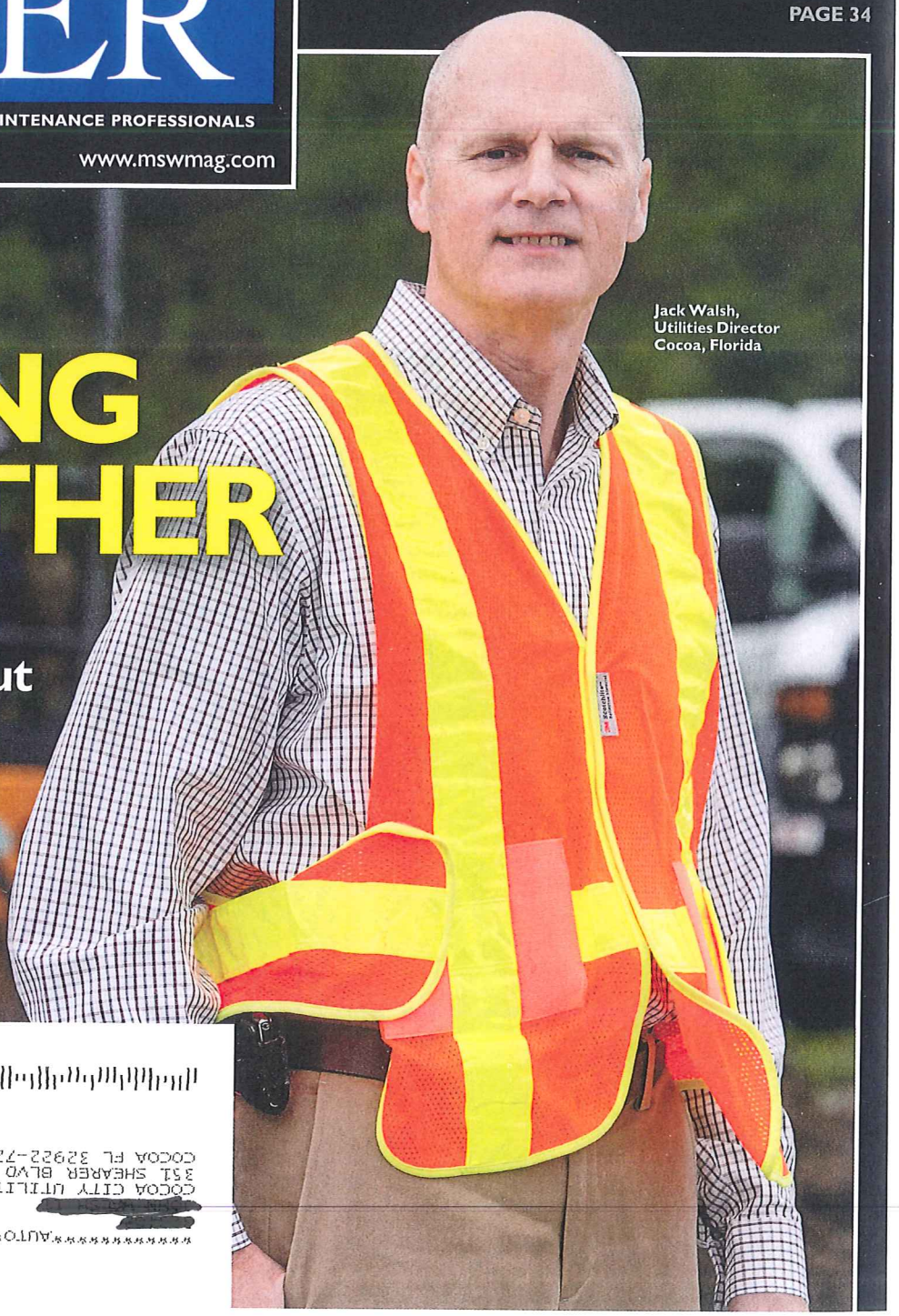
MUNICIPAL
SEWER & WATER™
FOR SANITARY, STORM AND WATER SYSTEM MAINTENANCE PROFESSIONALS
May 2014
www.mswmag.com

PULLING TOGETHER

The City of Cocoa gets proactive about reigning in its vast water system

PAGE 12



Jack Walsh,
Utilities Director
Cocoa, Florida

PULLING TOGETHER

The City of Cocoa reigns in its vast water system through citywide cooperation and the implementation of strong asset management principles

By Erik Gunn

Cocoa Field Operations Manager Chris Collier (left) and Utilities Director Jack Walsh in the Utilities Department shop. (Photography by Amanda Stratford)

With just 17,000 residents, the city of Cocoa, Fla., is fairly small. But it has a huge water system: 1,325 miles of mains, 20,400 valves and 6,000 hydrants alone.

Over the last few years, the city's utilities department has been implementing a major change in the way it manages that extensive infrastructure.

"We're taking a comprehensive approach to risk management and assessment," says Cocoa Utilities Director John "Jack" Walsh. Instead of a reactive approach, the utility is focusing on a proactive strategy: thoroughly taking stock of the water distribution system's conditions, systematically setting priorities for repairing or replacing the lines, valves and other assets, and better deploying manpower and technology to get the job done.

In Cocoa, proactive means finding problems instead of waiting for them to rear their heads. It means compiling a lot more data on the system's infrastructure and assets. And it means, Walsh acknowledges, spending a lot more money.

So far, city officials have been willing to preside over increasing budgets for both operations and capital improvements, approving bond issues as well as rate increases of about 5 percent per year to cover the rising costs.

They've done so because the utility has made the case for how essential the ongoing maintenance work and upgrades are, Walsh says.

Still working on it

He is proud of what the city – on Florida's east coast halfway between Jacksonville and Miami – has accomplished, but he's not complacent. "We're still getting it all worked out," he says. "But now we're starting to reap the benefits."

Walsh emphasizes the utility department's motto, Team Cocoa.

"We could not have achieved all that without the teamwork and cooperation of all the managers and employees, as well as the support and teamwork from the city manager, city council, and the finance and purchasing departments," he says.

Field Operations Manager Chris Collier says the utility and its leaders encouraged a cultural change to break out of the reactive approach, and the employees made it happen.

"None of this would have been possible without the expertise of the people in this division," Collier says. "There was a wealth of knowledge that was just sitting there waiting to be tapped."

Serving the space coast

Cocoa's water system began growing when the city started taking over water service for nearby communities with declining well-water quality in the 1950s. Nearby Air Force facilities needed water, which created an opportunity to extend service to the coast and establish better-quality wells. After the National Aeronautics and Space Administration established the national space program's primary launch site at Cape Canaveral, the system expanded still further.

Today the utility serves the city of Cocoa along with the communities of Rockledge and Cocoa Beach, Merritt Island, Cape Canaveral, Port St. John and parts of unincorporated Brevard County.

"We serve three federal government agencies," says Walsh: Patrick Air Force Base, Cape Canaveral Air Force Station and the Kennedy Space Center. "There's definitely some pressure to make sure we are reliable."

The utility also serves the Canaveral Port Authority, an important departure and arrival point for tourist cruises, which require millions of gallons of water for cleaning returning ships and refilling potable water storage before they go back out to sea.

A new leaf

An ROTC college graduate, U.S. Army veteran and licensed professional engineer, Walsh joined the City of Cocoa after working in private-sector construction management, project management and consulting. Hired as utility engineering manager, he was named acting utilities director in August 2011; the promotion was made permanent in April 2012.

To help change the utility department's reactive approach to maintenance, Walsh sought support of the city's elected and appointed leaders.

He started by spending the Christmas and New Year holiday season in his first year learning the Cocoa water distribution system, running queries on a computer database created from a partially completed 2009 inventory by a consultant.

"About 49 percent of our system is PVC," Walsh says – 617 miles of the system. According to the records, another 270 miles, or 21 percent, is asbestos concrete; 65 miles, or 5 percent, is ductile iron; 58 miles, or 5 percent, is prestressed concrete cylinder pipe (PCCP); 29 miles is cast iron; and 8 miles is galvanized iron pipe. And 17 percent – 219 miles – "is unknown material," he says.

Walsh believes the figures for ductile iron and galvanized iron pipe may be off. Paper records from the 1960s don't appear to have been updated as lines broke and were replaced by PVC. And many records listed hundreds of miles of pipe with the same "as-built" date. That would have been impossible; utility employees now believe the "as-built" date showed when the records were compiled, not when the lines were actually installed.

Making the case

Walsh constructed a pie chart showing the system's use of different pipe materials and brought it to the city council, the mayor and the city manager of Cocoa. "They didn't realize how large we had grown," he says.

Ed Moore, Cocoa utilities special projects supervisor, notes that in the years when the region was booming with new construction, the system grew while the workforce didn't. "Now the system is old enough that age has crept up on it," he says.

Walsh showed city officials samples of the various pipe materials in use, along with a piece of tuberculated cast-iron pipe recently removed in a main repair near City Hall. "It was probably 50 percent occluded," Walsh says.

He also distributed the report "Buried No Longer" from the American Water Works Association, which further helped convince officials why more aggressive maintenance was needed.

Turnaround

Cocoa had previously commissioned a consultant to inventory hydrant and valve locations. The information was to go into a new geographic information system database, but that hadn't yet been implemented.

(continued)

Maintenance worker Robert Sigman operates the track hoe while supervisor William (Bill) McDaniel assists. The crew is preparing to replace a broken hydrant assembly.

PROFILE:
Cocoa, Fla., Utilities Department (water service)

POPULATION SERVED:
280,000 regional drinking water customers, 80,000 connections

SERVICE AREA:
268 square miles serving Port St. John, Cocoa, Rockledge, Viera, Suntree, Merritt Island, Port Canaveral, Cape Canaveral Air Force Station, Kennedy Space Center, Cape Canaveral, Cocoa Beach, Patrick Air Force Base

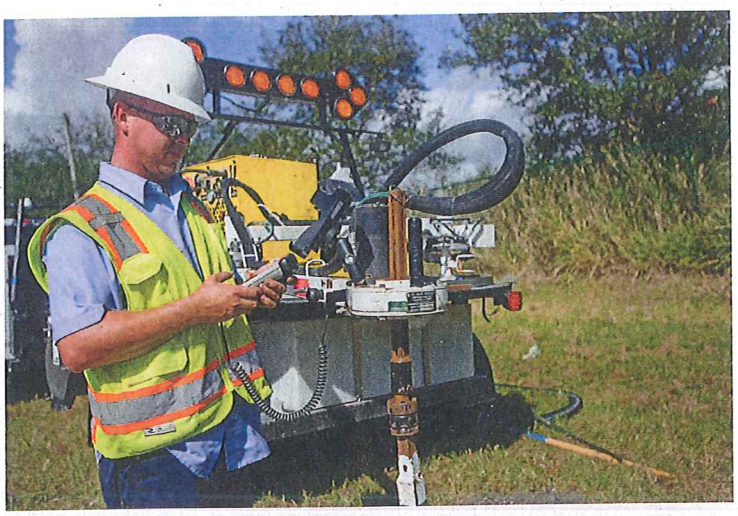
WATER VOLUME:
Capacity, 48 mgd ground water, 12 mgd surface water; average flow, 22 mgd

NUMBER OF EMPLOYEES (WATER DIVISION):
131 (includes administration, engineering, water field operations and water treatment plant)

INFRASTRUCTURE (WATER):
1,325 miles potable waterlines, 20,400 water valves, 6,300 hydrants

ANNUAL REVENUES (WATER):
$51 million

WEBSITE: www.cocoafl.org



Valve operator Justin Wonsch exercises valves along a highway right-of-way.

Walsh arranged training for staff members to use GPS hand-held units to enter information into the GIS and had staff members assigned to computer-aided design work retrained as GIS technicians.

The utility managers agreed that a more detailed assessment of system conditions and functionality was needed. Operations Manager Collier took charge of that task.

CH2M HILL, the city's engineering firm of record, helped plan and organize the hierarchy of assets to be assessed. Collier and the operations staff spent six months or more planning the project and worked with Mueller Service Co., the consulting arm of Mueller Water Products, to carry out the comprehensive review of valves and hydrants from April 2012 to September 2013.

The 280-square-mile service area was divided into four quadrants, and the survey team tested and exercised nearly all of the 20,400 inline valves and 6,000 hydrants, identifying those needing repairs or replacement. Four percent of the fixtures needed major repairs that could be completed on the spot. Another 5 percent needed minor repairs, most of them carried out right away, too, Walsh says. Finding that 83 percent of the fixtures were in operating order was something of a pleasant surprise.

Setting priorities

"We were happy with the results, only because we knew that over the history of the utility, we had never turned every valve in any kind of systematic fashion," Walsh says.

Of the remaining repairs, some were urgent but too complex to be fixed right away (such as replacing valves under a busy intersection), while others were less urgent but still important to address eventually. The next task was to decide which of the 960 identified major projects would come first.

"We spent the first quarter of the fiscal year since October trying to prioritize that list and make some cost estimates," Walsh says. "It's going to take us a couple of years to get through the list."

Moore is now in charge of working directly with CH2M HILL to follow up on the valve assessment findings.

"They are systematically going through the system to ensure that we are focusing our efforts in the right way," Collier says.

Simpler projects will be handled in-house, Walsh says, while more complicated work will be bid out.

Meanwhile, a parallel program involves pipeline assessment, repairs and replacement. A project to replace 14,000 feet of 24-inch pipe will go to bid later in 2014. Another upcoming project calls for 14,000 feet of 48-inch pipe. In both, asbestos-concrete pipe will be replaced with PVC, ductile iron or PCCP. The utility also recently completed replacement of 4,500 feet of 8-inch water main in Cocoa Beach. Collier says the utility also hopes to put in place a dedicated pipeline group just as it has a dedicated valve maintenance operation.

Rehabilitating wells, many going back nearly 60 years, has been another focus, says Walsh: "If we can't get the water out of the ground, it doesn't serve you." An ongoing project of rehabbing wells and well casings takes on about five wells a year in order of urgency. That work is being done by a private contractor.

Technology benefits

While doing the valve assessments, crews recorded the location, condition, materials, appropriate torque for each valve and other facts in the GIS database. In the field, Cocoa employees now use InfraMap software from iWater on laptop computers to call up current field assessment data.

In the past, once workers in the field isolated the location of a main break or valve failure, "they would have to come back here, make copies of the map, then go back out," Walsh says. The GIS database and the InfraMap software "has a substantial impact on our efficiency and ability to map when we find breaks in the field."

The software and database are helping the department capture the knowledge that fills the heads of some of its most senior employees. "My fear was that when these guys retire and move on, we would be left with trying to refigure out everything on our own again," Collier says.

MAKING DECISIONS

When is it time to replace a pipe? Age and material are important criteria – but they don't tell the whole story.

That's why the City of Cocoa uses modern asset-management principles to make those calls, says Utilities Director John "Jack" Walsh.

For Cocoa, which has a long list of pipe replacement and repair projects in its 1,325-mile water distribution system, galvanized pipe is the top priority for replacement.

"That doesn't do well in the brackish saltwater environment that a lot of our pipes see underground," says Walsh. "As we find it, we pull it out and remove it."

But cast-iron pipe can vary tremendously. Older, heavier-duty lines still hold up well, even if they've become tuberculated – while newer, thinner-walled cast-iron lines may need replacement sooner.

The condition of asbestos-cement can depend on factors such as the acidity of the soil, the water table and the conditions under which the pipe was first installed.

Asbestos-cement pipe being removed in one recent project was soft and brittle. "You could chip it off with your fingers," Walsh says. "But in other areas, there's asbestos cement that looks like the day you buried it."

Besides age or material, the city has implemented risk-assessment guidelines that take both of those into account, but also consider the potential impact of a failure in a particular location. Would it lead to a major traffic disruption? Or would it compromise an important public service or institution such as a hospital or school? Such questions are critical to help choose which projects come first.

"We try to prioritize the replacement based on that," Walsh says.