

CITY OF ENDERBY DRINKING WATER SYSTEM

ANNUAL REPORT 2024

April 22, 2025

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EXECUTIVE SUMMARY

The City of Enderby operates and maintains a community drinking water system in accordance with the Drinking Water Protection Act and the *Guidelines for Canadian Drinking Water Quality*.

In 2024, the total water distributed from the Water Treatment Plant was 567,189 m³. The maximum one-day demand was 3,074 m³ on, July 19 2024. By contrast, in 2023, the total water distributed from the Water Treatment Plant was 556,568 m³ and the maximum one-day demand was on July 22, 2023 at 2,943 m³.

In 2024, the City of Enderby spent \$1,071,543 to operate and maintain the community drinking water system. Of that value, capital investment represents 34.5% of the total expended by the City of Enderby in 2024.

The City continues its water quality monitoring program. Nothing of concern was discovered in the drinking water system in 2024.

The City's Public Works staff is certified to meet the legislative requirements of operating the Water Treatment Plant and distribution system.

The City has completed its Source Protection Plan for both sources and has taken action to implement its short-term recommendations. The City also completed its annual update to its Drinking Water Emergency Response Plan.

INTRODUCTION

The City of Enderby operates and maintains a community drinking water system in accordance with the Drinking Water Protection Act and Regulations, as well as the *Guidelines for Canadian Drinking Water Quality*. Pursuant to Section 15(b) of the British Columbia Drinking Water Protection Act and Section 11 of the British Columbia Drinking Water Protection Regulation, the City of Enderby provides the following Annual Drinking Water Report for 2024.

The goal of the City of Enderby is to provide clean, safe, and reliable drinking water. This means that the drinking water quality meets the standards specified in the *Guidelines for Canadian Drinking Water Quality* and the operation of the drinking water system is consistent with the BC Drinking Water Protection Act and Drinking Water Protection Regulation.

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

- Maximum acceptable concentrations of microbiological contaminants such as bacteria, protozoa, and viruses such as *Giardia*, *Cryptosporidium*, and *Escherichia coli*;
- Maximum acceptable levels of turbidity;
- Maximum acceptable chemical and 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.”¹

There are a variety of potential hazards to drinking water, most of which involve chemical and microbiological contaminants that may be introduced at the source or intake, during treatment, or during distribution. The City has implemented a water quality monitoring regime and uses multi-barrier treatment to manage the risks to public health. The City has a Drinking Water Emergency Response Plan and a Source Protection Plan for both of its sources.

WATER SYSTEM OVERVIEW

The Enderby water system consists of two sources:

1. Shuswap Well (ground water; suspected of being under the direct influence of surface water); and
2. Shuswap River (surface water).

¹ 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), 17.

The total amount of pipe in the distribution system is 30,962 meters. There are booster stations by the Bawtree Bridge, at the bottom of Gunter-Ellison Road, and between the upper and lower reservoirs on Francis Drive.

All water is chlorinated prior to distribution. The Shuswap River surface water is filtered through a two-stage rapid filtration system which reduces turbidity and minimizes the threat of giardia and cryptosporidium. The Shuswap Well is normally piped to the Water Treatment Plant clearwell, where it receives ultraviolet treatment in addition to the chlorination received on-site.

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 a water reservoir. Water from the Shuswap Well is chlorinated on-site and pumped to the clearwell, then through the UV disinfection system and to the reservoirs. There is a total of 3,782 m³ of reservoir capacity. Each system can be isolated and run to the reservoirs alone.

It should be noted that, when the Shuswap Well is supplying water, a number of customers east of the Bawtree Bridge may receive water that is only disinfected with chlorine, meaning that it does not receive the two forms of treatment required for surface water (the Shuswap Well is suspected of being under the influence of surface water). However, when the supply of water is from the Water Treatment Plant, all customers receive fully treated water.

Under current operating parameters, the combined source capacity of the Shuswap River and the Shuswap Well is 4,753 m³ per day. The maximum production capacity of the Water Treatment Plant is 3,150 m³ per day under normal operating conditions at peak demand, although the rate of production is affected by source water turbidity, which increases backwashing frequency and reduces available production time. The ultimate planned source capacity, with expanded infrastructure, operational changes, and assuming the capability to run the Shuswap Well for twenty-four hours per day, is 6,135 m³.

ANNUAL CONSUMPTION DATA

Note: the below figures only describe the Water Treatment Plant flow meter; this does not reflect the full quantity of water sent from the Shuswap Well, some of which is distributed to residents east of the Bawtree Bridge without being captured by the flow meter.

In 2024, the total water distributed from the Water Treatment Plant was 567,189 m³. The maximum one-day demand was 3,074 m³ on July 19 2024. By contrast, in 2023, the total water distributed from the Water Treatment Plant was 556,568 m³ and the maximum one-day demand was on July 22, 2023 at 2,943 m³.

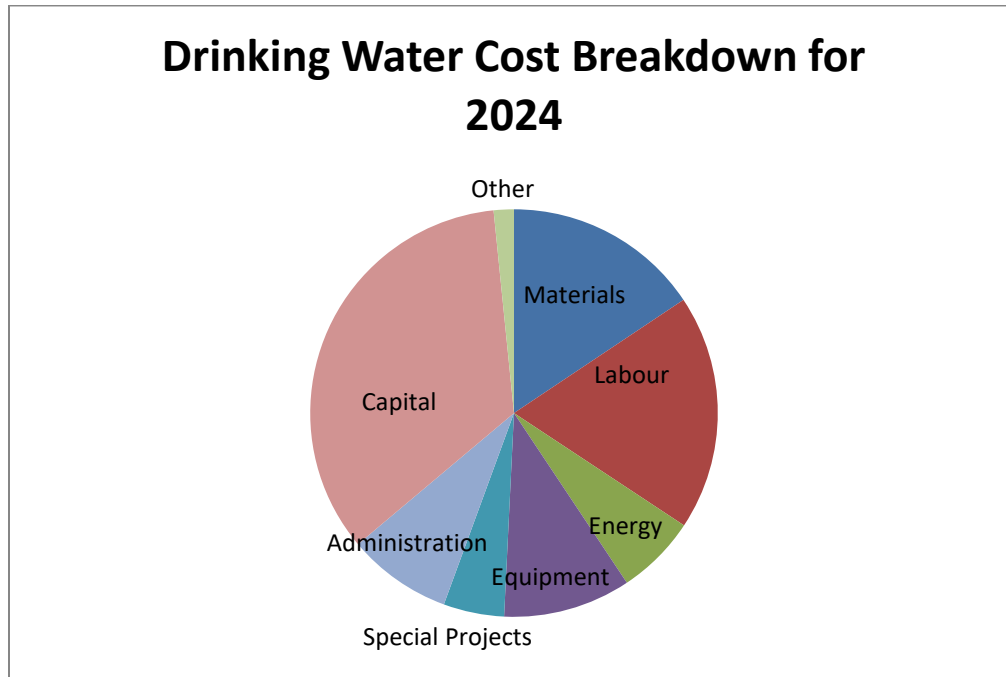
The following chart shows maximum and average daily demands from the Water Treatment Plant by month for 2023 and 2024.

Month	2024 Max. Daily Demand (m ³)	2024 Avg. Daily Demand (m ³)	2023 Max. Daily Demand (m ³)	2023 Avg. Daily Demand (m ³)
January	1658	1392	1635	1331
February	1929	1336	1403	1222
March	1525	1315	1352	1134
April	1807	1480	1282	1062
May	1963	1489	2258	1615
June	2244	1662	2573	1961
July	3074	2423	2943	2441
August	2874	2283	2935	2364
September	2411	1739	1909	1455
October	1650	1239	1307	1157
November	1419	1110	1296	1175
December	1347	1138	1562	1336

Year-to-year variations in demand tend to be influenced by the impact of weather upon consumption habits, particularly irrigation, while longer-range trends are influenced by population growth and demand management initiatives such as water rates and water conservation programs.

DRINKING WATER COST BREAKDOWN

In 2024, the City of Enderby spent \$1,071,543 to operate and maintain the community drinking water system. Of that value, capital investment represents 34.5% of the total.



The following chart compares the dollar value associated with each expense category:

Category	2024 Value	2023 Value
Materials	167,441	149,382
Labour	200,016	183,609
Energy	68,210	63,794
Equipment	108,410	94,035
Special Projects	51,599	20,425
Interest	-	-
Administration	88,774	72,908
Capital	369,936	153,951
Other	17,158	15,974
Total	1,071,543	754,077

WATER SYSTEM ASSESSMENT AND INFRASTRUCTURE DEFICIT

The total replacement value for the water distribution system (such as pipes and pumps) is \$47,716,805. As of December 31, 2024, the total depreciation is \$19,321,267.

The total replacement value for the City of Enderby water treatment system (such as buildings, clarifier, chlorinators, and ultraviolet bank) is \$9,286,363. As of December 31, 2024, the total depreciation is \$4,886,039.

In 2024, \$305,355 was contributed to the City of Enderby water reserve fund and \$229,358 was withdrawn, for a balance at the end of the year of \$817,090.

In order to address its infrastructure deficit, the City has committed to an incremental tax increase of 1% per year to the water utility. This amount is dedicated to asset management. The anticipated 2024 contribution to water reserves is \$287,100.

COMPLETED AND FORTHCOMING MAJOR PROJECTS

There were a number of major water projects completed or forthcoming as of December 31, 2024:

- Russell Avenue water main and service renewal (completed).
- Geographic Information System (GIS) updates and improvements (completed), including roll-out to Public Works work stations (completed).
- Reservoir #1 bypass program testing (completed).
- Reservoir #1 renewal (forthcoming).
- Planning for Water Treatment Plant expansion (in progress).
- Granville Avenue water main and service renewal (forthcoming).
- Preliminary planning for King Avenue water main renewal (forthcoming).
- Preliminary planning for Brickyard Road water main expansion (forthcoming).

MAJOR EVENTS

There was one relatively short period of elevated turbidity greater than 5 NTU in the Shuswap River during 2024. This lasted between March 21 and March 23, 2024. The seasonal freshet was gradual and did not bring the extended periods of elevated turbidity as seen in previous years. During this event, the water treatment plant was used as backup, and the Shuswap Well was the primary source to supply potable water to consumers.

There were five total breaks or major leaks identified during the year. They were addressed and handled promptly and no major service disruptions were experienced.

Reservoir #1 bypass program testing took place throughout the year to prepare for the reconstruction of Reservoir #1 in 2025. This involved isolating Reservoir #1 and using Booster Station #2 in conjunction with a variable frequency drive on a distribution pump at the Water Treatment Plant to supply water directly to Reservoir #2, and then configure valve works in Booster Station #2 to reduce pressure in order to provide stored water to Pressure Zone 1.

WATER QUALITY MONITORING

Daily samples are collected at the Shuswap Well and River and tested for pH, temperature, and turbidity. Daily samples are also collected at the Water Treatment Plant and tested for pH,

temperature, turbidity, and colour. The clearwell is tested on a daily basis for pH, temperature, turbidity, colour, and free and total chlorine.

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

At least once per month, samples are collected at 10 monitoring stations within the distribution system for microbiological testing. An total coliform test was found to be positive at City Hall February 21, 2024. In accordance with standard practice, this site was immediately re-sampled and returned negative for total coliforms. The February 21 positive sample was likely a sampling error or laboratory error. There were no other positive total coliform samples in 2024.

The filter backwash is sampled on a bi-monthly schedule for pH, conductivity, turbidity, total suspended solids, aluminum, and microbiology.

On a quarterly basis, trihalomethane (THM) samples are collected from the Brash PRV, Booster #1, and Valcain stations. THMs are by-products caused by the chemical reaction between chlorine and organic matter naturally present in water. High levels of THMs can have adverse health effects and, as a result, the *Guidelines for Canadian Drinking Water Quality* set a maximum acceptable concentration of 0.1 mg/L. All THM tests from the above sample stations reported below the maximum acceptable concentration, with concentrations never exceeding 0.0705 mg/L.

The Shuswap Well is tested monthly for nitrogen levels (including nitrates and nitrites) and microbiology. The Shuswap River is sampled monthly for microbiology. Both sources are sampled quarterly for total organic carbon.

The Shuswap River is sampled annually for comprehensive testing. The Shuswap Well is sampled every second year for comprehensive testing. The Shuswap River was tested in 2024.

The results are as follows.

Date	Parameter	Result (River)
August 14, 2024	Chloride	0.46
August 14, 2024	Fluoride	<0.10
August 14, 2024	Nitrate (as N)	<0.010
August 14, 2024	Nitrite (as N)	<0.010
August 14, 2024	Sulfate	5.9
August 14, 2024	EPHw10-19	<250
August 14, 2024	EPHw19-32	<250
August 14, 2024	LEPHw	<250
August 14, 2024	HEPHw	<250
August 14, 2024	Langelier Index	-1.9
August 14, 2024	Hardness, Total (as CaCO ₃)	43.7
August 14, 2024	Solids, Total Dissolved (calc)	49.5
August 14, 2024	Temperature, at pH	21.9
August 14, 2024	Colour, True	<5.0
August 14, 2024	Alkalinity, Total (as CaCO ₃)	40.6

August 14, 2024	Alkalinity, Phenolphthalein (as CaCO ₃)	<1.0
August 14, 2024	Alkalinity, Bicarbonate (as CaCO ₃)	40.6
August 14, 2024	Alkalinity, Carbonate (as CaCO ₃)	<1.0
August 14, 2024	Alkalinity, Hydroxide (as CaCO ₃)	<1.0
August 14, 2024	Cyanide, Total	<0.0020
August 14, 2024	Turbidity	0.8
August 14, 2024	pH	6.79
August 14, 2024	Conductivity (EC)	96.4
August 14, 2024	Coliforms, Total (Q-Tray)	1050
August 14, 2024	E. coli	20
August 14, 2024	Acenaphthene	<0.050
August 14, 2024	Acenaphthylene	<0.200
August 14, 2024	Acridine	<0.050
August 14, 2024	Anthracene	<0.010
August 14, 2024	Benz(a)anthracene	<0.010
August 14, 2024	Benzo(a)pyrene	<0.010
August 14, 2024	Benzo(b+j)fluoranthene	<0.050
August 14, 2024	Benzo(g,h,i)perylene	<0.050
August 14, 2024	Benzo(k)fluoranthene	<0.050
August 14, 2024	2-Chloronaphthalene	<0.100
August 14, 2024	Chrysene	<0.050
August 14, 2024	Dibenz(a,h)anthracene	<0.010
August 14, 2024	Fluoranthene	<0.030
August 14, 2024	Fluorene	<0.050
August 14, 2024	Indeno(1,2,3-cd)pyrene	<0.050
August 14, 2024	1-Methylnaphthalene	<0.100
August 14, 2024	2-Methylnaphthalene	<0.100
August 14, 2024	Naphthalene	<0.200
August 14, 2024	Phenanthrene	<0.100
August 14, 2024	Pyrene	<0.020
August 14, 2024	Quinoline	<0.050
August 14, 2024	Aluminum, total	0.0656
August 14, 2024	Antimony, total	<0.00020
August 14, 2024	Arsenic, total	<0.00050
August 14, 2024	Barium, total	0.0097
August 14, 2024	Boron, total	<0.0500
August 14, 2024	Cadmium, total	<0.000010
August 14, 2024	Calcium, total	14.6
August 14, 2024	Chromium, total	<0.00050
August 14, 2024	Cobalt, total	<0.00010
August 14, 2024	Copper, total	0.00252
August 14, 2024	Iron, total	0.099
August 14, 2024	Lead, total	0.00065
August 14, 2024	Magnesium, total	1.72

August 14, 2024	Manganese, total	0.00417
August 14, 2024	Mercury, total	<0.000010
August 14, 2024	Molybdenum, total	0.0006
August 14, 2024	Nickel, total	0.0004
August 14, 2024	Potassium, total	0.81
August 14, 2024	Selenium, total	<0.00050
August 14, 2024	Sodium, total	1.19
August 14, 2024	Strontium, total	0.0651
August 14, 2024	Uranium, total	0.00031
August 14, 2024	Zinc, total	0.008
August 14, 2024	Benzene	<0.5
August 14, 2024	Bromodichloromethane	<1.0
August 14, 2024	Bromoform	<1.0
August 14, 2024	Carbon tetrachloride	<0.5
August 14, 2024	Chlorobenzene	<1.0
August 14, 2024	Chloroethane	<2.0
August 14, 2024	Chloroform	<1.0
August 14, 2024	Dibromochloromethane	<1.0
August 14, 2024	1,2-Dibromoethane	<0.3
August 14, 2024	Dibromomethane	<1.0
August 14, 2024	1,2-Dichlorobenzene	<0.5
August 14, 2024	1,3-Dichlorobenzene	<1.0
August 14, 2024	1,4-Dichlorobenzene	<1.0
August 14, 2024	1,1-Dichloroethane	<1.0
August 14, 2024	1,2-Dichloroethane	<1.0
August 14, 2024	1,1-Dichloroethylene	<1.0
August 14, 2024	cis-1,2-Dichloroethylene	<1.0
August 14, 2024	trans-1,2-Dichloroethylene	<1.0
August 14, 2024	Dichloromethane	<3.0
August 14, 2024	1,2-Dichloropropane	<1.0
August 14, 2024	1,3-Dichloropropene (cis + trans)	<1.0
August 14, 2024	Ethylbenzene	<1.0
August 14, 2024	Methyl tert-butyl ether	<1.0
August 14, 2024	Styrene	<1.0
August 14, 2024	1,1,2,2-Tetrachloroethane	<0.5
August 14, 2024	Tetrachloroethylene	<1.0
August 14, 2024	Toluene	<1.0
August 14, 2024	1,1,1-Trichloroethane	<1.0
August 14, 2024	1,1,2-Trichloroethane	<1.0
August 14, 2024	Trichloroethylene	<1.0
August 14, 2024	Trichlorofluoromethane	<1.0
August 14, 2024	Vinyl chloride	<1.0
August 14, 2024	Xylenes (total)	<2.0

ENVIRONMENTAL OPERATORS CERTIFICATION

The *Drinking Water Protection Regulation* requires a Chief Operator certified by the Environmental Operators Certification Program at a level that matches the facility classification for Water Treatment and Water Distribution.

The Water Treatment Plant is a Class II facility. The Water Distribution system is a Class I facility.

During 2024, City of Enderby employed the following certified operators:

Name	Title	Water Treatment	Water Distribution
Damon Kipp	Systems Operator III	Level II	Level II
Ray Brown	Lead Hand I	Level I	Level II
Mervin Arvay	Utility I	-	Level III

WATER CONSERVATION PLAN

The City of Enderby's Water Conservation Plan identifies strategies to reduce water demand throughout the community. Reducing water demand helps to protect the watershed, mitigate requirements for infrastructure expansion, and reduce operating and maintenance costs.

As of December 31, 2024, the City of Enderby has achieved a number of strategies within its Water Conservation Plan, including:

1. Universal water metering;
2. Water Conservation and Drought Management framework; and
3. Education and compliance initiatives.

CROSS CONNECTION CONTROL PROGRAM

In 2003, Interior Health required all large water suppliers, including the City of Enderby, to 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 drinking water 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. Under Enderby's program, owners were expected to implement the recommendations in a timely manner and were responsible for all costs associated with their backflow prevention systems.

For a number of reasons, including cost and internal capacity limitations, the Cross Connection Control Program has not been fully implemented. The City of Enderby intends to increase compliance with its Cross Connection Control program in 2025 and will follow a risk-based approach focusing on premises isolation.

SOURCE PROTECTION PLAN

In February 2017, the City completed its Source Protection Plan for both the surface water intake and the Shuswap Well. The Source Protection Plan characterized the sources, provided an inventory of potential contaminants and threats, characterized risks, and recommended various actions to mitigate risk. As a result of this plan, the City has completed analyses of both sources for herbicides, pesticides, and petroleum in order to characterize the source water better.

The City has also reached out to relevant third parties to inform them of the locations of the City's drinking water sources and request that they notify the City in the event of an accident, spill, fire, or natural disaster. The City has also requested that the Regional District of North Okanagan refer development applications within the designated groundwater protection area.

EMERGENCY RESPONSE PLAN

The City of Enderby Drinking Water Emergency Response Plan was completed in 2013. The Emergency Response Plan includes provisions for public notification and response procedures for emergency situations, such as backflow incidents, broken water mains, chlorinator failure, source and/or reservoir contamination, and spills or vehicle accidents affecting the distribution system. It also provides an emergency contact directory.

The Emergency Response Plan was last updated on November 13, 2024.