



WATER QUALITY IN THE WORKS

Engineering News-Record spotlights the Orange County Sanitation District's \$3 billion wastewater treatment expansion in the October 23 issue. Go to ENR.com.

Protecting the Pacific: Orange County's tour de force program

In 2002, in response to residents' concerns regarding ocean water quality and beach contamination, the Orange County Sanitation District Board of Directors voluntarily committed to treat wastewater to secondary treatment standards. The district, the third largest wastewater agency in the western United States, serves more than 2 million customers in southern California.

This commitment to treat wastewater and rehabilitate existing and aging collections and treatment-plant infrastructure resulted in the development of a \$3 billion capital improvement program.

It involves more than 30 design firms and 20 contractors, with 145 projects ranging in size from \$50,000 to \$250 million. The work is scheduled to be complete by 2020.

Integrated Program Management Consultants, a CH2M HILL joint venture with Parsons, is the program manager. CH2M HILL's Jag Salgaonkar is the program manager and Fred Michael is the team's program controls lead.

"The district's capital improvement program is one of the largest in the county," Salgaonkar said. "By March 2007, nearly \$1.5 billion in construction will be taking

place, with spending reaching \$1.2 million per day. To put this in perspective, if the district was a private company, its 45 percent annual growth rate since 2003 would put it in *Fortune's* Top 100 fastest growing companies!"

The program team is tasked with designing, constructing and commissioning new facilities, while keeping existing facilities in operation, making the work at operating facilities very challenging from both construction and operations standpoints.

"To more effectively deliver the program and its many individual projects, we developed a unique project

delivery system based on the Project Management Institute's *Project Management Book of Knowledge*," Michael said. "The system provides a rigorous and methodical approach to project management that ensures all projects are planned, designed and constructed under budget and within schedule."

Project managers Dave May and Gino Rapagna were instrumental in developing a risk-based capital budgeting approach which uses Monte Carlo, a simulation analysis technique, to quantify risk on large complex projects. This risk analysis increases the level of confidence in individual

project and program costs, improves financial planning for rate setting and debt issuances and enhances communications with stakeholders on costs and associated risks.

"The program, under the leadership of Jag Salgaonkar, has provided exceptional people, tools and processes to deliver our projects under budget and on schedule," said Matt Smith, director of OCSD's program management office.

To further meet the challenges of this large program, the team is located with client staff to ensure efficient delivery. The team also developed "how-to" manuals for project managers,

project controls staff and construction managers to ensure consistency and discipline in program delivery. Preparing communication plans and team chartering create strong alliances and common goals among team members and between district staff and consultants.

Since beginning work on the program, CH2M HILL, as a member of Integrated Program Management Consultants, has met or exceeded all performance metrics to date. The program is under budget by more than \$100 million and all projects associated with the move to secondary treatment standards are ahead of schedule. 



▲ Each section of the 108-inch diameter pipe of the Bushard Trunk Sewer weighs 82,000 pounds.

▼ Workers place reinforcing steel into the slab of the diversion structure; four trunk sewers will enter the new headworks at this location.



▲ The microfiltration facility at the Groundwater Replenishment System includes a research center (covered slab) for continuing studies of water treatment methods to ensure the best quality water possible is recycled into the groundwater basin.

► Laying the 108-inch-diameter pipe requires big equipment and careful planning to ensure maximum safety precautions are taken.



◀ The ultraviolet light disinfection facility is another major component of the groundwater replenishment system.



About Orange County Sanitation District

The OCSD is the third largest wastewater agency west of the Mississippi, with a 471-square-mile service area and 2.3 million customers in 21 cities and 3 special districts. Other facts:

- 475 miles of interceptor sewers and trunk lines
- 17 off-site pump stations
- Average of 240 million gallons per day treated
- 10-foot-diameter, 4.5-mile offshore pipeline for ocean disposal
- Generation of 13,200 kilowatts of energy from burning methane produced as a plant byproduct and natural gas to power all plant operations

Delivering a \$3 billion enterprise program

CH2M HILL's company-store approach has allowed quick mobilization of highly qualified staff:

- **Water Business Group:** program and project managers
- **Engineering-Procurement-Construction:** construction inspectors, resident engineers, schedulers, cost estimators, construction managers, value engineers and constructibility reviewers
- **Services from across the firm include:**
 - environmental planners
 - community outreach specialists
 - design managers
 - operations and maintenance specialists
 - macroeconomics specialists
 - communications and risk management
 - accounting



The ribbon-cutting ceremony for completion of the new clarifiers and rehabilitated trickling filters; the first of seven EPA secondary treatment consent decree milestones met.



Pictured are 22 of the 27 CH2M HILL employees who work directly with OCSD staff. The district serves more than 2 million customers in southern California.

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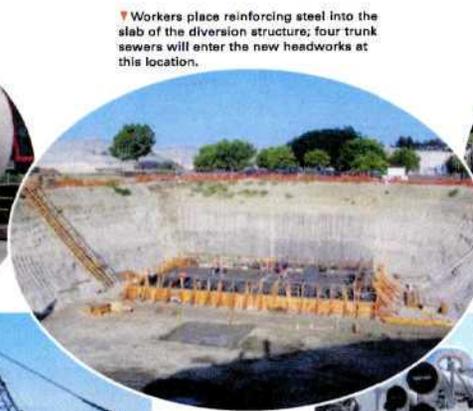
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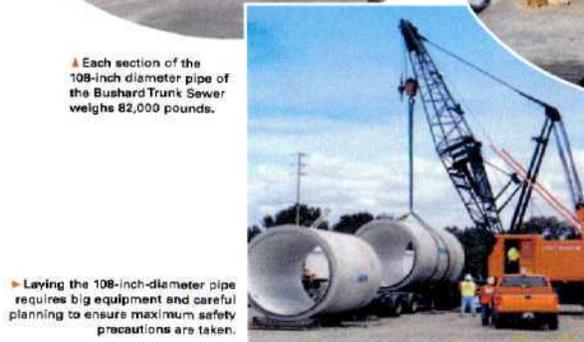
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