

CITY OF GUELPH DISTRICT METERING AREAS IMPLEMENTATION

The City of Guelph, Water Services Department with the help of C3 Water Inc. financially justified a five year program to implement 26 District Metering Areas (DMAs) throughout the City of Guelph's water distribution system, as shown in the map below. Economic justification of the use of development funding to build out the DMA program has been made through the deferral of capital costs associated with the development of new water supplies realized by reducing water loss. Economic justification was based on an average of 2.5 chambers per DMA, but to date the average number of chambers per DMA has been 1.9.

Currently in its third phase of construction, the implementation program is being managed by C3 Water Inc. The average time for construction of a chamber, once equipment and supplies are on-line has been three days. The capital program has expanded to include pressure and temperature instrumentation in addition to flow metering instrumentation. Record low temperatures in 2014 and 2015 resulted in an increase in frozen services which lead to temperature instrumentation being incorporated into the DMAs to provide additional information.

The City's project team were led through a conceptual, desk top design effort which resulted in several key decisions:

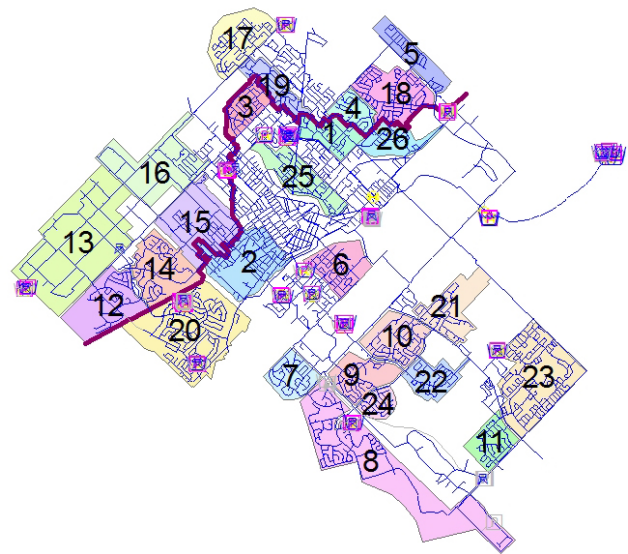
- Permanent DMAs that can be taken in and out of service as desired for analysis.
- In-ground communications boxes to reduce the potential for vandalism and/or accidental damage.
- Equipment housed in chambers of sufficient size to allow for future expansion to accommodate evolving technology.
- Battery powered instrumentation and communications via a wireless cellular backhaul.
- Reporting software that enables easily configurable custom reporting and the combination of data from a variety of sources.

- Integration of demand data with the City's hydraulic model to allow for demand pattern calibration.

DMA start-up plans has been developed which incorporate modelling for safe operation, isolation valve operation and testing in advance of isolation and fire flow testing to confirm safe operation.

A plan for the long-term O&M of the system is in development and will address annual inspections, maintenance, calibration and verification, reporting including water balance reporting, and coordination with leak surveys, leak identification and repairs. Currently the City utilizes ad-hoc acoustic leak surveys of metallic piping. The City is also reviewing medium and long-term alternative technologies, including the technology being developed in the UW WatSmart project, on which the City of Toronto, City of Guelph and C3 Water Inc., are all partners.

The City has selected SCADAWatch by Innovyze as a reporting and data visualization tool. SCADAWatch is a real-time operational performance and reporting dashboard. It was selected because of its ability to connect to multiple databases, geospatial presentation and reporting ability and the ability to create custom reports.



City of Guelph District Metering Areas Implementation (continued)

Start: 2015-Oct-05 00:00:00

End: 2015-Oct-06 00:00:00

DMA11 information

Number of Connections: 874

Length of Pipe: 7993m

DMA 11 FLOW: Daily



NOTES:

1. Dark blue is net DMA flow compared to red model diurnal curve for calibration
2. Light blue and light green are individual flow meters showing a 70 L/s instantaneous flow swing which the City was able to use to track down the large consumer causing this issue and mitigate it.