



EXECUTIVE CHAMBERS

HONOLULU

GEORGE R. ARIYOSHI
GOVERNOR

February 1, 1983

Mr. Roy R. Takemoto, Chairman
Environmental Quality Commission
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Mr. Takemoto:

Based on the recommendation of the Office of Environmental Quality Control, I am pleased to accept the environmental impact statement for the Waianae Wells in Waianae-Kai, Oahu, as a satisfactory fulfillment of the requirements of Chapter 343, Hawaii Revised Statutes.

This environmental impact statement will be a useful tool in deciding whether this project should be allowed to proceed. My acceptance of the statement is an affirmation of its adequacy under applicable laws and does not constitute an endorsement of the proposal.

When the decision is made regarding this action, I expect the proposing agency to carefully weigh the societal benefits against the environmental impact which will likely occur. This impact is adequately described in the statement, and, together with the comments made by reviewers, provide a useful analysis of alternatives to the proposed action.

With warm personal regards, I remain,

Yours very truly,


George R. Ariyoshi

cc: Mr. Kazu Hayashida
Board of Water Supply

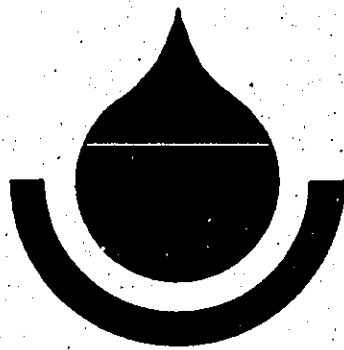
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Revised

Environmental Impact Statement

WAIANAE WELLS

BOARD OF WATER SUPPLY / CITY AND COUNTY OF HONOLULU



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CITY AND COUNTY OF HONOLULU

BOARD OF WATER SUPPLY

REVISED ENVIRONMENTAL IMPACT STATEMENT

for the

WAIANAЕ WATER WELLS

Waianae-Kai, Oahu, Hawaii

Tax Map Key: 8-5-06: 8 and Por. 1

THIS ENVIRONMENTAL DOCUMENT IS SUBMITTED
PURSUANT TO CHAPTER 343, HRS

PROPOSING AGENCY:

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

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ACCEPTING AUTHORITY:

Governor, State of Hawaii

S U M M A R Y

The Honolulu Board of Water Supply is proposing to sequentially develop two wells in upper Waianae Valley. The first well has been drilled and tested and will be put into production. The combined sustainable yield of the wells is anticipated to be approximately 1.0 million gallons per day. The first priority for use of the newly-developed water will be to meet projected growth in water demand on the Waianae Coast.

The wells will be located in the vicinity of Hiu Stream and two unnamed tributaries of Kumaipo Stream. Both streams are usually dry in their lower sections. Neither stream provides good habitat for fish or crustacea. Available data is inconclusive as to whether or not Kumaipo and Hiu Streams are fed by the basaltic aquifer, and would be affected by development of high level wells.

Archaeological resources, including agricultural terrace systems and free-standing walls, are present near the first well site but not readily visible at the second. Archaeologists have been retained to mark surface sites that should be avoided and will monitor future grading to determine whether subsurface archaeological features are present.

The wells will be in conformance with adopted State and County land use plans and policies, and will not have any significant adverse environmental impacts. For these reasons, and because all feasible well sites will need to be developed to meet Oahu's growing water needs, the BWS has rejected the "no project" alternative.

Other feasible approaches to Oahu water needs include conservation, bulkheading of tunnels, controlling leaks, exchanging non-potable water for potable water used for irrigation, and possibly seasonal peak-load pricing for water meters. Demineralization of brackish water would be a relatively costly method of increasing municipal water supply.

Test pumping of the first well provided a better understanding to resolving some of the questions involved in developing the two wells. However, actual drilling and test pumping of the second well will be necessary to fully resolve questions about total yield, water quality and impacts on stream flow.

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CHAPTER I. DESCRIPTION OF THE PROPOSED PROJECT

A. LOCATION AND LAND OWNERSHIP

The Board of Water Supply (BWS) is proposing to construct and develop two wells in upper Waianae Valley, Oahu (Figure 1). The first well site (DOWALD No. 2909-01) is located at an elevation of approximately 1,150 feet in the vicinity of an abandoned water tunnel. The well is approximately 350 feet upslope from an unnamed tributary of Kumaipo Stream (Figure 2). The second well site will be at an elevation of approximately 1,375 feet and about 1,700 feet north of the first site (Figure 2).

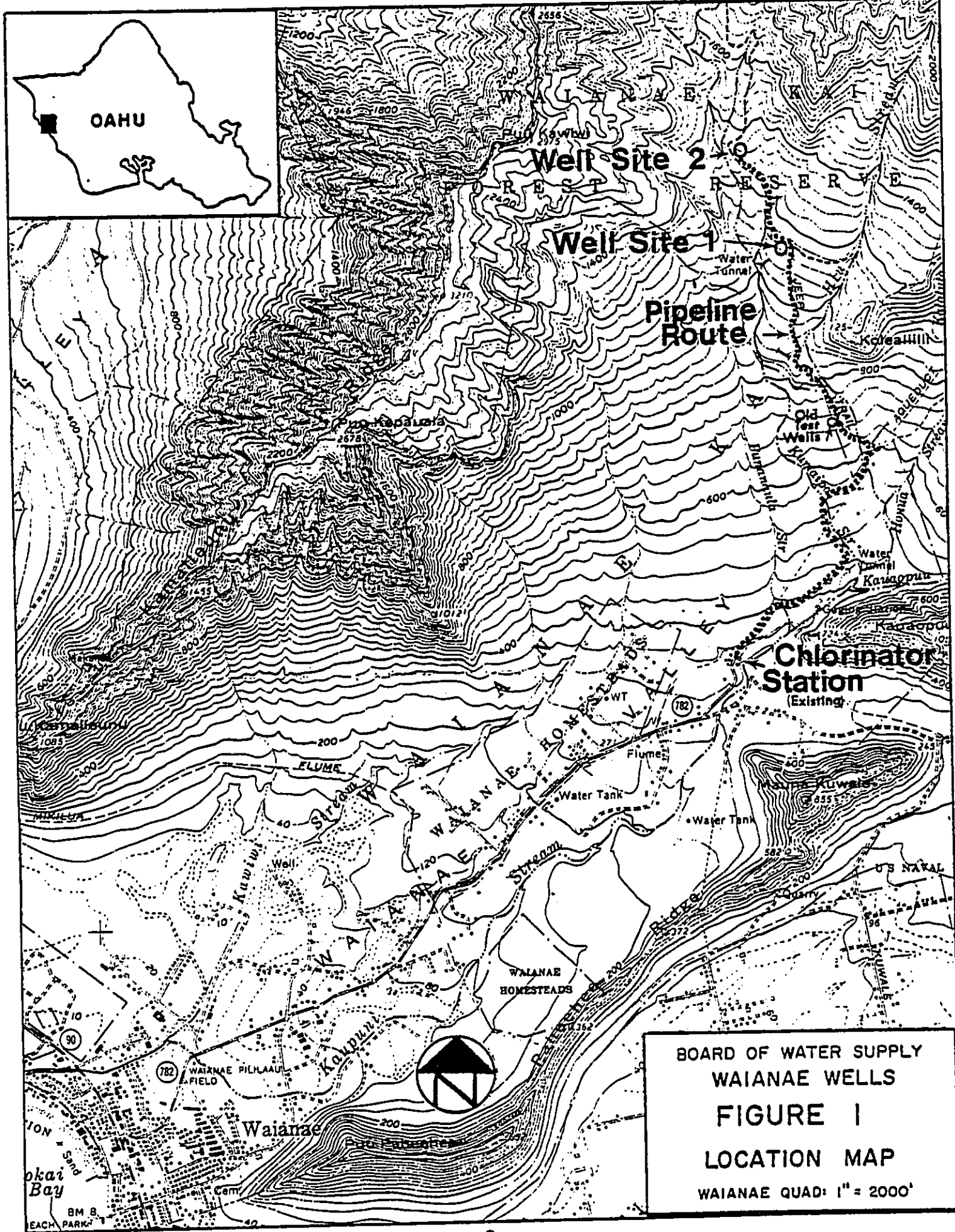
The first well site is located on City property identified by Tax Map Key 8-5-06: Parcel 8. The second well site will be located on State property identified by Tax Map Key 8-5-06: Portion of Parcel 1.

B. PROJECT OBJECTIVES

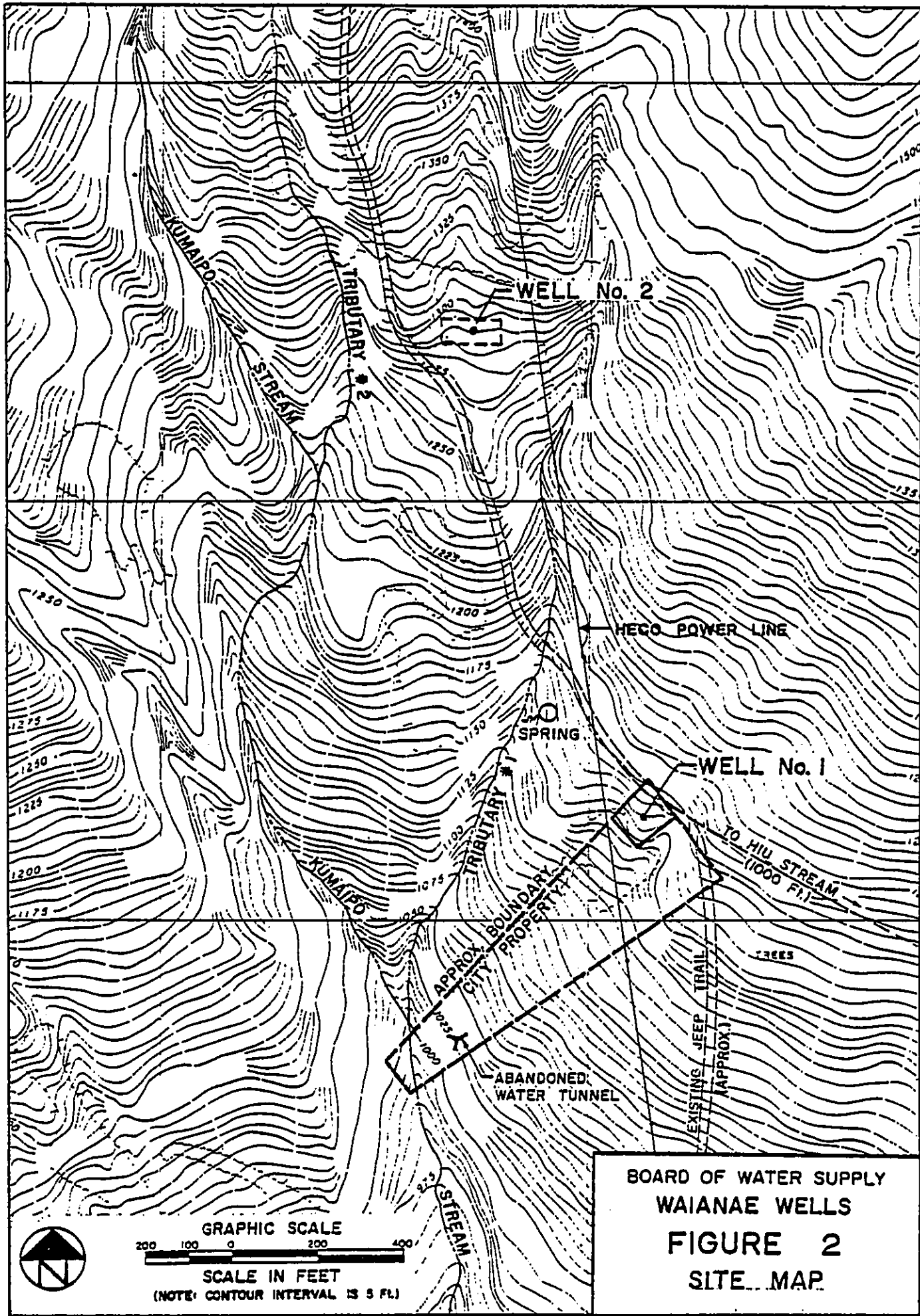
The wells will supply water to the Ewa-Waianae Water Use District and will test the feasibility of further water development in Waianae Valley. It is anticipated that the first well will have a sustainable yield of approximately 0.4 million gallons per day (mgd) and the second well will have about the same yield.

C. NEED FOR THE PROJECT

Once fully developed, the two wells will serve the Ewa-Waianae Water Use District, an area of 120 square miles on the leeward slopes of the Waianae mountains (Figure 3). The present population served by the Board of Water Supply in this District (outside of Barbers Point Naval Air Station) is approximately 51,000. The 1979 average water input was 15.85 mgd, ranging from a monthly low of 9.44 mgd to a monthly peak



BOARD OF WATER SUPPLY
 WAIANAE WELLS
 FIGURE I
 LOCATION MAP
 WAIANAE QUAD: 1" = 2000'

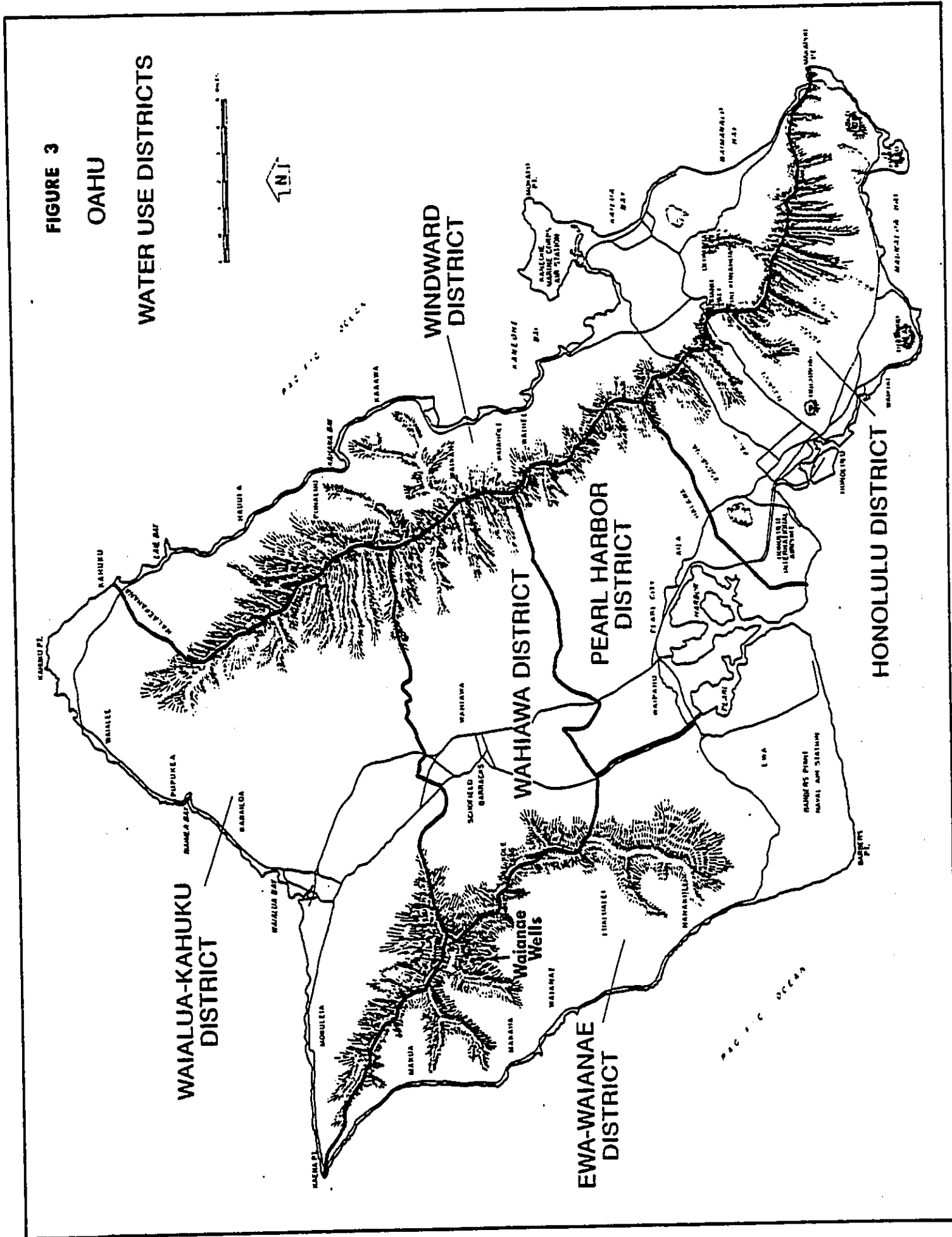


BOARD OF WATER SUPPLY
 WAIANAE WELLS
FIGURE 2
 SITE MAP

FIGURE 3

OAHU

WATER USE DISTRICTS



12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

demand of 17.43 mgd. Of the average consumption, 3.20 mgd (20%) is provided by in-district sources. (These figures, and all other discussions of water consumption and supply in this EIS, exclude the military reservations in the District since their water systems are independent except for a small number of facilities.) The Ewa-Waianae District is relatively arid; consequently, the current local water demand is not being met with local sources. The sustainable capacity of BWS wells and tunnels within the District is 4.20 mgd. The deficit is made up by importing an average of 12.65 mgd from the Pearl Harbor aquifer.

If population growth is allocated as envisioned in the 1977 Oahu General Plan Objectives and Policies, then the year 2000 population in the Ewa-Waianae District will be roughly 126,600 persons. This represents a 157% increase over the area's population in 1975. Of this total, the Waianae Coast is expected to support a population of 33,100 to 36,600 persons by the year 2000. Even if this population projection is not realized, some level of growth will occur in the District, given the probability of increased development associated with the proposed deep draft harbor at Barber's Point and the proposed resort at West Beach. With the availability of near-by jobs, the Ewa-Waianae District will become a more attractive place to live. Population growth will result in a corresponding increase in water demand.

The Pearl Harbor aquifer has been declared a Ground Water Control Area by the State Board of Land and Natural Resources (BLNR), in response to the impending risk of sea water encroachment into the aquifer. The rate of ground water withdrawal will be closely monitored, with a limit set on each use. The permitted increase in pumpage from the Pearl Harbor aquifer will probably be minimal. As a result, it will be necessary to develop local sources in the Waianae Coast Area to the fullest extent possible. The priority for use of newly-developed water will be first, to meet local growth in water demand, and second, to reduce the draft on the Pearl Harbor aquifer. For this reason, the "project area" is defined as the Waianae Coast for the purposes of this EIS. However, it should be kept in mind that the island's water system is partially integrated, so that developing a new source in one district helps the water budget of adjacent water use districts.

D. FACILITY PLAN

Each well will be constructed in two stages. A 1,000-foot deep exploratory well was drilled at the first well site and tested. Production facilities to fully develop the well will be installed after the construction plans are completed and fully approved by various City and State agencies. A similar procedure will be followed at the second well site. In the event that the second well site does not yield sufficient water to be economically feasible, then the BWS may choose to abandon the second well site.

1. **Well Site I.** A short gravel access road, less than 100 feet in length, was graded from the well site to the existing jeep trail which extends between Waianae Valley Road and the ridge separating Makaha and Waianae Valleys. An area of approximately 10,000 square feet (0.23 acres) was cleared and graded for a drilling site. The exploratory well is 1000 feet deep and has a 14-inch casing for 430 feet.

In order for the well to be put into production, the pad cleared for the exploratory well will have to be enlarged to accommodate a control building, piping and parking areas. The well site will occupy an area of approximately 10,000 to 12,000 square feet (0.23 to 0.27 acres). The control building, similar to that shown on Plate 1, will contain pump monitors and controls, a chlorination room (for emergency disinfection), electrical transformers, a washroom, and toilet facilities. Sewage will be collected in a water tight container requiring periodic pumping. A deepwell pumping unit will be installed in the well.

The site containing the well and control building will be landscaped and enclosed by a chain link fence. The existing jeep trail connecting the well site to Waianae Valley Road will be regraded where needed and resurfaced with gravel or crushed coral. The trail will be maintained by the BWS up to the well sites.

Gulleys which occasionally carry water across the jeep trail will be diverted under the trail with culverts. Approximately 9,000 feet of 12" water transmission main will be built along the jeep trail to an existing chlorinator station on Waianae Valley Road (Figure 1) where the main will be connected to the existing water system. Part of the main will be located on the Waianae Valley Road right-of-way mauka of Waianae Homesteads. Electric power for the pumps and related equipment will be obtained from the Hawaiian Electric lines that cross near the site.

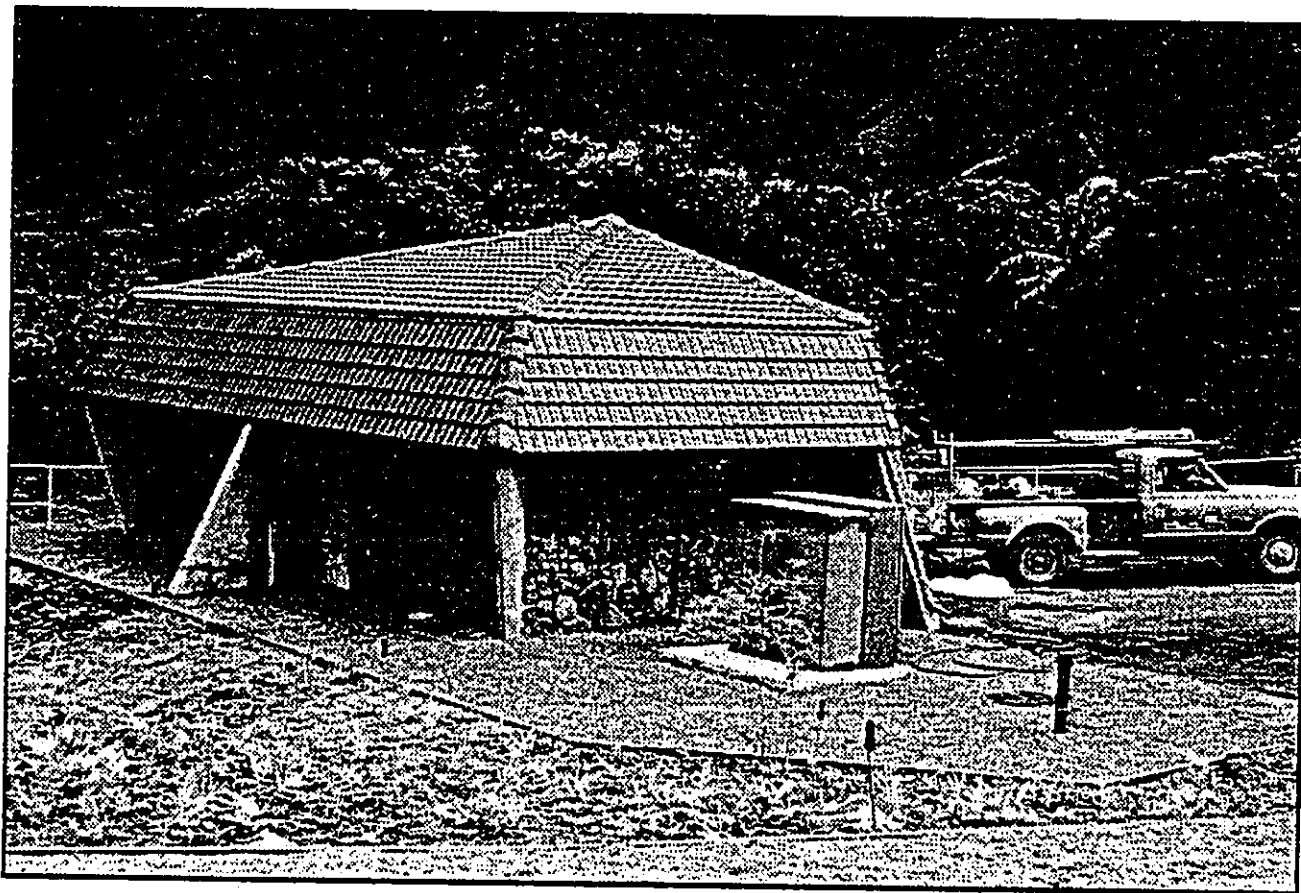


Plate 1. Typical BWS Control Building

2. WELL SITE II. Proposed improvements at the second well site are essentially the same as at the first well site. The existing jeep trail will have to be resurfaced for about another 1,600 feet mauka of the

first well site, and several gulleys will need to be diverted under the trail with culverts. A short gravel access road (less than 100 feet) will be graded from the second well site to the jeep trail. If the exploratory well is put into production, then a water main will be built from the second well site along the jeep trail to connect with the water main from the first well site. Electrical power will be obtained from Hawaiian Electric Company by using overhead power lines.

E. COSTS, FUNDING SOURCE, AND SCHEDULE

Construction of the first exploratory well cost approximately \$440,000. The total cost of developing the first well, including access road improvements and water transmission main, will be in excess of \$1,500,000.

Development of a exploratory well at the second well site will cost roughly \$530,000. Development of production facilities at the second well site will cost approximately \$500,000 (depending on final design).

User fees from the sale of water will amortize bonds sold to pay for construction of the two Waianae water wells and related infrastructure.

The initial exploratory well was completed in October, 1981. Final development has been budgeted, and will take place in the near future. Testing and development of the second well site is not yet scheduled.

F. HISTORIC PERSPECTIVE

The Waianae Coast was one of the earliest places of Hawaiian settlement. Although accessible fresh water was scarce, settlers were attracted by good fishing in the nearshore waters. The Hawaiians raised taro, sweet potatoes, and gourds in the vicinity of streams and springs. A relatively large expanse of terraces was cultivated in upper Waianae Valley.

Remnants of terraces and rock walls still remain at the first well site. The estimated Waianae Coast population at the time of first European contact was 4,000 to 6,000 people. By 1854, disease had reduced the Hawaiian population to less than 1,000. (Ref. 25 p. 14)

Private ownership of land followed the Great Mahele in the late 1840s. Within fifteen years, commercial ranches occupied almost half (over 17,000 acres) of the Waianae Region. In 1878, Herman Wideman began a sugar plantation in Waianae, which used surface water to irrigate 60 acres of cane. The plantation ultimately grew to 2,000 acres, but was forced to retrench to 1,200 acres because of insufficient water. The McCandless brothers drilled the plantation's first irrigation wells in 1882-83. Despite an intense search for fresh water, plantation wells and tunnels never produced more than 8 mgd. (Ref. 25 and Ref. 26)

In 1946, Waianae Sugar Company was forced to close because of problems with labor supply, production costs, water supply, military takeover of productive acreage, and discontinuance of the railroad. Waianae Development Company purchased 9,150 acres of land from Waianae Sugar Company in 1948 and made much of it available for purchase for housing and farming. There was an influx of both subdivisions and vegetable, fruit, dairy, hog, and poultry farms. Today most of Oahu's poultry, dairy, and pork production comes from the Waianae Region. (Ref. 25)

By 1950, the Waianae Coast population had reached 7,000. To meet the water needs of an expanding population, the BWS by-passed local resources and imported lower cost water from the Pearl Harbor aquifer. At that time, the Pearl Harbor Region was considered to have surplus ground water.

Because of rapid Oahu population growth following Statehood, withdrawal of Pearl Harbor ground water has recently approached sustainable yield. Starting with acquisition of Waianae Development Company's water rights and water system in 1973, the BWS began a program to produce more water within the Waianae Region to meet growing local demands. The two proposed Waianae wells are intended to implement the recommendations of hydrogeologist John F. Mink contained in a 1978 Waianae Water Development Study commissioned by the BWS. The BWS is also following the Study's recommendations to develop new water sources in adjacent Makaha Valley. (Ref. 26)

CHAPTER II. DESCRIPTION OF THE ENVIRONMENTAL SETTING

A. NATURAL ENVIRONMENT

1. **Appearance and Existing Use of Project Site.** The two well sites are approached via a steep, rocky jeep trail which begins at the end of Waianae Valley Road. The jeep trail has eroded to the point where it is barely adequate for use by a four-wheel drive vehicle. Numerous gulleys cross the jeep trail, and storm runoff has caused severe erosion. The jeep trail is used by hunters and campers for access to the upper Waianae Mountains.

The first well site is partially covered by tall grasses and trees. Numerous abandoned rock walls form agricultural terraces across portions of the site. Most of the walls are hidden from view by the tall grass and bushes. While parts of the site were formerly used for agriculture or for a home site, the entire site is now unused.

The second well site is completely overgrown by exotic trees and vines. No man-made artifacts are apparent on the site. Views into the site are blocked by trees. A trail through the site leads to clearings which are probably used for camping.

2. **Climate.** The Waianae Coast is located on the leeward side of Oahu, where rainfall is low compared to the rest of the island. Average annual rainfall is approximately 20 inches near the shoreline, 50 inches at the well sites, and as much as 100 inches at Mount Kaala, the highest point in the Waianae Range. (Ref. 26) The northeast trade winds are weaker on the Waianae Coast than other parts of Oahu. On many afternoons, the wind blows inland from the ocean. Because of the low rain-

fall and gentle winds, temperatures tend to be several degrees warmer on the Waianae Coast than most other parts of the island. Average high temperatures are in the 80s and average low temperatures are in the 60s (° F).

3. **Land Forms, Soils, and Geology.** Waianae Valley is characterized by a broad gently sloping floor and a high, corrugated head. The well sites are located near the base of Kamaileunu Ridge, which separates Waianae and Makaha Valleys. Slopes in the vicinity of the well sites have an average grade of about 15% to 20%.

At the well sites, alluvium and colluvium, deposited by stream erosion and gravity, overlie the basalt of the Waianae Volcano. Alluvium tends to be weathered, well-consolidated, and generally poorly permeable. Colluvium is mainly poorly consolidated gravity transported material and hence in some places may be very permeable. (Ref. 30) The U.S. Soil Conservation Service classifies the soil at the well sites as stony land, which is described as consisting of boulders and stones deposited by water and gravity on slopes ranging from 5 to 40 percent. Rock material covers 15 to 90 percent of the surface. The exposed soil consists of reddish and silty clay loam and very dark grayish-brown clay. In most places, there is enough soil to provide a foothold for plants. (Ref. 31, pp. 120-21)

The thickness of the alluvium and colluvium at the two well sites will be measured during drilling of exploratory wells. The underlying basalt was found to be approximately 160 feet below the surface during exploratory drilling of the first well. Hence it is likely that the underlying basalt may be at roughly the same depth at the second well site.

The basaltic lava underlying the well sites is intruded by numerous dikes. Stearns describes the formation of dikes as follows:

The flows of Oahu were fed by magma that rose through fairly vertical straight, narrow cracks. After the eruptions ceased, the magma in these cracks solidified to form dikes.... As the magma forming a dike cools under the weight of the overlying rocks, it forms a rock that is usually denser than the extrusives. (Ref 27, p. 20).

4. **Groundwater and Streams.** The basaltic lava flows underlying and mauka of the proposed well sites are permeable with intermittent dikes which are denser and are much less permeable. As a result, high level ground water is confined in the permeable rock between dikes. It is thought that high level ground water in the Waianae Range does not float on sea water. (Ref. 27, p. 236) Ground water confined between dikes in the Waianae Range is not stagnant, but instead moves gradually from higher level dike compartments to lower ones and eventually to the basal ground water body outside the dike zone. (Ref. 36, p. 3) Some groundwater also discharges into streams.

Mink estimates that the drainage area of Kumaipo and Hiu Streams, within which the well sites will be located, could reasonably provide a sustainable ground water yield of 1.5 to 2 mgd, and recommends construction of 3 or 4 wells. (Ref. 26, pp. 3-6) Mink believes that "...the basalt aquifer water table in Kumaipo-Hiu does not reach the ground surface...." and estimated that the water table "...should be at about 600 feet in Kumaipo where the ground elevation is 1,000 feet." (Ref. 26, p. 79)

Drilling of the exploratory well at Site 1 found basaltic material covered with 160 feet of alluvium.

Additional drilling encountered artesian water at a depth between 348 and 378 feet below ground level. The well was free flowing at approximately 30 gpm. The second well may possibly encounter the same results at a higher elevation. It is not known whether the second well will tap the same dike compartment; if it does, then it would probably affect the first well.

The primary stream that drains Waianae Valley, of which all of the other streams are tributaries, is Kaupuni Stream. At one time, Kaupuni Stream probably was perennial, but development of inland water tunnels and wells has captured the base flow of the stream. (Ref. 30 and Ref. 26, pp. 5-2, 5-3) Mink estimates that Kaupuni Stream now discharges to the ocean less than 5 percent of the year. (Ref. 26, p. 5-1)

Two tributaries of Kaupuni Stream are found in the project area: Hiu and Kumaipo. Both streams are usually dry in their lower sections. Hiu Stream is 1,200 to 1,500 feet from the well sites. The well sites are located along two unnamed tributaries of Kumaipo Stream. The first tributary joins the main stream at an elevation of 1,000 feet, and the second tributary joins the main stream at an elevation of 1,210 feet (Figures 2 and 4). A spring, which was formerly developed for agriculture, feeds the first unnamed tributary at an elevation of about 1,140 feet, approximately 350 feet from the first well site. The second well site is located approximately 200 feet from the second unnamed tributary of Kumaipo Stream.

In March 1979, Kumaipo Stream and the second unnamed tributary were followed from an elevation of around 1,500 feet to just below 900 feet (a distance of roughly 1/2 mile). They both were flowing for several hundred yards, then the flow would disappear for several hundred yards, then the flow would reappear again. On a number of other occasions, the main branch of Kumaipo Stream was observed to be dry immediately above

an elevation of 1,000 feet at which point Kumaipo is fed by the first unnamed tributary. This tributary is probably perennial. It has been observed during the spring and summer to have continuous gaining flow for a distance of approximately 1,200 feet above its confluence with Kumaipo Stream (Plate 2).

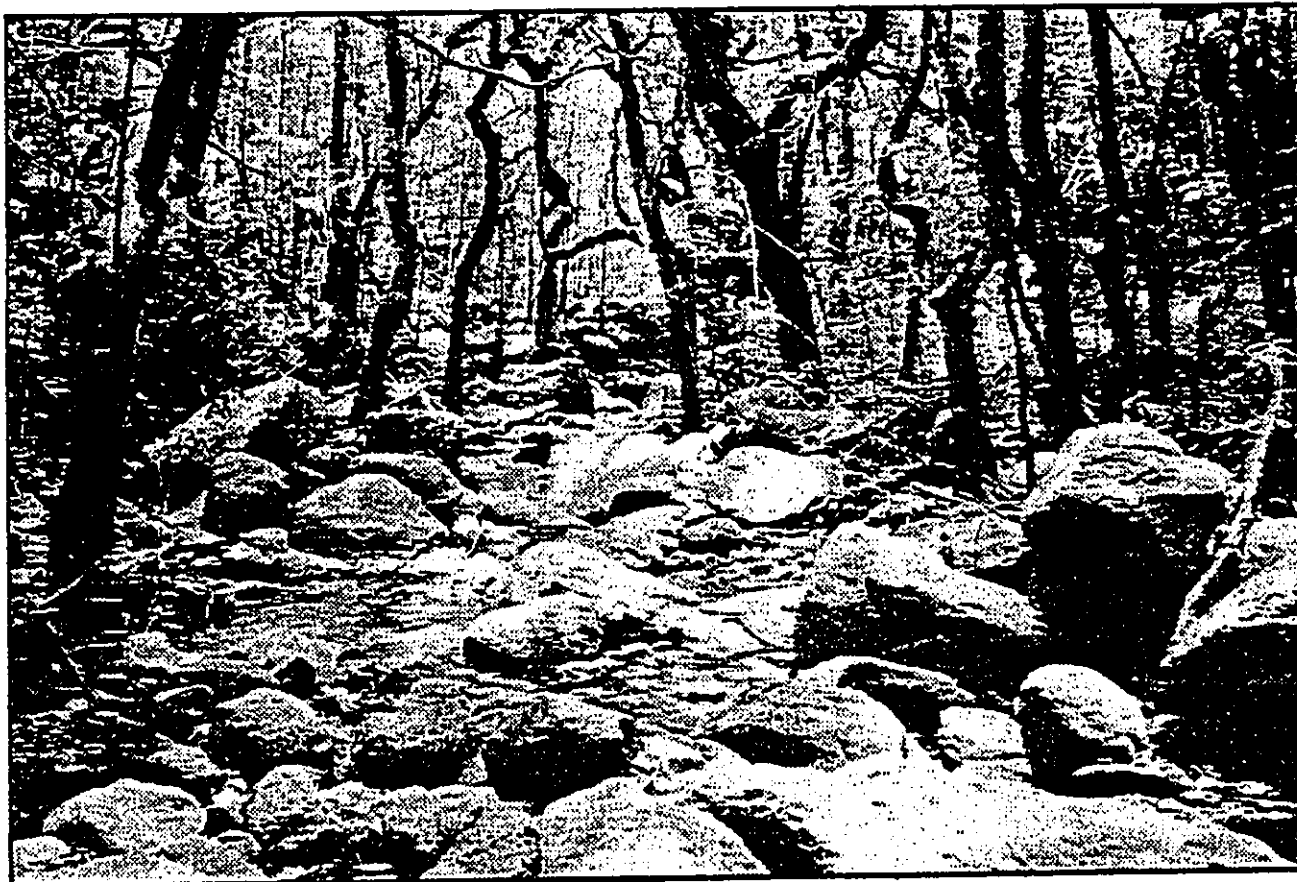


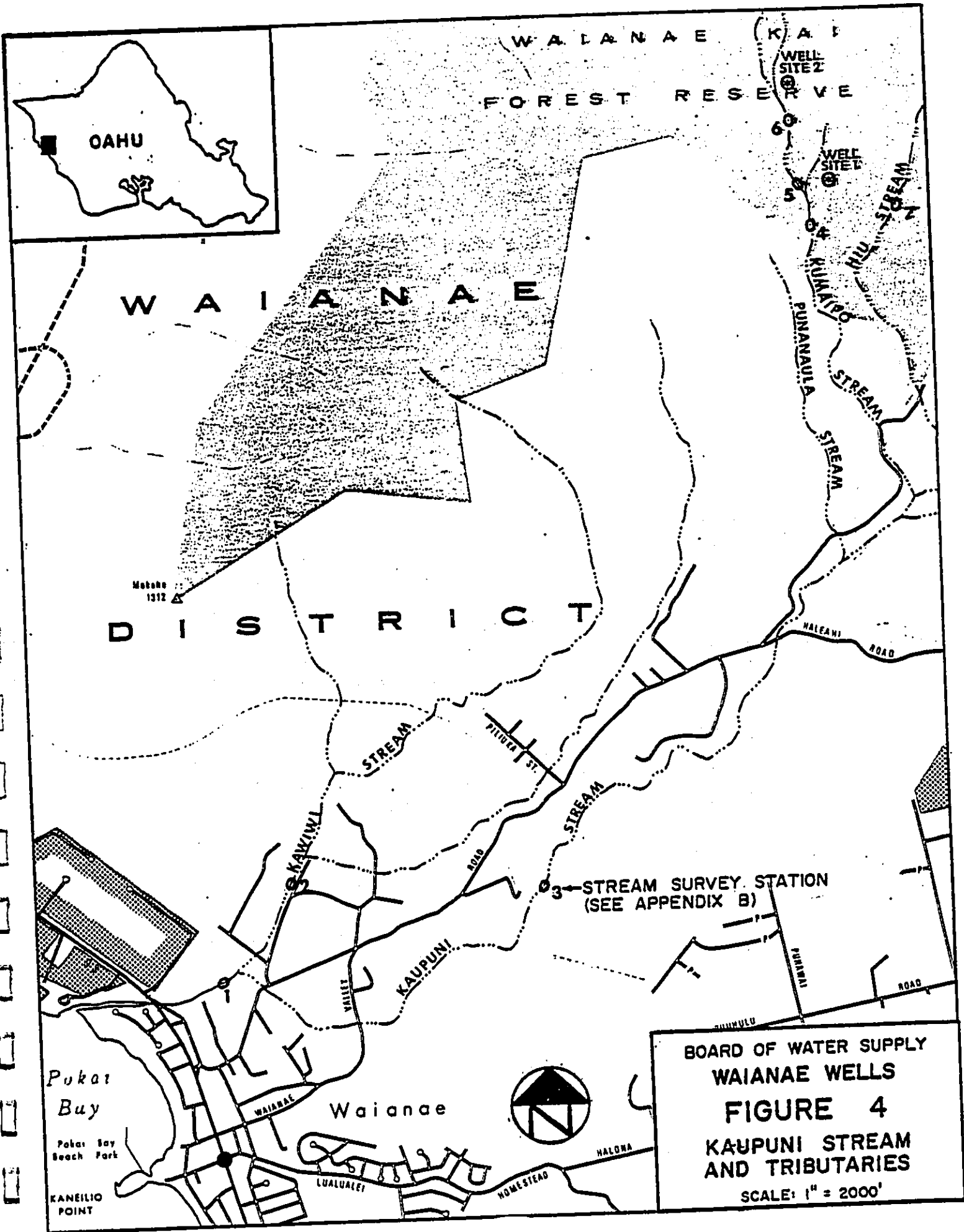
Plate 2. View Down Kumaipo Stream at Water Tunnel

It is questionable whether or not there is a connection between the ground water in the basaltic aquifer underlying the well sites and the few sections of Kumaipo and Hiu Streams that have continuous stream flow. The irregular water supply from the former Waianae Plantation Tunnel No. 16 (shown in Figure 2) (Ref. 27, p. 421) and the decrease in stream flow during well pumping tests are not sufficient to determine whether Kumaipo and Hiu Streams are fed by the basaltic aquifer.

Based on then available data on the thickness of the surface alluvium and ground water elevation, (especially records from Tunnel No. 16), Mink concluded that the source of seepages and springs that feed these streams is water caught in high level, surface alluvial material. (Ref. 26, p. 80) In other words, there may be two aquifers: a deep basaltic aquifer, and a shallow alluvial aquifer, with the latter contributing more to stream flow than the former. In contrast, the source of most other streams in Waianae and Makaha Valleys is ground water discharging from dike compartments where the stream is in contact with the underlying basalt. (Ref. 30) As a result, development of tunnels and wells to tap ground water has reduced or dried up water flow in most other streams in these valleys. (Ref. 30 and Ref. 36, p. 7)

5. **Natural Hazards.** The project area is located in Zone D, according to the Flood Insurance Study for the Island of Oahu, prepared by the Federal Insurance Administration. Zone D is defined as an area of undermined but possible flood hazards.
6. **Biological Resources.** A survey of the vegetation in the vicinity of the first well site and along the access jeep trail was conducted for this EIS. It was found that introduced plants have almost entirely replaced native plant communities (Appendix A). No rare or endangered species of plants were observed. The mature secondary forest present at both well sites includes such exotic species as monkeypod, silk oak, java plum, kukui nut and macadamia nut. Haole koa, passion fruit vines, and coffee trees are common at both well sites.

A study of stream fauna in Kaupuni, Kumaipo, and Hiu Streams conducted for this EIS found that all three streams provide poor habitat for fish and crustacea (Appendix B). Sampling stations are plotted on Figure 4. The lowest station on Kaupuni Stream was located



near its mouth, in brackish water subject to tidal action, while all other stations were in fresh water. No species of fish were found in any fresh water sampling station. A common ubiquitous pond snail, Melania sp., was abundant at an unusually high elevation at all sampling stations on Kumaipo Stream. Out of the four sampling stations on Kumaipo and Hiu Streams, the native endemic shrimp, o'pae, was found at only one station (Station 5). O'pae are common in perennial streams and usually spend part of their life cycle in fresh water and part in salt water. However, because Kumaipo and Hiu Streams do not flow continuously to the ocean more than a few days a year, it seems possible that o'pae are capable of completing their life cycle in fresh water.

No rare or endangered species of birds were present at either of the proposed well sites. A number of common introduced species were observed or heard including lace-necked dove, barred dove, Chinese thrush, Japanese white-eye, and cardinal. Other common introduced species which probably frequent the area include ring-necked pheasant, chukar partridge, red-billed leiothrix, bulbul, shama thrush, and ricebird. The native elepaio also is likely to frequent the area.

Feral pigs have left droppings and have rooted up vegetation at both well sites. Although not observed, mice, rats, and mongoose probably are abundant.

7. **Archaeological Resources.** Archaeological resources are present near the first well site but probably not at the second. An archaeological reconnaissance of the first well site revealed agricultural terrace systems, plots, enclosures, and free-standing walls (Appendix C). It is believed that the remains of ancient Hawaiian settlements around the first well site may offer significant research potential. However portions of archaeological features at the first well site were accidentally destroyed during construction of the

access road and exploratory well. Although no archaeological features were apparent along the access road and second well site, an archaeologist will also be retained to monitor grading at the second well site before and during construction.

B. SOCIAL ENVIRONMENT

- 1. Population Demographics.** The Waianae Coast has experienced rapid population growth from 7,000 (2.0% of Oahu's population) in 1950 to 32,800 (4.3% of Oahu's population) during the 1980 Census. However, the region's economy has not kept up with this growth, so most Waianae Coast residents commute outside of the region to work. Out of 276,237 employed persons on Oahu in 1974, only 4,581 (1.7%) had a job situated on the Waianae Coast. (Ref. 7, pp. 13, 14)

Waianae's population tends to be poorer, less educated, younger, and more ethnically part-Hawaiian than the population of Oahu as a whole. Table 1 compares the socio-economic characteristics of the Waianae Coast with the rest of Oahu, using the most recent reliable data available.

- 2. Existing Land Use.** The Waianae Coast consists of broad valleys bounded by the Waianae Mountain Range. These valleys, from northwest to southeast, are Makua, Keaau, Makaha, Waianae, Lualuali, and Nanakuli (Figure 3).

Relatively little of the Waianae Coast is developed. In 1975, intensive urban uses such as housing, business, and industry covered only 3,086 (8%) of the 38,164 acres in the region. Table 2 presents City Department of General Planning (DGP) tabulations about land use on the Waianae Coast.

TABLE 1

POPULATION CHARACTERISTICS OF THE WAIANAE COAST
AS COMPARED TO OAHU

	WAIANAE COAST (Census Tracts 96,97,98)	OAHU
Average Household Size in 1978	3.51	3.29
% of Households below the Poverty Level in 1975	19.9%	10.0%
% of Population Receiving Welfare in January 1980	35.1%	11.4%
Median Family Income in 1975	\$12,298	\$14,611
Median Family Income in 1978	\$10,000 to \$14,999	\$15,000 to \$19,999
% of Population Age 18 or over in 1975 Who Graduated from High School	57.7%	77.9%
% of Population Age 25 or Over in 1975 who Graduated from College	4.2%	16.6%
% of Population Age 19 or Less in 1978	46.2%	36.2%
% of Population of Part or All Hawaiian Ethnicity	41.8%	18.1%
% of Population of Caucasian Ethnicity in 1978	20.4%	27.5%
% of Population of Japanese Ethnicity in 1978	9.8%	25.3%

Sources: Ref. 8, 12, 14, 15, 16, 28, 33, 34, and 35

TABLE 2

LAND USE ON THE WAIANAK COAST IN 1975
(Census Tracts 96, 97, 98)

<u>Land Use</u>	<u>Acreage</u>	<u>% of Total</u>
Residential	2,394	6.3
Multi-Family	104	0.3
Industrial	515	1.3
Commercial	400	1.0
Hotel	33	0.1
Agricultural	1,930	5.1
Vacant Usable ^a	7,492	19.6
<u>Other^b</u>	<u>25,295</u>	<u>66.3</u>
TOTAL	38,164	100.0
Total Land In Use	16,301	42.7
Vacant Usable Land ^a	7,492	19.6
Vacant Unusable Land	14,344	37.6
<u>Other Unused Open Space</u>	<u>27</u>	<u>0.1</u>
TOTAL	38,164	100.0

a. Includes all developable vacant public and private land with less than 20% slope.

b. Includes all public and quasi-public uses and services including military lands.

Source: Ref. 24, pp. 172, 182

Most urban development on the Waianae Coast has occurred along the coastal highway and along the mouths of valleys. Most commercial and service centers are located in the coastal towns of Makaha, Waianae, Maili, and Nanakuli while inner valleys are primarily in agricultural and low density residential use. Makaha Valley is partly developed as a resort. Lualualei and Makua Valleys are under military control. Part of Lualualei serves as a Navy munitions depot and communications facility. Makua is used by the Army for maneuvers and target practice.

3. **Population Growth Permitted by Existing Land Use Controls.** Substantially more population growth is now allowed by existing County zoning than is called for by the adopted County land use plan. The 1977 Oahu General Plan has proposed that the July 1975 Waianae Coast population of 27,500 be allowed to increase to between 33,100 and 36,600 by the year 2000. By comparison using assumptions outlined below, the Waianae Coast's population could grow to range between 67,700 and 93,400.

In 1975, there were an estimated 9,284 residential units on the Waianae Coast. (Ref. 24, p. 246) At that time the DGP estimated that County zoning would allow construction of a maximum of 12,751 additional residential units for a total of 12,726 single family and 9,309 multi-family units. (Ref. 22, p. 41)

In addition to the total 22,035 units permitted by County zoning, the State of Hawaii Department of Hawaiian Home Lands (DHHL) could potentially build as many as 3,635 single family units on the Waianae Coast (assuming 3 units per gross acre). These would be placed on Hawaiian homes land which is either planned for development or "land banked" by the DHHL for future residential use. (Ref. 6, pp. 78-82) Although the County has zoned this DHHL land for agricultural use, pursuant to the Hawaiian Homes Commission Act enacted

by Congress in 1920, DHHL lands are exempt from State and County land use controls. (Ref. 4)

Combining residential units permitted by existing County zoning and residential units which could be built by the DHHL, there could be as many as 16,361 single family and 9,309 multi-family units on the Waianae Coast. Assuming an average of 3 to 4 persons per single family dwelling and 2 to 3 persons per multi-family dwelling, then at maximum, the Waianae Coast's population could grow to range between 67,700 and 93,400.

C. WATER DEVELOPMENT CONSIDERATIONS

1. **Water Supply, Demand, and Price.** Existing BWS water sources in Waianae and Makaha Valleys can supply a sustainable yield of 4.20 mgd. Of this, 2.00 mgd comes from the Waianae Tunnel, 0.70 mgd comes from the Waianae Plantation System, 0.50 mgd comes from the Kamaile Wells, 0.50 mgd comes from the Makaha Shaft, and 0.50 mgd comes from the Makaha Well I. The Waianae Tunnel and Plantation System and Kamaile Wells serve upper Lualualei and Waianae Valleys, and portions of Waianae Town. Makaha Shaft and Makaha Well serve upper Makaha Valley and portions of Makaha Town. (Ref. 21) A private water system supplies 0.89 mgd to a resort complex.

As of January 1980, the BWS pumped 4.50 mgd from the Pearl Harbor Water District to augment the supply to the Waianae Coast. It is projected that when the Waianae Coast population reaches 34,900, (the 1977 Oahu General Plan's regional population goal for the year 2000), the region's total water demand will be 9.95 mgd. If the Waianae Coast population expands to 55,000 the water demand would be 16.28 mgd. (Ref. 21) These BWS water demand estimates also include the

agricultural, industrial, and commercial uses which are likely to accompany population growth. Normal per capita residential use of water averages about 80 gallons per day. (Ref. 18 p. 58)

The rate for water assessed by the BWS is set so as to cover costs, including development of new sources, but not to make a profit. For the first 13,000 gallons of water used in a month, all users are charged the same basic rate. In 1970, this rate was \$0.34 per 1,000 gallons. In July 1980, the basic rate was \$0.76 per 1,000 gallons, representing an increase of around 8% per year. Above 13,000 gallons per month, agricultural users are given a reduced rate of \$0.61 per 1,000 gallons. Prior to July 1980, industrial users were also given a reduced rate. To encourage conservation, they are now charged the basic rate for all water used. Residential users continue to be charged the basic rate for all water used.

2. **BWS Policy Towards Requests for New Water Service.** As long as water is available, the BWS is under mandate to provide water to all who request it. However, the era of bountiful Oahu water supply is almost over. Sometime in the 1980s, due to the risk of salt water encroachment into the Pearl Harbor basal water lens, the Pearl Harbor Water District will not be able to safely supply water to meet increased demand. When the sustainable yield of the other BWS sources is reached, BWS policy will be to deny all Leeward Oahu (Makaha to Hawaii Kai) water hook-ups for new meters larger than 5/8" (adequate for a single family home) until such time as new water sources are developed.

In September 1979, pursuant to Chapters 177 and 178, HRS, and Board of Land and Natural Resources (BLNR) Administrative Rules Title 13 Chapter 166 (formerly Regulation No. 9), the BLNR designated the Ewa and Wahiawa judicial districts of Oahu as the Pearl Harbor Ground Water Control Area (GWCA). Chapter 166

authorizes the BLNR to regulate withdrawal of water from any designated GWCA that the BLNR determines is in danger of degradation due to withdrawals that exceed the recharge or endanger ground water quality. The Department of Land and Natural Resources (DLNR), Division of Water and Land Development (DOWALD), Hydrologic Advisory Committee has recommended that the BLNR set the safe withdrawal of water from the Pearl Harbor GWCA at 225 mgd. (Ref. 11, p. 17) The DOWALD has also recommended that the BLNR certify 224.4 mgd of average existing withdrawals from the Pearl Harbor GWCA as "preserved existing uses" to be grandfathered under Chapter 166. (Ref. 10) Of this total, an average of 76.95 mgd has been allocated to the BWS.

On the average, about 75.9 mgd of the water supplied by the BWS to leeward Oahu in 1981 was withdrawn from the Pearl Harbor GWCA. In the event that the BLNR restricts increased pumping from the Pearl Harbor Water District to the rest of Leeward Oahu, then the BWS will establish a policy by which water from new BWS sources is to be allocated. At this time it seems likely that water from the proposed Waianae wells will be used to service new water hook-ups on the Waianae Coast. New development on the Waianae Coast, and in most other parts of Leeward Oahu, will not be feasible unless the BWS is able to supplement the existing water system with new water sources.

3. **Potential Water Resources.** Mink estimates that in addition to existing BWS water sources, the BWS might be able to develop another 6 mgd of high-quality, relatively low-cost, water on the Waianae Coast. Of this, 4 mgd could potentially be developed from new high level wells in Makaha Valley, and 2 mgd could potentially be developed from new high level wells in Waianae Valley. (Ref. 26, pp. 3-5, 3-6) Upper Lualualei and Makua Valleys also contain developable ground water, but are unavailable for public water

development projects because they are controlled by the military.

4. **Planned Water Development Projects.** In addition to the two wells described in this EIS, the BWS has plans to install four high level wells in Makaha Valley over the next six years. Also, the DOWALD, has constructed a well at an elevation of 413 feet on the eastern slope of Kamaileunu Ridge in Waianae Valley. This well draws from the basal aquifer in Waianae Valley. Initial tests indicate the well will produce 500 gallons per minute (0.7 mgd) of potable water. This well will be used to supply low-cost water to a State proposed Waianae Agricultural Park and other existing agricultural activities in Waianae Valley.

CHAPTER III. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. AESTHETICS

Development of the two well sites will replace a limited area of secondary forest with landscaped facilities similar to those shown in Plate 2. The production wells and related infrastructure will probably not be visible except from ridgelines and from points where the existing jeep trail approaches close to the well sites.

B. GROUNDWATER AND STREAMS

If both exploratory wells prove successful, then up to about 1.0 mgd of ground water will be pumped from the two well sites. The wells will be cased through the alluvial aquifer so that the water will be drawn from the basaltic aquifer (See Chapter II). Although water withdrawal will not exceed sustainable yield, production facilities will lower the basaltic ground water elevation in the vicinity of the wells.

Kumaipo and Hiu Streams have naturally interrupted flow a little below an elevation of 800 feet. Above this elevation, some relatively limited stream sections appear to have a continuous base flow of a few gallons per minute. If it were the case that the source of stream flow was ground water discharging from dike compartments in the basaltic aquifer, then development of the Waianae wells would either reduce or dry up the flow along small parts of Kumaipo and Hiu Streams. Above the elevations at which the wells will be drilled (1,150 and 1,375 feet), stream flow from any source is unlikely to be affected by the wells.

Stream flow monitoring during test pumping of the first well (Table 3 and Figure 5) was inconclusive as to whether the wells would reduce stream flow. Monitoring will be continued when appropriate.

Since the available data suggest that Kumaipo and Hiu Streams are not fed by the basaltic aquifer, it is reasonable to conclude that they will not be significantly affected by development of the proposed wells. However, the hypothesis that the wells might reduce stream flow cannot be positively rejected until both wells are put into production.

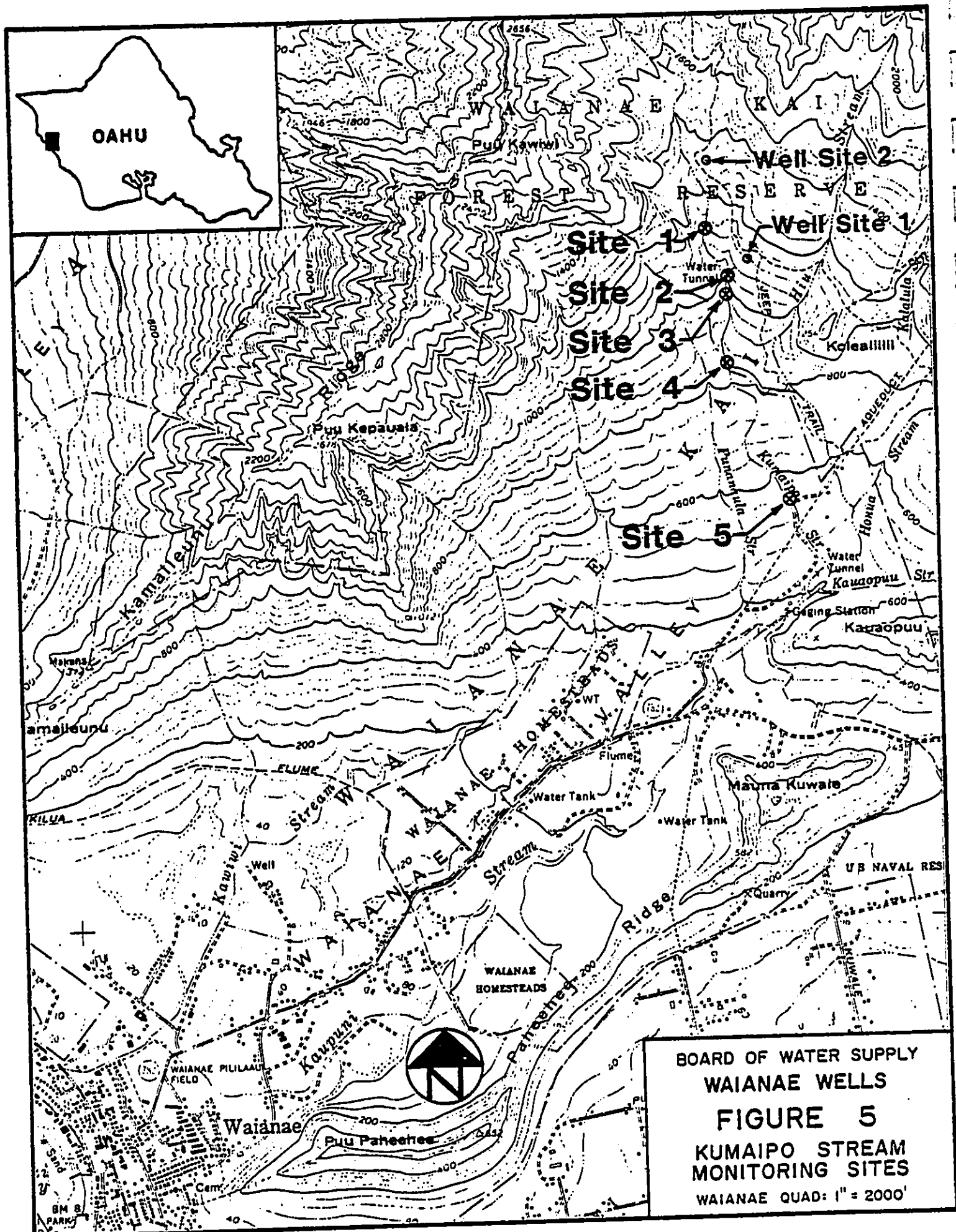


TABLE 3
STREAM FLOW MONITORING
KUMAIPO STREAM, WAIANAЕ, OAHU

(Discharge in cfs unless noted)

Date	Site 1	BWS Well	Site 2 Tunnel 16	Site 3	Site 4	Site 5	Remarks
8-25-81	<.01	.10	.01	.12	.10	dry	Water flowing from BWS well (artesian)
8-28-81	<.01	.10	.02	.12	.11	dry	Test pumping at BWS well.
9-28-81	<.01	>.10	.015	.15	.12	dry	
9-30-81							PUMP STARTED AT 0940 HOURS
10-01-81	<.01	.668	.015	Time (1055) .67 (1350) .65 (1410) .66	Time (1120) .56 (1440) .58	dry	Pumping rate 300 gpm at 1005 hours.
10-02-81	<.01	.690	.015	(1130) .68 (1425) .68	(1210) .58 (1505) .59	dry	Pump rate 310 gpm at 1110 hr
10-04-81	<.01	.657	.015	(1050) .65	(1125) .59	dry	Pump rate 295 gpm at 1040 hr
		.690		(1440) .66	(1530) .60		Pump rate 310 gpm at 1515 hr
10-05-81	<.01	0	.015	Time (1250) .056 (1430) .049	Time (1320) .054 (1330) .049 (1505) .047	dry	Well artesian at 1430 hr. Flow below ranch intake .01 cfs at 1515 hr No flow below ranch intake at 1515 hr.
10-06-81	<.01	.05	>.015	(0905) .075 (1345) .074	(0940) .062 (1345) .061	dry	Flow below intake .02 cfs
10-07-81	<.01	.06	>.015	(1330) .086	(1405) .072	dry	
10-09-81	<.01	<.01	.019	.034	.020	dry	Well capped, leaks ~1 gpm. No flow below ranch intake

Note: Site 3 includes discharge from Site 1, BWS well and Site 2.
 Site 4 located 50 feet upstream of the Waianae Valley Ranch intake.
 Source: USGS and BWS

Takasaki indicated that existing water tunnels and wells in other parts of Waianae Valley may have increased the recharge (and base-flow discharge) of the high level basaltic aquifer by making more storm water storage space available. (Ref. 30) Therefore, it is conceivable that water withdrawal from the proposed wells will increase the ability of storm water to infiltrate the higher parts of the Waianae Range, including Kamaileunu Ridge. This might have the beneficial effect of improving recharge to these and other nearby wells. However, it is very difficult to predict the movement of dike-impounded ground water.

Currently there is only one party known to utilize water from Kumaipo Stream. The Waianae Valley Ranch diverts all flow from Kumaipo Stream at an elevation of approximately 840 feet. Stream flow will be monitored after the wells are put into production to determine if there are any effects to stream flow. The BWS will supply water to existing stream users in the event that the planned wells affect stream flow.

C. BIOLOGICAL RESOURCES

Development of the two well sites for the most part will only require removal of common introduced plants. No rare or endangered species will be affected. Likewise, the proposed wells will not affect any rare or endangered species of birds, mammals, fish, or snails. Effects on common species also will be negligible.

If the proposed wells do reduce stream flow, then the sparse existing population of o'pae in Kumaipo Stream may be eliminated. It would be possible to restore stream flow by pumping a little well water back into the stream. Since the stream bed is relatively impermeable, and since well water would be cool and pure, this kind of engineering solution could preserve natural stream quality. However, it is felt that this measure is not justified because Kumaipo and Hiu Streams have relatively low value as a habitat for stream fauna. Since no rare native species are involved, there is no justification for reducing the water available for human consumption.

D. ARCHAEOLOGICAL RESOURCES

In order to avoid adverse impacts on archaeological resources, the following mitigation measures will be employed:

1. Production facilities will be located in an area free of visible artifacts.
2. Archaeologists will be retained, prior to construction of the access road, to flag sites that should be avoided.
3. Archaeological monitoring will be undertaken during grading to determine whether subsurface archaeological features or artifacts are present.
4. If any cultural materials are encountered, then a qualified archaeologist will examine them.
5. Any other measures requested by the State Historic Preservation Officer will be implemented.

E. WATER SUPPLY AND PRICE

It is hoped that the two wells will increase the Waianae Coast water supply by approximately 1.0 mgd. Actual sustainable yield may be less. The water produced by these wells will be used exclusively by Waianae District customers (primarily residential but to include all consumers). The first priority of use will be to accommodate new water hook-ups. Any water "left over" will replace water now imported from the Pearl Harbor District. Development of the wells will not affect water prices on the Waianae Coast because the BWS charges the same water rates throughout Oahu.

F. POPULATION GROWTH

The proposed wells will not directly induce population growth because water is not the only factor limiting development of new housing on the Waianae Coast. In the short run, the indirect impact of the proposed wells on population growth would be to facilitate DHHL plans to build housing on AG-1 zoned Hawaiian Home Lands. Without public subsidies, such as nominal land lease rents and low interest loans available to Hawaiians on DHHL lands, the mere presence of private residential zoned land and adequate water supply is not sufficient to assure population growth. Proximity to jobs and "status" schools are major factors which people consider when deciding where to live. As indicated in Chapter II, there are relatively few jobs on the Waianae Coast and proportionally fewer high school graduates as compared to the rest of Oahu. Population growth on the Waianae Coast probably is slow now because of this. According to the October 1979 Hawaiian Telephone Building Digest, there is not a single private housing development with a firm planned completion date on the entire Waianae Coast, except for units planned on lands owned by the DHHL. (Ref. 19, p. 22)

In the long run, development of a resort at West Beach, an amusement park at Ewa, and a deep draft harbor at Barbers Point are likely to provide many jobs within easy commuting distance from the Waianae Coast. Thus, there eventually will be substantial demand for new housing development on the Waianae Coast.

In the event that several successful new wells are drilled in Waianae and Makaha Valleys, and if existing water imports from the Pearl Harbor aquifer continue, then water will not be a constraint to population growth on the Waianae Coast. Using assumptions outlined in Chapter II, if all potential housing units permitted by County zoning and the Hawaiian Home Lands General Plan are built, then the Waianae Coast's population could expand to between 67,700 and 93,400 persons. By comparison, the estimated Waianae Coast population in January 1980 was 28,500. (Ref. 16, p. 85)

Population growth and development could be controlled by allocating public water supply only in conformance to the Oahu General Plan. However, the BWS has no legal mandate to use water supply as a tool to

direct growth. In the absence of any law or ordinance authorizing the BWS to refuse service when water is available, the BWS is committed to meeting all future demand.

G. CONSTRUCTION-RELATED IMPACTS

Construction-related impacts such as dust and erosion will be minimal because of standard mitigation measures. Construction noise will occur during daylight hours at great distance from existing homes in Waianae Valley. Construction equipment will mostly remain on site and will not affect traffic on Waianae Valley Road. Erosion will be minimized by limiting the areas exposed and by timely landscaping. Improving the jeep trail with culverts and a gravel surface will significantly reduce present levels of erosion.

H. RECREATION

Improvement of the existing jeep trail will facilitate access for hunters, hikers, and campers to the higher scenic parts of the Waianae Range. The existing trail is so rutted that even 4-wheel drive vehicles have difficulty using it.

The well sites will be located within "Hunting Area, Unit D." However, BLNR Administrative Rules Title 13 Chapter 123 only permits hunting of game mammals in this area on Saturdays, Sundays, and State holidays. As a precautionary measure, the BWS will request the Department of Land and Natural Resources to establish a safety zone surrounding the developed wells.

I. UNAVOIDABLE ADVERSE IMPACTS

If it should develop that withdrawal of water from the wells reduces water flow in Kumaipo and Hiu Streams, then reduction of stream flow would be an unavoidable impact. Because Kumaipo and Hiu Streams have interrupted flow for most of their length, and because they now provide poor habitat for fish and crustacea, stream preservation is not

considered adequate grounds to justify foregoing development of the proposed wells. If reduction of stream flow does occur, then adequate mitigation measures will be made to meet the needs of existing users.

J. COMMITMENT OF RESOURCES, FUTURE OPTIONS, AND LONG TERM PRODUCTIVITY

Once the Waianae wells are put into production, the BWS will be committed to using them to supply the Waianae Coast with water. Stream flow reduction in Kumaipo and Hiu Streams would be permanent, if it does occur. Otherwise, the proposed wells will not involve any trade-offs between environmental gains and losses or pose any risk of environmental degradation. High level ground water in the Waianae Range is a renewable resource. Water withdrawal from the two wells will not exceed sustainable yield.

K. GOVERNMENTAL POLICIES OFFSETTING ADVERSE IMPACTS

The primary result of the proposed project will be to make new water sources available to supply the local needs of the Waianae Coast. The project may thus allow new construction that otherwise might not occur due to the difficulty of developing private water sources. The policy of County government toward such growth is established by the County General Plan and zoning.

The Waianae Coast is connected to the BWS leeward Oahu water system and could be allocated more water if the BWS developed new water sources to supply leeward Oahu. Hence, the same benefits could be achieved if other water sources were substituted for the proposed Waianae Wells. However, leeward Oahu water needs are such that the BWS will shortly have to pursue all reasonably cost-effective water development possibilities, including some which pose the risk of substantial adverse impacts. Among the various relatively low-cost sources of water, development of the Waianae wells will cause minimal adverse impacts. For example, use of high level ground water in Waianae Valley is a more environmentally desirable alternative than substituting brackish water for high quality water now used to irrigate sugar cane in Ewa. Use of brackish irrigation water in the long term risks reduction of water quality in the Pearl Harbor basal aquifer or soil fertility.

**CHAPTER IV. RELATIONSHIP OF THE PROJECT TO LAND USE PLANS
POLICIES, AND CONTROLS**

The proposed Waianae water wells will be in conformance with adopted land use plans and policies and also with conditions and standards imposed by applicable land use controls. The following paragraphs describe these controls as they relate to the project.

A. STATE PLAN AND STATE LAND USE CONTROLS

The Hawaii State Plan, enacted by Act 100, SLH 1978, indicates legislative intent to:

Ensure that adequate support services and facilities are provided to accommodate the desired distribution of future growth throughout the State. (Section 226-5(b)(3), HRS)

Encourage the protection of rare or endangered plant and animal species and habitats native to Hawaii. (Section 226-11(b)(6), HRS)

Promote the preservation and restoration of significant natural and historic resources. (Section 226-12(b)(1), HRS)

Support water supply services to areas experiencing critical water shortages. (Section 226-16(b)(5), HRS)

Direct future urban development away from critical environmental areas or impose mitigating measures so that negative impacts on the environment would be minimal. (Section 226-104(c)(4), HRS)

Identify critical environmental areas in Hawaii to include but not be limited to the following: watershed and recharge areas; wildlife habitats (on land and in the ocean); areas with endangered species

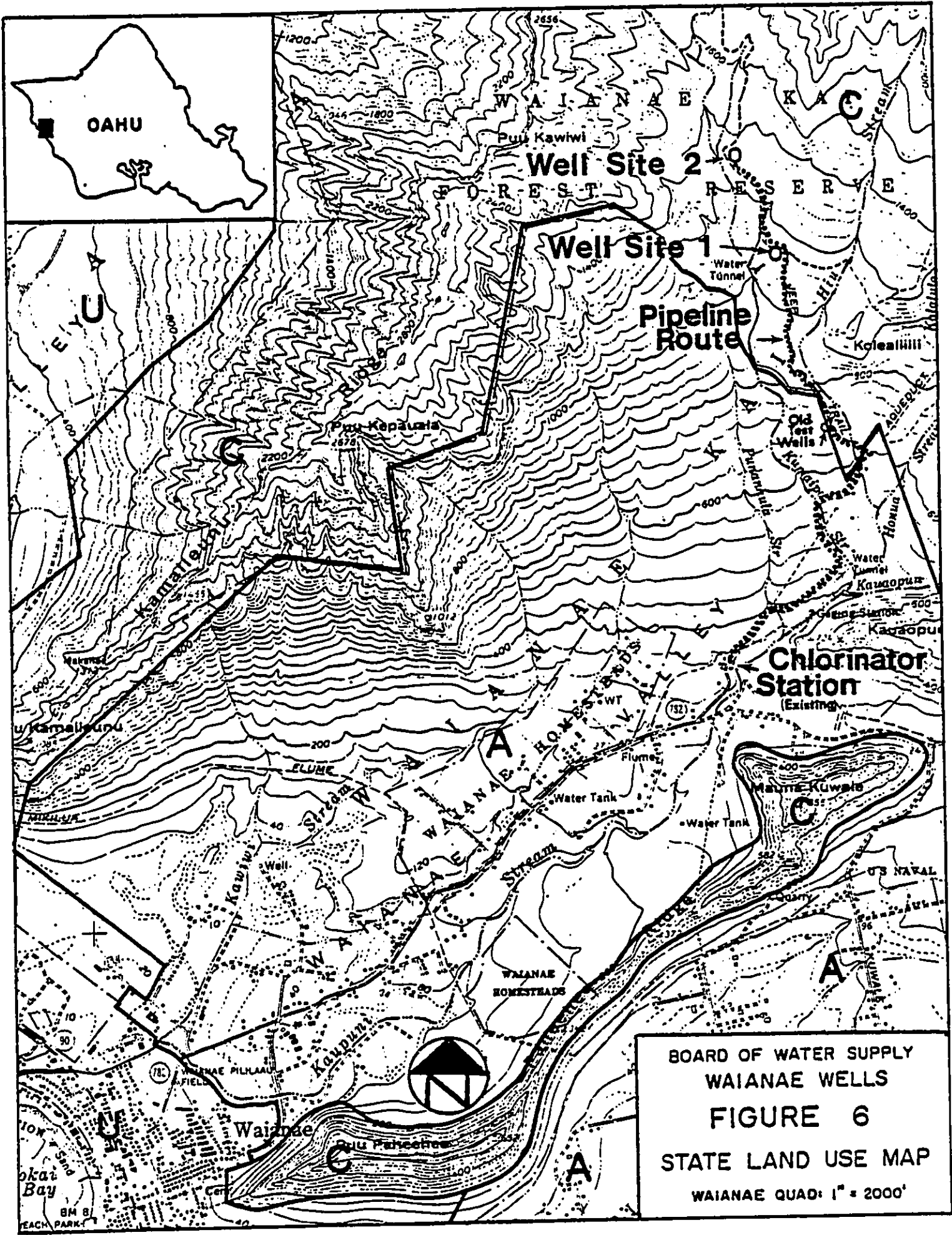
of plants and wildlife; natural streams and water bodies; scenic and recreational shoreline resources; open space and natural areas; historic and cultural sites; areas particularly sensitive to reduction in water and air quality; and scenic resources. (Section 226-104(c)(5), HRS)

With respect to these State Plan policies, the Waianae water wells will provide a portion of the water needed to accommodate population growth indicated in the 1977 Oahu General Plan. Also, the wells and related infrastructure will not adversely affect rare or endangered species, significant natural or historic resources, significant wildlife habitats, perennial streams, or open space or scenic resources. A full discussion of impacts is contained in Chapter III.

The primary State land use controls designated in Section 226-52, HRS, to implement the State Plan, are district boundary classification by the State Land Use Commission (LUC) and Conservation District Use Permits (CDUP) by the Board of Land and Natural Resources (BLNR). Both proposed well sites are located on lands which, under Chapter 205, HRS, the LUC has classified as Conservation District (Figure 6). Pursuant to Sections 205-5 and 183-41, HRS, the BLNR regulates land use within the Conservation District.

The well sites are located on lands designated in the Resource subzone on subzone maps of BLNR Administrative Rules Title 13 Chapter 2. Development of wells and water mains is a "Permitted Use" within the Resource subzone. As previously indicated, the wells and related infrastructure will not have significant adverse environmental effects (see Chapter III). The proposed facilities will also be in compliance with the objective of the Resource subzone, which is to develop, with proper management, areas to ensure sustained use of the natural resources of these areas.

The BWS will comply with other requirements of Title 13 Chapter 2 when developing preliminary construction plans.



BOARD OF WATER SUPPLY
 WAIANAE WELLS
 FIGURE 6
 STATE LAND USE MAP
 WAIANAE QUAD: 1" = 2000'

In addition to BLNR regulation of land use within the Conservation District, Section 6E-8, HRS, prohibits public agencies such as the BWS from undertaking any project which may affect historic property unless the Department of Land and Natural Resources (DLNR) gives written approval. (Ref. 3) Since archaeological remains are present on the first well site, the BWS has taken steps to obtain the DLNR Historic Preservation Officer's approval of construction plans. As recommended by the consulting archaeologist, the BWS will have an archaeologist present to monitor road and site grading (see Appendix C).

B. STATE COASTAL ZONE MANAGEMENT PROGRAM

The State Coastal Zone Management (CZM) Program explicitly requires public agencies to protect coastal ecosystems such as perennial streams containing native species which spend part of their life cycle in fresh water and part in salt water. (Ref. 32, pp. 61-63) The State CZM program also calls for adoption of State agency regulations to preserve sufficient stream flow to provide habitat for such species. (Ref. 32, pp. 210-11)

The proposed Waianae wells will not affect stream flow or stream fauna in perennial streams and hence would not conflict with the State CZM Program. Two tributaries of Kaupuni Stream, Kumaipo and Hiu Streams, are located in the vicinity of the proposed wells. All three streams have interrupted flow for most of their length and provide poor habitat for fish and crustacea. A study of fauna in these streams found no species of fish at any fresh water sampling station and only one site at which a native shrimp, o'pae, was present.

C. COUNTY GENERAL PLAN AND ZONING

If successful, the proposed Waianae wells will supply a total of 1.0 mgd. Assuming gross average consumption of 200 gpd per capita, counting all water users, 1.0 mgd could accommodate a population growth of 5,000 persons on the Waianae Coast. This would generally be in conformance with the population objectives and policies of the Oahu General Plan.

The 1977 Oahu General Plan has proposed that the Waianae Coast population increase to between 33,118 and 36,604 by the year 2000. However, as discussed in Chapter II, the existing County Zoning and DHHL plans for lands exempt from County land use controls could allow the Waianae Coast population to expand to between 67,700 and 93,400. It is not possible to predict the manner in which this discrepancy will be resolved by the Honolulu City Council.

At this time, the City Department of General Planning (DGP) has prepared preliminary draft Development Plans (DPs), but no DP ordinance is yet in effect for the Waianae Coast. Pursuant to Section 5-409 of the Revised City Charter, DPs are area-specific land use plans designed to carry out the Oahu General Plan. According to the DGP, the April, 1980 draft DP for the Waianae Coast proposed to allow the population to increase to 42,200 by the year 2000. (Ref. 23) DGP estimates do not include the possibility of the DHHL developing as many as 3,635 homes on lands exempt from County land use controls. Regardless, it seems likely the DGP will propose amendments to the Oahu General Plan to reflect population growth planned in the draft DP.

Pursuant to Section 46-4(a), HRS, zoning is the primary land use control which can be used to implement County land use plans. Zoning changes are prohibited except when in conformance with County plans. But as the State Circuit Court has ruled (Civil No. 57840), Section 46-4(a) enables, but does not obligate, the City Council to amend existing zoning to implement newly adopted land use plans such as the 1977 Oahu General Plan.

The actual well sites are in the State Conservation District. Pursuant to Section 205-5, HRS, County zoning can be used to regulate development in all land use districts except for the Conservation District. The water main to connect the wells to the existing BWS chlorinator station on Waianae Valley Road will be partially located in the State Agriculture District (Figure 5). The County has zoned AG-1 those parts of Waianae Valley which are in the State Agriculture District. Under Section 21-401 of the current Comprehensive Zoning Code of the City and County of Honolulu, public utility mains are a permitted use in the AG-1 zoning district.

CHAPTER V. ALTERNATIVES TO THE PROPOSED PROJECT

There are a wide range of alternatives to the proposed Waianae wells which to varying degrees could fulfill their objective of meeting future water demand. In brief, these alternatives are as follows:

- A. NO PROJECT
- B. ALTERNATIVE SITES
- C. ISLAND-WIDE APPROACHES
 - 1. Conservation, Bulkheading of Tunnels, Controlling Leaks.
 - 2. Desalinization of Brackish Water.
 - 3. Exchanging Water with Agriculture.
 - 4. Trapping Storm Runoff.
 - 5. Taking Stream Water.
 - 6. Taking Agricultural Water.
 - 7. Increasing Water Prices.

If adequate water were available, then County zoning rather than water supply would be the limiting factor on new development on the Waianae Coast. For that reason, any of the alternatives that could meet future water demand would have the same impact on population growth on the Waianae Coast as the proposed Waianae wells.

Although many of the alternatives to the proposed wells are feasible, the Waianae wells are sufficiently cost-effective that they cannot be rejected on purely economic grounds. Nor can they be rejected on purely environmental grounds. At worst, the wells only pose a slight risk to stream flow in two intermittent streams with relatively low value as stream habitat. Otherwise, the project will neither cause adverse impacts nor necessitate environmental trade-offs.

Over the next two decades, total Oahu water demand is projected to increase to the point where the BWS will have to seriously explore all feasible options. A number of alternatives involve significant risk of environmental degradation or undesirable trade-offs. Development of the

proposed Waianae wells will postpone the time when less environmentally desirable alternatives will become necessary.

A. NO PROJECT

If the Waianae wells are not developed, then BWS water development projects in the Waianae Water Use District will be limited to wells in Makaha Valley. The planned Makaha wells will have sufficient capacity to accommodate substantial population growth on the Waianae Coast, regardless of whether any wells are drilled in Waianae Valley. If and when water from the Makaha wells proves insufficient, then more water could eventually be imported into Waianae from other parts of Oahu. This would not be possible until after other new water sources are developed, particularly on the windward coast. Because of the serious consequences of overdrawing the Pearl Harbor aquifer, any means of replacing imported water with local water is highly desirable. Therefore, the "no project" alternative has been rejected for lack of justification. However, if the first test well in upper Waianae Valley proves unsuccessful, then the second well may not be pursued.

B. ALTERNATIVE SITES

There are undoubtedly many other sites on Oahu where water can be developed. Over the next few years, both the BWS and the DOWALD will be conducting an extensive investigation for new sources. However, other sites will not serve as alternatives to the proposed wells in Waianae Valley since these other sites will also need to be developed to meet the island's growing water needs.

In general, leeward Oahu well sites would tend to produce less water than windward Oahu sites. But, unlike leeward Oahu well sites, many of the possible windward sites have the potential to reduce the amount of water flowing in perennial streams. Reduced stream flow would be likely to adversely affect the biological, recreational, and aesthetic value of streams. Unless adequate mitigation measures are imposed, reduction of stream flow in a perennial stream would be contrary to the policies of the Hawaii CZM Program.

C. ISLAND-WIDE APPROACHES

By the year 2000, easily accessible, high quality ground water may not be sufficient to meet total Oahu water demand. Because of the way that Oahu's water supply system is integrated, steps can be taken on an island-wide basis to meet the growing urban demand for water. Without question, some island-wide approaches will ultimately become a necessity. Possible approaches vary widely in cost, impacts, and social acceptability. Some could feasibly serve as an alternative to the proposed Waianae wells by freeing water from the Pearl Harbor aquifer to be pumped to Waianae. To put the following alternatives in proper perspective, it should be realized that the projected municipal water needs for Oahu by the year 2000 range from 183 mgd to 230 mgd, depending on gross per capita consumption (@ 200-250 gpd). (Ref. 9, 16, 21 and 23) This represents an increase of 43 to 90 mgd over the 1980 level of municipal water consumption (140 mgd).

1. **Conservation, Bulkheading of Tunnels, Controlling Leaks.** A very efficient approach to meeting future water demand is to conserve water and avoid unnecessary losses. Major possibilities include installing water saving devices, bulkheading water collection tunnels, and repairing leaky water mains.

Ordinance No. 79-27 amended the Oahu plumbing code to require installation of water saving devices in new toilets and recirculating systems for new cooling equipment after November 9, 1979. Water savings could be expanded by installing similar devices in toilets and cooling equipment in existence prior to November 1979. While the BWS currently is not authorized by statute or ordinance to subsidize "retrofitting" old fixtures with water saving devices, there could be merit in such a program. However, at present, there is no reliable data on the water savings that could be expected, or the actual cost of a retrofitting program.

Part of Oahu's water supply comes from high level tunnels bored into the Koolau and Waianae mountains. Water trapped in the permeable mountain basalt by

impermeable dikes is drained by these tunnels. Unless they can be closed with a bulkhead to build up lost storage, water tunnels produce only base flows year round. Out of four tunnels with bulkheads, the procedure has been effective only at Waihee. Two bulkheading attempts in the Waiahole system were failures. Although the potential additional water supply from bulkheading has been estimated to be as much as 30 mgd by the Hawaii Water Resources Regional Study, based on past performance, the actual amount might be only a fraction of this. (Ref. 18, p. 56)

In fiscal year 1978-79, approximately 12% of the water input into the overall BWS system was unaccounted for. (For the Ewa-Waianae District, this figure is 5.6% or about 0.89 mgd.) This includes meter errors, non-metered uses (fire, line flushing, etc.) and an unknown amount of leakage. The cost of locating and repairing leaky sections of pipe has not been estimated at this time.

2. **Desalinization of Brackish Water.** Large quantities of brackish ground water could be made available for domestic use if excess salt were removed. Demineralization techniques are available which, although more expensive than normal ground water development, are considerably less costly than desalinization of ocean water. It has been estimated that in 1977, construction of a 20 mgd reverse osmosis demineralization plant to treat water from the Pearl Harbor Springs would cost approximately \$11 million. (Ref. 21, p. 22) The total annual cost of potable water from this plant would have been approximately \$412 per million gallons. However, 2/3 of this cost is for electric power. (Ref. 20, p. 40) The major disadvantage with desalinization is that electric power on Oahu is produced with non-renewable fossil fuels. Apart from the environmental trade-offs necessitated by use of such resources, the cost of fuel for electric

power has doubled over the last few years and will continue to escalate.

3. **Exchanging Water with Agriculture.** Of the 140 mgd of ground water used to irrigate sugar cane on leeward Oahu, about 50 mgd is high quality water suitable for human use. (Ref. 18, p. 56) This water could be exchanged for treated sewage effluent or brackish water. It is estimated that in 1977, it would cost \$255 per million gallons to exchange 20 mgd of brackish water from the Pearl Harbor Springs for high quality potable water from Ewa used for cane irrigation. (Ref. 21, p. 39)

Exchange of brackish water or treated sewage effluent for high quality irrigation water poses several risks. First, ground water could possibly be contaminated or rendered unpotable. Second, cane productivity could suffer. Third, the soil could become caked with salts and become less permeable, requiring more water to leach salts out of the soil. Fourth, treated sewage effluent might clog the drip irrigation tubes used in cane fields.

Initial studies using treated sewage effluent from Mililani indicate that problems with cane productivity and soil retention of salts probably can be resolved. (Ref. 20, p. 54) However, at this time, the most feasible option would be to exchange brackish water with high quality water used to irrigate sugar cane growing above caprock on the Ewa Plain. (Ref. 21, p. 18)

4. **Trapping Storm Runoff.** The economics of trapping storm runoff havenot been thoroughly analyzed. At some time in the future, as a means of preserving coastal water quality and preventing coral kills, the State "208" Water Quality Program may require that large scale development incorporate ponding basins to trap storm runoff. A possible variation would be joint

public and private programs to install dams to slow storm runoff out of natural drainage basins such as Waikele Stream. Besides reducing siltation of near shore waters, such measures would result in more efficient recharge to Oahu's basal water supply.

The environmental benefits of on-site and land based disposal of storm water need to be balanced against the debits. First, storm water ponding basins require large areas. While some forms of agriculture such as sugar cane can be located in a ponding basin, most human uses are precluded during wet periods. Second, ponding basins can create breeding grounds for mosquitoes. Third, ponding basins will continually require maintenance because of silt build-up from flood flows.

5. **Tapping Stream Water.** Surface water on Oahu could theoretically be treated and then used for human consumption. However, there would be formidable political and legal obstacles including the policies of the Hawaii CZM Program to preserve perennial streams. Punaluu and Kahana Streams on windward Oahu are the most feasible streams for water development. Their base flows are in the range of 9 to 12 mgd each. However, development and treatment of surface water from these streams would probably be more costly than to install wells and pump the ground water which is the source of stream flow.
6. **Taking Agricultural Water.** Simply taking State owned water away from the sugar companies would cause severe economic hardship. The BLNR has indicated that this approach will not be authorized if there are feasible alternatives. A more reasonable approach would be to require that if sugar cane fields are replaced with houses, then the high quality potable water used to irrigate these fields be provided to the BWS. For example, replacement of 1,000 acres of sugar cane on the Ewa Plain with houses could free over 6 mgd for use

by the BWS.

7. **Increasing Water Prices.** Increased water prices could lead to more efficient use of water and discourage waste. For this reason a study by the Hawaii Institute for Management and Analysis in Government (HIMAG), recommended imposition of peak-load (i.e. higher summer) prices for municipal water users along with a price break for agricultural water users hooked into the BWS system. (Ref. 5, pp. 111-114) The logic of the HIMAG recommendation is based on the assumption that the low cost of municipal water discourages the application of available water-saving technology. If this assumption is correct, then peak load pricing could delay the time when the BWS will be forced to turn to more expensive water sources such as brackish spring water. Peak load pricing has not yet been adopted, but as previously noted (page 27), the discounted rate formerly given to large industrial users has been eliminated in order to encourage water conservation.

CHAPTER VI. NECESSARY APPROVALS

1. Approval of this EIS by both the Governor and the BLNR prior to the granting of permits and approvals for construction of the production wells and infrastructure.
2. Conservation District Use Permit from the BLNR to construct the proposed wells and related infrastructure in the Conservation District.
3. Clearance from the DLNR Historic Preservation Officer that the project will not adversely affect historic sites.
4. Right of entry and disposition of State lands by the BLNR to improve and develop a production well on State lands at the second well site.
5. Special Permit from the Director of Land Utilization to construct a water main in the AG-1 zoning district (if proposed amendments to the current County Comprehensive Zoning Code are enacted).
6. County permits (eg. erosion control and building) to construct a water main and improve the dirt access road in the AG-1 zoning district.
7. The project is subject to the applicable terms and conditions of Chapter 20 of Title 11, Administrative Rules, Potable Water Systems, Public Health Regulations. In addition, the Director of Health must approve the well for use in accordance with Chapter 20.

CHAPTER VII. ORGANIZATIONS AND PERSONS CONSULTED

A. LIST OF CONSULTED PARTIES

1. Federal Government

- # * - U.S. Army Corps of Engineers [p. D-1, 16]
U.S. Geological Survey
- # * U.S. Department of Agriculture [p. D-1, 17, 22]
- # * U.S. Department of Interior [p. D-3, 18]
- # U.S. Army [p. D-19]
- # U.S. Coast Guard [p. D-20]
- # U.S. Navy [p. D-21]

2. State of Hawaii

- # * Department of Agriculture [P. D-4, 5]
- # * Department of Health [P. D-23]
- # * Department of Land and Natural Resources [p. D-8, 24, 25]
 - * Division of Fish and Game [p. D-6]
- # * Division of State Parks [p. D-6, 7]
- # * Division of Water and Land Development [p. D-9]
- # Department of Planning and Economic Development [p. D-26]
- # * Department of Transportation [p. D-10, 27]
- University of Hawaii
- # * Water Resources Research Center [p. D-11, 28]
- # * Environmental Center [p. D-11, 12]
- # Department of Accounting & General Services [p. D-29]
- # Department of Defense [p. D-30]
- # Office of Environmental Quality Control [p. D-31]

3. City and County of Honolulu

- # * Department of General Planning [p. D-12, 33]
- # * Department of Land Utilization [p. D-13]
- # * Department of Public Works [p. D-14, 34]
- # * Department of Transportation Services [p. D-15, 35]
- # Department of Housing and Community Development [p. D-36]
- # Department of Parks and Recreation [p. D-37]

4. Community

- Waianae Neighborhood Board
- Life of the Land
- # Sierra Club [p. D-38]
- Solomon Naone
- Perry J. White
- Legal Aid Society
- # Waianae Rap Center [p. D-40]
- # Benjamin M. Matsubara [p. D-43]
- Goodsill, Anderson & Quinn

Note:

- * Parties responding to the EIS Preparation Notice
- # Parties responding to the Environmental Impact Statement.

CHAPTER VIII. SUMMARY OF UNRESOLVED ISSUES

Actual drilling and test pumping of the two proposed Waianae wells will be necessary to provide firm answers to the following questions:

1. Will the second well sites yield enough water to justify installing production facilities?
2. What quality of water will be produced at the second well site and what will the total sustained ground water yield be?
3. How thick is the surface layer of alluvium and talus covering the underlying basalt at the second well site?
4. What is the static water table elevation at the second well site?
5. Will withdrawal of ground water from either of the Waianae wells reduce the water level in the few sections of Kumaipo or Hiu Streams that have continuous flow?

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APPENDIX A

BOTANICAL SURVEY

PROPOSED WAIANAE KAI WATER WELL SITE

Report of Botanical Survey

Grant Gerrish
March 14, 1979

Vegetation Zone

The proposed well site is located in the Guava Zone (Egler 1939). As in most other parts of this vegetation zone, the native plant communities have been almost entirely replaced by plants brought to Hawaii by man.

Existing Vegetation

The vegetation of the proposed well site in the Waianae Kai Forest Reserve is secondary forest with several clearings marking abandoned agricultural lands. In these clearings, of one-half to one acre, many unmortared stone walls parallel the contours of the slope. Apparently these walls once made up a system of agricultural terraces.

Presently these clearings are covered with a dense growth of herbaceous vegetation dominated by the introduced grass, Paspalum conjugatum, and the vines Ipomoea alba and Ipomoea congesta. Other common herbs are Canna indica, Desmodium uncinatum, and Rivinia humilis. Several mature Samanea saman (monkeypod) trees stand on the periphery of these clearings. At the time of the survey, the soil in these clearings was very wet; apparently, the waterlogged condition of the soil does not permit the development of forest.

The remainder of the site is covered with mature, secondary forest of introduced tree species. The canopy,

10 to 15 meters above the forest floor, is formed by Grevillea robusta, with a distinct understory of Leucaena leucocephala. In some areas, the Leucaena is replaced by dense stands of Coffea arabica (Coffee). There is little woody underbrush. The ground cover is almost entirely the semi-woody Rivinia humilis with some Kalanchoe pinnata.

On the floor of the Kumaipo Stream valley and in the valleys of its several tributaries, the canopy of Grevillea is discontinuous, and the streams are lined by mature stands of Aleurites moluccana (kukui nut)--a tree introduced by the Polynesians. The understory of Leucaena is much less dense and the ground is covered by a low grass, Oplismenus hirtellus, with a few ferns and other herbs.

Access Road

The jeep road enters the Waianae Kai Forest Reserve at an elevation of about 520 feet. From this point to an elevation of approximately 800 feet, the road passes through a dense monotypic forest of Leucaena leucocephala. Along the roadside, the tall grass, Panicum maximum, grows mixed with common roadside weeds, such as Bidens pilosa, Ageratum conyzoides, and Emilia javanica. At about 800 feet elevation, Grevillea robusta becomes prominent as a canopy tree and the forest above this elevation resembles the secondary forest which exists on the proposed site.

Reccomendations

No plants listed as rare or endangered (Federal Register 1976) were found on the proposed peoject site or near the existing access road. The Aleurites moluccana forest in the Kunaipo Stream valley is a particularly excellent development of this vegetation type. However, Aleurites stands are common on the island of Oahu and elsewhere in the state. The Aleurites stand on the proposed site should not be considered critical habitat.

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Waianae Kai Water Well Site - Species List

A listing of plants found at the proposed well site and along the access road leading to the site.

Nomenclature of flowering plants follows that of H. St. John. 1973. List and summary of the flowering plants in the Hawaiian Islands.

N = Native; E = Exotic (introduced to Hawaii by man).

<u>SPECIES</u>	<u>FAMILY</u>	<u>STATUS</u> <u>N/E</u>
Ferns		
<u>Blechnum occidentale</u> L.	Blechnaceae	E
<u>Cyclosorus dentatus</u> (Forsk.) Ching	Aspidiaceae	N
<u>Nephrolepis exaltata</u> (L.) Schott	Davalliaceae	N
Flowering Plants		
<u>Acacia farnesiana</u> (L.) Willd.	Leguminosae	E
<u>Ageratum conyzoides</u> L.	Compositae	E
<u>Aleurites moluccana</u> (L.) Willd.	Euphorbiaceae	E
<u>Bidens pilosa</u> L.	Compositae	E
<u>Canna indica</u> L.	Cannaceae	E
<u>Chloris inflata</u> Link	Gramineae	E
<u>Coffea arabica</u> L.	Rubiaceae	E
<u>Colocasia esculenta</u> (L.) Schott	Araceae	E
<u>Commelina diffusa</u> Burm. f.	Commelinaceae	E
<u>Cordyline terminalis</u> (L.) Kunth	Liliaceae	E
<u>Desmodium uncinatum</u> (Jacq.) DC.	Leguminosae	E
<u>Emilia javanica</u> (Burm. f.) C. B. Robins	Compositae	E
<u>Eugenia jambos</u> L.	Myrtaceae	E
<u>Grevillea robusta</u> A. Cunn. in R. Br.	Proteaceae	E

Waianae Kai

<u>SPECIES</u>	<u>FAMILY</u>	<u>STATUS</u> <u>N/E</u>
<u>Ipomoea alba</u> L.	Convolvulaceae	E
<u>Ipomoea congesta</u> R. Br.	Convolvulaceae	N
<u>Kalanchoe pinnata</u> (Lam.) Pers.	Crassulaceae	E
<u>Leucaena leucocephala</u> (Lam.) de Wit	Leguminosae	E
<u>Oplismenus hirtellus</u> (L.) Beauv.	Gramineae	E
<u>Opuntia megacantha</u> Salm-Dyck	Cactaceae	E
<u>Oxalis martiana</u> Zucc.	Oxalidaceae	E
<u>Panicum maximum</u> Jacq.	Gramineae	E
<u>Pipturus albidus</u> (H.&A.) Gray in Mann	Urticaceae	N
<u>Paspalum conjugatum</u> Berg.	Gramineae	E
<u>Passiflora edulis</u> Sims	Passifloraceae	E
<u>Psidium guajava</u> L.	Myrtaceae	E
<u>Rivinia humilis</u> L.	Phytolaccaceae	E
<u>Samanea saman</u> (Jacq.) Merr.	Leguminosae	E
<u>Sida cordifolia</u> L.	Malvaceae	N
<u>Sida fallax</u> Walp.	Malvaceae	N
<u>Solanum seaforthianum</u> Andr.	Solanaceae	E

APPENDIX B

AQUATIC MACROFAUNA STUDY

Aquatic Macrofauna in Kaupuni Stream and Three of Its Tributaries; Kawiwi,
Kumaipo, and Hiu Streams in Waianae, Oahu

by

Amadeo S. Timbol, Ph. D.
Aquatic Biologist

Introduction

This study was made at the request of VTN in connection with a proposed well for the Board of Water Supply at Kumaipo Stream, a tributary of Kaupuni Stream. The stream channel from Kumaipo through Kaupuni to the ocean was studied due to the nature of Hawaiian aquatic macrofauna. Excluding insects, all larger native stream species are diadromous (having marine larval development) as a consequence of invasion from the oceanic ecosystem and incomplete adaptation to freshwater life. Kaupuni Stream has perennial water at the mouth due to tidal influence, only occasional water at low levels, and perennial water at mid- and high elevations. Water flows continuously throughout only during winter freshets. It has been previously determined that 10% of the stream's channel had been modified (e.g. concrete-lined channel; Timbol and Maciolek 1978).

Kaupuni Stream drains Waianae valley on leeward Oahu. Waianae town is an agricultural community supporting some dairy farms. One such farm borders Kawiwi Stream (Station 2, see Methods and Appendix B) and another is by Kaupuni Stream near Station 3. Stream pollution appears to come from this activity.

The objectives of this study are to compile a list of aquatic macrofauna, determine their distribution and abundances and to determine the presence (or absence) of endangered or threatened species. On the basis of resident aquatic macrofauna and physical characteristics of stream channels, an assessment of the stream's ecological quality status is made. Field work for this report was done in March through May 1979.

A search for published literature indicate that no previous work of this nature had been done for Kaupuni Stream and its tributaries.

Methods

Seven stations were selected: 3 in Kumaipo Stream, 2 in Kaupuni Stream, 1 in Kawiwi Stream, and 1 in Hiu Stream (see Appendix B for locations). A stretch of 20 x 1 m of stream channel was pre-measured and animals which could be seen were identified and counted. Some specimens were caught with a hand net, identified, counted, and released live in the same area. Boulders, rocks and stones in the freshwater areas were examined for native mollusks (e.g. Neritina granosa or hihiwai).

Terms used in this report designating the origin of animals are: (1) endemic, means occurring naturally in Hawaii only; (2) indigenous, means occurring naturally in Hawaii and also elsewhere; (3) introduced, means that the animal was brought to Hawaii either intentionally or accidentally; and (4) native, includes both endemic and indigenous animals. Terms and signs used to indicate relative abundances are: abundant (+++), where more than 5, sometimes up to a hundred or more were found; common (++) , means between 2 and 5 individuals; uncommon (+), means only one was sighted or collected; and absent (0), means it was neither sighted nor collected. The biota list was checked for endangered and threatened species using the following list and scientific publications: USFWS List of Endangered and Threatened Species (1977) and Miller (1972).

The following is a brief description of the sampling station (for more details, refer to Appendixes A and B):

Station 1. On Kaupuni Stream, about 1 km (this and subsequent distances are along stream channel; from USGS topographic map) from stream mouth, at about 3 m elevation. Situated downstream of Old Plantation Road bridge by the Waianae Pililaa Field playground. Sampling station is on concrete-lined channel.

Station 2. On Kawiwi Stream, about 1.3 km from stream mouth, at about 6 m elevation. Sampling station is on concrete-lined channel.

Station 3. On Kaupuni Stream, about 3 km from stream mouth at about 25 m elevation. Sampling station is on debris basin located at the upstream end of the concrete-lined channel.

Station 4. On Kumaipo Stream, about 7.5 km from stream mouth at 290 m elevation. Sampling station is in Waianae Kai Forest Reserve. Stream channel is in natural state (unaltered). Sampling station is downstream of proposed BWS well.

Station 5. On Kumaipo Stream, about 7.8 km from stream mouth at about 350 m elevation. Sampling station is in the forest reserve. The stream channel is unaltered and situated alongside proposed BWS well and immediately upstream of water tunnel.

Station 6. On Kumaipo Stream, about 8.1 km from stream mouth at about 365 m elevation. Sampling station is in the forest reserve area; on an unaltered channel, and upstream of proposed BWS well.

Station 7. On Hiu Stream, about 7.8 km from stream mouth at about 340 m elevation. In terms of both water flow and stream bed, Hiu is much smaller than Kumaipo. Sampling site is within forest reserve area and unaltered.

Results and Discussion

At least 16 species of aquatic animals (Table 1) were found: 6 fish, 3 crustaceans, 3 insects, 2 mollusks, 1 amphibian, and 1 annelid. The important native animals are:

1. Awaous stamineus (o'opu nakea)

This endemic goby is the largest of the freshwater gobies. It is an obligately diadromous animal and needs suitable environmental conditions throughout the stream channel for the nakea larvae to reach the ocean and the post-larvae to migrate upstream to their place of permanent residence. In Kaupuni stream system, post-larvae and fingerlings were found only in Kawiwi Stream (see Table 2, later) where the water was brackish. It appears that the young nakea is unable to negotiate the approximately 7 km stream channel to Kumaipo Stream during the few days of winter freshet when water is continuously flowing. Miller (1972) listed the nakea as "threatened" for Oahu.

Not found nor seen are three native gobies and one goby-like fish. The absence of Lentipes concolor (o'opu alamoo), a candidate for the endangered species list is to be expected since this species had not been collected on Oahu for several years now. The absence of Sicydium stimpsoni (o'opu nopili), an endemic goby widely distributed in high grade streams (Timbol and Maciolek 1978), confirms earlier findings that the nopili can still be found on Oahu in only three windward streams. Nopili was not expected to be found at Kaupuni, an interrupted stream, since nopili preferred strong, continuous flow. The third goby, Awaous genevittatus (o'opu naniha) is ubiquitous and was expected to be in the stream system. That it was not seen could be due to the highly turbid water which diminished visibility. That it was not caught may be due to its absence or in very low numbers - a condition ^{which} may be due, partly at least, to pollution in the estuarine section. Thus, the naniha may still be present in the stream system. Likewise, the endemic goby-like fish, Electris sandwicensis (o'opu okuhe) was not found although it is found in almost all the estuaries on Oahu. It may not have been seen nor caught for the same reasons that the naniha was not seen nor caught. Again, this fish may still be in the estuarine area of Kaupuni Stream.

2. Atya bisulcata (opae kalaole)

This small (2-4 cm) endemic shrimp is frequently found abundant in most streams with perennial water (as in Kumaipo Stream). Atya is primarily a detrital feeder and is usually abundant in most high grade streams. Two schools of thought are found regarding its life cycle: (1) that it is capable of completing its life cycle in freshwater; and (2) it is an obligately diadromous animal as evidenced by its ubiquitous distribution. It was found only at Kumaipo Stream and in one site (Station 5, see Table 2, later) only. The paucity of the atyid shrimp in Kumaipo suggests that there is a lack of suitable habitat for them. That there is a lack of suitable habitat is also suggested by the absence of the introduced Macrobrachium lar (Tahitian prawn). This larger prawn has established itself in most streams.

Table 1. List of Aquatic Macrofauna in Kaupuni Stream and Three of Its Tributaries; Kawiwi, Kumaipo and Hiu (March - May 1979).

Scientific Name	Local Name	Origin	List ¹
A. FISH			
1. <u>Awaous stamineus</u>	o'opu nakea	endemic	depleted on Oahu ²
2. <u>Kuhlia sandvicensis</u>	aholehole	endemic	none
3. <u>Mugil cephalus</u>	mullet ³ , amaama	indigenous	none
4. <u>Poecilia reticulata</u>	wild guppy	introduced	none
5. <u>Sphyraena barracuda</u>	kaku	indigenous	none
6. <u>Tilapia (=Sarotherodon) mossambica</u>	tilapia	introduced	none
B. AMPHIBIA			
1. <u>Rana rugosa</u>	green frog	introduced	none
C. CRUSTACEA			
1. <u>Atya bisulcata</u>	opae kalaole	endemic	none
2. <u>Metopograpsus thukuhar</u>	grapsid crab	indigenous	none
3. <u>Portunus sanguinolentus</u>	three-spotted crab	indigenous	none
D. MOLLUSK			
1. Lymnaed snails	pond snail	undetermined	none
2. <u>Melania</u> sp.	pond snail	indigenous	none
E. ANNELID			
1. Hirudinea	leech	undetermined	none
F. INSECTA			
1. Anisoptera naiads	dragonfly	undetermined	none
2. Coleoptera adults	water beetle	undetermined	none
3. Hemiptera adults	water bugs	undetermined	none

¹ Considered as endangered or threatened in official register or scientific publications. Depleted means the species still occurs in numbers adequate for survival but heavily reduced in numbers and continues to decline at a rate substantially greater than can be sustained (Miller 1972).

² Miller 1972

³ Two additional mullet species, Neomyxus chaptalii (ououa) and Chelon engeli may be present.

3. Melania sp.

This small (2-5 cm), ubiquitous native pond snail was found only in Kumaipo Stream. Unlike in other streams where they are limited to the lower sections of streams (e.g. in Kahana and Kaneohe streams, windward Oahu), this pond snail was found at elevations as high as 365 m. This is probably the first record at this high elevation.

Absent is another endemic freshwater mollusk, Neritina granosa (hihiwai). This is not surprising since hihiwai was found only in three Oahu streams. On-going studies on Kahana Stream (one of three hihiwai streams) indicates that it is no longer found there.

Occurrence and relative abundances are given in Table 2. There are almost twice (11 versus 7) more species in brackish water than in freshwater. Not one species is ^{commonly} found in all stations. Only insects and the wild guppy are found in a freshwater station and a brackish water station. The rest are limited to either fresh- or brackish water. Three of the 11 species are marine visitors (Mugil cephalus, Sphyræna barracuda, and Portunus sanguinolentus). The only native resident goby, found to be abundant in the estuarine section is the Awaous stamineus (o'opu nakea).

Conclusions

None of the aquatic macrofauna in Kaupuni Stream and three of its tributaries is found in the Federal list of endangered or threatened species.

The Awaous stamineus (o'opu nakea) is listed as threatened on Oahu by Miller (1972).

There are probably only a few suitable habitats for Atya bisulcata at Kaupuni and its three tributaries; Kawiwi, Kumaipo, and Hiu. It is suggested that provisions be made for the continued survival of this native shrimp in the stream system.

The absence of widely distributed native animals at lower sections of Kaupuni Stream suggests that this section is highly polluted. This confirms the ecological quality designation of grade IV (low environmental and biological quality) given earlier by Timbol and Maciolek (1978).

The presence of the native atyid shrimp at middle elevation and the unaltered channels therein calls for a higher ecological quality designation for the freshwater sections of the streams. Grade II (moderate to high quality water or natural values) would be a better designation.

Literature Cited

- Miller, R. 1972. Threatened freshwater fishes of the United States. Trans. Am. Fish. Soc. 101:239-252.

Table 2. Distribution and Relative Abundances of Aquatic Macrofauna in Kaupuni Stream and Three of Its Tributaries; Kawiwi, Kumaipo, and Hiu. (March - May 1979).

Scientific Name	Sampling Station						
	Brackish		Freshwater				
	1	2	3	4	5	6	7
A. FISH							
1. <u>Awaous stamineus</u>	0	+++	0	0	0	0	0
2. <u>Kuhlia sandvicensis</u>	++	0	0	0	0	0	0
3. <u>Mugil cephalus</u>	+++	+++	0	0	0	0	0
4. <u>Poecilia reticulata</u>	0	+	+++	0	0	0	0
5. <u>Sphyraena barracuda</u>	++	0	0	0	0	0	0
6. <u>Tilapia mossambica</u>	+++	++	0	0	0	0	0
B. AMPHIBIA							
1. <u>Rana</u> tadpoles	0	0	0	+++	+++	+++	+++
2. <u>Rana rugosa</u> (adults)	0	0	0	0	0	0	+++
C. CRUSTACEA							
1. <u>Atya bisulcata</u>	0	0	0	0	++	0	0
2. <u>Metopograpsus messor</u>	++	0	0	0	0	0	0
3. <u>Portunus sanguinolentus</u>	+	0	0	0	0	0	0
D. MOLLUSK							
1. Lymnaed snails	0	+++	0	0	0	0	0
2. <u>Melania</u> sp.	0	0	0	+++	+++	+++	0
E. ANNELID							
1. Hirudinea	0	0	0	+++	+++	+++	+++
F. INSECTS							
1. Anisoptera naiads	0	0	0	0	+	0	0
2. Coleoptera adults	0	+++	+++	0	0	0	0
3. Hemiptera adults	0	+++	+++	++	0	0	0

Legend: +++ = abundant; ++ = common; + = uncommon; 0 = absent or not seen.
See also Appendix B.

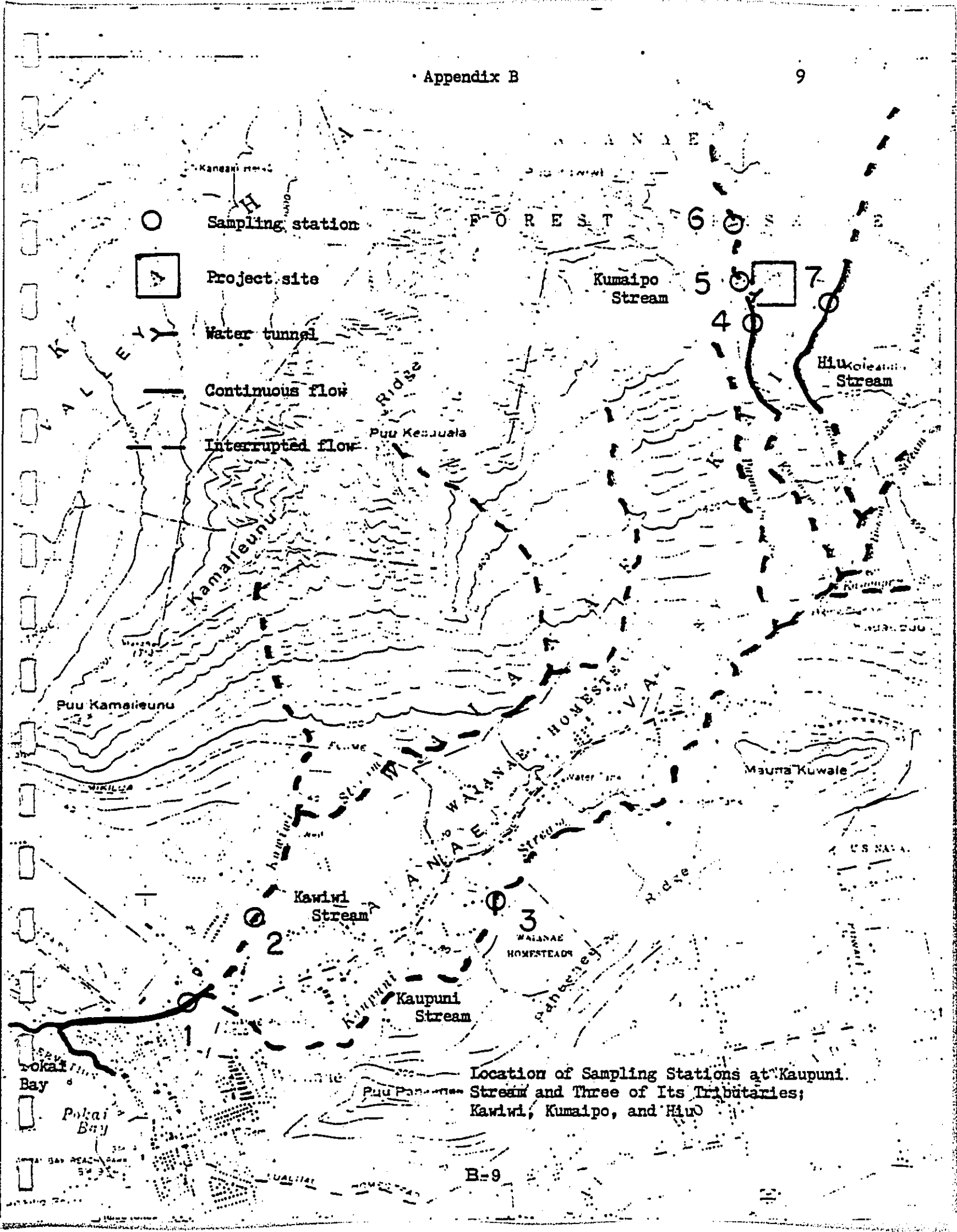
Timbol, A. S. and J. A. Maciolek. 1978. Part A. Statewide Inventory of Hawaiian Streams Including Survey of Habitat Factors and Associated Biota. FWS/OBS-78/16. USFWS National Stream Alteration Team Columbia, Missouri. 157 pp.

U. S. Fish and Wildlife Service. 1977. Endangered and Threatened Wildlife and Plants. Republication of List of Species. Federal Register Vol. 42, No. 135. Part V. July 14, 1977. pp. 36420-36433

Appendix A

Some Physicochemical Characteristics of Sampling Stations in Kaupuni Stream and Three of Its Tributaries; Kawiwi, Kumaipo, and Hiu.

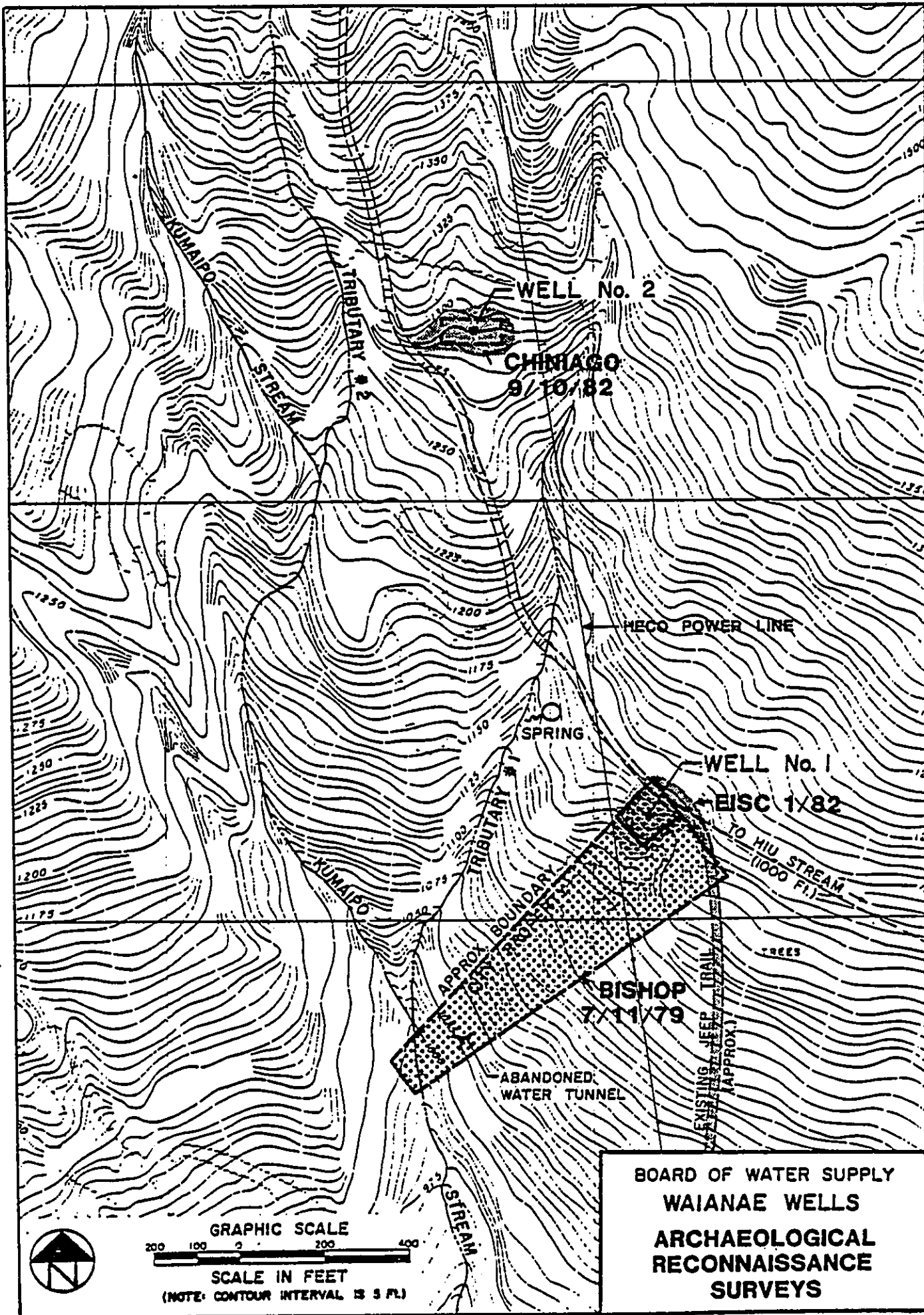
Sampling Station No. and Location	Parameter			
	Nature of Water and Stream Flow	Nature of Bottom	Width and Depth (m)	Others
1. Kaupuni Stream	Brackish, subject to tidal action	mud and silt on concrete-lined bottom	W= 15 D= 0.9	mod- erately turbid
2. Kawiwi Stream	Brackish, no appar- ent seaward flow, subject to tidal influence	red clay mud, silt on con- crete bottom	W= 0.8 D= 0.04	highly turbid
3. Kaupuni Stream	Freshwater, in pools; not flowing	silt, dissolved cow manure and red clay	W= 2 D= 0.05	highly turbid
4. Kumaipo Stream	Freshwater, riffle normal flow	gravel-boulder, with rotting kukui nut tree leaves	W= 1.5 D= 0.1	clear water
5. Kumaipo Stream	Freshwater, riffle normal flow	boulder-gravel, rotting kukui nut tree leaves	W= 1.5 D= 0.2	clear water
6. Kumaipo Stream	Freshwater riffle normal flow	boulder-gravel, rotting kukui nut tree leaves	W= 2.2 D= 0.5	clear water
7. Hiu Stream	Freshwater, riffle very slow flow	gravel and silt, rotting kukui nut tree leaves	W= 1.1 D= 0.07	milky white water



Location of Sampling Stations at Kaupuni Stream and Three of Its Tributaries; Kawiwi, Kumaipo, and Hukolea

APPENDIX C

ARCHAEOLOGICAL RECONNAISSANCE SURVEYS



ARCHAEOLOGICAL RECONNAISSANCE SURVEY OF
PROPOSED WAI'ANAE WATER WELL, WAI'ANAE,
O'AHU, HAWAI'I

by

Aki Sinoto
B.A., Anthropology
Member, Society of Professional Archaeologists
Department of Anthropology
Bernice P. Bishop Museum

Prepared for

VTN
Honolulu, Hawai'i
August 1979

An archaeological reconnaissance of an exploratory well site in the upper Wai'anae Valley, O'ahu Island was requested by VTN Pacific. Aki Sinoto from the Department of Anthropology, Bernice P. Bishop Museum, conducted this field inspection accompanied by Mr. Fred Proby of VTN Pacific and Mr. Chester Lao from the Board of Water Supply, on Wednesday, July 11, 1979.

The two major objectives of this survey, as outlined in our letter of June 29, 1979, were to determine the presence of any archaeological resources on the property and to examine several previously known stone walls.

The surveyed area lies within the Wai'anae-Kai Forest Reserve and occupies roughly a 4-acre strip of land between Kumaipō Stream and the existing jeep road. The topography is typical of drainageway side slopes, consisting of stones and boulders overlying a weathered volcanic substrate with a cover of reddish, silty, clay loam. The terrain generally retains an 18% slope with more acute slopes occurring near the stream at the southwestern terminus of the project area.

The vegetation consists of *koa-haole* (*Leucaena glauca*) as the dominant cover with *ti* (*Cordyline terminalis*), *kukui* (*Aleurites moluccana*), barnyard grass (*Echinochloa crusgalli*), *liliko'i* (*Passiflora edulis*), guava (*Psidium guajava*), chayote (*Sechium edule*), coffee (*Coffea arabica*), *hau* (*Hibiscus tiliaceus*),

and feral taro (*Colocasia esculenta*). Some other notable exotic trees in the area are silky oak (*Grevillea robusta*), mango (*Mangifera indica*), and monkeypod (*Samanea saman*).

The former exploitation of water resources in this area is evidenced by an abandoned water tunnel at the stream-cut bank in the SW portion of the Board of Water Supply well property. At present, aside from foot trails used by hikers and pig hunters, no permanent usage of the area is indicated.

Although no previously recorded sites were found to be present on the subject property, several agricultural terrace systems, plots, enclosures, and long free-standing walls were encountered. Many of these features are known by local people and except for disturbance by natural causes, most remain in fairly good states of preservation.

The agricultural systems consisted of terracing with stone retaining walls, stone-lined irrigation ditches ('*awawai*'), and associated smaller plots and enclosures defined by stone walls or alignments. Several areas of stone-reinforced stream banks were also observed. The long walls and some inter-connecting segments suggest boundary walls or animal enclosures. However, their origins have not been determined.

Wai'anae is one of the major valleys on O'ahu that appear to have been intensively cultivated during the prehistoric period. An extensive complex of agricultural terraces still remains fairly intact throughout most of the undeveloped portions of the valley. Since this valley, unlike the neighboring Makaha Valley, has not yet been intensively investigated archaeologically, these presently sited areas offer significant research potential. Also, since current archaeological research emphasizes holistic, environmental investigations, even the small number of sites present on the Board of Water Supply property become important in gaining an overview of the prehistoric exploitation of the valley.

According to the information furnished by VTN Pacific and the Board of Water Supply, of the total 4 acres, only approximately .23 to .27 acre or 6 to 7% will be affected by the exploratory well-boring operations. During the reconnaissance survey, Messrs. Proby and Lum determined the NW portion of the property to be most feasible for the location of the exploratory well. Two possible test-boring sites, one at the northern corner of

the property and the other at the eastern corner, both 25 to 50 ft from the existing jeep road, were suggested. The archaeological survey showed this area to be relatively free of archaeological features. The initial phase will involve the alteration of land by bulldozing and clearing for an access route for the boring machinery. Since this access route can be made to circumvent any sites, no adverse impact is anticipated during this initial testing phase. However, if the exploratory well proves successful, production facilities will be installed and occupy roughly 10,000 to 12,000 square feet (.23 to .27 acre). Further archaeological work may be necessary to mitigate the effects of this second phase of construction activities.

The following steps are recommended to mitigate any potential adverse impact on sites in this area:

- 1) Subsequent to the final determination of the exploratory well location, the access route should be flagged by archaeologists to avoid any sites in the area, and if possible to perform a similar task for the support facility area.
- 2) If unable to avoid sites within the support facility area, then a limited Phase I survey to map and instrument-locate the sites near the well, concentrating on the northeastern third of the property, should be conducted.
- 3) A search of historical literature and documents should be undertaken for the specific area. Historic maps should also be examined for indications of boundary and livestock walls.
- 4) Archaeological monitoring should be undertaken during any construction-related excavation or grading in the area, to determine the presence of any subsurface archaeological features.
- 5) During the course of construction or clearing, if any cultural materials are encountered, exposed, or recovered, a qualified archaeologist should be contacted.

The preceding recommendations can be implemented in increments and should be coordinated with the Board of Water Supply construction scheduling.

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 521
HONOLULU, HAWAII 96809

SUSUMU ONG, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

DIVISIONS:
CONSERVATION AND RESOURCES
ENFORCEMENT
CONVEYANCES
FISH AND GAME
FORESTRY
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

December 17, 1979

Board of Water Supply
City and County of Honolulu
630 So. Beretania St.
Honolulu, Hawaii 96843

Gentlemen:

Subject: EIS Preparation Notice Statement
Waianae Water Well TMK 2-5-06:8

Information given the Historic Preservation Office on December 15, 1979 by Fred Proby, VTN Pacific, indicates that the well site addressed in the above named Preparation Notice was not the same well as mentioned in our letter to you of November 26, 1979. After discussions with Mr. Proby and review of an archeological survey conducted by Mr. Aki Sinoto, Bernice P. Bishop Museum (MS C81479), we would like to make the following comments:

It is our understanding that only about 6% of the project area will be impacted during the research phase of development and that the area chosen for the exploratory well is relatively free of archaeological features. It is our recommendation, therefore, that an archaeological contractor be retained to flag sensitive areas, and to monitor the clearing of the land for access and alteration of the land by bulldozers. In this way, the access route and well site can be constructed to avoid archaeological sites thus preventing possible adverse effects to the cultural resources.

It is also our understanding that if the exploratory well is successful, further facilities will be constructed in the area. It is our recommendation that if this further construction is determined to be necessary that an archaeological survey be conducted of the remaining area. This survey should include a literature, map and document search of materials dealing with

Board of Water Supply

-2-

December 17, 1979

this specific area, instrument mapping of sites and features within the area of impact, and a final report which synthesizes the archaeological and historical research of the area. With this information, along with final construction plans, we will be able to evaluate if cultural resources of importance will be impacted by the development and to offer further recommendations.

Sincerely yours,

Susumu Ono
State Historic Preservation
Officer

cc: Fred Proby

PB:my

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA
HONOLULU, HAWAII 96843



FRANK F. FASI, Mayor
YOSHIE H. FUJINAKA, Chairman
DAT QUON PANG, Vice Chairman
RYOKICHI HIGASHIONNA
TERESITA R. JUBINSKY
WALLACE S. MIYAHIRA
ROBERT A. SOUZA
CLAUDE T. YAMAMOTO

February 21, 1980

KAZU HAYASHIDA
Manager and Chief Engineer

Mr. Susumu Ono
Chairman of the Board
Board of Land and
Natural Resources
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

Subject: Your Letter of December 17, 1979
on the Waianae Water Well

To facilitate processing of our Conservation District Use Application, a field survey of the proposed Makaha and Waianae well sites was made on February 6, 1980, with Mrs. Pat Beggerly of your staff. She indicated that she did not foresee any problems with drilling the exploratory wells at both sites. She did mention that any additional construction work, especially near archaeological features, should be monitored by an archaeological contractor. We will comply with this requirement.

If flow tests of the exploratory wells are successful, all archaeological features within the proposed project areas will be staked out before any clearing, grading, or other improvements are undertaken. All significant archaeological sites will be avoided in the design of our facilities.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: VTN Pacific

C-7

LOWER WAIANAE, WELL #1
WALK-THROUGH ARCHAEOLOGICAL RECONNAISSANCE

PREPARED FOR:

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

PREPARED BY:

Environment Impact
Study Corporation
Suite 605
770 Kapiolani Boulevard
Honolulu, Hawaii 96813

January, 1982

C-8

LOWER WAIANAE, WELL #1

WALK-THROUGH ARCHAEOLOGICAL RECONNAISSANCE

At the request of the Board of Water Supply (BWS), a field archaeological reconnaissance was conducted of the road alignment and well site for Well #1, in lower Waianae. The purpose for the reconnaissance was to estimate the level of effort which would be required to monitor archaeological resources during widening of the access and preparation of the well site.

Upon arrival at the site, however, it was discovered that the contractor not only had started widening the existing jeep road easement, but had already completed all land modification, both in widening the road and in filling and grading the well site. Apparently, all grading work by the contractor had been done without his receiving the "Notice to Proceed." Consequently, there was no material of archaeological or historical value recovered within the boundaries of the disturbed areas. It appeared that these land alterations did impact intact walls in several locations.

Damage was not extensive along the lower portions of the road alignment due to the relative sparcity of sites. These sites appeared to be mainly large boundary walls, some of impressive construction, up to approximately 1.7m high and 1.4m wide, with excellent core-fill construction.

Along the upper portions of the road alignment, damage appeared more extensive. This area had been intensively cultivated, all available areas being terraced. Much of the terracing which was immediately downslope of the road was damaged or wall alignments changed by road fill. However, it should be noted that a jeep roadway was center-line of the access modification, so the damage was an acceleration of existing conditions, rather than extensive new damage.

Earthwork, however, did remove several terrace units and did obscure the unit pattern of the area, making technical analysis of water flow through the lo'i system difficult. Hopefully, the portions presently under road fill might be partly intact. This, however, does not seem very likely because grading operations were not monitored by an archaeologist, because of the size and weight of the construction equipment, and because of the steep grade of the slope.

The most extensive of the damage was observed at the well site, where an open leveled area was prepared. To achieve this, the high side of the slope was cut and the lower side was extensively filled. Several large trees had been uprooted and pushed along the well site's edge. Examination of the cuts in the hillside did not reveal any artifacts, but there was indication that the

terraces had possibly served as lo'i, as evidenced by the discoloration of the soil and compaction of the clay into nodules. Several springs appear in this area, and standing water was present in two lo'i just below the well site. These lo'i had different vegetation from surrounding vegetation, indicating that the marshy conditions were existent prior to construction.

It is estimated that the well site grading operations covered approximately 7 lo'i, along with an excellent auwa'i drainage running through the system. It is possible that this lo'i system is, at least partially, intact beneath the fill.

As a result of the grading work that was done and observations made in the field, the following recommendations are suggested:

- (1) Based on the fact that no further earthwork is required within or beyond the boundaries of the disturbed area, further archaeological survey work is not required.
- (2) If, however, further earth modification is necessary, then an archaeologist should be present to monitor the activities.

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII



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

DIVISIONS:
CONSERVATION AND
RESOURCES ENFORCEMENT
CONVEYANCES
FISH AND GAME
FORESTRY
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

July 19, 1982

Mr. Charles Yoon, President
VTN Pacific
1164 Bishop Street, Suite 906
Honolulu, Hawaii 96813

Dear Mr. Yoon:

SUBJECT: Proposed Waianae Wells and Control Station
Waianae, Oahu, TMK 8-5-06: 1 por., 8

In consultation with your archaeological consultant, Bill Barrera, our office has reviewed the scope of work for the archaeological field work to be done for the Waianae wells, and concur with the proposed work.

It is our understanding that all archaeological sites in the vicinity of well sites and other areas likely to be affected by construction will be flagged and construction workers will be cautioned to avoid disturbing those areas.

An archaeological survey will be conducted in all areas affected by the project, and a report will be written that includes maps and locations of all archaeological sites in the project area, and historic preservation recommendations.

If archaeological resources are found to be present in the development area, then evaluation of these sites and possible mitigative measures should be coordinated with our office.

Sincerely yours,

Ralston Nagata
Assistant State Parks Administrator

cc: Board of Water Supply, City and
County of Honolulu

CHINIAGO INC.

Archaeological Consulting

1040-B SMITH STREET • HONOLULU, HAWAII 96817 • TELEPHONE: (808) 521-2785


September 13, 1982

Mr. Fred Proby
VTN Pacific
1164 Bishop Street
Suite 906
Honolulu, Hi. 96813

Dear Mr. Proby:

On September 10, 1982 I accompanied you and two representatives of the Department of Water Supply on an inspection of the proposed site of Waianae Well #2. Although no archaeological or historical remains were found, there is a possibility that evidence of old agricultural systems may lie buried beneath more recent sedimentary deposits. We can suggest two ways of dealing with this situation. The first is that the client retain an archaeologist to monitor the well-drilling and construction activities, with the understanding that if anything of significance is found the construction may not continue until the mitigation of adverse effects has been completed. The other approach would be to conduct test excavations prior to construction, thereby allowing the project to proceed without any possibility of interruption.

Sincerely yours


William Barrera, Jr.
President

APPENDIX D

COMMENTS ON THE EIS PREPARATION NOTICE AND EIS



United States
Department of
Agriculture

Soil
Conservation
Service

P. O. Box 50006
Honolulu, Hawaii
96850



DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
BUILDING 230
FT. SHAFTER, HAWAII 96828

August 30, 1979

FODED-FV

7 September 1979

Fred Proby

VTN
1164 Bishop St., Suite 906
Honolulu, HI 96813

Mr. Fred Proby
Chief Environmental Scientist
VTN Engineers, Architects and Planners
1164 Bishop Street, Suite 906
Honolulu, Hawaii 96813

Dear Fred:

Thank you for the opportunity to review the EIS Preparation Notices for the three proposed wells - Luluku Stream, Kaluanui Stream, and Maianae Kai.

I have no comment at this time but would appreciate an opportunity to review the EIS's when they are completed.

Sincerely,

OTIS M. GRYDE
District Conservationist

Dear Mr. Proby:

We have reviewed the Environmental Impact Statement Preparation Notice for the Luluku, Maianae and Kaluanui Water Wells that you forwarded to us on 22 August 1979. The water wells do not affect any US Army Corps of Engineers projects.

While details are not provided, the Luluku and Maianae wells appear to require the discharge of dredged or fill material into the respective streams for the construction of access roads and distribution lines. You have indicated that both of the streams have mean flows of two cubic feet per second. Thus, the discharge of dredged or fill material for any access road and pipeline crossings are authorized under nationwide permit provided the conditions in inclosure 1 are met. For further information, you are advised to contact the Operations Branch at 438-2264.

Specific comments concerning the content of the environmental impact statement are provided in inclosure 2. We appreciate the opportunity to participate in the review process.

Sincerely yours,

KISUK CHEUNG
Chief, Engineering Division

2 Incl
As stated



CONDITIONS FOR NATION-WIDE PERMITS

1. The discharge will not be located in the proximity of a public water supply intake.
2. The discharge will not occur in areas of concentrated shellfish production.
3. The discharge will not destroy a threatened or endangered species as identified under the Endangered Species Act or endanger the critical habitat of such species.
4. The discharge will not disrupt the movement of those species of aquatic life indigenous to the waterbody.
5. The discharge will consist of suitable material free from toxic pollutants in other than trace quantities.
6. The fill created by the discharge will be properly maintained to prevent erosion and other non-point sources of pollution.
7. The discharge will not occur in a component of the National or State wild and scenic river system.

COMMENTS ON THE ENVIRONMENTAL IMPACT STATEMENT
PREPARATION NOTICE

1. When information is available, the environmental impact statement should provide the following information concerning the wells:
 - a. Amount of water withdrawn from the well;
 - b. Rate of pumping;
 - c. Rate of aquifer recharge;
 - d. Aquifer yield;
 - e. Salinity and water quality; and
 - f. Relationship of the water withdrawal to water development in the area.
2. In addition to developing more water sources to meet present and future demands, a program to conserve water and to reduce water consumption needs to be developed and implemented as part of regional land use planning and water development planning. Providing more water without efforts to conserve water may be a waste of the resource.
3. The preparation notice suggests that water withdrawal may affect stream flow. Efforts should be made to determine whether or not the stream flow is actually dependent upon seepage from the dike system being tapped by the water wells, and to establish and maintain in-stream flow standards or criteria.
4. Stream uses and aquatic flora and fauna need to be identified. Kaluanui Stream was identified as a unique stream to be preserved in the preparation notice. The stream is also the only stream on Oahu which harbors populations of hihiwai (*Neritina granosa*). Water diversion from this stream may have an significant effect on the endemic snail. We suggest that the perennial flow of this stream be maintained.
5. The relationship of the project impacts (water diversion, reduction in stream flow) to State Coastal Zone Management and Water Quality Standard objectives should be addressed (maintenance of minimum stream flow, maintenance of water quality, water temperature, low dissolved oxygen content).
6. The environmental statement should address the probable effects on historic and archaeological resources.

Sheet 1

Sheet 2

COPY



United States Department of the Interior

FISH AND WILDLIFE SERVICE
300 ALA MOANA BOULEVARD
P. O. BOX 50167
HONOLULU, HAWAII 96850

IN REPLY REFER TO:
ES
Room 6307

October 3, 1979

September 25, 1979

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

Dear Sir:

In accordance with the August 22, 1979 request by Mr. Fred Proby of VTN, the U. S. Fish and Wildlife Service has reviewed the EIS preparation notices for wells proposed for construction at Luluku Stream (Kansohe), Kaluanui Stream (Mauiia) and Hainae Kai (Kumaiipu Stream), Oahu. Each of the preparation notices indicates that pumping will affect stream base flows to an unknown degree. We are concerned that a reduction in existing stream flow could adversely impact aquatic organisms, especially population of native gobies and shrimp. This is particularly true for Kaluanui Stream which has thus far retained its high natural quality.

In view of the above, the project EIS's should thoroughly quantify the effects of project implementation on existing streamflows and aquatic organisms. In addition, project alternatives must be thoroughly explored from an environmental as well as budgetary standpoint.

We appreciate the opportunity to comment.

Sincerely yours,

Maurice H. Taylor

Maurice H. Taylor
Field Supervisor
Division of Ecological Services

cc: PIA
IDFG
NHFS
VTN (Attn: Mr. Fred Proby)



Save Energy and You Serve America!

Mr. Maurice H. Taylor
Field Supervisor
Fish and Wildlife Service
United States Department
of the Interior
300 Ala Moana Boulevard
Honolulu, Hawaii 96850

Dear Mr. Taylor:

Subject: Your Letter of September 25, 1979,
on The EIS Preparation Notice for
Luluku, Kaluanui, and Hainae Wells

Thank you for your comments.

The effects of our well projects on the aquatic organisms in the streams and existing stream flows will be addressed in the EIS.

A USGS stream gaging station located above our proposed Kaluanui Well shows the upper reach of the stream to be perennial. This perennial flow is due to rainfall. However, where the stream passes our proposed well site, the flow is intermittent.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: VTN Pacific

GEORGE R. ABULON
GOVERNOR



JOHN FARIAS, JR.
CHAIRMAN, BOARD OF WATER SUPPLY
YUKIO NISHIZAWA
DEPUTY TO THE CHAIRMAN

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
1231 SOUTH KEELE AVENUE
HONOLULU, HAWAII 96813

STATE OF HAWAII
DEPARTMENT OF AGRICULTURE
1335 SO. KING STREET
HONOLULU, HAWAII 96813

October 4, 1979

MEMORANDUM

To: Mr. Kazu Hayashida, Manager & Chief Engineer
Board of Water Supply, C&C of Honolulu

Subject: EIS Preparation Notice
→ Waianae Water Well - THK: 8-5-06: Por. of Parcel 8
Kaluasui Water Wells - THK: 5-3-12: Por. of Parcel 41
Luluku Water Well - THK: 4-5-41: Por. of Parcel 1

The Department of Agriculture has reviewed the preparation notice for each of the subject well projects.

1. The Waianae region is one of Oahu's significant agricultural production areas. Water needs for farming are barely being met so any impact upon agricultural water supplies should be addressed.
2. The Kaluku-Punaluu region is planned to be a major water exporting area in the future. The EIS should address how future water needs will be met if agricultural use in the area is intensified. Agricultural parks are planned for Kaluku, and Waiahole Valley. Water needs for these specific projects have not been determined at this time.
3. The EIS for the Luluku Well should address the impact of the loss of 1/2 acre of land on the banana plantation.

The improvement of water supply systems at the subject sites will have long-term implications in regard to population growth and future land use. It is the Department's main concern that the respective EIS's prepared for the wells address the effects of the water source developments on agricultural water use, as well as urban and domestic requirements.

Thank you for the opportunity to comment.

JOHN FARIAS, JR.
Chairman, Board of Agriculture

cc: Fred Proby, Chief Environmental Scientist
VTN Engineers Architects Planners

COPY

HANK F. FASI, Mayor
YOSHIE H. FUJINAKA, Ch.
DAT DUON PANG, Vice Ch.
RYOKICHI HIGASHIHARA
TERESITA R. JURINSKY
WALLACE S. MIYAHARA
ROBERT A. SOUZA
CLAUDIE T. YAMAMOTO

November 26, 1979

KAZU HAYASHIDA
Manager and Chief Engineer

Mr. John Farias, Jr.
Chairman, Board of Agriculture
State of Hawaii
1428 South King Street
Honolulu, Hawaii 96814

Dear Mr. Farias:

Subject: Your Letter of October 4, 1979,
Commenting on the EIS Preparation
Notices for Our Proposed Waianae,
Kaluasui, and Luluku Wells

1. The average daily consumption in calendar year 1978 for Makaha-Waianae was 3.8 mgd and for Maile-Ranakuli, it was 2.8 mgd, or over 6.5 mgd per day for the combined areas. Our sources in the Makaha to Nanakuli area produced about 2.5 mgd in 1978, and the balance was imported from the Pearl Harbor water district. Since we have reached the limit of groundwater development in the Pearl Harbor Basin, there is an urgent need to develop the remaining groundwater supply in the Makaha-Waianae area for whatever future development that occurs in that area.

Our policy is to serve water whenever possible to meet the total community needs of the area, which include those of agriculture. However, we believe that development and use of marginal quality water by agriculture (chlorides ranging about 500 mg/l or higher) would be to the best interests of both of our departments. Department of Land and Natural Resources is already drilling a well in Waianae Valley at the 400' foot elevation to meet agricultural needs and, if feasible, we will propose that the system be integrated with ours to service both the agricultural and domestic requirements of that area.

Pure Water... man's greatest need - use it wisely

COPY



WALE R. ABAYGORN
GOVERNOR

JOHN FARIAS, JR.
CHAIRMAN, BOARD OF AGRICULTURE
YUKIO KITAGAWA
DEPUTY TO THE CHAIRMAN

Mr. John Farias, Jr.
Page 2

November 26, 1979

2. Your report titled "Final Environmental Impact Statement for an Agricultural Park on Oahu at Pohakaea in Kunia," December 1973 and March 1975, discusses the Kahuku and other alternative sites but does not include Waiahole Valley. We will address the agricultural water needs in Waiahole Valley when we receive data on the extent of your Waiahole Valley Agricultural Park and its water needs.

The estimated long-term recharge for the Kahuku area is 12 mgd. Existing water demand is 1 mgd for domestic use and 6 mgd for agricultural use. If 9 to 10 mgd is the sustainable figure based on an 80 to 85 percent recovery factor, then approximately 2 to 3 mgd may be additionally developed. Our Opana well development is planned for 2-1.5 mgd wells. As noted in our Kahuku Water Development EIS, "the project scope may need to be evaluated." We foresee no problem in meeting both agricultural and urban water demands in this area, as long as both activities are planned on a coordinated basis.

3. We will address the impact of the loss of 1/2-acre of land on the banana plantation in our EIS for the Luluku Well.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

KAZUO HAYASHIDA
Manager and Chief Engineer

cc: VTN Engineers



STATE OF HAWAII
DEPARTMENT OF AGRICULTURE
1425 SO. KING STREET
HONOLULU, HAWAII 96814

MEMORANDUM

TO: Mr. Kazuo Hayashida, Manager and Chief Engineer
Board of Water Supply, CAC of Honolulu

SUBJECT: Agricultural Water from Waianae Valley Well

Reference is made to your memorandum of November 26, 1979, concerning EIS Preparation Notices for the proposed Waianae, Kalahele, and Luluku Wells. In that memorandum, you propose that the well be drilled to fill the well in Waianae Valley to meet agricultural needs should, if feasible, be integrated with the BWS system to service both the agricultural and domestic requirements of that area.

It is our understanding that the source and uses of water from the Oler Waianae Well will be under the full control of the State, and water needed for agricultural uses will be reserved as the priority use of water from that source. In addition, since the Oler Well is being drilled at the 400-foot elevation, it may produce water of a higher chloride content than what is acceptable for domestic uses. Since the well is being drilled expressly to serve the proposed Waianae Agricultural Park as well as, to the extent feasible, other agricultural users in Waianae Valley, we would not want to see water diverted from this source for non-agricultural purposes unless provision were made for gallon-for-gallon exchange with Board of Water Supply sources.

JOHN FARIAS, JR.
Chairman, Board of Agriculture

cc: Mr. Susumu Uno, DWR
-VTN Engineers

GEORGE H. ANI'OHNI
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

DIVISION OF FISH AND GAME
1101 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

August 31, 1979

DIVISION OF
FISH AND GAME
OFFICE OF
STATE PARKS
WATER AND LAND DEVELOPMENT

ANITOHI
OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

DIVISION OF STATE PARKS
P. O. BOX 421
HONOLULU, HAWAII 96808

November 26, 1979

DIVISIONS:
CONSERVATION
(FISH AND GAME)
FOREST
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

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

Gentlemen:

SUBJECT: EIS Preparation Notice Statements for
Three Water Board Projects
→ Waianae Water Well TMK 8-5-06:8 por
Kaluanui Water Well TMK 5-3-12:41 por
Luluku Water Well TMK 4-5-41:1 por

Dear Kazu:
Thank you for the opportunity to review EIS Preparation Notices for proposed water wells at Luluku Stream, Kaluanui Stream and Waianae Kai (copies were transmitted to us by your consultant, VM Pacific, with a letter dated August 22, 1979).

We do not presently have any comments to offer, but we do look forward to reviewing the forthcoming Environmental Impact Statements.

Sincerely yours,
Kenji Ego
KENJI EGO, Director
Division of Fish and Game

KE:RYJ:em

cc: VM Pacific

Waianae Water Well

On August 6, 1979, contract archaeologists from the Board of Land and Natural Resources conducted a reconnaissance of the road and test well impact area and noted several archaeological features. On August 24, 1979, they made a monitoring trip to the work area and discussed their recommendations with the roadway construction crew. The archaeological features were pointed out in the field and the need for caution and preservation was stressed. Therefore, because it is known there are archaeological features in the area, we recommend that close coordination with an archaeological contractor is advised for this project.

Kaluanui Water Well - Haunua

It is our recommendation that an archaeological reconnaissance be conducted within the area of impact as it now extends outside the area planted in sugar cane into the slopes of the hillside (pg. 3 and 9) where there is a higher probability that archaeological resources may still exist.

MARK F. FASI, Major
THE H. FUJIRAKA, Ch
T. QUON PANG, Vice Ch
OKICHI HIGASHIMURA
NESITA H. JUBIRSKY
ALLACE S. MIYAIHARA
ROBERT A. SOUZA
LAUDE T. YAMAMOTO

COPY

OUR WATER SUPPLY
COUNTY OF HONOLULU
HONOLULU
HAWAII

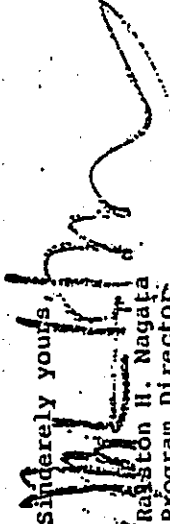
November 26, 1979

-2-

Board of Water Supply

Luluku Water Well - Kaneohe

Since the impact area for this well has previously been planted in bananas, it is unlikely that any archaeological features still remain. Therefore, we have no reservations for the project to proceed.

Sincerely yours,

Ralston H. Nagata
Program Director
Historic Sites Section

cc: Mr. Fred Proby
VTN Pacific
1164 Bishop Street
Suite 906
Honolulu, HI 96813

December 7, 1979

KAZU HAYASHIDA
Manager and Chief Engineer

Mr. Susumu Ono
Chairman of the Board
Department of Land and
Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Attention: Mr. Ralston H. Nagata


Dear Mr. Ono:

Subject: Mr. Ralston Nagata's Letter of
November 26, 1979 on EIS
Preparation Notices for Luluku
Well, Kaluanui Well, and Waianae
Well

Thank you for your comments on our proposed well projects.

Archaeological surveys will be made at the proposed Waianae and Kaluanui Well sites. Pertinent information gained from the surveys will be incorporated into the appropriate environmental impact statement. All significant archaeological sites will be staked-out before construction and will be avoided in our design of the facilities.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: VTN Pacific



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 511
HONOLULU, HAWAII 96809

Board of Water Supply

-2-

December 17, 1979

SUSUMU ONO, CHAIRMAN
BOARD OF WATER SUPPLY RESOURCES

EGGAR A. HAKASU
MEMBER OF THE BOARD

DIVISIONS:
CONSERVATION AND RESOURCES
CIVIL ENGINEERING
COMPLIANCE
FISH AND GAME
FORESTRY
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

December 17, 1979

Board of Water Supply
City and County of Honolulu
630 So. Heretania St.
Honolulu, Hawaii 96843

Gentlemen:

Subject: HIS Preparation Notice Statement
Waianae Water Well THK 8-5-06:8

Information given the Historic Preservation Office on December 15, 1979 by Fred Proby, VHI Pacific, indicates that the well site addressed in the above named Preparation Notice was not the same well as mentioned in our letter to you of November 26, 1979. After discussions with Mr. Proby and review of an archaeological survey conducted by Mr. Aki Sinoto, Barnes P. Bishop Museum (MS 081479), we would like to make the following comments:

It is our understanding that only about 6% of the project area will be impacted during the research phase of development and that the area chosen for the exploratory well is relatively free of archaeological features. It is our recommendation, therefore, that an archaeological contractor be retained to flag sensitive areas, and to monitor the clearing of the land for access and alteration of the land by bulldozers. In this way, the access route and well site can be constructed to avoid archaeological sites thus preventing possible adverse effects to the cultural resources.

It is also our understanding that if the exploratory well is successful, further facilities will be constructed in the area. It is our recommendation that if this further construction is determined to be necessary that an archaeological survey be conducted of the remaining area. This survey should include a literature, map and document search of materials dealing with

this specific area, instrument mapping of sites and features within the area of impact, and a final report which synthesizes the archaeological and historical research of the area. With this information, along with final construction plans, we will be able to evaluate if cultural resources of importance will be impacted by the development and to offer further recommendation

Sincerely yours,

Susumu Ono
State Historic Preservation
Officer

cc: Fred Proby

PB:my



BOARD OF WATER SUPPLY
 CITY AND COUNTY OF HONOLULU
 630 SOUTH BERETANIA
 HONOLULU, HAWAII 96843

W. F. FASI, Mayor
 W. H. FUJIKAWA, Chairman
 D. Y. KUON PANG, Vice Chairman
 H. K. KIKUCHI, HIGASHIMORIYA
 T. S. S. B. JURINSKY
 W. L. ACE S. MIYAIHARA
 R. MERT A. SOUZA
 CLAUDE T. YAMAMOTO

DIVISIONS:
 FORESTRY
 PUBLIC WORKS
 LAND MANAGEMENT
 STATE PARKS
 WATER AND LAND



STATE OF HAWAII
 DEPARTMENT OF LAND AND NATURAL RESOURCES
 DIVISION OF WATER AND LAND DEVELOPMENT
 P. O. BOX 371
 HONOLULU, HAWAII 96809

January 18, 1980

KAZU HAYASHIDA
 Manager and Chief Engineer

Mr. Susumu Ono
 Chairman
 Board of Land and
 Natural Resources
 P. O. Box 621
 Honolulu, Hawaii 96809

Dear Mr. Ono:

Subject: Your Letter of December 17, 1979,
 Recommending an Archaeological
 Survey for our Waianae Well
 Project,
 Tax Map Key 8-5-06: 8

We are arranging a field trip to the well sites with your
 archaeologist Pat Beggerly. We will subsequently notify you
 by letter on the scope of the archaeological survey to be
 conducted for our well project.

Should you have questions or require additional
 information, please call Lawrence Whang at 548-5221.

Very truly yours,

Kazu Hayashida
 KAZU HAYASHIDA
 Manager and Chief Engineer

cc: VTN Pacific

September 11, 1979

Mr. Kazu Hayashida
 Manager & Chief Engineer
 Board of Water Supply
 City & County of Honolulu
 630 S. Beretania Street
 Honolulu, Hawaii 96843

Dear Kazu:

EIS Preparation Notices

With reference to receipt of copies of EIS Preparation Notices for proposed
 water wells at Luluku Stream in Kaneohe, Kaluanui Stream in Hauula, and Watai
 our Division wishes to be a consulted party in the preparation of the EIS's.

We will be interested in any impact these well projects might have on the
 Department's proposed Kahuku agricultural park, Waianae agricultural park
 and on any downstream water uses.

Very truly yours

Robert T. Chiuck
 ROBERT T. CHIUCK
 Manager-Chief Engineer

DL: dh



WOP

Jack K. Suwa

September 14, 1979

September 21, 1979

Mr. Robert T. Chuck
Manager-Chief Engineer
Division of Water and
Land Development
Department of Land and
Natural Resources
State of Hawaii
P. O. Box 373
Honolulu, Hawaii 96809

Dear Mr. Chuck:

Subject: Your Letter of September 11, 1979
Responding to the EIS Preparation
Notices for Luluku, Kaluanui, and
Maianae Water Wells

Thank you for your comments. We have added your
department to our consulted parties list for the proposed
Luluku, Kaluanui, and Maianae water wells.

Should you have questions or require additional
information, please call Lawrence Nhang at 548-5221.

Very truly yours,

Kazu Hayashida
KAZU HAYASHIDA
Manager and Chief Engineer

cc: WTN Pacific

D-10

Mr. Fred Proby
Chief Environmental Scientist
WTN Pacific
1164 Bishop Street, Suite 906
Honolulu, Hawaii 96813

Dear Mr. Proby:

Subject: EIS Preparation Notices for
Water Wells at Luluku Stream, Kai
Kaluanui Stream, and Maianae Kai

Thank you very much for giving us the opportunity to
review and comment on the above-captioned EIS preparation
notices. We have no substantive comments to offer which
could improve the documents.

Very truly yours,

Ryokichi Higashionna
Ryokichi Higashionna



RECEIVED
OFFICE OF WATER RESOURCES
OCT 10 2 30 PM '79

7/10/79
1/16

UNIVERSITY OF HAWAII

Water Resources Research Center

2 October 1979

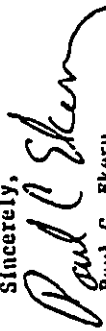
Mr. Kazuyoshi Hayashida
Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 S. Beretania St.
Honolulu, Hawaii 96843

Dear Mr. Hayashida:

Subject: EIS Preparation Notices for proposed water wells located at Luluku Stream (Kaneohe), Kaluanui Stream (Maunaloa), and Maianae Kai

We have reviewed the subject EIS and have no immediate comments. We, too, feel that the proper time for detailed EIS will come when the exploratory phases have been completed.

Sincerely,



Paul C. Ekern
MRRRC EIS Coordinator

PCE:jmn

cc: F. Peterson

Enclosure

D-II

AN EQUAL OPPORTUNITY EMPLOYER

2510 Duke Street - Honolulu, Hawaii 96823



University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 944-7301

August 30, 1979
PH:0003

Office of the Director

Mr. Fred Proby
Chief Environmental Scientist
VIN Pacific
Suite 906
1164 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Proby:

Environmental Impact Statement Preparation Notices

1. Luluku Stream, Kaneohe
2. Kaluanui Stream, Maunaloa
3. Maianae Kai, Maianae

The Environmental Center has received the above cited Preparation Notices from VIN. In all attempt to improve our evaluation procedures, we are now directing our attention, when appropriate, to those areas within the preparatio notices that would benefit from closer analysis.

The following are some concerns regarding the proposed well projects:

1. Luluku Well

The preparation Notice indicates that use of the proposed production well will probably result in a significant decrease in the flow of Luluku Stream. The EIS should address the ecological and esthetic consequences of the decrease

2. Kaluanui Well

The preparation notice indicates that the use of the proposed production well will probably result in a significant decrease in the groundwater contribution to the lower part of Kaluanui Stream. It suggests that the effect will be estimated from a 5-day running test. The results of the earlier use of Kahuku Plantation wells may be of greater significance to the estimation then the results of a test of such short duration. The EIS should address any ecologic and esthetic consequences of the decrease in stream flow.

AN EQUAL OPPORTUNITY EMPLOYER

DEPARTMENT OF GENERAL PLANNING
CITY AND COUNTY OF HONOLULU
550 SOUTH KING STREET
HONOLULU 9, HAWAII 96813

GEORGE S. MORIGUCHI
CHIEF PLANNING OFFICER

DGPB/79-2810 (C)



August 30, 1979

-2-

Mr. Fred Proby

3. Maianae Well

The preparation notice indicates that the use of the proposed production well will probably result in a significant decrease in the flow of Kamaipo Stream. The EIS should address any ecological and esthetic effects of this decrease.

Yours very truly,

Doak C. Cox

Doak C. Cox
Director

UCC/dh

cc: Barbara Voyt

September 12, 1979

MEMORANDUM

TO : MR. KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

FROM : GEORGE S. MORIGUCHI, CHIEF PLANNING OFFICER

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PREPARATION
NOTICES FOR PROPOSED WELLS AT KALUANUI,
NAIHAIE AND LULUKU
COMMENTS REQUESTED AUGUST 22, 1979

The environmental impact statements for these should discuss the impacts on agricultural and other present uses which might be affected by reductions in stream flow. The preparation notice for the Kalaanui wells indicates that "the coastal plain below the site still supports various agricultural land uses" but does not indicate whether any of these use water from the stream.

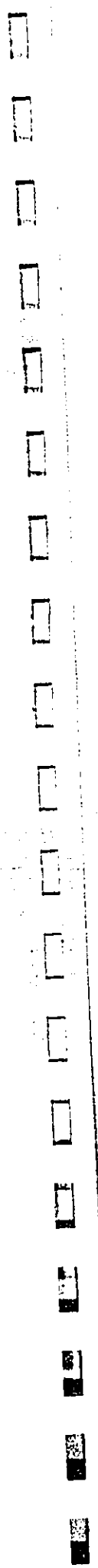
I thank you for affording us the opportunity of reviewing the preparation notices.

George S. Moriguchi

GEORGE S. MORIGUCHI
Chief Planning Officer

GSM:fmt

cc: VTH Pacific





September 18, 1979

September 11, 1979

LUB/79-3
79/EC-4

TO : MR. GEORGE S. MORIGUCHI
CHIEF PLANNING OFFICER
DEPARTMENT OF GENERAL PLANNING

FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY

SUBJECT: YOUR LETTER OF SEPTEMBER 12, 1979, COMMENTING ON
THE EIS PREPARATION NOTICES FOR PROPOSED WELLS
AT KALUANUI, MAIANAE, AND LULUKU

Thank you for your comments on our EIS preparation notices.

We will include any impacts on agriculture and on other uses which may be caused by any reduction in stream flow in the environmental impact statement for the proposed wells.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: VTN Pacific

MEMORANDUM

TO : KAZU HAYASHIDA, MANAGER & CHIEF ENGINEER
BOARD OF WATER SUPPLY

FROM : TYRONE T. KUSAO, DIRECTOR

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICES
FOR THE WAIANAE WATER WELL, LULUKU WATER WELL
(KANEOHE), AND KALUANUI WATER WELL (HAUULA)

The EIS Preparation Notices for the above proposed wells have been reviewed. We hope you will include a discussion of regional demand, specific geological resource units and ranges of sustainable yields of those units, and potential export of water resources outside of resource areas, as part of the Draft EIS for each project.

We may have more specific comments to make during the consultation and formal review period.

Should you have any questions on the above comments, please contact Scott Ezer of our staff at 523-4077.

Tyrone T. Kusao
TYRONE T. KUSAO
Director of Land Utilization

TYK:ey
cc: VTN, Attn. Fred Proby

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

GOP

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK P. PASS
MAYOR

WALLACE MIYAHIRA
DIRECTOR AND CHIEF ENGINEER

ENV 79-273

September 18, 1979

August 28, 1979

TO : MR. TYRONE T. KUSAO
DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY

SUBJECT: YOUR LETTER OF SEPTEMBER 11, 1979 COMMENTING
ON THE EIS PREPARATION NOTICE FOR MAIANAE,
LULUKU, AND KALUANUI WATER WELLS

TO : MR. KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

FROM : WALLACE MIYAHIRA, DIRECTOR AND CHIEF ENGINEER

SUBJECT: EIS PREPARATION NOTICES FOR KALUANUI,
LULUKU AND MAIANAE WATER WELLS

Thank you for your comments.

We will include discussions on regional demand,
specific geological resource units and sustainable yields,
and potential export of water resources in the EIS for each
water well.

Should you have questions or require additional
information, please call Lawrence Whang at 548-5221.

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: WTN Pacific

With respect to the location of the proposed Kaluanui water
wells, a wastewater treatment plant (WWTP) is proposed in the
adjacent area. The location of the WWTP is shown on page 10-47
of the 208 Water Quality Management Plan for the City and County
of Honolulu (Volume I, October 1978). There is no reason why
the WWTP cannot be relocated to eliminate any potential conflicts.

The locations of the Luluku and Maianae water wells are satisfactory.

Wallace Miyahira

WALLACE MIYAHIRA
Director and Chief Engineer

WM:nj

cc: Division of Wastewater Management
WTN Pacific

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
1001 HOLENA
HONOLULU, HAWAII 96843

FRANK F. FASI, M.A.
YOSHIE H. FUJIMAI
DAT QUON FANG, V.
RYOKICHI HIGASHI
TERESITA D. JUBIN
WALLACE S. MIYAI
ROBERT A. SOUZA
CLAUDE T. YAMAM

DEPARTMENT OF PUBLIC UTILITIES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
150 SOUTH KING STREET
HONOLULU, HAWAII 96813



September 14, 1979

September 12, 1979

TO : MR. WALLACE MIYAHIRA
DIRECTOR AND CHIEF ENGINEER
DEPARTMENT OF PUBLIC WORKS

FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY

SUBJECT: YOUR MEMORANDUM OF AUGUST 28, 1979, ON
EIS PREPARATION NOTICE FOR KALUANUI, LAULUKU,
AND WAIANAЕ WATER WELLS

Thank you for your comments on our well projects.

In regards to the siting of the proposed sewage treatment plant on the property just makai of our proposed well, we do not anticipate any conflicts. However, we will not permit the construction of any deep injection wells for effluent disposal in the "pass zone."

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

cc: /VTN Pacific

KAZU HAYASHIDA
Manager and Chief Engineer

MEMORANDUM

TO : KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

FROM : ROBERT R. WAY, DIRECTOR

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE
FOR THE WAIANAЕ WATER WELL, WAIANAЕ, OAHU, HAWAII

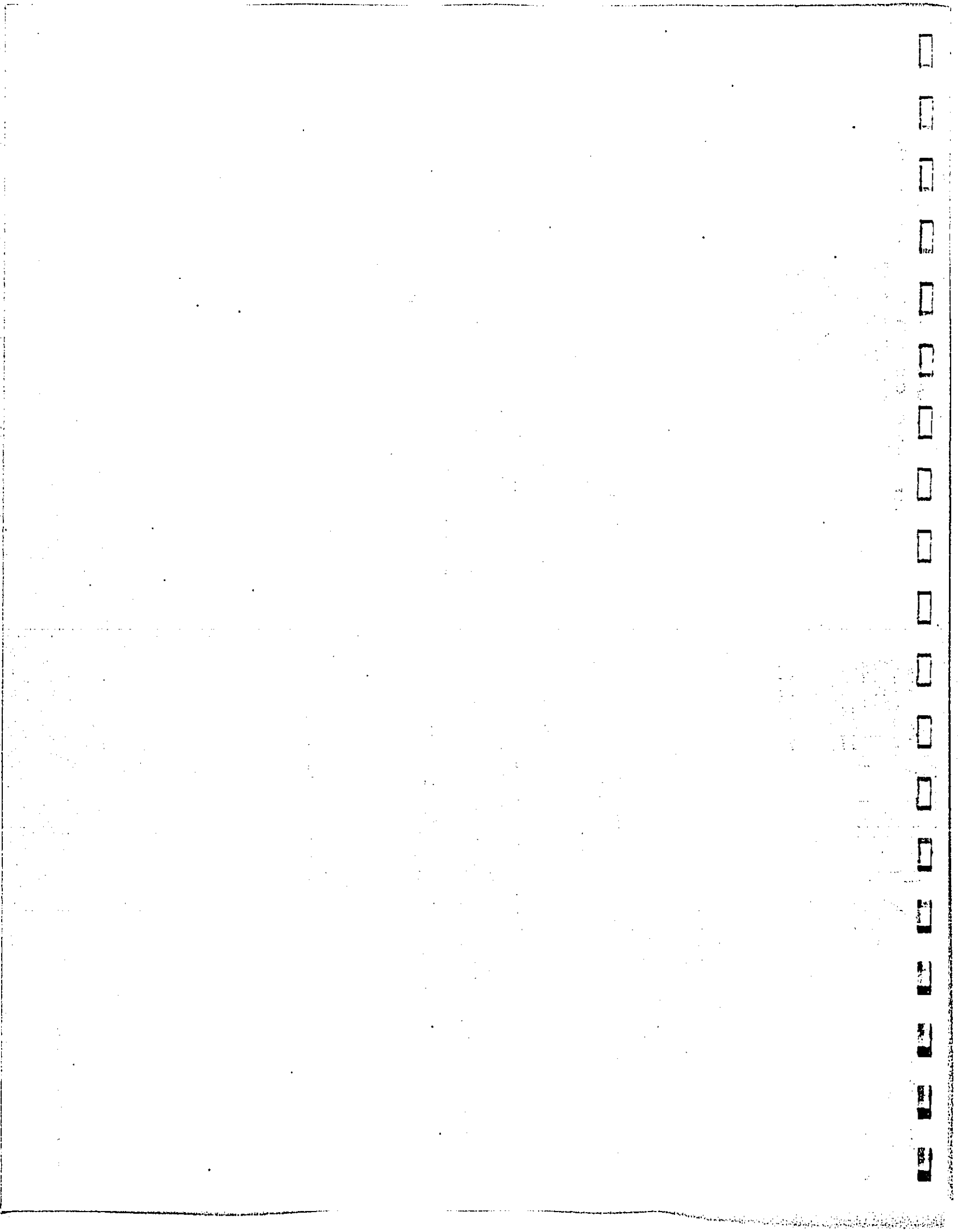
We have no comments on the Environmental Impact Statement Preparation Notice.

Robert R. Way

ROBERT R. WAY
Director

cc: VTN Pacific

Stater...man's greatest need - use it wisely



FRANK F. FASI, Mayor
 YOSHIE H. FUJIKAWA, Chairman
 DAI OJON PANG, Vice Chairman
 YOKICHI HIGASHIMURA
 MITSUO H. IMAI
 ROBERT A. JAVIERA
 ROBERT A. SOUZA
 CLAUDE T. YAMAMOTO



BOARD OF WATER SUPPLY
 CITY AND COUNTY OF HONOLULU
 630 SOUTH BERETANIA
 HONOLULU, HAWAII 96813

KAZU HAYASHIDA
 Manager and Chief Engineer

October 24, 1980

80-3044

RECEIVED
 DEPARTMENT OF THE ARMY
 SF OF WATER SUPPLY
 BUILDING 230
 FT. SHAFTER, HAWAII 96813
 11 40 AM '80

10 October 1980

DEPARTMENT OF THE ARMY
 SF OF WATER SUPPLY
 BUILDING 230
 FT. SHAFTER, HAWAII 96813

PODED-PV

Mr. Kazu Hayashida
 Manager and Chief Engineer
 Board of Water Supply
 City and County of Honolulu
 630 South Beretania Street
 Honolulu, HI 96813

Am. Dir
1/6

Dear Mr. Hayashida:

We have reviewed your Environmental Impact Statement (EIS) for Waianae Walls, Oahu, sent to us on 1 October 1980. We have prepared the following comments. There are no U.S. Army Corps of Engineers Civil Works projects that would be affected by your proposed project, and there are no Corps regulatory requirements that are applicable. The project site is located in Zone D, an area of undetermined but possible flood hazards, according to the Flood Insurance Study for the island of Oahu prepared by the Federal Insurance Administration.

Thank you for the opportunity to comment on your Environmental Impact Statement.

Sincerely,

Howard S. Kobayashi
 HOWARD S. KOBAYASHI
 Acting Chief, Engineering Division

CF:
 Mr. Susumu Oho, Chairman
 Board of Land and Natural Resources
 P.O. Box 621
 Honolulu, HI 96813

Mr. Harry Akagi, Acting Director
 Office of Environmental Quality Control
 State of Hawaii
 550 Halekauwila Street, Room 301
 Honolulu, HI 96813

PM

Subject: Your Letter of October 10, 1980
 on the Environmental Impact
 Statement for the Waianae Walls,
 Waianae-Kai, Oahu

Mr. Howard S. Kobayashi
 Acting Chief, Engineering Division
 U. S. Army Engineer District,
 Honolulu
 Building 230
 Fort Shafter, Hawaii 96858

Dear Mr. Kobayashi:

Thank you for your comments on the environmental impact statement for our proposed project. We will indicate in our revised environmental document that the project site is located in Zone D according to the Flood Insurance Study for Oahu by the Federal Insurance Administration.

Your letter will be appended to our final environmental document.

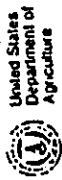
Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

Kazu Hayashida
 KAZU HAYASHIDA
 Manager and Chief Engineer

cc: VTN Pacific

For Water... man's greatest need - use it wisely



Soil Conservation Service

P. O. Box 50004
Honolulu, Hawaii
96850

October 28, 1980

Mr. Richard L. O'Connell
Office of Environmental
Quality Control
550 Halekuanila St., Room 301
Honolulu, HI 96813

Dear Mr. O'Connell:

Subject: EIS for Waianae Water Wells, Waianae-Kai, Oahu

We reviewed the subject environmental impact statement and have no comments to offer.

Thank you for the opportunity to review this document.

Sincerely,

J. P. Kanalz
JACK P. KANALZ
State Conservationist

cc: Board of Water Supply
City and County of Honolulu
630 South Beretania St.
Honolulu, Hawaii 96813

D-17

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU

630 SOUTH BERETANIA

HONOLULU, HAWAII 96813



FRANK F. FASI, Mayor
YOSHIE N. FUKUNAGA, Chairman
DAY COON FANG, Vice Chairman
RYUICHI NAKASHONNA
DAISUKE H. HOWARD
WILLIAM S. MIYAHARA
ROBERT A. SOUZA
CLAUDE T. YAMAMOTO

KAZU HAYASHIDA
Manager and Chief Engineer

November 5, 1980

Mr. Jack P. Kanalz
State Conservationist
Soil Conservation Service
U. S. Department of Agriculture
P. O. Box 50004
Honolulu, Hawaii 96850

Dear Mr. Kanalz:

Subject: Your Letter of October 28, 1980,
on The Environmental Impact Statement
(EIS) For Waianae Water Wells, Waianae-Kai,
Oahu

Thank you for reviewing the EIS for our proposed project.
Your letter will be appended to the revised environmental
document.

Should you have questions or require additional information,
please call Lawrence Whang at 548-5221.

Very truly yours,

Kazu Hayashida
KAZU HAYASHIDA
Manager and Chief Engineer

cc: JWN Pacific

Oct 31 2 16 PM '80

The Soil Conservation Service
is an agency of the
Department of Agriculture

Use this... man's greatest asset - his mind

SCS-15-1
10-79



RECEIVED
 BOARD OF WATER SUPPLY
 Department of the Interior
 Nov 13 4 21 PM '80
 FISH AND WILDLIFE SERVICE
 100 ALA MOANA BOULEVARD
 P. O. BOX 50167
 HONOLULU, HAWAII 96850

BOARD OF WATER SUPPLY
 P.O. BOX 50167, HONOLULU, HI 96850

COPY

November 7, 1980

November 17, 1980

Office of the Governor
 Environmental Quality Commission
 550 Halekuanui Street
 Room 301
 Honolulu, Hawaii 96813

Mr. Nevin D. Holmberg
 Fish and Wildlife Service
 U. S. Department of the Interior
 P. O. Box 50167
 Honolulu, Hawaii 96850

Dear Sir:

We have reviewed the subject Environmental Impact Statement (EIS) and offer the following comments.

The EIS adequately addresses the probable impacts of the project on fish and wildlife resources; therefore we have no additional comments to offer at this time.

We appreciate this opportunity to comment.

Sincerely yours,

Herald W. Ketchum

for
 Nevin D. Holmberg
 Deputy Project Leader for
 Ecological Services

cc: HDF&G
 dws
 DLNR

Re: EIS - Waianae Wells
 Waianae - Kai, Oahu, Hawaii

Subject: Your Letter of November 7, 1980,
 On the Environmental Impact
 Statement (EIS) for Waianae Wells,
 Waianae-Kai, Oahu

Dear Mr. Holmberg:

Thank you for reviewing the EIS for our proposed project. Your letter will be appended to the revised environmental document.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
 Manager and Chief Engineer

cc: WTN Pacific



Save Energy and You Serve America!



FRANK F. FASI, Mayor
 YOSHIE H. FUJIKAWA, Chairman
 DAT OJON PAAC, Vice Chairman
 RYOKICHI HIGASHIMURA
 DOMIO H. IIORETO
 WALLACE S. MIYAHARA
 ROBERT A. SOUZA
 CLAUDE T. YAMAMOTO

BOARD OF WATER SUPPLY
 CITY AND COUNTY OF HONOLULU
 620 SOUTH BERTANIA
 HONOLULU, HAWAII 96813

DEPARTMENT OF THE ARMY
 HEADQUARTERS UNITED STATES ARMY SUPPORT COMMAND, HAWAII
 FORT SHAFTER, HAWAII 96858

08 OCT 1980

October 17, 1980

KAZU HAYASHIDA
 Manager and Chief Engineer

APZU-BHZ-E

Board of Land and Natural Resources
 State of Hawaii
 1151 Punchbowl Street
 Honolulu, Hawaii 96813

OCT 10 1 29 PM '80

Gentlemen:

The Environmental Impact Statement (EIS) for the Waianae Water Well, Waianae-Kai, Oahu, Hawaii has been reviewed. No Army installations or activities will be adversely affected by the proposed project. Contrary to the statement on page 4 of the EIS, all military reservations in the Ewa-Waianae Water Use District do not have completely independent water systems. The Army's Recreation Center at Waianae-Kai Military Reservation purchases a small amount of water (approximately one million gallons per month) from the Honolulu Board of Water Supply.

Sincerely,

Original signed by

ADOLPH A. HIGHT
 COL, EA
 Director of Engineering and Housing

Copy Furnished:
 Board of Water Supply
 City and County of Honolulu
 630 South Beretania Street
 Honolulu, Hawaii 96813

Colonel Adolph A. Hight
 Director of Engineering
 and Housing
 Headquarters U. S. Army
 Support Command, Hawaii
 Fort Shafter, Hawaii 96858

Dear Colonel Hight:

Subject: Your Letter of October 8, 1980, On The Environmental Impact Statement (EIS) For Waianae Water Wells, Waianae-Kai, Oahu

Thank you for your comments on the EIS for our proposed project. We will revise the EIS to indicate that not all military reservations in the Ewa-Waianae District are independent of the public water system. Some facilities such as your recreation facility in Waianae and the Air Force's Palehua site receive water from us. Your letter will be appended to the revised environmental document.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
 Manager and Chief Engineer

cc: JVTN Pacific

Perf. Hight... name's greatest asset - his integrity

gm

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BD OF WATER SUPPLY
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BOARD OF WATER SUPPLY
1111 KALANIANA'OHU DRIVE
HONOLULU, HAWAII 96813

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(Dpl)

11000
30 September 1980

October 8, 1980

Governor
State of Hawaii
Board of Land and Natural Resources
550 Halekuanila Street, Room 301
Honolulu, Hawaii 96813

Dear Sir:

The Coast Guard has reviewed the Environmental Impact Statement prepared on the Waianae Wells and has not objection or constructive comments to offer at the present time.

Sincerely,

J. E. SCHWARTZ
Commander, U. S. Coast Guard
Fourteenth Coast Guard District
By Direction of the District Commander

Copy to:

Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, HI 96813

Commander J. E. Schwartz
Fourteenth Coast Guard District
677 Ala Moana Boulevard
Honolulu, Hawaii 96813

Dear Commander Schwartz:

Subject: Your Letter of September 30, 1980,
On The Environmental Impact Statement (EIS)
For Waianae Wells, Waianae, Oahu, Hawaii

Thank you for reviewing the EIS for our proposed project. Your letter will be appended to the revised environmental document.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: VTN Pacific

92

RECEIVED
DD OF WATER SUPPLY
HEADQUARTERS
NAVAIRBASE PEARL HARBOR
BOX 110
PEARL HARBOR, HAWAII 96860

80-3009

IN REPLY REFER TO:
OOZA:RLE:amh
Ser 2084

8 OCT 1980

pic
pk

Environmental Quality Commission
Office of the Governor
State of Hawaii
550 Halekaunila Street, Room 301
Honolulu, Hawaii 96813

Gentlemen:

Environmental Impact Statement
Maianae Wells

The Navy has reviewed the Environmental Impact Statement for
Maianae Water Wells and has no comments to offer. As requested, the
EIS is returned.

Thank you for the opportunity to review the subject EIS.

Sincerely,

R. D. EBER
Captain, CEC, USN
Facilities Engineer
By direction of the Commander

Encl

Copy to:
State Board of Land & Natural Resources
City Board of Water Supply

BOARD OF WATER SUPPLY

COPY

October 16, 1980

Captain R. D. Eber
Facilities Engineer
Headquarters, Naval Base
Pearl Harbor
P. O. Box 110
Pearl Harbor, Hawaii 96860

Dear Captain Eber:

Subject: Your Letter of October 8, 1980, On The
Environmental Impact Statement (EIS)
For Maianae Wells, Maianae-Kai, Oahu

Thank you for reviewing the EIS for our proposed project.
Your letter will be appended to the revised environmental
document.

Should you have questions or require additional information,
please call Lawrence Whang at 548-5221.

Very truly yours,

Kazu Hayashida
KAZU HAYASHIDA
Manager and Chief Engineer

cc: VTN Pacific

gn

COPY

BOARD OF WATER SUPPLY
1115 STATE STREET, SUITE 1100
HONOLULU, HAWAII 96813



STATE OF HAWAII
DEPARTMENT OF AGRICULTURE
1428 SOUTH KING STREET
HONOLULU, HAWAII 96814

December 5, 1980

Mr. John Farias, Jr.
Chairman, Board of Agriculture
1428 South King Street
Honolulu, Hawaii 96814

Dear Mr. Farias:

Subject: Your Letter of November 10, 1980,
on the Environmental Impact
Statement (EIS) for Waianae Wells,
Waianae Kai, Oahu

Thank you for reviewing the EIS for our proposed project.
Your letter will be appended to the revised document.

When we develop the new source, farmers will be provided
water on the same available basis as other consumers.

Should you have questions or require additional
information, please call Lawrence Whang at 548-5221.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: VTH Pacific

RECEIVED
BOARD OF WATER SUPPLY
DEC 12 10 27 AM '80

November 10, 1980

MEMORANDUM

To: Governor, State of Hawaii and Board of Land and
Natural Resources

Subject: EIS for the Waianae Well Oahu

The Governor of the State of Hawaii and the Board of Land and
Natural Resources

are advised that the Board of Agriculture has reviewed the
Environmental Impact Statement (EIS) for the proposed
Waianae Well Oahu and has concluded that the project
will not have a significant adverse effect on the
environment and that the project should be approved.

I thank you for the opportunity to comment.

John Farias, Jr.
John Farias, Jr.
Chairman, Board of Agriculture

cc: Board of Water Supply, Office of Land Use

gm

80-3722



RECEIVED
DEPT OF WATER SUPPLY
OCT 23 3 45 PM '80

GEORGE A. I. TURN
DIRECTOR OF HEALTH
JAMES P. CHARLES, M.D.
DEPUTY DIRECTOR OF HEALTH
HERBERT H. THOMPSON, M.A.
DEPUTY DIRECTOR OF HEALTH
MELVIN S. RODIGAN
DEPUTY DIRECTOR OF HEALTH
ADRIANA MALINDO SWART, M.A., J.D.
DEPUTY DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HAWAII 96811
October 22, 1980

IN COPY: DEPT. OF HEALTH
FILE: EPIIS-55

MEMORANDUM

To: Mr. Kazu Hayashida, Manager & Chief Engineer
Board of Water Supply, City & County of Honolulu

From: Deputy Director for Environmental Health

Subject: Environmental Impact Statement (EIS) for Malanee Water Wells

Thank you for allowing us to review and comment on the subject EIS. On the basis that the project will comply with all applicable Public Health Regulations, please be informed that we do not have any objections to this project.

Please correct the statement on page 54 of the EIS which indicates that though the Department of Health was consulted, we did not respond to the preparation notice for the project. We refer you to the attached letter of October 15, 1979 concerning the subject project. We reiterate the concerns stated in our earlier letter and request that Section 29, Public Health Regulations, Chapter 49, Potable Water Systems, source use approval be added to the listing of necessary approvals on page 53.

We realize that the statements are general in nature due to preliminary plans being the sole source of discussion. We, therefore, reserve the right to impose future environmental restrictions on the project at the time final plans are submitted to this office for review.

For
Melvin S. Rodigan
MELVIN S. RODIGAN

cc: DEQC
Governor's Office
DLHR

October 15, 1979

- 55

Mr. Kazu Hayashida
Manager & Chief Engineer
Board of Water Supply
City & County of Honolulu
Honolulu, Hawaii

Dear Mr. Hayashida:

Subject: Request for Comments on Proposed Environmental Impact Statement (EIS) for Malanee Water Well, Malanee, Oahu, Hawaii, Tax Map Key 0-5-06; Portion of Parcel 8

Thank you for allowing us to review and comment on the subject proposed EIS.

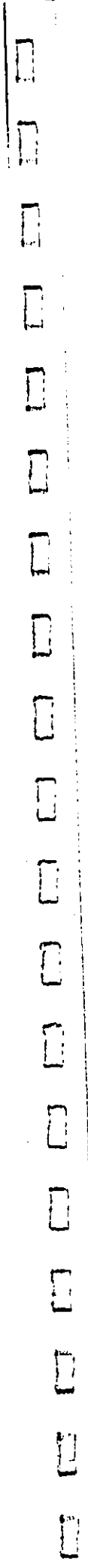
It is our understanding that the water produced by this source would be for domestic use. As such, this project would be subject to the applicable terms and conditions of Chapter 49, Potable Water Systems, Public Health Regulations. In addition, Section 29 of Chapter 49 requires that the well must be approved for potable use by the Director of Health prior to its use as a domestic source. As you are aware, such approval is based primarily on the successful submission of a preliminary engineering report addressing the concerns specified in Section 29.

We realize that the statements are general in nature due to preliminary plans being the sole source of discussion. We, therefore, reserve the right to impose future environmental restrictions on the project at the time final plans are submitted to this office for review.

Sincerely,

James S. McNeal
JAMES S. McNEAL, Ph.D.
Deputy Director for
Environmental Health

gm



80-3339

SUTAMAU OMO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 681
HONOLULU, HAWAII 96809

EDGAR A. HAYASHI
DIRECTOR

REGULATIONS AND
CONSERVATION
PERMITS
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

NOV 14 1980
REF. NO.: APO-2305

GEORGE W. ANTIPOUR
CHIEF OF BUREAU

NOV 14 1980

BOARD OF WATER SUPPLY
STATE DEPARTMENT OF LAND AND NATURAL RESOURCES

November 3, 1980

Mr. Melvin K. Koizumi
Deputy Director of Health
State Department of Health
P. O. BOX 3378
Honolulu, Hawaii 96801

Dear Mr. Koizumi:

Subject: Your letter of October 22, 1980, on the
Environmental Impact Statement (EIS) for
Maianae Water Wells, Maianae-Kai, Oahu

Thank you for reviewing the EIS for our proposed water
development project. Your letter will be appended to our
revised environmental document.

We will correct page 54 to indicate that a response to
the EIS preparation notice was received from your department.
An engineering report will be submitted to you for source
use approval as required by Section 29, Chapter 49, Public
Health Regulations.

Should you have questions or require additional information,
please call Lawrence Whang at 548-5221.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: JVTN Pacific

Honorable George Ariyoshi
Governor of Hawaii
550 Halekaunila Street
Honolulu, Hawaii 96813

Dear Sir:

We have reviewed the EIS for two wells, an access road and a control
building in the mauka areas of Maianae.

The EIS indicates that development of the proposed wells will not
significantly affect stream flows but that this cannot be positively deter-
mined until the wells are drilled and test pumped. We therefore suggest
that stream flows be closely monitored during and after developing the wells
and ask that the Board of Water Supply keep us informed of monitoring
activities.

We note that stream flows are intermittent in the Iliu Stream and almost
non-existent in the Kumaipo Stream. Aside from a few atyid shrimp in the
Kumaipo Stream there are no gobies or other fish species in these mauka
tributaries. We therefore conclude that both streams are poor habitats for
aquatic macrofauna.

We concur with the applicant's proposed mitigative measures regarding
the known and probable archaeological resources in the vicinity of their
Exploratory Well #1 which includes:

- 1) Archaeological flagging of sensitive areas, on access roads and
exploratory well site; and
- 2) Archaeological monitoring during physical manipulation of ground
surfaces to ascertain presence or absence of subsurface cultural
material.

These recommendations apply only for the initial drilling of the
Exploratory Well #1 in the areas surveyed by Bernice P. Bishop Museum on
July 11, 1979. These areas include the northern and eastern corners of the
property within 50 feet of the existing jeep road.



Handwritten mark

COPY

Honorable George Ariyoshi
Page 2
NOV 11 1980

December 24, 1980

If production facilities are installed at Well #1 site as noted on page 6 of the EIS document, then further archaeological research should be conducted as recommended by the archaeological consultant, Service P. Bishop Museum, Mr. Aki Shinoto. Such research should include:

- 1) Survey of area proposed for production facilities, by a qualified archaeologist; and
- 2) If archaeological resources are found to be present in the development area, then evaluation of these sites and possible mitigative measures should be coordinated with the State Historic Preservation Officer prior to physical manipulation of the area.

The document states that archaeological resources are not present at the site of Well #2. There is, however, no supporting document indicating that the area has been systematically surveyed by a qualified archaeologist. We therefore recommend that such a survey be conducted and the results sent to the State Historic Preservation Office for review, evaluation and further recommendations, as applicable, prior to physical manipulation of the area.

The site of Well #2 is on State-owned forest reserve. An application for a Conservation District permit has been filed by the Board of Water Supply. If approved, occupancy rights must then be processed. This may include withdrawal of land from the forest reserve.

During a site visit by Pat Gegerly, staff archaeologist, on February 6, 1980, it was noted that artifactual material was eroding from the roadbed within the "jeep trail" access road. Prior to physical manipulation of this roadway (as mentioned in the EIS document, pages 7-9), an archaeological reconnaissance should be conducted in the area to determine the source of the material and the possible impact of road construction on any archaeological resources present along this corridor. Additional archaeological reconnaissance should be conducted along proposed water main construction areas and powerline access corridors. The reports of date from these research projects should be transmitted to the State Historic Preservation Office for review, evaluation and further recommendations, as applicable, prior to physical manipulation of the areas.

Very truly yours,

Susumu Ono
SUSUMU ONO, Chairman
Board of Land and Natural Resources and
State Historic Preservation Officer

cc: C&C/Board of Water Supply

Mr. Susumu Ono, Chairman
Board of Land and Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

Subject: Your Letter of November 14, 1980
Commenting on the Archaeological
Features of Our Environmental
Impact Statement (EIS) for the
Maianae Wells, Site #1 and #2

We will hire a qualified archaeologist to survey the area proposed for the production facilities at Site #1 and #2 and their connecting roadway. A copy of the archaeologist's report will be transmitted to you for your review, evaluation, and recommendations.

Should you have questions or require additional information, please call Lawrence Whang at 548-5421.

Very truly yours,

Lawrence Whang
for KAZU HAYASHIDA
Manager and Chief Engineer

cc: VTN Pacific



P-418

STATE OF HAWAII
DEPARTMENT OF PLANNING AND
ECONOMIC DEVELOPMENT
P. O. Box 2359
Honolulu, Hawaii 96804

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
520 SOUTH UCHETANIA
HONOLULU, HAWAII 96843



HANK F. FASI, Mayor
WASHIE H. FUJIMAKI, Chairman
PAT QUON PANG, Vice Chairman
YOSHIOKI HIGASHIYAMA
JURU M. HOWARD
MILLIE S. MIYAHARA
ROBERT A. SOUZA
CLAUDE T. YAMAMOTO

Ref. No. 2321

November 10, 1980

KAZU HAYASHIDA
Manager and Chief Engineer

October 30, 1980

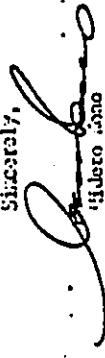
The Honorable George R. Ariyoshi
Governor of Hawaii
State Capitol
Honolulu, Hawaii 96815

Dear Governor Ariyoshi:

Subject: Environmental Impact Statement for Kalaheo Wells,
Kalaheo, Kauai

We have reviewed the above document and find that it has adequately
assessed the major environmental impacts which can be anticipated from the
implementation of this project.

Thank you for the opportunity to review and comment upon this
letter.

Sincerely,

Hideto Kono

cc: Board of Land and Natural Resources,
State of Hawaii

Board of Water Supply,
City and County of Honolulu

Office of Environmental Quality Control

Mr. Hideto Kono
Director
Department of Planning and
Economic Development
P. O. Box 2359
Honolulu, Hawaii 96804

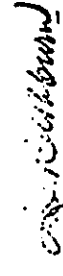
Dear Mr. Kono:

Subject: Your Letter of October 30, 1980
on the Environmental Impact
Statement (EIS) for Waianae
Well, Waianae-Kai, Oahu

Thank you for reviewing the EIS for our proposed project.
Your letter will be appended to the revised environmental
document.

Should you have questions or require additional
information, please call Lawrence Khang at 548-5221.

Very truly yours,



For
KAZU HAYASHIDA
Manager and Chief Engineer

cc: JTN Pacific

Nov 7 11 47 AM '80

Per HARR...man's printed word - use it wisely

gn

BOARD OF WATER SUPPLY

COPY

RECEIVED
BOARD OF WATER SUPPLY
OCT 10 2 16 PM '80

October 21, 1980

STP 8.6686

October 6, 1980

MEMORANDUM

TO: The Honorable George R. Ariyoshi
Governor of Hawaii

The Honorable Susumu Ono, Chairman
Board of Land and Natural Resources
State of Hawaii

FROM: Director of Transportation

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT
MAIANAE WELLS

Thank you for the opportunity to review and comment on the subject EIS. The project has no direct impact on our facilities. In this regard, we have no substantive comments to offer which could improve the document.

Ryokichi Higashionna
Ryokichi Higashionna

cc: OEQC
Board of Water Supply

Dr. Ryokichi Higashionna
Director
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Dr. Higashionna:

Subject: Your Letter of October 6, 1980, On The Environmental Impact Statement (EIS) For Maianae Wells, Waiānae-Kai, Oahu

Thank you for reviewing the EIS for our proposed project. Your letter will be appended to the revised environmental document.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

Kazu Hayashida
KAZU HAYASHIDA
Manager and Chief Engineer

cc: VTN Pacific

RECEIVED
80-316
80-316
BOARD OF WATER SUPPLY
Nov 13 3 28 PM '80

COPY

UNIVERSITY OF HAWAII
Water Resources Research Center

7 November 1980

Asst. Mgr. JH
P/E

The Honorable George Ariyoshi
Governor, State of Hawaii and
Board of Land and Natural Resources
State of Hawaii

Subject: EIS Waiau Wells, Oahu
Dear Governor Ariyoshi:

We have reviewed the Waiau Wells Environmental Impact Statement and have the following comment:

1. On p. 36, the possible reduction of streamflow in Kumaipo and Hiu Streams are categorized under unavoidable adverse impact. There is an alternative, which is to release water from the well if the streamflow is adversely affected. Since Hiu and Kumaipo streams are major tributaries of Kaupuni Stream, which is perennial at its lower reaches, any significant reduction of streamflow in Hiu and Kumaipo could unavoidably reduce the flow in Kaupuni Stream?
2. There was no survey of downstream groundwater users (i.e., irrigators) who might be adversely affected by the wells. Although surface flow may be lacking, is there groundwater flow under the streambed which could be adversely affected.

Thank you for this opportunity to comment. This EIS was reviewed by WREC and affiliate personnel.

Sincerely,
Edwin T. Murabayashi
Edwin T. Murabayashi
EIS Coordinator

ETH:jm
cc: C. Liu
H. Gee
Y.S. Fok
Environmental Center
Board of Water Supply

AN EQUAL OPPORTUNITY EMPLOYER
2540 Dole Street, Honolulu, Hawaii 96822

December 19, 1980

Dr. L. Stephen Lau, Director
Water Resources Research Center
University of Hawaii
2540 Dole Street
Honolulu, Hawaii 96822

Attention: Mr. Edwin T. Murabayashi
Dear Dr. Lau:

Subject: Your Letter of November 7, 1980, on the Environmental Impact Statement (EIS) for Waiau Wells, Waianae-Kai, Oahu

Thank you for reviewing and commenting on the EIS for our proposed project. Your letter will be appended to our revised EIS.

In response to your comments, we offer the following:

1. On p. 36, the possible reduction of streamflow in Kumaipo and Hiu Streams are categorized under unavoidable adverse impact. There is an alternative, which is to release water from the well if the streamflow is adversely affected. Since Hiu and Kumaipo streams are major tributaries of Kaupuni Stream, which is perennial at its lower reaches, any significant reduction of streamflow in Hiu and Kumaipo could unavoidably reduce the flow in Kaupuni Stream?
 - a. Kumaipo Stream has intermittent flows and we do not anticipate any adverse effects to it. However, we plan to confirm this when we test pump the exploratory well.
 - b. Flow in Hiu Stream is also not anticipated to be affected by the project. We also plan to confirm this when we test pump the exploratory well.
 - c. Releasing of well water into the stream is not economically prudent nor will any environmental benefit arise by this action.
 - d. Leakage from our City and County tunnel supplies flow to Kaupuni Stream. And as mentioned previously, we do not anticipate any adverse effects to streamflow in both Kumaipo and Hiu streams.

WALDO HANAUSS
COMPTROLLER
MADE IN HAWAII
PRINTED IN HAWAII



STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P. O. BOX 178, HONOLULU, HAWAII 96818
LETTER NO. (P) 2021.0

GEORGE B. ANTONINI
CONTROLLER

Dr. L. Stephen Lau
Page 2
December 19, 1980

- c. The U. S. Geological Survey is being contacted to determine the need to monitor the streams.
- 2. *There was no survey of downstream groundwater users (i.e., irrigators) who might be adversely affected by the wells. Although surface flow may be lacking, is there groundwater flow under the streambed which could be adversely affected?*
The only known user of streamflow down-gradient from the project site is the Waianae Rap Center. We do not anticipate adverse effects to streamflow.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

KAZU HAYASHIDA
For Manager and Chief Engineer

cc: VTN Pacific

Mr. Richard O'Connell
Director
Office of Environmental
Quality Control
550 Halekauwila Street
Honolulu, Hawaii

Dear Mr. O'Connell:

Subject: Environmental Impact Statement
for Waianae Wells

Thank you for this opportunity to review and comment on the subject project.

The project will not have any adverse environmental effect on any existing or planned facilities serviced by our department.

Very truly yours,

A. DEG. KURAHAI
State Comptroller



BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

P-387

January 7, 1981

27 OCT 1980

HIENG

State of Hawaii
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
3949 Diamond Head Road
Honolulu, Hawaii 96816

Mr. Hideo Murakami
State Comptroller
Department of Accounting
and General Services
P. O. Box 119
Honolulu, Hawaii 96810

Dear Mr. Murakami:

Subject: Your letter of October 14, 1980,
on the Environmental Impact
Statement (EIS) for Waianae Wells,
Waianae Kai, Oahu

Thank you for reviewing the EIS for our proposed project.
Your letter will be appended to the revised environmental
document.

Should you have questions or require additional information,
please call Lawrence Whang at 548-5721.

Very truly yours,

[Signature]
KAZU HAYASHIDA
Manager and Chief Engineer

cc: VTN Pacific

Office of Environmental Control
550 Halekauwila Street
Room 301
Honolulu, Hawaii 96813
Clements

Waianae Wells

We have received a copy of the "Waianae Wells" Environmental Impact Statement
and have no comments to offer at this time. The Environmental Impact Statement
is being forwarded to the Commission.

Sincerely,

[Signature]
JERRY H. MATSUDA
Captain, HANG
Contr & Engr Officer

[Handwritten mark]

BOARD OF WATER SUPPLY
CITY & COUNTY OF HONOLULU

COPY

GEORGE R. ARMITAGE
GOVERNOR



RECEIVED
80 OF WATER SUPPLY
02:21 3 52 PM '80
Harry Y. Akagi
Acting Director
TELEPHONE NO.
548-1813

80-3079

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

548 HALEKUA ST
ROOM 201
HONOLULU, HAWAII 96813

November 6, 1980

Captain Jerry M. Matsuda
Department of Defense
State of Hawaii
3949 Diamond Head Road
Honolulu, Hawaii 96816

Dear Captain Matsuda:

Subject: Your Letter of October 27, 1980, On The
Environmental Impact Statement (EIS) For
Waianae Wells, Waianae-Kai, Oahu

Thank you for reviewing the EIS for our proposed project.
Your letter will be appended to the revised environmental
document.

Should you have questions or require additional information,
please call Lawrence Nhang at 548-5221.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: JVTN Pacific

Mr. Kazu Hayashida
Manager and Chief Engineer
Board of Water Supply
630 S. Beretania Street
Honolulu, Hawaii 96813

Dear Mr. Hayashida:

Subject: Environmental Impact Statement for Waianae
Water Wells, Waianae-Kai, Oahu

We have reviewed the subject EIS and offer the following
comments for your consideration:

- 1) The proposed location of the second well in the con-
servation district appears to also be in a designated hunting
unit. Will a safety zone have to be established around the
pump site?
- 2) How will electrical power be provided to the second
well site?

Enclosed are a list of commenting agencies and organi-
zations and copies of comments addressed to this Office.

The EIS regulations allow the accepting authority to
consider responses received beyond the fourteen day response
period. We will do so in reviewing this EIS.

We thank you for the opportunity to review the subject
EIS and look forward to the revised statement.

Sincerely,

Harry Y. Akagi

HARRY Y. AKAGI
Acting Director

Attachment

JA



COPY

Mr. Harry Y. Akagi -2- December 8, 1980

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

[Handwritten signature]

KASU HAYASHIDA
Manager and Chief Engineer

cc: WTN Pacific

December 8, 1980

Mr. Harry Y. Akagi
Acting Director
Office of Environmental
Quality Control
550 Halekauwila Street
Room 301
Honolulu, Hawaii 96813

Dear Mr. Akagi:

Subject: Your Letter of October 20, 1980
on the Environmental Impact
Statement for Waianae Wells,
Maianae-Kai, Oahu

Thank you for reviewing the environmental impact statement for our proposed project. Your letter will be appended to the revised environmental document.

In answer to your two questions, we offer the following:

1. "The proposed location of the second well in the Conservation District appears to also be in a designated hunting unit. Will a safety zone have to be established around the pump site?"

According to information available from the Division of Fish and Game, State of Hawaii, the proposed well sites will be located within "Hunting Area, Unit D." However, Regulation 20, which regulates game mammal hunting, permits hunting only on Saturdays, Sundays, and State holidays in this hunting area. As a precautionary measure, we will request the Department of Land and Natural Resources to establish a safety zone if the exploratory well is successful.

2. "How will electrical power be provided to the second well site?"

Electrical power will be obtained from Hawaiian Electric Company by using overhead power lines.

COPY

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

80-3078

DEPARTMENT OF GENERAL PLANNING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

RECEIVED
BO OF WATER SUPPLY
OCT 20 11 59 AM '80

GEORGE S. MORIGUCHI
CHIEF PLANNING OFFICER



DGP9/80-2885 (CT)

Ma. - 1072
pk

FRANK P. PAW
DIRECTOR

October 24, 1980

October 17, 1980

TO : MR. GEORGE S. MORIGUCHI
CHIEF PLANNING OFFICER
DEPARTMENT OF GENERAL PLANNING

FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY

SUBJECT: YOUR LETTER OF OCTOBER 17, 1980,
ON THE ENVIRONMENTAL IMPACT STATEMENT (EIS)
FOR MAJANAHE WELLS, WAIANAHE-KAI, OAHU

Mr. Harry Y. Akagi, Acting Director
Office of Environmental Quality Control
State of Hawaii
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Mr. Akagi:

Maianahe Wells Environmental Impact Statement

We have reviewed the Environmental Impact Statement and have no comments.

Thank you for affording us the opportunity of reviewing the impact statement.

Thank you for reviewing the EIS for our proposed project. Your letter will be appended to the revised environmental document.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Sincerely,

George S. Moriguchi
GEORGE S. MORIGUCHI
Chief Planning Officer

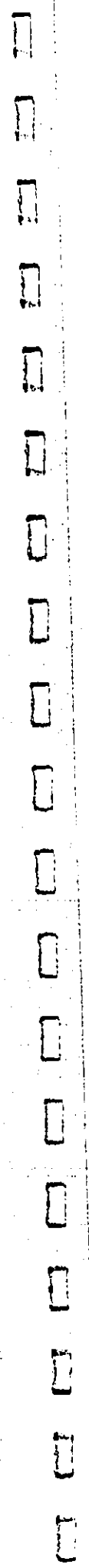
Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: VTN Pacific

GSM:fmt

cc: V BWS
DLNR



80-2737

DEPARTMENT OF PUBLIC WORKS RECEIVED
CITY AND COUNTY OF HONOLULU
450 SOUTH KING STREET
HONOLULU, HAWAII 96813
SEP 30 4 14 PM '80



WALLACE MIYAHIRA
DIRECTOR AND CHIEF ENGINEER

ENV 80-291

September 30, 1980

Asst. Mar. 8/8
AS/E

Office of Environmental Quality Control
State of Hawaii
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Gentlemen:

Subject: EIS for Waianae We.l.s,
Waianae, Oahu

With respect to our area of responsibility, the subject
EIS is satisfactory.

Very truly yours,

WALLACE MIYAHIRA
Director and Chief Engineer

cc: Board of Water Supply

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
650 SOUTH BERTANIA
HONOLULU, HAWAII 96813



October 10, 1980

TO : MR. WALLACE MIYAHIRA
DIRECTOR AND CHIEF ENGINEER
DEPARTMENT OF PUBLIC WORKS

FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY

SUBJECT: YOUR LETTER OF SEPTEMBER 30, 1980, ON THE
ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR
WAIANA E WELLS, WAIANA E, OAHU, HAWAII

Thank you for reviewing the EIS for our proposed
project. Your letter will be appended to the revised
environmental document.

Should you have questions or require additional
information, please call Lawrence Whang at 548-5221.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: VTN Pacific

True letter...man's greatest need - use it wisely

9

COPY

BOARD OF WATER SUPPLY

81-307-111

CITY AND COUNTY OF HONOLULU



RECEIVED
BO OF WATER SUPPLY
OCT 20 11 58 AM '80

AKIRA FUJITA
DIRECTOR

October 24, 1980

October 17, 1980

A.M. *[Signature]*

Honorable George R. Ariyoshi
Governor
State of Hawaii
State Capitol
Honolulu, Hawaii 96813

Dear Governor Ariyoshi:

Subject: Environmental Impact Statement for Waianae Wells

We have no comments on the Environmental Impact Statement for the Waianae Wells project.

Very truly yours,

[Signature]

AKIRA FUJITA
Director

cc: Board of Water Supply
Board of Land Natural Resources

D-35

TO : MR. AKIRA FUJITA
DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY

SUBJECT: YOUR LETTER OF OCTOBER 17, 1980, ON THE
ENVIRONMENTAL IMPACT STATEMENT (EIS)
FOR WAIANAЕ WELLS, WAIANAЕ-KAI, OAHU

Thank you for reviewing the EIS for our proposed project. Your letter will be appended to the revised environmental document.

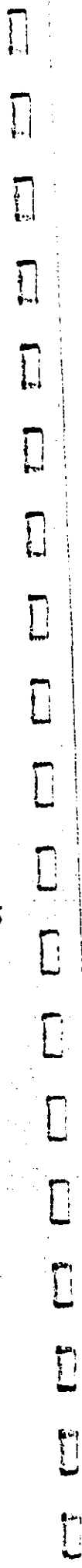
Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

[Signature]

KAZU HAYASHIDA
Manager and Chief Engineer

cc: WTN Pacific

[Handwritten mark]



COPY

BOARD OF WATER SUPPLY

80-3000

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 521-1101



BARREY CHUNG
MANAGER
MURAM TAKASHIMA
DEPUTY DIRECTOR

October 16, 1980

Ken
plc

October 6, 1980

Governor, State of Hawaii &
Board of Land & Natural Resources
State of Hawaii
Honolulu, Hawaii
Gentlemen:

Subject: Maianae Wells
Environmental Impact Statement
We have reviewed the subject Environmental Impact
Statement and have no comment.

Thank you for forwarding the EIS for our perusal.
Very truly yours,

Barrey Chung
Barrey Chung

cc: Board of Water Supply

TO : MR. BARRY CHUNG
DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY
SUBJECT: YOUR LETTER OF OCTOBER 6, 1980, ON THE
ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR
MAIANAE WELLS, MAIANAE-KAI, OAHU

Thank you for reviewing the EIS for our proposed
project. Your letter will be appended to the revised
environmental document.

Should you have questions or require additional
information, please call Lawrence Whang at 548-5221.

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: ATN Pacific

Pr

COPY

BOARD OF WATER SUPPLY

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU
850 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK P. PAN
MAIIB

RECEIVED
BOARD OF WATER SUPPLY
OCT 27 3 31 PM '80

RAMON DURAN
DIRECTOR

Mr. Ono
ME

October 22, 1980

November 3, 1980

Mr. Susumu Ono, Chairman
Board of Land and Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT
FOR THE MAIAEAE WATER WELLS

We have no comments on the EIS for the Maiaeae Water Wells.
Thank you for the opportunity to review the EIS.

Warm regards.

Sincerely,

Ramon Duran
RAMON DURAN, Director

RD:lm

cc: Board of Water Supply

TO : MR. FRANK DURAN, DIRECTOR
DEPARTMENT OF PARKS AND RECREATION

FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY

SUBJECT: YOUR LETTER OF OCTOBER 22, 1980, ON THE ENVIRONMENTAL
IMPACT STATEMENT (EIS) FOR MAIAEAE WATER WELLS,
MAIAEAE-KAI, OAHU

Thank you for reviewing the EIS for our proposed
project. Your letter will be appended to the revised
environmental document.

Should you have questions or require additional
information, please call Lawrence Hwang at 548-5221.

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: VJV Pacific

D-37

gr

RECEIVED
 BOARD OF WATER SUPPLY
The Sierra Club, Hawaii Chapter

Post Office Box 22897, Honolulu, HI 96822
 Telephone: (808) 916-8494

7 November 1980

Mr. Kazu Hayashida
 Manager-Chief Engineer
 Board of Water Supply
 City and County of Honolulu
 630 South Beretania
 Honolulu, Hawaii 96843

Re: Draft EIS for Ma'anae Wells (DK B-5-06:B and Portion 1)
 Dear Mr. Hayashida:

The Honolulu Group of the Sierra Club, Hawaii Chapter, appreciates the opportunity to comment on the draft Environmental Impact Statement (DEIS) for the Ma'anae Wells.

We note that the streams flowing from the vicinity of the proposed wells are not perennial and therefore our continuing concern with flow reduction in perennial streams is not applicable.

Also we are pleased to see the statement in the section on alternatives that "A very efficient approach to meeting future water demand is to conserve water and avoid unnecessary losses." (p. 48). The discussion which follows mentions several forms of water conservation with varying potential for water savings. However, the statement in the summary of the DEIS that "all feasible well sites will need to be developed to meet Oahu's growing water needs" makes us wonder whether the Board has any real commitment to obtaining additional non-agricultural water from other than new sources. In this present case, a one (1) per cent reduction in current municipal water use (which is 140 mgd according to page 48 of the DEIS) would supply a reliable source of water in an amount nearly equal to the 1.5 mgd hoped for from the proposed wells.

Sincerely,
Susan E. Miller
 Susan E. Miller, Chairman
 Honolulu Group Conservation Committee

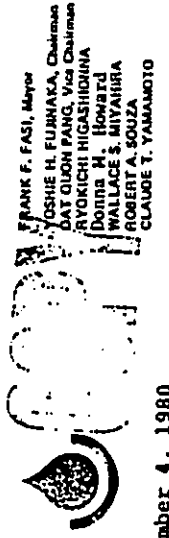
cc: Frank Fasi, Mayor, City and County of Honolulu

80-3264



Miunuu Puli, by Fisquet, W17

BOARD OF WATER SUPPLY
 CITY AND COUNTY OF HONOLULU
 630 SOUTH BERETANIA
 HONOLULU, HAWAII 96843



FRANK F. FASI, Mayor
 YOSHIE H. FURUKA, Chairman
 DAY QUDON PANG, Vice Chairman
 RYOKICHI HIGASHIYAMA
 Donna M. HOWATZ
 WALLACE S. MIYAHARA
 ROBERT A. SOUZA
 CLAUDE T. YAMAMOTO

December 4, 1980

KAZU HAYASHIDA
 Manager and Chief Engineer

Ms. Susan E. Miller
 The Sierra Club, Hawaii Chapter
 P. O. Box 22897
 Honolulu, Hawaii 96822

Dear Ms. Miller:

Subject: Your Letter of November 7, 1980, on the Environmental Impact Statement (EIS) for Maianae Wells, Maianae-Kai, Oahu

Thank you for reviewing the EIS for our proposed project. Your letter will be appended to the revised environmental document.

Your concern on our commitment to obtain water from other than new sources is discussed in Section C, Chapter V (pages 45-52) of the EIS.

Also, we would like to stress that the purpose of the project is to meet projected water demand in the Maianae area. This will lessen the dependency of importing water from the Pearl Harbor area.

The statement on page 6 that "the island's water system is integrated" is incorrect and will be revised. We are striving to completely integrate our water system and have integrated portions of it. For example, our Windward-Honolulu-Pearl Harbor system is not connected to our Waipahu-Maianae-Hakaha system. Therefore, any water gained from conservation in one system cannot be conveyed to another system as implied in your letter.

Should you have questions or require further information, please call Lawrence Whang at 548-5221.

Very truly yours,

Kazu Hayashida
 KAZU HAYASHIDA
 Manager and Chief Engineer

cc: WTN Pacific

More Water... man's greatest need - use it wisely

81-0001

Mr. Kazu Hayashida
March 13, 1981
Page 2

Third, given the existing gap between water production and consumption on the Leeward coast, no new major water uses can be approved or even tentatively approved until all existing needs are met from Leeward Oahu's own sources. As a corollary, the Board of Water Supply should not assure water to any new construction or plans for construction until all existing needs are met from Leeward Oahu's own sources.

Fourth, the EIS cites growth population projections based on land capacity which is overstated. On the other hand, the proposed Development Plan's projections reflect the community's desire to remain rural and agriculture. Projections that do not reflect the community's input should not be used to rationalize water and infrastructure development which then becomes the justifications for increasing the projected population capacity. Consequently, the 1977 Oahu General Plan's projection for the year 2000 of 36,600 people should be respected. Extrapolations based on fully developed urban land use are not reflective of community and cultural values.

A due respect for future generations and the inevitable error in human designs suggests we must always under utilize resources in order to leave choices for future generations and in order not to destroy the resources' capacity to replenish itself.

Fifth, the EIS fails to outline future agricultural uses in Waianae and Maile and their water needs.

Sixth, although the EIS acknowledges the unavoidable adverse impact of stream flow reduction in Kumaipo and Hui Streams, it fails to address the consequences for future farm and domestic use down the stream or the role of State and federal legal requirements to maintain minimum stream flow.

Seventh, in discussing alternatives, the EIS does not address the scope of the county's authority to require conservation plans. For example, does the county have the authority under its general police powers to require that water saving devices be placed in all public toilets, in all private business establishments, or in all private homes (whether old or new)? Could the county grant a one time rebate or a fee reduction as an incentive to any one who can demonstrate that such a device is being used? None of these alternatives or the authority to act is even discussed.

March 13, 1981

Mr. Kazu Hayashida
Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96813

Re: Waianae Well Environmental Impact Statement

Dear Mr. Hayashida:

Thank you for this opportunity to comment on the EIS for the Waianae Wells in Leeward Oahu. I apologize for not responding earlier and trust you have not been greatly inconvenienced by this delay.

I have reviewed the EIS for the Waianae Wells to be located in Waianae-Kai Oahu (TMK 8-3-06:8 and por. 1) and submit the following comments regarding the inadequacy of this EIS under EQC Regulation § 1:42. I draw your attention to the requirements of EQC Regulation 1:42(d), (e), (h), (j), (k).

The EIS indicates that the water will go for domestic and agricultural uses. However, the Board of Water Supply has not established priorities for water use relying instead upon a first come - first served basis. It is clear that even under this procedure, existing residential and agricultural uses have first preference. However, even among existing agricultural and residential areas there is no discussion of supplying farms and homes along the stream that have riparian, appurtenant and correlative uses diminished by the reduced stream flow. In particular, taro farmers at Camp Kaala and Mr. Henry Poe have existing water rights that may be diminished. Clearly, no new uses should be granted until these old uses are assured.

Second, it is clear that no water developed from Waianae Valley should go into any systems to provide water outside of the Waianae Valley under the McBryde decision.


Mr. Kazu Hayashida
March 13, 1981
Page 3

On page 49 of the EIS, it is stated: "approximately 12% of the water input into the overall BWS system was unaccounted for. This includes meter errors, non-metered uses (fire, line flushing, etc.) and an unknown amount of leakage. The cost of locating and repairing leaky sections of pipe has not been estimated at this time." 12% of the 15.85 mgd used in Waianae is more than 1.9 mgd or more than the expected capacity of both proposed wells. As the EIS states, this alternative source of water has not even been considered.

Finally, since more water developments are being planned for the future, the accumulative impact of more wells has not been considered.

In conclusion, we would like to see these important but sometimes overlooked issues taken into consideration before another irreversible step is taken in the exploitation and conversion of our island's natural and social environment.

Very truly yours,



ERIC ENOS
Waianae Rap Center

D-40

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU

100 SOUTH KING STREET

HONOLULU, HAWAII 96813

FILED ADMINISTRATIVE
YOSHIE H. FUJIMAKI, Chairman
DAI OOGI (ZANG), Vice Chairman
MORIKOJI H. HIRAYAMA
MICHIOKI J. UHIGI
ROBERT A. SOUZA
CLAUDE Y. YAMAGUCHI

April 26, 1981

KAZU HAYASHIDA
Member and Chief Engineer

Mr. Eric Enos
Waianae Rap Center
25-134 Plantation Road
Waianae, Hawaii 96792

Dear Mr. Enos:

Subject: Your Letter of March 13, 1981, on the
Environmental Impact Statement (EIS)
for Waianae Wells

Thank you for reviewing the EIS for our proposed well project. Your letter will be appended to the final revised document.

In answer to your comments, we offer the following response:

1. "The EIS indicates that the water will go for domestic and agricultural uses. However, the Board of Water Supply has not established priorities for water use relying instead upon a first come - first served basis. It is clear that even under this procedure, existing residential and agricultural uses have first preference. However, even among existing agricultural and residential areas there is no discussion of supplying farms and homes along the stream that have riparian, appurtenant and correlative uses diminished by the reduced stream flow. In particular, two farmers at Camp Laala and Mr. Henry Lee have existing water rights that may be diminished. Clearly, no new uses should be granted until these old uses are assured."

We anticipate no adverse effects to streamflow. However, the streamflow will be monitored before and after our exploratory well drilling to determine if there will be any effects to the streamflow. All water rights and existing uses will be assured should we install production wells in that area.

2. "Second, it is clear that no water developed from Waianae Valley should go into any system to provide water outside of the Waianae Valley under the McBryde decision."

We do not believe that the McBryde decision applies to groundwater development.

However, the water from our proposed well will be used within the Waianae area.

On Page 4 of the EIS, the Ewa-Waianae District used 15.85 million gallons per day of which 3.2 million gallons were supplied from sources within the district. The other 12.6 million gallons per day were supplied from the Pearl Harbor Basin. As mentioned on Page 6, the water will be used to meet local growth in water demand and to reduce the demand on the Pearl Harbor aquifer. However, the Leeward coast (Ewa to Hakaha) will have to continue to rely upon imported water from outside the district to make up its water supply deficit.

3. "Third, given the existing gap between water production and consumption on the Leeward coast, no new major water uses can be approved or even tentatively approved until all existing needs are met from Leeward Waianae sources. As a corollary, the Board of Water Supply should not contract water to any new construction or piece for construction until all existing needs are met from Leeward Waianae sources."

The developable sources in the Leeward coast from Ewa to Hakaha can never meet the consumption demand of that area. This area will have to continue to depend on imported water to make up its water supply deficit. The new sources planned for Hakaha and Waianae will allow us to increase available water supply in that area while maintaining present pumpages imported into the Waianae area from the Pearl Harbor Basin.

4. "Fourth, the EIS cites growth population projections based on land capacity which is overrated. On the other hand, the proposed Development Plan's projections reflect the community's desire to remain rural and agriculture. Projections that do not reflect the community's intent should not be used to rationalize water and infrastructure development which then becomes the justification for increasing the projected population capacity. Consequently, the 1977 Oahu General Plan's projection for the year 2000 of 36,600 people should be respected. Extrapolations based on fully developed urban land use are not reflective of community and cultural values."

Future water requirements are based on the State Department of Planning and Economic Development's population projections and the City's Development Plans.

5. "A due respect for future generations and the inevitable error in human designs suggests we must always under utilize resources in order to leave choices for future generations and in order not to destroy the resources' capacity to replenish itself."

Our water development policy is to develop groundwater to the resources' sustainable capacity. This policy does not destroy the resources capacity to replenish itself.

The EIS briefly describes alternatives to groundwater development such as desalting of sea water, trapping storm runoff, and using stream water. These options, although presently expensive, will be alternatives available to future generations.

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6. *"Fifth, the EIS fails to outline future agricultural uses in Waianae and Nāie and their water needs."*
We are working with the State Department of Agriculture and the State Department of Land and Natural Resources on future agricultural developments. They have already drilled a well for a proposed Agricultural Park planned for Waianae. We have discussed the use of the well with them to meet all agricultural needs in that area.

7. *"Sixth, although the EIS acknowledges the unavoidable adverse impact of stream flow reduction in Kumaipo and Hui Streams, it fails to address the consequences for future farm and domestic use down the stream or the role of State and Federal legal requirements to maintain minimum stream flow."*
The EIS does not acknowledge "the unavoidable adverse impact of streamflow reduction in Kumaipo and Hui Streams." On Page 31, we concluded that the streams will not be significantly affected by the proposed wells. However, without any actual evidence available, this impact is considered an unresolved issue (page 70) until we drill and test the exploratory well.

8. *"Seventh, in discussing alternatives, the EIS does not address the scope of the county's authority to require conservation plans. For example, does the county have the authority under its general police powers to require that water saving devices be placed in all public toilets, in all private business establishments, or in all private homes (whether old or new)? Could the county grant a one time rebate or a fee reduction as an incentive to any one who can demonstrate that such a device is being used? None of these alternatives or the authority to act is even discussed."*
Conservation of water in the home and in business establishments is an on-going program. Since November 1979, the Plumbing Code was amended to require that:

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1. Faucets or valves be limited to a maximum flow rate of three (3) gallons per minute (gpm).
2. Toilets be limited to a maximum discharge rate of 3.5 gallons per flush, and
3. Potable water used for cooling equipment must be recirculated or reused if the discharge exceeds one (1) gpm or flows more than ten (10) hours a day.

These requirements apply only to new construction. Existing facilities are exempt except where compliance is necessary for health or safety reasons.

Any savings incurred by homeowners using water saving devices will be reflected in the reduction in water use. The devices are inexpensive and easy to install and, therefore, savings in water use will compensate the homeowners for using the devices.

9. *"On page 49 of the EIS, it is stated: 'approximately 12% of the water input into the overall BWS system was unaccounted for. This includes meter errors, non-metered uses (fire, line flushing, etc.) and an unknown amount of leakage. The cost of locating and repairing leaky sections of pipe has not been estimated at this time'. 12% of the 15.65 mgd used in Waianae is more than 1.9 mgd or more than the expected capacity of both proposed wells. As the EIS states, this alternative source of water has not even been considered."*
Unaccounted for water is always being scrutinized and we are constantly looking for ways to reduce it. The 12% unaccounted for water is an island-wide average. For the Ewa-Waianae District, this figure is only 5.6% or about 0.89 mgd. Only a portion of the 0.89 mgd is attributable to pipeline leakage. Unaccounted for water is a normal part of all water systems and we have maintained this at a low level.

10. *"Finally, since more water developments are being planned for the future, the accumulative impact of more wells has not been considered."*

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RECEIVED
RD OF WATER SUPPLY
UKISHIMA & MATSUBARA II CO AH '81

Suite 1710 Pacific Trade Center
190 South King Street
Honolulu, Hawaii 96813
(609) 516-1818
Hgr. Hgr. W.R.
Asst. Hgr. W.R.
FIE

Attorneys at Law
A Law Corporation

May 11, 1981

Daniel S. Ukishima
Benjamin M. Matsubara
Gary H. K. T. Lee
Dale W. Lee
Meryn M. Huddle

Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96813

Re: Maianae Exploratory Well: Drilling, Casing and
Testing One Well, Maianae, Oahu, Hawaii, #81-47

Gentlemen:

Please be advised that this office represents Maianae Valley Ranch. I have been informed by my client that the above-referenced well digging project has been undertaken by your agency. At present, my client utilizes the natural stream flow which runs through its property for watering its livestock operations. Since Maianae Valley Ranch's livestock operations are extremely dependent upon the volume of water naturally generated from mountain springs, it is concerned over the effect the well digging operations will have on the natural stream flow. We therefore request that you provide us any information available in regard to our concerns and that a copy of the Environmental Impact Statement filed for the project be forwarded to us.

Thank you for your cooperation in this regard.

Very truly yours,

UKISHIMA & MATSUBARA

Benjamin M. Matsubara
Benjamin M. Matsubara

BMM/sab

cc: Maianae Valley Ranch

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We have done comprehensive geological and hydrological studies on future water development and, therefore, we conclude that the accumulative impact of more wells in the area will not have any adverse effects on the groundwater aquifer. The total draft from all wells, both private and public, in the area is designed not to exceed the sustainable yield of the aquifer.

If you have any questions, please contact Lawrence Whang at 548-5221.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: WTN Pacific

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BOARD OF WATER SUPPLY
STATE OF HAWAII

BOARD OF WATER SUPPLY
STATE OF HAWAII

COPY

June 17, 1981

February 5, 1982

RECEIVED

FEB 19 1982

VIII PACIFIC

Mr. Benjamin M. Matsubara
Ukishima and Matsubara
Suite 1746 Pacific Trade Center
190 South King Street
Honolulu, Hawaii 96813

Mr. Benjamin M. Matsubara
Ukishima and Matsubara
Pacific Trade Center, Suite 1746
190 South King Street
Honolulu, Hawaii 96813

Dear Mr. Matsubara:

Subject: Follow-up to our Letter of
June 17, 1981 on the Proposed
Maianae Wells, Waianae, Oahu

Your letter of May 11, 1981
on the Proposed Maianae Well,
Waianae, Oahu

We forward a copy of the environmental impact statement
for the proposed water development project as requested.

We plan to drill another exploratory well which will
give us a better indication of the impact pumpage will have
on streamflow. We were unable to pump sufficient
amounts of water from the first exploratory well to give us
a valid indication of the effect of pumpage on streamflow.
After we complete drilling and testing the second well, we
shall be glad to send you the data on the pumpages and related
streamflows. Should streamflow be affected, appropriate
mitigative measures will be taken.

If you have any questions, please call Lawrence Whang
at 548-5221.

If you have any questions, please contact Lawrence
Whang at 548-5221.

Very truly yours,

Very truly yours,

Kazu Hayashida
KAZU HAYASHIDA
Manager and Chief Engineer

Kazu Hayashida
KAZU HAYASHIDA
Manager and Chief Engineer

Enclosure:
VIII Pacific

cc: VTN Pacific