

FOCUS: SEWER

GETTING TOUGH ON I&I

The Vallejo Sanitation and Flood Control District uses pipe bursting as a key technology in an aggressive program to tighten its sewers

By *Scottie Dayton*

Heavy rains were overwhelming the Vallejo (Calif.) Sanitation and Flood Control District sewers and bypass systems, sending untreated sewage into San Francisco Bay during the largest storms and leaving the district vulnerable to a third-party lawsuit.

The district spent \$60 million on improvements that included upsizing interceptors, rehabilitating laterals and reducing inflow and infiltration (I&I). It also built a 3-million-gallon storage tank at the largest pump station and a 9-million-gallon storage basin at the Ryder Street wastewater treatment plant.

The capital improvement projects reduced sanitary sewer overflows (SSO) from 333 in 2000 to 45 in 2009. Average dry-weather flows decreased from 12 mgd to 9.3 mgd. The collection system achievements helped the district earn a 2007 Silver Peak Performance Award and a 2008 Gold Peak Performance Award from the National

Association of Clean Water Agencies (NACWA) for permit compliance.

Roots and I&I

The district, one of only three such independent state agencies, maintains 413 miles of 4- to 60-inch sanitary sewers comprising clay, concrete, PVC and HDPE pipe, and more than 100 miles of 4- to 6-inch laterals. The agency provides sewer and flood control services for the city of Vallejo, Mare

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Island, Sky Valley and unincorporated parts of Solano County.

“We’re unique in that we are responsible for the lower laterals; those running from the property line or public right-of-way to the sewer,” says field operations superintendent Andy Jannings. “Home-



Collection systems technician/equipment operator Don White and collection systems technician Justin Keating assemble the pipe bursting system from TRIC Tools. (Photography by Shawn Miller)



PROFILE:

Vallejo (Calif.)
Sanitation and Flood
Control District

FOUNDED:
1952

POPULATION SERVED:
120,000

AREA SERVED:
26 square miles

WASTEWATER FLOW:
9.3 mgd average dry weather

EMPLOYEES:
28 (field operations group)

INFRASTRUCTURE:
413 miles of sewer; 10,715
manholes; 28 lift stations

ANNUAL BUDGET:
\$27 million

WEB SITE:
www.vsfcd.com

owners are responsible for the upper laterals, those running from our jurisdiction back to the house. In the case of easements, we take responsibility for the last five feet of pipe, provided it has a cleanout.”

As the mainline improvements continued, the field operations group reported significant I&I and root intrusion coming from clay laterals in the older areas of town, and especially those in easements. “Developers gave no thought to

preventive maintenance when they built these communities,” says Jannings. “They ran laterals and mains through backyards and up hillsides, making many inaccessible.”

In 2003, the district began evaluating trenchless technologies. “Contractors rehabilitated several

thousand feet using pipe bursting, cured-in-place pipe liner, and spiral wound,” says Jannings. In several



Collection systems technician Jose Herrera operates the power rodder from OK Champion Corp.

PIGGYBACK BIDDING

When the Vallejo Sanitation and Flood Control District wants to purchase equipment, field operations superintendent Andy Jannings searches for cities that have done the bid work for him.

“Being a public agency, all purchases go out to bid,” he says. “We talk to other municipalities or a particular manufacturer to find out if people are going out to bid for equipment that may be in the style or type we want to purchase.”

If the specifications are identical, the manufacturer usually agrees to sell the equipment for the open public low bid price. “It shortens the process and saves us a lot of money because we don’t have to put it all together,” says Jannings.

neighborhoods, they rehabilitated mains and laterals on one side of an imaginary boundary line and left the opposite side untouched to measure I&I reduction by comparison. In another part of town, they rehabilitated only the laterals to see if that approach would be more cost effective.

“We learned that if the lateral wasn’t replaced, we had root intrusion in the newly lined mains,” says Jannings. “Furthermore, if the seal between the main and lateral liners wasn’t perfect, roots traveled along the annular space between the liner and host pipe, causing deformities in the liner and, in some cases, even breaking it.”

The pipe-bursting contractor,

however, used tees at the main-lateral junctions or saddle-fused the connections, and they were tight. At the same time, the 6-inch mains were upsized to the 8-inch industry standard, and that was the pivotal factor in Jannings’ decision to purchase a 30-ton pipe-bursting system from TRIC Tools Inc.

Multiple advantages

“We had done everything open-cut until then, so excavating two holes and not an entire street made a lot more sense,” says Jannings. “Before long, the real push became to pipe-burst laterals. A three-man crew excavates entrance and pull pits at the main and behind the sidewalk at the district cleanout.

The project blocks only one lane of traffic. It’s completed by the end of the day, and it puts an end to root intrusion. The lines basically become maintenance-free once they’re rehabilitated.”

In a one-off situation, the crew once used the ram to slip-line 1,800 feet of 6-inch SDR 21 HDPE pipe into an 8-inch, multi-use line with some S-curves. “Just a few live connections remained on the upstream end, enabling us to rehab it with smaller diameter pipe,” says Jannings. The men strung out more than 1,200 feet of pipe for the longest of the two pulls, which went straight through the manholes.

Carollo Engineers in Walnut Creek, Calif., developed the lateral replacement master plan using flow monitoring and modeling to handle a five-year return-rate storm. The program’s most successful element, however, was the engineers’ willingness to work closely with field crews.

“Our guys tell their supervisors why things need to be fixed and where,” says Jannings. “Then the four supervisors work in unison with the engineers to come up with the best solution. Incorporating input from the field crews has produced far better results than what



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The district has a unique program for upper laterals. After inspecting the completed project, the district originally reimbursed property owners at close to 100 percent of installation cost. Today, because those costs have increased, reimbursement is closer to 80 percent. If customers do not want to replace the lateral, the district reimburses them for installing a cleanout.

“It’s sort of a Catch-22 for us,” says Jannings. “Without a cleanout, homeowners own the lateral all the way to the main. Those laterals aren’t in our system, so we have no idea how many more are out there or how far along we are in our replacement program.”

As soon as a cleanout is installed

Collection systems technician Denis Crockett cleans a catch basin as collection systems technician Tom Riedl operates the the Vac-Con 1300 combination truck.



Collection systems technician Scott Ransford prepares a Model 1065 cable machine from Spartan Tool to cut a root located by a camera crew.

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on the district side of the line, the district takes responsibility for the lower lateral. In 2008, contractors replaced 31 lower laterals totaling 855 feet and installed 147 cleanouts. In 2009, they replaced 37 lower laterals totaling 1,500 feet and installed 209 cleanouts.

Protecting the contractor

The district has an in-house inspector and three engineers who

monitor all the work as it is happening to ensure that it is done to specifications. “Doing the inspections ourselves protects the contractors from themselves,” says Jannings. “If we alert them to a developing situation right away, they can correct it at minimal cost.”

One district engineer handles most of the rehabilitation work and meets with contractors to resolve issues. Jannings often receives calls to send someone from his department to provide the maintenance viewpoint. The major issue is always whether doing the repair will cost less than maintenance in perpetuity.

Jannings’ crews use two CUES Inc. camera vehicles to inspect the HDPE pipe. Otherwise, contractors must inspect with a district CCTV technician witnessing. “People are busy and may not review those tapes for a week or two,” says Jannings. “By then, the contractor has demobilized. With somebody in the van to point out problems, the repairs can be done promptly and won’t cost as much.”

In 2009, the district agreed to



Members of the Vallejo Sanitation and Flood Control District team include, from left: Guy Harris, Mike Sisson, Tom Riedl, Scott Ransford, Brian Burket, Ken Taylor, Shorty Miller, Jose Herrera, Justin Keating, Gary Meeker, Jay Frazelle, Shannon Boyt, Don White, Jim Gianulias, Denis Crockett, Tyler Armitage and Paul Moore.

televisé all sewer mains by August 2011. Some lines were probably inspected 15 or more years ago, but the records have disappeared. “We don’t know the exact number of old pipes in the system,” says Jannings.

“I spent more than 10 years doing TV work. Back then, we turned in the information and didn’t keep the records.” Today, the district uses Infor Public Sector/Hansen Technologies infrastructure management software to store preventive maintenance work orders, inspections and other information.

Maintaining the flow

The district’s pipe-cleaning program includes jetting, pigging or rodding siphons twice a month to remove the solids that collect on the bottom. The district has two jet trucks: an HV high-pressure unit from SRECO-Flexible and an 800-H unit from Sewer Equipment Co. of America. It also has a truck-mounted continuous rodder from OK Champion Corp.

The staff sometimes uses a Vac-Con 350 LHA-1000 combination sewer cleaner with hydroexcavator package because the water

“If the jetter operator brings back pipe or something abnormal, he calls the TV crew to televise the line.

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tank enables them to jet more lines on one fill up. The truck also has a 5-cubic-yard debris body, 8,000 cfm three-stage fan, and 50 gpm/3,000 psi water system.

Another part of the district's preventive maintenance agenda is the jet investigation program, which involves running a jet nozzle up older lines every two years. “If the operator brings back pipe or something abnormal, he calls the TV crew to televise the line,” says Jannings. “A jet machine can check many more segments than a CCTV truck set up in one spot spending time inspecting a perfectly good line.”

Maintenance also includes \$100,000 per year for chemical root treatment in the lower laterals and mains. Vaporooter treated about 600 laterals this year. For the previous five years, Duke's Root Control had won the bid. Jannings is comparing results to see which chemical works better. Vaporooter uses a combination of metham sodium and dichlobenil, while Duke's uses Razorooter II, a diquat-based herbicide.

Counting benefits

Looking back, Jannings is gratified with the results of the I&I program. “We have spent \$60 million

eliminating overflow conditions, which involved a tremendous amount of work,” says Jannings.

“To achieve the results we needed in the shortest time, we went to the option of conveying and storing, and increasing the interceptor sizes to drain the upper reaches of the system. Now we are fixing those things on the top end to make the system tight. The decrease in our average dry-weather flow is a simple indicator that all the new pipe is tightening the system and reducing I&I.”

The district's greatest challenge is to come as close as possible to eliminating blockages and overflows. The group will incorporate best management practices in its preventive maintenance program, continue an aggressive chemical root control program, perform a comprehensive and continuous condition assessment of the system, and rehabilitate or replace lines that cannot be effectively maintained.

“It's easy to overlook the linchpin in all of this, and that is the effort everyone makes to function as a cohesive group,” says Jannings. “My obligation is to provide the best equipment and training available so we are ready for the challenges ahead.” ■

MORE INFO:

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www.cuesinc.com

Duke's Root Control Inc.
800/447-6687
www.dukes.com

Infor Public Sector/Hansen Technologies
800/821-9316
www.hansen.com

OK Champion Corp.
800/431-9192
www.okchampion.com

Sewer Equipment Co. of America
800/323-1604
www.sewerequipment.com

Spartan Tool LLC
800/435-3866
www.spartantool.com

TRIC Tools Inc.
888/883-8742
www.trictrenchless.com

Vac-Con Inc.
904/284-4200
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Vaporooter
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www.vaporooter.com