

# THE CORPORATION OF THE CITY OF ROSSLAND

## REPORT TO COUNCIL



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**SUBMITTED BY:** Mike Thomas P.Eng

**SUBJECT:** WATER METERS AND WATER USE IN ROSSLAND

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### Background

Water meters were regulated by the City in the water service bylaw #2092 in 2000. This bylaw made it compulsory for multi-family, industrial, commercial and institutional properties to install a water meter. Bylaw #2384, in 2007 added a requirement that all dwellings undertaking a building permit where the value of construction exceeded \$25,000 were required to install a water meter. Note that section 9(3) also included a clause that “all irrigation systems shall be metered through the residential water meter”.

With the adoption of this bylaw City Council adopted a policy of moving toward compulsory, or “universal” water metering, which was furthered through council resolutions in 2008 and 2009. A revised water service bylaw will be brought forward in the coming months, to detail responsibilities of the City and the property owner regarding meters and other water infrastructure.

### Water Use Facts

Without metering, accurate estimates of water use by sector are impossible. From other municipalities around Canada, the residential use has been estimated at 260-300 litres per capita per day (lcd). However, other studies indicate residential use in BC of 420-440 lcd, (Environment Canada’s Municipal Water and Wastewater Survey and the National Water and Wastewater Benchmarking Initiative)<sup>1</sup>. *Note that 440 lcd is equal to 34 cubic meters a month.* Research conducted by Environment Canada in 1999 determined that metered residential properties used 288 lcd as opposed to flat-rate customers using 433 lcd<sup>2</sup> - a reduction of 33%. Data from 1999 showed that only 43% of Canadians were not metered for water use<sup>3</sup>.

The City of Calgary did a study of metered and unmetered municipalities across Canada, finding that maximum day consumption was reduced on average by 48% and average day demand was reduced by 38%<sup>4</sup>.

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<sup>1</sup> [http://poliswaterproject.org/sites/default/files/AMWSC%20soft%20path%20strategy\\_aug%2009\\_3.pdf](http://poliswaterproject.org/sites/default/files/AMWSC%20soft%20path%20strategy_aug%2009_3.pdf)

<sup>2</sup> [http://www.ec.gc.ca/water/en/manage/effic/e\\_meter.htm](http://www.ec.gc.ca/water/en/manage/effic/e_meter.htm)

<sup>3</sup> Susan McFarlane and Erik Nilsen, *On Tap: Urban Water Issues in Canada* (Calgary: Canada West Foundation, August 2003), p. 10.

<sup>4</sup> [http://www.red-lake.com/pdf/other/water\\_meter\\_report.pdf](http://www.red-lake.com/pdf/other/water_meter_report.pdf)

Rossland's challenge lies in the number of homes that are used as winter vacation properties and are unoccupied for many months of the year. Asking people to use less water and offering an incentive to do so is one thing, but when a property benefits from having a water connection but uses no water for months at a time, there is an expectation that these properties should contribute to the funding of the water system.

The average of 30 cubic meters per household per month was presented back in 2007. Assuming an average occupancy of two per household, that equals 500 lcd, at three people, it is 333 lcd. A review of water meter data shows that many homes are using less than this amount even in the summer months.

In response to questions regarding water meters and the water rates, a selection of 28 representative residential accounts from around Rossland was analyzed to determine average water rates and compare the difference between these accounts from July 2009 and September 2009. Some of these homes run in-ground sprinkler systems over the summertime, and typically these have the highest consumption some over 100 cubic meters in a month. Some of the homes that have moderate or lower consumption do have vegetable gardens and multiple occupants.

The average consumption of all the residences analyzed was 51,000 litres for July and 33,700 litres for September. Taking out the top quartile of larger users, the average for the remaining sample 21 dropped to 33.5 cubic meters (cum) in July and 22.2 cum in September. For these users, the average water and sewer bill was \$49.37 in July and \$45.01 in September. If you are currently on a fixed account, you are paying \$608 a year, which is equivalent to \$50.67 a month, or about 37,000 litres of water a month all year. Note that most homes use less water per occupant over the winter months than in the summer.

It is important to recognize that for both of the months analyzed, there are many accounts with consumption readings of less than 5 cum a month, suggesting that the occupants were not using the dwelling at the time - none of these properties were included in the above mentioned analysis.

Example calculations from the POLIS Soft Water Path Study for Abbotsford/Mission<sup>5</sup> show that with targeted efforts, average residential indoor consumption could be reduced from 242 lcd down to as low as 104 lcd and average outdoor consumption from 335 lcd to 107 lcd. This represents a per capita water use reduction of over 60%.

## **Water Supply Costs**

The breakdown of costs associated with the water supply system, treatment and distribution shows that over 90% of the cost of supplying water to Rossland can be considered "fixed" - in other words, not related to the actual volume of water flowing through the treatment plant or water mains. This is a factor of a system that operates predominantly on gravity, and a treatment system that is efficient and has few consumable inputs related to the volume being treated. Currently, the City's metered rates reflect the reality of fixed costs, while also giving some incentive for residents to reduce consumption. As better data becomes available at the

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<sup>5</sup> [http://poliswaterproject.org/sites/default/files/AMWSC%20soft%20path%20strategy\\_aug%2009\\_3.pdf](http://poliswaterproject.org/sites/default/files/AMWSC%20soft%20path%20strategy_aug%2009_3.pdf)

individual household level, the City may be able to modify the rate structure to give a greater incentive to reduce consumption. At the present, the rate structure is a balance of risk management (in the event that less water is used and as a result revenues would be reduced), and offering a per unit rate that rewards lower consumption.

## **Water Rate Structure**

Rossland is a Resort Community, with many homes that are occupied more frequently in the winter months than in the summer. As such, the rate structure needs to reflect the low summer usage attributed to these properties, while ensuring that the burden of maintaining the system is spread between all of the users of the system, after all, water is available to every connected property for consumption at any time of the year.

Keeping this in mind, it is also the intention to reduce the discretionary use of water in summer as this is when the creeks are at their lowest, and the potential for water shortages, either in supply or treatment is at its greatest.

The 2009 rates were structured to ensure that variable component was a smaller part of the revenue than the fixed, this was to cover the unknown variation in water usage between those who irrigate, those who don't, and those who's properties are not used for several months at a time; while still offering the incentive of reduced payments for reduced water consumption.

## **The Payback for Metering**

There has been some discussion around the community as to whether it is "worth it" to install a water meter. To be clear, if your household uses a small amount of water, the savings are greater the earlier you install the meter, as your water bills are likely to be less than if you were on a fixed rate. However, at this stage, a year into the program, it is unlikely that even the most waterwise consumers will see a net benefit if the cost of hiring a plumber is included in the calculation. Despite this, the City's expectation that all homes will be metered by December 2011 still stands. Fair and equitable rates based on usage can only be fully realized with all properties metered.

Much of the true payback comes in the form of individual households taking responsibility for their water use, and the reduction in peak consumption across the community that is likely to occur as a result. Rossland's water treatment system is near capacity, and rather than increasing supply to meet the peak day demand, it is prudent to investigate all options to reduce demand, rather than increasing supply. This is a key component in current best-practise water supply philosophies such as the Soft Path for Water<sup>6</sup>.

In addition, the Province has indicated that funding for infrastructure projects related to water or sewer are, in part, dependant on water conservation efforts. Funding is not likely to be forthcoming if there is not evidence of continued efforts at reducing demand, particularly in the residential sector.

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<sup>6</sup> <http://poliswaterproject.org>

Another issue we face as a community relates to the environmental consequences of our summer watering habits in Rossland. Currently the configuration of the intakes on Topping, Hanna and Murphy Creeks do not facilitate maintaining base-flows in the stream below the intake. For many months the intakes capture and divert all, or almost all of the flow in the streams, limiting the health of these creeks downstream of the intakes. For example, late in the summer of 2009, the Ministry of Environment issues it's first order related to Section 9 of the Fish Protection Act, temporarily curtailing water use for agriculture and irrigation on the Nicola River, upstream from Nicola Lake<sup>7</sup>. This sends a clear message to communities that draw water from fish bearing streams and Rosslanders should be aware that their summer watering habits can have a significantly different impact on the environment than those of communities down on the Columbia River such as Castlegar and Trail, and as a community we should proactively aim to comply with the intent of the Fish Protection Act.

### **Indoor Use vs Outdoor Use**

Examining several water bills from the City of Rossland, it is evident that for some properties outdoor water use can be as high as 45% of the total annual water consumption. As a comparison, studies conducted in the Abbotsford/Mission area put average outdoor use at around 25% of the total consumption, and a project in the Capital Regional District measured residential outdoor water use in Oak Bay as 43% of the residential annual consumption, while areas such as Sannich, Sidney and Sooke used around 24% of their annual residential water for outdoor uses<sup>8</sup>. The data from metered water accounts suggests that Rossland's outdoor water use varies significantly from modest usage to excessive. It is the excessive use of water that the City is targeting with the billing structure.

Studies have also shown that outdoor water use increases with both the household income and the value of the property, as such it has been suggested that people with higher incomes and living in more expensive dwellings should be able to make proportionately greater outdoor water savings than lower income families in less expensive dwellings who use less water<sup>9</sup>.

### **ICI Demand**

Industrial, Commercial and Institutional (ICI) facilities in Rossland have been required to install meters for over a decade now. Not all of these properties had complied with this request, however, a renewed approach to this issue will ensure that all of these properties are metered shortly, and data from ICI facilities will be soon be able to be reported separate from the residential and other uses.

### **Non-Revenue Water**

Non-revenue water includes water used from hydrants for flushing, fire-fighting and other uses. The City is in the process of metering all of the irrigation at parks, and is moving toward full-cost accounting, where water used by a department, building or activity is acknowledged

<sup>7</sup> <http://www.waterbucket.ca/wcp/?sid=45&id=631&type=single>

<sup>8</sup> [http://poliswaterproject.org/sites/default/files/WAC\\_Brief\\_Aug07.pdf](http://poliswaterproject.org/sites/default/files/WAC_Brief_Aug07.pdf)

<sup>9</sup> Ibid.

in the budget as a cost of operations. Transparency of water use allows for informed decisions by council and members of the public.

### **Leakage**

The City will be testing for system leakage in the coming month, however, data from similar municipalities indicates that leakage may be in the order of 10-20% of the total consumption. More detailed methods will be possible in the future with universal metering ,and targeted leak detection programs.

### **Water Supply System**

The City's water supply system is already approaching the current peak day capacity of the Star Gulch Treatment Plant with water use soaring in recent years on peak days. The City is interested in reducing peak water demand as a first step rather than increasing treatment capacity, as Provincial policy is moving regulation of water supply toward conservation measures rather than larger supply infrastructure.

### **Metering System**

The City supplies Sensus brand meters, to residential properties. These conform to the size requirements as stated in the American Water Works Standard C-700 (as most recently revised), and are approximately the same size as most other meters available for residential applications.

These meters transmit the analog reading to a digital device, usually located on the outside of the house which sends a packet of data to the City's wireless remote reading system for that property. The battery that powers this process has a life expectancy of approximately 10 years. The City's remote reading device is vehicle mounted is able to record all the meters throughout the City in under an hour, this data is transferred to the billing software, which automatically produces the bills according to the consumption recorded. This is usually done once a month. Prior to the use of this technology, reading meters and issuing bills for the metered properties was a multi-day exercise.

### **Meter Installation**

The City has looked at the average cost of installation for a water meter where the service is accessible inside the house after the residential shutoff and prior to any uses. Typically, the installation can be completed with minimal parts (around 20-50 dollars), however in some instances, due to tight spaces or other piping or utilities, a meter-setter will be required. These can be purchased from plumbing supply companies and come in a variety of shapes and sizes to offer simple alternatives to direct in-line installations.

The City has not made it compulsory for a plumber to install the meter or remote, however this is an option that many will choose, for reasons of workmanship, time and convenience. A typical water meter installation should be completed in less than two hours – usually costing less than \$200.

In rare situations where a meter cannot be installed inside the house, it is possible to purchase a meter pit which is an insulated in-ground chamber that is designed to protect the

meter from freezing and simplify access to the meter for servicing. A meter pit costs around \$900 to supply, and would cost around \$1000 to install as a mini-excavator and a plumber are likely needed.

### **Gas Tax Community Works Fund**

All local governments outside the Greater Vancouver Regional District automatically receive Gas Tax funding under the Community Works Fund, twice annually during the period 2005-2015, and make local choices about which eligible projects to fund. Projects must support the achievement of environmentally sustainable outcomes such as reduced pollution, reduced greenhouse gases or reduced water consumption.

The City can plan the use of this funding in advance, as such, council budgeted \$120,000 per year for three years from this source for the water meter program. Any funding not used by the water meter program in future years will be directed toward other environmental projects within the City that comply with the funding requirements.

### **Ongoing Operation and Maintenance Costs**

The City of Rossland faces a choice regarding the future of its water system, two scenarios are detailed in the following table.

<b><i>Scenario A – Business as Usual</i></b>	<b><i>Scenario B - Conservation</i></b>
Metering only on new dwellings,	Universal Metering
no incentives to reduce consumption,	Incentives to reduce consumption
flat rate billing for all homes	Consumption Based Billing
increasing water demand	Reduced water demand
increasing supply requirements – i.e. Major infrastructure projects	Stable supply requirements
no or minimal provincial or federal grant funding for infrastructure projects	Greater potential for infrastructure funding.

Regardless of whether water meters were required, the City has a network of watermains, sewer mains, raw-water lines, reservoirs, pump stations and treatment facilities that is ageing and will require upgrades. The benefits from avoiding the ongoing costs of large infrastructure projects, and possibly being able to redirect grant money to rehabilitation projects rather than new construction are significant.

The time required to operate the metered network, once installation is complete, will be approximately one day a month for the remote reading and any troubleshooting or new buildings.

The maintenance costs of the meters should be factored into a reserve in the water utility budget. Any issues that arise within the first ten years are covered under warranty and a replacement meter will be provided. As the meters age and need replacement to maintain accuracy, or if the battery has died, this reserve fund would be drawn upon to manage a replacement program. Assuming a lifespan of around twelve years, the City should be putting approximately \$30,000 a year into reserves to account for this future capital expense.

### **Conclusion**

The City of Rossland has implemented the water metering program for a number of reasons that may not have been applicable in previous years. The program allows residents flexibility in when they are to install meters, and City Staff are more than happy to discuss installation issues with any homeowner.

Transparency in water use and water utility accounting is a best practice that can be achieved through universal metering. The City's metering system offers streamlined workflow, accurate billing and detailed data for decision making regarding capital project planning and water use policy for the future.

[signed and placed in council agenda for Monday 9<sup>th</sup> November 2009]

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