

Manana Exploratory Well

**BOARD OF WATER SUPPLY**

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January 28, 1998

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'98 FEB 10 P2:06

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OFFICE OF  
ENVIRONMENTAL  
QUALITY CONTROL

Dear Mr. Gill:

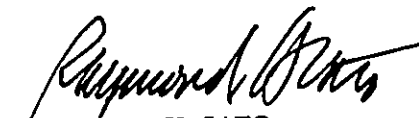
Subject: Finding of No Significant Impact for the Board of Water Supply's Proposed Manana Exploratory Well Project, Manana, Honolulu, Oahu, TMK: 9-7-24: 41

The Board of Water Supply has reviewed the comments received during the public comment period which began on December 8, 1997. 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 finding of no significant impact. We request that the proposed well project be published as finding of no significant impact in the next Office of Environmental Quality Control (OEQC) Bulletin.

Attached are the completed OEQC bulletin publication form and 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

cc: Chester Koga, R.M. Towill Corp.

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1998-02-23-0A-*FEA - Manana Exploratory* FEB 23 1998  
*Well* **FILE COPY**

Prepared in accordance with Chapter 343, Hawaii Revised Statutes

Final Environmental Assessment  
**MANANA EXPLORATORY WELLS**  
Manana, Honolulu, Oahu, Hawaii

February 1998

City and County of Honolulu  
BOARD OF WATER SUPPLY  
630 Beretania Street  
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Final Environmental Assessment  
**MANANA EXPLORATORY WELLS**  
Manana, Honolulu, Oahu, Hawaii  
TMK: 9-7-24:41

February 1998

PROPOSING AGENCY:  
City and County of Honolulu  
Board of Water Supply  
630 South Beretania Street  
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Chapter 1  
**EXECUTIVE SUMMARY**

**1.1 PROPOSING AGENCY AND ACTION**

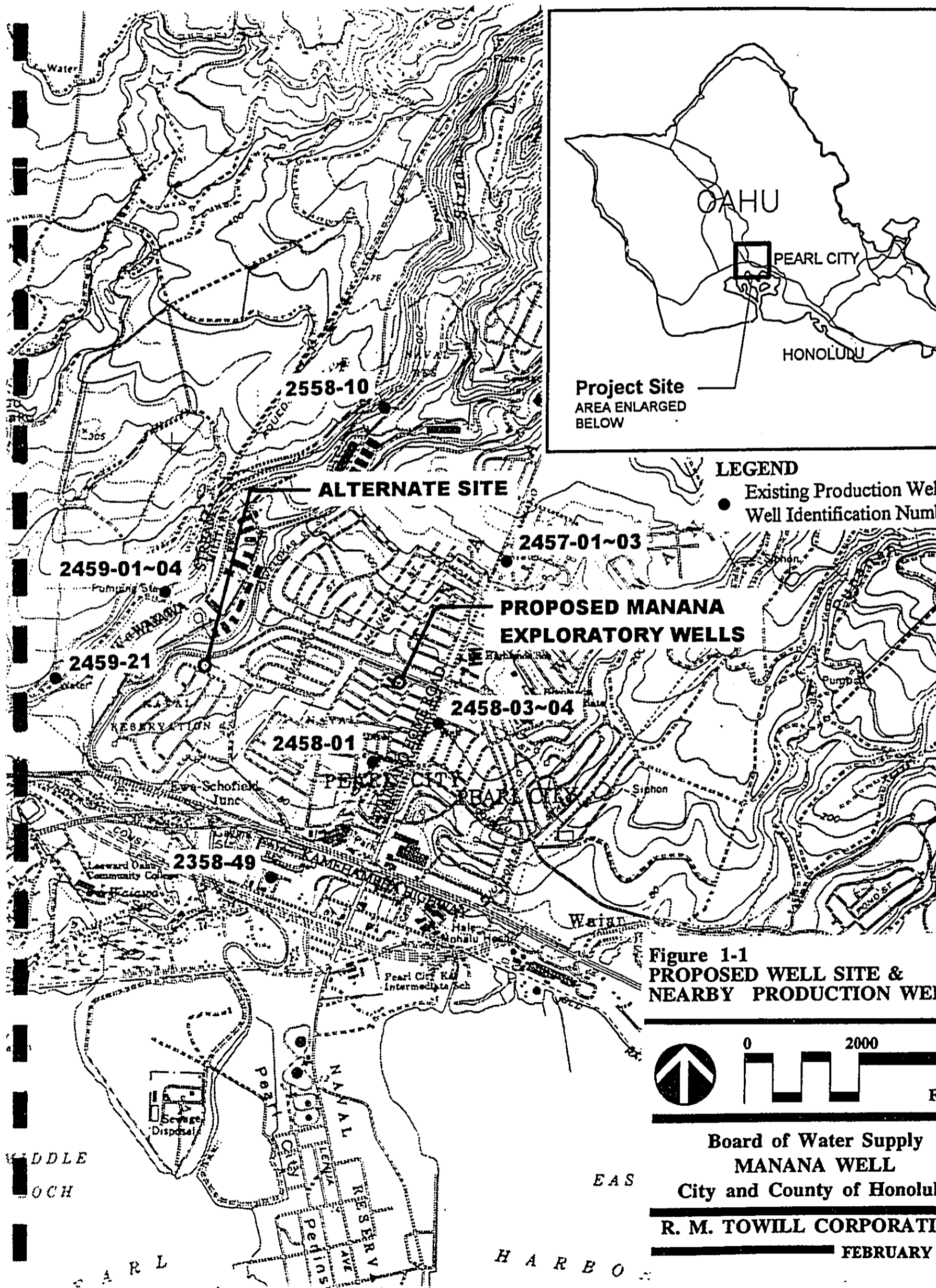
The Board of Water Supply (BWS), City and County of Honolulu, proposes to drill and case two exploratory potable wells on a portion of the Manana Naval Reservation at TMK: 9-7-24:41 (Figure 1-1 and Figure 1-2). Ownership of the parcel is currently being transferred from the Navy to the City and County of Honolulu through a Memorandum of Understanding (MOU). At present, the Navy has turned the deed over to the City, however the transfer has not yet been recorded with the Bureau of Conveyances (Andy Herada, City and County of Honolulu, Public Works, Land Survey and Acquisition Division, pers. comm., 10/22/97).

The proposed exploratory wells will be situated along the northern boundary of the Reservation, approximately 500 feet west of Waimano Home Road and the Moanalua Road intersection. The Manana Well Station is expected to yield a total of 1.5 million gallons per day (mgd) of potable water.

BWS will drill the exploratory wells to obtain hydrogeological data on the potential for new groundwater resources. After the exploratory wells have been drilled and cased, test pumping will be performed to determine if the quantity and quality of water is suitable for development. If the water meets acceptable standards and permitted uses become available, the wells will be converted to permanent production status. Conversion of the exploratory wells to production status will require a separate environmental assessment which will be filed at that time. This Environmental Assessment (EA) focuses on the environmental impacts directly associated with the drilling, casing, and testing of the exploratory wells, including the temporary installation of pumps, piping, and appurtenances. Long-term impacts associated with permanent production wells, including impacts on the sustainable yield of the underlying aquifer, will be addressed in a separate EA.



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**LEGEND**

- Existing Production Well
- Well Identification Number

**Figure 1-1  
PROPOSED WELL SITE &  
NEARBY PRODUCTION WELLS**



**Board of Water Supply  
MANANA WELL  
City and County of Honolulu**

**R. M. TOWILL CORPORATION**

**FEBRUARY 1968**

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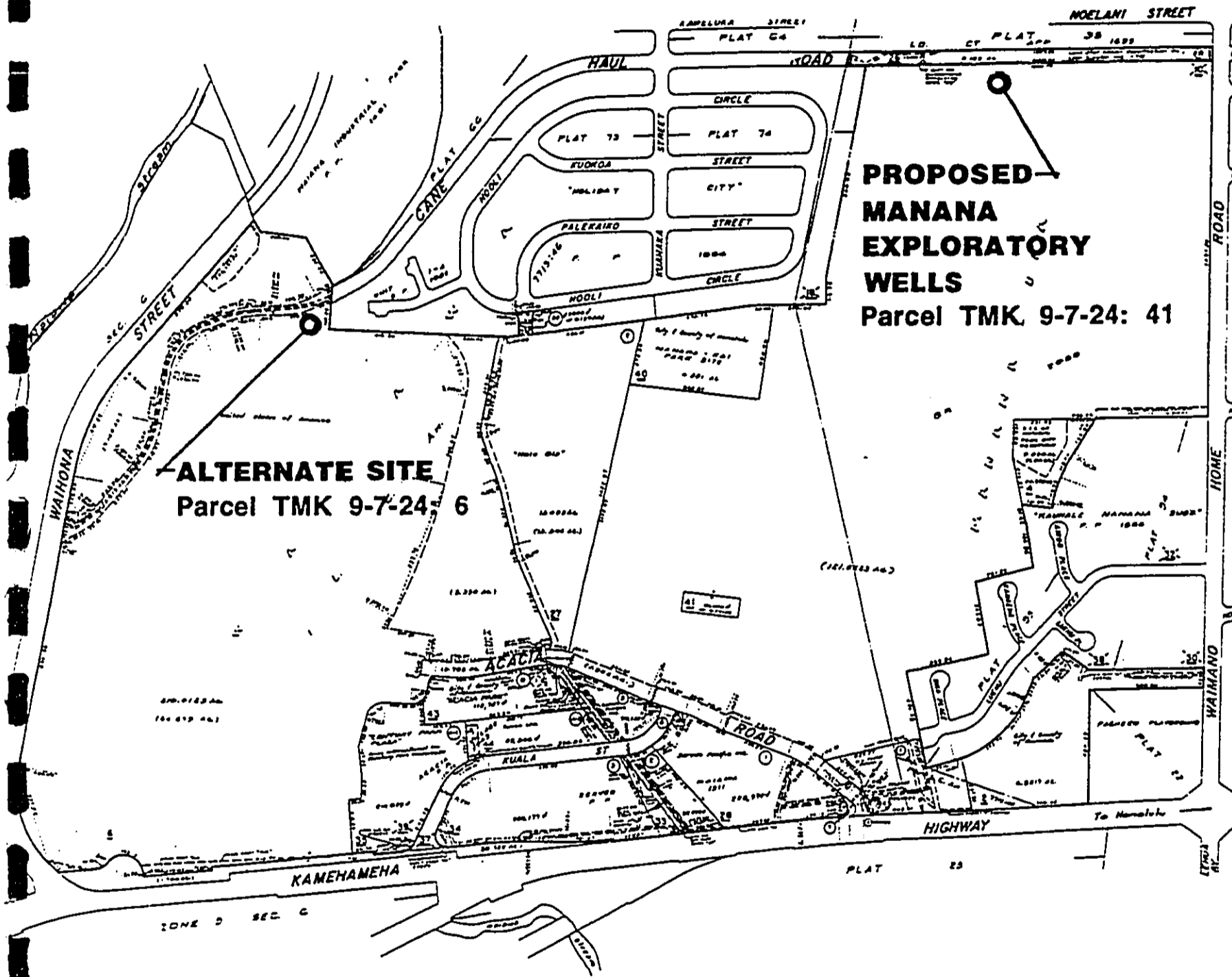


Figure 1-2  
PROJECT SITE AND  
TAX MAP KEY LOCATION



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City and County of Honolulu  
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FEBRUARY 1998

## 1.2 PURPOSE OF ENVIRONMENTAL ASSESSMENT

City and County of Honolulu funds will be used for development. This project, therefore, is subject to preparation of environmental documentation per requirements of Chapter 200, Title 11, Hawaii Administrative Rules (HAR), and Chapter 343, Hawaii Revised Statutes (HRS). This EA will address the limited environmental impacts anticipated for development of the proposed project.

A Final Environmental Assessment and accompanying Finding of No Significant Impact (FONSI) will be filed by BWS as part of the requirement for processing an EA.

## 1.3 PERMITS REQUIRED

Exploratory wells are considered minor and are not required to be shown on the Development Plan Public Facilities Map. However, successful completion of exploratory well tests will lead to conversion into production wells which will require that an application be filed for a Development Plan Public Facilities Map Amendment from the City and County of Honolulu, Department of Planning. Review and approval for this permit is from the Honolulu City Council. It is expected that this permit will be filed upon successful completion of exploratory well tests, during preparation and processing of the EA for the production wells.

The Commission on Water Resource Management (CWRM) will require a Well Construction permit. The permit will be for exploratory work including test pumping. Once exploratory work is completed the production wells will each require a permanent Pump Installation Permit and Water Use Permit.

BWS has permission to use the City and County of Honolulu, storm drainage system for discharges of effluent related to potable pump operation, replacement, and repair at various locations (Section 14-12.22, Revised Ordinances of Honolulu 1990, as amended). However, a National Pollutant Discharge Elimination System (NPDES) permit from the State Department of Health (DOH), Clean Water Branch, will be required if there are any discharges of effluent into State waters through the county storm sewer system. The NPDES permit might be avoided if BWS disposes of well effluent by other means, such as through the use of sprinklers for irrigation or dust control.

#### 1.4 PROJECT BENEFITS

The proposed exploratory wells will furnish valuable data that will be added to Oahu's island-wide hydrogeological information base. This data will be valuable in estimating the quantity and quality of groundwater resources available at this site, and, in combination with data from other wells, ultimately for the entire island. If the hydrogeological data shows that additional groundwater sources can be developed successfully, the Manana Exploratory Wells will be converted to permanent potable water wells.

If the exploratory wells are converted to permanent production, it would be part of a major water development project that will integrate new groundwater sources into the municipal water system. The development of additional water sources is necessary to accommodate the growing demand for water within the City and County of Honolulu.

#### 1.5 ALTERNATIVES CONSIDERED

This environmental assessment discusses the no action alternative, the delayed action alternative, site alternatives, and source alternatives.

The no action alternative was not considered a viable option because it does not fulfill the BWS mandate to provide potable water resources for the growing City and County of Honolulu. The no action alternative may also create restrictions to new development and may result in regional water shortages.

The delayed action alternative was considered but not pursued because this alternative would delay the provision of potable water. Delayed action would also result in similar environmental outcomes with higher development costs due to inflation.

One alternative site has been selected on a military parcel approximately one-half mile to the west of the primary site. Both the primary and secondary sites are regarded strictly as candidate locations for exploratory well drilling. Both sites were selected and assessed based on their proximity to existing

transmission systems, on their geologic and hydrologic likelihood of locating water, and on their suitability for accommodating exploratory well drilling operations with minimal negative impacts to surrounding areas.

Source alternatives to potable groundwater have been analyzed in the *Oahu Water Plan - Fifth Edition* (BWS, 1995). These include desalination, development of surface water and brackish groundwater sources, and recycling of treated wastewater. Although BWS is exploring development of alternative potable water sources, it does not consider currently available technologies to be feasible or practical due to high development cost and technical difficulties. (BWS, 1995).

#### 1.6 POTENTIAL IMPACTS AND MITIGATION MEASURES

Construction activities will involve use of a bulldozer/backhoe (as needed to prepare the site for drilling), truck mounted or stationary drill rig, electrical or internal combustion powered water pump(s), and construction related equipment including use of pickup trucks and water trucks (for dust control as applicable). Nearby residential areas may be impacted by airborne dust and vehicular pollution, however, the potential for impacts will be temporary and will cease when construction is completed.

Potential for noise will result from clearing, grading, and use of the drill rig and pumps. Nearby residential areas may be affected by noise levels exceeding allowable daytime standards of 55 dBA set by DOH through HAR, Title 11, Chapter 43. Additionally, Pearl City Highlands Elementary School, located approximately one-quarter mile away, might also be temporarily affected by drilling operations. There will be no noise impacts after the construction is completed.

To mitigate impacts on air quality, dust control measures will be used by the contractor. These measures will include the use of dust screens and water sprinkling as necessary to minimize fugitive dust. To minimize exhaust emissions, project contractors will properly maintain their internal combustion engines and will comply with DOH, HAR, Title 11, Chapter 59 and 60 regarding Air Pollution Control.

A noise permit will be required from the DOH, Noise and Radiation Branch, due to potential for excessive noise levels generated by project activities. The noise permit will require that contractors muffle all construction vehicles and machinery and maintain all noise attenuation equipment in good operating condition. If necessary, faulty equipment will be repaired or replaced. Further, drilling operations will be restricted to the hours of 7:30 am to 3:30 pm on weekdays and will be suspended on weekends and State holidays. If lineshaft pumps are used, they will be installed with mutes to reduce noise to acceptable levels. Alternatively, submersible pumps may be used.

The project may result in a temporary increase in heavy truck traffic. The greatest impact will be during initial mobilization of equipment to the site and following construction and testing activities when equipment is removed. Once construction equipment has been set-up, no significant impacts are expected to the adjoining streets, Waimano Home Road, Moanalua Road, Kamehameha Highway, or Acacia Road. Removal of equipment will be scheduled to avoid using Waimano Home Road and Kamehameha Highway as much as possible during peak traffic periods to minimize disturbance to residents.

No adverse impacts to geological formations underlying the drilling site or to soils at the surface of the site are expected. Surface water, notably the Waiawa Stream, Manana Stream, and Waimano Stream, will not be adversely affected by the proposed project due to their distance from the exploratory well site. No adverse impacts to wetland areas at Waiawa or Waiiau Springs are expected because of the great distance separating the project site from the springs and because anticipated groundwater withdrawals will not diminish equilibrium head levels below sustainable yields.

Pursuant to Section 14-22.22, Revised Ordinances of Honolulu, 1990, as amended, BWS is permitted by the City and County of Honolulu, Department of Public Works to dispose of potable groundwater discharged from wells into the County storm drainage system. Safe practices will be followed to ensure that discharge does not become contaminated before entering the County system.

If test results indicate that the quality or quantity of water from the exploratory wells is unsatisfactory, the wells will be capped and sealed to protect and preserve the underlying groundwater. One or both of the drilling holes may also be considered for use as a monitor well.

Project activities might alter the local distribution and abundance of birds presently using the land, but will not impact the overall abundance of these species on Oahu. No mitigation measures are required or recommended based on anticipated temporary impacts to the biological resources at the site.

### 1.7 DETERMINATION

In accordance with Chapter 343, HRS, BWS has determined that an EIS is not required for the construction and test pumping of the Manana Exploratory Wells. This determination has been made based on the short duration of the project and because any adverse impacts resulting from this project can be minimized to insignificant levels by applying the recommended mitigation measures.

If the results of the test pumping from Manana Exploratory Wells show adequate quality and quantity of water for development, BWS expects to file an EA for converting the wells to production status with a determination that an EIS is not required.

### 1.8 AGENCIES AND OTHERS CONSULTED

The following agencies were contacted during preparation of this EA:

#### State of Hawaii

- Department of Health  
Office of Environmental Quality Control (OEQC)  
Environmental Management Division
- Department of Land and Natural Resources  
Commission on Water Resource Management  
Aquatic Resources Division  
Historic Preservation Division

#### City and County of Honolulu

- Board of Water Supply
- Department of Land Utilization
- Planning Department

The following additional organizations, agencies, and individuals will be notified during the 30-day Draft EA comment period:

**Federal Agencies**

- U.S. Geological Survey
- U.S. Fish and Wildlife Service
- U.S. Army Corps of Engineers

**State Agencies**

- Department of Business, Economic Development & Tourism  
Office of Planning
- Department of Education
- University of Hawaii  
Environmental Center
- Office of Hawaiian Affairs

**City and County of Honolulu**

- Department of Housing and Community Development
- Department of Transportation Services
- Building Department
- Public Works, Land Survey and Acquisition Division

**Private and Community Organizations, and Elected Officials**

- Honolulu City Council
- Pearl City Neighborhood Board No. 21
- State Senator Cal Kawamoto
- State House Representative Noboru Yonamine
- Sierra Club



## Chapter 2

### **PURPOSE AND NEED FOR THE PROPOSED ACTION**

#### **2.1 PROJECT PURPOSE AND NEED**

The 1996 average municipal water demand on the Island of Oahu was approximately 148 million gallons per day (mgd). According to BWS, this demand for water is expected to increase to 175 mgd by the year 2000, and to more than 193 mgd by the year 2010 (BWS, 1997). BWS has been mandated to meet this demand by investigating, planning and developing additional water supplies within the limits of available resources. BWS proposes to develop new sources of potable groundwater on Oahu within the Pearl Harbor, Windward, and North Water Management Areas (WMA) to fulfill this mandate.

The Manana Exploratory Wells, which will consist of two single-bore drill holes, are a proposed BWS well project within the Pearl Harbor Groundwater Sector, Waipahu-Waiawa WMA, according to the CWRM's adopted WMA boundary. If tests for the quantity and quality of the groundwater from the exploratory wells meet desirable standards, the wells will be converted to production use and integrated into the BWS's municipal potable water source, storage, and transmission system. If converted to production status, the Manana Exploratory Wells are expected to have a combined total yield in excess of 1.5 mgd of potable water.

#### **2.2 THE STATE WATER CODE AND COMMISSION ON WATER RESOURCES MANAGEMENT**

The State Water Code and CWRM was established in 1987 by the Hawaii State Legislature in Section 174-C of the HRS. The task of CWRM is to administer 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; and,
- a water quality plan prepared by the Department of Health.

The State Water Code requires that CWRM establish management boundaries for each WMA. CWRM designated WMAs are located in areas where research suggests that ground and/or surface water resources are threatened by current or future proposed withdrawals or diversions of water (BWS, 1995).

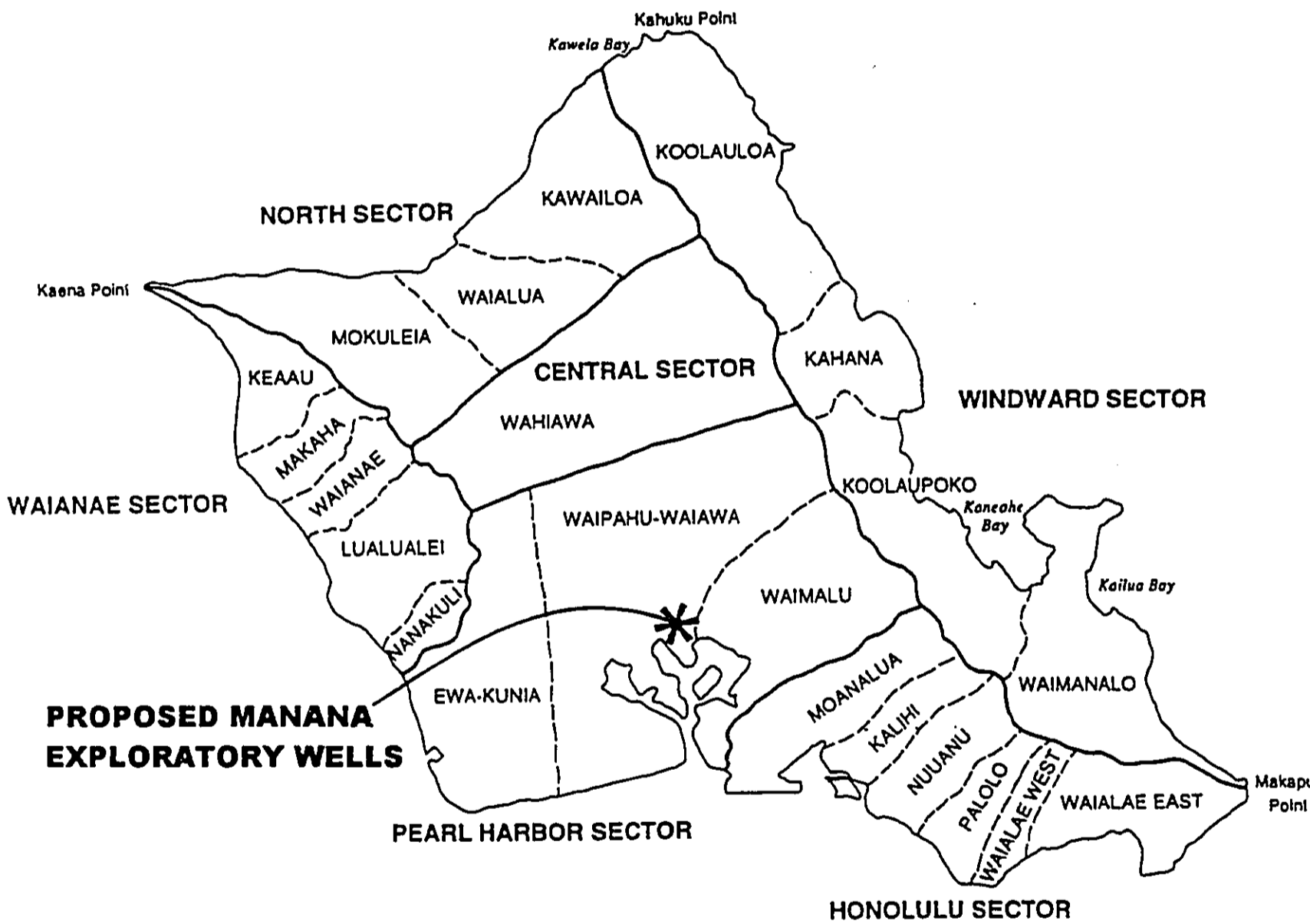
### 2.3 GROUND WATER SECTORS AND AQUIFERS

To assist in the planning and administration of WMAs and water resources in general, the CWRM has established six groundwater sectors that encompass the entire island of Oahu: Honolulu, Pearl Harbor, Waianae, Central, North, and Windward. The six groundwater sectors are further divided according to the boundaries of the underlying aquifers. In all sectors except Waianae, the aquifer divisions have been designated as WMAs. In some cases, several individual aquifers are combined into a single WMA. Figure 2-1 identifies these groundwater sectors and WMA boundaries for Oahu.

The Pearl Harbor Groundwater Sector contains three WMAs: Waimalu, Waipahu-Waiawa, and Ewa-Kunia. The Pearl Harbor sector is bound on the north-east by the Koolau Mountain Range and extends west from Moanalua Valley and Ewa, and north through Central Oahu, including Waipahu and Waiawa. The proposed Manana Exploratory Wells are slightly north of the Pearl City Peninsula in the Waipahu-Waiawa WMA. The Waipahu-Waiawa WMA is bounded by arbitrary rather than hydrogeological boundaries. The west boundary of Waipahu-Waiawa is Kunia Road and the east boundary is Waimano Home Road. The natural hydrogeological boundaries of Waipahu-Waiawa are the Waianae-Koolau aquifer interface, where younger Koolau lavas overlay the older Waianae lavas to the west and the Waiawa Stream to the east. If the CWRM adjusts the boundaries in the future, the sustainable yields will also be adjusted to account for the proper recharge area. (BWS, 1997).

LEGEND

- Groundwater Sector Boundary
- Aquifer System Boundary



**PROPOSED MANANA EXPLORATORY WELLS**

**Figure 2-1  
GROUNDWATER SECTORS  
AND AQUIFERS**



**NOT TO SCALE**

**Board of Water Supply  
MANANA WELL  
City and County of Honolulu**

**R. M. TOWILL CORPORATION**

**FEBRUARY 1998**

#### 2.4 SUSTAINABLE YIELD AND THE PEARL HARBOR WMA

The Hawaii State Water Plan requires that the CWRM determine sustainable yields of surface and groundwater sources for the State. Sustainable yield is the amount of groundwater that can be routinely extracted from an aquifer without adverse impacts to the quality or quantity of the water source. Based on the geologic and hydrologic characteristics of the various regions, CWRM produces estimates of sustainable yield for each aquifer, WMA, and groundwater sector. These estimates are used to guide the development of new water resources.

The purpose of this EA is to assess the suitability of the selected site for exploratory drilling. Evaluations of the capacity of the wells for sustained water production, estimated sustainable yield, and possible impact on the underlying aquifer if the wells are brought into permanent production is generally addressed, but will be the specific subject of a later EA for installation of permanent production wells.

Estimating sustainable yield for the island of Oahu and for its individual aquifers is complex. The sustainable yield of basal aquifers on any of the Hawaiian islands is always less than the average annual rate of recharge to the groundwater aquifer primarily because of the amount of fresh groundwater that is lost by mixing with the underlying salt water. Recharge itself is only an estimate based on sparse rainfall data, and evaporation, transpiration, and runoff estimates that are not measured (only perennial streams are gauged, not intermittent streams, drains, overland flow, or shallow under flow). (BWS, 1997). To calculate the amount fresh groundwater loss, numerous factors must be considered including characteristics of aquifer confinement, the thickness of the basal lens, and the rate of water extraction due to agricultural and urban activities. Aggregate estimates of sustainable yield for the Pearl Harbor Sector are relatively accurate, however, owing to advancements in hydrological and geological knowledge that is the byproduct of the long history of water development on Oahu. (BWS, 1995).

The Pearl Harbor groundwater sector is comprised of three underlying aquifer systems which also serve as WMAs: Waimalu Aquifer, Waipahu-Waiawa Aquifer, and the Ewa-Kunia Aquifer. Prior to the closure of the Oahu Sugar Company, the Waipahu-Waiawa Aquifer had an estimated sustainable yield of 119 mgd and permitted uses totaling 110.4 mgd, making it the highest yielding WMA in this sector. With the closure of the Oahu Sugar Company and cessation of sugar growing activities, substantial sources of groundwater recharge, including pumped ground water and Waiahole Ditch water used for sugar irrigation within the Waipahu-Waiawa and Ewa-Kunia Aquifers, have been shut off or diverted. Reduction in groundwater recharge to these aquifers causes a reduction in their sustainable yields, thus, where the Oahu Sugar Company had been permitted to use 60 mgd of basal groundwater, 60 mgd is no longer available. Excess groundwater made available from the closing of the Oahu Sugar Company is currently estimated to be approximately 35 mgd, primarily within the Waipahu-Waiawa Aquifer and, to a lesser extent, within the Ewa-Kunia Aquifer. (BWS, 1997).

At present, CWRM is reevaluating the sustainable yields of the aquifers in the Pearl Harbor Sector to adjust for water use and recharge changes resulting from the closure of the Oahu Sugar Company. Nevertheless, the Pearl Harbor Sector maintains the highest sustainable yield of all the Oahu aquifer systems' groundwater sectors (estimated at 184 mgd prior to the sugar plantation's closure - CWRM, May 1997 Water Use Permit Index). The second highest sustainable yield is from the Windward Sector WMA, provisionally estimated at 99 mgd. CWRM indicates that about 45 mgd of this total is not available due to potential stream flow impacts, however, case-by-case uses are allowable following an evaluation of impacts to sustainable yields. The third highest yield, 53.5 mgd, is from the Honolulu WMA, of which approximately 50.5 is already permitted. (BWS, 1997).

See: *Table 2-1, Groundwater Use by Aquifer System and Sustainable Yield.*

Table 2-1  
GROUNDWATER USE BY AQUIFER SYSTEM AND SUSTAINABLE YIELD  
(in million gallons per day)

Aquifer SECTOR / System	Dike / Basal Sustainable Yield	1996 Permitted Use <sup>1</sup>	Available Sustainable Yield	1994 Dike / Basal Use
<b>HONOLULU</b>				
Palolo	5	5.689	-0.689	5.207
Nuuanu	15	15.170	-0.170	14.994
Kalihi	9	8.492	0.508	7.818
Moanalua	18	18.570	-0.570	14.700
Waialae West	4	1.990	2.010	0.866
Waialae East	2	0.600	1.400	0.247
<b>SUBTOTAL</b>	<b>53</b>	<b>50.511</b>	<b>2.489</b>	<b>43.832</b>
<b>PEARL HARBOR</b>				
Waimalu	45	48.379	-3.379	45.070
Waipahu-Waiawa <sup>5</sup>	119	110.559	8.441	71.894
Ewa-Kunia	20	17.891	2.109	15.973
Makaiwa	0	0.000	0.000	0.000
<b>SUBTOTAL</b>	<b>184</b>	<b>176.829</b>	<b>7.171</b>	<b>132.937</b>
<b>CENTRAL</b>				
Wahiawa	23	20.746	2.254	9.710
<b>WAIANAE</b>				
Nanakuli <sup>6</sup>	1	0.000	1.000	0.000
Luaualei <sup>6</sup>	3	0.300	2.700	0.306
Waianae <sup>6</sup>	3	3.272	-0.272	2.886
Makaha <sup>6</sup>	4	2.228	1.772	2.204
Keaau <sup>6</sup>	4	0.000	4.000	0.000
<b>SUBTOTAL</b>	<b>15</b>	<b>5.800</b>	<b>9.200</b>	<b>5.396</b>
<b>NORTH</b>				
Mokuleia	12	6.030	5.970	2.123
Waialua	40	39.738	0.262	25.971
Kawailoa	39	7.053	31.947	2.003
<b>SUBTOTAL</b>	<b>91</b>	<b>52.821</b>	<b>38.179</b>	<b>30.097</b>
<b>WINDWARD</b>				
Koolauloa	35	18.590	16.410	11.714
Kahana <sup>2</sup>	13	1.101	11.899	0.715
Koolaupoko <sup>2</sup>	43	15.522	27.478	13.760
Waimanalo <sup>2</sup>	8	1.656	6.344	0.911
<b>SUBTOTAL</b>	<b>99</b>	<b>38.869</b>	<b>62.131</b>	<b>27.100</b>
<b>EWA CAPROCK</b>	<b>N/A<sup>3</sup></b>			
<b>GRAND TOTAL<sup>4</sup></b>	<b>465</b>	<b>343.576</b>	<b>121.424</b>	<b>249.072</b>

1 Dike/Basal Permitted Uses as of May 1996. Excludes highly saline to salt water use permits (chlorides > 1,000 mg/l).

2 Permanent instream flow standards may reduce the availability of excess sustainable yield.

Withdrawals affecting streams require amendments to instream flow standards.

3 Estimated sustainable yield is < 21 mgd due to sugar plantation closure.

4 Grand total of Dike/Basal uses excludes caprock, springs and perched alluvial sources.

5 Waipahu-Waiawa & Waialua sustainable yields may be reduced to reflect recharge reduction from sugar plantation closure.

6 Waianae is not a designated water management area, therefore existing uses are shown in lieu of permitted use.

SOURCE: George Yuen and Associates, 1990; DLNR and BWS records.

## 2.5 POTENTIAL AREAS FOR WATER SOURCE DEVELOPMENT WITHIN THE PEARL HARBOR SECTOR

The purpose of the Manana Exploratory Well is to determine if the development of additional potable water sources in the Waipahu-Waiawa WMA is feasible. Currently, permitted water uses from the Waipahu-Waiawa Aquifer do not exceed estimated sustainable yields and there appears to be potential for additional water development within this aquifer system with the closure of the Oahu Sugar Company.

The estimated sustainable yields for the Waimalu Aquifer and the Ewa-Kunia Aquifer are 45 mgd and 20 mgd respectively. These yields are insufficient to meet regional water demands from the developments at Kapolei and Ko'olina on the Ewa plain and from increasing water needs in the Honolulu Sector. Regional water demands from the Ewa Plain and the Honolulu sector thus require water imports from alternate sources.

Further development of the Manana site or other sites as a potable water source will follow testing of water quality and quantity and will require a water use permit. Impacts to the underlying aquifer system and the effects on additional potable water source development caused by the Manana Wells can not be fully assessed until test pumping is conducted and pumping data is gathered and analyzed. This information and any potential impacts to the underlying aquifer will be addressed in an environmental assessment for the installation of permanent production wells and accompanying facilities. This EA evaluates only the direct environmental impacts of exploratory well drilling operations.

## 2.6 EXISTING WATER SOURCES

According to CWRM's 1996 records, the Waipahu-Waiawa WMA contained 45 permitted production well sources. The estimated sustainable yield from the aquifer is 119 mgd and permitted uses totaled approximately 110.4 mgd leaving an approximate 8.6 mgd surplus yield. These figures are currently being reevaluated following the closure of the Oahu Sugar Plantation. The nearest wells to the proposed site within one-half mile are the Pearl City Wells I (#2458-03, 04) and II (2457-01 to 03) and the Pearl City Shaft (# 2458-01), from which BWS is permitted to withdraw a total of 3.82 mgd for municipal use. Figure 2-2, identifies all production wells that draw from the Waipahu-

Waiawa Aquifer within one mile of the project site. BWS is permitted to withdraw a total of 39.301 mgd from Waiawa-Waipahu Aquifer wells.

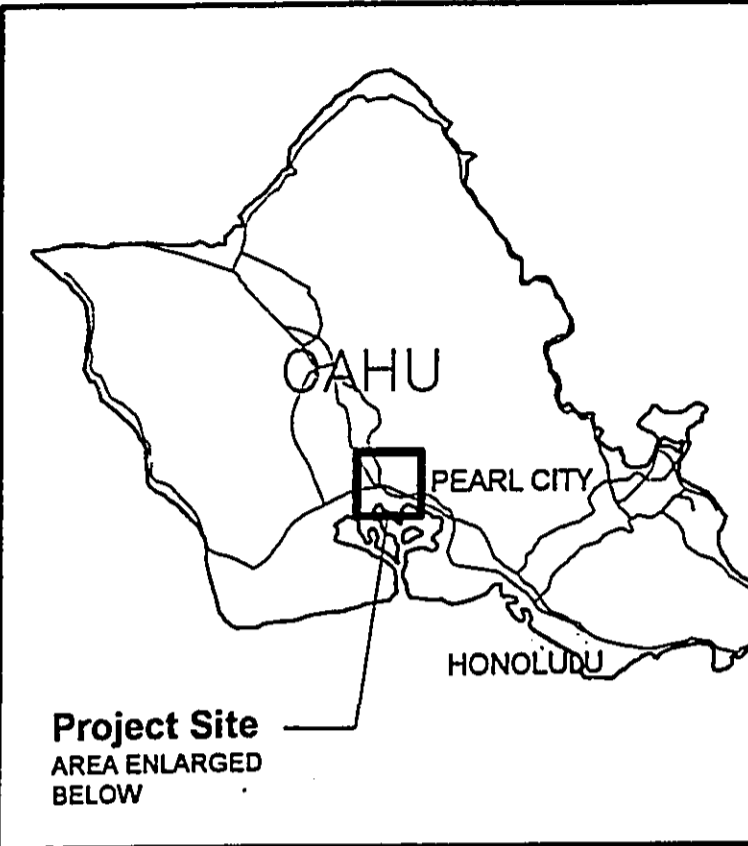
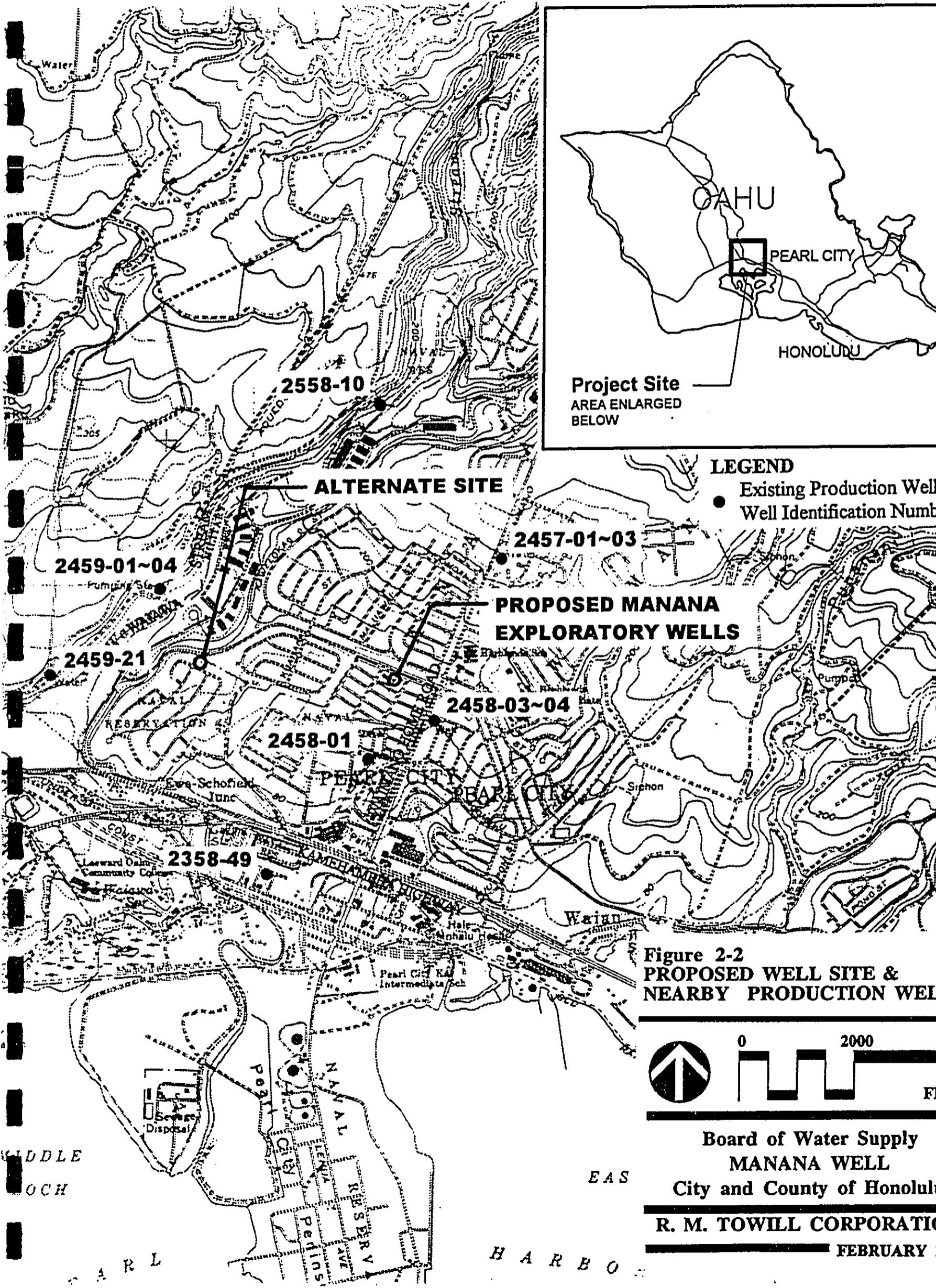
## 2.7 POTENTIAL FOR REALLOCATION OF CWRM PERMITTED USES

Currently, permitted uses for the Pearl Harbor Sector as a whole do not exceed the CWRM's estimate of sustainable yield for the sector. In the Waipahu-Waiawa Aquifer, estimated sustained yield will be reevaluated and may be reduced to reflect the recharge reduction from sugar plantation closure. At present, the sustainable yield is estimated at 119 mgd, of which 110.397 mgd is allocated by CWRM permit from 45 wells. The balance between estimated sustainable yield and permitted use is potentially available to be developed through new wells or allocated to existing wells that are operating below capacity. Additionally, while the sugar plantation closure may result in a reduction in sustainable yield, it also frees up excess groundwater for development and use. Where current permit holders are not using the full measure of water that they have been allocated, CWRM may elect to review permitted uses before allocating water from the estimated surplus.

*Table 2-2, Estimated Sustainable Yield and Permitted Use, Waipahu-Waiawa Aquifer* presents the current list of water use permit holders drawing from the Waipahu-Waiawa Aquifer.



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**LEGEND**  
 ● Existing Production Well  
 ● Well Identification Number

**Figure 2-2  
 PROPOSED WELL SITE &  
 NEARBY PRODUCTION WELLS**



**Board of Water Supply  
 MANANA WELL  
 City and County of Honolulu**

**R. M. TOWILL CORPORATION  
 FEBRUARY 1968**

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Table 2-2  
ESTIMATED SUSTAINABLE YIELD AND PERMITTED USE  
WAIPAHU-WAIAWA AQUIFER

Well User	Well Name	Permitted Use (mgd)
DHHL	Reservation	1.581
BWS	Various	2.437
Kahua Meat Co.	Kahua Meat Co.	0.110
Campbell Estate	EP 3 & 4	3.304
Gary Takiguchi	Honouliuli	0.020
C&C DHCD	EP 2	1.124
Harris Rug	Harris Rug	0.003
Robert Loo	Honouliuli	0.003
Tadahiro Abe	Honouliuli	0.009
Campbell Estate	EP 5 & 6	5.208
Campbell Estate	EP 7 & 8	6.113
Campbell Estate	EP 15 & 16	12.154
Watanabe, A.	Watanabe, A.	1.080
Oahu Sugar Co. (closed)	WP 6A, 6B	1.430
Oahu Sugar Co. (closed)	WP 7A, 7B, 7C	9.000
Oahu Sugar Co. (closed)	WP 1	1.151
Oahu Sugar Co. (closed)	WP 4A, 4B	3.305
Oahu Sugar Co. (closed)	WP 2A, 2B	5.594
Oahu Sugar Co. (closed)	WP 2C, 2D	1.862
BWS	Hoaeae Wells	6.610
BWS	Kunia I Wells	4.357
Nazarene Church	Pearl City	0.003
BWS	Waipahu I	6.000
BWS	Waipahu II	2.100
BWS	Waipahu III	2.657
DHHL	Waipahu III	0.027
C&C DHCD	Kunia III	1.088
H.H. Hamamoto	Royal Oahu	0.600
BWS	Kunia II, 3	1.260
BWS	Pearl City II	2.190
BWS	Pearl City Shaft	1.320
BWS	Pearl City I	0.310
BWS	Waipio Heights	0.630

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Table 2-2  
**ESTIMATED SUSTAINABLE YIELD AND PERMITTED USE**  
**WAIPAHU-WAIAWA AQUIFER**  
 Continued

Well User	Well Name	Permitted Use (mgd)
Yoshimura, D.	Waipahu	0.006
BWS	Waipio Heights I	0.500
BWS	Waipio Heights II	2.000
BWS	Pearl City III	0.500
U.S. Navy	Waiawa Shaft	14.997
Ige Y	Dairy Company	0.100
BWS	Mililani III	1.550
Hawaii Country Club	Hawaii Country Club	0.220
BWS	Waipio Heights III	0.850
Del Monte Corp.	Del Monte Corp.	0.154
BWS	Mililani I	2.980
BWS	Mililani II	1.900
<b>WATER ALLOCATION TOTALS</b>		<b>110.397</b>
<b>WAIPAHU-WAIAWA AQUIFER</b>		<b>Sustainable Yield</b>
<b>ESTIMATED SUSTAINED YIELD</b>		<b>119</b>

Source: Well and Water Use Permit Index, CWRM, May 28, 1997

## Chapter 3 PROJECT DESCRIPTION

### 3.1 PROJECT LOCATION AND SITE CHARACTERISTICS

The proposed project site is located in Pearl City, within a parcel of land proposed to be transferred in ownership from the U.S. Navy to the City and County of Honolulu (TMK: 1-7-24:41). The site is situated makai of a former cane haul road approximately 250 yards east of its intersection with Waimano Home Road. It is surrounded by well-established residential and commercial urban areas that include single-family residences, apartment complexes, and retail and service shops.

The site rests on a flat to gradually sloping plain at an elevation of approximately 140 feet above mean sea level (msl). The exploratory wells will be located on a triangular parcel of approximately 10,000 square feet. Figure 3-1, identifies the site location by tax map key number.

### 3.2 TECHNICAL CHARACTERISTICS

Both of the Manana Exploratory Wells will have the same technical characteristics. The wells are proposed to be single bores drilled approximately 270 feet deep to about 130 feet below mean sea level (msl) where they will extract potable water from the underlying basalt. The upper 170 feet of each bore will be cased with 14-inch outer-diameter steel casing. The lower 100 feet will be uncased. Well intake will begin at approximately 30 feet below msl and continue to draw from the full length of the uncased bore to its termination point (Figure 3-2). If the exploratory wells are converted to production status, they are expected to yield a combined total in excess of 1.5 mgd.

If a line shaft pump is used, the diesel engine will be surrounded with a mute to reduce noise levels. Alternatively, a subsurface pump might be used. If the wells are converted to permanent production, the installed pumps and power source will be similarly engineered to reduce pump noise to levels below the regulatory limit.

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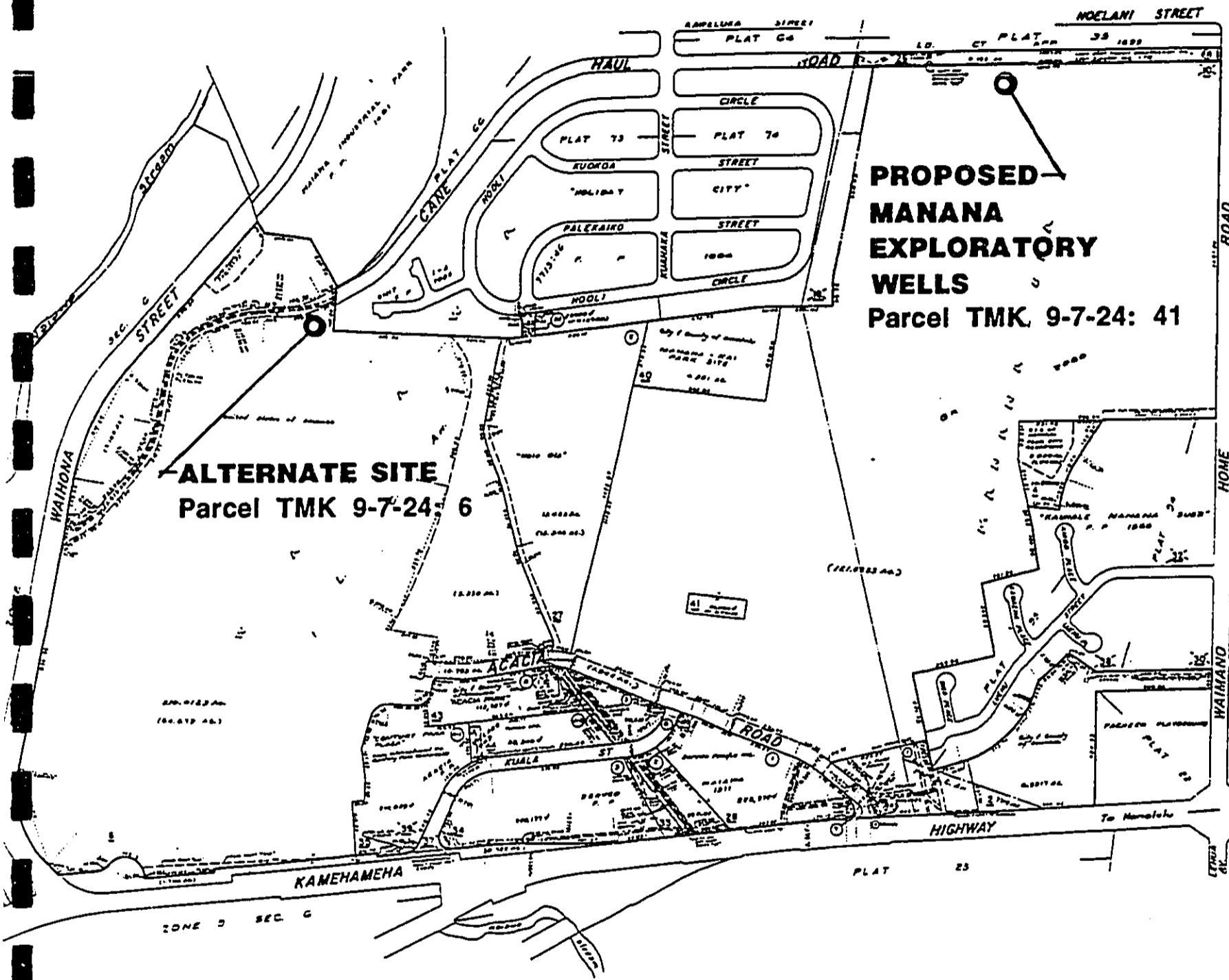
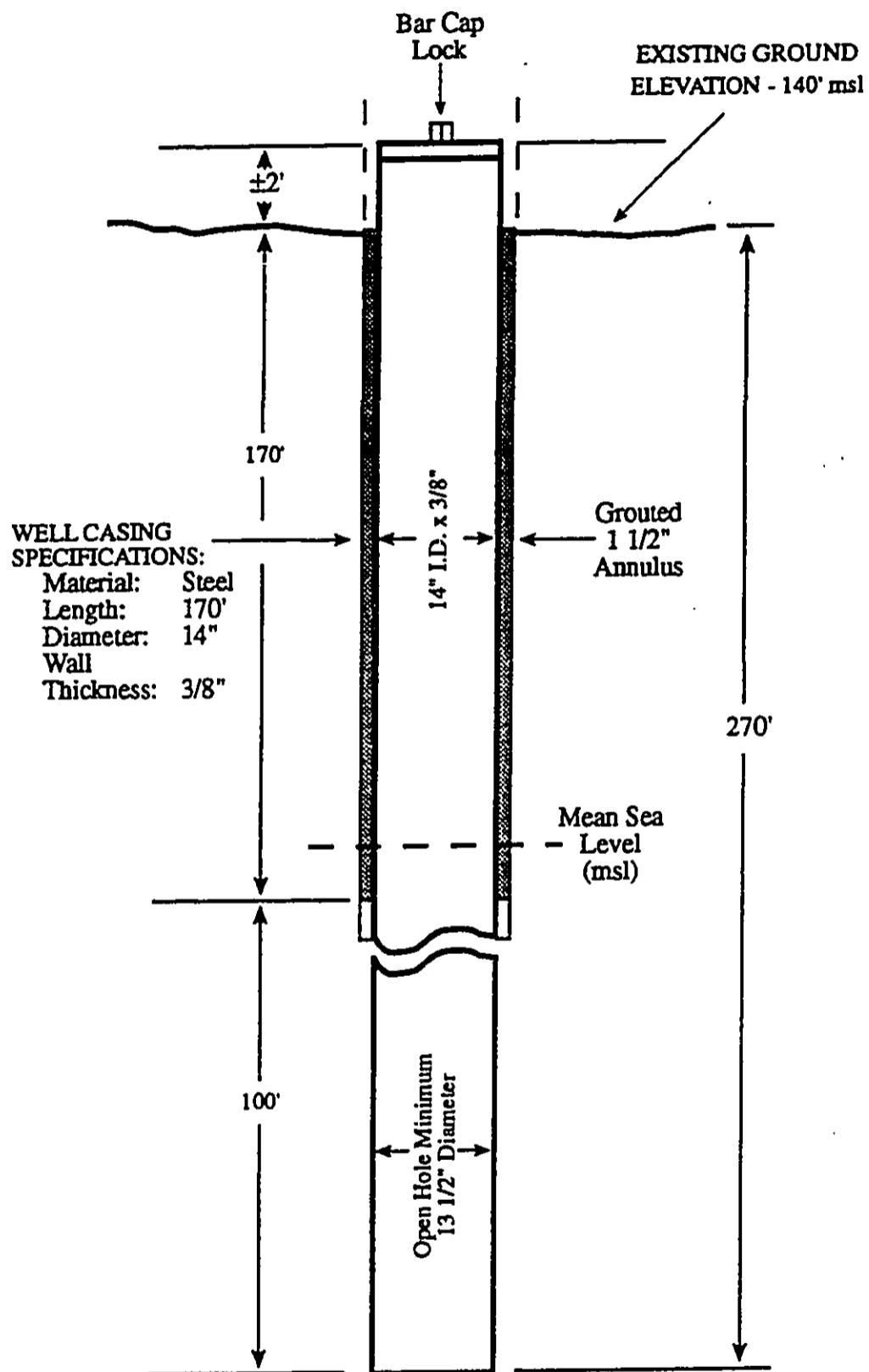


Figure 3-1  
PROJECT SITE AND  
TAX MAP KEY LOCATION



NOT TO SCALE

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MANANA WELL  
City and County of Honolulu  
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FEBRUARY 1998



**Figure 3-2  
 TYPICAL WELL CROSS-SECTION**

Board of Water Supply  
 MANANA WELL  
 City and County of Honolulu

**R. M. TOWILL CORPORATION**

**FEBRUARY 1998**

### 3.3 CONSTRUCTION AND EXPLORATORY WELL TESTING

The exploratory well site will be cleared to provide room for drilling operations and storage of all necessary materials and equipment. All excavated material from clearing and drilling will be stored on site during the exploratory phase of well development. Following drilling, each well will be cased and temporary pipelines and electric pump or internal combustion engine will be installed.

Drainage due to flushing and testing the exploratory wells will be conveyed via a flexible discharge hose to the county storm drain along Waimano Home Road. BWS is permitted by the City and County of Honolulu, Department of Public Works to dispose of potable groundwater discharge from well pumps into the City and County storm sewer system. The permit is issued pursuant to Section 14-12.22, Revised Ordinances of Honolulu, 1990, as amended.

Additionally, an NPDES permit is required from the State Department of Health for the discharge of foam, mud slurry and effluent associated with well drilling activities into waters of the State through the municipal separate storm sewer system. The NPDES permit requirement might be avoided if BWS disposes of well effluent by other means, such as the use of sprinklers for irrigation or dust control. An NPDES permit is not anticipated for disposal of test water of potable quality.

A yield draw down test will be conducted after each of the exploratory wells is drilled. A submersible pump may be used for testing purposes. Power for the pump will be through temporary electrical feed lines from the utility poles located along the cane haul road or supplied with a large trailer mounted portable generator. The yield draw down test will be performed on each well at a rate of 500 to 1000 gallons per minute (gpm). Following the yield draw down test, a long-term constant rate pumping test will be conducted for a minimum period of five days at the rate determined from the yield draw down test. Water table draw down will be measured and the quality of the water will be tested.

If the quantity and quality of the water prove to be satisfactory, the exploratory wells will be temporarily capped to prevent contamination of the water supply. An allocation from CWRM for permitted use will be requested for the well station and an amendment to the Development Plan

Public Facilities Map will be completed showing the facility to be a "site determined, water well programmed for construction within 6 years." The wells will then be converted to production status and the water will be discharged into the BWS 42-inch main along the cane haul road. The general site plan for the Manana Wells is displayed in Figure 3-3.

If test results prove to be unsatisfactory, the drill holes will be permanently capped and sealed or considered for use as monitoring wells. When the yield draw down and long-term constant rate pumping tests are completed, the temporary pumps, pipelines, and electrical lines 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.

#### **3.4 PROJECT SCHEDULE, COST, AND WORK FORCE**

The construction and testing phase is expected to begin in January 1998. Set-up, drilling, testing, and demobilization is expected to take between six to twelve months to complete. The capital cost for the entire project is estimated at ±\$300,000. It is anticipated that project financing will be through a BWS capital budget request which will be subject to review and approval by the Honolulu City Council. Administration of project funds will be through BWS.

Approximately four months will be required to complete the drilling of one well. Installation of the casing and grouting will require approximately one week per bore and another two to three weeks will be needed to install the pumps and conduct the testing on each well in turn. An additional two to four weeks should be reserved for demobilization of the site.



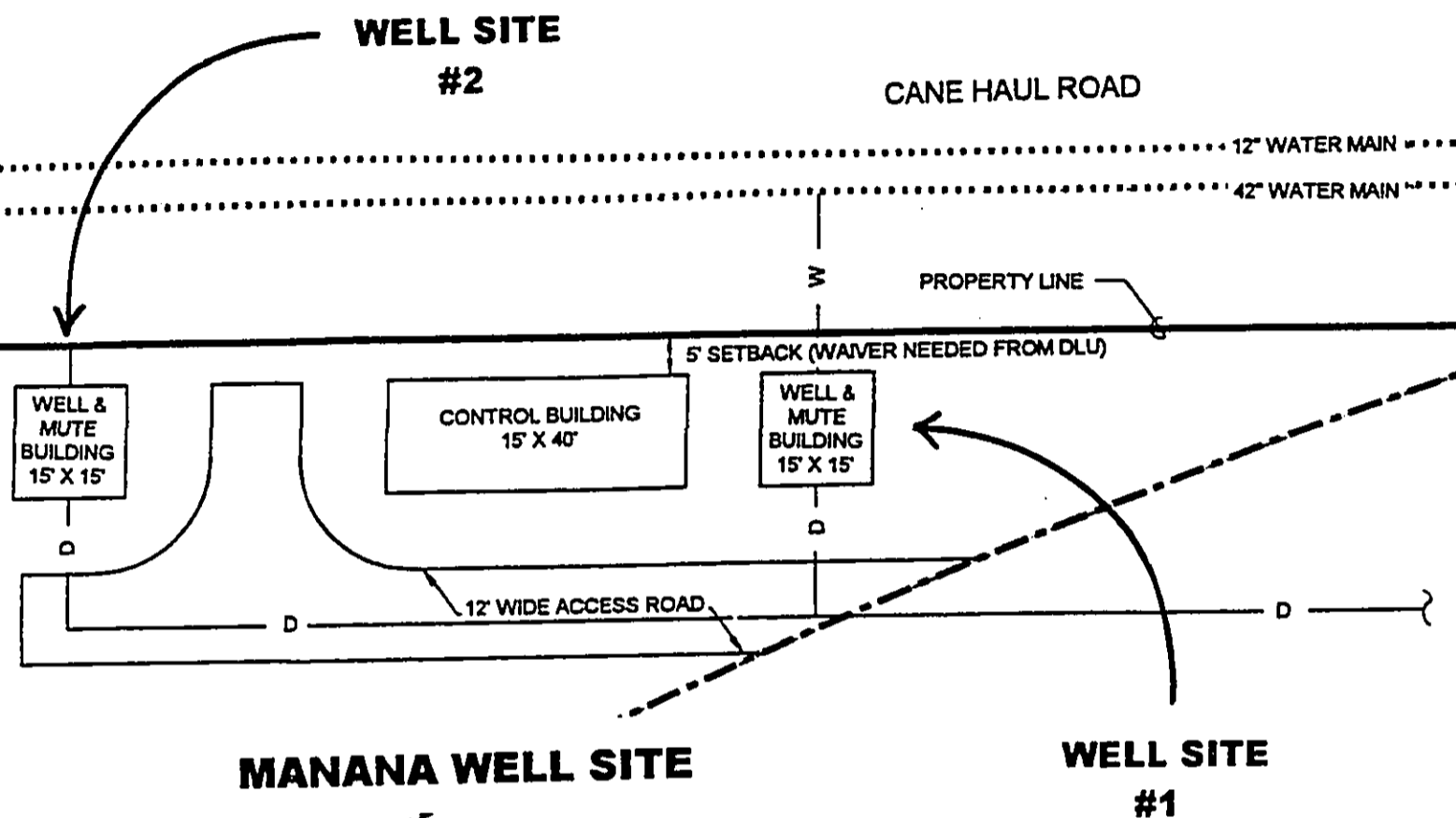


Figure 3-3  
PROJECT SITE PLAN



NOT TO SCALE

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MANANA WELL  
City and County of Honolulu  
R. M. TOWILL CORPORATION  
FEBRUARY 1998

## Chapter 4

### ENVIRONMENTAL SETTING, POTENTIAL IMPACTS, AND MITIGATION

#### 4.1 LAND USE AND OWNERSHIP

##### 4.1.1 Existing Environment

The proposed exploratory well site will require approximately 10,000 square feet at the mauka boundary of a 121-acre parcel identified by TMK: 9-7-24:41. The parcel is currently zoned F-1 and owned by the U.S. Navy, however, under a Memorandum of Understanding (MOU) dated August 9, 1993 between the City and County of Honolulu (the City) and the Navy, the City is obtaining the parcel in fee through a phased acquisition period that began in June, 1996. According to the Department of Public Works, Land Division, the Navy has already turned the deed over to the City, however the transfer has not yet been recorded with the Bureau of Conveyances (Andy Herada, City and County of Honolulu, Public Works, Land Survey and Acquisition Division, personal communication, 10/22/97).

The parcel comprises the main portion of the City's proposed Manana/Pearl City Junction Master Planned Development. At present, the land is developed with 38 military warehouses and 10 open storage areas. Over the past ten years, their use has been largely discontinued, however some of warehouses continue to be used by the Navy and others are being leased to the City under short-term agreement. Many of the warehouses are in a state of disrepair and are unfit for use.

The proposed well site is bordered on the north by a cane haul road and, at present, is surrounded on the south, west, and east by military warehousing. Across the cane haul road, approximately 80 feet north of the well site, is a single-family residential community. Under the City's proposed master plan, the well site, if converted to permanent production status, will eventually be contained on the southeast and southwest by thoroughfares providing access to facilities within the Manana / Pearl City Junction Development.

Surrounding land uses adjacent to the project site are Residential (R-5) to the north and west, Low-Density Apartment (A-1) to the east and west, and Military / Federal (F-1) to the south (PKF Hawaii & PBR Hawaii, September 1995).

#### **4.1.2 Project Impacts**

Installation of the Manana exploratory wells will not change any of the surrounding land uses or 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 well site is situated just inland of the Pearl City Peninsula on the Pearl Harbor Plain at about 140 feet above mean sea level. The topography is characterized by gradual slopes of up to 7 percent. The land surrounding the site has been extensively modified by grading and no significant geological or topographical features exist in the immediate area.

Temperatures in the area range on average from 60 to 90 degrees Fahrenheit throughout the year. Annual average rainfall is less than 30 inches. Monthly rainfall measured at the nearest rain gage station (in Waipahu) ranges between 2 to 5 inches. (University of Hawaii, 1983).

#### **4.2.2 Project Impacts**

Construction of the Manana Exploratory Wells will not have any impact 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

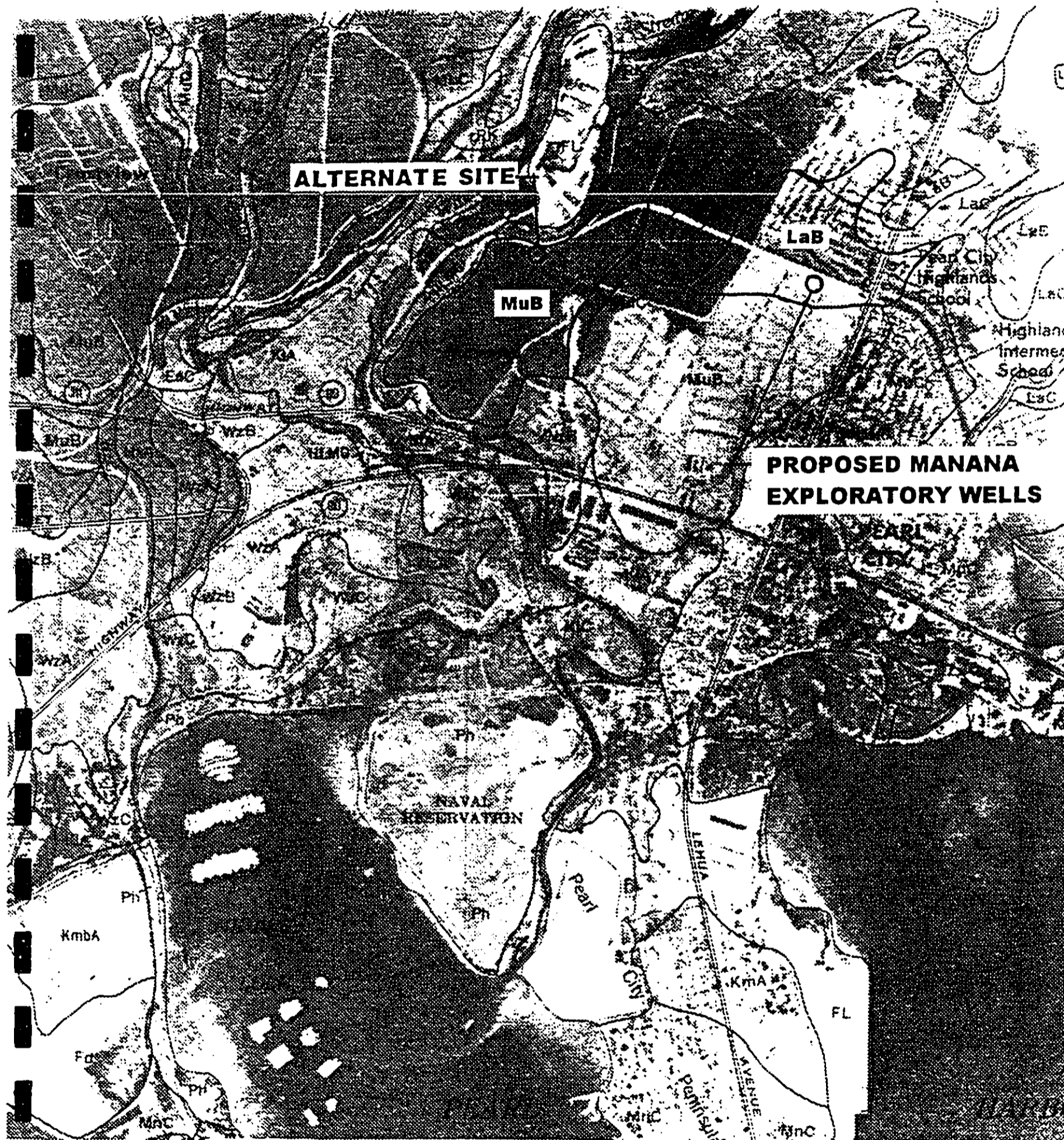
### 4.3.1 Geology

The Pearl Harbor Coastal Plain was primarily developed from alluvium deposited on the highly permeable Koolau basalt formations, and on the coral reefs that formed when sea level was higher than the present level. The project site is located on the leeward flank of the Koolau volcanic shield. The soil at the surface of the proposed site is classified by the U.S. Soil Conservation Service as Lahaina silty clay (LaB), 3 to 7 percent slope. This soil type is generally located within upland areas with slight slope. Cobblestones are common on the surface in a few places and the profile can contain fragments of coral, stones, gravel, or sand. These soils are medium acid in the surface layer and slightly acid to medium acid in the subsoil. Permeability is moderate, runoff is slow, and the erosion hazard is slight. The available water capacity is about 1.3 inches per foot in the surface layer and about 1.4 inches per foot in the subsoil. **Figure 4-1**, identifies the U.S. Department of Agriculture, Soil Conservation Service soil typology for the proposed project site. (U.S. Department of Agriculture, 1972).

### 4.3.2 Groundwater Hydrology

The proposed Manana Exploratory Wells are located in the thick basal aquifer that is confined between Waiawa Valley and Waimalu Valley. The basal aquifer is a lens-shaped body floating upon salt water. The basal lens is hydrologically confined along the coast by coastal plain deposits. Due to the relative impermeability of the coastal caprock, which retards outflow to the sea, the head of the basal lens is approximately 17 feet above sea level at the site. Based on the density ratio between fresh water to salt water, for every foot that the fresh water lens extends above sea level, the lens theoretically extends forty feet below sea level to the midpoint where salinity is half sea water. The basal lens of the Waipahu-Waiawa aquifer, thus, theoretically extends approximately 680 feet below sea level before reaching the transitional zone. (BWS, 1997).

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**LEGEND**

- LaB Lahaina Silty Clay, 3-7% Slopes
- MuB Molokai Silty Clay, 3-7% Slopes

  
**NOT TO SCALE**

**Figure 4-1  
SOILS MAP**

Board of Water Supply  
**MANANA WELL**  
 City and County of Honolulu  
**R. M. TOWILL CORPORATION**  
**FEBRUARY 1998**

Source: U.S. Dept. of Agriculture, Soil Conservation Service, & University of Hawaii. August, 1972.

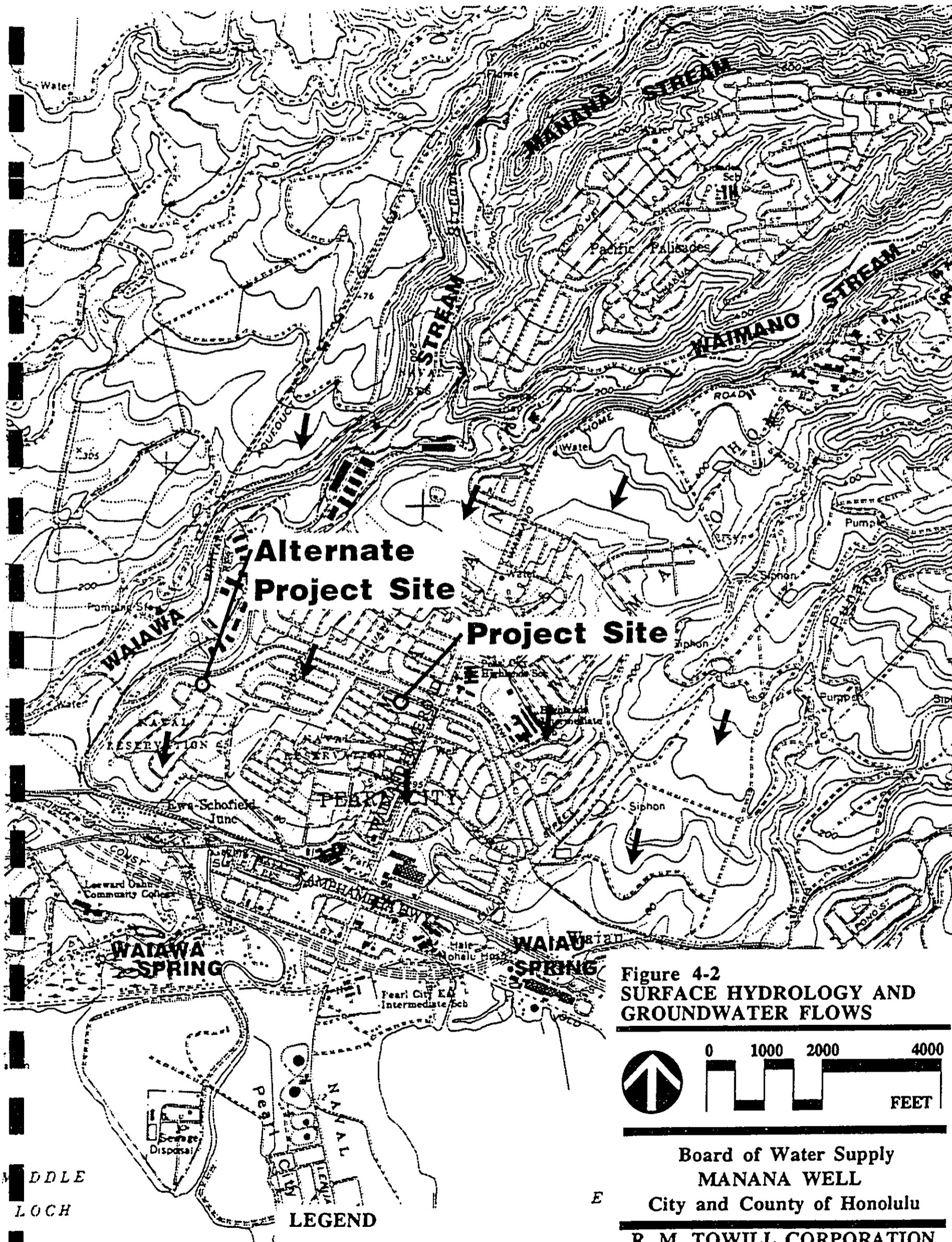
#### 4.3.3 Surface Water Hydrology

No sources of surface water exist on or adjacent to the proposed well site. The closest surface source, the Waiawa Stream, flows by approximately three-quarters of a mile to the north-west. This stream is the confluence of waters from Waimano, Manana, and Waiawa Valleys. At higher elevations within the Koolau Mountains, Waiawa Stream is a perennial water flow, tracing a path over exposed permeable basalt surfaces. At lower elevations, the stream becomes intermittent, flowing over a bed of alluvium that greatly reduces the amount of recharge to the Pearl Harbor Aquifer (Lau, 1987). According to USGS records, the mean daily flow in this stream for calendar year 1990 was 27 mgd (BWS, 1997).

In the Pearl Harbor area, basal ground water outflows as springs. The springs closest to the project site include Waiawa Springs and Waiau Springs. Waiawa Springs is situated on the north shore of Pearl Harbor's Middle Loch, approximately 1½ miles south-west of the project site. Waiau Spring is located on the north shore of Pearl Harbor's East Loch, approximately 1½ miles south-east of the project site. These springs are among several Pearl Harbor springs fed by overflow from the basal aquifer in the underlying basaltic rock layer. These springs act as spillways for the underground reservoir, issuing from this section in the caprock. Discharge from the springs is directly related to the height of the basal head and may vary with changes in the static level of adjacent wells. General hydrologic characteristics of the project area are displayed in **Figure 4-2**. (Wentworth, 1951; Stearns & Vaksvik, 1935).

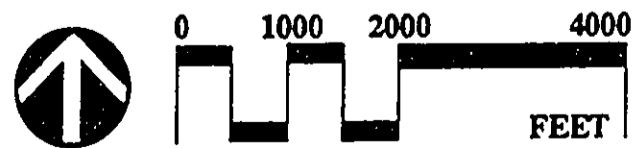
#### 4.3.4 Watershed and Aquifer Recharge

Waipahu-Waiawa Aquifer recharge depends on rainfall in the Koolau Mountains which seeps through permeable rock, natural faults, cooling joints and fissures in the basaltic layers to the underlying water table. Fed by rainfall and springs issuing from basalt dikes in the mountains, the major streams in the region, including Waikakalaua, Kipapa, Waiawa, Manana, and Waimalu, also transmit substantial amounts of water to Pearl Harbor, much of which percolates into the underground reservoir prior to reaching the areas of impermeable alluvium deposits.



**Alternate Project Site**  
**Project Site**

**Figure 4-2  
 SURFACE HYDROLOGY AND  
 GROUNDWATER FLOWS**



**Board of Water Supply  
 MANANA WELL  
 City and County of Honolulu  
 R. M. TOWILL CORPORATION  
 FEBRUARY 1998**

**LEGEND**  
 ↓ Ground Water Flow  
 (Adapted from L. S. Lau, 1987)

MIDDLE  
 LOCH

A R L

Water recharge in the past also resulted from agricultural irrigation infiltrating through the soil, however, with the cessation of sugar production, agricultural recharge is sharply reduced. Such surficial water, including that provided by direct rainfall on the plain, does not immediately transmit downward into the aquifer, and may take considerable time to reach the basal level. Surficial water, in general, does not contribute a substantial amount of water to the aquifer. Much of the water absorbed into the soil is held immediately below the surface or lost to evaporation and transpiration. Some of this water may also seep out as stream runoff into the sea. (BWS, 1995; Wentworth, 1951).

The proposed project site is located upon silty clay soil with moderate permeability above Koolau basalt containing the basal water. Within this area, surficial water transmission to the underlying aquifer does not contribute significantly to aquifer recharge.

#### 4.3.5 Project Impacts

No adverse impacts to the geological formations underlying the drilling site or to the soils at the surface of the site are expected from the exploratory well drilling operations. Impacts to the ground water flows are expected to be insignificant.

Waiawa Stream, in the vicinity of the project site, is perched over low-permeability alluvium at an elevation of approximately 50 feet above msl. The layers of alluvium serve to isolate the surface water of Waiawa Stream from the basal groundwater found at much lower depths. The Manana Wells are proposed to be cased to 170 feet, about 30 feet below msl within the Koolau basalt, with the uncased intake extending another 100 feet to approximately 130 feet below msl. The water withdrawn from pumping of the exploratory wells is not expected to affect excess flow into Waiawa Stream because of the distance between the stream and the project site. Additionally, the intake depth of the wells is approximately 80 feet deeper than the level of the stream's invert, and is separated by intervening layers of alluvium.

Although Waiau and Waiawa Springs are fed from basal water overflow at this section in the caprock, pumping from the Manana Exploratory Wells is not expected to adversely impact water flows to the springs. In the case of Waiau Springs, a net gain in springflow has recently been realized which will offset any potential springflow reduction caused by groundwater withdrawals at Manana. Waiau



Spring is fed by Hawaii Electric Company's (HECO) water tunnel as well as several artesian wells. Two of the artesian wells feeding the spring (Well # GS-11 and GS-12), were grouted down to 50 feet below msl in order to prevent surface influence into the newly converted BWS-HECO Waiiau Potable Wells project. Both of these wells flow by artesian head into sumps and are pumped into the public potable water system. Production from these wells was initially estimated to yield between 3 and 5 mgd, however the grouting reduced the wells' productive capacity to 2 to 3 mgd by blocking water flow into the well from the top 50 feet. This loss of water into the well system means a gain in water flow to the spring. (BWS, 1997).

Additionally, springflow to both Waiiau and Waiawa Springs will be maintained indirectly by setting and monitoring sustainable yield for the Waipahu-Waiawa and Waimalu Aquifers. Sustainable yield is related to a set equilibrium head level in the basal aquifer that must be maintained to ensure the viability of existing water production. If an amount of water in excess of the sustainable yield is withdrawn from the aquifer, the freshwater lens will shrink and allow salt water to intrude into the aquifer in its place. If water withdrawal does not exceed sustainable yield, then the equilibrium head level will not decrease. (BWS, 1997).

Although sustainable yield is set to address groundwater pumping, not springflow, by setting and maintaining water withdrawal within sustainable yield levels, springflow will also be maintained above a certain level. Because future pumpage at the Manana site will remain within the sustainable yield set for the aquifer and will not exceed historical extraction levels, the springs will not be adversely affected. This relationship applies as long as water extraction does not occur immediately adjacent to the spring. Located approximately 1½ miles away, the Manana Exploratory Wells are sufficiently distant from the spring to avoid causing an adverse impact. (BWS, 1997).

No adverse impacts to any wetland areas are expected because of the great distance separating the exploratory well site from wetland areas.

#### **4.3.6 Mitigation Measures**

Pursuant to Section 14-12.22 Revised Ordinances of Honolulu 1990, as amended, BWS is permitted by the County Department of Public Works to discharge effluent and test water from pumping

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operations into the City and County storm sewer system. Additionally, a National Pollutant Discharge Elimination System Permit (NPDES Permit) is required from the State Department of Health for effluent, foam, and mud slurry discharged from well drilling activities. Water pumped from the Manana Exploratory Wells during the test pumping stage is expected to be of potable quality, therefore, an NPDES Permit is not anticipated for water testing; however, safe practices will be employed in the disposal of all test water. Pumped water will be tested, flow rates will be regulated, and the flow path, including all necessary piping, will be routed and monitored to prevent contamination of the test water entering the county system. Additionally, the use of a temporary pipeline to transmit test water will eliminate impacts caused by flushed debris.

If the test pumping results indicate that the quality or quantity of the water from the exploratory wells is unsatisfactory, the wells will be sealed to prevent contamination of the underlying groundwater aquifers. The drill holes may also be considered for use as monitor wells.

No special monitoring of Waiawa, Manana, or Waimano Streams is required because exploratory well operations are not expected to affect stream flows. Both streams are more than 3000 feet away from the exploratory wells and are separated by intervening layers of low-permeability alluvium. These conditions prevent the streams from being affected by groundwater draw down from the Manana Well Station. Normal stream flow monitoring, including routine readings from Waiawa gaging station, are maintained by USGS.

## **4.4 NATURAL HAZARDS**

### **4.4.1 Flood Zones**

The Federal Emergency Management Agency Flood Insurance Rate Map (FIRM) of March 4, 1987, identifies the project site as lying within "Zone D", an area of undetermined, but possible flood hazard (Figure 4-3) This designation indicates the site is not likely to be subject to floods which would impact the project (National Flood Insurance Program, 1987).

### **4.4.2 Seismic Activity**

The Uniform Building Code (UBC) provides minimum design criteria to address potential for damages due to seismic disturbances. The UBC scale is rated from Seismic Zone 1 through Zone 4, with 1 the lowest level for potential seismic induced ground movement. Oahu has been designated within Seismic Zone 1. BWS, in the interest of public health and safety has adopted UBC Seismic Zone 3 standards for all its structures. All structures proposed for this project, therefore, will be built according to standards for UBC Seismic Zone 3.

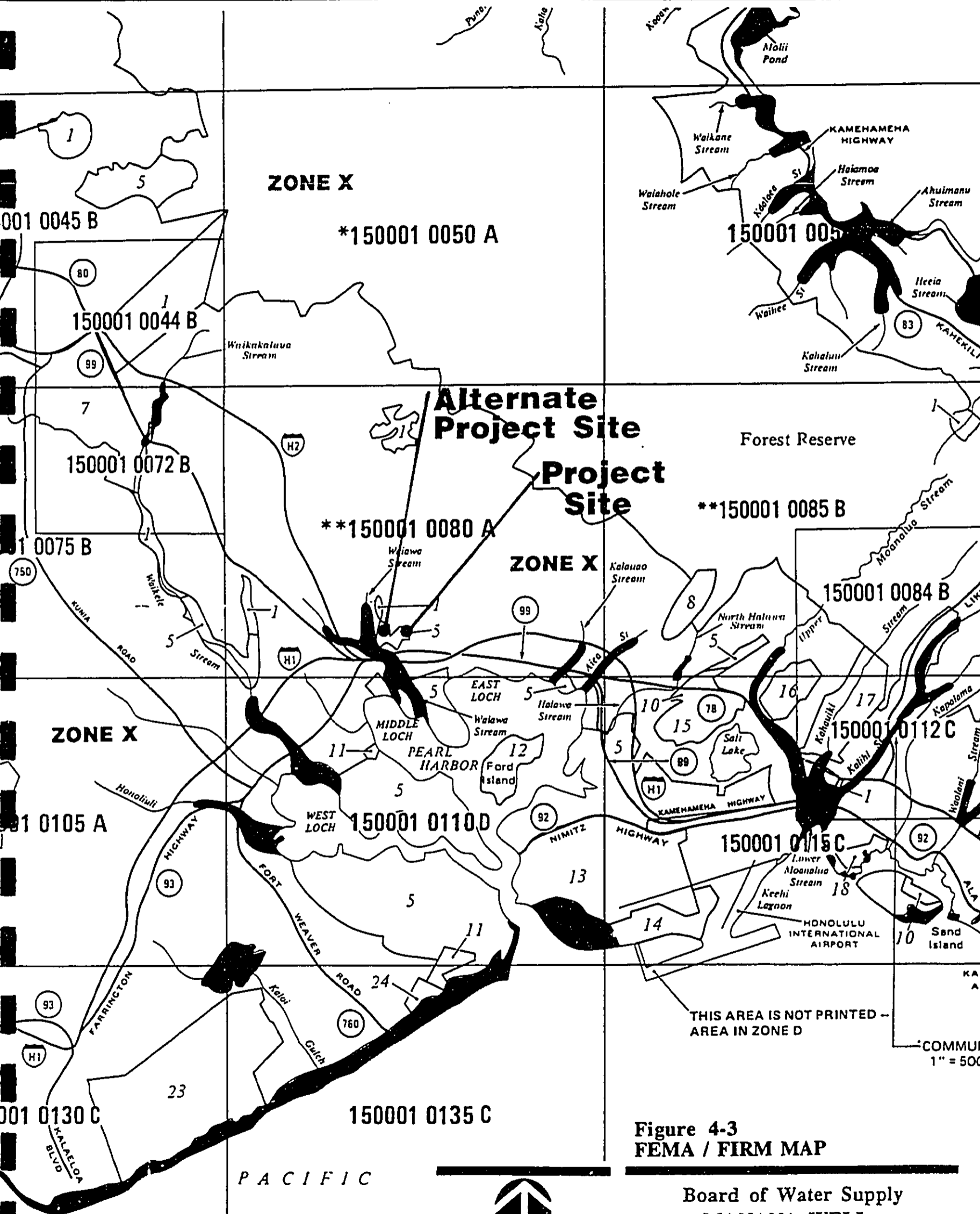
### **4.4.3 Project Impacts**

Flooding is not anticipated to affect the proposed project. Because seismic risk at the project site is minimal the proposed project is not expected to be affected by seismic activity.

### **4.4.4 Mitigation Measures**

All construction for this project will be in accordance with standards for Seismic Zone 3 to meet health and public safety requirements. No other mitigation measures are required or recommended.

0000 00 10 1454



THIS AREA IS NOT PRINTED - AREA IN ZONE D

\*COMMUNAL 1" = 500'

Figure 4-3  
FEMA / FIRM MAP

Board of Water Supply  
MANANA WELL  
City and County of Honolulu  
R. M. TOWILL CORPORATION  
FEBRUARY 1998

LEGEND

■ FLOOD PRONE AREAS

↑  
NOT TO SCALE

SOURCE: FIRM Flood Insurance Rate Map, City and County of Honolulu, Hawaii, Sept. 1990.

## 4.5 DEMOGRAPHICS

### 4.5.1 Population, Housing, and Employment

The Manana Exploratory Wells site is located in Census Tract 80.03, which lies within the Pearl City Neighborhood Statistics Program Area and is part of the Census Bureau's Ewa Division Statistic. According to the U.S. Census, the Ewa Division population grew 12.4% between 1990 and 1994, increasing from 230,189 to 258,700 residents. By the year 2010, the Ewa Division population is expected to grow an additional 6% to approximately 273,900 persons.

According to the 1990 Census, the Pearl City Neighborhood Statistics Program Area contained 13,540 households with an average household size of 3.44 (Figure 4-4). Developable land in the area is not in demand for additional housing, rather, additional shopping, medical, and other service facilities and more employment opportunities proximate to existing housing are in demand. Demands for new housing will primarily be met by development in Ewa and Central Oahu. (PKF Hawaii & PBR Hawaii, 1996).

Employment in this area includes commercial retail services at Pearl Highlands Center and Pearl City Shopping Center, retail and commercial activities along Kamehameha Highway and in the Waihona Industrial Center, services and skilled labor at Pearl Harbor and the Hawaiian Electric Company's Waiiau Station, and teaching, service and administrative jobs in area schools and Hale Mohalu Senior Apartments.

### 4.5.2 Project Impacts

The proposed Manana Exploratory Wells project will involve a small amount of construction work. However, this work will be temporary and will most likely be conducted by workers from outside of the area. Existing and future population, housing, and employment in the project vicinity will not be affected by this project. If an additional water source is developed from the Manana Wells site, it might be utilized for the City's proposed Manana/Pearl City Junction Development, a community service and retail center that would provide additional employment and service opportunities for area residents.

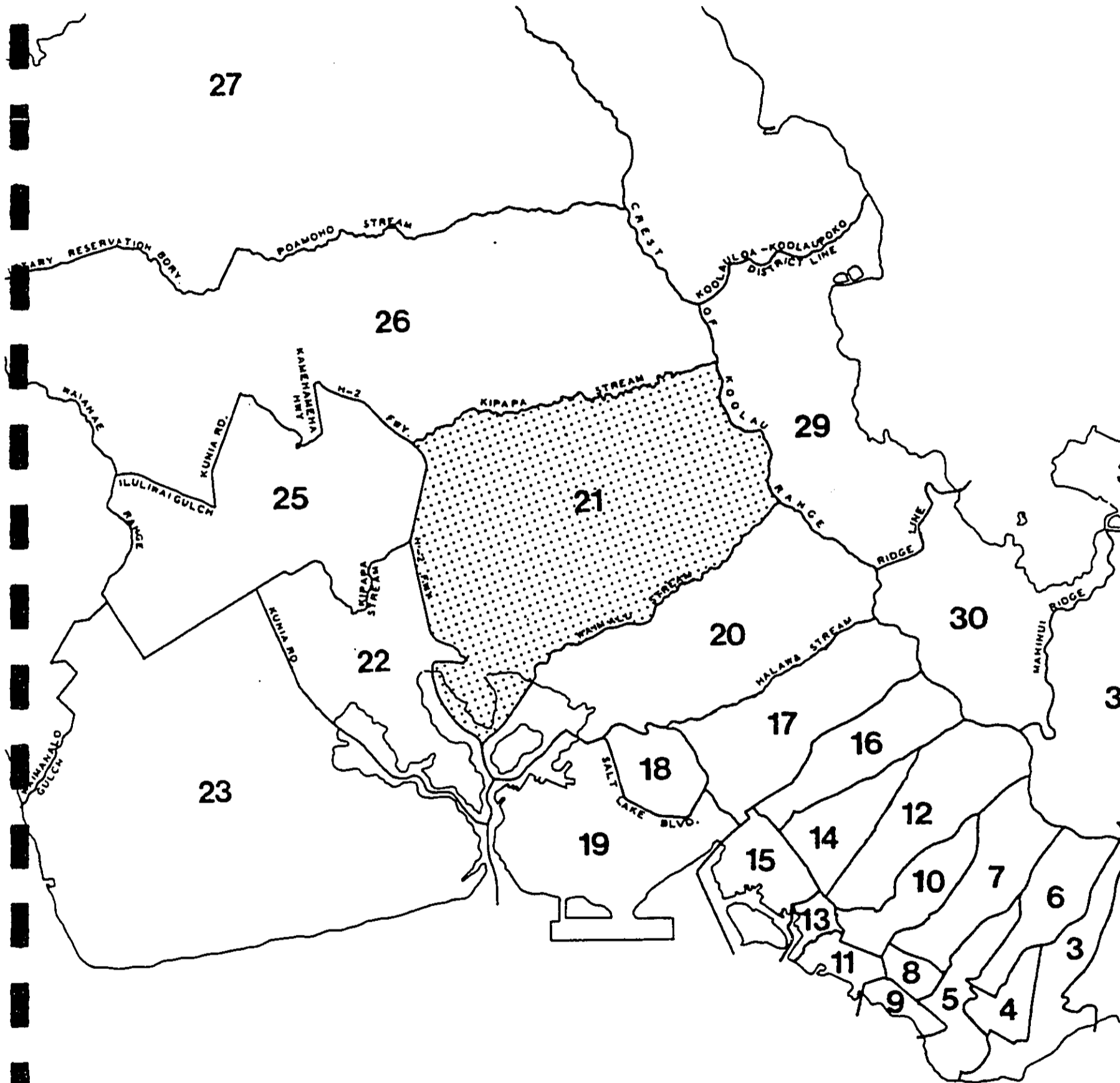


Figure 4-4  
 NEIGHBORHOOD BOARD  
 AREA NUMBER 21  
 PEARL CITY

  
 NOT TO SCALE

Board of Water Supply  
 MANANA WELL  
 City and County of Honolulu  
 R. M. TOWILL CORPORATION  
 FEBRUARY 1998

SOURCE: Hawaii State Databook. Neighborhood Statistics Program Areas.

#### **4.5.3 Mitigation Measures**

No measures to mitigate potential for demographic impacts are required or recommended.

### **4.6 ROADWAYS AND TRAFFIC**

#### **4.6.1 Site Access**

Major thoroughfares in the project vicinity include Waimano Home Road and Moanalua Road, both of which are four-lane City and County of Honolulu roadways, and Kamehameha Highway, a six-lane State highway. Additionally, a cane haul road runs along the north side of the project site.

At present, the project site is accessed through the grounds of the Manana Navy warehouse area, which can be entered via Hoomalu Street off of Waimano Home Road, or from the intersection of Acacia Road and Kuala Street off of Kamehameha Highway. In addition to these entrances, a chained and locked gate at the end of Moanalua Road offers possible access to the grounds at a location much closer to the proposed project site. A cane haul road, which runs along the north boundary of the project area, is presently separated from the site by a continuous chain-link fence that provides no points of access. Additionally, a house occupies the end of the cane haul road near the intersection with Waimano Home Road, thus further restricting access from this way.

Under the City's proposed Manana/Pearl City Junction Development plan, Moanalua Road would be extended across Waimano Home Road and into the subject property to provide a "spine road" traversing through the central core of the development. This road extension would form the southeastern border of the proposed Manana Wells site and provide convenient access in the future if the Manana exploratory wells are converted to permanent production.

#### **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 Waimano Home Road, Moanalua Road, Kamehameha Highway, or Acacia Road are expected with this project.

#### **4.6.3 Mitigation Measures**

To minimize traffic impacts to the nearby residents, the contractor will schedule heavy truck activity between the hours of 8:30 am and 2:30 pm on weekdays and will suspend activity on weekends and State holidays. The contractor will also schedule heavy truck traffic to avoid using Waimano Home Road and Kamehameha Highway as much as possible during the morning and afternoon peak periods.

### **4.7 VISUAL AND RECREATIONAL RESOURCES**

#### **4.7.1 Visual and Recreational Resources**

Existing views of the surrounding area are dominated by built features, mainly the light-colored mass of warehouse structures and surrounding chain-link fence which can be seen from the street. Most of the warehousing is in visible disrepair. There is no landscaping to speak of, and the warehouse grounds are overgrown with a variety of introduced weed, shrub, and grass species. As such, no specific or predominate natural features are visually associated with the subject property. However, the topography and existing elevation provide some opportunities for views toward Pearl Harbor. (PKF Hawaii & PBR Hawaii, 1996).

The closest public recreational areas to the project site are the Manana Kai Park and the Pearl City Recreational Center. The Manana Kai Park is located just south of the Ho'oli Circle cul-de-sac (a.k.a. "Holiday City") about one-quarter mile southwest of the proposed well site. About one-quarter mile to the east of the proposed well site is the Pearl City Recreational Center.

#### **4.7.2 Project Impacts**

No impacts to the visual resources will result from the construction or operation of the Manana Exploratory Wells. Since the project site is separated from both the Manana Kai Park and the Pearl City Recreational Center by distances of one-quarter mile, recreational activities at these locations will not be affected by the project in any way.



#### **4.7.3 Mitigation Measures**

No further mitigation measures are required or recommended for the exploratory wells project. If the wells are brought into permanent production, the exterior design of the well site may be guided by the City to ensure appropriate theme, materials, color, and landscaping.

### **4.8 CULTURAL RESOURCES**

#### **4.8.1 Cultural Resources**

An archaeological assessment of the project site and surrounding area was completed for the City and County of Honolulu, Department of Housing and Community Development, *Manana and Pearl City Junction Development, Environmental Impact Statement* (PKF Hawaii & PBR Hawaii, 1996), by Scientific Consultant Services, Inc. The purpose of the assessment was to evaluate the potential for significant archaeological sites in the proposed project area. The study was completed in July 1995.

The archaeological assessment included a thorough search of historic records, a review of previous archaeological studies, and a field visit. The study concluded that due to extensive grading and other modifications to the land surface, no significant archaeological or cultural sites are known or expected to exist on the project site. (McGerty and Spear, 1995).

#### **4.8.2 Project Impacts**

Based on the findings of the 1995 study, and on the extensively modified condition of the project area, it is determined that additional development of this site will not adversely impact any potential archaeological resources.

#### **4.8.3 Mitigation Measures**

There is always the possibility that previously unknown or unexpected subsurface cultural features, deposits, or burials may be encountered. To ensure that no subsurface cultural features will be destroyed during project construction, any site work within the project area will be monitored. In the unlikely event that archaeologically significant remains are encountered, work should cease in the immediate area and the DLNR, Historic Preservation Division notified at (808) 587-0047 to determine significance and treatment of any findings.

Cultural assessment consultations will also be handled through the Draft EA review process, with a copy of the Draft EA provided to the State Department of Hawaiian Home Lands and Office of Hawaiian Affairs. Archaeological and cultural resource related comments and concerns will be addressed in the Final EA.

#### 4.9 BIOLOGICAL RESOURCES

A botanical resources study and faunal survey report were also prepared as part of the *Manana and Pearl City Junction Development, Environmental Impact Statement* (PKF, 1996). The botanical study was completed by Winona Char and Associates, and the faunal study was completed by Phillip L. Bruner. Both studies were completed in December 1995.

##### 4.9.1 Botanical Resources

The *Botanical Resources Assessment Study*, provides the following assessment of the proposed BWS project site.

Due to the extensive land modifications from previous grading and construction, the original flora at the project site and surrounding area has been almost entirely replaced by introduced weed species and grass cover. The grassy areas in and around the project site include pitted beardgrass (*Bothriochloa pertusa*), Bermuda grass (*Cynodon dactylon*), and Guinea grass (*Panicum maximum*). Weedy areas consist of plants such as coat-buttons (*Tridax procumbens*), hairy spurge (*Chamaesyce hirta*), cheeseweed (*Malvastrum coromandelianum*), and white-flowered beggar's tick (*Bidens alba*). A few introduced trees and shrubs are found in the vicinity of the project area. These include mango (*Mangifera indica*), koa haole (*Leucaena leucocephala*), African tulip (*Spathodea campanulata*), avocado (*Persea americana*), banana (*Musa*), and coconut (*Cocos nucifera*). (Char & Associates, 1995).

Only one native species, the 'uhaloa or hi'aloa (*Waltheria indica*) was found on the project site. This species is known to be an indigenous species, native to the Hawaiian Islands and found throughout the tropics. (Char & Associates, 1995).

None of the plants found during the field study are listed, proposed, or threatened and endangered species (U.S. Fish and Wildlife Service, 1996); nor is any plant considered rare and vulnerable (Wagner *et al.* 1990). Because the site has been so greatly disturbed by past human activities, there are no remnants of any native plant-dominated vegetation types left on the site. (Char & Associates, 1995).

#### 4.9.2 Faunal Resources

According to the *Faunal Survey Report*, urban development around the project site has almost entirely replaced the native fauna and their associated habitats. The 1995 faunal survey found that fauna in the area consists of common feral animals, including cats (*Felis catus*) and mongooses (*Herpestes auropunctatus*). No endemic birds or waterfowl were identified at the site. The only native bird that frequents the vicinity is the migratory Pacific Golden-Plover or Kolea (*Pluvialis fulva*). Numerous exotic birds are known from the area, the most abundant of which include the Spotted Dove (*Streptopelia chinensis*), Zebra Dove (*Geopelia striata*), Common Waxbill (*Estrilda astrild*), Java Sparrow (*Padda oryzivora*) and House Finch (*Carpodacus mexicanus*). (Bruner, 1995).

None of the fauna known from the project site and vicinity are listed, proposed, or threatened and endangered species (U.S. Fish and Wildlife Service, 1996). All species noted above are common and occur widely throughout central Oahu. Endangered native species that do, on rare occasions occur in lowland areas of Oahu, such as the Hawaiian Hoary Bat (*Lasiurus cinereus semotus*) and Short-eared Owl or Pu'eo (*Asio flammeus sandwichensis*) are highly unlikely to visit the proposed project site or its vicinity. (Bruner, 1995).

#### 4.9.3 Project Impacts

Given the above findings, the proposed project will not have a significant negative impact on botanical or faunal resources. Project activities might alter the local distribution and abundance of birds presently using the land, but will not impact the overall abundance of these species on Oahu. There are no reasons to impose restrictions, conditions, or impediments to the proposed project based on conditions of natural biological resources at the site.

#### 4.9.4 Mitigation Measures

No mitigation measures are required or recommended for botanical and faunal resources.

### 4.10 AIR QUALITY AND NOISE

#### 4.10.1 Air Quality and Noise

Air quality on Oahu is excellent overall due to prevailing northeast trade winds. The Manana site also benefits from these trade winds and enjoys generally good air quality. The *Atlas of Hawaii*, indicates that particulate matter at the site averages 40 micrograms per cubic meter of suspended particulates over a twelve-hour daytime period. The maximum concentration of carbon monoxide for any one-hour period falls between 20 and 30 micrograms per cubic meter (1983:67-68).

An Air Quality Impact Report (AQIR) was prepared for the *Manana and Pearl City Junction Development, EIS*, by J. W. Morrow in January 1996. The findings of the AQIR indicate that presence of site air pollutants are well below State and Federal air quality standards indicating relatively high air quality. This finding was also made by the State Department of Health (DOH) from measurements in Downtown Honolulu (there were no monitoring stations proximate to the Manana site). The AQIR notes, however, that air quality at the project area should be comparable or perhaps somewhat better given the site's lower density of development. (PKF Hawaii & PBR Hawaii, 1996).

Existing air pollution at the project site is minimal, primarily resulting from vehicles on Waimano Home Road, Kamehameha Highway, and the H-1 Freeway. There are no stationary sources of air pollution in the area. Fugitive dust from human activities represents the only other potential source of negative impact to air quality.

Ambient noise at and around the project site is generally steady and also low-level, resulting primarily from vehicular traffic on Waimano Home Road and more distant noise emanating from traffic on Kamehameha Highway and the H-1 freeway. Remote noise from aircraft combined with naturally occurring sounds from wind and birds generates relatively low background noise. (PKF Hawaii & PBR Hawaii, 1996).

#### 4.10.2 Project Impacts

Construction activities and the operation of heavy vehicles and equipment at the project site will generate some dust and pollution emissions. A residential area immediately north of the project site, including several houses situated within 80 feet of the drilling site, will be temporarily affected by dust and pollution, however, these impacts will cease when construction is completed.

Noise impacts will likewise result from clearing, grading, heavy equipment operations, and drilling. Nearby residential areas, particularly those units immediately adjacent to the project site, will likely be affected by noise levels exceeding the allowable daytime standards of 55 dBA set by DOH Rules, Title 11, Chapter 43. Additionally, Pearl City Highlands Elementary School, located approximately one-quarter mile away on the north-east corner of the Waimano Home Road/Noelani Street intersection, may also be affected by drilling operations, though noise generated at the site is likely to be absorbed into the ambient background sound at that distance. There will be no noise impacts after the construction is completed.

#### 4.10.3 Mitigation Measures

To mitigate impacts on air quality caused by project activities, dust control measures will be undertaken by the project contractor. Such measures will include use of dust screens and water sprinkling as necessary to minimize levels of fugitive dust. To minimize exhaust emissions, project contractors will properly maintain their internal combustion engines and comply with DOH Rules Title 11, Chapter 59 and 60, regarding Air Pollution Control.

Excessive noise levels generated by project activities will require that a noise permit be filed with DOH, Noise and Radiation Branch. The provisions of the noise permit will require that contractors muffle all construction vehicles and machinery and maintain all noise attenuation equipment in good operating condition. Faulty equipment will be repaired or replaced.

To further minimize disturbances to nearby residents, drilling operations will be restricted to the hours of 7:30 am to 3:30 pm and will be suspended on weekends and State Holidays. If a line shaft pump is used, the diesel engine will be surrounded with a mute to reduce noise levels. Alternatively, a subsurface pump might be used. If the wells are converted to permanent

production, the installed pumps and power source will be similarly engineered to reduce pump noise to levels below the regulatory limit.

#### 4.11 CONTAMINATION SOURCES

##### 4.11.1 Known Contamination

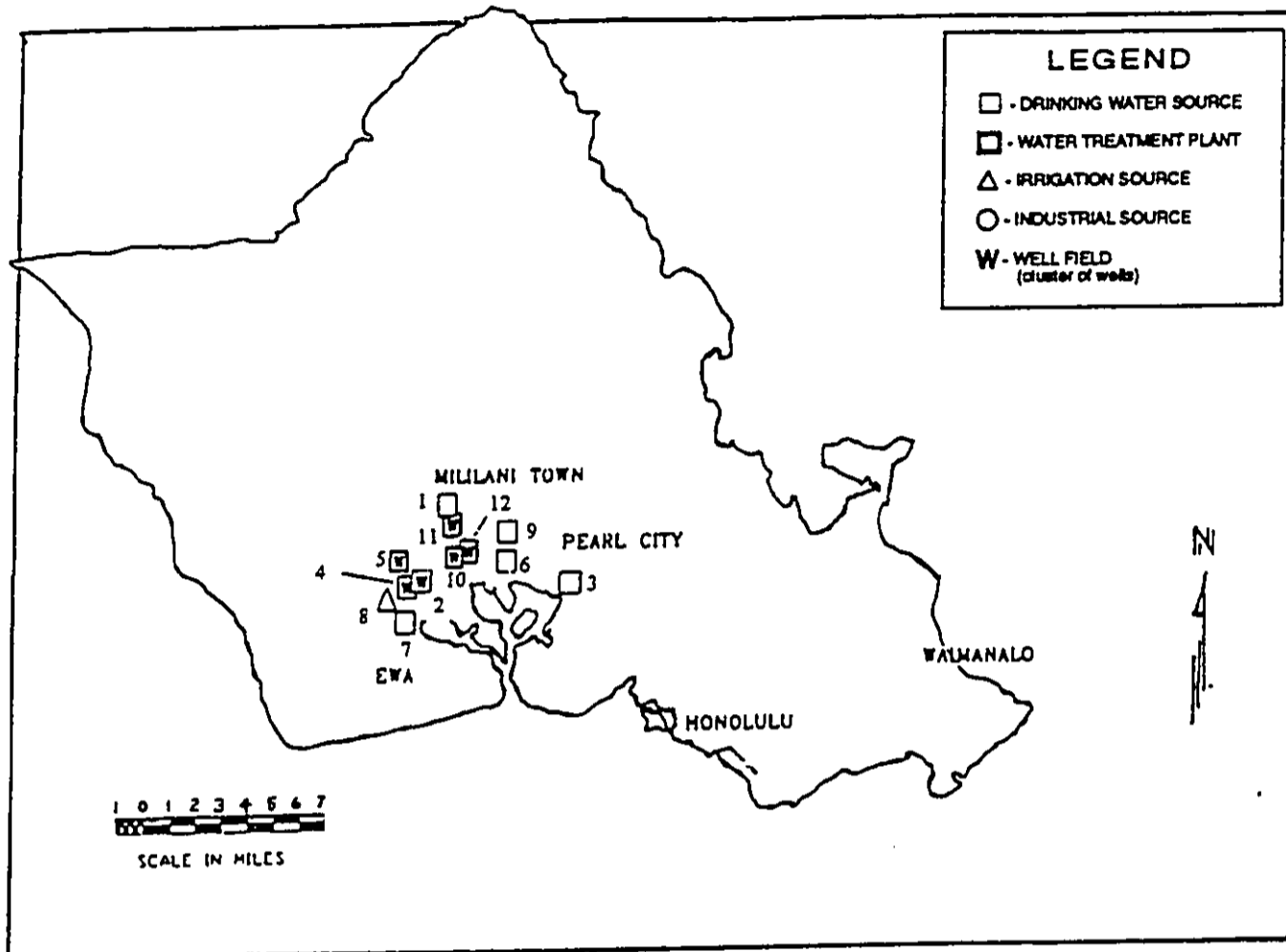
According to the CWRM *Water Quality Plan* (1990), minute traces of Tetrachloroethylene (PCE), a substance used in solvents and dry cleaning agents, were detected in drinking water sources in the Pearl City Area (Figure 4-5). However, the amount detected, 0.03 parts per billion (ppb), is considerably lower than safe drinking water standards for this substance (5.00 ppb), and is not considered significant.

Other substances reported in the Waipahu-Waiawa Aquifer include traces of Atrazine, Trichloropropane (TCP), Dibromochloropropane (DBCP), and Ethylene dibromide (EDB). All but the latter, EDB, fell well within safe drinking standards (Lau, 1987). Most of these substances are associated with pesticide and herbicide use from extensive agricultural operations west of the Waiawa Valley.

A search of the DOH, Underground Storage Tank (UST) Leak Log found no events near the project site that would negatively impact underground water quality.

An investigation of the Manana and Pearl City Junction Development site was also prepared by the U.S. Navy to identify whether years of industrial use on the property resulted in improper disposal of hazardous waste (US Navy, 1994). The purpose of the report was to research past practices and test the soils and buildings for contamination.

## GROUNDWATER CONTAMINATION ON THE ISLAND OF OAHU



**THIS MAP CONTAINS THE LAST CONFIRMED RESULTS FROM CONTAMINATED GROUNDWATER WELLS**

NO.	CONTAMINANT	DETECTED LEVEL (in ppb.)	APPLICABLE DRINKING WATER STANDARDS (in ppb.)
1	ICE:	0.700	5.000 MCL
2	ATRAZINE: ICP:	0.010 0.200	3.000 LTG
3	PCE:	0.030	5.000 pMCL
4	ATRAZINE: ICP:	0.083 0.650	3.000 LHA 0.800 LTG
5	DBCP: ICP:	influent 0.020 effluent <0.020 influent 0.650 effluent <0.200	0.040 LTG 0.800 LTG
6	PCE:	0.030	5.000 pMCL
7	ATRAZINE:	0.035	3.000 LHA
8	ATRAZINE:	0.100	3.000 LHA
9	DBCP: ICP:	0.024 0.210	0.040 LTG 0.800 LTG
10	EDB: ICP:	influent 0.055 effluent <0.020 influent <0.200 effluent <0.200	0.002 LTG 0.800 LTG
11	ICE: ICP:	0.550 0.250	5.000 MCL 0.800 LTG
12	ICP:	0.200	0.800 LTG

**NOTES:** Due to the number of wells in close proximity to each other, some sites are represented by wellfields and may contain several wells.  
Possible natural contaminants such as nitrates have not been included.

**Figure 4-5  
GROUNDWATER  
CONTAMINATION**

Source: Water Quality Plan, Hawaii Water Quality Plan, Commission on Water Resource Management, State of Hawaii, 1990

**Board of Water Supply  
MANANA WELL  
City and County of Honolulu**

**R. M. TOWILL CORPORATION  
FEBRUARY 1998**

The following is a summary of the major findings of the report:

- Most of the Manana Storage Facility parcels were found suitable for transfer in accordance with the August 1993 Memorandum of Understanding (MOU). One parcel, transferred prior to November 1996, will require that hazardous substances identified in the CLEAN Report are removed on schedule.
- Two environmental concerns associated with warehouse structures were identified in the CLEAN Report: asbestos was found in roofing and floor tiles of the warehouses; and, lead based paint is assumed present throughout the site on building structures.
- Appropriate mitigation measures will be implemented during demolition to comply with applicable State and Federal standards regarding the removal and disposal of asbestos and lead-paint.
- According to the MOU the Navy is responsible for all cleanup of building interiors. In addition, the Navy is responsible for the remediation and costs for any and all hazardous waste, including petroleum based pollutants, which are directly or indirectly related to the Navy's prior use or ownership of the site.

Remedial action since the 1994 report and surveys have been taken by the Navy. According to the *Manana and Pearl City Junction Development, Draft Environmental Impact Statement*, no additional clean-up activities are required except for the normal procedures associated with asbestos lead paint removal required in accordance with State and Federal regulations during demolition of the warehouse structures. (PKF Hawaii & PBR Hawaii, 1996).

#### **4.11.2 Potential Sources of Contamination**

The proposed project site is located on a relatively level parcel that has been used for military warehousing for several decades. Aside from those sources described in Section 4.11.1, no other major sources of potential contamination are known on the site. It is possible, however, that



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small amounts of contaminants from fuel, oil, solvents, cleaning agents, or other substances may be present in localized, isolated areas. Such contaminants are not expected to compromise water quality in the underlying aquifer.

#### **4.11.3 Project Impacts**

The proposed project is not expected to result in adverse impacts to municipal potable water resources. Similarly, project operations including drilling, heavy equipment use and vehicle use, are not expected to result in contamination of the project site.

#### **4.11.4 Mitigation Measures**

All water pumped from the Manana Exploratory Wells will be tested for potable quality. If the water does not meet standards for potable quality according to HAR, Section 11-20-29, the drill holes will be sealed and capped to prevent contamination. If the wells are converted to permanent production, water quality standards will be maintained through regular monitoring. If, contaminants are detected at levels exceeding safe drinking water standards, a treatment or filtration system might be employed, as necessary, to purify the water to potable quality.

Chapter 5

**RELATIONSHIP TO LAND USE DESIGNATIONS AND CONTROLS**

**5.1 HAWAII STATE PLAN**

The Hawaii State Plan, Chapter 226, Hawaii Revised Statutes (HRS), serves as a written guide for the future long range development of the State. The Plan identifies goals, objectives, policies, and priorities for the State.

The proposed project would be in conformance to the State Plan objectives and policies for facility systems - in general,

"(a) Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives."

"(b) To achieve the general facility systems objective, it shall be the policy of this State to: (1) Accommodate the needs of Hawaii's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans." and "(3) Ensure that required facility systems can be supported within resource capacities and at reasonable cost to the user" (HRS, Section 226-14).

The project would also conform to HRS, Section 226-16, water,

"(a) Planning for the State's facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities" (HRS, Section 226-16).

## 5.2 STATE LAND USE DESIGNATIONS

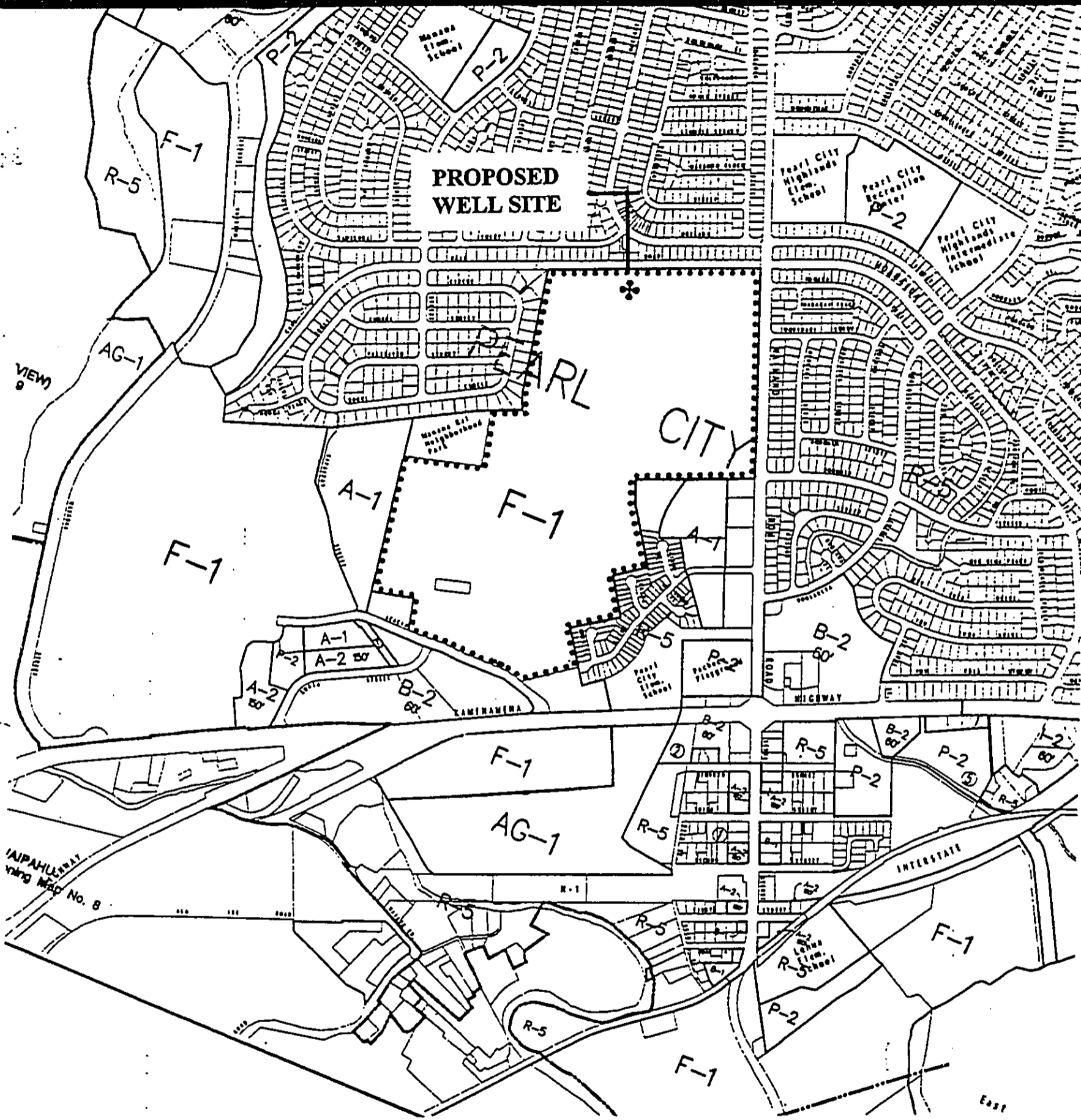
The project site is located within the State Land Use Urban District. According to State Law, Chapter 205, HRS, land use controls in the Urban Districts on the Island of Oahu are under the jurisdiction of the City and County of Honolulu. No action from the State Land Use Commission is required to implement the proposed Manana Exploratory Wells project or its conversion to production status.

## 5.3 CITY AND COUNTY OF HONOLULU LAND USE DESIGNATIONS AND CONTROLS

Land uses in the Urban District are controlled by the City's General Plan, Development Plan and Land Use Ordinance.

The project site is designated as F-1, Military, on the City and County of Honolulu's Zoning Map (Figure 5-1). This designation is in keeping with the previous military ownership and warehousing land uses already established when the Development Plan Land Use Maps were prepared. When military land ownership is transferred to City ownership, the F-1 designation automatically reverts to the Preservation zoning classification.

On the Primary Urban Center Development Plan Public Facilities Map, which is utilized by the City to plan for future public expenditures and capital improvements, the project site is designated as Government Building (GB) reflecting its current use for warehousing. Additionally, the larger parcel, on which the project site is located, has a "P" designation representing development of a community park within six years. (PKF Hawaii and PBR Hawaii, 1996).



**LEGEND**

- F-1      MILITARY AND FEDERAL
- PROJECT SITE
- .....      TMK BOUNDARY

**Figure 5-1  
PROJECT ZONING**

Board of Water Supply  
MANANA WELL  
City and County of Honolulu

**R. M. TOWILL CORPORATION**  
**FEBRUARY 1998**

Source: Draft Environmental Impact Statement -  
Manana and Pearl City Junction Development.  
PKF Hawaii and PBR Hawaii, January 1996.

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.

A Development Plan Public Facilities Map Amendment, under current procedure, will need to be filed upon BWS conversion of the exploratory wells to production wells. This amendment will require an application to the City and County of Honolulu, Department of Planning with approval by the Honolulu City Council. However, with the implementation of the City's Regional Development Plan Reports, the Development Plan Public Facility Map may be replaced with existing functional infrastructure plans.

The Manana Wells Station has been incorporated into the Oahu Water Management Plan, which is one of the BWS's functional plans.

Chapter 6

**ALTERNATIVES TO THE PROPOSED ACTION**

**6.1 NO ACTION ALTERNATIVE**

BWS has a legal requirement to provide potable water to the residents of the City and County of Honolulu. The proposed project would help to meet this requirement while the no action alternative would prevent BWS from doing so. The no action alternative:

- does not address the mandate of BWS to develop safe potable water resources for the residents of the City and County of Honolulu; and,
- would result in the lost opportunity to increase Oahu's existing potable resources. The further development of water resources at Manana would maximize available potable resources for all Oahu residents.

**6.2 DELAYED ACTION**

Development of the proposed site at a later date was not considered to be viable. BWS has programmed development of the Manana Exploratory Wells as part of its overall strategy for ensuring availability of potable resources. The delayed action alternative:

- would delay the BWS implementation schedule and result in little to no change in the potential environmental impact of the project;
- would result in higher future costs due to inflation; and,
- increase the risk that population growth will generate water demands in excess of available, developed supplies.

### 6.3 ALTERNATIVE SITES

This environmental assessment analyzes one of many possible potable groundwater source sites in the Pearl Harbor Sector. One alternative site has also been selected on a military parcel approximately one-half mile west of the primary site. Both the primary and secondary site are regarded strictly as candidate locations for exploratory well drilling.

Exploratory well sites are selected and assessed based on proximity to existing transmission systems, geologic and hydrologic likelihood of locating water, and on suitability for accommodating exploratory well drilling operations with minimal negative impacts to surrounding areas. An evaluation of the wells site's capacity for sustained potable water production, estimated sustainable yield, and possible impact on the underlying aquifer when in permanent production must follow water testing and would be the subject of an EA for installing permanent production wells.

The alternative site involves approximately +100,000 square feet along the south-eastern edge of Waiawa Gulch, within the Manana Naval Housing Tract. On its eastern boundary, the site abuts civilian housing from the Ho'oli Circle cul-de-sac (a.k.a. "Holiday City"). Along the southern boundary, the site abuts military housing fronting Birch Circle. The nearest residential unit is within 50 to 75 feet of a suitable bore site. The northern edge of the site falls off in a steep decline to the floor of Waiawa Gulch. Access to the site is via the northern terminus of Cedar Drive, within the Manana Naval Housing Tract.

The majority of the site is heavily overgrown with weeds, including koa haole (*Leucaena leucocephala*), California grass, and passion vine (*Passiflora foetida*). Approximately 30,000 square feet of the site is cleared, bare earth. Power lines that service the surrounding military and civilian housing cut diagonally across the south-eastern corner of the site.

While this site provides a suitable location for exploratory well drilling, it is less desirable than the primary site for several reasons. Housing is in close proximity to the alternative project site and would likely result in greater impacts from noise and air pollution. Additional mitigation

measures would therefore be required. Similarly, access to the site runs through a residential neighborhood and would require further mitigation to minimize impacts from heavy truck and vehicular traffic.

A County sewer drain is also not available nearby to handle test discharges from the wells. It is possible, however, that effluent and test water could be routed through temporary piping capped with sprinkler heads and used to water the surrounding landscape. If the wells are brought into permanent production, water transmission would be connected to the water main servicing the Manana Naval Housing.

Another consideration is land ownership. Ownership of the parcel on which the primary site is located is scheduled to be transferred from the Navy to the City under a Memorandum of Agreement. A similar transfer would be desired for the secondary site, which is currently owned by the military.

#### 6.4 ALTERNATIVE SOURCES

Alternatives to potable groundwater were analyzed by BWS in the *1995, Oahu Water Plan*. The alternatives investigated can be divided into two main categories:

- Alternative Sources of Potable Water
  - desalination
  - surface water development
- Alternative Sources of Non-Potable Water (which reduce the need for potable sources)
  - brackish groundwater development
  - recycling of treated wastewater
  - catchment systems

In addition to these categories, conservation of existing resources is also considered to be an important alternative to groundwater development.



All alternatives, with the exception of conservation, have high development costs, major technological challenges, and in the case of wastewater reuse, problems associated with social acceptance. Desalination, surface water, treatment of brackish water, and reuse of effluent wastewater all require high-cost water treatment plants. Use of alternative sources are also not without potential for environmental problems. Unrestrained removal of water from an underlying aquifer, whether fresh or brackish, can compromise and damage the transition zone between fresh and saline water.

Development of surface water is also constrained due to need to construct major new infrastructure to collect, treat, and transmit surface sources. Use of surface sources can also reduce habitat for native and indigenous species. Wastewater reuse, while costly, has the added difficulty of gaining public acceptance. Desalination plants show some promise as new technology becomes available. Major benefits include a virtually limitless resource base, the Pacific Ocean, while a significant impediment continues to be high development costs (BWS, 1995). According to BWS:

“Desalination: Desalination will be implemented as groundwater withdrawals approach sustainable yields. A site and technology study is currently under way. While the capital cost of a large scale desalination plant per gallon is equivalent to groundwater development in rural areas, the O&M cost at \$3.00 per thousand gallons is 10 times the cost of pumping groundwater. O&M cost directly affects water rates, which we are trying to keep as low as possible.

Surface Water: A 1996 surface Water Study indicated that surface water development for potable use was not feasible, given the small, variable flows, environmental impact and the intense regulatory process involved with the instream flow standards and the monitoring requirements of the Safe Drinking Water Act.

Reclamation: The reuse of sewage effluent is a promising alternative resource that is being actively pursued by the City to replace potable use for irrigation and industrial process water and to relieve the development pressure for high quality groundwater supplies.

Public health concerns and high costs for dual water system infrastructure limit the extent of reuse. The city is focusing on the Ewa Plains where dual water systems can be master planned in new developments rather than the more costly alternative to redevelop existing urban areas with dual systems. Additionally, the Honouliuli Wastewater Treatment plant effluent has chloride content very suitable for irrigation. Whereas the Sand Island plant chloride content is much too high for irrigation use." (BWS, 1997).

BWS already emphasizes conservation of existing groundwater resources with a stated goal of 10 percent reduction in per capita consumption by the year 2000. Conservation efforts include use of public information programs on the limitation of Oahu's resources and benefits of conservation, use of low flow home and commercial water fixtures, private catchment systems for irrigation, use of xeriscaping, maintenance of home plumbing fixtures (e.g., repair of leaking faucets and hoses), and periodic adjustment of water rate structures.

Although not now feasible, alternatives to potable groundwater will grow in importance as existing aquifer resources approach the limits of their sustainable yield. It is possible that one day, technology improvements will permit development of these alternatives to supplement Oahu's potable groundwater. In so doing, alternative source development will help to protect and preserve the future of Oahu's potable aquifer resources.

Conservation efforts will continue to play a key role in helping to reduce demand for existing groundwater supplies. Conservation alone, however, cannot be relied upon to meet all of Oahu's future water needs. Until such time that alternative source development can reliably and economically supplement existing resources, conservation in conjunction with the development of potable groundwater will remain the preferred BWS management strategy.

## 6.5 RECOMMENDED ACTION

The recommended action is to proceed with development of the proposed project at Manana, Oahu. The proposed project is part of the BWS program for source development and has been carefully considered to meet the future water needs of the City and County of Honolulu.

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## Chapter 7

### **RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY**

Development of the proposed project will commit the necessary construction and human effort, and fiscal resources. Use of these resources will benefit residents and visitors to the City and County of Honolulu by ensuring safe and clean potable water.

Long-term gains resulting from the proposed project include the long term use and benefits accruing from this resource. The proposed project, therefore, will enhance economic productivity by making possible future development.

## Chapter 8

**IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES BY  
THE PROPOSED ACTION**

Development of the proposed project will involve the irretrievable loss of certain environmental and fiscal resources. However, the costs associated with the use of these resources should be evaluated in light of recurring benefits to the residents of Honolulu.

It is anticipated that the construction of the proposed project will commit the necessary construction materials and human resources (in the form of planning, engineering, construction and labor). Reuse for much of these resources is not practicable. Although labor is compensated during the various stages of development, labor expended for project development is non-retrievable.

## Chapter 9

### NECESSARY PERMITS AND APPROVALS

#### 9.1 DEPARTMENT OF HEALTH

Development of the exploratory wells will require filing of a Noise Permit from the State Department of Health, Noise and Radiation Branch. Additionally, an NPDES permit is required from the State Department of Health for the discharge of foam, mud slurry, and well effluent associated with well-drilling activities into waters of the State through the municipal separate storm sewer system. The NPDES permit requirement might be avoided if BWS disposes of well effluent by other means, such as the use of sprinklers for irrigation or dust control. An NPDES permit is not anticipated for the disposal of test water of potable quality.

No other DOH permits for the exploratory wells are expected. However, development of production wells will require authorization for connection to a public water system (Public Health Regulations, Chapter 20, Title II, Potable Water Systems).

#### 9.2 DEPARTMENT OF LAND AND NATURAL RESOURCES COMMISSION ON WATER RESOURCES MANAGEMENT (CWRM)

BWS has filed a Well Construction permit with the Commission on Water Resource Management (CWRM). This permit will be for exploratory work including test pumping. Once exploratory work is completed, the production wells will require a permanent Pump Installation Permit and Water Use Permit.

- The Pump Installation Permit is required for conversion from exploratory to production status, and would be issued when the Water Use Permit has been approved.
- A Water Use Permit of a defined allocation amount is required to draw water out of the Waipahu-Waiawa WMA. Both the Pump Installation Permit and the Water

Use Permit will be filed upon satisfactory completion of exploratory pumping and testing.

### 9.3 CITY AND COUNTY OF HONOLULU

Exploratory wells are considered minor and are not required to be shown on the City and County of Honolulu's Development Plan Public Facilities Map. However, successful exploratory well tests will lead to conversion of the exploratory bores to production wells. This will require that an application be filed for a Development Plan Public Facilities Map amendment from the City and County of Honolulu, Department of Planning. Review and approval for this permit is from the Honolulu City Council. It is expected that this permit will be filed upon successful completion of exploratory well tests, during preparation and processing of the environmental assessment for the installation of the production wells.

However, with the implementation of the City's Regional Development Plan Reports, the Development Plan Public Facility Maps may be replaced with existing functional infrastructure plans. The Manana Wells Station has been incorporated into the Oahu Water Management Plan, which is one of the BWS's functional plans.

BWS already has permission to use the City and County of Honolulu, storm drainage system for discharges of effluent related to potable pump operation, replacement, and repair at various locations (Section 14-12.22, Revised Ordinances of Honolulu 1990, as amended).

Chapter 10  
**DETERMINATION**

In accordance with the provisions set forth in Chapter 343, Hawaii Revised Statutes, and the significance criteria in Section 11-200-12 of Title 11, Chapter 200, this assessment has determined that the project will have no significant adverse impact to water quality, air quality, existing utilities, noise, archaeological sites, or wildlife habitat. All anticipated impacts will be temporary and will not adversely impact the environmental quality of the area. According to the significance criteria:

*1. Irrevocable commitment to loss or destruction of natural or cultural resources -*

The proposed project is not anticipated to adversely impact any natural or cultural resources. The proposed well site is located on a previously developed parcel that is being transferred from the Navy to the City and County of Honolulu. The project site was previously disturbed during grading, paving, and building (warehouse) construction. An earlier archaeological assessment concluded that due to extensive grading and other modifications to the land surface, that no significant archaeological or cultural sites are known or expected to exist on the project site. (McGerty and Spear, 1995).

*2. Curtailment of the range of beneficial uses of the environment -*

The proposed location of the well site is along the northeast end of TMK: 9-7-24:41, adjacent to an existing access road. The location of the access road will facilitate servicing the well, while the well location will help to avoid conflicts with future City development within the lot. Upon completion, the presence of the well structure, e.g., pump(s), valves and appurtenances, is expected to be consistent with the surrounding structures and buildings within the parcel.

3. *Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders -*

The proposed project is consistent with the environmental policies, goals and guidelines delineated in Chapter 343, HRS, and the National Environmental Policy Act. Potential sources of adverse impacts have been identified and appropriate measures developed to mitigate or minimize impacts to negligible levels.

4. *Substantially affects the economic or social welfare of the community or state -*

The proposed project is intended to ensure the long-term provision of clean, potable water necessary for the future health, welfare, and growth of the surrounding community and Central Oahu region.

5. *Substantially affects public health -*

The proposed project will be developed in accordance with federal, state, and City and County of Honolulu, rules and regulations governing public safety and health. The primary public health concerns will involve air, water, noise, and traffic impacts. However, it is expected that these impacts can be minimized or brought to negligible levels by appropriate use of the mitigation measures described in this document.

6. *Involves substantial secondary impacts, such as population changes or effects on public facilities -*

The proposed project is part of the BWS program for development of water sources to serve the present and future population of the area. The project in itself, however, will not generate new population growth.

7. *Involves substantial degradation of environmental quality -*

The proposed project will be developed in accordance with the environmental policies of Chapter 343, HRS, and the National Environmental Policy Act. The project site is on land



previously used for warehousing purposes. The existing site, therefore, has already been subject to grading and development activity to accommodate construction. The proposed activity can be considered to be less obtrusive than the previous land use since it involves development of exploratory wells only on a small portion of the overall parcel.

Use of the underlying groundwater will also be subject to review and approval by the State Commission on Water Resource Management. This will ensure the long-term protection of the Waipahu-Waiawa Aquifer.

8. *Is individually limited but cumulatively has considerable effect on the environment, or involves a commitment for larger actions -*

The proposed project addresses the needs of existing and future area residents, businesses, and institutional users. Although Oahu's growing population will continue to place demands on need for more water, our potable resources are finite and limited. CWRM, which is charged with regulation of Hawaii's water resources, will ensure that permitted withdrawals are consistent with the available sustainable yield of aquifer systems such as Waipahu-Waiawa.

9. *Substantially affects a rare, threatened or endangered species or its habitat -*

There are no endangered flora or fauna species within the project site.

10. *Detrimentially affects air or water quality or ambient noise levels -*

Any potential impacts to air, water quality, or noise levels will be addressed by use of appropriate measures described in this document.

11. *Affects or is likely to suffer damage by being located in an environmentally sensitive area, such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, freshwater, or coastal waters -*

The proposed project is located in an area appropriate for urban development and related testing of exploratory wells. The proposed project site itself does not contain any especially sensitive environmental characteristics which would detract from the proposed activity.

12. *Substantially affects scenic vistas and view planes identified in county or state plans or studies -*

The exploratory wells will be located on an outlying area of the parcel. Construction equipment will be visible during drilling of the well and during installation of the test pump. However, upon completion the construction equipment will be removed from the site. The only remaining items will be the capped exploratory wells and valves/fittings. It is expected that the appearance of these items will be consistent with the warehouse surroundings of the site.

13. *Requires substantial energy consumption -*

Sufficient energy will be used to drill, case, install the exploratory wells, and perform test pumping. Energy will also be used during the transport of construction equipment, machinery, and personnel to the project site. None of these activities are expected to result in use of energy significantly greater than similar exploratory well projects.

Based on analysis and review of the above factors, it has been determined that an Environmental Impact Statement (EIS) will not be required, and that a Finding of No Significant Impact (FONSI) be issued for this project.

Chapter 11

**ORGANIZATIONS AND AGENCIES CONSULTED IN THE PREPARATION OF THE  
DRAFT ENVIRONMENTAL ASSESSMENT**

The following organizations and agencies were contacted during preparation of the Manana Exploratory Wells Draft Environmental Assessment, August 1997:

**11.1 STATE AGENCIES**

- Department of Health
  - Office of Environmental Quality Control (OEQC)
  - Environmental Management Division
- Department of Land and Natural Resources
  - Commission on Water Resource Management
  - Aquatic Resources Division
  - Historic Preservation Division

**11.2 CITY AND COUNTY OF HONOLULU**

- Board of Water Supply
- Department of Land Utilization
- Planning Department

Chapter 12

**ADDITIONAL ORGANIZATIONS AND AGENCIES CONSULTED DURING THE 30-DAY DRAFT ENVIRONMENTAL ASSESSMENT COMMENT PERIOD**

The following additional organizations and agencies were notified during the 30-day Draft Environmental Assessment comment period.

**12.1 FEDERAL AGENCIES**

- U.S. Geological Survey
- U.S. Fish and Wildlife Service
- U.S. Army Corps of Engineers

**12.2 STATE AGENCIES**

- Department of Business, Economic Development & Tourism  
Office of Planning
- Department of Education
- University of Hawaii  
Environmental Center
- Office of Hawaiian Affairs

**12.3 CITY AND COUNTY OF HONOLULU**

- Building Department
- Department of Housing and Community Development
- Department of Transportation Services
- Public Works, Land Survey and Acquisition Division

**12.4 PRIVATE AND COMMUNITY ORGANIZATIONS, AND ELECTED OFFICIALS**

- Honolulu City Council
- Pearl City Neighborhood Board No. 21
- State Senator Cal Kawamoto
- State House Representative Noboru Yonamine
- Sierra Club

**12.5 NOTIFICATION LETTERS**

The following letters were sent out to the listed agencies to announce the availability of the Draft EA for public review.

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R. M. TOWILL CORPORATION

420 Waiakamilo Rd #411 Honolulu HI 96817-4941 (808) 848-1133 Fax (808) 848-1037

December 2, 1997

Chief  
Fish & Wildlife Service  
U.S. Department of Interior  
300 Ala Moana Blvd., #5302  
PJKK Federal Building  
Honolulu, Hawaii 96813

Dear Chief:

SUBJECT: Public Review Copy of Draft Environmental Assessment (EA)  
for Manana Exploratory Wells, Manana, Hawaii

Please find attached a copy of the subject Draft EA. This document is forwarded for the Office of Environmental Quality Control (OEQC) public comment period commencing December 8, 1997, and ending January 7, 1998. Availability of this document for public review is published in the OEQC Environmental Notice bulletin.

Public comments may be forwarded to:

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

We ask that comment copies also be forwarded to:

Mr. Brian Takeda, Senior Planner  
R. M. Towill Corporation  
420 Waiakamilo Road, Suite 411  
Honolulu, Hawaii 96817-4941

Thank you for your assistance.

Sincerely,



Brian Takeda  
Senior Planner

Attachment  
cc: Nancy Heinrich, OEQC  
Scott Muraoka, Board of Water Supply

R. M. TOWILL CORPORATION

420 Waiakamilo Rd #411 Honolulu HI 96817-4941 (808) 848-1133 Fax (808) 848-1037

December 2, 1997

Chief  
U.S. Geological Survey  
U.S. Department of Interior  
677 Ala Moana Blvd., #415  
Honolulu, Hawaii 96813-5412

Dear Chief:

SUBJECT: Public Review Copy of Draft Environmental Assessment (EA)  
for Manana Exploratory Wells, Manana, Hawaii

Please find attached a copy of the subject Draft EA. This document is forwarded for the Office of Environmental Quality Control (OEQC) public comment period commencing December 8, 1997, and ending January 7, 1998. Availability of this document for public review is published in the OEQC Environmental Notice bulletin.

Public comments may be forwarded to:

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

We ask that comment copies also be forwarded to:

Mr. Brian Takeda, Senior Planner  
R. M. Towill Corporation  
420 Waiakamilo Road, Suite 411  
Honolulu, Hawaii 96817-4941

Thank you for your assistance.

Sincerely,



Brian Takeda  
Senior Planner

Attachment  
cc: Nancy Heinrich, OEQC  
Scott Muraoka, Board of Water Supply

0000 00 10 1489

R. M. TOWILL CORPORATION

420 WAIKAMULO RD #411 HONOLULU HI 96817-4941 (808) 848-1133 FAX (808) 848-1037

December 2, 1997

Commander  
Department of the Army  
Corps of Engineers  
Bldg. 230  
Fort Shafter, Hawaii 96858

Dear Commander:

SUBJECT: Public Review Copy of Draft Environmental Assessment (EA)  
for Manana Exploratory Wells, Manana, Hawaii

Please find attached a copy of the subject Draft EA. This document is forwarded for the Office of Environmental Quality Control (OEQC) public comment period commencing December 8, 1997, and ending January 7, 1998. Availability of this document for public review is published in the OEQC Environmental Notice bulletin.

Public comments may be forwarded to:

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

We ask that comment copies also be forwarded to:

Mr. Brian Takeda, Senior Planner  
R. M. Towill Corporation  
420 Waikamilo Road, Suite 411  
Honolulu, Hawaii 96817-4941

Thank you for your assistance.

Sincerely,



Brian Takeda  
Senior Planner

Attachment

cc: Nancy Heinrich, OEQC  
Scott Mursoka, Board of Water Supply

R. M. TOWILL CORPORATION

420 WAIKAMULO RD #411 HONOLULU HI 96817-4941 (808) 848-1133 FAX (808) 848-1037

December 2, 1997

Mr. Herman Aizawa, Superintendent  
Department of Education  
P. O. Box 2360  
Honolulu, Hawaii 96804

Dear Mr. Aizawa:

SUBJECT: Public Review Copy of Draft Environmental Assessment (EA)  
for Manana Exploratory Wells, Manana, Hawaii

Please find attached a copy of the subject Draft EA. This document is forwarded for the Office of Environmental Quality Control (OEQC) public comment period commencing December 8, 1997, and ending January 7, 1998. Availability of this document for public review is published in the OEQC Environmental Notice bulletin.

Public comments may be forwarded to:

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

We ask that comment copies also be forwarded to:

Mr. Brian Takeda, Senior Planner  
R. M. Towill Corporation  
420 Waikamilo Road, Suite 411  
Honolulu, Hawaii 96817-4941

Thank you for your assistance.

Sincerely,



Brian Takeda  
Senior Planner

Attachment

cc: Nancy Heinrich, OEQC  
Scott Mursoka, Board of Water Supply

0000 00 10 1490

R. M. TOWILL CORPORATION

420 Waiakamilo Rd #411 Honolulu HI 96817-4941 (808) 942-1133 Fax (808) 942-1037

December 2, 1997

Honorable Calvin Kawamoto  
State Senator  
Hawaii State Capitol, #204  
Honolulu, Hawaii 96813

Dear Senator Kawamoto:

SUBJECT: Public Review Copy of Draft Environmental Assessment (EA)  
for Manana Exploratory Wells, Manana, Hawaii

Please find attached a copy of the subject Draft EA. This document is forwarded for the Office of Environmental Quality Control (OEQC) public comment period commencing December 8, 1997, and ending January 7, 1998. Availability of this document for public review is published in the OEQC Environmental Notice bulletin.

Public comments may be forwarded to:

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

We ask that comment copies also be forwarded to:

Mr. Brian Takeda, Senior Planner  
R. M. Towill Corporation  
420 Waiakamilo Road, Suite 411  
Honolulu, Hawaii 96817-4941

Thank you for your assistance.

Sincerely,



Brian Takeda  
Senior Planner

Attachment  
cc: Nancy Heinrich, OEQC  
Scott Muraoka, Board of Water Supply

R. M. TOWILL CORPORATION

420 Waiakamilo Rd #411 Honolulu HI 96817-4941 (808) 942-1133 Fax (808) 942-1037

December 2, 1997

Honorable Noboru Yonamine  
State House of Representatives  
Hawaii State Capitol, #406  
Honolulu, Hawaii 96813

Dear Representative Yonamine:

SUBJECT: Public Review Copy of Draft Environmental Assessment (EA)  
for Manana Exploratory Wells, Manana, Hawaii

Please find attached a copy of the subject Draft EA. This document is forwarded for the Office of Environmental Quality Control (OEQC) public comment period commencing December 8, 1997, and ending January 7, 1998. Availability of this document for public review is published in the OEQC Environmental Notice bulletin.

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

We ask that comment copies also be forwarded to:

Mr. Brian Takeda, Senior Planner  
R. M. Towill Corporation  
420 Waiakamilo Road, Suite 411  
Honolulu, Hawaii 96817-4941

Thank you for your assistance.

Sincerely,



Brian Takeda  
Senior Planner

Attachment  
cc: Nancy Heinrich, OEQC  
Scott Muraoka, Board of Water Supply



R. M. TOWILL CORPORATION

420 Waiakamilo Rd #411 Honolulu HI 96817-4941 (808) 648-1133 Fax (808) 648-1937

December 2, 1997

Ms. Frenchy DeSoto, Chairperson  
Office of Hawaiian Affairs  
State of Hawaii  
711 Kapiolani Blvd., #500  
Honolulu, Hawaii 96813

Dear Ms. DeSoto:

SUBJECT: Public Review Copy of Draft Environmental Assessment (EA)  
for Manana Exploratory Wells, Manana, Hawaii

Please find attached a copy of the subject Draft EA. This document is forwarded for the Office of Environmental Quality Control (OEQC) public comment period commencing December 8, 1997, and ending January 7, 1998. Availability of this document for public review is published in the OEQC Environmental Notice bulletin.

Public comments may be forwarded to:

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

We ask that comment copies also be forwarded to:

Mr. Brian Takeda, Senior Planner  
R. M. Towill Corporation  
420 Waiakamilo Road, Suite 411  
Honolulu, Hawaii 96817-4941

Thank you for your assistance.

Sincerely,



Brian Takeda  
Senior Planner

Attachment

cc: Nancy Heinrich, OEQC  
Scott Muraoka, Board of Water Supply

R. M. TOWILL CORPORATION

420 Waiakamilo Rd #411 Honolulu HI 96817-4941 (808) 648-1133 Fax (808) 648-1937

December 2, 1997

Director  
University of Hawaii  
Environmental Center  
2444 Dole Street  
Honolulu, Hawaii 96822

Dear Director:

SUBJECT: Public Review Copy of Draft Environmental Assessment (EA)  
for Manana Exploratory Wells, Manana, Hawaii

Please find attached a copy of the subject Draft EA. This document is forwarded for the Office of Environmental Quality Control (OEQC) public comment period commencing December 8, 1997, and ending January 7, 1998. Availability of this document for public review is published in the OEQC Environmental Notice bulletin.

Public comments may be forwarded to:

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

We ask that comment copies also be forwarded to:

Mr. Brian Takeda, Senior Planner  
R. M. Towill Corporation  
420 Waiakamilo Road, Suite 411  
Honolulu, Hawaii 96817-4941

Thank you for your assistance.

Sincerely,



Brian Takeda  
Senior Planner

Attachment

cc: Nancy Heinrich, OEQC  
Scott Muraoka, Board of Water Supply

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0000 00 10 1492

R. M. TOWILL CORPORATION

420 WAIKAMULO RD #411 HONOLULU HI 96817-4941 (808) 842-1133 FAX (808) 842-1037

December 2, 1997

Dr. Seiji Naya, Director  
Dept. of Business, Economic  
Development & Tourism  
State of Hawaii  
P. O. Box 2359  
Honolulu, Hawaii 96804

Dear Dr. Naya:

SUBJECT: Public Review Copy of Draft Environmental Assessment (EA)  
for Manana Exploratory Wells, Manana, Hawaii

Please find attached a copy of the subject Draft EA. This document is forwarded for the Office of Environmental Quality Control (OEQC) public comment period commencing December 8, 1997, and ending January 7, 1998. Availability of this document for public review is published in the OEQC Environmental Notice bulletin.

Public comments may be forwarded to:

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

We ask that comment copies also be forwarded to:

Mr. Brian Takeda, Senior Planner  
R. M. Towill Corporation  
420 Waikamilo Road, Suite 411  
Honolulu, Hawaii 96817-4941

Thank you for your assistance.

Sincerely,



Brian Takeda  
Senior Planner

Attachment  
cc: Nancy Heinrich, OEQC  
Scott Muraoka, Board of Water Supply

R. M. TOWILL CORPORATION

420 WAIKAMULO RD #411 HONOLULU HI 96817-4941 (808) 842-1133 FAX (808) 842-1037

December 2, 1997

Mr. Robert Agres, Jr., Director  
Dept. of Housing & Community Dev.  
City and County of Honolulu  
650 South King St., 5th Floor  
Honolulu, Hawaii 96813

Dear Mr. Agres:

SUBJECT: Public Review Copy of Draft Environmental Assessment (EA)  
for Manana Exploratory Wells, Manana, Hawaii

Please find attached a copy of the subject Draft EA. This document is forwarded for the Office of Environmental Quality Control (OEQC) public comment period commencing December 8, 1997, and ending January 7, 1998. Availability of this document for public review is published in the OEQC Environmental Notice bulletin.

Public comments may be forwarded to:

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

We ask that comment copies also be forwarded to:

Mr. Brian Takeda, Senior Planner  
R. M. Towill Corporation  
420 Waikamilo Road, Suite 411  
Honolulu, Hawaii 96817-4941

Thank you for your assistance.

Sincerely,



Brian Takeda  
Senior Planner

Attachment  
cc: Nancy Heinrich, OEQC  
Scott Muraoka, Board of Water Supply

0000 00 10 1493

R. M. TOWILL CORPORATION

420 WAIKAMILLO RD #411 HONOLULU HI 96817-4941 (808) 842-1133 FAX (808) 842-1037

December 2, 1997

Ms. Cheryl Soon, Director  
Dept. of Transportation Services  
City and County of Honolulu  
650 South King St., 3rd Floor  
Honolulu, Hawaii 96813

Dear Ms. Soon:

SUBJECT: Public Review Copy of Draft Environmental Assessment (EA)  
for Manana Exploratory Wells, Manana, Hawaii

Please find attached a copy of the subject Draft EA. This document is forwarded for the Office of Environmental Quality Control (OEQC) public comment period commencing December 8, 1997, and ending January 7, 1998. Availability of this document for public review is published in the OEQC Environmental Notice bulletin.

Public comments may be forwarded to:

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

We ask that comment copies also be forwarded to:

Mr. Brian Takeda, Senior Planner  
R. M. Towill Corporation  
420 Waikamilo Road, Suite 411  
Honolulu, Hawaii 96817-4941

Thank you for your assistance.

Sincerely,



Brian Takeda  
Senior Planner

Attachment  
cc: Nancy Heinrich, OEQC  
Scott Muraoka, Board of Water Supply

R. M. TOWILL CORPORATION

420 WAIKAMILLO RD #411 HONOLULU HI 96817-4941 (808) 842-1133 FAX (808) 842-1037

December 2, 1997

Mr. Jonathan Shimada, Director  
Land Survey & Acquisition Division  
Department of Public Works  
City and County of Honolulu  
650 South King St., 15th Floor  
Honolulu, Hawaii 96813

Dear Mr. Shimada:

SUBJECT: Public Review Copy of Draft Environmental Assessment (EA)  
for Manana Exploratory Wells, Manana, Hawaii

Please find attached a copy of the subject Draft EA. This document is forwarded for the Office of Environmental Quality Control (OEQC) public comment period commencing December 8, 1997, and ending January 7, 1998. Availability of this document for public review is published in the OEQC Environmental Notice bulletin.

Public comments may be forwarded to:

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

We ask that comment copies also be forwarded to:

Mr. Brian Takeda, Senior Planner  
R. M. Towill Corporation  
420 Waikamilo Road, Suite 411  
Honolulu, Hawaii 96817-4941

Thank you for your assistance.

Sincerely,



Brian Takeda  
Senior Planner

Attachment  
cc: Nancy Heinrich, OEQC  
Scott Muraoka, Board of Water Supply

0000 00 10 1494

R. M. TOWILL CORPORATION

420 WAIKAMILLO RD #411 HONOLULU HI 96817-4941 (808) 848-1133 FAX (808) 848-1037

December 2, 1997

Mr. Randall Fujiki, Director  
Building Department  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813

Dear Mr. Fujiki:

SUBJECT: Public Review Copy of Draft Environmental Assessment (EA)  
for Manana Exploratory Wells, Manana, Hawaii

Please find attached a copy of the subject Draft EA. This document is forwarded for the Office of Environmental Quality Control (OEQC) public comment period commencing December 8, 1997, and ending January 7, 1998. Availability of this document for public review is published in the OEQC Environmental Notice bulletin.

Public comments may be forwarded to:

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

We ask that comment copies also be forwarded to:

Mr. Brian Takeda, Senior Planner  
R. M. Towill Corporation  
420 Waikamilo Road, Suite 411  
Honolulu, Hawaii 96817-4941

Thank you for your assistance.

Sincerely,



Brian Takeda  
Senior Planner

Attachment

cc: Nancy Heinrich, OEQC  
Scott Muraoka, Board of Water Supply

R. M. TOWILL CORPORATION

420 WAIKAMILLO RD #411 HONOLULU HI 96817-4941 (808) 848-1133 FAX (808) 848-1037

December 2, 1997

Chairperson  
Pearl City Neighborhood Board No. 21  
Honolulu City Hall  
530 South King Street  
Honolulu, Hawaii 96813

Dear Chairperson:

SUBJECT: Public Review Copy of Draft Environmental Assessment (EA)  
for Manana Exploratory Wells, Manana, Hawaii

Please find attached a copy of the subject Draft EA. This document is forwarded for the Office of Environmental Quality Control (OEQC) public comment period commencing December 8, 1997, and ending January 7, 1998. Availability of this document for public review is published in the OEQC Environmental Notice bulletin.

Public comments may be forwarded to:

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

We ask that comment copies also be forwarded to:

Mr. Brian Takeda, Senior Planner  
R. M. Towill Corporation  
420 Waikamilo Road, Suite 411  
Honolulu, Hawaii 96817-4941

Thank you for your assistance.

Sincerely,



Brian Takeda  
Senior Planner

Attachment

cc: Nancy Heinrich, OEQC  
Scott Muraoka, Board of Water Supply

0000 00 10 1495

R. M. TOWILL CORPORATION

420 WAIKAMULO RD #411 HONOLULU HI 96817-4041 (808) 648-1133 FAX (808) 648-1037

December 2, 1997

Ms. Floriana Cofman, Librarian  
Pearl City Public Library  
1138 Waimano Home Road  
Pearl City, Hawaii 96782

Dear Ms. Cofman:

SUBJECT: Public Review Copy of Draft Environmental Assessment (EA)  
for Manana Exploratory Wells, Manana, Hawaii

Please find attached a copy of the subject Draft EA. This document is forwarded for the Office of Environmental Quality Control (OEQC) public comment period commencing December 8, 1997, and ending January 7, 1998. Availability of this document for public review is published in the OEQC Environmental Notice bulletin.

Public comments may be forwarded to:

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

We ask that comment copies also be forwarded to:

Mr. Brian Takeda, Senior Planner  
R. M. Towill Corporation  
420 Waiakamilo Road, Suite 411  
Honolulu, Hawaii 96817-4941

Thank you for your assistance.

Sincerely,



Brian Takeda  
Senior Planner

Attachment

cc: Nancy Heinrich, OEQC  
Scott Muraoka, Board of Water Supply

R. M. TOWILL CORPORATION

420 WAIKAMULO RD #411 HONOLULU HI 96817-4041 (808) 648-1133 FAX (808) 648-1037

December 2, 1997

Mr. Mufi Hannemann  
Honolulu City Council  
City and County of Honolulu  
530 South King St., 2nd Floor  
Honolulu, Hawaii 96813

Dear Mr. Hannemann:

SUBJECT: Public Review Copy of Draft Environmental Assessment (EA)  
for Manana Exploratory Wells, Manana, Hawaii

Please find attached a copy of the subject Draft EA. This document is forwarded for the Office of Environmental Quality Control (OEQC) public comment period commencing December 8, 1997, and ending January 7, 1998. Availability of this document for public review is published in the OEQC Environmental Notice bulletin.

Public comments may be forwarded to:

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

We ask that comment copies also be forwarded to:

Mr. Brian Takeda, Senior Planner  
R. M. Towill Corporation  
420 Waiakamilo Road, Suite 411  
Honolulu, Hawaii 96817-4941

Thank you for your assistance.

Sincerely,



Brian Takeda  
Senior Planner

Attachment

cc: Nancy Heinrich, OEQC  
Scott Muraoka, Board of Water Supply

R. M. TOWILL CORPORATION

420 WAIKAMULO RD #411 HONOLULU HI 96817-1941 (808) 942-1133 FAX (808) 842-1937

December 2, 1997

Chairperson  
Sierra Club - Hawaii Chapter  
P. O. Box 2577  
Honolulu, Hawaii 96803

Dear Chairperson:

SUBJECT: Public Review Copy of Draft Environmental Assessment (EA)  
for Manana Exploratory Wells, Manana, Hawaii

Please find attached a copy of the subject Draft EA. This document is forwarded for the Office of Environmental Quality Control (OEQC) public comment period commencing December 8, 1997, and ending January 7, 1998. Availability of this document for public review is published in the OEQC Environmental Notice bulletin.

Public comments may be forwarded to:

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

We ask that comment copies also be forwarded to:

Mr. Brian Takeda, Senior Planner  
R. M. Towill Corporation  
420 Waikamilo Road, Suite 411  
Honolulu, Hawaii 96817-4941

Thank you for your assistance.

Sincerely,



Brian Takeda  
Senior Planner

Attachment  
cc: Nancy Heinrich, OEQC  
Scott Muraoka, Board of Water Supply

0000 00 10 1496

0000 00 10 1497

# CORRECTION

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

0000 00 10 1498

R. M. TOWILL CORPORATION

420 WAIKAMILO RD #411 HONOLULU HI 96817-4941 (808) 648-1133 FAX (808) 848-1037

December 2, 1997

Chairperson  
Sierra Club - Hawaii Chapter  
P. O. Box 2577  
Honolulu, Hawaii 96803

Dear Chairperson:

SUBJECT: Public Review Copy of Draft Environmental Assessment (EA)  
for Manana Exploratory Wells, Manana, Hawaii

Please find attached a copy of the subject Draft EA. This document is forwarded for the Office of Environmental Quality Control (OEQC) public comment period commencing December 8, 1997, and ending January 7, 1998. Availability of this document for public review is published in the OEQC Environmental Notice bulletin.

Public comments may be forwarded to:

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

We ask that comment copies also be forwarded to:

Mr. Brian Takeda, Senior Planner  
R. M. Towill Corporation  
420 Waiakamilo Road, Suite 411  
Honolulu, Hawaii 96817-4941

Thank you for your assistance.

Sincerely,



Brian Takeda  
Senior Planner

Attachment

cc: Nancy Heinrich, OEQC  
Scott Muraoka, Board of Water Supply



Chapter 13  
**COMMENTS AND RESPONSES TO THE DRAFT  
ENVIRONMENTAL ASSESSMENT 30-DAY COMMENT PERIOD**

The following comments were received during the Draft EA 30-day comment period. Attached are the responses to comments prepared by BWS.

0000 00 10 1500

*ck*  
**COPY**

*P*  
JEREMY HARRIS, Mayor  
WALTER O. WATSON, Jr. Chairman  
MAURICE H. YAMASATO, Vice Chairman  
KAZUO HAYASHIDA  
MELISSA V. J. LUM  
FORREST C. MURPHY  
JOHNATHAN K. SHIMADA, P.D.  
BARBARA VAN STANTON  
RAYMOND H. SAITO  
Manager and Chief Engineer



**BOARD OF WATER SUPPLY**  
CITY AND COUNTY OF HONOLULU  
630 SOUTH BERETANIA STREET  
HONOLULU HAWAII 96843  
PHONE (808) 527-6180  
FAX (808) 533-2714

January 5, 1998

*P*  
**RECEIVED BY CITY AND COUNTY OF HONOLULU** 974186  
**BD OF WATER SUPPLY**  
HONOLULU MUNICIPAL BUILDING  
630 SOUTH KING STREET, 2ND FLOOR • HONOLULU, HAWAII 96813  
PHONE (808) 525-4884 • FAX (808) 525-4887



Dec 23 9 59 AM '97

RANDALL K. FUJIKI  
DIRECTOR AND BUILDING SUPERINTENDENT  
ISIDORO BALDOLAR  
DEPUTY DIRECTOR AND BUILDING SUPERINTENDENT

PB 97-670

December 19, 1997

Dec 23 1 20 PM '97

**MEMO TO:** RAYMOND SATO, MANAGER AND CHIEF ENGINEER  
BOARD OF WATER SUPPLY  
**FROM:** RANDALL K. FUJIKI  
DIRECTOR AND BUILDING SUPERINTENDENT  
**SUBJECT:** PUBLIC REVIEW COPY OF DRAFT ENVIRONMENTAL  
ASSESSMENT (EA) MANANA EXPLORATORY WELLS  
MANANA, HAWAII

This is in response to your request of December 2, 1997 to review and comment on the subject material.

We have no comments to offer but appreciate the opportunity to review the document.

Should there be any questions, please have your staff contact Douglas Collinson at ext. 6375.

*Randall K. Fujiki*  
RANDALL K. FUJIKI  
Director and Building Superintendent

cc: R. M. Towill Corp. (B. Takeda)

**TO:** RANDALL K. FUJIKI  
DIRECTOR AND BUILDING SUPERINTENDENT  
BUILDING DEPARTMENT  
**FROM:** *Raymond H. Sato*  
RAYMOND H. SATO, MANAGER AND CHIEF ENGINEER  
BOARD OF WATER SUPPLY

**SUBJECT:** YOUR MEMORANDUM OF DECEMBER 19, 1997 REGARDING THE  
DRAFT ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED  
MANANA EXPLORATORY WELL, MANANA, OAHU, TMK: 9-7-24: 41

Thank you for reviewing the Draft Environmental Assessment for the proposed Manana Exploratory Well project.

We acknowledge that you have no comments to offer.

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

*cc:* Chester Koga, R.M. Towill Corp.

0000 00 10 150 1

**COPY**

JEREMY HARRIS Mayor  
WALTER O. WATSON, JR. Chairman  
MAURICE H. YAMASATO Vice Chairman  
KAZUHIKAWA-SHIDA  
MELESSA Y. J. LUM  
CHRISTOPHER C. MURPHY  
JONATHAN K. SHIMADA, PhD  
BARBARA I. IYAMA  
RAYMOND H. SATO  
Manager and Chief Engineer



December 24, 1997

**BOARD OF WATER SUPPLY**  
CITY AND COUNTY OF HONOLULU  
630 SOUTH BERETANIA STREET  
HONOLULU, HAWAII 96843  
PHONE (808) 527-6180  
FAX (808) 533-2714

**TO:** ROBERT AGRES, JR., DIRECTOR  
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

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

**SUBJECT:** YOUR MEMORANDUM OF DECEMBER 9, 1997 REGARDING THE  
DRAFT ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED  
MANANA EXPLORATORY WELL, MANANA, OAHU, TMK: 2-2-24: 41

Thank you for your memorandum regarding the Draft Environmental Assessment for the proposed Manana Exploratory Well project.

We acknowledge that the Department of Housing and Community Development has no objections to the proposed project.

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

cc: Chester Koga, R.M. Towill Corporation

974092

DEC 11 1 04 PM '97

RECEIVED DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT  
**BD OF WATER SUPPLY CITY AND COUNTY OF HONOLULU**  
630 SOUTH KING STREET, 5TH FLOOR • HONOLULU, HAWAII 96813  
Phone: (808) 323-4477 • Fax: (808) 527-5498

Dec 10 2 59 PM '97



ROBERT AGRES JR.  
DIRECTOR  
DARWIN J. HAMAHOTO  
DEPUTY DIRECTOR

December 9, 1997

**MEMORANDUM**

**TO:** Raymond Sato, Manager and Chief Engineer  
Board of Water Supply

**FROM:** Robert Agres, Jr., Director

**SUBJECT:** Draft Environment Assessment  
for Manana Exploratory Wells, Manana, Hawaii

Thank you for your letter of December 2, 1997 requesting our comments on the subject project.

The Department of Housing and Community Development has reviewed the draft environmental assessment and has no objections to the project.

*Robert Agres, Jr.*  
ROBERT AGRES, JR.  
Director

cc: Mr. Brian Takeda, Senior Planner  
R.M. Towill Corporation  
420 Waiakamilo Road, Suite 411  
Honolulu, Hawaii 96817-4941

0000 00 10 1502

COPY

JEREMY HARRIS Mayor  
WALTER O WATSON JR Chairman  
MAURICE H YAMASATO Vice Chairman  
KAZUHIYASHIDA  
MELISSA Y J LIAM  
FORREST C MALPRAH  
JONATHAN K SHIMADA P.D.  
BARBARA KM STANTON  
RAYMOND H SATO  
Manager and Chief Engineer



December 26, 1997

BOARD OF WATER SUPPLY  
CITY AND COUNTY OF HONOLULU  
630 SOUTH BERETANIA STREET  
HONOLULU HAWAII 96843  
PHONE (808) 527-6180  
FAX (808) 533-2714



The Senate  
The Nineteenth Legislature  
of the  
State of Hawaii  
STATE CAPOL  
HONOLULU HAWAII 96813

DEC 26 1997  
OK

December 5, 1997

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

SUBJECT: Public Review Copy of Draft Environmental  
Assessment (EA) for Manana Exploratory Wells,  
Manana, Hawaii

Dear Mr. Sato:

This is to respectfully let you and your Board of Water  
Supply know that I have had the opportunity to review a  
copy of the subject Draft EA.

As State Senator from the 19th Senatorial District  
(Waipahu/Pearl City), I believe that the Draft EA is just  
fine, and I support it wholeheartedly.

As usual, R. M. Towill Corporation has done an excellent  
job.

If you have any question as to my thoughts on the matter,  
please feel free to contact me.

Sincerely,

CAL KAWAMOTO  
State Senator

cc: Mr. Brian Takeda, Senior Planner  
R. M. Towill Corporation  
420 Waiakamilo Road, Suite 411  
Honolulu, Hawaii 96817-4941

The Honorable Cal Kawamoto  
The Senate  
State Capitol, Room 204  
Honolulu, Hawaii 96813

Dear Senator Kawamoto:

Subject: Your Letter of December 5, 1997 Regarding the Draft Environmental Assessment  
for the Board of Water Supply's Proposed Manana Exploratory Well Project,  
Manana, Honolulu, Oahu, TMK: 9-7-24: 41

Thank you for your letter regarding the Draft Environmental Assessment for the proposed  
Manana Exploratory Well project.

We acknowledge your support of the project.

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

Very truly yours,

RAYMOND H. SATO  
Manager and Chief Engineer

cc: Chester Koga, R.M. Towill Corporation

- HONOLULU DISTRICTS
- FIRST DISTRICT
- SECOND DISTRICT
- THIRD DISTRICT
- FOURTH DISTRICT
- FIFTH DISTRICT
- SIXTH DISTRICT
- SEVENTH DISTRICT
- EIGHTH DISTRICT
- NINTH DISTRICT
- TENTH DISTRICT
- ELEVENTH DISTRICT
- TWELFTH DISTRICT
- THIRTEENTH DISTRICT
- FOURTEENTH DISTRICT
- FIFTEENTH DISTRICT
- SIXTEENTH DISTRICT
- SEVENTEENTH DISTRICT
- EIGHTEENTH DISTRICT
- NINETEENTH DISTRICT
- TWENTY FIRST DISTRICT
- TWENTY SECOND DISTRICT
- TWENTY THIRD DISTRICT
- TWENTY FOURTH DISTRICT
- TWENTY FIFTH DISTRICT
- CHIEF CLERK
- PLANS SECTION



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

December 19, 1997  
Dec 22 2 55 PM '97

REPLY TO  
ATTENTION OF

Planning and Operations Division

Mr. Raymond Sato  
Manager and Chief Engineer  
Board of Water Supply  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813

Dear Mr. Sato:

Thank you for the opportunity to review and comment on the Draft Environmental Assessment (DEA) for the Manana Exploratory Wells Project, Pearl Harbor, Oahu (TMK 9-7-24: 41). The following comments are provided in accordance with Corps of Engineers authorities to provide flood hazard information and to issue Department of the Army (DA) permits.

- a. Based on the information provided, the proposed project will not impact waters of the U.S.; therefore, a DA permit will not be required for the project. Please contact our Regulatory Section at 438-9258 for further information and refer to file number 980000092.
- b. The flood hazard information provided on page 36 of the DEA is correct.

Sincerely,

Paul Mizue, P.E.  
Acting Chief, Planning  
and Operations Division

074153

PE

DEC 22 3 46 PM '97

COPY

BOARD OF WATER SUPPLY  
CITY AND COUNTY OF HONOLULU  
630 SOUTH BERETARIAH STREET  
HONOLULU, HAWAII 96843  
PHONE (808) 527-6180  
FAX (808) 533-2714



January 5, 1998

SEARCHED	INDEXED
SERIALIZED	FILED
JAN 7 1998	
HONOLULU	

JEREMY HARRIS, Mayor  
WALTER O. WATSON, JR., Chairman  
MAURICE H. YAMASATO, Vice Chairman  
KAZUO NAYASHI  
MELISSA Y. J. LUM  
FORREST C. MURPHY  
JOHN HANAU, Chairman  
BARBARA KIM STANTON

RAYMOND H. SATO  
Manager and Chief Engineer

Mr. Paul Mizue, P.E.  
Department of the Army  
Pacific Ocean Division, Corps of Engineers  
Fort Shafter, Hawaii 96858-5440

Dear Mr. Mizue:

Subject: Your Letter of December 19, 1997 Regarding the Draft Environmental Assessment for the Board of Water Supply's Proposed Manana Exploratory Well Project, Manana, Honolulu, Oahu, TMK. 9-7-24: 41

Thank you for reviewing the Draft Environmental Assessment (EA) for the proposed Manana Exploratory Well project.

We acknowledge that a Department of the Army permit will not be required for the proposed project. In addition, we note that the flood hazard information provided on page 36 of the Draft EA is correct.

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

Very truly yours,

FOR  
RAYMOND H. SATO  
Manager and Chief Engineer

cc: Chester Koga, R.M. Towill Corp.

0000 00 10 1503

0000 00 10 1504

**BOARD OF WATER SUPPLY**

CITY AND COUNTY OF HONOLULU  
630 SOUTH BERETANIA STREET  
HONOLULU HAWAII 96843  
PHONE (808) 527-6180  
FAX (808) 533-2714



January 27, 1998

**COPY**

JEREMY HARRIS Mayor  
WALTER O WATSON JR. Chairman  
MAURICE M YAMASATO Vice Chairman  
KAZU MATASHIDA  
MELISSA Y J LUM  
FOREST C MAJORITY  
JONATHAN K. SHIMODA PhD  
BURBANK KIM STANTON  
RAYMOND H SATO  
Manager and Chief Engineer

Mr. Brooks Harper  
Ecological Services  
Fish and Wildlife Services  
Pacific Islands Ecoregion  
United States Department of the Interior  
300 Ala Moana Boulevard, Room 3108, Box 50088  
Honolulu, Hawaii 96850

JAN 29 1998  
CIVIL  
M

Dear Mr. Harper:

Subject: Your Letter of December 24, 1997 Regarding the Draft Environmental Assessment for the Proposed Manana Exploratory Well, Manana, Oahu, Hawaii. IMK: 9-7-024: 041

Thank you for reviewing the Draft Environmental Assessment (EA) for the proposed Manana Exploratory Well project and for the biological information on the Pearl Harbor wetlands.

We acknowledge your concerns regarding the potential indirect, long-term impacts to the wetlands found within the Pearl Harbor Watershed. Pumpage from the Manana Wells is not expected to adversely impact the Pearl Harbor Aquifer, or spring flow to the Waiuu and Waiawa Springs. Within the Pearl Harbor Aquifer, the spring flow to both Waiuu and Waiawa Springs will be maintained by the sustainable yield limits established for the Waiuu-Waiawa and Waiuu Aquifers. The sustainable yield for the Pearl Harbor Aquifer is related to a set equilibrium head level in the basal aquifer that must be maintained to ensure the viability of existing water production and it indirectly maintains spring flow. Because future pumpage at the Manana site will remain within the sustainable yield set for the aquifer and will not exceed historical aquifer extraction levels, the springs will not be adversely affected. This relationship applies to water extraction that does not occur immediately adjacent to the springs. Located approximately 1.5 miles away, the Manana Wells are sufficiently distant from the springs to avoid causing an adverse impact. Since spring flows will not be affected, we do not expect any adverse impacts to the Pearl Harbor wetlands.

The Draft EA was sent to the U.S. Geological Survey (USGS) on December 2, 1997<sup>7</sup> for their review and comments. If the wells are successful, the EA for the production facility with the test pump data, will be sent to the USGS for comments.

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

Very truly yours,

RAYMOND H. SATO  
Manager and Chief Engineer

cc: Brian Takeda, R.M. Towill Corporation

0000 00 10 1505



United States Department of the Interior

FISH AND WILDLIFE SERVICE  
PACIFIC ISLANDS ECOREGION  
300 ALA MOANA BOULEVARD, ROOM 3108  
BOX 50088  
HONOLULU, HAWAII 96850  
PHONE: (808) 541-3441 FAX: (808) 541-3470

DEC 29 1997 PMTC

DEC 24 1997

In Reply Refer To: CAW

Mr. Raymond Sato  
Manager and Chief Engineer  
Board of Water Supply  
City and County of Honolulu  
630 South Beretania Street  
Honolulu, Hawaii 96817

Re: Draft Environmental Assessment for Manana Exploratory Wells, Manana, Oahu, Hawaii.

Dear Mr. Sato:

The U.S. Fish and Wildlife Service (Service) has reviewed the Draft Environmental Assessment (EA) for the Manana Exploratory Wells, Manana, Oahu, Hawaii. The project sponsor, the City and County of Honolulu Board of Water Supply (BWS), proposes to drill and encase two exploratory portable wells on a portion of the Manana Naval Reservation. The Service offers the following comments for your consideration.

Because the proposed construction project will occur on previously disturbed sites, the Service does not anticipate direct adverse impacts to fish and wildlife resources. However, the Service is concerned with the potential indirect long-term impacts that the proposed project may have on the water supply currently available to the wetlands found within the Pearl Harbor Watershed.

The Service has estimated that 31% of the coastal wetlands in Hawaii were lost between 1780 and 1980. The loss of wetland habitat is a primary reason for the decline of Hawaii's four endangered waterbird species: the Hawaiian stilt (*Himantopus mexicanus knudseni*), the Hawaiian coot (*Fulica alai*), the Hawaiian moorhen (*Gallinula chloropus sandvicensis*), and the Hawaiian duck (*Anas wyvilliana*). Wetlands within the Pearl Harbor Watershed, including those at Waipio Peninsula (jurisdiction of the U.S. Navy), Puhala Marsh (jurisdiction of the State of Hawaii), and the Pearl Harbor National Wildlife Refuge (jurisdiction of the U.S. Navy and the Service), support all four of these species, as well as large numbers of wintering shorebirds and migratory waterfowl. These wetlands have been identified as important habitat in the Hawaiian Waterbirds Recovery Plan.

The Service does not have the expertise within the Pacific Islands Office to (1) determine if the pump test design is adequate to identify potential long-term effects of water withdrawals from the Pearl Harbor Aquifer on wetlands within the Pearl Harbor Watershed or (2) evaluate subsequent results of the pump test. The Service believes that such evaluations are best accomplished by our sister agency, the U.S. Geological Service (USGS).

The Service recommends that the BWS request that the USGS review the adequacy of the pump test design and evaluate the results of the actual pump test. If the BWS is unable to obtain assurances from the USGS that the proposed water withdrawals will not affect the hydrology of the wetlands within the Pearl Harbor Watershed, we request that the BWS conduct a long-term monitoring program that will provide the Service, the State of Hawaii, and the U.S. Navy with the information necessary to make recommendations to protect the water needs of the wetlands at the Pearl Harbor National Wildlife Refuge, Puhala Marsh, and Waipio Peninsula.

Until the above concerns are addressed, the Service cannot concur with the applicant's Negative Declaration determination and finding that the proposed activity will not result in any significant adverse environmental impacts. The Service appreciates the opportunity to comment. If you have questions regarding these comments, please contact Fish and Wildlife Biologist Christine Willis at 808/541-3441.

Sincerely,

*Brooks Harper*  
Brooks Harper  
Field Supervisor  
Ecological Services

cc: R.M Towill Corporation  
DOFAW, Honolulu  
DAR, Honolulu  
CWB, Honolulu  
USGS, Hawaii  
Refuge Manager, Pearl Harbor NWR

0000 00 10 1506

02/04/98 13:33 FAX 5276195

BWS ENGINEERING

002

January 22, 1998

Mr. Gary Gill, Director  
Office of Environmental Quality Control  
State of Hawaii  
235 South Beretania Street, Suite 702  
Honolulu, Hawaii 96813

Dear Mr. Gill:

Subject: Your Letter of January 2, 1998 Regarding the Draft Environmental Assessment for the Board of Water Supply's Proposed Manana Exploratory Well Project. Manana, Honolulu, Oahu, TDK: 9-7-241-41

Thank you for reviewing the Draft Environmental Assessment (EA) for the proposed Manana Exploratory Well project.

We provide the following response to your concerns:

1. Contacts:

We will document all contacts with neighbors and neighboring landowners in the Final EA, including copies of correspondence.

2. Significance Criteria:

A discussion of significance criteria per Hawaii Administrative Rules, Chapter 11-200-12, will be provided in the Final EA.

3. Determination:

The determination statement will reflect the "anticipated" Finding of No Significant Impact for the proposed project.

4. Financial and Institutional Arrangements:

There are no financial or institutional arrangements or commitments related to developing the well. The well project will be financed through the Board of Water Supply's Water System Facilities Charge for resource development.

5. Development Permits:

At this time, only the well construction permit application has been filed with the State Commission on Water Resource Management. Should any new permits be filed, the appropriate information will be included in the Final EA.

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

Very truly yours,



RAYMOND H. SATO  
Manager and Chief Engineer



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BENJAMIN J. CAVETANO  
GOVERNOR



STATE OF HAWAII  
OFFICE OF ENVIRONMENTAL QUALITY CONTROL  
335 SOUTH BERTANCA STREET  
SUITE 202  
HONOLULU, HAWAII 96813  
TELEPHONE (808) 586-4185  
FACSIMILE (808) 586-4186

Raymond Sato  
January 2, 1998  
Page 2

GARY GILL  
DIRECTOR  
JAN 7 1998  
RMC

allocation credit to supply an urban development. The EA should include a full discussion of any institutional, financial or land use arrangements or commitments related to developing the well and delivering water to end users.

These arrangements may include the formation of public utility companies and subsequent rate-setting, the establishment of county water commitments, the co-funding of state or county water system development, an executive order or other set-aside of state lands, and purchase of land or easements by public entities.

All permits or governmental approvals required to fulfill these commitments should be listed, along with the status of each permit/approval.

Raymond Sato  
Board of Water Supply  
630 South Beretania St.  
Honolulu, HI 96843

January 2, 1998

Attention: Barry Usagawa

Dear Mr. Sato:

Subject: Draft Environmental Assessment (EA) for Manana Exploratory Wells,  
Pearl City, TMK: 9-7-24:41

1. Contacts: Notify the nearest neighbors or neighboring landowners of the proposed project, allowing them sufficient time to review the draft EA and submit comments. Document all contacts in the final EA and include copies of any correspondence.
2. Significance criteria: Include a discussion of findings and reasons, according to the significance criteria listed in HAR 11-200-12, that supports the anticipated Finding of No Significant Impact (FONSI) determination. You may use the enclosed sample as a guideline. *This analysis must be done prior to a determination of significance of impacts.*
3. Determination: A Finding of No Significant Impact (FONSI) determination was listed in Chapter 10 of the draft EA. The EIS law prohibits a determination of significant impact or lack of significant impact before the end of 30-day public review period and prior to receipt, response and analysis of all written comments. For a draft EA the proper determination is *anticipated FONSI*.
4. Financial and institutional arrangements: Why are these wells being developed? In some instances, a well is developed by private financing, the transfer of public lands to government or private developers, or in return for a water

If you have any questions, please call Nancy Heinrich at 586-4185.

Sincerely,

GARY GILL  
Director

Enc.

c: Brian Takeda

0000 00 10 1500

DEPARTMENT OF PUBLIC WORKS  
CITY AND COUNTY OF HONOLULU  
100 SOUTH KING STREET • HONOLULU, HAWAII 96813  
PHONE (808) 521-4341 • FAX (808) 527-5857

DISPATCH  
DATE: JAN 2 1998  
TIME: 5 19 56 PM  
REC'D: [initials]



December 31, 1997

JONATHAN K. SHIMADA, PH.D.  
DIRECTOR AND CHIEF ENGINEER  
POLANDO LIBBY, JR.  
DEPUTY DIRECTOR  
ENV 97-281

BOARD OF WATER SUPPLY  
CITY AND COUNTY OF HONOLULU  
630 SOUTH BERETANIA STREET  
HONOLULU, HAWAII 96843  
PHONE (808) 527-6180  
FAX (808) 533-2714



WALTER D. WATSON, JR. Chairman  
MURPHEE H. YAMASATO Vice Chairman  
KAZU HAYASHIDA  
MELOSSA Y. LUM  
FORREST C. MURPHY  
JONATHAN K. SHIMADA, PH.D.  
BARBARA ANN STANTON  
RAYMOND H. SATO  
Manager and Chief Engineer

COPY

January 27 1998  
MAIL ROOM  
JAN 2 1998  
[initials]

TO: JONATHAN K. SHIMADA, DIRECTOR AND CHIEF ENGINEER  
DEPARTMENT OF PUBLIC WORKS  
FROM: RAYMOND H. SATO, MANAGER AND CHIEF ENGINEER  
BOARD OF WATER SUPPLY  
SUBJECT: YOUR MEMORANDUM OF DECEMBER 31, 1997 REGARDING THE  
DRAFT ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED  
MANANA EXPLORATORY WELLS. TMK: 9-7-034: 041

MEMORANDUM:  
TO: RAYMOND SATO, MANAGER AND CHIEF ENGINEER  
BOARD OF WATER SUPPLY  
FROM: JONATHAN K. SHIMADA, PH.D  
DIRECTOR AND CHIEF ENGINEER  
SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (DEA)  
MANANA EXPLORATORY WELLS  
TMK: 9-7-34: 41

*J. Shimada*

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

- Page 14, Section 4.1.6 Mitigation Measures:  
1. In addition to coverage under the State Department of Health's General Permit, an effluent discharge permit from the Department of Public Works is required if discharged to City's municipal separate storm sewer systems.  
2. Also, appropriate best management practices (containment, filters, etc.) need to be used to prevent foam and mud from discharging to City system.  
Should you have any questions, please contact Alex Ho, Environmental Engineer, at Local 4150.

Thank you for reviewing the Draft Environmental Assessment for the proposed Manana Exploratory Wells project.

We provide the following responses to your concerns:

1. An effluent discharge permit from the Department of Public Works will be submitted for aquifer test pumping discharges into the municipal separate storm sewer system.
2. Best management practices will be implemented during well drilling activities to prevent drilling lubricants, such as foam and mud from entering the City Storm Sewer System.
3. A National Pollutant Discharge Elimination System permit will be submitted to the Department of Health for well drilling activities if discharges cannot be retained on-site.

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

cc: R.M. Towill Corp. (Brian Takeda)  
OEQC (Nancy Heinrich)

cc: Brian Takeda, R.M. Towill Corporation

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COPY

JEREMY HARRIS Mayor  
WALTER D. WATSON, JR. Chairman  
MAURICE H. YAMASATO Vice Chairman  
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MELISSA Y. LUI  
FORREST C. MURPHY  
JOHN HAN K. SHIMADA, PRO  
BARBARA KIM STANTON  
RAYMOND H. SATO  
Manager and Chief Engineer



BOARD OF WATER SUPPLY  
CITY AND COUNTY OF HONOLULU  
630 SOUTH BERTANIA STREET  
HONOLULU, HAWAII 96843  
PHONE (808) 527-6180  
FAX (808) 533-2714

January 30, 1998  
1998 FEB 1998  
OK  
PT

Mr. Rick Egged, Director  
Office of Planning  
Department of Business, Economic  
Development and Tourism  
P. O. Box 2359  
Honolulu, Hawaii 96804

Dear Mr. Egged:

Subject: Your Letter of December 22, 1997 Regarding the Draft Environmental Assessment for the Board of Water Supply's Proposed Manana Exploratory Well Project, Manana, Honolulu, Oahu, TMK: 9-7-24: 41

Thank you for reviewing the Draft Environmental Assessment (EA) for the proposed Manana Exploratory Well project.

The well drilling activity will require a National Pollutant Discharge Elimination permit with the State Department of Health.

Best management practices will be incorporated to retain drilling effluent on-site. Test pumping procedures to test the aquifers hydraulic characteristics will require an effluent discharge permit with the City Department of Public Works.

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

Very truly yours,

*Raymond H. Sato*  
FOR RAYMOND H. SATO  
Manager and Chief Engineer

cc: Brian Takeda, R.M. Towill Corporation

BENJAMIN J. CAYETANO  
GOVERNOR  
SELIF. NAYA  
DIRECTOR  
BRADLEY J. MOSSMAN  
DEPUTY DIRECTOR  
RICK EGGED  
DIRECTOR OFFICE OF PLANNING

Tel.: (808) 587-2846  
Fax: (808) 587-2824



DEPARTMENT OF BUSINESS,  
ECONOMIC DEVELOPMENT & TOURISM

OFFICE OF PLANNING  
235 South Beretania Street, 6th Flr., Honolulu, Hawaii 96813  
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Ref. No. P-7123

December 22, 1997

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

Dear Mr. Sato:

Subject: Draft Environmental Assessment for Manana Exploratory Wells, Manana, Hawaii

We wish to offer the following comment on the environmental assessment (EA).

We note on page 24 of the EA that foam, mud slurry, and effluent will likely be generated from construction and exploratory well testing, and that a National Pollutant Discharge Elimination System permit is required if they are discharged into State waters through the municipal storm sewer system. The document adds that the permit may be avoided if the Board of Water supply disposes of the well effluent by other means, such as for irrigation or dust control. If these or other alternatives can alleviate the need for storm drain disposal of the waste products, we encourage you to seriously consider incorporating them into the design of the project.

Coastal water quality is a leading environmental issue facing the State and nation. In Hawaii, clean coastal water quality is vital to sustaining tourism as the main economic activity. Working with the Department of Health, our Coastal Zone Management (CZM) Program has responsibilities to protect water quality. In addition to three legislative policies to assure protection of water quality, the CZM Program is developing a polluted runoff management plan in response to a congressional requirement. They both support alternative measures to discharging into the receiving coastal waters.

If there are any questions, please contact Christina Meller of our CZM Program at 587-2845.

Sincerely,  
*Rick Egged*  
Rick Egged  
Director  
Office of Planning

cc: OEQC  
R.M. Towill Corp.  
Maurice Kaya, DBEDT

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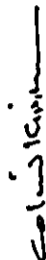
Letter to Mr. Takeda  
December 16, 1997  
Page 2

Please contact Colin Kippen (594-1938), Officer of the Land and Natural Resources Division, or Luis A. Manrique (594-1758), should you have any questions on this matter.

Sincerely yours,



Randall Ogata  
Administrator



Colin Kippen  
Officer,  
Land and Natural  
Resources Division

cc Board of Trustees



STATE OF HAWAII  
OFFICE OF HAWAIIAN AFFAIRS  
711 KAPOLANI BOULEVARD, SUITE 500  
HONOLULU, HAWAII 96813 5249  
PHONE (808) 594-1889  
FAX (808) 594-1865

DEC 22 1997  
MAIL ROOM  
MAIL

December 16, 1997

Mr. Brian Takeda  
R.M. Towill Corporation  
420 Waiakamilo Road, Suite 411  
Honolulu, HI 96817-4941

Subject: Draft Environmental Assessment (DEA) for  
Manana Exploratory Wells, Manana, Island of  
Oahu.

Dear Mr. Takeda:

Thank you for the opportunity to review the Draft Environmental Assessment (DEA) for Manana Exploratory Wells, Manana, Island of Oahu. The Board of Water Supply proposes to drill and case two exploratory potable wells on a parcel owned by the Navy and in process of being transferred to the City & County of Honolulu. These exploratory wells will provide hydrogeological data on potential groundwater sources in the area.

The Office of Hawaiian Affairs has no objections at this time to the proposed exploratory wells. Based on information contained in the DEA, the wells apparently bear no adverse impacts on adjacent lands nor upon existing flora or fauna and no known archaeological remains exist in the area. Furthermore, the wells will neither significantly affect nearby scenic resources nor air quality. Moreover, water pumping from the exploratory wells will be minor and will not significantly impact the sustainable yield of the Waipahu-Wahiawa aquifer.

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**BOARD OF WATER SUPPLY**

CITY AND COUNTY OF HONOLULU  
630 SOUTH BERTANIA STREET  
HONOLULU HAWAII 96843  
PHONE (808) 527-6180  
FAX (808) 533-2714



January 22, 1998

Mr. Randall Ogata, Administrator  
Office of Hawaiian Affairs  
State of Hawaii  
711 Kapiolani Boulevard, Suite 500  
Honolulu, Hawaii 96813-5249

Dear Mr. Ogata:


**Subject:** Your Letter of December 16, 1997 Regarding the Draft Environmental Assessment for the Board of Water Supply's Proposed Manana Exploratory Well Project, Manana, Honolulu, Oahu, TMK: 2-7-24: 41

Thank you for your letter regarding the Draft Environmental Assessment for the proposed Manana Exploratory Well project.

We acknowledge that the Office of Hawaiian Affairs has no objections to the proposed well project.

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

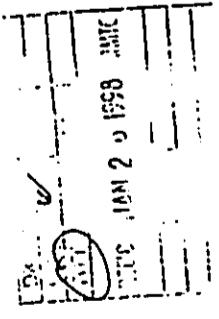
Very truly yours,

  
RAYMOND H. SATO  
Manager and Chief Engineer

cc: Chester Koga, R.M. Towill Corporation

**COPY**

- JEREMY WATSON, Jr. Chairman
- WALTERO WATSON, Jr. Chairman
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- MELISSA Y. LUM
- FORREST C. MURPHY
- JOATHANK SHAMADA, PTO
- BARBARA KIM STANTON
- RAYMOND H. SATO  
Manager and Chief Engineer



**REFERENCES**  
(Listed in Chronological Order)

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- Communication, BWS review comments regarding preliminary Draft Environmental Assessment for Manana Exploratory Well, City and County of Honolulu, Board of Water Supply, October 8, 1997.
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