

DRINKING WATER ANNUAL REPORT 2012



April 25, 2013

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Introduction

The City of Enderby operates and maintains a public water distribution system in accordance with the Drinking Water Protection Act and Regulations¹ and the Guidelines for Canadian Drinking Water Quality.²

As required pursuant to section 15 of the British Columbia Drinking Water Protection Act and section 11 of the British Columbia Drinking Water Regulations, the City of Enderby provides the following annual drinking water report for 2012.

The goal of the City of Enderby is to provide clean, safe, and reliable drinking water. Our drinking water must meet or exceed criteria defining “high quality drinking water.” The Federal-Provincial-Territorial Committee on Drinking Water defines high quality drinking water as:

free of both disease-causing organisms and chemicals in concentrations that have been shown to cause health problems. Such drinking water has minimal taste and odour, making it aesthetically acceptable to the public for drinking.³

High quality drinking water must meet requirements with respect to the following:

- Maximum acceptable concentrations of microbiological organisms (such as enteric viruses and E. Coli);
- Maximum acceptable levels of turbidity;
- Maximum acceptable concentrations of chemical contaminants;
- Specific physical parameters; and
- Aesthetic objectives related to taste, colour, and odour.

The City accomplishes these requirements through a multi-barrier approach to treatment. A multi-barrier approach is required as “the limitations or failure of one or more barriers may be compensated for by the effective operation of the remaining barriers. This compensation minimizes the likelihood of contaminants passing through the entire system and being present in sufficient amounts to cause illness to consumers.”⁴

There are a variety of potential hazards to drinking water which must be controlled. These threats involve chemical and microbiological pathogens that may be introduced at the source or intake, during treatment, or during distribution. These hazards are an ever-present risk to our drinking water supply. The City uses a robust water quality monitoring regime and multi-barrier treatment to manage these risks and protect the public.

¹ Province of BC, “Drinking Water Protection Act” (Victoria, BC: 2001).

² Health Canada, “Guidelines for Canadian Drinking Water Quality” (Ottawa, Ontario: 2012).

³ Federal-Provincial-Territorial Committee on Drinking Water and the CCME Water Quality Task Group, “From Source to Tap: Guidance on the Multi-Barrier Approach to Safe Drinking Water” (Ottawa, Ontario: 2004), 14.

⁴ Ibid., 17.

Water System Overview

The Enderby water system consists of 3 main sources:

1. Brash Creek (surface water – currently de-commissioned);
2. Shuswap Well (ground water; not yet determined if under the direct influence of surface water);
and
3. Shuswap River (surface water).

The total amount of pipe in the distribution system is 30,266 meters. This consists of 11,648 meters of PVC pipe and 18,618 meters of concrete pipe.

All water is pre-chlorinated prior to distribution. The Shuswap River water is filtered through a two-stage rapid filtration system which reduces turbidity and minimizes the threat of giardia and cryptosporidium. The Shuswap Well and Brash Creek are piped into the Water Treatment Plant and the clearwell.

Under normal operation, water from the Shuswap River is filtered and chlorinated, then pumped from the clearwell through the UV disinfection system and into the distribution system to the two water reservoirs located on the Knoll. Water from the Shuswap Well is chlorinated on-site and pumped to the clearwell, then through the UV disinfection system to the reservoirs. There is a total of 2400 m³ of reservoir capacity. Depending on demand, both systems can operate in conjunction. Each system can be isolated and run to the reservoirs alone. All water supplies can be operated with a portable generator.

It should be noted that, when water is drawn from the Shuswap Well supply, a number of customers east of the Enderby Bridge receive water that is not disinfected with UV light and has limited chlorine contact time for connections most proximate to the Well source. When all supply is from the Shuswap River source, all customers receive fully treated water.

The combined source capacity of the Shuswap River and the Shuswap Well is 6,245 m³ per day.

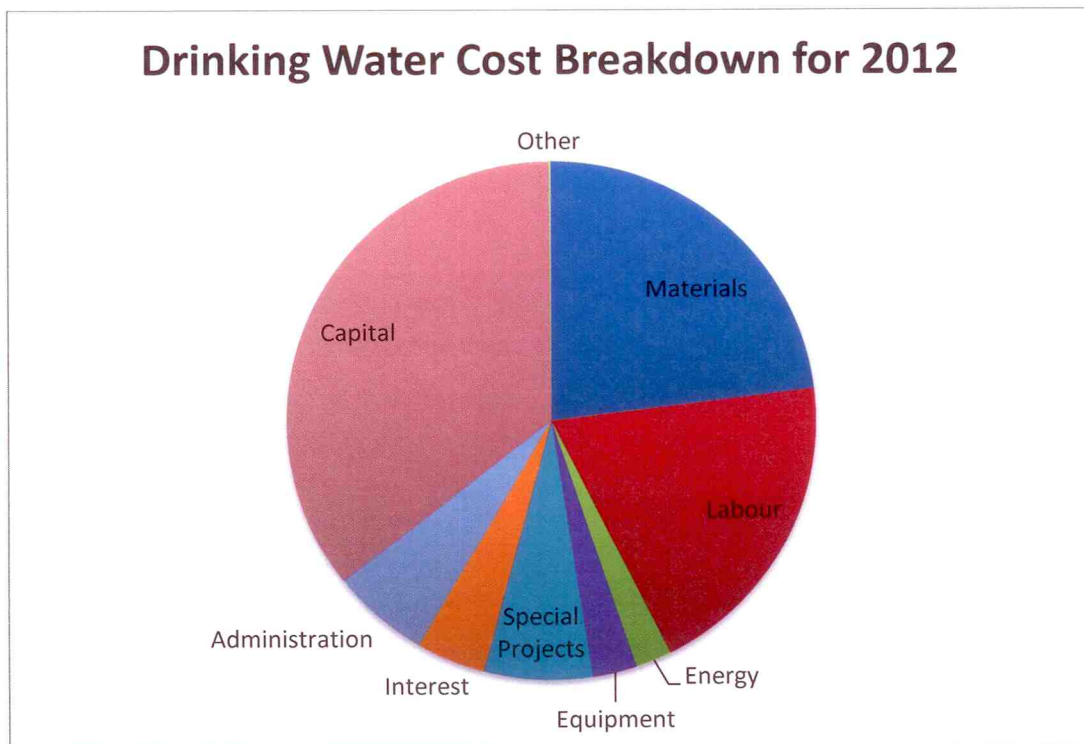
Annual Consumption Data

Total water distributed through the City of Enderby water system in 2012 was 668,985 m³. The maximum one-day demand in 2012 was on August 21 at 4,429 m³. The minimum one-day demand in 2012 was on March 17 at 755 m³.

Month	Min. Daily Demand (m ³)	Max. Daily Demand (m ³)	Avg. Daily Demand (m ³)
January	960	2073	1511
February	1023	2005	1458
March	755	2556	1395
April	979	2287	1565
May	1226	2699	1971
June	1519	2495	1987
July	1618	4281	2700
August	1869	4429	2987
September	1017	2955	2222
October	877	3801	1490
November	1021	1872	1377
December	957	2446	1392

Drinking Water Cost Breakdown

In 2012, the City of Enderby spent \$1,057,665 to provide safe drinking water. This includes water treatment processes such as chlorination, ultraviolet, and filtration as well as improvement, repair, and maintenance of the distribution system. The costs by expense category are:



Category	Costs
Materials	\$243,728.00
Labour	\$207,349.00
Energy	\$23,228.00
Equipment	\$28,743.00
Special Projects	\$70,113.00
Interest	\$44,626.00
Administration	\$63,722.00
Capital	\$374,789.00
Other	\$1,367.00
	<u>\$1,057,665.00</u>

Water System Assessment and Infrastructure Deficit

The total replacement value for the City of Enderby water distribution system (such as pipes and pumps) is \$24,318,054. As of December 31, 2012, the total depreciation is \$10,447,105. The remaining value is \$13,870,949.

The total replacement value for the City of Enderby water treatment system (such as buildings, clarifier, chlorinators, and ultraviolet) is \$7,165,130. As of December 31, 2012, the total depreciation is \$4,286,368. The remaining value is \$2,878,762.

In 2012, \$129,650 was contributed to the City of Enderby water reserve fund. Also in 2012, \$168,342 was withdrawn from the water reserve fund. The withdrawal paid for the Regent Avenue upgrade described below.

The balance of the City of Enderby's water reserve fund as of December 31, 2012 is \$351,218.87.

Completed Major Projects

There were two major investments in water infrastructure in 2012:

1. A portion of the Regent Avenue water line was replaced. The total value for this project was \$168,342; and
2. Two new chlorinators (primary and back-up) were purchased and installed. The total value for the chlorinators was \$13,332.

Forthcoming Major Projects

In 2013, the following projects are scheduled:

1. Turbidity monitoring at the Shuswap Well will be brought online and integrated into the SCADA system;
2. Reservoir 1 will be cleaned and the liner will be checked for leaks;
3. Portable backup power capable of running all components of the water treatment plant will be purchased; and

4. Clarifier nozzles and sand will be replaced.

Water Quality Monitoring

Daily samples are collected at the Shuswap Well and Riverbank sites and tested for pH, temperature, and turbidity. Daily samples are also collected at the Water Treatment Plant and the BCA filter for testing pH, temperature, turbidity, and colour. The clearwell is also tested on a daily basis for pH, temperature, turbidity, colour, and free and total chlorine.

Weekly system checks and distribution samples are tested for free chlorine residuals to ensure the minimum of 0.20 mg/L of free chlorine is found at the furthest points in the distribution system. Chlorine residuals were above the minimum threshold for all sample locations and dates.⁵

Every month, microbiology samples are collected at 13 monitoring stations, including 3 sites in east Enderby, 4 sites in west Enderby, 3 sites in central Enderby, and 3 source water sites. Monthly samples are also collected at the Shuswap Well and the Water Treatment Plant effluent. No E. Coli was detected at any of the sample points with the exception of the Shuswap River raw water sample location, which ranged from 1 to 29 per 100 millilitres. No Coliforms were detected at any of the sample points with the exception of the Shuswap River raw water sample location, which ranged from 32 to 200 per 100 millilitres. The Shuswap River raw water is treated with filtration, chlorine, and ultraviolet after the sample point to remove E. Coli and Coliforms from drinking water. No Coliforms or E. Coli were detected at the Shuswap Well raw water sample location in 2012.

The BCA filter backwash is sampled on a bi-monthly schedule for pH, conductivity, turbidity, total suspended solids, aluminum, biochemical oxygen demand, and microbiology. On a quarterly basis, trihalomethane samples are collected from the Brash PRV, Booster #1, and Valcairn stations. Also sampled on a quarterly basis are the Shuswap Well and Shuswap River sources for total organic carbon. The Shuswap River is sampled annually for comprehensive testing. The Shuswap Well is sampled every three years for comprehensive testing.

Environmental Operators Certification

City of Enderby operators are progressing towards required EOCP certifications. Interior Health requires that we have a designated chief operator certified at Level III for Water Treatment and Level II for Water Distribution. As of December 31, 2012, City of Enderby operators are certified as follows:

⁵ "In all public and semi-public systems applying disinfection, a disinfectant residual should be maintained throughout the distribution system at all times. Maintenance and monitoring of a residual disinfectant offer two benefits. First, a disinfectant residual will limit the growth of organisms within the system and may afford some protection against contamination from without; second, the disappearance of the residual provides an immediate indication of the entry of oxidizable matter into the system or of a malfunction of the treatment process." Federal-Provincial-Territorial Committee on Drinking Water, *Guidelines for Canadian Drinking Water Quality: Guideline Technical Documents: Escherichia coli* (Ottawa, Ontario: 2006), section 6.0.

Name	Title	Water Treatment	Water Distribution
Ida Arcand	Systems Operator	Level II	Level I (coursework only)
Clayton Castle	Lead Hand	Operator-in-Training*	Operator-in-Training*
Jamie Prevost	Utility Worker III	Operator-in-Training	Operator-in-Training
Robert Hubley	Utility Worker III	Operator-in-Training	Operator-in-Training
Sheldon Tokairen	Utility Worker III/Facility Maintenance Worker	Operator-in-Training	Operator-in-Training
Quinlan Harris	Utility Worker I/Facility Maintenance Worker	Operator-in-Training	Operator-in-Training
*certified			

In 2013, the City of Enderby commenced cooperation with Corix Utilities' Senior Water Specialists to meet Chief Operator certification requirements and gain expert consultation and relief/emergency support.

Major Events

Due to the elevated water levels of the Shuswap River during the summer, a boil water notice was issued on June 20, 2012 for City of Enderby water customers east of the Enderby Bridge. The notice was issued because the level of the Shuswap River threatened to enter the discharge culvert, which posed a risk of contamination. The notice was rescinded on July 6, 2012. The City worked closely with Interior Health before, during, and after the boil water notice. During the notice, an enhanced testing regimen was implemented. The boil water notice was rescinded after two consecutive samples for coliform tested negative.

Boil water advisories are used either as a precaution against or in response to a waterborne disease outbreak. The 2012 boil water notice was issued as a precautionary measure. The decision was made as a result of a joint decision of the City of Enderby's Systems Operator and Interior Health's Drinking Water Officer and Public Health Engineer. A risk management/risk assessment approach based upon site-specific conditions was utilized.

Water Conservation Plan

The City of Enderby's Water Conservation Plan establishes strategies that will help to reduce water demand throughout the community. Reducing water demand helps to protect our water resources, mitigate requirements for infrastructure expansion, and reduce operating and maintenance costs.

As of December 31, 2012, the City of Enderby has achieved a number of strategies within its Water Conservation Plan which include:

1. Identifying strategies for reducing water demand. Education, water metering, and rate structures promoting conservation provide the foundation for the City of Enderby Water Conservation Plan;
2. Implementing a Water Conservation Education program which utilized brochures, newspaper editorials, and advertising to promote education and awareness of our water resources;
3. Commenced an update to the 2008 Water Study to update growth projections and related infrastructure implications;
4. Establishing a water reduction target of 25%;
5. Completing approximately 98% of water meter installations on all residential, commercial, industrial and civic properties;
6. Completing a Loss Control Program which involved analyzing water meter data to establish potential losses, and then undertaking a Leak Detection Audit to identify water leaks within municipal infrastructure;
7. Partnered with the North Okanagan Regional District to amend the Building Bylaw to include requirements for water meters; and
8. Rewriting the Water Regulation Bylaw to incorporate sprinkling regulations.

Leak Detection Audit

As part of the City's Water Conservation Plan, a Leak Detection Audit was completed in June 2012. Flow monitors were set up at Reservoir 1, the Water Treatment Plant and Booster Station 2. The total Unaccounted For Water is estimated to be 6.5% or 12.05 m³ per hour. This was used as the base data for the application of leak detection techniques, which typically involved the use of electronic listening equipment to pinpoint the precise location of underground leaks. All hydrants, mainline valves, junction valves, meter settings and curb valves were subject to direct listening with the electronic equipment. All mainlines were listened with a ground microphone every foot, or as necessary. All leaks were then pinpointed, marked, and graded for severity.

The report indicated five leak locations, including 4 valve packings, 1 hydrant lead, and 1 service leak. The service leak and the hydrant lead were all repaired. The valve packings have either been replaced or adjusted on a temporary basis until the valve can be replaced in conjunction with other excavation.

The contractor responsible for conducting the audit noted that the City's distribution system was in "good health," with a relatively small number of leaks.

Cross Connection Control Program

In 2003, Interior Health required all large water purveyors (City of Enderby included) to develop and implement a cross connection control program as a condition of operating permit. The purpose of the program is to protect public health by ensuring that the drinking water provided by the City of Enderby is not contaminated due to a backflow incident.

The City adopted a Cross Connection Control Program in 2004 and began the program implementation with assessments of a number of commercial, industrial, institutional and agricultural customers in June, 2004. The emphasis was on sites identified as high risk. Under Enderby's program, owners were

expected to implement the recommendations in a timely manner and were responsible for all costs associated with the installation, inspection, testing, repair, replacement and maintenance of backflow prevention within their water system.

For a number of reasons, including cost and internal capacity limitations, the Cross Connection Control Program has not been fully implemented. It is worth noting that, based on anecdotal information, the current status of the City of Enderby’s program compares favorably with that of other communities. Below is a synopsis of the categories and status as of August 3, 2011:

Hazard	Quantity	Surveyed	Not Surveyed	Vacant	Compliant*
High	54	51	0	3	36 (71%)
Medium	44	24	18	2	12 (29%)
Low	90	32	55	2	18 (21%)
TOTAL:	188	107	73	7	66 (37%)

*Compliance percentages are based only on occupied sites which have been assessed/surveyed.

There are a number of outstanding high, medium and low risk sites which are not in compliance. A number of attempts have been made to inform owners of their respective responsibilities and seek their compliance. The City is exploring alternate measures to ensure compliance.

On June 12, 2012, City of Enderby staff met with representatives of Interior Health to discuss progress on the Cross Connection Control Program. A Compliance Strategy, Testing/Inspection Schedule, and Cost Summary were proposed to Interior Health as a means of determining testing and inspection frequency. Further conversations with Interior Health in 2013 will be held to understand whether this proposal may meet the requirements.

Emergency Response Plan

The City of Enderby Drinking Water Emergency Response Plan was completed in early 2013 and distributed beginning January 16, 2013. The Emergency Response Plan includes provisions for public notification and corrective measures to respond to emergency situations. It will be reviewed on an annual basis.