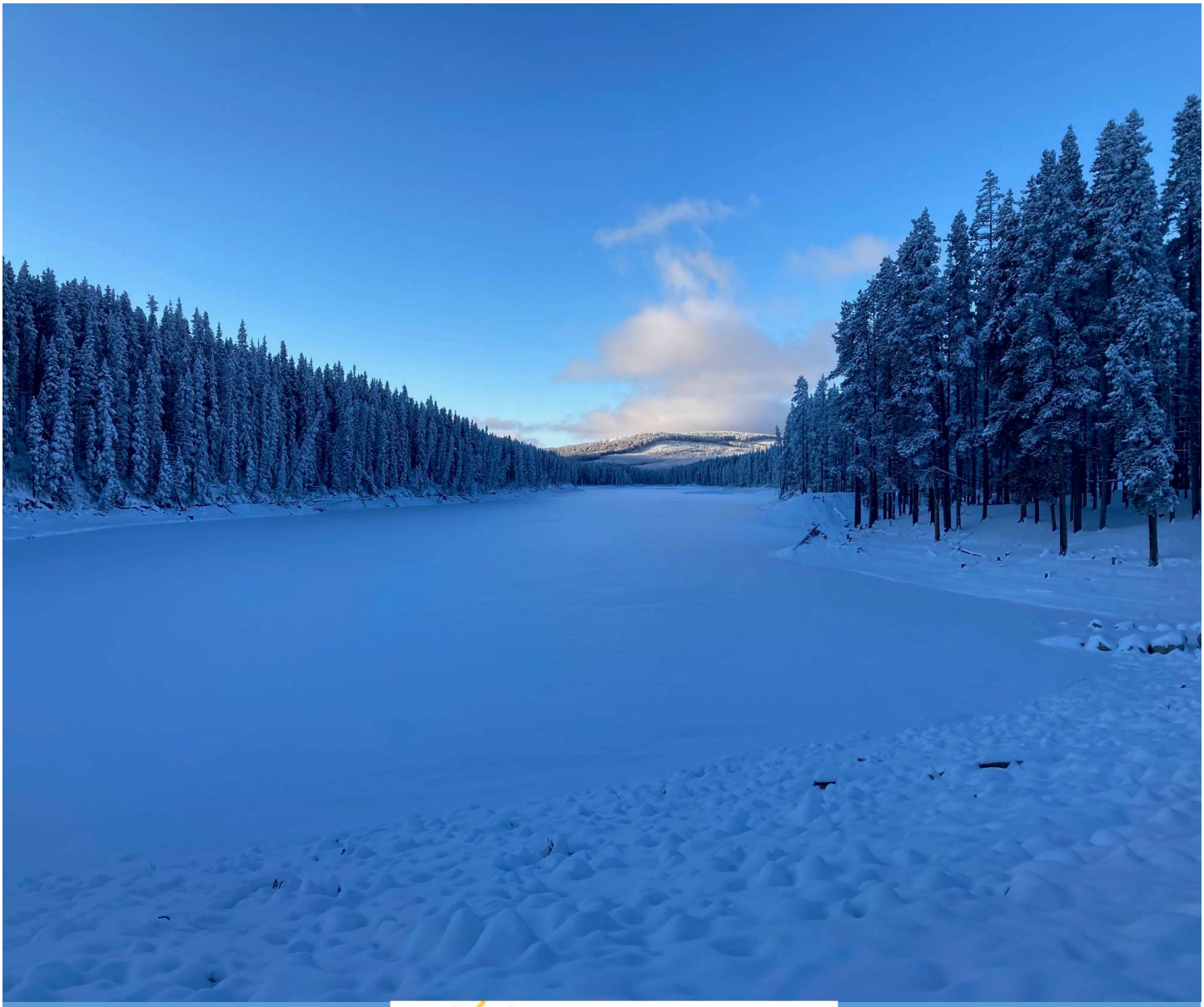

DISTRICT OF SUMMERLAND

2025 Drinking Water Quality Annual Report

Facility No. 14-105-00001

June 30, 2026

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1.0 System Overview and Description

The District of Summerland (DOS) municipal water supply is comprised of two separate drinking water systems that supply potable water to approximately 12,918 people based on the 2022 Census by Statistics Canada. The Summerland water system, also referred to as the Trout Creek water system, is the largest and currently satisfies greater than 99 percent of the District's potable water demands.

The Rodeo Grounds water system is classified as a small water system with three connections.

1.1 Summerland Water System

1.11 Supply

There are nine District-owned reservoirs throughout the 760 km^2 Summerland watershed. These reservoirs include Thirsk, Headwaters #1, #2, #3, #4, Crescent, Whitehead, Isintok and Tsuh as shown in Figure 2. The Summerland water system is gravity fed from Trout Creek and utilizes this diversion as the main supply. This water diversion feeds, via an open channel flume, into the Summerland Reservoir that acts as a 68ML (million litre) settling and balancing pond.

Water leaving the Summerland reservoir passes through a coarse intake screen followed by a finer mesh-screening chamber to exclude any large debris before entering the water treatment plant and irrigation system.

In 2010, the initial phase of separating the irrigation system from the domestic water system was completed. A 13MLD (million litre per day) capacity line in the upper Prairie Valley area was separated from the combined domestic/irrigation system and now serves as an irrigation-only piping system.

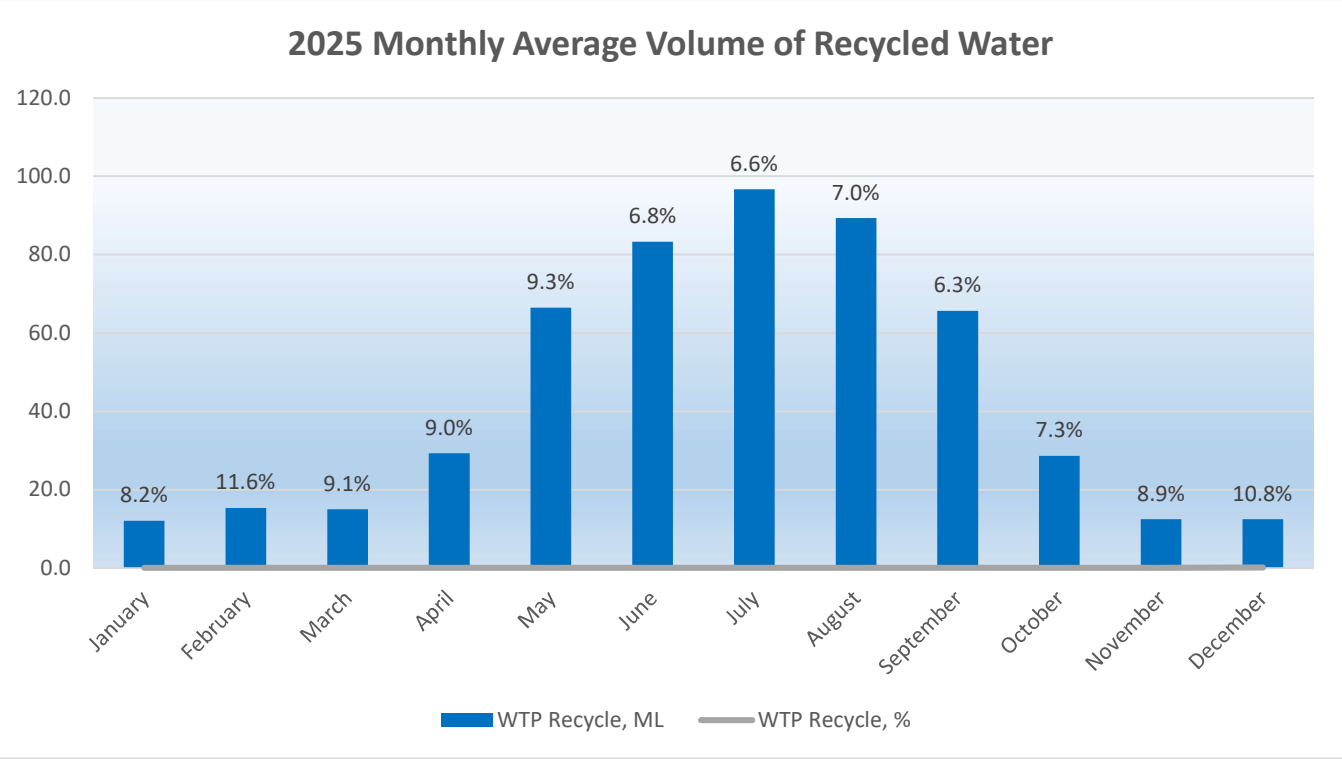
An additional phase of separation occurred during the Garnett Valley upgrade in 2017. The irrigation "only" line from Garnett Dam was extended east up Jones Flat Road where the irrigation connections were removed from the Summerland potable water supply and connected to the Garnett Valley Irrigation System. All Garnett Valley residences are now part of the Summerland water system and receive domestic water from the water treatment plant.

1.12 Water Treatment Plant

The water treatment process (see Figure 1) consists of coagulation, flocculation, sedimentation, filtration and chlorine disinfection with a capacity of 76 MLD. There are two ballasted floc ACTIFLO clarifiers and six dual media DUSENFLO filters. This was the first water treatment plant in British Columbia to utilize this process. Through the utilization of microsand, in addition to coagulant and polymer, the weight of the floc and speed of formation is greatly increased. This allows for rapid settling to occur in a much smaller footprint than conventional treatment plants.

A designated waste tank collects wastewater from the treatment process. Submersible pumps lift the wastewater to two on-site settling ponds. Pumps lift the settled sludge to drying beds located near the Summerland landfill site.

The recycled supernatant from the settling ponds is gravity fed back to the treatment process. This innovative design involves recycling up to 10% of the supernatant back to the front of the process for re-treatment. This significantly improves the water use efficiency of the process and makes it the first water plant in Canada to utilize this technology. The following graph indicates the monthly average volume of water recycled back to the raw water tank.



Historical / regular sampling results indicate that recycled water contributes very little to the number of coliforms, colour, turbidity, Cryptosporidium oocysts and Giardia cysts returned to the head of the plant. In fact, lab results confirm that recycled water show significantly better quality than raw Trout Creek water.

The treatment plant design is in accordance with LEED Silver guidelines. This design capitalizes on natural energy sources through use of extensive natural light and heat pumps to transfer energy from raw water. Rainwater is collected and infiltrated back into the ground in dry wells to reflect the predevelopment site conditions. The landscaping of the site closely reflects native species and requires no supplementary irrigation.

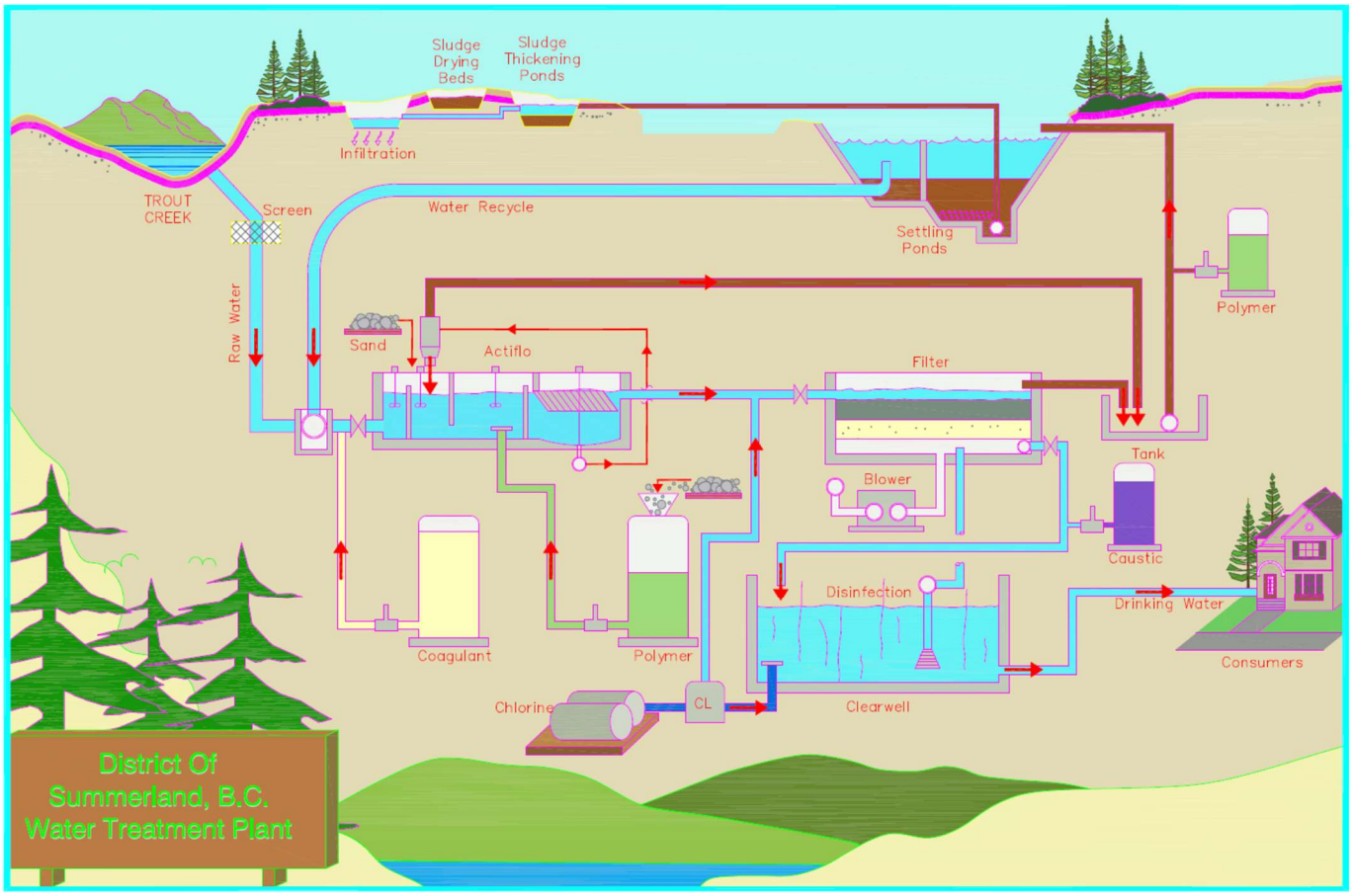


Figure 1 – Water Treatment Plant Schematic

1.13 Water Distribution System

The water distribution system piping ranges in size from 50mm to 1.37m in diameter, with a total combined length of approximately 216km. Thirteen pressure-reducing stations, twelve pumping stations and three in-ground storage tanks regulate system pressures ranging from 35 to 175psi at the consumer level.

1.14 Wells

Two wells, TW3 and TW5, installed at the Rodeo Grounds in 2003, provide an emergency supplemental water supply to the flume when flows from Trout Creek are insufficient to meet system demand. The combined capacity of the two wells is 66 lps (litres per second). Supplemental well water was not required in 2025.

The wells also provide sufficient supplemental flows to support Trout Creek during drought conditions, helping maintain the minimum streamflows required for fish habitat in the lower reaches of the creek. Infrastructure upgrades included the construction of a rip-rap outlet west of the Rodeo Grounds, allowing well water to be diverted directly into Trout Creek during periods of low streamflow caused by drought.

1.2 Garnett Valley Irrigation "only" System

The Garnett Valley Irrigation system is gravity fed utilizing Garnett Reservoir as the supply. Garnett Reservoir has an upper catchment area of 56 square kilometers, which also encompasses the Eneas Reservoir. The reservoir is located on Eneas Creek but receives much of its water from underground springs.

1.3 Summerland Rodeo Grounds Water System

The Summerland Rodeo Grounds is a small water system located on Bathville Road. There are three connections on this system including the Rodeo Grounds, caretakers' residence and the Kettle Valley Railway station. A 2HP submersible pump supplies water to the system with a maximum pumping rate of 255 lpm (liters per minute). The 150mm diameter well is located on the Rodeo Grounds property and is 54m deep.

2.0 System Classification and Operator Certification

The British Columbia Environmental Operators Certification Program (BC EOCP) classifies both the District of Summerland's water distribution system and water treatment plant as class IV systems (where class I is the least complex and class IV is the most complex).

The District currently employs six full-time staff members to operate and maintain the water treatment plant, water distribution system and upper reservoir water supply system. Water supply technician's certifications range from levels I to IV in both water distribution and water treatment.

EOCP Certification No.	Water Distribution Certification Level				Water Treatment Certification Level			
	IV	III	II	I	IV	III	II	I
1510	X							X
7058				X	X			
4020		X			X			
1000439		X					X	
1001121				X			X	
1002357								X

Operators maintain EOCP certifications through various accredited training opportunities. Future certification plans include advancing operators to higher levels.

3.0 Source Sampling

The District of Summerland's watersheds encompass approximately 815 km². Within this area, the District owns and operates 12 water storage reservoirs (Figure 2). Several additional lakes and tributaries also contribute to the water supply on a seasonal basis. Due to the size and geographic complexity of the

watershed, source water sampling is limited. To enhance source water monitoring, the District has increased the collection of annual comprehensive and algae samples in recent years, with sampling typically conducted near the end of summer.

The Summerland Reservoir is located approximately 300 m east and hydraulically downgradient of the Summerland Landfill. Because of its proximity to the landfill, additional water quality monitoring is required under the Summerland Landfill Operating Certificate (MR15275), issued pursuant to the Environmental Management Act. Water samples are collected quarterly from designated groundwater monitoring wells and the Summerland Reservoir and submitted to ALS Environmental Laboratory in Burnaby for analysis.

In addition to water quality analyses, groundwater levels are measured in 18 monitoring wells, along with the water level in the Summerland Reservoir, on a bi-weekly to monthly basis depending on the season. The monitoring results are evaluated annually by AtkinsRéalis Canada Inc. and presented in the 2025 District of Summerland Landfill Annual Environmental and Water Quality Report, which assesses groundwater and surface water quality downgradient of the landfill.

The 2025 monitoring results indicate that concentrations of leachate indicator parameters in the downgradient deep monitoring well and potential cross-gradient background wells remained within historical ranges and were substantially lower than concentrations observed in monitoring wells located immediately downgradient of the landfill. Similarly, concentrations of leachate indicator parameters in groundwater samples collected from monitoring wells nearest the reservoir and in surface water samples collected from the Summerland Reservoir were significantly lower than those measured in wells immediately downgradient of the landfill.

Overall, the monitoring results indicate that landfill leachate has not adversely affected the water quality of the Summerland Reservoir. While landfill-related impacts continue to be detectable in some groundwater monitoring wells located near the landfill, there is no evidence that these impacts are reaching or degrading the reservoir. According to AtkinsRéalis, the reservoir continues to function as a groundwater recharge area, with surface water elevations consistently remaining higher than groundwater elevations in the surrounding monitoring wells. This hydraulic relationship further supports the conclusion that the reservoir remains protected from groundwater impacts associated with the landfill.

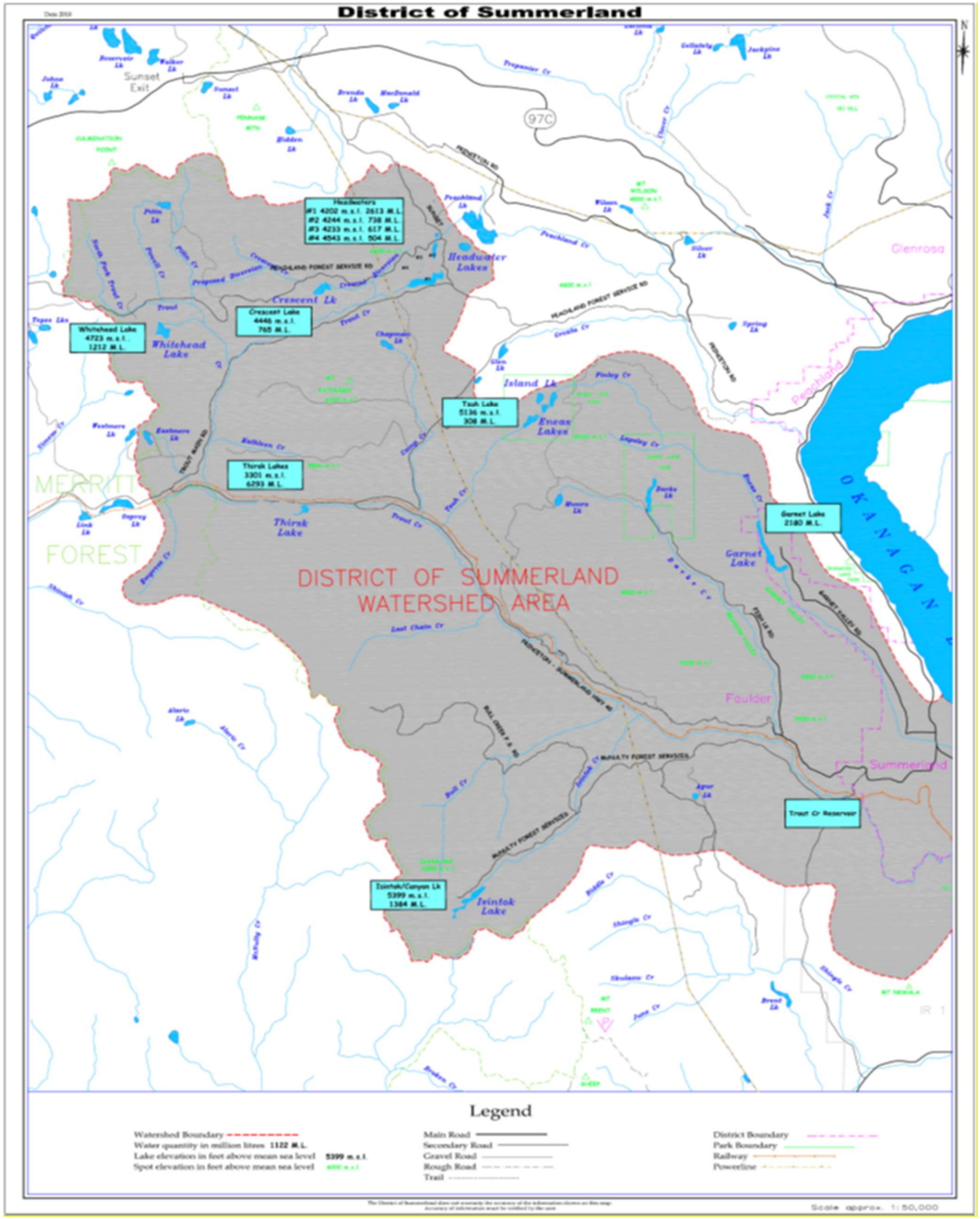


Figure 2 - District of Summerland Watershed Map

3.1 Sample Schedules

A sample schedule provides a guideline for conducting sampling events throughout the year. The tables below identify the recommended sampling locations and approximate collection times. Depending on the analyses being performed, sampling locations may include source water before treatment, various points throughout the treatment process, the first consumer served, and multiple locations within the distribution system, including sites at the extremities of the distribution network.

3.11 Summerland Water System – 2025 Sample Schedule

Summerland System	**LAB**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**Septembe**	**October**	**November**	**December**
Comprehensive - Distribution Pump House #6	CARO Kelowna				SA				SA				
Comprehensive - Pretreatment Summerland Reservoir Raw at WTP lab tap Trout Creek Raw at Intake	CARO Kelowna				SA				SA				
Gross Alpha & Beta Trout Creek Raw	CARO Kelowna									A			
PFAS – Polyfluoroalkyl Trout Creek at Intake (Raw), Summerland Reservoir (Raw) & Pump House #6	CARO Kelowna				SA				SA				
Comprehensive – Watershed HW #1 Outlet, Thirsk Outlet, Trout Creek Raw at Intake, Isintok Outlet.	CARO Kelowna								A				
Algae - Watershed HW #1 Outlet, Thirsk Outlet, Summerland Reservoir Raw at WTP Lab tap.	CARO Kelowna								A				
Algae – Pretreatment/Watershed Summerland Reservoir Raw at WTP Lab tap and ***WTP*** Recycle line (quarterly through 2025 adjust as required (if bloom occurs)	CARO Kelowna				Q		Q		Q		Q		
Corrosivity **pH, Alkalinity, LSI** (June & Oct only as it's included in Comprehensive sample), **First Draw (Lead, Copper) & Plus @ 5min** 4 locations in the Distribution System	CARO Kelowna				Q		Q		Q		Q		
E.coli Trout Creek, (Up&Dn Stream of Dark Creek inflow) Dark Creek (Above & Below Cattleguard & Mailboxes)	CARO Kelowna					**SA**		**SA**					
THMs & HAAs Pump House #6, Pumphouse #8, PRV #9 (Lower Town) and PRV #17 (Trout Creek)	CARO Kelowna	Q			Q			Q			Q		
Crypto/Giardia Trout Creek Raw & WTP Recycle	CARO Richmond	M	M	M	M	M	M	M	M	M	M	M	M
E. coli and Total Coliforms Various locations in Distribution	CARO Kelowna	W	W	W	W	W	W	W	W	W	W	W	W
Turbidity Various locations in Distribution	In House	W	W	W	W	W	W	W	W	W	W	W	W
Chlorine Residuals Various locations in Distribution	In House	W	W	W	W	W	W	W	W	W	W	W	W

W – WEEKLY M – MONTHLY Q – QUARTERLY SA – SEMI ANNUALLY A - ANNUALLY

3.12 Summerland Water Treatment Plant – 2025 Sample Schedule

Water Treatment Plant	January	February	March	April	May	June	July	August	September	October	November	December
Turbidity Trout Creek Raw, WTP Recycle, Waste, ActiFlow(s), Treated water at PH#2	D	D	D	D	D	D	D	D	D	D	D	D
E. coli and Total Coliforms Recycle line and Raw Water (in house testing)	W	W	W	W	W	W	W	W	W	W	W	W
Hardness and Alkalinity Trout Creek Treated	W	W	W	W	W	W	W	W	W	W	W	W
pH Trout Creek Raw, WTP Recycle, Waste, ActiFlow(s), Treated water at PH#2	D	D	D	D	D	D	D	D	D	D	D	D
True Colour Trout Creek Raw, WTP Recycle, Actiflow(s)	D	D	D	D	D	D	D	D	D	D	D	D
True Colour Treated water at PH#2	W	W	W	W	W	W	W	W	W	W	W	W
Apparent Colour Treated water at PH#2	D	D	D	D	D	D	D	D	D	D	D	D
Apparent Colour Trout Creek Raw	W	W	W	W	W	W	W	W	W	W	W	W
UV Transmittance Trout Creek Raw, Actiflow(s), Treated water at PH#2	D	D	D	D	D	D	D	D	D	D	D	D
Algae See "Summerland System" schedule												
Aluminum Treated water at PH#2	W	W	W	W	W	W	W	W	W	W	W	W
TSS WTP Recycle & Waste	W	W	W	W	W	W	W	W	W	W	W	W
Manganese Trout Creek Raw, Clarified Channel, Clearwell IN, Clearwell OUT, Treated water at PH#2	W	W	W	W	W	W	W	W	W	W	W	W

***W – WEEKLY D – DAILY**

3.13 Rodeo Water System – 2025 Sample Schedule

Rodeo System	LAB	January	February	March	April	May	June	July	August	September	October	November	December
Comprehensive Lodge	CARO Kelowna				SA				SA				
Bacteriological Lodge	CARO Kelowna	W	W	W	W	W	W	W	W	W	W	W	W
Turbidity Lodge	In House	W	W	W	W	W	W	W	W	W	W	W	W
Gross Alpha & Beta Lodge	CARO Kelowna									A			
Iron Lodge	In House	W	W	W	W	W	W	W	W	W	W	W	W
Manganese Lodge	In House	M	M	M	M	M	M	M	M	M	M	M	M
pH Lodge	In House	W	W	W	W	W	W	W	W	W	W	W	W
PFAS – Polyfluoroalkyl Substances										A			

W – WEEKLY M – MONTHLY SA – SEMI ANNUALLY A - ANNUALLY

4.0 Bacteriological Summary

The DOS must complete a minimum bacteriological sampling frequency of four samples per week in the Summerland water distribution system and four samples per month in the Rodeo water system. The collection of water samples come from predetermined locations throughout the town boundaries.

4.1 Summerland Water System

The Summerland water distribution system is classified by Interior Health as a water system with 301-10,000 connections. Sample sites are located from the middle to the end of the distribution system in alternating locations. A minimum of four samples are collected weekly and shipped to Caro Analytical. The DOS also has the ability for in-house analysis by the IDEXX Colilert P/A system, used weekly for process control.

Two hundred and sixteen routine bacteriological samples were collected from the Summerland water system throughout the year. All water sample results were <1cfu/100mL for both Total Coliforms and *E-coli.*

Microbiological Parameters	MAC	Method	Unit	Average	Minimum	Maximum	Number of Samples	Number of Results with Exceedances
Total coliforms	Not Detectable	Membrane Filtration / Chromocult Agar	cfu/100mL	<1	<1	<1	216	0
E.coli	Not Detectable	Membrane Filtration / Chromocult Agar	cfu/100mL	<1	<1	<1	216	0

4.2 Rodeo Grounds Water System

The Rodeo Grounds Water System is classified by Interior Health as a water system with 14 or less connections. Sample sites are identified as the Lodge and the Kettle Valley Railway station (KVR). The number of samples collected weekly from the Rodeo Grounds Water System include one that is submitted to Caro Analytical.

There were fifty-two samples collected from the Rodeo Grounds water system in 2025. All water sample results were <1cfu/100mL for both Total Coliforms and *E-coli.*

Microbiological Parameters	MAC	Method	Unit	Average	Minimum	Maximum	Number of Samples	Number of Results with Exceedances
Total coliforms	Not Detectable	Membrane Filtration / Chromocult Agar	cfu/100mL	<1	<1	<1	52	0
E.coli	Not Detectable	Membrane Filtration / Chromocult Agar	cfu/100mL	<1	<1	<1	52	0

5.0 Additional Water Quality Information

5.1 Comprehensive Summary

Comprehensive water analyses were performed on both water systems in the spring and fall of 2025 to ensure compliance with the Guidelines for Canadian Drinking Water Quality (GCDWQ). Parameters include metals, nutrients, bacteria, anions, and aesthetic objectives including colour. Monitoring of source water included an annual set of samples collected from the low-level outlets of Thirsk, Headwaters #1 and Isintok reservoirs.

Glossary of Terms:

GCDWQ - Guidelines for Canadian Drinking Water Quality
MRL - Method Reporting Limit
MAC - Maximum Acceptable Concentration
OG - Operational Guideline
AO - Aesthetic Objective
CFU/100mL - Colony Forming Units per 100 millilitres
mg/L - Milligrams per Litre
CU - Colour Units
µS/cm - Microsiemens per Centimeter
NTU - Nephelometric Turbidity Units
pH units - pH <7 = acidic, pH >7 = basic

5.11 Summerland Water System – Trout Creek Raw at Lab Tap

TC RAW at LAB TAP	2021		2022	2023		2024		2025			
Anions	**April**	**August**	**April**	**April**	**August**	**April**	**August**	**April**	**August**	**Spring Average**	**Fall Average**
Chloride	2.33	1.32	2.47	3.19	1.14	4.09	1.01	2.77	1.24	2.88	1.47
Fluoride	0.14	0.14	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.14	0.13	0.14
Nitrate (as N)	<0.010	<0.010	<0.010	<0.010	<0.010	0.044	<0.010	1.044	<0.010	0.039	0.010
Nitrite (as N)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Sulfate	5.9	4.4	6.6	8.3	4.1	9.0	3.8	8.3	4.4	7.2	4.3
General Parameters											
Alkalinity, Total (as CaCO3)	66.6	61.1	67.3	81.1	54	94.4	41.3	67.3	44.8	75.0	54.4
Alkalinity, Phenolphthalein (as CaCO3)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Bicarbonate (as CaCO3)	66.6	61.1	67.3	81.1	54	94.4	41.3	67.3	44.8	75.0	54.4
Alkalinity, Carbonate (as CaCO3)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Colour, True	23	24	22	<5.0	33	<5.0	30	7.3	22	21	26
Conductivity (EC)	126	121	134	173	104	172	87.5	164	105	149	111
Cyanide, Total	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0021	<0.0020	<0.0020	<0.0020
pH	7.51	7.84	7.51	7.09	7.43	6.90	6.54	7.32	6.79	7.42	7.45
Temperature, at pH	23.0	21.8	22.5	22.8	22.9	21.6	22.3	20.7	21.3	22.7	22.5
Turbidity	1.52	1.31	0.90	0.7	2.31	2.52	1.41	0.69	2.42	1.40	1.48
Calculated Parameters											
Hardness, Total (as CaCO3)	54.7	50.7	61.7	84.8	49.4	76.4	38.4	75.3	46.8	66.1	48.2
Langlier Index	0.0	-0.6	-0.8	-1.1	-1.2	-1.3	-2.3	-1.0	-1.9	-0.6	-1.1
Solids, Total Dissolved (calc)	74.3	66.2	78.9	99.1	61.2	105	48.3	86.2	54.8	86.1	61.4
Total Metals											
Aluminum, total	0.0575	0.0269	0.0455	0.0097	0.0513	0.0535	0.0696	0.0128	0.0732	0.0437	0.0428
Antimony, total	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Arsenic, total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Barium, total	0.0348	0.0382	0.0422	0.0447	0.0363	0.0455	0.0275	0.0429	0.035	0.0409	0.0356
Boron, total	<0.0050	<0.0050	<0.0050	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0050	0.0276
Cadmium, total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000013	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium, total	16.7	15.7	18.8	26.1	15.4	23.4	12.1	23.1	14.6	20.1	14.9
Chromium, total	<0.00050	<0.00050	0.001	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper, total	0.00205	<0.00040	0.00245	0.00113	0.00127	0.00111	0.00129	0.00145	0.00243	0.0017	0.0019
Iron, total	0.162	0.145	0.142	0.061	0.17	0.15	0.219	0.074	0.175	0.1347	0.1614
Lead, total	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Magnesium, total	3.16	2.77	3.57	4.71	2.63	4.37	1.98	4.28	2.48	3.84	2.62
Manganese, total	0.0157	0.0303	0.0193	0.00826	0.0324	0.014	0.0239	0.0108	0.0341	0.0156	0.0313
Mercury, total				<0.000010	<0.000010	<0.000010	<0.000010	<0.000040	<0.000010	<0.000010	<0.000010
Molybdenum, total	0.00252	0.00283	0.00298	0.00363	0.00271	0.00345	0.00272	0.00351	0.00305	0.0031	0.0029
Nickel, total	<0.00040	<0.00040	0.00042	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	0.0004	0.0004
Potassium, total	1.24	1.28	1.5	1.65	1.4	1.59	1.13	1.53	1.22	1.44	1.30
Selenium, total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Sodium, total	4.31	3.50	4.97	5.64	3.52	5.28	3.15	5.21	3.5	4.90	3.50
Strontium, total	0.220	0.225	0.264	0.333	0.202	0.316	0.168	0.299	0.201	0.272	0.209
Uranium, total	0.00267	0.00195	0.00282	0.00615	0.00112	0.00459	0.000844	0.00383	0.00101	0.00399	0.00148
Zinc, total	0.0049	0.0042	0.0059	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	0.0052	0.0050

5.12 Summerland Water System – Trout Creek Raw at Intake

TC RAW at INTAKE	2023	2024	2025	
Anions	**August**	**August**	**August**	**Fall Average**
Chloride	1.24	1.26	1.08	1.19
Fluoride	<0.10	<0.10	0.13	0.13
Nitrate (as N)	<0.010	<0.010	<0.010	<0.010
Nitrite (as N)	<0.010	<0.010	<0.010	<0.010
Sulfate	4.6	5.1	4.2	4.63
General Parameters				
Alkalinity, Total (as CaCO3)	54.1	47.1	45.4	48.87
Alkalinity, Phenolphthalein (as CaCO3)	<1.0	<1.0	<1.0	<1.0
Alkalinity, Bicarbonate (as CaCO3)	54.1	47.1	45.4	48.87
Alkalinity, Carbonate (as CaCO3)	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3)	<1.0	<1.0	<1.0	<1.0
Colour, True	30	24	24	26.00
Conductivity (EC)	111	114	106	110.33
Cyanide, Total	<0.0020	<0.0020	<0.0020	<0.0020
pH	7.46	7.55	6.88	7.30
Temperature, at pH	23.1	23.1	21.5	22.57
Turbidity	1.70	1.27	4.96	2.64
Microbiological Parameters				
Coliforms, Total (Q-Tray)	-	4020	-	4020
E.coli (Q-Tray)	-	25	-	25
Calculated Parameters				
Hardness, Total (as CaCO3)	50.4	49.4	45.3	48.37
Langlier Index	-1.1	-1.1	-1.7	-1.3
Solids, Total Dissolved (calc)	62.4	58.1	54.1	58.2
Total Metals				
Aluminum, total	0.0342	0.0539	0.146	0.08
Antimony, total	<0.00020	<0.00020	<0.00020	<0.00020
Arsenic, total	<0.00050	<0.00050	<0.00050	<0.00050
Barium, total	0.0334	0.0338	0.037	0.035
Boron, total	<0.0500	<0.0500	<0.0500	<0.0500
Cadmium, total	<0.000010	<0.000010	<0.000010	<0.000010
Calcium, total	15.6	15.6	14.1	15.1
Chromium, total	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, total	<0.00010	<0.00010	<0.00010	<0.00010
Copper, total	0.00118	0.00106	0.00128	0.00117
Iron, total	0.156	0.182	0.348	0.229
Lead, total	<0.00020	<0.00020	<0.00020	<0.00020
Magnesium, total	2.75	2.54	2.42	2.57
Manganese, total	0.0277	0.0294	0.0725	0.0432
Mercury, total	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum, total	0.00277	0.00321	0.00313	0.00304
Nickel, total	<0.00040	<0.00040	0.00052	0.00052
Potassium, total	1.47	1.36	1.2	1.34
Selenium, total	<0.00050	<0.00050	<0.00050	<0.00050
Sodium, total	3.68	3.62	3.42	3.57
Strontium, total	0.205	0.198	0.199	0.201
Uranium, total	0.00114	0.00141	0.000954	0.001168
Zinc, total	<0.0040	<0.0040	0.0065	0.0065

5.13 Summerland Water System – Pump House #6

PUMP HOUSE #6	2021		2022		2023		2024		2025			
Anions	April	August	April	August	April	August	April	August	April	August	**Spring Average**	**Fall Average**
Chloride	10.1	12.2	12.1	14.1	10.4	15.3	14.7	14.5	11.7	13.6	12.0	13.9
Fluoride	0.12	0.11	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.1	0.1
Nitrate (as N)	0.014	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	<0.010	0.034	0.013
Nitrite (as N)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011
Sulfate	7.6	4.1	6.6	3.6	8.3	4.2	10.2	3.7	8.4	5.0	7.0	4.3
General Parameters												
Alkalinity, Total (as CaCO3)	86.5	42.4	64.8	56.9	71.4	50.1	84.2	42.8	70.9	47.7	63.9	50.33
Alkalinity, Phenolphthalein (as CaCO3)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Bicarbonate (as CaCO3)	86.5	42.4	64.8	56.9	71.4	50.1	84.2	42.8	70.9	47.7	68.9	50.33
Alkalinity, Carbonate (as CaCO3)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (EC)	190	121	161	144	197	146	203	133	191	155	169	144.44
Cyanide, Total	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0024	<0.002	<0.002
pH	7.96	7.62	7.60	7.30	7.18	7.44	7.42	7.39	7.55	7.12	7.6	7.56
Temperature, at pH	25.3	23	22.3	23.3	22.7	23.2	21.6	22.5	18	22.8	23.1	22.37
Turbidity	0.14	<0.10	<0.10	<0.10	<0.10	0.15	<0.10	<0.10	0.21	0.12	0.1	0.14
Microbiological Parameters												
Coliforms, Total (Q-Tray)		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
E.coli (Q-Tray)		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Calculated Parameters												
Total Trihalomethanes	0.0722	0.0552	N/A	0.0560	0.0545	0.0781	0.0631	0.0606	0.0728		0.059	0.07
Hardness, Total (as CaCO3)	74.2	41.4	61.6	48.5	86.0	49.1	80.3	35.6	75.6	48.0	64.4	49.0
Langlier Index	-0.1	-1.1	-0.7	-1.4	-1.1	-1.2	-0.8	-1.4	-0.8	-1.5	-0.6	-1.0
Solids, Total Dissolved (calc)	109	65.8	91.8	80.1	107	79.6	119	70.5	104	77.4	91.9	77.6
Total Metals												
Aluminum, total	0.0248	0.0231	0.0192	0.0300	0.0276	0.0245	0.0184	0.0276	0.0188	0.0376	0.0256	0.0263
Antimony, total	<0.0001	<0.0001	<0.0001	<0.0001	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.0001	<0.0001
Arsenic, total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005
Barium, total	0.0422	0.0306	0.0387	0.0317	0.0443	0.0346	0.0437	0.0249	0.0416	0.0333	0.0398	0.0343
Boron, total	<0.0500	0.0954	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.0080	0.0567
Cadmium, total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001
Calcium, total	22.5	12.4	19.2	15.3	26.6	15.3	25	11.2	24.0	15.1	19.9	15.3
Chromium, total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper, total	0.00066	0.00506	0.00292	0.00285	0.00179	0.00206	0.00073	0.00089	0.00114	0.00239	0.0016	0.0036
Iron, total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead, total	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.0002	0.0002
Magnesium, total	4.33	2.55	3.32	2.47	4.73	2.62	4.34	1.83	3.81	2.51	3.56	2.64
Manganese, total	0.00766	0.00044	0.00159	0.00128	0.00125	0.00048	0.00063	0.00104	0.00107	0.00188	0.0067	0.0023
Mercury, total						<0.000010	<0.000010	<0.000010	<0.000040	<0.000010	<0.000010	<0.000010
Molybdenum, total	0.00337	0.00299	0.0028	0.00255	0.0039	0.00272	0.00381	0.00222	0.00351	0.00306	0.0030	0.0029
Nickel, total	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.0004	<0.0004
Potassium, total	1.52	1.22	1.48	1.25	1.67	1.4	1.63	1.12	1.58	1.31	1.47	1.34
Selenium, total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005
Sodium, total	10.6	7.5	9.64	8.62	11.2	10.2	11.9	12.0	11.5	10.8	8.62	9.47
Strontium, total	0.285	0.17	0.264	0.198	0.337000	0.199	0.333	0.157	0.299	0.201	0.288	0.205
Uranium, total	0.003070	0.000123	0.000773	0.000190	0.00408	0.000110	0.001350	0.000055	0.00196	0.000134	0.001788	0.000170
Zinc, total	<0.0040	0.0058	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	0.0841	0.0078
Volatile Organic Compounds (VOC)												
Bromodichloromethane	0.0103	0.0028	N/A	0.0037	0.0111	0.0047	0.0122	0.0027	0.0104	0.0038	0.0077	0.0043
Bromoform	<0.0010	<0.0010	N/A	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001
Chloroform	0.0517	0.0524	N/A	0.0523	0.0414	0.0734	0.0490	0.0579	0.0611	0.0715	0.0494	0.0620
Dibromochloromethane	0.0102	<0.0010	N/A	<0.0010	0.0020	<0.0010	0.0020	<0.0010	0.0012	<0.0010	<0.0010	<0.0010
Surrogate: Toluene-d8	94	104	N/A	108	70	105	102	78	72	104	94	92
Surrogate: 4-Bromofluorobenzene	81	105	N/A	98	79	82	100	73	60	84	91	89

5.14 Rodeo Water System

RODEO LODGE	2021		2022		2023		2024		2025			
Anions	**April**	**August**	**April**	**August**	**April**	**August**	**April**	**August**	**April**	**August**	**Spring Average**	**Fall Average**
Chloride	1.92	1.85	2.14	2.14	2.43	2.29	2.73	2.89	2.78	2.84	1.85	1.95
Fluoride	0.2	0.18	0.14	0.14	0.14	0.13	0.15	0.14	0.12	0.14	0.17	0.19
Nitrate (as N)	0.211	0.236	0.211	0.197	0.24	0.202	0.308	0.306	0.294	0.291	0.184	0.218
Nitrite (as N)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Sulfate	13.1	12.8	12.1	11.5	11.5	10.7	10.7	11.1	10.4	9.6	36.8	14.5
General Parameters												
Alkalinity, Total (as CaCO3)	174	169	174	174	153	168	169	162	158	164	162	162
Alkalinity, Phenolphthalein (as CaCO3)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Bicarbonate (as CaCO3)	174	169	174	174	153	168	169	162	158	164	162	162
Alkalinity, Carbonate (as CaCO3)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Colour, True	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity (EC)	281	293	311	320	323	314	334	343	341	351	393	310
Cyanide, Total	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0047	<0.0020	<0.002	<0.002
pH	7.97	8.15	8.07	8.2	7.76	8.08	7.64	7.38	7.94	7.87	7.94	8.05
Temperature, at pH	25.3	22.7	22.3	23.8	22.9	22.7	21.6	22.4	20.7	22.6	23.0	22.3
Turbidity	0.36	0.34	0.16	0.30	0.62	0.2	0.27	0.17	0.21	0.30	0.3	0.3
Microbiological Parameters												
Coliforms, Total (Q-Tray)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
E.coli (Q-Tray)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Calculated Parameters												
Hardness	147	146	151	143	160	158	158	162	166	161	145	145
Langlier Index	0.5	0.60	0.50	0.40	0.09	0.4	-0.02	-0.3	0.3	0.2	0.3	0.4
Solids, Total Dissolved (calc)	188	186	191	186	181	187	189	187	186	186	234	182
Total Metals												
Aluminum, total	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.005
Antimony, total	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.0001	<0.0001
Arsenic, total	0.00054	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005
Barium, total	0.0627	0.0648	0.0701	0.0648	0.0646	0.0671	0.0666	0.0709	0.0710	0.0725	0.0659	0.0659
Boron, total	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.006	0.0464
Cadmium, total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0001	<0.0001
Calcium, total	44.8	43	46.8	44.4	49.5	49.3	48.9	50.6	51.7	50.0	44.6	44.5
Chromium, total	0.00069	0.0009	0.00069	0.00065	0.00075	0.00068	0.00069	0.00073	0.00077	0.00076	0.00082	0.00082
Cobalt, total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001
Copper, total	0.0307	0.0176	0.0174	0.0208	0.0131	0.0369	0.0439	0.0531	0.0184	0.0519	0.1446	0.0641
Iron, total	0.043	0.020	0.012	0.024	0.042	<0.010	0.023	0.011	0.013	<0.010	0.037	0.023
Lead, total	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.0002	<0.0002
Magnesium, total	8.5	9.25	8.32	7.84	8.88	8.35	8.66	8.60	8.93	8.65	8.20	8.28
Manganese, total	0.00093	0.00072	0.00020	0.00072	0.00035	<0.00020	0.00063	<0.00020	<0.00020	<0.00020	0.1895	0.0006
Mercury, total	<0.000040	<0.000040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010		<0.000010	<0.0004	<0.0004
Molybdenum, total	0.00746	0.00727	0.00756	0.00685	0.00712	0.00678	0.00683	0.00717	0.00711	0.00689	0.00760	0.00716
Nickel, total	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	0.00070	0.00043
Potassium, total	2.88	3.19	3.05	2.82	3.08	3	3.01	3.01	3.15	3.00	2.89	2.84
Selenium, total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005
Sodium, total	10.5	11.7	11.4	10.1	10.8	10.6	10.6	10.9	11.1	10.6	24.6	10.5
Strontium, total	0.390	0.394	0.435	0.394	0.435	0.455	0.438	0.460	0.461	0.434	0.409	0.416
Uranium, total	0.00884	0.0084	0.00874	0.00794	0.00884	0.00786	0.00848	0.00831	0.00891	0.00854	0.0089	0.0087
Zinc, total	0.0059	0.0062	0.0051	<0.0040	<0.0040	<0.0040	0.0106	0.00710	0.0109	0.0120	0.0066	0.0071

5.15 Source Water – Thirsk Reservoir

THIRSK	2020	2021	2022	2023	2024	2025	
Anions	**August**	**August**	**August**	**August**	**August**	**August**	**Average**
Chloride	0.71	0.56	0.51	0.74	0.77	0.89	0.70
Fluoride	0.14	0.11	<0.10	<0.10	<0.10	0.13	0.13
Nitrate (as N)	0.011	<0.010	<0.010	<0.010	<0.010	0.011	0.011
Nitrite (as N)	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	0.011
Sulfate	3.1	3.4	2.7	3.9	3.7	3.7	3.4
General Parameters							
Alkalinity, Total (as CaCO3)	43.6	40.2	42.2	45.5	36.4	38.5	41.1
Alkalinity, Phenolphthalein (as CaCO3)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Bicarbonate (as CaCO3)	43.6	40.2	42.2	45.5	36.4	38.5	41.1
Alkalinity, Carbonate (as CaCO3)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Colour, True	35	40	44	37	32	31	37
Conductivity (EC)	90.2	79.1	79.3	89.3	89.4	88.1	85.9
Cyanide, Total	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0024	<0.0020
pH	7.69	7.72	7.43	7.22	7.06	6.91	7.34
Temperature, at pH	21.7	22.9	22.4	22.9	23.2	21.1	22.4
Turbidity	6.05	3.75	1.22	3.16	2.68	4.62	3.58
Calculated Parameters							
Hardness, Total (as CaCO3)	37.5	36.6	35.7	40.9	39.4	37.5	37.9
Langlier Index	-1.1	-1.1	-1.5	-1.5	-1.8	-2	-1.5
Solids, Total Dissolved (calc)	47.8	45.9	45.7	51.6	45.1	45.9	47.0
Total Metals							
Aluminum, total	0.0631	0.140	0.0649	0.064	0.0695	0.0764	0.07965
Antimony, total	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Arsenic, total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Barium, total	0.0349	0.0350	0.0293	0.0319	0.0335	0.0345	0.0332
Boron, total	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
Cadmium, total	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	0.000011	0.000011
Calcium, total	11.7	11.0	11.4	12.8	12.6	12.0	11.9
Chromium, total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, total	0.00011	0.00010	0.00010	<0.00010	<0.00010	0.00011	0.00011
Copper, total	<0.00040	0.00185	0.00138	0.00139	0.00136	0.00125	0.00145
Iron, total	0.323	0.400	0.155	0.22	0.311	0.368	0.296
Lead, total	<0.00020	0.00025	<0.00020	<0.00020	<0.00020	<0.00020	0.00025
Magnesium, total	2.01	2.20	1.76	2.16	1.92	1.84	1.98
Manganese, total	0.08550	0.0860	0.0165	0.0459	0.0844	0.157	0.079
Mercury, total		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum, total	0.00187	0.00227	0.00183	0.00219	0.00214	0.00255	0.00214
Nickel, total	<0.00040	0.00046	<0.00040	<0.00040	<0.00040	<0.00040	0.00046
Potassium, total	1.01	1.10	0.97	1.27	1.1	1.02	1.08
Selenium, total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Sodium, total	2.63	3.09	2.64	2.96	2.84	2.91	2.85
Strontium, total	0.157	0.135	0.131	0.155	0.148	0.146	0.145
Uranium, total	0.000938	0.000750	0.000855	0.000768	0.0008	0.000694	0.0008
Zinc, total	<0.004	0.0044	<0.0040	<0.0040	<0.0040	<0.0040	0.0044

5.16 Source Water – Headwaters #1 Reservoir

HEADWATERS #1	2020	2021	2022	2023	2024	2025	
Anions	**August**	**August**	**August**	**August**	**August**	**August**	**Average**
Chloride	0.34	0.32	0.28	0.34	0.39	0.83	0.42
Fluoride	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrate (as N)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Nitrite (as N)	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	0.011
Sulfate	3.5	3.1	3.4	3.5	3.0	3.1	3.3
General Parameters							
Alkalinity, Total (as CaCO3)	48.3	52.8	56.4	53.4	45.1	50.4	51.1
Alkalinity, Phenolphthalein (as CaCO3)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Bicarbonate (as CaCO3)	48.3	52.8	56.4	53.4	45.1	50.4	51.1
Alkalinity, Carbonate (as CaCO3)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Colour, True	15	18	14	19	13	12	15
Conductivity (EC)	97.3	97.4	98.4	96.4	102	109	100.1
Cyanide, Total	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0021	<0.0020
pH	7.72	7.91	7.45	7.31	7.11	6.88	7.40
Temperature, at pH	21.6	22.9	21.9	23.1	23.0	21.0	22.3
Turbidity	1.85	2.59	1.06	1.97	2.2	3.41	2.18
Calculated Parameters							
Hardness, Total (as CaCO3)	43.4	46.2	43.1	45.9	46.4	49.6	45.8
Langlier Index	-0.9	-0.6	-1.3	-1.3	-1.5	-1.7	-1.2
Solids, Total Dissolved (calc)	52.9	56.7	57.6	57.4	52.1	57.9	55.8
Total Metals							
Aluminum, total	0.0131	0.0282	0.0175	0.011	0.0221	0.0147	0.0178
Antimony, total	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Arsenic, total	0.00053	0.00056	<0.00050	<0.00050	0.00053	0.00067	0.00057
Barium, total	0.0166	0.0173	0.0144	0.0157	0.017	0.0175	0.0164
Boron, total	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
Cadmium, total	<0.000010	<0.000010	<0.000010	<0.000010	0.000038	0.00149	0.00076
Calcium, total	14.6	15	14.6	15.5	15.5	16.8	15.3
Chromium, total	<0.00050	<0.00050	0.00069	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, total	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper, total	<0.00040	0.00059	0.00064	0.00047	0.00047	0.011	0.00263
Iron, total	0.203	0.182	0.065	0.15	0.233	0.243	0.179
Lead, total	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00022	<0.00020
Magnesium, total	1.68	2.07	1.60	1.72	1.85	1.87	1.80
Manganese, total	0.04440	0.036	0.00917	0.0298	0.0767	0.0405	0.0394
Mercury, total	0.00143	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum, total	<0.00040	0.0016	0.00150	0.00133	0.00145	0.0018	0.00154
Nickel, total		<0.00040	<0.00040	<0.00040	<0.00040	0.00099	<0.00040
Potassium, total	1.18	1.27	1.13	1.34	1.48	1.69	1.35
Selenium, total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Sodium, total	2.16	2.72	2.22	2.37	2.34	2.88	2.45
Strontium, total	0.0964	0.0925	0.0853	0.0897	0.0877	0.095	0.091
Uranium, total	0.000045	0.000046	0.000048	0.000045	0.000038	0.000047	0.000045
Zinc, total	<0.0040	<0.004	<0.0040	<0.0040	<0.0040	0.0221	<0.0040

5.17 Source Water – Isintok Reservoir

ISINTOK	2022	2023	2024	2025	
Anions	**August**	**August**	**August**	**August**	**Average**
Chloride	0.11	0.19	0.22	0.19	0.18
Fluoride	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrate (as N)	0.016	<0.010	<0.010	<0.010	0.016
Nitrite (as N)	<0.010	<0.010	<0.010	<0.010	<0.010
Sulfate	<1.0	<1.0	<1.0	<1.0	<1.0
General Parameters					
Alkalinity, Total (as CaCO3)	13.6	12.4	5.1	3.9	8.8
Alkalinity, Phenolphthalein (as CaCO3)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Bicarbonate (as CaCO3)	13.6	12.4	5.1	3.9	8.8
Alkalinity, Carbonate (as CaCO3)	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3)	<1.0	<1.0	<1.0	<1.0	<1.0
Colour, True	55	84	42	42	56
Conductivity (EC)	29.8	29.9	33.2	30.6	30.9
Cyanide, Total	<0.0020	0.0028	<0.0020	<0.0020	0.0028
pH	6.96	6.7	6.8	6.5	6.74
Temperature, at pH	21.8	23.5	22.9	21.8	22.5
Turbidity	1.73	3.71	1.16	1.86	2.12
Calculated Parameters					
Hardness, Total (as CaCO3)	12.6	11.0	11.3	10.6	11.4
Langlier Index	-2.9	-3.1	-3.4	-3.8	-3.3
Solids, Total Dissolved (calc)	15.5	14.2	10.2	8.95	12.2
Total Metals					
Aluminum, total	0.207	0.179	0.11	0.104	0.150
Antimony, total	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Arsenic, total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Barium, total	0.0109	0.0097	0.0074	0.0074	0.0089
Boron, total	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
Cadmium, total	<0.000010	<0.000010	0.000212	<0.000010	0.000212
Calcium, total	3.87	3.31	3.36	3.21	3.44
Chromium, total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, total	0.00015	0.00053	<0.00010	<0.00010	0.00034
Copper, total	0.00148	0.00172	0.00181	0.00146	0.00162
Iron, total	0.308	2.17	0.452	0.428	0.840
Lead, total	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Magnesium, total	0.71	0.652	0.706	0.634	0.676
Manganese, total	0.05940	0.1320	0.0191	0.0187	0.05730
Mercury, total	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum, total	0.00117	0.00116	0.00113	0.00101	0.00112
Nickel, total	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Potassium, total	0.79	0.82	0.9	0.67	0.80
Selenium, total	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Sodium, total	1.69	1.65	1.85	1.88	1.77
Strontium, total	0.0295	0.0269	0.0257	0.0235	0.0264
Uranium, total	0.000273	0.00023	0.000173	0.000184	0.00022
Zinc, total	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040

5.2 Chlorine Residual

Treated water is monitored continuously for free chlorine residual by on-line HACH or Prominent analyzers at the water treatment plant and throughout the distribution system. Cellular and radio alarms alert operators if residuals deviate from desired set points. To ensure output accuracy, chlorine analyzers are routinely calibrated and maintained.

As set out in the annual sample schedule, various sample points are tested for free chlorine residual weekly throughout the water distribution system. The HACH Pocket Colorimeter II is used to test chlorine residual, as it is both rugged and portable. The colorimeters are serviced and calibrated annually by a certified HACH technician for quality assurance.

There are eleven sampling locations throughout the distribution system with pump house #2 located at the beginning of the system and monitored daily. The rest of the sample sites are located between the middle and the ends of the distribution system.

5.3 Turbidity

5.31 Summerland Water System

Raw water is monitored continuously with a Hach Surface Scatter 7sc Turbidimeter and trended on a 24-hour basis. A grab sample is also collected daily and analyzed in house with the Hach 2100Q for comparison. The meter is calibrated monthly or as required based on the readings. In 2025, daily raw water grab samples for turbidity ranged from a low of 0.45_{NTU} on February 28th to a high of 4.75_{NTU} on August 2nd.

Recycled water is monitored continuously for turbidity with a Solitax sc turbidimeter and trended on SCADA. The turbidity for recycled water ranged from a low of 0.17_{NTU} during the month of January to a high of 7.01_{NTU} in February.

Treated water is monitored continuously with Hach 5300sc turbidimeters at the six filter outlets prior to the clearwell and trended on SCADA. The annual average turbidity of treated water leaving the water treatment plant to distribution was $0.024_{NTU.}$

In addition to the continuous on-line monitoring of treated water leaving the plant, daily grab samples from Pump House #2, the first point of distribution, ranged from a low of 0.07_{NTU} to a high of 0.45_{NTU} throughout the year. Turbidity is monitored daily in the distribution system with a portable HACH 2100Q and continuously with a Hach 5300 sc. Secondary standards are used to verify the accuracy of the meter. A certified HACH technician services and calibrates the meter annually for quality assurance.

5.32 Rodeo Water System

Rodeo Grounds turbidity is monitored weekly from the Lodge and/or the Kettle Valley Railway Station. Grab samples ranged from 0.15_{NTU} to 0.87_{NTU}.
During periods of very low demand, system flushing is required to replenish the well with fresh water.

5.4 Trihalomethanes & Haloacetic Acids

The DOS must complete a minimum sampling frequency of four samples per year in the water distribution system for total Trihalomethanes (THMs) and Haloacetic acids (HAAs).

Based on the Canadian Drinking Water Guideline for THMs, the maximum acceptable concentration (MAC) is 0.10mg/L, expressed as a running annual average of quarterly samples and the MAC for HAAs is 0.08mg/L.
Samples are collected from five locations throughout the distribution system. All samples were submitted to Caro Analytical for analysis. The annual average THM and HAA were all below the MAC.

Total Trihalomethane & Total Haloacetic Acid SUMMARY

	THMs, mg/L					
	MAC = 0.1mg/L					
DATE	***PH#6***	***PH #8***	***PH #2B***	***City Hall***	***PRV #9***	***PRV #17***
10-Feb-25	0.0661	0.0471	0.0665	0.0510	0.0510	0.0510
08-Apr-25	0.0728	0.0668			0.0619	0.0672
07-Jul-25	0.0754	0.0830			0.0869	0.0778
18-Nov-25	0.1010	0.0750			0.0963	0.0837
01-Dec-25	0.0949	0.0577	*Re-sampled PH#6 for THM >MAC			
Minimum	0.0467	0.0471	0.0665	0.0510	0.0510	0.0510
Maximum	0.1040	0.0830	0.0665	0.0510	0.0963	0.0837
Average	0.0716	0.0659	0.0665	0.0510	0.0740	0.0699
	***HAA5, mg/L**					
	MAC = 0.08mg/L					
DATE	***PH#6***	***PH #8***	***PH #2B***	***City Hall***	***PRV #9***	***PRV #17***
10-Feb-25	0.0443	0.0318	0.0448	0.0338	0.0338	0.0338
08-Apr-25	0.0411	0.0348			0.0403	0.0448
07-Jul-25	0.0354	0.0389			0.0418	0.0406
18-Nov-25	0.0569	0.0434			0.0534	0.0539
Minimum	0.0205	0.0318	0.0448	0.0338	0.0338	0.0338
Maximum	0.0721	0.0434	0.0448	0.0338	0.0534	0.0539
Average	0.0443	0.0372	0.0448	0.0338	0.0423	0.0433

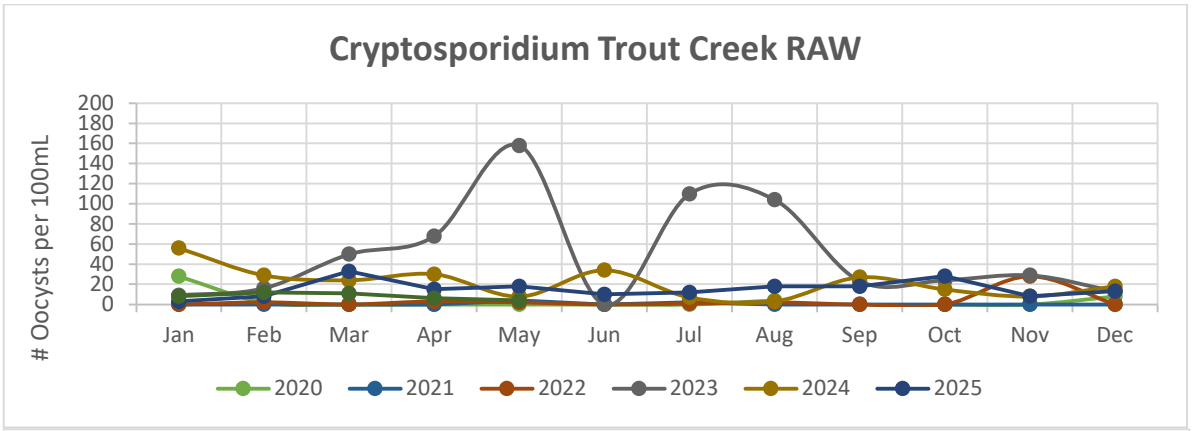
Haloacetic acids five (HAA5) refer to the five haloacetic acids most commonly found in drinking water consisting of monochloroacetic acid, dichloroacetic acid (DCA), trichloroacetic acid (TCA), monobromoacetic acid, and dibromoacetic acid

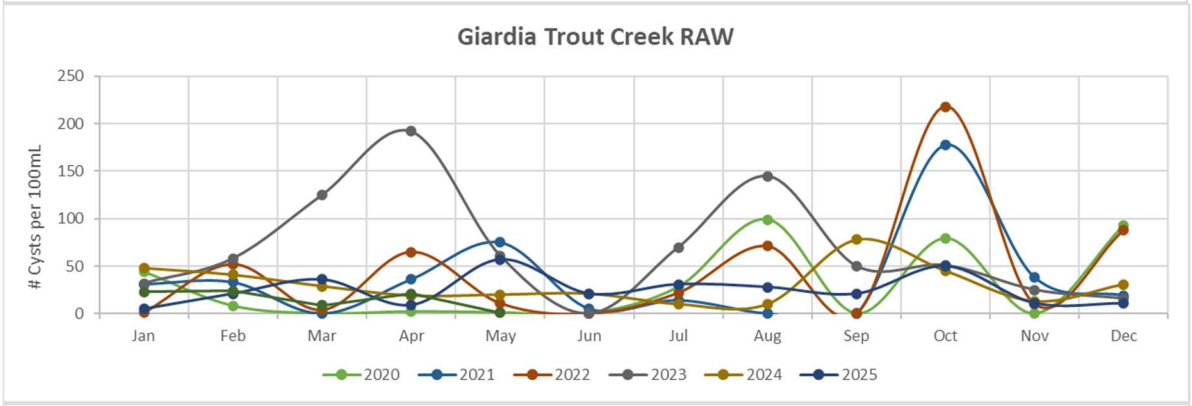
5.5 Cryptosporidium and Giardia

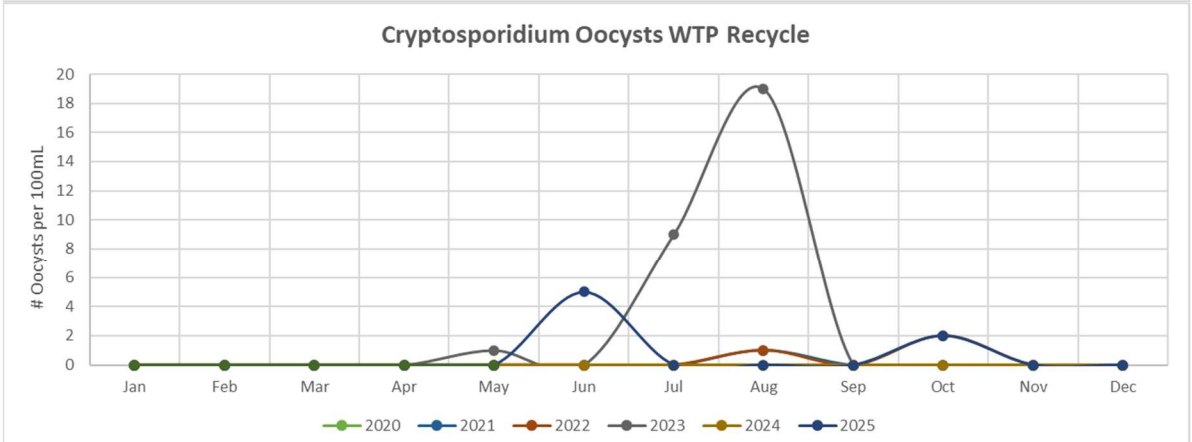
Cryptosporidium and Giardia performance monitoring locations include raw water and recycled wastewater supernatant. Raw water is collected directly from the piping to the raw water tank and is thoroughly flushed prior to sample collection. Recycled supernatant is collected from the piping from the settling ponds and also thoroughly flushed prior to sample collection.

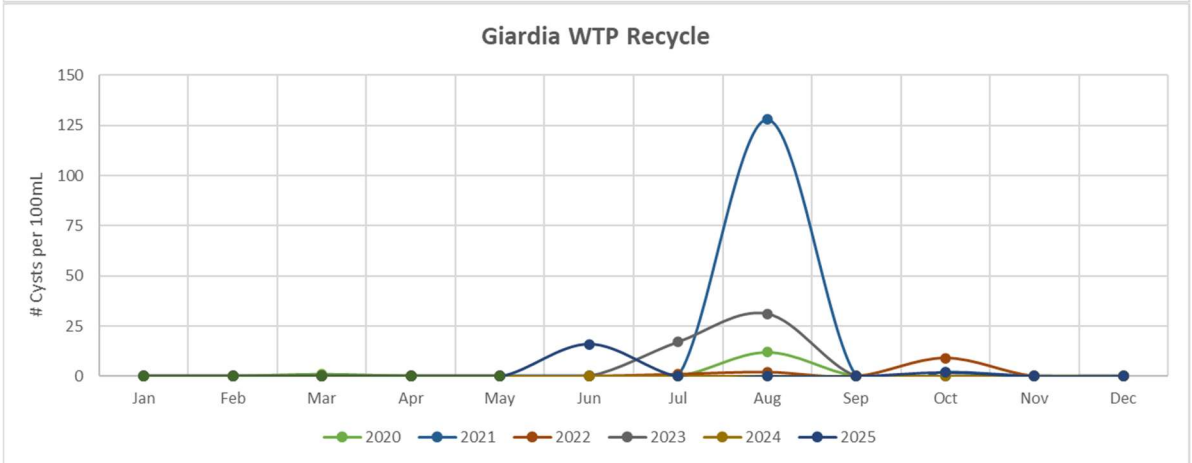
The following data includes the reported count per 100L volume of water.

Cryptosporidium & Giardia Data			
Analysis conducted through Caro Analytical Services by a third party lab, IG Micromed			
	WTP Recycle		
2025	Sample Volume, L	Cryptosporidium species, # Oocysts per 100L	Giardia species, # Cysts per 100L
January	100	0	0
February	100	0	0
March	100	0	0
April	100	0	0
May	100	0	0
June	100	5	16
July	100	0	0
August	100	0	0
September	100	0	0
October	100	2	2
November	100	0	0
December	100	0	0
**Lab results that are reported as <1 are entered as 0 for data analysis*			
Minimum	100	0	0
Maximum	100	5	16
Average	100	1	2
	Trout Creek Raw		
2025	Sample Volume, L	Cryptosporidium species, # Oocysts per 100L	Giardia species, # Cysts per 100L
January	100	3	5
February	100	8	21
March	100	33	36
April	100	15	9
May	100	18	57
June	100	10	21
July	100	12	31
August	100	18	28
September	100	18	21
October	100	28	50
November	100	8	11
December	100	13	11
**Lab results that are reported as <1 are entered as 0 for data analysis*			
Minimum	100	3	5
Maximum	100	33	57
Average	100	15	25


Cryptosporidium Trout Creek RAW
Oocysts per 100mL
200
180
160
140
120
100
80
60
40
20
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
2020
2021
2022
2023
2024
2025


Giardia Trout Creek RAW
Cysts per 100mL
250
200
150
100
50
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
2020
2021
2022
2023
2024
2025


Cryptosporidium Oocysts WTP Recycle
Oocysts per 100mL
20
18
16
14
12
10
8
6
4
2
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
2020
2021
2022
2023
2024
2025


Giardia WTP Recycle
Cysts per 100mL
150
125
100
75
50
25
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
2020
2021
2022
2023
2024
2025

5.6 Gross Alpha & Beta

To assess the level of radionuclides in drinking water, raw water samples are submitted annually to Caro Analytical Services for analysis of gross alpha and beta. The tests are cost-effective screening tools used to determine whether further isotope-specific analysis for radium or uranium is necessary.
Samples from both drinking water systems were collected at the source.

5.61 Summerland Water System

Radioactivity Parameters	MAC	Method	Unit	2021	2022	2023	2024	2025	Average	Minimum	Maximum	Number of Samples	Number of Results with Exceedances
Gross Alpha Activity	0.5	SM 7110 (2021) Radioactivity Counter	Bq/L	0.40	<0.04	<0.04	<0.04	0.05	0.23	<0.04	0.40	1	0
Gross Beta Activity	1	SM 7110 (2021) Radioactivity Counter	Bq/L	0.15	0.08	0.08	0.08	0.06	0.09	0.06	0.15	1	0

5.62 Rodeo Water System

Radioactivity Parameters	MAC	Method	Unit	2021	2022	2023	2024	2025	Average	Minimum	Maximum	Number of Samples	Number of Results with Exceedances
Gross Alpha Activity	0.5	SM 7110 (2021) Radioactivity Counter	Bq/L	0.19	<0.10	0.29	0.12	0.20	0.20	0.12	0.29	1	0
Gross Beta Activity	1	SM 7110 (2021) Radioactivity Counter	Bq/L	0.12	0.08	0.18	0.15	0.20	0.15	0.08	0.20	1	0

5.7 Algae

Algae can be an indicator of water quality issues that may affect water treatment processes, including filter clogging. Algal blooms can also cause water discolouration and produce unpleasant tastes and odours. As a proactive monitoring measure, water samples were collected during late summer, when phytoplankton production is typically at its seasonal peak, from five locations; Thirsk, Headwaters #1, Isintok, Summerland reservoirs and Trout Creek. All samples were submitted to Larratt Aquatic Consulting Ltd. for phytoplankton analysis.

Watershed samples were collected during the second week of August, with an additional sample collected from Thirsk Reservoir in October to assess seasonal changes.

Thirsk Reservoir exhibited the highest algal abundance among the reservoirs sampled. The August sample contained moderate to high total algal densities (12,287 cells/mL), while the October sample showed a marked seasonal decline to 1,600 cells/mL. Diatoms consistently dominated the phytoplankton community, accounting for more than 85% of total cell abundance, with cyanobacteria and green algae present only as minor components. The October results reflected the expected post-summer decline in phytoplankton productivity, indicating a recurring pattern of late-summer diatom blooms followed by autumn decreases.

The Summerland Reservoir sample also consisted primarily of diatoms, with smaller proportions of cyanobacteria and dinoflagellates. Cyanobacterial densities remained well below the cyanotoxicity warning threshold of 2,000 cells/mL, indicating a negligible risk of cyanotoxin production.

Water treatment plant (WTP) recycle samples contained lower overall phytoplankton densities but greater taxonomic diversity than the source water samples. These samples showed higher proportions of green algae, cyanobacteria, and flagellates, reflecting changes in community composition associated with the treatment process rather than differences in watershed conditions.

The highest algal densities recorded in Trout Creek samples to date occurred in 2025, with Dinobryon and Stichogloea as the dominant taxa. Although these genera can contribute to taste and odour issues and present operational challenges for drinking water treatment, the observed cell densities remained well below levels of concern for treatment performance or public health.

Across all sampling locations, peak algal abundance occurred in August, consistent with seasonal increases in water temperature, thermal stratification, and nutrient availability.

Overall, the monitoring results indicate that all reservoirs remain at low risk for cyanotoxin production. While elevated algal productivity during late summer may create occasional operational challenges, particularly related to treatment performance and aesthetics, cyanobacterial densities remained well below levels of concern. In addition, the areas where higher algal abundances were observed are located a considerable distance upstream of the drinking water intake, allowing for dilution and natural degradation of cyanobacteria and any associated toxins before reaching the treatment system.

No public health risks were identified from the 2025 Summerland Reservoir or Trout Creek intake samples.

6.0 Annual Water Consumption

Gravity fed water from the Summerland reservoir supplies both the water treatment plant and the non-potable irrigation system. Two water meters located inside the building below the reservoir register daily consumption. The combined volume was approximately 8,663ML in 2025 with the minimum day demand on February 8th and December 26th at 2.273MLD and the maximum day demand on July 8th at 81.925MLD.

7.0 Water Quality Events

In 2025, the District responded to three emergency water main breaks. Response protocols prioritize maintaining positive pressure within the water distribution system to protect against potential contamination and ensure the continued delivery of safe drinking water.

Maintaining water quality within the distribution system continued to present challenges, particularly in balancing preventative maintenance activities with achieving infrastructure repair and replacement targets. The District allocates annual funding to support the replacement of aging water infrastructure, helping to improve system reliability, reduce the likelihood of future water main failures, and maintain water quality standards.

7.1 Summerland Water System

A water main break occurred at 05:30, February 8th on Washington Avenue. It was determined that positive pressure was maintained and a boil water notice (BWN) was not necessary for the area. A section of the mainline was repaired as per AWWA protocol and water was restored by 11am.

A 12" water main break occurred May 16th on Prairie Valley Rd. It was determined positive pressure was maintained and a boil water notice (BWN) was not necessary for the area affecting 75 properties. A section of the mainline was repaired as per AWWA protocol and water was restored by 6pm.

A 10" water main break occurred October 15th at 7:30am on Victoria Road. It was determined positive pressure was maintained and a boil water notice (BWN) was not necessary for the area affecting approximately 110 properties. A section of the mainline was repaired as per AWWA protocol.

8.0 System Shortfalls and Problems

8.1 Summerland Water System

The large, multi-use watershed is home to cattle farming, forestry practices and numerous recreational activities. The District continues to work with the appropriate groups such as the Penticton Indian Band and the Ministry of Environment and Parks towards production of a Source Protection Plan. The watershed is also subject to flooding, wildfires and drought conditions.

A major shortfall at the Water Treatment Plant (WTP) is its limited treated water storage capacity. This places additional stress on operators and significantly increases the risk of a district-wide Boil Water Notice (BWN) if critical equipment fails. During peak summer demand, the WTP clearwell can be depleted to critical levels in as little as 45 minutes. In addition, periods of high water demand can exceed the treatment plant's capacity, requiring the supplemental supply line to open and allowing partially treated water to enter the distribution system in an emergency.

To further reduce this risk, the District is continuing its program to separate potable water distribution mains from irrigation-only mains. The system separation study was partially completed in 2025, with the remaining work continuing through 2026.

8.2 Rodeo Water System

The Rodeo well is subject to low demand from late fall through early spring when the facility is at its lowest annual occupation rate. During this time, there is an increase in turbidity as well as iron concentration resulting in the potential for iron-forming bacteria. A continuously flowing flush line on the Lodge water connection continues to keep the well water turning over during the off-season low demand.

9.0 Capital Works Plan

9.1 Completed Projects in 2025

Water Treatment Plant

- Pump Replacements and Upgrades – partially completed. Carried forward to 2026.
- Lamella Replacements – first train

Watershed

- Isintok Dam Spillway – Construction
- Source Water Protection Plan – partially completed. Carried forward to 2026.
- Thirsk Dam Safety Improvements - partially completed. Carried forward to 2026.
- Headwaters #1 Dam Safety Upgrades - partially completed. Carried forward to 2026.

Water Distribution System

- Domestic second services – meter installations
- Prairie Valley Road Watermain replacement (Morrow to Cartwright)
- Parkdale Housing (13609 Dickson Ave) offsite improvements
- System separation Study – Partially completed, carried forward to 2026.
- Neptune MRX920 mobile data collector (meter reader)
- Cathodic Protection Upgrades
- PRV #8 Above ground upgrade – Design

9.2 Anticipated Capital Projects for 2026

Water Treatment Plant

- Forklift replacement
- Lamella Replacements – second train
- Chlorine gas to Sodium hypochlorite conversion
- Mixer re-builds

Watershed

- Source Water Protection Plan
- Thirsk Dam Safety Improvements
- Garnett Dam Safety Upgrades - Design
- Headwaters #1 Dam Safety Upgrades – Design
- Dam Safety Review – Eneas and Tsuh
- Forklift replacement

Water Distribution System

- South Victoria Road System Separation Upgrade
- Dale Meadows water main replacement

- Garnet Ave Watermain - Design
- System Separation Study
- Water Supply Intake & Conveyance Upgrades (Flume) Design/Upgrade. Grant dependent.
- PRV #7 Above ground upgrade – Construction
- Cathodic Protection Upgrades
- Henry Avenue/Jubilee Rd West Watermain Replacement

9.3 Future Capital Projects

The following is a projection of future capital projects over the next five years:

Project	2027	2028	2029	2030	2031
WTP Controls Upgrade – Design and Construction	X	X	X		
Cathodic Protection Upgrades	X				
Henry Avenue/Jubilee Road West Watermain Replacement	X				
Crescent Dam Outlet & Spillway – Design & Construction			X	X	
Water Supply Intake and Conveyance Upgrades – Flume Construction (Grant Dependent)	X	X	X		
Garnet Dam Safety Upgrades	X				
Matsu Rd Water Main Replacement			X	X	
Thirsk Dam Crack Remediation	X				
PRV Above Ground Upgrades	X	X	X	X	X
Headwaters #1 Dam Safety Upgrades – Design & Construction	X	X			
Garnet Ave Watermain Upgrade	X				
Giants Head Upstream Water Separation - Design and Construction			X	X	
Dam Safety Reviews for Required Dams (Cresc, WH, Tsuh, Eneas…2/yr)		X			
Drought Response Plan Update	X				
Pumphouse Electrical Instrumentation & Gensets	X				
Hespeler Road Watermain		X	X		

Front Bench Rd Watermain		X	X		
Headwaters 3 Dam Safety Upgrades			X		

10.0 Emergency Response Plan

The DOS Water division Emergency Response Plan is updated regularly and available for viewing at the Public Works office. An electronic copy is also available on the District of Summerland website.

11.0 Cross Connection Control (CCC)

The District has a certified CCC backflow assembly tester / surveyor on staff who tests all municipally owned backflow assemblies. The town currently tests and tracks approximately 65 backflow assembly devices located on District owned and/or operated facilities. The District also currently tracks 421 backflow assemblies in our backflow management program.

11.1 CCC Water Utilities Bylaw No. 2014-019

A bylaw is in place to ensure the installation of Approved Backflow Preventers in all new construction. The District of Summerland retained MTS Inc. again in 2025 to continue work in conjunction with the District's Certified Backflow Prevention Device Tester to ensure appropriate CCC services. All new houses and construction projects in the District are reviewed to ensure appropriate backflow protection is installed.

12.0 Supervisory Control and Data Acquisition (SCADA)

The Summerland water system utilizes a SCADA system for gathering and analyzing real time data. The data collected is used to monitor and control the plant processes, detect and correct problems, and measure trends over time. Trending is then utilized to maintain efficiency, process data and communicate system issues to prevent unnecessary operational downtime.

The components of the SCADA system include sensors and control relays, Remote Telemetry Units (RTUs), a SCADA master unit, and the communication network. The system includes input and output signal hardware, networks, a Human-Machine Interface (HMI), controllers, communication, a database, and software.

Most of the control functions performed by the SCADA system are done automatically by two types of devices, either RTUs or Programmable Logic Controllers (PLCs). Data such as equipment status, meter readings and alarm status are collected at the RTU or PLC level.

The HMI serves as the master station that communicates the process status and alarm information collected along the SCADA system to the human operator. The pieces of data from the system are gathered into this one place, saving operators from manually combining polled data from individual points.

Operators are able to view any system alarms and information through the HMI, and make educated decisions based on the readings. The system is equipped with control functions so signals can be sent back to the RTUs to execute certain actions.

12.1 SCADA Updates

The following updates occurred in 2025:

- Pump House #3 Ewon installed
- Isintok and Thirsk Dam telemetry upgraded alarming capability including reservoir levels and temperature
- PH#6 replacement winter pump and VFD

12.2 Future SCADA Updates

- Design for the PLC and SCADA upgrades at the WTP was nominally completed in mid-2023. Construction has been postponed until 2028.
- PRV #7 telemetry upgraded alarming capability including pressure, flow and temperature.
- PH#1, PH#2A, PH#3 replacement flow meters.