

CHANGI PROJECT BREAKS NEW GROUND

Singapore's islandwide wastewater system overhaul in full swing

Groundbreaking occurred in late May for the Changi Water Reclamation Plant—a major component of a massive project CH2M HILL is working on that will replace virtually all of Singapore's wastewater system.

The Deep Tunnel Sewerage System includes two immense underground tunnels that will move the island's wastewater to the Changi and Tuas treatment plants. Once completed, these state-of-the-art facilities will replace six smaller plants.

Much of the Changi facility will be underground and will take up less than one-third the area needed for a conventional design; an important factor considering the 248-square-mile island currently has more than 4 million residents.

A CH2M HILL-Parsons Brinckerhoff joint venture, formed in 1996, is the project manager for the deep tunnel system. Initial work began in 1997 and

included feasibility studies along with conceptual and preliminary designs.

Less than three years later, CH2M HILL, assisted by PWD Consultants of Singapore, a firm with expertise in Singapore infrastructure development, was selected to design and manage construction of the Changi plant, which will be completed in 2008.

Project size is striking

Initially, the Changi facility alone will treat more than 211 million gallons per day and will be expandable to 634 million gpd.

Influent will flow through the north tunnel to the Changi facility, where it will then enter the pumping station, which consists of three underground shafts, each the size of a 20-story building. After passing through the screen shaft, influent flows to one of the pump shafts, each of which has five pumps. Each pump can move 106 million gpd.

Once the effluent enters the plant, liquids treatment will take 12 hours. Some of the processed water, which will meet the highest international standards for discharge, will then flow through an underground pipe to about 115 feet below sea level and will be dispersed in the Straits of Singapore. The remainder of the effluent will be further processed at the facility and used for cooling and washing equipment and chemical preparation.

The client, Singapore Public Utilities Board, plans to further treat the effluent to an ultrapure state, which can then be used in microelectronics manufacturing and other high-tech industries. CH2M HILL designed, managed construction and led performance studies of the first pilot NEWater plant. Deemed a success, the utilities board plans to soon build four plants, and CH2M HILL has been selected as the designer for the first two facilities.



Deep Tunnel pursuit pays off

General consensus among competitors in 1996 was that CH2M HILL, "the new kid on the block" in Singapore, would not stand a chance of winning the island's Deep Tunnel Sewerage System project. They now know better.

CH2M HILL staff worked in Singapore for more than a month preparing the proposal. This gave employees the opportunity to frequently meet with the client and build trust.

The proposal, which was second lowest among the competition, was submitted to the client in August 1996. Other than an occasional request for additional information or clarification, no word was heard from the client until the following January.

John Filbert, who was closely involved in the original proposal effort, was traveling through Bangkok on his way from Europe to Australia when he checked voice mail and learned that the proposal had been accepted.

"I immediately canceled the rest of my itinerary and headed to Singapore," Filbert said. "We negotiated a project start date (Feb. 22, 1997) for Phase 1, which included feasibility studies and conceptual design, to be delivered by November and Phase 2 (preliminary design and tender documents for subsequent phases) to be delivered by Nov. 22, 1998."

Some of the reasons the client selected CH2M HILL include:

- More professional hours per unit of cost
- The quality of the easy-to-read proposal
- An already established working relationship
- Senior executives willing to come to Singapore and work directly with the client
- Desirable work processes and technologies

Demonstrating the future of Changi



CH2M HILL assisted the Singapore Public Utilities Board with the Changi Water Reclamation Plant ground-breaking ceremony, which was held in May at the site of the facility's planned pumping station. Marketing staff, graphic designers and 3-D CAD technicians produced a video, two brochures, 15 posters and several demonstrations for the event.



Once completed, the Singapore Deep Tunnel Sewerage System will replace the island's primary wastewater conveyance system and treatment facilities. At right, the Changi Water Reclamation Plant is one of two planned facilities that will replace six smaller plants.