



To: Public Works and Transportation Committee

Date: September 26, 2013

From: John Irving, P.Eng. MPA
Director, Engineering

File: 10-6650-02/2013-Vol 01

Re: **Water Loss Management Update**

Staff Recommendation

That the Water Loss Management Update report (dated September 26, 2013 from the Director, Engineering) be received for information.

John Irving, P.Eng. MPA
Director, Engineering
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REPORT CONCURRENCE		
ROUTED TO:	CONCURRENCE	CONCURRENCE OF GENERAL MANAGER
Water Services	<input checked="" type="checkbox"/>	
REVIEWED BY DIRECTORS	INITIALS: DW	APPROVED BY CAO

Staff Report

Origin

The 2041 Official Community Plan (OCP) includes an objective to pursue water demand management strategies and continue water conservation initiatives, as part of providing sustainable infrastructure and resources.

Accordingly, at the March 28, 2011 Regular Council Meeting, Council adopted the following motion:

“That the development of an enhanced leak detection program be endorsed as a measure for further water conservation.”

Staff have provided updates on leak detection initiatives through the annual Utility Budget reports as well as through Ageing Infrastructure reports. This report provides an update of the water loss management initiatives and specific next steps that are being undertaken by the City.

Analysis

Water Audit and Monitoring

A water audit was completed in September 2011, as part of the 2041 OCP planning process. The audit estimated industrial, commercial, and institutional (ICI) demands, residential demands, and leakage.

As part of the leak detection program, the City has recently metered water connections to Metro Vancouver’s trunk water mains. The data from these meters will be used to improve the accuracy of future water audits and enable the City to identify areas of focus for leak detection. The meters will also be used to verify the accuracy of Metro Vancouver’s water charges. An updated water audit will be completed after more residential meters are installed and sufficient data is collected.

In addition, meter data loggers were recently installed for high-consuming ICI properties. The water consumption of these properties is being monitored and analyzed against overall minimum night flow, in order to further refine leakage estimates.

Water Metering

Water meters have been installed for 100% of ICI properties, 70% of single-family dwellings, and 35% of multi-family dwellings. Water metering helps property owners capture, identify, and reduce leaks on private property. As a result, property owners are more likely to detect and repair leaks when they are aware of an increase in consumption and cost.

The City reviews quarterly meter readings in order to identify properties with possible leaks and inform the homeowners in a timely manner. In addition, new meter technology that is currently being installed flags potential leaks for further analysis and repair. The City will be able to further capitalize on this feature as more meters are installed through the universal single-family

program and voluntary multi-family program. Table 1 outlines the number of properties where leaks were identified and repaired.

Table 1. Number of Private Property Leaks Identified and Repaired

Year	Number of Residential Properties	Number of ICI Properties
2011	470	211
2012	596	193
2013	258	121

Waterworks and Water Rates Bylaw No. 5637 provides monetary relief to properties that have leaks by charging a reduced rate when a leak is repaired by the property owner. Table 2 shows the amount of leakage that has been identified on private property and charged at a reduced rate, along with an estimated continuous leakage amount had the leaks been left unrepaired. Many of these leaks would have been unnoticed or ignored had water meters not been installed. The table also outlines the potential on-going cost to the City for water supplied by Metro Vancouver, had the properties not been metered.

Table 2. Reduced Leak Rate Applications

Year	Leakage Charged at Reduced Rate	Continuous Leakage if Properties not Metered and Leaks not Fixed	Additional Cost to City if Properties not Metered and Leaks not Fixed
2011	59,700 cubic meters	157,400 cubic meters / year	\$95,300 per year
2012	33,500 cubic meters	95,800 cubic meters / year	\$58,000 per year
2013	35,300 cubic meters	91,400 cubic meters / year	\$55,300 per year
Total Since 2011	128,500 cubic meters	344,600 cubic meters / year	\$208,600 per year

Toilet Rebates and Water Conservation Kits

The American Water Works Association (AWWA) estimates that leaking toilets and faucets account for 14% of indoor water use. The City has initiatives that assist homeowners with identifying and repairing leaks, and this can have a significant impact on reducing water consumption and managing water loss, particularly when combined with the meter program.

To date, homeowners have replaced 3,720 old, high-flush toilets with new, low-flush toilets through the Toilet Rebate Program. In addition to reducing flush volume, leaking toilet flappers and fill valves are also replaced in the process of toilet replacement. According to AWWA, 20% of toilets have leaks, with faulty toilet flappers and fill valves being the two most common causes. For residents who choose not to replace their toilets, the City offers free toilet leak detection dye tablets.

The City also offers free water conservation kits to homeowners with newly-installed meters. These kits include a low-flow showerhead, kitchen faucet aerator, bathroom faucet aerators, toilet fill cycle diverter, and toilet leak detection dye tablets. Replacing old fixtures will help to eliminate leaks as well as reduce water use.

City Water Main and Hydrant Leak Detection

City crews perform leak detection on City water assets on an on-going, systematic basis. The majority of this work is completed at night when water use is lowest, providing the best possible conditions for electronic leak detection.

Since 2011, 47% of the City's water infrastructure has been surveyed through this program, with 26 leaks on City property and 18 leaks on private property being identified and repaired. This leak detection program will continuously cycle through the City's water main and hydrant inventory on an on-going basis.

Next Steps

Pressure management: Management of the pressure in the City's water system has the potential to reduce the volume of leakage as well as extend the life of water mains. Higher water pressures are required to meet water demands in high water use periods, such as summer. However, water system pressure can be reduced during lower demand periods, such as winter. Engineering and Public Works are planning to lower system pressure on a trial basis this winter to determine the impact on system leakage.

Fixed-based meter reading: Meter reading is currently performed with mobile (drive-by) and walk-by methodology. With new technologies available on the market, there is an opportunity to upgrade the meter reading system, which would increase meter reading efficiency and allow the City to access leak information on demand. Fixed-based meter reading involves radio signals from meters being relayed to a central location (e.g. City Hall) via a wireless network. A fixed-based meter reading system eliminates the need for crews to travel throughout the City to retrieve meter readings and leak information. This would significantly reduce the time required for the City to receive leak alerts and notify the homeowners. The feasibility of meter reading via a fixed network will be investigated.

Information pamphlets: To assist residents with identifying private leaks and reducing water consumption, the City will develop and distribute an information pamphlet consisting of educational content on water meters, water conservation and leak detection. This pamphlet will be distributed to properties with newly-installed meters as well as existing meters.

Financial Impact

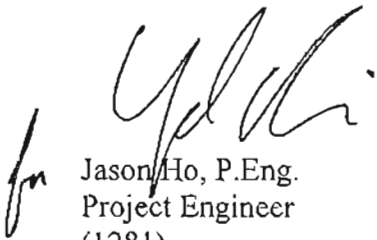
None.

Conclusion

There are a number of on-going initiatives that are included in the City’s Water Loss Management Program. This includes water audits, monitoring flows from Metro Vancouver’s trunk water main and high-consuming ICI properties, water metering, toilet rebates, water conservation kits, as well as City water main and hydrant leak detection. In particular, water metering has been instrumental in helping property owners to identify and repair a significant number of leaks. The benefits of water metering with respect to water loss management will become increasingly significant as more properties are metered through the universal single-family program and volunteer multi-family program. Moving forward, pressure management will also be explored as a means of reducing system leakage.



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