Going with the Flow

GPS used to establish location of thousands of water meters.

How long could your home or business go without water? Probably not long at all. A disruption of service is an inconvenience to nearly all public utility water customers, but for some it is absolutely unacceptable. Hospitals, manufacturing firms, car washes—the list of businesses that need a reliable water supply is long.

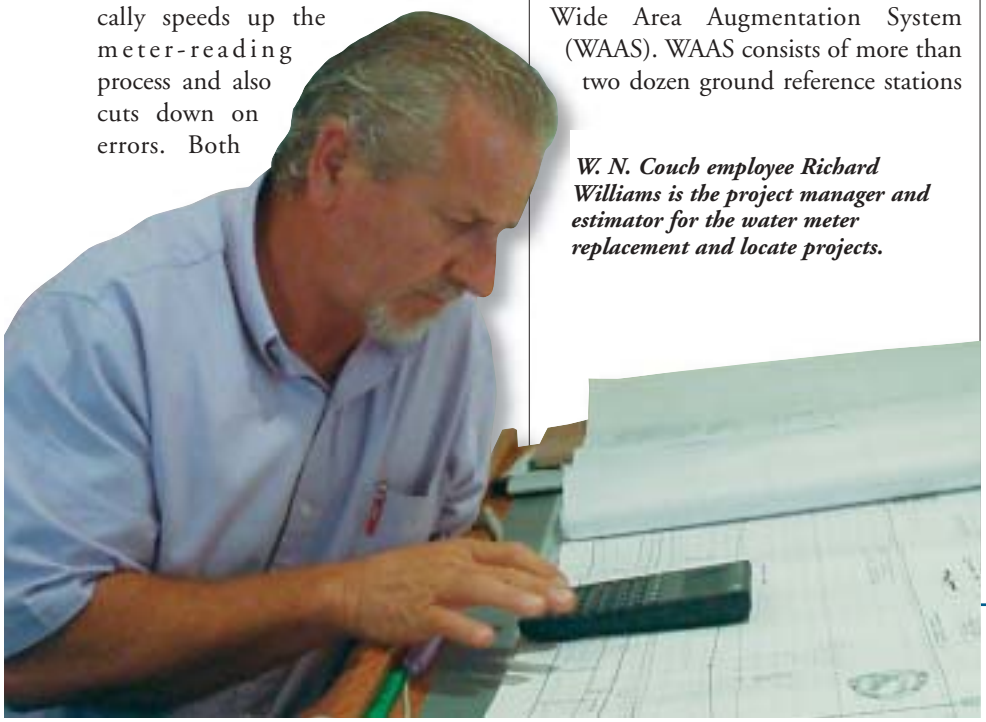
Keeping the flow going was one of the biggest challenges faced by W. N. Couch, Inc. (www.wncouch.com) when it was awarded a contract to replace 2,172 water meters for Tulsa, OK. "We had to accommodate everyone's needs without sending our crews backtracking all over the city," said Richard Williams, estimator and project manager. "As you can imagine, that was not an easy task."

In addition to replacing the meters, Couch had to establish the exact location of each meter and provide the city with that information. The long-term goal is to have all the meters in the city equipped for automated meter reading (AMR). With AMR, usage data for each customer is transmitted by radio frequency as the meter reader walks or drives by. AMR dramatically speeds up the meter-reading process and also cuts down on errors. Both advantages lower costs for the utility.

The actual AMR apparatus will be installed at a later date. Right now the city needs to standardize all of its meters to accept the AMR hardware. Knowing the location of each meter will simplify the process of retrofitting the meters for AMR operation when that time comes.

This is not the first time Couch has been awarded a contract to replace water meters for the city. This job covers 1 1/2- and 2-in. meters. Two previous contracts covered other sizes, including some 300 6-, 8-, and 10-in. meters and about 200 3- and 4-in. meters. Yet another prior agreement covered 3/4-in. meters, which are typically used for residential customers. All but the 3/4-in. meter contracts required location information. The current job must be completed in 270 days.

Couch is using Topcon's (www.topconpositioning.com) GMS-110 unit with a FC100 handheld computer/data collector and TopSURV GIS software to identify and record the meter locations. The GMS-110 is a differential GPS (DGPS) unit that can use standard satellite constellations as well as the Coast Guard's land-based beacons and the Wide Area Augmentation System (WAAS). WAAS consists of more than two dozen ground reference stations and two master stations, one on the east coast and one on the west coast. By correcting for GPS satellite orbit and clock drift plus signal delays caused by the atmosphere, WAAS dramatically improves GPS positioning.



W. N. Couch employee Richard Williams is the project manager and estimator for the water meter replacement and locate projects.

Although the satellite constellations, Coast Guard beacons, and WAAS service provide all the information Couch needs to do the meter locates, they do not provide it quickly. Private companies offer fee-based services that are much faster. Couch subscribes to OmniSTAR (www.omnistar), one of those fee-based services. "OmniSTAR gives us the same information as the free systems," said Williams, "but it's consistently quicker. It cuts at least several minutes from the initialization process when the GMS-110 is locating each meter." Subscription costs for the OmniSTAR package Couch uses are about $800 per year.

The city provides Couch with an ASCII file containing water meter data, such as meter location address, meter size, meter make and serial number, and meter can number. This file is loaded onto the GMS-110. A Couch employee goes to the address, confirms the meter serial number, and records that meter's X-Y coordinates. The updated file, which now includes the GPS information, is relayed back to the city engineer at the end of each day. The contract requires that coordinates be taken at the center of the meter can with sub-meter accuracy.

Early Locates

At first Couch was doing locates as a separate task after the meters were replaced. Each day the company could do at least 25 meters and could often record between 30 and 40 locations. "The problem is that you might have two meters in one block and not have two in the next mile," said Don Shope

This silo sits at the edge of the W. N. Couch, Inc. compound in Tulsa, the site where founder Wilson Nolen Couch lived with his family when he started installing phone lines in 1948.

of Keystone Plumbing, a subcontractor of Couch Contractors. "So now we're doing them as we replace the meters. It's more efficient."

But this approach presented a new problem. Battery life on the GMS-110 is very good, but isn't quite good enough for the 10- and 12-hour shifts Couch must often run in order to work around businesses' schedules. "We had just been leaving the unit turned on all day so it would be ready when we needed it," said Shope. "Now we turn it off until we're actually ready to do the locate. It only takes four or five minutes to start up, so we turn it on when we start our backfill."

The GMS-110 is the right device for the job. It's rugged, well-balanced, easy to carry, fast, and accurate. It is also cost-effective. Williams said Couch's cost is less than $4 per meter. Most of all, it is easy to use. "When we got that first contract I went out with the GMS-110 and was able to use it right away, with no training," said Williams. "I was able to export the data to an Excel spreadsheet file, as required by the city, and I'm no computer genius."

Despite Williams' experience, Couch president, A. Allen Couch, said "training is imperative" to get the most out of any piece of technology, including the GMS-110. "Our Topcon dealer is Ozark Laser and Shoring, and their people have been right there when we needed them," said Couch. "They know Topcon products and they know how to train other people to use those products."

Robert Ritchie is W. N. Couch's contact at Ozark Laser (OLS). The relationship between Couch and Ritchie goes back nearly 20 years, when the contractor first started using Topcon pipe lasers. When Ritchie came to OLS in 2003, soon after the company was formed, Couch followed him. Over the years Couch has acquired several pieces of Topcon equipment, including a GTS-235W total station, a HiPer Lite+ GPS receiver, and Pocket-3D software. The firm has come to rely so heavily on the HiPer Lite+ that they have hired an employee just for those applications.

W. N. Couch Contractors got started in 1948. Allen Couch's grandfather, Wilson Nolen Couch, worked in a steel mill and started installing phone lines with a Jeep-mounted trencher as a sideline. Today the company has 130 employees in three locations: Tulsa and Oklahoma City, OK, and Bentonville, AR. The company provides a broad array of services, from installing underground utilities to mass excavation to concrete placement, on projects ranging from $100,000 to over $6 million.

While the company uses Topcon products in many applications, they rely most heavily on Topcon technology when doing site preparation. Much of their site prep work involves small projects, such as convenience stores. But they have also done a number of bigger sites, including several for Wal-Mart.

Compared to other jobs Couch does, the meter replacement jobs are unique in many ways. They require the use of small equipment, such as backhoes. Much of the time the digging is done by hand. The work often must be performed at odd hours so that water customers' business operations are not interrupted. Location information consists of hundreds or thousands of discrete points, rather than a contiguous form, as would a roadway or a building footprint.

One thing nearly all of W. N. Couch's projects have in common, though, is the use of Topcon positioning equipment. "We've come to rely on Topcon products," said Allen Couch. "I don't know that you could go to any of our sites and not find at least one piece of Topcon hardware there. For us, Topcon products are as common as water coolers and every bit as necessary."

Don Shope uses a Topcon GMS-110 GPS unit and FC-100 data collector to record information on a water meter location for Tulsa. Shope is an employee of Keystone Plumbing, a subcontractor to W. N. Couch.