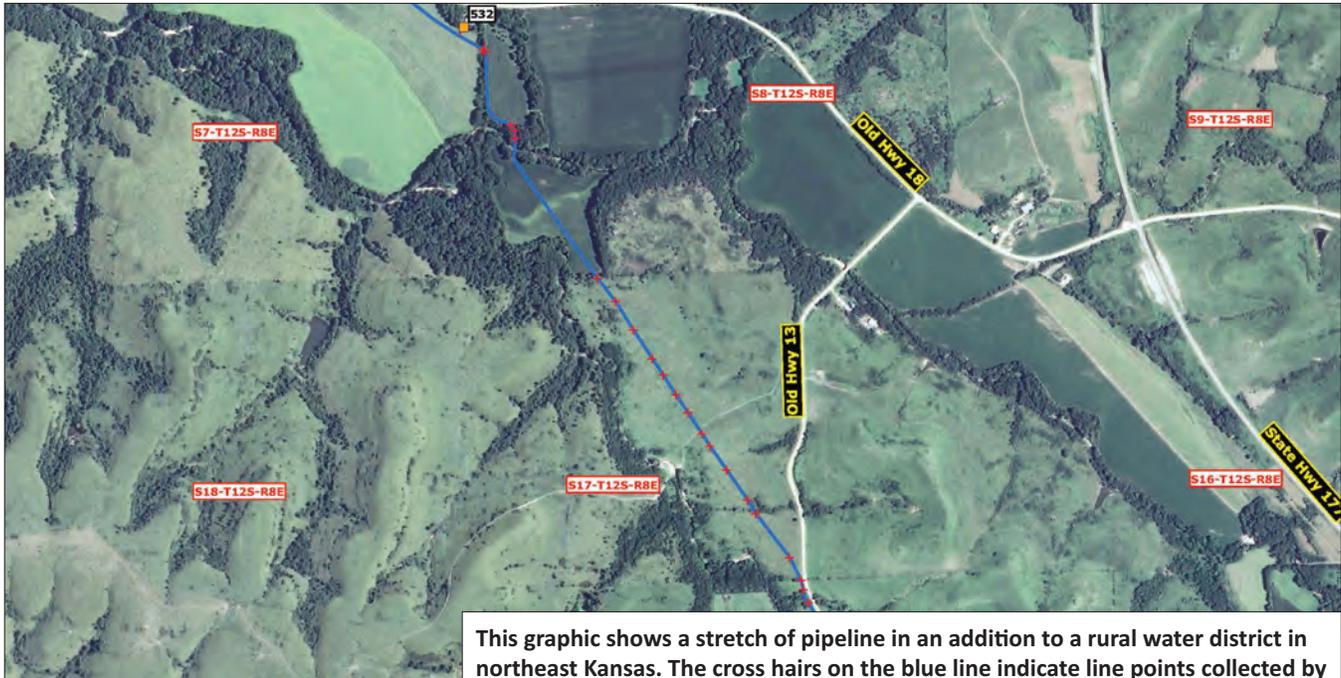


GPS Mapping Provides Long-Term Benefits to Cities, Water Districts, Other Utilities



This graphic shows a stretch of pipeline in an addition to a rural water district in northeast Kansas. The cross hairs on the blue line indicate line points collected by KRWA as part of that systems' GPS mapping project. Trench lines in pastureland land can be visible for many years, whereas in cultivated fields, there may be variations in plant growth that also can be visible on higher resolution aerals. Such information helps KRWA staff verify locations to provide the most accurate mapping project possible.

The KRWA Mapping Department has continued to receive ongoing interest about GPS mapping from water systems across Kansas. KRWA has completed data collection of a significant number of projects this summer; there are additional projects to collect. It is great to see so many cities and RWDs recognizing the value of GPS mapping.

There are many smaller towns in Kansas and rural water districts that have long-time employees. In some cases, the operator is the only person who knows the locations of water system features. Newer operators are often hampered because of the lack of good (accurate) mapping. My suggestion is that if the operator has been with the system for many years, and if mapping needs to be improved, then there should be no debate before taking the initiative to bring the utility mapping into the digital era. In my experience, an operator who has worked on a system for 30 years

usually has retirement in mind. What better way is there to pass on that knowledge than to GPS everything known to that person and get all that information documented in a format that can be retrieved and displayed? At the other end of the spectrum, new operators taking on a GPS mapping project will find it more challenging, but not impossible because they do not know the locations of pipes, valves and other appurtenances.

Where are the facilities?

A few years ago I began GPS data collection of a fairly large RWD with an operator who had been employed by the district for only a few months. The district also has automated meter reading. The district is able to read the meters without actually seeing them.

The process of data collection started out slow, as we spent more time looking for the meters than collecting their locations with the data logger. KRWA charges at an hourly rate for GPS mapping; we both recognized that working at the slow pace was not going to be feasible, and we had to go about it a different way. We focused on collecting the areas that were more easily locatable, such as in all the subdivisions. After that, we both agreed that the next step would be for me to continue on with other projects, and in the mean time, the operator and others with the district would locate the infrastructure area by area, and I could return and collect the additional features when a significant amount was located. And that is how we completed the rest of the project.

As of October 1, 2014, KRWA has 37 GPS mapping projects at some stage of development. These include 16 municipal water systems and nine municipal wastewater systems and 11 rural water districts.

GPS mapping is beneficial to everyone associated with the system. It's important to involve anyone who has knowledge of the system. Input from former operators, and board and council members helps make a big difference to having a thorough collection of the system features. Sometimes we even resort to asking landowners where the pipelines are installed.

GPS Mapping projects in progress at KRWA

As of October 1, 2014, KRWA has 37 GPS mapping projects at some stage of development. These include 16 municipal water systems and nine municipal wastewater systems and 11 rural water districts. Projects in progress and those completed are also listed on the KRWA Web site at <http://krwa.net/GIS/projects.shtml>. Projects presently in progress include the following:

| | | |
|--------------------------|-------------------------|---------------------------|
| Anderson RWD 5 | City of Kincaid | City of St. Marys |
| Barber RWD 3 | City of Lincoln | Clay RWD 1 |
| City of Axtell | City of Marysville - ww | Cowley RWD 5 |
| City of Axtell - ww | City of Mount Hope | Dickinson RWD 2 |
| City of Cambridge | City of Mount Hope - ww | Franklin RWD 1 |
| City of Canton | City of New Strawn | Franklin RWD 4 |
| City of Canton - ww | City of New Strawn - ww | Marion RWD 4 |
| City of Clay Center - ww | City of Olpe | Neosho RWD 4 |
| City of Elkhart | City of Scammon | (former #3 area) |
| City of Elkhart - ww | City of Scammon - ww | Peck Improvement District |
| City of Garden Plain | City of Sedgwick | Rice RWD 1 |
| City of Green | City of Sedgwick - ww | Sumner RWD 1 |
| City of Green - ww | City of St. George | |



When mapping some rural water districts, KRWA staff frequently access versions of older aerial photography to help verify pipeline locations. The focus of this graphic demonstrates how a pipeline installed years ago is still visible on an aerial photograph while it may not be to anyone on the ground. Depending on availability of the aerials, KRWA has been able to use aerials as far back as 1991 to verify pipeline locations as the aerials were taken at the time of construction of the water system. Using those aerials, KRWA has helped verify many rural water districts' pipelines, and particularly some cross-country pipeline.

Even after locating everything in the system, many water system operators are not always able to remember the locations of all the valves, meters, pipeline crossings, etc. When landmarks change such as old farmhouses or timber are dozed out, or fences are moved, the mention of a relationship of physical features to the water system becomes irrelevant.

Tracer wire is a great technology, and if installed on water lines is often considered as the best alternative for future line locates. However, there are numerous variables that can lead to failure of tracer wire. The risers holding the tracer wire often disappear due to farmers and their field cultivators; county mowers wipe out the risers in a blink. The wire can break for many of the same reasons water lines do, such as rocks in the trench, earth shifting, or having damage to pipelines. Often tracer wire is broken during repair of water mains. If not properly spliced, that wire will fail. By contrast, the only way GPS technology is going to fail is if all of the satellites fall out of the sky, or if for some reason the data was lost and not backed up. Neither of these scenarios is very likely to occur. Certainly if the satellites fall, there are going to be much bigger problems than worrying about the water system!

Going digital

At the conclusion of every mapping project, KRWA prints the map books, overview maps, and wall maps. These materials are then delivered to the respective city or RWD. A DVD of all the digital data is provided with the maps. The DVD contains the GPS data and aerial photographs to be used to view the data on a computer. A simple download of free viewing software is all that is necessary for viewing. Though the number of water system staff who have taken advantage of the viewing software is not as high as I think it should be, those who are using it absolutely love it; they hardly even look at their paper maps anymore. Users are able to get so much more out of the data in a digital format by being able to zoom in and take measurements to help locate water lines or valves. Though this free viewing software is limited in that users are unable to make changes or edits to the data, users can easily find what they are looking for without flipping through map pages.

The Kansas Water Office continues to subsidize the mapping with a grant of up to maximum of \$4,000 or fifty percent of the cost, whichever is less. As of October 1, 2014, the Kansas Water Office has awarded a total of

\$461,646.39 to public water systems to help them transition to GPS mapping. Also, according to Tina Rajala at the Kansas Water Office, there is \$55,741 in funding available as of October 1. The GPS Mapping subsidy is provided as a benefit of the Clean Drinking Water Fee.

KRWA staff would be pleased to discuss GPS mapping with any city or RWD. Give us a call at 785-336-3760 or you may email me directly at mark@krwa.net. There's no time like the present to get started. I would also like to invite anyone to stop by the KRWA booth at the 2015 Conference & Exhibition, March 24 - 26 at Century II Convention Center. We will have some map products on display and can also demonstrate the free "viewing software"; stop by and see how data can be joined in a project.

Mark Thomas has been a GIS Mapping Tech since September 2006. Mark has a bachelors degree in geography from Kansas State University and has specialized studies in ESRI's ArcView and Arc-Pad software. Mark lives



in Seneca with his wife Michelle and their sons Trent and Levi.

It's not too early to book your rooms!

**2015 KRWA Annual
Conference & Exhibition**

March 24 - 26, 2015

Century II Convention Center

Wichita, KS