



Founded back in the late 1800s, the modern-day Two Rivers Utilities was born of a 2011 merger between the City of Gastonia and the Town of Cramerton. For 15 years, the TRU staff had known that starting a valve-exercising program would be beneficial. Today, it is two years into a new valve-exercising program that combines high-accuracy location data with valve exercising.

User

City of Gastonia,
Two Rivers Utilities

Location

Gastonia, North Carolina

Industry

Municipality, Water

Partner(s)

Esri

Challenge

Two Rivers Utilities wanted to launch its first valve exercising program. As part of this initiative, TRU wanted to map all of its valves, which would allow it to perform highly accurate valve tracing in its GIS.

Solution

Eos Arrow 100 GNSS, Esri Collector for ArcGIS, iPad

Legacy Technology

Paper, Legacy GPS and GIS

Results

Two Rivers Utilities added hundreds of valves to its GIS as part of a new valve-exercising program, intended to reduce service interruptions and modernize valve-tracing on the Esri ArcGIS platform.

CITY OF GASTONIA PUBLIC UTILITY DEPARTMENT LOOKS TO THE FUTURE OF GIS WITH ARROW 100 FOR VALVE EXERCISING

Thirty minutes west of Charlotte, North Carolina, Two Rivers Utilities (TRU) offers water and sewer services to a large part of Gaston County. “We have the largest system in the area, and we even provide contracted services to neighboring municipalities,” TRU GIS Analyst Brian Hart said. With more than 600 miles of water mains, TRU’s water system was thought to contain at least 12,000 valves. But today, that figure has jumped to 13,000. It is due to a new valve-exercising program that combines high-accuracy location data with valve exercising.

THE CHALLENGE: TRU’S FIRST VALVE-EXERCISING PROGRAM

For 15 years, the TRU staff had known that starting a valve-exercising program would be beneficial. (Valve exercising is the task of opening and closing a valve to check if it’s functioning properly.) But it was only in the last five years that the utility hired the right team to bring the project to life. Brian Potocki was hired as the Division Manager of Utilities Maintenance, and Brian Hart as the GIS Analyst.

“We brought in the right staff, with our two Brians [Hart and Potocki], and one made the case for a valve exerciser and trailer, while the other one was able to get the technical side of things running,” said Ron Cook, the Assistant Division Manager of Systems Maintenance.

With Hart on board, the City of Gastonia purchased its first valve-exercising trailer, made by EH Wachs. The trailer came with a built-in handheld controller, which uses proprietary software to guide the exercising workflow.

“It does the whole process,” Hart said.

The controller is also capable of connecting via Bluetooth® to an external GPS receiver, which would allow TRU to update the location of its valves.

“Most of the locations were OK,” Hart said. “But they weren’t pinpoint accurate.”

The manufacturer recommended a specific brand of GPS receiver, but Hart wanted something that was more modern and easier to use. So Hart made the case for a new GPS receiver, and in 2017 he got his wish.

“We made him wait a year before he was allowed to change anything,” Cook joked.



TRU picked the Arrow 100 GNSS receiver because of its ease of use, accuracy and affordability. Its antenna was also small enough that a welder could permanently mount it to the valve-exercising trailer arm, to capture the precise location of each valve. While exercising each valve, the crew are also able to update their locations. This is done thanks to the trailer controller's Bluetooth® connection to the Arrow 100, which "snaps" the new, updated coordinates to the valve's ID.

"We picked the Arrow 100 because it was easy to use and affordable. In the South Gastonia zone alone, we found 400 valves that were not in the GIS."

Brian Hart, GIS Analyst,
Two Rivers Utilities

THE SOLUTION: ARROW 100 FOR VALVE EXERCISING

Hart had read about the Arrow 100 GNSS receiver in an Esri Water Newsletter article featuring Le-Ax Water District in Ohio. He called Le-Ax and asked for recommendations.

"Le-Ax spoke highly of the Arrow 100 GNSS," Hart said. "So we purchased our first Arrow 100 device."

Hart worked with Eos Positioning Systems to make sure the Arrow 100 paired properly via Bluetooth® to the trailer's handheld controller. Once paired, the Arrow 100 provided with an average of 40-cm location accuracy out of the box, using the free WAAS differential correction service.

"We picked the Arrow 100 because it was easy to use and affordable," Hart said.

Its antenna was also small enough that Hart could have a welder mount it onto a trailer arm. The exact location of the valves could thus be recorded with the trailer arm extending over them.

THE FIRST WORKFLOW: FINDING THE BEST PRACTICE IN ZONES 1 AND 2

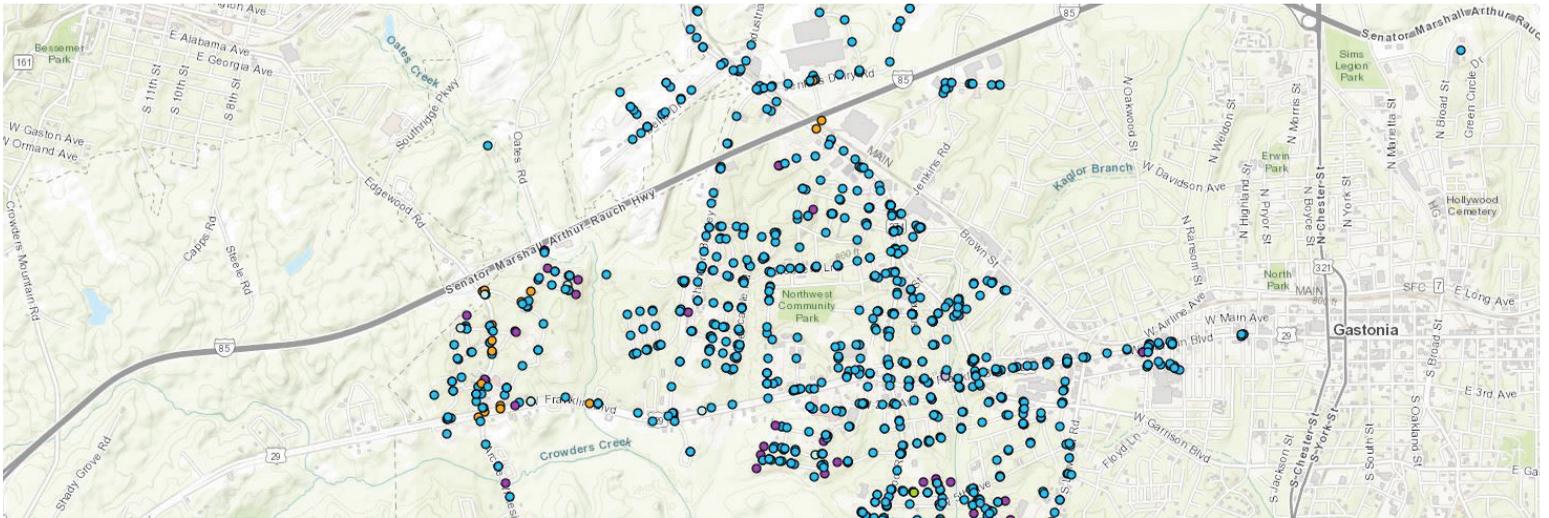
To start, Hart divided the city into six zones, which he further divided into grids. Then, from ArcMap, he provided the field crew with paper maps of the grids with all the valve locations. They hired a field technician, who previously had worked for TRU and already knew the system well, to locate and spray-paint valves in the first two zones.

The exercising crew followed up with the trailer and exercised each valve. During the exercising, the crew was also able to update the valve locations. This is done thanks to the trailer controller's Bluetooth® connection to the Arrow 100, which "snaps" the new coordinates to the valve's ID. Afterward, Hart exported the controller's data into ArcGIS Online for an updated view of the valve locations.

Sometimes, a valve not previously recorded in the GIS is found in the field. The crew would create a new record on the controller, and label it "NV" with a number, which stands for "New Valve Number X". When Hart downloads the data, he can then identify all the new valves that need to be entered into the GIS. The naming convention also lets him keep track of the total number of valves discovered during the exercising program.

"In the South Gastonia zone alone," Hart said, "we found 400 valves that were not in the GIS."

So far, the South Gastonia zone is the first zone to have been completed. The second zone will be wrapped up soon.



A field technician was sent to the third zone ahead of the exercising crew. With an iPad, Arrow 100, and Collector for ArcGIS, he located, spray painted, and updated the location of each valve. This saved the exercising crew time, by not having to locate the valves themselves, and it saved Hart from having to update the GIS manually.

“Being able to isolate smaller sections of the water system — especially when we run valve-isolation traces during an emergency — will allow us to keep the service running for the other customers. We are really passionate about customer satisfaction, and disrupting water service is a big deal.”

Brian Hart, GIS Analyst,
Two Rivers Utilities

THE SECOND WORKFLOW: QUEST FOR IMPROVEMENT IN ZONE 3

As part of an effort to increase efficiency, Hart wanted to pilot a second workflow for the third zone.

To do this, TRU purchased a second Arrow 100 GNSS receiver, which they then connected to an iPad running Esri Collector for ArcGIS®.

While the exercising crew was still working on the second zone, the field technician started on a third zone armed with both paper maps and the newly purchased Arrow 100 GNSS receiver. The field technician was then able to spray paint, as well as update the GPS coordinates of each valve.

In this way, the crew could save time by not having to locate the valves themselves, since they were already painted blue.

“We’re speeding up their time because they do not have to locate each valve themselves,” Hart said.

In addition, Hart didn’t have to do any manual data processing because Collector updated ArcGIS Online in real time.

“The field technician was almost too quick,” Hart joked. “Our guys would come later,” he added, “and some of the spray paint was already starting to wear away.”

THE THIRD WORKFLOW: REFINING THE WORKFLOW IN ZONE 4

For the fourth zone, the team plans to pilot a third workflow. This time, they will send the field technician *with the exercising crew* to work together. The field technician will “leapfrog” just ahead of the crew, and paint each valve right before they get to it.

“We’re always looking for the next best way to improve our efficiency,” Hart said.

THE RESULTS: FEWER CUSTOMER SERVICE INTERRUPTIONS, MODERN OUTLOOK

“We’re always looking for the next best way to improve our efficiency,” Hart said.

TRU anticipates immediate improvements on all fronts.

“We’ll be able to pinpoint valve shut-offs during a main break, as opposed to cutting off water to a larger section of customers,” Hart said.

Routine maintenance and scheduled repairs will also greatly benefit.

But the ultimate goal for Hart is a long-term movement to the new Esri Utility Network Management Extension for ArcGIS, which provides powerful valve-isolation tracing.

“Being able to isolate smaller sections of the water system — especially when we run valve-isolation traces during an emergency — will allow us to keep the service running for the other customers,” Hart said. “We are really passionate about customer satisfaction, and disrupting water service is a big deal.”

About Eos Positioning Systems®

Eos Positioning Systems® designs and manufactures the world's leading high-accuracy GNSS receivers for mobile data collection. In 2014, a technical team with more than two decades of GNSS experience founded Eos near Montreal. The team is credited with creating the world's first submeter Bluetooth GPS receiver (2001) and also the world's first RTK GNSS receiver for any device (e.g., iOS, Android). Today, the Eos Arrow Series™ GNSS receivers provide submeter and centimeter accuracy directly into any mobile app, including popular data-collection software such as Esri's Collector for ArcGIS®.

About the Arrow Series™

The Eos Arrow Series™ of GNSS receivers offer a unique balance of accuracy, affordability, flexibility, and simplicity not seen elsewhere on the market. Arrow receivers are flexible (any device, any app) and future-proof (support all new GNSS frequencies and all four global GNSS constellations). They are known for their superior tracking capability and accuracy under dense canopy, thanks to both patented technologies and the ability to maintain lock with free SBAS signals like WAAS, EGNOS, MSAS and GAGAN. In addition, the Arrow Gold RTK receiver can be turned into a base station when private RTK networks are not available or too onerous.



CONTACT EOS:

1160 Rue Lévis, Suite 100
Terrebonne QC, J6W 5S6
Canada

t : +1 (450) 824-3325

e : info@eos-gnss.com

PARTNER:



CUSTOMER:



www.eos-gnss.com

