

AWPCA 2004 WASTEWATER PROJECT OF THE YEAR

By Jerry Green, City of Phoenix and Jeff Cowee, Greeley and Hansen, LLC

CONGRATULATIONS TO THE PROJECT TEAM OF THE CITY OF PHOENIX, GREELEY AND HANSEN, AND ARCHER WESTERN CONTRACTORS.

23rd Avenue Wastewater Treatment Plant Headworks Modifications, Influent Pump Station, Influent Interceptor Upgrade, and Durango Street Improvements

In May 2003, the City of Phoenix Water Services Department successfully placed into operation a \$40- million project designed to address the aging interceptor infrastructure, reduce sewage flow impounding in the interceptor system, accommodate future sewage growth in the service area northeast of the Durango Curve, mitigate odorous conditions, reduce the potential for storm-related back-up in the lower portion of the system, and reduce the quantities of rock and other sewage borne debris entering the 23rd Avenue Wastewater Treatment Plant. Everyone from the local residents and Hamilton School, to the Arizona Department of Transportation (ADOT) and the City of Phoenix, view the project as a success.

The City of Phoenix 23rd Avenue Wastewater Treatment Plant Headworks Modifications, Influent Pump Station, Influent Interceptor Upgrade and Durango Street Improvements Project design team was lead by Paul Kinshella and Jerry Green with the City of Phoenix Water Services Department, John Hauskins with the ADOT, and Kevin Conway and Jeff Cowee of Greeley and Hansen, LLC with support team members from Archer Western Contractors, Nabar Stanley Brown, Aztec Engineering, C. F. Shuler, Logan Simpson Design, Speedie and Associates, and Ruth Copeman-Carll the Desert Botanical Garden.



Wastewater Project of the Year award recipients (L to R): Jeff Cowee, Greeley and Hansen, Paul Kinshella, City of Phoenix, Mike Lauer, City of Phoenix

Two major components of the project were the routing and design of the interceptor system and the design and hydraulic model testing of the 180 million-gallon per-day trench style self-cleaning pump station.

Route selection was complicated by the location of Interstate Highway 17 (I-17) isolating the treatment plant from the service area, congested utility rights-of-way, heavily traveled surface street freeway underpasses and access ramps, and the impact on Hamilton Elementary School. An Intergovernmental Agreement (IGA) between ADOT and the City of Phoenix and agreements between the City of Phoenix and the Murphy School District, Salt River Project, Arizona Public Service, Southwest Gas, and Cox Communications were required for the project to proceed.

As part of the IGA, several major design and construction challenges were overcome. Both the elevated and depressed portions of I-17 in the area of the Durango Curve were crossed with three new liner-plate tunnels constructed to install the new 72-inch interceptor along the north side of I-17 and transport flow under I-17 and into the treatment plant. Numerous utilities in the intersection of I-17 and 19th Avenue were modified including 96-inch and 36-inch storm drains, 48-inch and 36-inch irrigation pipes, a 6-inch high-pressure natural gas pipe, and fiber optic communications lines. The intersection of I-17 and 19th Avenue and the I-17 off-ramp remained open to traffic during the 30-day construction and installation of a custom designed, eight-piece precast junction and diversion structure designed to rapidly implement these modifications. The construction duration and operability goals of the IGA were accomplished.

The project disrupted an educational garden area managed by the Hamilton School C.H.A.M.P.S. students due to the installation of the interceptor pipeline installed under the length of the garden. The C.H.A.M.P.S. students designed a renewal of the garden that was named the "Learning Tree Plaza" and incorporated five unique educational garden types. Additional improvements were the installation of storm drains, improved street lighting, construction of a cul-de-sac to replace a heavily trafficked street separating Hamilton School from the Plaza, and walls to separate the Plaza from the heavily traveled I-17 frontage road.



Linear Plate Tunnel

The trench style self-cleaning pump station design, designed in accordance with the Hydraulic Institute Standards, was subjected to a 1/8 scale hydraulic model testing with the objective of minimizing hydraulic anomalies (vortexing) while maximizing the self cleaning capabilities of the wetwell design. Hydraulic model studies confirmed that surface vortexes were not apparent throughout the range of anticipated flows and water depth. However, the modeling did identify that anti-vortexing baffles were required to prevent sidewall and floor

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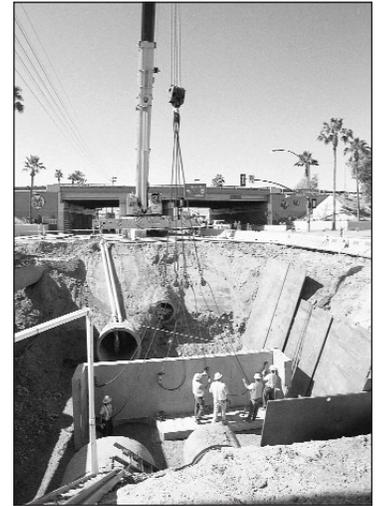
the self cleaning capabilities of the wetwell design. Hydraulic model studies confirmed that surface vortexes were not apparent throughout the range of anticipated flows and water depth. However, the modeling did identify that anti-vortexing baffles were required to prevent sidewall and floor vortexes and to reduce the amount of swirl experienced by the modeled pumps.

Improvements also included construction of an odor control system for the interceptor concurrently with the construction of the new self-cleaning influent pump station, rock traps, screens, solids handling and truck loading facilities, and other modifications to the headworks area of the 23rd Avenue Wastewater Treatment Plant.

Greeley and Hansen successfully placed the facilities into operation in May of 2003 and operated the facilities for sixty days prior to turning operation over to the plant staff.



45-MGD Pump



Precast Junction Structure