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Dr. Bruce Anderson  
Acting Director  
Office of Environmental  
Quality Control  
465 South King Street  
Kekuanaoa Building, Room 104  
Honolulu, Hawaii 96813

Dear Dr. Anderson:

Job No. 4-OW-2, Kahana Tunnel  
Bulkhead Project, Kahana, Koolauloa, Oahu, Hawaii

Pursuant to Section 11 of the Environmental Impact Statement Rules, transmitted for processing are four (4) copies of the Environmental Assessment and Notice of Determination (Negative Declaration) for the subject project. Also attached is a completed OEQC Bulletin Publication Form.

If there are any questions on this matter, please have your staff contact Mr. Edward Lau of the Planning Branch at extension 8-7496.

Sincerely,

  
KAZUO G. AKITA  
Manager-Chief Engineer

AM:lc

Enc.

lv

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FILE COPY

ENVIRONMENTAL ASSESSMENT  
AND NEGATIVE DECLARATION

Job No. 4-OW-2

\* Kahana Tunnel Bulkheading Project \*  
Koolauloa, Oahu \

Prepared for the  
Division of Water Resource Management  
Department of Land and Natural Resources  
State of Hawaii

Prepared by  
George A.L. Yuen & Associates, Incorporated  
100 North Beretania Street, Suite 303  
Honolulu, Hawaii 96817

December, 1990

**NOTICE OF DETERMINATION: Negative Declaration**

**FOR:** Job No. 4-OW-2  
Kahana Tunnel Bulkheading Project  
Koolauloa, Oahu

**BY:** Division of Water Resource Management  
Department of Land and Natural Resources

The proposed action will have no significant effect on the environment and therefore does not require the preparation of an Environmental Impact Statement. This Notice of Determination and the Environmental Assessment are being filed as a Negative Declaration.

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ENVIRONMENTAL ASSESSMENT

JOB NO. 4-OW-2

KAHANA TUNNEL BULKHEADING PROJECT

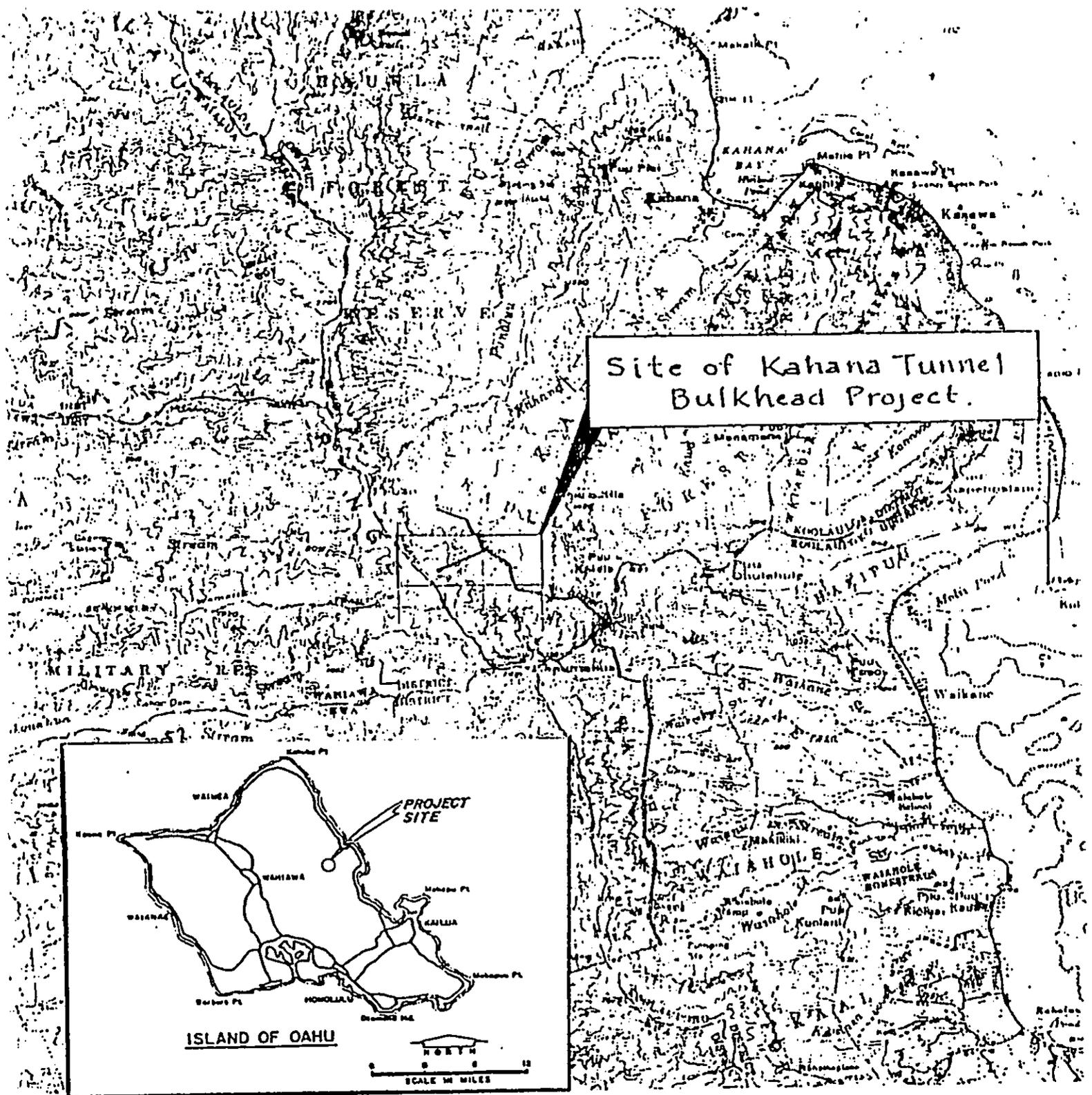
KOOLAULOA, OAHU

I. AUTHORITY

This environmental assessment covers the proposed construction of two reinforced concrete bulkheads in the dike system of Kahana Tunnel, Koolauloa, Oahu, including a proposed instrument house and data recording and telemetering systems located outside of the tunnel near the portal. This assessment is prepared in accordance with the requirements of Chapter 343, Hawaii Revised Statutes, and the Regulations for Environmental Impact Statements of the Environmental Quality Commission, State of Hawaii (see fig. 1 - Site Plan).

II. PROPOSING AGENCY

Division of Water Resource Management  
Department of Land and Natural Resources  
State of Hawaii  
Honolulu, Hawaii



LOCATION MAP  
KAHANA TUNNEL BULKHEAD PROJECT  
KOOLAULOA, OAHU, HAWAII  
SCALE: MILES

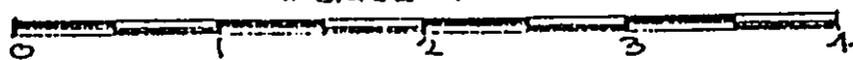


Fig 1

### III. DESCRIPTION OF THE PROPOSED PROJECT

The principal elements of the project consist of two reinforced concrete bulkheads, one (Bulkhead A) located at the head of the tunnel and the second (Bulkhead B) about 1,100 feet from the portal of the tunnel (see fig. 2), piping and appurtenances at the bulkheads, and a data recording system to monitor flow and pressure data at the bulkheads. Wiring for the data recording system extends from the flow tube and pressure gauge at each bulkhead to an instrument house located outside the tunnel (see fig. 5). In the tunnel, wiring will be anchored to the tunnel walls. At the portal, the wiring will be led to 2-inch plastic ducts buried in a trench extending along a new trail to the instrument house.

The instrument house will shelter flow and pressure data monitoring equipment, radio communication equipment and remote control equipment. The flow and pressure monitoring equipment will monitor the flow and pressure signals from each bulkhead. The radio communication equipment will provide two-way communication for transmitting data from the instrument house to DLNR's office in Honolulu.

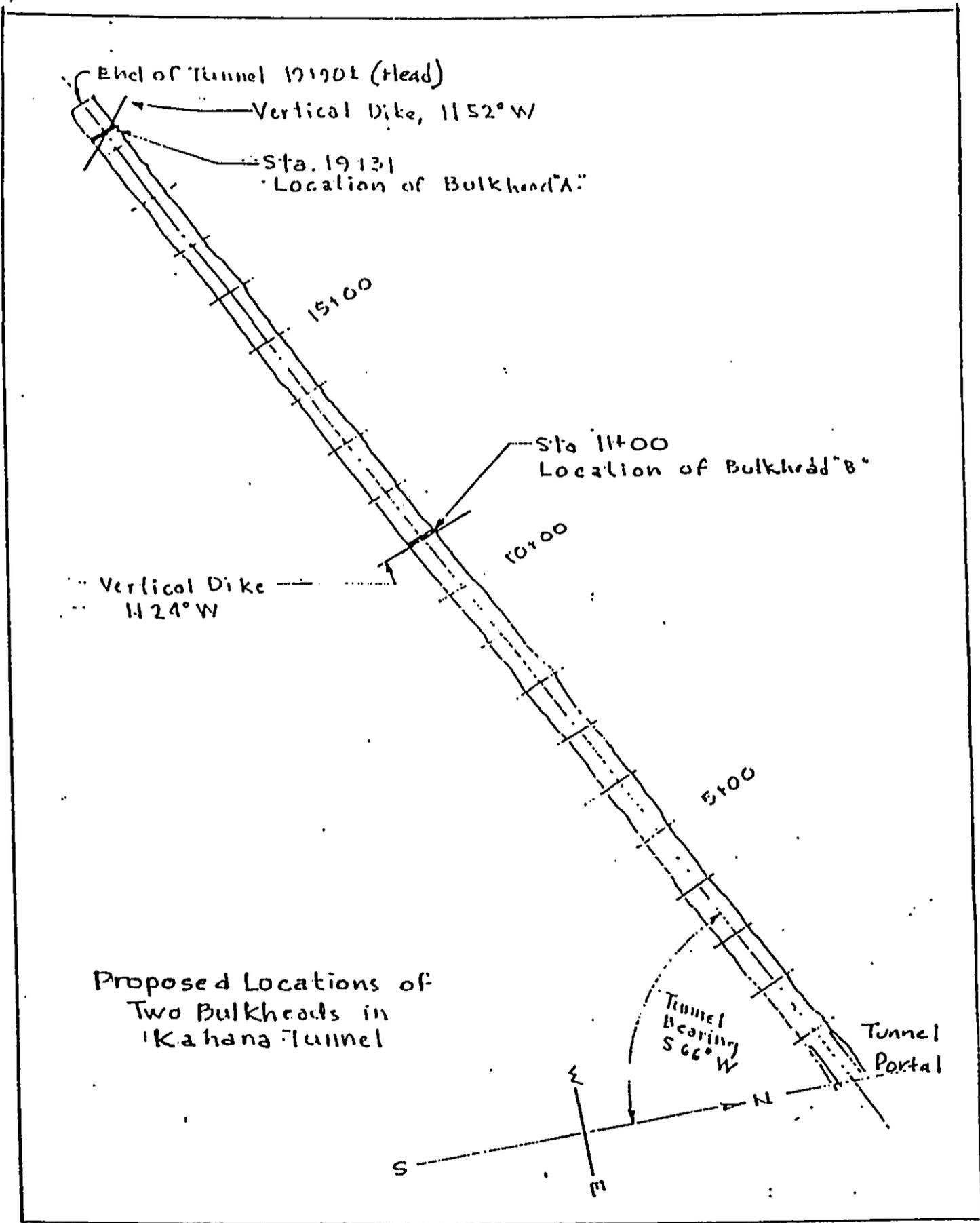


Fig. 2

The remote control equipment will enable flow regulation at the bulkheads via solenoid valves on the flow regulators. The system will draw power from a battery pack charged by 16 solar panels.

The instrument house will also contain converters which will transpose flow and pressure signals from the bulkheads to radio frequency and transmit them to the Honolulu Board of Water Supply's (BWS) 6.0 million gallon reservoir's instrument house in Kahana Valley. From this site, signals will be relayed via communication lines to BWS's Kahana wells and pump station and by Hawaiian Telephone Company's telephone lines to DLNR's office in Honolulu.

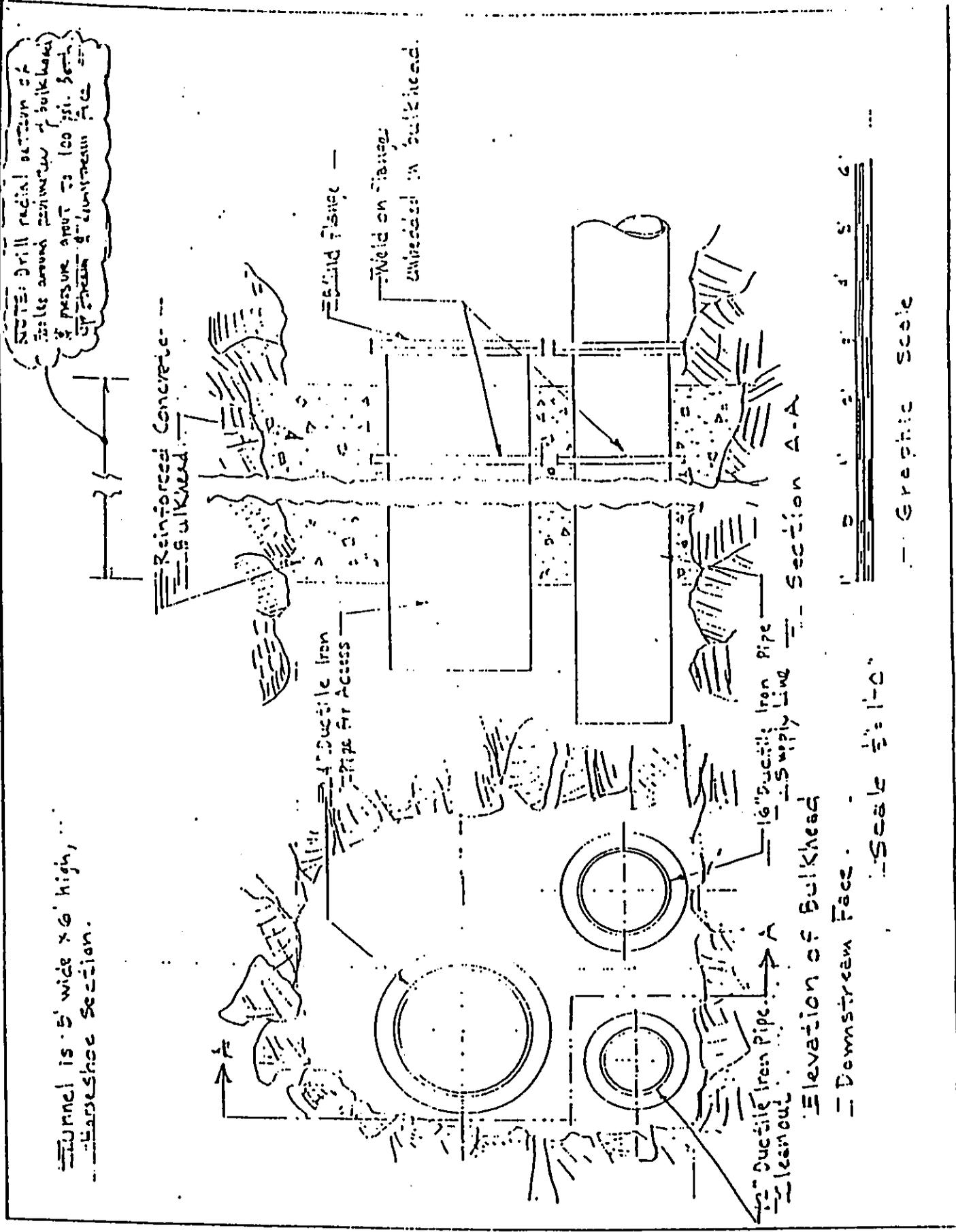
Tabulation, correlation, and interpretation of the flow and pressure readings will aid the State in making vital management decisions.

The dimensions of the tunnel where the bulkheads are to be located are roughly six feet wide and six to seven feet in height. The bulkheads will be of reinforced concrete, approximately three feet or more in thickness, and will be pressure-grouted against the dike and tunnel wall to provide ample bearing resistance.

Imbedded in the bulkhead will be piping for (1) a 16-inch ductile iron supply line, (2) a 24-inch ductile iron access opening with a bolted blind flange, and (3) a 12-inch ductile iron cleanout controlled by a gate valve and equipped with a pressure gauge. The supply line will be equipped with a gate valve, a flow tube, and a rate of flow controller. To provide stability against slippage, steel collars will be welded to all piping imbedded in the bulkhead.

The 16-inch supply line is designed to carry water developed in the dike compartments to the Waiahole Transmission Tunnel (see fig. 3 and 4). The 24-inch access opening will be for the purpose of allowing personnel to enter the dike compartments whenever necessary in the future. The 12-inch cleanout line will be located near the invert of the tunnel to permit cleaning out of the tunnel for any reason (see figs. 3, 4).

It will be necessary to extend the 16-inch supply line from Bulkhead A to Bulkhead B, a distance of about 900 feet, in order to control flows from storage upstream of Bulkhead A. That being the case, another 16-inch supply line must be installed in Bulkhead B in order to capture the supply developed and stored between Bulkheads A and B. Storage potential between these bulkheads is estimated at two billion gallons.



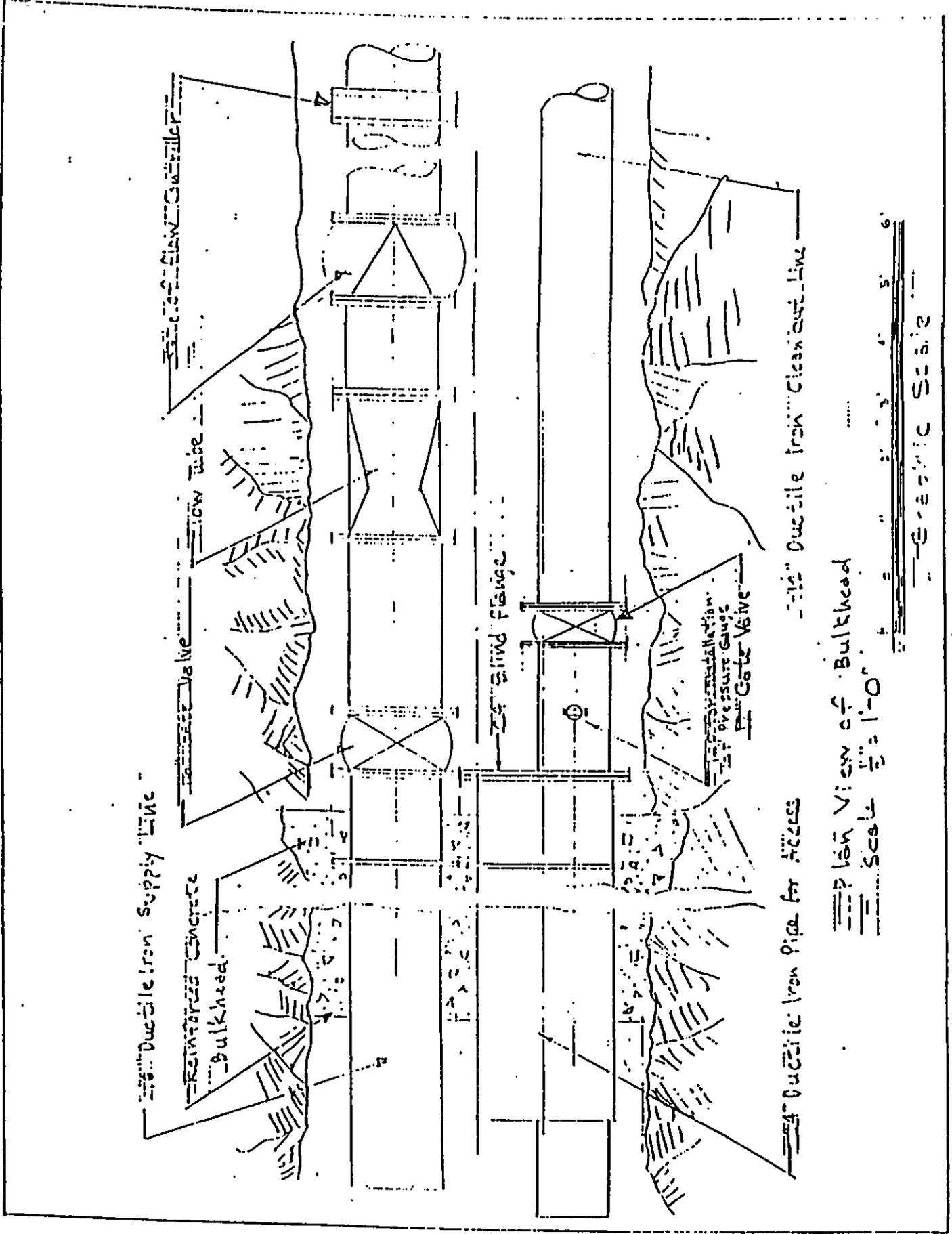


Figure 4

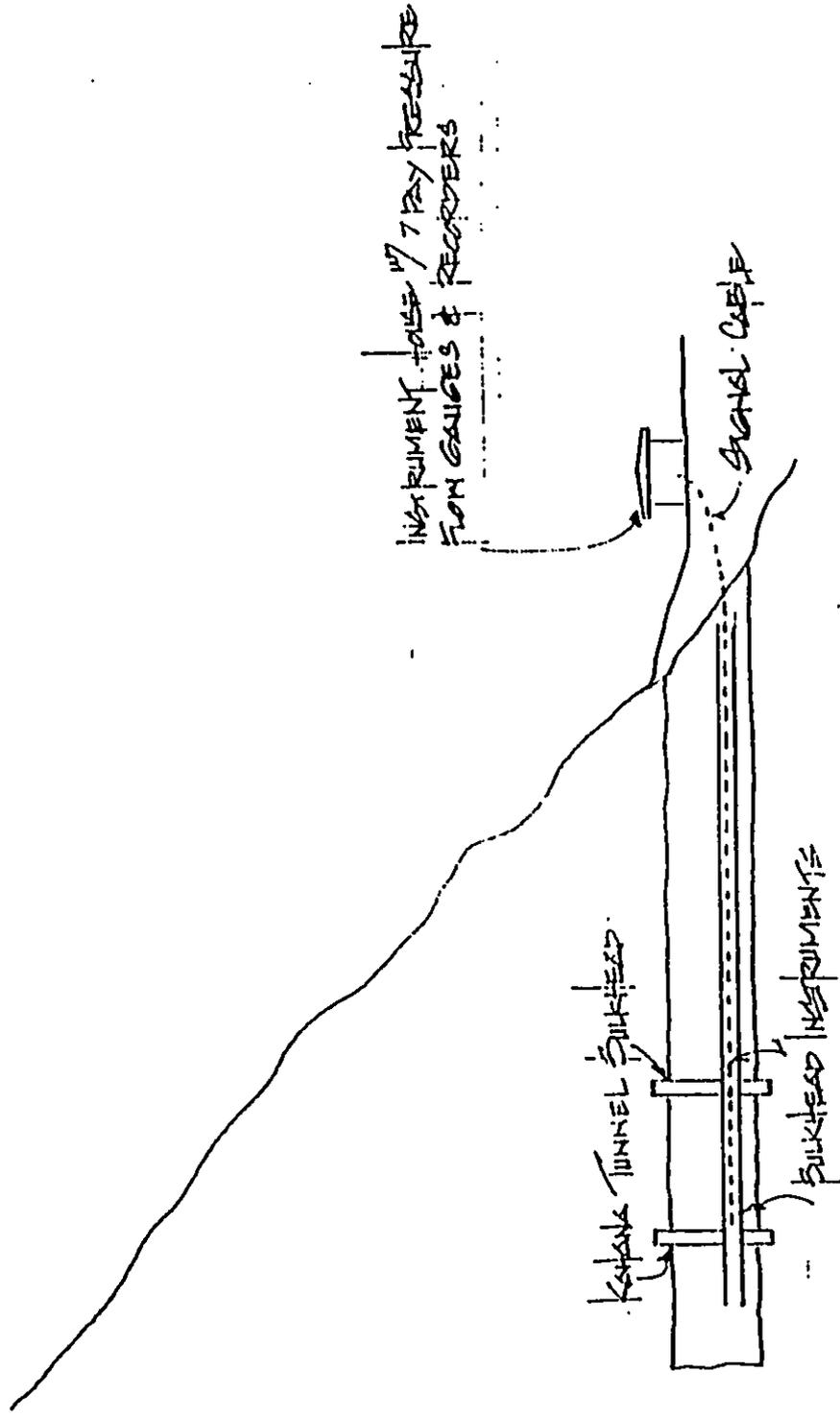


Fig. 5  
SCHEMATIC DATA RECORDING SYSTEM  
KAFANA TUNNEL PROJECT  
KOLAU LOA, OAHU, HAWAII

#### IV. PURPOSE OF PROJECT

The proposed project is designed to improve water service to users of the Waiahole transmission system. By installing two bulkheads in the Kahana dike system, it would be feasible to store water in the dike system behind the bulkheads during wet months when demands are low and to draw upon this storage when demands are high. If necessary, it would be possible to temporarily exceed mean flows in the transmission system to meet sudden and high short-term demands.

At present, flows in the Waiahole transmission system are not regulated. At times, water in the transmission system may not be fully used when demands are low. A data recording system to continually monitor flow and pressure data at the bulkheads will provide the State with information on storage supply. This information will enable the State to provide more dependable and possibly even increased water service to existing and future users.

When the bulkheads are completed, the estimated storage potential is about five billion gallons and the maximum rate of gravity discharge from the storage will be about five to six mgd.

V. DESCRIPTION OF THE AFFECTED ENVIRONMENT

The proposed bulkheads and piping system will be located entirely within the Kahana Tunnel in the State Conservation District (TMK 5-2-01:01). All of the valves, pressure gauges, and flow controllers will be located within the tunnel. The only exception will be a small (6'x 8') instrument house containing flow and pressure recorders and other equipment which will be located outside the tunnel. No residences and practically none of the natural environment will be disturbed (the closest resident is about three miles from the project site).

There is an area alongside the trail not far from the tunnel portal that is covered with low shrubbery and free of mature trees. With relatively minor ground preparation, this site will be used as a helicopter landing pad to be used primarily during the construction period.

An existing six-foot trail can be widened to eight feet to accommodate vehicles and equipment. This trail will be used as a temporary route for the transporting of equipment and materials from the helicopter pad to the construction site approximately 1,000 feet away.

Except for the helicopter pad and a trail leading to the tunnel and instrument house, no additional clearing, grading, or construction of roadways or trails is anticipated.

## VI. ARCHAEOLOGICAL CONSIDERATIONS

According to the Bishop Museum, the U.S. Army Corps of Engineers, and State Department of Land and Natural Resources, there is no record of archaeological sites found in the proposed project area. The Federal Registry has no record of archaeological or historic sites in the area. To date, all significant archaeological and historic findings have been confined to the lower areas of Kahana Valley, particularly at Huilua Fishpond which is located near the seacoast about four miles from the project site.

## VII. FLORA-FAUNA

- A. FLORA: According to a study done by the botany department of the University of Hawaii\*, the proposed project site is located in an area classified as the Metrosideros Woodlands. The trees in this area are usually the Acacia Koa and Ohia Lehua, with small scatterings of Psychotria, Hame, and Eucalyptus. The most abundant shrubbery and groundcover are Uluhe (Dicranoptius linearis) and Koster's Curse (Clidemia hirta). Small patches of loulou (Pritchardia sp.), hapu'u'i'i (Cibotium chamissoi), and hapu'u pulu (Cibotium spendens) can also be found. All of the above-named species are common and abundant. The Federal Registry has no listing of any endangered plants in the area.

Other than minor removal of scrub grass in the existing clearing to be used as a helicopter landing pad and clearing for a trail leading to the tunnel and instrument house, no other disturbance of the area is anticipated.

\* Kahana Valley Botanical Survey, 1973. Theobald and Wirawan, University of Hawaii Department of Biology.

B. FAUNA: Animals known to exist in the area are feral pigs, mongooses, feral cats and rats. Amphibians, such as toads and frogs, and reptiles such as skinks, geckos and the anolis lizard are fairly common in the area.

Introduced species of birds that may be found in the area include doves, Japanese white-eye, California linnet, white-rumped shama, mynah, bulbuls, melodious laughing thrush, cardinals, ricebirds and sparrow. Native birds such as the apapane may be found in the area. To a lesser extent, the amakihi, the elepaio and the iiwi may be seen at the elevation of the proposed project.

At the lower elevations of Kahana Valley, waterbirds such as the black-crowned night heron and cattle egret may be found in small numbers. Two endangered species, the Hawaiian coot and the Hawaiian Gallinule (mud-hen) have been observed in ponds at low elevations. The Hawaiian Owl (Pueo), the barn owl and wild ducks (Koloa) have also been seen in Kahana Valley but at relatively low elevations.

According to the Federal Division of Fish and Wildlife and the Army Corps of Engineers, there are no aquatic or marine animals or endangered wildlife in the area. Few species of fish exist in streams at low elevations. Mullet and milkfish may be found in ponds and stream estuaries, and forage fish such as swordtails, guppies, and gobies are fairly common in these streams, as are the oapu and opae.

In summarizing, there is no record of any endangered species of flora or fauna existing in the area of the proposed project. All evidence and testimony indicate that adverse effects on flora and fauna at the site would be nil.

### VIII. POTENTIAL ENVIRONMENTAL IMPACTS AND SIGNIFICANCE

Since the proposed project will be located almost entirely within the Waiahole and Kahana tunnels, no major environmental impacts, either long-or short-term, are anticipated. The following observations are pertinent to the project:

1. No additional excavation is planned outside of the tunnel. Minor adjustments in the wall of the tunnel at the bulkheads will need to be made to accommodate the bulkheads and pipe fittings.
2. There are no known significant historic or archaeological sites within the proposed construction area.
3. There are no threatened or endangered species of flora or fauna which will be affected by the proposed construction.

4. The instrument house will be small (6'x8'x7'). Field checks indicated that it would not be visible from the highway. Nevertheless, the area around the instrument house will be appropriately landscaped to keep the structure as unobstrusive as possible.
  
5. Limited short-term construction-related problems:
  - A. Dust: Very little dust, if any, will be generated by construction activities. Preparation of the helicopter pad and trail leading to the tunnel may give rise to a little dust but this can be kept under control by wetting down of the area.
  
  - B. Noise: The only noise of any consequence would be from helicopter operations. Use of helicopters would be restricted to daylight working hours. Since there are no endangered species of fauna in the area, adverse effects thereto would be moot.
  
  - C. Traffic: None, since transporting of materials, equipment and personnel to the site will be by helicopter.

D. Construction Washings into Ditch System: The contractor will be required to remove a few cubic yards of excess rock, concrete, and other loose material to an appropriate area outside of the tunnel. A gully outside of and close to the tunnel appears to be acceptable for this purpose. It is hidden by trees and is not visible to the public. A small amount of this material may inadvertently find its way into the ditch but the effect would be insignificant. There would be no hazard to public health since the ditch supply is not used for potable purposes.

6. Temporary decrease in flow from Kahana Tunnel:

After construction of the bulkheads and when storage is allowed to build up, the flow at the head of Kahana Tunnel would be committed to storage. With total diversion, the reduction of flow in Waiahole ditch would be about 8%. This flow reduction would be temporary until full storage is achieved or some arrangement is worked out between the State and the user (Oahu Sugar Company) to compensate for the reduction.

Assuming a storage buildup rate of 2.4 mgd (p. 27 of Engineering Report) and a fully recovered storage of three billion gallons, the length of time required to achieve full storage would be greater than three years.

Upon the completion of construction, a series of tests, over a period of at least a year, involving a correlation of flows, water level fluctuations, rainfall and pressures will be made. The results of these tests should give management a basis for decision-making in the storing and releasing of the water supply and how the needs of the State and its principal user, Oahu Sugar Company, can best be met.

The contractor will be required to observe all State and County standards and regulations regarding noise, dust, safety, drainage, and general sanitation.

IX. ALTERNATIVES TO PROPOSED PROJECT

1. DO NOT PROCEED WITH PROJECT. This is not compatible with the State's plan to eliminate waste during periods of high flows and low demand by storing water behind bulkheads and to draw upon this storage to meet high and fluctuating needs. Management needs this operating tool to provide flexibility to meet needs under varying conditions.
  
2. BUILD ONE OR MORE STORAGE FACILITIES TO STORE AN EQUIVALENT QUANTITY OF WATER. A rough rule of thumb for the cost of such facilities is close to a million dollars per million gallons of capacity. Obviously, the cost of building storage facilities of equivalent storage capacity would be astronomical. Moreover, even if funds were available, the adverse environmental impact of the sheer number of these facilities should obviate further consideration of this alternative.

X. SUMMARY AND RECOMMENDATIONS

1. Construction of Bulkheads A and B should proceed to enhance water conservation and to provide management with a means to regulate flows under varying degrees of demand. Water service to users will be improved.
2. Practically all work will be done within the tunnel system. The only external work will be some clearing for a helicopter landing area and trail to tunnel and instrument house, the unloading of materials by the helicopters, and the transporting of equipment and materials to the tunnel.
3. The proposed construction area has no known historic or archaeological sites.
4. There are no known endangered species of fauna or flora in the construction area.

5. There are no significant and negative long-term environmental impacts resulting from this project.
  
6. Short-term construction-related environmental problems consisting primarily of dust and noise would be few and limited. These problems would be temporary and could be controlled. The contractor will be cautioned to keep any loose material from entering the ditch system.

Any loose material entering the ditch system should not produce a water quality problem. Whatever turbidity which may develop would be virtually eliminated because of dilution and long flow time in the ditch. The flow in Kahana tunnel is only a fraction of the total flow in Waiahole Ditch. The length of the ditch is more than 20,000 feet, or nearly four miles.

## XI. FINDINGS AND DETERMINATION

The proposed action will have the following environmental effects:

1. In order to build up storage at the bulkheads, it will be necessary to reduce or cut off flows at the bulkheads. At bulkhead (A), the base flow is about 1 mgd, while at bulkhead (B), the combined flow is about 2.4 mgd. Any diminution in flows will be temporary and revocable at the option of the State. A series of flow tests will determine what operating option would best meet the needs of the State and its principal user, Oahu Sugar Company.
2. At shorter distances, the instrument house would probably be visible. However, this can be mitigated by proper landscaping with trees and shrubbery. At greater distances, especially from residential areas, the house would not be visible.
3. Short-term construction-related problems on noise, dust and turbidity in the ditch would be insignificant, temporary and controllable.

The proposed action will not affect any endangered species of flora or fauna. It will not involve an irrevocable commitment to loss or destruction of any natural or cultural resource, nor will it result in any environmental degradation. There would be no detrimental effects on public health as it relates to sanitation, air quality, ambient noise levels, dust, etc.

In view of the above, it is determined that the proposed action will not have a significant effect on the environment and that an Environmental Impact Statement is not required under Chapter 343, Hawaii Revised Statutes.

XII. PERSONS AND AGENCIES CONTACTED

<u>PERSON</u>	<u>AGENCY</u>
Toni Hahn	Bishop Museum
Dr. Joyce Bath	State DLNR
Chuck Streck	U.S. Army Corps of Engineers
John Ford	U.S. Division of Fish and Wildlife
Andy Yuen	U.S. Division of Fish and Wildlife
Ralph Saito	State Biologist - DLNR
Winona Char	Char & Associates
Peter Galloway	U.S. Army Corps of Engineers
Audrey Newman	Nature Conservatory
John Emerson	U.S. Army Corps of Engineers
Dr. Wayne Gagne (dec. 1988)	Bishop Museum

XIII. REFERENCES

- |   |   |
|---|---|
| 1. Kahana Valley Botanical Survey<br>March, 1973  | Theobald & Wirawan<br>U.H. Department of<br>Biology                               |
| 2. EIS - Kahana Valley State Park<br>August, 1978   | State DLNR  |
| 3. Evaluation of Major Dike-<br>Impounded Ground-Water<br>Reservoirs, Island of Oahu,<br>1985 | U.S. Geological<br>Survey Supply<br>Paper 2217:<br>K.J. Takasaki and<br>J.F. Mink |