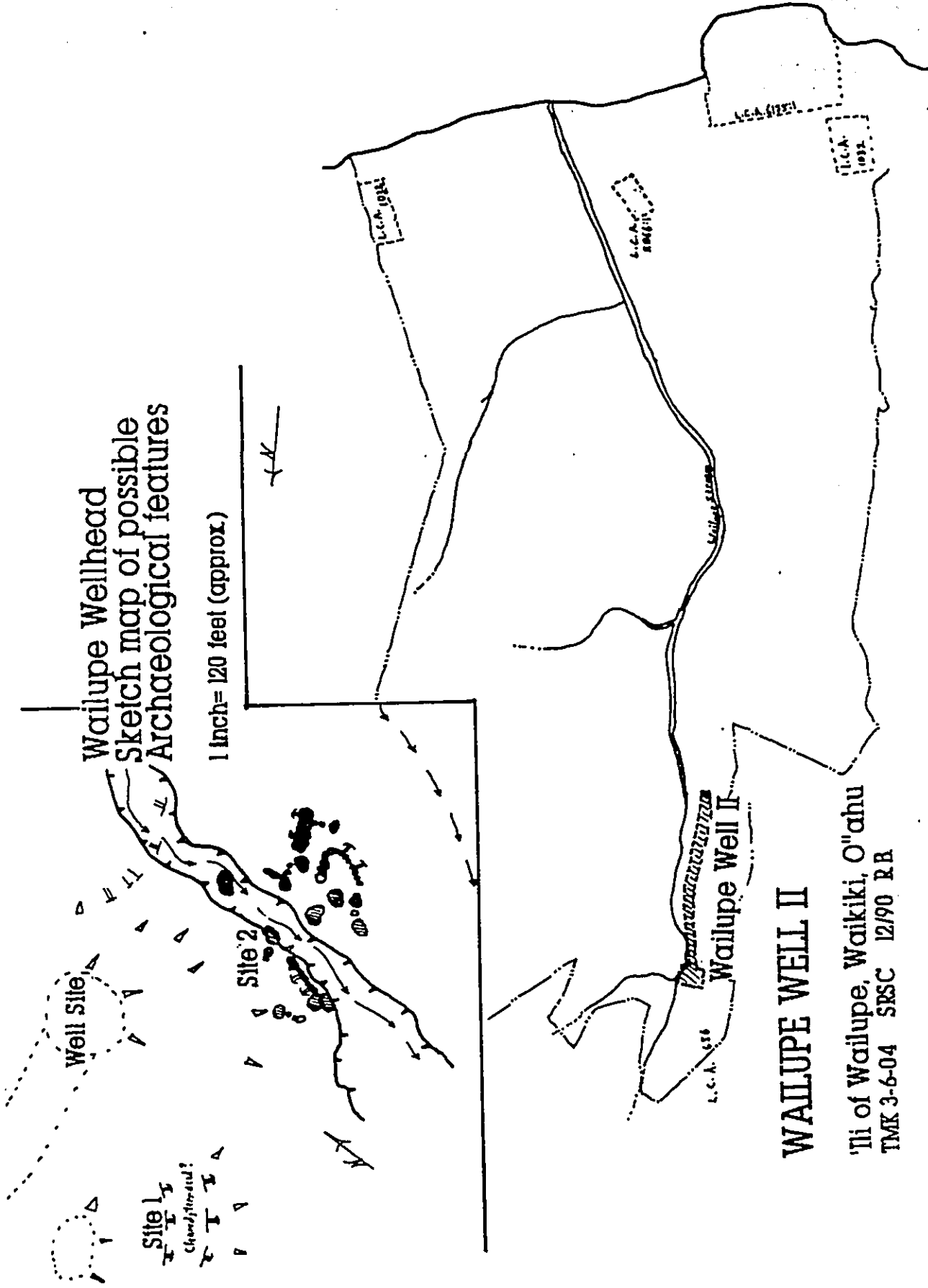
*(Native Testimony v. 10 pp. 441)*

*From the various testimonies a pattern results of the majority of the 'ili was divided between Kamaha and Kamehameha III, with smaller awards reflecting land either along the shore or just mauka near the stream or other water sources. The named places that are noted in the land testimony (especially Kalua, L.C.A. 2066) were not noted either on maps or in other sources and appear to have disappeared. Land use appears to have been limited to cash crops (watermelon) except for the small area devoted to taro (L.C.A. 2066). The main exploitation noted in the accounts again reflects aquaculture use, especially both the L.C.A. 2066 testimony, which suggests a complex system of aquaculture manipulation.*

*The key is Wailupe Fishpond:*

*Wailupe Fishpond (destroyed)*

*Site 56. The pond is 41 acres in area. The wall is approximately 2500 feet long. The west side is a broad sandy area, at least 50 feet wide, through which four outlets (makaha) now pass. The remainder of the wall is 12 feet wide, with waterworn basalt faced higher on the outside than within. The*



**WAILUPE WELL II**

'Ii of Wailupe, Waikiki, O'ahu  
 TMK 3-6-04 SPS 12/90 RB

central part is of a dirt and sand fill. (Sterling & Summers 1978: pp. 274-275)

The past tax maps show that the area mauka of the highway was part of the land owned by Robert Hind Ltd., and oral traditions have the whole back section of the valley as a dairy at least into the 1960's. The subdivisions mauka of the highway began development between 1949-1952. At the same time the stream was modified and formal drainage developed for the lower sections.

Wailupe Fishpond is shown on the early maps (1936, 1946) is shown as a substantial fishpond with a rather complex linked by makaha and 'auwai with a smaller pond called Punakou Pond on the maps. The fishponds were filled in by Hawaiian Dredging Co. (the Dillingham Corp.) and made into a leasehold subdivision between the 1950's and early 1960's.

An additional note is that at some period between the 1960's and the 1980's an area at the back of the valley (the area just makai of the study area) was converted (?) over from Watershed Forest Area and into residential lots, but there was no source located that would describe how this land was taken out of watershed.

The historical record is almost entirely lacking for the area within the immediate confines of this project. The lack of legendary sources, and the relative lack of interest in available historic sources on use of the mauka portions of Wailupe 'ili versus the complex aquaculture management system along the coast leaves a large gap in the easily-accessible record which must then rely almost completely on the archaeological record.

### Archaeological Reconnaissance

The archaeological reconnaissance was conducted on August 2, 1990 by Richard Bordner and David Cox of SRSC. The reconnaissance required approximately 6 hours to complete, in large part due to the extremely high grass in the jeep access roadbed. The access road and well site are located on an area of 5-10% slope approximately 50-200m from the stream, which was flowing at the time we conducted the survey (note contrast to quote above). This area consists largely of talus and alluvial transported material eroded out of the very steep slopes of the Wailupe and Waialae ridges, and has limited topsoil mixed with a large number of rock fall material.

It is in area of 20-40 inches of rain per year, and this is reflected in the existing vegetation cover which consists mainly of exotics, especially guava, hau, christmas berry and assorted grasses. The lone endemic is wide-spread at several locations-- the 'ulei. This is seen as a very low ground-following shrub in open areas. While it is one of the endemic plants, there is no documentary evidence to indicate that it is at present threatened, as it is found in the drier areas of most of the larger islands.

The study area proper has been heavily disturbed by construction of the jeep road at some time in the past. There is also evidence of past dairy activities in ground clearing of some loose rock material. As a result of these modifications, most of the standard indicators of past human occupation (stone alignments and stacked stone walls) were largely absent. The small leveled areas that are present in most fairly flat portions may

reflect past agricultural use, but this can not be verified by surface examination.

The only visible features that possibly reflect past cultural activity were those located in the immediate vicinity of the proposed well site (see Map I). These consisted of one cleared leveled area on top of a small knoll [Site 1], and a series of 4 cleared areas downslope near the stream [Site 2]. All appear to be planting terraces, with stacked rock at the edges reflecting loose material cleared from the planting areas. In addition, as small stream run-off appears to have been diverted to serve as an 'auwai for the terrace units, though this may just reflect a natural watercourse path downslope. All the features appear to have been rather heavily disturbed at some time in the past, most likely from heavy cattle traffic.

#### Conclusions and Recommendations

The only sites of possible archaeological or historical significance located by this reconnaissance within the boundaries of the study area were the series of cleared areas at the well-site proper (Sites 1 and 2). Given the poor condition of the features, and their general ambiguity both in function and age, the research opportunities for future investigation seem limited at best. The lack of visible features elsewhere in the study area suggest that heavy disturbance during the historic period, most likely during the dairy use of this portion of the valley, had a significant impact on the visible archaeological features in the study area.

From the surface evidence available, we believe that the



features located to not qualify as significant under the criteria of the NPS guidelines either on historic or archaeological grounds. However we would recommend that archaeological monitoring be conducted during all major clearing-grubbing activities and later during any major excavation and earth-moving activities during the project. At minimum, during excavation soil samples should be taken for possible future pollen analysis and reference. Materials should be on hand to take any possible charcoal samples that may be uncovered for the purpose of developing a time-frame for the period of possible agricultural use in this section of the valley. The disturbances in the past seem limited to the surface, and thus it is possible that significant archaeological resources are still intact subsurface, which may be recovered during monitoring.

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