

PRIMER 7 Water Loss Control

Grand River Watershed
Water Management Plan



How can water loss control benefit WDM in your Municipality?

System water losses average 13 per cent across Canada, ranging from 7.5 per cent to 21 per cent¹.



This loss can arise from leaks at distribution lines, service connections and storage tanks or unauthorized water uses such as theft from hydrants and illegal connections. Further inefficiencies can arise from authorized but

unmetered activities (e.g. flushing of mains and sewers, street cleaning and fire protection).

Fixing the leaks *before* they become major infrastructure problems and addressing unmetered inefficiencies can:

- Lower maintenance and operating costs;
- Increase revenue;
- Positively impact wastewater treatment capacity;
- Defer expensive capital projects for new water sources;
- Improve repair planning schedules;
- Lower risk of property damage by improving underground safety; and
- Increase public trust in the water utility.

Water Loss Control: A Cost-Effective “Big Bang for Your Buck” Water Efficiency Strategy

Reducing water loss can be a particularly effective strategy for some municipalities – in terms of water conservation, increased revenues, and cost savings.

A U.S. study on municipal water systems illustrated that “recapturing non-revenue water with an upfront investment is still a great business case with fast payback”.³

Framing the cost of initiatives in terms of “cost of acre foot (AF) of water saved”, water loss control initiatives in several U.S. case studies ranged from \$318 to \$658/AF of water saved – with an average avoided cost of \$1030/AF. By comparison, a number of aggressive demand side conservation programs were costing in excess of \$1000/AF of water saved after exhausting the cheapest initiatives.

A similar result can be seen here in the Grand River watershed; while Guelph’s 2011 Leak Detection Program cost \$46,000 to implement, it has avoided \$85,000 *per year* of costs.

³ Sturm, R. and J. Thornton. (2007). *Water loss control in North America: More cost effective than customer side conservation – why wouldn’t you do it?!* p.1

Stopping the Leaks = Significant Savings

Halifax, Nova Scotia, has been a leader in reducing water lost to leaks in its amalgamated system.

Through methodically tracking flows and leaks, changing water pressures, and standardized water audits, the Halifax Water utility has reduced the amount of water the system requires from 168 million litres per day in 1999 to 130 million in 2011.

The annual savings have been \$600,000, partly due to the need to pump less water and use fewer chemicals in water treatment².

² City Water Leaks Costing Millions of Dollars. CBC News. (Nov 23, 2011). Available at: <http://www.cbc.ca/news/canada/story/2011/11/17/f-infrastructure-pipes-water-loss-reduction.html>

¹ Environment Canada. (2011). *2011 Municipal Water Use Report:2009 Statistics*.

What can municipalities do to reduce water loss?

Leak reduction and management of "unaccounted for water" consists of a range of activities that vary in cost and other resource requirements. Some common approaches are shown in the figure below.

Measures to Reduce Municipal System Water Losses⁴

Investment of time & resources	Water Audit	Comparison of water treated and pumped to amount used by consumers and calculation of authorized unmetered water use. (The AWWA provides free software for creating a Water Balance, including calculation of an Infrastructure Leakage Index (ILI), which may be a more reliable indicator of leakage).
	Pressure management	Decreasing pressure in known leak areas to reduce water loss until pipes can be replaced.
	Active Leak Detection	Sonic leak detection – detecting the vibrations emitted through pipes as water escapes from a leak – District Metered Areas (DMA) approach, or other leak detection approaches.
	Corrosion Control	Such as cathodic protection of metallic pipes.
	Water main replacement	Replacing aging and leaking infrastructure.

Detecting leaks through the District Metered Areas (DMA) approach

District Metered Areas (DMA) is an approach for identifying suspected leaks that involves dividing water distribution systems into large meter areas.

Flow into one area can be monitored and compared to a calculated number based on the households and businesses in that area. If the flow that is measured is greater than that calculated, the meter area is subdivided again and the process repeated – in this way the location of a leak can be narrowed down to a small enough area that sonic leak detection can be used.



Working together across municipal departments

There is an opportunity for water leak detection to be coordinated with other municipal infrastructure and building projects, leading to improved efficiencies all around.

For example, street upgrading or resurfacing can be preceded by acoustic leak detection and repair. This can avoid excessive costs from having to excavate a newly re-paved road in order to fix water mains.

⁴ Adapted from OWWA. (2006). *Water Efficiency: A Guidebook for Small and Medium-sized Municipalities in Canada*. Chapter 4: Operating and Maintenance Measures.

Resources:

- Water Audit Methodology of the American Water Works Association (AWWA):
http://www.allianceforwaterefficiency.org/Water_Audit_Process_Introduction.aspx
<http://www.awwa.org/Resources/WaterLossControl.cfm?ItemNumber=48511>
- Water Loss Control in North America – More Cost Effective than Customer Side Conservation, 2007:
<http://www.allianceforwaterefficiency.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=2626>

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