BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU

630 SOUTH BERETANIA

HONOLULU, HAWAII 96843

March 2, 1984

TO: HONORABLE EILEEN R. ANDERSON, MAYOR

VIA: ANDREW I. T. CHANG, MANAGING DIRECTOR

FROM: KAZU HAYASHIDA, BOARD OF WATER SUPPLY

SUBJECT: FINAL ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR KAHALUU WELL

We recommend your acceptance of the EIS for our proposed water development project. The EIS complies with all the requirements of Chapter 343, Hawaii Revised Statutes.

According to Chapter 343, your acceptance is a formal determination that the EIS adequately describes identifiable environmental impacts and satisfactorily responds to comments received during the review of the statement.

The Kahaluu Well project would add 1.0 million gallons of water to the Windward-Honolulu Water District. This source is necessary to meet projected demands due to population growth.

We have enclosed a copy of the environmental document for your information.

If you have any questions, please contact me at 527-6180.

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

Encl.

CONCUR:

Andrew I. T. Chang
Managing Director

ACCEPTED:

Eileen R. Anderson MAR 5 1984

Eileen R. Anderson, Mayor / Date
City and County of Honolulu

City and County of Honolulu
Board of Water Supply

FINAL
ENVIRONMENTAL IMPACT STATEMENT

KAHALUU WELL

Koolaupoko, Oahu, Hawaii

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

550 HALEKAUWILA ST.
ROOM 301
HONOLULU, HAWAII 96813
PHONE 548-6915

March 19, 1984

Dear Recipient of the Final EIS for the
Kahaluu Well, Koolaupoko, Oahu:

The attached letter from the Environmental Center dated April 7, 1982 and the Board of Water Supply response of July 30, 1982 were inadvertently omitted from the final EIS that you received. Please insert these letters into your copy as a part of the Environmental Center's comments in Appendix D, Comments and Responses to Revised Draft Environmental Impact Statement.

Should you have any questions, please call Faith Miyamoto at 548-6915.

Sincerely,

Letitia N. Uyehara

Letitia N. Uyehara
Interim Director

8/2

July 30, 1982

Dr. Doak C. Cox, Director
Environmental Center
University of Hawaii at Manoa
2550 Campus Road, Crawford 317
Honolulu, Hawaii 96822

Dear Dr. Cox:

Subject: Your Letter of April 7, 1982, on the Draft Environmental Impact Statement (EIS) for Kahaluu Well, Kahaluu, Oahu

Thank you for your comments on the draft EIS of the proposed Kahaluu Well.

The primary objective of the pumping tests is to determine the quantity of water which can be pumped on a sustained basis. However, only long-term pumpage can accurately indicate its influence on streamflow.

We, therefore, indicated that we would continuously monitor streamflow as we withdrew water from the well.

The report, "Evaluation of Major Dike-Impounded Ground Water Reservoirs, Island of Oahu" prepared by the U. S. Geological Survey, indicates that dikes occur as many as 1,000 per mile in the windward area or as many as 100 and 200 per mile as predicted by MacDonald in 1956. It is, therefore, difficult to predict with certainty the extent to which a well penetrating a particular dike zone will reduce streamflow. Verification by pumping of the well over a long period, and continuous monitoring of the streamflow as we propose would be a valid indicator of the relationship between pumpages and streamflows.

We are committed to the maintenance of adequate streamflows in watersheds where we propose to develop new wells. Accordingly, we shall comply with any interim minimum streamflow standards which may be established by the State Department of Land and Natural Resources.

If you have any questions, please contact Herbert H. Minakami at 548-6183.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

HHM/LGR:mi
cc: K. Hayashida, L. Whang
82-846

University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 948-7361

Office of the Director

April 7, 1982

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

Dear Mr. Hayashida:

Draft EIS, Kahaluu Well
Kahaluu, Oahu

We appreciated receipt of your 28 October 1981 response to our review of the above draft EIS and your 23 November correction to that response. Some further comments from us that seemed warranted and that we prepared in December were unfortunately misplaced in our office. For whatever use can now be made of them, we are now sending you these comments.

It now seems recognized that reductions of stream flow resulted from the November 1980 pump test of the well. However, the BWS considers these reductions insignificant. From our analysis of the results of the pump test (details of which are presented in an attachment, we find evidence that the reductions were on the order of 0.3 mgd, about as great as the pre-test flow of the stream at site 3 (downstream from the well) and about 20 percent of the pre-test flows at sites 4 and 5 (further downstream). Characterizing these as insignificant does not seem warranted. Furthermore as we pointed out in our original review of the draft EIS, it is not unlikely that greater reductions will result from extended pumping periods even at the proposed pumping rate, about 2/3 of the test pump rate.

Your October 1981 response suggests that, if long term pumping does reduce the flow of the stream, the well can be throttled to insure meeting any future minimum stream flow standards that may be adopted by the State. We consider that, unless the Board of Water Supply is willing to guarantee that the well will be throttled to insure that the flow of the stream will not be reduced below natural rates (not below a minimum standard, particularly one not yet adopted), the EIS should address the effects of streamflow reductions on the biota of the stream and on diversions downstream from the well.

Yours very truly,

Doak C. Cox
Director

cc: Mayor Eileen Anderson
Office of Environmental Quality Control
Jacquelin Miller
Ed Murabayashi

Stream flow deficit resulting from test pumping of Kahaluu Well
(Attachment to 7 April 1982 letter on Draft EIS)

In this attachment we will use the term deficit to refer to the net of natural flow of the stream at a gaging station downstream of the pump discharge (as estimated from pre- and post-test measurements) plus the pump discharge minus the actual flow of the stream during the pump test.

The deficit at station 2A cannot be reliably estimated because, according to Table 3 in the draft EIS, there were no pre-test or post-test records at that station. The BWS letter of 23 November estimated the deficit at 0.31 mgd. If the natural pre-test flow at the station were identical to that at station 2, (converting cfs to mgd) the deficit would be estimated at 0.14 + 1.44 - 1.34 = 0.24 mgd. By either of these estimates the deficit was greater than the flow at station 2. This would be possible if, during the test, the stream actually lost water than gained or remained constant between station 2 and station 2A. An alternative possibility is, however, that the natural flow at station 2A was greater than that at 2A and the gain was simply reduced during the test.

The deficits at stations 3, 4, and 5 may be estimated more reliably from the data in Table 3. The increase in flow suggested by measurements made on 7 November 1980 at specified times after the pumping began that are not specified in Table 3, and the decrease in flow indicated by measurements made on 12 November at various times after the pump was shut down, suggest that there were significant increases in the sum of channel and bank storage during those periods. If the measurements on those dates are disregarded it appears that the deficits at stations 3, 4, and 5 were 0.28, 0.38, and 0.43 mgd., respectively. If the measurements could be considered exact, these deficits would suggest that influence of the pumping increased with increasing distance downstream from the well. The increase would be inexplicable if the stream tapped directly the dike compartment tapped by the well, but explicable in the light of the actual hydrogeology of the area.

The BWS 28 October response to the Environmental Center review of the draft EIS seems to confirm our impressions that the stream in the vicinity of and downstream of the well is in alluvium underlain by the dike-intruded lavas, and that natural stream gains result from discharges from aquifers within the alluvium that are fed in part from the underlying dike compartments. If this is the case, it is quite conceivable that the maximum influence of the well on the flow of the stream might be, not in the immediate vicinity of the well, but downstream at the points of discharge from the alluvial aquifers that are fed by the dike compartment tapped by the well and others hydrogeologically connected with it.

Considering the probable limits to the accuracy of the stream-flow measurements, however, it seems definite only that stream-flow deficits on the order of 0.3 mgd. resulted from the pump test.

Environmental Center
December 1981

CITY AND COUNTY OF HONOLULU

BOARD OF WATER SUPPLY

FINAL

ENVIRONMENTAL IMPACT STATEMENT

FOR

KAHALUU, KOOLAUPOKO, OAHU, HAWAII

TAX MAP KEY 4-7-08:02

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

Board Members:

Yoshie H. Fujinaka, Chair
Water A. Dods, Jr., Vice-Chair
Milton J. Agader
Michael J. Chun
Ernest A. Watari
Wayne J. Yamasaki

Kazu Hayashida Date 2/3/84

KAZU HAYASHIDA
Manager and Chief Engineer

Accepting Authority: Mayor, City and County of Honolulu

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FOR THE KAHALUU WELL

1. PROJECT DESCRIPTION

The Board of Water Supply is proposing to upgrade an existing exploratory well within the Forest Reserve lands in Kahaluu to a permanent production well. The project consists of the installation of a deep well water pump, concrete base, a control building, connection of the well to the existing 16-inch water line and appurtenant facilities.

2. ENVIRONMENTAL IMPACTS

The major impacts associated with the construction of the project will be of a temporary nature. Construction impacts will include inconveniences caused by dust, noise, and traffic disruptions. However, these can be minimized by close inspection and control of the project.

A five-day pumping test of the exploratory well yielded water of excellent quality. Monitoring performed before, during, and after the pumping test showed there were no discernible effects to the streamflow of Kahaluu Stream.

3. ALTERNATIVES

A. No action

B. Water exchange

C. Desalting of seawater

D. Wastewater reclamation

E. Surface water treatment

F. Demineralization of brackish water

SECTION 1

DESCRIPTION OF THE PROPOSED ACTION

I. GENERAL

The Board of Water Supply, City and County of Honolulu, proposes to convert the existing Kahaluu Exploratory Well to a production well. The exploratory well is located within the Waiahole Forest Reserve near the existing Kahaluu Tunnel. Water obtained from the well will be used to supplement the yield from the tunnel, which has a capacity of approximately 2 million gallons per day.[1] The exploratory well has been shown to have a sustainable capacity of at least 1.4 mgd of water, but the Board of Water Supply plans to limit withdrawals from the production well to 1.0 mgd.

The well site is located in the upper portion of Kahaluu, as shown in Figure 1. The Tax Map Key is First Division 4-7-08:2. Access to the project area is provided by a 20-foot wide roadway from the end of Malumalu Place to an existing chlorinator building. A construction road leading from the Chlorinator building to the well site will be paved during construction of the well improvements.

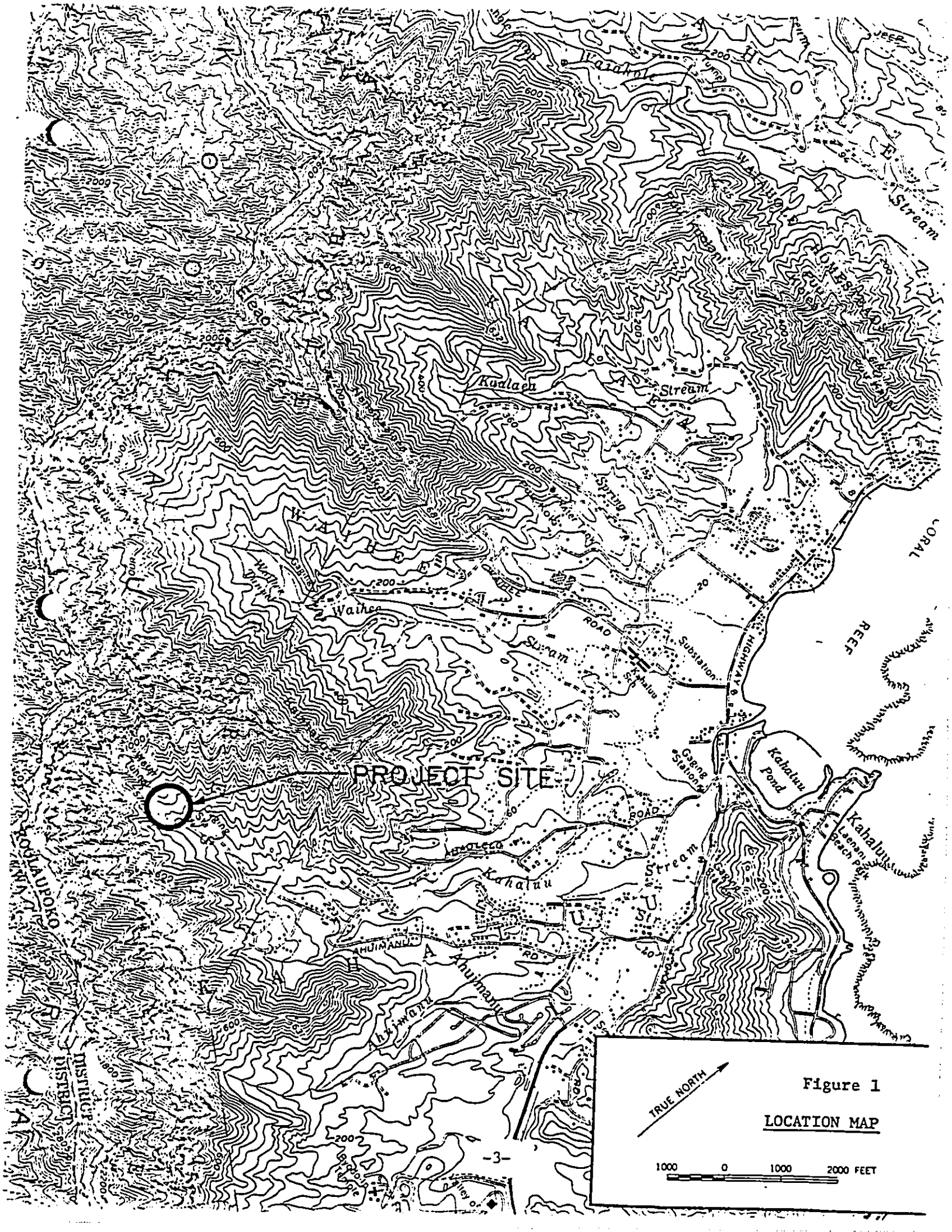

Figure 1

LOCATION MAP

To supplement the existing Windward sources the Board of Water Supply is studying the possible development of the following sources:

SOURCE	ESTIMATED CAPACITY (mgd)
Kahana Wells	0.5
Haiku Well	1.0
Iolekaa Well	0.3
Kahaluu Well	1.0
Luluku Well	1.0
Kaaawa Well I	0.5
Kamooalii Well I	0.5
Kaaawa Well II	0.5
Kaluanui Wells	2.0
Punaluu Wells IV	0.5
Punaluu Wells V	5.0
Kamooalii Well II	0.5
Hakipuu Well	0.5
Kaipapau Wells	1.0
Kuou Well II	0.5
Laie Wells	1.0
Waimanalo Wells II	0.3
Wailele Well	1.0
Maakua Wells	0.5
Kahana Valley	6.0
Kahana Well II	0.5
Waiahole-Waikane Wells I	1.0
Waiahole-Waikane Wells II	1.0

CORRECTION

THE PRECEDING DOCUMENT(S) HAS BEEN REPHOTOGRAPHED TO ASSURE LEGIBILITY
SEE FRAME(S)
IMMEDIATELY FOLLOWING

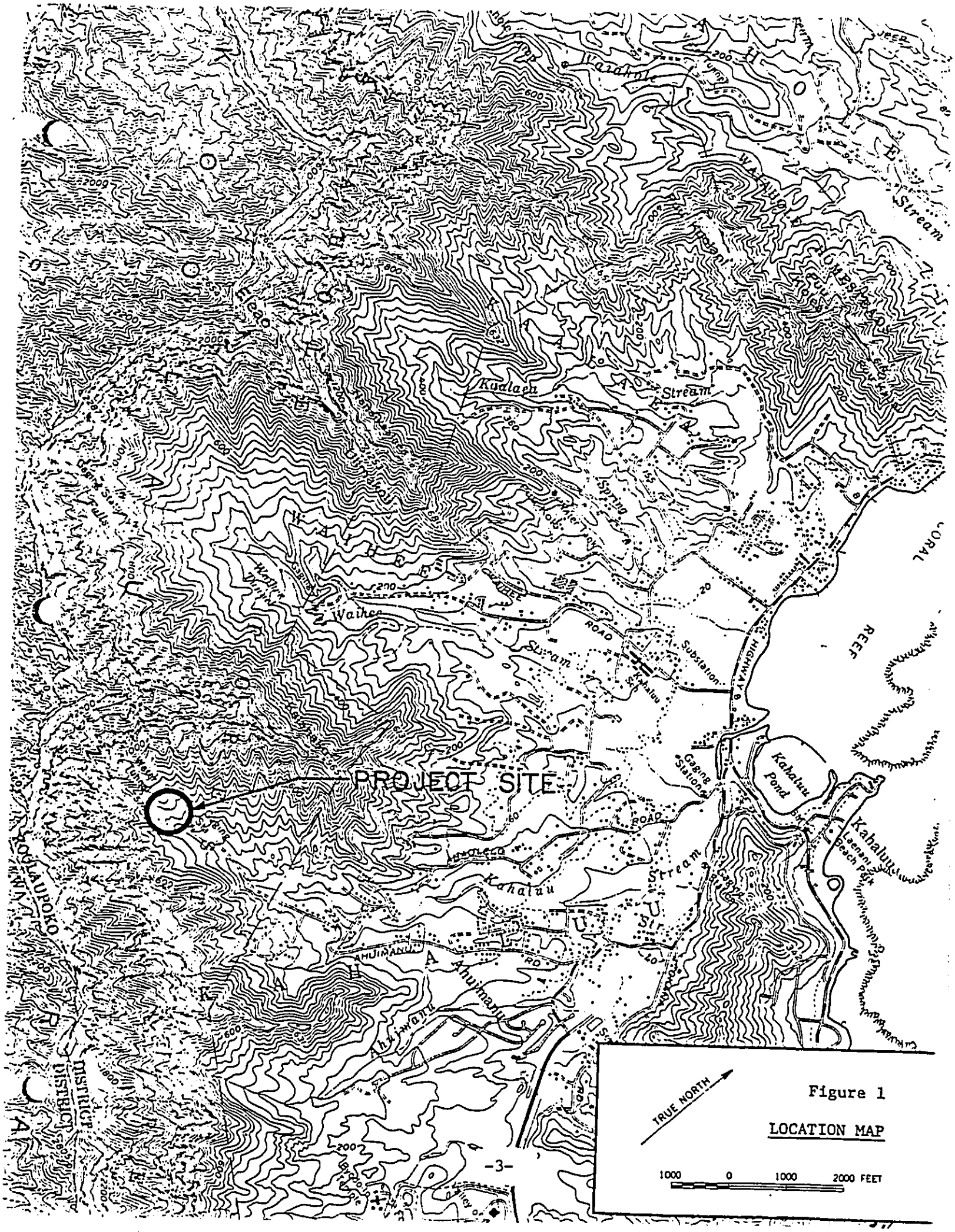

Figure 1

LOCATION MAP

II. PURPOSE OF THE PROJECT

The proposed Kahaluu Well is one of the many ongoing projects being undertaken by the Board of Water Supply to locate and develop new sources of water. It is urgent that the Kahaluu Well be developed in order to meet the ever increasing water demand for the Windward and Honolulu Water Districts. The production of all existing sources in the Windward Water District totals 17.32 mgd. These existing sources are as follows:

SOURCE	1982 PRODUCTION (mgd)
Waihee Tunnel*	5.48
Kahaluu Tunnel	2.29
Haiku Tunnel	0.99
Luluku Tunnel	0.75
Waimanalo Tunnels	0.83
Kuou Wells	1.56
Waimanalo Well	0.01
Waihee Wells I**	0.01
Waihee Inclined Wells	1.25
Hauula Well	0.13
Kahana Wells	0.58
Punaluu Wells I	0.39
Punaluu Wells II	2.83
Punaluu Wells III	0.22
Total:	17.32 mgd

* Yield for tunnel is base flow. Flow manipulated by bulkhead pressure and system demand.

** Quantity varies to meet Court Order to allow 2.7 mgd flow at stream gage station located below Waihee Wells I.

To supplement the existing Windward sources the Board of Water Supply is studying the possible development of the following sources:

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Kahana Wells	0.5
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Kamooalii Well I	0.5
Kaaawa Well II	0.5
Kaluanui Wells	2.0
Punaluu Wells IV	0.5
Punaluu Wells V	5.0
Kamooalii Well II	0.5
Hakipuu Well	0.5
Kaipapau Wells	1.0
Kuou Well II	0.5
Laie Wells	1.0
Waimanalo Wells II	0.3
Wailele Well	1.0
Maakua Wells	0.5
Kahana Valley	6.0
Kahana Well II	0.5
Waiahole-Waikane Wells I	1.0
Waiahole-Waikane Wells II	1.0

To collect and distribute the water resources of the Windward District, an intricate network of water transmission lines weave through the Windward area (Figure 2). The service system can be divided into two major subsystems, the low service system and the high service system.

The following description of the Windward water service system is drawn from "Windward Oahu Water Supply Study"[1]:

"The major transmission line for the low service system consists of a 30-inch diameter pipe running from Punaluu Wells II to the Kapaa 272 Reservoir, with a total length of approximately 21 miles. A parallel 20-inch diameter pipe along Kaneohe Bay Drive adds to the total flow carrying capacity directed toward Kailua via the Kapaa 272 Reservoir. From Kapaa, a 24-inch diameter pipe goes into Kailua to the Kailua and Pohakupu storage reservoirs. The transmission main then reduces down to a 20-inch pipe running from the Pohakupu area to the Waimanalo 232 Reservoir. Also from Kapaa, a 36-inch diameter pipe goes to the Pohakupu area, via Kapaa Quarry Road. From the Waimanalo 232 Reservoir, the transmission main system, varying in size from 36 inches to 30 inches, runs around Makapuu Point to the Kamiloiki 170 Reservoir."

"The existing high service system is supplied by a series of high elevation tunnels (Kahaluu, Haiku, and Luluku). The Kahaluu Tunnel serves a portion of the Ahuimanu Road area; the Haiku Tunnel fills the Haiku 500 Reservoir which serves the Haiku Plantation, and the Luluku Tunnel serves the Mahinui and Halekou subdivisions. The surplus water from these tunnels flow into a 16-inch diameter transmission line which runs through Kaneohe town along Kamehameha Highway. The line reduces to a 12-inch diameter pipe at Likelike Highway and continues on Kamehameha Highway down Auloa Road to serve the upper portion of the Maunawili subdivision. The remaining surplus water eventually goes into the Pohakupu 272 Reservoir."

Much of the recent increase in water demand in the Windward Water District is due to the rising population of the Windward area. A study conducted in April 1970 showed the resident population to be 99,284, indicating an average annual growth rate

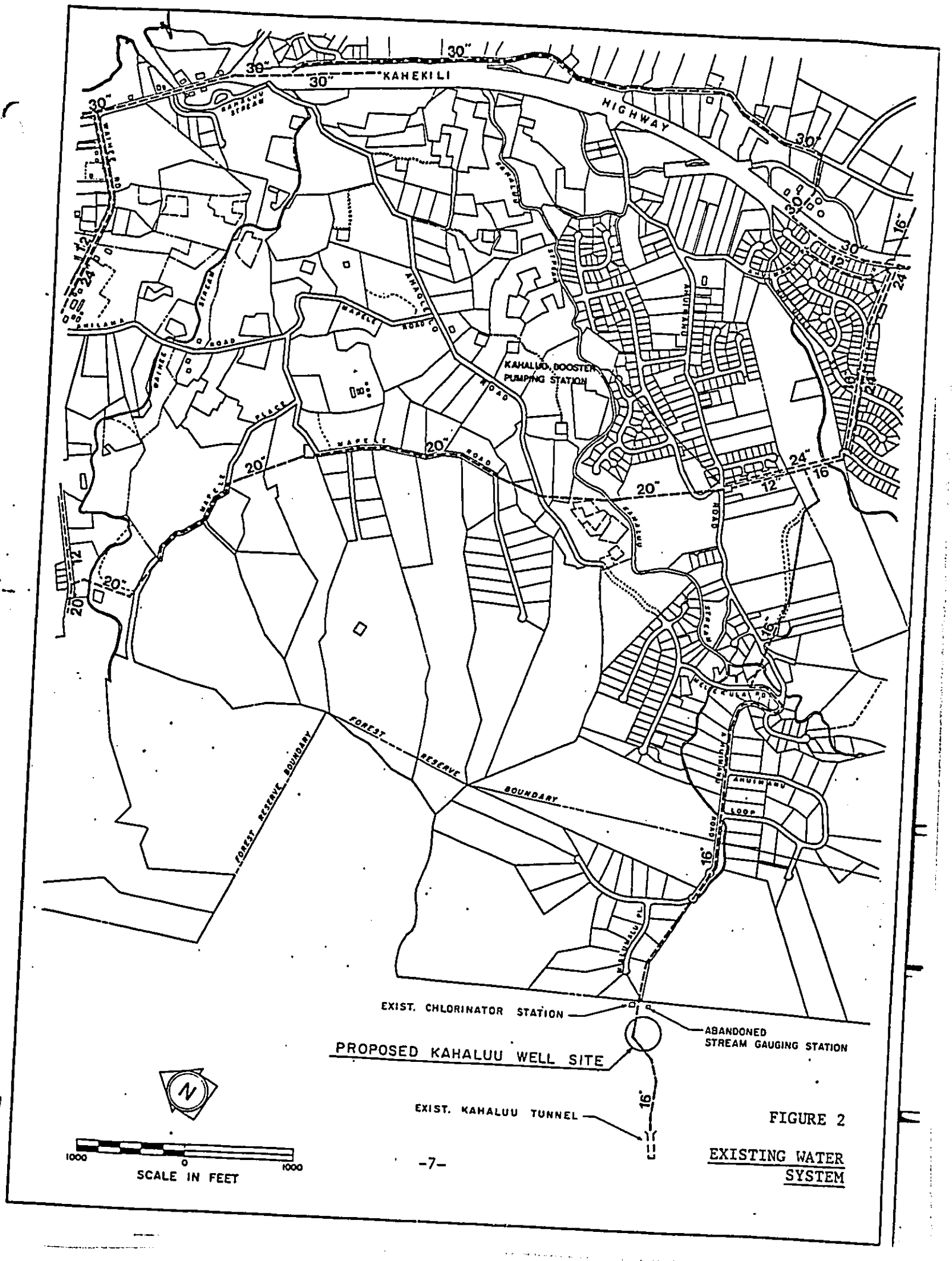

FIGURE 2

EXISTING WATER SYSTEM

of 4.2 percent over the preceding 10 years. From the period 1964 to 1974, water usage increased at an average annual rate of 4.1 percent. Based on the State's II-F population projection, the Windward population will reach 131,700 by the year 2000, with a predicted daily water usage of 22.0 million gallons.

Of the present daily production rate of 17.3 mgd, the Kahaluu Tunnel is providing the Windward District with approximately 2 million gallons of water daily. This supply is drawn mainly from high level dike compartments in the Koolau Mountain Range. Board of Water Supply studies showed a high probability for water recovery from untapped groundwater flow in the area below the tunnel, and testing results of the Kahaluu Exploratory Well have confirmed that the well can safely contribute 1.0 mgd to the Windward Water District.

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III. DETAILED DESCRIPTION OF THE PROJECT

The proposed location of Kahaluu Well is approximately 100 yards southeast of the existing chlorinator station (Figure 3). The site lies within 100 feet of a Kahaluu Stream tributary. Selection of the site was based upon hydrologic assessments by the Board of Water Supply which indicated a high potential for groundwater recovery from the upper Kahaluu area. The specific location was chosen for its close proximity to the existing 16-inch transmission main which simplifies the incorporation of the well into the Windward water system. Since the well waters will feed into the existing main conveying Kahaluu Tunnel waters, the waters from both the well and tunnel will be chlorinated. Generally, waters developed from wells are of high quality that chlorination is not needed except for emergencies, while waters from tunnel sources are usually chlorinated.

The drilling and testing of the well was completed in November, 1980. These tasks, along with all initial site work and site improvements, were part of the separately funded Kahaluu Exploratory Well project. The environmental ramification of these improvements have been analyzed in a separate environmental assessment. Test results of the Kahaluu Exploratory Well (See Table 1 and Table 2) indicate that the well may be capable of a sustained pumping rate of 1.4 mgd with no discernible effects on the streamflow of Kahaluu Stream (See Figure 4 and Table 3). To assure the long-term stability of the aquifer, the Board proposes to limit production to a maximum of 1.0 mgd.

The exploratory well is approximately 450 feet deep and cased as shown in Figure 5. To effect the conversion of the exploratory well to a production well, the scope of work will include the installation of a deep well water pump and appurtenances, connection to the existing 16-inch transmission line, final grading, construction of a control building and facilities, security fencing, acoustic mutes, drainlines, landscaping, and paving the service roads. Design and inspection of the conversion work will be under the direction of the Board of Water Supply. Work will be performed by a private contractor who will be selected by competitive bidding.

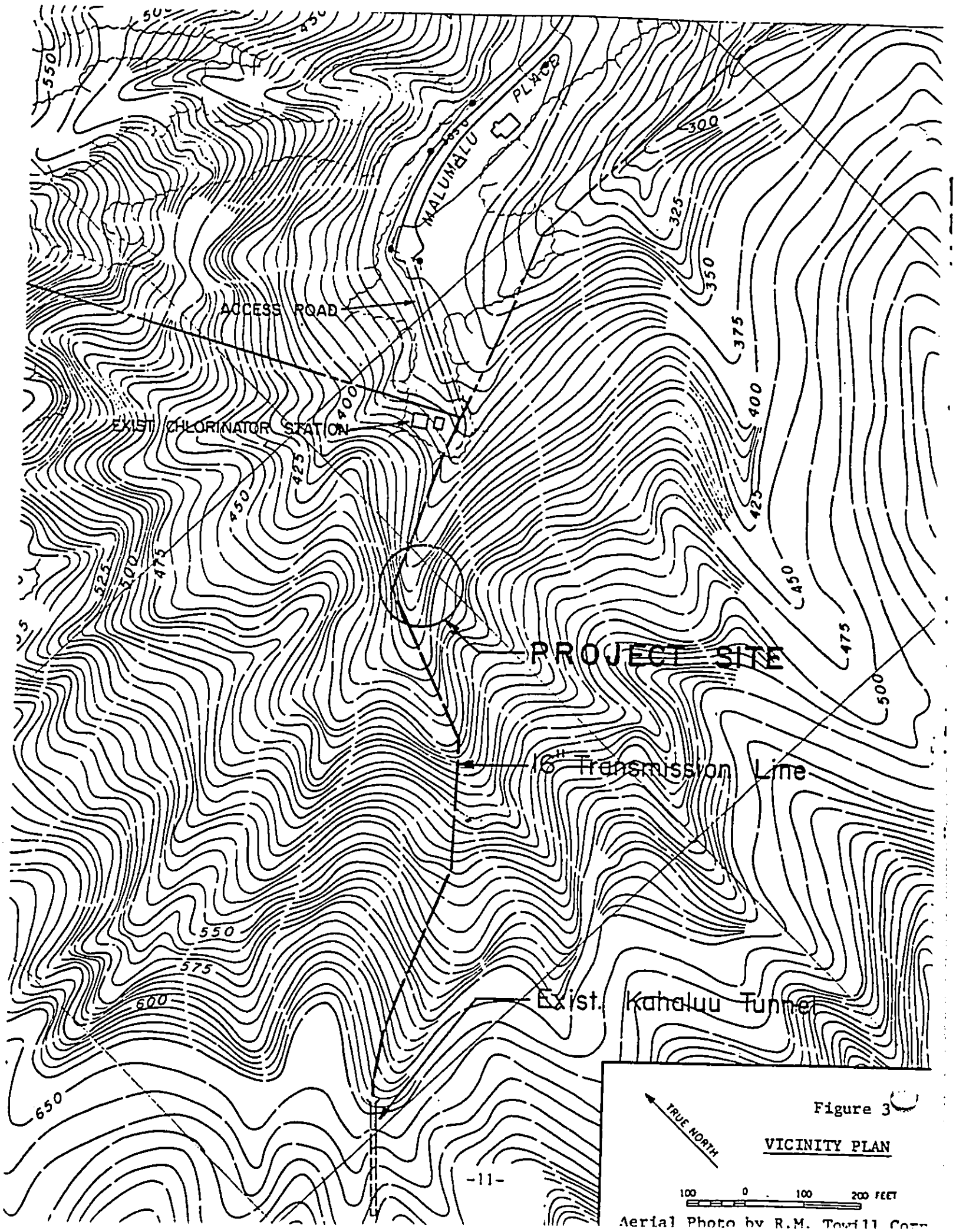


Figure 3

VICINITY PLAN

Aerial Photo by R.M. Towill Corp.

TABLE 1 - YIELD-DRAWDOWN TEST DATA

KAHALUU EXPLORATORY WELL NO. 2651-03

Location:	4-7-08:2
Elevation at Ground:	(+)419.0 ft.
Elevation at Bottom of Well:	(-)31.0 ft.
Elevation at End of Casing:	(+)179.0 ft.
Diameter of Casing:	11-15/16 in. I.D.
Head:	(+)333.0 ft.
Drilling completed:	10-10-80
Drilling Company:	Roscoe-Moss
Date of Yield-Drawdown Test:	11-6-80

Time	Q (gpm)	Drawdown (ft.)	Chloride (ppm)	Temp. (^{o}F)	Remarks
1000	----	----	----	----	Started pumping
1015	619	8.09	N/A	67.7	
1030	638	8.09	22	67.7	
1045	----	----	----	----	Changed rate
1047	718	9.24	N/A	N/A	
1115	701	9.24	22	67.7	
1133	----	----	----	----	Changed rate
1145	815	10.39	N/A	N/A	
1200	815	10.39	22	67.7	
1217	----	----	----	----	Changed rate
1220	1026	15.01	N/A	N/A	
1245	1019	15.01	22	67.7	
1300	----	----	----	----	Changed rate
1304	1231	20.79	N/A	N/A	
1315	1218	20.79	N/A	N/A	
1345	1239	20.79	22	67.8	
1400	----	----	----	----	Changed rate
1410	1348	25.41	22	67.9	Engine wide open
1415	----	----	----	----	Stopped pumping
1416	0	.00	N/A	N/A	

TABLE 2 - SUSTAINED YIELD TEST DATA

Date	Time	Q (gpm)	Drawdown (ft.)	Chloride (ppm)	Temp. (^{o}F)	Remarks
11- 7-80	0730	----	----	----	----	Started pumping
11- 7-80	0830	1017	13.86	N/A	N/A	
11- 7-80	0930	1000	13.86	N/A	N/A	
11- 7-80	1030	1003	13.86	N/A	N/A	Install pressure recorder
11- 7-80	1100	1003	13.86	22	67.7	
11- 7-80	1300	984	13.86	N/A	N/A	Changed 0_2 hose
11- 7-80	2400	1000	13.86	N/A	N/A	
11- 8-80	0700	1000	13.86	N/A	N/A	
11- 8-80	1100	1000	13.86	22	N/A	
11- 8-80	2400	1000	13.86	N/A	N/A	
11- 9-80	0700	1000	13.86	N/A	N/A	
11- 9-80	1100	1000	13.86	22	N/A	
11- 9-80	2400	1000	13.86	N/A	N/A	
11-10-80	0700	1000	13.86	N/A	N/A	
11-10-80	1400	1000	13.86	22	67.7	
11-10-80	2400	1000	13.86	N/A	N/A	
11-11-80	0700	1000	13.86	N/A	N/A	
11-11-80	1100	1000	13.86	21	N/A	
11-11-80	2400	1000	13.86	N/A	N/A	
11-12-80	0700	1000	13.86	N/A	N/A	
11-12-80	0745	1000	13.86	21	67.7	
11-12-80	0800	----	----	----	----	Stopped pump
11-12-80	0801	0	0	N/A	N/A	
11-12-80	0825	0	0	N/A	N/A	

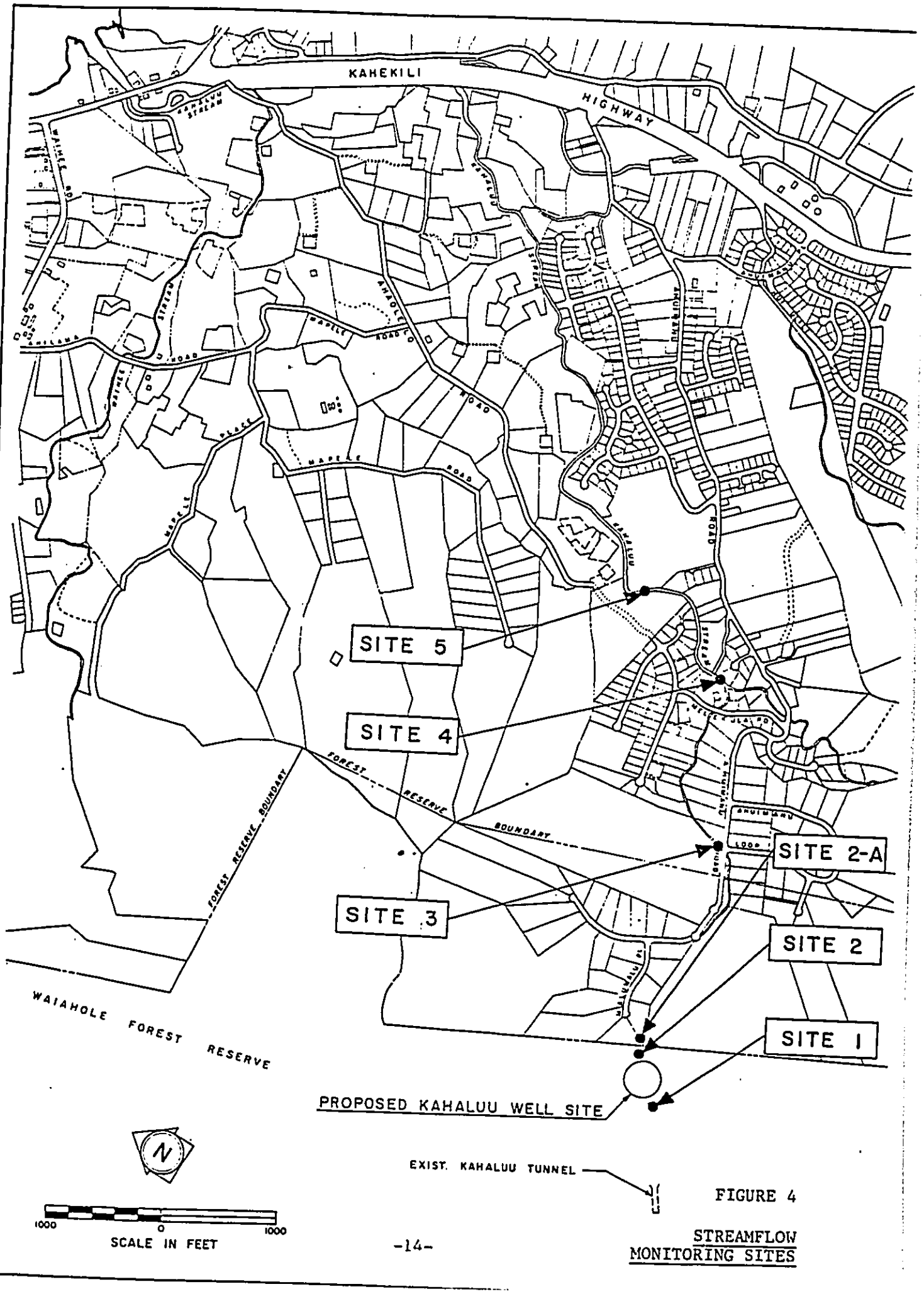


FIGURE 4

STREAMFLOW MONITORING SITES

TABLE 3 - STREAMFLOW MONITORING DATA

Date	Time	Discharge in CFS Site 1	Site 2	Site 2A	Site 3	Site 4	Site 5	Rema
7- 7-59	----	N/A	0.22	N/A	0.74	1.88	1.97	
10-29-80								0.2" Rain
10-30-80	----	0.28	0.25	N/A	0.50	1.46	1.62	
10-31-80	----	0.25	0.22	N/A	0.43	1.42	1.64	
11- 4-80	----	0.22	0.20	N/A	0.39	1.48	1.56	
11- 7-80	7:30 am	----	----	----	----	----	----	Pump Star
					(1,000 gpm metered by Well Drill			
11- 7-80	----	0.24	0.22	2.08	2.14	2.91	2.94	
11- 7-80	----	0.24	0.23	N/A	2.13	3.06	3.14	
11- 8-80	----	0.23	0.23	N/A	2.26	3.36	3.23	0.1" Rain
11- 8-80	----	N/A	0.23	2.08	2.15	3.07	3.22	
11- 9-80	----	0.23	0.23	N/A	2.08	3.02	3.15	
11-10-80	----	0.25	0.23	N/A	2.17	3.09	3.11	0.1" Rain
11-11-80	----	0.23	0.23	2.11	2.20	3.10	3.10	
11-11-80	----	N/A	0.23	N/A	2.14	3.11	N/A	
11-12-80	8:00 am	----	----	----	----	----	----	Pump Stop
11-12-80	9:40 am	N/A	0.23	N/A	0.61	1.76	N/A	
11-12-80	10:40 am	N/A	0.23	N/A	0.56	1.67	1.75	
11-12-80	1:20 pm	N/A	0.23	N/A	0.53	1.61	1.73	
11-12-80	2:20 pm	N/A	0.23	N/A	0.48	1.60	1.69	
11-12-80	3:30 pm	N/A	0.23	N/A	0.53	1.58	1.66	
11-12-80	4:40 pm	N/A	0.23	N/A	0.49	1.56	N/A	

TABLE 3 - STREAMFLOW MONITORING DATA (CONT.)

Date	Time	Discharge in CFS Site 1	Site 2	Site 2A	Site 3	Site 4	Site 5	Rema
11-13-80	9:10 am	N/A	0.24	N/A	0.44	1.51	1.63	
11-13-80	12:30 pm	N/A	0.23	N/A	0.46	1.48	N/A	
11-13-80	2:40 pm	N/A	0.23	N/A	0.42	1.47	1.55	
11-14-80	----	N/A	0.24	N/A	0.40	1.48	1.57	

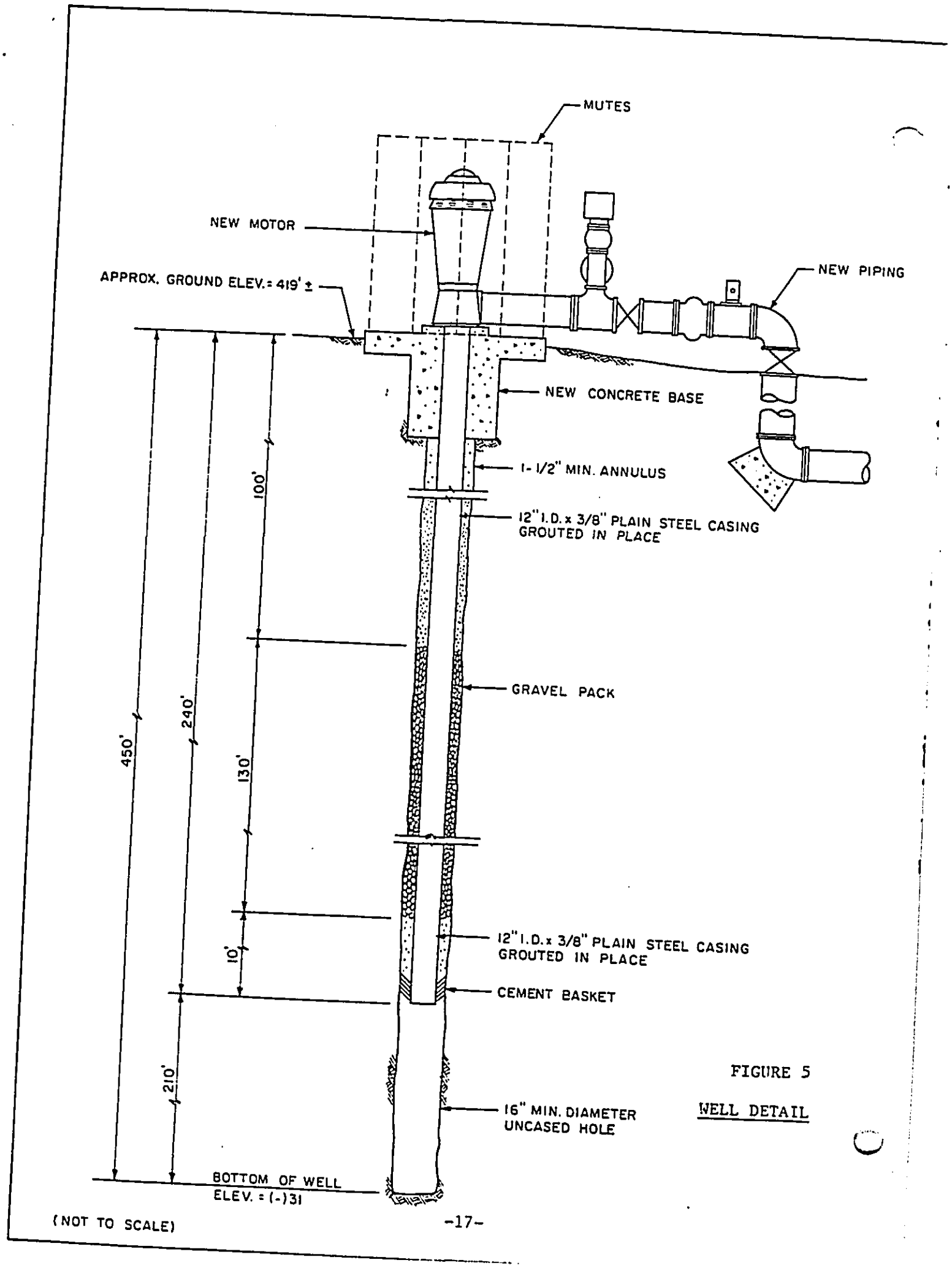


FIGURE 5

WELL DETAIL

Construction of these improvements is scheduled for FY 1984-1985. The project will be constructed with monies from the Board of Water Supply's capital improvement funds. The construction cost is estimated to be $855,000.

CORRECTION

THE PRECEDING DOCUMENT(S) HAS BEEN REPHOTOGRAPHED TO ASSURE LEGIBILITY
SEE FRAME(S)
IMMEDIATELY FOLLOWING

Construction of these improvements is scheduled for FY 1984-1985. The project will be constructed with monies from the Board of Water Supply's capital improvement funds. The construction cost is estimated to be $855,000.

Section 2

DESCRIPTION OF THE AFFECTED ENVIRONMENT

I. LAND USE

The well site is located within the State Forest Reserve. The State Land Use Designation is Conservation. A Conservation District Use Permit will be obtained from the Department of Land and Natural Resources prior to the start of construction. The area is zoned Preservation, P-1, as shown in Figure 6. Aside from its designated function as a watershed area, the land serves no other governmental, private or commercial purpose. The land required for the well and appurtenant facilities is owned by the City and County of Honolulu. Several concrete masonry structures already exist on the property. These include a chlorinator building, an abandoned chlorinator building, and an abandoned scalehouse. The abandoned facilities were constructed approximately 35 years ago for the Kahaluu Tunnel.

Land adjacent to and below the well site is zoned Residential (R-6) with an agricultural restriction due to the private ownership of the roads. These lots have a minimum area of one acre. Several single family dwellings have been built and are interspersed with vacant lots. The nearest dwelling is 450 feet from the well. There are no public facilities such as schools or hospitals adjacent to the proposed well site.

Further below the well site, but above Kahekili and Kamehameha Highways, land along Kahaluu Stream is zoned Residential,

(R-3, R-5, R-6). Single family homes utilize much of the land area in Kahaluu, along with flower farms, produce farms, and land used as grazing areas. Several residents and landowners draw water either directly from Kahaluu Stream or from auwais which branch from the stream.

A postcard survey of residents bordering the Kahaluu Stream and its auwais was conducted in March, 1980 to identify streamwater users. The survey was then supplemented by a field inspection of positive respondents. Identified were 19 users or potential users of streamwater, as shown in Figure 7 and Table 4. Of the 139 pre-stamped postcards that were mailed, only 57 were returned with 17 indicating they used or plan to use streamwater. A copy of the postcard and list of potential streamwater users are included in Appendix A.

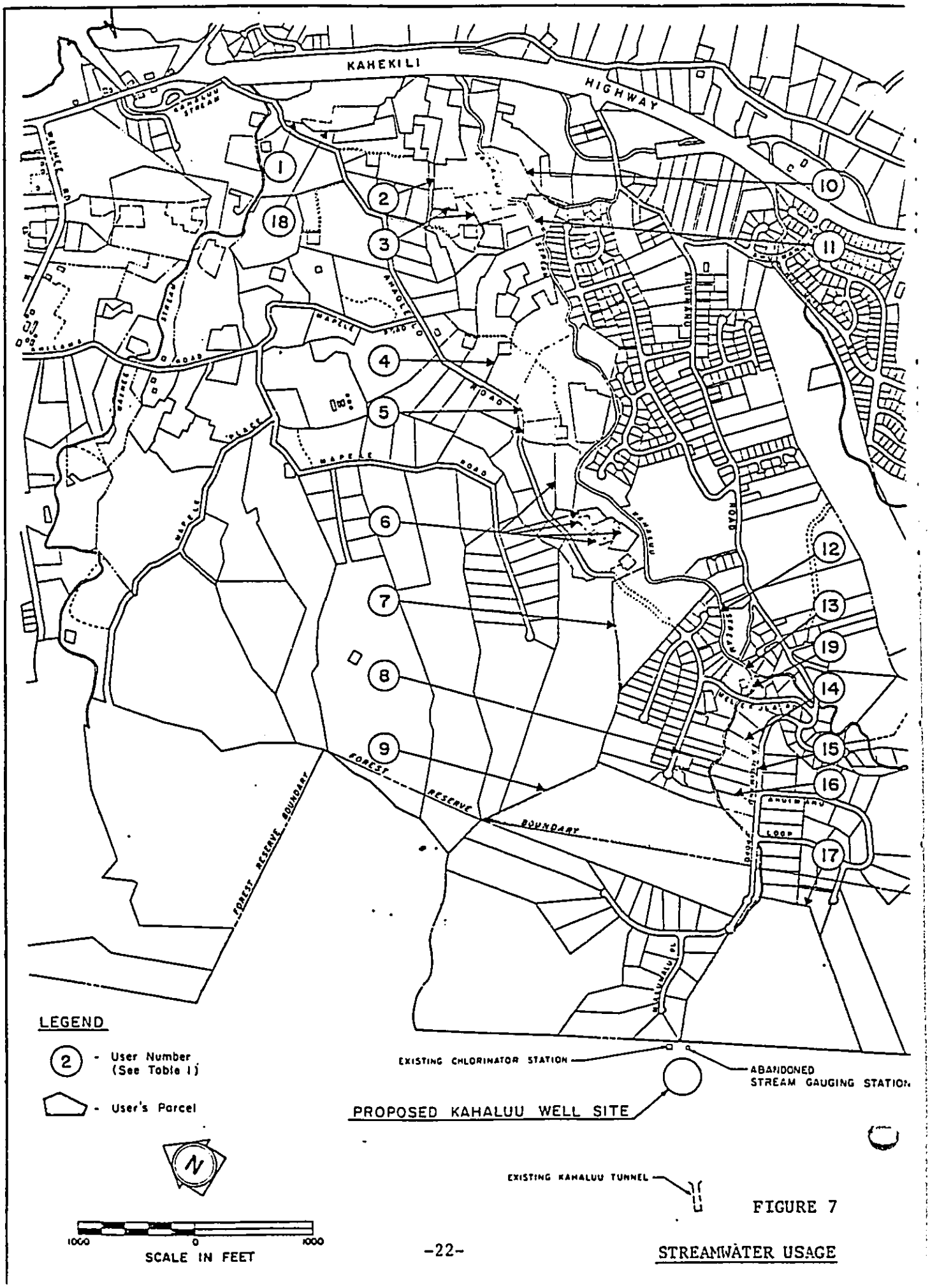


FIGURE 7

STREAMWATER USAGE

TABLE 4 - STREAMWATER USAGE

User No.	Owner/Tenant	Tax Map Key	Streamwater Usage
1.	Mr. Alfred C. Lum	4-7-28:2	Pumps water from Kahaluu Stream to irrigate 5 acre of taro.
2.	Mr. Raymond Y. Nikaido	4-7-28:20	Diverts water from Kahalu Stream by culvert to irri gate 3 acres of taro and 1 acre of ong choy and watercress.
3.	Mrs. Mae H. Ryder	4-7-28:7,8	Proposes to divert water by irrigation ditch to raise 1 acre of taro.
4.	Mr. Seichi Tateishi	4-7-29:3	Proposes to pump water from Kahaluu Stream to irrigate future farming acreage along stream bank
5.	Mr. Kazuo Ginoza	4-7-29:5,14	Diverts water from Kahalu Stream by culvert to irri gate 5 acres of banana.
6.	Mr. Kawehi Ryder	4-7-29:6,7, 8,9,26	Draws water from auwai to irrigate 2 acres of taro and sweet potato. Proposes to increase taro acreage to 4 acres.
7.	Mr. William S. Ching	4-7-46:6	Proposes to use water fro Kahaluu Stream at some future date.
8.	Mr. Robert LeClair	4-7-46:86	Uses water from Kahaluu Stream to irrigate 1000 sq.ft. of banana and papaya.
9.	Mr. Arthur Emes	4-7-05:60	Proposes to use water fro Kahaluu Stream to raise banana and taro.
10.	Mr. Ki Chung Lum	4-7-25:18	Uses water from Kahaluu Stream to irrigate 1 acre of cucumbers.

User No.	Owner/Tenant	Tax Map Key	Streamwater Usage
11.	Mr. Albert L. Lum	4-7-28:23	Uses water from Kahaluu Stream to irrigate 3 acre of taro and banana.
12.	Mr. Keith Watson	4-7-46:54	Uses streamwater to irrigate one dozen banana trees rooted on the bank of Kahaluu Stream.
13.	Mr. James Chung	4-7-46:3	Uses water from Kahaluu Stream to irrigate ornamental plants in gard bordering Stream.
14.	Mrs. R.C. Winslow	4-7-46:28	Uses water from Kahaluu Stream to irrigate 25,000 sq.ft. of banana and horticultural plants.
15.	Mr. Arthur Lee	4-7-46:29	Uses water from Kahaluu Stream to irrigate 10,000 sq.ft. of banana, taro, and horticultural plants.
16.	Mr. Robert Nagao	4-7-46:32	Uses water from Kahaluu Stream to cultivate aquarium plants.
17.	Dr. Edwin Kam	4-7-08:9	Pumps water from Kahaluu Stream to irrigate 10 acr of banana, taro, papaya, pineapple, and flowers during dry weather season.
18.	Mr. Pedro Bautista	4-7-28:31	Pumps water from Kahaluu Stream to irrigate 2 acre of taro, papaya, and vegetables.
19.	Mr. Jonathan Gans	4-7-46:1	Occasionally uses water from Kahaluu Stream to irrigate ornamental trees plants, and shrubs on a 1/3 acre lot.

Source: Calvin Kim & Associates, Inc.
March 1980 Survey of Potential
Streamwater Users
(Appendix A)

II. SOIL TYPES AND TOPOGRAPHY

The well is situated within an area covered by vegetation and fern growth. The surface soils in this area consist of Lolekaa Silty Clay (LoF) as designated by the Soil Conservation Service. Ground slopes in the vicinity of the exploratory well range between 15% and 30%. Land northeast of the project area consist primarily of Lolekaa Silty Clay of varying percentages of slope (5% to 70%), with Hanalei Silty Clay distributed along both the Kahaluu and Ahuimanu Streams.

A State Department of Agriculture map, "Agricultural Lands of Importance to the State of Hawaii," is presented in Figure 8.

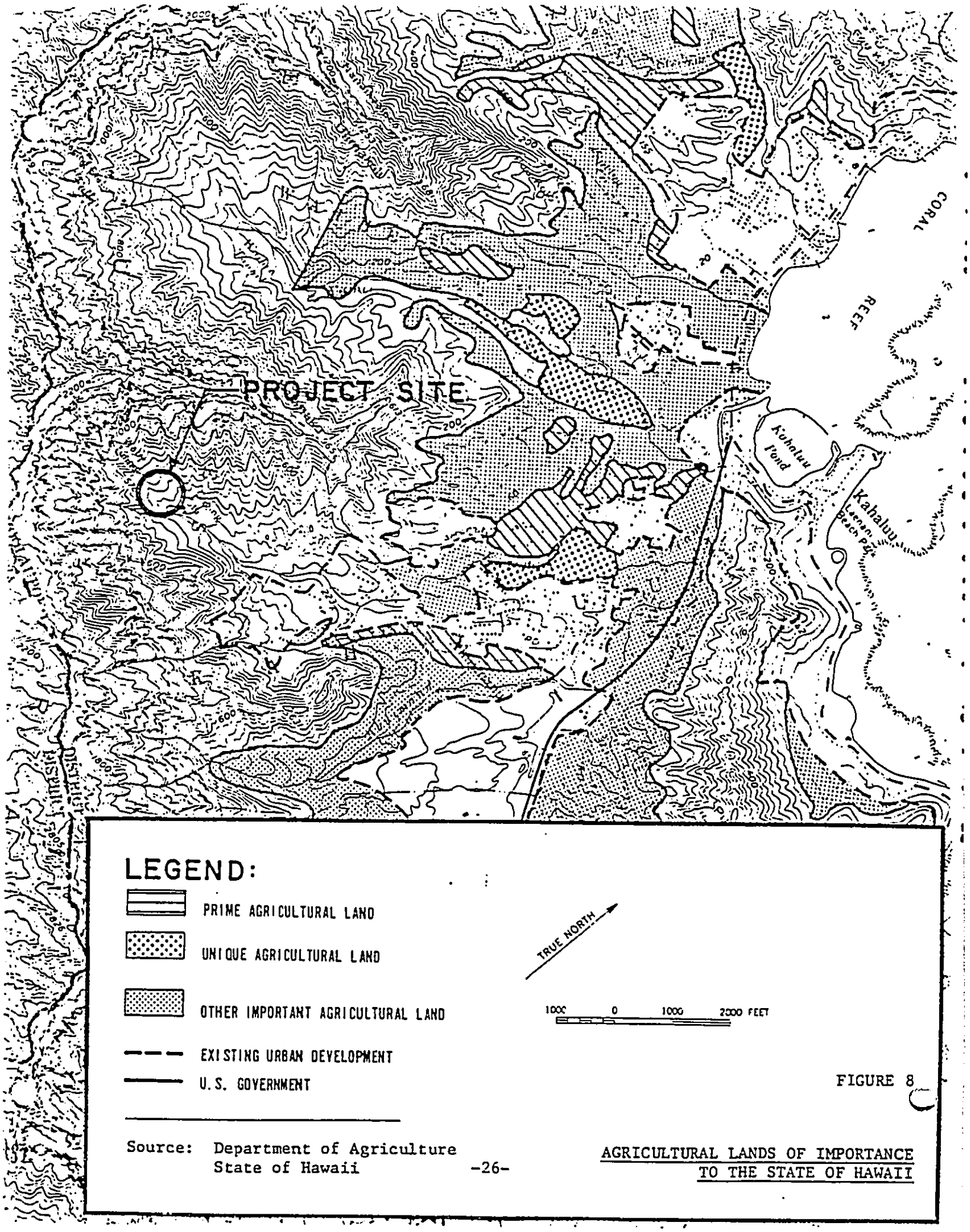


FIGURE 8

Source: Department of Agriculture
State of Hawaii

AGRICULTURAL LANDS OF IMPORTANCE
TO THE STATE OF HAWAII

III. RAINFALL AND DRAINAGE

The project site lies at the base of the Koolau Mountain Range in an area noted for its high level of rainfall. Rain gaging conducted by the USGS[5] (Table 5) during the period 1936 through 1971 showed the average annual precipitation for the area to be 99.18 inches per year. The maximum and minimum annual precipitation for the period of record were 132.44 inches and 65.81 inches, respectively.

Rainfall for November 1980, the month of the pumping tests for the Kahaluu Exploratory Well, amounted to 3.33 inches which was 69 percent below normal for the month. Average rainfall for a typical "dry" month such as July or August ranges from 5 to 7 inches based on a 30-year average rainfall data.

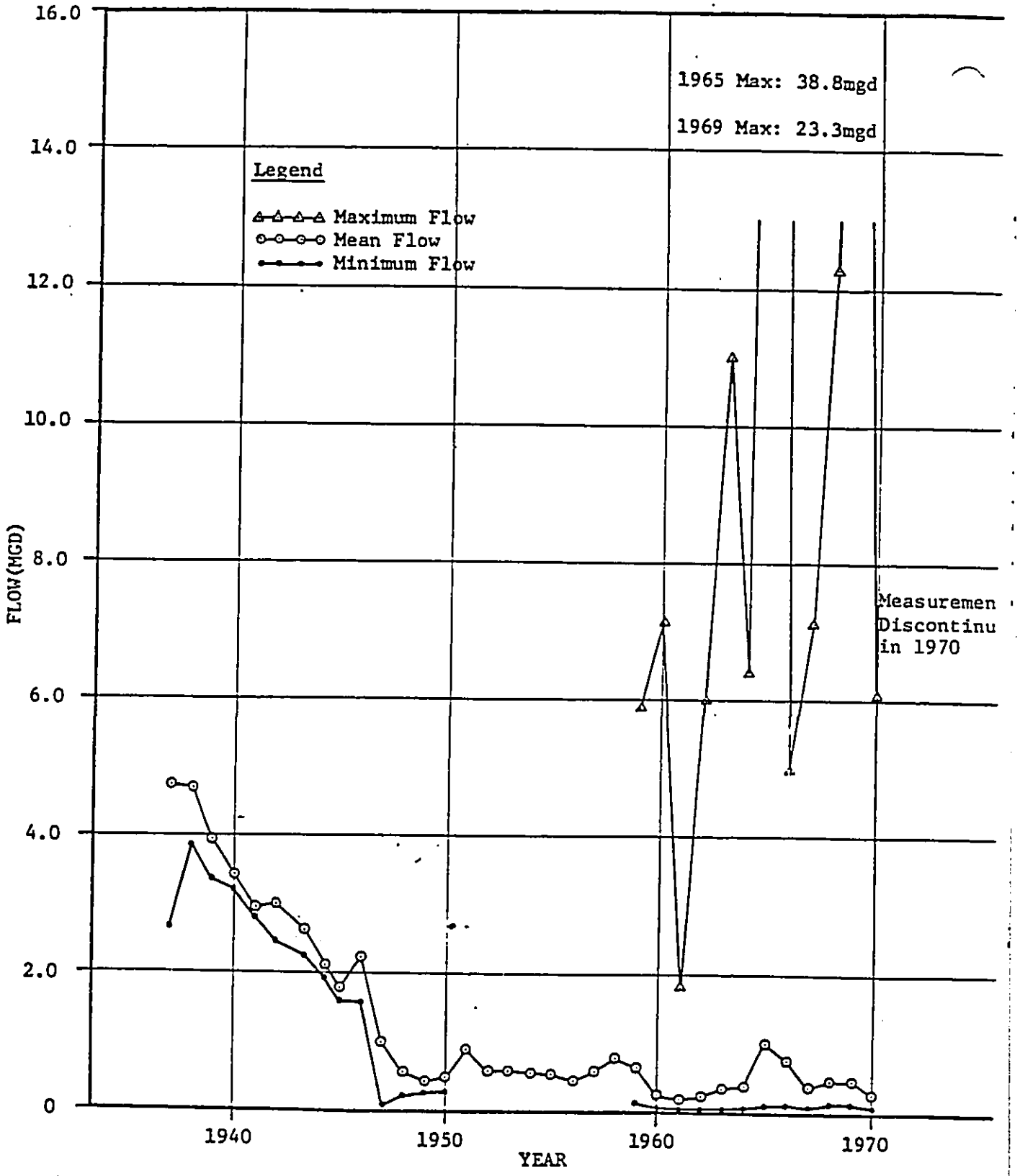
A USGS stream gage which operated in conjunction with the above mentioned rain gaging station monitored stream flow of the tributary during the period 1936 through 1971. The flow data is tabulated in Figure 9 for maximum, minimum and mean stream flows of the Kahaluu Stream tributary. The gaging station was located close to the proposed well site. Area that contributed to the gaged flow extended from the gaging station up to the Koolau ridge and covered a total of 176 acres. Average flow over the last 20 years of record was 0.52 mgd. During this period the maximum flow was 38.78 mgd and the minimum flow was 0.03 mgd.

According to the Flood Insurance Study for Oahu by the Federal Insurance Administration, the project site is located in Zone D, an area of undetermined but possible flood hazard potential.

TABLE 5 - ANNUAL RAINFALL DATA

Year	Inches of Rainfall	Year	Inches of Rainfall
1936	105.00	1957	Missing
1937	131.96	1958	Missing
1938	126.32	1959	70.12
1939	116.78	1960	Missing
1940	95.22	1961	73.30
1941	81.09	1962	71.35
1942	132.44	1963	120.64
1943	97.01	1964	108.76
1944	68.92	1965	Missing
1945	69.32	1966	Missing
1946	73.30	1967	101.50
1947	Missing	1968	Missing
1948	Missing	1969	Missing
1949	Missing	1970	82.43
1950	112.98	1971	65.81
1951	110.31		
1952	90.02	Max -	132.44
1953	66.27	75% -	110.97
1954	109.57	Med -	99.18
1955	101.36	25% -	72.78
1956	102.37	Min -	65.81

Source: Oahu Monthly and Median Rainfall
S. Key #839.00
Name: Kahaluu
Obs: USGS
Latitude: 21°26'18"
Longitude: 157°51'18"
Elevation: 360 Feet
Period of Record: 1936-1971



GAGING STATION: 16283000

LOCATION: KAHALUU STREAM NEAR HEEIA

Source: "Water Resources Data for Hawaii and Other Pacific Areas" U.S. Geological Survey

FIGURE 9

STREAMFLOW DATA

TABLE 6

WATER QUALITY DATA

Date		1/13/69	4/24/69	6/28/69	7/14/69	8/26/69
Temperature (Deg. C)		21	26	----	28	----
Concentration in mg/ℓ	Silica (SiO_2)	23	26	20	20	23
	Calcium (Ca)	14	15	14	14	15
	Magnesium (Mg)	7.8	7.4	7.5	7.8	8.2
	Sodium (Na)	----	----	----	18	17
	Potassium (K)	----	----	----	1.1	1.1
	Bicarbonate (HCO_3)	67	82	82	83	89
	Carbonate (CO_3)	0	0	0	0	0
	Chloride (Cl)	23	24	22	23	22
	Fluoride (F)	----	----	----	0.1	0.1
	Hardness (Ca, Mg)	67	68	66	67	71
	Non-Carbonate Hardness	12	1	0	0	0
	Percent Sodium	----	----	----	36	34
	Sodium Absorption Ratio	----	----	----	1.0	0.9
	Specific Conductance (Micromhos)	218	216	215	214	222
	PH (Units)	6.5	7.3	7.2	7.8	7.4

IV. EXISTING FLORA AND VEGETATION

The existing flora found on the site and adjacent lands are commonly found throughout the area, region and state.

Vegetation in the immediate vicinity of the site consists primarily of the following grasses: Brachiaria mutica (Forsk) staff, synonym Panicum purpuracens Radii (California grass); Commelina diffusa (honohono grass); and Oplisensus hirtellus (honohono kukui).

Other grasses and groundcovers commonly found within or directly adjacent to the site include: Bambusa vulgaris (feathery green bamboo); Dryopteris dentata (Forsk) C. Chr., synonym Cyclosorus dentatus (Forsk); Ching and Wedelia trilobata (wedelia).

Shrubs include: Cordyline terminalis (green ti); Hedychium cornarium (white ginger); and Zingiber zerumbet (shampoo ginger).

Trees include: Aleurites moluccana (kukui); Eugenia malaccensis (mountain apple); Pandanus ordoratissimus (hala); and Psidium guajava (yellow guava).

Exotic weeds commonly considered pests include: Clidemia hirta (Koster's curse); Leucaena leucocephala (haole koa); and Rubus rosaefolius (thimbleberry).

No known endangered or threatened plant species were encountered during formal inspections of the project site.

V. EXISTING TRAFFIC CONDITIONS

Vehicular traffic within the residential area surrounding the project is minimal, limited primarily to local traffic.

The primary route to the project site from Kahekili Highway is along Ahuimanu Road and Malumalu Place. Ahuimanu Road is paved with asphalt concrete over most of its length, but has a short stretch of unpaved roadway before Malumalu Place. Malumalu Place is also paved with asphalt concrete. The end portions of Ahuimanu Road and Malumalu Place are privately owned roads over which the Board of Water Supply has access and pipeline easements. A roadway easement across the end lots of Malumalu Place allows BWS access to the watershed area. The access road is paved with asphalt concrete between Malumalu Place and the chlorinator station.

VI. EXISTING UTILITIES

In addition to the Board of Water Supply, the Hawaiian Electric Company, Inc. and the Hawaiian Telephone Company, Inc. also serve the project area. Underground electric service extends from Malumalu Place to the chlorinator station.

A 16-inch underground water transmission line leads from the Kahaluu Tunnel to the chlorinator station and down through the valley.

VII. HISTORICAL AND ARCHAEOLOGICAL SITES

In a study conducted by the Bishop Museum there were no

historical or archaeological sites encountered in the immediate vicinity of the proposed development. Representatives of the Museum concluded that no damage would occur to historical or archaeological remains if construction activities were confined to the construction road and the area that is now the site of the exploratory well (see Appendix C for Bishop Museum's field survey and conclusions).

Should any archaeological or historical findings be encountered, the Historic Preservation Office of the Department of Land and Natural Resources will be notified immediately and all work will be suspended.

VIII. FAUNA

No endangered animal species were seen within the project area during the site surveys.

Many ornithological assessments have been made on the island of Oahu by the Hawaii Audobon Society and by other parties (See references). Bird species which may be found in the forest area of Kahaluu are the Spotted Dove (Streptopelia chinensis), Barred Dove (Geopelia striata), Red-Billed Leiothrix (Leiothrix lutea), Japanese Bush Warbler (Cettia diphone), Shama Thrush (Copsychus malabaricus), 'Elepaio (Chasiempis sandwichensis), Japanese White Eye or Mejiro (Zosterops japonica), 'Amakihi (Loxops virens), 'Apapane (Himatione sanguinea), Ricebird of Spotted Munia (Lonchura punctulata), North American Cardinal (Cardinalis cardinalis), and the House Finch (Carpodacus mexicanus).

The only forest birds on the endangered species list that are present on Oahu are the Hawaiian Creeper or Oahu Creeper (Loxops maculata) and the 'I'iwi (Vestiaria coccinea). Both of these species live in upper forests at an elevation of 2,000 feet and higher, very much above the 419 foot elevation of the Kahaluu Well site. It is unlikely that either of these bird species will be affected or disturbed by the construction of the Kahaluu Well.

Other animals which may be found in the area include the Brown Rat (Rattus norvegicus), Hawaiian Rat (Rattus exulans), Feral Dog (Canis familiaris), Mongoose (Herpestes auropunctatus), and Feral Pig (Sus scrofa).

Although no snails were spotted during investigation of the site, the type of vegetation in the area indicate that malacological life would include the genera Achatina, Bradybaena, and Euglandina.

The predatory snail, Euglandina rosea, was introduced on Oahu to control the Giant African Snail, Achatina fulica. In 1957, the State Department of Agriculture released a total of 134 specimens of the Euglandina rosea at the base or within Kahaluu Valley. The Euglandina has been blamed in part for the annihilation of the native Hawaiian Land snail, Achatinella, which is now under consideration for placement on the U.S. List of Endangered and Threatened Species.

Species of the Achatinella are generally found within native forests at elevations of 1,000 feet and higher. In addition to

the predatory habits of the Euglandina rosea, the relatively low elevation of the Well site and the proliferation of exotic vegetation are adverse to the Achatinella and make its presence at the Kahaluu Well unlikely.

IX. AQUATIC BIOTA

An assessment of aquatic life in Kahaluu Stream was performed in 1978 by the Hawaii Cooperative Fishery Research Unit of the University of Hawaii, under the auspices of the Fish and Wildlife Service, Department of the Interior.

Crustacean life present is limited to Procambarus clarkii (crayfish), a commonly found exotic species. Native fish include Eleotrosis sandwicencis (sleeper, o'opu okuhe), and exotic fish include Poecilia mexicana (shortfin molly), Poecilia reticulata (guppy), Tilapia mossambica (tilapia, mouthbrooder), and Xiphophorus helleri (green swordtail).

Section 3

SOCIO-ECONOMIC IMPACTS

As outlined in the Board of Water Supply's Oahu Water Plan, the Kahaluu Well is one of several sources proposed for development in the coming years. The need to expand the sustainable water service capacity of the Windward Water District is required by the past rapid growth and the projected growth of both resident population level and water consumption rate.

Department of Planning and Economic Development statistics coupled with BWS water-usage data indicate that by the year 2000, water needs of the Windward Water District will rise from the present 18 million gallons daily to an estimated 22 million gallons daily.

Development of the Kahaluu Well will provide for meeting some of the increasing water needs of the Windward community.

Other than the typical commitment of labor, materials, and money, the project is not anticipated to have any significant impact on cultural or natural resources. Although some land will be removed from contributing to recharge, the area involved is so miniscule and is considered insignificant.

In 1981, the State Board of Agriculture conducted a survey of irrigation water use in selected watershed areas of Windward Oahu. One of the watersheds surveyed was the Waihee-Kahaluu

watershed. According to the survey "the necessity for irrigation is dependent upon weather conditions." For taro and some aquaculture farms where stream flow as well as the volume of water used is important, it was found to be very difficult to add anything new to what has been determined in previous studies.

Flowers and nursery products comprises the largest crop in the Waihee-Kahaluu area followed by other crops such as taro, bananas, and vegetables. Most of the farms rely on the municipal water system for their irrigation needs, but taro and aquaculture still need stream water for their operations. To minimize any adverse impacts to agricultural users of Kahaluu Stream waters, the Board of Water Supply will monitor stream flow and maintain existing streamflow by controlling pumpages from the well.

SECTION 4

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATIVE MEASURES TO MINIMIZE ADVERSE IMPACTS

I. SHORT TERM IMPACTS

During the construction period, construction vehicles and equipment will use City and County roads leading to the project site. However, proper measures will be taken to assure that local traffic will not be unduly inconvenienced by the movement of these vehicles. The contractor will provide, install, and maintain all necessary signs and other protective facilities, which shall conform with the "Rules and Regulations Governing the Use of Traffic Control Devices at Work Sites on or Adjacent to Public Streets and Highways" adopted by the Highway Safety Coordinator, and the Federal Highway Administration's "Manual on Uniform Traffic Control Devices for Streets and Highways", Part IV, "Traffic Control for Highway Construction and Maintenance Operations". Modifications of existing public roadways is not required for implementation of this project.

Construction of the well improvements and connection to the existing transmission line will require excavation and grading of the site. These operations will conform to the City and County of Honolulu's grading ordinances. Any debris or soil inadvertently entering downstream waterways, ditches, drain pipes, and public or private lands will be removed. Additionally, all areas exposed during the earthwork activities will be sodded or planted immediately and swales will be lined with ground cover (pothes aureas). Removal of existing scrub

vegetation will be required; however, no known endangered or threatened plant species will be affected. Erosion control measures shall be taken to minimize soil erosion and to reduce susceptibility to flooding hazard.

As part of the construction work, some amount of noise will be generated by construction equipment and vehicles. Construction noise activity shall comply with the Community Noise Control Regulations (Chapter 11-43) of the State Department of Health. In addition, work hours shall be limited by the following schedule:

8:00 a.m. to 3:00 p.m., weekdays only

Earthwork activities have the potential to temporarily alter existing air quality. Dust and construction equipment exhaust fumes shall be controlled by means of water sprinkling and proper equipment maintenances. Any activity causing dust generation shall comply with the Air Pollution Control Regulations (Chapter 11-60) of the State Department of Health, and Chapter 23, Revised Ordinances of Honolulu.

The connection of the new well to the existing 16-inch main shall be hydrostatically tested to insure against leakage and material defects. It shall be disinfected with a chlorine solution in accordance with the Board of Water Supply's specifications. Disposal of the chlorine solution shall be carried out in accordance with State Department of Health requirements.

II. LONG TERM IMPACTS

The Board of Water Supply has conducted testing of the exploratory well and has determined that pumping activities have negligible effects on the minimum flow for Kahaluu Stream. The well showed a drawdown of fifteen (15) feet at a pumpage rate of 1,000 gallons per minute (1.44 mgd). This low drawdown indicates that there would not be a significant impact on the groundwater table downstream of the well. Although the exploratory well tests showed no reduction to streamflow during the test pumping, monitoring of streamflows will be continued to determine any long-term effects of the proposed production well. If monitoring of the downstream reaches of Kahaluu Stream show any significant effects to streamflow, pumpage will be reduced and reevaluated. This will mitigate adverse impacts to agricultural users of Kahaluu Stream waters and to aqua fauna.

The pumping rate of the production well will be controlled so that it will not exceed the 1.0 mgd rate. By imposing this limitation, the Board of Water Supply intends to assure the long-term stability of the aquifer and minimize any possible impact on aquatic life present in Kahaluu Stream.

The project is located in an area of undetermined flood hazard potential. In order to minimize potential flood damages, the design of the facilities shall consider the possibility of flash flooding and intrusive floodwaters.

Operation of the pump and electric motor at the Kahaluu Well will create noise which may affect residents within the immediate

vicinity. If constructed without the benefit of noise abatement devices, the estimated sound level would be 70 decibels at a distance of 100 ft from the motor. To reduce the transmission of sound the motor may be mounted on a concrete base at the ground surface and enclosed within a muting device. This installation would be designed to lower the noise level to below 55 decibels at a distance of 100 feet. An alternative installation would place submersible pumps within the well shaft as a noise minimizing measure.

Cesspools in Kahaluu Valley should not be adversely affected by the Kahaluu Well. Studies conducted by the State Department of Health as part of the 208 Water Quality Management Plan show that cesspools in the area have been experiencing a failure rate of 38%, attributed to the presence of alluvium and high water table conditions. In the event that the Kahaluu Well does lower the water table, the effect would be an improvement in the function of existing cesspools.

Contamination of the well by cesspools in the upper valley should not present a problem, as dikes within the region will provide an impasse to the movement of contaminants. Water quality tests on samples taken from the exploratory well showed the water to be of excellent quality.

III. BENEFITS

The Kahaluu Well will provide the Windward area with an additional source of water.

SECTION 5

PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

The construction activities may result in temporary inconveniences due to dust, noise, and traffic disruptions. These inconveniences will be minimized by proper implementation of dust, noise and traffic control measures and close inspection during construction by the Board of Water Supply.

Some clearing and grubbing within the project area will be required for the new improvements and for access to the site. Clearing will be limited to the minimum area required for the proposed construction work. Graded areas will be designed to control erosion.

SECTION 6

ALTERNATIVES TO THE PROPOSED ACTION

The Kahaluu Well is part of the Board of Water Supply's continuing program of exploration and development of new sources of water to meet projected demands. New wells located outside of Kahaluu are already included in this program, and thus are not true alternatives to the proposed project. A course of "No Action" on the development of the Kahaluu Well will only add to the problem of finding economical sources of water for the Windward area.

The Board of Water Supply has and will continue to carry out programs dealing with water conservation. However, demand factors used by the Board already account for conservation and are reflected in the per capita consumption figures.

Good ground water sources on the Windward side of Oahu are limited and may be insufficient to meet the projected demand for the year 2020. As a result, the Board of Water Supply is also considering the following alternatives to ground water:

1. Exchange of lower quality water for high-quality ground water with users who do not need a high-grade supply of water. Possible sources of lower quality water include STP effluent, and surface waters from springs and streams.

2. Desalting of seawater.

3. Wastewater reclamation.

4. Surface waters for domestic use.

5. Demineralization of brackish sources.

These alternatives are discussed in detail in Appendix G and there is no doubt that they will become increasingly important as the demand for water grows. However, many of the alternatives involve high development and treatment costs, while others require the cooperation of the public and other outside parties. For the present, ground water sources such as the proposed Kahaluu Well provide the most favorable solution to the problem of growing water demand.

SECTION 7

RELATIONSHIP OF THE PROJECT TO LAND USE PLANS, POLICIES, AND CONTROLS

The proposed production facilities at Kahaluu Well will be in conformance with adopted land use plans and policies, and also with conditions and standards imposed by applicable land use controls.

STATE OF HAWAII

A. Hawaii State Plan

Objectives and policies stated in the recently adopted Hawaii State Plan relating to the proposed project are as follows:

1. "Insure that adequate support services and facilities are provided to accommodate the desired distribution of future growth throughout the State."

2. "Continued growth and development of diversified agriculture throughout the State."

3. "Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs."

4. "Promote the preservation and restoration of significant natural and historic resources."

5. "Planning for the State's facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities."

6. "Relate growth activities to existing and potential water supply."

7. "Support research and development of alternate water sources."

8. "Assist in improving the quality, efficiency, service and storage capabilities of water systems for domestic and agricultural use."

9. "Support water supply services to areas experiencing critical water problems."

10. "Promote water conservation practices."

The proposed project is consistent with the goals of the Hawaii State Plan. The BWS is developing this water to accommodate existing and future growth as indicated by the Oahu General Plan and the II-F population projections of the State's Department of Planning and Economic Development. The water to be developed would be used for municipal use which include agricultural needs. Agricultural zoned lands or lands used for agriculture are not involved.

The BWS supports and is developing alternate water sources which would minimize demands on existing groundwater supplies. One such project involves the development of a caprock water source for irrigation use by the City's Department of Parks and Recreation.

B. Conservation District Use Application

Since the proposed project is located on Conservation zoned lands, a Conservation District Use Application (CDUA) will be required and approval obtained from the State Board of Land and Natural Resources.

The proposed project site is located in Subzone R of the Conservation District:

> "The objective of this subzone is to develop, with proper management, areas to ensure sustained use of the natural resources of those areas."

Relevant permitted uses of this subzone include:

- "Monitoring, observing and measuring natural resources;

- Any other government facilities not enumerated herein where the public benefit outweighs any impact on the Conservation District;...."

C. State Water Commission Report

The State Water Commission was appointed by the Governor in mid-1977 to review the availability of water supplies and

recommend appropriate administrative and legislative actions. After reviewing available reports and receiving testimony from major water purveyors, the Commission focused on major problems and issues. The resulting findings and recommendations are contained in a report titled "Hawaii's Water Resources: Directions for the Future." The priority recommendations from this report are reproduced in Appendix H.

D. COASTAL ZONE MANAGEMENT PROGRAM

The proposed project is not inconsistent with the purpose of the Coastal Zone Management (CZM) Act of 1972. The CZM Act declares that it is national policy [3.4]:

(a) "to preserve, protect, develop, and where possible, to restore or enhance, the resources of the Nation's coastal zones for this and succeeding generations;"

(b) "to encourage and assist the states to exercise effectively their responsibilities in the coastal zone through the development and implementation of management programs to achieve wise use of the land and water resources of the coastal zone, giving full consideration to ecological, cultural, historic and aesthetic values as well as to needs for economic development;"

(c) "for all Federal agencies engaged in programs affecting the coastal zone to cooperate and participate with state and local governments and regional agencies in effectuating the purposes of this title; and"

(d) "to encourage the participation of the public, of Federal, state, and local governments, and of regional agencies in the development of coastal zone management programs. With respect to implementation of such management programs, it is the national policy to encourage cooperation among the various state and regional agencies including establishment of inter-state and regional agreements, cooperative procedures, and joint action, particularly regarding environmental procedures (Public Law 92-583, Sec. 303, hereafter referred to as CZMA)."

E. HAWAII WATER RESOURCES PLAN

The purpose of the Hawaii Water Resources Regional Study was to formulate a comprehensive plan of action to achieve the balanced conservation, development and use of Hawaii's water resources. Coordinated by the U.S. Water Resources Council, the study was conducted by an intergovernmental team representing nearly 50 agencies, with the participation of private industry and the public. The result was the "Hawaii Water Resources Plan" which was published in January, 1979.

Recommendations from the plan which are clearly pertinent to the issue at hand include the following:

1. "Develop additional fresh water supplies to meet year 2000 needs statewide.

   Oahu: Develop ground water islandwide, especially Schofield Plateau and Waialua areas."

2. "Develop alternative water sources to supply Oahu in addition to planned development from conventional ground water sources.

   Restore dike storage.

   Optimize development of Honolulu and Pearl Harbor aquifers.

   Increase streamflow diversions compatibly with minimum streamflow requirements.

   Recycle wastewater and exchange for high quality irrigation water.

   Blend potable water with brackish water for a usable domestic product.

   Desalt brackish water supplies for domestic use."

3. "Provide additional irrigation water.

   Improve diversion, storage, and transmission systems.

   Develop more surface and ground water, compatible with environmental and recreational needs.

   Determine the level of treatment necessary to reuse domestic wastewater for sugarcane irrigation.

Study the reuse of treated domestic wastewater for irrigating diversified crops and timber.

Develop systems to reuse treated domestic wastewater as a new source of irrigation water supply."

4. "Control salt water intrusion into basal fresh water aquifers.

Design and space new wells and regulate pumping schedules of all wells to prevent excessive thinning of fresh water lenses.

Increase fresh water recharge to basal aquifers.

Determine long-term effects of periodic overdraft on ground water quality."

F. HAWAII INSTREAM USE PROTECTION ACT

The Hawaii Instream Use Protection Act was enacted to maintain or enhance stream flows for the potential stream uses such as stream fauna habitat, waterbird habitat, scientific and educational use, aesthetic enjoyment, water-based recreation, navigation, and waste assimilation. The Act provides protection for only streams in Windward Oahu.

Under the Act, the Department of Land and Natural Resources (DLNR) has been delegated the responsibility to establish permanent instream flow standards, interim instream flow standards, permit requirements for stream channel alterations, and an instream flow program.

Presently DLNR has not made any specific proposal on adopting appropriate flow standards for any stream in Windward Oahu. Regardless, the BWS intends to monitor stream flow and reduce pumpage from the well as necessary to meet any minimum stream flow standards that may be established for Kahaluu Stream.

CITY

A. General Plan

General Plan Objectives and Policies that relate to growth include the following:

1. Economic Activity

(a) Objective C - "to maintain the viability of agriculture on Oahu."

Policy 4 - "maintain agricultural land along the Windward and Waianae coasts for truck farming, flower growing, livestock production and other types of diversified agriculture."

The proposed project would not conflict with existing agricultural uses. No land or water presently used for agriculture will be affected by the project.

2. Transportation and Utilities

(a) Objective B - "to meet the needs of the people of Oahu for an adequate supply of water and for environmentally sound systems of waste disposal."

Policy 1 - "maintain an adequate supply of water for both future residents and future visitors."

Policy 2 - "maintain an adequate supply of water for future agricultural and industrial needs."

The proposed project is one of several strategies used to attain these goals.

Policy 3 - "encourage the development of new technology which will reduce the cost of providing water and the cost of waste disposal."

The BWS is actively involved in alternate water source development for the future. However, development of existing ground water sources is the least costly option currently available for providing domestic water.

Policy 4 - "encourage a lowering of per capita consumption of water and the per capita production of waste."

Although the proposed project would not hinder water conservation strategies, water conservation measures alone would not alleviate the ultimate necessity for this project.

(b) Objective C - "to maintain a high level of service for all utilities."

Policy 3 - "plan for the timely and orderly expansion of the utility system."

(c) Objective D - "to maintain transportation and utility systems which will help Oahu continue to be a desirable place to live and visit."

Policy 1 - "give primary emphasis in the capital improvement program to the maintenance and improvement of existing roads and utilities."

Policy 2 - "use the transportation and utility systems as a means of guiding growth and the pattern of land use on Oahu."

The development of this water system is proposed to comply with growth projected by the Honolulu General Plan.

It should be noted that the present Detailed Land Use Map designations may change when the City's new Development Plans are completed. Presently, the estimated completion date is mid 1984.

Due to its utility nature, the proposed project is a permitted use according to the County zoning controls. The site is outside of the Special Management Area (SMA) and will not need an SMA permit.

SECTION 8

LIST OF NECESSARY APPROVALS

	Type of Approval	Issuing Body
1.	Conservation District Use Permit	State of Hawaii Department of Land and Natural Resources
2.	Grading and Erosion Control Approval	City and County of Honolulu Department of Public Works
3.	Public Health Regulations, Chapter 49	State of Hawaii Department of Health
4.	Building Permit	City and County of Honolulu Department of Building

SECTION 9

REFERENCES

1. "Windward Oahu Water Supply Study"
   Planning Section, Board of Water Supply, August 1976

2. "Oahu Water Plan"
   Board of Water Supply/City and County of Honolulu, July 31, 1975

3. "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii"
   U.S. Department of Agriculture, Soil Conservation Service, August 1972

4. "Oahu Monthly and Median Rainfall"
   Department of Land and Natural Resources, State of Hawaii

5. "Water Resources Data for Hawaii and Other Pacific Areas"
   U.S. Geological Survey

6. "Environmental Impact Data Book"
   Golden, Ouellette, Saari, Cheremisinoff
   (Ann Arbor Science, 1979)

7. "Stream Channel Modification in Hawaii"
   Fish and Wildlife Service, U.S. Department of the Interior, April 1978

8. "Water Quality Management Plan for the City and County of Honolulu"
   State Department of Health & City and County of Honolulu, October 1978

9. "Hawaiian Birds"
   Hawaii Audobon Society, March 1959

10. "Hawaii's Birds"
    Hawaii Audobon Society, July 1978

11. "Hawaii's Endangered Forest Birds"
    Fish and Wildlife Service, U.S. Department of the Interior, 1974

12. "Guide to Hawaiian Birding"
    Hawaii Audobon Society, 1977

13. "Annotated Checklists of the Birds and Mammals of Hawaii"
    Division of Fish and Game, Department of Land and Natural Resources, State of Hawaii 1975

REFERENCES (CONT.)

14. "Ancient and Recent Animal Life"
Ronald Walker, 1967

15. "Land Snails from Hawaii, Christmas Island, and Samoa"
Henry Pilsbry, C. Montague Cooke, Jr., Marie C. Neal, 1928

16. "A Survival Status Report on the Endemic Hawaiian Tree Snail Genus Achatinella (Swainson) from Oahu"
Alan D. Hart, 1979

17. "Hawaiian Land Shells"
C. Montague Cook, Jr., 1941

18. "Agricultural Water Use, Selected Water Districts - Windward Oahu"
Hawaii Agricultural Reporting Service, 1982.

SECTION 10

APPENDICES

APPENDIX A:	MAILING LIST - POSTCARD SURVEY OF POTENTIAL STREAMWATER USERS
APPENDIX B:	CONSULTED AGENCIES
APPENDIX C:	COMMENTS AND RESPONSES ON DRAFT EIS
APPENDIX D:	COMMENTS AND RESPONSES ON REVISED DRAFT EIS
APPENDIX E:	DISTRIBUTION OF RESIDENTIAL POPULATION (YEAR 2000)
APPENDIX F:	HOUSING CHARACTERISTICS
APPENDIX G:	FUTURE ALTERNATIVE SOURCES OF WATER
APPENDIX H:	WATER COMMISSION REPORT: PRIORITY RECOMMENDATIONS

APPENDIX A

POSTCARD SURVEY OF

POTENTIAL STREAMWATER USERS

CALVIN KIM & ASSOCIATES, INC.
CIVIL ENGINEERS
SUITE 201 828 FORT STREET MALL
HONOLULU, HAWAII 96813

KAHALUU WATERSHED SURVEY

	Yes	No
Does a portion of Kahaluu Stream or an auwai flow within your property? If yes:	✓	
1) Is the streamflow or auwai flow continuous throughout the year?	✓	
2) Are you presently using the water for agricultural, farming, or irrigation purposes?		✓

Estimate the area under cultivation: _____square feet

Estimate the amount of water being used: _____gal per day

Crops being cultivated:

____banana ____taro
____papaya ____other: _____

May we call on you for additional information?		

Phone number: _____

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APPENDIX A

MAILING LIST – POSTCARD SURVEY OF POTENTIAL STREAMWATER USERS

Card No.	Tax Map Key	Owner/Tenant Address
1	4-7-08: 9	Mr. & Mrs. Edwin Tu 500 University Ave., PH 10 Honolulu, Hawaii 96826
2	4-7-08:10	Kahaluu Plantations Corp. (Address Unknown)
3	4-7-05:60	Mr. & Mrs. Arthur Emes 47-701 Ahuimanu Road Kaneohe, Hawaii 96744
4	4-7-46:17	Ms. Anna C. Au (Address Unknown)
5	4-7-46:32	Mr. & Mrs. Robert Nagao 47-679 Ahuimanu Road Kaneohe, Hawaii 96744
6	4-7-46:18	Mr. & Mrs. Noel E. Bren 45-133 Ka Hanahou Circle Kaneohe, Hawaii 96744
7	4-7-46:31	Mr. & Mrs. Howard DeCosta 47-510 Apau Loop Kaneohe, Hawaii 96744
8	4-7-46:19	Mr. & Mrs. William M. Kahane 47-660 Melekula Road Kaneohe, Hawaii 96744
9	4-7-46:86	Mr. & Mrs. Robert J. LeClair 47-656 Melekula Road Kaneohe, Hawaii 96744
10	4-7-46:30	Mrs. Harriet Y.H. DeCosta 47-358 Lulani Street Kaneohe, Hawaii 96744
11	4-7-46:29	Mr. Arrhur M. Lee 47-659 Ahuimanu Road Kaneohe, Hawaii 96744
12	4-7-46:20,84	Mr. & Mrs. Thomas C. Oshiro 47-667 Hui Ulili Kaneohe, Hawaii 96744
13	4-7-46:21	Mr. & Mrs. Paul K.Y. Dang 2312 Aina Lani Place Honolulu, Hawaii 96822
14	4-7-46:28	Mr. & Mrs. Shoichi Tanouye 1253 Kahili Street Kailua, Hawaii 96734
15	4-7-46:24	Mr. James B. Divine II 47-544 Melekula Road Kaneohe, Hawaii 96744
16	4-7-46:22	Mr. Emanuel J. Levine 3659 Woodlawn Terrace Honolulu, Hawaii 96822
17	4-7-46:27	Mr. Malcolm Inouye 47-649 Ahuimanu Road Kaneohe, Hawaii 96744
18	4-7-46:26	Mr. & Mrs. Richard J. Rogan 42-641 Ahuimanu Road Kaneohe, Hawaii 96744
19	4-7-46: 1	Mr. Jonathan M. Gans 47-533 Melekula Road Kaneohe, Hawaii 96744
20	4-7-46:39	Mr. & Mrs. Louis D. Castro, J. 47-529 Melekula Road Kaneohe, Hawaii 96744
21	4-7-46: 3	Mr. & Mrs. James Y.K. Chung 47-545 Melekula Road Kaneohe, Hawaii 96744
22	4-7-46: 4	Mr. & Mrs. John L. Ryan 47-549 Melekula Road Kaneohe, Hawaii 96744
23	4-7-46:42	Ms. Celestina Saberon P.O. Box 733 Kaneohe, Hawaii 96744
24	4-7-46:43	Mr. & Mrs. Herbert O. LaBenz 47-622 Melekula Road Kaneohe, Hawaii 96744
25	4-7-46:59	Mr. & Mrs. Thomas H. Griffith 47-618 Melekula Road Kaneohe, Hawaii 96744
26	4-7-46:57	Mr. & Mrs. Patrick K. Tan Chu 47-507 Nenehiwa Place Kaneohe, Hawaii 96744
27	4-7-46:56	Mr. & Mrs. William W. Cayaban 47-505 Nenehiwa Place Kaneohe, Hawaii 96744
28	4-7-46:55	Mr. & Mrs. Hin Chiu Lau 301 Ala Moana Boulevard Honolulu, Hawaii 96813
29	4-7-46:54	Mr. & Mrs. Keith M.S. Watson 47-501 Nenehiwa Place Kaneohe, Hawaii 96744
30	4-7-46:53	Mr. & Mrs. James M. Harshey 1105 Kainui Drive Kailua, Hawaii 96734
31	4-7-46:61	Mr. Clayton L. Routsong 47-502 Nenehiwa Place Kaneohe, Hawaii 96744
32	4-7-46: 6	Mr. William S. Ching 45-181F Lilipuna Road Kaneohe, Hawaii 96744

APPENDIX A

MAILING LIST - POSTCARD SURVEY OF POTENTIAL STREAMWATER USERS (CONT)

Card No.	Tax Map Key	Owner/Tenant Address
33	4-7-32:41	Mr. & Mrs. Charles E. Cripps 47-510 Laumiki Place Kaneohe, Hawaii 96744
34	4-7-32:42	Mr. & Mrs. Robert H. Edgar P.O. Box 860 Kaneohe, Hawaii 96744
35	4-7-32:13	Mr. & Mrs. Terrence E. Haney 46-197 Lilipuna Road Kaneohe, Hawaii 96744
36	4-7-32:35	Mr. Thomas H. Medeiros 47-563 Ahuimanu Road Kaneohe, Hawaii 96744
37	4-7-32:14	Ms. Antoninette M. Rockfort 47-559 Ahuimanu Road Kaneohe, Hawaii 96744
38	4-7-32:15	Mr. & Mrs. William A. McCartney P.O. Box 507 Kaneohe, Hawaii 96744
39	4-7-32:16	Mr. & Mrs. Raymond Porter 47-543D Ahuimanu Road Kaneohe, Hawaii 96744
40	4-7-32:17	Ms. Flora Kim Choi Makiki Nursery, Inc. 2179 Makiki Heights Drive Honolulu, Hawaii 96822
41	4-7-29:10	Mr. & Mrs. Ernest H. Brickman 47-389 Ahaolelo Road Kaneohe, Hawaii 96744
42	4-7-28: 8 4-7-29 6 (Tenancy 001)	Mr. Ezra Hookano P.O. Box 855 Kaneohe, Hawaii 96744
43	4-7-29: 6 (Tenancy 002)	Ms. Margaret Kealoha P.O. Box 1802 Kahului, Hawaii 96732
44	4-7-29: 6 (Tenancy 003)	Mr. Lui Hookano 47-310 Lulani Street Kaneohe, Hawaii 96744
45	4-7-29: 6 (Tenancy 004)	Mr. & Mrs. Raymond Porter 47-543D Ahuimanu Road Kaneohe, Hawaii 96744
46	4-7-29: 6 (Tenancy 005)	Ms. Elizabeth B. Morse P.O. Box 928 Kaneohe, Hawaii 96744
47	4-7-29: 6 (Tenancy 006)	July Hookano P.O. Box 156 Kaneohe, Hawaii 96744
48	4-7-29: 6 (Tenancy 007)	Mr. William K. Pahia 48-437 Kamehameha Hwy Kaneohe, Hawaii 96744
49	4-7-29: 6 (Tenancy 008)	Ms. Martha McCabe P.O. Box 976 Kaneohe, Hawaii 96744
50	4-7-29: 6 (Tenancy 009)	Mr. Edward K. Nevalu 47-050 Laenani Drive Kaneohe, Hawaii 96744
51	4-7-29: 6 (Tenancy 010)	Ms. Lucy Dias P.O. Box 1114 Kaneohe, Hawaii 96744
52	4-7-29: 5,14	Mr. & Mrs. Kazuo Ginoza 47-322 Ahaolelo Road Kaneohe, Hawaii 96744
53	4-7-29: 3	Mr. & Mrs. Seichi Tateishi 47-292 Ahaolelo Road Kaneohe, Hawaii 96744
54	4-7-29: 1,18	Mr. Kenneth Y.E. Lau 47-282 Ahaolelo Road Kaneohe, Hawaii 96744
55	4-7-50:46	Development Inc. P.O. Box 4347 Honolulu, Hawaii 96813
56	4-7-50:45	Mr. Harry B. Yoshioka c/o Bank of Hawaii Mortgage Se Financial Plaza of the Pacific Honolulu, Hawaii 96813
57	4-7-50:44	Mr. & Mrs. Wesley O. Walker 47-511 Hio Place Kaneohe, Hawaii 96744
58	4-7-50:43	Mr. & Mrs. Glenn N. Kurosaki 47-507 Hio Place Kaneohe, Hawaii 96744
59	4-7-50:42	Mr. & Mrs. Richard T. Fujinaga 47-503 Hio Place Kaneohe, Hawaii 96744
60	4-7-50:41	Mr. & Mrs. Theodore C. Cosme 47-487 Apau Loop Kaneohe, Hawaii 96744
61	4-7-50:40	Mr. & Mrs. Franklin T. Oshiro 47-483 Apau Loop Kaneohe, Hawaii 96744
62	4-7-50:39	Mr. & Mrs. George S. Morisugi 47-479 Apau Loop Kaneohe, Hawaii 96744
63	4-7-50:38	Ms. Susan S. Torres 47-473 Apau Loop Kaneohe, Hawaii 96744
64	4-7-50:37	Mr. & Mrs. Earl S. Motooka 47-471 Apau Loop Kaneohe, Hawaii 96744

APPENDIX A

MAILING LIST - POSTCARD SURVEY OF POTENTIAL STREAMWATER USERS (CONT)

Card No.	Tax Map Key	Owner/Tenant Address
65	4-7-50:36	Mr. & Mrs. Stephen I. Otaguro 47-459 Apau Loop Kaneohe, Hawaii 96744
66	4-7-50:35	Mr. & Mrs. Hoy Charles Yee, Jr. c/o Koolau Boys Home Kailua, Hawaii 96734
67	4-7-55:38	A Country Place, Inc. 47-723 Kamehameha Hwy Kaneohe, Hawaii 96744
68	4-7-55:51	Mr. & Mrs. Robert Chai 47-411 Kapehe Street Kaneohe, Hawaii 96744
69	4-7-55:52	Mr. & Mrs. Larry M. Matsubara 47-407 Kapehe Street Kaneohe, Hawaii 96744
70	4-7-55:53	Mr. & Mrs. Michael K. Nakamura 47-403 Kapehe Street Kaneohe, Hawaii 96744
71	4-7-55:54	Mr. & Mrs. Florentine Dumadag (Address Unknown)
72	4-7-55:102	Mr. & Mrs. Hiram Ani 47-393 Kapehe Street Kaneohe, Hawaii 96744
73	4-7-55:101	Mr. & Mrs Sonny Ah Toon 47-391 Kapehe Street Kaneohe, Hawaii 96744
74	4-7-55:100	Mr. & Mrs. Antone Menzsa P.O. Box 514 Kaneohe, Hawaii 96744
75	4-7-55:99	Mr. & Mrs. John Hong, Jr. 47-385 Kapehe Street Kaneohe, Hawaii 96744
76	4-7-55:97	Mr. & Mrs. Francisco Perez, Jr. 47-379 Kapehe Street Kaneohe, Hawaii 96744
77	4-7-55:96	Mr. & Mrs. Felix Domingues 47-377 Kapehe Street Kaneohe, Hawaii 96744
78	4-7-55:95	Mr. Yoshio Hokama 47-373 Kapehe Street Kaneohe, Hawaii 96744
79	4-7-55:61	Mr. & Mrs. Ryotoku Noborikawa 47-357A-1 Ahuimanu Road Kaneohe, Hawaii 96744
80	4-7-28:23	Mr. & Mrs. Albert L. Lum 47-202 Ahaolelo Road Kaneohe, Hawaii 96744
81	4-7-28:20,30	Mr. & Mrs. Benigno B. Miguel 1111 Gulick Avenue Honolulu, Hawaii 96819
82	4-7-25:20 4-7-28:05	Mr. & Mrs. Wilfred H. Chun 1171 Kaumailuna Place Honolulu, Hawaii 96817
83	4-7-25:18	Mr. & Mrs. Linford Wong P.O. Box 1270 Kaneohe, Hawaii 96744
84	4-7-40: 1	Mr. & Mrs. Adrian F. Anderson 1345 Naulu Place Honolulu, Hawaii 96818
85	4-7-40: 2	Mr. & Mrs. Robert M. Fernandez 3914 Maunahilu Place Honolulu, Hawaii 96744
86	4-7-40: 3	Mr. & Mrs. Richard Paglinawan 47-710 Ahuimanu Road Kaneohe, Hawaii 96744
87	4-7-40: 4	Mr. & Mrs. Donald D. Mitchell 47-750 Ahuimanu Loop Kaneohe, Hawaii 96744
88	4-7-40:27	Ms. Katharine E. Mitchell 47-760 Uakea Place Kaneohe, Hawaii 96744
89	4-7-40:19 (HR 0001)	Mr. & Mrs. Russell Corsson 47-722C Ahuimanu Loop Kaneohe, Hawaii 96744
90	4-7-40:19 (HR 0002)	Ms. Sylvia K. Fernandez 47-722B Ahuimanu Loop Kaneohe, Hawaii 96744
91	4-7-40:19 (HR 0003)	Mr. John D. Stallman 47-722A Ahuimanu Loop Kaneohe, Hawaii 96744
92	4-7-40:19 (HR 0004)	Mr. & Mrs. Harold Messenheimer 47-724 Ahuimanu Loop Kaneohe, Hawaii 96744
93	4-7-40:19 (HR 0005) (HR 0006)	Mr. & Mrs. Ray Medley 47-728 Ahuimanu Loop Kaneohe, Hawaii 96744
94	4-7-40:19 (HR 0007)	Mr. & Mrs. Keith Woolliams 47-722J Ahuimanu Loop Kaneohe, Hawaii 96744
95	4-7-40:19 (HR 0008)	Mr. & Mrs. John Scholte 47-724H Anuimanu Loop Kaneohe, Hawaii 96744
96	4-7-40:19 (HR 0009)	Mr. & Mrs. Michael Cripps 47-724J Ahuimanu Loop Kaneohe, Hawaii 96744

APPENDIX A

MAILING LIST - POSTCARD SURVEY OF POTENTIAL STREAMWATER USERS (CONT)

Card No.	Tax Map Key	Owner/Tenant Address
97	4-7-40:19 (HR 0010)	Mr. & Mrs. Ainahau Young 47-724G Ahuimanu Loop Kaneohe, Hawaii 96744
98	4-7-40:19 (HR 0011)	Mr. & Mrs. Francis Lee 1133B 2nd Avenue Honolulu, Hawaii 96816
99	4-7-40:19 (HR 0012)	Mr. & Mrs. David Llacuna 47-724E Ahuimanu Loop Kaneohe, Hawaii 96744
100	4-7-40:19 (HR 0013)	Mr. John Kennedy 47-724D Ahuimanu Loop Kaneohe, Hawaii 96744
101	4-7-40:19 (HR 0014)	Mr. & Mrs. William Pupuhi 47-724C Ahuimanu Loop Kaneohe, Hawaii 96744
102	4-7-40:19 (HR 0015)	Mr. & Mrs. Raymond Chew 47-724B Ahuimanu Loop Kaneohe, Hawaii 96744
103	4-7-40:19 (HR 0016)	Mr. & Mrs. Stefan Fekete 47-724 A Ahuimanu Loop Kaneohe, Hawaii 96744
104	4-7-40:19 (HR 0017)	Mr. & Mrs. Howard Keliihoomalu 47-722D Ahuimanu Loop Kaneohe, Hawaii 96744
105	4-7-40:19 (HR 0018)	Mr. & Mrs. Stephen Lee 47-722E Ahuimanu Loop Kaneohe, Hawaii 96744
106	4-7-40:19 (HR 0019)	Mr. & Mrs. Wayne Hancock 47-722F Ahuimanu Loop Kaneohe, Hawaii 96744
107	4-7-40:19 (HR 0020)	Mr. & Mrs. Eugene Gurga 47-722G Ahuimanu Loop Kaneohe, Hawaii 96744
108	4-7-40:19 (HR 0021)	Ms. Elizabeth Stone P.O. Box 394 Naalehu, Hawaii 96722
109	4-7-29:26	Ms. Elizabeth Morse P.O. box 928 Kaneohe, Hawaii 96744
110	4-7-29: 9	Mr. Edward Newalu 47-050 Laenani Drive Kaneohe, Hawaii 96744
111	4-7-29:13	Mr. Masaru Katamoto 47-340 Ahaolelo Road Kaneohe, Hawaii 96744
112	4-7-29:16	Mr. & Mrs. Kenneth Lau 47-282 Ahaolelo Street Kaneohe, Hawaii 96744
113	4-7-29: 2	Mr. William Kapiko, Jr. 47-024 Lihikai Drive Kaneohe, Hawaii 96744
114	4-7-29:19	Mr. Jerry Abreu 47-262A Ahaolelo Road Kaneohe, Hawaii 96744
115	4-7-28:13	Mr. & Mrs. Kenichi Nakasone 1129 Kokea Street Honolulu, Hawaii 96817
116	4-7-28:22	Mr. & Mrs. Kiyoshi Higa 47-234 Ahaolelo Road Kaneohe, Hawaii 96744
117	4-7-28:33	Mr. & Mrs. Iwao Kamemoto 3230 Pakanu Street Honolulu, Hawaii 96822
118	4-7-28:35	Mr. & Mrs. Kiyoshi Arakawa 47-220 Ahaolelo Road Kaneohe, Hawaii 96744
119	4-7-28: 4,36	Mr. & Mrs. Francis D.M. Wong 47-206 Ahaolelo Road Kaneohe, Hawaii 96744
120	4-7-28:11,37	Mr. Lam Ho Inga 47-804 Kamehameha Hwy Kaneohe, Hawaii 96744
121	4-7-28:28	Mr. & Mrs. Roy M. Arakawa P.O. Box 715 Waianae, Hawaii 96792
122	4-7-28: 7	Ms. Mae Ryder 47-204F Ahaolelo Road Kaneohe, Hawaii 96744
123	4-7-28:16,32	Ms. Cecilia K. Kapu 47-170 Ahaolelo Road Kaneohe, Hawaii 96744
124	4-7-59:33	Mr. & Mrs. Donald D. Mitchell 47-750 Ahuimanu Loop Kaneohe, Hawaii 96744
125	4-7-59:30	Mr. Alan Moon, Jr. 1130 Wilder Avenue, PH 2 Honolulu, Hawaii 96822
126	4-7-59:27	Mr. & Mrs. David W. Campbell 47-718 Ahuimanu Loop Kaneohe, Hawaii 96744
127	4-7-59: 8	Mr. & Mrs. George Fernandez 47-634 Uakea Place Kaneohe, Hawaii 96744
128	4-7-59:10	Mr. & Mrs. Darryl Pate 47-686 Hui Alala Street Kaneohe, Hawaii 96744

APPENDIX A

MAILING LIST - POSTCARD SURVEY OF POTENTIAL STREAMWATER USERS (CONT)

Card No.	Tax Map Key	Owner/Tenant Address
129	4-7-59:12	Mr. & Mrs. Valentine Marciel P.O. Box 815 Kaneohe, Hawaii 96744
130	4-7-59:13	Mr. & Mrs. Mitsuo Kawashima 2333 Kapiolani Boulevard Honolulu, Hawaii 96826
131	4-7-59:14	Mr. & Mrs. Wayne Wahineokai 47-637 Uakea Place Kaneohe, Hawaii 96744
132	4-7-59:18	Mr. & Mrs. Bruce Miller P.O. Box 1412 Elko, Nevada 89801
133	4-7-59:19	Mr. & Mrs. Simeon Callejo 47-618 Ahuimanu Road Kaneohe, Hawaii 96744
134	4-7-27: 3	Mr. Norito Tokushige 47-227 Ahaolelo Road Kaneohe, Hawaii 96744
135	4-7-27: 2	Pioneer Federal Savings & Loan Assoc. P.O. Box 20 Honolulu, Hawaii 96810
136	4-7-27: 6	Bishop Trust Co., Ltd. P.O. Box 2390 Honolulu. Hawaii 96804

APPENDIX B

CONSULTED AGENCIES

APPENDIX B

CONSULTED AGENCIES

1. Federal:
   - U.S. Department of Agriculture, Soil Conservation Service
   - U.S. Army, Headquarters United States Army Support Command
   - U.S. Army, Corps of Engineers
   - U.S. Department of Interior, Fish and Wildlife Service
   - U.S. Navy
   - U.S. Department of Transportation, Coast Guard

2. State:
   - Department of Accounting & General Services
   - Department of Agriculture
   - Department of Defense
   - Department of Health
   - Department of Health, Office of Environmental Quality Control
   - Department of Land and Natural Resources
   - Department of Planning & Economic Development
   - Department of Transportation
   - University of Hawaii, Environmental Center
   - University of Hawaii, Water Resources Research Center

3. Honolulu City & County:
   - Department of General Planning
   - Department of Housing & Community Development
   - Department of Land Utilization
   - Department of Parks & Recreation
   - Department of Public Works
   - Department of Transportation Services

4. Private Organizations:
   - Bernice P. Bishop Museum

5. Community Organizations:
   - Kahaluu Neighborhood Board No. 29
   - Kaneohe Neighborhood Board No. 30
   - Kailua Neighborhood Board No. 31

Oct 16 3 52 PM '79 79-417

LIFE OF THE LAND
A GROUP FOR ENVIRONMENTAL RESEARCH AND ACTION

Asst. Mgr. W/E
P/E.

October 9, 1979

Mr. Laurence Whang
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96813

Dear Mr. Whang:

Life of the Land would like to be a consulted party on the EIS being prepared for Kahaluu Well. Please send us a copy of the draft EIS when it becomes available. We would appreciate it if the draft EIS discusses in detail the impacts of the project on stream flow in perennial streams on windward Oahu.

Sincerely,

Doug Teller

Douglas Neller
Staff Supervisor

404 PIIKOI STREET HONOLULU HAWAII 96814 TELEPHONE 521 1300

October 18, 1979

Mr. Douglas Meller
Staff Supervisor
Life of the Land
404 Piikoi Street
Honolulu, Hawaii 96814

Dear Mr. Meller:

Subject: Your Letter of October 9, 1979, on Our Kahaluu Well

We have added your organization to our consulted party's list for the proposed project. A copy of the draft EIS will be sent to you when it becomes available. The EIS will discuss any impacts the project may have on streamflow in the area.

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: Calvin Kim & Assoc.

MHS:am

cc: K. Hayashida
L. Whang

79-4127

April 11, 1980

Mr. Calvin Kim
Calvin Kim & Associates
828 Fort Street Mall - Suite 201
Honolulu, Hawaii 96813

Dear Mr. Kim:

This is in response to your letter of last month in reference to the proposed Kahaluu Well at Koolaupoko (Oahu Tax Map Key 4-7-08:2). The Kahaluu Stream does indeed flow within my property (as does one of its tributaries) and is continuous throughout the year. At present I am using stream water only occasionally for irrigation of primarily ornamental trees, plants and shrubs.

For several reasons I am strongly opposed to the proposed well. The construction of such a well would significantly reduce water flow (note that construction of other wells somewhat north along the Koolaus in recent years has already reduced stream flow in Kahaluu Stream and its tributaries). The consequences of reduced flow are serious. First there are fish, fresh water shrimp, and other aquatic fauna and flora dependent upon the stream having sufficient flow. Secondly, the inevitable seepage from cesspools in the area would be more serious a threat to public safety and the environment with less flow to dilute and carry off such seepage. (Note that neighborhood children frequently play in the stream.) Third, significantly reduced flow (especially in the non-winter months) could result in increased blockage of the stream bed from vegetation (which would otherwise have note been able to grow in faster moving, deeper water). Such blockage could result in potential increased flood damage.

I hope that an Environmental Impact Study has been done to access the above and other relevant issues. If so, I would appreciate you telling me how I might obtain a copy of same.

For me personally, the overriding concern is that the reduced stream flow would constitute removal of an extremely valuable asset without any compensation at all. Note that I selected my home because of its proximity to the stream. I won't go into great detail about the joys and soothing nature of a babbling brook outside one's window - but be aware that I treasure the stream greatly. If the City and County of Honolulu Board of Water Supply proceeds with the proposed well it will be taking something from me without permission and without just compensation.

I would appreciate being notified of any hearings or public meetings regarding the proposed well. Note that I feel strongly enough in this matter that if necessary I will ask my attorney to bring suit to try and stop the well.

Sincerely,

Jonathan Gans
47-533 Melekula Road
Kahaluu, Hawaii 96744

cc: Mayor's Office
Board of Water Supply

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

COPY

April 22, 1980

Mr. Jonathan Gans
47-533 Melekula Road
Kahaluu, Hawaii 96744

Dear Mr. Gans:

Subject: Your Letter of April 11, 1980
Commenting on The Proposed
Kahaluu Well

Thank you for your comments on our proposed project.

The environmental impact statement (EIS) for the project will address your concerns on stream flow, flora, fauna (including aquatic biota), flood hazards, water uses, and visual impacts.

A copy of the EIS will be sent to you when it becomes available.

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: Calvin Kim & Assoc.

APPENDIX C

COMMENTS AND RESPONSES

TO DRAFT ENVIRONMENTAL IMPACT STATEMENT

P. 260

HEADQUARTERS
NAVAL BASE PEARL HARBOR
BOX 110
PEARL HARBOR, HAWAII 96860

IN REPLY REFER TO:
002A:RLE:amn
Ser 2083

7 OCT 1980

The Honorable Frank F. Fasi
Mayor of Honolulu
530 S. King Street
Honolulu, Hawaii 96813

Dear Mayor Fasi:

Environmental Impact Statement
Kahaluu Well

The Environmental Impact Statement for Kahaluu Well forwarded by the Environmental Quality Commission has been reviewed and the Navy has no comments to offer. Per the Commission's request, the EIS is being returned to the Commission by copy of this letter.

The opportunity to review the subject EIS is appreciated.

Sincerely,

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

Copy to:
Board of Water Supply
City and County of Honolulu

Environmental Quality Commission (w/encl)

OCT 10 1 29 PM '80

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

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 7, 1980, On The Environmental Impact Statement (EIS) For Kahaluu Well, Koolaupoko, 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: Calvin Kim & Associates

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80-2934

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

APZV-EIE-E

07 OCT 1980

Honorable Frank F. Fasi
Mayor of City and County of Honolulu
530 S. King Street
Honolulu, Hawaii 96813

Dear Mayor Fasi:

The Environmental Impact Statement for Kahaluu Well, Kahaluu, Koolaupoko, Oahu, Hawaii has been reviewed and we have no comments to offer. There are no Army installations or activities in the vicinity of the proposed project.

Sincerely,

[illegible] Signed by

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

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

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

October 10, 1980

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 7, 1980, On The Environmental Impact Statement (EIS) For Kahaluu Well, Kahaluu, Koolaupoko, 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: Calvin Kim & Associates

P-259

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

COMMANDER (dpl)
Fourteenth Coast Guard District
Prince Kalanianaole Federal Bldg.
300 Ala Moana Blvd.
Honolulu, Hawaii 96850
Serial 536
11000
7 October 1980

Mayor Frank F. Fasi
City & County of Honolulu
530 S. King Street
Honolulu, Hawaii 96813

Dear Mayor Fasi:

The Coast Guard has reviewed the Environmental Impact Statement prepared on the Kahaluu Well and has no 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 & County of Honolulu
630 South Beretania Street
Honolulu, HI 96843

Oct 10 1 29 PM '80

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

October 16, 1980

Commander J. E. Schwartz
Fourteenth Coast Guard District
Prince Kalanianaole Federal
Building
300 Ala Moana Boulevard
Honolulu, Hawaii 96650

Dear Commander Schwartz:

Subject: Your Letter of October 7, 1980, On The Environmental Impact Statement (EIS) For Kahaluu Well, Koolaupoko, 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: Calvin Kim & Associates

80-3043

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
BUILDING 230
FT. SHAFTER, HAWAII 96858

RECEIVED
BD. OF WATER SUPPLY
Oct 15 11 41 AM '80

FODED-PV

10 October 1980

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

Dear Mr. Hayashida:

We have reviewed your Environmental Impact Statement (EIS) for Kahaluu Well, Kahuluu, Koolaupoko, 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
Acting Chief, Engineering Division

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

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

COPY

FRANK F. FASI, Mayor
JOSHIE H. FUJINAKA, Chairman
T QUON PANG, Vice Chairman
KICHI HIGASHIOKA
na H. Howard
WALLACE S. MIYAMURA
ROBERT A. SOUZA
CLAUDE T. YAMAMOTO

KAZU HAYASHIDA
Manager and Chief Engineer

October 24, 1980

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

Dear Mr. Kobayashi:

Subject: Your Letter of October 10, 1980 on the Environmental Impact Statement for Kahaluu Well, Koolaupoko, Oahu

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
Manager and Chief Engineer

cc: Calvin Kim & Associates

P-388

P. O. Box 50006
Honolulu, Hawaii
96850

October 29, 1980

Honorable Frank F. Fasi
Mayor, City and County of Honolulu
530 S. King Street
Honolulu, Hawaii 96813

Nov 3 12 00 PM '80

Dear Mayor Fasi:

Subject: EIS - Kahaluu Well, Kahaluu, Koolaupoko, Oahu, Hawaii

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

Thank you for the opportunity to review this document.

Sincerely,

Otis M. Gryde
District Conservationist

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

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

November 6, 1980

Mr. Otis M. Gryde
District Conservationist
Soil Conservation Service
U. S. Department of Agriculture
P. O. Box 50006
Honolulu, Hawaii 96850

Dear Mr. Gryde:

Subject: Your Letter of October 29, 1980, On The Environmental Impact Statement (EIS) For Kahaluu Well, Koolaupoko, 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: Calvin Kim & Associates

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80-3267

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

November 7, 1980

A.M. - HR
P/E

Mayor Frank F. Fasi
City and County of Honolulu
530 South King Street
Honolulu, Hawaii 96813

Re: EIS - Kahaluu Well
Kahaluu, Oahu, Hawaii

Dear Sir:

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

Section 2 VIII, Fauna, does not discuss bird species which use the area, nor are land snails mentioned. Both of these subjects should be addressed.

In addition, the minimum flow required for Kahaluu Stream to remain a viable habitat for the present aquatic biota has not been determined, therefore; controlling the pumping rate at .5 mgd may not be appropriate. Furthermore, to insure that streamflow does not decrease below the minimum required during periods of drought, the Service recommends that provisions be incorporated in the design to pump well water into the stream.

We appreciate this opportunity to comment.

Sincerely yours,

for Nevin D. Holmberg
Deputy Project Leader for
Ecological Services

cc: HDF&G
BWS
OEQC

CONSERVE AMERICA'S ENERGY

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

December 18, 1980

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

Dear Mr. Holmberg:

Subject: Your Letter of November 7, 1980, on the Environmental Impact Statement (EIS) for Kahaluu Well, Koolaupoko, Oahu

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

We have the following reply to your comments:

1. *Section 2 VIII, Fauna, does not discuss bird species which use the area, nor are land snails mentioned. Both of these subjects should be addressed.*

   We will include a listing of the bird species that frequent the area and mention the land snail in the Section on fauna.

2. *In addition, the minimum flow required for Kahaluu Stream to remain a viable habitat for the present aquatic biota has not been determined, therefore; controlling the pumping rate at .5 mgd may not be appropriate. Furthermore, to insure that streamflow does not decrease below the minimum required during periods of drought, the Service recommends that provisions be incorporated in the design to pump well water into the stream.*

   Our sustained pump test on the exploratory well showed a drawdown of 15 feet at a pumpage rate of 1000 gallons per minute. Although there were no discernible effects to streamflow during our test pumping, we will continue to monitor Kahaluu Stream to determine the potential long-term effect, if any, of our proposed project.

   Should streamflow decrease to levels experienced during periods of drought, we will stop pumping and re-evaluate the project. No special provision will be made to pump well water into the stream at this time.

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: Calvin Kim & Associates

DEPARTMENT OF THE ARMY
PACIFIC OCEAN DIVISION, CORPS OF ENGINEERS
BUILDING 230
FT. SHAFTER, HAWAII 96858

PODED-PV

14 November 1979

Mr. Calvin D.S. Kim, President
Calvin Kim & Associates, Inc.
Suite 201
828 Fort Street Mall
Honolulu, Hawaii 96813

Dear Mr. Kim:

We have revieved the Environmental Assessment for the Kahaluu Well, Koolaupoko, Oahu, Hawaii, dated 18 September 1979. The project does not affect any Corps projects or areas of jurisdiction. A Department of the Army permit is not required for the upgrading of the exploratory well.

The proposed project is located in an area of undetermined, but possible flooding according to the Flood Insurance Rate Map (Incl 1). An evaluation of flood hazard potential should be used in designing the facilities to insure that possible flood damages are reduced or prevented.

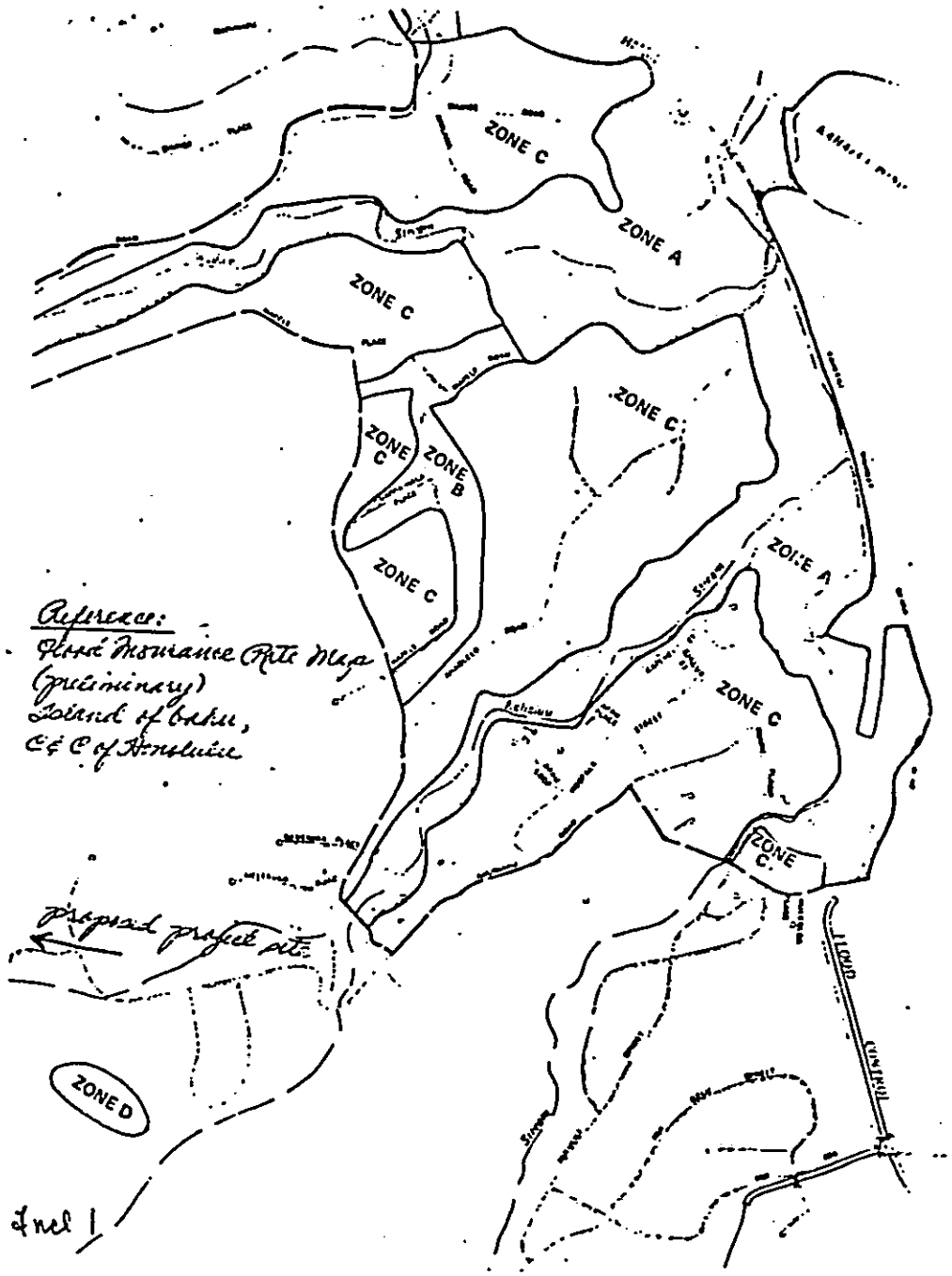
Reduced stream flow could affect aquatic organisms in Kahaluu Stream. If possible, the reduced stream flow should be quantified and compared with existing stream flows to estimate the probable impact.

Thank you for the opportunity of reviewing the Environmental Assessment.

Sincerely yours,

HISUK CHEUNG
Chief, Engineering Division

1 Incl
As stated



Incl 1

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

December 20, 1979

Mr. Sisuk Chaung
Chief, Engineering Division
Pacific Ocean Division
Corps of Engineers
Building 230
Fort Shafter, Hawaii 96859

Dear Mr. Chaung:

Subject: Your Letter of November 14, 1979, to Mr. Calvin Kim on the EIS Preparation Notice for the Kahaluu Well

Thank you for reviewing and commenting on our environmental document.

In response to your comment on stream flow, the effects of our well project to stream flow will be verified when the exploratory well is tested. The probable effects of reduced stream flow to aquatic organisms will be addressed in the EIS and coordinated with the appropriate agencies.

We will also address the flood hazard potential in the environmental impact statement and will consider the flood damage potential in our design of the well facilities.

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

Very truly yours,

K. Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Calvin Kim & Associates

United States Department of Agriculture
Soil Conservation Service
P. O. Box 50004
Honolulu, Hawaii
96850

November 15, 1979

Mr. Calvin D.S. Kim
Calvin Kim & Associates, Inc.
Suite 201, 828 Fort Street Mall
Honolulu, Hawaii 96813

Dear Mr. Kim:

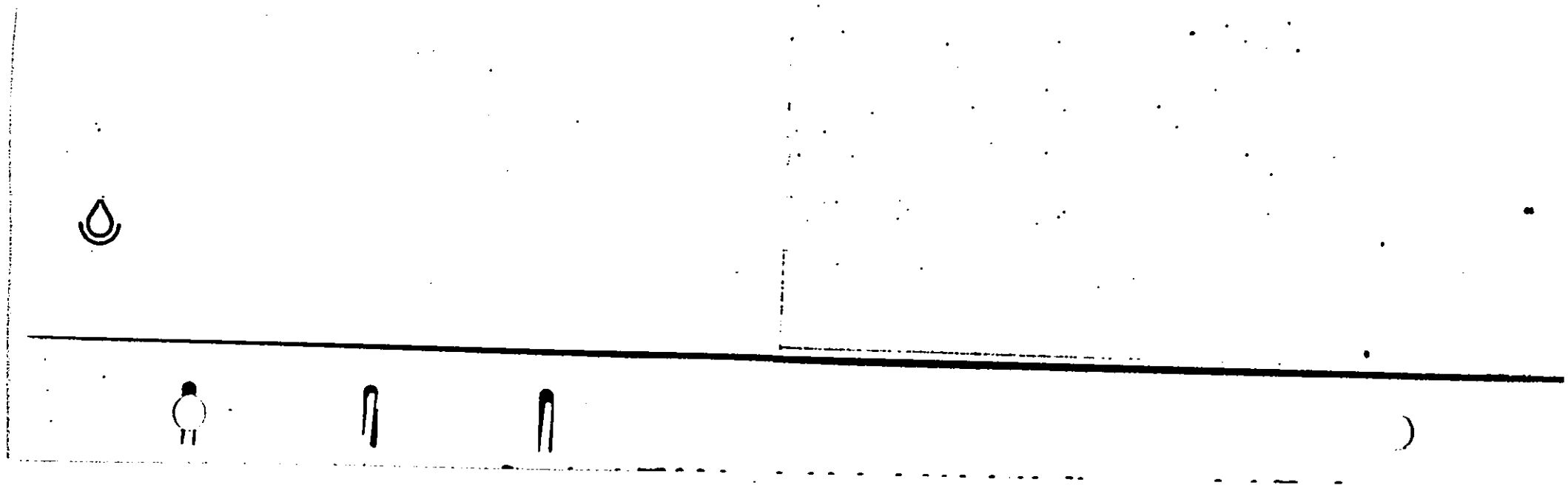
Subject: Kahaluu Well at Koolaupoko, Oahu, Hawaii

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

Thank you for the opportunity to review this document.

Sincerely,

Jack P. Kanalz
State Conservationist



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79-4043

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HAWAII 96801

GEORGE A. L. YUEN
DIRECTOR OF HEALTH

VERNE C. WAITE, M.D.
DEPUTY DIRECTOR OF HEALTH

HENRY N. THOMPSON, M.A.
DEPUTY DIRECTOR OF HEALTH

JAMES S. KUMAGAI, PH.D., P.E.
DEPUTY DIRECTOR OF HEALTH

TADAO BEPPU
DEPUTY DIRECTOR OF HEALTH

October 3, 1979

In reply, please refer to:
File: EPHSD/San

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

Dear Mr. Hayashida:

SUBJECT: Kahaluu Exploratory Well
Koolaupoko, Oahu, Hawaii
Tax Map Key: 4-7-08:2

This letter was precipitated by the notice of the captioned project in the August 8, 1979 edition of the EQC Bulletin. It is our understanding that if the well proves to be economically feasible, it shall be incorporated into the Windward area water system. As you know, Section 29 of Chapter 49, Public Health Regulations requires approval by the Director of Health of all new potable water sources.

This is to inform you that the terms and conditions of Section 29 will be applicable to the Kahaluu well once the determination has been made to use it to supply domestic water.

Thank you for your efforts to comply with our regulations.

Sincerely,

THOMAS E. ARIZUMI
Supervisor, Drinking Water Section
Sanitation Branch
Environmental Protection and Health
Services Division

MJH:jan

FILE: KAHALUU AREA EX.

October 18, 1979

Dr. James S. Kumagai
Deputy Director for
Environmental Health
State of Hawaii
Department of Health
P. O. Box 3378
Honolulu, Hawaii 96801

Attention Mr. Thomas E. Arizumi

Dear Dr. Kumagai:

Subject: Your Letters of October 3, 1979
Informing us of the Section 29,
Chapter 49, Public Health
Regulations Requirements for Our
Proposed Haiku and Kahaluu Wells

Thank you for keeping us informed of the Section 29 requirements.

We shall comply with the requirement of Section 29 when we proceed with the project.

Should you have questions or require additional information, please call Lawrence Whang at 548-5222.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

LHYW/HHMipvk
cc: K. Hayashida
Engineering (w/copies of incoming letters)
L. Whang

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79-4047

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P/E

Honorable Frank F. Fasi
Mayor
City and County of Honolulu
530 South King Street
Honolulu, Hawaii

Dear Mayor Fasi:

Subject: Environmental Impact Statement
for the Kahaluu Well

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,

HIDEO MURAKAMI
State Comptroller

MI:ck

cc: Board of Water Supply

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

October 14, 1980

Mr. Hideo Murakami
State Comptroller
P. O. Box 119
Honolulu, Hawaii 96810

Dear Mr. Murakami:

Subject: Your Letter of October 7, 1980, on the Environmental Impact Statement (EIS) for Kahaluu Well, Koolauloa, 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
Manager and Chief Engineer

cc: Calvin Kim & Associates

80-3049

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HAWAII 96801

October 17, 1980

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Oct 20 3 54 PM '80

GEORGE A. L. YUEN
DIRECTOR OF HEALTH

JOHN P. CHALMERS, M.D.
DEPUTY DIRECTOR OF HEALTH

HENRY N. THOMPSON, M.A.
DEPUTY DIRECTOR OF HEALTH

MELVIN K. KOIZUMI
DEPUTY DIRECTOR OF HEALTH

ABELINA MADRID SHAW, M.A., J.D.
DEPUTY DIRECTOR OF HEALTH

In reply, please refer to:
File: EPHS-SS

MEMORANDUM

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

From: Deputy Director for Environmental Health

Subject: Environmental Impact Statement (EIS) for Kahaluu Well

Thank you for the opportunity of reviewing the subject Environmental Impact Statement.

We wish to reaffirm our letter of October 3, 1979 which stated that once it was determined the Kahaluu Well would be used to serve potable water, the well would be subject to the terms and conditions of Section 29, Chapter 49, Public Health Regulations. As you are aware, Section 29 requires the submission of an engineering report which addresses all concerns set down in that section. Among those concerns are a number of issues addressed in the long-term impacts section of the Environmental Impact Statement. Such items as the undetermined flood hazard potential, the impact of the well on the stream flow of the Kahaluu Stream, and the impact of the drawdown on the performance of nearby cesspools will need to be further defined in the engineering report. For other concerns, please consult the document, "Guidelines for Preparation of Preliminary Engineering Reports for New Potable Water Sources," sent you previously.

If you should have any questions, please feel free to contact the Drinking Water Program at 548-2235.

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 K. KOIZUMI

cc: Mayor's Office

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

October 24, 1980

Mr. Melvin K. Koizumi
Deputy Director for Environmental Health
Department of Health
P. O. Box 3378
Honolulu, Hawaii 96801

Dear Mr. Koizumi:

Subject: Your Letter of October 17, 1980, On The Environmental Impact Statement for Kahaluu Well, Koolaupoko, Oahu

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

An engineering report will be submitted for your 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
Manager and Chief Engineer

cc: Calvin Kim & Associates

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STP 9.6716

OCT 20 1980

The Honorable Frank F. Fasi
Mayor
City and County of Honolulu
530 South King Street
Honolulu, Hawaii 96813

Dear Mayor Fasi:

Environmental Impact Statement
Kahaluu Well, Kahaluu, Koolaupoko, Oahu

Thank you for the opportunity to comment on the subject EIS. We have no substantive comments to offer which could improve the document.

Very truly yours,

Ryokichi Higashionna

Ryokichi Higashionna
Director of Transportation

cc: Board of Water Supply

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

October 27, 1980

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

Dear Dr. Higashionna:

Subject: Your Letter of October 20, 1980, on the Environmental Impact Statement (EIS) for Kahaluu Well, Koolaupoko, 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
Manager and Chief Engineer

cc: Calvin Kim & Associates

- P-316

Plan-7

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

HIENC

27 OCT 1980

Nov 3 12 00 PM '80

Mayor Frank Fasi
City and County of Honolulu
530 South King Street
Honolulu, Hawaii 96813

Gentlemen:

Kahaluu Well

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

Sincerely,

Jerry M. Matsuda

JERRY H. MATSUDA
Captain, HANG
Contr & Engr Officer

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

November 6, 1980

Captain Jerry H. 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 Kahaluu Well, Koolaupoko, 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: Calvin Kim & Associates

P-417

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

Ref. No. 2322

October 30, 1980

The Honorable Frank F. Fasi
Mayor
City and County of Honolulu
Honolulu, Hawaii 96813

Dear Mayor Fasi:

Subject: Environmental Impact Statement for Kahaluu Well, Koolaupoko, Oahu

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 matter.

Sincerely,

Hideto Kono

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

Office of Environmental Quality Control

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

FRANK F. FASI, Mayor
YOSHIE N. FUJINAKA, Chairman
DAT QUON PANG, Vice Chairman
RYOKICHI HIGASHIGAWA
Donna H. Howard
WALLACE S. MIYAMURA
ROBERT A. SOUZA
CLAUDE T. YAMAMOTO

KAZU HAYASHIDA
Manager and Chief Engineer

November 10, 1980

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 Kahaluu Well, Koolaupoko, 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,

for KAZU HAYASHIDA
Manager and Chief Engineer

cc: Calvin Kim & Associates

GEORGE R ARIYOSHI
GOVERNOR

RECEIVED
BD OF WATER SUPPLY
Nov 6 3 33 PM '80

80-32.51

HARRY Y. AKAGI
ACTING DIRECTOR
TELEPHONE NO.
548-6915

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

550 HALEKAUWILA ST
ROOM 301
HONOLULU HAWAII 96813

A.M.
P/E

November 5, 1980

Mr. Kazu Hayashida, Director
Board of Water Supply
City and County of Honolulu
Honolulu, Hawaii 96813

SUBJECT: Environmental Impact Statement for Kahaluu Well

Dear Mr. Hayashida:

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

PAGE 9

The EIS states,

> "The drilling and testing of the well are planned for FY 1980-1981. These tasks, along with all initial site work and site improvements, are part of the separately funded Kahaluu Exploratory Well project. The environmental ramifications of these improvements have been analyzed in a separate environmental assessment."

It is important to note that the EIS Regulation 1:12 c. requires that a group of proposed actions shall be treated as a single action when the components actions are phases or increments of a larger undertaking, the individual project is a necessary precedent for a larger project, or the individual project represents a commitment to a larger project.

DESCRIPTION, PAGE 9

The description should include the size of the population the project will serve. What is the present and future water demands of the population to be served? Where is the

service area for the proposed project? Will some of the water be transported to the Honolulu area?

The project description should also include the number of acres for the proposed site and the building size.

PAGE 12

What is the estimated cost of the proposed action? Who owns the land on which the project will be located?

PAGE 24

The statement, "No known endangered or threatened plant species were encountered during normal inspection of the project site," should be documented. Who conducted the flora survey?

PAGE 25

The statement, "There are no known historical or archaeological sites that will be affected by the proposed development," should be documented. Was this statement made on the basis of Bishop Museum's letter? Or was this conclusion reached by other means?

PAGE 26

What is the basis for the statement, "There are no endangered animal species habitating the project site?" The statement should be documented.

PAGE 27

The EIS states,

> "Department of Planning and Economics statistics coupled with BWS water-usage data indicate that the year 2000, water needs of the Windward Water District will rise from the present 18 million gallons daily to an estimated 22 million gallons daily."

How were these figures derived? What is the population base and the per capita requirement?

PAGE 30

The EIS indicates that 0.5 mgd will be pumped if there is minimal impact to the water flow of Kahaluu Stream. Will the same amount be pumped if there is an impact on the stream?

PAGE 33

The discussion on alternatives should be expanded. Consideration should also be given to water conservation programs and recycling of water to reduce the demands.

EFFECT OF PUMPING ON NATIVE AQUATIC FAUNA SPECIES

The EIS should address the impact of pumping on the native aquatic fauna. What species inhabit the stream? What impact will pumping have on the stream in terms of pH, temperature, and minimum stream flow? What is the maximum pumpage?

SECONDARY IMPACTS

The EIS should discuss the potential secondary impacts generated by the project. Because water is a strong factor influencing growth, the increase of water supply would also facilitate growth. Therefore, the EIS should address any population increase which this project would generate and its secondary impact as prescribed by EIS Regulations 1:42 c. and e.

POLICIES, PROGRAMS, AND PLANS

The EIS should include discussion on how the proposed action affects the Coastal Zone Management Program, the Hawaii State Plan, and the Development Plans of the City and County of Honolulu.

We hope that the comments will be helpful to you in preparing the revised EIS. If you should have any questions regarding this matter, please do not hesitate to contact us.

Sincerely,

Harry Y. Akagi
Acting Director

cc: Mayor Fasi

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

December 29, 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 November 5, 1980, on the Environmental Impact Statement for Kahaluu Well, Koolaupoko, Oahu

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

In response to your comments, we offer the following which will be incorporated into the revised document:

PAGE 9

The EIS states,

> *"The drilling and testing of the well are planned for FY 1980-1981. These tasks, along with all initial site work and site improvements, are part of the separately funded Kahaluu Exploratory Well project. The environmental ramifications of these improvements have been analyzed in a separate environmental assessment."*

It is important to note that the EIS Regulation 1:12 c. requires that a group of proposed actions shall be treated as a single action when the components actions are phases or increments of a larger undertaking, the individual project is a necessary precedent for a larger project, or the individual project represents a commitment to a larger project.

We concur that the exploratory well may be followed by a production well with control station, roadway, and connecting pipelines. However, the exploratory well is

An exploratory well is an investigatory research step to provide facts on available quantity, quality, head loss, and loss if any of streamflow. Should the exploratory well results indicate that it is not feasible to proceed with the next phase, then the next phase is canceled. Our assessing of an exploratory well and filing of a negative declaration permits time for facts such as stream monitoring during pump tests to be available. These facts are not available until the first phase is completed and we can make a valid assessment of the effect of production wells.

Therefore, we believe that we are correct in going ahead with a negative statement for the exploratory well and including all pertinent facts in the EIS write-up for the production wells.

DESCRIPTION, PAGE 9

The description should include the size of the population the project will serve. What is the present and future water demands of the population to be served? Where is the service area for the proposed project? Will some of the water be transported to the Honolulu area?

The project description should also include the number of acres for the proposed site and the building size.

The project is one of many sources needed to meet the projected population to be served of 125,000.

Present water demand is about 17 mgd and the future demand is estimated at 22 mgd (ref. page 6).

Water from the Kahaluu Well will primarily serve the Windward Water District (Census Tracts 102 to 113) with excess water transported to the Honolulu Water District (Census Tract 1). The amount of water conveyed from the Windward Water District to the Honolulu Water District is operationally limited to 0.12 mgd because of insufficient water for exportation. The conveyance is needed to prevent water from stagnating in the interconnecting transmission mains.

The project would use about one-half acre of land including the area needed for the control building (20 ft. by 50 ft.).

PAGE 12

What is the estimated cost of the proposed action? Who owns the land on which the project will be located?

The estimated cost of the project is $765,000.

The land is owned by the City and County of Honolulu (page 13).

PAGE 24

The statement, "No known endangered or threatened plant species were encountered during normal inspection of the project site," should be documented. Who conducted the flora survey?

The flora survey was conducted by Mr. Dennis Kim of Design Planners Associates, Incorporated. His findings are incorporated in the document.

PAGE 25

The statement, "There are no known historical or archaeological sites that will be affected by the proposed development," should be documented. Was this statement made on the basis of Bishop Museum's letter? Or was this conclusion reached by other means?

The statement was made on the basis of the field survey by Rose Schilt of Bishop Museum. Should any work be proposed beyond the area under California grass cover, an archaeologist will be hired to monitor the initial clearing activities.

PAGE 26

What is the basis for the statement, "There are no endangered animal species habitating the project site?" The statement should be documented.

The statement will be revised to indicate that no endangered animal species were seen within the project area during the site surveys.

PAGE 27

The EIS states,

> *"Department of Planning and Economics statistics coupled with BWS water-usage data indicate that the year 2000, water needs of the Windward Water District will rise from the present 17 million gallons daily to an estimated 22 million gallons daily."*

How were these figures derived? What is the population base and the per capita requirement?

The BWS population projection is based on the State's Department of Planning and Economic Development's II-F projection and the City's Department of General Planning's distribution of the II-F projection.

The II-F projection forecasts a population of 917,400 people by the year 2000. The per capita consumption is estimated at 176 gallons per day.

PAGE 30

The EIS indicates that 0.5 mgd will be pumped if there is minimal impact to the water flow of Kahaluu Stream. Will the same amount be pumped if there is an impact on the stream?

Presently, there are no established minimum flow requirements for Kahaluu Stream or any other stream on the island. However, our recently completed pumping tests on the exploratory well showed no discernible effects to streamflow. Had the well adversely affected streamflow, the scope of the project would have been re-evaluated. We will continue to monitor streamflows when our production well is installed to determine, if any, long-term effects.

PAGE 33

The discussion on alternatives should be expanded. Consideration should also be given to water conservation programs and recycling of water to reduce the demands.

The BWS has and will continue to carry out programs dealing with water conservation. It must be realized

that conservation will only delay the development of new sources as this has already been accounted for in the per capita consumption figures.

Other alternatives such as recycling and desalination will be addressed in the revised document.

EFFECT OF PUMPING ON NATIVE AQUATIC FAUNA SPECIES

The EIS should address the impact of pumping on the native aquatic fauna. What species inhabit the stream? What impact will pumping have on the stream in terms of pH, temperature, and minimum stream flow? What is the maximum pumpage?

On page 26 is a summary of the aquatic fauna that inhabit the stream obtained from an assessment performed in 1978 by the University of Hawaii.

The minimum flow recorded at the gaging station one-half mile above the forest reserve boundary was 0.03 mgd. Average flow over a twenty-year period was about 0.5 mgd.

As the pumping tests on the exploratory well showed no discernible effects to streamflow, no effects to pH and temperature are anticipated.

The maximum pumpage is 1.5 mgd. The well was tested at this rate for five consecutive days with no discernible effects to streamflow.

SECONDARY IMPACTS

The EIS should discuss the potential secondary impacts generated by the project. Because water is a strong factor influencing growth, the increase of water supply would also facilitate growth. Therefore, the EIS should address any population increase which this project would generate and its secondary impact as prescribed by EIS Regulations 1:42 c. and e.

Water development projects are planned to respond to the projections established by the State Department of Planning and Economic Development and distributions of the City's Department of General Planning. Water is not developed to direct population growth.

POLICIES, PROGRAMS, AND PLANS

The EIS should include discussion on how the proposed action affects the Coastal Zone Management Program, the Hawaii State Plan, and the Development Plans of the City and County of Honolulu.

The project is not within lands subject to the Coastal Zone Management (CZM) Program and would not have any adverse effects to the objectives of the CZM Program.

The proposed well is also compatible with the Hawaii State Plan by:

1. Encouraging management practices which conserve and protect watersheds and water sources.

2. Promoting irrigation and wastewater management practices which conserve and fully utilize vital water resources.

3. Encouraging all industries including the fishing, aquaculture, and recreation industries to protect the environment.

4. Encouraging all individuals to reduce waste and excessive consumption.

Our long-range water development plans are in accord with the Department of General Planning's population distribution which is in conformance with the Development Plans of the City and County of Honolulu.

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

Very truly yours,

For KAZU HAYASHIDA
Manager and Chief Engineer

cc: Calvin Kim & Associates

P. 459

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 948-7361

Office of the Director

November 7, 1980
RE:0316

Mayor Frank F. Fasi
City & County of Honolulu
530 South King Street
Honolulu, Hawaii 96813

Dear Mayor Fasi:

Environmental Impact Statement
Kahaluu Well
Kahaluu, Koolaupoko, Oahu

The Environmental Center has reviewed the above cited DEIS with the assistance of Alexis Cheong Linder, Barbara Vogt and Jacquelin Miller, Environmental Center.

Although we have no objections to the exploratory well at Kahaluu being converted to production purposes, we do have reservations concerning the postcard survey and the impacts of the proposed pumpage rate (.5 mgd) on the minimum stream flow.

The number of current users or potential users of stream water represent approximately 13 percent of the total sample number (page 15). Was this the total number of positive respondents to the postcard survey? If this was the case are there any plans for further field inspection of non-respondents to identify other users or potential users of stream water to obtain a more representative sample number? Additionally were there any objections or comments as to the proposed conversion of the exploratory well particularly in reference to impact on stream flow?

The average stream flow for the Kahaluu tributary from 1951-1971 was .52 mgd (page 21) and the proposed pumpage rate is .50 mgd. Groundwater drawdown is expected during pumping that may result in a decrease in streamflow (page 32). Is there an approximate figure for the expected decrease in stream flow due to the proposed pumpage rate? A significant decrease in stream flow is potentially detrimental to the aquatic biota.

Thank you for the opportunity to review this document.

Yours truly,

Doak C. Cox
Director

cc: Board of Water Supply
OEQC
WRRC

December 16, 1980

Dr. Doak C. Cox
Director, Environmental Center
University of Hawaii
2550 Campus Road, Crawford 317
Honolulu, Hawaii 96822

Dear Dr. Cox:

Subject: Your Letter of November 7, 1980, on the Environmental Impact Statement for Kahaluu Well, Koolaupoko, Oahu

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

Our responses to your comments on the postcard survey and the impacts on streamflow are as follows:

"The number of current users or potential users of stream water represent approximately 13 percent of the total sample number (page 15). Was this the total number of positive respondents to the postcard survey? If this was the case are there any plans for further field inspection of non-respondents to identify other users or potential users of stream water to obtain a more representative sample number? Additionally were there any objections or comments as to the proposed conversion of the exploratory well particularly in reference to impact on stream flow?"

Of the returned postcards, only the respondents listed on pages 17 and 18 of the EIS indicated that they used stream water. A follow-up field inspection was conducted to confirm the amount of users of the stream.

However, our pumpage tests showed a drawdown of 15 feet at a pumpage rate of 1000 gpm with no discernible effects on streamflow. This information was not available at the time the EIS was circulated, but it will be incorporated into the revised environmental document.

"The average stream flow for the Kahaluu tributary from 1951-1971 was .52 mgd (page 21) and the proposed pumpage rate is .50 mgd. Groundwater drawdown is expected during pumping that may result in a decrease in streamflow (page 32). Is there an approximate figure for the expected decrease in stream flow

due to the proposed pumpage rate? A significant decrease in stream flow is potentially detrimental to the aquatic biota."

The statement that pumping may affect streamflow was made to assure all potential impacts were addressed in the EIS. Although we did not anticipate any adverse effects to streamflow from the well, we could not confirm this without actually pump testing the well and gaging the stream. The pump tests showed no discernible effects to streamflow. The tests were coordinated with farmers along the stream and the U. S. Geological Survey. We will continue to monitor the flow in Kahalui Stream. We propose to install a stream gage to determine the long-term effects, if any, of our production wells.

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: Calvin Kim & Associates

80-3317

UNIVERSITY OF HAWAII

Water Resources Research Center

RECEIVED
WATER SUPPLY
1980 NOV 12 PM 3:28

November 7, 1980

Asst. Mgr.
PIE

Mayor Frank F. Fasi
City and County of Honolulu
530 South King Street
Honolulu, Hawaii 96813

Dear Mayor Fasi:

We have reviewed the Kahaluu Wells Environmental Impact Statement and have the following comments:

1. The main concern is the lack of discussion of the potential effects on in-stream parameters such as quantity and quality of flow, biota, aesthetics, etc. They are addressed more specifically below.

2. There is no attempt in estimating possible streamflow reduction. Will this be done when the exploration well is tested? If so, and if streamflow reduction is significant, what will be done? It is noted that the minimum flow given in Fig. 8 is only 0.1 - 0.2 mgd; therefore the stream could be completely dried up.

3. The possible effects of streamflow reduction on the biota, etc., are not discussed at all, despite several letters from the BWS in Appendix C indicating this information would be in the EIS. Since 23 more wells are being planned for windward Oahu, and groundwater development at most of these sites could possibly reduce streamflow, perhaps the BWS might consider a study of in-stream flow values and effects which would be applicable to all their planned sites.

4. The survey of downstream water users appears to be very cursory and the EIS makes no attempt to assess either the possible impact of reduced streamflow to them or any mitigating measures that the BWS would take in such an event. Dry periods are when the BWS will be pumping the heaviest and this is also when the farmers need irrigation the most; all at a time when the normal streamflow will also be at its lowest stage. A repeat of the Waiahee stream case would be unfortunate for everyone.

Mayor Frank F. Fasi
November 7, 1980
Page 2

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

Sincerely,

Edwin T. Murabayashi

Edwin T. Murabayashi
EIS Coordinator

ETM:jn

cc: F. Peterson
H. Gee
Y.S. Fok
Board of Water Supply
Environmental Center

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

December 18, 1980

Dr. L. Stephen Lau, Director
Water Resources Research Center
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 Kahaluu Wells, Koolaupoko, Oahu

Thank you for your comments. We have the following replies to your letter:

1. *The main concern is the lack of discussion of the potential effects on in-stream parameters such as quantity and quality of flow, biota, aesthetics, etc. They are addressed more specifically below.*

Streamflow data is presented on page 23, Figure 8. However, only flow measurements are shown. Attached are water quality data which will be incorporated into the revised EIS.

Listing of flora and fauna appear on pages 24 and 26.

2. *There is no attempt in estimating possible streamflow reduction. Will this be done when the exploration well is tested? If so, and if streamflow reduction is significant, what will be done? It is noted that the minimum flow given in Fig. 8 is only 0.1 - 0.2 mgd; therefore the stream could be completely dried up.*

Reduction in streamflow was not anticipated to be significant. Kahaluu Stream is considered to be a gaining stream in which flow at its mouth is greater than at its head.

Results from our recently completed testing of the exploratory well, along with streamflow monitoring, show no discernible effects to streamflow. The well was tested at a pumpage rate of 1000 gpm with an associated drawdown of 15 feet. Although the exploratory well tests show no reduction to streamflow, we will continue to monitor the streamflow to determine the long-term effects of our groundwater well.

3. *The possible effects of streamflow reduction on the biota, etc., are not discussed at all, despite several letters from the BWS in Appendix C indicating this information would be in the EIS. Since 23 more wells are being planned for windward Oahu, and groundwater development at most of these sites could possibly reduce streamflow, perhaps the BWS might consider a study of in-stream flow values and effects which would be applicable to all their planned sites.*

Our recent monitoring of the stream during pumpage tests show no discernible effect on streamflow. Therefore, there should be no effect on the biota. Also, we are investigating the monitoring of all streams during pumpage tests which may be affected by planned future sources.

4. *The survey of downstream water users appears to be very cursory and the EIS makes no attempt to assess either the possible impact of reduced streamflow to them or any mitigating measures that the BWS would take in such an event. Dry periods are when the BWS will be pumping the heaviest and this is also when the farmers need irrigation the most; all at a time when the normal streamflow will also be at its lowest stage. A repeat of the Waihee stream case would be unfortunate for everyone.*

The stream user survey was made to determine the existing users of the stream and the arount used. Streamflow monitoring was conducted before, during, and after the pumpage tests were completed. Any significant reduction in streamflow would probably result in reduction in pumpage from the well.

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

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

Attach.

79-4481

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF WATER AND LAND DEVELOPMENT
P. O. BOX 373
HONOLULU, HAWAII 96809

RECEIVED
BD OF WATER SUPPLY
Nov 15 11 53 AM '79

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

Mgr. RTC
Asst. Mgr. KHH
P/E

November 13, 1979

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

Dear Kazu:

Kahaluu Well

With reference to the Environmental Assessment for the Kahaluu Well prepared by Calvin Kim and Associates, Inc., we have no objections to the proposed conversion of the existing exploratory well into a production well. However, we would like to comment that the pumping test results and data of the exploratory well ought to be included in the assessment to more clearly support the statements "Testing of the exploratory well...supports the use of the well as a permanent source..." and "The reduction in streamflow is considered to be negligible and will not affect land uses downstream of the well site." More complete dimensional data on the well should also be shown in Figure 4.

Very truly yours,

ROBERT T. CHUCK
Manager-Chief Engineer

DL:ak

"TO CLEAN OUR LAND, HAWAII"

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

November 21, 1979

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

Dear Mr. Chuck:

Subject: Your Letter of November 13, 1979 on the EIS Preparation Notice for the Kahaluu Well

Thank you for your comments on our environmental assessment.

We will include the pumping test data and a discussion on the feasibility of converting the exploratory well into a permanent source and any effects to streamflow in the EIS. Also, dimensional data will be added to Figure 4.

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: Calvin Kim & Associates

80-3388

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

SUSUMU ONO, 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

RECEIVED
BD OF WATER SUPPLY
Nov 19 3 36 PM '80

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

NOV 14 1980

REF. NO.: APO-2326

Honorable Frank F. Fasi
Mayor of Honolulu
Honolulu Hale
Honolulu, Hawaii 96813

Dear Mayor Fasi:

We have reviewed the EIS for converting the Kahaluu exploratory well to a production well.

The EIS does not appear to be acceptable in that results of the exploratory well should be discussed with more detail. For example, it is anticipated that the well will cause some groundwater drawdown but the impact on stream flow and an aquatic biota is not addressed. It seems essential to include quantified results of pumping tests including any reduction in stream flow and to describe impacts anticipated as a result of using the well for production.

A review of our records indicates that this project does not occur on historic properties that are listed on the Hawaii Register and/or the National Register of Historic Places, or that have been determined eligible for inclusion on the National Register of Historic Places. However, this does not confirm the absence of historical, cultural, architectural and/or archaeological resources on the property.

If this project proceeds and any unanticipated sites or remains such as artifacts, shell, bone or charcoal deposits; human burials; rock or coral alignments, pavings, or walls are encountered, the Board of Water Supply should stop work and contact this office (548-7460) immediately.

Very truly yours,

Susumu Ono

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

cc: Board of Water Supply

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

December 18, 1980

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

Dear Mr. Ono:

Subject: Your Letter of November 14, 1980, on the Environmental Impact Statement for Kahaluu Well, Koolaupoko, Oahu

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

We have the following comments to your letter:

1. *The EIS does not appear to be acceptable in that results of the exploratory well should be discussed with more detail. For example, it is anticipated that the well will cause some groundwater drawdown but the impact on stream flow and an aquatic biota is not addressed. It seems essential to include quantified results of pumping tests including any reduction in stream flow and to describe impacts anticipated as a result of using the well for production.*

   The exploratory well drilling was not completed at the time the EIS was published which prevented the inclusion of any test results into the document.

   Results from the recently completed pumpage tests showed a drawdown of 15-feet at a pumpage rate of 1000 gpm with no discernible effects to streamflow. From this information we do not anticipate any adverse effects to streamflow and aquatic biota. Although the exploratory well tests show no reduction in streamflow, we will continue to monitor the streamflow to determine the long-term effects of the production well. This information will be incorporated into the revised EIS.

2. *A review of our records indicates that this project does not occur on historic properties that are listed on the Hawaii Register and/or the National Register of Historic Places, or that have been determined eligible for inclusion on the National Register of Historic Places. However, this does not confirm the absence of historical, cultural, architectural and/or archaeological resources on the property.*

If this project proceeds and any unanticipated sites or remains such as artifacts, shell, bone or charcoal deposits; human burials; rock or coral alignments, pavings, or walls are encountered, the Board of Water Supply should stop work and contact this office (548-7460) immediately.

Should any historical, cultural, or archaeological remains be encountered, we will stop work and will contact your office immediately.

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: Calvin Kim & Associates

80-3302

GEORGE R. ARIYOSHI
GOVERNOR

JOHN FARIAS JR
CHAIRMAN, BOARD OF AGRICULTURE

YUKIO KITAGAWA
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF AGRICULTURE
1428 SO. KING STREET
HONOLULU, HAWAII 96814

RECEIVED
BD OF WATER SUPPLY
Nov 17 3 36 PM '80
A.C.

November 19, 1980

MEMORANDUM

To: Mayor Frank F. Fasi, City & County of Honolulu

Subject: EIS for the Kahaluu Well
Kahaluu, Koolaupoko, Oahu

The Department of Agriculture has reviewed the subject report and offers the following comments.

We believe that the effects of the well in relation to potential groundwater drawdown and decreased streamflow are not adequately addressed. On page 32 appears the statement, "Some groundwater drawdown is expected during pumping, which may result in a decrease in surface streamflow." The EIS contains a list of persons who responded to a survey of streamwater users, but does not discuss the potential impacts of reduced streamflow on these agricultural users, or the alternatives or mitigating measures which might be taken if the minimum flow for Kahaluu Stream is not maintained. It seems reasonable that the test results of the exploratory well should be known before decisions are made on a permanent well.

Thank you for the opportunity to comment.

John Farias, Jr.
Chairman, Board of Agriculture

cc: Board of Water Supply
Department of Land and Natural Resources
Department of Health

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

December 15, 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 Kahaluu Well, Koolaupoko, Oahu

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

In response to your comments, we offer the following:

1. "We believe that the effects of the well in relation to potential groundwater drawdown and decreased streamflow are not adequately addressed. On page 32 appears the statement, 'Some groundwater drawdown is expected during pumping, which may result in a decrease in surface streamflow.'"

   The discussion on the potential impacts on drawdown and streamflow is adequate from the information available at the time the EIS was written. Since then, our exploratory well has been drilled. Results from the recently completed pumpage tests showed a drawdown of 15 feet at a pumpage rate of 1000 gpm with no discernible effects to streamflow. However, we will continue to monitor the streamflows to determine, if any, the long-term effects of our well project. From this information, we do not anticipate any adverse effects to streamflow and aquatic biota. This information will be incorporated into the revised EIS.

2. "The EIS contains a list of persons who responded to a survey of streamwater users, but does not discuss the potential impacts of reduced streamflow on these agricultural users, or the alternatives or mitigating measures which might be taken if the minimum flow for Kahaluu Stream is not maintained."

   Results from our recent pump testing of the exploratory well show no discernible effects to streamflow. Furthermore, we have been in contact with farmers throughout the drilling and testing phase of the

3. "It seems reasonable that the test results of the exploratory well should be known before decisions are made on a permanent well."

We agree and this is the procedure we essentially follow in all of our production well projects. However, in order to expedite the projects, we have started the preparation of the EIS's before we complete the exploratory drilling of the well and will complete the EIS after the results are known.

Since the exploratory well has already been drilled and tested, we submit the following information:

(1) Drawdown was 15 feet at a pumpage rate of 1000 gpm, and

(2) No discernible effects to streamflow was found during the pumpage tests.

We hope we have satisfactorily addressed your concerns. 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: Calvin Kim & Associates

80-2971

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

FRANK F. FASI
MAYOR

WALLACE MIYAHIRA
DIRECTOR AND CHIEF ENGINEER

RECEIVED
BD OF WATER SUPPLY
Oct 7 4 05 PM '80

ENV 80-294

October 2, 1980

MEMORANDUM

TO : HONORABLE FRANK F. FASI, MAYOR
CITY AND COUNTY OF HONOLULU

FROM : WALLACE MIYAHIRA, DIRECTOR AND CHIEF ENGINEER

SUBJECT: EIS FOR THE KAHALUU WELLS, KOOLAUPOKO, OAHU

We have reviewed the subject EIS and have the following comments:

a. The proposed project will have no adverse effect on our public works facilities.

b. The effect of the proposed well on cesspools is discussed on pages 30 and 31. More important is the potential of contaminations of the groundwater near the project site from cesspools in the upper valley. A clarification in the Revised EIS would be desirable.

WALLACE MIYAHIRA
Director and Chief Engineer

cc: Board of Water Supply

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

COPY

FRANK F. FASI, Mayor
YOSHIE H. FUJIWARA, Chairman
DAT QUON PANG, Vice Chairman
RYOKICHI HIGASHIOKA
Donna H. Howard
WALLACE S. MIYAHIRA
ROBERT A. SOUZA
CLAUDE T. YAMAMOTO

KAZU HAYASHIDA
Manager and Chief Engineer

October 29, 1980

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

FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY

SUBJECT: YOUR LETTER OF OCTOBER 2, 1980, ON THE ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR KAHALUU WELLS, KOOLAUPOKO, OAHU

Thank you for commenting on the EIS for our proposed well project.

We will indicate in the revised EIS that dikes will prevent the well from being contaminated by the cesspools in the upper valley.

We are working closely with the State's Department of Health to prevent the construction of cesspools in areas that could adversely affect potable groundwater resources.

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

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Calvin Kim & Associates

80-3019

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

FRANK F. FASI
MAYOR

RECEIVED
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OCT 10 3 54 PM '80
RAMON DURAN
DIRECTOR

October 8, 1980

MEMORANDUM

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

FROM : RAMON DURAN, DIRECTOR

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT (EIS)
FOR KAHALUU WELL

We have no comments on the EIS for the proposed upgrading of the Kahaluu Well.

Thank you for the opportunity to review the EIS.

Warm regards.

RAMON DURAN, Director

RD:lm

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

October 16, 1980

TO : MR. RAMON DURAN
DIRECTOR
DEPARTMENT OF PARKS AND RECREATION

FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY

SUBJECT: YOUR MEMORANDUM OF OCTOBER 8, 1980, ON THE ENVIRONMENTAL IMPACT STATEMENT FOR KAHALUU WELLS, KOOLAUPOKO, OAHU, HAWAII

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

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

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Calvin Kim & Associates

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

80-3120

RECEIVED
BD OF WATER SUPPLY
Oct 23 10 41 AM '80

FRANK F. FASI
MAYOR

GEORGE S. MORIGUCHI
CHIEF PLANNING OFFICER

DGP10/80-2907(GT/LP)

October 22, 1980

MEMORANDUM

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

FROM : GEORGE S. MORIGUCHI, CHIEF PLANNING OFFICER

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT FOR KAHALUU WELL, SEPTEMBER 23, 1980

We have the following comments.

Windward Population Growth

It is indicated that

> "A study conducted on April, 1970 showed the resident population to be 99,284, indicating an average annual growth rate of 5.3 percent over the preceding ten years" (p. 6, emphasis added).

This growth rate should be recalculated. The compound rate appears to be more like 4.2 percent.

Long Term Impacts

In this section (pp. 30-31), concern is expressed for aquatic life in Kahaluu Stream, pump noise, lowering of the water table and the resulting impact on cesspools, and possible damage to the proposed facilities from flash flooding or flood waters.

The critical potential impact--on downstream users--is not discussed in this section. Downstream users are critical because of potential lawsuits if pumping here adversely affects stream flow.

It should be clarified that the testing has not yet been completed and that existing and potential stream users will be notified by the Board of Water Supply when testing starts, so that they may see for themselves whether downstream flows are adversely affected.

GEORGE S. MORIGUCHI
Chief Planning Officer

GSM:fmt

cc: ✓BWS, Attention: Larry Whang
OEQC

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

November 3, 1980

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

FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY

SUBJECT: YOUR MEMORANDUM OF OCTOBER 22, 1980, ON THE ENVIRONMENTAL IMPACT STATEMENT FOR KAHALUU WELL, KOOLAUPOKO, OAHU

Thank you for your comments on the environmental impact statement for our proposed well project.

We will revise the environmental impact statement to indicate an annual growth rate of 4.2 per cent.

Also, we are in contact with downstream users of the stream, and we are keeping them apprised of our stream monitoring activities and pump testing schedule.

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

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Calvin Kim & Associates

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

80-Dir.-3128

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Oct 24 3 26 PH '80

AKIRA FUJITA
DIRECTOR

TE10/80-2814

October 23, 1980

MEMORANDUM

TO : HONORABLE FRANK F. FASI, MAYOR

VIA : EDWARD Y. HIRATA, MANAGING DIRECTOR

FROM : AKIRA FUJITA, DIRECTOR

SUBJECT: EIS FOR KAHALUU WELL

We have no comments on the EIS for the Kahaluu Well Project.

AKIRA FUJITA
Director

cc: Board of Water Supply

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

November 3, 1980

TO : MR. AKIRA FUJITA, DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY

SUBJECT: YOUR LETTER OF OCTOBER 23, 1980, ON THE ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR KAHALUU WELL, KOOLAUPOKO, 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
Manager and Chief Engineer

cc: Calvin Kim & Associates

80-3132

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4191

RECEIVED
BD OF WATER SUPPLY
Oct 27 10 37 AM '80

FRANK F. FASI
MAYOR

EDWARD Y. HIRATA
HOUSING DIRECTOR

BARRY CHUNG
DIRECTOR

MYRA M. TARASARI
DEPUTY DIRECTOR

A.M. K.K.
P/L

October 23, 1980

Mayor Frank P. Fasi
City and County of Honolulu
530 South King Street
Honolulu, Hawaii

Dear Mayor Fasi:

Subject: Kahaluu Well
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,

Barry Chung
Barry Chung

cc: Board of Water Supply
Environmental Quality Commission

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

November 3, 1980

TO : MR. BARRY CHUNG, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY

SUBJECT: YOUR LETTER OF OCTOBER 23, 1980, ON THE ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR KAHALUU WELL, KOOLAUPOKO, 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: Calvin Kim & Associates

80-3197

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

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BD OF WATER SUPPLY
Oct 31 3 56 PM '80

FRANK F. FASI
MAYOR

TYRONE T. KUSAO
DIRECTOR
80/EC-4(SH)

October 30, 1980

A.M. - [illegible]
11/5

MEMORANDUM

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

FROM : TYRONE T. KUSAO, DIRECTOR

SUBJECT : ENVIRONMENTAL IMPACT STATEMENT (EIS)
KAHALUU WELL - KAHALUU, KOOLAUPOKO, OAHU
BOARD OF WATER SUPPLY
TAX MAP KEY: 4-7-08: 2

We find that the EIS document for the above adequately addresses potential impacts. However, we feel Section VII., Historical and Archaeological Sites on Page 25, should be expanded to include references to the August 13, 1979 report of the Bishop Museum. This report indicates that no damage to archaeological or historical remains would occur if the construction activities are confined to the old coral road bed and the area presently under California Grass cover. We have no further comments to offer.

If there are any questions, please contact Sampson Mar of our staff at 523-4077.

TYRONE T. KUSAO
Director of Land Utilization

TTK:sl

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

COPY

FRANK F. FASI, Mayor
[illegible]
[illegible]
[illegible]
[illegible]
ROBERT A SOUZA
CLAUDE T YAMAMOTO

KAZU HAYASHIDA
Manager and Chief Engineer

November 6, 1980

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

FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY

SUBJECT: YOUR MEMORANDUM OF OCTOBER 30, 1980, ON THE ENVIRONMENTAL IMPACT STATEMENT FOR KAHALUU WELL, KOOLAUPOKO, OAHU

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

We will revise Section VII, Historical and Archaeological Sites on page 25, to reference the Bishop Museum report appearing in Appendix C of the document.

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

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Calvin Kim & Associates

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

ROBERT R. WAY
DIRECTOR

TE10/79-321

November 9, 1979

Calvin Kim & Associates, Inc.
828 Fort Street Mall, Suite 201
Honolulu, Hawaii 96813

Gentlemen:

Subject: Your Letter Dated October 23, 1979
Regarding Kahaluu Well Environmental Assessment
Koolaupoko, Oahu, Hawaii
TMK: 4-7-08: 2

We find that the traffic concerns connected with the project have been identified and adequately addressed.

Very truly yours,

ROBERT R. WAY
Director

BERNICE P. BISHOP MUSEUM

P.O. Box 6037, Honolulu, Hawaii 96818 • Telephone 847-3511

August 13, 1979

Mr. Calvin Kim
Calvin Kim & Associates, Inc.
Suite 201, 828 Fort Street Mall
Honolulu, Hawai'i 96813

Dear Mr. Kim:

Re: Request for Services / Archaeological/Historical Inspection
for Kahalu'u Wells at Ko'olau Poko, O'ahu, Hawai'i / TMK 7-7-08:2

On August 9, 1979, I was accompanied by Mr. Arnold Goto from your office to conduct a field inspection of the proposed Kahalu'u Exploratory Well Site. At this time it was somewhat difficult to determine the exact boundaries of the area to be impacted by the drilling activities, due to the presence of dense vegetation and to the fact that the area of construction has not yet been surveyed. It appears that the drilling will take place at a site near Kahalu'u Stream which is presently supporting a heavy growth of California grass (*Brachiaria mutica*). Such a stand of this type of vegetation has probably taken hold following relatively recent (20th century) clearing activities or other disturbances which removed the original vegetation cover. No remains of archaeological or historical significance were encountered in this immediate area occupied by the California grass.

However, north of the California grass, and beyond what appears to be the old coral road bed, lies an area where remnants of prehistoric Hawaiian field terraces may exist. We cleared away some of the vegetation in a few spots in this area to expose what appeared to be possible retaining walls for such terraces. This opinion is offered rather cautiously, because further work would be required to clear more vegetation in order to confirm or deny this possibility. We do have the following information from E. S. Craighill Handy (The Hawaiian Planter, Vol. I, 1940, p. 97):

> "There must have been terraces throughout the broad part of the valley for several miles inland. Some of those in the lower portion of the valley are cultivated now; most of them are neglected....The terrace sections of Kahaluu are tucked away in pockets of land watered from several streams; there are few large continuous areas, but the total area under cultivation in ancient times must have been very considerable."

In summary, we can forsee no damage to archaeological or historical remains, assuming the areas of impact are confined to the old coral road bed and to the area presently under California grass cover. However, should construction activities go beyond these areas, we would recommend further archaeological investigation of adjacent areas. An equally appropriate alternative, in this case,

would be to have an archaeologist monitor the initial clearing activities, if the surveyed site does not lie entirely in the boundaries of the grass.

If I can be of further assistance, or if you have any questions, please call me at 847-3511. We appreciate the opportunity to work on this small survey with you and would be happy to offer our services in the future.

Yours sincerely,

Rose Schilt

Rose Schilt
Archaeologist

RS:gmc

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

October 21, 1980

Mr. & Mrs. Albert L. Lum
47-202 Ahaolelo Road
Kaneohe, Hawaii 96744

Dear Mr. & Mrs. Lum:

Subject: Request for Kahaluu Well Environmental Impact Statement (EIS)

A copy of the Kahaluu Well EIS is enclosed for your review. Please return your comments on the environmental assessment to us by November 7, 1980.

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

Encl.

I have no comments
Mr. & Mrs. Albert L. Lum
NOV 17 1980

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

November 19, 1980

Mr. & Mrs. Albert L. Lum
47-202 Ahaolelo Road
Kaneohe, Hawaii 96744

Dear Mr. & Mrs. Lum:

Subject: Environmental Impact Statement (EIS) for Kahaluu Well, Koolaupoko, 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: ✓Calvin Kim & Associates

80-3276

KAHALUU NEIGHBORHOOD BOARD NO. 29
c/o KAHALUU COMMUNITY CENTER
47 233 WAIHEE ROAD
KANEOHE HAWAII 96744
AREA INCLUDES KAHALUU WAIHE'E WAIAHOLE WAIKANE HAKIPUU AND KUALOA

"Let us not ever have an unhappy minority"

RECEIVED
BD OF WATER SUPPLY
Nov 10 10 40 AM '80

Hqr. P.H.
Adm. - J. Sc
P/E

November 7, 1980

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

Dear Mr. Hayashida:

The document circulated by your office under the title E.I.S. Kahaluu Well does not present an adequate assessment of the environmental impact of a permanent production well operating at the head of Kahalu'u Stream.

The purpose of the formal EIS is to provide information regarding the proposed action, not merely reporting, as in the document circulated, that "the BWS will conduct extensive testing of the exploratory well." The data that could be realized from such extensive testing, if conducted, would serve to provide some backup to the disturbing phrase:

> "Some groundwater drawdown is expected during pumping, which may result in a decrease in surface streamflow."

If production is permanent, drawdown would be permanent; streamflow perhaps decreased permanently. However, the effects of the BWS well project to stream flow are not verified until the exploratory well is tested, and are certainly not present here.

In order for possible reduced stream flow to be measured and compared with existing stream flows, the gauging station should be considered for re-opening. As the Kahalu'u Board is continually stressing the need to protect existing agricultural users, gauging should be considered for the areas downstream in agriculture, such as the high rated ALISH sections.

The Kahalu'u Neighborhood Board No. 29 has requested the DLNR start monitoring in-stream flows of all Windward side streams specifically those in Koolaupoko and Koolauloa.

Running throughout the document is the theme of explicit misrepresentation that the Well is necessary for Windward District use by the year 2000. The figures provided of 43.18 mgd proposed windward production (excluding any production of Waihee Wells 1--strangely not available for 1979) would allow

transport outside of the Windward District of 21.18 mgd. The appeal to insular interests is not only inaccurate, it is unseemly and further points to inadequacies in the document.

Permanent production, if the stream surface flow is altered or reduced, would result in a rupture of the stream ecology. Probably either California grass could take over and choke out less hardy fauna or an increase in erosion could be expected with a less stable system. An increase in siltation of the flood lagoon (not shown on any maps) might be of economic consideration since the City is obligated to SCS to maintain the project. Again, information from exploratory well experiment not provided.

The Kahalu'u area is presently cesspooled. Would toxicity of the stream be increased due to drawdown or due to reduced stream volume? The aesthetics of a free flowing stream are appreciated; bould the nature of the stream be changed?

Very truly yours,

Elwin L. Spray, Chairman
Kahalu'u Neighborhood Board No. 29

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

December 18, 1980

Mr. Elwin L. Spray, Chairman
Kahaluu Neighborhood Board No. 29
c/o Kahaluu Community Center
47-232 Waihee Road
Kaneohe, Hawaii 96744

Dear Mr. Spray:

Subject: Your Letter of November 7, 1980, on the Environmental Impact Statement (EIS) for Kahaluu Well, Koolaupoko, Oahu

Thank you for reviewing and commenting on the environmental document for our proposed well. Your letter will be appended to the revised environmental impact statement.

In response to your comments we offer the following:

1. *The purpose of the formal EIS is to provide information regarding the proposed action, not merely reporting, as in the document circulated, that "the BWS will conduct extensive testing of the exploratory well." The data that could be realized from such extensive testing, if conducted, would serve to provide some backup to the disturbing phrase:*

   "Some groundwater drawdown is expected during pumping, which may result in a decrease in surface streamflow."

   If production is permanent, drawdown would be permanent; streamflow perhaps decreased permanently. However, the effects of the BWS well project to stream flow are not verified until the exploratory well is tested, and are certainly not present here.

The following information will be incorporated into the final EIS:

a. The monitoring of streamflow before, during, and after the pumping tests showed no discernible effects to streamflow.

b. The well showed a drawdown of fifteen (15) feet at a pumpage rate of 1000 gallons per minute. This low drawdown would indicate that there would not be significant effects on the groundwater table downstream of the well.

c. Although the exploratory well tests show no reduction to streamflow, we will continue to monitor streamflows to determine the long term effects of the proposed production wells.

2. *In order for possible reduced stream flow to be measured and compared with existing stream flows, the gauging station should be considered for re-opening. As the Kahalu'u Board is continually stressing the need to protect existing agricultural users, gauging should be considered for the areas downstream in agriculture, such as the high rated ALISH sections.*

   We are coordinating with the U. S. Geological Survey (USGS) on permanently activating the gaging station near the well site.

   Installing permanent gaging stations downstream was considered unfeasible by USGS since they would be susceptible to severe flood damage.

3. *The Kahalu'u Neighborhood Board No. 29 has requested the DLNR start monitoring in-stream flows of all Windward side streams specifically those in Koolaupoko and Koolauloa.*

   We concur with your request to DLNR as it will provide more information in assessing any action affecting streamflows including water development projects and agricultural uses.

4. *Running throughout the document is the theme of explicit misrepresentation that the Well is necessary for Windward District use by the year 2000. The figures provided of 43.18 mgd proposed Windward production (excluding any production of Waihee Wells I--strangely not available for 1979) would allow transport outside of the Windward District of 21.18 mgd. The appeal to insular interests is not only inaccurate, it is unseemly and further points to inadequacies in the document.*

The document presents the latest information that is available.

The production figures for proposed new sources are provided for information and are the quantities we hope to be developed. These anticipated amounts can only be verified during the well pump test for each new source.

On page 4 of the EIS it is stated "that the Kahaluu Well be developed in order to meet the ever increasing water demand for the Windward and Honolulu Water Districts." Water developed in the Windward District will be used to meet the district's water demand first and any excess will be conveyed to the Honolulu District.

For calendar year 1979, Waihee Wells were pumped from August to December at an average rate of 0.160 mgd.

5. *Permanent production, if the stream surface flow is altered or reduced, would result in a rupture of the stream ecology. Probably either California grass could take over and choke out less hardy fauna or an increase in erosion could be expected with a less stable system. An increase in siltation of the flood lagoon (not shown on any maps) might be of economic consideration since the City is obligated to SCS to maintain the project. Again, information from exploratory well experiment not provided.*

We agree that any changes in streamflow would affect stream ecology, but not "rupture" it. The pump test that was performed on the exploratory well indicated very little effects on streamflow. Your concern on erosion and siltation is understandable. To clarify your statement, erosion is a function of flow balanced against the bedload of the stream. Less flow would reduce erosion and siltation; not increase it. Also, vegetation in the stream would decrease the potential for erosion..

As mentioned previously, information from the exploratory well test will be included in the revised EIS.

6. *The Kahalu'u area is presently cesspooled. Would toxicity of the stream be increased due to drawdown or due to reduced stream volume? The aesthetics of a free flowing stream are appreciated; would the nature of the stream be changed?*

Toxicity or nature of the stream would not change, since the pump test of the exploratory well showed no discernible effects to streamflow.

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: Calvin Kim & Associates

50-3501

920 19th Avenue
Honolulu, Hawaii 96816

RECEIVED
BD. OF WATER SUPPLY
DEC 4 10 13 AM '80

December 2, 1980

A.M - KHK
P/E

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

Dear Sir:

My tenant, Mr. Pedro Bautista, pumps water from Kahluu Stream to irrigate our two acre lot (being Tax Key: 4-7-28-1 31) on which he grows taro, papaia, and vegetables. He has been doing this for several years now.

Will you please include this information in Table I (Streamwater Usage), Kahaluu Well EIS. Thank You.

Yours sincerely,

Raymond Y. Nikaido

Raymond Y. Nikaido

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

December 11, 1980

Mr. Raymond Y. Nikaido
920 19th Avenue
Honolulu, Hawaii 96816

Dear Mr. Nikaido:

Subject: Your Letter of December 2, 1980, on the Environmental Impact Statement for Kahaluu Wells, Koolaupoko, Oahu

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

We will include your tenant, Mr. Pedro Bautista, in Table I, Streamwater Usage.

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: Calvin Kim & Associates

LIFE OF THE LAND — A GROUP FOR ENVIRONMENTAL RESEARCH AND ACTION

December 3, 1980

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

Dear Mr. Hayashida,

Life of the Land would like to submit the following comments on the EIS for the Kahaluu Well.

1) There is a discrepancy between page 2 and page 25 as to whether the access road is currently paved or not. If it is not currently paved then the effects of runoff caused by paving of this road in a high rainfall area should be addressed.

2) On page 4 you state an urgent need for water development to meet windward water needs. How do you reconcile this statement with the finding of the State Water Commission that if maximum conservation presently achievable were practiced little if any additional water development would be necessary for Oahu till the year 2000. We do not feel that the alternative of conservation water to meet our increasing needs is adequately examined in this EIS.

3) On page 8 you state, "Board of Water Supply studies show showed a high probability for water recovery from untapped groundwater flow in the area below the tunnel." What is the effect of this on recharge to streams and basal aquifers? Might this not in the long range endanger necessary recharge to the basal aquifer?

4) On page 15 we question the validity of a postcard survey. You indicate 17 users were identified by your survey is this an accurate count of users or merely the number of respondents. An accurate count of users is vital to setting a minimum stream flow. As found in the appendix Mr. Kim is a user but was not identified by your survey.

5) Why was stream monitoring stopped in 1970?

6) More information is needed on the type of erosion contols to be implemented as mentioned on page 28.

7) Page 30 addresses a pumpage rate of 05 mgd a day, what if even this rate effects the minimum stream flow. The action required if this is the case is not discussed and should be. Maintaining an adequate flow in the stream is essential to the livelyhood of the resident farmers of the area and the protection of the stream ecosystem.

In conclusion we do not feel that this EIS adequately addresses the potential impacts of pumpage of this well on the stream or possible alternatives to the pumping of this well.

Sincerely,

Dorothy D. Letts
Executive Director

cc:Clavin Kim and Associates, Inc.
Office of Environmental Quality
Office of the Mayor

June 16, 1981

Ms. Dorothy D. Letts
Executive Director
Life of the Land
404 Piikoi Street, Room 209
Honolulu, Hawaii 96814

Dear Ms. Letts:

Subject: Your Letter of December 3, 1980 on the Environmental Impact Statement (EIS) for Kahaluu Well, Koolaupoko, Oahu

We have the following reply to your comments:

1) *There is a discrepancy between page 2 and page 25 as to whether the access road is currently paved or not. If it is not currently paved then the effects of runoff caused by paving of this road in a high rainfall area should be addressed.*

The existing access road is unpaved. Proposed site improvements include paving of the access road up to the well site. All grading and drainage plans are being coordinated with the City's Department of Public Works to assure compliance with all local code requirements.

2) *On page 1 you state an urgent need for water development to meet windward water needs. How do you reconcile this statement with the finding of the State Water Commission that if maximum conservation presently achievable were practiced little if any additional water development would be necessary for Oahu till the year 2000. We do not feel that the alternative of conservation water to meet our increasing needs is adequately examined in this EIS.*

We are continually encouraging people to conserve water and are looking for new ways of achieving this goal. So far, we were instrumental in requiring the mandatory installation of water conservation fixtures in all new construction.

The information in the State Water Commission Report should not be taken out of context. The statement that very little water needs to be developed to the year 2000 is based on the assumption that per capita consumption be reduced by 25 percent below 1975 levels. This would reduce per capita consumption to 150 gallons per person per day which is a very unrealistic figure. Such a low figure is achievable only in areas that are predominantly residential with moderate commercial establishments and does not provide for industrial or agricultural uses.

3) *On page 8 you state, "Board of Water Supply studies show a high probability for water recovery from untapped groundwater flow in the area below the tunnel." What is the effect of this on recharge to streams and basal aquifers? Might this not in the long range endanger necessary recharge to the basal aquifer?*

Our test pumping of the exploratory well showed minimal effects to streamflow. However, we will periodically monitor streamflow and are pursuing activating a stream gaging station with the U. S. Geological Survey. If the stream gaging station and the periodic monitoring of the downstream reaches of Kahaluu Stream show any significant effects to streamflow, pumpage will be reduced and reevaluated.

4) *On page 15 we question the validity of a postcard survey. You indicate 12 users were identified by your survey is this an accurate count of users or merely the number of respondents. An accurate count of users is vital to setting a minimum stream flow. As found in the appendix Mr. Xin is a user but was not identified by your survey.*

The 17 users was a fairly accurate count. Besides the postcard survey, meetings were held with farmers in the area and the EIS was circulated to all the known streamflow users and community organizations. We have added two users to our list including Mr. Gano.

5) *Why was stream monitoring stopped in 1970?*

The decision to stop stream monitoring lies with the U. S. Geological Survey (USGS). According to the USGS, monitoring was stopped due to financial considerations.

6) *More information is needed on the type of erosion controls to be implemented as mentioned on page 28.*

Erosion control will include revegetation of denuded areas and lining of swales with ground cover (pothos aureas).

7) *Page 30 addresses a pumpage rate of 0.5 mgd a day, what if even this rate affects the minimum stream flow. The action required if this is the case is not discussed and should be. Maintaining an adequate flow in the stream is essential to the livelihood of the resident farmers of the area and the protection of the stream ecosystem.*

The exploratory well was pumped at a rate of 1.5 mgd during the five-day sustained pumping test. Streamflow monitoring data showed no significant impacts to the stream. To assure that an adequate flow remains in the stream to support the existing stream water users and the stream ecosystems, we will periodically monitor the streamflow when the well becomes operational.

In conclusion we do not feel that this EIS adequately addresses the potential impacts of pumpage of this well on the stream or possible alternatives to the pumping of this well.

The test pumping of the well indicated minimal effects to streamflow. The streamflow data is being included in the EIS.

Other alternatives to the project such as desalting, water exchange and conservation will be addressed in the EIS.

If you have any questions, please contact Lawrence Whang at 546-5221.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

Kawehi Ryder
47-016 Laenani Drive
Kaneohe, HI 96744
December 5, 1980

RECEIVED
BD OF WATER SUPPLY
Dec 8 3 31 PM '80

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

Dear Mr. Hayashida:

I have reviewed the Environmental Impact Statement for the Kahaluu Well located at Kahaluu, Koolaupoko, Oahu, Hawaii, Tax Map Key 4-8-08:2, dated September 23, 1980, and submit the following comments regarding the inadequacy of this EIS to meet the requirements of § 1:42 of the Regulations of the Environmental Quality Commission.

The EIS identifies 17 landowners and users within the Kahaluu watershed, including my family, who are dependent upon stream water for irrigation of taro, watercress, ong choy, bananas, sweet potatoes, papaya, cucumber, pineapple, flowers, and ornamental, horticultural and aquarium plants. These growers are cultivating or propose to cultivate more than 34 acres of agricultural lands. See EIS Table 1 at pp. 17-18. In addition, the Kahaluu watershed includes agricultural lands of importance to the State which are classified as prime, unique and other important agricultural land. In spite of these substantial agricultural stream water uses, the only remarks in the EIS directed to the effects on these agricultural water users are that "Some groundwater drawdown is anticipated during pumping, which may result in a possible decrease in surface stream flow." See EIS at p.1 and p. 32. Absolutely nothing in this EIS discusses the water requirements of the existing agricultural users and the adequacy of the existing stream flow to meet their needs in light of the existing BWS tunnel at Kahaluu which already takes 2 million gallons of water per day from the Kahaluu watershed. See EIS at p.9.

In Appendix C to the EIS letters are included from Douglas Meller of Life of the Land, Robert T. Chuck, Manager-Chief Engineer, Division of Water and Land Development of the Department of Land and Natural Resources, Kisuk Cheung, Chief, Engineering Division of the Army Corps of Engineers, and Jonathan Gans, a property owner and user of the Kahaluu Stream. Each of these persons asked that the EIS include detailed information and data obtained from test pumping of the exploratory well, a quantification of reduced stream flow and a comparison with existing stream flows. The BWS gave a

uniform response to each of these letters stating that pumping test data and any affects to streamflow would be included in the EIS. However, in spite of these assurances, no data or quantification whatsoever as to the long-term effects on stream flow are included in the EIS. Without such information, the EIS fails to meet the requirements of Section 1:42 of the EQC regulations. If the pumping of this well reduces stream flow, then Section 1:42d. requires an analysis of conflicts with agricultural preservation, economic, and land use policies, reconciliation with such policies, and a statement of reasons for proceeding if there is a conflict.

Furthermore, stream dewatering will have primary and secondary environmental impacts on stream flora and fauna, loss of agriculture uses, and cumulative effects when combined with existing stream dewatering at Kahaluu and in adjacent areas including Haiku, Waihe'e, and other windward streams. These must be addressed as required by Section 1:42e. Also, to the extent that increased water availability stimulates growth in windward Oahu, Section 1:42e requires an evaluation of the impact upon the resource base including land use, water, and public services.

Section 1:42f requires a discussion of adverse consequences to goals set out in Chapters 342 and 344 of the Hawaii Revised Statutes. The EIS contains no discussion of conflicts with Chapter 344 policies of limiting population growth, and promoting, fostering, and preserving agriculture. Furthermore, if stream dewatering conficts with these goals, a rationale for proceeding with the project must be clearly set forth.

Section 1:42g requires a discussion of alternatives. The only alternatives discussed are the development of surface water or no action. However, the EIS completely fails to discuss the availability of other sources for groundwater development. The stated goal of this project is to meet projected water needs for the year 2000 when windward water consumption is expected to reach 22 million gallons of water per day. This is an increase of 4.4 million gallons per day over present windward water production. Yet at p.5 of the EIS 23 different well projects are listed with an estimated capacity to produce over 25 million gallons per day, more than double the present water usage! Development of either of the two largest of these sources would supply more water than needed by the year 2000, yet no discussion whatsoever is included as to the feasibility of developing these alternate sources. Without any analysis, it is impossible for the BWS to determine if there are any more

suitable alternatives to further dewatering Kahaluu Stream.

Section 1:42k requires a discussion of the extent to which further stream dewatering at Kahaluu will foreclose the range of beneficial uses of the environment for agriculture, fishing, and recreational and esthetic uses. Further, if stream flow is reduced, the stream bed may become clogged with vegetation and increase the risk of serious flooding. Without reliable data as to the effects on stream flow, this factor cannot be properly evaluated.

In conclusion, this EIS is totally inadequate to assess the probable significant environmental effects of this water project. It also fails to meet several of the legal requirements of the EQC Regulations and, therefore, is unacceptable.

Sincerely,

Kawehi Ryder

Kawehi Ryder

cc: Mayor Frank Fasi, Accepting Authority

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

January 7, 1981

Mr. Kawehi Ryder
47-016 Laenani Drive
Kaneohe, Hawaii 96744

Dear Mr. Ryder:

Subject: Your Letter of December 5, 1980, on the Environmental Impact Statement (EIS) for Kahaluu Well, Koolaupoko, Oahu

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

In response to your comments, we offer the following:

1. We share your concern on the adequacy of water available for agriculture. We will monitor the streamflow so farmers, who rely on the stream, can continue to use the water for farming.

2. The stream discharge data and water level record collected before, during, and after the pumpage tests are attached for your information and will be included in the revised EIS. The data shows pumpage from the exploratory well had a negligible effect on streamflow.

3. The project does not conflict with agricultural preservation, economic, and land-use policies. Governmental use in Conservation District zoned lands is a permitted use. There will be no removal of existing agricultural zoned lands. And, from the attached data, we do not anticipate any impact to stream water users, since the pumpage tests indicate negligible effects to streamflow.

4. The results of the data collected during the test pumping of the exploratory well indicate that our well will not impact on the stream. However, we will continue to monitor streamflow to determine any long-term effects from the production well.

5. Water development projects are designed to meet projected growth. Population growth projections are provided by the State Department of Planning and Economic Development and the population distribution is provided by the City's Department of General Planning.

6. The project does not conflict with Chapters 342 and 344 of the Hawaii Revised Statutes.

7. The project can also be used for agriculture, should farmers desire water from our system, and qualify for our special agriculture water rates.

8. A discussion on other alternatives will be included in the revised EIS. Alternatives to be included are water conservation, desalting, water exchange, and recycling.

9. The wells listed on Page 5 are not alternative sources. All the well projects will have to be developed to meet water requirements to the year 2000 and possibly further into the future. Sources close to Kaneohe are being developed first to avoid installing lengthy transmission facilities. This is the basis for developing Kahaluu and Haiku wells at this time.

10. Flooding is always a concern. Even without the project, the lower reaches of Kahaluu Stream (below Laumiki Place) are within Zone A of the Flood Insurance Rate Map. Areas within Zone A are in areas susceptible to 100-year floods.

Should you have questions or require additional information, please call Lawrence Whang at 546-5221.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer.

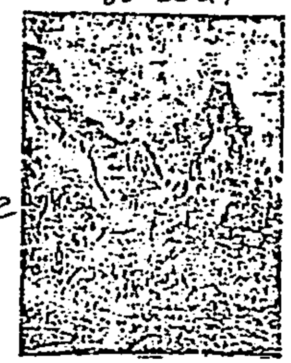
Attach
cc: Chin Kim & Associates

80-3524

The Sierra Club, hawaii Chapter
Post Office Box 22897, honolulu, hi 96822
Telephone: (808) 946-8494

RECEIVED
BD OF WATER SUPPLY
DEC 8 6 45 AM '80

Mgr
Adm.



Nuuanu Pali, by Fisquet, 1837

7 December 1980

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

Re: Draft Environmental Impact Statement for Kahalu'u Well
(TMK 4-7-08:2)

Dear Mr. Hayashida:

The Honolulu Group of the Sierra Club, Hawai'i Chapter, appreciates the opportunity to comment on the draft Environmental Impact Statement (dEIS) for the Kahalu'u Well.

One of the Group's primary concerns with any water well drilling project is the potential effect on perennial streams in the vicinity of the well. The dEIS does take note of the fact that there may be a possible decrease in surface stream flow, specifically in Kahalu'u Stream. However, we must take exception to the fact that although the dEIS is for a proposal to turn an exploratory well into a production well, the exploratory well itself has only recently been drilled and was tested after the original deadline for comments on the dEIS. (These statements are based on page 9 of the dEIS and on recent newspaper reports.) It would seem that the purpose of an exploratory well should be to provide information not only to the Board as to the presence of a sufficient supply of water but also to answer public questions as to the effect of pumping on the stream flow. The results of such tests should be included in the dEIS.

Anotheraspect of the dEIS which concerns us is that the socio-economic impact analysis completely ignores the potential effect of stream flow reduction on users of the stream. Information elsewhere in the dEIS indicates that a reduction would affect the livelihood of some users, not just their convenience. If diversified agriculture is truly something the City and County wants, then reliable, adequate water supplies are essential.

Current and proposed development plans and policies for the island of O'ahu, as well as present or potential State Controls on pumpage from the island's major aquifers, obviously require the Board of Water Supply to seek additional water sources. We would argue, however, that this dEIS has a major fault in that the only alternative considered is "No Action". Understandably, this alternative is not favored. However, to quote the dEIS (September 1980) for the Wai'anae Wells: "A very efficient approach to meeting future water demand is to conserve water and avoid unnecessary losses." Conservation of water, both by users and within the distribution system, is a viable and practical source of additional water which is not even mentioned in the dEIS.

Sincerely,

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

December 22, 1980

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

Dear Ms. Miller:

Subject: Your Letter of December 7, 1980, on the Environmental Impact Statement for Kahaluu Well, Koolaupoko, Oahu

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

In response to your comments we offer the following:

1. *One of the Group's primary concerns with any water well drilling project is the potential effect on perennial streams in the vicinity of the well. The dEIS does take note of the fact that there may be a possible decrease in surface stream flow, specifically in Kahaluu Stream. However, we must take exception to the fact that although the dEIS is for a proposal to turn an exploratory well into a production well, the exploratory well itself has only recently been drilled and was tested after the original deadline for comments on the dEIS. (These statements are based on page 9 of the dEIS and on recent newspaper reports.) It would seem that the purpose of an exploratory well should be to provide information not only to the Board as to the presence of a sufficient supply of water but also to answer public questions as to the effect of pumping on the stream flow. The results of such tests should be included in the dEIS.*

   We concur that the exploratory well should provide information for making the decision to proceed or not to proceed with the project. The results of the test pumping will be included in the revised EIS.

2. *Another aspect of the dEIS which concerns us is that the socio-economic impact analysis completely ignores the potential effect of stream flow reduction on users of the stream. Information elsewhere in the*

livelihood of some users, not just their convenience. If diversified agriculture is truly something the City and County wants, then reliable, adequate water supplies are essential.

We are making every effort to assure that our proposed well will not have detrimental effects on users of the stream. Some of our actions are:

(1) We have coordinated the test pumping and stream-flow monitoring with concerned farmers in the area,

(2) We are working with the U. S. Geological Survey on activating an existing gaging station,

(3) We have conducted surveys to determine users of stream water, and

(4) We will continue to monitor streamflow to determine, if any, effects of the production well. USGS will be assisting us on this.

The EIS does not indicate that a reduction in stream-flow would affect the livelihood of some users. On pages 17 and 18, we list 17 users. Of these, four are not presently using stream water but are proposing to use it. However, we will continue to work with the farmers along the stream to maintain the existing streamflow.

We concur that diversified agriculture needs a reliable, adequate water supply.

3. *Current and proposed development plans and policies for the island of Oahu, as well as present or potential State Controls on pumpage from the island's major aquifers, obviously require the Board of Water Supply to seek additional water sources. We would argue, however, that this dEIS has a major fault in that the only alternative considered is "No Action." Understandably, this alternative is not favored. However, to quote the dEIS (September, 1980) for the Waiawa Wells: "A very efficient approach to meeting future water demand is to conserve water and avoid unnecessary losses." Conservation of water, both by*

users and within the distribution system, is a viable and practical source of additional water which is not even mentioned in the dEIS.

We will be including in the discussion of alternatives the subject of 1) water conservation, 2) water exchange, and 3) desalting.

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

Very truly yours,

For KAZU HAYASHIDA
Manager and Chief Engineer

cc: Calvin Kim & Associates

80-3621

December 08, 1980

Mgr. DS
A.M. HC
F/E

RECEIVED
BD OF WATER SUPPLY
DEC 15 10 35 AM '80

Kazu Hayashida
Manager and Chief Engineer
Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96843

Re: Kahaluu Well E I S mailed on 10/21/80

Dear Mr. Hayashida;

On at least two different occasions, the last of which was earlier today, I spoke with your assistant, Mr. Lawrence Whang. This letter is now being written in protest to the proposed Kahaluu Well.

The Kaelua Stream runs through the north end of my property. Because this section (through which the stream flows) is lower than the rest of my 7.031 acres, the over-flowing of the stream has made it a fertile area which had nurished fine, large bananas. I bought the property in January of this year primarily because of its farming potential.

Soon after the purchase, the Board of Water Supply informed me of the possibility that the Kahaluu Well would be built. At that time further land was being cleared for the further planting of banana. Upon receipt of your notice all work stopped. Now the heavy brush has covered all the lower acreage.

After speaking with several property owners in this area, I am now aware that I should not have stopped the clearing and planting. As soon as I am able, the further planting of bananas will again start. At that time and thereafter, I will utilize all the necessary water flowing in the stream.

Unless the Board of Water Supply is willing and able to secure for me a legal guarantee that the proposed Kahaluu Well will not now or in the future deny my land the necessary water needed to cultivate my bananas, then my protest of this date will stand.

Sincerely,

R.C. Winslow
47-653 Ahuimanu Road
Kaneohe, Hawaii 96744
Telephone: 235-9432

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

December 30, 1980

Mrs. R. C. Winslow
47-653 Ahuimanu Road
Kaneohe, Hawaii 96744

Dear Mrs. Winslow:

Subject: Your Letter of December 8, 1980, on the Environmental Impact Statement for Kahaluu Well, Koolaupoko, Oahu

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

Our test pumping of the exploratory well showed that our well project will not affect streamflow. This was verified by measurements taken before and after the pump tests with the help of the U. S. Geological Survey. However, we will continue to monitor the streamflow to determine any long-term effects from our proposed production well.

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

Very truly yours,

For KAZU HAYASHIDA
Manager and Chief Engineer

cc: Calvin Kim & Associates

APPENDIX D

COMMENTS AND RESPONSES TO

REVISED DRAFT ENVIRONMENTAL IMPACT

STATEMENT

P 1428/81

HEADQUARTERS
NAVAL BASE PEARL HARBOR
BOX 110
PEARL HARBOR, HAWAII 96860

IN REPLY REFER TO:

002A:jw
Ser 1589
24 AUG 1981

The Honorable Eileen R. Anderson
Mayor of the City and County of Honolulu
Honolulu, Hawaii 96813

Dear Mayor Anderson:

Environmental Impact Statement
Kahaluu Well

The Environmental Impact Statement for the proposed Kahaluu Well, forwarded by the Environmental Quality Commission, has been reviewed and the Navy has no comments to offer. By copy of this letter, per the Commission's request, the subject EIS is being returned.

The opportunity to review the subject EIS is appreciated.

Sincerely,

R. L. ELSBERND
Lieutenant Commander, CEC, USN
Deputy Facilities Engineer
By direction of the Commander

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

State EQC (w/ EIS)

September 17, 1981

Lieutenant Commander R. L. Elsbernd
Deputy Facilities Engineer
Headquarters, Naval Base Pearl Harbor
Box 110
Pearl Harbor, Hawaii 96860

Dear Lieutenant Commander Elsbernd:

Subject: Your Letter of August 24, 1981,
on the Revised Draft Environmental
Impact Statement for Kahaluu Well

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

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

Very truly yours,

for KAZU HAYASHIDA
Manager and Chief Engineer

MHS:am
cc: K. Hayashida
L. Whang
P-1428

81-2294

81-1164

(dpl)

RECEIVED
BD OF WATER SUPPLY
AUG 25 3 23 PM '81

A/M MHR
P/E

Mayor Eileen Anderson
City and County of Honolulu
530 King Street
Honolulu, Hawaii 96813

Dear Mayor Anderson:

The Fourteenth Coast Guard District has reviewed the Environmental Assessment for the Kahaluu Well and has no objection or constructive comments to offer at the present time.

Sincerely,

J. E. SCHWARTZ
Commander, U. S. Coast Guard
District Planning Officer
By direction of
Commander, Fourteenth Coast Guard District

Copy to: Board of Water Supply

September 17, 1981

Commander J. E. Schwartz
District Planning Officer
Fourteenth Coast Guard District
Prince Kalaniana'ole Federal
Building
300 Ala Moana Boulevard
Honolulu, Hawaii 96850

Dear Commander Schwartz:

Subject: Your Letter on the Revised Draft Environmental Impact Statement for Kahaluu Well

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

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

Very truly yours,

For KAZU HAYASHIDA
Manager and Chief Engineer

MHS:am
cc: K. Hayashida
L. Whang
81-2294

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

APEN-E-E

26 AUG 1981

Honorable Eileen Anderson
Mayor of City and County of Honolulu
[illegible] King Street
Honolulu, Hawaii 96813

Dear Mayor Anderson:

Thank you for providing us the opportunity to comment on the Revised Draft Environmental Impact Statement for Kanalua Well, Kahaluu, Koolaupoko, Oahu, Hawaii. However, we have no comments to offer on the proposal to increase the project scope from 0.5 mgd to 1.0 mgd production.

Sincerely,

Original signed by

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

CF:
Board of Water Supply
City and County of Honolulu
[illegible] South Beretania Street
Honolulu, Hawaii 96843

September 17, 1981

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

Dear Colonel Hight:

Subject: Your Letter of August 26, 1981, on the Revised Draft Environmental Impact Statement for Kahaluu Well

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

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

Very truly yours,

For KAZU HAYASHIDA
Manager and Chief Engineer

MHS:am
cc: K. Hayashida
L. Whang
P-1427

United States Department of the Interior

FISH AND WILDLIFE SERVICE
P.O. BOX 50167
HONOLULU, HAWAII 96850

IN REPLY REFER TO:
ES
Room 6307

SEP 2 1981

Mayor Eileen Anderson
City and County of Honolulu
530 South King Street
Honolulu, Hawaii 96813

Re: Revised DEIS-Kahaluu
Well, Oahu, Hawaii

Dear Mayor Anderson:

We have reviewed the referenced draft environmental impact statement. The proposed action will have little, if any, adverse impact on fish and wildife resources; therefore, we have no comments at this time.

We appreciate this opportunity to comment.

Sincerely yours,

Ernest Kosaka
Project Leader
Office of Environmental Services

cc: NMFS
HDF&G
EPA, San Francisco

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

September 14, 1981

Mr. Ernest Kosaka
Office of Environmental Services
Fish and Wildlife Service
U. S. Department of the Interior
P. O. Box 50167
Honolulu, Hawaii 96850

Dear Mr. Kosaka:

Subject: Your Letter of September 2, 1981, on the Revised Draft Environmental Impact Statement (DEIS) for Kahaluu Well

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

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

Very truly yours,

For KAZU HAYASHIDA
Manager and Chief Engineer

MHS:am
cc: K. Hayashida
L. Whang
81-2368

U. S. ARMY ENGINEER DISTRICT, HONOLULU
BUILDING 230
FT SHAFTER, HAWAII 96858

81-2421

AM
P/E

POOED-PV

8 September 1981

Honorable Eileen Anderson
Mayor, City & County of Honolulu
530 South King Street
Honolulu, Hawaii 96813

Dear Mayor Anderson:

Thank you for the opportunity to review the Revised Draft Environmental Impact Statement (EIS) for Kahaluu Well, Oahu, Hawaii, sent to us on 17 August 1981. The US Army Corps of Engineers provided comments on the draft EIS for the project on 14 November 1979 (included in Appendix C of the revised draft EIS). These comments are still valid for the revised draft EIS, and we have no further comments to make. The Corps will be pleased to review the Final EIS when it becomes available.

Sincerely,

RICHARD CHUN
Acting Chief, Engineering Division

CF:
Board of Water Supply
City & County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

Sep 16 11 42 AM '81

September 24, 1981

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

Dear Mr. Chun:

Subject: Your Letter of September 8, 1981, on the Revised Draft Environmental Impact Statement for Kahaluu Well, Oahu, Hawaii

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

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

Very truly yours,

For KAZU HAYASHIDA
Manager and Chief Engineer

MIIS:am
cc: K. Hayashida
L. Whang
81-2421

United States Department of Agriculture | Soil Conservation Service | P. O. Box 50004 Honolulu, Hawaii 96850

September 18, 1981

Mr. Donald A. Bremner
Chairman, Environmental
Quality Commission
550 Halekauwila St., Room 301
Honolulu, HI 96813

Dear Mr. Bremner:

Subject: Revised Draft EIS for Kahaluu Well

We have reviewed the subject draft and have no comments to offer.

Thank you for the opportunity to review.

Sincerely,

ACTING
JACK P. KANALZ
State Conservationist

cc:
Mayor Eileen Anderson, City and County of Honolulu
Board of Water Supply, City and County of Honolulu

SEP 21

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

SCS-AS-1
10-78

September 28, 1981

Mr. Jack P. Kanalz
State Conservationist
Soil Conservation Service
U. S. Department of Agriculture
Box 50004
Honolulu, Hawaii 96050

Dear Mr. Kanalz:

Subject: Your Letter of September 18, 1981, on the Revised Draft Environmental Impact Statement for Kahaluu Well

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

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

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

MHSram
cc: K. Hayashida
L. Whang

P-1543

81-2504

United States Department of the Interior

GEOLOGICAL SURVEY
Water Resources Division
P.O. Box 50166
Honolulu, Hawaii 96850

RECEIVED
BOARD OF WATER SUPPLY
'81 SEP 25 10 24 AM

September 21, 1981

MGR
AM
P/E

Honorable Eileen Anderson, Mayor
City and County of Honolulu
530 South King Street
Honolulu, Hawaii 96813

Dear Mayor Anderson:

Subject: Revised draft environmental impact statement - Kahaluu Well

Enclosed are comments by staff hydrologists of the U.S. Geological Survey concerning the subject environmental impact statement. In general, the EIS is adequately prepared and factual information presented is correct. Our comments deal with interpretations of these facts which may serve to more completely characterize the complexity of the hydrological system in the area concerned.

If there are any questions about the material presented, it should be addressed to Mr. Charles Hunt or Mr. Kiyoshi Takasaki at 546-8331. Thank you for letting us comment on this environmental impact statement.

Sincerely,

Benjamin L. Jones
District Chief

Enclosures

cc: Manager & Chief Engineer
Board of Water Supply

cc/with return of EIS: Environmental Quality Commission

We should consider their comments in regard to streamflow effects. Our statement that the pump tests shows no discernible effects should be clarified DM 9/25/81

Page	Para.	Lines	Remarks
1	3	1-3	"A five-day pumping test of the exploratory well yielded water of excellent quality. Monitoring of Kahaluu Stream before, during and after the pumping test showed there were no discernible effects on streamflow." Comment: Add "of Kahaluu Stream during the five-day pumping test" to end of sentence after "streamflow."
1	4	1-6	The alternatives B through F are broad policies that might be components of a comprehensive water development plan rather than alternatives to development by the Kahaluu well. Items B through F are alternatives to development of water in general not to development of 1.0 mgd by the proposed Kahaluu well.
9	2	5-9	"Test results of the Kahaluu Exploratory Well (See table 1 and Table 2) indicate that the well is capable of a sustained pumping rate of 1.4 mgd with no discernible effects on the streamflow of Kahaluu Stream (See Figure 4 and Table 3)." Comment: The test results might be more precisely summarized as follows: "Test results of the Kahaluu Exploratory Well indicate that the well is capable of being pumped for 5 days at a pumping rate of 1.4 mgd with no discernible effects on the streamflow of Kahaluu Stream at Site 2 (See Figure 4 and Table 3) where there should be no effect since it appears that the stream does not intersect the water table at this site; or at sites 3 through 5 (See Figure 4 and Table 3) which may be too far away to be affected by pumping for only 5 days and whose value is further limited by the discharge of the pumped water into the stream upstream from these sites." In other words, the hydrologic system in question is a complex, coupled system of surface and ground water. Gaining, losing, and carrying reaches of the stream and transient ground water flow in a finite, bounded aquifer (possibly subject to dewatering) are probable characteristics of this system. Due to the shortness of the pumping test (in this particular system, 5 days is, most certainly, a short-term test) and the distance to

Page	Para.	Lines	Remarks
9	2	5-9 (contd.)	the gaining reaches of the stream (Sites 3-5) which are of most interest, and to the further complication of discharging the pumped water into the stream, the data as presented do not support the conclusion that "the well is capable of a sustained pumping rate of 1.4 mgd with no discernible effects on the streamflow of Kahaluu Stream."
39	1	1-3	"The Board of Water Supply has conducted extensive testing of the exploratory well and has determined that pumping activities have negligible effects on the minimum flow for Kahaluu Stream." Comment: Under a heading of "Long Term Impacts", a five-day pumping test does not qualify as "extensive" testing. The rest of the statement is, as mentioned above, oversimplification.
39	1	3-6	The drawdown of 15 feet at a pumpage rate of 1,000 gallons per minute may not be representative of long-term drawdown. Sustained pumpage may result in dewatering of the finite aquifer and additional drawdown. Further, it is not evident whether the gaining reaches of the stream are in the same or different dike compartments than the well and/or the nature of their coupling. Such uncertainties make it inappropriate to state that there would not be a significant impact on the groundwater table downstream of the well.
42	1	1-5	The EIS states that water demand will rise from the present 18 mgd to 22 mgd by the 2000, a difference of 4 mgd. Yet on page 5, 23 possible sources are listed which might produce a total of 27.1 mgd. These sources might be considered as alternatives to the proposed well.
42	3	All	As previously stated, these alternatives are very broad policies which might be part of a comprehensive plan. Their implementation does not hinge on the present project and it is inappropriate to present them in this light.
43	1	All	

October 14, 1981

Mr. Benjamin L. Jones
District Chief
U. S. Geological Survey
P. O. Box 50166
Honolulu, Hawaii 96850

Attention: Messrs. Charles Hunt
and Kiyoshi Takasaki

Dear Mr. Jones:

Subject: Your Letter of September 21, 1981, on the Revised Draft Environmental Impact Statement for Kahaluu Well

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

In response to your comments, we offer the following:

1. We will add the phrase, 'of Kahaluu Stream during the five-day pump test" to the end of the last sentence of the third paragraph on Page 1.

2. Although the alternatives mentioned in the document would eventually become part of a comprehensive water development plan, they are still considered alternatives to developing groundwater.

3. We concur that the hydrologic system is a complex system. Due to the short duration of the sustained pump test, we will reword the paragraph on Page 9, Paragraph 2, to read: "Test results of Kahaluu Exploratory Well (See Table 1 and Table 2) indicate that the well may be capable of a sustained pumping rate of 1.4 mgd with no discernible effects on the streamflow of Kahaluu Stream (See Figure 4 and Table 3)."

4. We concur that the five-day test is not an extensive test and will delete the word "extensive" on Page 39, Paragraph 1. Also, the effects on streamflow will be clarified to indicate that the pumping activity had negligible effects on Kahaluu Stream for the duration of the test pumping.

5. There are many uncertainties involved in determining the impact on groundwater and surface water resources. However, we feel the well is located on the edge of the dike complex, and the nature of Kahaluu Stream gaining flow in the lower reaches suggests the lower area is primarily supplied by rainfall.

6. Our water development projects are not intended to serve only a particular region. It is hoped the sources we develop will serve the entire island. Water is being developed in areas of developable groundwater and is to be used in areas of need. Of course, the immediate needs of the region where the water is developed would have first priority to the water. So the sources listed on Page 5 are considered part of our regional water development plan and not alternatives to the proposed well.

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

Very truly yours,

S/ Kazu

KAZU HAYASHIDA
Manager and Chief Engineer

MHS:bw
cc: K. Hayashida
L. Whang
81-2504

81-2537

RECEIVED
DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 15TH AIR BASE WING (PACAF)
HICKAM AFB, HI
SEP 29 1 25 PM '81

REPLY TO ATTN OF: DEEV (Mr Shiroma, 449-1831)

SUBJECT: Draft EIS for Kahaluu Wells

TO: Honorable Eileen Anderson
Mayor of City and County of Honolulu
530 South King Street
Honolulu, Hawaii 96813

1. This office has reviewed the subject EIS and has no comment to render relative to the proposed project.

2. We greatly appreciate your cooperative efforts in keeping the Air Force apprised of your project and thank you for the opportunity to review the document.

WILLIAM T. MORIOKA
Chief, Engrg & Envmtl Plng Div
Directorate of Civil Engineering

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

AM
P/E
24 SEP 1981

October 8, 1981

Mr. William T. Morioka
Chief, Engineering and
Environmental Planning Division
Headquarters 15th Air Base Wing
(PACAF)
Department of the Air Force
Hickam Air Force Base, Hawaii 96853

Dear Mr. Morioka:

Subject: Your Letter of September 24, 1981, on the Revised Draft Environmental Impact Statement for Kahaluu Wells

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

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

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

MHS:am
cc: K. Hayashida
L. Whang
81-2537

P.1414/81

GEORGE R. ARIYOSHI
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
3949 DIAMOND HEAD ROAD, HONOLULU, HAWAII 96816

VALENTINE A. SIEFERMANN
MAJOR GENERAL
ADJUTANT GENERAL

DAVID C. AU
DEPUTY ADJUTANT GENERAL

HIENG

25 AUG 1981

Mayor Eileen Anderson
City and County of Honolulu
530 South King Street
Honolulu, Hawaii 96813

Gentlemen:

Kahaluu Well

Thank you for providing us the opportunity to review your proposed project, Kahaluu Well Environmental Impact Statement.

We have completed our review and have no comments to offer at this time.

Yours truly,

JERRY M. HATSUDA
Captain, HANG
Contr & Engr Officer

cc: Board of Water Supply
Env. Quality Commission w/EIS

AUG 27 3 53 PM '81

September 1, 1981

General Valentine A. Siefermann
Adjutant General
Department of Defense
State of Hawaii
3949 Diamond Head Road
Honolulu, Hawaii 96816

Attention: Capt. Jerry M. Matsuda

Dear Gen. Siefermann:

Subject: Your Letter of August 25, 1981, on the Revised Draft Environmental Impact Statement (EIS) for Kahaluu Well, Koolaupoko, Oahu

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

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

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

MHS:bw
cc: K. Hayashida
L. Whang

P-1414

81-2317

GEORGE R. ARIYOSHI
HIDETO KONO
ITALO SOMMER

DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT
STATE ENERGY OFFICE
335 Merchant Street, Room 110
Honolulu, Hawaii 96813

Ref No 81:829

August 25, 1981

AM
P/E

MEMORANDUM

TO: Mayor Eileen Anderson, C & C of Honolulu

FROM: Edward J. Greaney, Jr., Acting Manager

SUBJECT: Environmental Impact Statement for Kahaluu Well

The State Energy Office has no comment.

EJG:deb

cc: Board of Water Supply

September 18, 1981

Mr. Hidato Kono, Director
Department of Planning and
Economic Development
State of Hawaii
335 Merchant Street, Room 110
Honolulu, Hawaii 96813

Attention: Mr. Edward J. Greaney, Jr.

Dear Mr. Kono:

Subject: Your Letter of August 25, 1981, on the Revised Draft Environmental Impact Statement for Kahaluu Well

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

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

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

MHS:am
cc: K. Hayashida
L. Whang
81-2317

GEORGE R. ARIYOSHI
GOVERNOR

P-1462/81

FRANKLIN Y. K. SUNN
DIRECTOR
RICHARD PAGLINAWAN
DEPUTY DIRECTOR
ALFRED K. SUGA
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF SOCIAL SERVICES AND HOUSING

RECEIVED
Sep 3 1 8 30 AM '81

August 28, 1981

AM
P/E

Mayor Eileen Anderson
City and County of Honolulu
530 South King Street
Honolulu, Hawaii 96813

Dear Mayor Anderson:

Subject: Kahaluu Well - Revised Draft Environmental Impact Statement

The Hawaii Housing Authority has reviewed the revised draft EIS to upgrade an existing exploratory well in Kahaluu to a permanent well and has no specific comments to offer relative to the proposed action. The Authority is, however, highly supportive of this action as it will provide additional water for the Windward area. This additional source will assist in the plans of the Authority for the development of affordable housing in the Windward district.

Thank you for the opportunity to comment on this matter.

Sincerely,

Franklin Y. K. Sunn

FRANKLIN Y. K. SUNN
Director

cc: ✓Board of Water Supply

September 11, 1981

Mr. Franklin Y. K. Sunn, Director
Dept. of Social Services and Housing
State of Hawaii
P. O. Box 339
Honolulu, Hawaii 96809

Dear Mr. Sunn:

Subject: Your Letter of August 28, 1981, on the Revised Draft Environmental Impact Statement for Kahaluu Well

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

If you have any questions, please contact Lawrence Whang at 540-5221.

Very truly yours,

KAZU HAYASHIDA
for Manager and Chief Engineer

MIS:bw
cc: K. Hayashida
L. Whang

P-1462
81-2301

MAYOR'S OFFICE
CITY & COUNTY

'81 SEP 2 PM 2:12

GEORGE R ARIYOSHI
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P. O. BOX 119 HONOLULU, HAWAII 96810

HIDEO MURAKAMI
COMPTROLLER

MIKE N. TOKUNAGA
DEPUTY COMPTROLLER

LETTER NO(P)1709.1

SEP 1 1981

Honorable Eileen Anderson
Mayor
City and County of Honolulu
530 South King Street
Honolulu, Hawaii 96813

Dear Mayor Anderson:

Subject: Revised Draft Environmental Impact Statement for the Kahaluu Well

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,

HIDEO MURAKAMI
State Comptroller

September 14, 1981

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

Dear Mr. Murakami:

Subject: Your Letter of September 1, 1981, on the Revised Draft Environmental Impact Statement for the Kahaluu Well

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

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

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

MHStam
cc: K. Hayashida
L. Whang
81-2369
P-1456

Planning PW—

01-2393

GEORGE R. ARIYOSHI
Governor of Hawaii

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

RECEIVED
BD OF WATER SUPPLY
SEP 9 3 42 PM '81

SUSUMU ONO, CHAIRMAN
Board of Land & Natural Resources
EDGAR A. HAMASU
Deputy to the Chairman

DIVISIONS:
CONSERVATION AND ENVIRONMENT
CONSERVANCY
FISH AND GAME
FORESTRY
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

September 2, 1981

AM
P/E

Honorable Eileen Anderson
Mayor
City & County of Honolulu
530 S. King Street
Honolulu, HI 96813

Subject: Kahaluu Well EIS, Kahaluu, Oahu

Dear Mayor Anderson:

Thank you for the opportunity to review and comment on the subject EIS. There are no State Park interests involved in this project.

We are returning the EIS to the Environmental Quality Commission as they requested.

Very truly yours,

/S/ SUSUMU ONO

SUSUMU ONO
Chairman of the Board

cc: Board of Water Supply
Environmental Quality Commission

September 17, 1981

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 September 2, 1981, on the Revised Draft Environmental Impact Statement for Kahaluu Well

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

If you have any questions, please contact Lawrence Whang at 540-5221.

Very truly yours,

For KAZU HAYASHIDA
Manager and Chief Engineer

MHS:am
cc: K. Hayashida
L. Whang
31-2393

81-2404

RECEIVED
BD OF WATER SUPPLY
Sep 10 3 16 PM '81

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HAWAII 96801

September 9, 1981

GEORGE A. L. YUEN
DIRECTOR OF HEALTH

JOHN F. CHALMERS, M.D.
DEPUTY DIRECTOR OF HEALTH

HENRY H. THOMPSON, M.A.
DEPUTY DIRECTOR OF HEALTH

MELVIN K. KOIZUMI
DEPUTY DIRECTOR OF HEALTH

ABELINA MADRID SHAW, M.A., J.D.
DEPUTY DIRECTOR OF HEALTH

In reply, please refer to:
File: EPHS-SS

MEMORANDUM

To: Honorable Eileen Anderson
Mayor, City & County of Honolulu

From: Deputy Director for Environmental Health

Subject: Environmental Impact Statement (EIS) for Kahaluu Well, Kahaluu, Koolaupoko, Oahu

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

Please be informed that we do not have anything to add to our earlier comments of October 17, 1980.

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 H. KOIZUMI

cc: OEQC
Board of Water Supply

September 18, 1981

Mr. George A. L. Yuen, Director
Department of Health
State of Hawaii
P. O. Box 3378
Honolulu, Hawaii 96801

Attention: Mr. Melvin K. Koizumi

Dear Mr. Yuen:

Subject: Your Letter of September 9, 1981, on the Revised Draft Environmental Impact Statement for Kahaluu Well

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

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

Very truly yours,

For KAZU HAYASHIDA
Manager and Chief Engineer

MHS:bw
cc: K. Hayashida
L. Whang

81-2404

81-2473

Received
Sep 30 1:01

September 17, 1981 STP 8.7620

AM der
P/E

The Honorable Eileen Anderson
Mayor
City and County of Honolulu
530 South King Street
Honolulu, Hawaii 96813

Dear Mayor Anderson:

EIS Kahaluu Well Revieu
Kahalau, Koolaupoko, Oahu

Thank you for the opportunity to comment on subject document.

We have no substantive comments to offer to improve your document.

Very truly yours,

Ryokichi Higashionna
Director of Transportation

cc: Board of Water Supply

September 28, 1981

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

Dear Dr. Higashionna:

Subject: Your Letter of September 17, 1981, on the Revised Draft Environmental Impact Statement for Kahaluu Well

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

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

Very truly yours,

FAZU HAYASHIDA
Manager and Chief Engineer

MHS:am

cc: K. Hayashida
L. Whang

81-2473

P-1555/81

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

September 18, 1981

Ref. No. 3629

The Honorable Eileen R. Anderson
Mayor
City and County of Honolulu
530 South King Street
Honolulu, Hawaii 96813

Dear Mayor Anderson:

Subject: Revised Draft Environmental Impact Statement for Kahaluu Well, Koolaupoko, Oahu

We have reviewed the above revised 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 matter.

Sincerely,

Hideto Kono

cc: Board of Water Supply,
City and County of Honolulu
Office of Environmental Quality Control

September 29, 1981

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

Dear Mr. Kono:

Subject: Your Letter of September 18, 1981, on the Revised Draft Environmental Impact Statement for Kahaluu Well

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

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

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

MHS:am
cc: K. Hayashida
L. Whang
P-1555

Planning file

R 1578/81

University of Hawaii at Manoa

Water Resources Research Center
Holmes Hall 283 • 2540 Dole Street
Honolulu, Hawaii 96822

21 September 1981

Honorable Eileen Anderson
Mayor, City and County of Honolulu
530 South King Street
Honolulu, Hawaii 95813

Dear Mayor Anderson:

Subject: Revised Draft EIS, Kahaluu Well, Board of Water Supply, August 13, 1981

We have reviewed the subject EIS and offer the following comments:

1. Since the test pumping was done in November, a winter (wet) month, the drawdown as well as effects on streamflow may not be representative of what may happen during critical dry summer periods. This should be taken into consideration.

2. There is nothing in the text stating specifically that farmers will be assured a continuing supply of irrigation water from Kahaluu Stream. Only water for maintenance of aquatic life is mentioned on p. 39.

3. Will the proposed well affect the yield of Kahaluu Tunnel?

Thank you for the opportunity to comment. This material was reviewed by WRRC personnel.

Sincerely,

Edwin T. Murabayashi
EIS Coordinator

Sep 25 3 26 PM '81

ETM:ja

cc: Y.S. Fok
H. Gee
BWS

October 16, 1981

Dr. L. Stephen Lau, Director
Water Resources Research Center
Holmes Hall 283
2540 Dole Street
Honolulu, Hawaii 96822

Attention: Mr. Edwin T. Murabayashi

Dear Dr. Lau:

Subject: Your letter of September 21, 1981, on the Revised Draft Environmental Impact Statement for Kahaluu Well

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

In answer to your comments, we offer the following:

1. *Since the test was done in November, a winter (wet) month, the drawdown as well as effects on streamflow may not be representative of what may happen during critical dry summer periods. This should be taken into consideration.*

Although November is considered a wet month, rainfall was less than normal. According to our monthly rainfall index which is based on the 30-year average for each month, the rainfall was 69 percent less than normal in the intake area, or 3.33 inches. Rainfall for the months of July to September, which are considered "dry" months, ranges from 5.16 to 7.18 inches (based on the 30-year average). This rainfall data shows that the pump test was performed during a period typical of a "dry" month.

2. *There is nothing in the text stating specifically that farmers will be assured a continuing supply of irrigation water from Kahaluu Stream. Only water for maintenance of aquatic life is mentioned on Page 39.*

In our response to comments on the environmental document, we indicated that we will maintain existing streamflow. This action would allow an adequate amount of water to meet the existing streamwater needs for the farmers and the existing aquatic biota. To assure that streamflow will be maintained, flow will be continuously monitored when the well becomes operational, and pumpage from the well will be reduced or curtailed as dictated by the information obtained from the streamflow monitoring.

3. *Will the proposed well affect the yield of Kahaluu Tunnel?*

We do not anticipate any adverse impacts to the yield of Kahaluu Tunnel because of the distance between the two sources and the presence of intervening dikes.

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

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

MHS:bw
cc: K. Hayashida
L. Whang
P-1573

81-2493

GEORGE R. ARIYOSHI
GOVERNOR

JACK K. SUWA
CHAIRMAN, BOARD OF AGRICULTURE

RECEIVED
BD. OF WATER SUPPLY
Sep 23 3 00 PM '81

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
P. O. Box 22159
Honolulu, Hawaii 96822

September 22, 1981

AM
P/E

MEMORANDUM

To: Mayor Eileen Anderson
City & County of Honolulu

Subject: Kahaluu Well

The Department of Agriculture has reviewed the subject EIS and finds that our concerns have been addressed.

Thank you for the opportunity to comment.

Jack K. Suwa

JACK K. SUWA
Chairman, Board of Agriculture

cc: Board of Water Supply

September 30, 1981

Mr. Jack K. Suwa, Chairman
Board of Agriculture
State of Hawaii
P. O. Box 22159
Honolulu, Hawaii 96822

Dear Mr. Suwa:

Subject: Your Letter of September 22, 1981, on the Revised Draft Environmental Impact Statement for Kahaluu Well

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

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

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

MHS:am
cc: K. Hayashida
L. Whang
81-2493

"Support Hawaiian Agricultural Products"

Planning Dr

P 1574/81

University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 948-7361

Office of the Director

September 22, 1981

RE:0338

Mayor Eileen Anderson
City and County of Honolulu
530 South King Street
Honolulu, Hawaii 96813

Dear Mayor Andersen:

Revised Draft Environmental Impact Statement
Kahaluu Well
Kahaluu, Koolaupoko, Oahu

The Environmental Center review of the Kahaluu Well revised Draft EIS has been prepared by Deak Cox and Jacquelin Miller. Personnel from other departments with expertise in water resource matters were consulted, however, time did not permit their usual formal input due to beginning semester teaching loads.

Hydrolic impact

The potential impact of the proposed use of the Kahaluu Well that should probably be of greatest concern is a hydrologic one--specifically the effect of the well draft on the low-water flow of Kahaluu Stream. The nature and magnitude of this effect are, in principle, estimable either in a general way through consideration of the geohydrology of the area or quantitatively through stream flow monitoring over a period during a part of which the well is test pumped.

Although there is in the DEIS a brief discussion of rainfall and drainage in the area (p. 27), these topics are not adequately or accurately addressed. The statement is made, for example, that the average annual precipitation in the area is 99.18 in./yr. Table 5 (p. 23) indicates that this is the mean at a specific raingage, whose location is not plotted in any map showing the well or streamgage sites. The averages, for the drainage area of the stream or any specific part of that area, or for the probable area of recharge of the groundwater that the well will develop, are likely to be quite different. Long-term maximum, mean, and minimum flows are presented (Fig. 9, p. 29) for only a single gaging station close to the pumped well (p. 29 and Fig. 6, p. 26).

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There is no discussion of the geohydrology of the area. The aquifer from which the well will draw is not described. Well details are shown in Figure 5 with neither geologic nor hydrologic information. The fact that there is an existing Kahaluu water development tunnel is recognized (p. 2 et al.), and the tunnel site is shown on Figure 7. However the hydrogeologic relations among the tunnel, the well, and the stream are not discussed.

The lack of discussion does not result from a lack of information, because there is actually a good deal of information about the hydrogeology of the area, information from which it may be concluded that the tunnel, the well, and the low flow of the stream are all fed by groundwater retained in dike compartments in Koolau lavas, the highest heads being in compartments farthest mauka and generally lower heads in compartments successively farther makai.

Two significant hydrogeologic facts are suggested by information presented in the report, but not recognized or discussed there.

1) The significant reduction in both mean and minimum stream flows in the approximate period from 1935 to 1950 (Fig. 9) suggests that a major part of the natural low flow of the stream was intercepted by the Kahaluu tunnel.

2) Kahaluu is "considered to be a gaining stream" (response to Water Resource Research Center comments on first DEIS), suggesting that it receives significant groundwater contributions makai of the tunnel.

These in turn would suggest that draft from the well should be expected to reduce further the low flow of the streams in the absence of conclusive contrary evidence from the combination of test pumping and stream-flow monitoring.

The DEIS concludes that the results of the testing and monitoring do constitute contrary evidence, stating (p. 9) that their results "indicate that the well is capable of a sustained pumping rate of 1.4 mgd with no discernible effects on the stream flow of Kahaluu Stream." To support this statement, there is a citation to Figure 4 and Table 3, but not in detail to data presented in them, and there is no further discussion. Because the conclusion is of critical importance, the test results and their implications will be reviewed here.

The pump-test period included a day of variable draft followed by 4 days of draft at 1000 gpm (Tables 1 and 2), equivalent to 1.4 mgd or 2.2 cfs. Stream flows were gaged 8, 7, and 4 days before the beginning of the test and at intervals during the test and for 2 days thereafter (Table 3). The conclusion in the DEIS seems to be based on the fact that the streamflow at the two sites nearest the well, site 1 upstream and site 2 downstream, remained essentially constant at about 0.23 cfs. Because the effects of the pumping may well have extended to more than one dike compartment in the underlying lavas and in any case could have reached the surface only by way of an aquifer or aquifers in overlying sediments, equilibrium might well not have been achieved during the test period, and it cannot be assumed that the stream flow effects would necessarily have been manifest in the immediate vicinity of the well. Therefore the record of flows at more distant sites warrant examination.

At site 2A, just downstream from site 2, the flow during the test was about 2.08 cfs. (there were no pre-test measurements). At site 3, about 1/4 mile makai, the flow increased from its pre-test rate of 0.4 cfs to about 2.14 cfs during the test, decreased

to 0.60 cfs when the test ended, and thereafter decreased to the pre-test rate. At sites 4 and 5, below the confluence of another Kahaluu tributary, approximately the same increases were superimposed on larger pre- and post-test rates. It appears that the water drawn from the well was returned to the stream between sites 2 and 2A. If, however, the entire 2.2 cfs draft had been added to the pre-test flow at site 3, the total would have been about 2.6 cfs, about 0.5 cfs greater than was actually measured during the test. Some of the pumped water may have gone into recharge of the superficial aquifers, and indeed the continuance for a day or two at site 3 of flows exceeding the pre-test and eventual post-test rates supports this hypothesis. However, even allowing for this exceedence, it appears reasonable to interpret the record as indicating that the total flow at site 3 was significantly less than the sum of the pre-test flow and the well discharge and, therefore, that the natural seepage to the stream between site 2 and site 3 was significantly reduced as a result of the test.

Without more information on the point of discharge of the water drawn from the well, more analysis of the effects of the slight rainfalls that occurred preceding and during the test, etc., it is impossible to be certain of the validity of this interpretation. However, from the combination of background information and the information in the EIS it seems more probable that the test draft from the well resulted in a significant decrease in stream flow than that it did not. Recognizing that equilibrium may not have been achieved in the test period, it seems probable that even the proposed draft of the well, 1.0 mgd rather than 1.5 mgd, may result in a significant decrease in stream flows.

Secondary impacts

Because it seems probable that streamflows will be reduced by the proposed use of the well, the EIS should address the effects of the reduction, not only on the minimum residual stream flow rates but on the uses that are made of water diverted from the stream and on the stream biota.

The need for further consideration of the geo-hydrology of this area is of critical importance in determining the potential impacts of this project. Similar wells are now in the planning stage by BWS and their attendant EIS's are also under preparation. If the inadequacies of the geohydrologic analyses as found in this Kahaluu Well EIS, persist throughout these projects serious negative impacts may result to the biota and downstream users.

We appreciate the opportunity to comment on this document and look forward to your response to our concerns.

Yours truly,

Doak C. Cox
Director

CMK

cc: OEQC
Board of Water Supply
Jacquelin Miller

November 23, 1981

Dr. Doak C. Cox, Director
Environmental Center
University of Hawaii at Manoa
2550 Campus Road, Crawford 317
Honolulu, Hawaii 96822

Dear Dr. Cox:

Subject: Your Telephone Conversation of November 13, 1981, on the Board's Response to Comments Made by the Environmental Center on the Kahaluu Well Environmental Impact Statement (EIS)

Thank you for your call on the Kahaluu Well EIS.

We concur with your evaluation that our response contains an error. The 2.03 figure on page 6, paragraph 3 should be corrected to 1.3; mgd. This would then indicate a loss in streamflow of 0.31 mgd.

We will also change the phrase "no discernible effects" relative to streamflow to "no significant effects" wherever the phrase appears in the EIS.

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

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

MES:am
cc: K. Hayashida
L. Whang

October 23, 1931

Dr. Doak C. Cox, Director
Environmental Center
University of Hawaii at Manoa
2550 Campus Road, Crawford 317
Honolulu, Hawaii 96822

Dear Dr. Cox:

Subject: Your Letter of September 22, 1981, on the Revised Draft Environmental Impact Statement for Kahaluu Well

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

In answer to your comments, we offer the following:

1. *The potential impact of the proposed use of the Kahaluu well that should probably be of greatest concern to a hydrologic one--specifically the effect of the well draft on the low-water flow of Kahaluu Stream. The nature and magnitude of this effect are, in principle, estimable either in a general way through consideration of the geohydrology of the area or quantitatively through stream flow monitoring over a period during a part of which the well is test pumped.*

As indicated by the data provided in the streamflow monitoring data and taking bank storage, stream diversions, and discrepancies between the well meter and stream gaging methods, there was no discernible effect on streamflow during the test pumping of the well.

2. *Although there is in the DEIS a brief discussion of rainfall and drainage in the area (p. 27), these topics are not adequately or accurately addressed. The statement is made, for example, that the average annual precipitation in the area is 99.16 in./yr. Table 5 (p. 28) indicates that this is the mean at a specific raingage, whose location is not plotted in any map showing the well or streamgage sites. The averages, for the drainage area of the stream or any specific part of that area, or for the probable area of recharge of the groundwater that the well will develop, are likely to be quite different. Long-term maximum, mean, and minimum flows are presented (Fig. 8, p. 29) for only a single gaging station close to the pumped well (p. 29 and Fig. 6, p. 19).*

The rainfall data was from a U. S. Geological Survey raingage located at the abandoned stream gaging station near the well site (refer to Figure 2). Also, the streamflow data shown in Figure 9 is from the only gaging station on Kahaluu Stream with a long-term record.

3. *There is no discussion of the geohydrology of the area. The aquifer from which the well will draw is not described. Well details are shown in Figure 5 with neither geologic nor hydrologic information. The fact that there is an existing Kahaluu water development tunnel is recognized (p. 2 et al.), and the tunnel site is shown on Figure 7. However the hydrogeologic relations among the tunnel, the well, and the stream are not discussed.*

The lack of discussion does not result from a lack of information, because there is actually a good deal of information about the hydrogeology of the area, information from which it may be concluded that the tunnel, the well, and the low flow of the stream are all fed by groundwater retained in dike compartments in Koolau lavas, the highest heads being in compartments farthest mauka and generally lower heads in compartments successively farther makai.

Two significant hydrogeologic facts are suggested by information presented in the report, but not recognized or discussed there.

1) The significant reduction in both mean and minimum stream flows in the approximate period from 1935 to 1950 (Fig. 9) suggests that a major part of the natural low flow of the stream was intercepted by the Kahaluu tunnel.

2) Kahaluu is "considered to be a gaining stream" (response to Water Resource Research Center comments on first DEIS), suggesting that it receives significant groundwater contributions makai of the tunnel.

These in turn would suggest that draft from the well should be expected to reduce further the low flow of the streams in the absence of conclusive contrary evidence from the combination of test pumping and stream-flow monitoring.

The DEIS concludes that the results of the testing and monitoring do constitute contrary evidence, stating (p. 5) that their results "indicate that the well is capable of a sustained pumping rate of 1.4 mgd with no discernible effects on the stream flow of Kahaluu Stream." To support this statement, there is a citation to Figure 4 and Table 3, but not in detail to data presented in them, and there is no further discussion. Because the conclusion is of critical importance, the test results and their implications will be reviewed here.

The pump-test period included a day of variable draft followed by 4 days of draft at 1000 gpm (Tables 1 and 2), equivalent to 1.4 mgd or 2.2 cfs. Stream flows were gaged 3, 7, and 4 days before the beginning of the test and at intervals during the test and for 2 days thereafter (Table 3). The

conclusion in the DEIS seems to be based on the fact that the streamflow at the two sites nearest the well, site 1 upstream and site 2 downstream, remained essentially constant at about 0.23 cfs. Because the effects of the pumping may well have extended to more than one dike compartment in the underlying lavas and in any case could have reached the surface only by way of an aquifer or aquifers in overlying sediments, equilibrium might well not have been achieved during the test period, and it cannot be assumed that the stream flow effects would necessarily have been manifest in the immediate vicinity of the well. Therefore the record of flows at more distant sites warrant examination.

At site 2A, just downstream from site 2, the flow during the test was about 2.05 cfs. (there were no pre-test measurements). At site 3, about 1/3 mile makai, the flow increased from its pre-test rate of 0.4 cfs to about 2.1± cfs during the test, decreased to 0.60 cfs when the test ended, and thereafter decreased to the pre-test rate. At sites 4 and 5, below the confluence of another Kahaluu tributary, approximately the same increases were superimposed on larger pre- and post-test rates. It appears that the water drawn from the well was returned to the stream between sites 2 and 2A. If, however, the entire 2.2 cfs draft had been added to the pre-test flow at site 3, the total would have been about 2.6 cfs, about 0.6 cfs greater than was actually measured during the test. Some of the pumped water may have gone into recharge of the superficial aquifers, and indeed the continuance for a day or two at site 3 of flows exceeding the pre-test and eventual post-test rates supports this hypothesis. However, even allowing for this exceedance, it appears reasonable to interpret the record as indicating that the total flow at site 3 was significantly less than the sum of the pre-test flow and the well discharge and, therefore, that the natural seepage to the stream between site 2 and site 3 was significantly reduced as a result of the test.

Without more information on the point of discharge of the water drawn from the well, more analysis of the effects of the slight rainfalls that occurred preceding and during the test, etc., it is impossible to be certain of the validity of this interpretation. However, from the combination of background information and the information in the EIS it seems more probable that the test draft from the well resulted in a significant decrease in stream flow than that it did not. Recognizing that equilibrium may not have been achieved in the test period, it seems probable that even the proposed draft of the well, 1.5 mgd rather than 1.4 mgd, may result in a significant decrease in stream flows.

The exploratory well is located in the marginal dike zone within approximately 1,500 feet of the dike complex. The well will penetrate Koolau lavas compartmented by dikes. Kahaluu Stream behaves as a sink into which surface and ground waters drain. The highest water levels occur in the crest compartments and decrease stepwise towards the coast. Because of lower porosity and permeability, coupled with a relatively abundant rainfall in excess of evapotranspiration needs, the dike complex areas are at or near saturation. Perennial flow in Kahaluu Stream is fed largely by leakage from Kahaluu Tunnel and augmented at times by gains from seasonal high head ground water discharges.

During the 5-day pumping test, neither the stream flow above the well or at the old gaging site changed, which indicate poor hydraulic continuity between the dike reservoirs at depth and the overlying alluvium. The pumpage from the well into the stream at the rate of 1.5 mgd (1000 gpm) showed no discernible effect in the critical reaches above and below the well that would be most likely influenced. Perched flow on alluvium appears to be a logical conclusion, although a time span greater than 5 days to achieve equilibrium may be required.

Water from the well was conveyed 600 feet and discharged below the calibrated control section of the former gaging station at site 2. This was done to eliminate or minimize return flow to areas affected by the well and accounts for the large flow increase in a short distance.

Below Ahuimanu Road, the low permeability of the dike complex tends to force underflow to the ground surface which, together with the increase of watershed areas, accounts for gaining flow. Flow in the recent alluvium may account for short-term deficiencies, residual delayed flows, and unseen underflow. Evapotranspiration of phreatophytes and other plants cause deficits. These factors may also account for the decreased flow at the lower stations, rather than attributing reduction of flow from decreased ground water discharge.

Comparison of metered pump discharge with gaged stream flows may account for differences because of the limiting accuracies of each method. Meters are not accurate over the full range and must be calibrated to determine errors. Gaging of stream flows with current meters is subject to a wide variety of errors so that calculated flows have errors of 5 to 10 percent; underflow in the alluvium beneath and around the gaging site passes unmeasured. When the 1.5 mgd of the pump is added to the 0.15 mgd at site 2, the aggregate should be 1.65 mgd, but site 2 showed 2.08 or 0.43 mgd more than accountable through simple addition of numbers.

Although the 5 day test may not indicate total long-term effects, the well can be regulated to insure adequate flows in Kahaluu Stream.

The slight rainfalls preceding and during the test appeared as short-term spikes on the water level recorder and can be ignored. Although November is usually wet, October and November of 1980 were drier than normal.

4. *Because it seems probable that streamflows will be reduced by the proposed use of the well, the EIS should address the effects of the reduction, not only on the minimum residual stream flow rates but on the uses that are made of water diverted from the stream and on the stream biota.*

The fact that stream flow above, below, and immediately near the well was unaffected by pumping plus the proximity of the exploratory well to the dike complex may limit the effects on the flow of Kahaluu Stream. If pumping does reduce flow in Kahaluu Stream, the well can be throttled to insure meeting any future minimum stream flow standards by the State.

If you have any questions, please contact Richard Fujii at 548-6134.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

RMS/CL:am
cc: K. Hayashida
C. Lao
S. Whang
P-1574

Planning 81-2542

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
550 HALEKAUWILA ST.
ROOM 301
HONOLULU, HAWAII 96813

Melvin Koizumi
Deputy Director
TELEPHONE NO.
548-6915

Mgr. K+H
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P/E

September 22, 1981

Kazu Hayashida, Director
Board of Water Supply
City and County of Honolulu
Honolulu, Hawaii 96815

SUBJECT: Environmental Impact Statement for Kahaluu Well, Kahaluu, Oahu

Dear Mr. Hayashida:

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

1. Page 5.

The EIS should indicate that Haiku Well has been changed from 0.5 mgd to 1.0 mgd.

2. Page 8.

The EIS states, "Of the present daily production rate of 17.6 mgd, the Kahaluu Tunnel is providing the Windward District with approximately 2 million gallons of water daily." The 15.6 mgd balance should be mentioned and accounted for.

3. Page 9.

We note that the well is located near the chlorinator station. The EIS should indicate whether the water will be chlorinated by this station. If so, the effects of the chlorination should be discussed.

4. Page 9.

The drilling and testing of the well was completed in November 1980. In order to have a more realistic picture of the sustainable yield and whether Kahaluu Stream will be affected, the test should have been conducted during the drier months. We feel that test during the summer months will assure a long-term stability of the water table.

5. Page 42.

In discussing alternatives to the proposed action, EIS regulation 1:42 g. states,

> A rigorous exploration and objective evaluation of the environmental impacts of all reasonable alternative actions, particularly those that might enhance environmental quality or avoid or reduce some or all of the adverse environmental benefits, costs, and risks shall be included in the agency review process in order not to prematurely foreclose options which might enhance environmental quality or have less detrimental effects ... In each case, the analysis shall be sufficiently detailed to allow benefits, costs, and risks of the proposed action and each reasonable alternative.

Thus, there should be further discussion of the alternatives and not just a listing of them.

6. Page 47.

The postcard survey of potential users should be further described as to the method used, criteria used, and what was the purpose of the survey.

7. Although the EIS touched lightly on secondary impacts, it must be recognized that water projects are growth inducing. Therefore, an expanded discussion should be given and relate the project with the policies and objectives of the county general plan and the proposed development plans.

8. Furthermore, the EIS should reflect state policies such as the State Plan, the Coastal Zone Management Act and the State Environmental Policy in the text and not as a response to a comment.

9. The EIS should reflect in the text that the area is located within the potential flood hazard zone D.

10. The cost of project should also be included in the text of the EIS as prescribed by EIS regulations.

11. There should be further discussion in the EIS about establishing minimal stream flow for Kahaluu Stream. In addition, there should be discussion of the cumulative effect of the proposed development of wells on the groundwater acquifer both in short-term and long-term parameters.

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

Yours truly,

Melvin K. Koizumi
Deputy Director for Environmental Health

cc: Mayor Eileen Anderson, City and County of Honolulu

October 28, 1981

Mr. George A. L. Yuen
Director
Department of Health
State of Hawaii
P. O. Box 3378
Honolulu, Hawaii 96801

Attention: Mr. Melvin Koizumi

Dear Mr. Yuen:

Subject: Your Letter of September 22, 1981, on the Revised Draft Environmental Impact Statement (EIS) for Kahaluu Well

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

Our response to your comments are as follows:

1. *Page 5.*

The EIS should indicate that Haiku Well has been changed from 0.5 mgd to 1.0 mgd.

The change in well capacity will be corrected in the revised EIS.

2. *Page 8.*

The EIS states, "Of the present daily production rate of 17.6 mgd, the Kahaluu Tunnel is providing the Windward District with approximately 2 million gallons of water daily." The 15.6 mgd balance should be mentioned and accounted for.

On page 4 is a listing of our existing Windward District sources and their 1979 production. The figures in the discussion were "rounded off" for convenience.

3. *Page 9.*

We note that the well is located near the chlorinator station. The EIS should indicate whether the water will be chlorinated by this station. If so, the effects of the chlorination should be discussed.

The water from the well will be chlorinated since it will be conveyed in the same pipeline as the Kahaluu Tunnel waters. If the well water was conveyed in a separate main, chlorination may not be needed as most of our well sources do not require chlorination.

4. *Page 9.*

The drilling and testing of the well was completed in November 1980. In order to have a more realistic picture of the sustainable yield and whether Kahaluu Stream will be affected, the test should have been conducted during the drier months. We feel that test during the summer months will assure a long-term stability of the water table.

According to our rainfall records, the amount of precipitation for November was 3.33 inches which is 69 percent below normal for the month. The average precipitation for a typical "dry" month such as July or August ranges from 5 to 7 inches. The rainfall data is based on a 30-year average.

5. *Page 42.*

In discussing alternatives to the proposed action, EIS regulation 1:42 g. states,

> *A rigorous exploration and objective evaluation of the environmental impacts of all reasonable alternative actions, particularly those that might enhance environmental quality or avoid or reduce some or all of the adverse environmental benefits,*

costs, and risks shall be included in the agency review process in order not to prematurely foreclose options which might enhance environmental quality or have less detrimental effects . . . In each case, the analysis shall be sufficiently detailed to allow benefits, costs, and risks of the proposed action and each reasonable alternative.

Thus, there should be further discussion of the alternatives and not just a listing of them.

A discussion of the alternatives will be incorporated in the revised EIS.

6. *Page 47.*

The postcard survey of potential users should be further described as to the method used, criteria used, and what was the purpose of the survey.

The postcard survey was made to identify any existing stream water users. Postcards were mailed to all property owners whose land abuts the stream. Each postcard was coded to determine who the respondent was and requested: (1) if Kahaluu Stream or an canal flows within their property; (2) whether the stream or canal was continuous throughout the year; (3) if streamwater was used for agricultural use; (4) how much land area was being cultivated; (5) the amount of streamwater used; and (6) the type of crops under cultivation. The postcards were addressed to the consultant and were pre-stamped. Follow-up field interviews were made with respondents who indicated they used streamwater. Of the 139 postcards mailed, only 57 were returned with 17 indicating they used or plan to use streamwater.

7. *Although the EIS touched lightly on secondary impacts, it must be recognized that water projects are growth inducing. Therefore, an expanded discussion should be given and relate the project with the policies and objectives of the county general plan and the proposed development plans.*

The discussion on the City's General Plan objectives and policies will be expanded. See attachment #1.

8. *Furthermore, the EIS should reflect state policies such as the State Plan, the Coastal Zone Management Act and the State Environmental Policy in the text and not as a response to a comment.*

The State Plan, Coastal Zone Management Act and the State Environmental Policy will be incorporated into the text of the revised EIS. See attachment #2.

9. *The EIS should reflect in the text that the area is located within the potential flood hazard zone D.*

The revised EIS will note in the text that the project site is located within Zone D, an area of undetermined flood hazard potential.

10. *The cost of project should also be included in the text of the EIS as prescribed by EIS regulations.*

The construction cost is estimated to be $765,600 and will be noted in the text of the EIS.

11. *There should be further discussion in the EIS about establishing minimal stream flow for Kahaluu Stream. In addition, there should be discussion of the cumulative effect of the proposed development of wells on the groundwater aquifer both in short-term and long-term parameters.*

Presently, there is a joint Federal, State, and County Advisory Committee developing minimal streamflow standards. However, the committee is still developing the standards as no draft has been submitted for public review and comments. Until minimum streamflow standards are established, we will be monitoring Kahaluu Stream when the well becomes operational to assure that the existing streamflow is maintained.

The short-term impact showed minimal effects on the groundwater aquifer by the water quality samples taken from the well during the test pumping. In fact, chloride levels improved from 22 parts per million (ppm) to 21 ppm. Also, after the test pumping was completed, the groundwater levels recovered immediately.

If you have any questions, please contact Lawrence Whang at 546-3221.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

KH:lm
cc: K. Hayashida
G. Hiu
A. Koga
L. Whang
81-2542

ATTACHMENT #1

General Plan Objectives and Policies that relate to growth include the following:

A. Economic Activity

1. Objective C - "to maintain the viability of agriculture on Oahu."

Policy 4 - "maintain agricultural land along the Windward and Waianae coasts for truck farming, flower growing, livestock production and other types of diversified agriculture."

The proposed project would not conflict with existing agricultural uses. No land or water presently used for agriculture will be affected by the project.

2. Transportation and Utilities

1. Objective B - "to meet the needs of the people of Oahu for an adequate supply of water and for environmentally sound systems of waste disposal."

Policy 1 - "maintain an adequate supply of water for both future residents and future visitors."

Policy 2 - "maintain an adequate supply of water for future agricultural and industrial needs."

The proposed project is one of several strategies used to attain these goals.

Policy 3 - "encourage the development of new technology which will reduce the cost of providing water and the cost of waste disposal."

The BWS is actively involved in alternate water source development for the future. However, development of existing ground water sources is the least costly option currently available for providing domestic water.

Policy 4 - "encourage a lowering of per capita consumption of water and the per capita production of waste."

Although the proposed project would not hinder water conservation strategies, water conservation measures alone would not alleviate the ultimate necessity for this project.

2. Objective C - "to maintain a high level of service for all utilities."

Policy 3 - "plan for the timely and orderly expansion of the utility system."

3. Objective D - "to maintain transportation and utility systems which will help Oahu continue to be a desirable place to live and visit."

Policy 1 - "give primary emphasis in the capital improvement program to the maintenance and improvement of existing roads and utilities."

Policy 2 - "use the transportation and utility systems as a means of guiding growth and the pattern of land use on Oahu."

The development of this water system is proposed to comply with growth projections by the Honolulu General Plan.

It should be noted that the present Detailed Land Use Map designations of Country and the City's new Development Plans are compatible. Presently, the estimated completion date is late 1981.

Due to its utility nature, the proposed project is a permitted use according to the City's zoning controls. The site is outside of the Special Management Area (SMA) and will not need an SMA permit.

focused on major problems and issues. The resulting findings and recommendations are contained in a report titled "Hawaii's Water Resources: Directions for the Future." The priority recommendations from this report are reproduced in Appendix __.

IV. COASTAL ZONE MANAGEMENT PROGRAM

The proposed project is not inconsistent with the purpose of the Coastal Zone Management (CZM) Act of 1972. The CZM Act declares that it is national policy [3.4]:

(a) "to preserve, protect, develop, and where possible, to restore or enhance, the resources of the Nation's coastal zones for this and succeeding generations;"

(b) "to encourage and assist the states to exercise effectively their responsibilities in the coastal zone through the development and implementation of management programs to achieve wise use of the land and water resources of the coastal zone, giving full consideration to ecological, cultural, historic and aesthetic values as well as to needs for economic development;"

(c) "for all Federal agencies engaged in programs affecting the coastal zone to cooperate and participate with state and local governments and regional agencies in effectuating the purposes of this title; and"

(d) "to encourage the participation of the public, of Federal, state, and local governments, and of regional agencies in the development of coastal zone management programs. With respect to implementation of such management programs, it is the national policy to encourage cooperation among the various state and regional agencies, including establishment of inter-state and regional agreements, cooperative procedures, and joint action, particularly regarding environmental procedures (Public Law 92-583, Sec. 303, hereafter referred to as CZMA)."

V. HAWAII WATER RESOURCES PLAN

The purpose of the Hawaii Water Resources Regional Study was to formulate a comprehensive plan of action to achieve the balanced conservation, development and use of Hawaii's water resources. Coordinated by the U. S. Water Resources Council, the study was conducted by an intergovernmental team representing nearly 50 agencies, with the participation of private industry and the public. The result was the "Hawaii Water Resources Plan," which was published in January, 1979.

Recommendations from the plan which are clearly pertinent to the issue at hand include the following:

1. "Develop additional fresh water supplies to meet year 2000 needs statewide.

   Oahu: Develop ground water islandwide, especially Schofield Plateau and Waialua areas."

2. "Develop alternative water sources to supply them in addition to planned development from conventional ground water sources.

   Restore dike storage.

   Optimize development of Honolulu and Pearl Harbor aquifers.

   Increase streamflow diversions compatibly with minimum streamflow requirements.

   Recycle wastewater and exchange for high quality irrigation water.

   Blend potable water with brackish water for a usable domestic product.

   Desalt brackish water supplies for domestic use."

3. "Provide additional irrigation water.

   Improve diversion, storage, and transmission systems.

   Develop more surface and ground water, compatible with environmental and recreational needs.

Determine the level of treatment necessary to reuse domestic wastewater for sugarcane irrigation.

Study the reuse of treated domestic wastewater for irrigating diversified crops and timber.

Develop systems to reuse treated domestic wastewater as a new source of irrigation water supply."

4. "Control salt water intrusion into basal fresh water aquifers.

Design and space new wells and regulate pumping schedules of all wells to prevent excessive thinning of fresh water lenses.

Increase fresh water recharge to basal aquifers.

Determine long-term effects of periodic overdraft on ground water quality."

P-1398/81

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

EILEEN R. ANDERSON
MAYOR

MICHAEL J. CHUN, Ph.D.
DIRECTOR AND CHIEF ENGINEER

August 20, 1981

ENV 81-315

AM
P/E

MEMORANDUM

TO: HONORABLE EILEEN R. ANDERSON, MAYOR
CITY AND COUNTY OF HONOLULU

VIA: ANDREW I. T. CHANG, MANAGING DIRECTOR

FROM: MICHAEL J. CHUN, DIRECTOR AND CHIEF ENGINEER

SUBJECT: EIS (REVISED) FOR THE KAHALUU WELL, KAHALUU, OAHU

We have reviewed the subject EIS (Revised) and have no additional comments.

MICHAEL J. CHUN
Director and Chief Engineer

cc: BWS

September 18, 1981

TO : DR. MICHAEL J. CHUN
DIRECTOR AND CHIEF ENGINEER
DEPARTMENT OF PUBLIC WORKS

FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY

SUBJECT: YOUR LETTER OF AUGUST 20, 1981, ON THE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR KAHALUU WELL

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

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

For KAZU HAYASHIDA
Manager and Chief Engineer

MHS:bw
cc: K. Hayashida
L. Whang

P-1398

81-2298

PB 81-715

August 24, 1981

TO: HONORABLE EILEEN R. ANDERSON, MAYOR

V.A. MR. ANDREW I.T. CHANG, MANAGING DIRECTOR

FROM: ROY H. TANJI
DIRECTOR AND BUILDING SUPERINTENDENT

SUBJECT: KAHALUU WELL
REVISED DRAFT EIS

We have reviewed the subject project and have no comments to offer.

ROY H. TANJI
Director and Building Superintendent

cc: K. Harada
Board of Water Supply

September 18, 1981

TO : MR. ROY H. TANJI
DIRECTOR AND BUILDING SUPERINTENDENT
BUILDING DEPARTMENT

FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY

SUBJECT: YOUR LETTER OF AUGUST 24, 1981, ON THE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR KAHALUU WELL

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

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

For KAZU HAYASHIDA
Manager and Chief Engineer

MHS:bw
cc: K. Hayashida
L. Whang

81-2298

P-1439/81

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4191

EILEEN R. ANDERSON
MAYOR

JOSEPH K. CONANT
DIRECTOR

CHARLES K. TORIGOE
DEPUTY DIRECTOR

RECEIVED
AUG 31 3 54

August 26, 1981

AM
P/E

Honorable Eileen R. Anderson, Mayor
City and County of Honolulu
530 South King Street
Honolulu, Hawaii 96813

Dear Mayor Anderson:

Subject: Kahaluu Well
Environmental Impact Statement

We have reviewed the subject Environmental Impact Statement and have no comment.

We are retaining the copy of the Statement for our files.

Sincerely,

for Joseph K. Conant

cc: Board of Water Supply
Office of Environmental Quality Control

September 18, 1981

TO : MR. JOSEPH K. CONANT
DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY

SUBJECT: YOUR LETTER OF AUGUST 26, 1981, ON THE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR KAHALUU WELL

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

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

for KAZU HAYASHIDA
Manager and Chief Engineer

MHS:bw
cc: K. Hayashida
L. Whang

P-1439

81-2409

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

EILEEN R. ANDERSON
MAYOR

ROBERT K. MASUDA
DIRECTOR

RECEIVED
Sep 11 3 04 PM '81

August 27, 1981

AM AAR
P/E

MEMORANDUM

TO : HONORABLE EILEEN R. ANDERSON, MAYOR

VIA : ANDREW I. T. CHANG, MANAGING DIRECTOR

FROM : ROBERT K. MASUDA, DIRECTOR

SUBJECT: REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE KAHALUU WELL

We have no comments on the EIS for the proposed conversion of the existing exploratory well to a permanent well.

RKM:vc
cc: BWS

SEP 10 1981

September 29, 1981

TO : MR. ROBERT K. MASUDA
DIRECTOR
DEPARTMENT OF PARKS AND RECREATION

FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY

SUBJECT: YOUR LETTER OF AUGUST 27, 1981, ON THE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR KAHALUU WELL

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

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

Kazu Hayashida
KAZU HAYASHIDA
Manager and Chief Engineer

MHS:am
cc: K. Hayashida
L. Whang

81-2409

BWS

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

EILEEN R. ANDERSON
MAYOR

ROY A. PARKER
DIRECTOR

RECEIVED
BD. OF WATER SUPPLY
SEP 14 3 31 PM '81

TEO/81-2587

September 11, 1981

AM for P/E

MEMORANDUM

TO: HONORABLE EILEEN R. ANDERSON, MAYOR

VIA: ANDREW I. T. CHANG, MANAGING DIRECTOR

FROM: ROY A. PARKER, DIRECTOR

SUBJECT: REVISED DRAFT EIS FOR KAHALUU WELL

We have no comments on the revised Draft EIS.

Roy Parker
for ROY A. PARKER

cc: BWS

September 22, 1981

TO : MR. ROY A. PARKER
DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY

SUBJECT: YOUR LETTER OF SEPTEMBER 11, 1981 ON THE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR KAHALUU WELL

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

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

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

MHS:am
cc: K. Hayashida
L. Whang

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813 • (808) 523-4432

EILEEN R. ANDERSON
DIRECTOR

MICHAEL M. McELROY
DIRECTOR

RECEIVED
BOARD OF WATER SUPPLY
'81 SEP 15 AM 7:51

LU9/81-4901 (JH)

September 14, 1981

AM
P/E

MEMORANDUM

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

FROM : MICHAEL M. McELROY, DIRECTOR

SUBJECT : REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR KAHALUU WELL, KAHALUU, KOOLAUPOKO, OAHU, HAWAII
BOARD OF WATER SUPPLY, TAX MAP KEY 4-7-08:

We find that the revised EIS document for the above includes the Bishop Museum report referenced in Section VII, Historical and Archaeological Sites on Page 25. This report by Rose Schilt, Archaeologist for the Bishop Museum, adequately addresses potential impacts if the construction activities are confined to the old coral road bed and the area presently under California Grass cover. We have no further comments to offer.

If there are any questions, please contact John Machol of our staff at 523-4077.

Michael M. McElroy
MICHAEL M. McELROY
Director of Land Utilization

MMM:sl

September 29, 1981

TO : MR. MICHAEL M. McELROY
DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY

SUBJECT: YOUR LETTER OF SEPTEMBER 14, 1981, ON THE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR KAHALUU WELL

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

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

KAZU HAYASHIDA
Manager and Chief Engineer

MHS:am
cc: K. Hayashida
L. Whang
81-2418

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

EILEEN R. ANDERSON
MAYOR

WILLARD T. CHOW
CHIEF PLANNING OFFICER

RECEIVED
BOARD OF WATER SUPPLY
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DGP8/81-2809

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P/E

September 15, 1981

MEMORANDUM

TO: Mr. Kazu Hayashida, Manager and Chief Engineer
Board of Water Supply

SUBJECT: Revised Draft EIS for Kahaluu Well

We have no further comments on the subject environmental impact statement. Our earlier comments have been incorporated in the revised draft.

Ralph Kawamoto

RALPH KAWAMOTO
Planner

APPROVED:
Willard T. Chow
WILLARD T. CHOW

September 29, 1981

TO : DR. WILLARD T. CHOW
CHIEF PLANNING OFFICER
DEPARTMENT OF GENERAL PLANNING

FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY

SUBJECT: YOUR LETTER OF SEPTEMBER 15, 1981, ON THE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR KAHALUU WELL

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

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

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

MHS:am
cc: K. Hayashida
L. Whang

81-2434

KAHALUU NEIGHBORHOOD BOARD NO. 29
c/o KAHALUU COMMUNITY CENTER
47 232 WAIHEE ROAD
KANEOHE, HAWAII 96744
WEBIA KEA KAHALU'U, WAINE'E MAIKOLE MAIKANE HAOIPUU AND KUALOA

"Let us not ever have an unhappy minority"

March 23, 1981

Honorable Fileen Anderson, Mayor
City and County of Honolulu
City Hall
Honolulu, HI 96813

Subject: Water Resources Position Statement

Dear Mayor Anderson:

For many years the Kahalu'u community has become increasingly concerned over the approaching crisis situation in water resource management. To address this concern, Kahalu'u Neighborhood Board No. 29 has prepared and adopted the attached Water Resource Position Statement.

The first recommendation is made to conform with the intent of the Constitutional Convention to eliminate conflicting policies and directions in water resource management:

"That the State of Hawaii and the City and County of Honolulu, in cooperation with each other, establish an independent Oahu Water Authority which shall have jurisdiction over the management of all perched, dike impounded, and basal ground waters and all stream, sheet flow and ponded surface waters on the island of Oahu."

The other and equally important recommendations are made to implement an action program to correct immediate and prevent future problems brought about by water development and diversion.

We are forwarding this Position Statement with the hope that the background information and specific recommendations will enable you to assist us in solving our very real water resource problems.

Very truly yours,

Elwin Spray, Chairman
Neighborhood Board No. 29

cc: George Aryoshi, Governor, State of Hawaii
Richard Wong, President, Hawaii State Senate
Henry Peters, Speaker, Hawaii State House of Representatives
Rudy Pacarro, Chairman, Honolulu City Council

KAHALUU NEIGHBORHOOD BOARD NO. 29
c/o KAHALUU COMMUNITY CENTER
47 232 WAIHEE ROAD
KANEOHE, HAWAII 96744
WEBIA KEA KAHALU'U, WAINE'E MAIKOLE MAIKANE HAOIPUU AND KUALOA

"Let us not ever have an unhappy minority"

WATER RESOURCES POSITION STATEMENT
March 11, 1981

The Kahalu'u Neighborhood Board No. 29, which represents 8 Ahupua'a from Kualoa to He'eia, is seriously concerned about the availability to water for agriculture, aquaculture and stream and bay resources in this rural community and other communities along the entire windward coast.

For over 10 years the community has worked together to plan its future. The story of this effort is reported in A Planned Community: Steps on the Journey - Summary of Kualoa to He'eia Community Initiatives published by the Board in July, 1980. In September, 1979 the Board adopted the following Community Goals:

> "The windward area from Kualoa to He'eia is distinctively rural in character, possesses great scenic beauty and serves as a critical buffer zone at the very edge of Honolulu's urbanization. The goals of the Development Plan shall insure that Kahalu'u:
>
> a) remains a community devoted to diversified agriculture and related activities.
>
> b) preserves its ocean (Kane'one Bay) and mountain (Ko'olau Range) beauty and its natural water and land resources.
>
> c) maintains its essentially rural life-style.
>
> All efforts to preserve and develop the community's economic, natural and human resources shall be directed toward the accomplishment of these goals."

During the past 2 years the community and the Board have concentrated their attention on the preparation of proposed City and County Development Plans which will reinforce these goals.

Because of the importance of diversified agriculture and stream and bay resources to the future of this and other windward communities, the Board feels compelled to adopt this Water Policy and Resource Position Statement.

Importance of Water for Non-Urban Use

An adequate quantity and quality of fresh water is essential for diversified agriculture, taro farming, stream fishing and aquaculture. The proper quality of

of brackish water is required for fishponds, limu harvesting, bay fish breeding grounds and mariculture. Adequate quantity quality and flow of water is essential for maintenance of the ecology of streams, wetlands, the shoreline and Kane'ohe Bay.

Importance of Non-Urban Lands

Agricultural lands are of vital importance to O'ahu. They provide a satisfying livelihood and lifestyle for many and as a source of food production they are now important, but will become essential as the need for island food and energy self-sufficiencyincreases. Agricultural lands together with conservation and other non-urban lands provide the considerable open space required for a high density island population, the vast areas required for watershed protection and the mountain, stream and shoreline areas required for outdoor recreation. Most of this non-urban land could not survive in a useful condition without an ample quantity of quality fresh water.

Water Development and Diversions

There is a history of developing water on the windward side and diverting it to other parts of the island. For many years the private Waiahole ditch and tunnel system has collected and diverted water to central O'ahu sugar lands currently at the rate of 25 mgd. More recently the Board of Water Supply has developed windward water which it increasingly diverts to urban Honolulu. By the year 2000 the Board of Water Supply estimates that it will produce windward water at the rate of 43 mgd of which it intends to transport 21 mgd to urban Honolulu.

Even now, the Board of Water Supply water development in the He'eia, Kahalu'u, and Waihe'e watersheds has had serious adverse effects on stream flow. Planned water development would extend these adverse effects up and down the windward coast. Furthermore, water development in a particular watershed may reduce availibility in other watersheds. For example, the Haiku Tunnel in He'eia has contributed drastically to the reduction of Kahalu'u Stream flow. (see Exhibit 1)

Water Rights

Board of Water Supply water development has already required Waihe'e farmers to go to court to protect their traditional and constitutional reparaian and appurtenant rights to water. Additional development and diversion may well send many others to court.

Previous Board Positions and Statements

Since its inception the Board has consistently spoken out for a sensible water policy. A few examples follow:

> Position on Water (9-25-77)-A comprehensive statement of concerns and proposals excerpt: "... that no growth or development be permitted on O'ahu until it is proven beyond a reasonable doubt that the potable freshwater resource of this island be not exceeded by a margin wide enough to assure fulfilment of the policy of the State of Hawaii to preserve and promote agriculture towards a large measure of self-sufficiency,than we now have..."
>
> Position Paper on the Waihe'e Watershed (5-10-78) - a thorough review of problems and a proposal for interim development controls or special design

> district and comprehensive watershed development plan.
>
> Monitoring Stream Flows (11-3-80) to DLNR-discusses concern over reduction of stream flows essential to agriculture and requests flow monitoring-excerpts: "...windward water resource development consists principally of tunnels for impounded high level dike water and deep wells for underlying basal water... both types of development reduce stream flow by diversion of draw down...it is important that data be collected prior to construction of any additional test or production facilities...all streams on the windward side must be monitored because the hydrologic relationships between watersheds, dike complexes and basal waters have not been determined..."
>
> Comments on Kahalu'u Well EIS (11-7-80) to BWS - discusses inadequacies, inaccuracies, and misrepresentations in the EIS - discusses probable stream flow reduction and subsequent effects.
>
> Environmental Impact Assessments of Negative Declarations for a number of proposed test wells (2-14-81) to BWS and DLNR - excerpts: "...concerned over the apparent casualness with which exploratory wells are transposed into production facilities...an exploratory well with a bore size much less than that of a production well would be more in keeping with a negative declaration ...Board recommends bore reduction for exploratory wells or else an EIS.
>
> Hui Malama Aina 'O Ko'olau - Water Policy Statement (0-22-80) - endorsement by the Board of Hui Malama's six policy statements.

Water Policy Statements

The Kahalu'u Neighborhood Board No. 29 advises and recommends that:

1. The State of Hawai'i and City and County of Honolulu, in cooperation with each other, establish an independent O'AHU WATER AUTHORITY which shall have jurisdiction over the management of all perched, dike impounded & basal ground waters and all stream, sheet flow & ponded surface waters on the island of O'ahu
2. the Department of Land and Natural Resources immediately establish interim stream flow standards for all windward streams.
3. development of any additional windward water resources be limited by interim or permanent stream flow standards and be reserved first for windward agricultural use and next for windward suburban use.
4. a monitorium be established on any additional diversion of windward water outside Ko'olopoko & Ko'olauloa until establishment of permanent stream flow standards that will assure fulfillment of the policy of the State of Hawai'i to achieve ever increasing agricultural self-sufficiency
5. no water be taken from present agricultural users and that the appurtenant and reparian rights of water users be protected and defended to the fullest extent.

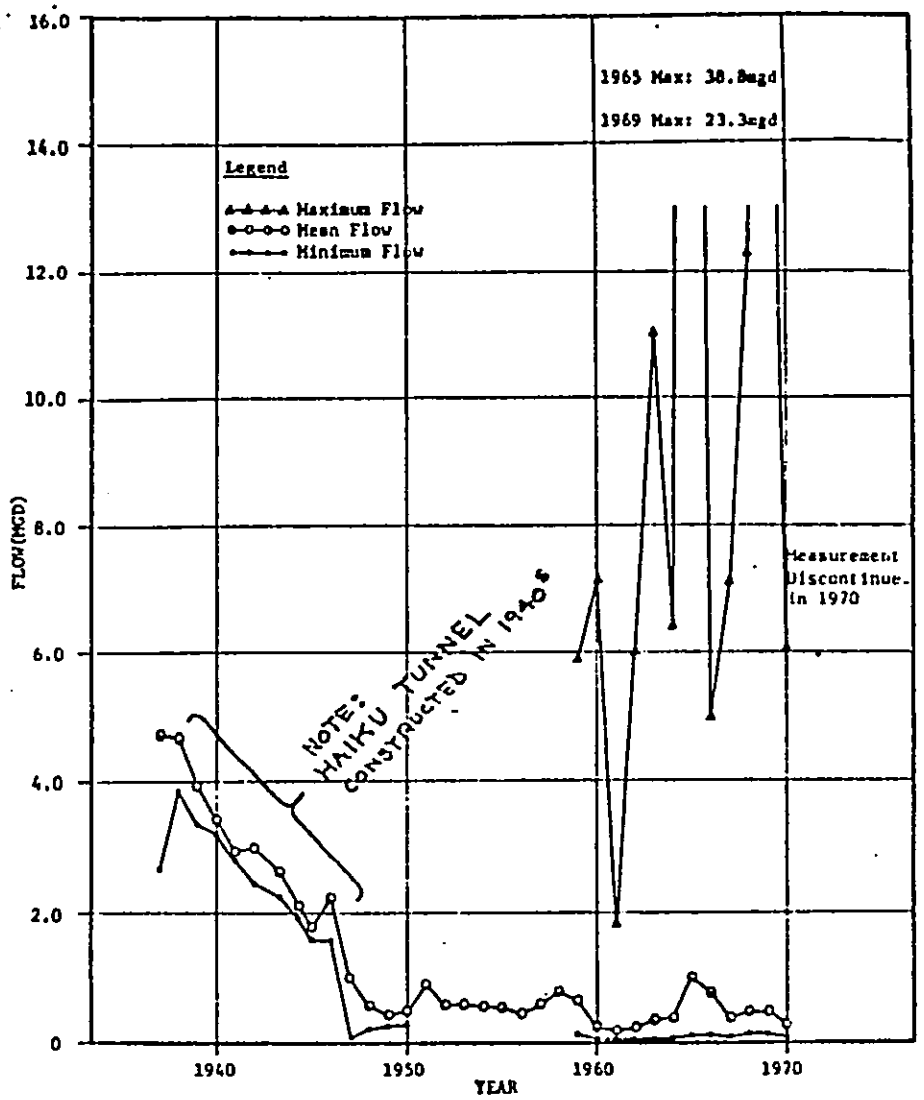
6. the Department of Land and Natural Resources immediately commence monitoring in-stream flows of all windward streams - gauging stations to be installed at appropriate stratetic locations along each stream.

7. the Department of Land and Natural Resources initiate a comprehensive study of all windward water resources encompassing the sources and amounts of impounded high level dike water, underlying basal water, ground water, in-stream water, surface run-off & ground recharge and the hydrologic relationships of the various types of water resources and their further inter-relationships with watersheds, shoreline and Kane'ohe Bay.

8. water for urban growth be developed from conservation measures, re-use and desalinization.

Exhibit I - Stream Flow Data, Kahalu'u Stream
Exhibit II - Typical Hydrological Cross Section of Windward Ko'olau Range
Exhibit III-Description of Ahupua'a in Neighborhood Board No. 29 District
Exhibit IV-Water Resources Map for Neighborhood Board No. 29 District.

Water Resources Position Statement Statement
approved unanimously (For-9, Opposed-0, Absent-5)
Kahalu'u Neighborhood Board No. 29
at Regular Meeting of March 11, 1981



GAGING STATION: 16283000
LOCATION: KAHALUU STREAM NEAR HEEIA

Source: "Water Resources Data for Hawaii and Other Pacific Areas" U.S. Geological Survey

FIGURE 8

STREAMFLOW DATA

KAHALU'U NEIGHBORHOOD BOARD # 29
WATER RESOURCES POSITION STATEMENT
EXHIBIT I

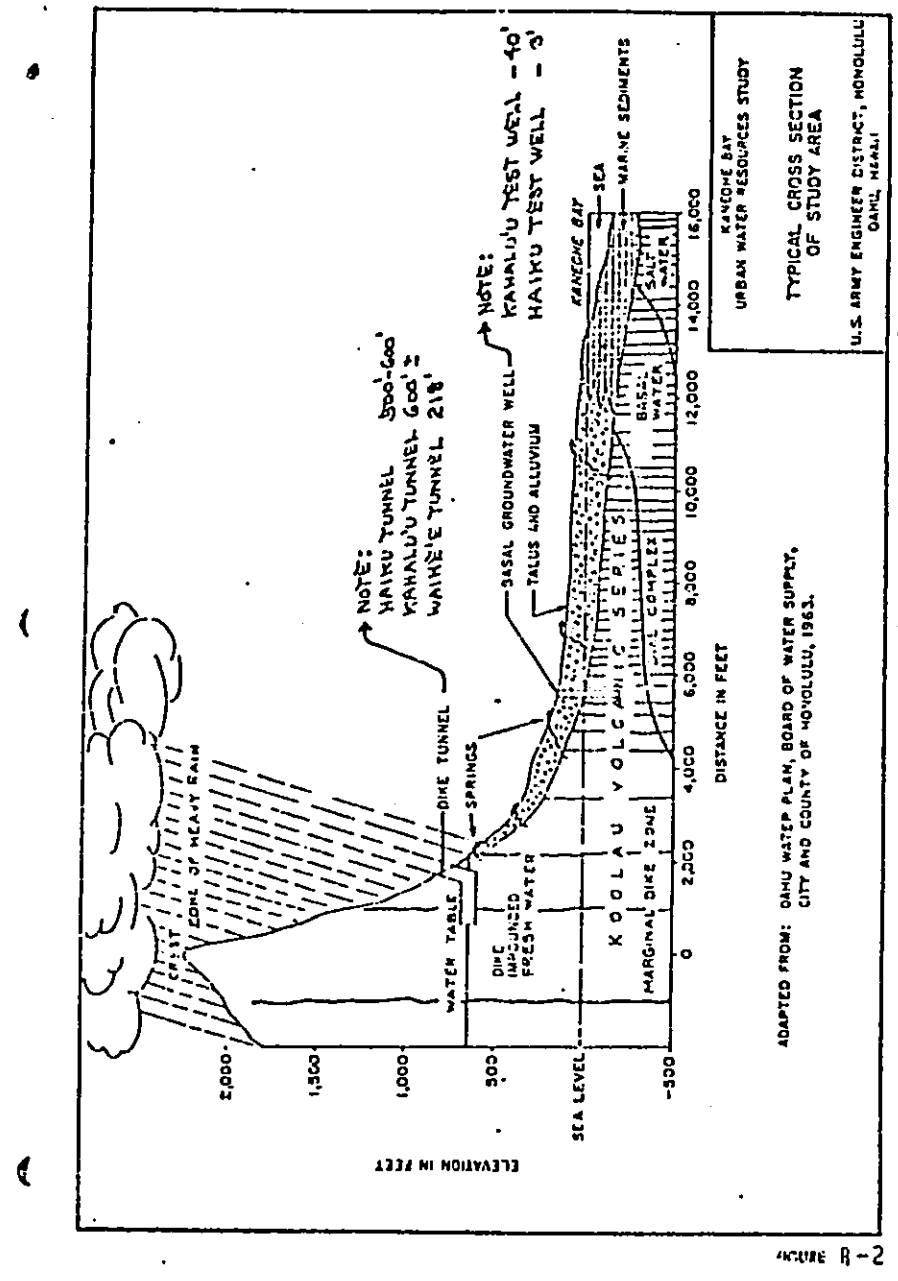


FIGURE B-2

KAHALUU NEIGHBORHOOD BOARD #29
WATER RESOURCES POSITION STATEMENT

EXHIBIT II

FIGURE B-2

KAHALUU NEIGHBORHOOD BOARD NO. 29
c/o KAHALUU COMMUNITY CENTER
47-232 WAIHEE ROAD
KANEOHE, HAWAII 96744
AREAS INCLUDE KAHALUU, WAIHE'E, WAIAHOLE, WAIKANE, HAKIPU'U AND KUALOA

"Let us not ever have an unhappy community"

Water Resource Position Statement
Exhibit III-Ahupua'a Descriptions

Ahupua'a of Kualoa

Agricultural and Recreational-no streams

Ahupua'a of Hakipu'u

Agricultural and Rural

- Hakipu'u Stream-flows through agricultural lands and historic taro lo'i to Kane'ohe Bay.

  Board of Water Supply water development: proposed deep wells-estimated production, .50 mgd. basal water.

  Note: stream flow essential to existing aquaculture development at entrance to bay.

Ahupua'a of Waikane

Agricultural and Rural

- Waikane Stream-flows through agricultural lands to wetland and Kane'ohe Bay.

  Board of Water Supply water development: proposed deep wells-estimated production,.50 mgd basal water (see note 1)

  Private water development: (see note 2)

- Waiku'eke'e Stream'-flows through agricultural lands-major tributary to Waikane Stream.

  Board of Water Supply water development: proposed deep wells-estimated production .50 mgd basal water (see note 1)

  Private water development: (see note 2)

Ahupua'a of Waiahole

Agricultural and Rural

- 'Uwao Stream-flows through agricultural lands-tributary to Waianae Stream

  Board of Water Supply water development: none.

  Private water development: (see note 2).

- Waianu Stream-flows through agricultural lands-major tributary to Waiahole Stream.

  Board of Water Supply water development: proposed deep wells-estimated production, .50 mgd basal water (see note 1).

  Private water development (see note 2).

- Waiahole Stream-flows through agricultural lands to wetland and Kane'ohe Bay.

  Board of Water Supply water development: proposed deep wells, estimated production, .50 mgd basal water (see note 1).

  Private water development: (see note 2).

Ahupua'a of Ka'alaea

Mostly Agricultural and Rural-some suburban

- Ka'alaea Stream-flows through agricultural lands to wetland and Kane'ohe Bay.

  Board of Water Supply water development: none.

Ahupua'a of Waihe'e

Mostly Agricultural and Rural-some suburban-parks, school, public and community facilities.

- Waiaka (North Waihe'e) Stream-minor stream in agricultural area-flows to wetland and Kane'ohe Bay.

  Board of Water Supply water development: none.

- Waihe'e Stream-flows through agricultural land to flood control lagoon and Kane'ohe Bay.

  Board of Water Supply water development: existing high level tunnel-1979 production 5.54 mgd dike water-existing inclined wells-1979 production .77 mgd dike water-existing high level wells-1979 production not published (see note).

  Note: Water development has so reduced stream flow that a court order will not allow diversions to reduce stream flow below 2.70 mgd-this, however, is not an adequate flow to sustain extensive taro production downstream.

- Hamana Stream-Waihe'e tributary above water development.

- Kalia Stream-Waihee tributary below water development.

Ahupua'a of Kahalu'u

Partly Suburbanized-single family houses, townhouses, strip commercial area.

- Kalohaka Stream-minor stream in agricultural area-flows to Waihe'e Stream near flood control lagoon.

  Board of Water Supply water development: none.

- Kahalu'u Stream-agriculture on Waihe'e side-houses crowding He'eia side may require channelizing lower portion-flows to channel and flood control lagoon.

  Board of Water Supply water development: existing high level tunnel-1979 production, 1.89 mgd dike water-existing deep test well-estimated production-.50 mgd basal water (but may be nearer 1.5 mgd).

  Note: Tunnel diversion has contributed toward reduced stream flow. (See Exhibit I).

Ahupua'a of He'eia ('Ahuimanu and He'eia Kea portions)

Partly suburbanized-single family houses, townhouses, shopping center and cemetary.

- 'Ahuimanu Stream-planned residential will protect upper part of stream (see note)-housing development has caused channelizing of lower part-flows to channel and flood control and Kane'ohe Bay.

  Board of Water Supply water development: none.

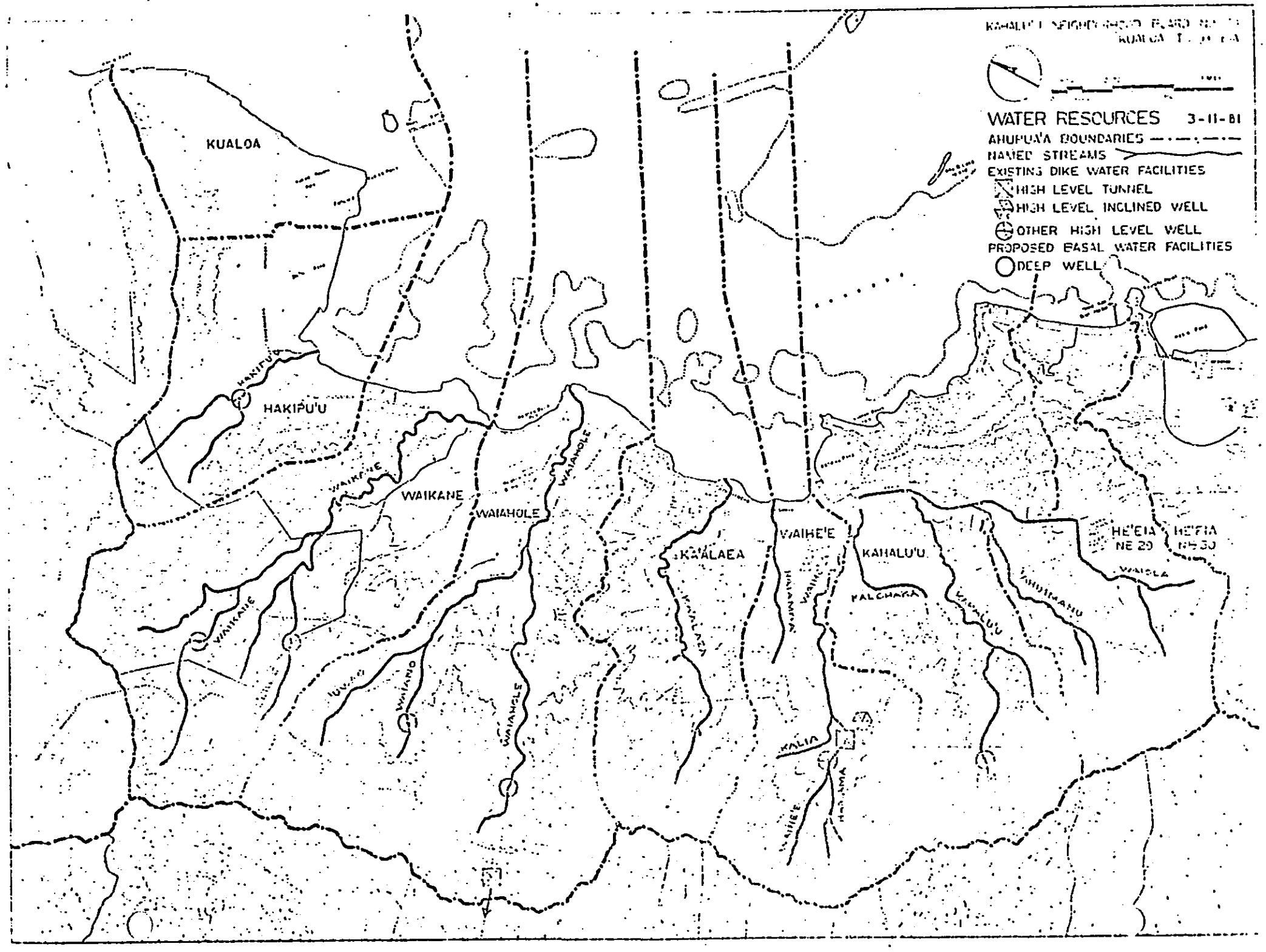
  Note: planned residential on upper stream may develop private water production-developer to donate historic Kahalu'u Taro Lo'i site.

- Waiola Stream-upper part protected by cemetary-lower part channelized to handle increased pavement and roof run-off-flows to channel and flood control lagoon and Kane'ohe Bay.

  Board of Water Supply water development: none.

Note 1 Total estimated Board of Water Supply production for Waiahole and Waikane wells is 2.00 mgd-so, .5 mgd is allocated to each of four streams: Waikane, Waike'eke'e, Waiano and Waiahole.

Note 2 Private development includes extensive Waiahole ditch and tunnel system which collects 25 mgd of dike water from Kahana, Waikane and Waiahole and diverts it to central O'ahu Sugar lands.


KUALOA
HAKIPU'U
HAKIPU'U
WAIKANE
WAIKANE
WAIAHOLE
WAIAHOLE
KAALAEA
WAIHE'E
KAHALU'U
KALCHAKA
HE'EIA
NE 29
WAIOLA
KALIA
WATER RESOURCES 3-11-81
AHUPUA'A BOUNDARIES
NAMED STREAMS
EXISTING DIKE WATER FACILITIES
HIGH LEVEL TUNNEL
HIGH LEVEL INCLINED WELL
OTHER HIGH LEVEL WELL
PROPOSED BASAL WATER FACILITIES
DEEP WELL

KAHALUU NEIGHBORHOOD BOARD NO. 29
c/o KAHALUU COMMUNITY CENTER
47-239 WAIHEE ROAD
KANEOHE, HAWAII 96744
AREAS OF KAHALUU, WAIHEE, WAIAHOLE, WAIKANE, HAKIPUU AND KUALOA

"Let us not even have an unhappy minority"

November 3, 1980

Mr. Susumu Ono, Director
Department of Land and Natural Resources
State of Hawaii
1151 Punchbowl Street
Honolulu, HI 96813

Subject: Monitoring Stream Flows - Koolaupoko and Koolauloa

Dear Mr. Ono:

Because of its continuing concern over the reduction of stream flows due to existing and proposed development of dike and basal water resources, Kahalu'u Neighborhood Board No. 29, at its October 22, 1980 meeting, moved "that the Department of Land and Natural Resources start monitoring in-stream flows of all windward side streams - specifically those in Koolaupoko and Koolauloa".

Windward water resource development consists principally of tunnels for impounded high level dike water and deep wells for underlying basal water (see various exhibits attached).

Both types of development reduce stream flow by diversion or drawdown. It is vital that existing operating gauging stations be supplemented by reactivating abandoned stations and installing new stations in order to adequately measure flows immediately down stream of all existing and proposed tunnels and wells. It is important that data be collected prior to construction of any additional test or production facilities.

Although some of the attached exhibits refer primarily to the Kaneohe Bay Watershed, all streams on the windward side must be monitored because the hydrologic relationships between watersheds, dike complexes and basal waters have not been determined.

The maintenance of adequate stream flows is generally important for ecological reasons, but is particularly important in Neighborhood Board No. 29 (Koolauloa), No. 29 (Kahalu'u) and No. 32 (Waiahole) areas for the development of taro farming, aquaculture and diversified agriculture.

Very truly yours,

Edwin B. Stevens

Edwin B. Stevens
Chairman
Planning and Zoning Committee
Kahaluu Neighborhood Board No. 29

Enclosure

cc: Councilman Toraki Matsumoto
Representative Charles Toguchi
Board of Water Supply
U.S. Geological Survey
U.S. Soil Conservation Services (Otis Gryde - Field Services)
Neighborhood Boards No. 28, 30, 31, 32
Kahaluu Neighborhood Board No. 29 Resource Center
Ed Stevens - Neighborhood Board No. 29 Planning and Zoning Committee
Guy Nakamoto - Neighborhood Board No. 29 Water Resources Committee

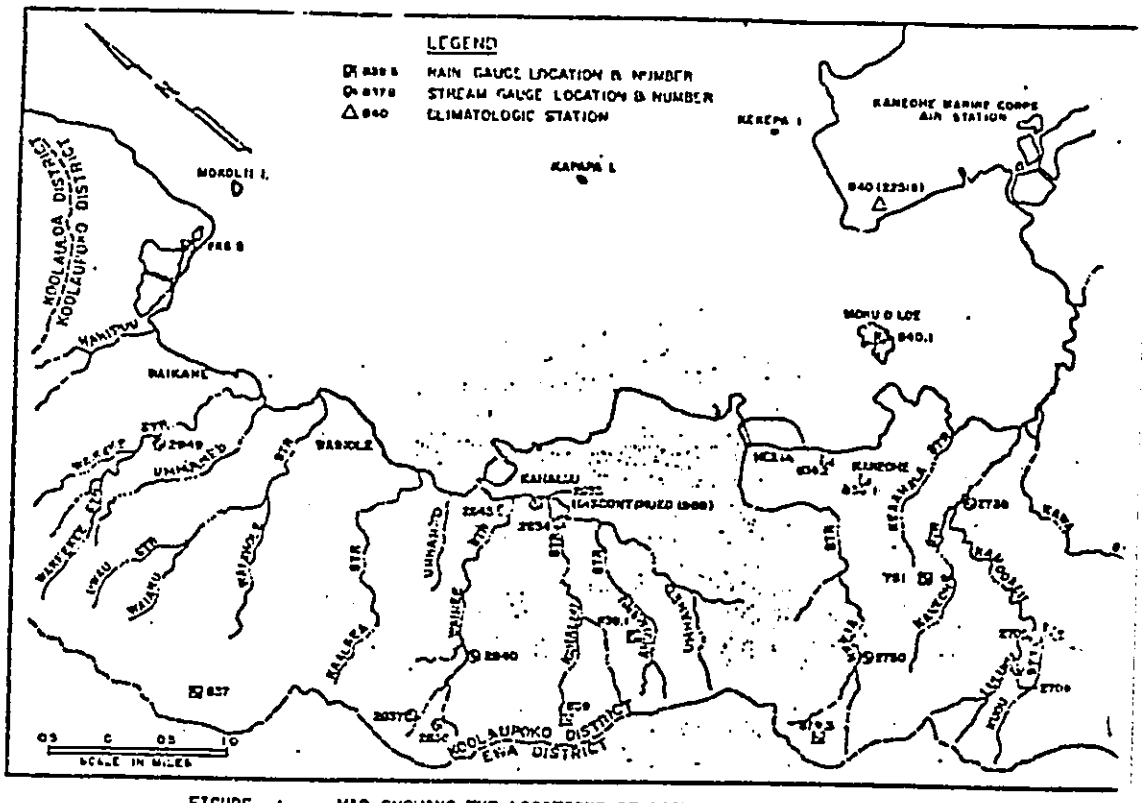


FIGURE 4: MAP SHOWING THE LOCATIONS OF RAIN GAGES AND STREAM GAGES IN THE KANEOHE BAY AREA AND THE KMCAS CLIMATOLOGIC STATION

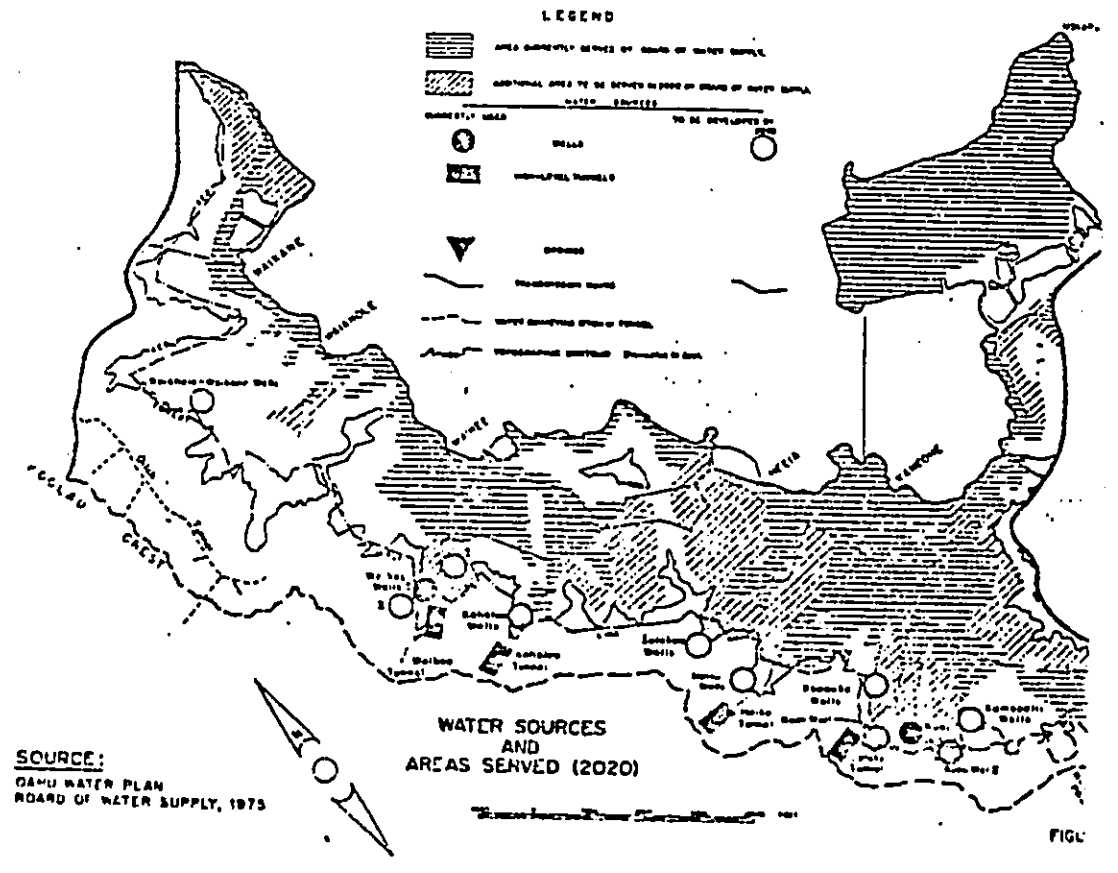
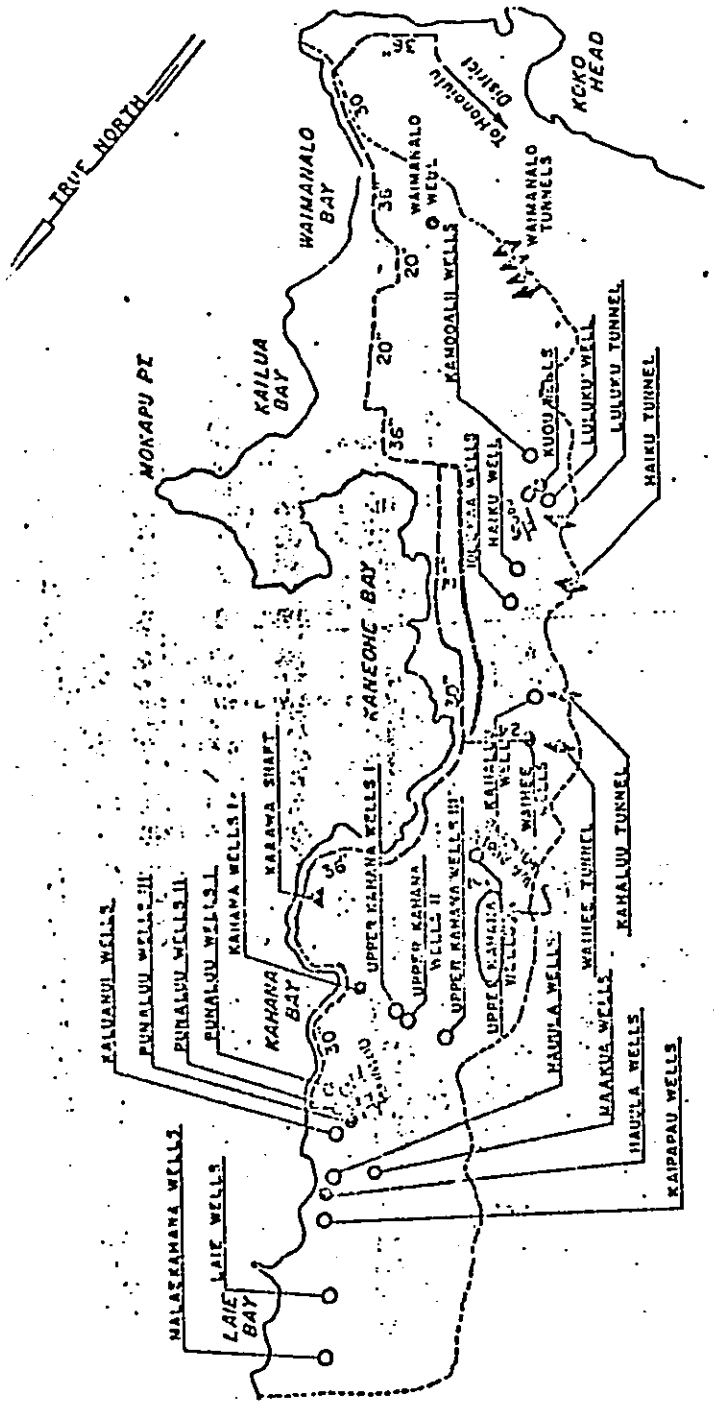


FIGURE 16

FIGU



WINDWARD DISTRICT
WATER SYSTEM

FIGURE 3

II. PURPOSE OF THE PROJECT

The proposed Kahaluu Well is one of many ongoing projects being undertaken by the Board of Water Supply to locate and develop new sources of water. It is urgent that the Kahaluu Well be developed in order to meet the ever increasing water demand for the Windward and Honolulu Water Districts. The production of all existing sources in the Windward Water District totals 17.58 mgd. These existing sources are as follows:

SOURCE	1979 PRODUCTION (mgd)
• Waihee Tunnel*	5.54
• Kahaluu Tunnel	1.69
Haiku Tunnel	1.05
Luluku tunnel	0.74
Waimanalo Tunnels	0.63
Kuou Wells	1.91
Waimanalo Well	0.01
• Waihee Wells I**	-
• Waihee Inclined Wells	0.77
Haoula Well	0.15
Punaluu Wells I	0.39
Punaluu Wells II	3.33
Punaluu Wells III	1.17
Total	17.58 mgd

* Yield for tunnel is base flow. Flow manipulated by bulkhead pressure and system demand.

** Quantity varies to meet Court Order to allow 2.7 mgd flow at stream gage station located below Waihee Wells I.

To supplement the existing Windward sources the Board of Water Supply is studying the possible development of the following sources:

SOURCE	ESTIMATED CAPACITY (mgd)
Kahana Wells	0.5
Haiku Well	0.5
Iolekaa Well	0.3
• Kahaluu Well	0.5
Luluku Well	1.0
Kaaawa Well I	0.5
Kaneohe Well I	0.5
Kaaawa Well II	0.5
Kaluanui Wells	2.0
Punaluu Wells IV	0.5
Punaluu Wells V	5.0
Kaneohe Well II	0.5
• Hakipuu Well	0.5
Kalpapau Wells	1.0
Kuou Well II	0.5
Laie Wells	1.0
Waimanalo Wells II	0.3
Waiaele Well	1.0
Maakua Wells	0.5
Kahana Valley	6.0
Kahana Well II	0.5
• Waiahole-Waikane Wells I	1.0
• Waiahole-Waikane Wells II	1.0

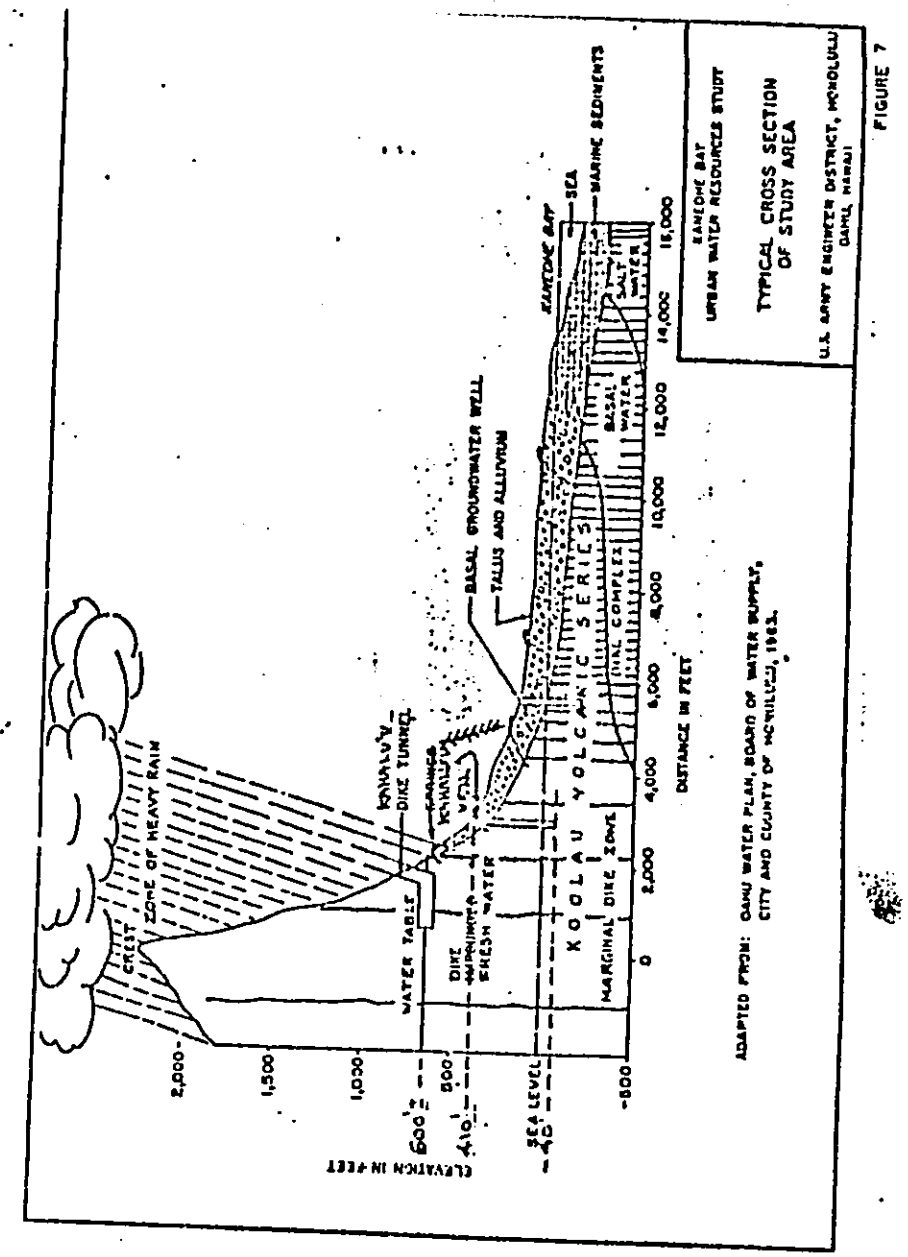
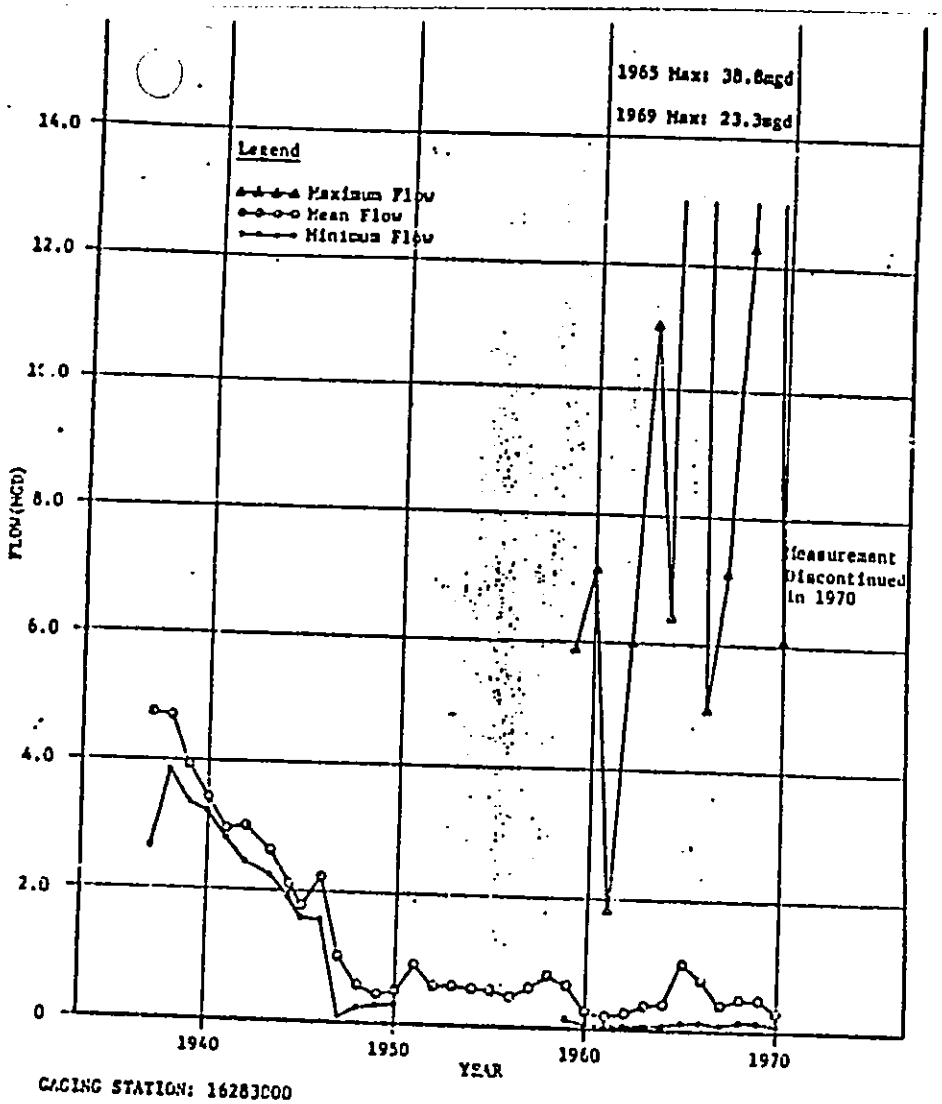


FIGURE 7



GAGING STATION: 16283C00

LOCATION: KAHALUU STREAM NEAR HEEIA

Source: "Water Resources Data for Hawaii and Other Pacific Areas" U.S. Geological Survey

FIGURE 8

STREAMFLOW DATA

GEORGE R. ARIYOSHI
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
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

March 31, 1981

Mr. Edwin B. Stevens
Chairman, Planning & Zoning Comm.
Kahaluu Neighborhood Board No. 29
47-232 Waihee Road
Kaneohe, Hawaii 96744

Dear Mr. Stevens:

Thank you for your letter expressing concern over the need to monitor streamflows in the Koolaupoko and Koolauloa areas on Oahu.

The Department of Land and Natural Resources has recognized the need for the maintenance of streamflows necessary for significant instream uses in many of our streams in the State. Currently, departmental programs addressing this area of concern include (1) a cooperative stream-gaging program with the U.S. Geological Survey where streams throughout the State including those in windward Oahu are being gaged to determine the quantity and quality of streamflows, (2) issues concerning instream uses are discussed in the department's functional plan on water resources, (3) new legislative proposals to establish an ongoing instream use program in the department have been introduced in the 1981 legislative session.

With regard to our current cooperative USGS program, plans are underway to begin profiling streamflow characteristics of major stream systems having significant instream values. This basic hydrologic information certainly will help analyze instream flow requirements of our streams.

The functional plan on water resources addresses the need for instream use protection and implementing actions to establish a long-term instream use program in the State government. A copy of the plan is enclosed for your information.

Finally, in an attempt to obtain statutory authority for the State to establish a program to protect instream uses of water, Governor Ariyoshi introduced a bill relating to the protection of stream uses of water (SB 1470, HB 1982). The companion bills establish an instream use program in the Department of Land and Natural Resources. Our latest information on the status of these bills indicates

that they both will be deferred to the 1982 legislative session for further consideration.

We certainly appreciate your interest and concern over the critical problem confronting many of our areas in the State. Please be assured that the Department of Land and Natural Resources recognizes the problems and is doing its best with available financial resources and personnel.

Very truly yours,

SUSUMU ONO
Chairman of the Board

Enc.

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
Donna H. Howard
WALLACE S. MIYAHIRA
ROBERT A. SOUZA
CLAUDE T. YAMAMOTO

KAZU HAYASHIDA
Manager and Chief Engineer

December 5, 1980

Mr. Edward B. Stevens
Chairman
Planning and Zoning Committee
Kahaluu Neighborhood Board No. 29
47-232 Waihee Road
Kaneohe, Hawaii 96744

Dear Mr. Stevens:

Subject: Your Letter of November 3, 1980 to Department of Land and Natural Resources on Monitoring of Windward Stream Flows

Thank you for sending us a copy of your letter to Mr. Susumu Ono. We have cooperated for a long time with the U. S. Geological Survey (USGS) to operate stream gages on many streams on this island. On the windward side, the streams include Waihee Stream, Kaluanui Stream, and Punaluu Stream. Currently we are working with USGS to gage Kahaluu Stream and Haiku Stream.

Should you have questions, please call Richard Fujii at 548-6134.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Mr. Susumu Ono, DLNR

The Sierra Club, Hawaii Chapter

Post Office Box 22397, Honolulu, HI 96822
Telephone: (808) 946-8494

September 22, 1981

MGR
AM
P/E

Nuuanu Pali, by Fisquet, 1837

Board of Water Supply
City and County of Honolulu
Honolulu, Hawaii 96843

Revised Draft Environmental Impact Statement
Kamalu'u Production Well, Kahalu'u, Ko'olaupoko, Oahu

In regards to the Kahalu'u well, the Sierra Club repeats the position that it took on the Kaaku Well:

1. There should be no expansion of Windward wells until minimum stream flow standards have been set for all Windward streams. Past experience has shown that the dike and stream complex is inter-related, and there can be detrimental effects in a related stream some distance away. The Board of Water Supply does not presently have sufficient information.
2. We continue to congratulate the Board on its conservation efforts, be we still consider them insufficient.
3. We continue to feel that the mandated State Water Policy should be in place before further expansion of the water system.
4. We continue to think that addressing the needs of agriculture first would be showing great wisdom.
5. We continue to insist that water is one of Hawaii's greatest resources, for now and for the future, and we express a concern that it be regarded as such.

We have thoroughly read the EIS response of the Kahalu'u Neighborhood Board and wish to fully concur with their analysis.

Aloha

Gail N. Menck
Legislative Chairman

SEP 24 3 16 PM '81

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU

[illegible]

[illegible]

FRANK F. FASI, Mayor

YOSHIE H. FUJINAKA, Chairman
DAT QUON PANG, Vice Chairman
RYOKICHI HIGASHIONNA
Donna H. Howard
WALLACE S. MIYAHIRA
ROBERT A. SOUZA
CLAUDE T. YAMAMOTO

KAZU HAYASHIDA
Manager and Chief Engineer

December 5, 1980

Mr. Edward B. Stevens
Chairman
Planning and Zoning Committee
Kahaluu Neighborhood Board No. 29
47-232 Waihee Road
Kaneohe, Hawaii 96744

Dear Mr. Stevens:

Subject: Your Letter of November 3, 1980 to Department of Land and Natural Resources on Monitoring of Windward Stream Flows

Thank you for sending us a copy of your letter to Mr. Susumu Ono. We have cooperated for a long time with the U. S. Geological Survey (USGS) to operate stream gages on many streams on this island. On the windward side, the streams include Waihee Stream, Kaluanui Stream, and Punaluu Stream. Currently we are working with USGS to gage Kahaluu Stream and Haiku Stream.

Should you have questions, please call Richard Fujii at 548-6134.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Mr. Susumu Ono, DLNR

[illegible]

THE SIERRA CLUB, Hawaii Chapter

Post Office Box 22397, Honolulu, HI 96822
Telephone: (808) 946-8494

September 22, 1981

MGR
AM
P/E

Board of Water Supply
City and County of Honolulu
Honolulu, Hawaii 96843

Nuuanu Pali, by Fisquet, 1837

Revised Draft Environmental Impact Statement
Kamalu'u Production Well, Kahalu'u, Ko'olaupoko, Oahu

In regards to the Kahalu'u well, the Sierra Club repeats the position that it took on the Kaimu Well:

1. There should be no expansion of Windward wells until minimum stream flow standards have been set for all Windward streams. Past experience has shown that the dike and stream complex is inter-related, and there can be detrimental effects in a related stream some distance away. The Board of Water Supply does not presently have sufficient information.
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We have thoroughly read the EIS response of the Kahalu'u Neighborhood Board and wish to fully concur with their analysis.

Aloha

Ilsa N. Menck
Legislative Chairman

SEP 24 3 16 PM '81

October 2, 1981

Mrs. Lola N. Mench
Legislative Chairman
The Sierra Club, Hawaii Chapter
P. O. Box 22697
Honolulu, Hawaii 96822

Dear Mrs. Mench:

Subject: Your Letter of September 22, 1981 on the Revised Draft Environmental Impact Statement (EIS) for Kahaluu Well

Thank you for your comments on the revised draft EIS for the proposed Kahaluu Well project. The Board of Water Supply (Board) will append your letter to the revised environmental document.

Until minimum streamflow standards are adopted by the State, the Board plans to proceed with its well development projects in the Windward area, including Kahaluu. The Board has been taking streamflow measurements before, during, and after each exploratory well project and has commissioned the U. S. Geological Survey to install permanent stream gages, such as on Kahaluu Stream, to monitor the long-term effect of the wells. To mitigate any adverse short- and long-term impacts to streamflow, the Board will monitor streamflows when the wells are placed in operation and will control the pumping to maintain streamflows in Haiku, Iolekaa, and Kuala Streams established by the State.

The proposed project is in accord with the State's Water Resources Development Plan. Some of the applicable objectives of the Plan are 1) assure adequate municipal supplies for planned urban growth, 2) support long-range municipal water supply planning, and 3) promote municipal water conservation.

Agricultural water needs were addressed in the environmental document according to the latest information available. A survey to determine agricultural water uses in the Windward area is being planned by the State Department of Agriculture with the assistance of the State Department of Land and Natural Resources and the Board of Water Supply.

In conjunction with the Board's water development program, the agency has pursued a vigorous water conservation program. This program, in part, consists of making presentations at schools, distributing pamphlets, making appeals to restaurants to serve water only when requested, and working with the State Highway Division and the City Parks and Recreation Department to substitute alternative sources of water for irrigation. The Board has been able to achieve as much as a 10 percent reduction in water use since 1970 despite the addition of more than 6,000 new consumers.

If you have any questions, please contact Kazu Hayashida of the Board of Water Supply at 548-6100.

Very truly yours,

EILEEN R. ANDERSON

ERA:lm (M. Shigetani, Board of Water Supply)

cc: Mr. Andrew I. T. Chang
Managing Director

K. Hayashida
G. Hiu
J. Whang

81-2514
81-2502

October 2, 1981

Mrs. Lola N. Mench
Legislative Chairman
The Sierra Club, Hawaii Chapter
P. O. Box 22697
Honolulu, Hawaii 96822

Dear Mrs. Mench:

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Very truly yours,

EILEEN R. ANDERSON

ERA:lm (M. Shigetani, Board of Water Supply)

cc: Mr. Andrew I. T. Chang
Managing Director

K. Hayashida
G. Miu
J. Whang

81-2514
81-2502

RECEIVED
BOARD OF WATER SUPPLY
SEP 22 3 48 PM '81

81-2478

LEGAL AID SOCIETY OF HAWAII

SUITE 1100, 1164 BISHOP STREET
HONOLULU, HAWAII 96813
TELEPHONE (808) 536-4302

RICHARD DORSEY MULLER, ESQ.
Interim Executive Director

Hand Delivered

Mgr. KW
AM
P/E
Comm Rel (Denise S.
(for info only
9/23/81

September 22, 1981

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

Dear Mr. Hayashida:

This office has been retained to represent Mr. Kawehi Ryder and Hui Malama Aina O Ko'olau regarding the Board of Water Supply Kahaluu Well project. We have examined the Revised Draft Environmental Impact Statement for the Kahaluu Well, Kahaluu, Koolaupoko, Oahu, Hawaii, Tax Map Key 4-7-08:2, dated August 13, 1981 and have concluded that this EIS fails to meet the requirements of § 1:42 of the Regulations of the Environmental Quality Commission. Many of our objections were stated in Kaweni Ryder's letter of December 5, 1980 which is included in the EIS, and that letter is incorporated herein by reference. The issues raised in that letter have not been adequately addressed in the Revised EIS.

The EIS still does not attempt to determine the amount of water needed by the farmers and water users identified in Table 4 at pp. 23 and 24. This table shows over 36 acres of land in agricultural use and only includes those persons responding to a postcard survey. Nothing is included in the Revised EIS to show whether there are additional users of the stream water. Without knowing how much water is actually needed, it is impossible to determine whether any water is availablefor removal from the watershed by your well project. Unless a minimum stream flow including environmental needs and agricultural needs for all agricultural uses and potential uses in Kahaluu is determined and included this EIS is inadequate. Due to the water diversions from the Kahaluu Stream by the BWS's existing Kahaluu Tunnel, there is not enough water in the stream for Kawehi Ryder's existing needs on his property. This would be verified if you determined the water requirements of all the farmers of Kanaluu.

In addition, your data on the test pumping of the stream does not include the long-term effects of pumping. The test was conducted during a very brief five-day period in December of last year and in no way indicates what the effects of long-term pumping would be on stream flow. Nevertheless, at p. 39 of the Revised EIS, you state that pumping has "negligible effects on the minimum flow for Kahaluu Stream."

From the EIS, it is almost impossible to interpret the test data or to figure out how the test was conducted. No testing model is presented and the methodology is not apparent. Many of the measurements are entered as "N/A" which is not explained. At p. 39 you state that 1,000 gallons per minute (1.44 mgd.) was the pumpage rate. Yet Table 3 is stated in cubic feet/second (CFS). We are not told what is done with the water being pumped out. However, it appears that the water being pumped out was going directly into Kahaluu Stream somewhere between Site 2 and Site 2A. It is not surprising that you found no effect on stream flow since you measured the water in the stream including the water you pumped into the stream! If the stream figures for Site 2 and Site 2A reflect the amount of water put into the stream by the test pumping and we subtract an equivalent amount at Sites 4 and 5, then there is a very significant drop in stream flow of more than 20%! Thus, the data and stated conclusion that there is no effect on stream flow is totally incorrect and misleading. The EIS certainly does not explain how the data presented supports any conclusion as to stream flow.

Since your response to Mr. Ryder's letter of December 5, 1980 was based upon the incorrect conclusion that pumping has no effect on stream flow, the other points raised in that letter remain to be addressed. Of special importance is the fact that you are planning 23 new wells on the windward side to remove over 26 million gallons of water per day. This massive dewatering of the remaining windward streams will have a very great cumulative social, environmental and economic impact on the people of Oahu and their environment. Such impacts on population growth, demand for and adequacy of housing and other public services and the urbanization of windward Oahu and the displacement of farmers must be addressed. This you have completely failed to do.

Unless the points raised by the December 5, 1980 letter, as well as those stated here are adequately and thoroughly addressed, Hui Malama Aina O Ko'olau and Kawehi Ryder will have no choice except to bring suit to invalidate the EIS and to enjoin any further work on the Kahaluu Well project.

Sincerely,

Ronald Albu

RONALD ALBU
Attorney for Kawehi Ryder
and Hui Malama Aina O Ko'olau

RA:ggp

October 29, 1981

Mr. Richard D. Muller
Interim Executive Director
Legal Aid Society of Hawaii
Suite 1100, 1164 Bishop Street
Honolulu, Hawaii 96813

Attention: Mr. Ronald Albu

Dear Mr. Muller:

Subject: Your Letter of September 22, 1981, on the Revised Draft Environmental Impact Statement (EIS) for Kahaluu Well

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

We have the following comments in regard to your letter:

The EIS still does not attempt to determine the amount of water needed by the farmers and water users identified in Table 4 at pp. 23 and 24. This table shows over 70 acres of land in agricultural use and only includes those persons responding to a postcard survey. Nothing is included in the Revised EIS to show whether there are additional users of the stream water. Without knowing how much water is actually needed, it is impossible to determine whether any water is available for removal from the watershed by your well project. Unless a minimum stream flow including environmental needs and agricultural needs for all agricultural uses and potential uses in Kahaluu is determined and included, this EIS is inadequate. Due to the water diversions from the Kahaluu Stream by the DLNR's existing Kahaluu Tunnel, there is not enough water in the stream for Kaushi Ryder's existing needs on his property. This would be verified if you determined the water requirements of all the farmers of Kahaluu.

Our consultant attempted to determine the amount of water used by respondents of the postcard survey, who indicated that they use Kahaluu Stream. Many of the people contacted had no idea as to the amount of water they were using. Others, who did give an amount of water used, indicated the amount was what they thought they used.

However, we are currently working jointly with the State Department of Agriculture to determine agricultural water uses in the Windward area, including the Kahaluu area. When the survey on agricultural water use is complete, we will be discussing the results with farmers in the Windward areas.

To mitigate any long-term impacts to stream water users and aquatic biota, we will be monitoring streamflow when the well becomes operational and will maintain the existing streamflow by controlling the pumpages from the well.

In addition, your data on the test pumping of the stream does not include the long-term effects of pumping. The test was conducted during a very brief five-day period in December of last year and in no way indicates what the effects of long-term pumping would be on stream flow. Nevertheless, at p. 39 of the Revised EIS, you state that pumping has 'negligible effects on the minimum flow for Kahaluu Stream."

We agree that the five-day sustained pump test does not confirm any long-term effects. However, as indicated we will control the pumpages so that streamflow in the Kahaluu Stream will not be affected.

From the EIS, it is almost impossible to interpret the test data or to figure out how the test was conducted. No testing model is presented and the methodology is not apparent. Many of the measurements are entered as "N/A" which is not explained. At p. 39 you state that 1,000 gallons per minute (1.44 mgd) was the pumping rate. But Table 3 is stated in cubic feet/second (CFS). We are not told what is done with the water being pumped out. However, it appears that the water being pumped out was going directly into Kahaluu Stream somewhere between Site 3 and Site 3A. It is not surprising that you found no effect on stream flow since you measured the water in the stream <u>including the water you pumped into the stream</u>! If the stream figures for Site 3 and Site 24 reflect the amount of water put into the stream by the test pumping and we subtract an equivalent amount at Sites 4 and 5, then there is a very significant <u>drop</u> in stream flow of more than 30%! Thus, the data and stated conclusion that there is no effect on stream flow is totally incorrect and misleading. The EIS certainly does not explain how the data presented supports any conclusion as to stream-flow.

October 29, 1981

Mr. Richard D. Muller
Interim Executive Director
Legal Aid Society of Hawaii
Suite 1160, 1164 Bishop Street
Honolulu, Hawaii 96813

Attention: Mr. Donald Albu

Dear Mr. Muller:

Subject: Your Letter of September 22, 1981, on the Revised Draft Environmental Impact Statement (EIS) for Kahaluu Well

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

We have the following comments in regard to your letter:

The EIS still does not attempt to determine the amount of water needed by the farmers and water users identified in Table 4 at pp. 23 and 24. This table shows over 38 acres of land in agricultural use and only includes three persons responding to a postcard survey. Nothing is included in the Revised EIS to show whether there are additional users of the stream water. Without knowing how much water is actually needed, it is impossible to determine whether any water is available for removal from the watershed by your well project. Unless a minimum stream flow including environmental needs and agricultural needs for all agricultural user and potential uses in Kahaluu is determined and included, this EIS is inadequate. Due to the water diversions from the Kahaluu Stream by the DLNR's existing Kahaluu Tunnel, there is not enough water in the stream for Kaveki Ryder's existing needs on his property. This would be verified if you determined the water requirements of all the farmers of Kahaluu.

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However, we are currently working jointly with the State Department of Agriculture to determine agricultural water uses in the Windward area, including the Kahaluu area. When the survey on agricultural water use is complete, we will be discussing the results with farmers in the windward areas.

To mitigate any long-term impacts to stream water users and aquatic biota, we will be monitoring streamflow when the well becomes operational and will maintain the existing streamflow by controlling the pumpages from the well.

In addition, your data on the test pumping of the stream does not include the long-term effects of pumping. The test was conducted during a very brief five-day period in December of last year and in no way indicates what the effects of long-term pumping would be on stream flow. Nevertheless, at p. 30 of the Revised EIS, you state that pumping has 'negligible effects on the minimum flow for Kahaluu Stream."

We agree that the five-day sustained pump test does not confirm any long-term effects. However, as indicated we will control the pumpages so that streamflow in the Kahaluu Stream will not be affected.

From the EIS, it is almost impossible to interpret the test data or to figure out how the test was conducted. No testing model is presented and the methodology is not apparent. Many of the measurements are entered as "S/A" which is not explained. At p. 39 you state that 1,000 gallons per minute (1.44 mgd) was the pumpage rate. Yet Table 3 is stated in cubic feet/second (CFS). We are not told what is done with the water being pumped out. However, it appears that the water being pumped out was going directly into Kahaluu Stream somewhere between Site 2 and Site 2A. It is not surprising that you found no effect on stream flow since you measured the water in the stream <u>including the water you pumped into the stream!</u> If the stream figures for Site 3 and Site 2A reflect the amount of water put into the stream by the test pumping and we subtract an equivalent amount at Sites 4 and 5, then there is a very significant <u>drop</u> in stream flow of more than 30%! Thus, the data and stated conclusion that there is no effect on stream flow is totally incorrect and misleading. The EIS certainly does not explain how the data presented supports any conclusion as to stream-flow.

The streamflow monitoring was conducted by the U. S. Geological Survey. Prior to the yield-drawdown test, flow measurements were made to obtain baseline data. The baseline data showed Kahalua Stream to be a "gaining" stream where the downstream flow is greater than the upstream flow. Baseline data were obtained on four occasions from July 7 to November 4, 1980.

As indicated in Table 1, the pump test was performed from November 7 to November 12, 1980. Approximately 2.2 cubic feet per second (cfs) of water was discharged into the stream between Site 2 and Site 2A. Spot measurements were taken at Site 2A. When no measurements were taken, an "N/A" was noted which means "not available."

Site 3 is near Mr. Ryder's farm and Sites 4 and 5 are downstream of his farm. There was some variation in flow at sites 3, 4 and 5. Based on our measurements, we conclude that there was no significant increase in streamflow that can be directly attributable to our pump test.

The streamflow monitoring was also coordinated with and was made in the presence of Mr. Ryder and other farmers in the area.

Since your response to Mr. Ryder's letter of December 5, 1980 was based upon the incorrect conclusion that pumping had no effect on stream flow, the other points raised in that letter remain to be addressed. Of special importance is the fact that you are planning 45 new wells on the windward side to remove over 26 million gallons of water per day. This massive dewatering of the remaining windward streams will have a very great cumulative social, environmental and economic impact on the people of Oahu and their environment. Such impacts on population growth, demand for and adequacy of housing and other public services and the urbanization of windward Oahu and the displacement of farmers must be addressed. This you have completely failed to do.

Although we have plans to develop 26 million gallons of water per day, this figure will be revised as exploratory wells are drilled and tested. Some wells may produce more water, while others may develop less water than anticipated. The 26 million gallons per day figure is only an estimate.

Our water development projects are planned to meet projected water needs but not at the expense of agriculture. Our projects are planned in response to population forecasts of the State Department of Planning and Economic Development (see Attachment No. 1) and the City's Development Plans. A table showing the residential distribution will be included in the revised environmental document.

The demand for and the adequacy of housing is not within the purview of this document. However, a table summarizing the housing characteristics for Oahu will be included in the revised document (see Attachment No. 2).

A section addressing existing public services in the area is already incorporated in the document.

The project does not entail any displacement of farmers or other persons in the area. The project is situated on land already owned by the City and the water would be conveyed in existing pipelines. No condemnations or acquisition of additional easements will be required.

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

Very truly yours,

FUJIO HAYASHIDA
Manager and Chief Engineer

Attach.

MHS/HHH:LW
cc: K. Hayashida, Community Relations Office
L. Whang
81-2478

Attachment No. 1

DISTRIBUTION OF THE RESIDENTIAL POPULATION: YEAR 2000

LOCATION	2000 POPULATION*	% OF TOTAL
Primary Urban Center		
Honolulu (Waialae-Kahala-Haleiwa)	353,200	38.5
Aiea-Pearl City	114,700	12.5
Secondary Urban Center		
Ewa-Makakilo	19,700	10.0
Urban Fringe		
Aina Koa-Hawaii Kai	57,800	6.3
Kailua	43,100	4.7
Kaneohe-Ahuimanu	60,500	6.6
Waipahu-Crestview	42,200	4.6
Mililani-Waipio	34,900	3.8
Wahiawa	45,900	5.0
Rural		
Waimanalo	11,000	1.2
Kahaluu-Kahuku	17,400	1.9
North Shore	10,100	1.1
Waianae Coast	34,900	3.8
OAHU TOTAL:	917,400	100.0

*Updated with Series II-F projection.

Attachment No. 2

HOUSING CHARACTERISTICS

HOUSING:

Total housing units	251,714
Renter-occupied and vacant units	147,289
Owner-occupied units	104,425
Average selling price (single family)	$152,000
Median value, owner-occupied (1976)	$75,000
Median gross monthly rent (1976)	$234

Source: Data Book (1980), DPED, State of Hawaii

81-2472

KAHALUU NEIGHBORHOOD BOARD NO. 29
C/O KAHALUU COMMUNITY CENTER
47-232 WAIHEE ROAD
KANEOHE, HAWAII 96744
WAIKALUA, KAHALUU, WAIHE'E, WAIAHOLE, WAIKANE, HAKIPUU AND KUALOA

"Let us not ever have an unhappy minority"

September 17, 1981

Mayor Eileen Anderson
City & County of Honolulu
530 South King Street
Honolulu, Hawaii 96813

Revised Draft Environmental Impact Statement
Kahalu'u Production Well, Kahalu'u, Ko'olaupoko, O'ahu

Dear Mayor Anderson:

Because stream flow monitoring systems have not yet been put in place and minimum stream flow standards have not yet been established the Kahalu'u Neighborhood Board must again repeat its positions on Windward water resources development and diversion.

Furthermore, it is our understanding that there may be a legal question as to whether any additional Windward exploratory or production well development can be allowed to proceed until the Hawaii Supreme Court decides the minimum stream flow dispute between Waihe'e farmers and the Board of Water Supply.

This letter expresses our concerns regarding the proposed conversion of the Kahalu'u Test Well into a 1 mgd Production Well. Board positions on Windward water development and diversion are detailed in its Water Resources Position Statement (See Exhibit I) and its letter to the Department of Land and Natural Resources titled Monitoring Stream Flows and that department's response (See Exhibit II).

Specific comments relating to the Kahalu'u Well are as follows:

1) No production from Kahalu'u Well until interim Windward Water District Stream flow standards are adopted and a Windward Water District Stream flow monitoring system is in place. Excerpts from our Board's Water Resources Position Statement:

> "The Department of Land and Natural Resources immediately establish interim stream flow standards on all Windward Streams." and "The Department of Land and Natural Resources immediately commence monitoring in-stream flows of all Windward Streams - gauging stations to be installed at strategic locations along each stream."

2) No production from Kahalu'u Well until more extensive test pumping is performed to determine long term effects not only on Kahalu'u stream flow, in-stream and stream dependent uses and stream and Kane'ohe Bay ecology, but on other Windward Water District watersheds as well. It should be noted that, upon adoption of the Ko'olaupoko Development Plan, various lands along Kahalu'u Stream now zoned Residential will be re-designated for Agricultural use. Test pumping, to date, has been limited to a few days in November, 1980 and the data obtained might thus be considered fraudulent. A satisfactory test period should be not less than one year and the resulting flow records should be compared with flow records for past years of equivalent rainfall. Excerpts from our Board's Water Resources Position Statement:

> "The Department of Land and Natural Resources initiate a comprehensive study of all Windward water resources encompassing the sources and amounts of impounded high level dike water, underlying basal water, ground water, in-stream water, surface run-off and ground recharge and the hydrologic relationships with watersheds, shorelines and Kane'ohe Bay."

3) No production from Kahalu'u Well for diversion outside the Windward Water District. In its Haiku Well Environmental Impact Statement the Board of Water Supply states: "conceivably, the Haiku Well could also serve the Honolulu Water Districts." In its Ioleka'a Well Environmental Assessment the Board of Water Supply states: "In order to meet increasing demand for water on leeward O'ahu, water development projects in windward O'ahu have been accelerated." And the Board of Water Supply has previously stated that it estimates that, by the year 2000, it will produce windward water at the rate of 40 mgd of which it intends to transport 21 mgd to urban Honolulu. The Board of Water Supply must cease to assume that there will be "excess" windward water available for diversion outside of the Windward Water District. Excerpts from our Board's Water Resources Position Statement:

> "Development of any additional Windward Water resources be limited by interim or permanent stream flow standards and be reserved first for Windward agricultural use and next for Windward Suburban use." and "A moratorium be established on any additional diversion of Windward Water outside Ko'olaupoko and Ko'olauloa until establishment of permanent stream flow standards that will assure fulfillment of the policy of the State of Hawai'i to achieve ever increasing agricultural self-sufficiency."

Mayor Eileen Anderson
City & County of Honolulu
Revised Draft Environmental Impact Statement
Kahalu'u Production Well, Kahalu'u, Ko'olaupoko, O'ahu
Page 2

We trust that you will give our concerns your serious attention.

Very truly yours,

Edwin B. Stevens

Edwin B. Stevens, Chairman
Kahalu'u Neighborhood Board No. 29

Exhibit I - N.B. No. 29 Water Resources Position Statement (3-11-81)
Exhibit II - N.B. No. 29 Letter to DLNR Monitoring Stream Flow (11-3-80)
and DLNR response (3-31-81)

cc: Board of Water Supply
Department of Land and Natural Resources
Councilman Toraki Matsumoto
Councilman Andrew Poepoe
Kahalu'u N.B. No. 29 - Chairman
- Water Resources
- Resource Center
Neighborhood Commission

October 7, 1981

Mr. Edwin B. Stevens, Chairman
Kahaluu Neighborhood Board No. 29
c/o Kahaluu Community Center
47-232 Waihee Road
Kaneohe, Hawaii 96744

Dear Mr. Stevens:

Subject: Your Letter of September 17, 1981 on the Revised Draft Environmental Impact Statement for Kahaluu Well

Thank you for your interest in the Board of Water Supply's (Board) proposed water development project. Your letter will be appended to the final environmental impact statement.

The Board does not concur with your no action proposal that no production should occur from Kahaluu Well until Windward District streamflow standards are adopted, more extensive pumping of the exploratory well be performed, and no diversion of water should take place outside the Windward Water District. In order to insure future availability of water for the public, the Board feels that the Windward water development program should be pursued to its fullest potential.

However, to mitigate your concern on streamflow standards, the Board plans to arrange with the U. S. Geological Survey for continuous monitoring of the stream when the station becomes operational to detect any long-term effects. Pumpage from the well will be reduced or stopped should streamflow be adversely affected. A sufficient amount of water will be maintained in the stream to meet the needs of existing streamwater users, especially for those who currently depend on streamflow for their farming activities.

Extensive test pumping of the well is an ideal condition but entails wasting 365 million gallons for at least one year of pumping not to mention the energy wasted. Instead of wasting the water on a prolonged test, the Board feels that the water could be put to beneficial use in the water system while the long-term effects are evaluated.

The Board has the responsibility to provide municipal water for the land uses designated in the City's General Plan. Windward sources will be needed for future developments not only in the Windward area but also in the primary urban center and Ewa. The water needs of the Board will be coordinated with the needs of other water users to insure that the requirements of all water users are satisfied.

If you have any questions, please contact Kazu Hayashida of the Board of Water Supply at 548-6180.

Very truly yours,

Eileen R. Anderson

EILEEN R. ANDERSON

ERA:lm (M. Shigetani/H. Minakami, Board of Water Supply)

cc: Mr. Andrew I. T. Chang
Managing Director

K. Hayashida
Mr. Whang

81-2513
81-2472

APPENDIX E

DISTRIBUTION OF RESIDENTIAL POPULATION

(YEAR 2000)

APPENDIX E

DISTRIBUTION OF THE RESIDENTIAL POPULATION: YEAR 2000

LOCATION	2000 POPULATION*	% OF TOTAL
Primary Urban Center		
Honolulu (Waialae-Kahala-Halawa)	353,200	38.5
Aiea-Pearl City	114,700	12.5
Secondary Urban Center		
Ewa-Makakilo	19,700	10.0
Urban Fringe		
Aina Koa-Hawaii Kai	57,800	6.3
Kailua	43,100	4.7
Kaneohe-Ahuimanu	60,500	6.6
Waipahu-Crestview	42,200	4.6
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Wahiawa	45,900	5.0
Rural		
Waimanalo	11,000	1.2
Kahaluu-Kahuku	17,400	1.9
North Shore	10,100	1.1
Waianae Coast	34,900	3.8
OAHU TOTAL:	917,400	100.0

* Updated with Series II-F projection

APPENDIX E

DISTRIBUTION OF THE RESIDENTIAL POPULATION: YEAR 2000

LOCATION	2000 POPULATION*	% OF TOTAL
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OAHU TOTAL:	917,400	100.0

* Updated with Series II-F projection

APPENDIX F

HOUSING CHARACTERISTICS

APPENDIX F

HOUSING CHARACTERISTICS

HOUSING:

Total housing units.	251,714
Renter-occupied and vacant units	147,289
Owner-occupied units	104,425
Average selling price (single family). . .	$152,000
Median value, owner-occupied (1976) . . .	$ 75,000
Median gross monthly rent (1976)	$ 234

Source: Data Book (1980), DPED, State of Hawaii

APPENDIX G

FUTURE ALTERNATIVE SOURCES OF WATER

APPENDIX G
FUTURE ALTERNATIVE SOURCES OF WATER[1]

A. WATER EXCHANGE PROGRAM

This program would consist of an exchange of water between Oahu Sugar Co. and the Board of Water Supply. Presently, Oahu Sugar is using approximately 40 to 50 mgd of domestic quality water for sugarcane irrigation. The BWS would trade water of lower quality for this potable water on a one-to-one basis. The lower quality water for exchange would come from any of the potential sources listed below. In addition, another 20 mgd could be converted to domestic use if this water were to be blended with water of lower mineral content; thus, from 40 to 70 mgd would be available for exchange.

1. Sewage Effluent [6.1]

It is estimated that approximately 33 mgd of sewage effluent would be available for use in the exchange program. About 25 mgd could be supplied by the Honouliuli WWTP, and about 8 mgd by the Mililani STP. It would be mixed with higher quality water on a ratio of one part effluent to three parts water and then used for drip irrigation.

The existing Mililani Sewage Treatment Plant is located on the West Bank of Kipapa Gulch, 15,000 feet north of the Oahu Sugar Co. mill in Waipahu. The effluent is presently discharged into Kipapa Stream and flows down to Pearl Harbor. The most feasible way to use this effluent for sugarcane irrigation is to pump it from the plant to the Waiahole Ditch, about 8,000 feet mauka.

The Honouliuli WWTP is the other sewage treatment plant in this cane growing area that can furnish cane irrigation water. It will be located outside the east boundary of Barbers Point Naval Air Station, about 4,000 feet north of the Ewa Plantation mill. To make this effluent available for cane irrigation, it is necessary to pipe it about 20,000 feet toward the present location of Ewa shaft, although it may be applied to the cane fields on

[1]SOURCE: City and County of Honolulu, 1979, Board of Water Supply, Honouliuli Wells Environmental Impact Statement, Notice of Preparation.

the plain surrounding the WWTP. However, piping the effluent to Ewa shaft will make its application more widespread, affording opportunities for selective applications and dilution.

The cost of supplying the sewage effluent has been estimated at $0.09 per thousand gallons for the Mililani STP and $0.13 per thousand gallons for the Honouliuli WWTP [6.2]. Studies by the University of Hawaii Water Resources Research Center indicate that the 1-3 mixture ratio is adequate to meet State Department of Health standards and sugar needs as well [6.3]. .

2. Pearl Harbor Springs [6.4]

The average discharge of water from the Pearl Harbor Springs is about 55 mgd. About 13 mgd of this is pumped to sugarcane fields, and the remaining 42 mgd discharges into the sea after flowing through water cress or other wetland crops [6.5]. Thus, spring water could be captured and used for additional cane irrigation, or possibly mixed with effluent and then applied.

Three major springs are located at Kalauao, Waiau, and Waiawa. They were used in the past for irrigation, and redevelopment of the springs would be feasible. To regain the use of the springs for sugarcane irrigation, these waters must be collected and pumped westward to the cane growing areas overlying the caprock. A more feasible scheme would also encompass an integrated pipeline pumping system involving all three spring areas and two surface streams -- Waikele and Waiawa. Assuming that the pumping installations are sized to accommodate the lower flows expected during the summer months, up to 40 mgd of water suitable for cane irrigation can be delivered to cane growing areas from the three spring areas and the two surface streams. It is estimated that the cost of supplying water from the springs will be approximately 12 cents per thousand gallons [6.6].

3. West Loch Reservoir [6.7]

Another alternative which has been suggested is to dam West Loch to create a reservoir to capture flood flows from Waikele Stream.

Although the dry weather flow is presently being used for irrigation, flood flows rush into West Loch unused because there is no large storage basin to capture them.

A large storage reservoir in West Loch would make it possible to store the high flows during the rainy months for use during the drier summer months. A dam extending 2,700 feet on a bearing of north 75° east from Nichol's Point to Waipio Peninsula can form a 2.3 billion gallon reservoir. Using existing hydrographic data, the proposed reservoir would be able to sustain a flow of about 10 mgd.

To deliver the stored flood water, an intake structure pumping station and pipeline would have to be constructed. Delivery of this source of water to the Waikele area would require a pipeline of 16,500 feet long. Consequently, this would be a relatively expensive source, at $0.68 per thousand gallons [6.8], and the environmental impacts would need to be studied in some detail before proceeding. Trapping of sediments in the reservoir would shorten the useful life span of the reservoir unless periodic dredgings were performed.

4. Brackish Water

Brackish water wells are another potential source of irrigation water. These could be developed in the caprock of the Ewa plain or Waianae coast. As long as the chloride content is below 1,000 ppm, the water would be suitable for this use. Some 20 mgd is presently being drafted from this area for irrigation.

B. BRACKISH WATER DEMINERALIZATION

Brackish water in the caprock and transition zone comprises a large potential water source presently unused due to excessive mineral content. Caprock water occurs in the Ewa plain and Waianae coastal areas. In the Ewa area, chloride content of the water ranges up to 2,000 ppm and total dissolved solids (TDS) up to 4,000. Transition zone wells are located along the shoreline of Pearl Harbor and in the Metropolitan area of Honolulu. The two most advanced demineralization processes are electrodialysis and reverse osmosis.

1. Electrodialysis

In electrodialysis, brackish water is pretreated and filtered, and then forced through an electrically-charged stack of selectively permeable membranes. The mineral salts in the water separate into positively-charged and negatively-charged ions that pass through the membranes, leaving fresh water behind [6.9]. After chlorination, this product water is suitable for domestic use.

A single stack may contain as many as 600 membranes and pass up to 250,000 gallons per day of product water. To obtain higher feed-to-product concentration ratios, multiple stacks in stages (series) are required. The number of stages selected is based on feed water hardness (calcium and magnesium concentration), total dissolved solids (TDS), temperature and the presence of any particularly troublesome ions [6.10]. The conceptual design of the process is shown in Figure 6-1.

Operational problems include corrosion, scale formation, and a phenomenon known as "concentration polarization," which limits the portion of dissolved solids that can be removed in a single stack to 50 percent of the dissolved solids in the feed water. Pretreatment of the feed water and the addition of acid can aid in control of these problems.

The salt composition of the waste brine is nearly the same as that of the feed water, and the concentration can usually be built up to levels acceptable for disposal into the sea or coastal injection wells [6.11].

Two major operating and maintenance costs are membrane replacement and electric power. The life expectancy of electrodialysis membranes is about five years if they are properly cared for. Electric power is required to pump the fluid streams through the stacks and force the ions through the membranes. About eight kwhr

per 1,000 gallons of product per 1,000 ppm salt reduction are typical at economical current densities and without feed pre-heating. Of this power demand, 3 kwhr are for pumping and 5 kwhr are the processed power requirements. The energy requirement is nearly in direct proportion to the salt removal rate [6.12].

Electrodialysis has provided municipal water for about 10 years in plant sizes up to about 2 mgd.

2. Reverse Osmosis [6.13]

Osmosis occurs if two solutions of different concentration, but in the same solvent, are separated from one another by a semi-permeable membrane that allows the passage of the solvent but not the solute. The phenomenon of osmosis is that the solvent flows from the dilute solution to the more concentrated solution until the pressure on the more concentrated side of the membrane rises to a value known as the "osmotic pressure difference" between the two solutions. Reverse osmosis occurs when a pressure greater than the osmotic pressure difference is applied to the more concentrated solution and the solvent is forced to flow into the dilute solution. The principals of osmosis and reverse osmosis are illustrated in Figure 6-2.

In practice, brackish water is pretreated and filtered and then raised to operating pressures (usually 400 to 600 psi) and fed into reverse osmosis modules containing membranes. Part of the feed water passes through the membranes into the product water stream. The more concentrated feed stream with reduced flow then flows into other modules, where more water is added to the product water stream. A conceptual design of the process is shown in Figure 6-3. It can be seen from the design that the process is such a simple one that only mechanical force is required for its operation.

All currently available membranes allow some of the salt to pass through into the product water. The amount of salt passing through

the membrane is proportional to the salt concentration at the membrane face; therefore, higher concentration feed waters produce a lower quality product. In a multi-stage operation, the concentration of feed water will at some stage become so great that the product water produced in that stage will be unacceptable; thus, with feed waters of higher concentration (between 2,500 and 10,000 ppm total dissolved solids), only one or two stages may be the maximum that can be used.

Operational problems include the fact that with continuing operation, the water production rate tends to decline due to membrane compaction and membrane fouling by scale and contaminants. This production decline can be as high as 20 to 30 percent in a single year for high pressure (up to 1,000 psi) plants, for low pressure, less than 300 psi, plant compaction is generally insignificant.

The salt composition of waste brine is nearly the same as the feed water, as in the case for electrodialysis.

The major operating cost is electric power consumption for pumping. The power demand is typically about 400 kw per million gallons per day production capacity for low concentration feed water. This increase is about 600 kw per mgd for high concentration feed waters. The higher the recovery ratio, the less the energy required at per unit volume of production since less water is pressurized.

The major maintenance cost is the high pressure pump, which should be provided as multiple parallel pumps with standby capacity to improve plant availability. The high maintenance costs have been attributed to the high pressured corrosive fluids and entrained particulate matter.

Reverse osmosis plants have been used for several years to produce municipal water, many of them in Florida. Most of them are less than 1 mgd; however, in the City of Cape Coral, Florida, a 4.7

mgd plant went on line in March, 1977. It utilizes six reverse osmosis modules, each with 22 membranes and a 500,000 gallon per day capacity. The feed water carries approximately 1,250 ppm of total dissolved solids (TDS), while the product water contains less than 65 ppm. With an operating cost of 59 cents per thousand gallons and an allocation of 22 cents per thousand gallons to cover amortized capital costs, a total production cost of 81 cents per thousand gallons was obtained in late 1977 [6.14].

Four reverse osmosis pilot units have been tested on Oahu at the following locations: Mililani Sewage Treatment Plant, Wahiawa Sewage Treatment Plant, Well 82-2A (located on the Diamond Head side of the Neil Blaisdell Center Exhibition Hall), and Well 119 (located at Honolulu Gas Company in the Iwilei District near Honolulu Harbor). Raw sewage, primary effluent and final effluent from conventional sewage treatment plants, as well as brackish groundwater from both basaltic and reef limestone aquifers were then field tested at 600 psig operating pressure [6.15].

The operation on wastewaters suffered from the problem of performance decline. However, the operation with brackish water yielded promising results. The solute rejection was high and maintained almost unchanged throughout the test period.

Based on a cost model developed for estimating desalting costs by reverse osmosis plants with spiral-wound modules (one type of module), product water costs in Hawaii were estimated at 83.7 cents, 63.4 cents, and 49.7 cents per 1,000 gallons for 1, 10 and 50 mgd plants, respectively [6.16].

A 10 mgd reverse-osmosis plant treating water of the quality found in the Ewa plain can be built for about $8 million and operate at about $0.40 to $0.50 per 1,000 gallons [6.17]. Capital and operating costs of a like-sized electrodialysis plant are comparable. If Waiau and Waiawa springs were used as sources (with 1,000 TDS), a 10 mgd reverse osmosis plant could operate at about $0.25 to $0.30 per 1,000 gallons [6.18].

Table 6-1 gives a further comparison of these two demineralization methods. Neither has any clear advantage over the other and the final selection of one process may depend upon operational considerations.

The BWS is presently proposing a 1 mgd reverse osmosis pilot plant to be built in 1982. To be located at Hawaiian Electric Company property in Waiau, the plant would operate from two to three years. The Board would learn the true costs of constructing and operating a desalinization plant. The BWS has applied for federal funding and was selected as fifth of 37 applicants by the Office of Water Research and Technology.

If a large scale reverse osmosis plant or other costly alternative is used in future years, then the water rates will have to be restudied and may possibly increase.

C. SURFACE WATER [6.19]

In the past surface streams on Oahu have not been used for domestic sources due to the ready availability of reliable, high quality, groundwater sources. The diversion of the flow from Lulumahu Ditch in Nuuanu Valley into a modified slow sand filter is the single example of a surface water source presently in use. Raw water quality is excellent except during rainy periods.

The more typical surface stream will probably require more extensive treatment, including the usual purification processes consisting of coagulation, flocculation, sedimentation, filtration and chlorination. The desirable points of diversion typically occur far from existing distribution-transmission works and would require relatively large initial outlay of capital as well as continual treatment costs. Pumping costs will vary from case to case.

Two large windward streams, Kahana and Punaluu, present the best opportunities for surface water development. In both cases the streams largely represent the outflow of groundwater and thus present the

TABLE 6-1

COMPARISON OF DESALTING METHODS[1/]

Consideration	Electrodialysis (ED)	Reverse Osmosis (RD)
State of Demonstration	Up to 2 MGD, less than 10 years	Up to 4 MGD, less than 5 years
Design and Construction Period	1-2.5 years based on size	1-2.5 years based on size
Land Requirement	.4-4 acres	.7-6.8 acres
TDS Range	Low TDS	Greater than ED
Removal Capability	Limited to 50% per pass	Up to 99% per pass, removes organics
Sensitivity to Operating Conditions	High (voltage, pH, flow, concentration)	Low
Pretreatment	Med. requirement	Modest to extensive
Production Rate	Slight decrease with time	Decrease with time
Waste Disposal	Lesser problem	Lesser problem
Mechanical Problems	Some	Some
Corrosion	Very little	Very little
Scaling	May limit recovery	May limit recovery
Field Cleaning	Easy equipment disassembly	In-site chemical cleaning
Water Temperature	Ambient	Ambient
System Complexity	Medium	Low
System Pressure (leakage)	Low	High, leakage problem
Energy Demand	8,000 kwh/mgd, direct proportion to TDS	400 kwh/mgd, increases somewhat with TDS
O&M Cost	Least up to 4 mgd	1.2-1.6 times ED up to 4 mgd
Capital Cost	Least of all methods	1-1.5 time ED
Unit Water Cost	Low for low TDS	In range of ED

1/Based on low TDS and plant size of 0.5 to 20 mgd.

SOURCE: [6.10]

potential of groundwater development first. This potential in both cases should be thoroughly examined before resorting to surface water development because there are considerable economic and operational advantages to groundwater development. After all the groundwater potentials have been developed, the remaining stream flow can be developed via treatment plants.

A third possible surface source is the Kalauao Spring area in Aiea. It is the only one of the Pearl Harbor Springs that presently yields water that meets mineral quality standards for potable water, but needs purification to meet all other standards. The highly developed nature of surrounding land as well as the close proximity of two major highways are negative factors because of the potential for contamination beyond the capability of treatment processes. Flow varies from 10 to 15 mgd.

In addition to the above three potential major surface sources, there are a number of smaller streams in Central Oahu and Honolulu that have some potential. In central Oahu, Waialua Sugar Company is presently diverting Kaukonahua, Helemano, Poamoho and Opaeula Streams into its irrigation system. All of these streams have domestic water supply potential if given adequate treatment.

Kalihi, Nuuanu and Waiakeakua (Manoa) Streams in Honolulu have some potential for surface water development. The combined mean flows during June, 1973, was about 5.5 mgd. The option of combining the flows for centralized treatment must be weighed against high transmission costs in an urbanized setting. The straight line distance between Kalihi and Waiakeakua is on the order of 20,000 feet; however, the alternative of three separate treatment plants would cost more to operate.

Yield from surface sources can be substantially increased if large storage reservoirs are available to capture flood flows. However, local experience with reservoirs has not been good. The only successful reservoir is Lake Wilson in Wahiawa where local geology is favorable for water storage.

The more typical situation in stream valleys shows narrow elongated valley floors covered with relatively impervious strata with valley

sides exposing considerable bare bedrock. Large reservoirs in such a valley would probably hold water at shallow depths but would prove to be leaky as more of the valley sides were submerged.

Diversion of stream flows with minimal storage appears to be more economically feasible, but stream yields will not be large because flood flows must necessarily be passed through due to lack of storage. Also capture of flood flows will result in rapid silting of the reservoir and loss of storage.

D. DESALINIZATION OF SEA WATER

This alternative would use techniques similar to desalinization of brackish water, but utilizing feed water of higher salinity (15,000 to 20,000 ppm). Numerous studies have shown the cost of desalting sea water to be two to three times as much as desalting brackish waters [6.20]. Technical development of desalinization methods continues to improve and lower product water costs. However, rising energy costs and inflation tend to negate these gains. This source of domestic water will continue to be a viable choice, although an expensive one.

E. WASTEWATER RECLAMATION [6.21]

The direct reuse of reclaimed wastewater is at the far end of a scale of uses that includes industrial, aesthetic and agricultural applications. There has been an understandable reluctance to accept direct recycling of treated wastewater for human consumption in the past. Historically, there are two emergency instances where virtually direct reuse was practiced by the necessity for these two cases has long since passed. Direct reuse is presently practiced only at Windhoek, South Africa.

In all of the three above cited instances, dire necessity dictated the direct use, albeit with some dilution. The only alternative was to do without water. While wastewater would be used for irrigation, it is unlikely that direct reuse will occur since so many other alternatives are available.

F. BLENDING

Another technique which could be used here is that of blending water of high quality with water of lower quality. Water from the more brackish Pearl Harbor Springs could be blended with high quality water to meet domestic water quality standards.

G. INDIVIDUAL DEMINERALIZATION UNITS [6.22]

A final alternative is the use of compact desalting units for residential use. There would be some opportunity to use these in areas having only saline water sources. Each dwelling unit would purify only water needed for drinking and cooking. Sanitary uses would be met by the saline supply.

Some home desalting units are already in use, and a similar situation exists in Bermuda where many homes have catchment basins above their homes for fresh water, with brackish water supplying their other needs. It may be expected that such dual water supply systems will increase in use over the next 10 to 30 years.

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APPENDIX H

WATER COMMISSION REPORT:

PRIORITY RECOMMENDATIONS

(Excerpts)

APPENDIX H

PRIORITY RECOMMENDATIONS

1. Stabilizing or Reducing Per Capita Water Consumption.

* Recommendation: CONTINUE AND INTENSIFY CONSERVATION PROGRAMS UNDERTAKEN BY THE COUNTY WATER DEPARTMENTS AND THE MILITARY TO STABILIZE OR REDUCE THE PER CAPITA CONSUMPTION OF MUNICIPAL WATER. Action agencies: County water departments and military.

A major factor influencing water demand is a projected increase in per capita consumption, from 200 gpd on Oahu today to 240 gpd in the year 2000. Stabilizing per capita consumption at 200 gpd or reducing consumption by water conservation measures offers an immediate opportunity to reduce the need to develop new supplies, reserve available water supplies for future generations, and save development, operation, and maintenance costs.

Aggressive conservation programs by domestic water users on Neighbor Islands as well as Oahu will provide substantial benefits.

2. Regulating Pearl Harbor Ground Water Resources.

* Recommendation: CONTROL FURTHER DEVELOPMENT OF AND INCREASE FROM THE PEARL HARBOR BASIN GROUND WATER BODY AND THE SCHOFIELD HIGH-LEVEL GROUND WATER BODY THROUGH APPLICATION OF CHAPTER 177, HRS. AS AN IMMEDIATE INTERIM MEASURE,

IMPOSE A MORATORIUM ON INCREASED EXPORT OF WATER FROM THE PEARL HARBOR AREA. Action agency: DLNR.

The combined pumpage of the agricultural, municipal, and military users in the Pearl Harbor area is presently reaching the estimated limit of sustainable yield. Water levels of monitoring wells show a steady decline over a period of 65 years. Although the Pearl Harbor body may currently not be in a critical state, controls are needed over additional developments and increased pumpage to ensure the long-term integrity of Hawaii's most productive fresh water sources.

3. Accelerating Water Source Developments on Oahu.

* Recommendation: ACCELERATE THE DEVELOPMENT OF NEW SURFACE AND GROUND WATER SOURCES AND ALTERNATIVE SOURCES TO MEET PROJECTED MUNICIPAL WATER DEMANDS ON OAHU, AGGRESSIVELY PURSUING RESEARCH TO DETERMINE PRACTICAL DEVELOPMENT METHODS. Action agency: Honolulu BWS.

Water demand projections for Oahu show a substantial need for new municipal supplies. All other water requirements, except for environmental and social values, show only a token increase. It is estimated that about 100 mgd must be developed incrementally over the next 20 years.

Untapped ground and surface water sources are available on Oahu, as shown in Figures 1 and 2. Large ground water supplies are available in the Windward Oahu areas of Kahuku, Kahana, and Koolaupoko. Moderate supplies are available in the Mokuleia, Waianae, and Hawaii Kai areas.

Streams in Windward Oahu, especially Kahana and Punaluu, appear most promising for development of large supplies. Streams in Koolaupoko, mostly perennial, have small flows which can be easily developed. Stream developments in the Pearl Harbor area would require large dams to capture flood flows.

Potential alternative sources include: (1) exchanging low-quality water developed at Pearl Harbor Springs and at Waiawa and Waikele streams and treated sewage effluent from Mililani and Honouliuli for high-quality irrigation water; (2) blending brackish water with fresh water; (3) desalting brackish water.

4. Moderating Oahu's Population Growth.

* Recommendation: STATE AND COUNTY GOVERNMENTS TAKE INTO ACCOUNT THE FINITE LIMITATIONS OF WATER RESOURCES IN ESTABLISHING POLICIES THAT INFLUENCE THE RATE OF POPULATION INCREASE AND RELATED URBAN DEVELOPMENT, PARTICULARLY ON OAHU. Action agencies: DPED, County planning departments.

Current estimates show that Oahu's total available water supplies that can be developed by conventional means will be fully utilized by the turn of the century, if current trends continue. Practically all of the new water demand, based upon unit consumption of projected population increase, is for potable water. The pattern of urban development whether concentrated or sprawled, will determine patterns of water distribution.

As previously noted, several alternatives are available to balance water supply and demand on Oahu. Untapped resources are

still available for development; wastewater reuse, blending brackish and fresh water, and desalting brackish water are potentially feasible; and technological breakthroughs might enhance available water supplies for future years. Conservation of water by all users would also help to balance supply and demand.

However, population growth is the primary influence upon water demand on urbanized Oahu. Even though alternative supplies may be developed and conservation measures may be implemented, unless the rate of population growth is decelerated, the water problem on Oahu is expected to persist.

5. Establishing a Permit System for Water Development and Use.

* Recommendation: THE STATE LEGISLATURE ADOPT A PERMIT SYSTEM TO CONTROL THE DEVELOPMENT AND USE OF HAWAII'S SURFACE AND GROUND WATER RESOURCES IN ORDER TO PREVENT DEPLETION AND QUALITY DETERIORATION, AND PROVIDE FOR AN INDEPENDENT "WATER USE CONTROL BOARD" TO ADMINISTER THE PROGRAM. Action agency: Tenth State Legislature.

The Commission finds that an additional measure of public control over water development and use is warranted. Increasing competition for limited water supplies and the shortcomings of court decisions bearing on water use allocation make clear the need for administrative regulation of water use under statutory principles.

A suggested "Water Use Control Act" appended to this report details a comprehensive water use control program. The proposed program, administered by an independent "Water Use Control Board," would regulate the use of surface and ground water by permit on the basis of reasonable and beneficial use in the public interest.

The 1978 Constitutional Convention's amendments on water resources (Article XI, Section 7) calls upon the legislature to provide for the regulation of Hawaii's water resources in the public interest. The Commission feels that the proposed act meets the intent and requirements of the Constitutional amendment.

6. Formulating a State Water Code.

* Recommendation: THE LEGISLATURE AUTHORIZE THE FORMULATION OF A COMPREHENSIVE WATER CODE BY A DESIGNATED AGENCY TO DEFINE EXPLICITLY WATER RIGHTS IN HAWAII AND TO DELINEATE THE ROLE OF GOVERNMENT IN WATER MANAGEMENT. Action agency: Tenth State Legislature.

Water legislation in Hawaii has evolved over the years in response to specific needs on a piecemeal basis which has often resulted in overlapping administrative powers. Also, the recent "Hanapepe case" has unsettled Hawaii's traditional system of surface water rights. An apparent need has arisen for statutory clarification of surface and ground water rights by the Legislature. The courts then would have a statutory basis upon

which to decide water controversies rather than rely entirely on case law.

A Water Code, formulated jointly by appropriate legal, water, political and other disciplines, should define rights to natural waters, overcome significant deficiencies in existing legislation, enunciate a basic water resources policy, and enhance water management efficiency among government agencies.

7. Satisfying Water Information Needs.

* Recommendation: ACCELERATE AND IMPROVE PROGRAMS FOR GATHERING AND UTILIZING INFORMATION ON WATER RESOURCES, INCLUDING SUSTAINABLE YIELDS, WATER DEMANDS, WATER CONSERVATION OPPORTUNITIES, METHODS AND COSTS OF WATER DEVELOPMENT, AND ASSESSMENT OF ENVIRONMENTAL IMPACTS OF DEVELOPMENT. Action agency: DLNR.

As demands approach the sustainable yield of water sources currently developed, there is a particular need for a variety of water information to determine precisely the feasibility of demand and supply alternatives. Much of the information acquired in the past has been and is contributing to the present state of technology. However, with computer capabilities, present data bases often are inadequate to utilize computer capacities fully.

OTHER RECOMMENDATIONS

8. Upgrading Rural Water Service.

* Recommendation: UPGRADE MUNICIPAL WATER SERVICES IN RURAL COMMUNITIES TO MINIMUM DELIVERY, QUANTITY, AND QUALITY STANDARDS. Action agencies: County water departments.

The Commission visited some rural communities on Maui and found substandard water systems. Most of the rural water systems are modest in size and relatively simple in facility requirements. Upgrading the systems would mainly require replacement of deteriorated pipelines, storage tanks, and diversion structures. The cost of the improvements would be modest compared to major water development projects and would help to preserve rural lifestyles and agricultural production.

9. Supporting Agriculture.

* Recommendation: PROVIDE IRRIGATION SERVICES IN SUPPORT OF AGRICULTURE, WITH EMPHASIS ON DIVERSIFIED CROP AND AQUACULTURE PRODUCTION. Action agency: DLNR.

The Legislature, through the Hawaii State Plan, has adopted a state policy to support agriculture in general and diversified crop and aquaculture production in particular to strengthen Hawaii's economic base. Opportunities to provide irrigation services in support of plantation and diversified agriculture and aquaculture are many. Tolerance to lower quality water and to treated sewage effluent provide a broader range of potential water

supplies for agricultural uses than for domestic use.

10. Protecting Water for Environmental and Social Values.

* Recommendation: ESTABLISH A COMPREHENSIVE STATEWIDE MINIMUM STREAMFLOW CONTROL PROGRAM TO PROVIDE AND PROTECT WATER RESOURCES FOR ENVIRONMENTAL, AESTHETIC, AND RECREATIONAL USES. Action agency: DLNR.

The usual assessments of current water use and projections of future demands account for traditional uses - municipal, agricultural, industrial, and military - but do not include water for environmental, aesthetic, and recreational purposes. This deficiency is being increasingly recognized in planning, development, data, research, and regulation programs. However, to date there are no specific government or private programs to provide and protect water resources for environmental, aesthetic and recreational uses. The need for such a program is apparent.

11. Financing Water Programs and Projects.

* Recommendation: UTILIZE THE STATE FUNCTIONAL PLAN ON WATER RESOURCES TO GUIDE STATE FUNDING OF WATER PROGRAMS AND PROJECTS, CONSIDERING STATE COST-SHARING IN AND SUPPORT OF BOND FINANCING FOR COUNTY PROJECTS, COORDINATION OF FEDERAL FUNDING OF STATE AND COUNTY PROGRAMS AND PROJECTS, PROMOTION OF CONSERVATION PROGRAMS, AND SUPPORT OF RESEARCH PROGRAMS BY AGENCIES BENEFITTING FROM THE RESULTS.

Action agency: DLNR

The Hawaii State Plan calls for the development of a water resources functional plan for submittal to the 1980 Legislature for adoption. The functional plan is required to specify priority water programs and projects for state funding to implement the goals and objectives of the Hawaii State Plan and the respective county general plans.

12. Balancing Urban Growth and Water Developments.

* Recommendation: BALANCE THE RATE OF URBAN DEVELOPMENT WITH THE RATE OF MUNICIPAL WATER DEVELOPMENT. Action agencies: County planning departments and water departments.

Imposition of moratoriums on subdivision developments by some county water departments has resulted from an imbalance between rapid urban growth and water developments. The moratoriums are intended to allow the water departments to catch up with the permitted urban expansion.

Ample water resources are currently available on all islands for development. With proper long-range planning by municipal, agriculture, industry, and military water agencies and coordination with land use planning, a balance may be achieved between water development and urban growth.

13. Optimizing Water Development on Oahu.

* Recommendation: OPTIMIZE ISLANDWIDE WATER DEVELOPMENT ON OAHU, CONSIDERING THE ISLAND'S FULL RANGE OF HYDROLOGIC POTENTIALS AND LIMITATIONS AND REASONABLE COSTS. Action agency: DLNR.

Development of new water supplies on Oahu may be realized in three time frames, although each activity begins at the same time. The development of available surface and ground water sources and alternate supplies have been discussed under the section on accelerating water source developments on Oahu. A third alternative more complex and comprehensive, involves optimizing the development and management of the entire island's water resources.

Specific actions include: (a) developing high-level ground water at Schofield plateau and rehabilitating the storage capacity of dike compartments in the Koolau Mountains by bulkheading selected tunnels for use as peaking sources to augment Pearl Harbor and Honolulu basal ground water sources during summer months, (b) stabilizing pumpage from wells as much as possible to minimize mixing and the consequent thinning of the fresh ground water body, (c) controlling well spacing and drafts of new wells to increase the sustainable yield of the Pearl Harbor and Honolulu ground water basis, and (d) limiting use of highly saline or low quality water for irrigation in areas where infiltration might degrade the fresh ground water lens.

14. Optimizing Water Development on Maui.

* Recommendation: OPTIMIZE ISLANDWIDE WATER DEVELOPMENT ON MAUI, CONSIDERING THE ISLAND'S FULL RANGE OF HYDROLOGIC POTENTIALS AND LIMITATIONS AND REASONABLE COSTS. Action agency: DLNR.

Maui has two major water source areas, the northern half of West Maui and the northern third of East Maui. Major demand centers are located at Lahaina, Wailuku-Kahului, Kihei-Makena, and Kula. The estimated sustainable yield of the Wailuku-Waihee ground water body may be the limiting factor to continued water development for export beyond the Wailuku-Kahului area.

Long-range actions to optimize development of Maui's water resources may include the following: (1) limiting the export of water from the Wailuku-Kahului areas to quantities presently planned, (2) limiting development of ground water in the Wailuku-Waihee area to the basin's sustainable yield, (3) developing additional water supplies in northern East Maui to meet the needs of central Maui, (4) developing separate systems in the lower Kula area for domestic an irrigation water services, and (5) optimizing the development of the low-head ground water body in the Lahaina district by modifying well spacings and drafts.