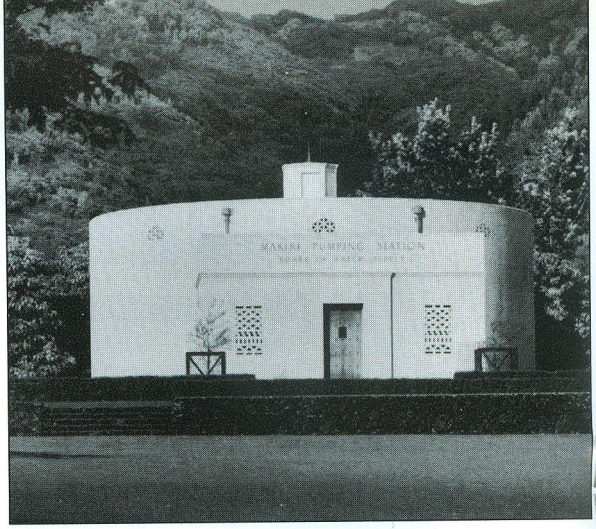
Water supply facilities boast unusual architecture

Oahu Pumping Stations

by Raymond H. Sato



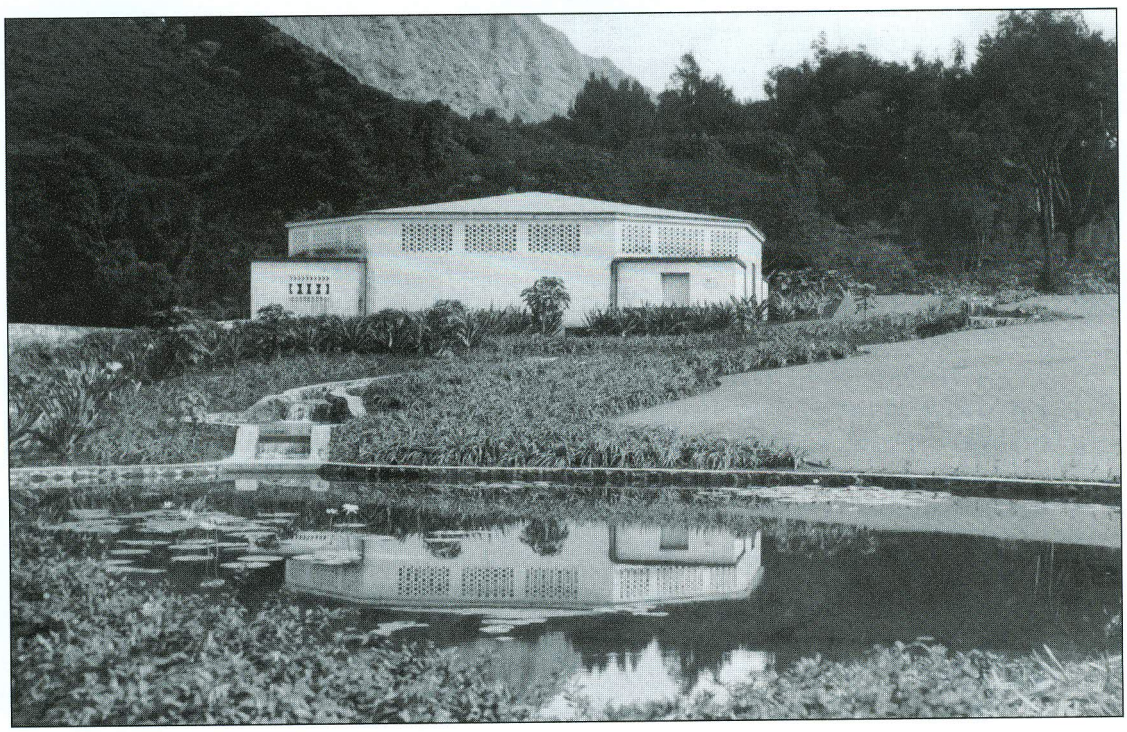
The Makiki Pumping Station, built in 1935, is an example of a building permanently integrated into its environment.

Some of the least-noticed public structures on Oahu are the hundreds of Board of Water Supply pumping stations, reservoirs, booster stations and administrative buildings, many of which are somewhat camouflaged by shrubbery or painted with colors that blend with their surroundings.

The Honolulu Board of Water Supply's Beretania Public Service Building, 630 S. Beretania St., is an example of architecture that has won national and local recognition for its design. As administrative headquarters, this building is the heart of major operations for the island's water systems. It was designed by Hart Wood, FAIA, in 1951 and completed shortly after his death in 1957.

Numerous other water facilities are tucked away in neighborhoods and in the "backwoods" of urban and suburban Honolulu. Many of these display unusual architectural features that set them apart from typical utility structures. They demonstrate the Board's early commitment to high quality design work on its pumping stations which began with the hiring of Hart Wood for its design work in the 1930s.

On Oahu, there is a unique water supply because of the island's natural environment. Water is plentiful because of the towering Koolau mountain ranges, the geology of this island and its location in the Pacific. Oahu intercepts the Pacific trades carrying moisture toward the island.



The Upper Nuuanu Aerator, built in 1935, was originally designed so that passersby could see the machinery at work.

An average of two billion gallons of rain falls on this island daily. Of that, approximately one-third is used by vegetation and lost through transpiration. Another third runs off into the ocean through streams, or evaporates. The remainder seeps into the slopes of the Koolaus and slowly percolates through the porous lava rock that stores it as ground water, much like in a sponge.

It takes about 25 years for rainwater to filter down through the Koolaus into island aquifers. In the process, Oahu's water is naturally purified. Because it is stored underground, island water is considered to be very good quality and requires little or no treatment to make it safe for drinking.

Because fresh water is lighter than sea water, this fresh water "floats" atop the body of salt water which is absorbed into the base of the island. This water is drawn out through wells and shafts, and pumped into reservoirs and transmission mains around the island.

Electric pumps create suction to draw water out of wells into pipelines that carry the water to higher elevations, where it is stored in reservoirs along island hillsides. As consumers turn on the tap, water is released from the reservoirs into distribution systems through gravity flow.

The Board's average water production is about 157 million gallons daily in a normal year. The Board serves an estimated 1 million people and provides water for domestic consumption, fire protection, industrial, commercial, institutional and agricultural use.

As the population continues to grow, the demand for water will increase accordingly. Development of the second urban center at Ewa is a masterminded effort in which water supply plays an integral role. During the next 20 years, an estimated 15 million gallons per day will be needed to support the new Ewa communities.

Some of that demand is being met from supplies imported from the Pearl Harbor aquifer, as well as from sources within the Ewa area. Additional water may be available with the ending of some plantation activities, and the resulting decrease in pumpage from the Pearl Harbor and Ewa/Waianae aquifers.

Natural population growth in the years ahead will require the populace on Oahu to use water more efficiently and require the Board of Water Supply to develop additional water by:

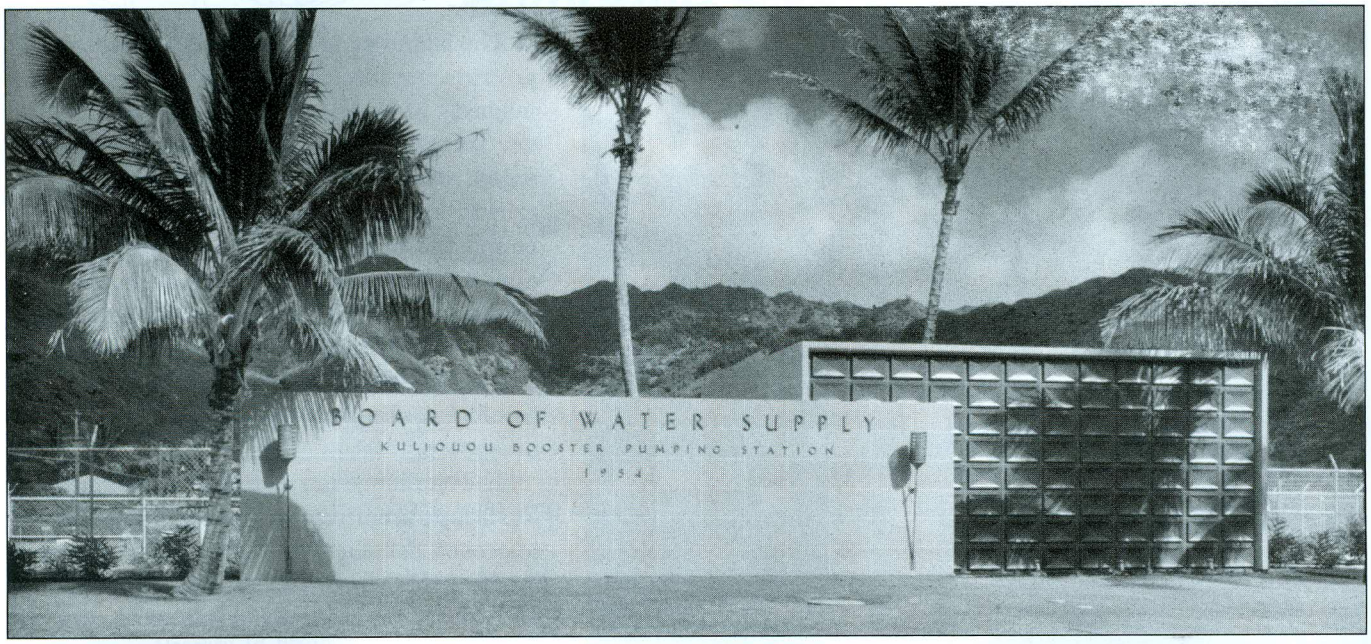
- Developing additional ground water resources.
- Developing non-potable sources for irrigation and non-domestic use.
- Implementing demand management—promoting efficient water use through conservation practices, retrofitting to more water-efficient plumbing fixtures, conversion to xeriscaped landscapes and discouraging water waste wherever possible.

"The development of the island's water supply may include the larger development of desalinization plants," said Glenn Mason, AIA, of Spencer Mason Architects.

Campbell Estate and the Hawaii State Department of Land and Natural Resources built a demonstration desalinization plant near Barbers Point Naval Air Station as part of Campbell's development of the Ewa plain. A desalinization plant also has been in use by the Kona Village Hotel on Hawaii for a number of years.

"These types of facilities are a new building type and form which may become increasingly more important on Oahu and areas of other islands where water supplies are severely limited," Mason said.

↔ Raymond H. Sato is manager and chief engineer of the Honolulu Board of Water Supply.



The Kuliouou Line Booster Pumping Station, built in 1954, boasts the most contemporary design by Hart Wood, FAIA, and Edwin Weed. Its more technological look was designed to reflect the machinery housed within it.