

- 1992-05-18-KA-FEA-Kalepa Ridge Well #1, Lihue Water System
Hanamaulu

MAY 18 1992

ENVIRONMENTAL ASSESSMENT
FOR
CONTROLS, PUMPHOUSE AND PIPELINE
FOR KALEPA RIDGE WELL NO. 1
LIHUE WATER SYSTEM
HANAMAULU, KAUAI, HAWAII

Tax Map Key: 3-8-02:8

Proposing Agency

DEPARTMENT OF WATER
County of Kauai
P.O. Box 1706
Lihue, Hawaii 96766-5706

Responsible Official:

Raymond H. Sato
Raymond H. Sato, Manager & Chief Engineer

Date:

May 4, 1992

Prepared by

Belt Collins & Associates
680 Ala Moana Boulevard
Honolulu, Hawaii 96813

May 1992

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CHAPTER 1
INTRODUCTION AND SUMMARY

1.1 APPLICANT/PROPOSING AGENCY

Department of Water, County of Kauai

1.2 APPROVING AGENCY

Department of Water, County of Kauai

1.3 AGENCIES CONSULTED IN MAKING THE ASSESSMENT

Department of Land and Natural Resources, Historic Preservation Division

1.4 PROJECT OBJECTIVES, BACKGROUND, AND JUSTIFICATION

The objective of the proposed project is to develop a new water source to improve the ability of the County of Kauai to meet growing needs in the Lihue-Hanamaulu area. Until recently, this area has been adequately served by a series of high level (shallow) wells located in the Kilohana slopes, together with the Lihue Plantation water tunnel.

However, over the last two to three years, water levels in the Kilohana wells and Lihue Plantation tunnel have dropped significantly. Water levels at the Lihue Plantation tunnel source have dropped by 63 percent, reducing the pumping capacity by about 50 percent. This decrease may be due to Lihue Plantation's conversion from furrow irrigation to drip irrigation, which has resulted in less recharge to the high level aquifer and the increased pumping demand.

At the same time, water demand continues to grow on Kauai. In the fiscal year ending 1991, the Department of Water system served a resident population of about 51,200, 20 percent of which resided in Lihue and Hanamaulu. Average daily water demand on the island during this period was 13.75 million gallons per day (mgd). Average daily demand in Lihue and Hanamaulu was 3.3 mgd. According to Department of Water projections, average daily water demand in 2010 will be 26 mgd islandwide and 7.2 mgd in Lihue and Hanamaulu (increases of approximately 90 and 118 percent, respectively).

The Department of Water is taking both long- and short-term measures to address this situation. It is in the process of preparing a master plan to improve the capacity of the system to meet projected water demand over the long term. Interim measures include water conservation and the development of additional high level wells. For example, large water users in the Lihue and Hanamaulu area were asked last summer to voluntarily reduce water consumption by 25 percent. The proposed Kalepa Ridge project is a first step in the well development program to meet immediate needs.

Kalepa Ridge Well No. 1 was selected as a first step because it is an existing well that can be made operational fairly quickly. The well was drilled to a depth of 540 feet below mean sea level in 1954, and put into service for a short time in late 1962. It was connected by underground pipeline to the adjacent water tank, and water from it was used to supply nearby homes. The residents complained of unacceptable odor and taste, and the well was subsequently disconnected and capped, and the pump was removed.

In February-March 1991, the Water Resources Division of the U.S. Geological Survey (USGS), Department of the Interior, conducted pump tests at Kalepa Ridge Well No. 1, and also performed a water quality analysis. The water sample analyzed met all national primary and secondary drinking water regulations, except for total coliform, which could be removed by chlorination. No taste or odor was detected in the sample. The cause of the taste and odor problem that led to abandonment of the well has never been determined. It is possible that water might have been sitting in the tank for too long, but this or any other explanation has not been documented. (See Appendix A, letters from USGS, May 22 and December 13, 1991.)

1.5 PROJECT AND SITE DESCRIPTION

The existing Kalepa Ridge Well No. 1 and adjacent 0.5 mg concrete storage tank are located on the southern side of Kalepa Ridge at an elevation of 303 feet above mean sea level, overlooking the Hanamaulu residential subdivision. Much of the well and reservoir site is paved with asphalt, and it is enclosed by a chain link fence.

The Department of Water proposes to install a deepwell pump, controls, control building, connecting pipeline, and other facilities needed to reactivate the existing well. Some grading and earthmoving will be required. The pipe connecting the tank to the well is already in place. Power lines for the well and an access road are also in place.

1.6 POTENTIAL IMPACTS, MITIGATION MEASURES, AND ALTERNATIVES

Other than potential noise, air quality, and erosion impacts during construction, no other adverse impacts are expected as a result of the project. The construction-related impacts will not be significant and can be mitigated.

Alternatives to the proposed action include no action, delayed project, alternate well sites, and water conservation.

1.7 GOVERNMENTAL PERMITS AND APPROVALS

A Pump Installation Permit is required from the State of Hawaii Commission on Water Resource Management, Department of Land and Natural Resources.

CHAPTER 2
PROJECT DESCRIPTION

2.1 PROJECT SITE

2.1.1 Location and Description

Kalepa Ridge Well No. 1 is located on the southern slope of Kalepa Ridge in the Hanamaulu area of Kauai. The well is at the 303-foot elevation, adjacent to an existing 0.5-mg concrete water storage tank. It is drilled to a depth of 540 feet below mean sea level. Access to the site is via a cane haul road located behind the Lihue Plantation baseyard on Kuhio Highway. A paved road leads up to the well and reservoir site from the cane haul road. See Figure 1, Location Map.

Much of the 25,000-square-foot site is paved with asphalt and enclosed by a chain link fence with a locked gate. Existing facilities include the water tank, capped well, and pipeline connecting the well to the tank (see Figure 2). The originally installed pump and control building were removed when the well was abandoned.

2.1.2 Land Ownership

The Kalepa well and tank site is located on a parcel owned by the County of Kauai, Board of Water Supply (TMK 3-8-02:8). It was conveyed by the State of Hawaii to the County of Kauai by Executive Order 2223.

2.1.3 Land Use Designations and Controls

The Kalepa well site is in the State Agricultural Land Use District; uses within the Agricultural District are regulated by the counties.

The County designations are as follows:

Kauai County General Plan: Agriculture
Kauai County Regional Development Plan: Agriculture
Kauai County Zoning: Agriculture

A Pump Installation Permit is required from the State of Hawaii Commission on Water Resources Management, Department of Land and Natural Resources. No County permits are required.

2.2 PROPOSED FACILITIES AND ACTIVITIES

The preliminary site plan is shown in Figure 3. The project will involve the following:

- Installation of a deepwell pump and appurtenances to connect the well to the existing 0.5 mg concrete storage tank located at the well site.
- Construction of a control building on the site to centralize controls for the new submersible pump.
- Modification of the reservoir level-sensing system to accommodate pump control and additional required functions.
- Installation of a chlorination facility and air bubbler system to monitor pump operation and to operate manually set chlorine feed lines.
- Site modification, including drainage. Approximately 7.5 cubic yards (cy) of trench excavation and backfill work is required to install the connecting pipeline, and about 14 cy of structural excavation and backfill work is needed to construct the pump control/chlorinator building. The clearing and grubbing area for drainage will be approximately 1,100 square feet.
- Electrical work, including well pump controls and control building electrical system.

The pipe connecting the tank to the well is already in place. Power lines for the well and an access road are also in place.

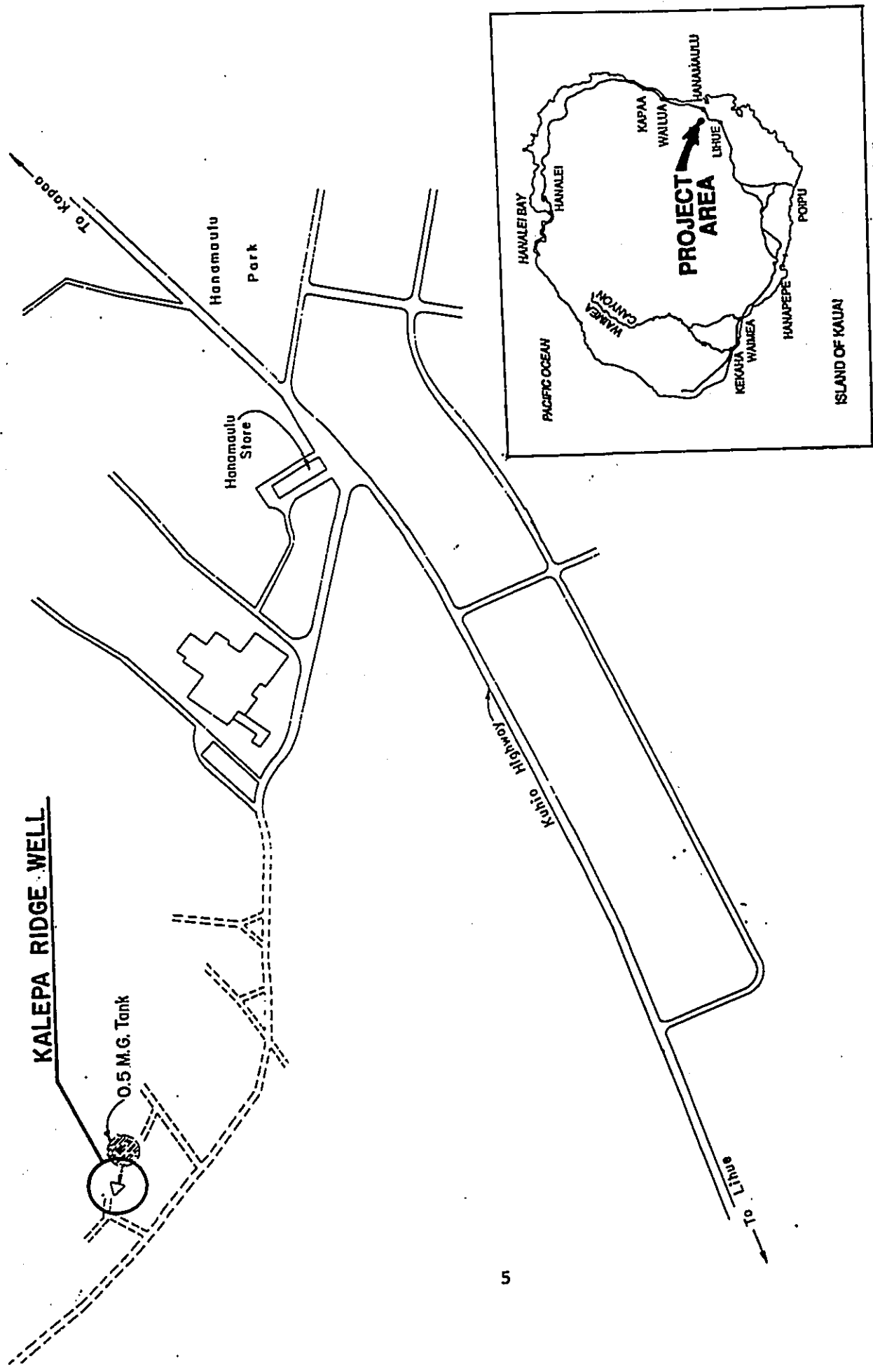
When in operation, the well will be pumped at a rate of 120 gallons per minute. Because chloride concentrations were still rising at the end of the USGS pump tests conducted in early 1991, the concentrations will be monitored when the well is put back into production (see Appendix A).

2.3 PROJECT SCHEDULE AND COST

Construction is expected to be completed in three months; site work would be accomplished during the first three weeks. The estimated construction cost of \$290,000 is broken down as follows.

Site work	\$ 20,000
Pump installation	\$105,000
Electrical	\$100,000
Control building	<u>\$ 65,000</u>
	\$290,000

10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



5

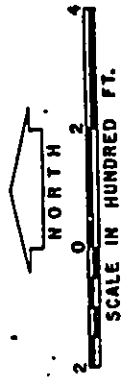


Figure 1
LOCATION MAP

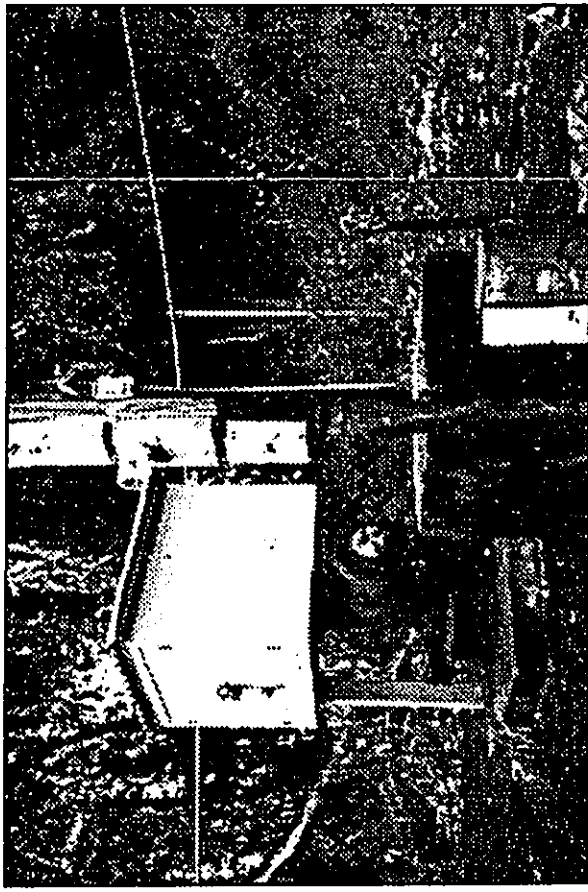
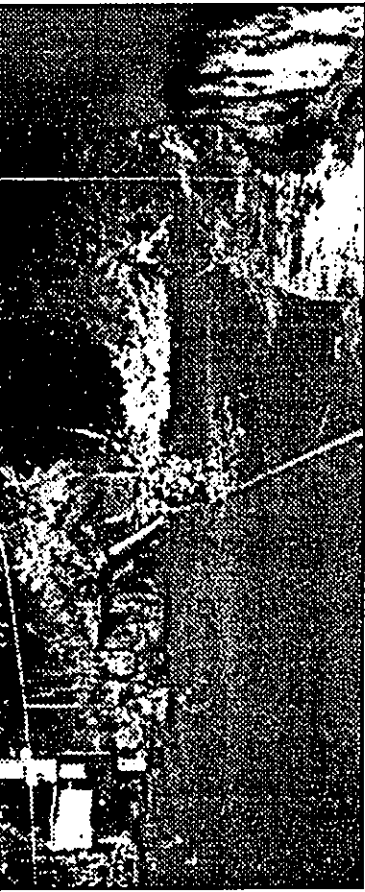


Figure 2
KALEPA RIDGE WELL SITE
Hanalei, Kauai, Hawaii
Prepared by: Belt Collins & Associates
March 1992

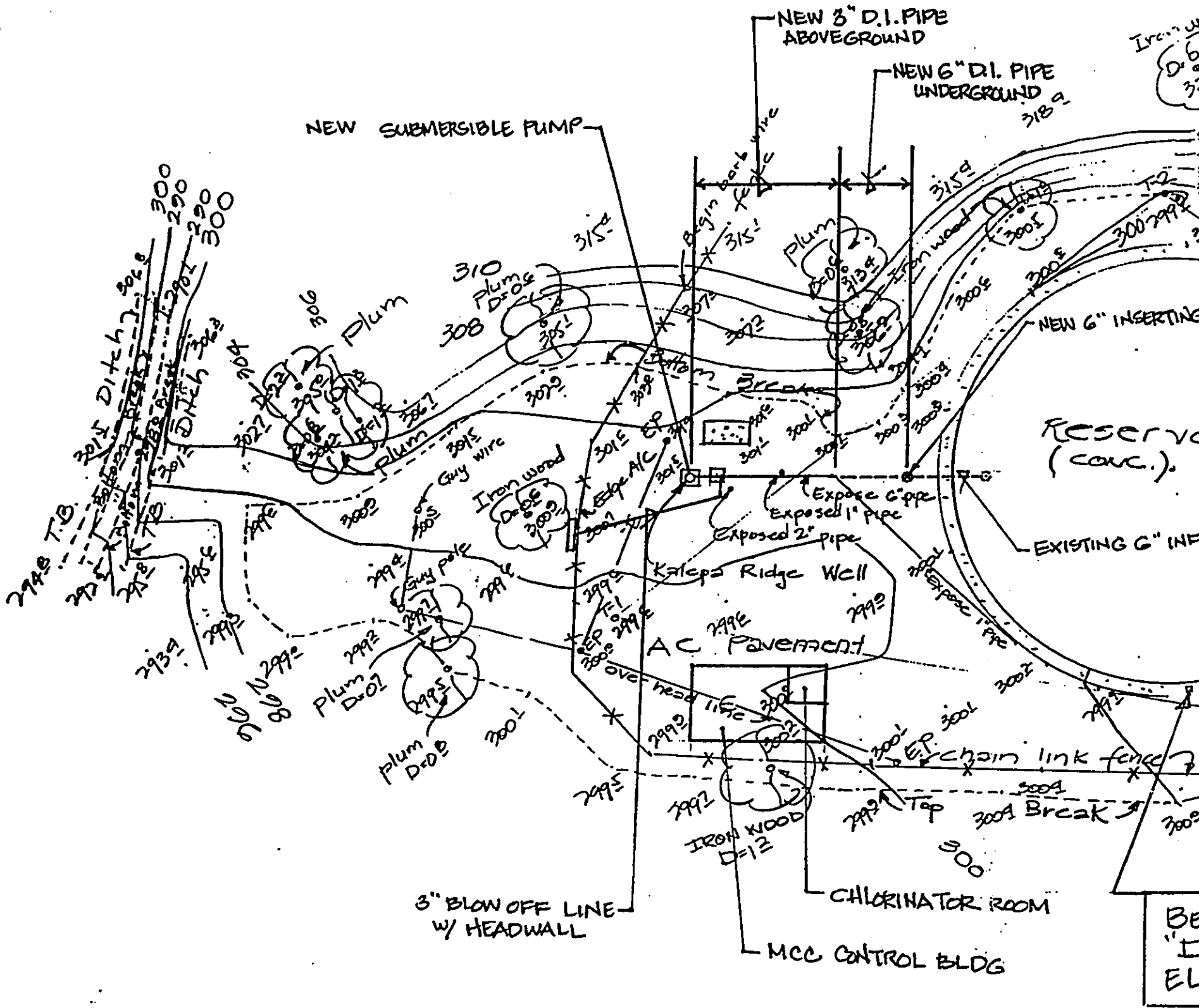
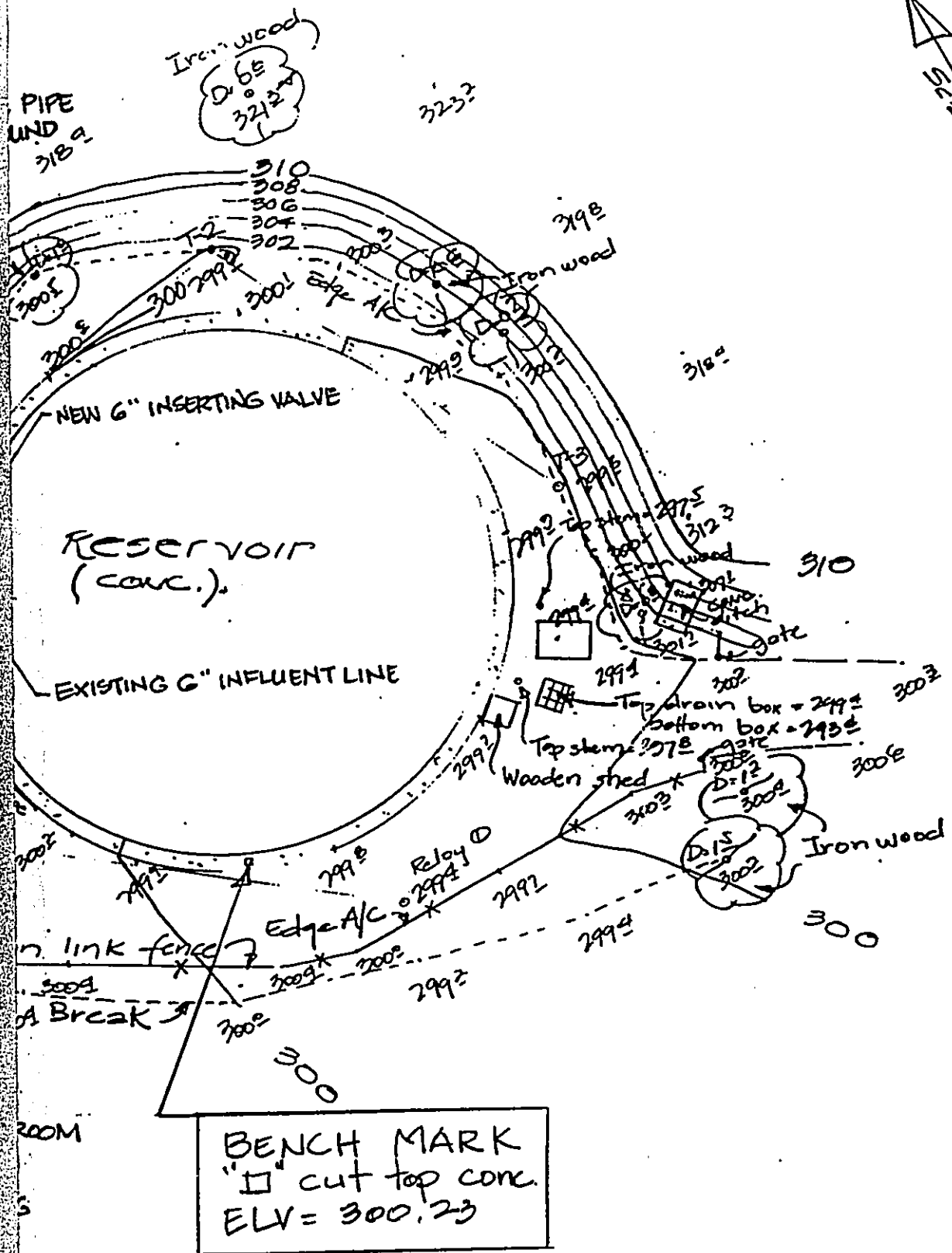


Figure 3

PRELIMINARY SITE PLAN

BM

Scale 1 in. = 20 ft.
 TRUE NORTH



BENCH MARK
 "□" cut top CONC.
 ELV = 300.23

SITE PLAN

10 MAR 92

CHAPTER 3
POSSIBLE ALTERNATIVES

3.1 NO ACTION

The proposed action is one of several interim measures being carried out by the Department of Water to meet immediate and short-term water demand in Lihue and Hanamaulu. No action will result in water shortages, particularly during the drier summer months. It is also likely that any new development in the Lihue-Hanamaulu area will have to be deferred due to an inadequate supply of water.

3.2 DELAYED PROJECT

Delay of the project would initially have the same effect as the no action alternative. The Kilohana wells and Lihue Plantation water tunnel are no longer adequate to meet demand during the dry months. The existing Kalepa Ridge Well No. 1 was selected as a first step in the development of new wells because it can be made operational fairly quickly.

3.3 ALTERNATE WELL SITES

In addition to the Kalepa Ridge project, other high level wells will be developed to meet immediate demand. Sites for new wells are being identified, but these will require more time to bring into production. The Kalepa Ridge well is already drilled, and the water quality is acceptable; therefore, it offers a good first step in the overall program.

3.4 WATER CONSERVATION

The Department of Water is already implementing water conservation measures in conjunction with its well program (for example, voluntary reductions by large users). Both are required to meet water demand over the short-term.

CHAPTER 4
EXISTING ENVIRONMENT

4.1 **PHYSIOGRAPHY**

4.1.1 Topography

Although the site is situated on the slope of Kalepa Ridge at an elevation of 303 feet above mean sea level, it was graded when the water tank and well were constructed. Hence, the well is on level ground. Access is via a relatively steep paved road leading up from the Lihue Plantation cane haul road.

4.1.2 Soils and Geology

Soils on the site are Lihue Silty Clay, 15 to 25 percent slopes (LhD). The Lihue series consists of well-drained soils on uplands on the island of Kauai. These soils developed in material weathered from basic igneous rock. They are gently sloping to steep, with elevations ranging from nearly sea level to 800 feet. Annual rainfall is 40 to 60 inches, and mean annual soil temperature is 73° F. On LhD soils, runoff is medium and the erosion hazard is moderate. (U.S. Department of Agriculture, Soil Conservation Service, *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii*, August 1972.)

The underlying geologic formation is volcanic rock, and the Kalepa well source is a highly permeable basalt aquifer.

4.1.3 Climate

The average annual rainfall at Lihue Airport, not far from the project site, is 44 inches. Temperatures range from 69.3° F. (daily minimum) to 81.1° F. (daily maximum). (State of Hawaii, Department of Business and Economic Development, *The State of Hawaii Data Book*, 1990.)

4.2 **BIOLOGICAL RESOURCES**

4.2.1 Flora

The well and reservoir site is almost completely paved with asphalt. A few weeds have managed to grow in cracks in the asphalt. There are also several plants in the area directly behind the well site, including ironwood and plum trees. Surrounding vegetation outside the fence includes wedelia, various grasses and weeds, ficus, and koa haole. It is unlikely that the site provides a habitat for any threatened or endangered plant species.

4.2.2 Fauna

No wildlife was observed within the enclosure during visits to the site. The site is in an industrial/agricultural/residential area, and the surrounding flora is composed of primarily introduced plants. Therefore, it is unlikely that it provides an important habitat for threatened or endangered native bird species. Most terrestrial endemic or indigenous birds are limited to native forests at higher elevations. Exceptions include the 'elepaio (*Chasiempis sandwichensis*), which has been found in some areas where nearly all of the vegetation is composed of introduced plants, and the pueo or Hawaiian short-eared owl (*Asio flammeus sandwichensis*), which is found in open grassland, pastures, forests, lava flows, and residential areas. It is possible that these birds frequent the project area, but the more common species found in such an environment include the cardinal, barred dove, spotted dove, mockingbird, mynah, ricebird, house sparrow, and white eye—all of which are introduced. (University of Hawaii, Department of Geography, *Atlas of Hawaii*, Second Edition, University of Hawaii Press, 1983.)

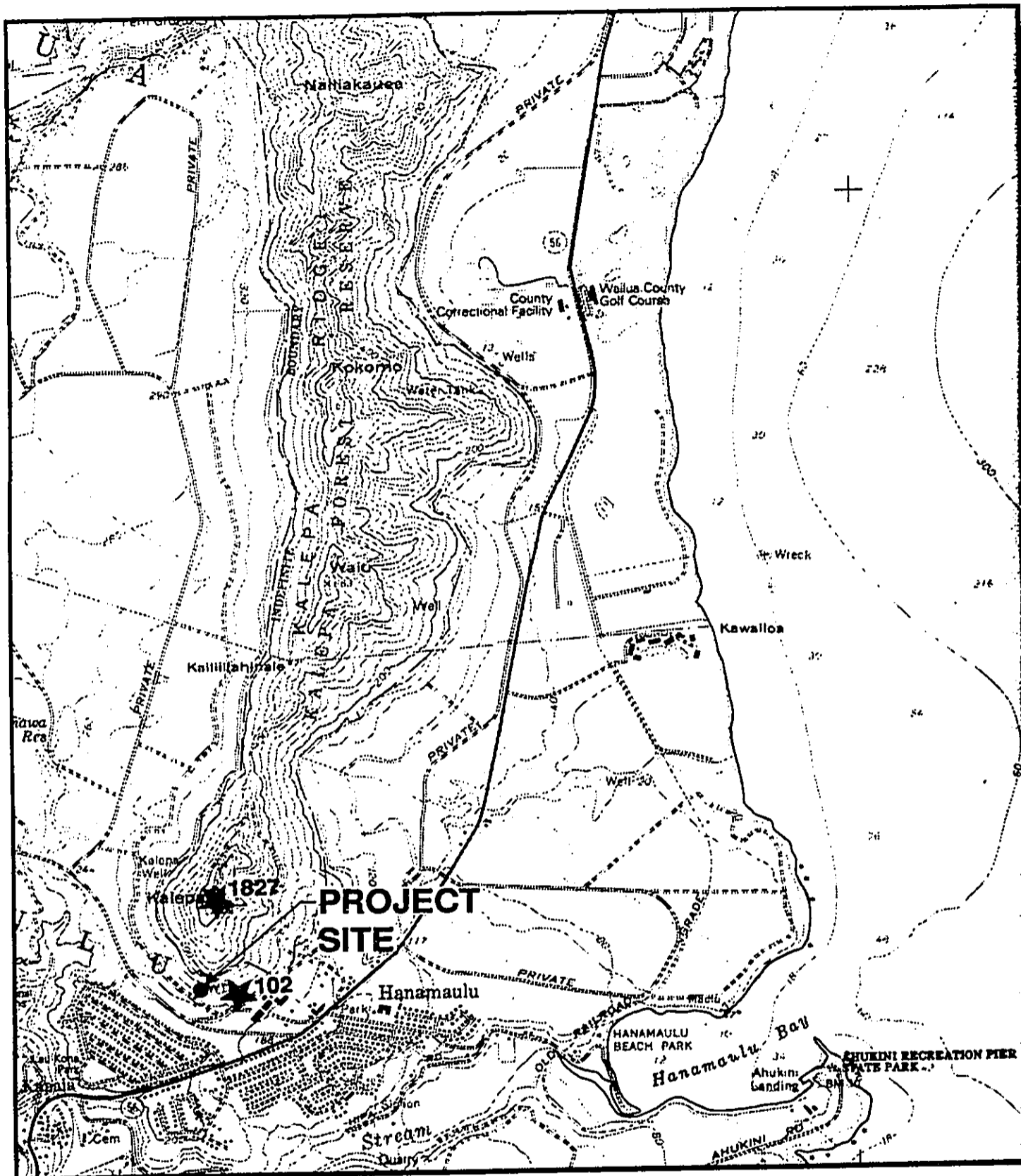
4.3 ARCHAEOLOGY

Two archaeological sites are located in the general vicinity. A burial platform (Site 1827) is found at the top of Kalepa Ridge. Site 1827 is approximately 1,500 feet from the well site at an elevation of about 700 feet above mean sea level. The other site in the area is Kalaeokamau Heiau (Site 102), located about 500 feet from the well site—near the cane haul road at the base of Kalepa Ridge. The location of both archaeological sites is shown in Figure 4. *See letter*

4.4 SOCIOECONOMIC ENVIRONMENT

Hanamaulu is a small plantation community located on the outskirts of Lihue town. Land uses around the well site include cultivated sugar fields and the Lihue Plantation automotive baseyard. Beyond the sugar fields to the southwest, approximately 750 feet from the well site, is a residential subdivision. Hawaiian Telephone antenna facilities are situated at the top of the ridge. There are no parks, schools, or other public facilities within the immediate project vicinity.

Hanamaulu is composed primarily of single-family homes, together with small businesses located along Kuhio Highway. The resident population in 1990 was 3,611 (State of Hawaii DBED, *The Population of Hawaii, 1990*, Statistical Report 219, July 1991.)



Sites ★
 1827 - Burial Platform
 102 - Kalaueokamau Heiau

Figure 4
LOCATION OF ARCHAEOLOGICAL SITES
 Hanamaulu, Kauai, Hawaii
 Prepared by: Belt Collins & Associates
 March 1992

CHAPTER 5

POTENTIAL IMPACTS AND MITIGATION MEASURES

The impacts associated with the proposed action will be temporary, lasting only while construction and installation are taking place, a period of about three months. No long-term adverse impacts are foreseen.

5.1 TEMPORARY IMPACTS DURING CONSTRUCTION

Impacts during construction and installation would include some noise and emissions from vehicles and equipment, as well as dust, primarily from vehicles traversing the cane haul road and perhaps as a result of the excavation and trenching. These impacts would be *minimal and short-term*. There is also the slight potential of some erosion and runoff due to the excavation activities; however, sediment and erosion control measures will be implemented during sitework.

All operations will be conducted in conformance with the State Department of Health's regulations regarding noise (Chapters 11-42 and 11-43 of the Department's Administrative Rules). The contractor will use mufflers and other means for noise control. All noise attenuating equipment will be properly maintained and repaired or replaced as needed. No other mitigation measures are necessary.

5.2 OTHER IMPACTS

No other adverse impacts are anticipated. The project area has already been graded and developed; land forms will not be significantly altered as a result of the project. Stormwater runoff from the site will not increase in quantity or rate of flow. There will be no adverse effects on streams in the area since the groundwater elevation of the well is lower than the streams' invert elevation. Existing flora will not be displaced, with the exception of scattered weeds and grasses within the fenced well/reservoir facility and a limited area outside the fence. No endangered plant or animal species are known to occur on the site. There are several archaeological sites in the general vicinity, but they are a sufficient distance away so that no adverse effects are anticipated. (See Appendix B for copy of a letter from the Historic Preservation Division.) No negative socioeconomic impacts are expected; the project is intended to have positive effects by helping to meet existing water demand. The proposed action will not adversely affect existing public facilities or services.

CHAPTER 6
DETERMINATION

In accordance with Chapter 343, Hawaii Revised Statutes, it has been determined that the proposed action will not significantly affect the environment and that an Environmental Impact Statement is not required. The determination has been made based primarily on the short duration of the project and its minimal impact on the environment. Temporary effects during construction can be adequately minimized or alleviated by the suggested mitigation measures.

CHAPTER 7

REFERENCES

State of Hawaii, Department of Business, Economic Development & Tourism. (November 1990). *The State of Hawaii Data Book, 1990; A Statistical Abstract*.

_____. (July 1991). *The Population of Hawaii, 1990*. Statistical Report 219.

University of Hawaii, Department of Geography. (1983). *Atlas of Hawaii*. Second Edition. Honolulu: University of Hawaii Press.

U.S. Department of Agriculture, Soil Conservation Service. (August 1972). *Soils Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii*.

APPENDIX A

Eng/MATU, → Mst File ✓
D.O. 03590-5



United States Department of the Interior



GEOLOGICAL SURVEY

WATER RESOURCES DIVISION
677 ALA MOANA BLVD. SUITE 415 HONOLULU, HI 96813
91 DEC 16 P 4: 29

December 13, 1991

Mr. Gregg Fujikawa
Department of Water
County of Kauai
P.O. Box 1706
Lihue, HI 96766

Dear Mr. Fujikawa:

As requested in our phone conversation on December 11, 1991, I have complied the following history of construction, testing, and use of the Kalepa well from records at the County of Kauai Department of Water, the State of Hawaii Department of Land and Natural Resources, and the U.S. Geological Survey. The Kalepa well is located on the southern side of Kalepa ridge near Hanamaulu subdivision at an elevation of 303 feet above mean sea level (MSL).

**Kalepa well (5921-01)
History of construction, testing, and use**

November 1954: The Kalepa well was completed to a depth of 540 feet (ft) below land surface in November 1954 by Samson and Smock Ltd. The static water level in the well was about 15 ft above MSL. The drilling was stopped owing to the loss of a drill bit at the bottom of the hole. The well was cased to a depth of 315 ft with 14-inch diameter steel casing. The casing is perforated from 275 to 315 ft. On November 9, 1954 the well was pump tested at 100 gallons per minute (gpm) for 9 hours. The drawdown, which is defined as the distance the water level in the well is lowered, was 19 ft. The chloride concentration of the pumped water increased from 23 to 182 milligrams per liter (mg/L) during pumping.

December 1954: In an attempt to increase the yield of water from the well, 47 sticks of dynamite were used to blast the well at 530 ft below land surface. On December 22, 1954 a bailed water sample was collected from the well. The well was temporary abandon owing to the low yield and high chloride concentration during pumping.

April 1960: A subsurface bore-hole video survey and pumping test of the Kalepa well was made by Layne Water Development. The subsurface bore-hole video survey revealed that: 1) the casing was in excellent condition, 2) the hole has a dog-leg at 80, 200, and 390 ft, and the open hole below the casing was reasonably solid with very few cracks. The well was pump tested at a rate of 300 gpm for 36 hours with a drawdown of 39 ft and a chloride concentration of 250 mg/L.

April 1962: U.S. Pumps of Hawaii, Inc. field tested a pump that had been installed in the Kalepa well for connection to the Lihue Water System. The design condition was for 150 gpm with the pump intake set at 320 ft below the top of the casing. The pump broke suction after 12 minutes of pumping at 150 gpm, and had to be throttled back to 91 gpm before the water level remained relatively stable for 30 minutes of pumping.

Late 1962: The Kalepa well was connected to the Lihue Water System sometime after April 1962. The well was disconnected and temporarily abandoned after consumers in the Hanamaulu subdivision complained that the water being supplied had an unacceptable taste and odor. The exact date the well was brought on- and off-line, and the quantity of water pumped is not known.

October 1964: A bailed water sample was collected from the well on October 19, 1964. The well remained temporarily abandon.

September 1965: To determine the origin of the taste and odor problem, the Kalepa well was pump tested at approximately 115 gpm for 9 days. The chloride concentration of the pumped water increased from 21.3 to 85.2 mg/L during pumping. A one gallon water sample was collected for more complete chemical analysis near the end of the pumping test, but was lost in shipping.

October 1967: The pump and pump column were removed and the well abandon on October 3, 1967.

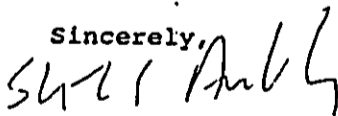
February - March 1991: To determine the origin of the taste and odor problem and the hydraulic properties of aquifer material surrounding the well, a pumping test and water quality analysis of the well was done by the U.S. Geological Survey. Water samples were collected at various depths from the water column within the well prior to pumping. A down-the-hole thief sampler connected to an electric winch was used to collect the samples. The chloride concentration of water in the well was 19 mg/L from top to bottom. A three-stage 4-inch submersible pump was set at approximately 344 ft below land surface or 56 ft below the static water level. A variable rate pumping test was performed on February 27, 1991. A constant rate pumping test was performed at 120 gpm for 96 hours from February 28 to March 4, 1991. Water samples were collected at the beginning, middle, and end of the 96-hour constant rate pump test. The chloride concentration of the pumped water increased from 33 mg/L to 67 mg/L during the 96 hour constant rate pump test. While the drawdown had stabilized at 21 feet after 16 hours of pumping, the chloride concentration of the pumped water was still rising at the end of the test (see enclosed figure).

Summary of pumping test results.

Date (yr)	Static water level (feet)	Pumping rate (gpm)	Duration (hrs)	Drawdown (feet)	Chloride (mg/L)	
					initial	final
1954	15	100	9	19	23	182
1960	--	300	36	39	--	250
1965	--	115	216	--	21.5	85.2
1991	13	120	96	21	19	67

If you have any questions please contact me at 808-541-2655.

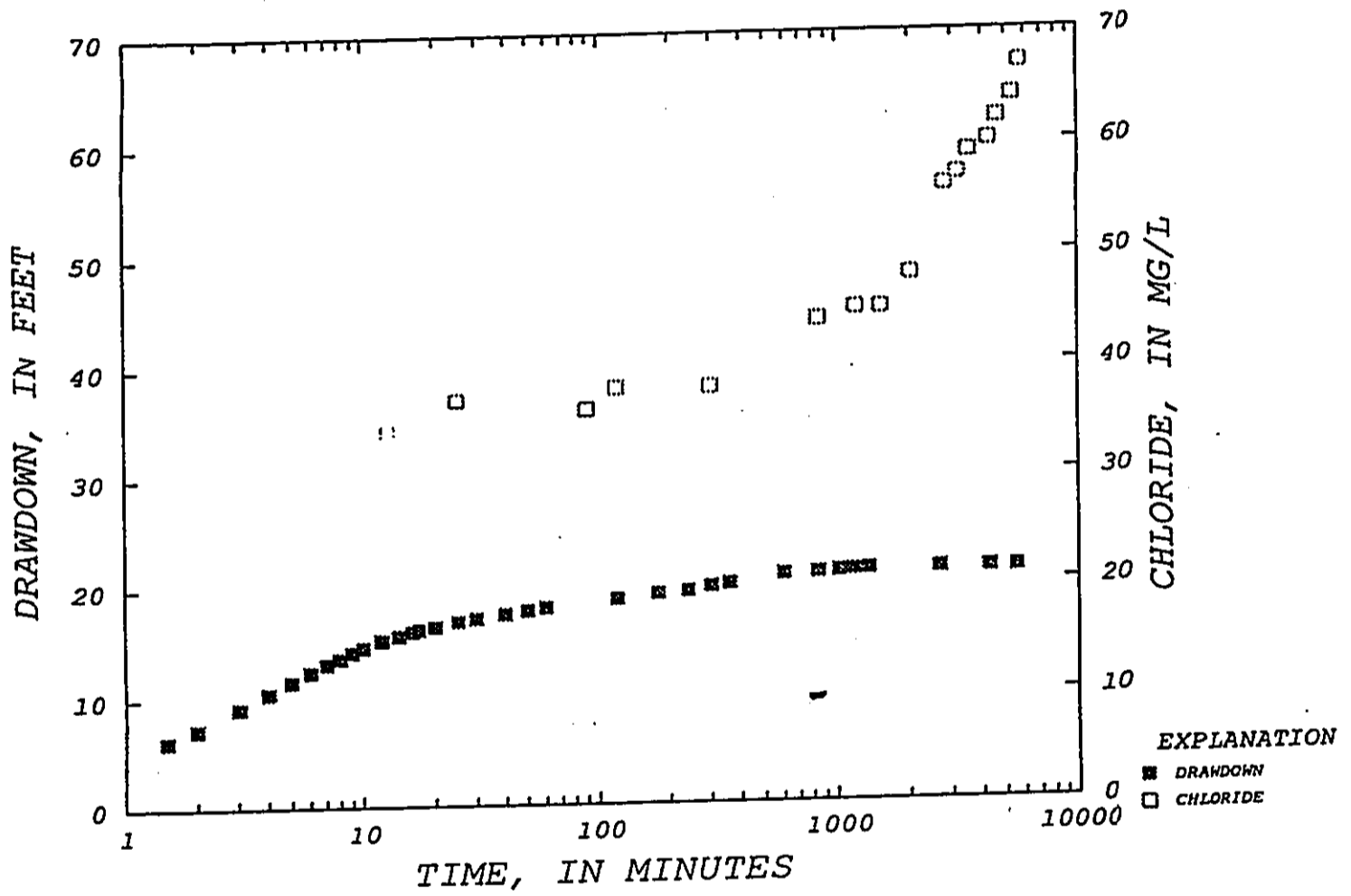
Sincerely,



Stephen S. Anthony
Hydrologist

Enclosure:

KALEPA WELL 5921-01
PUMPING RATE = 120 GPM





United States Department of the Interior

GEOLOGICAL SURVEY

WATER RESOURCES DIVISION
677 ALA MOANA BLVD. SUITE 415
HONOLULU, HI 96813

May 22, 1991



Mr. Raymond Sato
Manager and Chief Engineer
Department of Water
County of Kauai
P.O. Box 1706
Lihue, Kauai 96766

Dear Ray,

This letter provides water quality analysis results of a sample collected from the Kalepa well (5921-01) on March 4, 1991. The water sample was collected near the end of a constant rate pumping test that was performed at 120 gallons per minute for 96 hours from February 28 to March 4, 1991. The sample was analyzed at the U.S. Geological Survey's National Laboratory in Arvada, Colorado.

The water sample analyzed meets all national primary and secondary drinking water regulations, except for total coliform. Coliforms can be removed by chlorination. The chloride concentration of this sample is 67 milligrams per liter. While the drawdown had stabilized at 21 feet after 16 hours of pumping, the chloride concentration of the pumped water was still rising at the end of the test. If this well is to be put back into production, the chloride concentration should be monitored until it stabilizes.

A report that describes the results of the pumping test and water quality analysis of the Kalepa well is being prepared. We were not able to detect a taste or odor that might have contributed to the abandonment of this well in the early 1960's.

Sincerely,

William Meyer
District Chief

Enclosure:

**WATER QUALITY RESULTS
KALEPA WELL, KAUAI, HAWAII**

Station number ----- 215958159214301
Date of collection --- 03-04-91
Flow rate (gpm) ----- 115

The following is a summary of water quality results from the Kalepa well compared to the national primary and secondary drinking water regulations. All values are reported in milligrams per liter unless otherwise noted. MCL = maximum contaminant level.

National Primary Drinking Water Regulations (as of May 1990)

<u>CONTAMINANT</u>	<u>MCL</u>	<u>Kalepa Well</u>
Arsenic	0.05	<0.001
Barium	1	<0.1
Cadmium	0.010	<0.001
Chromium	0.05	0.004
Fluoride	4.0	<0.1
Lead	0.05	0.003
Mercury	0.002	<0.0001
Nitrate as N	10	1.1
Selenium	0.01	<0.001
Silver	0.05	<0.001
Coliforms (total)	1/100 mL	16/100 mL
Fecal coliform	not listed	<1/100 mL
Turbidity	1-5 NTU	0.3
2,4-D	0.1	<0.00001
Endrin	0.0002	<0.00001
Lindane	0.004	<0.00001
Methoxychlor	0.1	<0.00001
2,4,5-TP Silvex	0.01	<0.00001
Benzene	0.005	<0.0002
Carbon tetrachloride	0.005	<0.0002
P-Dichlorobenzene	0.075	<0.0002
1,2-Dichloroethane	0.005	<0.0002
1,1-Dichloroethylene	0.007	<0.0002
1,1,1-Trichloroethane	0.20	<0.0002
Trichloroethylene	0.005	<0.0002
Vinyl chloride	0.002	<0.0002
THM (chloroform, Bromoform, Bromodichloromethane, Dibromochloromethane)	0.10	<0.0002

**National Secondary Drinking Water Regulations (as of May 1990)
(Non-enforceable and may affect aesthetic qualities)**

<u>CONTAMINANT</u>	<u>LEVEL</u>	
Chloride	250	67
Color	15 units	not determined
Copper	1	0.001
Corrosivity	non-corrosive	not determined
Fluoride	2	<0.1
Foaming agents	0.5	not determined
Iron	0.3	0.02
Manganese	0.05	0.01
Odor	3 threshold	not detected
pH	6.5-8.5	8.0
Sulfate	250	<0.5
Total Diss Solids	500	345
Zinc	5	A-5 0.07

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UNITED STATES DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
NATIONAL LABORATORY
ARVADA, COLORADO

WATER QUALITY ANALYSIS
KALEPA WELL, KAUAI, HAWAII

STATION NUMBER ----- 215958159214301
DATE OF COLLECTION ----- 03-04-1991
TIME OF COLLECTION ----- 1300
FLOW RATE (GALLONS/MINUTE) -- 115

WATER TEMPERATURE, DEGREES CELSIUS	26.2
SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELESIOUS	515.
TURBIDITY (NTU)	0.30
PH, FIELD	7.7
PH, LABORATORY	8.0
FECAL COLIFORM (PER 100 ML)	<1
COLIFORM, TOTAL (PER 100 ML)	16
PHENOLS, TOTAL (UG/L)	1
SULFIDE TOTAL (MG/L AS S)	0.5
MAJOR IONS	
CALCIUM DISSOLVED (MG/L AS CA)	19
MAGNESIUM DISSOLVED (MG/L AS MG)	20
SODIUM DISSOLVED (MG/L AS NA)	54
POTASSIUM DISSOLVED (MG/L AS K)	1.3
ALKALINITY, FIELD, MG/L AS CACO3	111
CHLORIDE DISSOLVED (MG/L AS CL)	67
SULFATE DISSOLVED (MG/L AS SO4)	48
FLUORIDE DISSOLVED (MG/L AS F)	0.10
IRON DISSOLVED (UG/L AS FE)	7
MANGANESE DISSOLVED (UG/L AS MN)	2.
SILICA DISSOLVED (MG/L AS SIO2)	72
NUTRIENTS	
NITROGEN AMMONIA TOTAL (MG/L AS N)	0.01
NITROGEN, NITRITE, TOTAL, MG/L AS N	0.01
NITROGEN AMMONIA PLUS ORGANIC TOTAL (MG/L AS N)	0.20
NITROGEN NITRITE PLUS NITRATE TOTAL (MG/L AS N)	1.10
PHOSPHORUS TOTAL (MG/L AS P)	0.16
PHOSPHORUS ORTHOPHOSPHATE, TOTAL (MG/L AS P)	0.13
METALS, TOTAL RECOVERABLE (UG/L)	
ARSENIC	<1
BARIUM	<100
BERYLLIUM	<10
CADMIUM	<1
CHROMIUM	4
CHROMIUM	<1
COBALT	1
COPPER	20
IRON	3
LEAD	

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MANGANESE	<10
MERCURY	<0.10
MOLYBDENUM	<1
NICKEL	2
SILVER	<1
ZINC	70
ALUMINUM	20
LITHIUM	<10
SELENIUM	<1
TRIAZINE HERBICIDES, TOTAL RECOVERABLE (UG/L)	
ALACHLOR	<0.2
AMETRYNE	<0.1
ATRAZINE	<0.1
BROMACIL	<0.2
BUTACHLOR	<0.1
BUTYLATE	<0.1
CARBOXIN	<0.2
CYANAZINE	<0.2
CYCLOATE	<0.1
DE-ISOPROPYL ATRAZINE	<0.2
DE-ETHYL ATRAZINE	<0.2
DIPHENAMID	<0.1
HEXAZINONE	<0.2
METOLACHLOR	<0.2
METRIBUZINE	<0.1
PROPACHLOR	<0.1
PROPAZINE	<0.1
PROMETONE	<0.2
PROMETRYNE	<0.1
SIMETRYNE	<0.1
SIMAZINE	<0.1
TERBACIL	<0.2
TRIFLURALIN	<0.1
VERNOLATE	<0.1
ORGANOPHOSPHATE PESTICIDES, TOTAL RECOVERABLE (UG/L)	
CHLORPYRIFOS	<0.01
DEF	<0.01
DIAZINON	<0.01
DISYSTON	<0.01
ETHION	<0.01
FONOFOS (DYFONATE)	<0.01
MALATHION	<0.01
METHYL PARATHION	<0.01
METHYL TRITHION	<0.01
PARATHION	<0.01
PHORATE	<0.01
TRITHION	<0.01
ORGANOCHLORINE PESTICIDES, TOTAL RECOVERABLE (UG/L)	
PERTHANE	<0.1
ALDRIN	<0.01
LINDANE	<0.01
CHLORDANE	<0.1
DDD	<0.01

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DDE	<0.01
DDT	<0.01
DIELDRIN	<0.01
ENDOSULFAN	<0.01
ENDRIN	<0.01
TOXAPHENE	<1.
HEPTACHLOR	<0.01
HEPTACHLOR EPOXIDE	<0.01
METHOXYCHLOR	<0.01
MIREX	<0.01

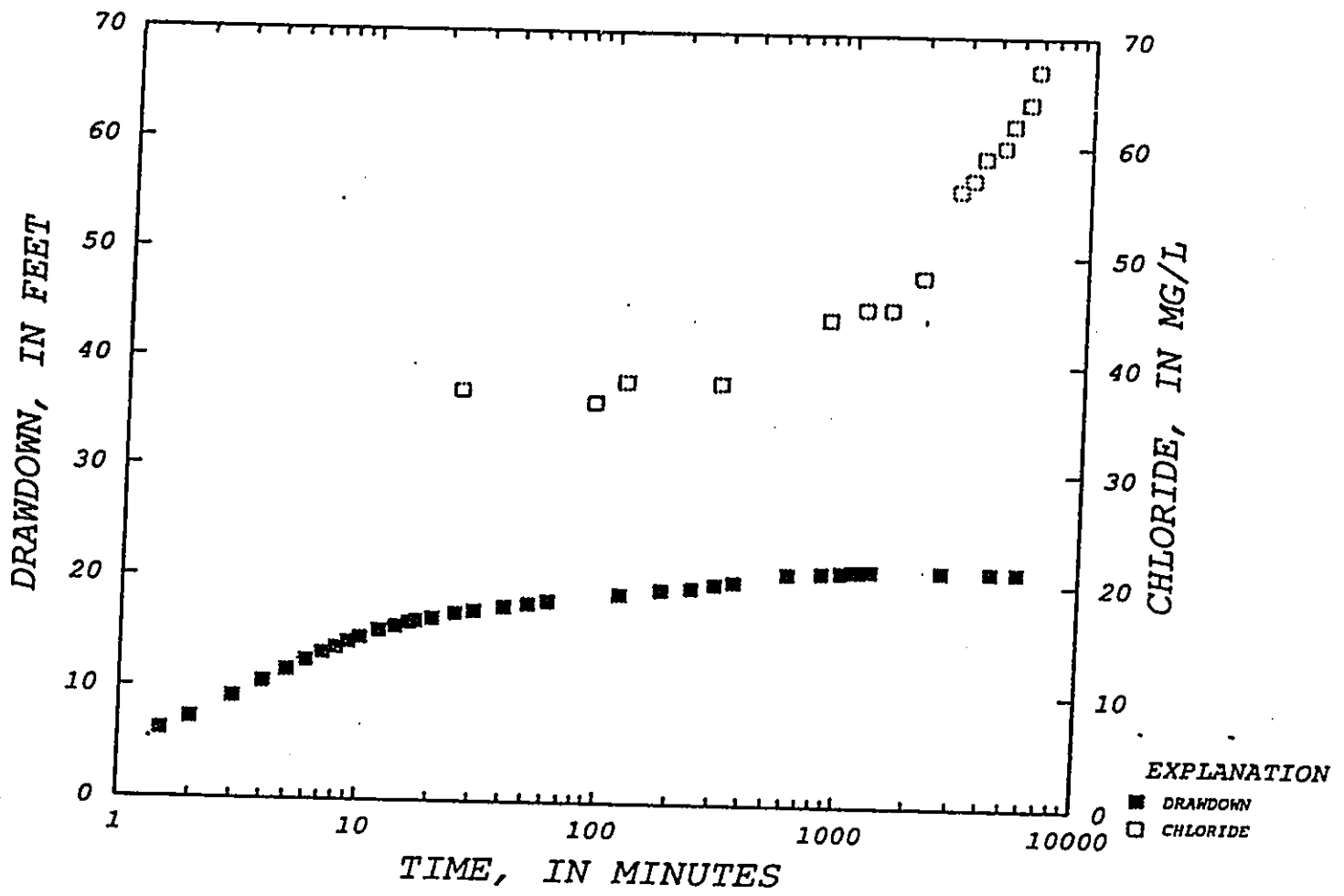
VOLATILE ORGANICS, TOTAL RECOVERABLE (UG/L)

DICHLOROBROMOMETHANE	<0.2
CARBONTETRACHLORIDE	<0.2
1,2-DICHLOROETHANE	<0.2
CHLOROFORM	<0.2
TOLUENE	<0.2
BENZENE	<0.2
CHLOROBENZENE	<0.2
CHLOROETHANE	<0.2
ETHYLBENZENE	<0.2
TETRACHLOROETHYLENE	<0.2
TRICHLOROFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,1-DICHLOROETHYLENE	<0.2
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
1,1,2,2-TETRACHLOROETHANE	<0.2
1,2-DICHLOROBENZENE	<0.2
1,2-DICHLOROPROPANE	<0.2
1,2-TRANS-DICHLOROETHENE	<0.2
1,3-DICHLOROPROPENE	<0.2
1,3-DICHLOROBENZENE	<0.2
1,4-DICHLOROBENZENE	<0.2
2-CHLOROETHYLVINYLETHER	<0.2
DICHLORODIFLUOROMETHANE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
VINYLCHLORIDE	<0.2
TRICHLOROETHYLENE	<0.2
STYRENE	<0.2
XYLENE	<0.2
1,2-DIBROMOETHANE	<0.2
BROMOFORM	<0.2
CHLORODIBROMOMETHANE	<0.2
METHYLBROMIDE	<0.2
METHYLCHLORIDE	<0.2
METHYLENECHLORIDE	<0.1
NAPHTHALENES	<0.1
PCB	<0.1

CHLOROPHENOXY ACID HERBICIDES, TOTAL RECOVERABLE (UG/L)

2,4-D	<0.01
2,4,5-T	<0.01
SILVEX	<0.01
2, 4-DP	<0.01

KALEPA WELL 5921-01
PUMPING RATE = 120 GPM



JOHN WAIHEE
GOVERNOR OF HAWAII

RECEIVED

APR 15 1992

BELT COLLINS & ASSOCIATES

APPENDIX B



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

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RESOURCES ENFORCEMENT
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FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
PROGRAM
LAND MANAGEMENT
STATE PARKS
WATER RESOURCE MANAGEMENT

April 10, 1992

Susan Rutka
Belt Collins & Associates
680 Ala Moana Boulevard
Honolulu, Hawaii 96813

LOG NO: 5005
DOC NO: 1851W

Dear Ms. Rutka:

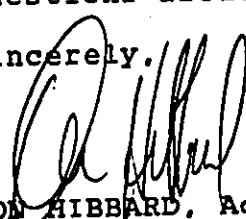
SUBJECT: Historic Preservation Concerns -- EA for Controls,
Pumphouse and Pipeline for Kalepa Ridge Well No. 1
Lihue Water System
TMK: 3-8-02: 8
Hanamaula, Lihue, Kaua'i

Thank you for submitting this EA for our review and comments.

A review of our records shows that there are two known historic sites near the project location. Since this area has been disturbed by previous construction of the existing service road and well, we believe that the proposed well will have "no effect" on significant historic sites.

Please contact Ms. Nancy McMahon at 587-0006 if you have any questions about these comments.

Sincerely,


DON HIBBARD, Administrator
State Historic Preservation Division

NM:sty

cc: Gregg Fujikawa, County of Kauai, Water Department