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New Water-Jet System Cleans Downtown Oakland Sewer in Record Time — Without Raising a Stink

OAKLAND, CALIFORNIA, May 24, 2006 — Last month, in the heart of the downtown business district, the Oakland Public Works Agency completed probably the most massive sewer cleaning project ever done in this city — and hardly anyone noticed. Using a new high-power water-jetting system, Oakland-based V&A Consulting Engineers coordinated the removal of sediment deposits up to three feet deep from a 66"-diameter sewer beneath 20th Street in record time, without interrupting service and without the noisy machinery, exposed sewage piping and rank odor that usually accompany such jobs. "They operated for a week," says PWA project manager Gunawan Santoso, P.E., "and we didn't have a single complaint."



Sewer Hog™ and Grit Gator (dewatering box) were set up near 20th Street and Broadway.

The cleanout was part of a condition assessment intended to assure that the existing sewer system will be adequate for the rapidly growing neighborhood, explains engineer Jose L. Villalobos, V&A's president and CEO. But the decades-old sediment layers made closed-circuit TV inspection impossible. "Removing it with a conventional bucket machine might have taken a month or more, if it could be done at all," Villalobos notes. "Meanwhile, you'd have a thousand feet of bypass piping obstructing traffic and the transfer of solids to the disposal truck would be generating sewage odors."



Preparing to lower the downhole slurry pump.

At that point Villalobos learned of Sewer Hog™, an innovative sewer cleaning technology that uses a 350-gallon-per-minute (gpm) water jet, at 2,000 pounds of pressure, to dislodge obstructions. After a field trip to see the equipment in action, Villalobos arranged for Texas-based Garner West, the system's designer and manufacturer, to send a unit to Oakland in early April. "If it worked as we hoped, we would be able to get the data Public Works needed, and also see a good demonstration of the technology."

The system is deceptively simple. A 200-pound multi-nozzle waterjet head is attached to the Sewer Hog's hose, inserted into a manhole and maneuvered upstream, where the jet loosens the detritus and forces it back to the manhole. A powerful downhole pump, essentially a garbage disposal on steroids, then chews up everything, including plastic, metal, bricks and rocks, and shoots the resulting slurry through an 8-inch-diameter hose, at 2500 gpm, up to a pressurized dewatering box at street level. The sand and grit are taken out and the filtered water goes back into the sewer.

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The equipment was set up near the Oakland BART station entrance 20th Street and Broadway on Tuesday, April 4. Cleaning started immediately and continued for four days, removing all but a few inches of the sediment from the 66" main. Work was continued over the weekend, after a connecting 24" pipe was found to be almost totally blocked with rags and other debris. A total of 46 tons of sand, gravel and grit was removed and sent to a landfill. "It wasn't a complete cleanout, but with limited funding this had to be essentially a pilot demonstration project," Villalobos explains.

Some passers-by seemed curious about the 60-foot array of bright red machinery parked by the curbside, but the noise from the jetter's 600-hp engine was not much louder than a passing bus, and the operation, as promised, was essentially odor-free.

The 20th Street sewer is typical of large sewer lines in older cities, Villalobos says. Over the decades, grit, sand and organic matter settle and consolidate into a cement-like mass, with interspersed bricks, small boulders and anything else that can find its way into or be stuffed down a drain. "Many are so blocked they can only work at a half or a quarter of their nominal capacity, sometimes much less," he explains. "At 66 inches in diameter, the 20th Street sewer should be able to handle 32 million gallons a day, but its actual capacity was only one-third of that—around 12 mgd—before cleaning."

Many municipalities have large-diameter sewers, originally meant to carry the (now forbidden) combined sanitary and stormwater flow, but Villalobos says they are rarely or ever cleaned except after overflows or other emergencies. "If a community wants to maintain capacity in its wastewater system, the simplest way is to just clean the sewers. But on the principle of 'out of sight, out of mind,' these are the hardest projects to fund—although, later, when there's a collapse, somehow there is always money for the far more expensive emergency repairs."

But that may be changing, Villalobos believes. "Many of these facilities are getting to be 80, a hundred years old, but they are still valuable public infrastructure assets," he says. "The problem is, too much of the time they fail to get the attention and resources they need to stay in good condition. Now, just in the past few years, maintenance and asset management have become a hot issue, thanks to changes in the public accounting rules, and that change can potentially mean a massive extension in the useful life of these critical resources."

About V&A Consulting Engineers

Founded in 1979, Oakland, California-based V&A Consulting Engineers, Inc. helps clients protect and preserve public-works infrastructure and facilities used in the water, wastewater, transportation, and petrochemical industries. A noted expert on corrosion issues in public utility infrastructure, Jose Villalobos coauthored the new chapter "Corrosion Protection of Water and Wastewater Facilities" in the forthcoming *Corrosion: Environments and Industries, Vol. 13C* of the industry-standard *ASM Handbook* series.

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