DISTRICT OF SUMMERLAND

2024 Drinking Water Quality Annual Report

Facility No. 14-105-00001

June 27, 2025

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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 square kilometer 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 remove 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.

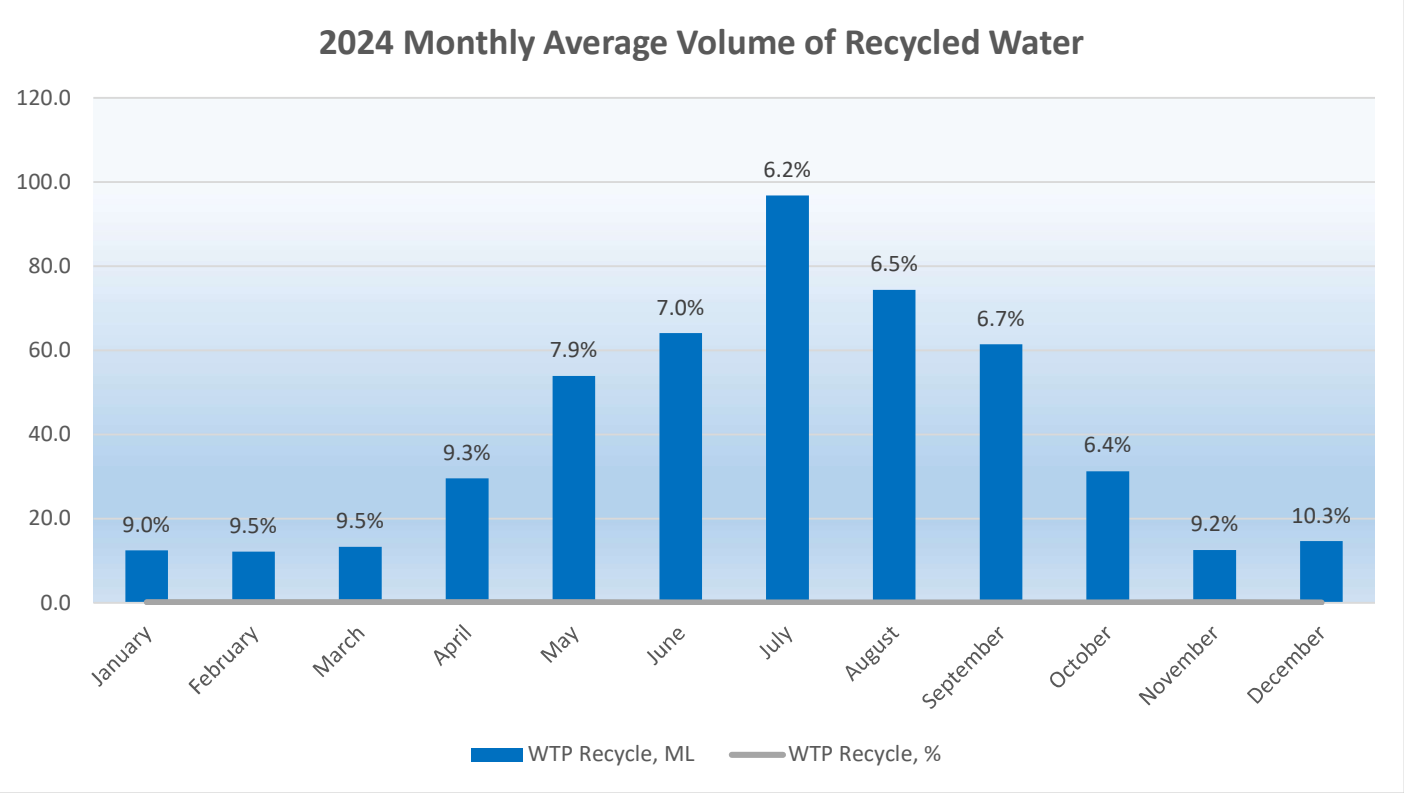
An additional phase of separation occurred during the Garnett Valley upgrade in 2017 (see section 1.2 for more details). The irrigation "only" line from Garnett Dam was extended east up Jones Flat Road where the irrigation connections were removed from the Summerland potable water supply and connected 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 76MLD. 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 that are 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 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. Lab results for recycled water indicates significantly better water quality characteristics than that of the raw water from Trout Creek.

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.

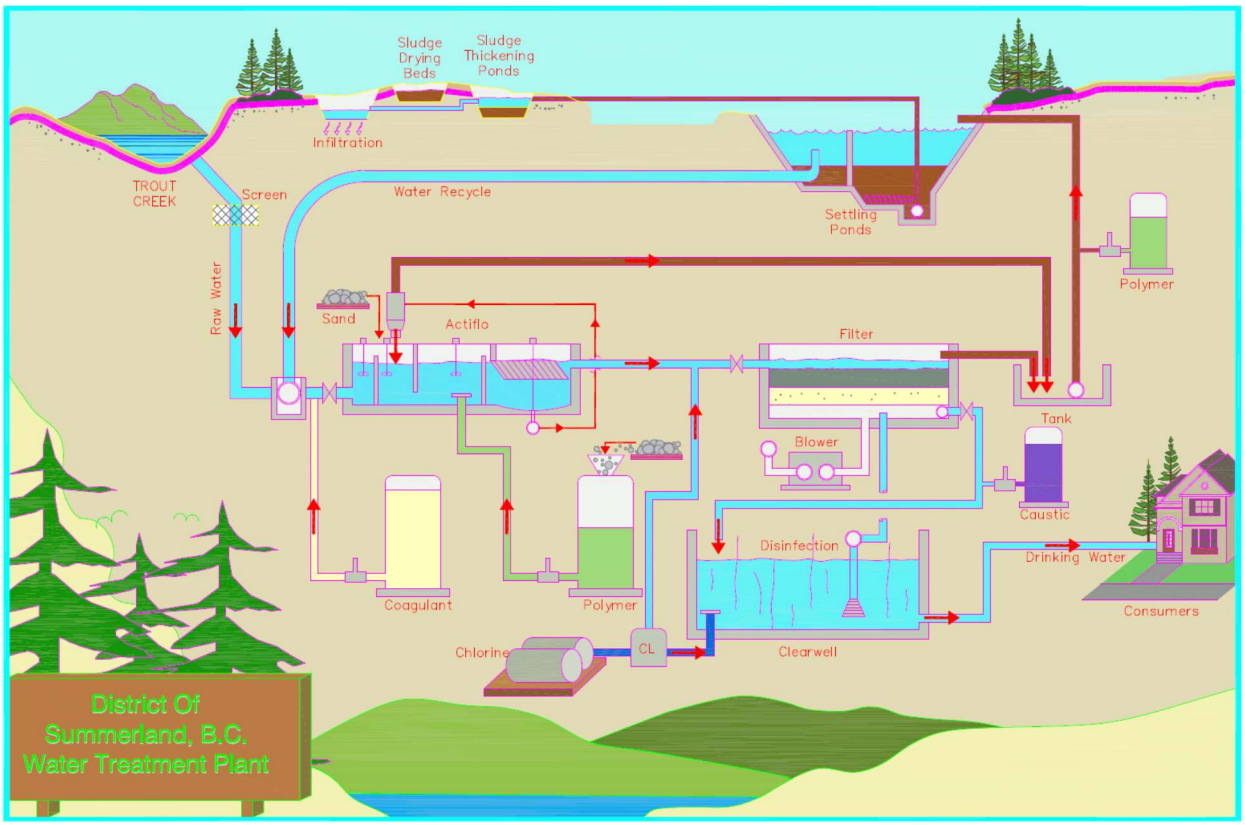


Figure 1 – Water Treatment Plant Schematic

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 named TW_3 and TW_5, installed on the Summerland Rodeo Grounds property in 2003, serve as an emergency supplemental water source when flows from Trout Creek are insufficient to meet system demands. The relatively minor combined output of TW_3 and TW_5 was determined to be 66LPS (liters per second). Supplemental well water was not required in 2024.

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 255LPM (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			
9357			X		X			
1439			X				X	
156247			X				X	

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

3.0 Source Sampling

Summerland's watersheds combined encompasses approximately 815 square kilometers. Within this boundary, the DOS owns and operates 12 water storage reservoirs as shown in Figure 2. Various other lakes and tributaries also contribute to the water supply on a seasonal basis. Due to the size and layout of the watershed, source sampling is limited. The Summerland Reservoir is located approximately 300m east, and hydraulically down gradient of the Summerland Landfill. Due to this proximity, additional sampling is a requirement of the Summerland Landfill Operating Certificate MR15275, issued under the provisions of the Environmental Management Act. Sample collection from specified monitoring wells

and the Summerland reservoir is scheduled quarterly. Samples are submitted to ALS Environmental Lab in Burnaby for analysis.
In addition to analysis of various parameters, water levels are recorded from 18 monitoring wells and the Summerland Reservoir on a bi-weekly to monthly basis. Atkins Realis Canada Inc. presented the data in the 2024 DOS Landfill Annual Environmental and Water Quality Report. In summary of this report, the Landfill leachate did not negatively affect water quality in the Summerland Reservoir.

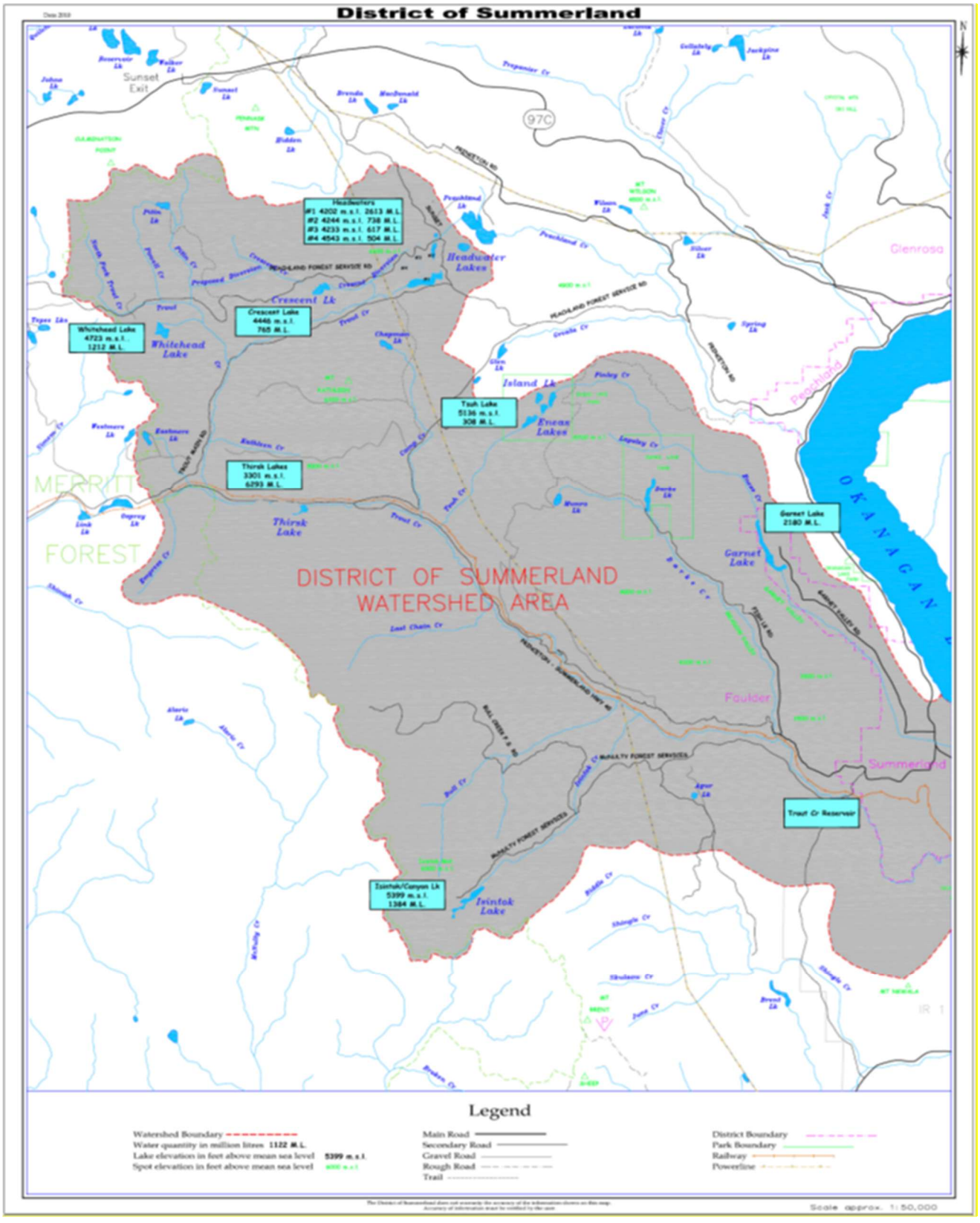


Figure 2 - District of Summerland Watershed Map

3.1 Sample Schedules

A sample schedule is used as a guideline for sampling events throughout the year. The following tables indicate the location and approximate timing for sample collection. Depending on the type of analysis, these locations may vary from source water before treatment to locations ranging from the first consumer to the distribution system ends.

3.11 Summerland Water System – 2024 Sample Schedule

Summerland System	**LAB**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**
Comprehensive - Distribution 1. Pump House #6 ***Include TOC AND Asbestos***	CARO Kelowna				SA				SA				
Comprehensive - Pretreatment 1. Summerland Reservoir Raw at WTP lab tap **2.** Raw sample at Intake	CARO Kelowna				SA				SA				
Gross Alpha & Beta Trout Creek Raw	CARO Kelowna									A			
PFAS – Polyfluoroalkyl Trout Creek Raw & PH#6	CARO Kelowna												
Comprehensive – Watershed Headwaters #1 Outlet, Thirsk Outlet, Trout Creek Raw at Intake, Isintok Outlet. *Include TOC, Total P, Total dissolved P, TKN, Total Ammonia as N.*	CARO Kelowna								A				
Algae - Watershed Headwaters #1 Outlet, Thirsk Outlet, Summerland Reservoir Raw at WTP Lab tap.	CARO Kelowna								A				
Algae – Pretreatment/Watershed Summerland Reservoir Raw at WTP Lab tap (quarterly through 2023 then adjust accordingly)	CARO Kelowna				Q		Q		Q			Q	
Lead & Copper – Distribution First Draw & Plus 5min One location in Distribution	CARO Kelowna			SA				SA					
E.coli Trout Creek, (Up&Dn Stream of Dark Creek inflow) Dark Creek (Above & Below Cattleguard & Mailboxes)	CARO Kelowna					**SA**		**SA**					
THMs Pump House #6 and GV Cattleguard	CARO Kelowna	Q			Q			Q			Q		
HAAs Pump House #6 and GV Cattleguard	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

Total coliforms and E. coli 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 – 2024 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
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
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

***W – WEEKLY D – DAILY**

3.13 Rodeo Water System – 2024 Sample Schedule

Rodeo System	LAB	January	February	March	April	May	June	July	August	September	October	November	December
Comprehensive Lodge	CARO Kelowna				S A				S A				
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

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. An average of four samples are collected weekly that are shipped to Caro Analytical. The DOS also has the ability for in-house samples processed by the IDEXX Colilert P/A system for back up capabilities.

Two hundred and ten bacteriological samples were collected from the Summerland water system throughout the year. Two treated water samples were shown to contain 1 Total Coliform and <1 *E-coli*. These two locations were immediately resampled and both were negative for 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	210	2
E.coli	Not Detectable	Membrane Filtration / Chromocult Agar	cfu/100mL	<1	<1	<1	210	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-four samples collected from the Summerland Rodeo Grounds water system in 2024. One treated water sample was shown to have 2 Total Coliforms and <1 *E-coli.* Two locations were immediately resampled and both were negative for 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	54	1
E.coli	Not Detectable	Membrane Filtration / Chromocult Agar	cfu/100mL	<1	<1	<1	54	0

5.0 Additional Water Quality Information

5.1 Comprehensive Summary

Comprehensive water analyses was performed on both water systems in the spring and fall of 2024 to ensure compliance with the Guidelines for Canadian Drinking Water Quality (GCDWQ). Parameters of a comprehensive analysis include metals, nutrients, bacteria, anions, and aesthetic objectives including colour, taste and odour. 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

Caro Analytical Services - Lab Summary
Summerland System - Trout Creek Raw

Month/Year	April 2024	August 2024	MRL	GCDWQ	Units
Anions					
Chloride	4.01	0.98	0.10	AO ≤ 250	mg/L
Fluoride	0.10	<0.10	0.10	MAC = 1.5	mg/L
Nitrate (as N)	<0.010	<0.010	0.010	MAC = 10	mg/L
Nitrite (as N)	<0.010	<0.010	0.010	MAC = 1	mg/L
Sulfate	10.4	3.6	1.0	AO ≤ 500	mg/L
General Parameters					
Alkalinity, Total (as CaCO3)	89.5	39.3	1.0	N/A	mg/L
Alkalinity, Phenolphthalein (as CaCO3)	<1.0	<1.0	1.0	N/A	mg/L
Alkalinity, Bicarbonate (as CaCO3)	89.5	39.3	1.0	N/A	mg/L
Alkalinity, Carbonate (as CaCO3)	<1.0	<1.0	1.0	N/A	mg/L
Alkalinity, Hydroxide (as CaCO3)	<1.0	<1.0	1.0	N/A	mg/L
Colour, True	<5.0	30	5.0	AO ≤ 15	CU
Conductivity (EC)	173	84.4	2.0	N/A	µS/cm
Cyanide, Total	<0.0020	<0.0020	0.0020	MAC = 0.2	mg/L
pH	6.91	6.51	0.10	7-10.5	pH units
Temperature, at pH	21.6	22.6	N/A	N/A	°C
Turbidity	0.61	1.28	0.10	OG <1	NTU
Calculated Parameters					
Hardness, Total (as CaCO3)	76.4	36.2	0.500	N/A	mg/L
Langlier Index	-1.3	-2.3	-5.0	N/A	-
Solids, Total Dissolved (calc)	104	46.0	1.00	AO ≤ 500	mg/L
Total Metals					
Aluminum, total	0.0094	0.0579	0.0050	OG <0.1	mg/L
Antimony, total	<0.00020	<0.00020	0.00020	MAC = 0.006	mg/L
Arsenic, total	<0.00050	<0.00050	0.00050	MAC = 0.01	mg/L
Barium, total	0.0435	0.0265	0.0050	MAC = 2	mg/L
Boron, total	<0.0500	<0.0500	0.0050	MAC = 5	mg/L
Cadmium, total	<0.000010	<0.000010	0.000010	MAC = 0.007	mg/L
Calcium, total	23.2	11.4	0.20	N/A	mg/L
Chromium, total	<0.00050	<0.00050	0.00050	MAC = 0.05	mg/L
Cobalt, total	<0.00010	<0.00010	0.00010	N/A	mg/L
Copper, total	0.00129	0.00161	0.00040	MAC = 2	mg/L
Iron, total	0.053	0.174	0.010	AO ≤ 0.3	mg/L
Lead, total	<0.00020	<0.00020	0.00020	MAC = 0.005	mg/L
Magnesium, total	4.46	1.85	0.010	N/A	mg/L
Manganese, total	0.00655	0.0196	0.00020	MAC = 0.12	mg/L
Mercury, total	<0.000010	<0.000010	0.000010	MAC = 0.001	mg/L
Molybdenum, total	0.00355	0.00229	0.00010	N/A	mg/L
Nickel, total	<0.00040	<0.00040	0.00040	N/A	mg/L
Potassium, total	1.55	1.14	0.10	N/A	mg/L
Selenium, total	<0.00050	<0.00050	0.00050	MAC = 0.05	mg/L
Sodium, total	5.31	3.00	0.10	AO ≤ 200	mg/L
Strontium, total	0.322	0.160	0.0010	MAC = 7	mg/L
Uranium, total	0.00457	0.000765	0.000020	MAC = 0.02	mg/L
Zinc, total	<0.0040	<0.0040	0.0040	AO ≤ 5	mg/L

5.12 Summerland Water System – Pump House #6

Caro Analytical Services - Lab Summary
Summerland System - Pump House #6

Month/Year	April 2024	August 2024	MRL	GCDWQ	Units
Anions					
Chloride	14.7	14.5	0.10	AO ≤ 250	mg/L
Fluoride	<0.10	<0.10	0.10	MAC = 1.5	mg/L
Nitrate (as N)	<0.010	<0.010	0.010	MAC = 10	mg/L
Nitrite (as N)	<0.010	<0.010	0.010	MAC = 1	mg/L
Sulfate	10.2	3.7	1.0	AO ≤ 500	mg/L
General Parameters					
Alkalinity, Total (as CaCO3)	84.2	42.8	1.0	N/A	mg/L
Alkalinity, Phenolphthalein (as CaCO3)	<1.0	<1.0	1.0	N/A	mg/L
Alkalinity, Bicarbonate (as CaCO3)	84.2	42.8	1.0	N/A	mg/L
Alkalinity, Carbonate (as CaCO3)	<1.0	<1.0	1.0	N/A	mg/L
Alkalinity, Hydroxide (as CaCO3)	<1.0	<1.0	1.0	N/A	mg/L
Carbon, Total Organic	N/A	3.65	0.50	N/A	mg/L
Colour, True	<5.0	<5.0	5.0	AO ≤ 15	CU
Conductivity (EC)	203	133	2.0	N/A	µS/cm
Cyanide, Total	<0.0020	<0.0020	0.0020	MAC = 0.2	mg/L
pH	7.42	7.39	0.10	7-10.5	pH units
Temperature, at pH	21.6	22.5		N/A	°C
Turbidity	<0.10	<0.10	0.10	OG <0.1	NTU
Calculated Parameters					
Total Trihalomethanes	0.0631	0.0606	0.00400	MAC = 0.1	mg/L
Hardness, Total (as CaCO3)	80.3	35.6	0.500	N/A	mg/L
Langlier Index	-0.8	-1.4	-5.0	N/A	-
Solids, Total Dissolved (calc)	119	70.5	1.00	N/A	mg/L
Total Metals					
Aluminum, total	0.0184	0.0276	0.0050	OG <0.1	mg/L
Antimony, total	<0.00020	<0.00020	0.00020	MAC = 0.006	mg/L
Arsenic, total	<0.00050	<0.00050	0.00050	MAC = 0.01	mg/L
Barium, total	0.0437	0.0249	0.0050	MAC = 1	mg/L
Boron, total	<0.0500	<0.0500	0.0050	MAC = 5	mg/L
Cadmium, total	<0.000010	<0.000010	0.000010	MAC = 0.005	mg/L
Calcium, total	25.0	11.2	0.20	N/A	mg/L
Chromium, total	<0.00050	<0.00050	0.00050	MAC = 0.05	mg/L
Cobalt, total	<0.00010	<0.00010	0.00010	N/A	mg/L
Copper, total	0.00073	0.00089	0.00040	MAC = 2	mg/L
Iron, total	<0.010	<0.010	0.010	AO ≤ 0.3	mg/L
Lead, total	<0.00020	<0.00020	0.00020	MAC = 0.01	mg/L
Magnesium, total	4.34	1.83	0.010	N/A	mg/L
Manganese, total	0.00063	0.00104	0.00020	AO ≤ 0.05	mg/L
Mercury, total	<0.000010	<0.000010	0.000010	MAC = 0.001	mg/L
Molybdenum, total	0.00381	0.00222	0.00010	N/A	mg/L
Nickel, total	<0.00040	<0.00040	0.00040	N/A	mg/L
Potassium, total	1.63	1.12	0.10	N/A	mg/L
Selenium, total	<0.00050	<0.00050	0.00050	MAC = 0.05	mg/L
Sodium, total	11.9	12.0	0.10	AO ≤ 200	mg/L
Strontium, total	0.333	0.157	0.0010	N/A	mg/L
Uranium, total	0.00135	0.000055	0.000020	MAC = 0.02	mg/L
Zinc, total	<0.0040	<0.0040	0.0040	AO ≤ 5	mg/L
Volatile Organic Compounds (VOC)					
Bromodichloromethane	0.0122	0.0027	0.0010	N/A	mg/L
Bromoform	<0.0010	<0.0010	0.0010	N/A	mg/L
Chloroform	0.0490	0.0579	0.0010	N/A	mg/L
Dibromochloromethane	0.0020	<0.0010	0.0010	N/A	mg/L
Surrogate: Toluene-d8	102	78	70-130%	N/A	%
Surrogate: 4-Bromofluorobenzene	100	73	70-130%	N/A	%

5.13 Rodeo Water System

Caro Analytical Services - Lab Summary

Rodeo System - Lodge

Month/Year	April 2 2024	August 6 2024	MRL	GCDWQ	Units
Anions					
Chloride	2.73	2.89	0.10	AO ≤ 250	mg/L
Fluoride	0.15	0.14	0.10	MAC = 1.5	mg/L
Nitrate (as N)	0.308	0.306	0.010	MAC = 10	mg/L
Nitrite (as N)	<0.010	<0.010	0.010	MAC = 1	mg/L
Sulfate	10.7	11.1	1.0	AO ≤ 500	mg/L
General Parameters					
Alkalinity, Total (as CaCO3)	169	162	1.0	N/A	mg/L
Alkalinity, Phenolphthalein (as CaCO3)	<1.0	<1.0	1.0	N/A	mg/L
Alkalinity, Bicarbonate (as CaCO3)	169	162	1.0	N/A	mg/L
Alkalinity, Carbonate (as CaCO3)	<1.0	<1.0	1.0	N/A	mg/L
Alkalinity, Hydroxide (as CaCO3)	<1.0	<1.0	1.0	N/A	mg/L
Colour, True	<5.0	<5.0	5.0	AO ≤ 15	CU
Conductivity (EC)	334	343	2.0	N/A	µS/cm
Cyanide, Total	<0.0020	<0.0020	0.0020	MAC = 0.2	mg/L
pH	7.64	7.38	0.10	7-10.5	pH units
Temperature, at pH	21.6	22.4	N/A	N/A	℃
Turbidity	0.27	0.17	0.10	OG <0.1	NTU
Calculated Parameters					
Hardness, Total (as CaCO3)	158	162	0.500	N/A	mg/L
Langlier Index	-0.02	-0.3	-5.0	N/A	-
Solids, Total Dissolved (calc)	189	187	1.00	N/A	mg/L
Total Metals					
Aluminum, total	<0.0050	<0.0050	0.0050	OG <0.1	mg/L
Antimony, total	<0.00020	<0.00020	0.00020	MAC = 0.006	mg/L
Arsenic, total	<0.00050	<0.00050	0.00050	MAC = 0.01	mg/L
Barium, total	0.0666	0.0709	0.0050	MAC = 1	mg/L
Boron, total	<0.0500	<0.0500	0.0050	MAC = 5	mg/L
Cadmium, total	<0.000010	<0.000010	0.000010	MAC = 0.005	mg/L
Calcium, total	48.9	50.6	0.20	N/A	mg/L
Chromium, total	0.00069	0.00073	0.00050	MAC = 0.05	mg/L
Cobalt, total	<0.00010	<0.00010	0.00010	N/A	mg/L
Copper, total	0.0439	0.0531	0.00040	MAC = 2	mg/L
Iron, total	0.023	0.011	0.010	AO ≤ 0.3	mg/L
Lead, total	<0.00020	<0.00020	0.00020	MAC = 0.01	mg/L
Magnesium, total	8.66	8.60	0.010	N/A	mg/L
Manganese, total	0.00063	<0.00020	0.00020	AO ≤ 0.05	mg/L
Mercury, total	<0.000010	<0.000010	0.000010	MAC = 0.001	mg/L
Molybdenum, total	0.00683	0.00717	0.00010	N/A	mg/L
Nickel, total	<0.00040	<0.00040	0.00040	N/A	mg/L
Potassium, total	3.01	3.01	0.10	N/A	mg/L
Selenium, total	<0.00050	<0.00050	0.00050	MAC = 0.05	mg/L
Sodium, total	10.6	10.9	0.10	AO ≤ 200	mg/L
Strontium, total	0.438	0.46	0.0010	N/A	mg/L
Uranium, total	0.00848	0.00831	0.000020	MAC = 0.02	mg/L
Zinc, total	0.0106	0.0071	0.0040	AO ≤ 5	mg/L

5.14 Source Water

Summerland System Source Water	Caro Analytical Services - Lab Summary Headwaters #1 Reservoir Low Level Outlet	Thirsk Reservoir Low Level Outlet	Isintok Reservoir Low Level Outlet			
Month/Year	**August 27 2024**	**August 27 2024**	**August 27 2024**	**MRL**	**GCDWQ**	**Units**
Anions						
Chloride	0.39	0.77	0.22	0.10	AO ≤ 250	mg/L
Fluoride	<0.10	<0.10	<0.10	0.10	MAC = 1.5	mg/L
Nitrate (as N)	<0.010	<0.010	<0.010	0.010	MAC = 10	mg/L
Nitrite (as N)	<0.010	<0.010	<0.010	0.010	MAC = 1	mg/L
Sulfate	3.0	3.7	<1.0	1.0	AO ≤ 500	mg/L
General Parameters						
Alkalinity, Total (as CaCO3)	45.1	36.4	5.1	1.0	N/A	mg/L
Alkalinity, Phenolphthalein (as CaCO3)	<1.0	<1.0	<1.0	1.0	N/A	mg/L
Alkalinity, Bicarbonate (as CaCO3)	45.1	36.4	5.1	1.0	N/A	mg/L
Alkalinity, Carbonate (as CaCO3)	<1.0	<1.0	<1.0	1.0	N/A	mg/L
Alkalinity, Hydroxide (as CaCO3)	<1.0	<1.0	<1.0	1.0	N/A	mg/L
Ammonia, Total (as N)	<0.050	<0.050	0.053	0.050	N/A	mg/L
Carbon, Total Organic	6.34	8.77	7.23	0.5	N/A	mg/L
Colour, True	13	32	42	5.0	AO ≤ 15	CU
Conductivity (EC)	102	89.4	33.2	2.0	N/A	µS/cm
Cyanide, Total	<0.0020	<0.0020	<0.0020	0.0020	MAC = 0.2	mg/L
pH	7.11	7.06	6.80	0.10	7-10.5	pH units
Phosphorus, Total Dissolved	<0.0050	0.0073	0.0084	0.050	N/A	mg/L
Temperature, at pH	23.0	23.2	22.9	N/A	N/A	°C
Turbidity	2.20	2.68	1.16	0.10	OG <0.1	NTU
Calculated Parameters						
Hardness, Total (as CaCO3)	46.4	39.4	11.3	0.500	N/A	mg/L
Langlier Index	-1.5	-1.8	-3.4	-5.0	N/A	-
Solids, Total Dissolved (calc)	52.1	45.1	10.2	1.00	N/A	mg/L
Total Metals						
Aluminum, total	0.0221	0.0695	**0.110**	0.0050	OG <0.1	mg/L
Antimony, total	<0.00020	<0.00020	<0.00020	0.00020	MAC = 0.006	mg/L
Arsenic, total	0.00053	<0.00050	<0.00050	0.00050	MAC = 0.01	mg/L
Barium, total	0.017	0.0335	0.0074	0.0050	MAC = 1	mg/L
Boron, total	<0.0500	<0.0500	<0.0500	0.0050	MAC = 5	mg/L
Cadmium, total	0.000038	<0.000010	0.000212	0.000010	MAC = 0.005	mg/L
Calcium, total	15.5	12.6	3.36	0.20	N/A	mg/L
Chromium, total	<0.00050	<0.00050	<0.00050	0.00050	MAC = 0.05	mg/L
Cobalt, total	<0.00010	<0.00010	<0.00010	0.00010	N/A	mg/L
Copper, total	0.00047	0.00136	0.00181	0.00040	MAC = 2	mg/L
Iron, total	0.233	0.311	0.452	0.010	AO ≤ 0.3	mg/L
Lead, total	<0.00020	<0.00020	<0.00020	0.00020	MAC = 0.01	mg/L
Magnesium, total	1.85	1.92	0.71	0.010	N/A	mg/L
Manganese, total	0.07670	0.0844	0.0191	0.00020	AO ≤ 0.05	mg/L
Mercury, total	<0.000010	<0.000010	<0.000010	0.000010	MAC = 0.001	mg/L
Molybdenum, total	0.00145	0.00214	0.00113	0.00010	N/A	mg/L
Nickel, total	<0.00040	<0.00040	<0.00040	0.00040	N/A	mg/L
Potassium, total	1.48	1.10	0.90	0.10	N/A	mg/L
Selenium, total	<0.00050	<0.00050	<0.00050	0.00050	MAC = 0.05	mg/L
Sodium, total	2.34	2.84	1.85	0.10	AO ≤ 200	mg/L
Strontium, total	0.0877	0.148	0.0257	0.0010	N/A	mg/L
Uranium, total	0.000038	0.000800	0.000173	0.000020	MAC = 0.02	mg/L
Zinc, total	<0.0040	<0.0040	<0.0040	0.0040	AO ≤ 5	mg/L

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 levels 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 2024, daily raw water grab samples for turbidity ranged from a low of 0.54 $_{NTU}$ on January 8th to a high of 2.80 $_{NTU}$ on June 10th.

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 0.11_{NTU} during the month of January to a high of 12.0_{NTU} in April.

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 $0.020_{NTU.}$

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 0.28 $_{NTU}$ 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 on a routine basis. 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 0.14_{NTU} to 0.55_{NTU}.

Occasional system flushing is required during periods of very low demand in order to regenerate 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.
The sample location for the Summerland water system is Pump House #6 located on Simpson Road and samples were submitted to Caro Analytical for analysis.

The average annual concentration of THMs was 0.0590mg/L.

The average annual concentration of HAAs was 0.0328mg/L.

Quarterly THMs & HAAs		
Analysis conducted by Caro Analytical Services		
2024	Total Trihalomethanes, mg/L	Total Haloacetic Acids, mg/L
MAC	**0.1**	**0.08**
First Quarter - January 16th	0.0467	0.0356
Second Quarter - April 2nd	0.0631	0.0321
Third Quarter - July 2nd	0.0606	0.0431
Fourth Quarter - October 15	0.0657	0.0205
Minimum	0.0467	0.0205
Maximum	0.0657	0.0431
Average	**0.0590**	**0.0328**

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

2024	WTP Recycle		
	Sample Volume, L	Cryptosporidium species, # Oocysts per 100L	Giardia species, # Cysts per 100L
January 2nd	100	0	0
February 5th	100	0	0
March 4th	100	0	0
April 3rd	100	0	0
May 6th	100	0	0
June 4th	100	0	0
July 2nd	100	0	0
August 6th	100	0	0
September 10th	100	0	0
October 21st	100	0	0
November 5th	100	0	0
December 18th	100	0	0
**Lab results that are reported as <1 are entered as 0 for data analysis*			
Minimum	100	0	0
Maximum	100	0	0
Average	100	0	0

2024	Trout Creek Raw		
	Sample Volume, L	Cryptosporidium species, # Oocysts per 100L	Giardia species, # Cysts per 100L
January 2nd	100	56	48
February 5th	100	29	41
March 4th	100	24	29
April 3rd	100	30	19
May 6th	100	8	20
June 4th	100	34	21
July 2nd	100	7	10
August 6th	100	3	10
September 10th	100	27	78
October 21st	100	15	45
November 5th	100	8	13
December 18th	100	18	31
**Lab results that are reported as <1 are entered as 0 for data analysis*			
Minimum	100	3	10
Maximum	100	56	78
Average	100	22	30

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

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO	Summerland, District of	WORK ORDER	24I1974
PROJECT	Summerland System	REPORTED	2024-10-08 16:41

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Trout Creek Raw (24I1974-05) | Matrix: Water | Sampled: 2024-09-17 07:55						
Radioactivity Parameters						
Gross Alpha Activity	< 0.04	MAC = 0.5	0.04	Bq/L	2024-10-08	
Gross Beta Activity	**0.08**	MAC = 1	0.03	Bq/L	2024-10-08	

5.62 Rodeo Water System

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO	Summerland, District of	WORK ORDER	24I1976
PROJECT	Rodeo System	REPORTED	2024-10-02 14:48

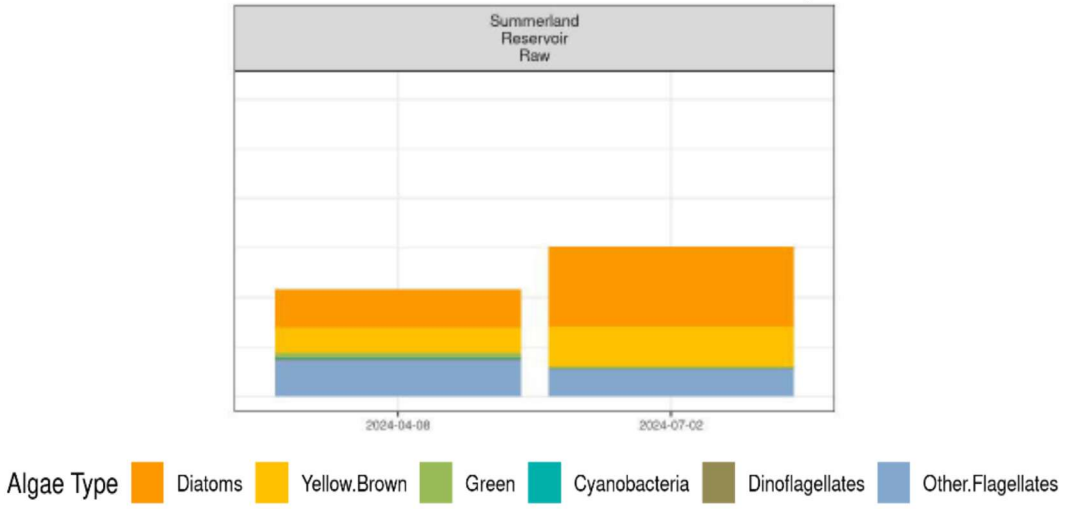
Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Radioactivity Parameters						
Gross Alpha Activity	**0.12**	MAC = 0.5	0.04	Bq/L	2024-09-30	
Gross Beta Activity	**0.15**	MAC = 1	0.03	Bq/L	2024-09-30	

5.7 Algae

Algae can be an indicator of water quality issues that could have an impact on water treatment processes such as filter clogging. Aesthetically, algae blooms can cause water discolouration, taste and odour. As a pre-emptive measure, samples were collected throughout the summer from five reservoirs including Thirsk, Headwaters #1, Isintok, Garnett Valley, Summerland and one sample from Trout Creek. These samples were submitted to Larratt Aquatic Consulting Ltd for analysis.

Samples were collected on April 8 and July 2. The Summerland Reservoir sample contained a mixture of different algae types, but were still dominated by diatoms and Chrysophytes. The Cyanobacteria population was very low with a maximum of 15 cells/mL.

There were no health risks identified from the Summerland reservoir samples submitted in 2024.



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 7.891ML in 2024 with the minimum day demand on March 10th at 2.827MLD and the maximum day demand on July 16th at 98.198MLD.

7.0 Water Quality Events

The District responded to three emergency water main breaks in 2024. The protocol for water main break response involves maintaining positive pressure in order to protect the water system from potential contamination.
Challenges for maintaining water quality in the distribution system involved managing the preventative maintenance program while achieving target levels for infrastructure repair and replacement. Annual budget is allocated for the replacement of aging infrastructure.

7.1 Summerland Water System

A water main break occurred March 13th on Monro Avenue. It was determined that positive pressure was maintained and a boil water notice (BWN) was not necessary for the area affecting 16 properties. A section of the mainline was repaired as per AWWA protocol and water was restored by 11am.

A water main break occurred May 14th on Dale Meadows Road east of Haddrell Ave to Gould Avenue. It was determined positive pressure was lost and a boil water notice (BWN) was called for the area. A section of the mainline was replaced as per AWWA protocol. Samples were collected on May 15th and 16th. With approval from IHA, the BWN was lifted on May 17th.

Sample Date	Location	Free Chlorine Residual (ppm)	Turbidity, NTU	Total Coliforms cfu/100mL	*E-coli*, cfu/100mL
May 15/24	12509 Dale Meadows	0.76	0.20	<1	<1
May 15/24	10019 Gould Avenue	0.53	0.84	<1	<1
May 16/24	12509 Dale Meadows	0.69	0.40	<1	<1
May 16/24	9801 Gould Avenue	0.43	0.65	<1	<1

A 12" water main break occurred December 4th on Victoria Road between Dale Meadows Road and Lenzi Street. It was determined positive pressure was maintained and a boil water notice (BWN) was not necessary for the area affecting approximately 50 properties. A section of the mainline was repaired as per AWWA protocol. In consultation with IH, water was restored in approximately three hours.

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, 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 is having limited treated water storage. This puts added stress on operators and greatly increases the likelihood of a District wide BWN should vital equipment at the WTP fail. During peak summer flows, the WTP clearwell can be critically depleted after only 45 minutes. Along with this, high flow demands can exceed the capacity of the water treatment plant resulting in the opening of the supplemental line, allowing partially treated water into the system. This has rarely occurred since the first phases of system separation were completed. To ensure that this risk is reduced, the District is continuing with plans to separate more sections of potable water distribution mains from irrigation only mains. The system separation study is to be undertaken by our engineering consultant in 2025.

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. A new water source is being investigated to eliminate the use of the Rodeo System.

9.0 Capital Works Plan

9.1 Completed Projects in 2024

Water Treatment Plant

- Rotork actuator installation on both raw water valves, filter to waste valves and filter backwash valves
- Text capable WTP Auto-dialer
- WTP Controls Upgrade & PLC Upgrade – Design
  - ❖ Construction has been postponed to 2026 and 2027
- Chlorine gas to Sodium hypochlorite conversion
  - ❖ Construction has been postponed to 2029
- Lamella Replacements – the first of two trains completed

Watershed

- Source Water Assessment – ongoing
- Isintok Dam Spillway – Design and start of construction on monitoring weir and spillway. Substantially completed in 2024
- Crescent & Whitehead Dam Spillway – Design postponed indefinitely.
  - Dam Safety Review – Crescent and Whitehead finalized in 2025.

Water Distribution System

- Trout Creek Flume & Water Intake Structure Upgrade/Design. Grant dependent. Not successful.
- Giants Head Road Water System Separation – Phase 1 Construction completed.
  - Unable to connect until upsizing of supply piping along Aileen Road.
- Dale Meadows water main replacement Design and Construction. Mostly complete, to be finished off in 2025 along side the Victoria Road project.
- Domestic second services – meter installations

9.2 Anticipated Capital Projects for 2025

Water Treatment Plant

- Lamella Replacements – second train
- WTP - Pump Replacement and Upgrade – Raw pumps

Watershed

- Headwaters #1 – Design and Construction
- Source Water Protection Plan
  - ❖ Ongoing from 2024
- Isintok Dam Spillway – Construction
  - ❖ Ongoing from 2024
- Neptune MRX920 mobile data collector (meter reader)
- Thirsk Dam crack remediation design
  - ❖ Waiting on Estimates for 2025 Budget

Water Distribution System

- Prairie Valley Road Watermain replacement (Morrow to Cartwright)
- System separation study to be undertaken by our engineering consultant in 2025.
- Victoria Road System Separation Upgrade
- PRV Above ground upgrade – Design & Construction
- Henry Ave/Jubilee Road West – Watermain Replacement

9.3 Future Capital Projects

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

Project	2026	2027	2028	2029	2030
WTP Controls Upgrade - Construction	X	X			
Chlorine gas to sodium hypochlorite conversion				X	
Crescent Dam Outlet & Spillway – Design & Construction		X	X		
Water Supply Intake and Conveyance Upgrades – Flume Construction (Grant Dependent)	X	X			
Garnet Dam spillway widening, slope protection & apron extension - Design		X	X		
Annual Water Main Replacements	X	X			
Thirsk Slide Gates Replacement	X	X			
PRV #1 and Trout Creek Tank above ground upgrades	X	X			

10.0 Emergency Response Plan

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

11.0 Cross Connection Control (CCC)

The District has a certified CCC backflow assembly tester 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 2024 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 2024:

- Improved filter turbidity trending
- Improved communication between the wtp and the waste ponds
- PRV, Pumphouse and Garnet Valley Reservoir telemetry upgraded alarming capability including pressure and temperature alarms.
- Intake Turbidity monitoring

12.2 Future SCADA Updates

- Design for the PLC and SCADA upgrades at the WTP was nominally completed in mid-2023 and is anticipated to be constructed in 2026.