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

September 25, 1995

Mr. Gary Gill, Director
Office of Environmental Quality Control
State of Hawaii
220 South King Street
Fourth Floor
Honolulu, Hawaii 96813

Dear Mr. Gill:

Subject: Negative Declaration for the Proposed Wahiawa II Well Addition,
TMK: 7-3-07: 06 and 09, Wahiawa, Oahu, Hawaii

The Board of Water Supply has reviewed the comments received during the public comment period which began on May 8, 1995. We have determined that the environmental impacts of this project have been adequately addressed as discussed in the final environmental assessment (EA) and are therefore, issuing a negative declaration. We request that our proposed well project be published in the October 8, 1995 OEQC Bulletin as a Negative Declaration.

Attached are four copies of the final EA for your review.

If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours

RAYMOND H. SATO
Manager and Chief Engineer

Attachments

1995-10-08-OA-FEA- Wahiawa II Well Addition

FINAL ENVIRONMENTAL ASSESSMENT

WAHIAWA II WELL ADDITION

WAHIAWA, OAHU, HAWAII
TAX MAP KEY: 7–3–07:06 and 09

PROPOSING AGENCY
CITY AND COUNTY OF HONOLULU
BOARD OF WATER SUPPLY

Submitted pursuant to Chapter 343, Hawaii Revised Statutes

SEPTEMBER 1995

CH2MHILL

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Chapter 1
Executive Summary

1.1 Proposing Agency and Proposed Action

The City and County of Honolulu Board of Water Supply (BWS) proposes to drill and case an additional potable water well in Wahiawa within an existing City and County of Honolulu Corporation Yard located on California Avenue in Wahiawa, across from Kaala Elementary School. The proposed well site is proposed to be located on the east side of a 2.2-acre Corporation Yard, which is owned by the City and County of Honolulu and operated by the BWS.

The existing Wahiawa II Well facilities are located on the northwest portion of the 2.2-acre BWS corporation yard and consist of a single potable water well, a pump, pipelines, a control house, and electrical and mechanical control devices. Water from the existing Wahiawa II Well facilities is pumped into BWS's municipal system via pipelines to an existing 12-inch water main located within California Avenue.

The proposed well addition is to be the second well in the Wahiawa II Well facilities. The well addition is proposed to be located on the northeast portion of the BWS's corporation yard, and about 200 feet upgradient and north of the banks of Wahiawa Reservoir (also known as Lake Wilson). The well is expected to be capable of yielding about 1.5 million gallons per day (mgd) of potable water.

The drilling and casing of this well is the first step of a process that the BWS utilizes to obtain hydro-geological data on the potential of new potable groundwater resources that could be used for municipal purposes. Following the drilling and casing of the exploratory well, well pump tests will be performed to determine if the quantity of the water from the exploratory well is suitable for municipal use. If the quantity of the water proves to be unsuitable, the exploratory well will be sealed and/or capped.

If the quantity of the water is suitable, the well will be integrated into the Wahiawa II Wells facility as a permanent production well. However, the presence of volatile organic compounds in the well is possible. If necessary, the quality of the water will be made suitable for municipal use with the installation of a granular activated charcoal (GAC) water treatment facility on the site. If the quantity of the water is sufficient, and if the quality of water can be made suitable for municipal use with a GAC water treatment facility, the BWS's next step will be to integrate the well into the BWS's municipal facilities as a permanent production well.

If the well is to be developed into a permanent potable water production well, a subsequent amendment to City and County of Honolulu Development Plan Public Facilities Map to include the project area as a "site determined water well programmed for production within 6 years" will be required.

This environmental assessment (EA) evaluates the impacts of the drilling, casing, and testing of this proposed well addition. The proposed action includes the temporary installation of pumps, piping, and appurtenances, and the monitoring of nearby potable water wells to determine the effects to these nearby wells during the test pumping. If the well is developable, this proposed action will include the installation of a permanent pump, pipelines, and electrical and mechanical control devices for the permanent production well, and integration into the existing production facility. This action includes, if necessary, a GAC water treatment facility installed on the site to make the quality of the water suitable for municipal use. All construction work will take place within the 2.2-acre City and County of Honolulu BWS Corporation Yard.

1.2 Purpose of this Environmental Assessment

This EA was prepared pursuant to Chapter 343, Hawaii Revised Statutes (HRS). Any project proposing the use of State of Hawaii or county lands or funds must comply with Chapter 343, HRS. Environmental compliance pursuant to Chapter 343, HRS, is required because the proposed well addition is to be located within property under the jurisdiction and ownership of the City and County of Honolulu, and will be constructed with BWS funds.

A final environmental assessment and an accompanying negative declaration by the BWS determining that the impacts of this project are not sufficient to require the preparation of an environmental impact statement (EIS) will satisfy the Chapter 343, HRS, requirements.

1.3 Subsequent Permits and Approvals Required for Exploratory and Production Well

A well construction pump installation and water use permit will be required from the Commission on Water Resource Management (CWRM).

A noise permit will be required from the State of Hawaii, Department of Health (DOH), Noise and Radiation Branch.

A building permit will be required from the City and County of Honolulu Building Department.

According to the City and County of Honolulu Planning Department, exploratory wells are considered minor, and are not required to be shown on the Development Plan Public Facilities Map. If the well is developed into a potable water production well, a subsequent amendment to City and County of Honolulu Development Plan Public Facilities Map to include the project area as a "site determined water well facility programmed for construction within 6 years" will first be required, since the site is not shown as such on the Development Plan Public Facilities Map. A Development Plan Public Facilities Map amendment Application would require an application to the City and County of Honolulu Planning Department, and approval by the City and County of Honolulu City Council.

1.4 Benefits of this Project

The proposed well addition will furnish valuable data that will be added to Oahu's island-wide hydro-geological information base. This data will be valuable in estimating the quantity and quality and of the potable groundwater resources available at this site, and in combination with data from other potable wells, the data will ultimately be valuable for determining the total water resources available for the entire island.

If the hydro-geological data shows that potable groundwater sources can be developed successfully at this site, this well will be converted to a permanent potable water well and added to the Wahiawa II Well facilities and Oahu's potable water system. The development of additional potable water sources is necessary to accommodate the growing demand for potable water within the City and County of Honolulu.

1.5 Alternatives Considered

The no action alternative, the delayed action alternative, site alternatives, and source alternatives are discussed in this environmental assessment or were discussed in previous environmental analyses done by the BWS.

The no action alternative was not pursued because it would be contrary to the BWS's legal mandate to provide for the water needs of a growing population. This project is part of an overall potable groundwater development program intended to increase the water supply to meet growing municipal water demands. If the BWS's water source development program is curtailed, the BWS would be hampered in providing adequately for the water needs of the future population of the island, which may result in restrictions in new development as well as regional water shortages.

The delayed action alternative was not pursued because this alternative would delay the BWS's implementation schedule, and would have substantially similar environmental

outcomes as the no action alternative, and higher development costs because of inflation. Delay in the proposed well testing program would increase the risk that the growth in population will lead to water demands in excess of available supplies.

This environmental assessment analyzes one of two possible potable groundwater well sites currently being evaluated by the BWS in the Wahiawa portion of the Central Sector. The other possible potable water well site being considered is in the Whitmore Village area. The well site in the Whitmore Village area is considered by the BWS to be additional site for development of potable water development rather than an alternative site.

Alternative source development was analyzed by the BWS in its 1984 study, *Regional Environmental Impact Assessment for Development of Wells, Reservoirs, Transmission Lines and Appurtenances at Honolulu, Hawaii*, where potential potable water source alternatives other than groundwater were evaluated, including desalinization, the development of surface and brackish water sources, and the recycling of treated wastewater. Typically these alternative sources have considerably higher costs and technical challenges. For instance, the use of surface water from Wahiawa Reservoir, which receives effluent from the City and County of Honolulu's sewage disposal plant, has a high potential for health and safety problems, and would require costly water treatment works. The development of these alternatives was not considered as feasible as the development of groundwater resources.

1.6 Potential Impacts of this Project and Mitigation Measures

Construction work, primarily the drilling of the exploratory well, will cause minor short-term noise and air pollution impacts. Noise and air pollution impacts from this project will be noticeable at the closest residences located across California Avenue, at adjacent Leialoalo Place, and at the nearest school, Kaala Elementary School, which is located across California Avenue. All government rules and regulations concerning noise and air pollution will be followed during construction to minimize these minor short-term noise and air pollution impacts.

Contractors will comply with all of the conditions of the required noise permit. Mufflers will be required for all construction equipment. All noise attenuating equipment will be maintained in proper operation condition and will be repaired or replaced as needed. For the drilling operation, drilling operations will be restricted to the hours of 7:30 am to 3:30 pm on weekdays and will exclude state holidays. In order to reduce noise levels from the temporary pumps, a surface pump will be installed with mutes, or a submersible pump (which is considerably quieter) will be used. If the well is incorporated into the existing facilities as a permanent production well, noise levels from the permanent pump will be

reduced to below regulatory levels by the use of a surface pump installed with mutes, or by the use of a submersible pump.

To mitigate the effects of the construction activities, dust control measures, such as water sprinkling and dust screens, may be implemented by the contractor as necessary to reduce dust levels that may affect the nearby residents. Further, the contractor will properly maintain its internal combustion equipment to minimize exhaust emissions, and will comply with the Hawaii Department of Health Rules Title 11, Chapter 59 and 60 regarding Air Pollution Control.

Traffic impacts to California Avenue will be minimal. The contractor will schedule the movement of heavy trucks and vehicles to or from the site after 8:30 am and before 2:30 pm Monday through Friday and will exclude state holidays. These measures will help avoid the morning and afternoon peak traffic periods and to avoid conflicts with the traffic to nearby Kaala Elementary School.

Water from the test pumping will be discharged into the south fork of Wahiawa Reservoir via an existing 24-inch storm drain line that is connected to a collection system that drains the Corporation Yard's parking area. It is expected that the water that will be discharged will be clean and therefore will not introduce any pollutants into the environment. Care will be taken in disposing of the test water to preclude the possibility of flushing debris or resuspending sediments and other pollutants in Wahiawa Reservoir.

If the test pumping results indicate that the quantity of the water from the exploratory well is unsatisfactory for municipal use, the Wahiawa II Well Addition will be capped and/or sealed to prevent malicious or accidental contamination of the underlying groundwater aquifers. During the test pumping, the nearby potable groundwater wells will be monitored to determine if they are affected. The proposed well addition site is located about 280 feet east of the existing Wahiawa II Well, which is also in the 2.2-acre Wahiawa Corporation Yard. Including the existing Wahiawa II Well, there are eight other potable water wells located within one mile of the proposed well site in the Wahiawa Aquifer. The resulting data from the monitoring of the nearby groundwater wells will be valuable to determine if the well addition can be integrated into the existing Wahiawa II Well facility.

The south fork of Kaukonahua Stream is also the south fork of Wahiawa Reservoir and is located behind the Corporation Yard property. Wahiawa Reservoir's south fork is located about 200 feet to the south of the proposed well site. There will not be any adverse impacts to Kaukonahua Stream or Wahiawa Reservoir in this vicinity because the water flowing into Kaukonahua Stream and Wahiawa Reservoir is supplied by high elevation (about 880 feet above msl) surface water which will not be affected by the deep groundwater (approximately 20 feet below msl) withdrawn by the well.

The presence of volatile organic compounds in the well is possible. If the quantity of the water is sufficient, and if the quality of water can be made suitable for municipal use with a GAC water treatment facility, the BWS will integrate the well into the BWS's municipal facilities as a permanent production well.

There is no potential for adverse impacts to significant wetlands since none exist in the Wahiawa Aquifer. The nearest wetlands occur at Pearl Harbor to the south and Haleiwa to the north, both about 9 miles away.

The identified minor adverse impacts can be appropriately mitigated. There are substantial potential benefits that can be provided in terms of the potable water supplies from the Wahiawa II Well Addition, if it is able to be developed as a production well.

1.7 Determination

In accordance with Chapter 343, HRS, the BWS has determined that an EIS is not required for the Wahiawa II Well Addition construction, test pumping, and the development of the Wahiawa II Well Addition into a production well and the incorporation of this well into the existing Wahiawa II Well facility. The permanent production well will include the installation of permanent pumps, pipelines, and electrical and mechanical control devices, and if necessary, the installation of a GAC water treatment facility.

This determination has been made because whatever minor adverse impacts that result from this project may be minimized to insignificant levels by the application of the recommended mitigation measures.

1.8 Agencies and Others Consulted in Making this Assessment

The following agencies were consulted during the preparation of the draft environmental assessment for this project:

State of Hawaii agencies

- Department of Land and Natural Resources
  - Commission on Water Resources Management
- Department of Health
  - Environmental Management Division
  - Office of Environmental Quality Control

City and County of Honolulu agencies

- Planning Department
- Land Utilization Department

Twenty-one government agencies and three groups or other individuals were provided a copy of the draft environmental assessment for this project and requested to provide comments. The following is a list of those agencies and others who were provided a copy of the draft environmental assessment.

Federal agencies

- U.S. Department of Agriculture, Soil Conservation Service
- U.S. Army Corps of Engineers, Pacific Ocean Division
- U.S. Department of Transportation
- U.S. Fish and Wildlife Service

State of Hawaii agencies

- Department of Agriculture
- Department of Business, Economic Development, and Tourism
- Department of Education
- Department of Land and Natural Resources
  - Aquatic Resources Division
  - Forestry and Wildlife Division
  - Historic Preservation Division
  - Commission on Water Resources Management
- Department of Health
  - Environmental Management Division
  - Office of Environmental Quality Control
- Department of Transportation, Highways Division
- University of Hawaii
  - Environmental Center
  - Water Resources Research Center

City and County of Honolulu agencies

- Planning Department
- Land Utilization Department
- Public Works Department
- Transportation Services Department
- Wastewater Management Department

Others

- City Council District I representative Rene Mansho
- Wahiawa Neighborhood Board No. 26, Chair Jack Kampfer
- Sierra Club, Hawaii Chapter

Chapter 2
Purpose and Need for the Proposed Action

2.1 Project's Purpose and Need

In 1980, the average municipal water demand on the island of Oahu was 130 mgd. The BWS's 1982 *Oahu Water Plan* projected that the island-wide average municipal water demand would increase to 156 mgd in 1990, and to 181 mgd in the year 2000. Actual BWS water usage in 1990 averaged 158 mgd, of which 156 mgd was potable water. In 1992, the Commission on Water Resource Management (CWRM), Department of Land and Natural Resources (DLNR), in its 1992 review draft of the *Hawaii Water Plan, Oahu Water Management Plan* (OWMP), projected that municipal water demand would be between 204 to 213 mgd by the year 2010, depending on whether the upper limit of the City and County of Honolulu's General Plan population projection for Oahu is attained. Thus, additional water requirements for the year 2010 are projected to be between 48 and 57 mgd. To meet the growing island-wide demand for water, the BWS plans to develop new sources of potable groundwater on Oahu within Wahiawa (see Figure 2-1).

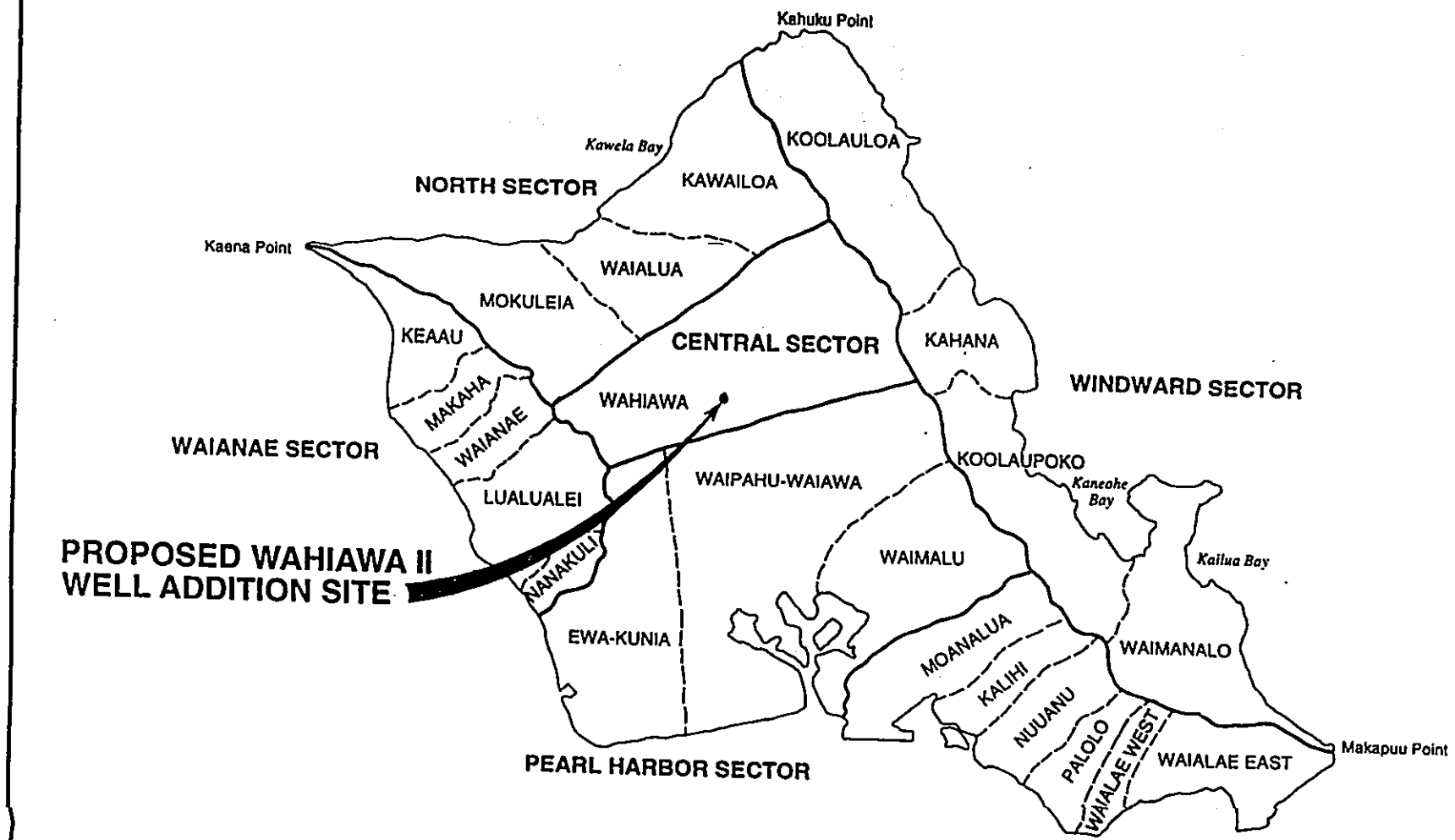
The Wahiawa II Well Addition is a proposed BWS well project within the Central Sector, Wahiawa Aquifer. If the tests for the quantity and quality of the groundwater from the well addition proves to be successful, the BWS intends to convert this well into a production well and integrate it into the BWS's Oahu potable water source, storage, and transmission system. The Wahiawa II Well Addition, if converted to a production well, is expected to be able to yield about 1.5 mgd of potable water.

2.2 The State Water Code and the Commission on Water Resource Management

The State Water Code and the CWRM were established in 1987 by the Hawaii State Legislature in Section 174-C, HRS. The CWRM was established to handle the administration of the new State Water code.

The State Water Code established a Hawaii Water Plan consisting of four parts:

- a water resource protection plan prepared by the CWRM
- water use and development plans prepared by each county
- a state water project plan prepared by state agencies
- a water quality plan prepared by the Department of Health



LEGEND

Groundwater Sector Boundary

Aquifer System Boundary

Source: Commission on Water Resource Management, 1992.

Environmental Assessment
Wahiawa II Well Addition
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FIGURE 2-1

GROUNDWATER SECTORS AND AQUIFER SYSTEMS

NORTH

0 5 10 MILES

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As part of the Hawaii Water Plan, a study was commissioned to determine the sustainable yields of surface and groundwater sources statewide.

Under the state water code, the CWRM creates management boundaries for water management areas (WMAs). Water management areas were designated by the CWRM for those areas where the CWRM decided, after conducting scientific investigation and research, that management of groundwater or surface water, or both, was necessary because the water resources for that area were threatened by existing or proposed withdrawal or diversion of water.

In designating an area for groundwater use regulation, the CWRM must consider the following:

(1) *Whether an increase in water use of authorized planned use may cause the maximum rate of withdrawal from the groundwater source to reach 90 percent of the sustainable yield of the proposed water management area;*

(2) *There is an actual or threatened water quality degradation as determined by the Department of Health;*

(3) *Whether regulation is necessary to preserve the diminishing groundwater for future needs, as evidenced by excessively declining groundwater levels;*

(4) *Whether the rates, times, spacial patterns, or depths of existing withdrawals of groundwater are endangering the stability or optimum development of the groundwater body due to upconing or encroachment of salt water;*

(5) *Whether the chloride contents of existing wells are increasing to levels which materially reduce the value of their existing uses;*

(6) *Whether excessive preventable waste of water is occurring;*

(7) *Serious disputes respecting the use of the groundwater resources are occurring; or*

(8) *Whether water development projects that have received any federal, state, or county approval may result, in the opinion of the commission, in one of the above conditions.*

Notwithstanding an imminent designation of a water management area conditioned on a rise in the rate of groundwater withdrawal to a level of 90 percent of the area's sustainable yield, the CWRM, when such level reaches the 80 percent level of the sustainable yield,

may invite the participation of water users in the affected area to an informational hearing for the purposes of assessing the groundwater situation and devising mitigative measures (Section 174C-44, HRS).

In designating an area for surface water use regulation, the CWRM must consider the following:

(1) *Whether regulation is necessary to preserve the diminishing surface water for future needs, as evidenced by excessively declining surface water levels, not related to rainfall variations, or increasing or proposed diversions of surface waters to levels which may detrimentally affect existing instream uses or prior existing off stream uses;*

(2) *Whether the diversions of stream waters are reducing the capacity of the stream to assimilate pollutants to an extent which adversely affects public health or existing instream uses; or*

(3) *Serious disputes respecting the use of surface water resources are occurring. (Section 174C-45, HRS)*

The CWRM has administrative control over the withdrawal of groundwater and diversion of surface water within a water management area and is responsible for ensuring reasonable beneficial uses of the resources in the public interest.

2.3 Groundwater Sectors and Aquifers

The CWRM has established, for planning and administration purposes, six groundwater sectors that encompass the entire island of Oahu (see Figure 2-1). These sectors are: Honolulu, Pearl Harbor, Waianae, Central, North, and Windward. Presently, all sectors except the Waianae Sector have been designated as groundwater management areas. The Windward Sector, which became a groundwater management area in July 1992, was the last sector to be included as a groundwater management area on the island of Oahu.

Each groundwater sector is divided into aquifers. The Central Sector is located on the central plain of Oahu, on the Schofield plateau between the Koolau Mountains to the northeast, and the Waianae Mountains to the southwest. The North Sector is located down gradient and to the northwest, and consists of the Mokuleia, Waialua, and Kawailoa aquifers. The Pearl Harbor Sector is located down gradient and to the south, and consists of the Ewa-Kunia, Waipahu-Waiawa, and Waimalu aquifers. The Central Sector consists of a single aquifer, the Wahiawa Aquifer.

From northwest to southeast, the Wahiawa Aquifer is about 3 to 7 miles wide, and from the southwest to the northeast, is about 12 to 14 miles long. The Wahiawa II Well Addition is proposed to be located near the center of the Wahiawa Aquifer at the west end of Wahiawa town.

2.4 Sustainable Yield and the Central Water Management Area-Wahiawa Aquifer

In order to evaluate the impacts of developing an additional permanent potable groundwater source on this site, it may be necessary to estimate the sustainable yield of the underlying aquifer system. Sustainable yield is the amount of groundwater that can be removed from an aquifer over a period of many years without developing serious adverse impacts to the aquifer.

Within the Hawaiian Islands, the sustainable yield of basal aquifers for each island is always less than the average annual rate of recharge to the groundwater aquifer, because a small amount of the groundwater is not available for development because a portion of the "fresh" groundwater is lost by mixing with the underlying salt water. Estimating sustainable yield for the island of Oahu and for its individual aquifers is complex, because the amount of fresh groundwater that is mixed with salt water is dependent upon the degree of aquifer confinement, lens thickness, the degree of agricultural and urban development, and numerous other factors that are not constant.

The highest estimated sustainable yield of 184 mgd occurs in the Pearl Harbor WMA. The OWMP notes that the Central WMA's only aquifer, the Wahiawa Aquifer, has a total estimated sustainable yield of 23 mgd. The Pearl Harbor WMA is the most heavily utilized WMA for municipal water use. In 1990, 92.01 mgd, or nearly 60 percent of BWS's total usage of 156 mgd, was taken from the Pearl Harbor WMA. In comparison, the BWS's total usage from the Wahiawa Aquifer was about 3.65 mgd in 1990, or about 2 percent of BWS's total island-wide usage.

For the 12-month period ending July/August 1991, the average water withdrawn from the Wahiawa Aquifer was 11.32 mgd, which is about 12 mgd lower than this aquifer's estimated sustainable yield of 23 mgd.

2.5 Potential Areas for Source Development

According to the OWMP report, there is potential for developing additional potable water sources in Wahiawa, North Shore, Windward and Waianae areas. Of the remaining areas, the OWMP report states that virtually all of the prime groundwater sources in the Pearl

Harbor and Honolulu aquifers have been developed and are under restricted allocations of the CWRM, and that the development of new sources for future development in the Pearl Harbor and Honolulu aquifers will require efforts to reallocate existing potable water supplies.

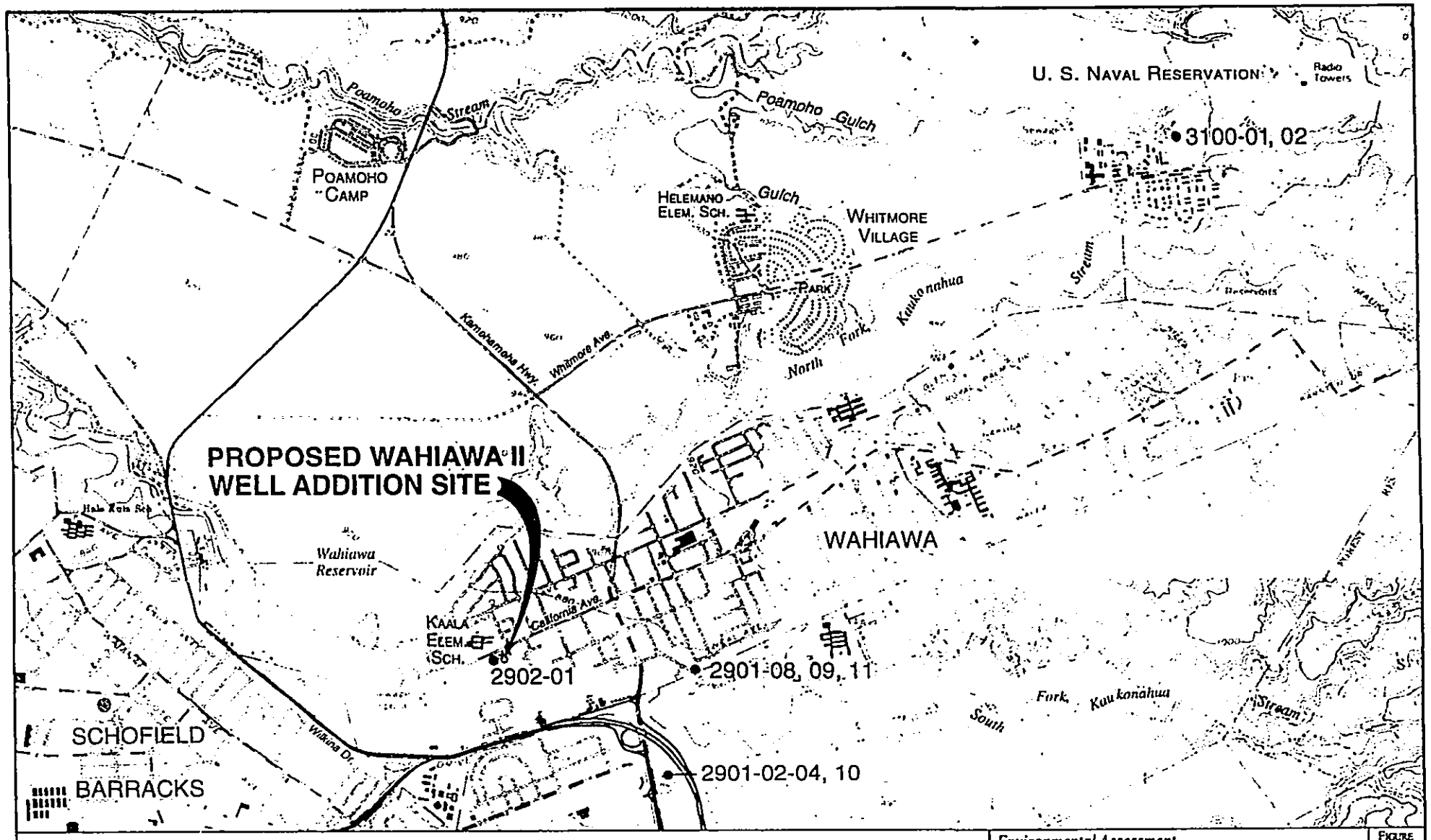
The impact of development of additional sources of potable groundwater in Honolulu was done in a separate study entitled *Regional Environmental Impact Assessment for Development of Wells, Reservoirs, Transmission Lines and Appurtenances at Honolulu, Hawaii,* which was prepared for the BWS and published in 1984. The BWS evaluated the development of additional sources of potable groundwater in Windward Oahu in a separate study entitled *Windward Oahu Regional Water System Improvements,* published in 1988.

The purpose of the proposed Wahiawa II Well addition is to determine if the development of additional potable water sources in the Wahiawa Aquifer is feasible.

2.6 Existing Water Sources

According to OWMP, the Wahiawa Aquifer facilities consists of wells operated by BWS, the military, Waialua Sugar Company, and Del Monte Corporation (see Figure 2-2). The BWS operates Wahiawa Wells (Well Nos. 2901-08, 09, and 11) and Wahiawa II Well (Well No. 2902-01). The military operates the Schofield Shaft (Well Nos. 2901-02 to 04, and 10) and has two wells in the U.S. Naval Reservation (Well No. 3100-01 and 02). The Waialua Sugar Company operates three wells (Well Nos. 3102-01, 3203-01 and 02) and Del Monte Corporation operates one well (Well No. 3103-01) northwest of Poamoho Camp (over two miles northwest of the proposed Wahiawa Well II Addition, and not shown on Figure 2-2). Del Monte Corporation also operates two wells (Well Nos. 2803-05 and 07) west of Wheeler Air Force Base (about 1-1/2 miles southwest of the Wahiawa Well Addition, and not shown on Figure 2-2).

Records for the Wahiawa Aquifer for 1990 indicate that the BWS withdrew a total of about 3.25 mgd from its three existing wells at its Wahiawa Well facility and about 0.40 mgd from its one existing well at the Wahiawa II Well facility, for a total of 3.65 mgd. Military users withdrew about 3.92 mgd, Waialua Sugar Company withdrew about 0.35 mgd, and Del Monte Corporation withdrew about 1.15 mgd. The CWRM has set the authorized water use for the Wahiawa Aquifer System to 22.53 mgd, about 0.5 mgd less that the estimated 23 mgd sustainable yield for this aquifer.



Well No.	Well Name
2901-02-04, 10	Schofield Shaft
2901-08, 09, 11	Wahiawa Wells
2902-01	Wahiawa II Well
3100-01, 02	U.S. Naval Reservation, Whitmore

Source: *Oahu Water Management Plan*, Commission on Water Resource Management, May 1992

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FIGURE 2-2

PROPOSED WAHIAWA II WELL ADDITION

NORTH

0 2000 4000 FEET

CH2M HILL

Chapter 3
Project Description

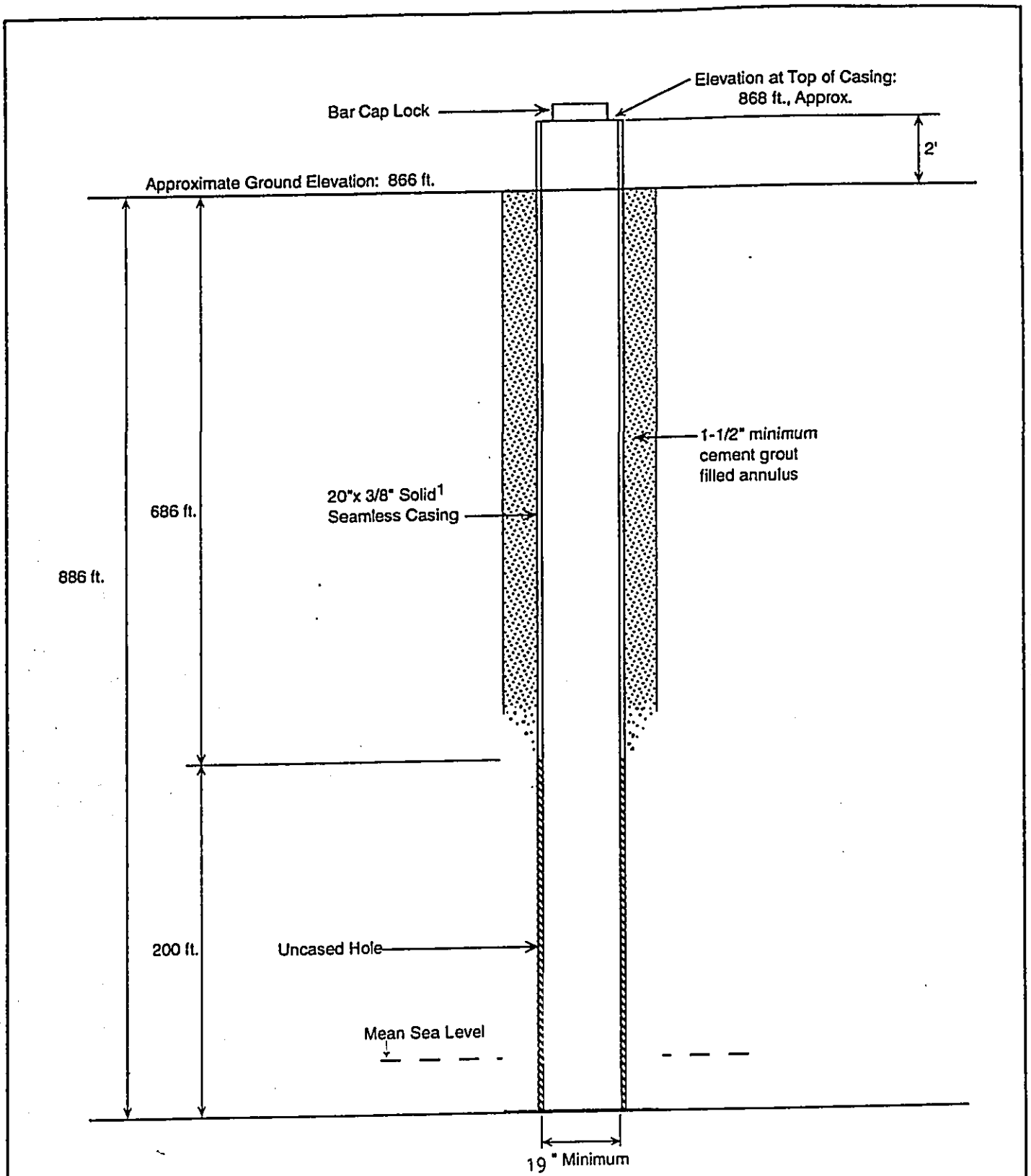
3.1 Location and Site Characteristics

The proposed project site is located in Wahiawa, on the high Schofield plateau in Central Oahu between the Koolau Mountain Range to the northeast and the Waianae Mountain Range to the southwest. The site is located near the west end of Wahiawa town, in the land area between north fork and the south fork of Kaukonahua Stream. Wahiawa Reservoir is a man-made irrigation water reservoir with a normal elevation of 842 feet above msl. The reservoir level is controlled by a spillway at the confluence of the north fork and south fork of Kaukonahua Stream.

The proposed well addition site is located within an existing City and County of Honolulu BWS corporation yard which is fronted by California Avenue on its north side, and by the Wahiawa Reservoir on the south back side. The proposed well addition site is about 866 feet above msl and is about 200 feet upgradient and north of the bank of the Wahiawa reservoir. The site is across the street from Kaala Elementary School and from residential homes on the north side of California Avenue. On the south side of California Avenue, the site is flanked by the City and County of Honolulu's sewage disposal plant on the west side and by the State of Hawaii's road maintenance shed and yard on the east side. The site is an existing paved area within the BWS corporation yard, which is owned by the City and County of Honolulu, and is under the jurisdiction of the BWS. Access to the site is via California Avenue, which is under the jurisdiction of the State of Hawaii in this area (see Figure 2-2).

3.2 Technical Characteristics

The Wahiawa II Well Addition site is proposed for a single well. The well is proposed to be located about 120 feet from the edge of California Avenue, near the east edge of the BWS corporation yard. The well is proposed to be approximately 886 feet deep to about 20 feet below mean sea level and will attempt to extract potable water from the underlying basalt (see Figure 3-1). The proposed Wahiawa II Well Addition, if converted to a production well is expected to be able to yield about 1.5 mgd. A 20-foot by 40-foot by 10-foot-high temporary control structure will be constructed near the proposed well site at the east end of the site.



NOTES:

[1]Solid Casing:

Material:	Steel
Length:	686 ft.
Diameter:	20 in.
Wall thickness:	3/8 in.

Environmental Assessment
Wahiawa II Well Addition
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Figure 3-1

WELL CROSS-SECTION

Not to scale

CH2M HILL

Within about 1 mile of the proposed Wahiawa II Well Addition, there are two existing BWS potable water well sites consisting of four wells and one well site operated by the U.S. Army consisting of four wells. The existing BWS Wahiawa II Well (Well No. 2902-01) is located about 280 feet to west. The existing BWS Wahiawa Wells (Well Nos. 2901-08, 09, and 11) are located about 3,500 feet to the east. The U.S. Army's Schofield Shaft Wells (Well Nos. 2901-02 to 04, and 10) are located about 3,500 feet to the southeast. There are no other potable water wells within 1-1/2 miles.

Records for the Wahiawa Aquifer for 1990 indicate that the BWS withdrew a total of about 3.25 mgd from its three existing wells at its Wahiawa Well facility and about 0.40 mgd from its one existing well at the Wahiawa II Well facility, for a total of 3.65 mgd. The U.S. Army withdrew about 3.92 mgd from its Schofield Shaft.

The oldest of the BWS wells are the three wells in the Wahiawa Wells facility, built from 1941 to 1962 at a ground elevation of 870 to 873 feet above msl, had initial static heads varying from about 273 to 275 feet above msl. The Wahiawa II Well was built in 1974 at a ground elevation of 866 feet above msl and had an initial static head of about 276 feet above msl. The U.S. Army's Schofield Shaft wells were built from 1936 to 1956 at ground elevations of about 287 and had initial static heads of about 284 feet above msl.

It is expected that the proposed Wahiawa II Well Addition Well will be successful in yielding the necessary quantity of potable groundwater that will be suitable for municipal use because it will be extracting water at a depth of 180 feet above msl from high level dike-confined water, where the BWS hydrologists have predicted that there may be adequate yields of potable groundwater available.

The presence of volatile organic compounds in the well addition is possible. If necessary, the quality of the water will be made suitable for municipal use with the installation of a GAC water treatment facility on the site. If the quantity of the water is sufficient, and if the quality of water can be made suitable for municipal use with a GAC water treatment facility, the BWS will integrate the well into the BWS's municipal facilities as a permanent production well. If this well is integrated into BWS's municipal facilities, it will be connected into an existing 16-inch diameter pipe leading into the BWS water main in California Avenue.

3.3 Construction and Well Testing

The proposed Wahiawa II Well Addition will be approximately 886 feet deep with the upper 686 feet consisting of a 20-inch diameter steel casing. The lower 200 feet of the well will be an uncased hole. The ground elevation of the proposed Wahiawa II Well Addition will be about 866 feet above mean sea level (see Figure 3-1).

Drainage from the Wahiawa II Well Addition from testing or flushing will be conveyed through temporary pipes that will be emptied into the existing storm drainage system within the BWS Corporation Yard. The storm drainage system leads into an underground system of 24-inch pipes that empties into Wahiawa Reservoir. This existing storm drainage system will be used to dispose of the water extracted during the yield draw down test and the long term constant rate pump test.

The yield draw down test will be conducted after the Wahiawa II Well Addition is drilled, and temporary diesel or electric pumps and pipelines are connected. The yield draw down test will be performed for the exploratory well at a rate of 700 to 1,400 gallons per minute. Following the yield draw down test, a long term constant rate pump test will be conducted for the well for a period of several days at the rate determined from the yield-draw down tests. Water table draw down rates will be measured and the quality of water will be tested.

Should the quantity of the potable water prove to be satisfactory for municipal use, the well addition will be temporarily capped. If the pump tests prove to be unsatisfactory, the well will be sealed and/or capped. When the yield draw down and the long term constant rate pump tests are completed, the temporary diesel or electric pumps, pipelines, and control structure will be removed from the site, and all surplus excavation material and construction debris will be removed and disposed of off-site in compliance with applicable State, and City and County regulations.

The presence of volatile organic compounds in the well addition is possible. If the quantity of the water is sufficient and if the quality of water can be made suitable for municipal use with a GAC water treatment facility, the BWS will integrate the well into the BWS's municipal facilities as a permanent production well. The existing Wahiawa II Well facilities presently supplies water to the municipal system via a pipeline leading into a 12-inch water main in California Avenue. Permanent facilities will include a permanent pump installed at the Wahiawa II Well Addition site along with the necessary pipelines to connect the well to the existing control house, and additional electrical and mechanical control devices necessary for the well addition's operation. If necessary, the permanent facility will include a GAC water treatment facility installed on the site.

3.4 Project Schedule, Cost, and Work Force

The construction and testing of the proposed Wahiawa II Well Addition is expected to begin in September 1995, and take eight months to complete. The capital cost for the exploratory portion of this project is estimated at $600,000, and would probably involve a work crew consisting of no more than 12 people at any one time.

Drilling will be completed in about 6 months. Installation of the casing will take about a week and another 2 to 3 weeks will be required to install the pump and run the test pumping. Demobilization may take up to 2 weeks. Total project duration for the construction and testing of the well addition is estimated to be about 8 months.

If the well tests are successful, the Wahiawa II Well Addition will be integrated into the existing municipal potable water system. Installation of the permanent pumps, pipelines, and necessary electrical and mechanical control devices, is expected to take up to an additional 10 months, at an additional cost of $1,600,000 without the GAC water treatment facility, and $2,500,000 with the GAC water treatment facility.

Chapter 4

Environmental Setting, Potential Impacts, and Mitigation

4.1 Land Use and Ownership

4.1.1 Existing Environment

Land use in this vicinity of Wahiawa is suburban. The proposed site is in a BWS corporation yard; the site is fronted by California Avenue on its north side and at its back by the Wahiawa Reservoir on the southern side. Single-family residences and Kaala Elementary School are located across California Avenue. The site, which is on the south side of California Avenue, is flanked by the City and County of Honolulu sewage disposal plant on its west side, and by the State of Hawaii road maintenance shed and yard on the east side.

The 2.2-acre BWS corporation yard is identified by Tax Map Key parcels 7-3-07: 06 and 09, and is owned by the City and County of Honolulu. The single-family residential lots located across California Avenue are privately owned. Kaala Elementary School is owned by the City and County of Honolulu. The sewage disposal plant site is owned by the City and County of Honolulu and the road maintenance shed and yard is owned by the State of Hawaii. Wahiawa Reservoir, a man-made irrigation water reservoir, is located behind the BWS corporation yard and is owned by Castle and Cooke, Inc. The Wahiawa Reservoir, which receives effluent from the City and County of Honolulu's sewage disposal plant, is also a recreational resource used for fishing.

4.1.2 Project Impacts

Installation of the Wahiawa II Well Addition will not change any of the surrounding land uses and ownership patterns.

4.1.3 Mitigation Measures

No mitigation measures are proposed or required.

4.2 Topography, Climate and Rainfall

4.2.1 Existing Environment

The proposed BWS site is in Wahiawa, in the high Schofield plateau of Central Oahu, and in the area between the north fork and the south fork of the Kaukonahua Stream. Wahiawa Reservoir is a man-made reservoir with a normal elevation of 842 feet above msl that is controlled by a spillway at the confluence of the north fork and south fork of Kaukonahua Stream. The two tributaries of Kaukonahua Stream flow in a westward direction from the Koolau Mountains along the north edge and south edge of Wahiawa, and join together at the west end of Wahiawa before flowing northwestward into Kaiaka Bay at Waialua. The proposed BWS site is located about 200 feet north and upgradient of the banks of the south fork of Wahiawa Reservoir, at a ground elevation of about 866 feet above msl (see Figure 3-1).

Temperature ranges from 74 to 75 degrees Fahrenheit in March and ranges from 79 to 80 degrees Fahrenheit in September. A northeasterly or windward trade wind is prevalent throughout most of the year. In Hawaii, the term "windward" generally refers to the normal direction of this prevailing trade wind, and not the direction of the wind at a specific time. The northeast or windward trade wind occurs with higher frequency in the summer, about 90 percent of the time, as compared to winter, when the northeast trade wind occurs only about 50 percent of the time.

Rainfall averages about 250 inches per year near the upper reaches of the tributaries of Kaukonahua Stream near the upper ridges of the Koolau Mountain range (at an elevation of about 2,400 feet above msl). The rainfall at the elevations near the upper ridges of the Koolau Mountains is the result of mountain caused or "orographic" rains that form as the moist trade wind air moves in from the sea, predominantly from the northeast direction from the windward side of the island, first along the lower flat lands, and then up the steep windward slopes of the Koolau Mountains. Rainfall distribution on both windward and leeward sides of the Koolau Mountains, and on the Schofield plateau, closely follows the topographic contours, with higher rainfall at the upper slopes, and lower rainfall at lower elevations on the plateau. Rainfall in the area of the BWS site averages about 50 inches per year.

4.2.2 Project Impacts

Installation of the Wahiawa II Well Addition would not have any significant effect on the topography, climate, or rainfall in the area.

4.2.3 Mitigation Measures

No mitigation measures are proposed or required.

4.3 Geology and Hydrology

4.3.1 Geology

The island of Oahu is result of the growth, connection, and erosion of two elongated shield volcanoes that are the foundation of the present Waianae and Koolau mountain ranges. The Waianae volcano, which is the older of the two volcanoes, formed the caldera that is now the Waianae mountain range. The Koolau volcano became active after the Waianae volcano had reached its maturity, and continued its activity long after the Waianae volcano ceased its activity. The Koolau volcano continued to build and fill in the region between the two volcanoes creating one island as lava flows continued westward creating the Schofield plateau and the leeward areas of what is now Honolulu.

Within the geological time known as the "great erosional period," the Koolau volcano was for a long period of time inactive, during which time erosion and the deposition of sediment continued to shape the deep valleys on the island of Oahu. Changes in sea level also shaped the island of Oahu, as evidenced by the marine and terrestrial sediments deposited on the coastal plains, especially around Pearl Harbor and Ewa. Reef limestone coral fossils are found miles inland from the present shoreline and conspicuous submarine benches are found offshore. After the long period of dormancy, eruptions broke out on the southern slopes of the Koolau range and at the heads of the deeply eroded valleys, with lava from these eruptions running down the valleys and spreading out.

Along the west edge of the Schofield plateau near the east slopes of the Waianae mountain range, the deep subsurface geology is comprised of alternating layers of basalt and alluvium formed along the slopes of the older Waianae volcano. The deepest and thickest layer is Waianae basalt, which is a result of the oldest volcanic eruptions from the Waianae volcano. After the Waianae volcano had ceased its activity, this deepest and thickest layer of Waianae basalt was alternately overlaid by layers of chiefly older alluvium from the erosion of the Waianae mountain range, and by the layers of Koolau basalt from the continuing eruptions of the Koolau volcano that lapped up against the sides of the now silent alluvium covered Waianae volcano. The alternating layers of basalt and alluvium follow the original slope of the old Waianae volcano and extend eastward beneath the Schofield plateau, presumably underlying a portion of west Wahiawa town. An overlying layer of chiefly older alluvium extends eastward from the Waianae mountains across the Schofield plateau to about the east edge of Schofield Barracks, to about where the west boundary of Wahiawa town is now located. In the areas east of Schofield Barracks, which

includes both Wahiawa and Whitmore Village, the geologic structure is Koolau basalt (Stearns and Vaksvik, 1935).

The soils at the surface of the proposed Wahiawa II Well Addition site is classified by the U.S. Soil Conservation Service as Wahiawa Silty Clay (WaA). Downgradient from the site, Helemano Silty Clay (HLMG) is found along the banks of the Wahiawa Reservoir.

Wahiawa Silty Clay is characterized as having moderate permeability, slow runoff, slight erosion hazard, and low shrink-swell potential. Wahiawa Silty Clay is typically found in areas with 0 to 2 percent slopes.

Helemano Silty Clay is characterized as having moderately rapid permeability, medium to very rapid runoff, severe to very severe erosion hazard, and moderate shrink-swell potential. Helemano Silty Clay is typically found in areas with 30 to 90 percent slopes.

4.3.2 Groundwater Hydrology

The proposed BWS Wahiawa II Well addition is located in Wahiawa town and is proposed to be drilled deep beneath the high Schofield plateau, within the Wahiawa Aquifer. Beneath the Schofield plateau, the Wahiawa Aquifer consists of a high-level groundwater body, occurring in the high yield, permeable basalts.

Northeast of the Schofield plateau, moderate yields of high-level groundwater occur in the marginally dike-intruded basalts in the northwest rift of the Koolau volcano. This high level groundwater moves southwestward from the dike-intruded basalts of the Koolau crest into the dike-free basalts at the lower elevations beneath the Schofield plateau in the Wahiawa Aquifer. From the north portion of the Wahiawa Aquifer, this high-level groundwater flows northwestward toward the Waialua Aquifer, and from the south portion of the Wahiawa Aquifer groundwater flows southeastward toward the Waipahu-Waiawa Aquifer. In the Wahiawa Aquifer, the high-level groundwater level stands as much as 265 feet above msl. The northwestward and southeastward flow of this high-level groundwater toward the Waialua and Waipahu aquifers is believed to be constrained by two northeast-to-southwest trending geological features, one located more than 2 miles to the northwest of Wahiawa town and Whitmore Village and the other one located about 1 mile to the southeast of Wahiawa town. Geological formations of dikes and other impermeable layers are presumed to have created this high-level groundwater body.

According to OWMP, the Wahiawa Aquifer facilities consists of wells operated by BWS, the military, Waialua Sugar Company, and Del Monte Corporation (see Figure 2-2). The BWS operates Wahiawa Wells (Well Nos. 2901-08, 09, and 11) and Wahiawa II Well (Well No. 2902-01). The military operates the Schofield Shaft (Well Nos. 2901-02 to 04, and 10) and has two wells in the U.S. Naval Reservation (Well No. 3100-01 and 02). The Waialua

Sugar Company operates three wells (Well Nos. 3102-02, 3203-01 and 02) and Del Monte Corporation operates one well (Well No. 3103-01) northwest of Poamoho Camp (over two miles northwest of the proposed Wahiawa Well II Addition, and not shown on Figure 2-2). Del Monte Corporation also operates two wells (Well Nos. 2803-05 and 07) west of Wheeler Air Force Base (about 1-1/2 miles southwest of the Wahiawa Well Addition, and not shown on Figure 2-2).

Records for the Wahiawa Aquifer for 1990 indicate that the BWS withdrew a total of about 3.25 mgd from its three existing wells at its Wahiawa Well facility and about 0.40 mgd from its one existing well at the Wahiawa II Well facility, for a total of 3.65 mgd. Military users withdrew about 3.92 mgd, Waialua Sugar Company withdrew about 0.35 mgd, and Del Monte Corporation withdrew about 1.15 mgd. The CWRM has set the authorized water use for the Wahiawa Aquifer System to 22.53 mgd, about 0.5 mgd less that the estimated 23 mgd sustainable yield for this aquifer.

For the 12-month period ending July/August 1991, the average water withdrawn from the Wahiawa Aquifer was 11.32 mgd, which is about 12 mgd less than this aquifer's estimated sustainable yield of 23 mgd.

The Wahiawa II Well Addition is proposed to be 886 feet deep and reach a depth of 20 feet below msl and will attempt to draw potable water suitable for municipal use from the basalt. If the pump tests results indicate that the quantity of the water from the Wahiawa Well II Addition is unsatisfactory for municipal use, the well will be capped and/or sealed to prevent malicious or accidental contamination of the underlying groundwater aquifers.

During the test pumping, the nearby potable groundwater wells will be monitored to determine if they are affected. The proposed well addition site is located about 280 feet east of the existing Wahiawa II Well, which is also in the 2.2-acre Wahiawa corporation yard. Including the existing Wahiawa II Well, there are eight other potable water wells located within one mile of the proposed well site in the Wahiawa Aquifer. The resulting data from the monitoring of the nearby groundwater wells will be valuable to determine if the well addition can be integrated into the existing Wahiawa II Well facility.

The presence of volatile organic compounds in the well addition is possible. If necessary, the quality of the water will be made suitable for municipal use with the installation of a GAC water treatment facility on the site. If the quantity of the water is sufficient, and if the quality of water can be made suitable for municipal use with a GAC water treatment facility, the BWS will integrate the well into the BWS's municipal facilities as a permanent production well.

4.3.3 Surface Water Hydrology

The Wahiawa drainage basin flows into both the north fork of Kaukonahua Stream and the south fork of Kaukonahua Stream. The streams flow toward the west and converge at the west end of Wahiawa town to form Kaukonahua Stream, a perennial stream. Kaukonahua Stream continues to the northwest, eventually flowing into the sea at Waialua. Wahiawa Reservoir, which receives effluent from the City and County of Honolulu's sewage disposal plant, is an unlined earthen irrigation water reservoir created at the confluence to the north and south forks of Kaukonahua Stream, and has a normal elevation of 842 feet above msl. The water level of the reservoir is controlled by a spillway about a mile downstream from the BWS site. The south fork of the Kaukonahua Stream is also the south fork of Wahiawa Reservoir, and is the closest water body to the proposed BWS well site. The proposed BWS well site is located about 200 feet up gradient from to the south fork of Wahiawa Reservoir.

The U.S. Geological Survey stream flow gage in the south fork of Kaukonahua Stream (No. 208000) is located about 2-1/2 miles upstream from the proposed BWS well site at an elevation of 860.35 feet above msl. A stream flow gage in the north fork of Kaukonahua Stream (No. 200000) is located east of Wahiawa town at an elevation of 1,150 feet above msl. The average flow for the south fork of Kaukonahua Stream at Gaging Station No. 208000 was 21.2 cfs (13.7 mgd) for the period since 1957, and the average flow for the north fork of Kaukonahua Stream at Gaging Station No. 200000 was 16.3 cfs (10.5 mgd) for the period since 1913 (CWRM, 1990).

Water from the test pumping will be discharged into the reservoir at the south fork of Kaukonahua Stream via the existing surface storm drainage system in the BWS corporation yard. The surface storm drainage system drains into an underground system of 24-inch pipes that empties into the reservoir. It is expected that the water that will be discharged from the test pumping of the well will be clean, and therefore will not introduce any pollutants into the reservoir's environment. Care will be taken in disposing of the test water to preclude the possibility of flushing debris or re-suspending sediments and other pollutants in Wahiawa Reservoir.

Wahiawa Reservoir has recreational resources due to fishing. There will not be any adverse impacts to Wahiawa Reservoir's fishing related recreational resources in this vicinity, because the water that will be discharged into the Wahiawa Reservoir is expected to be clean, and will not be harmful to the fresh water fish in the reservoir.

Wahiawa Reservoir has a nominal surface elevation of 842 above msl in this vicinity. The Wahiawa II Well Addition is proposed to be cased to a depth of about 686 feet (about 180 feet above msl) within the basalt, with the uncased section of the well extending from about 180 feet above msl to 20 feet below msl to the bottom of the well. The water drawn from

the basalt from 180 feet above msl to 20 feet below msl due to the pumping of this well is not expected to affect the near surface groundwater flowing into Kaukonahua Stream and Wahiawa Reservoir because of the estimated 662 feet separating the uncased intake section of the well from Wahiawa Reservoir's elevation.

The nearest wetlands occur at Pearl Harbor to the south and Haleiwa to the north, both about 9 miles away (U.S. Army, 1977). There is no potential for adverse impacts to significant wetlands since none exist in the Wahiawa Aquifer.

4.3.4 Project Impacts

No adverse impacts to the geological formations underlying the drilling site for the exploratory well or to the soils at the surface of the site are expected. Impacts to the groundwater and surface water flows of Kaukonahua Stream are expected to be insignificant. There will be no adverse impacts to the Wahiawa Reservoir and its recreational fishing resources.

4.3.5 Mitigation Measures

During the test pumping, the existing surface storm drainage system will be used in disposing of the test water and care will be taken to preclude the possibility of flushing debris or re-suspending sediments and other pollutants in Wahiawa Reservoir. Best Management Practices (BMP) will be implemented and therefore a National Pollution Discharge Elimination System (NPDES) Permit is not required.

If the pump tests results indicate that the quantity of the water from the exploratory well is unsatisfactory, the Wahiawa II Well Addition will be capped and/or sealed to prevent malicious or accidental contamination of the underlying groundwater aquifer.

During the test pumping, the nearby potable groundwater wells will be monitored to determine if they are affected. The proposed well addition site is located about 280 feet east of the existing Wahiawa II Well, which is also in the 2.2-acre Wahiawa corporation yard. Including the existing Wahiawa II Well, there are eight other potable water wells located within one mile of the proposed well site in the Wahiawa Aquifer. The resulting data from the monitoring of the nearby groundwater wells will be valuable to determine if the well addition can be integrated into the existing Wahiawa II Well facility.

The presence of volatile organic compounds in the well addition is possible. If necessary, the quality of the water will be made suitable for municipal use with the installation of a GAC water treatment facility on the site. If the quantity of the water is sufficient, and if the quality of water can be made suitable for municipal use with a GAC water treatment

facility, the BWS will integrate the well into the BWS's municipal facilities as a permanent production well.

Pumpage of this well will not affect stream flow in the south fork of Kaukonahua Stream or the water elevation in Wahiawa Reservoir because of the large elevation difference separating the stream and reservoir from the section of the well drawing water.

No other mitigation measures are proposed or required.

4.4 Natural Hazards

4.4.1 Flood Zones

The proposed Wahiawa II Well Addition site is located at an elevation of about 866 feet above msl in central Oahu. The site is located in the Flood Insurance Rate Map (FIRM) Zone D, in an area where flood hazards are undetermined. The nearest flood-prone areas are located at Kaiaka Bay, approximately 8 miles away to the northwest, and at Waiawa and Waikele streams, approximately 8 miles to the southeast.

4.4.2 Seismic Activity

Under the Uniform Building Code (UBC), the island of Oahu is designated as Seismic Zone 1, which in a scale from 1 to 4, is the zone with the lowest potential for ground motion created by seismic events. The UBC establishes minimum design criteria for structures to resist the effects of seismic ground motion, in accordance with the standards for the seismic zone in which the structure is to be built. In the interest of public health and safety, the BWS has adopted the standards for Seismic Zone 3 for all of its structures. All structures that will be built as part of this project will be designed and built in accordance with the UBC standards for Seismic Zone 3.

4.4.3 Project Impacts

The proposed project will not affect nor will be affected by flooding. Seismic risk at the project site is minimal. The proposed project will not affect seismic activity, and will not likely be affected by seismic activity.

4.4.4 Mitigation Measures

As a public health and safety measure, the BWS has adopted the standards for Seismic Zone 3 for the design and construction of all the structures that will be a part of this project.

No other mitigation measures are proposed or required.

4.5 Demographics

4.5.1 Population, Housing, and Employment

The project area where the well addition is proposed is located in Census Tract 94, which generally comprises the area north of the Schofield Barracks boundary, east of Wilikina Drive, west of Kamehameha Highway, and south of the north fork of Kaukonahua Stream. According to U.S. Census reports, the population for this tract increased 4 percent from 1980 to 1990 from 5,040 to 5,242. In 1990, the U.S. Census reports showed that there were 5,619 housing units in Wahiawa town. Employment in this tract includes commercial-retail services along Kamehameha Highway in downtown Wahiawa and along Wilikina Drive, teaching and administration jobs at the Kaala Elementary School, and other governmental jobs at the City and County of Honolulu's sewage disposal plant, the BWS Corporation Yard, and the State Department of Transportation's road maintenance shed and yard.

4.5.2 Project Impacts

The proposed Wahiawa II Well Addition will involve a small amount of new construction work. However, this work will be temporary and will most likely be conducted by workers that reside outside of this census tract. Existing and future population, housing, and employment in this portion of Wahiawa will not be affected by this project.

4.5.3 Mitigation Measures

No mitigation measures are proposed or required.

4.6 Roadways and Traffic

4.6.1 Roadways and Traffic

California Avenue, is a State of Hawaii roadway in the area fronting the BWS corporation yard where Wahiawa II Well Addition is being proposed. California Avenue is a main thoroughfare through Wahiawa town and is the only roadway access to the BWS site. California Avenue is accessed primarily from Kamehameha Highway, which is the only access to Wahiawa town. According to the State of Hawaii Department of Transportation, average daily traffic on Kamehameha Highway in 1991 through Wahiawa town in the section north of California Avenue amounted to 22,224 vehicles per day; in the section

south of California Avenue, average daily traffic on Kamehameha Highway was 42,669 vehicles per day. Kamehameha Highway traffic through Wahiawa town consists of a mix of automobiles, trucks, and buses.

Traffic on California Avenue in the vicinity of the proposed Wahiawa II Well Addition site is a combination of residential and commuter trips from the predominantly single-family and apartment units in this area, Kaala Elementary School, and the work crews at the City and County of Honolulu sewage disposal plant, the BWS corporation yard, and the State of Hawaii road maintenance shed. Traffic on California Avenue is usually light, except during the morning or afternoon peak periods when increased traffic occurs because of commuter and school traffic.

4.6.2 Project Impacts

The project will create a slight and temporary rise in heavy truck traffic. No significant or long-term impacts to either Kamehameha Highway or California Avenue are expected with this proposed project.

4.6.3 Mitigation Measures

To minimize traffic impacts and avoid conflicts with the traffic to the nearby Kaala Elementary School, the contractor will schedule heavy truck activity between the hours of 8:30 am to 2:30 pm Monday through Friday and will exclude state holidays.

4.7 Visual and Recreational Resources

4.7.1 Visual Resources and Recreational Resources

In the vicinity of the project area, there are distant views of the Koolau Mountains to the northeast and the Waianae Mountains to the southwest from pedestrians and vehicles on California Avenue. For the most part, views of the Wahiawa Reservoir from California Avenue are obscured or nonexistent because of the existing buildings on the BWS corporation yard site, and because the ground slopes down from California Avenue toward the Wahiawa Reservoir.

The school grounds of Kaala Elementary School are located across the street from the proposed well site. Wahiawa District Park, located a little less that 1 mile northeast of the proposed project area, is the next closest recreational area to the site.

4.7.2 Project Impacts

The proposed Wahiawa II Well Addition will not be noticeable from the Kaala Elementary School grounds, since the new facility will blend into the existing facilities within the BWS Corporation yard.

Since the project site and Wahiawa District Park is separated by a distance of nearly 1 mile, the Wahiawa District Park recreational areas will not be affected by this proposed project in any way.

4.7.3 Mitigation Measures

No mitigation measures are proposed or required.

4.8 Cultural Resources

4.8.1 Cultural Resources

An archaeological assessment was conducted by Cultural Surveys of Hawaii on December 12, 1994. The results of the archaeological assessment are found in Appendix A of this report.

A review of the literature found that no archaeological investigations have been conducted that encompass the present project area. Surveys of the surrounding area from 1930 to 1994 reveal few precontact findings. There are no apparent remnants of any sites of archaeological or cultural significance at or in the proposed project area because the area has been totally altered by past and present land uses. The Wahiawa healing stones, which still exist, are located a few blocks away on California Avenue.

4.8.2 Project Impacts

The results of the field work show that this project area is devoid of archaeological potential. The proposal for additional development of this site will not impact any archaeological resources.

4.8.3 Mitigation Measures

No mitigation measures are proposed or required.

4.9 Biological Resources

4.9.1 Botanical Resources

A botanical reconnaissance survey was conducted by Char and Associates on December 13, 1994. The results of the botanical reconnaissance survey and related research are found in Appendix B of this report.

The BWS corporation yard, where the proposed site is located, is a gravel-covered and thus supports only a few small, weedy herbaceous species. One plant, the yellow woodsorrel (*Oxalis corniculata*), is presumably of early Polynesian introduction. The rest of the plants found on the site are introduced or alien species, including artillery plant (*Pilea microphylla*) and niruri (*Phyllanthus debilis*).

None of the plants is a listed, proposed, or candidate threatened and endangered species; nor is any plant considered rare or vulnerable.

4.9.2 Faunal Resources

A faunal (bird and mammal) reconnaissance survey was conducted by Philip L. Bruner, Environmental Consultant, on December 6, 1994. The results of this bird and mammal reconnaissance survey and related research are found in Appendix C of this report.

No resident birds were observed on the site; however, a black-crowned night heron (*Nycticorax nycticorax*) was seen along the shore of Wahiawa Reservoir immediately behind the site. It is unlikely that native birds would occur on the proposed site.

No seabirds or migratory shorebirds were observed; none would be expected at this location.

A total of 8 species of exotic bird were recorded, including red-vented bulbul (*Pycnonotus cafer*), northern cardinal (*Cardinalis cardinalis*), and Japanese white-eye (*Zosterops japonicus*). Other species of exotic birds probably also occur in this area. None of these exotic species are "endangered" or "threatened."

No feral mammals were seen on the survey. The non-native Small Indian Mongoose *(Herpestes auropunctatus)*, along with rats, mice, and feral cats are likely to occur in nearby areas.

It is not known whether or not the endemic and "endangered" Hawaiian Hoary Bat (*Lasiurus cinereus semotus)* utilizes the area around Wahiawa Reservoir. While the hoary

bat has been observed around bays and ponds, there is no record of it occurring in the reservoir area.

4.9.3 Project Impacts

There are no sensitive native plants communities on the project site. The proposed project will not have any affect on any significant biological resources.

There were no sensitive bird or mammal resources observed on or nearby the project site. The proposed project should have no impact on any significant bird or mammal resources.

4.9.4 Mitigation Measures

For both botanical and faunal resources, no mitigation measures are proposed or required.

4.10 Air Quality and Noise

4.10.1 Air Quality and Noise

Air quality on Oahu is, in general, relatively clean and low in pollution, except where there are large numbers of motor vehicles or stationary sources. In the vicinity of the BWS project site at the southwest end of California Avenue, pollution contributed from vehicles travelling on Kamehameha Highway is minimal because of the distance separating Kamehameha Highway from the project site, and the predominance of the northeast trade winds. Air pollution resulting from vehicles on California Avenue in this vicinity is usually minimal, but will be slightly elevated during the morning and afternoon peak traffic periods when there is increased traffic into and out of Kaala Elementary School and because of increased commuter trips. However, with the absence of any major stationary sources of air pollution, the air quality in this portion of Wahiawa near the project site is usually good.

Ambient noise at and around the project site is also usually low, and results mainly from vehicular movements on California Avenue, from the activities at the nearby Kaala Elementary School buildings, from the City and County of Honolulu's sewage disposal plant, from the BWS corporation yard, from the State of Hawaii's road maintenance shed and yard, and from the more distant residents in the nearby homes. Ambient noise levels are higher in the morning and afternoon peak traffic periods, due to the increased number of cars that travel into and out of Kaala Elementary School, and the increased commuter traffic on California Avenue.

4.10.2 Project Impacts

Construction of the exploratory and production well will involve heavy vehicle and equipment operations that will create a small amount of fugitive dust and pollutant emissions. The fugitive dust and pollutant emissions will have minimal impacts upon the nearby school buildings and adjacent residents. There will be no long-term air quality impacts once construction is completed.

On the island of Oahu, community noise controls have been set for analyzing noise impacts pursuant to State of Hawaii Department of Health (DOH) Rules, Title 11, Chapter 43. Allowable daytime and nighttime noise level standards for sensitive receptors in residential, preservation, hotel, apartment, and business districts have been set under these rules. The project site is located in a I-2, Intensive Industrial zone. For industrial zones, the maximum allowable daytime noise level from 7:00 am to 10:00 pm is 70 dBA and the maximum allowable nighttime noise level from 10:00 pm to 7:00 am is 70 dBA. The project site is located across the street from a R-5, Residential zone, where the Kaala Elementary School is located. For residential zones, the maximum allowable daytime noise level from 7:00 am to 10:00 pm is 55 dBA and the maximum allowable nighttime noise level from 10:00 pm to 7:00 am is 45 dBA.

The project will have noise impacts at the nearby school buildings and possibly to the nearby residents. Heavy equipment moving, construction, and the drilling of the exploratory well, will have noise that may be intrusive at the nearby school and to the nearby residents. For the well drilling, if the cable tool drilling method is used, noise will result from the drill bit hitting rock, in a manner similar to a pile driver. Noise will also result from the operation of the diesel engine driving the drill. To reduce pump noise levels during the test pumping, a surface pump may be installed with mutes, or a submersible pump, which will considerably reduce noise levels, may be installed. If the test pumping is successful, the well will be converted to a permanent production well and connected to the existing Wahiawa Well II facility. To reduce permanent pump noise levels, a surface pump may be installed with mutes, or a submersible pump may be installed to reduce noise to less than the regulatory limit.

A noise permit will be required from the Noise and Radiation Branch of the State of Hawaii DOH for the construction of the exploratory and production well, and may be required for the test pumping.

There will be no noise impacts after the construction is completed.

4.10.3 Mitigation Measures

To mitigate the effects of the construction activities to the nearby school buildings and adjacent residences, dust control measures, such as water sprinkling and dust screens, will be implemented by the contractor to reduce dust levels, as necessary. Further, the contractor will properly maintain its internal combustion equipment to minimize exhaust emissions, and will comply with the Hawaii DOH Rules Title 11, Chapter 59 and 60 regarding Air Pollution Control.

Contractors will comply with all of the conditions of the required noise permit. Mufflers will be required for all construction equipment. All noise attenuating equipment will be maintained in proper operation condition and will be repaired or replaced as needed. For the drilling operation, drilling operations will be restricted to the hours of 7:30 am to 3:30 pm on weekdays and will not include state holidays.

To reduce pump noise levels during the test pumping, a surface pump may be installed with mutes, or a submersible pump, which will reduce noise considerably, may be installed. If the test pumping is successful, and permanent pumps are installed, a surface pump with mutes may be installed, or a submersible pump may be installed to reduce noise levels to less than the regulatory limit.

Chapter 5
Relationship to Land Use Designations and Controls

5.1 State Land Use Designations and Controls

The subject property is located with the State Land Use Urban District. According to State law, Chapter 205, HRS, the land use controls in the Urban Districts on the island of Oahu are under the jurisdiction of the City and County of Honolulu.

A well construction pump installation and water use permit will be required from the Commission on Water Resource Management (CWRM).

A noise permit will be required from the State of Hawaii, Department of Health, Noise and Radiation Branch.

5.2 City and County of Honolulu Land Use Designations and Controls

The subject parcel is shown as a public facility on the City and County of Honolulu's Development Plan Land Use Map and is shown as I-2, Intensive Industrial, on the City and County of Honolulu's Zoning Map. According to the City and County of Honolulu's Land Use Ordinance (LUO), the proposed project is considered a Utility Installation, Type A, and is a principal permitted use in the I-2, Intensive Industrial zoning district.

According to the City and County of Honolulu Planning Department, the construction of the exploratory wells is considered minor and is not required to be shown on the Development Plan Public Facilities Map.

If the Wahiawa II Well Addition is converted to a production well, the well site will need to be consistent with the City and County of Honolulu's Development Plan Public Facilities Map. Before City and County of Honolulu funds can be committed for construction of a permanent production well, the well site must be shown as a "site determined water well facility programmed for construction within 6 years." A Development Plan Public Facilities Map amendment would require an application to the City and County of Honolulu Planning Department and approval by the City Council of the City and County of Honolulu.

A building permit will be required from the City and County of Honolulu Building Department.

Chapter 6
Possible Alternatives

The no action alternative, the delayed action alternative, alternative sites, and alternative sources were considered either in this environmental assessment or in previous environmental analyses done by the BWS.

6.1 No Action Alternative

The no action alternative was not pursued because it would be contrary to the BWS's legal mandate to provide for the water needs of a growing population. This project is part of an overall potable groundwater development program intended to increase the water supply to meet growing municipal water demands. If the BWS's water source development program is curtailed, the BWS would be hampered in providing adequately for the water needs of the future population of the island, which may result in restrictions in new development as well as regional water shortages.

6.2 Delayed Action

The delayed action alternative was not pursued because this alternative would delay the BWS's implementation schedule, and would have substantially similar environmental outcomes as the no action alternative, and higher development costs because of inflation. Delay in the proposed well testing program would increase the risk that the growth in population will lead to water demands in excess of available supplies.

6.3 Alternative Sites

This environmental assessment analyzes one of two possible potable groundwater well sites currently being evaluated by the BWS in the Wahiawa portion of the central sector. The other possible potable water well site being considered is in the Whitmore Village area. The well site in the Whitmore Village area is considered by the BWS to be additional site for development of potable water development rather than an alternative site.

6.4 Alternative Sources

Alternative source development was analyzed by the BWS in its 1984 study, *Regional Environmental Impact Assessment for Development of Wells, Reservoirs, Transmission Lines and Appurtenances at Honolulu, Hawaii*, where potential potable water source alternatives other than groundwater were evaluated, including desalinization, the development of surface and brackish water sources, and the recycling of treated wastewater. Typically these alternative sources have considerably higher costs and technical challenges. For instance, the use of surface water from Wahiawa Reservoir, which receives effluent from the City and County of Honolulu's sewage disposal plant, has a high potential for health and safety problems and would require a costly water treatment works. The development of these alternatives was not considered as feasible as the development of groundwater resources.

Chapter 7
List of Preparers

CH2M HILL

Robert Chuck, P.E.	Project Administrator and Senior Reviewer
Clyde Kanehiro	Cartographer
Bennett Mark, P.E., A.I.C.P	Project Manager
Mara Soloway	Project Assistant

SUBCONSULTANTS

Phillip L. Bruner	Faunal (Bird and Mammal) Resources
Char and Associates	Botanical Resources
Cultural Surveys Hawaii	Archaeological and Cultural Resources

Chapter 8

Agencies Consulted in Making this Assessment

The following agencies were consulted during the preparation of the draft environmental assessment for this project:

State of Hawaii agencies

- Department of Land and Natural Resources
  - Commission on Water Resources Management
- Department of Health
  - Environmental Management Division
  - Office of Environmental Quality Control

City and County of Honolulu agencies

- Planning Department
- Land Utilization Department

Chapter 9

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Appendix A

Appendix B

AN ARCHAEOLOGICAL ASSESSMENT OF
the Exploratory Well Site at
Wahiawa, O'ahu

(TMK 7-3-07:09)

by

Brian L. Colin, B.A.

and

Hallett H. Hammatt, Ph.D.

Prepared for

CH2M Hill

Cultural Surveys Hawaii
December 1994

TABLE OF CONTENTS

LIST OF FIGURES

INTRODUCTION

The purpose of this report is to describe the results of an archaeological assessment conducted at the exploratory well site at Wahiawa, Oahu (TMK 7-3-07:09). The Board of Water supply is proposing to develop a well facility at this site to include installation of one pump, control building, piping, transmission main, electrical equipment and appurtenances.

Property Description

The project area which is located within the City Board of Water Supply Corporation Yard on California Avenue across the street from Kaala School. The site is fully leveled and developed, and the buildings on site are surrounded by an asphalt parking area. There is an existing well on the north west corner of the site.

Directly to the south of the project area is a portion of the South Fork of the Wahiawa Reservoir. The eastern portion of the project area abuts a State of Hawaii Road Maintenance shed and yard. The northern portion of the project area is delineated by California Avenue. Virtually the entire project area is surrounded by a chain link fence except for entrances and exits.

The entire property has apparently gone through a number of tillings and gradings due to it formerly probably being cultivated in sugarcane and pineapple.

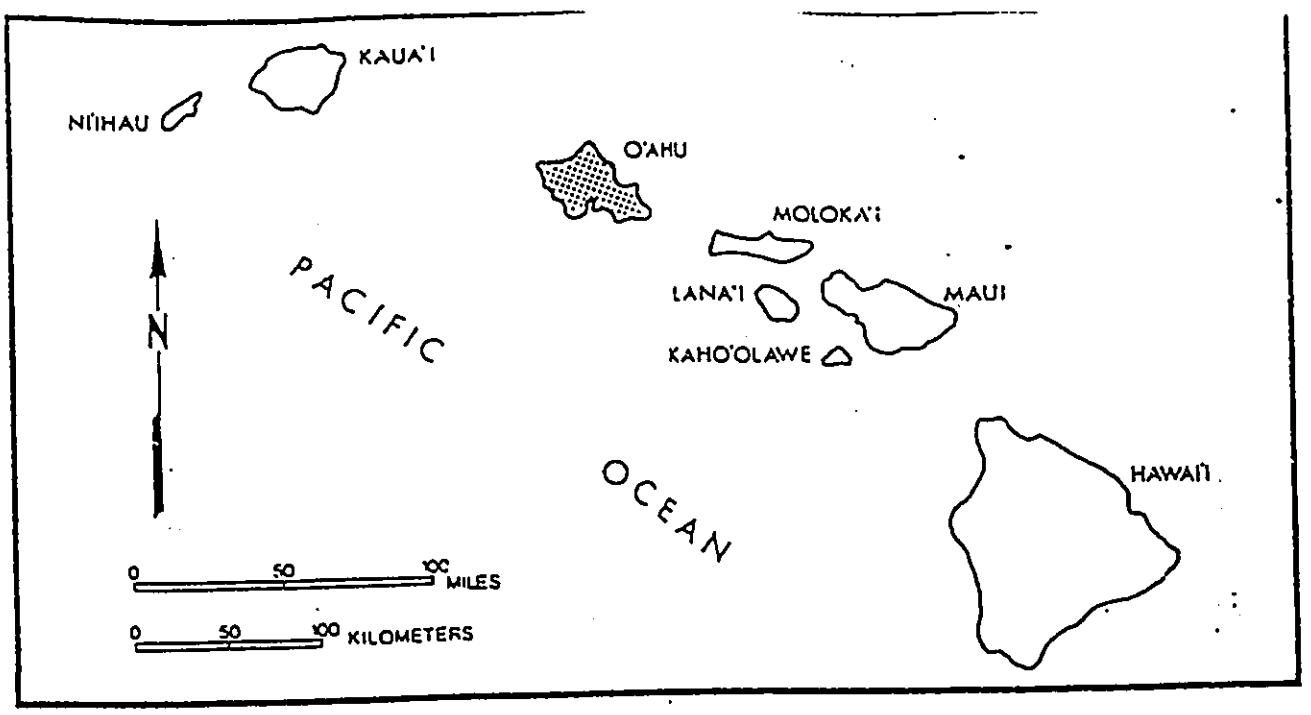


Fig. 1 State of Hawai'i

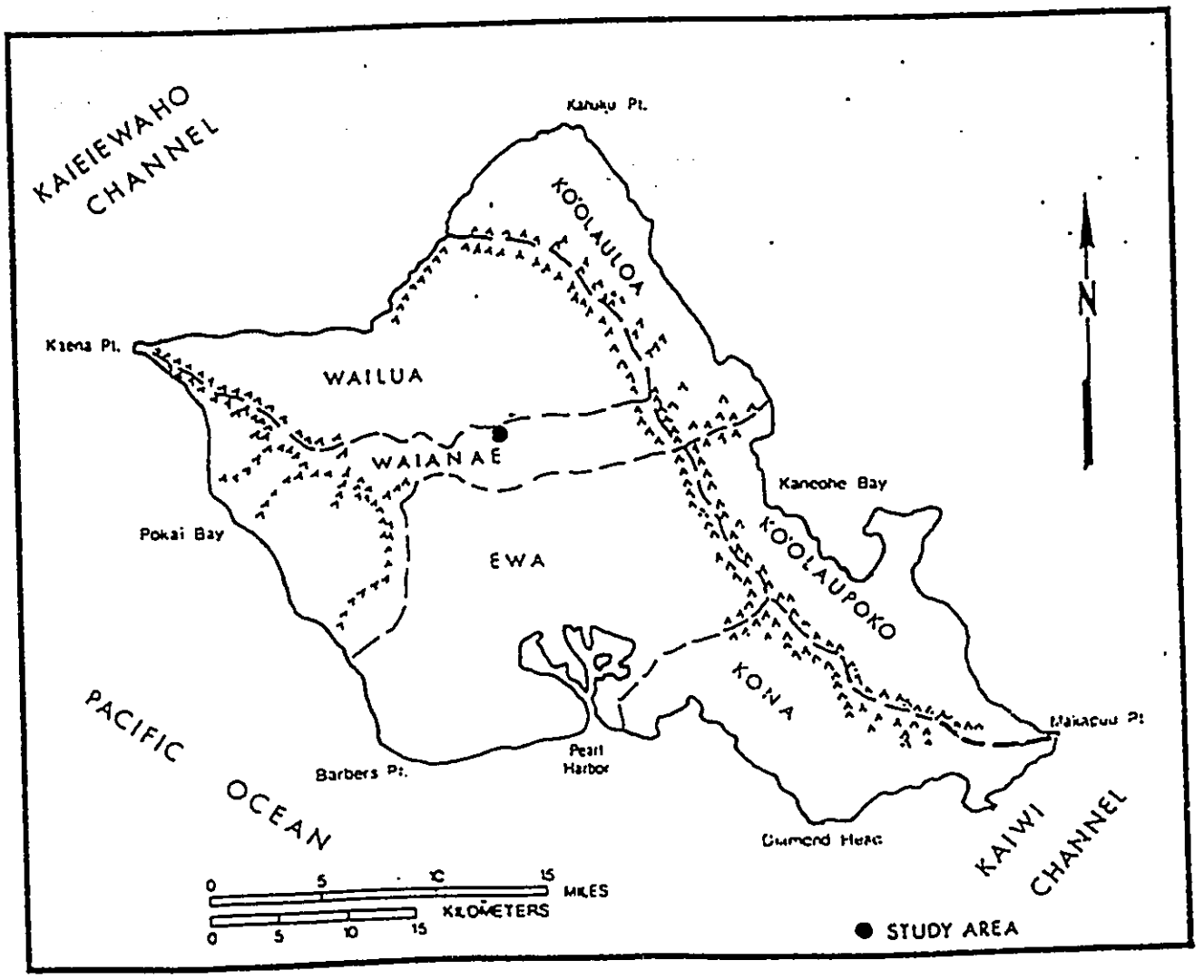
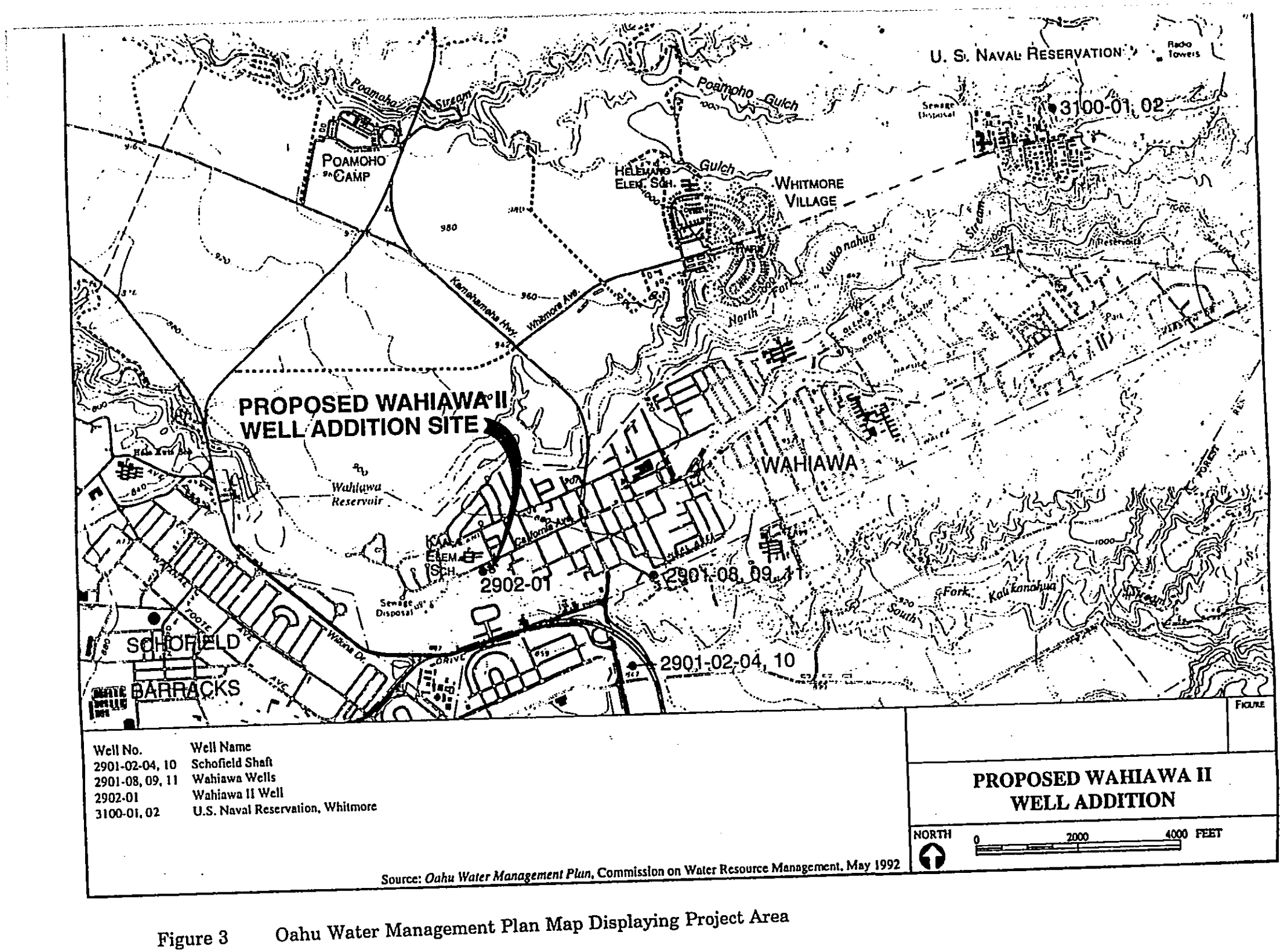


Fig. 2 O'ahu Island Location Map



Well No.	Well Name
2901-02-04, 10	Schofield Shaft
2901-08, 09, 11	Wahiawa Wells
2902-01	Wahiawa II Well
3100-01, 02	U.S. Naval Reservation, Whitmore

PROPOSED WAHIAWA II WELL ADDITION

NORTH 0 2000 4000 FEET

Source: *Oahu Water Management Plan*, Commission on Water Resource Management, May 1992

Figure 3 Oahu Water Management Plan Map Displaying Project Area

PREVIOUS ARCHAEOLOGY

No archaeological investigations have been conducted within the present project area.

McAllister Survey

Two sites were recorded by J. Gilbert McAllister in 1930 during his survey of the island of Oahu. One of the sites, Kukaniloko Birthstones are located approximately one mile to the north of the project area. McAllister (1933) stated the following in his book "Archaeology of Oahu":

> Kukaniloko, located near Wahiawa, on the Waialua side of Kaukonahua Gulch, one of the two famous places in the Hawaiian islands for the birth of children of tapu chiefs.... Kukaniloko is said to have been established by Nankaoko and his wife, Kahihiokalani, whose son, Kapawa, heads the list of the important *alii* born here.
>
> There is now little to see at Kukaniloko. It is an inclosed area about one-half acre in size, with many large stones, some just visible, others protruding to a height of 3 to 4 feet, scattered about on a well-kept lawn. Tall trees border the site. To the old Hawaiians these stones were all named and represented alii, but now the only name remembered is Kahamaluihi, a flat stone near the center of the group. The old Hawaiians of today remember that in their childhood they were never allowed by their parents to approach even near the sacred birthplace, an indication of the great respect in which Kukaniloko was held, even a century after contact with Europeans and more than a half century after the coming of the missionaries.

McAllister (1933) also states the following about Hoolonopahu heiau which was supposedly situated near Kukaniloko:

> Hoolonopahu was a heiau which functioned in connection with Kukaniloko. Here were kept the sacred drums of Opuku and Hawea which announced the birth of an alii. Nothing now remains of the temple. The land is planted in pineapples.

Apparently there are no remnants of Hoolonopahu heiau. Virtually all of the land surrounding the site area of Kukaniloko is comprised of pineapple fields.

Also within the vicinity of the project area a few blocks along California Ave. are the Wahiawa healing stones. McAllister (1933) states the following about the healing

stones:

> In connection with Kukaniloko, Wahiawa healing stone" may be mentioned. About fifty years ago there was in the bed of Kaukonahua Gulch a large stone, almost 6 feet lone, 2 feet wide and less than 1 foot thick. It is now said to have been Keanini-ula-o-ka-lani, considered as a milestone at the side of the old Hawaiian pathway. Thrum is not of this opinion. This stone was noticed by Mr. George Galbraith and moved to Kukaniloko, where it remained for many years. Galbraith had placed the stone in an upright position, which made it one of the most prominent of the group. Because of its unusual shape and position, the stone became noticed and was the recipient of much attention. Offerings of all sorts were placed before the stone, and it was soon discovered that it had unusual healing power. Large crowds of people were attracted to the site and soon the other more sacred stones of Kukaniloko were covered with the tallow from candles burnt as offerings to this prominent stone; decayed food and flowers lay about the once tapu ground; and the Daughters of Hawaii, who had taken over the care of Kukaniloko, decided that this stone, which had no connection with Kukaniloko, should be moved. It was therefore moved to Wahiawa, where it became a Mecca for people from islands as well as Oahu. Thousands gathered each day, either to witness the healing powers of this strange stone or to partake of its benefits. Chinese, Japanese, Filipino, Koreans, Portuguese, and Hawaiians all were among the daily pilgrims to this shrine, each worshipping their own way. The importance of the stone has now dwindled, and only a few persons visit the place to leave flowers or other offerings.

These stones are still present and are located along the northern side of California Ave. People still are placing offerings of fruit, incense, and flower on or near the stones which are situated in a small cement structure which encloses the stones and is sealable with a wrought iron gate.

Recent Investigations

A number of investigations have been conducted in the immediate vicinity of the project area. In 1983 Hommon and Ahlo conducted a survey of a 12 acre parcel on the east end of California Ave.(the present project area is located at the west end of California Ave.). No sites were identified in their survey.

In 1992 Paul H. Rosendahl Inc. conducted an inventory survey of approximately 2000 acres of the Galbraith Trust Lands situated directly to the north of the present project area. Only two sites were identified during the survey, one of which is the

Kukaniloko Birthstones (218) and the other consisted of a stacked rock wall at the base of Poamoho Stream Gulch.

In 1994, BioSystems Analysis Inc. conducted an archaeological investigation for the U.S. Army Corps of Engineers at a portion of Schofield Barracks. They identified three historic structures but none of the structures were deemed significant. The project area was located to the northwest of the present project area.

Based on the results of the archaeological investigations in the vicinity of the project area it is unlikely that any cultural deposits, sites, or remains older than fifty years would be encountered within the project area. When this is looked at in conjunction with the previous and present land use and land alterations the likelihood of encountering anything that is culturally significant is extremely slim.

ARCHAEOLOGICAL FINDINGS

Archaeological Fieldwork

Archaeological fieldwork was conducted on December 12, 1994. Fieldwork consisted of pedestrian coverage of the property along with photographic documentation. It is highly probable that the well site itself was agricultural land before its development in 1977.

Conclusions

It is clear from the results of the fieldwork, that this project area is devoid of archaeological potential. The proposal for additional development of this site, will not impact archaeological resources. For these reasons, no further archaeological investigation should be required for this project. If, however, in the unlikely event that archaeological remains are encountered during development of the exploratory well, work should cease and the State Historic Preservation Division of Department of Land and Natural Resources should be notified at 587-0047 to determine significance and treatment of the findings.

Figure 4 Portion of Project Area Fronting California Ave., View to Southwest

Figure 5 Southern Portion of Project Area Displaying Existing Board of Water Supply Buildings, View to Southwest

Figure 6 View to the Southeast from California Ave. Northwest corner of the Project Area

Figure 7 View to Northeast from Southwest Corner of the Project Area

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December 1994

BOTANICAL RESOURCES ASSESSMENT
WAHIAWA II WELL ADDITION
WAHIAWA DISTRICT, ISLAND OF O'AHU

INTRODUCTION

The proposed Wahiawa II Well Addition is sited within the City and County of Honolulu's Board of Water Supply corporation yard on California Avenue, Wahiawa town. The corporation yard is located directly across (south of) Ka'ala Elementary School. The well addition is needed to meet the future water demands of the district. The proposed project will include installation of one pump, control building, piping, transmission main, and electrical equipment and other appurtenances.

At the request of the Honolulu Board of Water Supply and CH2M Hill, a botanical assessment study was conducted for the Wahiawa II Addition exploratory well on 13 December 1994. The primary objectives of the study were to describe the vegetation on the site, search for threatened and endangered species as well as rare and vulnerable plants, and identify areas of potential environmental problems or concerns and propose appropriate mitigation measures.

A walk-through survey method was used. Notes were made on plant associations and distribution, substrate types, topography,

drainage, exposure, etc. Plant identifications were made in the field; plants which could not be positively identified were collected for later determination in the herbarium (U.H., Manoa - HAW), and for comparison with the most recent taxonomic literature. The plant names used in the following discussion follow the most recent treatment of the Hawaiian flora by Wagner et al. (1990).

DESCRIPTION OF THE VEGETATION

The proposed well site is located on a level landscaped area covered with very coarse gravel. A mock-orange hedge (Murrya paniculata) is found along the California Avenue boundary and the eastern perimeter; an existing pump house is located to the north; and an asphalt driveway is located to the west.

Plant cover on this graveled area is sparse, about 30% cover, and consists of small, annual, herbaceous species. Artillery plant or rockweed (Pilea microphylla), a pale green-leaved plant with succulent stems and small, inconspicuous flowers, is abundant. Niruri (Phyllanthus debilis) and yellow woodsorrel (Oxalis corniculata) are common, while the other species such hairy spurge (Chamaesyce hirta), oriental hawksbeard (Youngia japonica), slender amaranth (Amaranthus viridus), Medicago sp.. milkweed (Sonchus oleraceus), etc., are occasional. The plants form low mats, 2 to 4 inches tall, in most places. A few clumps of moss are occasionally encountered.

DISCUSSION AND RECOMMENDATION

The site proposed for the new well is located within the Board of Water Supply's corporation yard and has been significantly altered and landscaped. The level, gravel covered well site is sparsely vegetated and supports only a few small, weedy hebaceous species. One plant, the yellow woodsorrel, is presumably of early Polynesian introduction. The rest of the plants found on the site

are introduced or alien species, that is, they were brought to the Hawaiian Islands by humans, intentionally or accidentally, after Cook's discovery of the islands in 1778.

None of the plants is a listed, proposed, or candidate threatened and endangered species (U.S. Fish and Wildlife Service 1994a, 1994b); nor is any plant considered rare or vulnerable (Wagner et al. 1990). All of the plants can be found in similar disturbed and landscaped environments throughout the Hawaiian Islands and other tropical and subtropical regions.

There is almost nothing of botanical interest on the proposed new well site as it has been extensively disturbed and modified. Given the findings above, there are no botanical reasons to impose any restrictions, conditions, or impediments to the development of the site. No recommendations are proposed at this time.

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Appendix C

AVIFAUNAL AND FERAL MAMMAL SURVEY FOR A BOARD OF WATER SUPPLY EXPLORATORY WELL SITE AT WAHIAWA, OAHU

Prepared for

CH2M Hill

by

Phillip L. Bruner
Assistant Professor of Biology
Director, Museum of Natural History
BYU-Hawaii
Environmental Consultant - Faunal (Bird & Mammal) Surveys

9 December 1994

INTRODUCTION

The purpose of this report is to present the findings of a bird and mammal field survey of a proposed well site at Wahiawa, Oahu conducted on 6 December 1994 (Fig. 1). Also included are references to pertinent literature.

The objectives of the field survey were to:

1- Record what bird and mammal species occur on and near the property, or may likely be found there given the type of habitats available.

2- Determine the presence or likely occurrence of any native fauna, particularly any that are considered "Endangered" or "Threatened".

3- Evaluate the importance of the property for native wildlife and note any special or unique resources.

GENERAL SITE DESCRIPTION

Figure One gives the location of the proposed well. This site is on the grounds of the existing Wahiawa Board of Water Supply Corporation Yard. The property is already developed. An elementary school is across the street and a portion of Lake Wilson lies along the back of the property. A forest of introduced trees occurs along

the lake. No wetland property exists on the BWS Corporation Yard land.

Weather during the field survey was cloudy and cool. Winds were light from the east.

STUDY METHODS

Field observations were made with binoculars and by listening for vocalizations. The area was surveyed by a drive-through of the developed lands and a walk-through of the area near Lake Wilson. Counts were made of all birds seen or heard during the visit (Table 1). Published data of birds known from this region of the island were consulted in order to acquire a more complete picture of the possible species that might be expected in this area (Pratt et al. 1987) and Hawaii Audubon Society 1993.

Scientific names used in this reprot follow those given in Hawaii's Birds (Hawaii Audubon Society 1993); Field guide to the birds of Hawaii and the Tropical Pacific (Pratt et al. 1987) and Mammal species of the World (Honacki et al. 1982).

RESULTS

Resident Endemic (Native) Land Birds:

No native, resident land birds were observed on the survey. Given the type of habitat on the property it is unlikely that any native resident landbird would occur on this site.

Resident Waterbirds:

An adult Black-crowned Night Heron (Nycticorax nycticorax) was seen standing along the shore of Lake Wilson immediately behind the Board of Water Supply Corporation Yard. This species is the only native waterbird not presently listed as endangered or threatened. Because of the depth of Lake Wilson the habitat most utilized by waterbirds is adjacent to the shoreline.

Seabirds and Migratory Shorebirds:

No seabirds were observed on the survey. None would be expected at this location.

No migratory shorebirds were recorded on this survey. Habitat suitable for these birds does not occur on the property. The shoreline of Lake Wilson may provide some foraging opportunities.

Exotic (Introduced) Birds:

A total of eight species of exotic birds were recorded during the field survey (Table 1). Pratt et al. (1987) and Hawaii Audubon

Society (1993) note that other species which might occur in this area include: Barn Owl (Tyto alba); House Finch (Carpodacus mexicanus) and House Sparrow (Passer domesticus). No unusual species were recorded at this location.

Feral Mammals:

No feral mammals were seen on the survey. The introduced Small Indian Mongoose (Herpestes auropunctatus) along with rats, mice and feral cats are likely to occur in nearby areas.

Oahu records of the endemic and endangered Hawaiian Hoary Bat (Lasiurus cinereus semotus) are limited (Tomich 1986; Kepler and Scott 1990). I have seen bats around ponds and over bays on Kauai and the Big Island. Whether or not they occur in the Lake Wilson area is not recorded in the literature.

DISCUSSION AND CONCLUSIONS

This brief field survey provides a limited view of the wildlife which utilize the area. The number and relative abundance of each species may vary throughout the year due to available food resources and reproductive success. Exotic species sometimes prosper only to later disappear or become a less significant part of the ecosystem (Williams 1987; Moulton et al. 1990). Long term studies can provide

a more comprehensive view of the bird and mammal populations in a particular area. Nevertheless, some general conclusions related to birds and mammals at this site are provided. The following comments summarize the findings of this survey.

1- A drive/walk-through of the property and nearby lands was used to survey this site. All birds seen and heard were tallied. These data are summarized in Table 1.

2- No native birds were recorded on the survey. No "endangered" or "threatened" species were found on the survey. The native Black-crowned Night Heron was seen along the shore of Lake Wilson behind the Board of Water Supply Corporation Yard. It would be unlikely that native birds would occur on the actual proposed well site.

3- The proposed well site is on developed lands. I would not characterize this property as unique or special for native or non-native birds and mammals. Any development at this site should have no significant consequences on the populations of birds and mammals on Oahu. The shoreline of Lake Wilson lies outside of the proposed well site and would not likely be impacted by the proposed development.

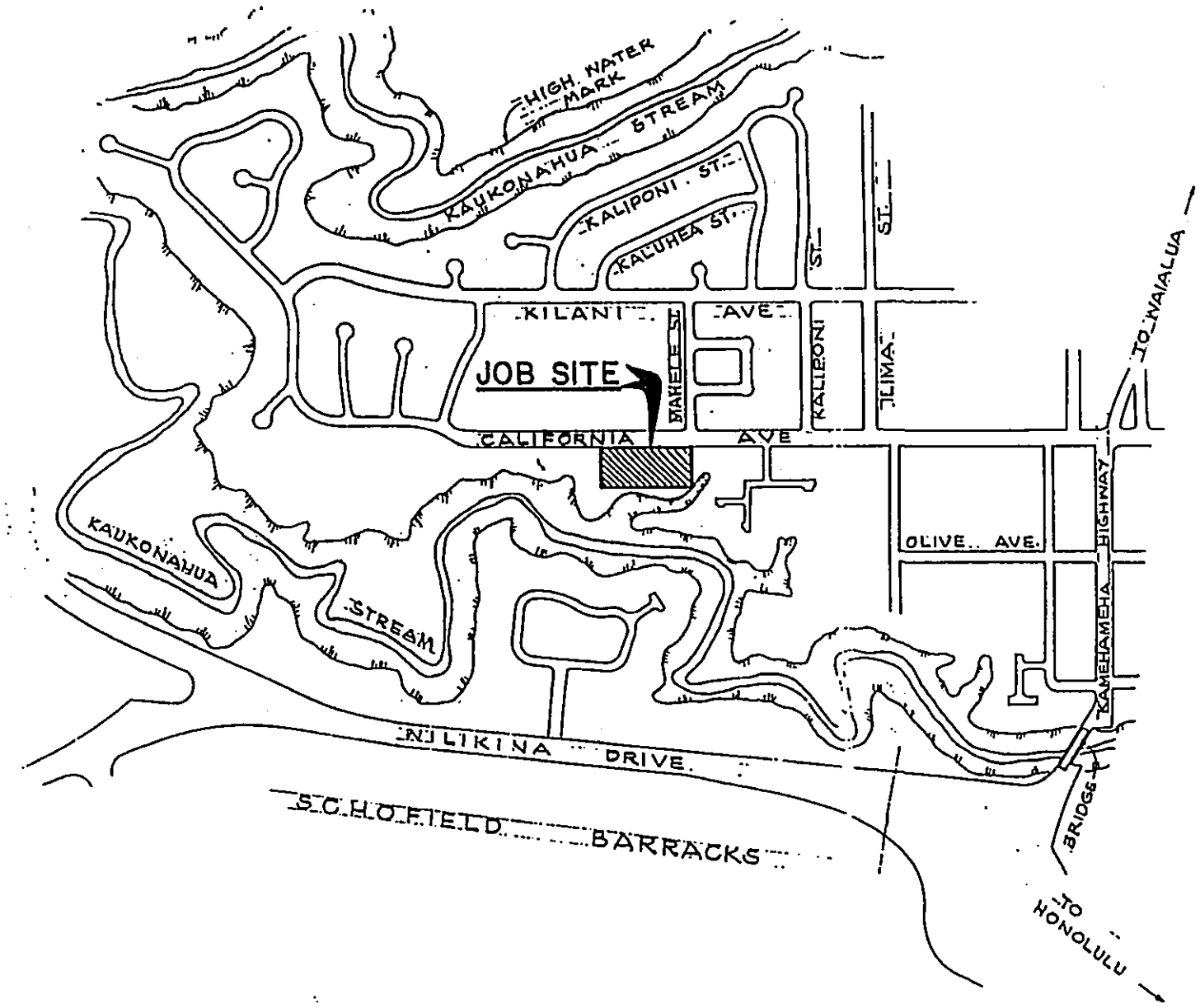

Fig. 1. Location of faunal (bird & mammal) field survey at Wahiawa, Oahu.

TABLE 1

Introduced birds recorded at the proposed Wahiawa well site on Oahu. These data provide only an estimate of relative abundance.

COMMON NAME	SCIENTIFIC NAME	TOTAL NUMBER RECORDED
Spotted Dove	Streptopelia chinensis	3
Zebra Dove	Geopelia striata	7
Common Myna	Acridotheres tristis	7
Red-vented Bulbul	Pycnonotus cafer	4
Northern Cardinal	Cardinalis cardinalis	3
Red-crested Cardinal	Paroaria coronata	2
Japanese White-eye	Zosterops japonicus	22
White-rumped Shama	Copsychus malabaricus	1

SOURCES CITED

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Appendix D

Appendix D

Agencies and Others Provided a Copy of the Draft Environmental Assessment

Twenty-one government agencies and three groups or other individuals were provided a copy of the draft environmental assessment for this project and requested to provide comments.

The following is a list of those agencies and others who were provided a copy of the draft environmental assessment.

Federal agencies

- U.S. Department of Agriculture, Soil Conservation Service
- U.S. Army Corps of Engineers, Pacific Ocean Division
- U.S. Department of Transportation
- U.S. Fish and Wildlife Service

State of Hawaii agencies

- Department of Agriculture
- Department of Business, Economic Development, and Tourism
- Department of Education
- Department of Land and Natural Resources
  - Aquatic Resources Division
  - Forestry and Wildlife Division
  - Historic Preservation Division
  - Commission on Water Resources Management
- Department of Health
  - Environmental Management Division
  - Office of Environmental Quality Control
- Department of Transportation, Highways Division
- University of Hawaii
  - Environmental Center
  - Water Resources Research Center

City and County of Honolulu agencies

- Planning Department
- Land Utilization Department
- Public Works Department
- Transportation Services Department
- Wastewater Management Department

Others

- City Council District I Representative Rene Mansho
- Wahiawa Neighborhood Board No. 26, Chair Jack Kampfer
- Sierra Club, Hawaii Chapter

Appendix E

Appendix E
Comments and Responses to the Draft Environmental Assessment

PLN-83/95

DEPARTMENT OF THE ARMY
U S ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF

May 9, 1995

Planning Division

Mr. Barry Usagawa
City and County of Honolulu
Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96843

Dear Mr. Usagawa:

Thank you for the opportunity to review and comment on the Draft Environmental Assessment for the Wahiawa II Well Addition, Wahiawa, Oahu (TMK 7-3-7: 6 and 9). The following comments are provided pursuant to Corps of Engineers authorities to disseminate flood hazard information under the Flood Control Act of 1960 and to issue Department of the Army (DA) permits under the Clean Water Act; the Rivers and Harbors Act of 1899; and the Marine Protection, Research and Sanctuaries Act.

a. Based on the information provided, a DA permit will not be required for the project.

b. The flood hazard information provided on page 4-8 of the environmental assessment is correct.

Sincerely,

Ray H. Jyo, P.E.
Director of Engineering

Copy Furnished:

Mr. Bennett Mark
CH2M Hill
1585 Kapiolani Boulevard, Suite 1420
Honolulu, Hawaii 96814-4530

MAY 10 2 00 PM '95

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

May 22, 1995

Mr. Ray H. Jyo, P.E.
Department of the Army
U. S. Army Engineer District, Honolulu
Fort Shafter, Hawaii 96858-5440

Dear Mr. Jyo:

Subject: Your Letter of May 9, 1995 on the Draft Environmental Assessment (EA) for the Proposed Wahiawa II Well Addition, Wahiawa, Oahu, TMK: 7-3-07: 6 and 9

Thank you for reviewing the Draft EA for the proposed Wahiawa II Well Addition Project.

We acknowledge that you have no objections to the proposed project.

If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,

RAYMOND H. SATO
Manager and Chief Engineer

cc: Bennett Mark, CH2M Hill

MAY 25 1995
CH2M HILL - HNL

IRRB:372

BENJAMIN J. CAYETANO
Governor

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
Honolulu, Hawaii 96814-2512

May 8, 1995

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

ATTN: Mr. Barry Usagawa

Gentlemen:

Re: Wahiawa II Well Addition
Draft Environmental Assessment

Thank you for the copy of the Draft Environmental Assessment prepared for the above project.

The Department of Agriculture has no comments or objections to this project.

Sincerely,

JAMES J. NAKATANI
Chairperson, Board of Agriculture

c: CH2M HILL
ARM Div.
PDO

PLH-86/95

JAMES J. NAKATANI
Chairperson, Board of Agriculture

Mailing Address:
P.O. Box 22159
Honolulu, Hawaii 96823-2159

FAX: (808) 973-9613

MAY 10 1 21 PM '95

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

June 2, 1995

Mr. James J. Nakatani, Chairperson
Department of Agriculture
State of Hawaii
1428 South King Street
Honolulu, Hawaii 96814-2512

Dear Mr. Nakatani:

Subject: Your Letter of May 8, 1995 on the Draft Environmental Assessment (EA) for the Proposed Wahiawa II Well Addition, Wahiawa, Oahu, TMK: 7-3-7: 06 and 09

Thank you for reviewing the Draft EA for the proposed Wahiawa II Well Addition project.

We acknowledge that you have no comments or objections to the proposed project.

If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,

RAYMOND H. SATO
Manager and Chief Engineer

cc: Bennett Mark, CH2M Hill

PLN-125/95

BENJAMIN J. CAYETANO
GOVERNOR
SELBI F. HAYA
DIRECTOR
RICK EGGED
DEPUTY DIRECTOR

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

Central Pacific Plaza, 220 South King Street, 11th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Telephone: (808) 586-2355
Fax: (808) 586-2377

June 1, 1995

Jun 20 11 03 AM '95

Mr. Bennett Mark
Ch2M HILL
1585 Kapiolani Boulevard, Suite 1420
Honolulu, Hawaii 96814-4530

Dear Mr. Mark:

Subject: Wahiawa II Well Addition

The Land Use Commission offers the attached comments on the subject project.

Thank you for the opportunity to offer our comments.

Sincerely,

Shelley M. Mark for
Senior Advisor to the Director

Enclosure

BENJAMIN J. CAYETANO
GOVERNOR

ESTHER UEDA
EXECUTIVE OFFICER

STATE OF HAWAII
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM
LAND USE COMMISSION
Room 104, Old Federal Building
335 Merchant Street
Honolulu, Hawaii 96813
Telephone: 587-3822

May 5, 1995

SUBJECT: Director's Referral No. 95-051-L
Draft Environmental Assessment (EA) for the Wahiawa II Well Addition, TMK No.: 7-3-07: 6 and 9, Wahiawa, Oahu, Hawaii

We have reviewed the draft EA for the subject project and have the following comments:

1) We confirm that the proposed Wahiawa II Well Addition site, as represented on Figure 2-2, is located within the State Land Use Urban District.

2) We suggest that the final EA include a map showing the site in relation to the State Land Use Districts. We have enclosed for your information copies of the Commission's official maps (portions of O-4, Haleiwa and O-5, Schofield Barracks) which depict the district boundaries for the area.

We have no further comments to offer at this time.

EU:BS:th

enclosures

O-4
HALEIWA

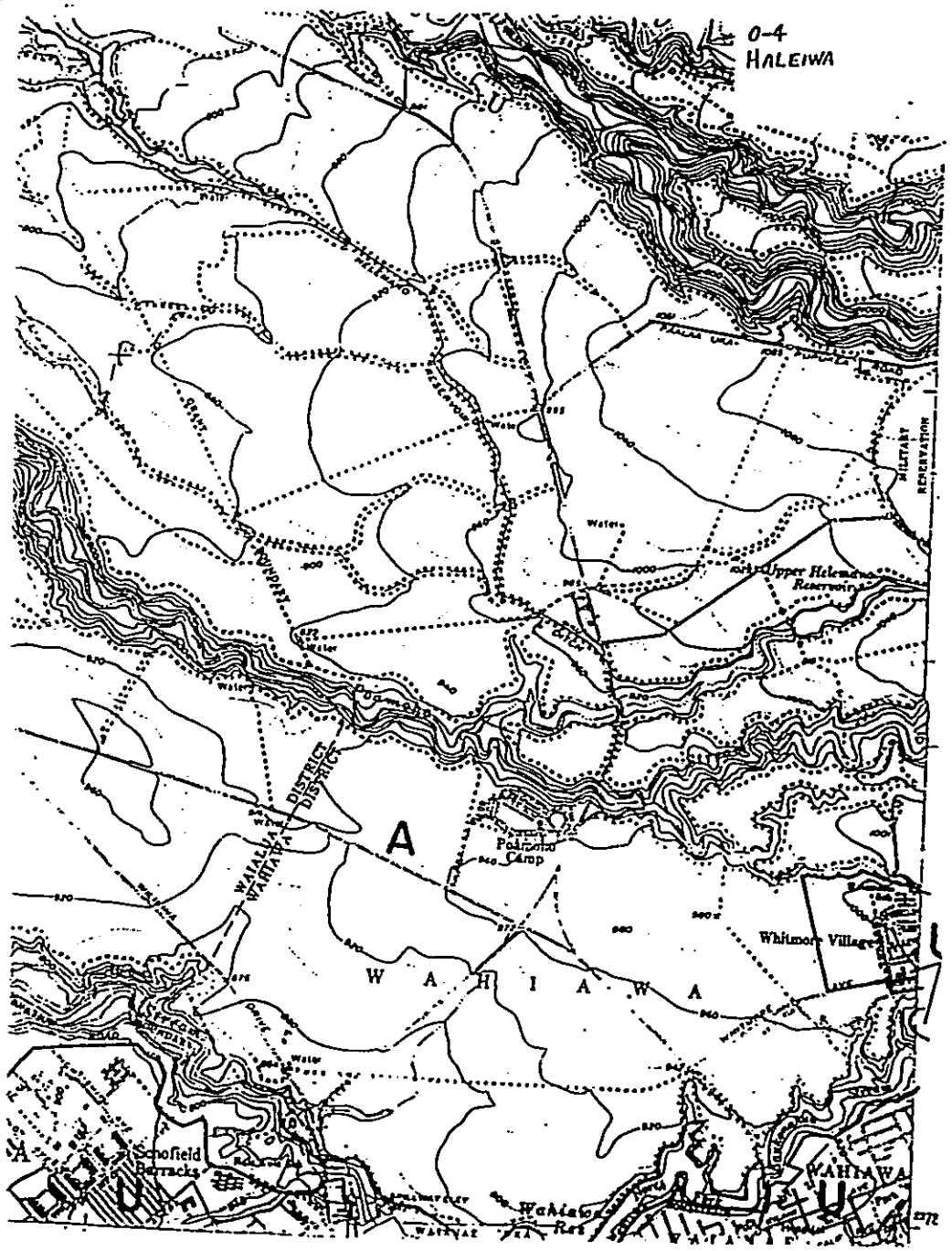
O-5
SCHOFIELD
BARRACKS

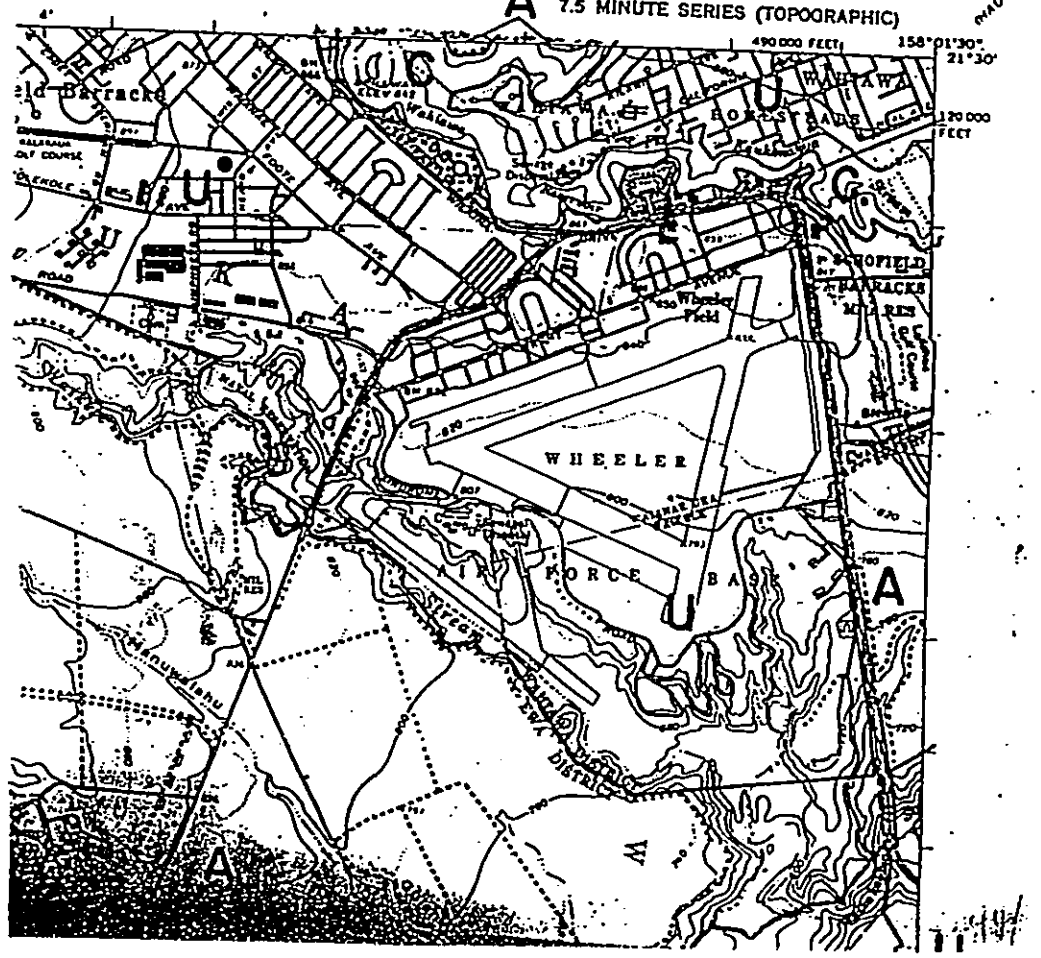
DISTRICT BOUNDARIES

TATE OF HAWAII
USE COMMISSION
PLANNING & ECONOMIC DEVELOPMENT
TIVE DATE: DEC 2 0 1974

DISTRICTS
U = URBAN
R = RURAL
A = AGRICULTURAL
C = CONSERVATION

SCHOFIELD BARRACKS QUADRANGLE
HAWAII—CITY AND COUNTY OF HONOLULU
ISLAND OF OAHU
7.5 MINUTE SERIES (TOPOGRAPHIC)





BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

August 4, 1995

Mr. Shelley M. Mark
Department of Business,
Economic Development and Tourism
State of Hawaii
P. O. Box 2359
Honolulu, Hawaii 96804

Dear Mr. Mark:

Subject: Your Letter of June 1, 1995 on the Draft Environmental Assessment (EA) for the Proposed Wahiawa II Well Addition, Wahiawa, Oahu, TMK: 7-3-7: 06 and 09

Thank you for reviewing the Draft EA for the proposed Wahiawa II Well Addition project and for providing the State Land Use District map. We have the following responses to your comments:

1. We acknowledge that the Land Use Commission has confirmed that the project site is within the State Land Use Urban District.

2. The final EA will include a State Land Use District map showing the location of the project site.

If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,

RAYMOND H. SATO
Manager and Chief Engineer

cc: Bennett Mark, CH2M Hill

Benjamin J. Cayetano
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF EDUCATION
P. O. BOX 2360
HONOLULU, HAWAII 96804

OFFICE OF THE SUPERINTENDENT

PLN-92/95

HERMAN M. AIZAWA, PH.D.
SUPERINTENDENT

[redacted]

May 9, 1995

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

Attn: Mr. Barry Usagawa

Dear Mr. Usagawa:

SUBJECT: Draft Environmental Assessment
Wahiawa II Well Addition
TMK: 7-3-07: 06 and 09

We have reviewed the subject assessment and have determined that the proposed well addition may impact Kaala Elementary School during the period of construction.

The Department of Education is concerned about noise, dust, and traffic during the construction of the proposed well. The DOE will require that mitigating measures be taken to address these concerns so the educational environment at the elementary school is not disrupted.

Thank you for the opportunity to comment.

Sincerely,

Herman M. Aizawa, Ph.D.
Superintendent

HMA:jml

cc: A. Suga
A. Hokama, CDO

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

June 5, 1995

Herman M. Aizawa, Ph. D.
Department of Education
State of Hawaii
P. O. Box 2360
Honolulu, Hawaii 96804

Dear Dr. Aizawa:

Subject: Your Letter of May 9, 1995 on the Draft Environmental Assessment (EA) for the Proposed Wahiawa II Well Addition, Wahiawa, Oahu, TMK: 7-3-7: 06 and 09

Thank you for reviewing the Draft EA for the proposed Wahiawa II Well Addition project. We have the following responses to your concerns:

1. The Board of Water Supply requires all construction work to comply with noise and dust limits set forth by the Department of Health. Should these limits be exceeded, the contractor will take the necessary measures to eliminate or mitigate the noise and dust impacts.

2. Traffic concerns will be addressed with an approved traffic control plan.

If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,

RAYMOND H. SATO
Manager and Chief Engineer

cc: Bennett Mark, CH2M Hill

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

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

PLN-95/95

LAWRENCE MIIKE
DIRECTOR OF HEALTH

MAY 21 5 19 AM '95

May 16, 1995

95-054/epo

Mr. Barry Usagawa
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

Dear Mr. Usagawa:

Subject: Draft Environmental Assessment

Wahiawa II Well Addition
Wahiawa, Oahu
TMK: 7-3-7: 6 & 9

Thank you for allowing us to review and comment on the subject project. We do not have any comments to offer at this time.

Sincerely,

Lawrence Miike
Director of Health

c: CH2M Hill (Mr. Bennett Mark)

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

June 6, 1995

Lawrence Miike, M.D.
Director
Department of Health
State of Hawaii
P. O. Box 3378
Honolulu, Hawaii 96801

Dear Dr. Miike:

Subject: Your Letter of May 16, 1995 on the Draft Environmental Assessment (EA) for the Proposed Wahiawa II Well Addition, Wahiawa, Oahu, TMK: 7-3-7: 06 and 09

Thank you for reviewing the Draft EA for the proposed Wahiawa II Well Addition project.

We acknowledge that you have no comments to the proposed project.

If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,

RAYMOND H. SATO
Manager and Chief Engineer

cc: Bennett Mark, CH2M Hill

BENJAMIN J. CAYETANO
Governor of Hawaii

RECEIVED
BD OF WATER SUPPLY

JUN 26 11 22 AM '95

951788

Chairperson
MICHAEL D. WILSON
Board of Land and Natural Resources

Deputy Director
GILBERT COLOMA-AGARAN

Aquaculture Development
Aquatic Resources
Boating and Ocean Recreation
Bureau of Conveyances
Conservation and Environmental Affairs
Conservation and Resources Enforcement
Forestry and Wildlife
Historic Preservation
Land Management
State Parks
Water and Land Development

JUN 30 11 30 AM '95

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

P. O. Box 621
Honolulu, Hawaii 96809

REF:OCEA:TES

FILE NO.: 95-586

The Honorable Raymond H. Sato
Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96813

JUN 22 1995

Dear Mr. Sato:

Subject: Draft Environmental Assessment (DEA): Wahiawa II Well Addition, Wahiawa, Oahu, TMK: 7-3-07: 6 and 9

We have reviewed the DEA for the subject project transmitted by your consultant's letter dated April 26, 1995, and have the following comments:

Division of Aquatic Resources

The Division of Aquatic Resource (DAR) comments that since the proposed well site is located 200 feet upgradient of the Wahiawa Reservoir (a Freshwater Pubic Fishing Area), mitigation measures should be taken during its construction (drilling and casing) and testing to insure that drill cuttings, cutting extraction medium, petroleum products, sediment and other debris from blowing, leaching, draining or entering the reservoir through the storm drain. DAR notes that silt-laden drilling and testing water can suffocate fish and cause fish kill in the reservoir.

DAR does not expected this project to have significant adverse impact on aquatic resource values in this area if the following precautions are taken to minimize silt/sediment-laden drilling and testing water from entering the reservoir during drilling and testing operations:

1. Site work should be scheduled for periods of minimal rainfall;

2. Use of some type of trapment (siltation basins or tanks) to remove sediments before emptying the drill and test water into the existing storm drainage system within the Board of Water Supply's Corporation yard;

3. Petroleum products from heavy vehicles and equipment operations should be prevented from falling, blowing or leaching into the aquatic environment.

We will forward any Historic Preservation Division concerns as they become available.

We have no other comments to offer at this time. Thank you for the opportunity to comment on this matter.

Please feel free to contact Steve Tagawa of our Office of Conservation and Environmental Affairs at 587-0377, should you have any questions.

Aloha,

Gilbert S. Coloma-Agaran
MICHAEL D. WILSON

ST:tes

c: Mark Bennett, CH2M Hill

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

August 4, 1995

Mr. Michael D. Wilson, Chairperson
Department of Land and Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Wilson:

Subject: Your Letter of June 22, 1995 on the Draft Environmental Assessment (EA) for the Proposed Wahiawa II Well Addition, Wahiawa, Oahu, TMK: 7-3-7: 06 and 09

Thank you for reviewing the Draft EA for the proposed Wahiawa II Well Addition project. We have the following responses to your concerns:

DIVISION OF AQUATIC RESOURCES (DAR):

1. The Board of Water Supply (BWS) proposes to undertake mitigative measures during the well's construction (drilling and casing) and testing to ensure that drill cuttings, cutting extraction medium, petroleum products, sediment, and other debris will be prevented from entering the Wahiawa Reservoir through the storm drain. A permit to discharge dewatering effluent will be obtained from the Department of Public Works prior to any discharges into the municipal storm drain.

2. The BWS acknowledges that DAR does not expect this project to have significant adverse impacts on aquatic resource values in the project area if proper best management practices are implemented.

If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,

RAYMOND H. SATO
Manager and Chief Engineer

cc: Bennett Mark, CH2M Hill

SM/BU:js
cc: R. Sato
B. Usagawa

95-1788

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

PLN-80/95

MICHAEL D. WILSON
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTY
GILBERT S. COLOMA-AGARAN

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

April 28, 1995

Board of Water Supply
City and County of Honolulu
attn: Mr. Barry Usagawa
630 S. Beretania Street
Honolulu, HI 96843

Dear Mr. Usagawa:

SUBJECT: Wahiawa II Well Addition

We have had the opportunity to review the Draft Environmental Assessment regarding the Wahiawa II Well Addition. We have no objections to the proposed request as it will not affect our programs or projects. Thank you for the opportunity to comment.

Very truly yours,

Michael G. Buck
Administrator

c: Oahu Branch
OCEA
c:\wfc\cdua\94951\wahiawa.ltr

MAY 3 3 20 PM

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

May 12, 1995

Mr. Michael G. Buck
Division of Forestry and Wildlife
Department of Land and Natural Resources
State of Hawaii
1151 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Buck:

Subject: Your Letter of April 28, 1995 on the Draft Environmental Assessment (EA) for the Proposed Wahiawa II Well Addition, Wahiawa, Oahu, Hawaii, TMK: 7-3-07: 6 and 9

Thank you for reviewing the Draft EA for the proposed Wahiawa II Well addition project.

We acknowledge that you have no objections to the proposed project.

If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,

RAYMOND H. SATO
Manager and Chief Engineer

cc: Bennett Mark, CH2M Hill

MAY 13 1995
CH2M HILL

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

PLN-96/95

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTY
GILBERT COLOMA-AGARAN

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION DIVISION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

MAY 21 5 49 AM '95

May 18, 1995

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

LOG NO: 14483
DOC NO: 9505EJ03

Dear Mr. Usagawa:

SUBJECT: Draft Environmental Assessment for Wahiawa II Well Addition
Wahiawa, Wahiawa, O'ahu
TMK: 7-3-07:06 and 09

We have been asked to review the DEA for the proposed Wahiawa II Well Addition and submit our comments directly to your office. The DEA supports our "no effect" on historic sites determination for well construction and pump installation to the Commission on Water Resource Management dated April 24, 1995. The copy of the archaeological assessment report by Cultural Surveys Hawaii included in the DEA, has been placed in our library where it is available for public review and comment.

Aloha,

DON HIBBARD, Administrator
Historic Preservation Division

EJ:jk

cc: Bennett Mark, CH2M Hill

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

June 5, 1995

Mr. Don Hibbard, Administrator
State Historic Preservation Division
Department of Land and Natural Resources
State of Hawaii
33 South King Street, 6th Floor
Honolulu, Hawaii 96813

Dear Mr. Hibbard:

Subject: Your Letter of May 18, 1995 on the Draft Environmental Assessment (EA) for the Proposed Wahiawa II Well Additions, Wahiawa, Oahu, TMK: 7-3-7: 06 and 09

Thank you for reviewing the Draft EA for the proposed Wahiawa II Well Addition project.

We acknowledge the determination that the proposed project will have no effect on any historic sites, as indicated in comments to the Commission on Water Resource Management on the well construction and pump installation permits.

If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,

RAYMOND H. SATO
Manager and Chief Engineer

cc: Bennett Mark, CH2M Hill

BENJAMIN CAYETANO
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

May 15, 1995

FLN-93/95

KAZU HAYASHIDA
DIRECTOR

DEPUTY DIRECTORS
SAM CALLEJO
GLENN M. OKIMOTO

IN REPLY REFER TO:
HWY-PS
2.5577

MAY 16 9 36 AM '95

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

Attention: Mr. Barry Usagawa

Dear Mr. Sato:

Subject: Draft EA for Wahiawa II Well Addition,
Wahiawa, Oahu; TMK: 7-3-07: 06 & 09

Thank you for requesting our comments. The proposed Wahiawa well addition will not adversely affect State highway facilities.

Very truly yours,

KAZU HAYASHIDA
Director of Transportation

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

June 2, 1995

Mr. Kazu Hayashida, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Hayashida:

Subject: Your Letter of May 15, 1995 on the Draft Environmental Assessment (EA) for the Proposed Wahiawa II Well Addition, Wahiawa, Oahu, TMK: 7-3-7: 06 and 09

Thank you for reviewing the Draft EA for the proposed Wahiawa II Well Addition project.

We acknowledge that you have no objections to the proposed project.

If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,

RAYMOND H. SATO
Manager and Chief Engineer

cc: Bennett Mark, CH2M Hill

PLN-108/95

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P. O. BOX 621
HONOLULU, HAWAII 96809

MICHAEL D. WILSON
CHAIRPERSON

ROBERT S. NAKATA
ROBERT G. GIRALD
DAVID A. HORIKOA
LAWRENCE H. MIKE
RICHARD H. COX

RAE M. LOUI, P.E.
DEPUTY

JUN 14 1995

Mr. Barry Usagawa
Board of Water Supply
City & County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

Dear Mr. Usagawa:

Wahiawa II Well Addition

We received the Environmental Assessment for the captioned project, and offer the following comments.

The EA presents the information, but without clearly explaining that this project would extend the allocations in the Wahiawa aquifer system beyond the estimated sustainable yield. The Commission is in the process of reviewing the status of the existing allocations and actual uses in the aquifer system, and will work with the applicant to resolve the matter.

The EA states incorrectly (p.2-4) that the last water management area was designated in March 1993. The March 1993 action merely separated the Ewa Caprock Aquifer from the basal aquifers of the Pearl Harbor Groundwater Management Area. The Windward Sector and the Island of Moloka'i, designated effective July 15, 1992, were the last two areas to be designated by the Commission.

If you have any questions, please call Charley Ice at 587-0251.

Sincerely,

RAE M. LOUI
Deputy Director

Cl:ss

JUN 15 1 32 PM '95

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

RECEIVED
AUG 7 1995
CH2M HILL - HNL

August 3, 1995

Ms. Rae M. Loui
Deputy Director
Commission on Water
Resource Management
Department of Land and
Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Dear Ms. Loui:

Subject: YOUR LETTER OF JUNE 14, 1995 REGARDING THE DRAFT ENVIRONMENTAL ASSESSMENT (EA) FOR THE PROPOSED WAHIAWA II WELL ADDITION - TAX MAP KEY: 1-6-22: 07

Thank you for reviewing the Draft EA for the proposed Wahiawa II Well Addition project.

The proposed Wahiawa II Well Addition has been revised from a production well to a standby well only. When future additional water becomes necessary and if permitted use is available due to the revocation process, the Board of Water Supply will then apply for a water use permit for this well.

We also acknowledge your comment on the effective designation date of the Windward Section and the Island of Moloka'i as water management areas.

If you have any questions, please call me at 527-5235.

Very truly yours,

BARRY USAGAWA

cc: Bennett Mark, CH2M Hill

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

JEREMY HARRIS
MAYOR

KENNETH E SPRAGUE
DIRECTOR AND CHIEF ENGINEER

DARWIN J HANAMOTO
DEPUTY DIRECTOR

951332
Mgr
Dep
PE

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May 12, 1995

MEMORANDUM:

TO: RAYMOND SATO, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

FROM: for KENNETH E. SPRAGUE
DIRECTOR AND CHIEF ENGINEER

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (DEA)
WAHIAWA II WELL ADDITION
TAX MAP KEY: 7-3-07: 06 AND 09

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

1. The DEA should address the ownership of the Wahiawa Reservoir.

2. The DEA should also describe the best management practices (BMPs) during the pump testing as mentioned in Section 4.3.5.

Should you have any questions, please contact Mr. Alex Ho, Environmental Engineer, at 523-4150.

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

June 5, 1995

TO: KENNETH E. SPRAGUE, DIRECTOR AND CHIEF ENGINEER
DEPARTMENT OF PUBLIC WORKS

FROM: RAYMOND H. SATO, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

SUBJECT: YOUR MEMORANDUM OF MAY 12, 1995 REGARDING THE DRAFT ENVIRONMENTAL ASSESSMENT (EA) FOR THE PROPOSED WAHIAWA II WELL ADDITION, TMK: 7-3-07: 06 AND 09

Thank you for reviewing the Draft EA for the proposed Wahiawa II Well Addition project. We have the following responses to your concerns:

1. The Wahiawa Reservoir is owned by Castle and Cooke, Inc., as indicated in Section 4.1.1.

2. Best management practices will be implemented during the test pumping of the exploratory well to minimize potential pollution of receiving waters. Care will be taken in the disposal of the test water to preclude the possibility of flushing debris into Wahiawa Reservoir. Flow velocities will be dissipated to reduce any scouring effects.

If you have any questions, please contact Barry Usagawa at 527-5235.

cc: Bennett Mark, CH2M Hill

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Dep
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MAY 31 1995

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

JEREMY HARRIS
MAYOR

CHERYL D SOON
CHIEF PLANNING OFFICER

CAROLL TAKAHASHI
DEPUTY CHIEF PLANNING OFFICER

RS 4/95-0889

May 23, 1995

MEMORANDUM

TO: RAYMOND SATO, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

FROM: CHERYL D. SOON, CHIEF PLANNING OFFICER
PLANNING DEPARTMENT

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (DEA), WAHIAWA II WELL ADDITION

Thank you for giving us the opportunity to review the Wahiawa II Well Addition Draft Environmental Assessment (DEA).

Earlier this month, we reviewed the Well Construction/Pump Installation and Water Use Permit Applications for this project. As we indicated then, we support the development of additional municipal water sources in the Central Oahu Development Plan area to facilitate the development of a secondary urban center at Kapolei and the Ewa and Central Oahu areas.

The DEA shows that the Wahiawa Aquifer can sustain additional usage since only 11.23 mgd were used in 1990, 12 mgd less than the estimated sustainable yield of 23 mgd and 11.3 mgd less than the CWRM authorized use of 22.53 mgd for the Wahiawa Aquifer System. However, page 2-6 of the DEA accounts for only 9.07 mgd withdrawn in 1990; 2.16 mgd (to reach the 11.23 mgd mentioned on page 2-5) is unaccounted for. This discrepancy should be addressed.

The attached Board of Water Supply letter dated May 12, 1995 regarding its Water Use Permit Application for this project discusses CWRM authorizations and how this project may not cause the authorizations to exceed the sustainable yield. You may wish to include this discussion in the DEA.

The Central Oahu Development Plan Land Use designation of the project site is correctly identified as Public Facility on page 5-1.

If this well proves to yield the quality and quantity of water desired, we will work with you to process the required Development Plan Public Facilities Map amendment.

Should you have any questions, please call Rona Suzuki of the Planning Department staff at 527-6076.

Cheryl D. Soon
CHERYL D. SOON
Chief Planning Officer

CDS:lh

Attachment

cc: Mr. Bennett Mark, CH2M HILL

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

May 12, 1995

3/45-0474

TO: CHERYL D. SOON, CHIEF PLANNING OFFICER
PLANNING DEPARTMENT

FROM: RAYMOND H. SATO, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

SUBJECT: STATE WATER COMMISSION'S LETTER DATED APRIL 10, 1995 TO MAYOR HARRIS ON THE WATER USE PERMIT APPLICATION FOR BOARD OF WATER SUPPLY WAHIAWA WELLS II WELL NO. 2 (2902-01)

We request your support of the water use permit for the proposed Well No. 2 at Wahiawa Wells II station. The well will provide water for developments in Wahiawa and vicinity that are in the Board of Water Supply's Wahiawa system. Although approval of the permit for 1.313 mgd would bring the present authorized use slightly over the CWRM estimated sustainable yield of 23 mgd, Waialua Sugar has been pumping only two mgd out of a total authorized use of more than eight mgd for the past ten years. Waialua Sugar Company Pump 25 has not been pumped for 11 years and can be considered abandoned under the water code. Therefore, the permit can be granted since pumpages from this source will not cause the total actual pumpages from the basin to exceed the estimated sustainable yield.

If you have any questions, please contact Herbert Minakami at 527-6183.

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

August 9, 1995

TO: CHERYL D. SOON, CHIEF PLANNING OFFICER
PLANNING DEPARTMENT

FROM: RAYMOND H. SATO, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

SUBJECT: YOUR MEMORANDUM OF MAY 23, 1995 ON THE DRAFT ENVIRONMENTAL ASSESSMENT (EA) FOR THE PROPOSED WAHIAWA II WELL ADDITION, TMK: 7-3-07: 6 AND 9

Thank you for reviewing the Draft EA for the Wahiawa II Well Addition Project. We have the following response to your concerns:

1. We understand that the subject site is currently designated "Public Facility" on the Development Plan Land Use Map. We will process the required Development Plan Public Facilities Map Amendment prior to permanent pump installation if the test pump results are favorable.

2. The discrepancy between the 9.07 mgd and 11.3 mgd pumpages in 1990, results from the Commission on Water Resource Management (CWRM) reports of average pumpages as of December 1990 and July/August 1991, respectively. Our consultants' discussion with the CWRM staff indicated that the difference in the total withdrawal rates reported was due mostly to the variable monthly withdrawal rates by Waialua Sugar Company Wells, by the Del Monte Wells, and by a Board of Water Supply (BWS) well which was not put into service until early 1991.

The BWS has revised the present plan to use the additional well for standby and peak demand purposes only. A water use permit application will be submitted to CWRM at a later date after unused allocation becomes available through the revocation process.

If you have any questions, please call Barry Usagawa at 527-5235.

cc: Bennett Mark, CH2M Hill

951447

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
PACIFIC PARK PLAZA
711 KAPIOLANI BOULEVARD, SUITE 1200
HONOLULU, HAWAII 96813

JEREMY HARRIS
MAYOR

CHARLES O. SWANSON
DIRECTOR

TE-2160
PL95.1.132

May 23, 1995

MEMORANDUM

TO: RAYMOND H. SATO, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

FROM: CHARLES O. SWANSON, DIRECTOR

SUBJECT: WAHIAWA II WELL ADDITION
DRAFT ENVIRONMENTAL ASSESSMENT (EA)
TMK: 7-3-07: 06 AND 09

This is in response to the draft EA sent to us from CH2M HILL on April 26, 1995 requesting our comments for the subject project.

Based on our review, we have no objections or comments to offer at this time. For your information, California Avenue fronting the project site is under City jurisdiction.

Should you have any questions, please contact Lance Watanabe of my staff at local 4199.

for CHARLES O. SWANSON

cc: CH2M HILL

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

June 7, 1995

RECEIVED
JUN - 9 1995
CH2M HILL - HNL

TO: CHARLES O. SWANSON, DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

FROM: For RAYMOND H. SATO, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

SUBJECT: YOUR MEMORANDUM OF MAY 23, 1995 REGARDING THE DRAFT ENVIRONMENTAL ASSESSMENT (EA) FOR THE PROPOSED WAHIAWA II WELL ADDITION, TMK: 7-3-07: 06 AND 09

Thank you for reviewing the Draft EA for the proposed Wahiawa II Well Addition project.

We acknowledge that you have no comments or objections to the proposed project.

If you have any questions, please contact Barry Usagawa at 527-5235.

cc: Bennett Mark, CH2M Hill

University of Hawai'i at Mānoa

Environmental Center
A Unit of Water Resources Research Center
Crawford 317 • 2550 Campus Road • Honolulu, Hawai'i 96822
Telephone: (808) 956-7361 • Facsimile: (808) 956-3980

June 7, 1995
EA:00120

Mr. Barry Usagawa
City and County of Honolulu
Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96843

Dear Mr. Usagawa:

Draft Environmental Assessment
Wahiawa II Well Addition
Wahiawa, Oahu

The City and County Board of Water Supply (BWS) proposes to drill and case an additional potable water well in Wahiawa on California Avenue. The well, which is the second on the 2.2 acre BWS corporation site, is expected to yield about 1.5 million gallons per day (mgd). If pump tests reveal suitable quality and quantity, the well will be integrated as a permanent production well.

We reviewed this Draft Environmental Assessment (EA) with the assistance of Dave Penn, Geography; and Paul Berkowitz of the Environmental Center.

Limited Public Review

Starting last month, the BWS adopted a new approach to the environmental review process. Instead of preparing separate EAs for the exploratory and production phases, both phases are addressed in a single document. As a result, knowledge gained from the pump tests is unavailable for public review, and without this information, the public cannot adequately evaluate the proposed action.

To avoid this problem, the BWS could specify precise criteria for converting exploratory wells to production wells. For the Wahiawa II well addition, no such criteria are established: the document merely asserts that the well will go into production if it proves "suitable". We suggest that the term, "suitable", should be expressed in terms of exact quantities and qualities.

Water Quality

Given the area's previous problems with contamination, it seems appropriate for the EA to discuss the water quality history of the site. Furthermore, potential health effects of chemically contaminated water should be noted.

Instead of suggesting that granular activated charcoal (GAC) filters might be necessary, the EA should present the basis for such a suspicion. Is there a record of volatile organic compounds detected in nearby wells? What compounds and what concentrations does the BWS expect to find? At the very least, the BWS should present water quality data from the other Wahiawa II well which lies just 280 feet away.

Total Authorized Use

The total permitted use, which is presented on page 2-5, should be discussed in reference to the sustainable yield (page 2-6). Although current use is substantially below the sustainable yield, total authorized use for the Wahiawa Aquifer is at 22.53 mgd, just barely below the estimated yield of 23 mgd. If the Commission on Water Resource Management (CWRM) issues new permits for the proposed 1.5 mgd well, then the potential for overdraft exists. As more users apply for permits, the allocations for existing users may have to be reduced. Other competing applications for Wahiawa water, such as Del Monte wells, illustrate the dilemma.

Legal Mandate

The BWS suggests that it has a legal mandate to meet the water needs of a growing population. For each of the Development Plan areas, the County General Plan sets population limits, not population goals. Since these limits are set with little if any consideration for water supply factors, the restriction of new development constitutes prudent planning, and is, if anything, optimistic. If land use plans are flawed because of their lack of consideration of water resources, then the further restriction of these plans through water use planning is justified and necessary.

Wetlands

Given the spillover effect from the Wahiawa Aquifer and the presence of downgradient wetlands in both Pearl Harbor and Haleiwa, potential impacts to significant wetlands do exist. Also, for the sake of thoroughness, wetlands do occur in the Wahiawa Aquifer, particularly in the mountain bogs of the Koolau Range.

Cultural Resources

A cultural resource assessment encompasses far more than just an archaeological survey. The developer should seek community knowledge concerning the site significance. This type of information could be obtained from groups such as the Wahiawa Hawaiian Civic Club.

Alternative Sources

The list of alternatives on page 6-2 should include a discussion of other water sources such as rainfall catchment and stormwater detention. Furthermore, just as electric utilities have done, the BWS should consider conservation and demand-side management as alternate sources.

Conclusion

In its present form, this document fails to adequately address the water quality issue, which is perhaps the most important issue related to the proposed project. More information is needed, particularly relating to the history of the site and the water quality records from surrounding wells. This is especially important in light of the BWS' new approach to environmental assessment which circumvents public review of pump test data. Since public review is eliminated at this stage, precise standards of "suitable" water quantities and quality should be defined. This Draft EA also contains inadequacies or inaccuracies with regard to permitted use, source alternatives, wetlands, cultural resources, and the legal mandate. Before continuing with the proposed action, these issues need to be addressed.

Thank you for the opportunity to review this Draft EA.

Sincerely

John T. Harrison, Ph.D.
Environmental Coordinator

cc: OEQC
CH2M Hill
Roger Fujioka
Dave Penn
Paul Berkowitz

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

September 1, 1995

Mr. John T. Harrison
Environmental Coordinator
University of Hawaii
Environmental Center
Crawford 317
2550 Campus Road
Honolulu, Hawaii 96822

Dear Mr. Harrison:

Subject: Your Letter of June 7, 1995 on the Draft Environmental Assessment (EA) for the Wahiawa II Well Addition, Wahiawa, Oahu, Hawaii, TMK: 7-3-7: 6 and 9

Thank you for reviewing the Draft EA for the Wahiawa II Well Addition project. We have the following responses to your specific comments:

1. Public Review

The Board of Water Supply (BWS) follows the EA process as required by the State's Environmental Impact Statement (EIS) law and the Department of Health's (DOH) administrative rules for this project. The BWS feels that by following the requirements of the law and the administrative rules in the preparation of this EA, appropriate consideration will be given to all agency and public comments prior to the determination on whether or not an EIS is required.

The exploratory and possible production phases of this project were included [B this EA document so that all phases of this project, including its possible conclusion, are adequately disclosed. Furthermore, this project adds to an existing pump facility where minimal impacts in the production phase are anticipated. In this case, two EA's are not necessary expending limited public funds.

Criteria

2. Water Quality

As yet, there is no water quality history for the well depth proposed at the specific well site. The purpose of the first phase of this project is to obtain water quality data to determine if the water from the proposed well will meet the DOH water quality standards for a production well. In accordance with Section 29 of Chapter 11-20 HAR, the engineering report must be approved by DOH prior to activation of the proposed well. It is not appropriate at this time to speculate on health effects from chemicals which have not been identified in the water and may not even be present since water quality tests have not yet been conducted.

There is no substantive reason to believe that the water from this proposed well will not meet water quality standards. The water quality of the Wahiawa II Well located 280 feet to the west, meets all State water quality standards without the need for a Granulated Activated Charcoal (GAC) filter.

The EA cautiously notes the possibility that there may be volatile organic compounds (VOCs) in the well because of other wells in Central Oahu, particularly in Mililani that had VOCs. The BWS has found that GAC filters have been effective and will if necessary, incorporate it into the facility.

3. Authorized Use

The EA discusses sustainable yield and average water usage in Section 2.4 and discusses The Commission of Water Resource Management (CWRM) authorized usage in Section 2.6. The Wahiawa Sector has substantial unused water allocation beyond the 4 year limitation set by the Water Code. However, BWS has revised the use of this well for standby and peaking purposes only until the CWRM evaluates and completes the revocation process. A Water Use Permit will be submitted at that time.

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

4. Your comments regarding legal mandate

The BWS is required by the City Charter to determine the policy for construction, additions, extensions and improvements to the water systems of the City. The process is also required to be done after consultation with the Chief Planning Officer of the City Planning Department. The BWS is thus obligated to use the population objectives used by the Planning Department for the planning of BWS facilities, including additional wells.

Many other factors beside water resources are considered in formulating the community based development plans. Land use is not restricted by water resources and it is also not restricted by sewer, transportation, etc. Infrastructure can be expanded to meet land use plans and water can be moved from areas of supply to areas of demand as allowed by the Water Code.

5. Wetlands

Section 4.3.4 describes the possible impacts to the significant wetlands identified in a report prepared for the U.S. Army in 1977. There is no potential for adverse impacts to these down-gradient wetlands in Pearl Harbor and Waialua because these wetlands are fed by surface water or by near-surface groundwater leaking through breaks in the overlying caprock. The spillover effect only becomes significant if the sustainable yield of the Wahiawa aquifer is surpassed, but this is not the case. Wetlands occurring at elevations higher than the proposed well are not affected because any wetlands in the Koolau Range would be upgradient from the well site.

6. Your comments regarding Cultural Resources

The BWS is satisfied that the cultural resources analysis done for this project by Cultural Surveys Hawaii was satisfactory and no cultural sites of significance will be adversely affected. The well site is within an existing City corporation yard in a developed residential and commercial area. The State Historic Preservation Division of the State Department of Land and Natural Resources determined that this project would have "no effect" on historic sites.

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

7. Your comments regarding Alternatives

The alternatives of using rainfall catchment and stormwater detention were considered and addressed in Section 6.4 when surface water sources were considered. As indicated, either of these alternatives has a higher potential for health and safety problems and would require costly treatment works, and are not considered as feasible as development of groundwater resources. In addition, BWS already fully considers conservation and demand side management in an effort to extend the available water resource.

If you have any questions, please contact Barry Usagawa at 527-5235.

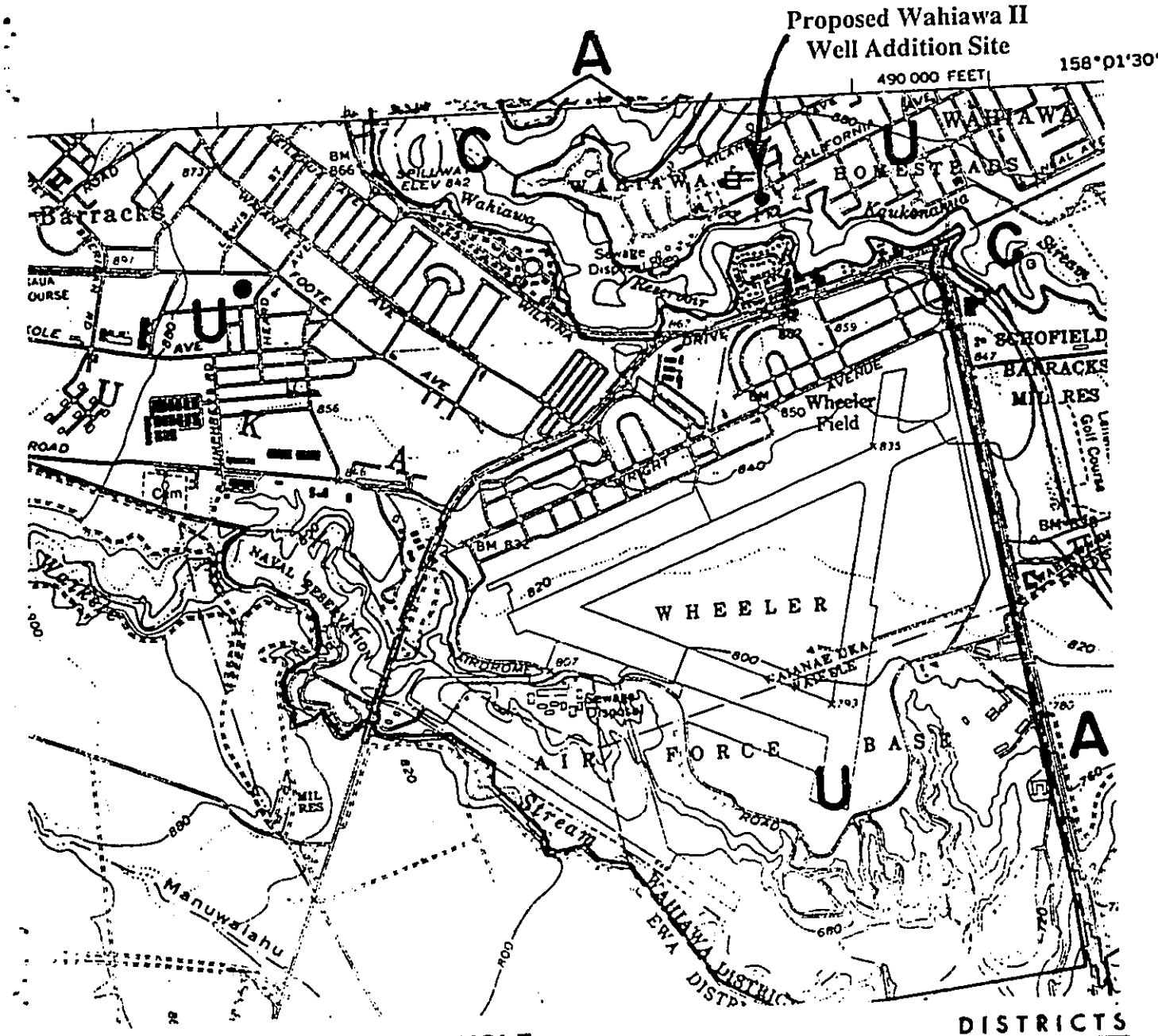
Very truly yours,

RAYMOND H. SATO
Manager and Chief Engineer

cc: Bennett Mark, CH2M Hill

Appendix F

State of Hawaii Land Use District Boundary Map Showing Location of Project Site in State Urban District



SCHOFIELD BARRACKS QUADRANGLE
HAWAII—CITY AND COUNTY OF HONOLULU
ISLAND OF OAHU
7.5 MINUTE SERIES (TOPOGRAPHIC)

DISTRICTS

U = URBAN
R = RURAL
A = AGRICULTURAL
C = CONSERVATION