MUNICIPAL
SEWER & WATER™
FOR SANITARY, STORM AND WATER SYSTEM MAINTENANCE PROFESSIONALS
May 2011
www.mswmag.com

KNOWING THE FLOWS

PAGE 22

Comprehensive monitoring helps a major sewerage agency optimize capacity and cut SSOs

MUNICIPAL
SEWER & WATER™
FOR SANITARY, STORM AND WATER SYSTEM MAINTENANCE PROFESSIONALS
May 2011
www.mswmag.com

KNOWING THE FLOWS

PAGE 22

Comprehensive monitoring helps a major sewerage agency optimize capacity and cut SSOs

Everything new, All in one place.

Why consider outdated gear when Envirosight technology delivers superior data, expandability, productivity and support.

New VeriSight™ Pro delivers all the functionality of the original, plus greater push power, improved image quality, sturdier construction and a lightweight controller with superior text, recording and annotation capability.

VeriSight™ PRO

Without confined space entry, new DiaMetrik™ measures all dimensions of manholes and pipes to within 0.1". Quick and easy, it helps you safely complete inspections and plan relining.

New ROVVER™ X brings an advanced touchscreen interface and dozens of new features to pipe inspection's most proven brand. Its digital pendant grants precise, concurrent control over camera, crawler and reel functions; records MPEG video; lets you classify observations for upload to WinCan; exports data via USB; and supports online diagnostics and upgrades. With all this digital horsepower, it's easy to overlook the hardware features that make ROVVER X the new benchmark for inspection capability.

ROVVER X

quickview®

With powerful Haloptic™ technology and a built-in manhole camera, the new QuickView™ captures 400' of infrastructure in a single pass. It's all you need to inspect pipes and manholes, scope maintenance work, and avoid confined space entry. Join 2000-plus users who already trust QuickView for fast, thorough inspection.

DIGISEWER III

The new DigiSewer™ III side-scan camera captures brighter scans at higher resolution, imaging your infrastructure three times faster than CCTV. It is available for all Envirosight crawlers, and works interchangeably with traditional video cameras.

Envirosight LLC

www.envirosight.com • (866) 936-8476

INSIDE:

FLOW CONTROL / MONITORING; STORMWATER TREATMENT, DEWATERING & PRETREATMENT

COVER:
State-of-the-art flow monitoring is a key to the Washington Suburban Sanitary Commission's effort to manage and eliminate sanitary sewer overflows (SSOs). A partner in that effort is an ADS Environmental Services crew that includes field representative Chris Johnson. (Photography by Andrew Lightman)

FEATURES

COLUMNS

COMING IN JUNE 2011

Special Issue: Pipeline Inspection, Surveying and Mapping

- Water: Digital leak detection in Clayton County, Ga.
- Sewer: Five Wisconsin villages share pipe inspection technology
- Sewer: Cooperative approach to pipeline inspection in Greater Cincinnati, Ohio
- The Human Side: A major boost for efficiency in San Diego, Calif.

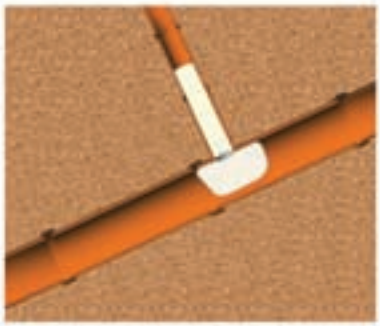
MAY 2011
MUNICIPAL SEWER & WATER

Perma-Liner™ Sectional Main Line Point Repair™

- No Excavation - Eliminates Disruptive Digging And Restoration
- *Repairs 6" to 54" Diameter Pipelines*
- 100% Solids Epoxy
- *Reinforced Materials With A PU Coated Finish*
- Total Time of Repair Is Only Hours Compared To Days
- *As Many As 7 Repairs In A Single Day*
- Exceeds ASTM F1216 Specifications
- *Manufactured In Kit Form, No Measuring Or Waste*
- In Most Cases, No Bypass Pumping Needed
- *Reduces Job Costs - Labor, Equipment, Materials, Traffic Control, and Unforeseen Liabilities*

PERMA-LINER™ INDUSTRIES, INC.®

Sectional Main Line Point Repair™



InnerSeal™ Innerwrap™
Lateral Connection Seal

InnerSeal™ Innerwrap™ Lateral Connection Seal

- Independent Double Bladder System
- *100% Solids Epoxy*
- Ambient or Steam Cure
- *Tee & Wye Connections from 6" x 4" to 36" x 12"*
- Lateral lengths available from 18 inches to 50+ feet.

after

Perma-Main™ Continuous Air Inversion

featuring the
"Top Gun"

- Trenchless Lining, Manhole to Manhole
- *600+ Feet Continuous*
- 6" - 24" Diameters
- *Steam Cure*

Turn-Key Trailers

2011 Trenchless Tour

Chicago, IL / June 8th, Anaheim, CA / July 20th - 22nd, Boise, ID / August 17th

CALL
(866) 336-2568 Toll Free
(727) 507-9749 International

YouTube

VISIT
www.perma-liner.com

ADVERTISER INDEX

MUNICIPAL SEWER & WATER

FOR SANITARY, STORM AND WATER SYSTEM MAINTENANCE PROFESSIONALS

Published monthly by:

COLE publishing

1720 Maple Lake Dam Rd.,
PO Box 220, Three Lakes WI 54562

www.mswmag.com

In U.S. or Canada call toll-free 800-257-7222
Elsewhere call 715-546-3346
E-mail: info@mswmag.com
Fax: 715-546-3786

Office hours Mon.-Fri., 7:30 a.m.-5 p.m. CST

SUBSCRIPTIONS: A one year (12 issue) subscription to Municipal Sewer & Water™ in the United States and Canada is free to qualified subscribers. A qualified subscriber is any individual or company in the United States or Canada that maintains, manages, designs or installs municipal or commercial sewer, water and storm infrastructures. Non-qualified subscriptions are available at a cost of $60 per year in the United States and Canada/Mexico. Subscriptions to all other foreign countries cost $150 per year. To qualify, visit www.mswmag.com/order/subscription or call 800-257-7222.

Our subscriber list is occasionally made available to carefully selected companies whose products or services may be of interest to you. Your privacy is important to us. If you prefer not to be a part of these lists, please contact Nicole at nicolel@colepublishing.com.

CLASSIFIED ADVERTISING: Minimum rate of $25 for 20 words; $1 per each additional word. All classified advertising must be paid in advance. DEADLINE: Classified ads must be received by the first of the month for insertion in the next month's edition. PHONE-IN ADS ARE NOT ACCEPTED. **Fax** to 715-546-3786 only if charging to MasterCard, VISA, Discover or AmEx. Include all credit card information and your phone number (with area code). **Mail** with check payable to COLE Publishing Inc. to the address above. CLASSIFIED ADVERTISING APPEARS NATIONWIDE AND ON THE INTERNET. Not responsible for errors beyond first insertion.

DISPLAY ADVERTISING: Contact Jim Koshuta or Kayla Wilkowski at 800-994-7990. Publisher reserves the right to reject advertising which in its opinion is misleading, unfair or incompatible with the character of the publication.


Jim Koshuta


Kayla Wilkowski

EDITORIAL CORRESPONDENCE: Send to Editor, *Municipal Sewer & Water*, P.O. Box 220, Three Lakes, WI, 54562 or email editor@mswmag.com.

REPRINTS AND BACK ISSUES: Visit www.mswmag.com for options and pricing. To order reprints, call Jeff Lane at 800-257-7222 (715-546-3346) or email jeffl@colepublishing.com. To order back issues, call Nicole at 800-257-7222 (715-546-3346) or email nicolel@colepublishing.com.

CIRCULATION: 2010 average circulation was 37,808 copies per month (U.S. and international distribution).

What Makes **HOBAS®** The Standard?

Precision centrifugal casting, consistent high quality, fiberglass-reinforced, polymer mortar pipes

Responsive customer service, on-site field reps backed by extensive engineering support

HOBAS®

Time Proven

Leak Free

Long Lasting

Corrosion Resistant

High Strength

Quick, Easy Installation

High Flow Capacity

HOBAS PIPE USA
281-821-2200
www.hobaspipe.com

HERE IN THE FUTURE

These days a magazine is a lot more than a paper thing that comes in the mail. It's also part of an evolving world of online communication.

FROM THE EDITOR

Ted J. Rulseh

I used to brag that I intended to be the technology equivalent of Herb in those old Burger King commercials: The last person on earth not carrying a cell phone.

Then about two years ago, circumstances forced my hand. When on the road, if I needed to call people, I had to use pay phones, and they were getting scarce. Sometimes I had to use a decrepit one in a gas station/convenience store parking lot, amid traffic noise and sometimes in rotten weather.

I broke down and signed up for a smart phone, just like the one my post-college daughter had recently acquired. In her reply to my first text message she said: "Dad — hope you like it here in the future."

How things change

Well, actually, I did, and I do. And "here in the future" means many things. In particular, it means a magazine like *MSW* is not at all the same thing it once was. Sure, you get a bound paper copy that comes in the mail. But you can also read that same magazine — pictures, page layouts and all — at the website, www.mswmag.com.

And the magazine is now part of the vast and growing world of social networking. I once (not too long ago) told a friend, "If I ever tweet, I hope someone shoots me." Now I can tweet (and heaven help me have done so) from the *MSW* Twitter account.

MSW also has a Facebook page where you can sign up to be a fan. The Web page has a link to an editor's weblog (those things actually go by the awful name of "blog") where now and then I post a bit of industry news or an observation or idea. Under the Interact tab, the website also has a Contact form where you can share a comment or ask a question by way of email.

Momentum building?

So far these networking tools aren't getting a great deal of use, but that's likely to change as more of us adapt to the new communication channels and — let's face it — as the industry's workforce gets progressively younger with retirements of Baby Boomers.

A magazine today is much more a living, breathing organism than it was half a dozen or even two or three years ago. Through these new communication channels, you have opportunities to embrace it, to shape it, to be part of a better-connected community of readers.

So here's a challenge to you. Perhaps if you're in my age group (and I came of age around the time of the first Clean Water Act), you resist the new ways of communicating and some of the new communication devices. I hereby encourage you to try them out.

Think about it. A few years ago, if a magazine article interested you, and you wrote a letter to the editor in response, you would wait a couple of months to see it in print. Now, if you send that letter by email or through our Contact function, there's a chance you could see it on my editor's blog the next day.

If you sign up to "follow" *MSW* on Twitter, you can get clued in to what's coming in the next issue of the magazine or to something just posted on the blog. There's also a Discussion Forum on the website (again under the Interact tab) that we wish more operators would use (though we realize there are other online forums).

Getting the knack

The beauty of all these communication technologies is that they are incredibly easy to use. When I brought home my smart phone after getting a quick demo in the store, I thought I was doomed to spend a day or two poring over the manual and pecking at the keyboard. Not so. I picked up the basics in a few minutes, barely even looking at the manual. So it is with tools like Facebook, Twitter and YouTube — only more so.

You don't even need to read a "For Dummies" book. Just go out there and get to work. Maybe ask a tech-savvy friend a few basic questions and you'll know what you need to get a good start.

A magazine today is much more a living, breathing organism than it was half a dozen or even two or three years ago. Through these new communication channels, you have opportunities to embrace it, to shape it, to be part of a better-connected community of readers.

In most of these instances I'll be feeling my way along the same as you are, getting used to the idea of what it means now to edit a magazine, as you get used to what it means to read one. In the end I believe we'll all like it fine "here in the future." Even if at first we don't, we must accept that these new ways are here to stay, and we have to embrace them if we want to stay in the loop.

As Bob Dylan put it somewhat ominously, "You'd better start swimmin' or you'll sink like a stone ..." ✦

Comments on this column or about any article in this publication may be directed to editor Ted J. Rulseh, 877/953-3301; editor@mswmag.com.

Ultimate Warrior / Hi-Flow Ultimate Warrior

Introducing the most powerful force in the field. Spartan unleashes two of the industry's toughest jetters. The Ultimate Warrior brings you all the features of Spartan's revolutionary Warrior — a fully enclosed, sound-dampening fiberglass body, the power of 4,000 PSI at 18 GPM, and a 180° pivoting hose reel with optional six-function remote control for easy operation in tight quarters — but in a dual axle configuration with a towable capacity of 600 gallons. And that's not all. Its alter ego, the new Hi-Flow Ultimate Warrior offers 3,000 PSI at 35 GPM, perfect for small municipalities and use in larger sewers.

SPARTAN TOOL, L.L.C. | 1506 WEST DIVISION STREET | MENDOTA, ILLINOIS 61342
ORDER BY PHONE: **800.435.3866** ORDER ONLINE: **WWW.SPARTANTOOL.COM**

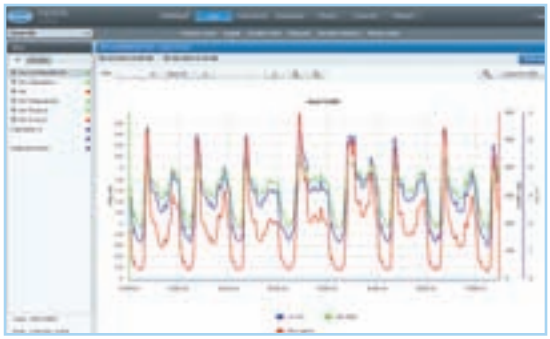
Hach.
We Know Flow.

Economical, time-saving wireless flow monitoring solutions.

NEW!

The Hach FL900 Series Flow Logger and proven Flo-Dar® Sensor, a winning combination that takes flow monitoring to a whole new level. The non-contact sensor, remote communications and intuitive software will reduce site time, increase safety and allow you to easily manage your flow data, as well as your budget.

800-368-2723 • www.hachflow.com/FL900



Hach FSDATA™ Web-Based Software

The Hach FL900 Series Flow Logger and Marsh-McBirney Flo-Dar Sensor

HACH®

MARSH McBIRNEY SIGMA

FOCUS: SEWER

AGAINST THE CURRENT

With its wastewater plant at capacity, an Alaska community is metering flows while upgrading its collection system to keep I&I in check

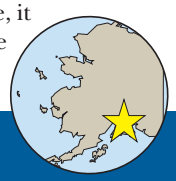
By Peter Kenter

Frawner Corporation employees install the wireless Hach DDS Flo-Dar system next to the Girdwood Airport runway. (Photos courtesy of Hach Flow Meter Products & Services)

The resort community of Girdwood, Alaska, receives more than 200 inches of snow annually. That's good news for tourists who enjoy skiing on the slopes of the Chugach Mountains surrounding the town.

But during spring runoff, it's bad news for the wastewater treatment plant, which is approaching capacity. While inspection and maintenance keep the collection system in top shape, the Anchorage Water & Wastewater Utility (AWWU) is conducting an extensive flowmeter study to determine how inflow and infiltration (I&I) from stormwater and snowmelt can best be reduced to meet EPA guidelines.

The study is critical to finalizing the design for an expansion of the treatment plant, to be completed over the next few years. Although the community lies about 40 miles from Anchorage, it falls under the



PROFILE:
City of Girdwood, Alaska (client of Anchorage Water & Wastewater Utility)

POPULATION:
2,300

CUSTOMERS:
750

AREA SERVED:
3 square miles

INFRASTRUCTURE:
22 miles of sanitary sewers

ANNUAL BUDGET:
$38 million (wastewater, entire AWWU system)

WEBSITE:
www.awwu.biz

(continued)

jurisdiction of the Municipality of Anchorage, and its water and wastewater infrastructure is operated by the AWWU.

"We have an activated sludge plant at capacity right now," says Tom Winkler, project engineer with the AWWU. "Now that it's reached the end of its useful life at 30 years, we're going to build a new plant alongside it. We chose a membrane bioreactor (MBR) system for treatment, but MBR is not very good at a wide variation in flow.

"The water is also very cold, and that affects the flux rate of the membrane. So essentially, the less water we need to treat, the fewer membranes will be required and the less expensive the plant will be. The question is whether it's more cost-effective to expand the plant or upgrade the collection system."

A Flo-Dar sensor is installed with cellular-equipped logger and long life battery pack.

A non-contact Flo-Dar area velocity sensor in a 16-inch sanitary sewer line.

"The less water we need to treat, the fewer membranes will be required and the less expensive the plant will be. The question is whether it's more cost-effective to expand the plant or upgrade the collection system."

Tom Winkler

The mountains around Girdwood tend to direct snowmelt into the community. The valley also gets significantly higher rainfall than the surrounding area, approaching 80 inches annually. Wastewater flows in Girdwood average about 500,000 gpd, depending on tourist activity. When rain falls on melting snow, the system can be inundated with up to 2 mgd.

Measuring flows

"We've initiated a flowmeter study of the area to identify the leakier parts of the collection system," says Winkler. "We've also placed two rain gauges so we can see if there's a correlation between storm events and higher I&I."

The AWWU contracted Stephl Engineering of Anchorage, a firm specializing in collection systems and trenchless technology consulting, to approach the issue from several directions. The project includes:

- Designing and evaluating the flowmeter project.
- Ongoing evaluation of I&I in the sanitary sewer system.
- Rainfall monitoring.
- CCTV inspection of services and sewer mains.
- Collection system rehabilitation.

"Much of what's happening is occurring below the surface," says company owner Matt Stephl, P.E. "At times the collection system becomes totally submerged, and we think the groundwater levels may be rising by as much as six to eight feet. All of the surface water eventually ends up at the treatment plant. It's the volume of the water, not the condition of the water, that's the challenge. Currently, all they can do at the plant is move the water through at a faster pace."

In 2006, the utility had tried a study using flowmeters with submerged sensors. "The pipes around the ski resort area run at steep

A remote-powered wireless DDS Sigma rain gauge is installed above the snow line at the Alyeska Resort Base Weather Station.

MANHOLE TO MANHOLE

For a community of only 2,300 residents, Girdwood has an unusual number of manholes — almost 450. That's because the sewer system must accommodate a large number of changes in both main direction and depth to service the undulating terrain.

As part of a campaign to reduce I&I in the system, the Anchorage Water and Wastewater Utility (AWWU), of which Girdwood is a client community, contracted with Stephl Engineering to prepare a rehabilitation plan for all manholes, beginning in 2005.

"The Girdwood water table is very high, so the manholes fell prey to frost-jacking, which shifted them around until some of the concrete sections that comprise the shaft have pulled apart," says Matt Stephl, owner of the engineering firm.

The solution was to place internal flexible compression seals supplied by Cretex Specialty Products and Trelleborg Pipe Seals Milford around the joints. The seals are held in place with stainless steel expansion bands.

"It's an I&I solution, but not a structural repair," says Stephl. "These internal bands are somewhat flexible, and they've actually performed pretty well." The firm repaired all 450 of the manholes in the first five-year phase of the program, ending in 2010. The program has since been renewed for an additional five years.

"We will be going back and inspecting and repairing every one of them, but we're targeting a number of manholes each year," says Stephl. "We're happy with the success in I&I reduction from manhole problems, and we'll be inspecting and maintaining about 80 of them in 2011."

(continued)

angles, with sewer flows at very low depth," says Stephl. "The high water velocity and shallow flows presented tough conditions for those monitors. We had planned a more comprehensive study using a meter with more advanced technology for 2009."

Better data delivery

Stephl contacted local Hach flowmeter representative Bob Feltman with Northwest Pump & Equipment about the Girdwood project. The two discussed the advantages of using the Flo-Dar flowmeter and of the utility contracting for Data Delivery Service (DDS) instead of buying the equipment outright.

Stephl pushed for the DDS option because the meters would only be employed for the length of the study. "Matt also thought it would be advantageous for AWWU not to be involved in the installation and maintenance, but he was fairly certain the utility would want to purchase the equipment," says Feltman.

"Eventually, through Matt's gentle persuasion, we got the job put out for bid, and AWWU contracted for six Flo-Dar meters and two Sigma rain gauges. They were installed in August 2009 in a DDS contract." That contract has since been expanded to include two more flowmeters.

An employee of Frawner Corporation installs a Flo-Dar system.

"Just on repairs carried out during the summer on about 5,000 feet of sewer main, we've knocked off about 22,000 gallons of wastewater per day from entering the collection system."

Tom Winkler

The Girdwood collection system runs about 110,000 feet and consists mostly of 8- to 12-inch pipes. Stephl divided the system into six roughly equal basin areas to determine which ones might be the greatest I&I contributors during high-runoff events.

"What we're trying to do is slowly identify the basins, working toward finding the sources of I&I," says Stephl. "Some basins react quicker to storm events, while others have a fairly uniform base groundwater flow. We'll move the meters around within the basins to continue to try to pinpoint the I&I to smaller areas."

The Flo-Dar meters read the flow area with a scanning device, then transmit the data via cell phone through broadcast towers erected at each meter site. The information is then transmitted to users through a Web interface.

Ian Morrison, Hach flow field service manager II, was involved in the installation. "We used directional Yagi antennas on 10-foot poles for each site," he says. "This setup allowed us to position the antennas for optimal reception and keep them above the snow line." Contractor Frawner Corporation fabricated and installed the antenna masts.

Instant data collection

"All six DDS meters have excellent cell reception, and we had no loss of data at all in an area that is notorious for poor cell phone service," says Stephl. "We can have our treatment plant operator call us on the phone and tell us we have a runoff event going on, and treatment plant flows are going up, and I can look at the meter data right away.

"So far, the flow data has been good, and the data all looks consistent. Unlike the submerged-style sensors that were used previously, the Flo-Dar radar velocity sensor accurately relays water velocities. We correlate the rainfall input with the flow times and try to figure out if we have a bigger inflow problem or a bigger infiltration problem.

"With a dynamic population based on tourism, it's very difficult to figure out a true sanitary sewer base flow, so the meters helped us figure that out as well."

Stephl Engineering is now taking the raw sewer data and comparing it against the flow during individual storms, which in the area typically last two to three days. Storms in April last even longer. These rains, in tandem with snowmelt, can quickly submerge the entire collection system.

The rain gauges testify to the unusual microclimate of Girdwood. The gauge placed at the base of one of the mountains collects 50 percent more precipitation than the one at the wastewater plant a short distance away. The data is broken down to try to determine where the water is entering the system and whether it's coming from the surface or groundwater.

I&I pilot program

Although the AWWU conducts routine maintenance on the wastewater system, the flowmeter study has helped it concentrate on the basin exhibiting the greatest I&I. A project carried out in 2010 was a test case for the effectiveness of reducing I&I flows at the source: It helped show how much water could be diverted from the treatment plant, measured against baseline data collected from the meters.

"We decided to find and repair all of the deficiencies in the cell that encompasses that subdrainage system," says Winkler. The utility carried out closed-circuit camera inspections of all sewer mains in the cell, then repaired any problems uncovered.

The collection system consists largely of ductile iron pipe, and some of it is relatively new. The Great Alaskan Earthquake of 1964 destroyed some of the original settlement, which was then relocated further up the valley.

The wastewater infrastructure for the ski resort, which was not relocated, was built in the 1970s. The mains are buried deep beneath the community's frost line — water mains are buried to 10 feet and sewer lines to eight feet. In winter, the ground must be thawed with steam probes before repairs can be made.

Dig and replace

"With the mains at that depth, open-cut repairs are expensive," says Stephl. "So some techniques that are cost-effective in other states will not be around Anchorage. We do a lot of cured-in-place work and inversion lining. Pipe bursting is also fine in certain applications, but it's not cost-effective when it involves service connections, because we'll have to dig down to establish those anyway."

The utility repaired a number of leaks and holes in the mains by installing external wraparound waterproof repair clamps. "We also found dozens of joints in the service lines that were leaking," says Winkler. "The leaks were usually because of frost-jacking. We repaired those leaks by digging and replacing the entire service pipe from the sewer main in the street to the property line. Groundwater was also entering the sewer through the cleanouts on the sewer main. The leaking cleanouts were removed and replaced with new manholes."

The repair and rehab program is paying off. "Just on repairs carried out during the summer on about 5,000 feet of sewer main, we've knocked off about 22,000 gallons of wastewater per day from entering the collection system," says Winkler. The utility is also testing manholes and repairing defects as part of a 10-year program that began in 2005.

The new Girdwood Wastewater Treatment Plant will be designed with an initial capacity to handle as much water as the Girdwood collection system sends it, but as little as possible considering efforts to reduce flow and control I&I. "We want to act on I&I so that we can adapt the design capacity to reflect the results of our control efforts," says Winkler. As 2010 ended, Stephl Engineering was designing a repair and rehab blitz on a second basin, this one closer to one of the mountains.

"The AWWU will televise the sewer system and conduct a comprehensive repair project on the sewer mains, services and manholes in that basin," says Stephl. "We're happy with the result of the program on the first basin in 2010. Moving on to the next basin, we'll see if we can repeat those results in 2011." ✦

> **"What we're trying to do is slowly identify the basins, working toward finding the sources of I&I. Some basins react quicker to storm events, while others have a fairly uniform base groundwater flow."**
>
> **Matt Stephl**

MORE INFO:

Cretex Specialty Products
800/345-3764
www.cretexseals.com

Hach Flow Meter Products & Services
800/368-2723
www.hachflow.com
(See ad page 11)

Trelleborg Pipe Seals Milford
800/626-2180
www.trelleborg.com/npc

PROBLEM:

EXPENSIVE DRAINAGE SYSTEM FAILURES

SAVE ON REPAIRS

- *Concrete pipe suffers 5.8 repair-demanding breaks per 100 km each year[1], and carries high costs in materials, transportation and maintenance.*
- **Plastic pipe from JM Eagle is the product that won't break down or crack, and studies show it maintains its smooth interior for at least 100 years[2].**

SAVE PRECIOUS RESOURCES

- *Out-of-control storm and waste water cause $50.7 billion in damage and waste to cities across the United States each year[3].*
- **Plastic pipe from JM Eagle is virtually leak-free and break-resistant. It protects the water it carries, and protects cities from flooding and contamination.**

SAVE TIME & LABOR COSTS

- *Concrete is not only an outdated material, it is also labor-intensive, complicated and problematic to install, causing delays and budget overruns.*
- **Innovative and modern plastic pipe from JM Eagle promises a low-cost, on-time project free of heavy equipment, product failures and extra manpower requirements.**

[1] Source: National Research Council of Canada.
[2] Source: Jana Laboratories in association with Plastics Pipe Institute.
[3] Source: EPA.

SOLUTION: EAGLE CORR PE™

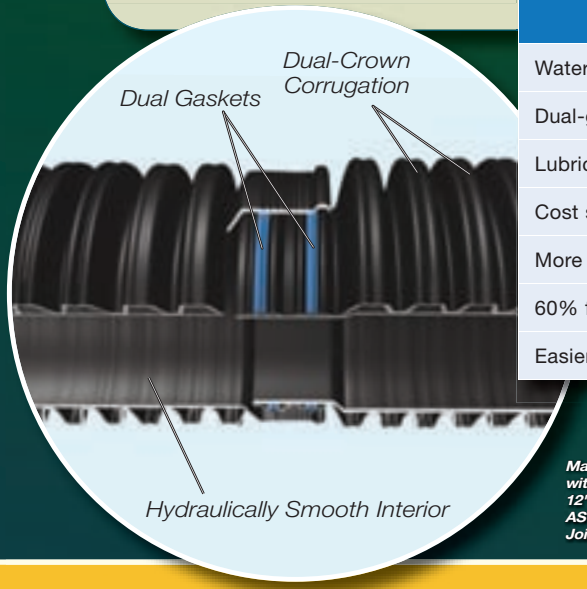
JM Eagle™

LOWER COSTS WITH HIGHER PERFORMANCE

BETTER ENGINEERED FOR A MORE DURABLE JOINT

Eagle Corr PE (Dual Wall) from JM Eagle is the first choice in gravity flow drainage applications. Available in 4-inch to 60-inch diameters, Eagle Corr PE:

- **Features a dual-crown corrugated exterior for greater pipe stiffness values and a hydraulically smooth interior for maximum efficiency.**
- **Boasts superior strength-to-weight ratio and flexible conduit design.**
- **Supports H-25 live loads with a minimum cover of 1 foot, while allowing for cover heights of 100 feet.**
- **Comes available with a full line of standard and custom fittings in either a soil-tight or watertight (10.8 psi) connection.**



	EAGLE CORR PE	REINFORCED CONCRETE PIPE	COMPETING CORRUGATED
Watertight configuration	✓	∅	✓
Dual-gasket technology	✓	∅	∅
Lubricant-free gasket available	✓	∅	∅
Cost savings in materials and installation	✓	∅	✓
More resistant to abrasion and corrosion	✓	∅	✓
60% fewer joints	✓	∅	✓
Easier and safer to handle	✓	∅	✓

Manufactured and tested in accordance with 4"-10" AASHTO M252 and ASTM F2648; 12"-60" AASHTO M294, ASTM F2306 and ASTM F2648; Gaskets meet ASTM F477; Joints meet ASTM D3212.

Now available for nationwide distribution

Please visit www.jmeagle.com for an introduction to JM Eagle's exclusive technology.

FOCUS: SEWER

KNOWING THE FLOWS

A comprehensive monitoring system helps a major sewerage agency keep tabs on its system, optimize capacity, and help drive down SSOs

By Jim Force

State-of-the-art flow monitoring technology is a key to the Washington Suburban Sanitary Commission's effort to manage and eliminate sanitary sewer overflows (SSOs), as mandated in a 2005 consent decree.

Supplied by ADS Environmental Services, the 174 flow monitors and 16 rain gauges help WSSC collect data to establish baseline flows, determine pipe capacities, and track weather-related inflow and infiltration (I&I) in its 5,400-mile collection system. WSSC serves nearly 1.9 million people in Montgomery and Prince George's counties (Maryland), next to Washington, D.C.

"We've worked with ADS for over 25 years," says Glen Diaz, sewer analysis unit coordinator. "The equipment is accurate, durable and reliable. We really like the Web-based system that makes data available in real time to anyone with an Internet connection, not just a limited group of people."

Several new monitors and rain gauges recently installed represent an upgrade. Flow monitoring was among several requirements of the 2005 consent decree involving WSSC, the U.S. EPA, the U.S. Department of Justice, and the Maryland Department of the Envi-

PROFILE: Washington (D.C.) Suburban Sanitary Commission

FOUNDED: 1918

POPULATION SERVED: 1.9 million

AREA SERVED: 1,000 square miles

EMPLOYEES: 1,500

ANNUAL RAINFALL: 39 inches

INFRASTRUCTURE: 5,400 miles of sanitary sewers; 47 pump stations; 7 treatment plants

ANNUAL BUDGET: $40 million (collection system operation and maintenance)

WEBSITE: www.wsscwater.com

ADS Environmental Services field representative Jacob Deaner prepares a FlowShark sensor for attachment to a manhole. The sensors are a key part of WSSC's effort to optimize capacity and reduce SSOs. (Photography by Andrew Lightman)

Members of the WSSC team involved with flow monitoring include, from left, Jeff Diggs, Gordon Brown, Glendon Diaz, and Andrew Fitzsimons.

ronment. The agreement details a comprehensive $350 million program to mitigate and eliminate basement backups and SSOs in the collection system and at pump stations and treatment plants in the 1,000-square-mile service area.

Detailed agenda

WSSC dates to 1918, and portions of its sewer system are older. Some lines consist of vitrified clay, ductile iron, PVC, concrete and PCCP pipes. The system is prone to I&I during wet weather, and to clogging by roots and debris. Fats, oils and grease (FOG) is an especially difficult problem, as there are thousands of restaurants and other food establishments in the area.

The commission manages the system by separating it into 25 distinct sewer basins (sewersheds). "Ours is a separate sanitary sewer system consisting of mostly gravity flow," explains Diaz. "A sewershed consists of a network of neighborhood sewers tying into collector sewers, all flowing into a common trunk line."

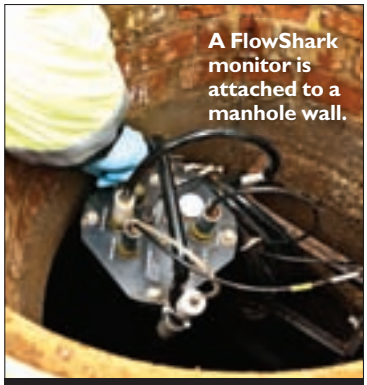
In 2002, the commission began discussing the need to improve the system. Three years later, WSSC signed the consent decree and embarked on a 12-year plan to address its issues. In that same year, WSSC experienced 167 SSOs, resulting in the loss of 4.8 million gallons, largely related to severe weather. Specifically, the agreement requires WSSC to:

- Inspect and clean about a third of its sewer system.
- Conduct comprehensive sewer surveys in nine of its sewer basins, using state-of-the-art technology to collect data on flows, rainfall, and manhole and pipe conditions.
- Continue and enhance its flow monitoring program.
- Develop computer models of sewer system sections to determine present and future requirements and plan sewer line improvements.
- Rehabilitate sewers as necessary over a 10-year period.
- Enhance its FOG program through increased inspection and permitting programs.

The consent decree also requires WSSC to help protect source water quality by purchasing buffer land around its Patuxent River reser-

"We really like the Web-based system that makes data available in real time to anyone with an Internet connection, not just a limited group of people."

Glen Diaz



A FlowShark monitor is attached to a manhole wall.

MULTIPLE TECHNOLOGIES

The flowmeters and rain gauges installed by the Washington Suburban Sanitary Commission include the latest technology from ADS, an IDEX Water & Wastewater Business. The flowmeters include ADS Model 4000, FlowShark and FlowShark Triton units, able to cross-check up to three depths and two velocities with four sensor options. Each sensor provides multiple technologies for continuous running of comparisons and tolerances.

The wireless ADS RainAlert rain gauges let operators know via text or e-mail messages when rainfall intensity exceeds a critical threshold. They can be deployed as stand-alone units or as part of a comprehensive monitoring network.

SEWERS ON A DIET

One requirement of the Washington Suburban Sanitary Commission consent decree is a stronger program to control fats, oils and grease (FOG). That's the responsibility of Wayne Ludwig, unit coordinator, and his team of inspectors, supervisors and support staff.

The WSSC has had a FOG program since the early 1990s — the consent decree formalized it and made it more comprehensive. The food service establishments in Montgomery and Prince George's counties — some 8,640 — keep Ludwig's crew plenty busy. "At this point, we've inspected about 80 percent, and we plan to have completed inspections at another 1,800 establishments by year end," Ludwig says.

Because WSSC has both the wastewater and plumbing authority in its service area, the FOG inspection team can review both the plumbing code and the grease removal systems at these businesses. "We can determine if a business is complying with the plumbing code, whether the FOG requirements apply, and if the grease control devices are sized, installed, maintained and operated properly," Ludwig says. "This comprehensive process prevents multiple regulatory agency confusion and gives us an enforcement edge."

A typical inspection visit involves a close look at the kitchen and the plumbing fixtures, photographs, updating of contact information, and review of indoor grease traps or outdoor grease abatement systems. Some small, non-franchise establishments change owners frequently, and employees may not even be aware of the grease traps and their condition.

The plumbing code is updated about every two years, and that includes grease control requirements. The WSSC regulations also require a manifest for grease-hauling contractors, assuring proper disposal of the material.

How are they doing? "According to the EPA, the national average for overflows directly related to grease is 47 percent," Ludwig says. "We're at about 31 percent, and we believe much of that is from residential users."

voirs, eliminating illegal drain connections to the sewer system, and improving cold-weather nitrogen removal at its Western Branch treatment facility.

On track so far

The sewer rehabilitation project is on schedule to meet the consent decree requirements, according to contracts unit coordinator Mark Behe. "At present, we're rehabbing or replacing about 30 miles of sewer on a very aggressive schedule," he says. "We have projects ongoing in at least 10 of our sewer basins." Trenchless technology is the choice for rehabilitation wherever possible. Methods include grouting of joints, cured-in-place pipe (CIPP) using approved manufacturers, and pipe bursting.

WSSC is also grouting and lining manholes using approved manufacturers' materials.

"We can see what the flows are, versus what they're designed to be, and we can anticipate problem areas. The closer our sewer flow is to our water production flow in a certain basin, the more we're assured that our system is getting tighter."

Andrew Fitzsimons

Sewer cleaning is a fundamental strategy for removing blockages from the collection system, maintaining hydraulic capacity, and so helping to prevent SSOs. Sewer cleaning is classified as:

- Proactive, focusing on sewers with no history of problems.
- Preventive, targeting sewer segments known to have blockages and SSOs.
- Emergency, performed to remediate the impacts of SSOs.

While the triggers for cleaning may be different, the methods and equipment used are similar. These include waterjetting, rodding, and bucket-machine cleaning.

New flowmeters

The ADS flowmeters are critical to the program, because the data they record and report is used to recalibrate the sewer model and

From left, ADS field representatives Brad Darago and Chris Johnson, WSSC team member Andrew Fitzsimons, and ADS field representative Jacob Deaner.

to help determine the areas in need of rehabilitation, repair, or replacement.

"The data drives our SSES (Sewer System Evaluation Study) and enables us to determine which basins require the most attention," says Andrew Fitzsimons, project manager for flow metering. "We can see what the flows are, versus what they're designed to be, and we can anticipate problem areas. The closer our sewer flow is to our water production flow in a certain basin, the more we're assured that our system is getting tighter."

WSSC has 151 flowmeters permanently stationed throughout the system, measuring both diurnal and wet-weather flows. In addition, 23 billing meters measure flows into or out of the WSSC system, such as flows to the Blue Plains Wastewater Treatment Plant in Washington, D.C. Also, a number of onsite treatment facilities contribute flow to the WSSC system. Fitzsimons says the meters on these lines give WSSC accurate numbers for billing purposes.

The flow metering program

Chris Johnson installs fittings for the sensor equipment.

also includes a number of temporary meters — portable units that can be taken into a targeted area to measure flows relating to a particular problem, such as chronic sewer backups in a specific neighborhood. Generally, says Fitzsimons, these meters stay on location for about two months.

Updating technology

WSSC continues to improve the flow monitoring system. Several meters were upgraded to the latest wireless technology to address communication limitations from telephone service. Over the last two years, meters were relocated and added to meet WSSC modeling recommendations and to enhance flow balancing capabilities. One of the latest ADS Triton meters, with surface velocity radar, was recently installed in a high-entry-risk 102-inch sewer.

Lastly, ADS has supplied 16 state-of-the-art rain gauges, positioned every five to 10 miles throughout the WSSC service area to log precipitation amounts and track I&I impacts. The gauges record about 40 inches of rainfall in a normal year, consistent with the 39.3-inch average recorded at Reagan National Airport over a 30-year period.

Fitzsimons says his group likes the new ADS flowmeters because they have built-in redundancy, and because they are designed to perform low-level data cleanup, freeing staff from doing that task manually. "This saves us several hours of extra work," he says.

The data analysis is part of a turnkey contract ADS has with WSSC. ADS is responsible for manufacturing, delivering, installing, maintaining and calibrating its equipment in the field. ADS has also helped WSSC determine the best locations for the flow monitors, evaluating sites for flows, pipe size, grade and safety issues.

The ADS team reviews and finalizes data from each site on a weekly basis, issues maintenance work orders, and finalizes current and historical trend data for posting to IntelliServe and sliicer.com for further review and discussion by the WSSC project team. Both landline and wireless connections are available.

Thus far, through the combined efforts of WSSC and ADS, the flow metering system uptime percentage has been 97.2, several points better than the EPA-mandated 90 percent. "The system enables our staff to be able to concentrate on the most critical collections system maintenance," Diaz concludes. ✦

MORE INFO:

ADS Environmental Services
800/633-7246
www.adsenv.com
(See ads pages 17, 38 and 52)

RELENTLESS.

The Aries LETS (Lateral Evaluation Television System) sets the standard for productive, reliable and versatile mainline and lateral inspections. Feature-rich and customizable to serve your uniquely specific needs, the LETS is engineered to inspect a mainline up to a 36 inch diameter and lateral of more than 150 feet … and that's just the start. Add the self-cleaning PE3600 Pan/Tilt camera and you have the most complete system available today for navigating and inspecting the toughest lateral line conditions.

Relentlessly pursuing **innovation**. Relentlessly ensuring reliable **performance**. Relentlessly dedicated to serving you with quality customer service. The Aries LETS. Relentlessly working with unmatched efficiency until the job is done. For more information, contact your Aries dealer or sales representative today.

ARIES®

Proudly Manufactured in the U.S.A. | **ARIESINDUSTRIES.com** | **(800) 234-7205**

The installed ADS FlowAlert meter with GSM (global system for mobile) wireless communication. (Photos courtesy of ADS Environmental Services)

BETTER MOUSETRAPS

PRODUCT:
FlowAlert wireless depth monitoring and alarming system

MANUFACTURER:
ADS Environmental Services
800/633-7246
www.adsenv.com

APPLICATION:
Wastewater flow monitoring

BENEFIT:
Increases understanding of system and pipe storage capacity

USER:
Lowell Regional Wastewater Utility, Mass.

LEVEL HEADED

Pressure transducer level sensors help a Massachusetts wastewater utility safely optimize storage capacity in its interceptor system

By Scottie Dayton

"We went to the plant managers and graphically demonstrated that we had unused storage capacity. Consequently, we increased the set points on every diversion gate to utilize that capacity."

Mike Stuer

The Lowell (Mass.) Regional Wastewater Utility sewer separation program and remote gate control system upgrades had significantly reduced combined sewer overflows (CSOs) to local waterways.

To further reduce CSOs, operators at the 32 mgd Duck Island Wastewater Treatment Facility wanted to make full use of the 48- to 120-inch reinforced concrete interceptor system for storage of wet-weather flows.

Because the pipes are fairly flat, ultrasonic level sensors in diversion stations throughout the interceptor system enabled operators to extrapolate levels for upstream pipe segments. But without a true understanding of levels in all interceptor segments, the utility lacked confidence when establishing set points for the automatic gate control in remote diversion stations. "In the past, we erred on the conservative side to protect the public and their property," says Mike Stuer, utility engineering manager.

To address the lack of understanding, the utility undertook an interceptor level monitoring program with engineering consultants Woodard & Curran and CDM. The project team developed a plan to install level sensors in critical locations that did not have level monitoring. The key was to "see" levels in all reaches of the interceptor system during heavy rainfalls. The team selected FlowAlert level sensors from ADS Environmental Services.

"We liked these sensors because they focused on level measurement," says Stuer. "The critical component was the IntelliServe real-time software that connects to an ADS flow monitoring website, enabling operators to see what was happening as it happened."

The utility purchased 10 level sensors, and ADS installed and maintained them for one year. During the monitoring period, the sensors verified that a 1-million-gallon storage pipe was underutilized. More important, the level monitoring program provided a better understanding of the interceptor system, allowing operators to optimize its storage

capacity without fear of damaging property.

Bad day in Lowell

Built in 1980, more than eight miles of interceptor pipes run along both banks of the Merrimack and Concord rivers, conveying flow to the Duck Island facility. During heavy rains, diversion stations throughout the interceptor system discharge into the river, relieving the system of excess flows. Stormwater and infiltration create combined flows of more than 100 mgd at the treatment plant.

The motivation for interceptor level monitoring was a catastrophic blowout in an old brick interceptor in 1998. "We blew the crown right off the pipe and flooded a neighborhood because we had to drive to the stations and manually open the diversion gates," says Stuer. "Over the past 10 years, we've been installing ultrasonic level sensors tied to the SCADA system at Duck Island, and now we control the gates from the plant."

The blowout greatly increased the utility's sensitivity about interceptor storage. That required the project team to make a strong case for safe storage. "One of the most interesting things about interceptor level monitoring was assuring management that what we were doing was safe — that we weren't going to have another catastrophe," says Stuer. After consideration, Mark Young, utility executive director, agreed to support the project.

Picking spots

Aaron Fox, utility engineer supervisor, identified the optimal locations for the level sensors and managed the project's technical aspects. Brandon Kelly, utility staff engineer, coordinated with Mike Armes, ADS project manager, to install the units, which required no external power, cabling, or other infrastructure.

The sensors use a pressure transducer attached to a pipe invert to sense the head of the water column above it. Two float switches provide multilevel, date- and time-stamped depth notification. An optional depth sensor records depth readings for depth trending and flow calculation.

The wireless communications platform instantly sends low, high, and high-high flow condition reports via emails and text messages without special software. The advanced circuitry minimizes power usage and extends battery life.

"Although the suggestion was made to measure the flow rate in the interceptor, we decided to avoid measuring velocity for fear of complicating things," says Stuer. "All we wanted to know was the level."

Kelly worked with ADS to calibrate the sensors every six weeks throughout the program. "We monitored any segment where we weren't sure about the levels or wherever we had information gaps between the diversion stations," says Stuer.

Tangible benefits

Stuer and his engineers developed charts that tracked 17 level trends in the diversion stations and FlowAlert locations, then correlated the levels with gate positions, flows at the plant, precipitation, and activity in the interceptor system.

"We went to the plant managers and graphically demonstrated that we had unused storage capacity," says Stuer. "Consequently, we increased the set points on every diversion gate to utilize that capacity.

"For example, we increased the gate-open set point from 9 to 9.2 feet on a 120-inch pipe. It may not sound like much, but when it is two-tenths of a foot over several miles, that's a substantial volume." Raising the set point in one 96-inch pipe by 4 feet enabled the most dramatic capacity increase.

The sensors also identified 3,000 feet of 96-inch pipe that carried very little flow even during prolonged downpours. "About one-half mile from the plant, the elevation in the North Bank interceptor drops seven feet," says Stuer. "It's like a waterfall inside the pipe. Wet-weather flows during heavy rains surcharge the lower segment, while the upper segment is almost empty. We're going to install flow-control gates at that location and gain one million gallons of additional storage."

The utility removed the FlowAlert sensors after the study and now relies solely on the ultrasonic sensors in the diversion stations to monitor and adjust the system. The ADS units, however, are not in retirement.

"The Duck Island plant is using a 30-year-old hydraulic grade line," says Stuer. "To determine the facility's actual wet-weather treatment capacity, we installed six ADS sensors throughout the treatment process. They are enabling us to better understand our system and to become more confident in our decisions." ✦

A FlowAlert pressure level sensor is installed in the flow, and the float alarm switch is on the weir wall.

The GSM (global system for mobile) wireless FlowAlert meter with pressure level sensor mounted to a stainless steel band.




GapVax®

888-442-7829

STAND OUT!

FROM THE OTHERS

WITH THE BEST EQUIPMENT ON THE MARKET

- ✔ better fuel efficiency
- ✔ easier to operate
- ✔ easier to maintain
- ✔ safer operation
- ✔ superior design

PARTSEXPRESS

NOW HIRING SALES REPS - CHECK DETAILS ON OUR WEBSITE

FOCUS: STORM

TACKLING THE TERRAIN

A Georgia city uses partnerships, inter-department cooperation, and technology to take on tough stormwater challenges in the face of limited resources

By Scottie Dayton

Waycross, a Georgia city of 15,000 people, is too small to come under MS4 stormwater permit coverage, yet it is one of few state municipalities its size to adopt an aggressive stormwater management ordinance.

It's all because of topography. Waycross, the largest city on the Satilla River, was built on a wetland creek system separated by sugar sand hills. Man-made canals dewatered the creeks, enabling the land to be developed. The present-day Waycross City Drainage Canal, a Satilla River tributary, runs down the center of the old system, draining more than 8,000 acres of dense urban development.

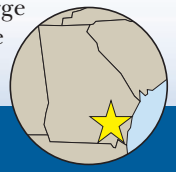
Another topographical feature affecting runoff is the Eastern Subcontinental Divide. Rain falling north of it reaches the Atlantic Ocean via the Satilla River. The southern fringe of the city, four miles from the Okefenokee Swamp, lies south of the ridgeline. Water there drains to the Gulf of Mexico via the swamp and Suwannee River.

The city, faced with $3 million worth of stormwater projects and an annual stormwater budget of $329,000, advances the work through partnerships with developers and cooperation between departments.

Flood control challenges

The Satilla River is critical to protect, as it is considered a wild and pristine river. It is also a habitat for redbreast sunfish and one of Georgia's few blackwater rivers — a deep, slow-moving channel flowing through forested swamps and wetlands.

The 27-mile canal system flows from all directions throughout Waycross. Most headwaters begin as natural ditches with vegetative buffers, then become part of the city's open and piped stormwater conveyance system. Two major arteries converge into one large canal behind



Joey SanNicolas (right), soil erosion and stormwater permitting manager, and Eric Tomlin, engineering technician, verify capacity and water level in an 8-acre regional retention pond constructed through a public-private partnership. (Photography by Dave Callaway)

PROFILE:
Engineering Division, Engineering and Environmental Management, Waycross, Ga.

FOUNDED:
1874

POPULATION SERVED:
35,000

AREA SERVED:
46 square miles

EMPLOYEES:
21

ANNUAL RAINFALL:
48 inches

INFRASTRUCTURE:
50 miles of stormwater collection and conveyance; 27 miles of drainage canals; 2,400 catch basins, flumes and inlets; 5-acre detention basin; 8-acre retention pond

ANNUAL BUDGET:
$329,000 (stormwater and flood control)

WEBSITE:
www.waycrossga.com

Stormwater permit requests are fielded by the Office of the City Engineer. Frank Baugh, city engineer, reviews developer plans for a pending storm drainage permit.

City public works staff is supplemented by a prison crew that works year-round, removing obstructions, overgrowth and vegetation from the canal system, mainly in areas inaccessible to equipment operators.

BEYOND THE WALLS

The Waycross Public Works Department has an innovative approach to maintaining stormwater canals that are inaccessible to equipment: It employs a crew of 12 inmates with a guard from nearby Ware State Prison.

Convicts remove vegetation and obstructions, bag litter, and stabilize stream banks. "The city pays $40,000 a year to cover the guard's salary and transportation costs," says Frank Baugh, P.E., of the Engineering Division. "Without this arrangement, we couldn't afford to clean the canals."

the wastewater treatment plant on the city's east side. Main canals are 40 to 80 feet wide and 6 to 8 feet deep.

Waycross has one of the largest rail classification yards in the country, with hundreds of miles of parallel track. As the yard developed, workers redirected channels draining to the Suwannee River to the city's canal system, diminishing its capacity.

As a retail hub for southeastern Georgia, Waycross has the largest concentration of stores within a 50-mile radius. City and Ware County officials, worried about how the ongoing and anticipated development would affect flood control, conducted a study of the conveyance system and canals in 1994. They inventoried structures, analyzing them for size and ability to handle flows during different rain events.

"A significant number were undersized for even a 10-year event," says city engineer Frank Baugh, P.E., of the Engineering Division. "The study showed that development, with its topographical changes, would compound flooding issues. Our goal then became to prevent progressive deterioration of the drainage system and find a way to control future growth."

> **"We want to partner with the county to study the dynamics of drainage at the rail yard. That will establish which channels to route back to the Suwannee River, taking pressure off the canal system."**
>
> **Frank Baugh**

Logistics thwarted those efforts. Outside the city limits is the Doughnut, an urban fringe with significant development. After the study, the city and county were supposed to adopt a self-imposed comprehensive storm drainage ordinance. The city did in 2000, but the county did not, and that enabled contractors to avoid permit requirements.

Beginning in 2001, droughts mitigated flood control challenges, but heavy rains in recent years reopened city-county collaboration. "We're discussing pooling our resources and retaining a consultant to refine the city's stormwater management ordinance based on our 10 years of experience," says Baugh. "The consultant will then draft the county's ordinance so it complements ours, and we'll both adopt it."

Caring for canals

Baugh expects further cooperation with the county to investigate what is causing channel blockages in densely vegetated, swampy areas that are difficult to penetrate.

"We can't send in men until the weather cools off and the insects slow down," says Baugh. "We also want to partner with the county to study the dynamics of drainage at the rail yard. That will establish which channels to route back to the Suwannee River, taking pressure off the canal system."

Public works crews mow canal banks in populated areas. They also maintain the city's 5-acre detention basin, built to mitigate flooding caused by runoff from upstream developments and a residential area. An excavator operator and dump truck drivers repair cave-ins and washouts and remove brush and debris from the mouths of culverts and pipes. The work takes 480 man-hours per year. The city hires licensed contractors to eradicate brush within the canal footprint by applying herbicides.

Baugh has four workers who respond to complaints about the conveyance system. "We had a dedicated cleaning crew, but lost it six years ago to attrition," he says. The men have a backhoe and Vactor 2100 PD combination sewer cleaner. When needed, they borrow a camera from the sewer and water department.

One of the toughest maintenance challenges is highly acidic soil corroding the 18- to 72-inch corrugated metal drainpipes under streets. The majority of the city's capital projects are replacing failed sections with concrete or plastic pipe when the streets cave in. "We open-cut because it is more economical than trenchless technology and most repairs are in residential areas with low-volume traffic," says Baugh.

One such residential area with a failing 460-foot-long segment of 72-inch piped canal is causing a lot of head scratching. "We're not

A Bandalong Litter Trap is installed on the main city drainage canal below the last confluence point before discharge to the Satilla River. Will Corbett closes the trap gate in preparation for removing the basket.

Photo courtesy of Wayne Morgan

From left, Huey Morgan, Jamie Herrin and J.R. Davis are part of the city's four-man infrastructure crew that maintains city stormwater collection, conveyance, catch basins, flumes and inlets.

quite sure how to tackle it because open-cut repair of this magnitude is cost prohibitive," says Baugh. The city is making interim grout repairs and exploring in situ repair options.

Trapping trash

Beyond canal care, the city faces a challenge with trash washing into the system during rain events. For years, litter discharging into the Satilla River from Morningside Creek, a primary outflow from the Waycross City Drainage Canal system, collected downstream in rafts of trash going on for 10 to 15 miles.

Although the city had no legal obligation, it wanted to be a good steward. Periodically, the wastewater treatment plant staff voluntarily cleaned up the canal below the last confluence point near the facility, but their efforts intercepted only a fraction of the litter. As the volume increased, trash became the prime concern of anglers, residents, and Gordon Rogers, then the Satilla Riverkeeper.

"Having worked closely with Gordon on other water-quality issues, we sought his help," says Baugh. He told the city staff about the Bandalong Litter Trap from Storm Water Systems.

The trap has two high-density polyethylene booms that provide flotation, a maintenance platform, and aluminum and stainless steel hardware and braces. The booms, spanning the 80-foot-wide channel in a vee, direct litter into an aluminum basket that when full is lifted with a truck-mounted crane and emptied into a container.

Chains connected to the cables that tension the booms allow them to float. The booms rise and fall as water levels fluctuate from one to two feet deep in summer and from 10 to 12 feet deep in late winter. In one day, Storm Water Systems installed the device below the confluence and a half mile upstream from the Satilla River.

"The area doesn't lend itself to a bar screen, which would have required a cost-prohibitive capital project and an Army Corps of Engineers permit due to excessive encroachment into the floodway," says Baugh. "The trap anchors to the stream bank with guy wires cemented into the ground. There is minimal disturbance."

From May through September 2010, the city removed 73 cubic yards of litter. Based on annual rainfall of 48 inches, Baugh estimates the device will catch 150 cubic yards of trash per year. The cost of the project, including extension of a service road, was $127,000. It should help posture Waycross for compliance when it falls under MS4 permitting. The Georgia Environmental Facilities Authority provided a loan for the work.

By agreement

Partnerships remain the city's strongest stormwater management tool. A developer envisioned building a 60-acre strip mall on the southeast side of the Doughnut. The land had remained undeveloped because years ago the city had routed runoff from numerous upstream developments onto the property.

"We reached an agreement," says Baugh. "The developer would construct an 8-acre retention pond with ample capacity to handle upstream development, and the city would repay his expenditure over 28 years and take possession of the pond. He also built 2-acre detention basins to his out-parcel tracts — the only completed part of the strip mall due to the economy."

The city's biggest stormwater challenge remains flood control and financing of projects. "We've implemented a water-sewer rate study and did increase our millage rate in 2010," says Baugh. When Waycross falls under Phase II MS4 permit coverage — and the state says it is coming — the city will consider levying a stormwater utility fee to finance those capital projects. ✦

"We're discussing pooling our resources and retaining a consultant to refine the city's stormwater management ordinance based on our 10 years of experience."

Frank Baugh

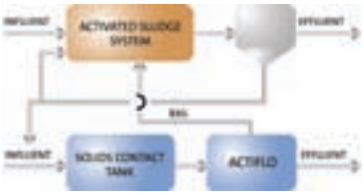
MORE INFO:

Storm Water Systems, Inc.
888/730-5819
www.stormwatersystems.com

Vactor Manufacturing
800/627-3171
www.vactor.com
(See ads pages 3 and 34)

FLOW CONTROL and MONITORING/ STORMWATER MANAGEMENT

By Benjamin Wideman



Organic particulate removal

The **BIOACTIFLO** process from Kruger Inc. removes soluble and particulate organic material (more than 85 percent total BOD removal) while providing high-quality treated water. The process achieves 100 percent biological treatment for all wet-weather flows and saves installation costs. The system can greatly reduce capital and installation costs of membrane filtration processes by treating peak flows, or can be used for tertiary treatment during dry weather. **919/677-8310; www.krugerusa.com.**

Stormwater chambers

CULTEC has added internal manifold capability to its **Recharger 150** and **Contactor 100** subsurface stormwater chambers, allowing more design flexibility and eliminating the need for fabricated pipe manifolds. The internal manifold is created by inserting an HVLV SFCx2 feed connector into the portal on the sidewall of the chamber.

Polyethylene liner is placed beneath the feed connector locations to prevent scouring and to provide a smooth surface for stormwater travel. The two side portals on each chamber allow manifolding to take place at any point in the stormwater management system. It eliminates external manifolds and so decreases the required footprint.

The Recharger series are high-capacity chambers. The Contactor series consist of lower-profile models for systems with high water tables or other depth restraints or when design requires a larger infiltrative surface area. **800/428-5832; www.cultec.com.**

Lightweight treatment system

Advanced Drainage Systems **Water Quality Units** are a lightweight, easy-to-install and efficient stormwater treatment solution. The units remove floatable debris such as oils and greases, are available in 36- to 60-inch diameters, and are made from HDPE. Each unit is fitted with access risers for easy inspection and maintenance of the sediment and oil chambers. Independent testing showed removal of 80 percent of TSS, 80 percent of oil and grease, 74 percent of heavy metals, and 43 percent total phosphorus. **800/821-6710; www.ads-pipe.com.**

Flow data delivery

Hach Flow Meter Products & Services offers **Data Delivery Services,** a hands-off approach to open-channel sewer flow monitoring for short- and long-term applications. Hach handles installation of Web-enabled flowmeters and performs maintenance and data collection so that users never have to visit the monitoring sites.

The company says customers see significant savings while freeing staff for other tasks. Users pay only for the sewer flow data, and the contract includes guaranteed meter uptime. Users can access unedited data anytime via a Web browser on a password-protected site. Professional flow data reporting can be accomplished on graphical Web-based user interface. Hydrographs, scatter-plots and other representations are provided. Event notification alarms can be sent to customer-specified recipients for any sensor parameter via email or text. **800/368-2723; www.hachflow.com/dds.**

Submersible propeller pumps

Flygt submersible propeller pumps from ITT Water & Wastewater move large volumes of water within low- to medium-head applications. The motor and hydraulics are integrated into one compact unit, resulting in smaller, less complex and more cost-effective pump stations. Operating submerged, they take up less space and eliminate noise and motor cooling problems. Capacities range from 4,000 to 120,000 gpm. **203/712-8999; www.flygtus.com.**

Netting system

StormX from Storm Water Systems is an end-of-pipe netting capture system designed for urban hot spots. It has the strength to handle first flush and capture gross

pollutants as small as 5 mm without causing flooding.

The system is constructed of stainless steel hubs that can be cast into concrete or mechanically attached for a weir configuration or secured directly to concrete or steel pipe outfalls with reusable commercial grade nets. Built-in overflows allow heavy runoff to flow unimpeded. The devices are designed to allow the weirs and nets to assist with sediment fallout and collection. They are available in a variety of standard sizes from 18 to 72 inches in diameter and in custom sizes. **888/730-5819; www.stormwatersystems.com.**

Detention system

The **Storm Capture** modular stormwater detention system from Oldcastle Precast is an underground structural precast concrete system used for infiltration, detention, or retention and reuse, as well as for treatment-train systems. Its stand-alone traffic-bearing design does not rely on final paving and associated stone underlayment or on specific stone backfill for structural capacity and storage. Modules are made of high-strength concrete and are installed on a simple setting bed of stone.

The ability to support traffic allows for minimal cover. Pavement options are asphalt, concrete or concrete pavers. Standard inlet grates allow stormwater direct entry from a roadway surface, eliminating separate inlet structures. The system incorporates direct access for inspection and cleaning through grates, manholes or removable slabs, as well as a Maintenance Module for sustainability. The modules have a smaller footprint with more storage capacity and allow for rapid installation. **888/965-3227; www.oldcastleprecast.com/stormcapture.** ✦

CSA, NASSCO Offer Certification Program

CSA Standards and the National Association of Sewer Service Companies (NASSCO) will offer the Pipeline Assessment Certification Program Version 6.0 (PACP). The program provides pipeline professionals in Canada and the United States with the knowledge and information to visually evaluate sewer pipe conditions and manage TV inspections required for assessing trenchless projects before they begin. A schedule of PACP classes is available at www.nassco.org.

ISI to Develop Infrastructure Sustainability Measuring Tool

The Institute for Sustainable Infrastructure, founded by the American Council of Engineering Companies (ACEC), the American Public Works Association (APWA) and the American Society of Civil Engineers (ASCE), is developing a sustainability rating system for North American infrastructure. The rating system is founded on the triple bottom line concept of sustainability, which includes environmental, economic and social considerations. It is designed to identify the benefits of sustainable practice for owners, regulators and practitioners. The rating system will be formally launched this summer as a voluntary, Web-based product, with an option for third-party verification.

WesTech Engineering Acquires WWETCO

WesTech Engineering Inc. of Salt Lake City, Utah, has acquired WWETCO LLC of Atlanta, Ga. WWETCO, wholly owned by WesTech, will continue to function as an independently operated company. WesTech is a manufacturer of process equipment for municipal water, wastewater and mining.

Cretex Names Shepard West Coast Regional Manager

Cretex Specialty Products named Marilyn Shepard West Coast regional manager. She has 15 years of industry experience and has served for 10 years as a PACP/MACP master trainer for the National Association of Sewer Service Companies (NASSCO).

HOBAS Releases Product Brochure

HOBAS Pipe USA has released a 72-page product brochure covering its centrifugally cast, fiberglass reinforced, polymer mortar pipe. The brochure includes guide specifications, joint details, manufacturing processes and more.

TYPAR Tested by Army Corps of Engineers for Flood Control

TYPAR Geocells from Fiberweb Inc. were evaluated by the U.S. Army Corps of Engineers Research and Development Center on their ability to withstand a variety of flood-related conditions. Tests showed the three-dimensional, nonwoven fabric took less time to install, had less seepage, took less time to remove and showed greater endurance than sandbags.

Pryor Opens Southland Tool

David Pryor

David Pryor has opened Southland Tool Manufacturing Inc. in Anaheim, Calif. The sewer cleaning equipment manufacturer has been involved in the sale and manufacturing of equipment for municipalities for 30 years. His product line includes flat debris traps and double-sided, three-bladed cutters for rodders.

Aries Industries Names Kroll President, CEO

Nick Kroll

Aries Industries Inc. named Nick Kroll president and chief executive officer in March. Kroll has 20 years experience in business development, strategic planning, acquisitions, organizational development and customer service, primarily in the industrial sector. He said the new position provides an opportunity to improve processes and bring new technology to the marketplace. Kroll had been president at Trico Corp., Pewaukee, Wis., since 2001 and vice president of business development at Engine Power Inc., Oconomowoc, Wis., for six years. He has a bachelor of arts degree in economics from St. Norbert College and an MBA from Marquette University. ✦

Matt Daniels, GIS technician, uses the YourGOV phone application to verify a reported problem. (Photos courtesy of Dan Hartman, City of Golden)

FOCUS: WATER/SEWER

BECOMING A BELIEVER

Social networking tools mean better communication and greater efficiency for public works and water/sewer operations in Golden, Colo.

By Ken Wysocky

A couple of years ago, Dan Hartman could easily sum up his disdain for social media such as Twitter in less than 140 characters: Absolutely no use whatsoever.

These days, Hartman, public works director for Golden, Colo., is tweeting a different tune as he enlists social media to help his department defuse community controversies, quickly notify residents about water main breaks and other emergencies, and allow citizens to help with asset management and initiate repair orders.

No one is more surprised about it than Hartman, who once thought social media was nothing but a bother — just one more thing to keep track of when everyone is already asked to do more with less. But as he gradually immersed himself in social media such as YourGOV and i-Neighbors.org, he saw that there just might be merits to it.

"My guess is that this is pretty much unplowed ground for most public works departments," he says. "But looking forward, I've got to believe it's the way of the future. I started working here 22 years ago, and around that time I remember attending a really long and contentious city council meeting where officials debated the purchase of a fax machine. Talk about a huge shift in communications and technology!"

Cell phone apps

The YourGOV cell phone or computer application (app) from Cartegraph shows how social media helps Hartman's department work more efficiently. Citizens can visit the city's website (www.cityofgolden.net) and download the app for free, then use it to report non-emergency problems they encounter. The company that developed the app also created the department's asset management software.

"If a citizen sees a fire hydrant leak or water bubbling up from under a manhole cover, for example, they can use the YourGOV app on their mobile phone to send a message to our department," Hartman says. "The global positioning system (GPS) in their phone tells us where the problem is located."

The message automatically gen-

PROFILE:
Water and Wastewater Utility Divisions,
Golden, Colo.

CHARTERED:
1859

POPULATION:
18,000

AREA SERVED:
7 square miles

CUSTOMERS:
7,000

EMPLOYEES:
26

INFRASTRUCTURE:
108 miles of water lines; 114 miles of sewers

ANNUAL BUDGET:
$7.6 million

WEBSITE:
www.cityofgolden.net

An example of a map on the YourGOV (Cartegraph) application that a technician would use to locate a reported main break or leak.

erates a work order through the department's work management system. That order is then emailed to the cell phone of someone on an appropriate field crew. When the work is done, the work order is closed, and the resident who sent the notification gets an email saying the problem has been resolved.

"It's a concept known as crowd sourcing, where the citizens become part of the public works department," Hartman notes. "Ninety-nine percent of the time when things don't get fixed, it's because we don't know about it. But with this technology, citizens become an adjunct to our organization — our eyes and ears out in the field."

Hartman notes that municipalities without complete asset inventories can take the concept one step further by asking residents to, say, take a photo of a fire hydrant with their cell phone and email it to a public works or water department. The GPS-based phones will indicate where the hydrant is located.

Taking the pulse

Hartman also uses i-Neighbors (www.i-neighbors.org), which allows residents to organize into cyber communities and talk to each other about anything and everything — including public works issues. The size of each neighborhood could be from a few hundred to a few thousand homes.

i-Neighbors is an online application that allows residents to organize into cyber communities and talk to each other about anything and everything — including public works issues.

As even a newbie might guess, monitoring i-Neighbors communications involves a lot of separating the wheat from the chaff. "I belong to seven different i-Neighbors groups," Hartman says. "The system is email based, so the posts come to my mailbox. Yes, there are a lot of them, but I've learned that you can quickly delete most of them.

"And as much as I don't care so much that Betty needs a babysitter, there's an awful lot going on, and things in a neighborhood can go viral on you pretty quickly." He cites one particular post by a resident who claimed a traffic intersection at an entrance to a neighborhood was dangerous.

There was no evidence to back that up, but by the time Hartman found out about the brewing controversy, residents had added 40 or 50 more posts, each one upping the emotional ante. The lesson: Become part of the discussion early, when you can defuse a situation with facts and before uninformed residents start inflaming the situation by proposing unworkable solutions to what essentially is a non-problem.

While Hartman concedes that i-Neighbors can be a time drain, he says preparing for a neighborhood meeting to deal with an issue could take a couple of days anyway.

"All those emails may sound onerous, but you invest the time one way or another," he says. "I'd rather spend time being proactive on the front end of things, which is way more efficient. It's better to start working early on with people to find a real solution, before they get entrenched with certain ideas. The trip back from a bad idea is tougher for a community than a collaborative trip to a better solution."

Dan Hartman, public works director, City of Golden.

A city employee uses an application on a handheld Juno GPS (Trimble) to verify a reported problem.

PROACTIVE APPROACH IS GOLDEN

The city of Golden used to average 18 sewer main backups a month and more than 200 a year. But in the last three years, there have been only two. The reason? An aggressive routine maintenance and line replacement program for the city's 108 miles of water and 114 miles of sewer lines, says public works director Dan Hartman.

"We're very much a preventive maintenance organization," he says. "Sure, we respond and fix things when they break, but we'd much rather not have anything break or back up." The city dedicates a two-member crew and a combination cleaner — a 2010 Vacall AJV 1215 — to routine maintenance. It carries a 1,500-gallon water tank, a 12-cubic-yard debris tank, and a water system that generates 2,000 psi/80 gpm.

Crews inspect manholes at least once every two years and clean sewer lines about as often, although some problem lines get cleaned as much as quarterly. The city also inspects and tests hydrants and exercises valves annually.

Years ago, the city established a fully funded replacement program for water and sewer lines, based on a 70-year life cycle for water lines and an 80-year cycle for sewer lines. The water line life cycle is shorter than normal because of electrolysis problems and higher-than-normal water pressure in low areas of the mountain community. Pressures can run as high as 170 psi.

"As the water lines get changed out from mostly cast-iron pipes to PVC pipe, I suspect the life cycle will be a little longer," he says.

> **"Ninety-nine percent of the time when things don't get fixed, it's because we don't know about it. But with this technology, citizens become an adjunct to our organization — our eyes and ears out in the field."**
>
> **Dan Hartman**

Tweet tweet

The department also uses Twitter, another social media platform, to communicate with people who sign up to "follow" the department. Twitter text messages, known as tweets, must be 140 characters or less. Hartman says Twitter is great for situations such as water main breaks, because it can eliminate some of the time-consuming, labor- intensive process of knocking on doors to notify residents of emergency situations.

"We call dispatch and they send out a tweet to residents in the area," he says. "It's short and to the point. We tell them the break's location and how long they can expect to be without water."

The department promotes Twitter and YourGOV on its website and in communications that go out to residents, both written and verbal. It also uses Twitter to promote the YourGOV app.

"Whenever we get a call from someone, we tell them they can follow Golden Public Works on Twitter," he says. "It doesn't cost a thing, and they'll get a notice every time something like this happens. We've been doing this for almost a year and have a few hundred followers."

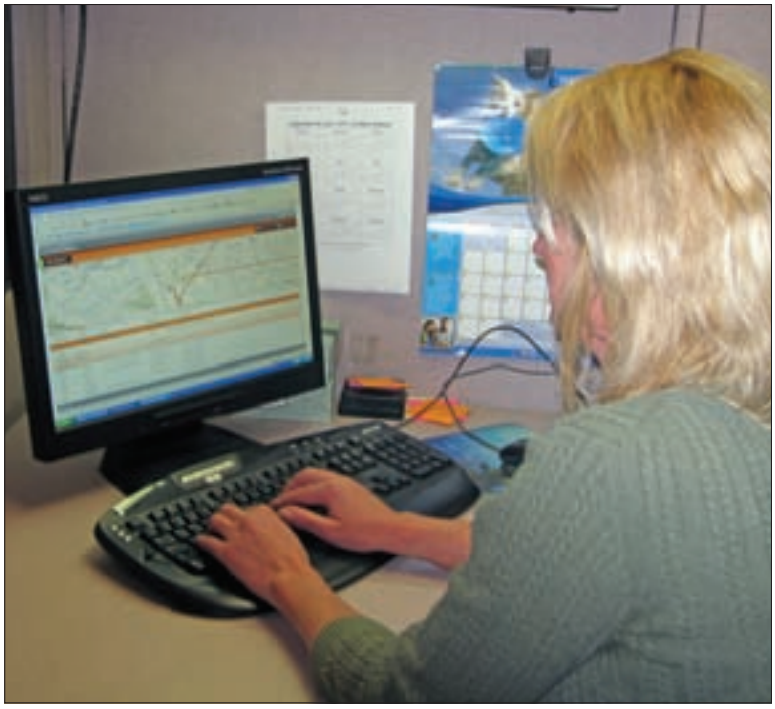
More efficient, less paperwork

The department's use of cell phone apps also increases productivity through more efficient scheduling. Using an app on a Trimble Juno series handheld computer GPS and field data collection device, made by Trimble Navigation Ltd., field crews can inspect a manhole, for instance, then digitally generate a work order for cleaning, if needed.

"It removes the paperwork from the system, and organizes the work orders in the most efficient manner," Hartman says. "You don't want to fix a manhole, come back to the office, go out and fix another one, and so on. Now supervisors just ask the system to provide a day's worth of work within a geographic area that minimizes their crew running around to disparate locations."

The system also dramatically reduces paperwork. Previously, crews would fill out forms by hand for a repair or other maintenance, then give it to a clerk who would hand-key the information into the system. The increased efficiency allowed the department to trim staff by one half-time employee, and data-entry accuracy is better because with fewer employees in the data-entry loop, there's less opportunity for error.

"This also provides good documentation," Hartman adds. "Sometimes we jet a line, and then a basement backup occurs. We can show the homeowner that we cleaned that line, say, six months ago. Crews can use their handheld devices to pull up information about specific sections of line right there in the field."



Administrative coordinator Carrie Vogt checks the YourGOV computer application on her desktop. Citizens can visit the city's website and download the app for free, then use it to report non-emergency problems they encounter.

Things change

Hartman says that because technology changes and advances so rapidly, it's hard to be sure what other practical applications may develop for social media within the department, or which media will still be viable even a few years from now. As evidence of how fast technology shifts, he points to resident phone calls to the department, which have dropped about 80 percent during the last five years, supplanted by an exponential increase in emails.

The city pays supervisors a monthly allowance that helps subsidize the cost of a smart phone, which they then can use professionally and personally to avoid carrying around two cell phones. This reflects cell phones' status as essential equipment.

"My point is that going forward, how we communicate in the future probably won't be how we communicate today," Hartman says. "We can speculate a lot, but this kind of stuff changes so quickly that we don't know where it will lead.

"But I've absolutely come to believe that you can't wait on technology. You might jump in and use Twitter, and Twitter may go away in three years. But you have to jump in and evolve as things evolve, or you and your department risk becoming a relic."

> **"It's better to start working early on with people to find a real solution, before they get entrenched with certain ideas. The trip back from a bad idea is tougher for a community than a collaborative trip to a better solution."**
>
> **Dan Hartman**

In other words, using 140 characters or less: Hopelessly behind the times and irrelevant. ✦

MORE INFO:

Cartegraph
563/556-8120
www.cartegraph.com
(See ad page 39)

Trimble – Mapping & GIS
800/874-6253
www.trimble.com/mgis

Vacall Industries
800/382-8302
www.vacallindustries.com

We invite readers to offer ideas for this regular column, designed to help municipal and utility managers deal with day-to-day people issues like motivation, team building, recognition and interpersonal relationships. Feel free to share your secrets for building and maintaining a cohesive, productive team. Or ask a question about a specific issue on which you would like advice. Call editor Ted Rulseh at 800/257-7222, or email editor@mswmag.com.

MANAGING YOUR BOSS

The employee-supervisor relationship works both ways. Each party has responsibility for creating a productive work partnership.

By Ken Wysocky

Shelves of books have been written about how to manage employees effectively. But when it comes to advising employees about how to manage their bosses — there aren't many.

This imbalance masks a clear truth: The boss-employee relationship is a two-way street. Employees are just as responsible for establishing a good relationship with their managers as those managers are for doing the same for their team.

While that's true in a perfect world, reality is often quite different. Many employees find themselves working for bad managers, and that makes managing-up strategies important, says Marie McIntyre, a workplace psychologist and long-time consultant for leadership training and teamwork development.

"The problem is that no one is born with the knowledge of how to direct the performance of others," notes McIntyre, a national management columnist and author of *Secrets to Winning Office Politics*. "What typically happens is a good employee gets promoted because they're just that — a good employee. The common thought is if you're a great nurse, you'll be a great nursing supervisor. Or if you're a great sewer inspector, you'll be a great sewer-inspection supervisor.

"But they often receive no additional managerial training, so we end up with a lot of employees being managed by people with inadequate preparation. So you must learn to build a relationship with your boss.

"Most people think that because there's a boss to manage you, it's their job to develop a good relationship and communicate with you effectively. But it's a two-way relationship, and an important one at that, because that person influences many key things in your life, from salary to the quality of your working environment."

Empower yourself

So what can an employee do to manage up? Whether you have a great, good or not-so-good supervisor, first accept that, for better or worse, the boss is the boss. Those who don't accept that fact are doomed to an unwinnable power struggle.

"You have to accept that your boss has organizational power to direct and supervise you," McIntyre says. "That's true even if your boss is an idiot. You typically don't get to pick your boss. If you're lucky, you get a boss who is a good match for you. The challenge arises when you get a boss who isn't such a good match."

It's also critical to ask for feedback. Many managers practice what McIntyre calls "psychic management," in which they observe things that concern them but are afraid to provide negative feedback. They bring those issues to the forefront only during an annual performance review, at which time it's usually a case of too little, too late.

"That's why it's good to ask for feedback occasionally," she says. "Ask your supervisor how things are going from their perspective. What's going well and what isn't? Couch it in terms of, 'How can I make your job easier?' Granted, it's really your manager's responsibility to tell you these things. But if he or she doesn't, you're better off asking. And it's important to be non-defensive when they respond."

Management styles

Another strategy is to figure out what makes your manager happy. For example, some managers like to be very involved. If it bothers you that your boss asks a lot of questions and seems to be micromanaging, consider that she is simply interested in what you're doing, and provide the information she wants.

Other managers are very hands-off, and that can be liberating and disconcerting at the same time. "I recently heard from a client who works in a different building than her supervisor and hadn't had significant contact in two months," McIntyre says. "That concerned her. Sometimes you need to seek out ways to communicate better. Ask your manager how much information he wants, or what kinds of decisions she wants to be involved in."

Part of the relationship is making your boss look good, whether you want to or not. Meet deadlines, stay within budget, share information, solve problems and get along with fellow employees. If you attend a professional conference and take in a presentation on new trends in sewer inspections, send your manager a summary.

Or if you hear that another department is being reorganized, ask your manager if he or she knows about it. If your manager has to make an important presentation, develop and share an idea or two that could help make it better.

> **"You may hate having a difficult boss, but if you're smart, you'll figure out how to develop the best possible relationship. Your feelings about the person may not change, but you can improve the relationship, and that can make all the difference."**
>
> **Marie McIntyre**

Be complimentary

It never hurts to give your boss a sincere compliment. "I'm not talking about sucking up, or being a yes-man," McIntyre notes. "But very few managers are all bad, so you can always find something positive to say.

"If you give someone an honest compliment, they'll pick up on the sincerity. Of course, you shouldn't do it every day, or a week before your annual performance review. But resolve to look for positives and express appreciation for them."

Even if you have a somewhat

adversarial relationship with a manager, there are ways to turn negatives into positives. For instance, if you don't see your supervisor very often, let him know you appreciate being trusted to work independently. If your boss asks a lot of questions, tell her you appreciate her interest in your work.

"Most managers are deluged with problems," McIntyre says. "We tend to focus on the things that make our lives less pleasant and take the good things for granted. So at the end of a discussion about a work issue, provide a compliment. Maybe it's as simple as thanking your boss for giving you so much autonomy. Your boss will probably fall off his chair because no one ever does that."

On the other end of the spectrum, avoid complaining to others about your boss. "It's one thing to say to a colleague, 'Boy, Bob really likes to get involved in the details of a project — how do you handle that?'" McIntyre says. "That's sort of like group therapy to help you work better together. But that's a lot different than saying, 'Bob sure is a micromanager, isn't he?' Eventually, those kinds of comments get back to your manager. If you have to vent your frustrations, it's better to do that with a trusted friend or family member."

Danger zone

McIntyre also advises employees to be wary about managing the transition from one boss to another. The most dangerous points in any employee's career are when they get a new boss, whether a colleague who gets promoted, someone from another department, or someone new to the organization.

"If it's someone from outside the organization, all bets are off," she says. "You may have a great 10-year record, but not with them. The shining star may suddenly become the goat, and the goat may suddenly become the shining star, just because the new boss has a different management style and different expectations."

The bottom line is that employees should continually challenge themselves to improve the manager-employee relationship.

"I worry about sounding like Little Miss Mary Sunshine, but you can turn a bad relationship into something good," McIntyre says. "You may hate having a difficult boss, but if you're smart, you'll figure out how to develop the best possible relationship, even if he or she is a gold-plated jerk. Your feelings about the person may not change, but you can improve the relationship, and that can make all the difference." ✦

BRINGING THE INDUSTRY TOGETHER

NASSCO reaches out to other industry associations to help further the goals of promoting growth in trenchless technology

By Ted DeBoda, P.E.

Now that I've got my feet wet as executive director, I want to take a big step out into the industry and do everything I can do to bring the benefits of NASSCO together with other associations allied to the field of underground construction.

NASSCO's mission is to set industry standards for the assessment and rehabilitation of underground pipelines and to assure continued acceptance and growth of trenchless technologies. That's a lofty goal that we can't achieve alone. That is why we're reaching out to other organizations to help build awareness of the importance of infrastructure maintenance and repair, which in the end will help us all.

NASSCO is deploying a number of initiatives, internal and external, to help achieve these objectives. They include:

- Partnering with Water Environment Federation (WEF) to help them incorporate the Pipeline Assessment and Certification Program (PACP) into the Operations Challenge.
- Working with NASSCO's Industry Relations Committee to develop presentation tools to target regional WEF Member Associations, such as the Chesapeake Water Environment Association (CWEA). This outreach will help the associations understand what NASSCO offers in education and training, specifically PACP and our Inspector Training and Certification Program (ITCP) for cured-in-place pipe.

As president-elect of CWEA, I am slated to become president in September. In that role, I will be responsible for standard duties, but my main focus will be on outreach and effective training to support sewer professionals in Delaware, Maryland, and Washington D.C. That includes helping the U.S. Army Corps of Engineers incorporate PACP into its regional guidelines for pipeline inspections under levees.

NASSCO is also working with the Corps to develop an International Levee Handbook to capture the state-of-the-practice in levee design, construction, operations and maintenance, including the use of PACP. The countries participating include the United Kingdom, Ireland, France, Germany, Netherlands, and the U.S.

I'll also be supporting the American Society of Civil Engineers (ASCE) pipeline infrastructure group to help develop guidelines to conduct a sewer system evaluation survey (SSES), and coordinating with American Composites Manufacturing Association (ACMA) to support efforts for continued evaluation and application of good science around the Department of Health and Human Services proposal to list styrene as a "reasonably anticipated carcinogen."

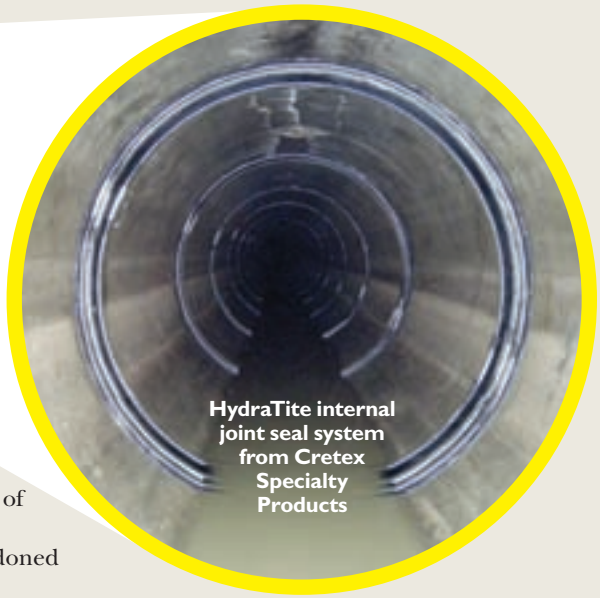
I was asked recently if I foresee any conflict between focusing on the work at hand within NASSCO and reaching out to other organizations. The answer is a resounding "No." We at NASSCO know that each association has its strengths, and we are open to partnership with any and all organizations that share our goal — to set standards and build awareness for trenchless technologies. ✦

Ted DeBoda is executive director of NASSCO. He can be reached at director@nassco.org. NASSCO is located at 11521 Cronridge Drive, Suite J, Owings Mills, MD 21117.

Product Spotlight

Mechanical Seal System Repairs Joints in Large-Size Pipes

By Ed Wodalski



HydraTite internal joint seal system from Cretex Specialty Products

The HydraTite internal joint seal system from Cretex Specialty Products is a mechanical, trenchless remediation for the repair of pipe joints. Made to eliminate infiltration and exfiltration, the system has a rubber seal (EPDM or nitrile) that spans the joint and is held in place by stainless steel retaining bands. Each seal is custom made to ensure compliance with project specifications and is a recognized method of joint repair by AWWA manual M28.

The system can be used in virtually any type of pipe — steel, concrete, clay, plastic — from 18 to 216 inches. "It's pretty adaptable," says Pete Tortorici, senior regional sales manager. Seals are available in 11-, 14- and 21-inch widths.

Retaining bands can be supplied as one piece or as multiple pieces and are made from carbon steel, 304 stainless, 316L stainless or AL-6XN. The band thickness varies with the size of the seal. A stainless steel backing plate can be added behind the seal for added support when spanning voids in the pipe wall, such as for remediation of expansion joints, sealing off abandoned laterals, or repairing deteriorated joints.

Depending on the pipe diameter, a seal can be installed in about 40 minutes and can last for the life of the pipe. Able to withstand hydrogen sulfide, the joint seal system offers a cost-effective alternative to sliplining or other trenchless methods for smaller repairs. "With sliplining, there might only be a few joints in a 1,000-foot run that you might need to seal," Tortorici says.

The joint seal is also an alternative to grouting. "With a manual seal, you put it in there and you forget about it," Tortorici says. **800/345-3764; www.cretexseals.com.**

New Pig Introduces Form-A-Funnel Oil Draining Tool

The Heavy Duty Form-A-Funnel draining tool from New Pig Corp. is made to guide oil from large vehicles into oil drains for no-mess oil changes. The tool bends to fit into tight spaces and holds any shape. Edges can be molded around large filters and drains to create a leakproof seal. The funnels feature a moldable aluminum alloy core covered by a thick layer of pliable nitrile rubber. The chemical-resistant funnel can withstand temperatures up to 425 degrees F. Measuring 22 by 8.6 inches, the funnel can be used for servicing large diesel trucks, heavy equipment, generators and emergency compressors. **800/468-4647; www.newpig.com.**

Fibergrate Offers Containment Pans

The fiberglass spill containment system from Fibergrate Composite Structures is designed to protect workers and the environment against contamination from spills at oil and gas well sites. The system features a uniform flat surface for the placement of heavy mobile drilling rigs, frac and other equipment, while providing a trip-free environment for workers. The system includes a large pan created from a matrix of fiberglass reinforcement embedded in a corrosion-resistant resin and covered with traffic-bearing, slip-resistant, high-load molded grating. The modular system enables multiple pans to be set up in various arrangements. **972/250-1633; www.fibergrate.com.**

PumpBiz Introduces Propane-Powered Pump

The PortaPump propane-powered pump from PumpBiz Inc. is designed to remove standing water from golf course bunkers and fairways, flooded parking lots, sidewalks, or drain water from pits that need to be excavated because of pipe breakage or root damage. Able to pump up to 2,000 gph, the one-person unit is powered by a Honda 4-stroke, 35 cc engine. A larger unit, able to pump up to 16,800 gph is available. **800/786-7249; www.pumpbiz.com.**

AIT Introduces INVU Pipe Camera

The INVU portable pipe camera system from Advanced Inspection Technologies can inspect heat exchanger tubes, septic lines and tanks, boiler tubes, steam lines and other applications. The handheld miniature push camera system includes a 25-foot spring cable for inspecting pipes with multiple angles. The 7-pound camera can snake through 1-inch openings. The system can be connected to virtually any video or recording device through a standard composite video output, as well as a laptop or portable DVR. **321/610-8977; www.aitproducts.com.**

Vac-Con Introduces Natural-Gas-Powered Truck

The Compressed Natural Gas truck by Vac-Con features a CNG-powered auxiliary-mounted engine that powers the truck's water system. The combination high-pressure water and vacuum cleaning system is mounted on a Freightliner Business Class M2 112V CNG chassis. The truck has an Allison 3000RDLS transmission and 2,500-square-inch windshield for enhanced visibility. **888/491-5762; www.vac-con.com.**

Mr. Manhole Introduces Plug-In Teeth

Plug-in teeth for the Mr. Manhole Six Shooter enable worn or damaged cutting teeth to be replaced on the job site without cutting or welding. The new carbide teeth also provide longer cutting life and improved concrete cutting. **419/229-3015; www.mrmanhole.com.**

StoneAge Introduces 40,000 psi Tube Cleaner

The Banshee BN13-40k rotary tube cleaner from StoneAge Tools Inc. is designed to clean tubes 5/8- to 1-inch in diameter at pressure up to 40,000 psi. The tool features OS2 Sapphire nozzles and two replaceable head models. **866/795-1586; www.stoneagetools.com.**

KROHNE Introduces WATERFLUX 3070 Water Meter

The battery-driven, stand-alone WATERFLUX 3070 water meter from KROHNE has an accuracy of 0.2 percent. It can be equipped with a data logger and optional wireless communication (GSM) modem. **800/356-9464; www.krohne.com.**

General Equipment Offers Gas-Powered Ventilators

GP8 and GP8H portable gas-powered air ventilation blowers from General Equipment Co. are made to remove toxic gases from confined workspaces. The blowers deliver airflow of 1,561.6 cfm or 1,066 cfm with two 90-degree bends in the hose. Both models are made of heavy-gauge aluminum and steel. Weighing 56 pounds, the GP8 has a 3.5 hp, 3,600 rpm Briggs & Stratton engine, while the GP8H has a 3.5 hp, 3,600 rpm Honda engine. An adjustable governor with manual speed control enables the operator to vary the blower volume as needed. **800/533-0524; www.generalequip.com.**

Metrotech Offers HL10 Water Leak Detector

The HL10 handheld acoustic water leak location device from Vivax-Metrotech Corp. offers acoustic and visible values for leak survey and leak pin-pointing. The locator has three filter settings for background noise suppression. Features include an LED light for use in low light areas and wind-protected GM 80 ground microphone. **800/446-3392; www.vivax-metrotech.com.**

Vacall Introduces Sewer Cleaner Series

Three new series of Vacall AllJet Vac combination sewer cleaners from Gradall Industries Inc. feature an oval-shaped debris body with cylindrical sides, AllSmartFlow CANbus control system with programmable LCD display and telescopic booms. New P Series models feature a front-mounted hose reel with optional axial pivot for multi-directional productivity. F Series models have a three-stage fan system, while R Series models feature a rear-mounted hose reel and boom. **800/382-8302; www.vacallindustries.com.**

Val-Matic Introduces High-Pressure Plug Valves

High-pressure Cam-Centric plug valves from Val-Matic Valve & Mfg. Corp. are available in sizes 3 through 24 inches. The body, cover and plug are made of ductile iron, rated for 250 psi with ANSI 125-pound drilling. The valves feature 316 stainless steel shaft bearing and welded overlay nickel seat for a tight seal and long life. **630/941-7600; www.valmatic.com.** ✦

WORTH NOTING

PEOPLE

Mark Kollitz was elected president of the Missouri Chapter of the American Public Works Association.

David R. Watt was named Secretary-Treasurer of the American Water Resources Association.

Emery Swearingen, one of the founding members of the Florida Association of Stormwater Utilities (the predecessor to the Florida Stormwater Association) received an Honorary Membership award from the FSA.

MSW *welcomes your contribution to this listing. Please send notices of new hires, promotions, service milestones, certifications or achievements to editor@mswmag.com.*

LEARNING OPPORTUNITIES

APWA

The American Public Works Association is offering these seminars:

- May 3–4 – Stormwater Management Workshop, San Diego, Calif.
- May 12 – Sustainable Utility Construction: Methods and Techniques, Audio/Web Broadcast
- May 17–18 – Public Fleet Management Workshop, Lexington, Ky.
- May 26 – Small Projects, Big Results: Facilities and Grounds Sustainability Projects, Audio/Web Broadcast
- June 28 – Out of the Box Funding Options for Public Fleets, Audio/Web Broadcast

Visit www.apwa.net.

CALENDAR

May 22–26
American Society of Civil Engineers World Environmental & Water Resources Congress, Palm Springs, Calif. Visit www.asce.org.

June 12–15
Water Environment Federation Collection Systems 2011, Raleigh Convention Center, Raleigh, N.C. Visit www.wef.org.

June 12–16
ACE11, American Water Works Association Annual Conference & Exposition, Washington, D.C. Visit www.awwa.org.

June 27–29
American Public Works Association 2011 Sustainability in Public Works Conference, Hilton Portland & Executive Tower, Portland, Ore. Visit www.apwa.net.

June 27–29
American Water Resources Association 2011 Summer Specialty Conference, Snowbird Resort, Snowbird, Utah. Visit www.awra.org.

ASCE

The American Society of Civil Engineers is offering these seminars:

- May 11–13 – HEC-RAS Computer Workshop for Unsteady Flow Applications, Baltimore, Md.
- May 12–13 – Leadership Development for the Engineer, Atlanta, Ga.
- May 19–20 – Pumping Systems Design for Civil Engineers, Orlando, Fla.
- May 20 – Seismic Design of Liquid Storage Tanks, San Diego, Calif.
- June 2–3 – Pumping Systems Design for Civil Engineers, Scottsdale, Ariz.
- June 16–17 – Pipe Selection for Municipal Facilities, Portland, Maine
- June 16–17 – Stormwater BMPs That Work: Effective Analysis, Design and Maintenance, San Antonio, Texas
- June 23–24 – Leadership Development for the Engineer, Dallas, Texas

Visit www.asce.org.

AWWA

The American Water Works Association is offering Underground Corrosion Training May 17–19 in Morgantown, W.Va. Visit www.awwa.org.

Wisconsin

The Wisconsin Department of Natural Resources is offering these courses:

- May 2–3 – Iron and Zeolite, Fond du Lac
- May 5 – Working in the Streets – Traffic Control and Clothing, Janesville
- May 10–11 – Utility Management 2, Madison
- May 12 – Treatment, Spooner
- May 17 – Surface Water Processes, Green Bay
- May 19 – Treatment, Tomahawk
- June 8 – Customer Service, Richfield
- June 9 – Treatment, Fennimore
- June 15 – Personal Protective Equipment, Plover
- June 16 – Treatment, Whitewater

Visit www.dnr.state.wi.us/org/es/science/opcert/training.htm.

The University of Wisconsin Department of Engineering-Professional Development is offering a Mastering the Fundamentals of HEC-RAS L685 seminar May 9–11 in Madison. Visit www.epdweb.engr.wisc.edu.

Municipal Sewer & Water invites your national, state or local association to post notices and news items in this column. Send contributions to editor@mswmag.com. ✦


CENTRAL OKLAHOMA
Winnelson
COMPANY
YOUR SOURCE FOR
RIDGID
6% ONE YEAR FINANCING AVAILABLE!
Longer lease rates also available. Call Keith for details.
microEXPLORER™ Digital Inspection Camera
CS1000 Digital Recording Monitor
LT1000 Laptop Interface System
BUYING A SEESNAKE?
CALL US FOR GREAT PRICING & FREE SHIPPING!
WE WILL NOT BE UNDERSOLD
microDrain Reel
DVDPak
– Call Us Evenings and Weekends –
Keith: 405-602-9155 &
Jim: 405-205-3974
CALL TOLL FREE: 888-947-8761
5037 NW 10th
Oklahoma City, OK 73127
www.centralwinnelson.com


Sava
SAVA-HIGH PERFORMANCE PIPE PLUGS
SAVATECH CORP - PORT ORANGE - FLORIDA - 888-436-9778 - 386-760-0706
WWW.SAVATECH.COM
SAME DAY SHIPPING - WORLDWIDE
NEW
45 PSI
TANKS
PILLOW PLUGS UP TO 108"
HEAVY-DUTY KEVLAR REINFORCED RUBBER
LIFTING BAGS
MULTI-SIZE PIPE PLUGS
BYPASS PLUGS
ISO 9001

classifieds

see photos in color at www.mswmag.com

BLOWERS

New Roots 27" 1021 PD blower. In stock, ready to ship or install. **www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).** (M05)

VFC200P-5T, FUJI Pumps, Regenerative Blowers, Ring Compressors. All models, accessories. Authorized distributor. Authorized parts and repair center. Call 888-227-9822. www.carymfg.com (MBM)

BUSINESSES

Well-Established and Profitable Texas Septic, Sewer & Installation Business For Sale. PRICE RECENTLY REDUCED. Grossing in excess of $600,000 annually, customer list of nearly 2,000 accounts and 430 contracted customers. Includes nice late model equipment, most are 2007, 2008 model years. Owner retiring after nearly 40 years in business. Real estate available upon request. Reduced to $450,000. E-mail jeffb@colepublishing.com or call 800-257-7222 and ask for Jeff Bruss for more details. **A B2 Business Brokerage Listing - www.BTwo.biz.** (MBM)

Amarillo, Texas sewer, drain & plumbing business established in 1976. Owner wants to retire, so take the keys to a 2004 Sprinter outfitted with all of the equipment you'll need to run this business. Price includes real estate with 80x100 shop/office on two city lots. Good gross, good profit, financials available with signed non-disclosure. Offered at $495,000. E-mail jeffb@colepublishing.com or call 800-257-7222 and ask for Jeff Bruss for more details. **A B2 Business Brokerage Listing - www.BTwo.biz.** (MBM)

Successful business with a large amount of equipment and inventory. Profitable sewer and septic business in central Pennsylvania. Increasing revenue over the past 3 years and a large amount of equipment and inventory. Equipment is a mix of old and new, but all is working and making money. Selling price $349,000. E-mail jeffb@colepublishing.com or call 800-257-7222 and ask for Jeff Bruss for more details. **A B2 Business Brokerage Listing - www. BTwo.biz.** (MBM)

Dallas/Fort Worth, Texas Area Sewer/Rehab Business For Sale. Drain Cleaning, TV inspection, Pipeline & Manhole Rehab/Relining, Municipal Cleaning and Maintenance business for sale. Excellent opportunity to expand or start your own business. Good revenue history and priced to sell. Includes all equipment to get started. **Offered at $195,000.** E-mail jeffb@colepublishing.com, visit www.Btwo.biz, or call 800-257-7222 and ask for Jeff Bruss for more details. **A B2 Business Brokerage Listing.** (MBM)

BUSINESSES

Chicago-Area Biosolids, Land Application, Dredging and Industrial Services Business. Established in 1985, owner is retiring. Reputable business includes real estate servicing the entire Chicagoland area with sludge and biosolids disposal and treatment services. Real estate and shop included with sale valued at $750,000, business grosses in excess of $3 million annually, $6.3 million in equipment and assets including several TerraGators, Vac Trailers, dump trailers, loaders and much more. Offered at $4,900,000 - huge potential, good profit and priced right. Non-Disclosure Agreement required, all P&L statements, list of assets, and financials available to qualified buyers. E-mail jeffb@colepublishing.com or call 800-257-7222 and ask for Jeff Bruss for more details. **A B2 Business Brokerage Listing - www. BTwo.biz.** (MBM)

BUSINESSES WANTED

ERH Enterprises Inc. is a successfully established Midwestern-based Water and Wastewater Operation Company located in the eastern part of central Illinois and we are looking to buy used Water and Wastewater Plants as well as any used equipment pertaining to, or that can be used in, this field of work. Anyone having any offers please call 217-267-2331 and ask for John McBride, the Vice President/Director of Operations. (M05)

CATCH BASIN CLEANER

2008 American La France Condor with a new VacAll VS10DC, 10-yd. debris body, dual steer dual sweep street sweeper and catch basin cleaner. (Stock #13352V) **www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).** (M05)

JET VACS

1990 Ford L8000 S/A Vac: 7.4L diesel, jetter, 1,021 hours on unit, 59K miles, A/T, Vactor 2110 body, Model 4-764-180, s/n: 90-9-4016, 4000 cfm, 60 gallons gtm @ 2000 psi. $39,500
715-546-2680 WI MBM

1999 Sterling cab and chassis with a Vactor 2100 combination vacuum loader and high pressure sewer cleaning system. (Stock #2129V) **www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).** (C05)

JET VACS

1996 Ford F800 w/Vactor 2103: Cummins @ 175 hp, Fuller FS5306A, 177" WB, 9,000/17,500 axles, Vactor 2103-16 mini-vac 1600 cfm, s/n: 96-01V-5720. .....$29,500
715-546-2680 WI MBM

2008 Sterling LT7501 with a VacAll AJV1015, 10-yd. debris body, 1500 gal. water, combination vacuum/jetting unit. (Stock #13366) **www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).** (M05)

1988 Ford L8000 Vac: Ford @ 210 hp, A/T, 81K miles, 6K hours, spring susp., spoke wheels, Vac-Con body, Cummins showing 1,292 hrs., s/n: V290T-0488186. .....$22,500
715-546-2680 WI MBM

1998 Vactor PD2100: 15 cu. yd. debris body; 1500 gal. water capacity, Holmes PD blower, 8' telescoping boom, 800' hose. Freightliner FLD112, tandem axle, N-11 Cummins w/Allison auto, 90,800 miles/12,820 hours, tires 90%. Call for more info..... Asking $85,000
608-835-7767 WI C05

JETTERS: TRUCKS

2006 GMC TC6500 cab and chassis with Pipe Hunter trunk mounted jetting unit, 3000 psi @ 50 gpm with a 1,000 US gal. water tank, rear mounted hose reel with JET EYE camera system. **6,800 original miles, like new. $129,000 sale price. (Retails for $210,000)** (Stock #13234V) **www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).** (M05)

JETTERS: TRUCKS

1990 Ford Diesel L8000: Miles 44,341. Enclosed front driven hydraulic system replaced, Sreco 2000 psi. Has traffic arrow safety lights, interior like new. Can email pictures. $14,500 OBO. 650-333-3304 CA. (M05)

1992 Ford L8000 cab and chassis with an enclosed Sewer Equipment Co. jetting unit with a Myers D-65 hydraulically driven water-cooled pump. (Stock #1505C) **www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).** (M05)

PIPELINE REHABILITATION

4" Percussion Milling Cutter Enz Golden Jet for 3/4" - 1" hose version 14.100. LIKE NEW - used on one job! $3,500. Plumbing Anytime, Inc. 307-733-3534 WY. (M05)

POSITIONS AVAILABLE

Southeast Sales Manager Position. Seeking experienced individual to represent distributor of high quality nozzles and accessories to municipals and contractors. Would suit person with existing customer route. Salary, benefits and strong commission structure for proven individual. Email resume to sales@nctnozzles.com. (M05)

WEST COAST REGIONAL SALES MANAGER RapidView IBAK North America - Distributor of high quality, high production pipeline inspection technologies is looking for a West Coast Regional Sales Manager. If you are interested in working with cutting edge equipment in a quality sales environment please send your resume to hr@rapidview.com; or fax to 574-223-7953. (M05)

National Tools Sales: Nozzles and sewer cleaning tools. Previous industry experience is required. No relocation required, extensive travel. This is a commission position although we will consider a small base to cover costs for the right individual. The successful candidate will be knowledgeable of the processes and tools utilized in our industry, will be highly self motivated, computer literate, dependable, organized and ambitious. **Arizona Sales Rep Wanted:** Represent our full line of wastewater, streets and maintenance products. Must have good knowledge of the industry and equipment demonstration experience. Modest salary to start, benefits and strong commission incentive offered. **Counterman, Shop Help:** Based at our Torrance California headquarters, must have plumbing or municipal maintenance experience. Good with tools and computer literate. Neat and dependable. Salary, benefits and commission. Please contact us with your resume and references. Advanced Infrastructure Technologies, sales@advancedworld.com, www.advancedworld.com. (M05)

SUBMIT YOUR AD ONLINE AT www.mswmag.com – IT'S ALWAYS THERE TO MEET YOUR BUSY SCHEDULE

PUMPS

Buy & Sell all makes and models, **new & used** vacuum pumps & high pressure water pumps, and good used replacement parts. Call for an inventory sheet and save. **www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).** (M05)

RENTAL EQUIPMENT

Liquid vacs, wet/dry industrial vacs, combination jetter/vacs, vacuum street sweeper & catch basin cleaner, truck & trailer mounted jetters. All available for daily, weekly, monthly, and yearly rentals. **VSI Rentals, LLC, (888) VAC-UNIT (822-8648) www.vsirentalsllc.com.** (M05)

SEPTIC TRUCKS

1998 Mack RD6885 with a 3200 US gallon stainless steel vacuum tank unit. (Stock #6653V) **www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).** (M05)

One (1) 2006 3200 US gallon **stainless steel** vacuum tank. **www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).** (M05)

SEPTIC TRUCKS

1978 Mack Vac Truck: Mack diesel, M/T, 10,500/19,040 axles, camelback susp., spoke wheels, 22.5 tires. .$24,500
715-546-2680 WI MBM

1993 Volvo Septic Truck: Detroit series 60 @ 350 hp, Fuller 13-spd., engine brake, 273K miles, walking beam susp., air up/down pusher axle, spoke wheels, 22.5 tires, PTO, Masport pump. .$24,500
715-546-2680 WI MBM

SEPTIC TRUCKS

2010 Peterbilt 348 with new Presvac 3600 US gal. aluminum vacuum pressure tank with Masport HXL400WV vacuum pressure pump. (Stock #8808) **www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).** (M05)

SERVICE/REPAIR

Dynamic Repairs - Inspection Camera Repairs: 48-hr. turn-around time. General Wire, Ratech, Ridgid, Pearpoint, Electric Eel, Gator Cams, Insight Vision, Vision Intruders. Quality service on all brands. **Rental equipment available.** For more info. call Jack at 973-478-0893. Lodi, New Jersey. (MBM)

SHORING

Manufacturer Offering Modular Aluminum Shoring, Lightweight Steel or Aluminum Trench Boxes, Aluminum Slide Rail Systems, and OSHA Training. www.americanshoring.com. 1-800-407-4674. (M08)

TANKS

One (1) 2006 3200 US gallon **stainless steel** vacuum tank. **www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).** (M05)

TRUCKS (MISC.)

1999 Chevrolet C6500 pump truck for sale. 2 door. Caterpillar engine. Masport pump. 72,000 miles. 912-587-7517 GA. (M05)

VACUUM LOADERS

1999 International with a Guzzler Ace 27" HG wet/dry industrial vacuum tank loader. **Demo/Rental unit.** (Stock #7390) **www.VacuumSalesInc.com, (888) VAC-UNIT (822-8648).** (M05)

VACUUM TRAILER

2007 Ring-O-Matic 750 High CFM Vac Trailer: Cat 3024 @ 50 HP, 696 hours, liquid-cooled, 750 gallon cap., 850 CFM lobe style blower, 20,860# GVW. $29,500
715-546-2680 WI MBM

SUBMIT YOUR CLASSIFIED AD ONLINE at www.mswmag.com

The Root Intrusion Solution

The Problem...

The Solution...

The Result.

Simple. Effective. Proven.

ROOTX®

1-800-844-4974

www.rootx.com

www.rootxperts.com

VAC·CON
MORE POWER TO YOU

The most intelligent operating system in the industry.

EXPERTISE

TECHNOLOGY

RESPONSIBILITY

Knowledge is power

What makes the Omnibus Control System the most intelligent operating system in the industry? Because one simple control operates ALL the vacuum and water system functions of the Vac-Con Combination Sewer Cleaner. This coordination of systems allows you to use only as much power as is needed, saving time and fuel expended on the job.

The Omnibus Control System is precise, economical, and expandable. Not to mention it's backed by a worldwide network of trained distributors.

Omnibus is what happens when you blend the power of experience with the power of technology. For more information visit www.vac-con.com/omnibus.html

A HOLDEN INDUSTRIES Company

VAC·CON 1986 25 2011

969 Hall Park Drive • Green Cove Springs, FL 32043 • Tel: 904-284-4200 • Fax: 904-284-3305 • vns@vac-con.com

Vac-Con is a subsidiary of Holden Industries, Inc., a 100% employee-owned company.