

Anchorage Water and Wastewater Utility Asset Mapping Project



PROJECT HIGHLIGHTS

- AWWU delivers 26 million gallons of water to 249,000 residents per day
- Previous maps inaccurate by as much as 100 feet
- Interns use GeoXH to collect spatially accurate data on 30,000 Utility assets
- High-accuracy data collection critical for finding assets buried in snow during the winter

PROJECT: Anchorage Water and Wastewater Utility Updates Records With High-Accuracy Mapping Project

PROJECT DATE: 2006-2007

When it comes to clean air, sparkling clear streams and a spacious natural urban environment, the residents of Anchorage, Alaska have it all. Many states in the U.S. struggle to protect their water sources from pollution and often must ration water supplies in order to meet demand for this precious resource. But this is one problem that does not trouble the residents of Anchorage.

Surrounded by six mountain ranges and boasting 60 glaciers within 50 miles of the city, Anchorage benefits from pollution-free water sources that will meet the municipality's needs well into the 21st century.

One need that wasn't being met, however, was the need for accurate data about the location of the Anchorage Water and Wastewater Utility's (AWWU) water main valves, fire hydrants, manholes, and other water and wastewater assets. That is, until GIS supervisor Tina Miller spearheaded a co-op agreement with the University of Alaska in 2006 to hire summer interns to update the Utility's data.

AWWU is the largest water and wastewater utility in Alaska. The Utility collects water from two major surface watersheds and several deep underground wells to service approximately 249,000 residents in and around Anchorage. In addition to delivering approximately 26 million gallons of water per day to Anchorage residents, the Utility also operates three wastewater treatment facilities.

AWWU has always been at the forefront when it comes to using technology to gain operational efficiencies. The Utility first

implemented a Geographic Information System (GIS) in the early 1990s.

In 1992 the Utility began to use ESRI software and digitize existing 500-scale hardcopy maps of their service areas and assets. This allowed for more accurate electronic record keeping and for more access to the records by the employees. Information in the GIS included size and type of water pipes, pressure-reducing valves, booster stations, lift stations, facilities, and hydrants.

From 1992 to 2000 the GIS data was continually improved. Overall, more complete data meant additional information on record drawings, with more accurate spatial locations, and more precise information for private development and private systems projects. In 2000, the GIS data was migrated from its ArcInfo format into an ArcSDE enterprise system, where information was more easily updated, accessed and shared.

Although AWWU was on its way to having an efficient and useful GIS, the spatial information about the Utility's assets was still inaccurate and difficult to use. Because the original sources of information were 500 scale maps, the location of water and sewer assets were off by as much as 100 feet in some places.

"Our water and sewer infrastructure is buried by snow for most of the winter," said Tina Miller, AWWU's GIS Supervisor. "Having maps that were off by anywhere from five to 100 feet made it very difficult for our workers to find and turn off water main valves in the middle of January.

THE EQUIPMENT USED ON THIS PROJECT INCLUDES

- GeoXH handheld
- GPS Analyst extension
- ArcGIS software

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During the Hurricane Katrina disaster, we observed that other utilities had accurate Global Positioning System (GPS) information for their assets and were much better off. We knew we needed to update our records.”

Miller jump-started the Asset Mapping Project with the enlistment of six University of Alaska interns to collect GPS data on Utility’s assets. The project turned out to be so successful, with interns collecting more than 20,000 points of accurate data throughout the summer of 2006, that more interns were hired in 2007 not only from the University of Alaska, but from the University of Colorado, John’s Hopkins University and Dartmouth University, as well.

Each morning, students arrived at the Utility to receive the day’s assignment. The Municipality of Anchorage is laid out in a half-mile by half-mile grid system and each day teams of interns were assigned data collection by one or more grids. Each team would head into the field in a company vehicle, equipped with a cell phone, laptop, shovel, and metal detector, as well as a Trimble® GeoXH™ handheld GPS receiver with Microsoft® Windows Mobile® version 5.0 software.

“The Trimble units are perfect for our needs,” said Miller. “The GeoXH was the only rugged handheld that offered sub-foot accuracy. If you’re standing in a snow-drift in below-freezing temperatures looking for a water valve, you want the data you’re relying on to be as accurate as possible.”

In the field, students used paper maps or their laptops to access electronic record drawings of existing data to locate manholes, valves, hydrants and other assets. Once the asset was located, students used handheld GPS units to record

information about the type of asset and its precise location.

At the end of each day, students would return to the office where the data was downloaded into the company’s enterprise GIS system. Using ESRI ArcGIS software with the Trimble GPS Analyst™ extension, Miller was able to postprocess the data using differential correction, improving the accuracy of the positions collected even further.

“One of the reasons we selected the Trimble handheld units was because of the postprocessing capabilities and the seamless integration with ESRI’s ArcPad and ArcGIS software,” said Miller.

Anchorage Water and Wastewater has already received the value out of this project by spatially correcting the existing GIS information. The hardcopy maps and electronic applications have improved dramatically, with some areas having previously been up to 500 feet off. The information in GIS is now ready to be employed in a GPS-enabled locate process, making the information even more valuable to dig crews. AWWU also plans to implement a workflow using GPS units to collect new infrastructure information as well—which should be significantly easier than cleaning up the historic information.

Over the course of two summers, 15 student interns have collected more than 95 percent of the spatially accurate data for 30,000 Anchorage Water and Wastewater Utility assets. With this information readily available, it will increase the field crew’s efficiency in locating assets in the winter months, help reduce emergency response times and ensure AWWU is better prepared to respond in the event of an emergency line break or natural disaster.

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