

**Client:**  
City and County of  
Honolulu, Hawaii

**Project Name:**  
Sand Island  
Wastewater  
Treatment Plant

**Project Duration:**  
2000–2006

**Project Cost:**  
\$170 Million

**Parsons  
Responsibilities:**  
Construction of  
Plant Expansion  
and Improvements



The Sand Island Wastewater Treatment Plant (SIWWTP) is the largest wastewater treatment facility in the state of Hawaii, and it will serve metropolitan Honolulu, Waikiki, and the outlying suburbs.

In 2000, Parsons was awarded the two largest public works contracts in the history of the City and County of Honolulu: (1) the SIWWTP Disinfection Facility and Effluent Pump Station Project; and (2) the SIWWTP New Headworks and Primary Clarifiers Project. The total combined value of both projects exceeds \$170 million.



*Parsons carpenters prepare an interior formwork panel for hoisting. This was the first of 72 wall pours for the two-each 140-foot diameter cast-in-place primary clarifiers.*

The two projects will increase the daily average plant capacity from 82 million gallons per day (mgd) to 90 mgd and will increase wet weather capacity from 210 mgd to 270 mgd. They will also reduce pathogenic organisms in plant effluent through the introduction of ultraviolet (UV) disinfection treatment and improved process efficiencies.

As the general contractor for the two projects, Parsons constructed the new effluent pump station and UV disinfection facility including the installation of four new effluent pumps and four channels of UV light disinfection units, along with ancillary systems and standby generators. It also included the installation of twin 96-inch diameter, 300-foot-long concrete pipes preceding the UV treatment system.

Construction of the new headworks facility included an effluent pump station and two new clarifiers, each constructed out of poured-in-place concrete and housed with the latest process technology. Headworks facility construction included a new influent receiving box, six new screening channels, four new aerated grit chambers for sediment removal, and the installation of biofilter trickling filters and catalytic carbon scrubbers for hydrogen sulfide gas reduction.

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*Approximately 17 feet below grade, and 9 feet below the Pacific Ocean, Parsons mechanical crews lay a twin-78-inch reinforced concrete pressure pipeline on top of a jet-grouted trench bottom.*

One of the project's most significant challenges was managing groundwater intrusion. Wet well and pipeline installations required excavations as deep as 27 feet below sea level into highly-porous coral formations. In order to combat the ocean inflow, Parsons used water removal and disposal methods including jet grout installation, sumping, deep well installation, filtration ponds, and injection wells. The jet grouting process was used throughout the project as a means of preventing groundwater infiltration and providing a foundation for the structures above. A majority of the jet grouting was owner-designed; however, Parsons field engineers were required to design several specialty installations around active sewer



*This 70,000 lb. vertical turbine pump shaft required two cranes to lift it off the ground. This first pump of four was successfully hoisted into its final location by Parsons crews.*

force mains, which were as large as 84 inches in diameter.

As is typical for construction, disposal of the groundwater was much more difficult than the removal of the water. In order to dispose of the water, Parsons installed 60-foot-deep injection wells, which allowed the construction water to be pumped into the well at ground level and dispersed through a 100 mil (1/100 of an inch) slotted casing 40 feet below the surface. In order to keep the wells from clogging, Parsons used a series of filters along the discharge route to remove coral granules. If the coral granules are not removed, the wells would be useless.

The project's second challenge was the discovery of contaminants within the soil. This is a common occurrence in Hawaii, especially at this jobsite, which is a man-made island. Parsons was able to assist the owner in self-performing removal of the contaminated soils, thus minimizing impact to the project schedule. After removal of the soils, the project resumed.

The project is currently in the start-up and tie-in phase, and onsite field engineers are spending countless hours scheduling the necessary phasing and sequencing. The conversion of flow into the new headworks and effluent pump station has been coordinated and timed precisely so that wastewater will not be discharged into the outfall. This involves a series of hot taps into the existing and live concrete pipes and installation of stopples to divert flow to the newly installed pipelines. The outfall is located approximately 2 miles offshore in 240 feet of water.



*Looking at an influent 96-inch pipeline to the Screening Facility, Parsons crews have staged the falsework for cast-in-place walkways above the future wastewater flow.*

Both projects are expected to be on line by the end of 2005. The upgraded facility is an important part of the City and County of Honolulu's efforts to continue to meet federal Clean Water Act regulations.