



Water Treatment Plant Annual Report 2024

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This report was completed in May 2025 in accordance with the requirements of the Ministry of Health Services and the Interior Health Authority.

1.0 Water Treatment History

In 1986 the City of Penticton experienced an outbreak of Giardia that was determined to have originated from the Penticton Creek water source. Engineering studies were conducted in 1987-1988 and a dual source, water treatment plant was determined to be the best solution for the future of Penticton. The plant was commissioned in the spring of 1996 and is located at the East end of Penticton Avenue next to Penticton Creek. In January of 1997 the city placed its new water treatment facility online and the Penticton Creek source was returned to service. Since 1997 the city has used only Okanagan Lake and Penticton Creek for its domestic water usage. The two sources are used in variable proportions from year to year. This is determined by source water quality, quantity and plant operational considerations.

In 2005 the city awarded a contract to Earth Tech (AECOM) Engineering Consultants to review the current water system and address any anticipated issues likely to arise over the next 5-year, 10-year, and 15-year terms. A preliminary recommendation of this study was that Penticton Creek could be used as an alternate summer peak demand water source. Pilot studies were completed in the fall of 2007 and a high-rate dissolved aeration process was identified as the preferred option to meet increased summer demands. The final design was completed in early 2008 and construction began in the fall of 2008. The project was completed in November 2009 and has allowed the city to operate a dual source variable conventional water plant. Recent changes have included the replacement of chlorine gas and Sulfur dioxide with the safer options of Sodium hypochlorite and Vitamin C.

2.0 Water Supply System

Penticton's water supply system was initially designed in the 1920s to use water from Penticton Creek. Okanagan Lake water was pumped into the system during the spring freshet due to the high colour and organics in the creek water. Water is currently supplied to the treatment plant from two sources – Penticton Creek, through a gravity system, and Okanagan Lake, through pumps and a dedicated raw water main. Okanagan Lake Pump Station was upgraded with new electrical controls, variable frequency drives, rebuilt pumps, an upgraded surge protection valve, and a cooling system for the Motor Control Centre to improve the reliability and life of key electrical equipment.

Penticton Creek Intake

The City of Penticton operates a drinking water intake in Penticton Creek. The Penticton Creek Watershed covers 174 km² and represents 90% of the total watershed area. According to previous research by Don Dobson, the most important snow-sensitive zone is 1660 m. Most of the precipitation in the watershed falls, primarily as snow, within this zone.

Penticton Creek originates from Greyback Mountain Dam, approximately 10 km east of Penticton at an elevation of 1,649 meters. Many small tributaries and creeks also feed Penticton Creek, which allows water to be used at times without depleting storage.

The City of Penticton maintains Greyback Lake and Dam, which has a maximum storage volume of 10,000-acre feet, or 12.3 million cubic meters. The dam was built in 1967 under the A.R.D.A. (Agricultural Rural Development Act) program. Untreated water is diverted from Penticton Creek at the Campbell Mountain Diversion for the North agricultural irrigation system. Penticton Creek continues west towards Penticton # 2 Dam.

The intake is located at the end of Penticton Avenue and draws water from a small balancing reservoir (71,500 m³) built in the stream channel of Penticton Creek. The creek flows over the top of the dam and onwards to Okanagan Lake.

Further upstream is the Campbell Mountain Reservoir, storing up to 31,000 m³, which serves as a balancing reservoir for the irrigation system along the Naramata Bench.

Water temperature in Penticton Creek shows strong seasonal variation ranging from 3.7 °C during January, to 18 °C during August 2024. Storage in Greyback Reservoir contributes to the significant summer warming observed in the creek water.

True Colour, which is an indicator of organic material in the water averaged 46 TCU, with a low of 25 TCU, and a high of 110 TCU, and a high turbidity of 2.3 NTU

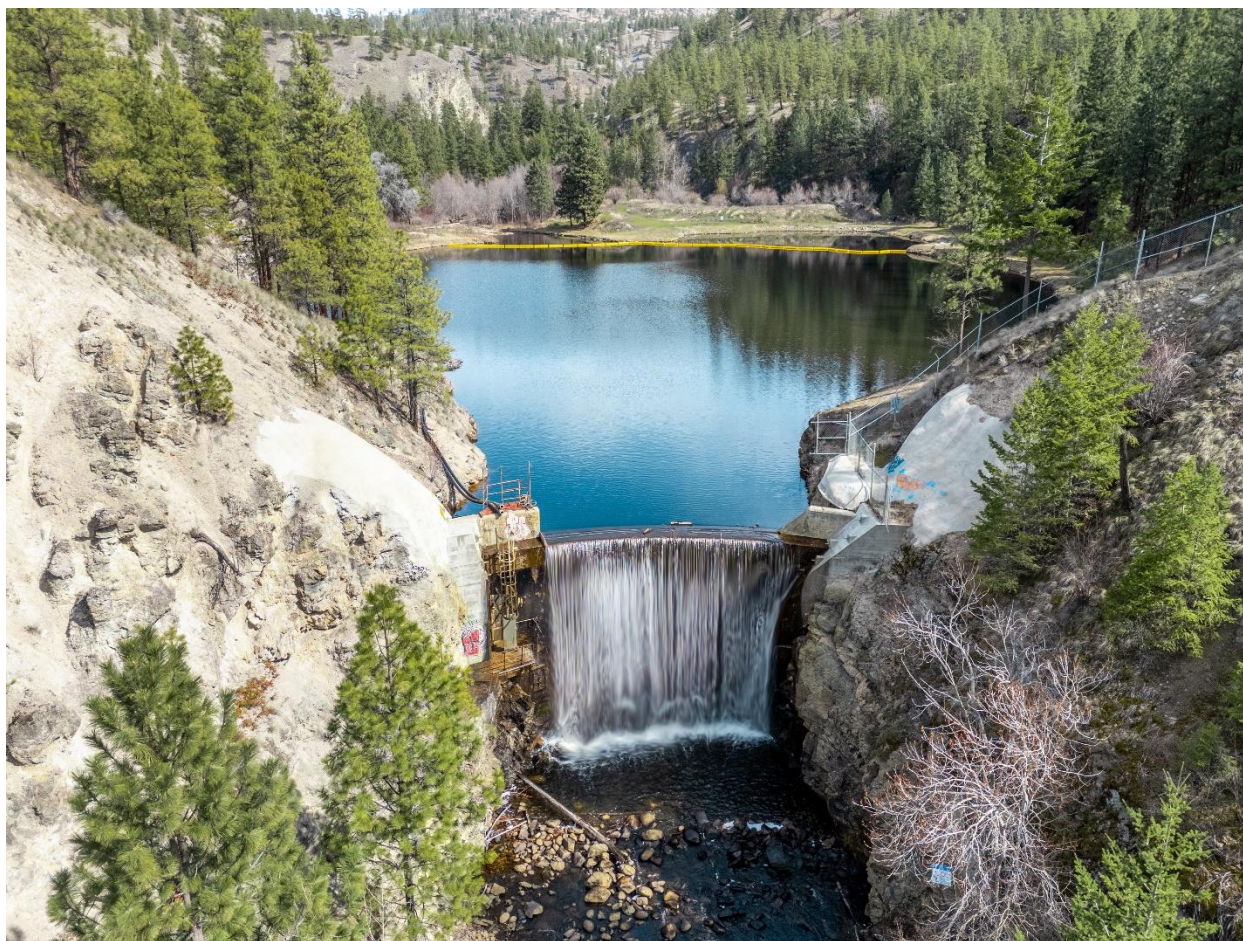
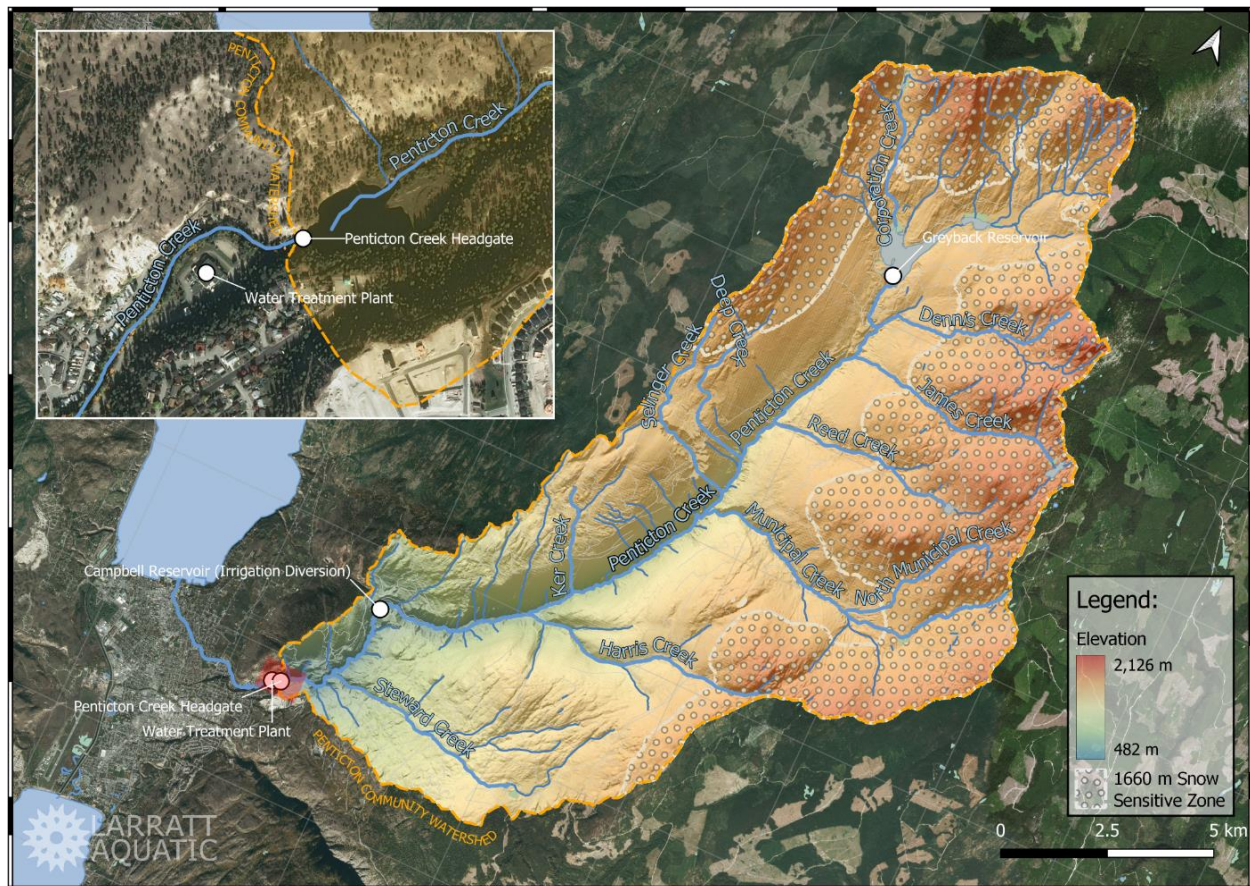


Figure 1. Penticton Creek Dam 2



Creek Name	Confluence Elevation (m ASL)	Watershed Area (ha)	Terrain Zone	Within Snow-Sensitive Zone?
Corporation	1578	556	Highlands u/s of Greyback Lake	Y
Dennis	1515	978	Highlands	Y
James	1476	854	Highlands	Y
Reed	1337	903	Highlands	Y
Deep	1218	245	Canyon	Y
Selinger	1132	314	Canyon	Y
Municipal	1100	2748	Highlands into Canyon	Y
Harris	751	1386	Highlands into Canyon	Y
Steward	519	1555	Mid-elevation into Canyon	N

Figure 2. Penticton Creek Tributaries - Larratt Aquatic

In 2024, 1.18 billion Litres of creek water was blended with 5.61 billion Litres of Okanagan Lake water and treated at the Water Treatment Plant. The total intake into the treatment plant was 6.78 billion Litres in 2024.

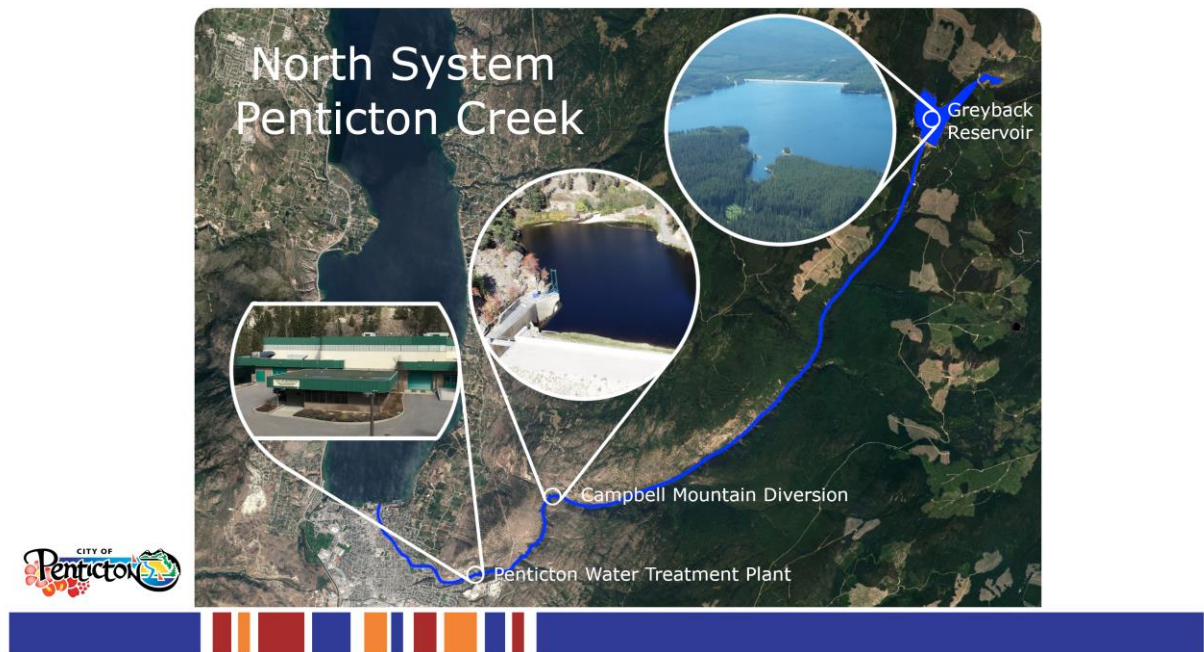


Figure 3. Penticton Creek North Irrigation System

Okanagan Lake Intake

Okanagan Lake is a large, deep lake with low nutrient concentrations. It is approximately 135 km long, 1-5 km wide, and has a surface area of 350 km². The theoretical residency time is ~52.8 years. Its maximum depth is 230 m, with a mean depth of 76 m, and it is divided into three sub-basins by underwater ridges. The intake is located within the south basin. Okanagan Lake receives water from 19 major tributaries, of which Mission Creek and Trout Creek are the largest. Okanagan Lake discharges into Okanagan River at Penticton (a tributary of the Columbia River).

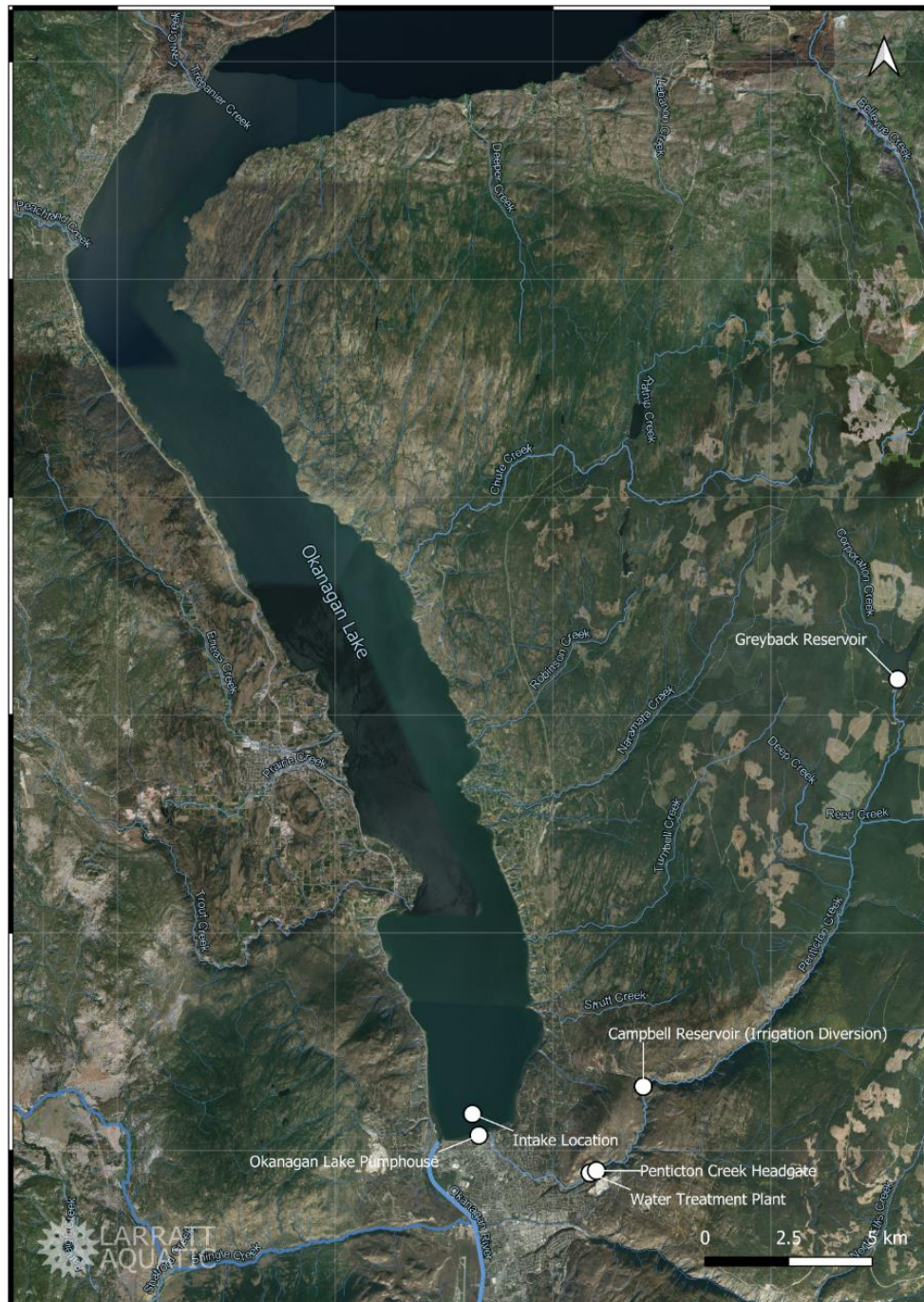


Figure 4. Okanagan Lake Water Shed -Larratt Aquatic

Every year, the single greatest effect on water quality in Okanagan Lake is the size of the freshet and its variable imports of nitrogen, phosphorus, pH, calcium, sulphates and organic/inorganic particulates.

Okanagan Lake is monomictic, forming distinct water temperature layers during the spring and remains stratified through the summer. The water layers erode during the fall until the water column mixes, usually in November. The lake becomes one temperature top to bottom and remains fully mixed throughout the winter until stratification commences again in the spring.

Turbidity in the Okanagan Lake raw water averaged 0.26 NTU with a low of 0.11 NTU and a high of 1.32 NTU. Freshet has a definite effect on turbidity with seasonal exceedances of 1 NTU in each year from 2019-2024.

True colour on the lake averaged 2.9 TCU with a low of 1 TCU and a high of 10 TCU during freshet.

The high turbidity was 1.32 NTU but this can be influenced by flow increases causing sediment in the intake and raw supply pipeline to be stirred.



Figure 5. Okanagan Lake Pump Station

Okanagan Lake water is pumped into the treatment plant from the Okanagan Lake Pump Station via a 5 KM dedicated main.

In 2024, the City of Penticton pumped 5.61 billion Litres from the Okanagan Lake pump station to the Penticton Water Treatment Plant. The total combined intake into the treatment plant was 6.78 billion Litres.

Warren Avenue Well

The Warren Avenue Well was fully decommissioned and officially closed and the water license rescinded in 2024.



Figure 6: Warren Ave Well

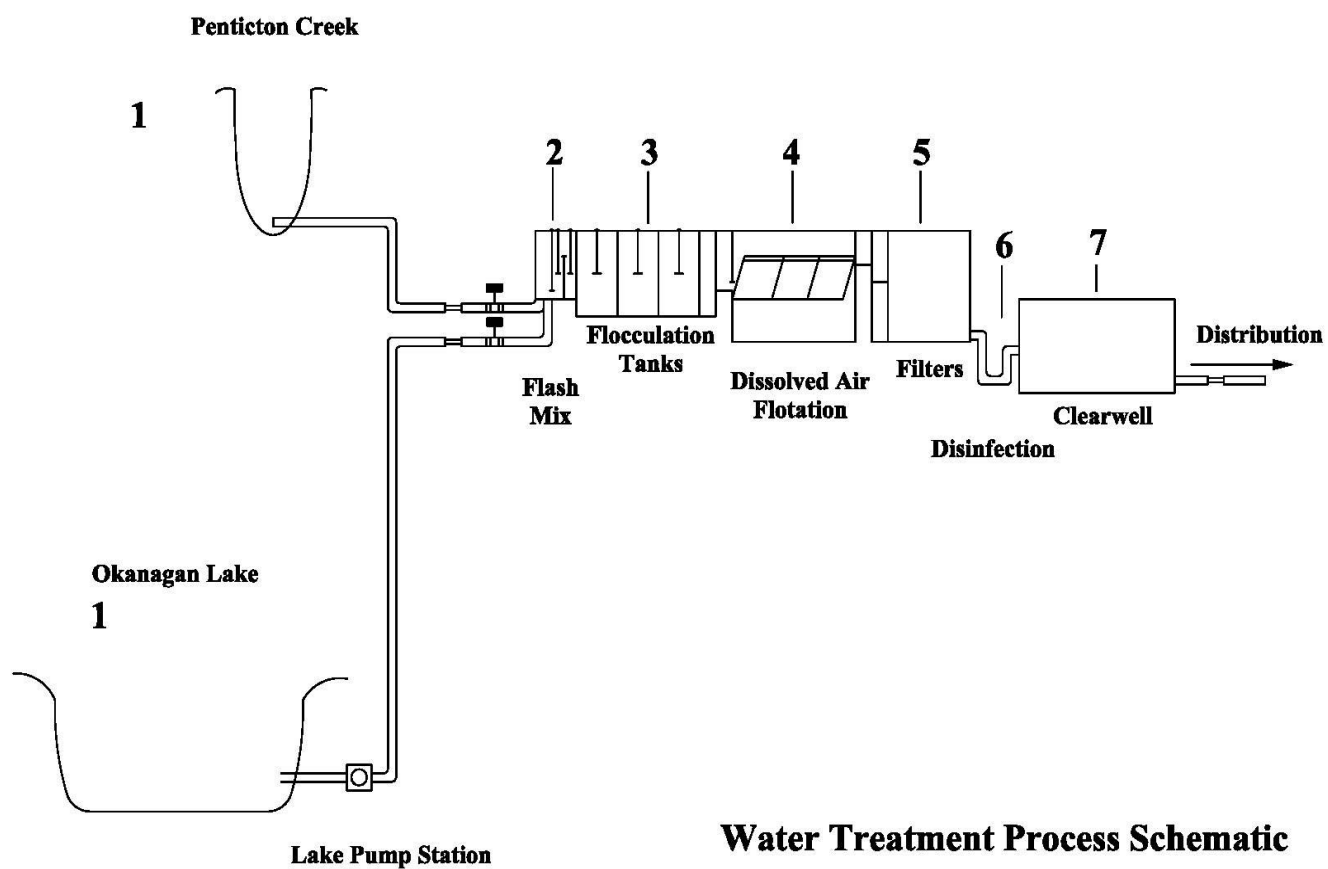


Figure 7. Penticton Water Treatment Schematic

3.0 Water Treatment

The City of Penticton's Water Treatment Plant has a 78 million Litres/day capacity and uses a multi-barrier system designed to treat water in a single or blended format from two sources: Okanagan Lake and Penticton Creek. The water quality of the two sources is distinctly different and requires different protocols for successful treatment. The objectives of treatment for the two sources are to meet Guidelines for Canadian Drinking Water Quality on a consistent basis.

The Water Treatment Plant was commissioned in 1996 and upgraded in 2008, which included the installation of the following processes: high-rate dissolved air flotation, new pump station and dedicated main for the Ridgedale Reservoir system, incline plate thickeners for the residuals process, and increased clear well storage.

In 2020, the chemical systems including Chlorine and SO₂ gases were removed and replaced with Sodium Hypochlorite and Vitamin C.

Blend Chamber

The water arrives at the treatment plant into the blend chamber, water from a single source or from both sources in the desired percentage is blended together and coagulants (chemicals that cause fine particles to clump together, forming "floc") are added. This mixing disperses the coagulants throughout the water and starts the coagulation process.



Figure 8. Penticton Blend Chamber

Chart 1: Monthly Chemical Record 2024

Month	In Flow	Out Flow	ACH	Coagulant Aid	Floc Aid
2024	Million Litres	Million Litres	mg/L	mg/L	mg/L
January	353.48	349.71	16.98	1.65	0.43
February	308.24	307.03	17.08	2.08	0.41
March	337.13	336.84	15.09	2.06	0.40
April	457.50	456.54	17.68	2.11	0.36
May	696.99	688.66	18.66	2.00	0.35
June	738.27	730.99	14.17	2.00	0.37
July	1023.44	1013.72	13.50	2.07	0.35
August	969.60	959.24	17.55	2.00	0.33
September	754.02	745.54	21.28	2.00	0.42
October	492.25	484.15	18.64	1.88	0.44
November	327.63	323.94	15.07	1.80	0.36
December	336.58	333.45	13.81	1.80	0.36
Average	566.26	560.81	16.29	1.96	0.38
Total	6782.93	6719.70			

- Average ACH dosage for the year 16.29 mg/L
- Average Coagulant Aid (CAP) polymer (WF 2551 A) dosage for the year 1.96 mg/L
- Average Floc Aid (WF 7220 A) dosage for the year 0.38 mg/L

Coagulation & Flocculation

Water passes through the flocculation tanks where it is gently mixed. Tapered energy mixing is employed in the flocculation process. The particles will come in contact with each other and form larger floc. It is in this stage of the process that the majority of the impurities and harmful bacteria are captured within the floc particles and will later be captured in the DAF float or the filter.



Figure 9. Penticton Water Treatment Floc Tank Mixers

Dissolved Air Floatation

The water enters the dissolved air flotation basin where a saturated dissolved air/water stream is mixed with the process stream allowing the floc particles that have formed in the previous process to rise. The float rises to the top of the basin removing impurities from the water.

This float is processed by the onsite centrifuge or diverted to the sewer system to aid in the wastewater treatment process. The water then proceeds to the filtration stage.



Figure 10. Penticton Water Treatment Dissolved Air Floatation

Filtration

Six deep bed, mono media filters are utilized at the Penticton Water Treatment Plant. The filter material used is anthracite coal at a depth of 1.80 meters. As the water passes through the filter, impurities are removed. The number of filter washes required is directly related to the quantity and quality of the water processed through the filter. Filter backwashes are regulated by four different factors:

The time the filter has been online, turbidity, particle counts, and head loss. The number of filter washes increases dramatically in the months of May - August. This is related to the amount of water processed during the increased summer water demands. In 2022, three of the filters received new butterfly valves and electric actuators. The remaining three filters were upgraded in spring 2023.



Figure 11. Penticton Water Treatment Mono Media Filters

Residuals Handling

There were no unauthorized discharges to Penticton Creek during 2024. The City of Penticton is constantly evaluating and making improvements to its treatment of the backwash stream. Ministry of Environment permit # PE-13491 which monitored the discharge was cancelled in 2011 due to changes in regulations.

Capital upgrades to the residuals process were constructed in 2009 as part of the Water Treatment Capacity Upgrade. These upgrades consisted of a new pump station and two new gravity thickeners to process backwash residuals.

In 2020 a Vitamin C de-chlorination system replaced the SO_2 gas to remove the backwash water chlorine residual. Testing of the backwash water indicates that the improvements made to the backwash handling system have considerably improved the discharge quality in comparison to pre-upgrade results.



Figure 12. Penticton Water Treatment Residual Handling Building

Disinfection

Once impurities have been removed from the water, liquid sodium hypochlorite is added as a disinfectant. This ensures the water is safe and prevents bacteria from developing as it travels from the treatment plant to the customer. The water treatment plant uses hypochlorite pumps that add a 6 -12% sodium hypochlorite chlorine solution at pre flocculation, and post filtration to achieve the required 1.35 mg/L residual leaving the facility.

Chart 2. 2024 Chlorine Residual

Month	mg/L Cl
January	1.34
February	1.39
March	1.35
April	1.34
May	1.35
June	1.37
July	1.35
August	1.40
September	1.39
October	1.39
November	1.40
December	1.40
Average	1.37

- Average 2024 chlorine residual at the clear well discharge was 1.37 mg/L

4.0 Water Distribution System

The City of Penticton water system consists of six reservoirs, five main pressure zones, two pump stations, three booster stations, 256.3 km of distribution mains, 1,082 fire hydrants and approximately 10,467 water service connections, serving a population of 36,885 people.

These reservoirs establish different pressure zones to service a particular area of the distribution system. The reservoirs are filled during periods of decreased water usage and are used to buffer the system when water demands are high.

Total reservoir capacity, excluding the treatment plant clear well, is 13.72 million Litres and (22.22 million Litres including water plant clear well). All reservoirs are remotely controlled via the SCADA system located at the Water Treatment Plant.

Water System Pressure Zones

- **1420 zone.** The supply reservoir for this zone is the **Duncan Avenue Reservoir**, which has a capacity of 5.90 ML, and the Water Treatment Plant clear well. Water to fill this reservoir originates at the Treatment Plant and is controlled via a pressure reducing valve located near the reservoir. This zone supplies the lower areas of Penticton and West Bench.
- **1620 zone.** The supply reservoir for this zone is the **Evergreen Reservoir**, which has a capacity of 2.30 ML. This zone supplies the southern middle bench lands of Penticton. The

water to fill this reservoir is gravity fed from the 1650 Ridgedale Reservoir via an automatic control valve.

- **1650 zone.** The supply for this zone is the **Ridgedale Reservoir**, which has a capacity of 2.35 ML. Water for this reservoir is pumped from the Water Treatment Plant's clear well. This zone supplies the middle bench lands of Penticton.
- **1820 zone.** The supply for this zone is the two **Carmi Reservoirs** and the **Gordon Avenue Reservoir**, which have a capacity of 1.14, 1.35 and 0.53 ML respectively. This zone supplies the upper-level areas of Penticton and is supplied by the Ridgedale Reservoir and pump station.
- **2020 zone.** The supply for this zone is the **Sendero Reservoir**, which has a capacity of 1.5 ML. This zone supplies the Sendero and Ridge subdivision located in the upper Carmi region. Water to fill this reservoir is supplied from the Ridgedale Reservoir and pump station.

5.0 Water Plant Staffing

The water plant is staffed by Environmental Operators Certification Program (EOCP) certified operators seven days per week, 365 days per year. The current complement of staff is:

Chart 3. 2024 Staff Complement

Name	Position	Certification Level	Years of Experience
Alistair Wardlaw	Water Quality Supervisor	EOCP WT IV	36
Don Mortimer	Water Plant Forman	EOCP WT III	18
Matt Finlayson	Operator III	EOCP WT IV	10
Stuart Henderson	Operator III	EOCP WT IV	11
Jesse Repchuk	Operator II	EOCP WT III	5
Randy Wewetzer	Operator II	EOCP WT III	14
Scott Graham	Electrician/Instrumentation	Journeyman	16

All EOCP certified operators are mandated to receive annual 2.4 continuing education units of training every two years to maintain their certified operator certification.

6.0 Water Quality Monitoring Program

The raw water quality program is designed to compare seasonal trends that may impact treatment parameters and economic outcomes of using the source. The program includes parameters that are easily tested and linked to changes such as turbidity, temperature, pH, conductivity and microbiological results. The source monitoring program is conducted daily for each water source at the water treatment laboratory.

In addition to the laboratory tests conducted daily on each water source, the city samples both raw water sources weekly for Total Coliform and E. coli using the Colilert test method.

The City of Penticton maintains and operates ten dedicated sample stations located within the distribution system. The treated water within each pressure zone is continuously monitored for chlorine residual by an online residual analyzer connected to the Water Treatment Plant's SCADA via fibre optic or radio network. Chlorine dosage is adjusted at the treatment plant to maintain free chlorine residuals within the distribution system. The Works Department maintains two automatic flush systems at the system extremities to help keep residuals at appropriate levels.

Water Quality Monitoring

459 microbiological tests were sampled for E. coli and Total Coliform in the treated water supply in 2024. Biological tests were collected from 45 different locations within the city distribution boundaries. The results from the bacteriological tests indicated that 456 samples

were negative for bacteriological contamination. One test had an indeterminate result and subsequent resampling was negative. Two samples at a residence showed one and two total coliforms. Extensive testing revealed no concerns in the city water distribution system.

In 2024, a commercial lab tested the treated water and source waters four times a year. These scans test for disinfection byproducts, metals, nutrients, total organic carbon and organic pesticides. Samples are collected at the PRV Station, Okanagan Lake sample tap, Penticton Creek sample tap, and a rotating sample location in the distribution system.

In 2023, The City of Penticton participated in a study supervised by Health Canada to determine if the chemical PFAS was present in Okanagan Lake, Penticton Creek, and the treated water leaving the Water Treatment Plant. All levels were either not detectable or less than present and possible future guidelines. PFAS (per- and polyfluoroalkyl substances) are a group of man-made chemicals used in various industries such as Teflon cookware, water repellent coatings, firefighting foams, as well as other products. They are a concern as they are considered “forever chemicals” meaning they are very difficult to breakdown and can cause health issues if present in food or water.

Testing for PFAS was conducted in 2024 and is an ongoing monitoring program.

The Health Canada and other testing showed extremely low or non-detectable levels so the Penticton drinking water is safe. The city will continue to work with Interior Health, Health Canada, and engineering consultants to monitor and report levels of these chemicals to ensure that Penticton’s water is safe.

See Appendix B for Water Quality analysis and reports.

7.0 Water Use and Licenses

Domestic

The City of Penticton holds domestic water licenses for Penticton Creek, Ellis Creek and Okanagan Lake water sources for the purpose of Waterworks Local Authority.

Penticton Creek (license C014229), (license C005729)

Ellis Creek (license C005731), license (C005732), and license (C025234)

Okanagan Lake (license C116809), (C116810), (C116811), * (C130923), * (C130920)

* West Bench operations

The total yearly capacity of these licenses is 250.9 billion Litres. In 2024, The City of Penticton pumped or diverted 6.78 Billion Litres from Okanagan Lake and Penticton Creek for domestic waterworks use.

Irrigation

The City of Penticton holds irrigation water licenses for Penticton Creek, Ellis Creek and Okanagan Lake water sources for the purpose of Irrigation.

Penticton Creek (license C035678), (license C005729)
Ellis Creek (license C0241819), license (C0241803)
Okanagan Lake (license C130923)

In 2024 the City diverted 1.42 billion Litres from the Penticton Creek system for irrigation use.

In 2024 the City diverted 324 million Litres from the Ellis system as well as 346 million litres from the WTP for irrigation use during construction of Ellis dam #4.

These licenses are renewed each year and reviewed by the Water Stewardship Division within the Ministry of Environment.

Chart 4. 2024 Raw Water Diversion for Domestic and Irrigation use

Month	Penticton Cr.	Ellis Cr.	Ok Lake	Total
2024	Million Litres	Million Litres	Million Litres	Million Litres
Domestic	1,175		5,607	6,783
Irrigation	1,419	324		2,089

The Ellis # 4 Dam had major reconstruction in 2024 and was out of service from July 2024 to April 2025. The Ellis system received 346 million Litres from July 2024 to October 2024 from the Water Treatment Plant using an emergency bypass connection with backflow protection.

8.0 Water Use Monitoring

The volume of water pumped from the Okanagan Lake Pump Station and Penticton Creek is continuously monitored by flow meters located at the Water Treatment Plant. Treated plant discharge water into the distribution system is also continuously monitored to determine peak days and unusual usage.

From 2015-2022, the City of Penticton’s per capita water usage was trending down. In 2023 there was an increase, but in 2024 total and per capita water usage has returned to a downward trajectory.

Chart 5. Raw Water Usage 2014 – 2024

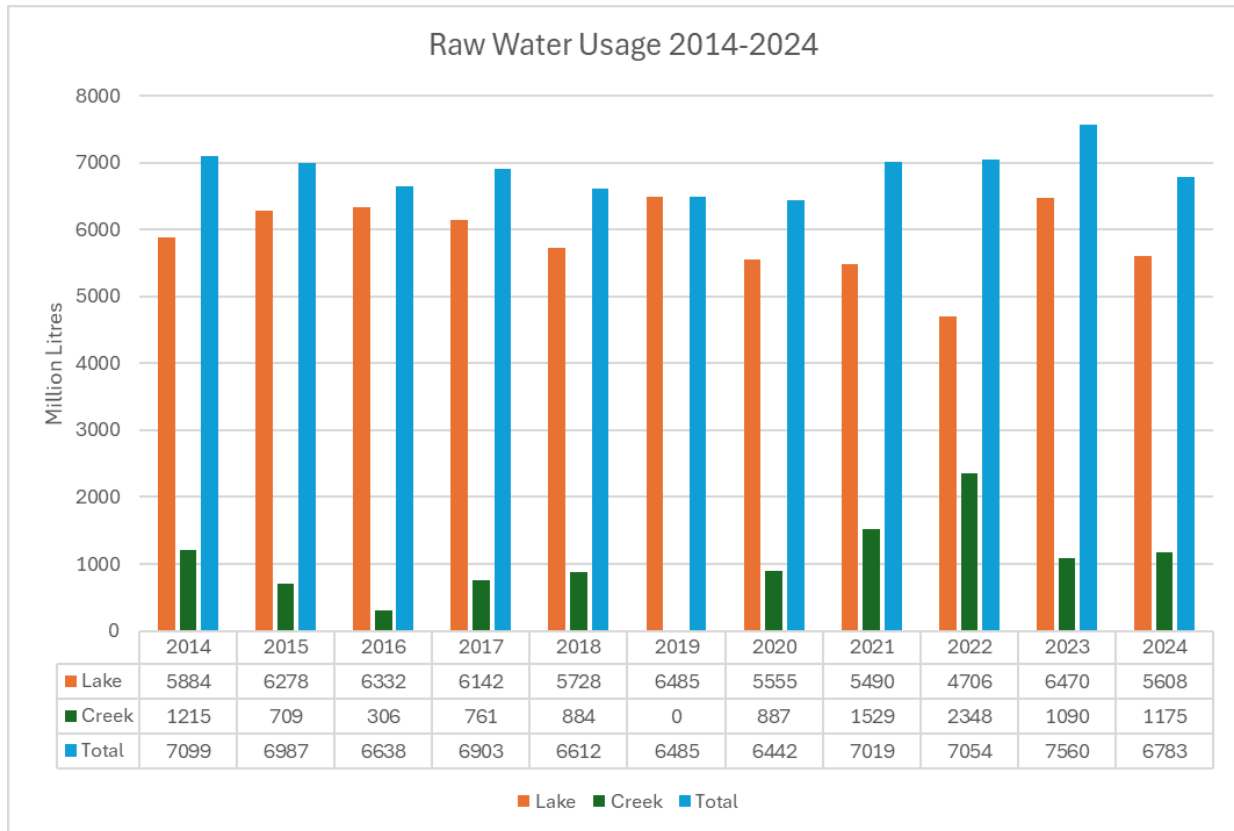
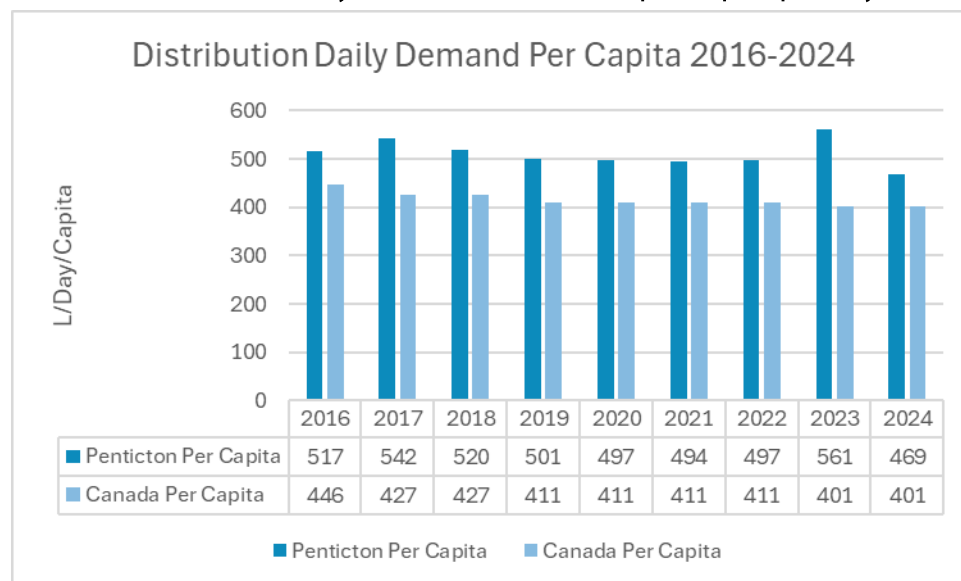


Chart 6. Average Daily Demand 2015-2024 (per capita per day)

Year	Total Distribution (ML)	West Bench (ML)	West Bench Per Capita	Penticton Distribution Net (ML)	Population	Penticton Per Capita Water Usage (L/Day/person)	Canadian Per Capita (L/Day/person)
2024	6719.7	315	983	6404.6	39142	469	401
2023	7557.6	333	1043	7224.6	38375	516	401
2022	6986.2	296	928	6690.2	37623	487	411
2021	6988.4	339.6	1065	6648.8	36885	494	411
2020	6422.1	293.6		6128.5	33761	497	411
2019	6484.8	305		6179.8	33761	501	411
2018	6699	296		6403	33761	520	427
2017	7024	346		6678	33761	542	427
2016	6748	375		6373	33761	517	446
2015	6977	402		6575	32877	548	460

- Penticton population estimate based on the 2021 census plus estimate of 2% per year 39,142 population estimate for 2024
- West Bench population 874 from 2021 census.

Chart 7. Distribution Daily Demand 2016-2024 (per capita per day)



Average Penticton per capita demand based on net distribution (Total – West Bench)

- Average Canadian demand from Statistics Canada

Chart 8. Maximum Daily Demand ML 2012-2024

Year	Population	Max Daily Demand (Litres/Capita)	Max Daily Demand (Million Litres)	Max Day
2012	32877	1107	36.4	Aug 20/12
2013	32877	1186	39	July 29/13
2014	32877	1266	42.3	July 14/14
2015	32877	1268	41.7	July 6/15
2016	33761	1063	37.2	June 6/16
2017	33761	1241	41.9	July 4/17
2018	33761	1220	41.2	July 25/18
2019	33761	1241	41.9	August 6/19
2020	33761	1084	36.6	August 18/20
2021	36885	1217	44.9	July 1/21
2022	37623	1100	41.4	August 8/22
2023	38375	1091	41.9	July 1/23
2024	39,142	1049	41.0	Aug 3/24

The peak maximum daily demand from the last 11 years was 44.9 million litres per day in 2021. The peak maximum daily demand historically was in July 2001 with 51.5 million litres per day, which was 1614 Litres per capita per day. Significant water conservation and the expanded use of reclaimed treated wastewater effluent for some parks and golf course irrigation are credited for the decreased water usage.

2012 – 2015 32,877 population from 2011 census
 2016 – 2020 33,761 population from 2016 census
 2021 36,885 population from 2021 census
 2022 37,623 population estimate of 2021 census plus 2%
 2023 38,375 population estimate 2022 plus 2%
 2024 39,142 population estimate 2023 plus 2%

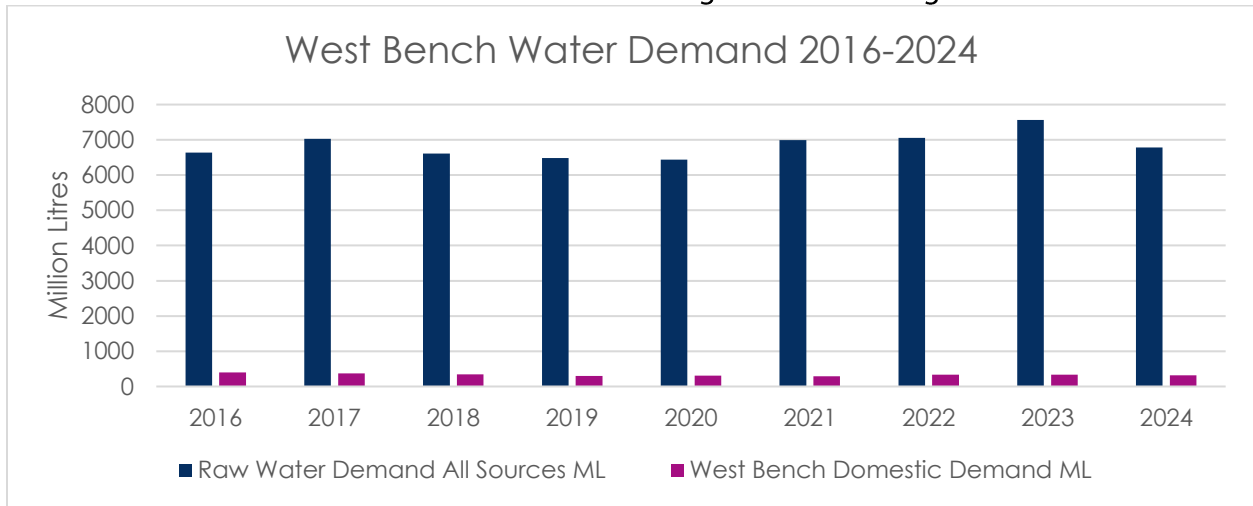
Chart 9. Water Consumption City of Penticton 2024

Month	Lake Supply	Creek Supply	Total Intake	Total Distribution
2024	Million Litres	Million Litres	Million Litres	Million Litres
January	251	103	353	350
February	243	65	308	307
March	279	58	337	337
April	427	31	457	457
May	662	35	697	688
June	781	189	970	959
July	915	108	1023	1013
August	781	189	970	959
September	542	212	754	746
October	349	144	492	484
November	232	96	328	324
December	239	98	337	333
Daily Average	15.36	3.22	18.58	18.41
Monthly Average	467	98	565	560
Total	5607	1175	6783	6720

9.0 Water Demand and Water Conservation

In 2014 an extension of the distribution system was constructed to supply domestic city water to the West Bench Irrigation System. This system is owned and operated by the Regional District and is supplied with water by The City of Penticton via a bulk purchase water agreement. In 2024, 315 million Litres of water was supplied to the West Bench Irrigation System.

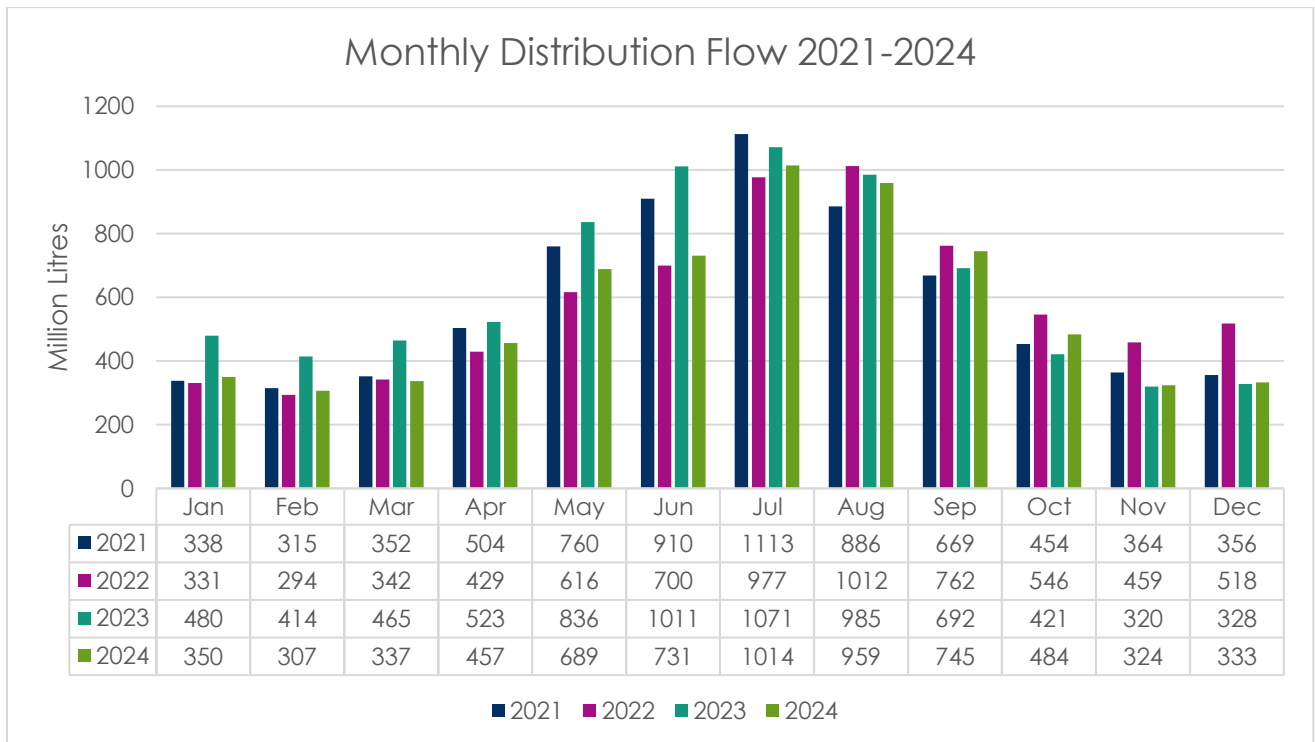
Chart 10. 2016 – 2024 Raw Water Demand / Including West Bench Irrigation District



Demand has a direct impact on existing water infrastructure as well as community planning. In 2024, peak day was 41.9 million Litres, which occurred on August 8. This includes water supply to the West Bench Irrigation System.

Average Yearly Daily Demand per person was 561 Litres per capita per day based upon a population of 36,885. Demands, which are based on distribution flow meter records excluding backwash and other operational uses of water within the treatment process.

Chart 11. Total Distribution Demand by Month 2021 – 2024



2024 Water Conservation Goal and Objectives

1. Reduce Peak Day Demand and Average Daily Demand

Purpose – minimize the impact of our growing community on water resources. Effectively monitor programs, which aim at reducing Peak Day Demand and Average Daily Demand.

2. Update Water Conservation Webpage

Purpose – provide relevant solutions to reducing water waste as well as timely information on water consumption to promote the cause and effect of turning off the tap. Every drop counts! The City of Penticton's web page has links to the Okanagan Basin Water Board and valley wide information supporting water conservation.

10.0 Drought Management

In 2021, the city completed work with a consulting engineer to develop and update a drought management plan. The purpose of the plan is to provide the city with a professional report that identifies our water supply and looks at water demands historically and for the future. The identified drought resilience for each source and the requirements to mitigate an extended drought. The report identifies trigger points and provides decision making guidelines for each level of drought. In 2023, the Penticton Water System was in a Stage 1 restriction from May 1 to August 31.

Irrigation Systems

Two creeks within the City of Penticton boundaries are used as sources of water for irrigation systems. The South Okanagan Development Company initially developed the Penticton Creek irrigation system in 1906. The Ellis Creek irrigation system was developed in the late 1960's. The Penticton Creek Irrigation System is of high significance as the City of Penticton holds licenses for domestic water works on this source.

Penticton Creek Irrigation System

Records indicate that Penticton #1 Dam was built prior to 1921, although the exact year of construction is not known. It is located approximately 22 km northeast of Penticton. The dam has a live storage capacity of 1.48 million m³ and empties into the reservoir of Greyback Dam. A dam safety study identified seepage and stability issues and recommended the structure be updated or decommissioned. In September of 2006, upon final review of the Knight and Piesold dam study, Penticton #1 dam was breached and removed from service.

The Greyback Dam is located at the head of the Penticton Creek watershed, approximately 19-

km northeast of Penticton. The dam is used by the City of Penticton to supply and control water for domestic water and north irrigation system. The dam has a live storage capacity of approximately 12.33 million m³. Greyback Dam is a zoned earth fill embankment designed by the Canadian Department of Regional Economic Expansion, with construction completed in 1967. The dam is approximately 35 meters in height and 610 meters in length. An emergency spillway is located on the east abutment. Greyback Reservoir covers an area of approximately 300 acres and empties into Penticton Creek flowing into Campbell Mountain Diversion Dam followed by Penticton #2 dam.

Penticton Creek Irrigation System

A.C. McEachern Ltd. of Vancouver constructed the Campbell Mountain Diversion Dam in 1966-1967. The purpose of this project was to divert water from Penticton Creek via a tunnel to the north irrigation system. The diversion dam has a storage capacity of 31,000 m³ of water. The method of construction is an earth filled embankment with a side discharge concrete channel spillway and chute located on the right abutment. Before the construction of this diversion, irrigation water for farms and orchards located on the north bench was via flume and open ditch. Water, that is not diverted, flows into Penticton Creek and Penticton #2 dam.

Penticton # 2 Dam is a concrete arch dam originally constructed in about 1930 and raised by 3 meters in 1939. The current dam is approximately 16 meters in height and spans 22 meters between abutments. The dam has a storage capacity of 71,500 m³ of water. The flooded area behind the dam is approximately 5 acres. The current use of the dam is to supply water to the Water Treatment Plant located immediately downstream. Flow data is monitored continuously.

Total daily city allotted capacity for irrigation from Penticton Creek is calculated to be 46.26 million Litres per day. 2024 peak day for Penticton Creek irrigation system was 15.2 million litres recorded at the Randolph Rd flow meter on July 7th Total demand on Penticton Creek Irrigation system in 2024 was 1.42 billion Litres

Ellis Creek Irrigation System

The Ellis Creek Diversion dam was constructed in 1966 by Interior Contracting Ltd. of Penticton and has been in operation since the spring of 1967. A major upgrade was started in June 2024. The dam was drained and out of service for the remainder of 2024 and into 2025.

The diversion dam is a small earth fill embankment with a concrete channel weir that spills over the crest and downstream face of the dam. The dam has a relatively minor storage capacity of approximately 6,200 m³ of water. The flooded area behind the dam is less than 1 acre. The diversion dam receives water from Ellis #2 and Ellis #4 dams. Maintenance of the diversion dam is the responsibility of the City Works Division.

The total daily city allotted capacity for irrigation from Ellis Creek is calculated to be 9.99 million litres per day. Peak day for Ellis Creek irrigation system occurred on August 2nd when 10.6

million litre demand was recorded by the Ellis Creek Irrigation flow meter. Total demand for Ellis Creek Irrigation system for 2024 was 670 million Litres.

Chart 12: Irrigation Water Use 2012-2024

Year	Penticton Creek Irrigation (Million Litres)	Ellis Creek Irrigation (Million Litres)
2012	3126	330
2013	3015	263
2014	3208	297
2015	3228	397
2016	3113	754
2017	3340	886
2018	1318	764
2019	1252	690
2020	1246	644
2021	1591	863
2022	1156	598
2023	1571	724
2024	1419	670

11.0 Cross Connection Control

A cross connection refers to any actual or potential physical connection between a potable water line and any pipe, vessel or machine containing or possibly containing a non-potable fluid, gas or solid, such that it is possible for the contaminant to enter the water system by backflow.

The City of Penticton's Cross Connection Control program has approximately 2,542 testable assemblies. These testable assemblies refer to Double Check Valve Assemblies and Reduced Pressure Backflow Assemblies isolating moderate and high hazards. The program is managed by the City of Penticton Building Department.

A secondary component of the Cross Connection Control Program entails performing site surveys and plan reviews of proposed building projects which identify actual or potential cross connections and their remedies. In some cases, the solution incorporated a non-testable device such as a Hose Bib Vacuum Breaker, an approved air gap or the elimination of the backflow hazard altogether.

These measures are in place as a means of providing safe drinking water and meeting one of the City of Penticton's conditions on the Interior Health Permit to Operate.

12.0 Source Water Protection Assessment and Plan

The objective of this drinking water source assessment was to quantify the source water quality, identify hazards, and make recommendations on protecting the source water quality of the City of Penticton's Okanagan Lake and Penticton Creek intakes.

Specific recommendations and action plans were developed with the aim of providing the best water quality. Key recommendations include:

- applying best management practices for shoreline protection
- creating a legal framework for the intake protection zone
- improving the condition of Penticton Creek's watershed drainage infrastructure
- educating recreators on how to operate safely near the intakes.

This assessment characterizes natural and man-induced hazards to drinking water quality as physical, chemical, or biological. As these risks change over time, revisions of this document may be needed. Existing research was augmented by a 2021 survey of the Penticton Creek watershed, field study of water currents, water quality profiles, and algae sampling in Okanagan Lake near the intake.

13.0 Water Operational and Capital Improvements

Capital Improvements 2024

1. Penticton PRV Replacement –Tender awarded late 2024 with no significant work started.
2. 168 M of 150mm watermain
3. 82 M of 200mm watermain
4. 130 M of 300mm watermain
5. 11 fire hydrants installed
6. Ellis #4 Upgrade construction started in July 2024.

Distribution System Maintenance 2024

1. Hydrants Inspected – "A" 347 / "B" 749
2. Main lines valves operated – 246
3. 2500 Service Valve confirmation checks completed.
4. 20 Emergency water main repairs
5. 62.65 KM of water main flushed
6. 15% of watermains evaluated for leaks with acoustic leak equipment
7. 99 Water meters replaced through maintenance
8. 87 new water meters installed through development driven construction
9. New debris boom installed at Penticton #2 Dam / Ellis Creek Diversion Dam
10. 38 new water service install between 25mm – 150mm

Appendix A Quick Facts 2024

2024 Lab Data			
Lake	High	Low	Avg
Alkalinity	118	98	110
Colour			
Apparent	15	2	6
Colour True	10	1	3
Hardness	132	110	125
pH	8.41	7.88	8.08
Turbidity	1.320	0.107	0.256
Creek	High	Low	Avg
Alkalinity	20	4	13
Colour			
Apparent	131	28	55
Colour True	110	25	46
Hardness	20	6	13
pH	7.66	6.26	6.87
Turbidity	2.31	0.458	0.780
Distribution	High	Low	Avg
Alkalinity	111	74	94
Hardness	122	86	104
pH	8.34	7.71	8.00
Turbidity	0.039	0.018	0.030

2024 Raw Source Water Volumes

Raw water source volumes	
Flows	Million Litres
Ellis Creek Irrigation	670.2
Penticton Creek Irrigation	1419.2
Penticton Creek Domestic	1175.4
Okanagan Lake	5607.5
Warren Ave Well	0
Total Plant Intake	6782.9

2024 Distribution Quick Facts

Quick Facts			
2024 Parameter	Result	Unit	Date
Total Distribution	6719.7	ML	2024 Total Distribution
Maximum Day	41.042	ML/d	2024 Max Day
Minimum Day	7.13	ML/d	2024 Min Day
Average Daily	18.58	ML/d	2024 Average
Average Daily / Capita	469	L/d/c	2024 Average
Maximum Daily / Capita	1049	L/d/c	Aug 3 2024
Minimum Daily / Capita	182	L/d/c	Jan 25 2024
Average Alkalinity	94	mg/l CaOH3	2024 Average
Chlorine Avg. at Plant	1.37	mg/l	2024 Average
Hardness Average	104	mg/l CaOH3	2024 Average
pH Average	8.00	pH Units	2024 Average
Turbidity Avg.	0.030	NTU	2024 Average

Appendix B – Water Quality Lab Reports

- Summary of 2024 Bacteriological Testing
- Caro Quarterly Sampling Results
- Carollo PFAS Summary Results

2024

	Sample #	Date	Time	Location	Pressure Zone	Free CL2	Turbidity (NTU)	Temp (*C)	pH	E. coli Coliform /100 mL CARO	Total Coliform (/100 mL) CARO	e.Coli Coliform (/100ml) In-House	Total Coliform (/100mL) In-House
January	1	2-Jan	10:30	Randolph	1650ft/503m	0.87	0.034	8.00	7.95	<1	<1		
	2	2-Jan	10:55	OK lake Pump House	1420ft/433m	0.87	0.113	8.30	7.81	<1	<1		
	3	2-Jan	11:35	490 Waterloo Ave	1420ft/433m	1.03	0.058	8.00	7.71	<1	<1		
	4	2-Jan	13:55	397 Edna Ave	1420ft/433m	1.28	0.088	6.30	7.69	<1	<1		
	5	2-Jan	13:10	Gordon	1820ft/555m	0.56	0.098	7.20	7.84	<1	<1		
	6	2-Jan	13:30	Lawrence	2020ft/616m	0.43	0.093	6.20	7.78	<1	<1		
	7	5-Jan	13:55	Randolph	1650ft/503m	0.95	0.085	6.10	7.89			A	A
	8	5-Jan	13:40	1900 Penticton Ave	1650ft/503m	1.03	0.090	6.00	7.88			A	A
	9	5-Jan	14:35	4300 Lakeside Rd	1420ft/433m	0.79	0.085	8.70	8.03			A	A
	10	9-Jan	13:33	Randolph	1650ft/503m	0.88	0.110	5.90	8.10	<1	<1		
	11	9-Jan	13:58	4300 Lakeside Rd	1420ft/433m	0.86	0.130	10.00	8.20	<1	<1		
	12	9-Jan	14:13	Gordon	1820ft/555m	0.65	0.465	6.80	8.20	<1	<1		
	13	9-Jan	14:37	Carmi	1820ft/555m	0.78	0.230	8.00	8.10	<1	<1		
	14	9-Jan	14:44	Lawrence	2020ft/616m	0.50	0.204	6.20	8.10	<1	<1		
	15	9-Jan	15:00	1900 Penticton Ave	1650ft/503m	1.03	0.100	9.40	7.90	<1	<1		
	16	12-Jan	10:35	Randolph	1650ft/503m	0.82	0.058	6.70	7.97			A	A
	17	12-Jan	10:57	OK lake Pump House	1420ft/433m	0.85	0.105	6.90	7.85			A	A
	18	12-Jan	11:47	Gordon	1820ft/555m	0.46	0.286	6.30	7.88			A	A
	19	16-Jan	11:35	4300 Lakeside Rd	1420ft/433m	0.56	0.069	7.50	8.02	<1	<1		
	20	16-Jan	12:43	1946 Harris Drive	2020ft/616m	0.22	0.079	7.70	7.97	<1	<1		
	21	16-Jan	13:25	Carmi Station	1820ft/555m	0.51	0.097	6.50	7.93	<1	<1		
	22	16-Jan	13:47	OK Lake Pump Station	1420ft/433m	0.74	0.137	7.10	7.84	<1	<1		
	23	16-Jan	14:14	Community Centre	1420ft/433m	0.93	0.051	8.60	7.73	<1	<1		
	24	16-Jan	14:38	Randolph Rd	1650ft/503m	0.97	0.069	6.30	7.84	<1	<1		
	25	20-Jan	11:05	Gordon	1820ft/555m	0.48	0.122	5.10	8.00			A	A
	26	20-Jan	11:30	Carmi Station	1820ft/555m	0.64	0.153	5.60	7.84			A	A
	27	20-Jan	14:00	1900 Penticton Ave	1650ft/503m	0.98	0.066	4.20	7.81			A	A
	28	23-Jan	10:52	4300 Lakeside Rd	1420ft/433m	0.75	0.046	6.40	7.93	<1	<1		
	29	23-Jan	11:11	Gordon Station	1820ft/555m	0.49	0.117	5.40	7.84	<1	<1		
	30	23-Jan	11:45	1900 Penticton Ave	1650ft/503m	0.96	0.036	8.60	7.72	<1	<1		
	31	23-Jan	13:17	Carmi Station	1820ft/555m	0.56	0.833	5.10	7.85	<1	<1		
	32	23-Jan	13:47	Randolph Rd Station	1650ft/503m	0.84	0.050	5.40	7.77	<1	<1		
	33	23-Jan	14:07	OK Lake Pumpstation	1420ft/433m	0.55	0.124	6.70	7.75	<1	<1		
	34	25-Jan	9:17	OK Lake Pumpstation	1420ft/433m	0.83	0.086	5.90	7.76			A	A
	35	25-Jan	10:39	Gordon Station	1820ft/555m	0.53	0.097	5.30	7.88			A	A
	36	25-Jan	11:15	Carmi Station	1820ft/555m	0.55	0.308	5.80	7.86			A	A
February	37	2-Feb	10:18	Yards	1650ft/503m	0.68	0.169	8.80	7.73			A	A
	38	2-Feb	10:39	1410 Penticton Ave	1650ft/503m	1.10	0.065	5.60	7.74			A	A
	39	2-Feb	13:33	Naramata Rd.	1650ft/503m	0.55	0.058	5.80	7.81			A	A
	40	6-Feb	8:58	4300 Lakeside Rd	1420ft/433m	0.70	0.082	6.80	7.82	<1	<1		
	41	6-Feb	9:16	Gordon Ave Station	1820ft/555m	0.52	0.095	5.40	7.82	<1	<1		
	42	6-Feb	10:37	Randolph Rd Station	1650ft/503m	0.85	0.054	5.30	7.75	<1	<1		
	43	6-Feb	10:57	OK Lake Pumphouse	1420ft/433m	0.84	0.071	6.20	7.77	<1	<1		
	44	6-Feb	11:20	Carmi Station	1820ft/555m	0.56	0.109	6.00	7.81	<1	<1		
	45	6-Feb	11:39	Lawrence Test Station	2020ft/616m	0.33	0.067	4.50	7.81	<1	<1		
	46	9-Feb	13:30	Gordon Ave Station	1820ft/555m	0.53	0.159	5.70	7.93			A	A
	47	9-Feb	13:28	1946 Harris Dr.	2020ft/616m	0.37	0.232	6.00	8.01			A	A
	48	9-Feb	14:04	1900 Penticton Ave	1650ft/503m	0.85	0.037	9.00	8.05			A	A
	49	13-Feb	10:41	Yards	1650ft/503m	0.68	0.182	9.00	7.79	<1	1.0		
	50	13-Feb	11:04	4300 Lakeside Rd	1420ft/433m	0.82	0.068	7.10	7.84	<1	<1		
	51	13-Feb	11:21	Gordon Ave Station	1820ft/555m	0.54	0.094	5.60	7.88	<1	<1		
	52	13-Feb	11:42	Carmi Station	1820ft/555m	0.55	0.092	5.80	7.83	<1	<1		
	53	13-Feb	13:43	Randolph Rd Station	1650ft/503m	0.87	0.071	5.40	7.84	<1	<1		
	54	13-Feb	14:04	OK Lake Pumpstation	1420ft/433m	0.97	0.078	6.20	7.87	<1	<1		
	55	16-Feb	9:18	4300 Lakeside Rd	1420ft/433m	0.77	0.097	6.60	8.03			A	A
	56	16-Feb	9:37	1410 Penticton Ave	1420ft/433m	1.11	0.066	6.00	7.92			A	A
	57	16-Feb	13:46	1900 Penticton Ave	1650ft/503m	1.02	0.080	6.80	7.88			A	A
	58	16-Feb	13:24	OK Lake Pump Station (Resample)	1420ft/433m	0.96						A	A
	59	20-Feb	10:30	Gordon Ave Station	1820ft/555m	0.58	0.099	5.30	7.84	<1	<1		
	60	20-Feb	10:53	Carmi Station	1820ft/555m	0.61	0.091	5.90	7.82	<1	1.0		
	61	20-Feb	11:16	Lawrence Test Station	2020ft/616m	0.63	0.064	4.70	7.80	<1	<1		
	62	20-Feb	13:03	WWTP	1420ft/433m	0.93	0.060	10.10	7.80	<1	<1		
	63	20-Feb	13:30	OK Lake Pumphouse	1420ft/433m	0.90	0.099	5.90	7.80	<1	<1		
	64	20-Feb	13:55	Randolph Rd Station	1650ft/503m	0.86	0.083	5.60	7.80	<1	<1		
	65	23-Feb	11:25	1900 Penticton Ave	1650ft/503m	0.99	0.057	5.90	8.07			A	A
	66	23-Feb	11:30	4300 Lakeside Rd	1420ft/433m	0.71	0.153	6.90	7.90			A	A
	67	23-Feb	12:00	Gordon Ave Station	1820ft/555m	0.58	0.092	5.90	7.90			A	A
	68	23-Feb	12:20	Carmi Station (Resample)	1820ft/555m	0.60		6.90				A	A
	69	27-Feb	10:29	4300 Lakeside Rd	1420ft/433m	0.74	0.110	7.10	7.78	<1	<1		
	70	27-Feb	10:47	Yards	1650ft/503m	0.81	0.180	8.90	7.74	<1	<1		
	71	27-Feb	10:57	Carmi Stn	1820ft/555m	0.64	0.230	6.60	7.77	<1	<1		
	72	27-Feb	11:20	Fairford Bridge	1420ft/433m	1.01	0.220	5.40	7.81	<1	<1		
	73	27-Feb	11:43	Riverside Dr	1420ft/433m	0.85	0.090	6.60	7.79	<1	<1		
	74	27-Feb	12:57	1900 Penticton Ave	1650ft/503m	0.98	0.090	4.90	7.80	<1	<1		

March	75	1-Mar	8:52	Gordon Ave Stn	1820ft/555m	0.53	0.120	6.00	7.98			A	A
	76	1-Mar	9:16	Randolph Rd Stn	1650ft/503m	0.90	0.054	5.00	7.96			A	A
	77	1-Mar	10:36	4300 Lakeside Rd	1420ft/433m	0.79	0.079	7.00	7.97			A	A
	78	5-Mar	10:34	WWTP	1420ft/433m	0.96	0.060	7.50	7.96	<1	<1		
	79	5-Mar	10:58	Gordon Ave Stn	1820ft/555m	0.52	0.098	5.90	7.99	<1	<1		
	80	5-Mar	11:32	Yards	1650ft/503m	0.72	0.189	8.30	7.89	<1	<1		
	81	5-Mar	13:13	Smythe Test Station	1420ft/433m	0.52	0.083	6.90	7.96	<1	<1		
	82	5-Mar	13:40	Timmins Test Station	1420ft/433m	1.21	0.055	5.50	8.00	<1	<1		
	83	5-Mar	13:54	Riverside Dr	1420ft/433m	0.93	0.093	6.80	8.01	<1	<1		
	84	8-Mar	13:15	4300 Lakeside Rd	1420ft/433m	0.71	0.123	7.10	8.13			A	A
	85	8-Mar	13:45	Randolph Rd Stn	1650ft/503m	0.84	0.048	6.80	7.94			A	A
	86	8-Mar	14:01	1900 Penticton Ave (WTP)	1650ft/503m	0.96	0.067	9.90	7.90			A	A
	87	12-Mar	10:26	4300 Lakeside Rd	1420ft/433m	0.76	0.065	7.10	7.96	<1	<1		
	88	12-Mar	10:50	Elm Ave Test Stn	1420ft/433m	0.76	0.170	6.70	7.95	<1	<1		
	89	12-Mar	11:20	Wiltse Blvd Test Stn	1620ft/494m	0.63	0.160	5.70	8.00	<1	<1		
	90	12-Mar	13:18	Carmi Station	1820ft/555m	0.60	0.161	6.90	7.98	<1	<1		
	91	12-Mar	13:34	Lawrence Ave Test Stn	2020ft/616m	0.39	0.055	5.60	7.94	<1	<1		
	92	12-Mar	13:58	Riverside Dr	1420ft/433m	0.90	0.068	6.80	7.96	<1	<1		
	93	15-Mar	10:43	Valleyview Test Station	1620ft/494m	0.41	0.239	5.90	7.99			A	A
	94	15-Mar	11:03	Smythe Test Station	1420ft/433m	0.60	0.052	7.10	7.91			A	A
	95	15-Mar	11:28	Timmins Test Station	1420ft/433m	1.20	0.044	5.80	7.93			A	A
	96	19-Mar	13:20	Smythe Test Station	1420ft/433m	0.60	0.058	7.70	8.11	<1	<1		
	97	19-Mar	13:41	Gordon Ave Stn	1820ft/555m	0.67	0.155	7.70	7.99	<1	<1		
	98	19-Mar	13:58	Wiltse Blvd Test Stn	1620ft/494m	0.65	0.130	6.60	7.95	<1	<1		
	99	19-Mar	13:17	Riverside Dr	1420ft/433m	1.01	0.066	7.60	7.93	<1	<1		
	100	19-Mar	13:51	Randolph Rd Stn	1650ft/503m	0.91	0.073	6.20	7.93	<1	<1		
	101	19-Mar	14:22	Lawrence Ave Test Stn	2020ft/616m	0.44	0.047	6.90	7.78	<1	<1		
	102	21-Mar	11:32	Randolph Rd Stn	1650ft/503m	1.00	0.052	6.20	8.00			A	A
	103	21-Mar	12:55	1900 Penticton Ave (WTP)	1650ft/503m	1.00	0.094	8.20	8.02			A	A
	104	21-Mar	13:44	Carmi Station	1820ft/555m	0.69	0.205	8.40	8.05			A	A
	105	26-Mar	13:24	Lawrence Ave Test Stn	2020ft/616m	0.44	0.080	7.20	8.20	<1	<1		
	106	26-Mar	13:55	Randolph Rd Stn	1650ft/503m	0.83	0.070	6.60	8.10	<1	<1		
	107	26-Mar	13:15	4300 Lakeside Rd	1420ft/433m	0.67	0.066	9.00	7.94	<1	<1		
	108	26-Mar	14:00	Valley View	1620ft/494m	0.47	0.165	8.00	7.99	<1	<1		
	109	26-Mar	14:20	Gordon	1820ft/555m	0.47	0.113	8.30	8.02	<1	<1		
April	110	2-Apr	11:14	Smythe Dr	1420ft/433m	0.63	0.046	9.40	7.89	<1	<1		
	111	2-Apr	11:35	Wiltse Blvd	1620ft/494m	0.81	0.605	8.10	7.95	<1	<1		
	112	2-Apr	11:59	Lawrence Ave	2020ft/616m	0.57	0.041	8.50	7.95	<1	<1		
	113	2-Apr	13:25	Timmins St	1420ft/433m	1.17	0.034	8.40	7.99	<1	<1		
	114	2-Apr	13:43	Riverside Dr	1420ft/433m	0.93	0.048	8.80	7.97	<1	<1		
	115	2-Apr	14:06	Randolph Rd Station	1650ft/503m	0.87	0.034	7.30	7.99	<1	<1		
	116	2-Apr	14:37	Carmi Station	1820ft/555m	0.60	0.281	7.90	8.07	<1	<1		
	117	5-Apr	10:31	Gordon	1820ft/555m	0.57	0.079	8.50	8.07			A	A
	118	5-Apr	11:30	Carmi Station	1820ft/555m	0.63	0.146	7.90	7.87			A	A
	119	5-Apr	13:00	1900 Penticton Ave	1650ft/503m	1.02	0.035	9.30	8.21			A	A
	120	9-Apr	10:24	Yards	1650ft/503m	0.76	0.094	10.70	7.93	<1	<1		
	121	9-Apr	11:12	Valleyview	1620ft/494m	0.60	0.172	9.20	8.07	<1	<1		
	122	9-Apr	11:34	Gordon	1820ft/555m	0.49	0.095	9.00	8.12	<1	<1		
	123	9-Apr	13:29	Fairford Bridge	1420ft/433m	1.12	0.108	7.50	7.91	<1	<1		
	124	9-Apr	13:49	Riverside	1420ft/433m	0.96	0.199	8.60	7.93	<1	<1		
	125	9-Apr	14:20	Lawrence	2020ft/616m	0.52	0.041	8.60	7.96	<1	<1		
	126	9-Apr	15:10	1900 Penticton Ave	1650ft/503m	0.96	0.081	8.20	8.11	<1	<1		
	127	12-Apr	10:41	City Yards	1650ft/503m	1.01	0.055	10.10	8.20			A	A
	128	12-Apr	11:35	4300 Lakeside Rd	1420ft/433m	0.89	0.300	10.10	8.20			A	A
	129	12-Apr	11:50	Carmi Station	1820ft/555m	0.87	0.319	9.30	8.10			A	A
	130	16-Apr	10:19	Riverside Drive	1420ft/433m	1.06	0.063	8.80	7.92	<1	<1		
	131	16-Apr	10:45	Randolph Rd Station	1650ft/503m	0.94	0.038	7.50	7.93	<1	<1		
	132	16-Apr	11:19	Smythe Dr	1420ft/433m	0.64	0.061	10.10	7.96	<1	<1		
	133	16-Apr	11:46	Elm Ave	1420ft/433m	0.84	0.092	10.20	7.97	<1	<1		
	134	16-Apr	13:33	Wiltse Blvd	1620ft/494m	0.60	0.266	9.00	8.03	<1	<1		
	135	16-Apr	13:54	Carmi Station	1820ft/555m	0.60	0.096	8.90	8.06	<1	<1		
	136	16-Apr	14:30	1900 Penticton Ave	1650ft/503m	1.03	0.079	8.10	8.02	<1	<1		
	137	19-Apr	12:45	4300 Lakeside Rd	1420ft/433m	1.02	0.140	10.20	8.40			A	A
	138	19-Apr	13:05	Valleyview Test Stn	1620ft/494m	0.50	0.470	9.80	8.30			A	A
	139	19-Apr	14:00	1900 Penticton Ave	1650ft/503m	1.08	0.090	9.60	8.30			A	A
	140	23-Apr	10:23	Yards	1650ft/503m	1.07	0.038	11.00	7.96	<1	<1		
	141	23-Apr	10:50	Smythe Dr	1420ft/433m	0.71	0.048	11.30	7.89	<1	<1		
	142	23-Apr	11:15	Gordon Station	1820ft/555m	0.55	0.052	10.30	7.93	<1	<1		
	143	23-Apr	11:50	Wiltse Blvd	1620ft/494m	0.68	0.550	9.00	7.89	<1	<1		
	144	23-Apr	13:18	Timmins St	1420ft/433m	1.15	0.039	8.70	7.87	<1	<1		
	145	23-Apr	13:37	Riverside Dr	1420ft/433m	0.86	0.073	10.50	7.86	<1	<1		
	146	23-Apr	14:10	Lawrence Ave	2020ft/616m	0.70	0.043	10.10	7.86	<1	<1		
	147	26-Apr	13:30	Ok Lake Station	1420ft/433m	0.99	0.090	9.70	7.93			A	A
	148	26-Apr	14:40	City Yards	1650ft/503m	1.00	0.081	11.40	8.06			A	A
	149	26-Apr	15:35	1900 Penticton Ave	1650ft/503m	1.08	0.067	11.20	8.27			A	A

May	150	4-May	11:58	4300 Lakeside Rd	1420ft/433m	0.97	0.158	11.00	8.00			A	A
	151	4-May	13:59	Lawrence Ave Stn	2020ft/616m	0.74	0.063	9.10	8.15			A	A
	152	4-May	14:23	Randolph Rd Stn	1650ft/503m	0.94	0.052	9.00	8.11			A	A
	153	7-May	12:59	Randolph Rd Stn	1650ft/503m	0.88	0.060	8.50	8.10	<1	<1		
	154	7-May	13:30	Riverside Dr Stn	1420ft/433m	1.03	0.100	9.00	8.10	<1	<1		
	155	7-May	13:47	Timmins St Stn	1420ft/433m	1.17	0.080	8.10	8.10	<1	<1		
	156	7-May	14:20	Lawrence Ave Stn	2020ft/616m	0.69	0.110	9.00	8.10	<1	<1		
	157	7-May	14:40	Carmi Pump House	1820ft/555m	0.60	0.150	9.40	8.10	<1	<1		
	158	7-May	16:12	Smythe Dr Stn	1420ft/433m	0.79	0.120	10.90	8.10	<1	<1		
	159	7-May	16:32	Valleyview Test Stn	1620ft/494m	0.49	0.120	10.30	8.10	<1	<1		
	160	10-May	11:52	Fairford Bridge	1420ft/433m	1.12	0.077	9.00	8.20			A	A
	161	10-May	13:32	Wiltse Blvd	1620ft/494m	0.90	0.365	9.80	8.10			A	A
	162	10-May	13:53	Gordon Station	1820ft/555m	0.67	0.067	10.60	8.20			A	A
	163	14-May	13:16	4300 Lakeside rd	1420ft/433m	1.01	0.182	11.30	8.24	<1	<1		
	164	14-May	13:30	Smythe Dr Stn	1420ft/433m	0.89	0.090	12.70	8.29	<1	<1		
	165	14-May	13:46	Gordon Station	1820ft/555m	0.66	0.066	11.50	8.28	<1	<1		
	166	14-May	14:05	Elm st	1420ft/433m	0.92	0.159	13.60	8.24	<1	<1		
	167	14-May	14:53	Okanagan Lake Pumphouse	1420ft/433m	0.95	0.172	11.00	8.22	<1	<1		
	168	14-May	16:54	1900 Penticton Ave	1650ft/503m	1.12	0.061	7.70	8.26	<1	<1		
	169	14-May	16:30	Lawrence Ave Stn	2020ft/616m	0.74	0.110	9.70	8.30	<1	<1		
	170	17-May	10:45	Valleyview Test Stn	1620ft/494m	0.80	0.062	12.60	8.08			A	A
	171	17-May	11:07	Carmi Pump House	1820ft/555m	0.78	0.133	10.50	8.06			A	A
	172	17-May	11:47	Timmins St Stn	1420ft/433m	1.22	0.095	9.40	8.02			A	A
	173	21-May	11:30	Carmi Pump House	1820ft/555m	0.72	0.160	10.60	8.12	<1	<1		
	174	21-May	13:30	Smythe Dr Stn	1420ft/433m	0.68	0.081	13.00	8.07	<1	<1		
	175	21-May	13:55	Wiltse Blvd	1620ft/494m	0.65	0.234	11.00	8.09	<1	<1		
	176	21-May	14:16	Lawrence Ave Stn	2020ft/616m	0.58	0.041	10.70	8.09	<1	<1		
	177	21-May	13:28	Randolph Rd Stn	1650ft/503m	0.98	0.066	9.80	8.06	<1	<1		
	178	21-May	13:47	Riverside Dr Stn	1420ft/433m	1.05	0.111	10.00	8.07	<1	<1		
	179	21-May	14:29	WWTP	1420ft/433m	1.07	0.112	12.90	8.08	<1	<1		
	180	24-May	13:42	Randolph Rd Stn	1650ft/503m	0.87	0.039	9.60	8.10			A	A
	181	24-May	14:04	Fairford Bridge	1420ft/433m	0.98	0.052	11.50	8.10			A	A
	182	24-May	14:23	Gordon Station	1820ft/555m	0.58	0.079	12.00	8.10			A	A
	183	28-May	13:40	Okanagan Lake Pumphouse	1420ft/433m	1.00	0.081	11.60	8.04	<1	<1		
	184	28-May	14:05	Naramata Sample Station	1650ft/503m	0.57	0.101	14.70	8.01	<1	<1		
	185	28-May	14:30	Lawrence Ave Stn	2020ft/616m	0.62	0.038	11.70	8.05	<1	<1		
	186	28-May	13:28	Fairford Bridge	1420ft/433m	1.01	0.081	10.90	8.12	<1	<1		
	187	28-May	13:50	Gordon Station	1820ft/555m	0.62	0.063	11.90	8.11	<1	<1		
	188	28-May	14:06	Valleyview Test Stn	1620ft/494m	0.42	0.082	13.20	8.13	<1	<1		
	189	28-May	14:26	4300 Lakeside Rd	1420ft/433m	0.80	0.381	13.10	8.11	<1	<1		
June	190	4-Jun	10:40	Lawrence Ave Stn	2020ft/616m	0.52	0.038	11.00	8.12	<1	<1		
	191	4-Jun	10:58	Randolph	1650ft/503m	0.93	0.121	10.20	8.11	<1	<1		
	192	4-Jun	11:00	Carmi Stn	1820ft/555m	0.59	0.123	10.80	8.09	<1	<1		
	193	4-Jun	11:22	Riverside Dr	1420ft/433m	0.99	0.122	11.00	8.07	<1	<1		
	194	4-Jun	11:23	Wiltse School	1620ft/494m	0.74	0.212	11.70	8.08	<1	<1		
	195	4-Jun	11:42	Timmins St	1420ft/433m	1.13	0.104	10.70	8.08	<1	<1		
	196	4-Jun	11:43	Smythe Dr	1420ft/433m	0.61	0.056	10.60	8.08	<1	<1		
	197	7-Jun	15:14	Valley View Test Stn	1620ft/494m	0.66	0.110	13.70	8.20			A	A
	198	7-Jun	15:29	Elm St Stn	1420ft/433m	0.84	0.120	12.80	8.10			A	A
	199	7-Jun	16:26	1900 Penticton Ave	1650ft/503m	1.11	0.100	8.30	8.00			A	A
	200	11-Jun	10:45	Smythe Dr	1420ft/433m	0.82	0.221	14.00	8.13	<1	<1		
	201	11-Jun	11:10	Gordon Station	1820ft/555m	0.63	0.066	12.80	8.11	<1	<1		
	202	11-Jun	11:27	Wiltse Blvd	1620ft/494m	1.02	0.150	11.40	8.08	<1	<1		
	203	11-Jun	11:41	Yards	1650ft/503m	1.12	0.069	13.80	8.05	<1	<1		
	204	11-Jun	14:22	Naramata Flush Stn	1650ft/503m	0.44	0.066	15.50	7.99	<1	<1		
	205	11-Jun	14:46	Okanagan Lake Pump	1420ft/433m	1.00	0.217	12.50	8.03	<1	<1		
	206	11-Jun	15:50	Lawrence Ave	2020ft/616m	0.65	0.099	13.10	8.06	<1	<1		
	207	15-Jun	13:00	1946 Harris Dr	2020ft/616m	0.64	0.052	17.30	8.10			A	A
	208	15-Jun	12:54	Carmi Pump Stn	1820ft/555m	0.70	0.110	12.50	8.20			A	A
	209	15-Jun	13:40	Randolph Rd Stn	1650ft/503m	0.95	0.330	10.20	8.20			A	A
	210	18-Jun	11:25	Fairford Bridge	1420ft/433m	0.89	0.051	12.20	8.14	<1	<1		
	211	18-Jun	11:40	Riverside Dr	1420ft/433m	1.02	0.054	11.50	8.09	<1	<1		
	212	18-Jun	13:25	WWTP	1420ft/433m	1.01	0.046	18.70	8.08	<1	<1		
	213	18-Jun	13:57	Smythe Dr	1420ft/433m	0.63	0.067	16.00	8.08	<1	<1		
	214	18-Jun	16:09	Wiltse Blvd	1620ft/494m	0.65	0.109	13.30	8.05	<1	<1		
	215	18-Jun	16:26	Gordon	1820ft/555m	0.58	0.043	13.30	8.12	<1	<1		
	216	18-Jun	16:50	Lawrence Ave	2020ft/616m	0.63	0.035	12.90	8.05	<1	<1		
	217	21-Jun	10:58	Smythe Dr	1420ft/433m	0.93	0.263	15.10	8.13			A	A
	218	21-Jun	11:22	Carmi Pump Stn	1820ft/555m	0.69	0.131	11.20	8.08			A	A
	219	21-Jun	13:42	Randolph Rd Stn	1650ft/503m	0.86	0.085	12.30	8.02			A	A
	220	25-Jun	10:13	1900 Penticton Ave	1650ft/503m	1.09	0.028	11.40	8.12	<1	<1		
	221	25-Jun	13:10	Randolph Stn	1650ft/503m	0.96	0.031	12.10	8.17	<1	<1		
	222	25-Jun	13:25	Valley View	1620ft/494m	0.55	0.038	15.70	8.10	<1	<1		
	223	25-Jun	13:35	Riverside Stn	1420ft/433m	1.14	0.049	11.70	8.10	<1	<1		
	224	25-Jun	13:45	4300 Lakeside Rd	1420ft/433m	0.96	0.656	14.80	8.08	<1	<1		
	225	25-Jun	14:00	Lawrence Ave	2020ft/616m	0.66	0.039	12.80	8.11	<1	<1		
	226	25-Jun	14:10	Carmi Station	1820ft/555m	0.69	0.087	12.70	8.09	<1	<1		
	227	28-Jun	11:05	Gordon Ave Stn	1820ft/555m	0.96	0.051	12.20	8.13			A	A
	228	28-Jun	11:27	Timmins St Stn	1420ft/433m	1.18	0.059	11.00	8.09			A	A
	229	28-Jun	11:46	Randolph Rd Stn	1650ft/503m	0.83	0.052	11.70	8.07			A	A

July	230	2-Jul	10:55	Randolph Rd Stn	1650ft/503m	0.90	0.033	11.90	8.10	<1	<1		
	231	2-Jul	11:48	Community Centre	1420ft/433m	0.99	0.047	14.90	8.06	<1	<1		
	232	2-Jul	13:25	Fairford Bridge Stn	1420ft/433m	1.04	0.312	13.60	8.11	<1	<1		
	233	2-Jul	13:45	Gordon Ave Stn	1820ft/555m	0.64	0.061	14.10	8.05	<1	<1		
	234	2-Jul	14:21	Valleyview Test Stn	1620ft/494m	0.43	0.043	16.50	8.03	<1	<1		
	235	2-Jul	14:35	Smythe Dr Stn	1420ft/433m	0.62	0.073	16.90	8.09	<1	<1		
	236	2-Jul	15:00	Lawrence Ave Stn	2020ft/616m	0.69	0.054	13.80	8.03	<1	<1		
	237	5-Jul	13:35	Carmi Ave Stn	1820ft/555m	0.64	0.103	13.30	8.13			A	A
	238	5-Jul	13:50	Wiltse School Stn	1620ft/494m	0.89	0.111	13.10	8.14			A	A
	239	5-Jul	14:10	4300 Lakeside Rd	1420ft/433m	0.76	0.112	17.20	8.10			A	A
	240	9-Jul	10:45	Randolph Rd Stn	1650ft/503m	1.09	0.042	12.50	8.00	<1	<1		
	241	9-Jul	11:10	Ok Lake Pumphouse	1420ft/433m	0.92	0.066	14.20	7.99	<1	<1		
	242	9-Jul	11:28	AWWTP	1420ft/433m	0.66	0.052	20.40	8.00	<1	<1		
	243	9-Jul	13:15	Smythe Dr Stn	1420ft/433m	0.60	0.071	11.00	8.00	<1	<1		
	244	9-Jul	13:34	Valleyview Test Stn	1650ft/503m	0.57	0.061	18.60	8.02	<1	<1		
	245	9-Jul	13:50	Gordon Ave Stn	1820ft/555m	0.59	0.041	14.80	8.00	<1	<1		
	246	9-Jul	14:10	Lawrence Ave Stn	2020ft/616m	0.58	0.052	14.50	8.03	<1	<1		
	247	12-Jul	11:00	Lawrence Ave Stn	2020ft/616m	0.64	0.068	13.30	8.00			A	A
	248	12-Jul	11:20	4300 Lakeside Rd	1420ft/433m	0.90	0.307	18.40	7.99			A	A
	249	12-Jul	11:45	Riverside Dr STN	1420ft/433m	1.03	0.118	12.90	8.02			A	A
	250	16-Jul	10:30	Smythe Dr Stn	1420ft/433m	0.73	0.061	17.50	8.06	<1	<1		
	251	16-Jul	11:45	Valleyview Test Stn	1620ft/494m	0.35	0.042	20.10	8.03	Overgrown	Overgrown		
	252	16-Jul	13:20	Carmi Ave Stn	1820ft/555m	0.71	0.038	13.40	8.01	<1	<1		
	253	16-Jul	13:35	Lawrence Ave Stn	2020ft/616m	0.57	0.057	15.30	7.99	<1	<1		
	254	16-Jul	13:55	Randolph Rd Stn	1650ft/503m	0.90	0.043	14.80	7.97	<1	<1		
	255	16-Jul	14:30	Fairford Bridge Stn	1420ft/433m	1.08	0.068	13.70	7.99	<1	<1		
	256	16-Jul	14:45	Riverside Dr STN	1420ft/433m	0.92	0.062	13.80	8.00	<1	<1		
	257	18-Jul		Valley View Resample	1620ft/494m	0.27	0.122	20.10	8.18			0.00	0.00
	258	18-Jul		Valley View Resample	1620ft/494m	0.27	0.122	20.10	8.18			0.00	0.00
	259	19-Jul	11:40	1946 Harris Dr.	2020ft/616m	7.60	0.054	19.40	8.01			A	A
	260	19-Jul	15:00	Naramata Rd Stn	1650ft/503m	0.56	0.053	23.50	8.04			A	A
	261	19-Jul	15:48	Smythe Dr Stn	1420ft/433m	0.25	0.058	18.90	7.97			A	A
	262	23-Jul	13:30	Randolph Rd Stn	1650ft/503m	0.71	0.046	14.20	7.98	<1	<1		
	263	23-Jul	14:00	Timmins St Stn	1420ft/433m	0.99	0.051	14.30	8.03	<1	<1		
	264	23-Jul	14:40	Lawrence Ave Stn	2020ft/616m	1.15	0.064	15.80	8.01	<1	<1		
	265	23-Jul	13:57	Wiltse School Stn	1620ft/494m	0.57	0.140	12.70	8.00	<1	<1		
	266	23-Jul	14:55	Valleyview Test Stn	1620ft/494m	0.55	0.090	18.70	8.00	<1	<1		
	267	23-Jul	16:46	Smythe Dr Stn	1420ft/433m	0.22	0.190	18.80	7.90	<1	<1		
	268	24-Jul	7:30	1900 Penticton Ave	1650ft/503m	0.65	0.104	10.40	8.01	<1	<1		
	269	30-Jul	8:50	Lawrence Ave Stn	2020ft/616m	1.08	0.153	13.50	8.02	<1	<1		
	270	30-Jul	9:25	Naramata Rd Stn	1650ft/503m	0.69	0.052	21.90	7.99	<1	<1		
	271	30-Jul	10:10	AWWTP	1420ft/433m	0.28	0.061	20.50	7.97	<1	<1		
August	272	2-Aug	11:15	Fairford Bridge Stn	1420ft/433m	1.08	0.560	14.40	8.03			A	A
	273	2-Aug	11:40	Gordon Stn	1820ft/555m	0.73	0.136	15.20	8.05			A	A
	274	2-Aug	13:25	Naramata rd Stn	1650ft/503m	0.28	0.063	22.40	8.02			A	A
	275	6-Aug	11:00	Gordon Stn	1820ft/555m	0.63	0.051	15.20	8.02	<1	<1		
	276	6-Aug	11:35	Smythe Dr Stn	1420ft/433m	0.59	0.067	18.40	8.00	<1	<1		
	277	6-Aug	12:05	Randolph Rd Stn	1650ft/503m	0.89	0.061	14.90	7.93	<1	<1		
	278	6-Aug	13:15	Okanagan Lake Pumphouse	1420ft/433m	0.73	0.053	16.40	7.98	<1	<1		
	279	6-Aug	13:35	Riverside Dr Stn	1420ft/433m	1.00	0.123	15.10	8.00	<1	<1		
	280	6-Aug	13:50	Timmins St Stn	1420ft/433m	1.18	0.104	14.10	7.91	<1	<1		
	281	6-Aug	14:10	Lawrence Ave Stn	2020ft/616m	0.62	0.064	15.90	7.98	<1	<1		
	282	9-Aug	15:24	Lawrence Ave Stn	2020ft/616m	0.71	0.100	15.30	8.10			A	A
	283	9-Aug	17:20	1900 Penticton Ave	1650ft/503m	1.14	0.080	13.90	8.10			A	A
	284	13-Aug	11:12	City Hall Lunch Room	1420ft/433m	1.13	0.086	16.70	8.02	<1	<1		
	285	13-Aug	11:26	Community Centre	1420ft/433m	0.67	0.097	22.80	8.06	<1	<1		
	286	13-Aug	11:53	AWWTP	1420ft/433m	0.69	0.355	22.50	7.99	<1	<1		
	287	13-Aug	13:25	Carmi Stn	1820ft/555m	0.43	0.180	15.60	7.96	<1	<1		
	288	13-Aug	13:40	Lawrence Ave Stn	2020ft/616m	0.69	0.093	16.20	7.97	<1	<1		
	289	13-Aug	14:20	Skaha Beach H2O Stn	1420ft/433m	0.97	0.041	15.70	8.03	<1	<1		
	290	13-Aug	14:50	1900 Penticton Ave	1650ft/503m	1.31	0.039	16.10	8.00	<1	<1		
	291	16-Aug	11:25	Randolph Rd Stn	1650ft/503m	0.87	0.074	15.20	8.00			A	A
	292	16-Aug	11:52	Gordon Stn	1820ft/555m	0.70	0.108	15.20	8.13			A	A
	293	20-Aug	10:30	Smythe Dr Stn	1420ft/433m	0.69	0.070	18.70	8.00	<1	<1		
	294	20-Aug	10:50	Valleyview dr. Stn	1620ft/494m	0.36	0.051	21.70	8.01	<1	<1		
	295	20-Aug	11:10	Fairford Bridge Stn	1420ft/433m	1.20	0.044	14.30	7.98	<1	<1		
	296	20-Aug	11:40	Riverside Dr Stn	1420ft/433m	1.09	0.161	14.20	7.96	<1	<1		
	297	20-Aug	13:25	Naramata rd Stn	1420ft/433m	0.28	0.082	22.80	8.07	<1	<1		
	298	20-Aug	14:05	Carmi Stn	1820ft/555m	0.50	0.067	15.00	8.05	<1	<1		
	299	20-Aug	14:25	Lawrence Ave Stn	2020ft/616m	0.58	0.049	16.10	8.00	<1	<1		
	300	23-Aug	12:08	Naramata rd Stn	1650ft/503m	0.39	0.160	21.80	8.00			A	A
	301	24-Aug	17:15	1900 Penticton Ave	1650ft/503m	1.10	0.130	12.00	8.10			A	A
	302	27-Aug	10:45	Randolph Rd Stn	1650ft/503m	0.93	0.071	14.40	8.01	<1	<1		
	303	27-Aug	11:10	Timmins St Stn	1420ft/433m	1.25	0.078	13.90	7.99	<1	<1		
	304	27-Aug	11:45	Smythe Dr Stn	1420ft/433m	0.77	0.107	19.00	7.98	<1	<1		
	305	27-Aug	13:30	Gordon Stn	1820ft/555m	0.63	0.077	15.10	8.04	<1	<1		
	306	27-Aug	13:45	Wiltse School	1820ft/555m	0.75	0.216	13.40	7.99	<1	<1		
	307	27-Aug	14:10	Lawrence Ave Stn	2020ft/616m	0.66	0.042	14.90	7.96	<1	<1		
	308	28-Aug	8:10	1900 Penticton Ave	1620ft/494m	0.92	0.047	14.90	7.98	<1	<1		
	309	30-Aug	11:40	Riverside Dr Stn	1420ft/433m	1.10	0.124	14.00	8.08			A	A
	310	30-Aug	12:00	Carmi Stn	1820ft/555m	0.51	0.091	14.80	8.01			A	A
	311	30-Aug	13:30	Valleyview dr. Stn	1650ft/503m	0.34	0.098	20.10	7.98			A	A

September	312	3-Sep	12:05	Randolph Rd Stn	1650ft/503m	0.86	0.039	14.60	8.08	<1	<1		
	313	3-Sep	12:30	Riverside Dr Stn	1420ft/433m	1.12	0.058	14.30	8.07	<1	<1		
	314	3-Sep	12:53	Fairford Bridge	1420ft/433m	1.00	0.040	14.80	8.04	<1	<1		
	315	3-Sep	13:17	4300 Lakeside Rd	1420ft/433m	1.08	1.610	18.70	7.96	<1	<1		
	316	3-Sep	13:30	Gordon Ave Stn	1820ft/555m	0.64	0.056	15.00	8.07	<1	<1		
	317	3-Sep	13:52	City Yards	1650ft/503m	1.06	0.095	20.10	7.97	<1	<1		
	318	3-Sep	14:05	Carmi Stn	1820ft/555m	0.55	0.093	14.70	8.01	<1	<1		
	319	6-Sep	10:40	Lawrence Ave Stn	2020ft/616m	0.62	0.060	13.90	7.96			A	A
	320	6-Sep	11:43	Naramata Rd.	1650ft/503m	0.38	0.043	21.10	8.02			A	A
	321	6-Sep	12:30	Smythe Dr.	1420ft/433m	0.86	0.062	19.00	7.96			A	A
	322	10-Sep	11:50	Lawrence Ave Stn	2020ft/616m	0.64	0.037	14.70	7.96	<1	<1		
	323	10-Sep	12:20	Gordon Ave Stn	1820ft/555m	1.06	0.034	14.60	7.94	<1	<1		
	324	10-Sep	13:16	Valleyview Test Stn	1620ft/494m	0.34	0.068	20.60	8.01	<1	<1		
	325	10-Sep	11:54	Randolph Rd Stn	1650ft/503m	0.89	0.037	14.70	7.90	<1	<1		
	326	10-Sep	12:25	Okanagan Lake Pumpstation	1420ft/433m	0.98	0.062	20.10	7.91	<1	<1		
	327	10-Sep	12:45	Riverside Dr Stn	1420ft/433m	1.19	0.046	14.40	7.93	<1	<1		
	328	10-Sep	13:05	Community Centre Lunch Room	1420ft/433m	1.15	0.075	16.00	7.87	<1	<1		
	329	13-Sep	10:58	WWTP	1420ft/433m	0.81	0.040	17.00	7.98			A	A
	330	13-Sep	11:23	Wiltse School Stn	1620ft/494m	0.73	0.064	14.80	7.95			A	A
	331	13-Sep	11:45	4300 Lakeside Rd	1420ft/433m	1.08	0.065	16.80	7.94			A	A
	332	13-Sep	16:14	4-597 Martin	1420ft/433m	1.07	0.043	17.10	8.01			0.00	1.00
	333	13-Sep	16:14	4-597 Martin	1420ft/433m	1.07	0.043	17.10	8.01			0.00	2.00
	334	14-Sep	11:27	579 Martin	1420ft/433m	1.12	0.067	18.10	7.88			0.00	0.00
	335	14-Sep	11:55	Penticton Library	1420ft/433m	1.06	0.090	21.40	7.87			0.00	0.00
	336	14-Sep	12:42	1-597 Martin	1420ft/433m	1.39	0.234	12.40	7.86			0.00	0.00
	337	14-Sep	12:50	2-597 Martin	1420ft/433m	1.32						0.00	0.00
	338	14-Sep	13:00	4-597 Martin	1420ft/433m	1.40						0.00	0.00
	339	14-Sep	13:10	570 Martin	1420ft/433m	1.27	0.090	13.20	7.88			0.00	0.00
	340	17-Sep	9:40	Naramata Rd. Stn	1650ft/503m	0.47	0.049	20.40	7.99	<1	<1		
	341	17-Sep	10:38	Timmins St. Stn	1420ft/433m	1.24	0.060	13.70	7.97	<1	<1		
	342	17-Sep	10:56	Fairford Bridge Stn	1420ft/433m	1.09	0.051	14.60	7.94	<1	<1		
	343	17-Sep	11:40	Lawrence Ave Stn	2020ft/616m	0.73	0.057	14.70	7.91	<1	<1		
	344	17-Sep	11:57	Carmi Stn	1820ft/555m	0.53	0.092	14.10	7.95	<1	<1		
	345	17-Sep	12:40	Valleyview Stn	1620ft/494m	0.30	0.076	20.00	7.98	<1	<1		
	346	17-Sep	13:05	Smyth Dr	1420ft/433m	0.80	0.328	18.30	7.96	<1	<1		
	347	20-Sep	11:26	Randolph Rd Stn	1650ft/503m	0.90	0.120	14.30	7.90			A	A
	348	20-Sep	12:05	Riverside Dr Stn	1420ft/433m	1.05	0.090	13.90	8.00			A	A
	349	20-Sep	13:17	Gordon Ave Stn	1820ft/555m	0.63	0.100	15.00	8.00			A	A
	350	24-Sep	10:35	Randolph Rd Stn	1650ft/503m	0.90	0.070	13.90	8.10	<1	<1		
	351	24-Sep	11:10	City Hall Lunch Room	1420ft/433m	0.92	0.090	16.80	8.10	<1	<1		
	352	24-Sep	11:36	Columbia School Lunch Room	1820ft/555m	1.18	0.110	12.60	8.00	<1	<1		
	353	24-Sep	14:07	Lawrence Ave Stn	2020ft/616m	0.69	0.110	15.40	8.00	<1	<1		
	354	24-Sep	14:40	4300 Lakeside Rd Stn	1420ft/433m	1.02	0.130	17.20	7.90	<1	<1		
October	355	1-Oct	11:06	Naramata Rd Stn	1650ft/503m	0.57	0.130	18.90	8.20	<1	<1		
	356	1-Oct	11:36	Riverside Dr Stn	1420ft/433m	1.12	0.130	13.00	8.20	<1	<1		
	357	1-Oct	11:59	Lawrence Ave Stn	2020ft/616m	0.56	0.150	13.00	8.20	<1	<1		
	358	1-Oct	12:15	Carmi Pump Stn	1820ft/555m	0.79	0.160	12.50	8.10	<1	<1		
	359	1-Oct	13:36	Valleyview Test Stn	1620ft/494m	0.33	0.130	17.90	8.20	<1	<1		
	360	1-Oct	13:55	Smythe Dr Stn	1420ft/433m	0.80	0.015	17.10	8.10	<1	<1		
	361	4-Oct	11:06	Randolph Rd Stn	1650ft/503m	0.91	0.285	13.10	7.97			A	A
	362	4-Oct	13:33	Gordon Ave Stn	1820ft/555m	0.63	0.054	13.30	8.01			A	A
	363	4-Oct	14:07	Elm Stn	1420ft/433m	0.90	0.177	13.80	7.99			A	A
	364	8-Oct	13:18	Randolph Rd Stn	1650ft/503m	0.92	0.060	11.80	7.95	<1	<1		
	365	8-Oct	13:34	Lake Pump Stn	1420ft/433m	0.86	0.172	13.50	7.92	<1	<1		
	366	8-Oct	13:46	Riverside Dr Stn	1420ft/433m	1.00	0.046	13.80	7.92	<1	<1		
	367	8-Oct	14:07	Gordon Ave Stn	1820ft/555m	0.61	0.051	13.60	7.97	<1	<1		
	368	8-Oct	14:20	City Yards	1650ft/503m	0.72	0.206	16.80	7.91	<1	<1		
	369	8-Oct	11:50	1900 Penticton Ave	1650ft/503m	1.08	0.037	9.80	7.87	<1	<1		
	370	10-Oct	11:18	Timmins St Stn	1420ft/433m	1.20	0.110	10.80	8.20			A	A
	371	15-Oct	11:45	Naramata Rd Stn	1650ft/503m	0.39	0.068	17.30	8.05	<1	<1		
	372	15-Oct	13:30	WWTP	1420ft/433m	0.81	0.059	16.70	7.86	<1	<1		
	373	15-Oct	14:05	4300 Lakeside Rd	1420ft/433m	0.79	0.094	15.10	7.93	<1	<1		
	374	15-Oct	14:30	Wiltse Blvd Stn	1620ft/494m	0.55	0.087	13.40	7.90	<1	<1		
	375	15-Oct	14:40	Carmi Pump Stn	1820ft/555m	0.90	0.077	12.10	7.90	<1	<1		
	376	15-Oct	14:52	Lawrence Ave Stn	2020ft/616m	0.63	0.076	13.60	7.89	<1	<1		
	377	18-Oct	11:45	Randolph Rd Stn	1650ft/503m	0.78	0.120	12.30	7.90			A	A
	378	22-Oct	10:45	Randolph Rd Stn	1650ft/503m	0.80	0.037	11.20	7.97	<1	<1		
	379	22-Oct	11:07	Riverside Dr Stn	1420ft/433m	0.83	0.072	13.50	7.97	<1	<1		
	380	22-Oct	11:24	Timmins St Stn	1420ft/433m	1.09	0.049	12.10	7.94	<1	<1		
	381	22-Oct	11:36	Fairford Bridge Stn	1420ft/433m	0.85	0.386	13.00	7.96	<1	<1		
	382	22-Oct	13:44	Smythe Dr Stn	1420ft/433m	0.44	0.077	15.70	7.91	<1	<1		
	383	22-Oct	14:14	Lawrence Ave Stn	2020ft/616m	0.36	0.052	13.20	7.94	<1	<1		
	384	29-Oct	13:44	City Yards	1650ft/503m	0.90	0.101	14.10	7.92	<1	<1		
	385	29-Oct	13:54	Wiltse School STN	1620ft/494m	0.51	0.105	12.30	7.97	<1	<1		
	386	29-Oct	14:07	Gordon STN	1820ft/555m	0.33	0.114	12.50	8.01	<1	<1		
	387	29-Oct	14:20	OK Lake Pumphouse	1420ft/433m	0.80	0.083	11.90	7.92	<1	<1		
	388	29-Oct	14:50	Randolph STN	1650ft/503m	0.82	0.069	11.00	7.94	<1	<1		
	389	29-Oct	15:13	Lawrence Ave STN	2020ft/616m	0.27	0.088	13.70	7.95	<1	<1		

November	390	1-Nov	11:02	4300 Lakeside Rd	1420ft/433m	0.57	0.475	13.70	7.91			A	A
	391	1-Nov	11:35	Carmi Reservoir	1820ft/555m	0.40	0.146	11.00	7.94			A	A
	392	1-Nov	11:55	1900 Penticton Ave	1650ft/503m	0.86	0.082	14.30	7.93			A	A
	393	5-Nov	11:08	Gordon Ave STN	1820ft/555m	0.27	0.076	12.20	8.01	<1	<1		
	394	5-Nov	12:03	WWTP	1420ft/433m	0.77	0.086	13.10	7.95	<1	<1		
	395	5-Nov	12:31	Community Centre Lunch Room	1420ft/433m	0.89	0.057	13.60	7.93	<1	<1		
	396	5-Nov	12:57	City Hall Lunch Room	1420ft/433m	0.61	0.091	14.70	7.95	<1	<1		
	397	5-Nov	13:12	OK Lake Pumphouse STN	1420ft/433m	0.81	0.098	11.60	7.95	<1	<1		
	398	5-Nov	13:55	Carmi Ave STN	1820ft/555m	0.40	0.156	11.00	7.97	<1	<1		
	399	8-Nov	9:00	Naramata Rd Stn	1650ft/503m	0.23	0.058	12.80	7.85			A	A
	400	8-Nov	9:25	Lake Pump Stn	1420ft/433m	0.82	0.075	11.50	7.88			A	A
	401	8-Nov	10:01	Carmi Stn	1820ft/555m	0.35	0.120	11.70	7.87			A	A
	402	12-Nov	11:35	Smythe Dr Stn	1420ft/433m	0.39	0.090	13.20	8.10	<1	<1		
	403	12-Nov	11:58	Wiltse Blvd Stn	1620ft/494m	0.97	0.220	8.80	8.10	<1	<1		
	404	12-Nov	12:18	Carmi Pump House	1820ft/555m	0.39	0.100	10.00	8.10	<1	<1		
	405	12-Nov	12:31	Lawrence Ave Stn	2020ft/616m	0.29	0.080	11.60	8.10	<1	<1		
	406	12-Nov	14:20	Riverside Dr Stn	1420ft/433m	0.89	0.110	10.80	8.10	<1	<1		
	407	12-Nov	14:50	Naramata Rd Stn	1650ft/503m	0.22	0.080	12.80	8.00	<1	<1		
	408	15-Nov	14:39	1900 Penticton Ave	1650ft/503m	0.89	0.100	13.30	8.02			A	A
	409	15-Nov	15:37	Carmi Stn	1820ft/555m	0.37	0.078	10.60	8.07			A	A
	410	15-Nov	16:02	1946 Harris Dr	2020ft/616m	0.16	0.076	14.00	8.06			A	A
	411	19-Nov	14:10	Naramata Rd Stn	1650ft/503m	0.29	0.047	11.60	8.06	<1	<1		
	412	19-Nov	11:51	Smythe Dr Stn	1420ft/433m	0.42	0.100	12.50	8.10	<1	<1		
	413	19-Nov	12:20	Gordon Ave Stn	1820ft/555m	0.51	0.120	10.00	8.10	<1	<1		
	414	19-Nov	13:40	City Yards	1650ft/503m	0.95	0.190	10.40	8.10	<1	<1		
	415	19-Nov	14:00	Lawrence Ave Stn	2020ft/616m	0.35	0.090	10.30	8.10	<1	<1		
	416	19-Nov	14:47	1900 Penticton Ave	1650ft/503m	0.98	0.082	10.30	7.80	<1	<1		
	417	22-Nov	13:32	1946 Harris Dr	2020ft/616m	0.21	0.057	12.80	7.95			A	A
	418	22-Nov	14:05	Randolph Rd. STN	1650ft/503m	0.72	0.044	10.10	7.86			A	A
	419	22-Nov	14:20	City Hall Lunch Room	1420ft/433m	0.79	0.102	18.20	7.89			A	A
	420	26-Nov	10:45	Naramata Rd Stn	1650ft/503m	0.30	0.029	10.40	8.02	<1	<1		
	421	26-Nov	11:45	1900 Penticton Ave	1650ft/503m	0.98	0.037	11.70	7.97	<1	<1		
	422	26-Nov	14:00	Smythe Dr Stn	1420ft/433m	0.48	0.064	10.80	8.01	<1	<1		
	423	26-Nov	14:25	Timmins Street Sample Stn	1420ft/433m	1.28	0.058	8.40	7.98	<1	<1		
	424	29-Nov	11:54	Carmi STN	1820ft/555m	0.49	0.110	9.30	8.00			A	A
December	425	3-Dec	11:00	Naramata Stn	1650ft/503m	0.38	0.041	9.60	8.04	<1	<1		
	426	3-Dec	11:25	Okanagan Lake Pump House	1420ft/433m	0.87	0.084	9.00	8.00	<1	<1		
	427	3-Dec	13:25	AWWTP	1420ft/433m	0.89	0.047	10.10	8.01	<1	<1		
	428	3-Dec	14:15	4300 Lakesid Rd	1420ft/433m	0.65	0.258	10.10	8.04	<1	<1		
	429	3-Dec	14:25	Wiltse sample stn	1620ft/494m	0.53	0.083	8.10	8.08	<1	<1		
	430	3-Dec	14:45	Carmi Pump House	1820ft/555m	0.42	0.278	9.70	8.10	<1	<1		
	431	3-Dec	15:00	Lawrence sample stn	1820ft/616m	0.46	0.038	7.80	8.09	<1	<1		
	432	6-Dec	12:00	Randolph Rd Stn	1650ft/503m	0.84	0.110	8.30	8.00			A	A
	433	6-Dec	12:45	Okanagan Lake Pump House	1420ft/433m	0.94	0.100	7.90	8.00			A	A
	434	6-Dec	13:21	Carmi Pump House	1820ft/555m	0.54	0.120	7.30	8.00			A	A
	435	6-Dec	14:00	1900 Penticton Ave	1650ft/503m	1.07	0.120	12.20	8.00			A	A
	436	10-Dec	14.:48	Carmi Pump House	1820ft/555m	0.48	0.068	10.10	8.15	<1	<1		
	437	10-Dec	15:16	1946 Harris Dr	2020ft/616m	0.35	0.040	11.00	8.12	<1	<1		
	438	10-Dec	15:42	Randolph Rd Stn	1650ft/503m	0.80	0.027	7.20	8.05	<1	<1		
	439	10-Dec	17:09	1900 Penticton Ave	1650ft/503m	0.87	0.068	12.50	8.10	<1	<1		
	440	10-Dec	14:41	4300 Lakeside Rd.	1420ft/433m	0.54	0.133	9.30	8.12	<1	<1		
	441	10-Dec	15:00	Wiltse sample stn	1620ft/494m	0.53	0.075	7.60	8.10	<1	<1		
	442	10-Dec	15:20	Gordon Ave Stn	1820ft/555m	0.44	0.075	8.00	8.13	<1	<1		
	443	14-Dec	13:30	Gordon	1820ft/555m	0.41	0.074	7.70	8.09			A	A
	444	14-Dec	13:50	Carmi	1820ft/555m	0.48	0.129	8.90	8.08			A	A
	445	14-Dec	14:13	Lake Pump Stn	1620ft/494m	0.96	0.069	7.90	8.02			A	A
	446	14-Dec	14:40	1900 Penticton Ave	1650ft/503m	1.03	0.237	8.40	8.03			A	A
	447	17-Dec	10:40	Randolph Rd. STN	1650ft/503m	0.89	0.039	8.20	7.98	<1	<1		
	448	17-Dec	11:05	OK Lake Pump STN	1420ft/433m	0.98	0.064	7.40	8.00	<1	<1		
	449	17-Dec	11:45	Naramata Rd. STN	1650ft/503m	0.40	0.062	9.40	7.98	<1	<1		
	450	17-Dec	12:15	Community Centre Lunch Room	1420ft/433m	1.04	0.054	8.90	8.02	<1	<1		
	451	17-Dec	12:45	4300 Lakeside Rd. STN	1420ft/433m	0.78	0.126	8.50	8.00	<1	<1		
	452	17-Dec	13:05	Gordon STN	1820ft/555m	0.47	0.072	7.20	8.06	<1	<1		
	453	17-Dec	13:25	Wiltse School STN	1620ft/494m	0.54	0.120	7.20	8.05	<1	<1		
	454	20-Dec	15:00	Gordon Ave Stn	1820ft/555m	0.50	0.130	7.00	8.10			A	A
	455	20-Dec	15:25	Randolph Rd Stn	1650ft/503m	0.90	0.070	7.10	8.10			A	A
	456	20-Dec	16:05	1900 Penticton Ave	1650ft/503m	1.09	0.080	6.00	8.10			A	A
	457	27-Dec	11:45	1900 Penticton Ave	1650ft/503m	1.05	0.073	7.80	8.19			A	A
	458	27-Dec	13:10	1946 Harris Dr	2020ft/616m	0.39	0.047	9.60	8.15			A	A
	459	27-Dec	14:46	Randolph Rd. STN	1650ft/503m	0.92	0.043	6.30	8.09			A	A
Annual													
Average						0.78	0.11	11.43	8.00				
n						459							

CERTIFICATE OF ANALYSIS

REPORTED TO Penticton, City of - DW & STP
171 Main Street
PENTICTON, BC V2A 5A9

ATTENTION Alistair Wardlaw

PO NUMBER

PROJECT Quarterly Samples

PROJECT INFO OPR178-025

WORK ORDER 24B0959

RECEIVED / TEMP 2024-02-07 10:11 / 7.1°C

REPORTED 2024-02-15 13:59

COC NUMBER B113333

Introduction:

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If you have any questions or concerns, please contact me at bwhitehead@caro.ca

Authorized By:

Brent Whitehead
Account Manager

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TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24B0959
2024-02-15 13:59

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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PRV Stn (24B0959-01) | Matrix: Water | Sampled: 2024-02-06 11:00

Anions

Chloride	9.90	AO ≤ 250	0.10	mg/L	2024-02-09	
Fluoride	< 0.10	MAC = 1.5	0.10	mg/L	2024-02-09	
Nitrate (as N)	0.041	MAC = 10	0.010	mg/L	2024-02-09	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2024-02-09	
Sulfate	22.0	AO ≤ 500	1.0	mg/L	2024-02-09	

Calculated Parameters

Total Trihalomethanes	0.0364	MAC = 0.1	0.00400	mg/L	N/A	
Hardness, Total (as CaCO ₃)	96.4	None Required	0.500	mg/L	N/A	
Langelier Index	-0.3	N/A	-5.0		2024-02-14	CT6
Nitrogen, Organic	0.0700	N/A	0.0500	mg/L	N/A	
Solids, Total Dissolved	132	AO ≤ 500	1.00	mg/L	N/A	

General Parameters

Alkalinity, Total (as CaCO ₃)	86.6	N/A	1.0	mg/L	2024-02-10	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-02-10	
Alkalinity, Bicarbonate (as CaCO ₃)	86.6	N/A	1.0	mg/L	2024-02-10	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-02-10	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-02-10	
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2024-02-13	
Carbon, Total Organic	4.51	N/A	0.50	mg/L	2024-02-12	
Colour, True	6.4	AO ≤ 15	5.0	CU	2024-02-09	
Conductivity (EC)	240	N/A	2.0	µS/cm	2024-02-10	
Cyanide, Total	< 0.0020	MAC = 0.2	0.0020	mg/L	2024-02-09	
Nitrogen, Total Kjeldahl	0.070	N/A	0.050	mg/L	2024-02-13	
pH	7.89	7.0-10.5	0.10	pH units	2024-02-10	HT2
Phosphorus, Total (as P)	< 0.0050	N/A	0.0050	mg/L	2024-02-12	
Sulfide, Total	< 0.020	AO ≤ 0.05	0.020	mg/L	2024-02-12	
Temperature, at pH	21.3	N/A		°C	2024-02-10	HT2
Turbidity	0.23	OG < 1	0.10	NTU	2024-02-09	
UV Transmittance @ 254 nm - Unfiltered	92.4	N/A	0.10	% T	2024-02-09	

Haloacetic Acids

Monochloroacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-02-13	
Monobromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-02-13	
Dichloroacetic Acid	0.0190	N/A	0.0020	mg/L	2024-02-13	
Trichloroacetic Acid	0.0182	N/A	0.0020	mg/L	2024-02-13	
Dibromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-02-13	
Total Haloacetic Acids (HAA5)	0.0372	MAC = 0.08	0.00200	mg/L	N/A	
Surrogate: 2-Bromopropionic Acid	110		70-130	%	2024-02-13	

Total Metals

Aluminum, total	0.0103	OG < 0.1	0.0050	mg/L	2024-02-13	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2024-02-13	

TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24B0959
2024-02-15 13:59

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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PRV Stn (24B0959-01) | Matrix: Water | Sampled: 2024-02-06 11:00, Continued

Total Metals, Continued

Arsenic, total	< 0.00050	MAC = 0.01	0.00050	mg/L	2024-02-13	
Barium, total	0.0174	MAC = 2	0.0050	mg/L	2024-02-13	
Boron, total	< 0.0500	MAC = 5	0.0500	mg/L	2024-02-13	
Cadmium, total	< 0.000010	MAC = 0.007	0.000010	mg/L	2024-02-14	
Calcium, total	26.7	None Required	0.20	mg/L	2024-02-13	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-02-13	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2024-02-13	
Copper, total	0.00043	MAC = 2	0.00040	mg/L	2024-02-13	
Iron, total	< 0.010	AO ≤ 0.3	0.010	mg/L	2024-02-13	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2024-02-13	
Magnesium, total	7.17	None Required	0.010	mg/L	2024-02-13	
Manganese, total	0.00074	MAC = 0.12	0.00020	mg/L	2024-02-13	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2024-02-14	
Molybdenum, total	0.00256	N/A	0.00010	mg/L	2024-02-13	
Nickel, total	0.00069	N/A	0.00040	mg/L	2024-02-13	
Potassium, total	1.97	N/A	0.10	mg/L	2024-02-13	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-02-13	
Sodium, total	11.4	AO ≤ 200	0.10	mg/L	2024-02-13	
Strontium, total	0.215	MAC = 7	0.0010	mg/L	2024-02-13	
Uranium, total	0.000060	MAC = 0.02	0.000020	mg/L	2024-02-13	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2024-02-13	

Volatile Organic Compounds (VOC)

Bromodichloromethane	0.0022	N/A	0.0010	mg/L	2024-02-13	
Bromoform	< 0.0010	N/A	0.0010	mg/L	2024-02-13	
Chloroform	0.0341	N/A	0.0010	mg/L	2024-02-13	
Dibromochloromethane	< 0.0010	N/A	0.0010	mg/L	2024-02-13	
Surrogate: Toluene-d8	104		70-130	%	2024-02-13	
Surrogate: 4-Bromofluorobenzene	100		70-130	%	2024-02-13	

Carmi Pumpstation (24B0959-02) | Matrix: Water | Sampled: 2024-02-06 11:25

Anions

Chloride	9.63	AO ≤ 250	0.10	mg/L	2024-02-09	
Fluoride	< 0.10	MAC = 1.5	0.10	mg/L	2024-02-09	
Nitrate (as N)	0.043	MAC = 10	0.010	mg/L	2024-02-09	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2024-02-09	
Sulfate	22.1	AO ≤ 500	1.0	mg/L	2024-02-09	

Calculated Parameters

Hardness, Total (as CaCO3)	98.8	None Required	0.500	mg/L	N/A	
Langelier Index	-0.9	N/A	-5.0		2024-02-14	CT6
Nitrogen, Organic	0.0780	N/A	0.0500	mg/L	N/A	

TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24B0959
2024-02-15 13:59

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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Carmi Pumpstation (24B0959-02) | Matrix: Water | Sampled: 2024-02-06 11:25, Continued

Calculated Parameters, Continued

Solids, Total Dissolved	137	AO ≤ 500	1.00	mg/L	N/A	
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General Parameters

Alkalinity, Total (as CaCO ₃)	92.5	N/A	1.0	mg/L	2024-02-10	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-02-10	
Alkalinity, Bicarbonate (as CaCO ₃)	92.5	N/A	1.0	mg/L	2024-02-10	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-02-10	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-02-10	
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2024-02-13	
Carbon, Total Organic	4.14	N/A	0.50	mg/L	2024-02-12	
Colour, True	< 5.0	AO ≤ 15	5.0	CU	2024-02-09	
Conductivity (EC)	241	N/A	2.0	µS/cm	2024-02-10	
Cyanide, Total	< 0.0020	MAC = 0.2	0.0020	mg/L	2024-02-09	
Nitrogen, Total Kjeldahl	0.078	N/A	0.050	mg/L	2024-02-13	
pH	7.24	7.0-10.5	0.10	pH units	2024-02-10	HT2
Phosphorus, Total (as P)	< 0.0050	N/A	0.0050	mg/L	2024-02-12	
Sulfide, Total	< 0.020	AO ≤ 0.05	0.020	mg/L	2024-02-12	
Temperature, at pH	21.0	N/A		°C	2024-02-10	HT2
Turbidity	0.25	OG < 1	0.10	NTU	2024-02-09	
UV Transmittance @ 254 nm - Unfiltered	92.2	N/A	0.10	% T	2024-02-09	

Total Metals

Aluminum, total	0.0119	OG < 0.1	0.0050	mg/L	2024-02-13	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2024-02-13	
Arsenic, total	< 0.00050	MAC = 0.01	0.00050	mg/L	2024-02-13	
Barium, total	0.0177	MAC = 2	0.0050	mg/L	2024-02-13	
Boron, total	< 0.0500	MAC = 5	0.0500	mg/L	2024-02-13	
Cadmium, total	< 0.000010	MAC = 0.007	0.000010	mg/L	2024-02-14	
Calcium, total	27.4	None Required	0.20	mg/L	2024-02-13	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-02-13	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2024-02-13	
Copper, total	0.00214	MAC = 2	0.00040	mg/L	2024-02-13	
Iron, total	0.034	AO ≤ 0.3	0.010	mg/L	2024-02-13	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2024-02-13	
Magnesium, total	7.35	None Required	0.010	mg/L	2024-02-13	
Manganese, total	0.00129	MAC = 0.12	0.00020	mg/L	2024-02-13	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2024-02-14	
Molybdenum, total	0.00260	N/A	0.00010	mg/L	2024-02-13	
Nickel, total	< 0.00040	N/A	0.00040	mg/L	2024-02-13	
Potassium, total	2.03	N/A	0.10	mg/L	2024-02-13	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-02-13	
Sodium, total	11.9	AO ≤ 200	0.10	mg/L	2024-02-13	
Strontium, total	0.226	MAC = 7	0.0010	mg/L	2024-02-13	
Uranium, total	0.000099	MAC = 0.02	0.000020	mg/L	2024-02-13	

TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24B0959
2024-02-15 13:59

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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Carmi Pumpstation (24B0959-02) | Matrix: Water | Sampled: 2024-02-06 11:25, Continued

Total Metals, Continued

Zinc, total	0.0063	AO ≤ 5	0.0040	mg/L	2024-02-13	
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Smythe Dr. Sample Stn (24B0959-03) | Matrix: Water | Sampled: 2024-02-06 11:50

Calculated Parameters

Total Trihalomethanes	0.0645	MAC = 0.1	0.00400	mg/L	N/A	
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Haloacetic Acids

Monochloroacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-02-13	
Monobromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-02-13	
Dichloroacetic Acid	0.0287	N/A	0.0020	mg/L	2024-02-13	
Trichloroacetic Acid	0.0308	N/A	0.0020	mg/L	2024-02-13	
Dibromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-02-13	
Total Haloacetic Acids (HAA5)	0.0594	MAC = 0.08	0.00200	mg/L	N/A	
Surrogate: 2-Bromopropionic Acid	107		70-130	%	2024-02-13	

Volatile Organic Compounds (VOC)

Bromodichloromethane	0.0044	N/A	0.0010	mg/L	2024-02-13	
Bromoform	< 0.0010	N/A	0.0010	mg/L	2024-02-13	
Chloroform	0.0601	N/A	0.0010	mg/L	2024-02-13	
Dibromochloromethane	< 0.0010	N/A	0.0010	mg/L	2024-02-13	
Surrogate: Toluene-d8	105		70-130	%	2024-02-13	
Surrogate: 4-Bromofluorobenzene	102		70-130	%	2024-02-13	

Randolph Rd Station (24B0959-04) | Matrix: Water | Sampled: 2024-02-06 13:10

Calculated Parameters

Total Trihalomethanes	0.0609	MAC = 0.1	0.00400	mg/L	N/A	
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Haloacetic Acids

Monochloroacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-02-13	
Monobromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-02-13	
Dichloroacetic Acid	0.0280	N/A	0.0020	mg/L	2024-02-13	
Trichloroacetic Acid	0.0303	N/A	0.0020	mg/L	2024-02-13	
Dibromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-02-13	
Total Haloacetic Acids (HAA5)	0.0583	MAC = 0.08	0.00200	mg/L	N/A	
Surrogate: 2-Bromopropionic Acid	110		70-130	%	2024-02-13	

Volatile Organic Compounds (VOC)

Bromodichloromethane	0.0038	N/A	0.0010	mg/L	2024-02-13	
Bromoform	< 0.0010	N/A	0.0010	mg/L	2024-02-13	
Chloroform	0.0570	N/A	0.0010	mg/L	2024-02-13	
Dibromochloromethane	< 0.0010	N/A	0.0010	mg/L	2024-02-13	
Surrogate: Toluene-d8	100		70-130	%	2024-02-13	

TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24B0959
2024-02-15 13:59

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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Randolph Rd Station (24B0959-04) | Matrix: Water | Sampled: 2024-02-06 13:10, Continued

Volatile Organic Compounds (VOC), Continued

Surrogate: 4-Bromofluorobenzene	94		70-130	%	2024-02-13	
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Naramata Rd Sample Stn (24B0959-05) | Matrix: Water | Sampled: 2024-02-06 13:20

Calculated Parameters

Total Trihalomethanes	0.0609	MAC = 0.1	0.00400	mg/L	N/A	
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Haloacetic Acids

Monochloroacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-02-13	
Monobromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-02-13	
Dichloroacetic Acid	0.0301	N/A	0.0020	mg/L	2024-02-13	
Trichloroacetic Acid	0.0321	N/A	0.0020	mg/L	2024-02-13	
Dibromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-02-13	
Total Haloacetic Acids (HAA5)	0.0622	MAC = 0.08	0.00200	mg/L	N/A	
Surrogate: 2-Bromopropionic Acid	115		70-130	%	2024-02-13	

Volatile Organic Compounds (VOC)

Bromodichloromethane	0.0042	N/A	0.0010	mg/L	2024-02-13	
Bromoform	< 0.0010	N/A	0.0010	mg/L	2024-02-13	
Chloroform	0.0567	N/A	0.0010	mg/L	2024-02-13	
Dibromochloromethane	< 0.0010	N/A	0.0010	mg/L	2024-02-13	
Surrogate: Toluene-d8	100		70-130	%	2024-02-13	
Surrogate: 4-Bromofluorobenzene	96		70-130	%	2024-02-13	

Sample Qualifiers:

CT6 Results were based on lab temperature & lab pH.
HT2 The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

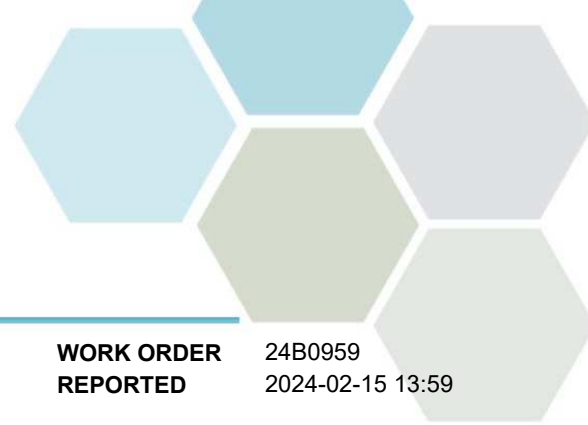
WORK ORDER REPORTED 24B0959
2024-02-15 13:59

Analysis Description	Method Ref.	Technique	Accredited	Location
Alkalinity in Water	SM 2320 B* (2021)	Titration with H2SO4	✓	Kelowna
Ammonia, Total in Water	SM 4500-NH3 G* (2021)	Automated Colorimetry (Phenate)	✓	Kelowna
Anions in Water	SM 4110 B (2020)	Ion Chromatography	✓	Kelowna
Carbon, Total Organic in Water	SM 5310 B (2022)	Combustion, Infrared CO2 Detection	✓	Kelowna
Colour, True in Water	SM 2120 C (2021)	Spectrophotometry (456 nm)	✓	Kelowna
Conductivity in Water	SM 2510 B (2021)	Conductivity Meter	✓	Kelowna
Cyanide, SAD in Water	ASTM D7511-12	Flow Injection with In-Line UV Digestion and Amperometry	✓	Kelowna
Haloacetic Acids in Water	EPA 552.3*	Liquid-Liquid Microextraction, Derivatization and GC-ECD	✓	Richmond
Hardness in Water	SM 2340 B* (2021)	Calculation: 2.497 [total Ca] + 4.118 [total Mg] (Est)	✓	N/A
Langelier Index in Water	SM 2330 B (2021)	Calculation		N/A
Mercury, total in Water	EPA 245.7*	BrCl2 Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	✓	Richmond
Nitrogen, Total Kjeldahl in Water	SM 4500-Norg D* (2021)	Block Digestion and Flow Injection Analysis	✓	Kelowna
pH in Water	SM 4500-H+ B (2021)	Electrometry	✓	Kelowna
Phosphorus, Total in Water	SM 4500-P B.5* (2011) / SM 4500-P F (2021)	Persulfate Digestion / Automated Colorimetry (Ascorbic Acid)	✓	Kelowna
Solids, Total Dissolved in Water	SM 1030 E (2021)	SM 1030 E		N/A
Sulfide, Total in Water	SM 4500-S2 D* (2021)	Colorimetry (Methylene Blue)	✓	Edmonton
Total Metals in Water	EPA 200.2 / EPA 6020B	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	✓	Richmond
Transmittance at 254 nm - Unfiltered in Water	SM 5910 B* (2021)	Ultraviolet Absorption	✓	Kelowna
Trihalomethanes in Water	EPA 5030B / EPA 8260D	Purge&Trap / GC-MSD (SIM)	✓	Richmond
Turbidity in Water	SM 2130 B (2020)	Nephelometry	✓	Kelowna

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Glossary of Terms:

RL	Reporting Limit (default)
% T	Percent Transmittance
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
°C	Degrees Celcius
AO	Aesthetic Objective
CU	Colour Units (referenced against a platinum cobalt standard)
MAC	Maximum Acceptable Concentration (health based)
mg/L	Milligrams per litre
NTU	Nephelometric Turbidity Units
OG	Operational Guideline (treated water)
pH units	pH < 7 = acidic, pH > 7 = basic
µS/cm	Microsiemens per centimetre
ASTM	ASTM International Test Methods
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association



APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO Penticton, City of - DW & STP
PROJECT Quarterly Samples

WORK ORDER 24B0959
REPORTED 2024-02-15 13:59

General Comments:

The results in this report apply to the received samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Caro will dispose of all samples within 30 days of sample receipt, unless otherwise agreed. The quality control (QC) data is available upon request

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager: bwhitehead@caro.ca

Please note any regulatory guidelines applied to this report are added as a convenience to the client, at their request, to help provide some initial context to analytical results obtained. Although CARO makes every effort to ensure accuracy of the associated regulatory guideline(s) applied, the guidelines applied cannot be assumed to be correct due to a variety of factors and as such CARO Analytical Services assumes no liability or responsibility for the use of those guidelines to make any decisions. The original source of the regulation should be verified and a review of the guideline(s) should be validated as correct in order to make any decisions arising from the comparison of the analytical data obtained to the relevant regulatory guideline for one's particular circumstances. Further, CARO Analytical Services assumes no liability or responsibility for any loss attributed from the use of these guidelines in any way.

CERTIFICATE OF ANALYSIS

REPORTED TO Penticton, City of - DW & STP
171 Main Street
PENTICTON, BC V2A 5A9

ATTENTION Alistair Wardlaw

PO NUMBER

PROJECT Quarterly Samples

PROJECT INFO OPR178-025

WORK ORDER 24B1778

RECEIVED / TEMP 2024-02-14 10:50 / 8.7°C

REPORTED 2024-02-22 16:25

COC NUMBER B1122

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO/IEC 17025:2017 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks



You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

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Authorized By:

Brent Whitehead
Account Manager

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TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24B1778
2024-02-22 16:25

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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Okanagan lake Sample Tap (24B1778-01) | Matrix: Water | Sampled: 2024-02-14 06:20

Anions

Chloride	6.87	AO ≤ 250	0.10	mg/L	2024-02-16	
Fluoride	0.12	MAC = 1.5	0.10	mg/L	2024-02-16	
Nitrate (as N)	0.054	MAC = 10	0.010	mg/L	2024-02-16	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2024-02-16	
Sulfate	32.9	AO ≤ 500	1.0	mg/L	2024-02-16	

Calculated Parameters

Hardness, Total (as CaCO ₃)	128	None Required	0.500	mg/L	N/A	
Langelier Index	-0.4	N/A	-5.0		2024-02-22	CT6
Nitrogen, Organic	0.169	N/A	0.0500	mg/L	N/A	
Solids, Total Dissolved	172	AO ≤ 500	1.00	mg/L	N/A	

General Parameters

Alkalinity, Total (as CaCO ₃)	118	N/A	1.0	mg/L	2024-02-17	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-02-17	
Alkalinity, Bicarbonate (as CaCO ₃)	118	N/A	1.0	mg/L	2024-02-17	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-02-17	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-02-17	
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2024-02-17	
Carbon, Total Organic	4.53	N/A	0.50	mg/L	2024-02-16	
Colour, True	< 5.0	AO ≤ 15	5.0	CU	2024-02-17	
Conductivity (EC)	301	N/A	2.0	µS/cm	2024-02-17	
Cyanide, Total	< 0.0020	MAC = 0.2	0.0020	mg/L	2024-02-20	
Nitrogen, Total Kjeldahl	0.169	N/A	0.050	mg/L	2024-02-21	
pH	7.55	7.0-10.5	0.10	pH units	2024-02-17	HT2
Phosphorus, Total (as P)	0.0051	N/A	0.0050	mg/L	2024-02-21	
Sulfide, Total	< 0.020	AO ≤ 0.05	0.020	mg/L	2024-02-20	
Temperature, at pH	20.5	N/A		°C	2024-02-17	HT2
Turbidity	0.20	OG < 1	0.10	NTU	2024-02-16	
UV Transmittance @ 254 nm - Unfiltered	86.9	N/A	0.10	% T	2024-02-17	

Total Metals

Aluminum, total	< 0.0050	OG < 0.1	0.0050	mg/L	2024-02-21	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2024-02-21	
Arsenic, total	< 0.00050	MAC = 0.01	0.00050	mg/L	2024-02-21	
Barium, total	0.0220	MAC = 2	0.0050	mg/L	2024-02-21	
Boron, total	< 0.0500	MAC = 5	0.0500	mg/L	2024-02-21	
Cadmium, total	< 0.000010	MAC = 0.007	0.000010	mg/L	2024-02-21	
Calcium, total	35.6	None Required	0.20	mg/L	2024-02-21	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-02-21	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2024-02-21	
Copper, total	0.00293	MAC = 2	0.00040	mg/L	2024-02-21	
Iron, total	< 0.010	AO ≤ 0.3	0.010	mg/L	2024-02-21	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2024-02-21	

TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24B1778
2024-02-22 16:25

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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Okanagan lake Sample Tap (24B1778-01) | Matrix: Water | Sampled: 2024-02-14 06:20, Continued

Total Metals, Continued

Magnesium, total	9.49	None Required	0.010	mg/L	2024-02-21	
Manganese, total	< 0.00080	MAC = 0.12	0.00020	mg/L	2024-02-21	RA3
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2024-02-21	
Molybdenum, total	0.00338	N/A	0.00010	mg/L	2024-02-21	
Nickel, total	0.00056	N/A	0.00040	mg/L	2024-02-21	
Potassium, total	2.52	N/A	0.10	mg/L	2024-02-21	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-02-21	
Sodium, total	11.9	AO ≤ 200	0.10	mg/L	2024-02-21	
Strontium, total	0.287	MAC = 7	0.0010	mg/L	2024-02-21	
Uranium, total	0.00228	MAC = 0.02	0.000020	mg/L	2024-02-21	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2024-02-21	

Penticton Creek Sample Tap (24B1778-02) | Matrix: Water | Sampled: 2024-02-14 06:25

Anions

Chloride	0.37	AO ≤ 250	0.10	mg/L	2024-02-16	
Fluoride	< 0.10	MAC = 1.5	0.10	mg/L	2024-02-16	
Nitrate (as N)	< 0.010	MAC = 10	0.010	mg/L	2024-02-16	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2024-02-16	
Sulfate	1.7	AO ≤ 500	1.0	mg/L	2024-02-16	

Calculated Parameters

Hardness, Total (as CaCO ₃)	16.6	None Required	0.500	mg/L	N/A	
Langelier Index	-3.3	N/A	-5.0		2024-02-21	CT6
Nitrogen, Organic	0.205	N/A	0.0500	mg/L	N/A	
Solids, Total Dissolved	20.1	AO ≤ 500	1.00	mg/L	N/A	

General Parameters

Alkalinity, Total (as CaCO ₃)	14.8	N/A	1.0	mg/L	2024-02-17	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-02-17	
Alkalinity, Bicarbonate (as CaCO ₃)	14.8	N/A	1.0	mg/L	2024-02-17	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-02-17	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-02-17	
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2024-02-17	
Carbon, Total Organic	6.43	N/A	0.50	mg/L	2024-02-16	
Colour, True	42	AO ≤ 15	5.0	CU	2024-02-17	
Conductivity (EC)	43.3	N/A	2.0	µS/cm	2024-02-17	
Cyanide, Total	< 0.0020	MAC = 0.2	0.0020	mg/L	2024-02-20	
Nitrogen, Total Kjeldahl	0.205	N/A	0.050	mg/L	2024-02-21	
pH	6.33	7.0-10.5	0.10	pH units	2024-02-17	HT2
Phosphorus, Total (as P)	0.0102	N/A	0.0050	mg/L	2024-02-21	
Sulfide, Total	< 0.020	AO ≤ 0.05	0.020	mg/L	2024-02-20	
Temperature, at pH	21.2	N/A		°C	2024-02-17	HT2

TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24B1778
2024-02-22 16:25

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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Penticton Creek Sample Tap (24B1778-02) | Matrix: Water | Sampled: 2024-02-14 06:25, Continued

General Parameters, Continued

Turbidity	1.52	OG < 1	0.10	NTU	2024-02-16	
UV Transmittance @ 254 nm - Unfiltered	54.3	N/A	0.10	% T	2024-02-17	

Total Metals

Aluminum, total	0.153	OG < 0.1	0.0050	mg/L	2024-02-21	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2024-02-21	
Arsenic, total	< 0.00050	MAC = 0.01	0.00050	mg/L	2024-02-21	
Barium, total	0.0065	MAC = 2	0.0050	mg/L	2024-02-21	
Boron, total	< 0.0500	MAC = 5	0.0500	mg/L	2024-02-21	
Cadmium, total	< 0.000010	MAC = 0.007	0.000010	mg/L	2024-02-21	
Calcium, total	4.57	None Required	0.20	mg/L	2024-02-21	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-02-21	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2024-02-21	
Copper, total	0.00206	MAC = 2	0.00040	mg/L	2024-02-21	
Iron, total	0.343	AO ≤ 0.3	0.010	mg/L	2024-02-21	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2024-02-21	
Magnesium, total	1.24	None Required	0.010	mg/L	2024-02-21	
Manganese, total	0.00567	MAC = 0.12	0.00020	mg/L	2024-02-21	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2024-02-21	
Molybdenum, total	0.00056	N/A	0.00010	mg/L	2024-02-21	
Nickel, total	0.00044	N/A	0.00040	mg/L	2024-02-21	
Potassium, total	0.54	N/A	0.10	mg/L	2024-02-21	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-02-21	
Sodium, total	2.61	AO ≤ 200	0.10	mg/L	2024-02-21	
Strontium, total	0.0503	MAC = 7	0.0010	mg/L	2024-02-21	
Uranium, total	0.000612	MAC = 0.02	0.000020	mg/L	2024-02-21	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2024-02-21	

Sample Qualifiers:

- CT6 Results were based on lab temperature & lab pH.
- HT2 The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.
- RA3 The Reporting Limit has been raised due to comparable level detected in the blank(s).

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

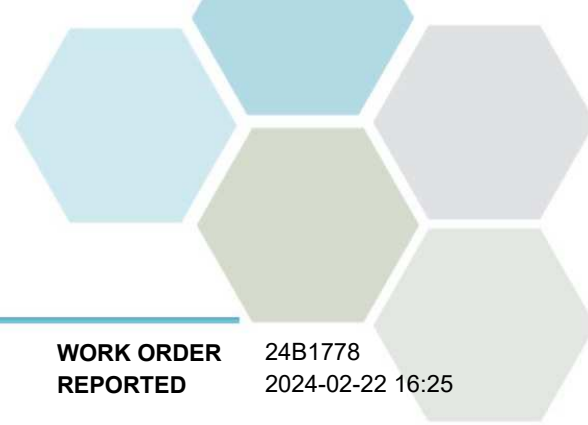
WORK ORDER REPORTED 24B1778
2024-02-22 16:25

Analysis Description	Method Ref.	Technique	Accredited	Location
Alkalinity in Water	SM 2320 B* (2021)	Titration with H ₂ SO ₄	✓	Kelowna
Ammonia, Total in Water	SM 4500-NH ₃ G* (2021)	Automated Colorimetry (Phenate)	✓	Kelowna
Anions in Water	SM 4110 B (2020)	Ion Chromatography	✓	Kelowna
Carbon, Total Organic in Water	SM 5310 B (2022)	Combustion, Infrared CO ₂ Detection	✓	Kelowna
Colour, True in Water	SM 2120 C (2021)	Spectrophotometry (456 nm)	✓	Kelowna
Conductivity in Water	SM 2510 B (2021)	Conductivity Meter	✓	Kelowna
Cyanide, SAD in Water	ASTM D7511-12	Flow Injection with In-Line UV Digestion and Amperometry	✓	Kelowna
Hardness in Water	SM 2340 B* (2021)	Calculation: 2.497 [total Ca] + 4.118 [total Mg] (Est)	✓	N/A
Langelier Index in Water	SM 2330 B (2021)	Calculation		N/A
Mercury, total in Water	EPA 245.7*	BrCl ₂ Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	✓	Richmond
Nitrogen, Total Kjeldahl in Water	SM 4500-Norg D* (2021)	Block Digestion and Flow Injection Analysis	✓	Kelowna
pH in Water	SM 4500-H+ B (2021)	Electrometry	✓	Kelowna
Phosphorus, Total in Water	SM 4500-P B.5* (2011) / SM 4500-P F (2021)	Persulfate Digestion / Automated Colorimetry (Ascorbic Acid)	✓	Kelowna
Solids, Total Dissolved in Water	SM 1030 E (2021)	SM 1030 E		N/A
Sulfide, Total in Water	SM 4500-S ₂ D* (2021)	Colorimetry (Methylene Blue)	✓	Edmonton
Total Metals in Water	EPA 200.2 / EPA 6020B	HNO ₃ +HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	✓	Richmond
Transmittance at 254 nm - Unfiltered in Water	SM 5910 B* (2021)	Ultraviolet Absorption	✓	Kelowna
Turbidity in Water	SM 2130 B (2020)	Nephelometry	✓	Kelowna

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Glossary of Terms:

RL	Reporting Limit (default)
% T	Percent Transmittance
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
°C	Degrees Celcius
AO	Aesthetic Objective
CU	Colour Units (referenced against a platinum cobalt standard)
MAC	Maximum Acceptable Concentration (health based)
mg/L	Milligrams per litre
NTU	Nephelometric Turbidity Units
OG	Operational Guideline (treated water)
pH units	pH < 7 = acidic, pH > 7 = basic
µS/cm	Microsiemens per centimetre
ASTM	ASTM International Test Methods
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association



APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24B1778
2024-02-22 16:25

General Comments:

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CERTIFICATE OF ANALYSIS

REPORTED TO Penticton, City of - DW & STP
171 Main Street
PENTICTON, BC V2A 5A9

ATTENTION Alistair Wardlaw

PO NUMBER

PROJECT Quarterly Samples

PROJECT INFO OPR178-025

WORK ORDER 24E3859

RECEIVED / TEMP 2024-05-29 10:24 / 10.9°C

REPORTED 2024-06-17 16:50

COC NUMBER B135507

Introduction:

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If you have any questions or concerns, please contact me at bwhitehead@caro.ca

Authorized By:

Brent Whitehead
Account Manager

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#108 4475 Wayburne Drive Burnaby, BC V5G 4X4

TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24E3859
2024-06-17 16:50

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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PRV Station (24E3859-01) | Matrix: Water | Sampled: 2024-05-28 11:20

Anions

Chloride	9.77	AO ≤ 250	0.10	mg/L	2024-05-31	
Fluoride	0.15	MAC = 1.5	0.10	mg/L	2024-05-31	
Nitrate (as N)	0.071	MAC = 10	0.010	mg/L	2024-05-31	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2024-05-31	
Sulfate	27.1	AO ≤ 500	1.0	mg/L	2024-05-31	

Calculated Parameters

Total Trihalomethanes	0.0398	MAC = 0.1	0.00400	mg/L	N/A	
Hardness, Total (as CaCO ₃)	119	None Required	0.500	mg/L	N/A	
Langelier Index	-0.8	N/A	-5.0		2024-06-06	CT6
Nitrogen, Organic	0.0940	N/A	0.0500	mg/L	N/A	
Solids, Total Dissolved	158	AO ≤ 500	1.00	mg/L	N/A	

General Parameters

Carbon, Total Organic	3.94	N/A	0.500	mg/L	2024-06-13	
Alkalinity, Total (as CaCO ₃)	104	N/A	1.0	mg/L	2024-06-04	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-06-04	
Alkalinity, Bicarbonate (as CaCO ₃)	104	N/A	1.0	mg/L	2024-06-04	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-06-04	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-06-04	
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2024-05-31	
Colour, True	< 5.0	AO ≤ 15	5.0	CU	2024-05-31	
Conductivity (EC)	304	N/A	2.0	µS/cm	2024-06-04	
Cyanide, Total	< 0.0020	MAC = 0.2	0.0020	mg/L	2024-06-04	
Nitrogen, Total Kjeldahl	0.094	N/A	0.050	mg/L	2024-06-03	
pH	7.33	7.0-10.5	0.10	pH units	2024-06-04	HT2
Phosphorus, Total (as P)	< 0.0050	N/A	0.0050	mg/L	2024-05-31	
Sulfide, Total	< 0.020	AO ≤ 0.05	0.020	mg/L	2024-06-03	
Temperature, at pH	19.7	N/A		°C	2024-06-04	HT2
Turbidity	0.76	OG < 1	0.10	NTU	2024-05-30	
UV Transmittance @ 254 nm - Unfiltered	93.5	N/A	0.10	% T	2024-06-03	HT1

Haloacetic Acids

Monochloroacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-06-04	
Monobromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-06-04	
Dichloroacetic Acid	0.0113	N/A	0.0020	mg/L	2024-06-04	
Trichloroacetic Acid	0.0106	N/A	0.0020	mg/L	2024-06-04	
Dibromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-06-04	
Total Haloacetic Acids (HAA5)	0.0219	MAC = 0.08	0.00200	mg/L	N/A	
Surrogate: 2-Bromopropionic Acid	80		70-130	%	2024-06-04	

Total Metals

Aluminum, total	0.0972	OG < 0.1	0.0050	mg/L	2024-06-04	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2024-06-04	

TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24E3859
2024-06-17 16:50

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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PRV Station (24E3859-01) | Matrix: Water | Sampled: 2024-05-28 11:20, Continued

Total Metals, Continued

Arsenic, total	< 0.00050	MAC = 0.01	0.00050	mg/L	2024-06-04	
Barium, total	0.0227	MAC = 2	0.0050	mg/L	2024-06-04	
Boron, total	< 0.0500	MAC = 5	0.0500	mg/L	2024-06-04	
Cadmium, total	< 0.000010	MAC = 0.007	0.000010	mg/L	2024-06-04	
Calcium, total	32.0	None Required	0.20	mg/L	2024-06-04	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-06-04	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2024-06-04	
Copper, total	0.00058	MAC = 2	0.00040	mg/L	2024-06-04	
Iron, total	0.010	AO ≤ 0.3	0.010	mg/L	2024-06-04	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2024-06-04	
Magnesium, total	9.41	None Required	0.010	mg/L	2024-06-04	
Manganese, total	0.00970	MAC = 0.12	0.00020	mg/L	2024-06-04	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2024-06-03	
Molybdenum, total	0.00307	N/A	0.00010	mg/L	2024-06-04	
Nickel, total	0.00044	N/A	0.00040	mg/L	2024-06-04	
Potassium, total	2.49	N/A	0.10	mg/L	2024-06-04	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-06-04	
Sodium, total	14.0	AO ≤ 200	0.10	mg/L	2024-06-04	
Strontium, total	0.276	MAC = 7	0.0010	mg/L	2024-06-04	
Uranium, total	0.000172	MAC = 0.02	0.000020	mg/L	2024-06-04	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2024-06-04	

Volatile Organic Compounds (VOC)

Bromodichloromethane	0.0035	N/A	0.0010	mg/L	2024-06-03	
Bromoform	< 0.0010	N/A	0.0010	mg/L	2024-06-03	
Chloroform	0.0363	N/A	0.0010	mg/L	2024-06-03	
Dibromochloromethane	< 0.0010	N/A	0.0010	mg/L	2024-06-03	
Surrogate: Toluene-d8	125		70-130	%	2024-06-03	
Surrogate: 4-Bromofluorobenzene	94		70-130	%	2024-06-03	

Wiltse Sample Stn (24E3859-02) | Matrix: Water | Sampled: 2024-05-28 10:30

Anions

Chloride	9.37	AO ≤ 250	0.10	mg/L	2024-05-31	
Fluoride	0.15	MAC = 1.5	0.10	mg/L	2024-05-31	
Nitrate (as N)	0.063	MAC = 10	0.010	mg/L	2024-05-31	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2024-05-31	
Sulfate	26.5	AO ≤ 500	1.0	mg/L	2024-05-31	

Calculated Parameters

Hardness, Total (as CaCO3)	118	None Required	0.500	mg/L	N/A	
Langelier Index	-0.7	N/A	-5.0		2024-06-06	CT6
Nitrogen, Organic	0.0770	N/A	0.0500	mg/L	N/A	

TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24E3859
2024-06-17 16:50

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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Wiltse Sample Stn (24E3859-02) | Matrix: Water | Sampled: 2024-05-28 10:30, Continued

Calculated Parameters, Continued

Solids, Total Dissolved	156	AO ≤ 500	1.00	mg/L	N/A	
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General Parameters

Carbon, Total Organic	4.03	N/A	0.500	mg/L	2024-06-13	
Alkalinity, Total (as CaCO ₃)	104	N/A	1.0	mg/L	2024-06-04	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-06-04	
Alkalinity, Bicarbonate (as CaCO ₃)	104	N/A	1.0	mg/L	2024-06-04	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-06-04	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-06-04	
Ammonia, Total (as N)	0.052	None Required	0.050	mg/L	2024-05-31	
Colour, True	< 5.0	AO ≤ 15	5.0	CU	2024-05-31	
Conductivity (EC)	279	N/A	2.0	µS/cm	2024-06-04	
Cyanide, Total	< 0.0020	MAC = 0.2	0.0020	mg/L	2024-06-04	
Nitrogen, Total Kjeldahl	0.129	N/A	0.050	mg/L	2024-06-03	
pH	7.34	7.0-10.5	0.10	pH units	2024-06-04	HT2
Phosphorus, Total (as P)	< 0.0050	N/A	0.0050	mg/L	2024-05-31	
Sulfide, Total	< 0.020	AO ≤ 0.05	0.020	mg/L	2024-06-03	
Temperature, at pH	20.0	N/A		°C	2024-06-04	HT2
Turbidity	0.71	OG < 1	0.10	NTU	2024-05-30	
UV Transmittance @ 254 nm - Unfiltered	93.7	N/A	0.10	% T	2024-06-03	HT1

Total Metals

Aluminum, total	0.0155	OG < 0.1	0.0050	mg/L	2024-06-05	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2024-06-05	
Arsenic, total	< 0.00050	MAC = 0.01	0.00050	mg/L	2024-06-05	
Barium, total	0.0211	MAC = 2	0.0050	mg/L	2024-06-05	
Boron, total	< 0.0500	MAC = 5	0.0500	mg/L	2024-06-05	
Cadmium, total	< 0.000010	MAC = 0.007	0.000010	mg/L	2024-06-05	
Calcium, total	31.7	None Required	0.20	mg/L	2024-06-05	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-06-05	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2024-06-05	
Copper, total	0.0110	MAC = 2	0.00040	mg/L	2024-06-05	
Iron, total	0.022	AO ≤ 0.3	0.010	mg/L	2024-06-05	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2024-06-05	
Magnesium, total	9.42	None Required	0.010	mg/L	2024-06-05	
Manganese, total	0.00093	MAC = 0.12	0.00020	mg/L	2024-06-05	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2024-06-03	
Molybdenum, total	0.00325	N/A	0.00010	mg/L	2024-06-05	
Nickel, total	0.00043	N/A	0.00040	mg/L	2024-06-05	
Potassium, total	2.37	N/A	0.10	mg/L	2024-06-05	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-06-05	
Sodium, total	13.3	AO ≤ 200	0.10	mg/L	2024-06-05	
Strontium, total	0.272	MAC = 7	0.0010	mg/L	2024-06-05	
Uranium, total	0.000172	MAC = 0.02	0.000020	mg/L	2024-06-05	

TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24E3859
2024-06-17 16:50

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Wiltse Sample Stn (24E3859-02) Matrix: Water Sampled: 2024-05-28 10:30, Continued						
Total Metals, Continued						
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2024-06-05	

Smythe Dr. Sample Stn (24E3859-03) | Matrix: Water | Sampled: 2024-05-28 10:55

Calculated Parameters						
Total Trihalomethanes	0.0635	MAC = 0.1	0.00400	mg/L	N/A	
Haloacetic Acids						
Monochloroacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-06-04	
Monobromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-06-04	
Dichloroacetic Acid	0.0166	N/A	0.0020	mg/L	2024-06-04	
Trichloroacetic Acid	0.0166	N/A	0.0020	mg/L	2024-06-04	
Dibromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-06-04	
Total Haloacetic Acids (HAA5)	0.0332	MAC = 0.08	0.00200	mg/L	N/A	
Surrogate: 2-Bromopropionic Acid	82		70-130	%	2024-06-04	
Volatile Organic Compounds (VOC)						
Bromodichloromethane	0.0061	N/A	0.0010	mg/L	2024-06-03	
Bromoform	< 0.0010	N/A	0.0010	mg/L	2024-06-03	
Chloroform	0.0574	N/A	0.0010	mg/L	2024-06-03	
Dibromochloromethane	< 0.0010	N/A	0.0010	mg/L	2024-06-03	
Surrogate: Toluene-d8	125		70-130	%	2024-06-03	
Surrogate: 4-Bromofluorobenzene	101		70-130	%	2024-06-03	

Naramata Rd Sample Stn (24E3859-04) | Matrix: Water | Sampled: 2024-05-28 09:00

Calculated Parameters						
Total Trihalomethanes	0.0859	MAC = 0.1	0.00400	mg/L	N/A	
Haloacetic Acids						
Monochloroacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-06-04	
Monobromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-06-04	
Dichloroacetic Acid	0.0235	N/A	0.0020	mg/L	2024-06-04	
Trichloroacetic Acid	0.0201	N/A	0.0020	mg/L	2024-06-04	
Dibromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-06-04	
Total Haloacetic Acids (HAA5)	0.0436	MAC = 0.08	0.00200	mg/L	N/A	
Surrogate: 2-Bromopropionic Acid	74		70-130	%	2024-06-04	
Volatile Organic Compounds (VOC)						
Bromodichloromethane	0.0078	N/A	0.0010	mg/L	2024-06-03	
Bromoform	< 0.0010	N/A	0.0010	mg/L	2024-06-03	
Chloroform	0.0781	N/A	0.0010	mg/L	2024-06-03	
Dibromochloromethane	< 0.0010	N/A	0.0010	mg/L	2024-06-03	
Surrogate: Toluene-d8	126		70-130	%	2024-06-03	

TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24E3859
2024-06-17 16:50

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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Naramata Rd Sample Stn (24E3859-04) | Matrix: Water | Sampled: 2024-05-28 09:00, Continued

Volatile Organic Compounds (VOC), Continued

Surrogate: 4-Bromofluorobenzene	106		70-130	%	2024-06-03	
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Randolph Rd Sample Stn (24E3859-05) | Matrix: Water | Sampled: 2024-05-28 09:20

Calculated Parameters

Total Trihalomethanes	0.0595	MAC = 0.1	0.00400	mg/L	N/A	
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Haloacetic Acids

Monochloroacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-06-04	
Monobromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-06-04	
Dichloroacetic Acid	0.0168	N/A	0.0020	mg/L	2024-06-04	
Trichloroacetic Acid	0.0167	N/A	0.0020	mg/L	2024-06-04	
Dibromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-06-04	
Total Haloacetic Acids (HAA5)	0.0335	MAC = 0.08	0.00200	mg/L	N/A	
Surrogate: 2-Bromopropionic Acid	80		70-130	%	2024-06-04	

Volatile Organic Compounds (VOC)

Bromodichloromethane	0.0057	N/A	0.0010	mg/L	2024-06-03	
Bromoform	< 0.0010	N/A	0.0010	mg/L	2024-06-03	
Chloroform	0.0538	N/A	0.0010	mg/L	2024-06-03	
Dibromochloromethane	< 0.0010	N/A	0.0010	mg/L	2024-06-03	
Surrogate: Toluene-d8	120		70-130	%	2024-06-03	
Surrogate: 4-Bromofluorobenzene	97		70-130	%	2024-06-03	

Okanagan Lake Sample Tap (24E3859-06) | Matrix: Water | Sampled: 2024-05-28 11:40

Anions

Chloride	5.61	AO ≤ 250	0.10	mg/L	2024-05-31	
Fluoride	0.16	MAC = 1.5	0.10	mg/L	2024-05-31	
Nitrate (as N)	0.093	MAC = 10	0.010	mg/L	2024-05-31	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2024-05-31	
Sulfate	28.1	AO ≤ 500	1.0	mg/L	2024-05-31	

Calculated Parameters

Hardness, Total (as CaCO3)	124	None Required	0.500	mg/L	N/A	
Langelier Index	-0.7	N/A	-5.0		2024-06-06	CT6
Nitrogen, Organic	0.190	N/A	0.0500	mg/L	N/A	
Solids, Total Dissolved	160	AO ≤ 500	1.00	mg/L	N/A	

General Parameters

Carbon, Total Organic	4.68	N/A	0.500	mg/L	2024-06-13	
Alkalinity, Total (as CaCO3)	110	N/A	1.0	mg/L	2024-06-04	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2024-06-04	
Alkalinity, Bicarbonate (as CaCO3)	110	N/A	1.0	mg/L	2024-06-04	

TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24E3859
2024-06-17 16:50

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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Okanagan Lake Sample Tap (24E3859-06) | Matrix: Water | Sampled: 2024-05-28 11:40, Continued

General Parameters, Continued

Alkalinity, Carbonate (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-06-04	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-06-04	
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2024-05-31	
Colour, True	< 5.0	AO ≤ 15	5.0	CU	2024-05-31	
Conductivity (EC)	307	N/A	2.0	µS/cm	2024-06-04	
Cyanide, Total	< 0.0020	MAC = 0.2	0.0020	mg/L	2024-06-04	
Nitrogen, Total Kjeldahl	0.190	N/A	0.050	mg/L	2024-06-03	
pH	7.33	7.0-10.5	0.10	pH units	2024-06-04	HT2
Phosphorus, Total (as P)	0.0076	N/A	0.0050	mg/L	2024-05-31	
Sulfide, Total	< 0.020	AO ≤ 0.05	0.020	mg/L	2024-06-03	
Temperature, at pH	20.3	N/A		°C	2024-06-04	HT2
Turbidity	0.46	OG < 1	0.10	NTU	2024-05-30	
UV Transmittance @ 254 nm - Unfiltered	87.5	N/A	0.10	% T	2024-06-03	HT1

Total Metals

Aluminum, total	0.0075	OG < 0.1	0.0050	mg/L	2024-06-04	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2024-06-04	
Arsenic, total	0.00050	MAC = 0.01	0.00050	mg/L	2024-06-04	
Barium, total	0.0231	MAC = 2	0.0050	mg/L	2024-06-04	
Boron, total	< 0.0500	MAC = 5	0.0500	mg/L	2024-06-04	
Cadmium, total	< 0.000010	MAC = 0.007	0.000010	mg/L	2024-06-04	
Calcium, total	33.7	None Required	0.20	mg/L	2024-06-04	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-06-04	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2024-06-04	
Copper, total	0.00365	MAC = 2	0.00040	mg/L	2024-06-04	
Iron, total	0.011	AO ≤ 0.3	0.010	mg/L	2024-06-04	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2024-06-04	
Magnesium, total	9.72	None Required	0.010	mg/L	2024-06-04	
Manganese, total	0.00155	MAC = 0.12	0.00020	mg/L	2024-06-04	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2024-06-03	
Molybdenum, total	0.00344	N/A	0.00010	mg/L	2024-06-04	
Nickel, total	0.00085	N/A	0.00040	mg/L	2024-06-04	
Potassium, total	2.53	N/A	0.10	mg/L	2024-06-04	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-06-04	
Sodium, total	12.5	AO ≤ 200	0.10	mg/L	2024-06-04	
Strontium, total	0.283	MAC = 7	0.0010	mg/L	2024-06-04	
Uranium, total	0.00258	MAC = 0.02	0.000020	mg/L	2024-06-04	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2024-06-04	

Penticton Creek Sample Tap (24E3859-07) | Matrix: Water | Sampled: 2024-05-28 11:35

Anions

Chloride	0.35	AO ≤ 250	0.10	mg/L	2024-05-31	
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TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24E3859
2024-06-17 16:50

Analyte	Result	Guideline	RL Units	Analyzed	Qualifier
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Penticton Creek Sample Tap (24E3859-07) | Matrix: Water | Sampled: 2024-05-28 11:35, Continued

Anions, Continued

Fluoride	< 0.10	MAC = 1.5	0.10 mg/L	2024-05-31	
Nitrate (as N)	< 0.010	MAC = 10	0.010 mg/L	2024-05-31	
Nitrite (as N)	< 0.010	MAC = 1	0.010 mg/L	2024-05-31	
Sulfate	< 1.0	AO ≤ 500	1.0 mg/L	2024-05-31	

Calculated Parameters

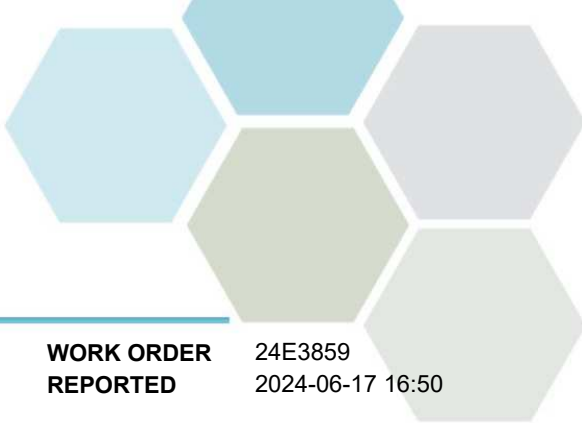
Hardness, Total (as CaCO ₃)	8.42	None Required	0.500 mg/L	N/A	
Langelier Index	-4.5	N/A	-5.0	2024-06-06	CT6
Nitrogen, Organic	0.292	N/A	0.0500 mg/L	N/A	
Solids, Total Dissolved	6.32	AO ≤ 500	1.00 mg/L	N/A	

General Parameters

Carbon, Total Organic	13.6	N/A	0.500 mg/L	2024-06-13	
Alkalinity, Total (as CaCO ₃)	1.5	N/A	1.0 mg/L	2024-06-04	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	N/A	1.0 mg/L	2024-06-04	
Alkalinity, Bicarbonate (as CaCO ₃)	1.5	N/A	1.0 mg/L	2024-06-04	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	N/A	1.0 mg/L	2024-06-04	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	N/A	1.0 mg/L	2024-06-04	
Ammonia, Total (as N)	< 0.050	None Required	0.050 mg/L	2024-05-31	
Colour, True	80	AO ≤ 15	5.0 CU	2024-05-31	
Conductivity (EC)	22.8	N/A	2.0 µS/cm	2024-06-04	
Cyanide, Total	< 0.0020	MAC = 0.2	0.0020 mg/L	2024-06-04	
Nitrogen, Total Kjeldahl	0.292	N/A	0.050 mg/L	2024-06-03	
pH	6.42	7.0-10.5	0.10 pH units	2024-06-04	HT2
Phosphorus, Total (as P)	0.0109	N/A	0.0050 mg/L	2024-05-31	
Sulfide, Total	< 0.020	AO ≤ 0.05	0.020 mg/L	2024-06-03	
Temperature, at pH	20.2	N/A	°C	2024-06-04	HT2
Turbidity	0.95	OG < 1	0.10 NTU	2024-05-30	
UV Transmittance @ 254 nm - Unfiltered	28.2	N/A	0.10 % T	2024-06-03	HT1

Total Metals

Aluminum, total	0.411	OG < 0.1	0.0050 mg/L	2024-06-04	
Antimony, total	< 0.00020	MAC = 0.006	0.00020 mg/L	2024-06-04	
Arsenic, total	< 0.00050	MAC = 0.01	0.00050 mg/L	2024-06-04	
Barium, total	0.0064	MAC = 2	0.0050 mg/L	2024-06-04	
Boron, total	< 0.0500	MAC = 5	0.0500 mg/L	2024-06-04	
Cadmium, total	< 0.000010	MAC = 0.007	0.000010 mg/L	2024-06-04	
Calcium, total	2.38	None Required	0.20 mg/L	2024-06-04	
Chromium, total	0.00056	MAC = 0.05	0.00050 mg/L	2024-06-04	
Cobalt, total	0.00011	N/A	0.00010 mg/L	2024-06-04	
Copper, total	0.00289	MAC = 2	0.00040 mg/L	2024-06-04	
Iron, total	0.220	AO ≤ 0.3	0.010 mg/L	2024-06-04	
Lead, total	< 0.00020	MAC = 0.005	0.00020 mg/L	2024-06-04	
Magnesium, total	0.599	None Required	0.010 mg/L	2024-06-04	



TEST RESULTS

REPORTED TO PROJECT	Penticton, City of - DW & STP Quarterly Samples	WORK ORDER REPORTED	24E3859 2024-06-17 16:50
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Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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Penticton Creek Sample Tap (24E3859-07) | Matrix: Water | Sampled: 2024-05-28 11:35, Continued

Total Metals, Continued

Manganese, total	0.00377	MAC = 0.12	0.00020	mg/L	2024-06-04	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2024-06-03	
Molybdenum, total	0.00021	N/A	0.00010	mg/L	2024-06-04	
Nickel, total	0.00041	N/A	0.00040	mg/L	2024-06-04	
Potassium, total	0.36	N/A	0.10	mg/L	2024-06-04	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-06-04	
Sodium, total	1.72	AO ≤ 200	0.10	mg/L	2024-06-04	
Strontium, total	0.0320	MAC = 7	0.0010	mg/L	2024-06-04	
Uranium, total	0.000479	MAC = 0.02	0.000020	mg/L	2024-06-04	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2024-06-04	

Sample Qualifiers:

CT6	Results were based on lab temperature & lab pH.
HT1	The sample was prepared and/or analyzed past the recommended holding time.
HT2	The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

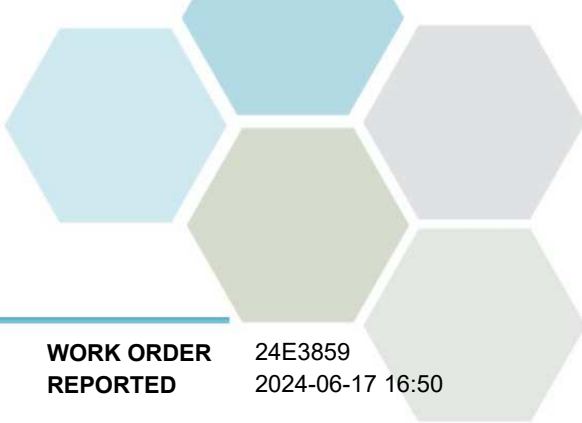
WORK ORDER REPORTED 24E3859
2024-06-17 16:50

Analysis Description	Method Ref.	Technique	Accredited	Location
Alkalinity in Water	SM 2320 B* (2021)	Titration with H2SO4	✓	Kelowna
Ammonia, Total in Water	SM 4500-NH3 G* (2021)	Automated Colorimetry (Phenate)	✓	Kelowna
Anions in Water	SM 4110 B (2020)	Ion Chromatography	✓	Kelowna
Carbon, Total Organic in Water in Water	SM 5310 B* (2022)	Combustion, Infrared CO2 Detection		Sublet
Colour, True in Water	SM 2120 C (2021)	Spectrophotometry (456 nm)	✓	Kelowna
Conductivity in Water	SM 2510 B (2021)	Conductivity Meter	✓	Kelowna
Cyanide, SAD in Water	ASTM D7511-12	Flow Injection with In-Line UV Digestion and Amperometry	✓	Kelowna
Haloacetic Acids in Water	EPA 552.3*	Liquid-Liquid Microextraction, Derivatization and GC-ECD	✓	Richmond
Hardness in Water	SM 2340 B* (2021)	Calculation: 2.497 [total Ca] + 4.118 [total Mg] (Est)	✓	N/A
Langelier Index in Water	SM 2330 B (2021)	Calculation		N/A
Mercury, total in Water	EPA 245.7*	BrCl2 Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	✓	Richmond
Nitrogen, Total Kjeldahl in Water	SM 4500-Norg D* (2021)	Block Digestion and Flow Injection Analysis	✓	Kelowna
pH in Water	SM 4500-H+ B (2021)	Electrometry	✓	Kelowna
Phosphorus, Total in Water	SM 4500-P B.5* (2011) / SM 4500-P F (2021)	Persulfate Digestion / Automated Colorimetry (Ascorbic Acid)	✓	Kelowna
Solids, Total Dissolved in Water	SM 1030 E (2021)	SM 1030 E		N/A
Sulfide, Total in Water	SM 4500-S2 D* (2021)	Colorimetry (Methylene Blue)	✓	Edmonton
Total Metals in Water	EPA 200.2 / EPA 6020B	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	✓	Richmond
Transmittance at 254 nm - Unfiltered in Water	SM 5910 B* (2021)	Ultraviolet Absorption	✓	Kelowna
Trihalomethanes in Water	EPA 5030B / EPA 8260D	Purge&Trap / GC-MSD (SIM)	✓	Richmond
Turbidity in Water	SM 2130 B (2020)	Nephelometry	✓	Kelowna

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Glossary of Terms:

RL	Reporting Limit (default)
% T	Percent Transmittance
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
°C	Degrees Celcius
AO	Aesthetic Objective
CU	Colour Units (referenced against a platinum cobalt standard)
MAC	Maximum Acceptable Concentration (health based)
mg/L	Milligrams per litre
NTU	Nephelometric Turbidity Units
OG	Operational Guideline (treated water)
pH units	pH < 7 = acidic, pH > 7 = basic
µS/cm	Microsiemens per centimetre



APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO PROJECT	Penticton, City of - DW & STP Quarterly Samples	WORK ORDER REPORTED	24E3859 2024-06-17 16:50
ASTM	ASTM International Test Methods		
EPA	United States Environmental Protection Agency Test Methods		
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association		

General Comments:

The results in this report apply to the received samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Caro will dispose of all samples within 30 days of sample receipt, unless otherwise agreed. The quality control (QC) data is available upon request

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager:bwhitehead@caro.ca

Please note any regulatory guidelines applied to this report are added as a convenience to the client, at their request, to help provide some initial context to analytical results obtained. Although CARO makes every effort to ensure accuracy of the associated regulatory guideline(s) applied, the guidelines applied cannot be assumed to be correct due to a variety of factors and as such CARO Analytical Services assumes no liability or responsibility for the use of those guidelines to make any decisions. The original source of the regulation should be verified and a review of the guideline(s) should be validated as correct in order to make any decisions arising from the comparison of the analytical data obtained to the relevant regulatory guideline for one's particular circumstances. Further, CARO Analytical Services assumes no liability or responsibility for any loss attributed from the use of these guidelines in any way.

CERTIFICATE OF ANALYSIS

REPORTED TO Penticton, City of - DW & STP
171 Main Street
PENTICTON, BC V2A 5A9

ATTENTION Alistair Wardlaw

PO NUMBER

PROJECT Quarterly Samples

PROJECT INFO OPR178-025

WORK ORDER 24H3271

RECEIVED / TEMP 2024-08-26 10:13 / 4.4°C

REPORTED 2024-09-03 11:19

COC NUMBER B112233

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO/IEC 17025:2017 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks



You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

We've Got Chemistry



It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

Ahead of the Curve



Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

By engaging our services, you are agreeing to CARO Analytical Service's Standard Terms and Conditions outlined here:
<https://www.caro.ca/terms-conditions>

If you have any questions or concerns, please contact me at bwhitehead@caro.ca

Authorized By:

Brent Whitehead
Account Manager

1-888-311-8846 | www.caro.ca

#110 4011 Viking Way Richmond, BC V6V 2K9 | #102 3677 Highway 97N Kelowna, BC V1X 5C3 | 17225 109 Avenue Edmonton, AB T5S 1H7 |
#108 4475 Wayburne Drive Burnaby, BC V5G 4X4

TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24H3271
2024-09-03 11:19

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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Smythe Dr. (24H3271-01) | Matrix: Water | Sampled: 2024-08-25 06:10

Calculated Parameters

Total Trihalomethanes	0.0663	MAC = 0.1	0.00400	mg/L	N/A	
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Haloacetic Acids

Monochloroacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-08-31	
Monobromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-08-31	
Dichloroacetic Acid	0.0245	N/A	0.0020	mg/L	2024-08-31	
Trichloroacetic Acid	0.0292	N/A	0.0020	mg/L	2024-08-31	
Dibromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-08-31	
Total Haloacetic Acids (HAA5)	0.0537	MAC = 0.08	0.00200	mg/L	N/A	
Surrogate: 2-Bromopropionic Acid	105		70-130	%	2024-08-31	

Volatile Organic Compounds (VOC)

Bromodichloromethane	0.0050	N/A	0.0010	mg/L	2024-08-28	
Bromoform	< 0.0010	N/A	0.0010	mg/L	2024-08-28	
Chloroform	0.0612	N/A	0.0010	mg/L	2024-08-28	
Dibromochloromethane	< 0.0010	N/A	0.0010	mg/L	2024-08-28	
Surrogate: Toluene-d8	110		70-130	%	2024-08-28	
Surrogate: 4-Bromofluorobenzene	77		70-130	%	2024-08-28	

Naramata Rd Stn (24H3271-02) | Matrix: Water | Sampled: 2024-08-25 06:30

Calculated Parameters

Total Trihalomethanes	0.0952	MAC = 0.1	0.00400	mg/L	N/A	
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Haloacetic Acids

Monochloroacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-08-31	
Monobromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-08-31	
Dichloroacetic Acid	0.0212	N/A	0.0020	mg/L	2024-08-31	
Trichloroacetic Acid	0.0412	N/A	0.0020	mg/L	2024-08-31	
Dibromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-08-31	
Total Haloacetic Acids (HAA5)	0.0625	MAC = 0.08	0.00200	mg/L	N/A	
Surrogate: 2-Bromopropionic Acid	106		70-130	%	2024-08-31	

Volatile Organic Compounds (VOC)

Bromodichloromethane	0.0068	N/A	0.0010	mg/L	2024-08-28	
Bromoform	< 0.0010	N/A	0.0010	mg/L	2024-08-28	
Chloroform	0.0884	N/A	0.0010	mg/L	2024-08-28	
Dibromochloromethane	< 0.0010	N/A	0.0010	mg/L	2024-08-28	
Surrogate: Toluene-d8	110		70-130	%	2024-08-28	
Surrogate: 4-Bromofluorobenzene	77		70-130	%	2024-08-28	

Fairford Bridge Stn (24H3271-03) | Matrix: Water | Sampled: 2024-08-25 10:50

Anions

TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24H3271
2024-09-03 11:19

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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Fairford Bridge Stn (24H3271-03) | Matrix: Water | Sampled: 2024-08-25 10:50, Continued

Anions, Continued

Chloride	9.70	AO ≤ 250	0.10	mg/L	2024-08-27	
Fluoride	< 0.10	MAC = 1.5	0.10	mg/L	2024-08-27	
Nitrate (as N)	0.075	MAC = 10	0.010	mg/L	2024-08-27	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2024-08-27	
Sulfate	23.9	AO ≤ 500	1.0	mg/L	2024-08-27	

Calculated Parameters

Total Trihalomethanes	0.0528	MAC = 0.1	0.00400	mg/L	N/A	
Hardness, Total (as CaCO ₃)	101	None Required	0.500	mg/L	N/A	
Langelier Index	-0.1	N/A	-5.0		2024-08-29	CT6
Nitrogen, Organic	0.131	N/A	0.0500	mg/L	N/A	
Solids, Total Dissolved	137	AO ≤ 500	1.00	mg/L	N/A	

General Parameters

Alkalinity, Total (as CaCO ₃)	88.7	N/A	1.0	mg/L	2024-08-28	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-08-28	
Alkalinity, Bicarbonate (as CaCO ₃)	88.7	N/A	1.0	mg/L	2024-08-28	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-08-28	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-08-28	
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2024-08-28	
Carbon, Total Organic	2.89	N/A	0.50	mg/L	2024-08-28	
Colour, True	< 5.0	AO ≤ 15	5.0	CU	2024-08-28	
Conductivity (EC)	264	N/A	2.0	µS/cm	2024-08-28	
Cyanide, Total	< 0.0020	MAC = 0.2	0.0020	mg/L	2024-08-28	
Nitrogen, Total Kjeldahl	0.131	N/A	0.050	mg/L	2024-08-29	
pH	8.03	7.0-10.5	0.10	pH units	2024-08-28	HT2
Phosphorus, Total (as P)	< 0.0050	N/A	0.0050	mg/L	2024-08-29	
Sulfide, Total	< 0.020	AO ≤ 0.05	0.020	mg/L	2024-08-30	
Temperature, at pH	22.4	N/A		°C	2024-08-28	HT2
Turbidity	0.10	OG < 1	0.10	NTU	2024-08-27	
UV Transmittance @ 254 nm - Unfiltered	92.9	N/A	0.10	% T	2024-08-26	

Haloacetic Acids

Monochloroacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-08-31	
Monobromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-08-31	
Dichloroacetic Acid	0.0197	N/A	0.0020	mg/L	2024-08-31	
Trichloroacetic Acid	0.0239	N/A	0.0020	mg/L	2024-08-31	
Dibromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-08-31	
Total Haloacetic Acids (HAA5)	0.0436	MAC = 0.08	0.00200	mg/L	N/A	
Surrogate: 2-Bromopropionic Acid	109		70-130	%	2024-08-31	

Total Metals

Aluminum, total	0.0128	OG < 0.1	0.0050	mg/L	2024-08-27	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2024-08-27	

TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24H3271
2024-09-03 11:19

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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Fairford Bridge Stn (24H3271-03) | Matrix: Water | Sampled: 2024-08-25 10:50, Continued

Total Metals, Continued

Arsenic, total	< 0.00050	MAC = 0.01	0.00050	mg/L	2024-08-27	
Barium, total	0.0188	MAC = 2	0.0050	mg/L	2024-08-27	
Boron, total	< 0.0500	MAC = 5	0.0500	mg/L	2024-08-27	
Cadmium, total	< 0.000010	MAC = 0.007	0.000010	mg/L	2024-08-27	
Calcium, total	27.7	None Required	0.20	mg/L	2024-08-27	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-08-27	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2024-08-27	
Copper, total	0.00156	MAC = 2	0.00040	mg/L	2024-08-27	
Iron, total	< 0.010	AO ≤ 0.3	0.010	mg/L	2024-08-27	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2024-08-27	
Magnesium, total	7.63	None Required	0.010	mg/L	2024-08-27	
Manganese, total	0.00110	MAC = 0.12	0.00020	mg/L	2024-08-27	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2024-08-27	
Molybdenum, total	0.00282	N/A	0.00010	mg/L	2024-08-27	
Nickel, total	< 0.00040	N/A	0.00040	mg/L	2024-08-27	
Potassium, total	1.91	N/A	0.10	mg/L	2024-08-27	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-08-27	
Sodium, total	11.9	AO ≤ 200	0.10	mg/L	2024-08-27	
Strontium, total	0.230	MAC = 7	0.0010	mg/L	2024-08-27	
Uranium, total	0.000096	MAC = 0.02	0.000020	mg/L	2024-08-27	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2024-08-27	

Volatile Organic Compounds (VOC)

Bromodichloromethane	0.0039	N/A	0.0010	mg/L	2024-08-28	
Bromoform	< 0.0010	N/A	0.0010	mg/L	2024-08-28	
Chloroform	0.0488	N/A	0.0010	mg/L	2024-08-28	
Dibromochloromethane	< 0.0010	N/A	0.0010	mg/L	2024-08-28	
Surrogate: Toluene-d8	113		70-130	%	2024-08-28	
Surrogate: 4-Bromofluorobenzene	77		70-130	%	2024-08-28	

PRV Station (24H3271-04) | Matrix: Water | Sampled: 2024-08-25 11:25

Anions

Chloride	9.69	AO ≤ 250	0.10	mg/L	2024-08-27	
Fluoride	< 0.10	MAC = 1.5	0.10	mg/L	2024-08-27	
Nitrate (as N)	0.074	MAC = 10	0.010	mg/L	2024-08-27	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2024-08-27	
Sulfate	24.2	AO ≤ 500	1.0	mg/L	2024-08-27	

Calculated Parameters

Total Trihalomethanes	0.0268	MAC = 0.1	0.00400	mg/L	N/A	
Hardness, Total (as CaCO3)	100	None Required	0.500	mg/L	N/A	
Langelier Index	-0.4	N/A	-5.0		2024-08-29	CT6

TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24H3271
2024-09-03 11:19

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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PRV Station (24H3271-04) | Matrix: Water | Sampled: 2024-08-25 11:25, Continued

Calculated Parameters, Continued

Nitrogen, Organic	0.101	N/A	0.0500	mg/L	N/A	
Solids, Total Dissolved	137	AO ≤ 500	1.00	mg/L	N/A	

General Parameters

Alkalinity, Total (as CaCO ₃)	87.6	N/A	1.0	mg/L	2024-08-28	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-08-28	
Alkalinity, Bicarbonate (as CaCO ₃)	87.6	N/A	1.0	mg/L	2024-08-28	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-08-28	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-08-28	
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2024-08-28	
Carbon, Total Organic	3.32	N/A	0.50	mg/L	2024-08-28	
Colour, True	< 5.0	AO ≤ 15	5.0	CU	2024-08-28	
Conductivity (EC)	263	N/A	2.0	µS/cm	2024-08-28	
Cyanide, Total	< 0.0020	MAC = 0.2	0.0020	mg/L	2024-08-28	
Nitrogen, Total Kjeldahl	0.101	N/A	0.050	mg/L	2024-08-29	
pH	7.75	7.0-10.5	0.10	pH units	2024-08-28	HT2
Phosphorus, Total (as P)	< 0.0050	N/A	0.0050	mg/L	2024-08-29	
Sulfide, Total	< 0.020	AO ≤ 0.05	0.020	mg/L	2024-08-30	
Temperature, at pH	22.8	N/A		°C	2024-08-28	HT2
Turbidity	< 0.10	OG < 1	0.10	NTU	2024-08-27	
UV Transmittance @ 254 nm - Unfiltered	92.6	N/A	0.10	% T	2024-08-26	

Haloacetic Acids

Monochloroacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-08-31	
Monobromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-08-31	
Dichloroacetic Acid	0.0155	N/A	0.0020	mg/L	2024-08-31	
Trichloroacetic Acid	0.0183	N/A	0.0020	mg/L	2024-08-31	
Dibromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-08-31	
Total Haloacetic Acids (HAA5)	0.0338	MAC = 0.08	0.00200	mg/L	N/A	
Surrogate: 2-Bromopropionic Acid	101		70-130	%	2024-08-31	

Total Metals

Aluminum, total	0.0117	OG < 0.1	0.0050	mg/L	2024-08-27	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2024-08-27	
Arsenic, total	< 0.00050	MAC = 0.01	0.00050	mg/L	2024-08-27	
Barium, total	0.0186	MAC = 2	0.0050	mg/L	2024-08-27	
Boron, total	< 0.0500	MAC = 5	0.0500	mg/L	2024-08-27	
Cadmium, total	< 0.000010	MAC = 0.007	0.000010	mg/L	2024-08-27	
Calcium, total	27.6	None Required	0.20	mg/L	2024-08-27	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-08-27	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2024-08-27	
Copper, total	0.00266	MAC = 2	0.00040	mg/L	2024-08-27	
Iron, total	< 0.010	AO ≤ 0.3	0.010	mg/L	2024-08-27	
Lead, total	0.00042	MAC = 0.005	0.00020	mg/L	2024-08-27	

TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24H3271
2024-09-03 11:19

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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PRV Station (24H3271-04) | Matrix: Water | Sampled: 2024-08-25 11:25, Continued

Total Metals, Continued

Magnesium, total	7.57	None Required	0.010	mg/L	2024-08-27	
Manganese, total	0.00142	MAC = 0.12	0.00020	mg/L	2024-08-27	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2024-08-27	
Molybdenum, total	0.00273	N/A	0.00010	mg/L	2024-08-27	
Nickel, total	< 0.00040	N/A	0.00040	mg/L	2024-08-27	
Potassium, total	1.89	N/A	0.10	mg/L	2024-08-27	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-08-27	
Sodium, total	11.9	AO ≤ 200	0.10	mg/L	2024-08-27	
Strontium, total	0.228	MAC = 7	0.0010	mg/L	2024-08-27	
Uranium, total	0.000091	MAC = 0.02	0.000020	mg/L	2024-08-27	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2024-08-27	

Volatile Organic Compounds (VOC)

Benzene	< 0.5	MAC = 5	0.5	µg/L	2024-08-28	
Bromodichloromethane	0.0031	N/A	0.0010	mg/L	2024-08-28	
Bromoform	< 0.0010	N/A	0.0010	mg/L	2024-08-28	
Chloroform	0.0236	N/A	0.0010	mg/L	2024-08-28	
Dibromochloromethane	< 0.0010	N/A	0.0010	mg/L	2024-08-28	
Ethylbenzene	< 1.0	AO ≤ 1.6	1.0	µg/L	2024-08-28	
Methyl tert-butyl ether	< 1.0	AO ≤ 15	1.0	µg/L	2024-08-28	
Styrene	< 1.0	N/A	1.0	µg/L	2024-08-28	
Toluene	< 1.0	MAC = 60	1.0	µg/L	2024-08-28	
Xylenes (total)	< 2.0	AO ≤ 20	2.0	µg/L	2024-08-28	
Surrogate: Toluene-d8	108		70-130	%	2024-08-28	
Surrogate: 4-Bromofluorobenzene	78		70-130	%	2024-08-28	

Okanagan Lake (24H3271-05) | Matrix: Water | Sampled: 2024-08-25 12:00

Anions

Chloride	6.09	AO ≤ 250	0.10	mg/L	2024-08-27	
Fluoride	< 0.10	MAC = 1.5	0.10	mg/L	2024-08-27	
Nitrate (as N)	0.087	MAC = 10	0.010	mg/L	2024-08-27	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2024-08-27	
Sulfate	29.4	AO ≤ 500	1.0	mg/L	2024-08-27	

Calculated Parameters

Hardness, Total (as CaCO3)	123	None Required	0.500	mg/L	N/A	
Langelier Index	-0.1	N/A	-5.0		2024-08-29	CT6
Nitrogen, Organic	0.123	N/A	0.0500	mg/L	N/A	
Solids, Total Dissolved	158	AO ≤ 500	1.00	mg/L	N/A	

General Parameters

Alkalinity, Total (as CaCO3)	106	N/A	1.0	mg/L	2024-08-28	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2024-08-28	

TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24H3271
2024-09-03 11:19

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Okanagan Lake (24H3271-05) Matrix: Water Sampled: 2024-08-25 12:00, Continued						
<i>General Parameters, Continued</i>						
Alkalinity, Bicarbonate (as CaCO ₃)	106	N/A	1.0	mg/L	2024-08-28	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-08-28	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-08-28	
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2024-08-28	
Carbon, Total Organic	3.53	N/A	0.50	mg/L	2024-08-28	
Colour, True	< 5.0	AO ≤ 15	5.0	CU	2024-08-28	
Conductivity (EC)	299	N/A	2.0	µS/cm	2024-08-28	
Cyanide, Total	< 0.0020	MAC = 0.2	0.0020	mg/L	2024-08-28	
Nitrogen, Total Kjeldahl	0.123	N/A	0.050	mg/L	2024-08-29	
pH	7.88	7.0-10.5	0.10	pH units	2024-08-28	HT2
Phosphorus, Total (as P)	< 0.0050	N/A	0.0050	mg/L	2024-08-29	
Sulfide, Total	< 0.020	AO ≤ 0.05	0.020	mg/L	2024-08-30	
Temperature, at pH	23.0	N/A		°C	2024-08-28	HT2
Turbidity	0.21	OG < 1	0.10	NTU	2024-08-27	
UV Transmittance @ 254 nm - Unfiltered	86.4	N/A	0.10	% T	2024-08-26	

Total Metals

Aluminum, total	< 0.0050	OG < 0.1	0.0050	mg/L	2024-08-27	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2024-08-27	
Arsenic, total	< 0.00050	MAC = 0.01	0.00050	mg/L	2024-08-27	
Barium, total	0.0216	MAC = 2	0.0050	mg/L	2024-08-27	
Boron, total	< 0.0500	MAC = 5	0.0500	mg/L	2024-08-27	
Cadmium, total	< 0.000010	MAC = 0.007	0.000010	mg/L	2024-08-27	
Calcium, total	33.9	None Required	0.20	mg/L	2024-08-27	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-08-27	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2024-08-27	
Copper, total	0.00235	MAC = 2	0.00040	mg/L	2024-08-27	
Iron, total	< 0.010	AO ≤ 0.3	0.010	mg/L	2024-08-27	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2024-08-27	
Magnesium, total	9.17	None Required	0.010	mg/L	2024-08-27	
Manganese, total	0.00092	MAC = 0.12	0.00020	mg/L	2024-08-27	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2024-08-27	
Molybdenum, total	0.00339	N/A	0.00010	mg/L	2024-08-27	
Nickel, total	0.00056	N/A	0.00040	mg/L	2024-08-27	
Potassium, total	2.24	N/A	0.10	mg/L	2024-08-27	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-08-27	
Sodium, total	11.6	AO ≤ 200	0.10	mg/L	2024-08-27	
Strontium, total	0.306	MAC = 7	0.0010	mg/L	2024-08-27	
Uranium, total	0.00227	MAC = 0.02	0.000020	mg/L	2024-08-27	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2024-08-27	

Penticton Creek (24H3271-06) | Matrix: Water | Sampled: 2024-08-25 13:00

TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24H3271
2024-09-03 11:19

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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Penticton Creek (24H3271-06) | Matrix: Water | Sampled: 2024-08-25 13:00, Continued

Anions

Chloride	0.26	AO ≤ 250	0.10	mg/L	2024-08-28	
Fluoride	< 0.10	MAC = 1.5	0.10	mg/L	2024-08-28	
Nitrate (as N)	< 0.010	MAC = 10	0.010	mg/L	2024-08-28	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2024-08-28	
Sulfate	< 1.0	AO ≤ 500	1.0	mg/L	2024-08-28	

Calculated Parameters

Hardness, Total (as CaCO ₃)	11.3	None Required	0.500	mg/L	N/A	
Langelier Index	-3.4	N/A	-5.0		2024-08-29	CT6
Nitrogen, Organic	0.198	N/A	0.0500	mg/L	N/A	
Solids, Total Dissolved	9.13	AO ≤ 500	1.00	mg/L	N/A	

General Parameters

Alkalinity, Total (as CaCO ₃)	4.4	N/A	1.0	mg/L	2024-08-28	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-08-28	
Alkalinity, Bicarbonate (as CaCO ₃)	4.4	N/A	1.0	mg/L	2024-08-28	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-08-28	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-08-28	
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2024-08-28	
Carbon, Total Organic	6.21	N/A	0.50	mg/L	2024-08-28	
Colour, True	40	AO ≤ 15	5.0	CU	2024-08-28	
Conductivity (EC)	31.5	N/A	2.0	µS/cm	2024-08-28	
Cyanide, Total	< 0.0020	MAC = 0.2	0.0020	mg/L	2024-08-28	
Nitrogen, Total Kjeldahl	0.198	N/A	0.050	mg/L	2024-08-29	
pH	6.81	7.0-10.5	0.10	pH units	2024-08-28	HT2
Phosphorus, Total (as P)	0.0105	N/A	0.0050	mg/L	2024-08-29	
Sulfide, Total	< 0.020	AO ≤ 0.05	0.020	mg/L	2024-08-30	
Temperature, at pH	23.1	N/A		°C	2024-08-28	HT2
Turbidity	0.82	OG < 1	0.10	NTU	2024-08-27	
UV Transmittance @ 254 nm - Unfiltered	51.7	N/A	0.10	% T	2024-08-26	

Total Metals

Aluminum, total	0.130	OG < 0.1	0.0050	mg/L	2024-08-27	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2024-08-27	
Arsenic, total	< 0.00050	MAC = 0.01	0.00050	mg/L	2024-08-27	
Barium, total	0.0057	MAC = 2	0.0050	mg/L	2024-08-27	
Boron, total	< 0.0500	MAC = 5	0.0500	mg/L	2024-08-27	
Cadmium, total	< 0.000010	MAC = 0.007	0.000010	mg/L	2024-08-27	
Calcium, total	3.29	None Required	0.20	mg/L	2024-08-27	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-08-27	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2024-08-27	
Copper, total	0.00188	MAC = 2	0.00040	mg/L	2024-08-27	
Iron, total	0.433	AO ≤ 0.3	0.010	mg/L	2024-08-27	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2024-08-27	



TEST RESULTS

REPORTED TO PROJECT	Penticton, City of - DW & STP Quarterly Samples	WORK ORDER REPORTED	24H3271 2024-09-03 11:19
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Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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Penticton Creek (24H3271-06) | Matrix: Water | Sampled: 2024-08-25 13:00, Continued

Total Metals, Continued

Magnesium, total	0.737	None Required	0.010	mg/L	2024-08-27	
Manganese, total	0.00844	MAC = 0.12	0.00020	mg/L	2024-08-27	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2024-08-27	
Molybdenum, total	0.00048	N/A	0.00010	mg/L	2024-08-27	
Nickel, total	< 0.00040	N/A	0.00040	mg/L	2024-08-27	
Potassium, total	0.44	N/A	0.10	mg/L	2024-08-27	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-08-27	
Sodium, total	1.75	AO ≤ 200	0.10	mg/L	2024-08-27	
Strontium, total	0.0392	MAC = 7	0.0010	mg/L	2024-08-27	
Uranium, total	0.000324	MAC = 0.02	0.000020	mg/L	2024-08-27	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2024-08-27	

Sample Qualifiers:

CT6	Results were based on lab temperature & lab pH.
HT2	The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24H3271
2024-09-03 11:19

Analysis Description	Method Ref.	Technique	Accredited	Location
Alkalinity in Water	SM 2320 B* (2021)	Titration with H ₂ SO ₄	✓	Kelowna
Ammonia, Total in Water	SM 4500-NH ₃ G* (2021)	Automated Colorimetry (Phenate)	✓	Kelowna
Anions in Water	SM 4110 B (2020)	Ion Chromatography	✓	Kelowna
BTEX in Water	EPA 5030B / EPA 8260D	Purge&Trap / GC-MSD (SIM)	✓	Richmond
Carbon, Total Organic in Water	SM 5310 B (2022)	Combustion, Infrared CO ₂ Detection	✓	Kelowna
Colour, True in Water	SM 2120 C (2021)	Spectrophotometry (456 nm)	✓	Kelowna
Conductivity in Water	SM 2510 B (2021)	Conductivity Meter	✓	Kelowna
Cyanide, SAD in Water	ASTM D7511-12	Flow Injection with In-Line UV Digestion and Amperometry	✓	Kelowna
Haloacetic Acids in Water	EPA 552.3*	Liquid-Liquid Microextraction, Derivatization and GC-ECD	✓	Richmond
Hardness in Water	SM 2340 B* (2021)	Calculation: 2.497 [total Ca] + 4.118 [total Mg] (Est)	✓	N/A
Langelier Index in Water	SM 2330 B (2021)	Calculation		N/A
Mercury, total in Water	EPA 245.7*	BrCl ₂ Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	✓	Richmond
Nitrogen, Total Kjeldahl in Water	SM 4500-Norg D* (2021)	Block Digestion and Flow Injection Analysis	✓	Kelowna
pH in Water	SM 4500-H+ B (2021)	Electrometry	✓	Kelowna
Phosphorus, Total in Water	SM 4500-P B.5* (2011) / SM 4500-P F (2021)	Persulfate Digestion / Automated Colorimetry (Ascorbic Acid)	✓	Kelowna
Solids, Total Dissolved in Water	SM 1030 E (2021)	SM 1030 E		N/A
Sulfide, Total in Water	SM 4500-S ₂ D* (2021)	Colorimetry (Methylene Blue)	✓	Edmonton
Total Metals in Water	EPA 200.2 / EPA 6020B	HNO ₃ +HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	✓	Richmond
Transmittance at 254 nm - Unfiltered in Water	SM 5910 B* (2021)	Ultraviolet Absorption	✓	Kelowna
Trihalomethanes in Water	EPA 5030B / EPA 8260D	Purge&Trap / GC-MSD (SIM)	✓	Richmond
Turbidity in Water	SM 2130 B (2020)	Nephelometry	✓	Kelowna

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Glossary of Terms:

RL	Reporting Limit (default)
% T	Percent Transmittance
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
°C	Degrees Celcius
AO	Aesthetic Objective
CU	Colour Units (referenced against a platinum cobalt standard)
MAC	Maximum Acceptable Concentration (health based)
mg/L	Milligrams per litre
NTU	Nephelometric Turbidity Units
OG	Operational Guideline (treated water)
pH units	pH < 7 = acidic, pH > 7 = basic
µg/L	Micrograms per litre
µS/cm	Microsiemens per centimetre



APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO PROJECT	Penticton, City of - DW & STP Quarterly Samples	WORK ORDER REPORTED	24H3271 2024-09-03 11:19
ASTM	ASTM International Test Methods		
EPA	United States Environmental Protection Agency Test Methods		
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association		

General Comments:

The results in this report apply to the received samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Caro will dispose of all samples within 30 days of sample receipt, unless otherwise agreed. The quality control (QC) data is available upon request

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager:bwhitehead@caro.ca

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CERTIFICATE OF ANALYSIS

REPORTED TO Penticton, City of - DW & STP
171 Main Street
PENTICTON, BC V2A 5A9

ATTENTION Alistair Wardlaw

PO NUMBER

PROJECT Quarterly Samples

PROJECT INFO OPR178-025

WORK ORDER 24K2420

RECEIVED / TEMP 2024-11-20 10:36 / 5.1°C

REPORTED 2024-11-28 12:52

COC NUMBER B112233

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO/IEC 17025:2017 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks



You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

We've Got Chemistry



It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

Ahead of the Curve



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If you have any questions or concerns, please contact me at hhannaoui@caro.ca

Authorized By:

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TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24K2420
2024-11-28 12:52

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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Smythe Dr. Stn (24K2420-01) | Matrix: Water | Sampled: 2024-11-19 11:51

Calculated Parameters

Total Trihalomethanes	0.0485	MAC = 0.1	0.00400	mg/L	N/A	
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Haloacetic Acids

Monochloroacetic Acid	0.0035	N/A	0.0020	mg/L	2024-11-26	
Monobromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-11-26	
Dichloroacetic Acid	0.0236	N/A	0.0020	mg/L	2024-11-26	
Trichloroacetic Acid	0.0309	N/A	0.0020	mg/L	2024-11-26	
Dibromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-11-26	
Total Haloacetic Acids (HAA5)	0.0580	MAC = 0.08	0.00200	mg/L	N/A	
Surrogate: 2-Bromopropionic Acid	109		70-130	%	2024-11-26	

Volatile Organic Compounds (VOC)

Bromodichloromethane	0.0034	N/A	0.0010	mg/L	2024-11-27	
Bromoform	< 0.0010	N/A	0.0010	mg/L	2024-11-27	
Chloroform	0.0452	N/A	0.0010	mg/L	2024-11-27	
Dibromochloromethane	< 0.0010	N/A	0.0010	mg/L	2024-11-27	
Surrogate: Toluene-d8	88		70-130	%	2024-11-27	
Surrogate: 4-Bromofluorobenzene	82		70-130	%	2024-11-27	

Naramata Rd Stn (24K2420-02) | Matrix: Water | Sampled: 2024-11-19 14:10

Calculated Parameters

Total Trihalomethanes	0.0557	MAC = 0.1	0.00400	mg/L	N/A	
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Haloacetic Acids

Monochloroacetic Acid	0.0034	N/A	0.0020	mg/L	2024-11-26	
Monobromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-11-26	
Dichloroacetic Acid	0.0233	N/A	0.0020	mg/L	2024-11-26	
Trichloroacetic Acid	0.0505	N/A	0.0020	mg/L	2024-11-26	
Dibromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-11-26	
Total Haloacetic Acids (HAA5)	0.0771	MAC = 0.08	0.00200	mg/L	N/A	
Surrogate: 2-Bromopropionic Acid	120		70-130	%	2024-11-26	

Volatile Organic Compounds (VOC)

Bromodichloromethane	0.0041	N/A	0.0010	mg/L	2024-11-27	
Bromoform	< 0.0010	N/A	0.0010	mg/L	2024-11-27	
Chloroform	0.0516	N/A	0.0010	mg/L	2024-11-27	
Dibromochloromethane	< 0.0010	N/A	0.0010	mg/L	2024-11-27	
Surrogate: Toluene-d8	84		70-130	%	2024-11-27	
Surrogate: 4-Bromofluorobenzene	74		70-130	%	2024-11-27	

Randolph Rd Stn (24K2420-03) | Matrix: Water | Sampled: 2024-11-19 13:45

Calculated Parameters

TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24K2420
2024-11-28 12:52

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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Randolph Rd Stn (24K2420-03) | Matrix: Water | Sampled: 2024-11-19 13:45, Continued

Calculated Parameters, Continued

Total Trihalomethanes	0.0445	MAC = 0.1	0.00400	mg/L	N/A	
Haloacetic Acids						
Monochloroacetic Acid	0.0029	N/A	0.0020	mg/L	2024-11-26	
Monobromoacetic Acid	0.0021	N/A	0.0020	mg/L	2024-11-26	
Dichloroacetic Acid	0.0246	N/A	0.0020	mg/L	2024-11-26	
Trichloroacetic Acid	0.0396	N/A	0.0020	mg/L	2024-11-26	
Dibromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-11-26	
Total Haloacetic Acids (HAA5)	0.0693	MAC = 0.08	0.00200	mg/L	N/A	
Surrogate: 2-Bromopropionic Acid	113		70-130	%	2024-11-26	

Volatile Organic Compounds (VOC)

Bromodichloromethane	0.0036	N/A	0.0010	mg/L	2024-11-27	
Bromoform	< 0.0010	N/A	0.0010	mg/L	2024-11-27	
Chloroform	0.0410	N/A	0.0010	mg/L	2024-11-27	
Dibromochloromethane	< 0.0010	N/A	0.0010	mg/L	2024-11-27	
Surrogate: Toluene-d8	92		70-130	%	2024-11-27	
Surrogate: 4-Bromofluorobenzene	84		70-130	%	2024-11-27	

PRV Station (24K2420-04) | Matrix: Water | Sampled: 2024-11-19 14:30

Anions

Chloride	9.08	AO ≤ 250	0.10	mg/L	2024-11-21	
Fluoride	0.15	MAC = 1.5	0.10	mg/L	2024-11-21	
Nitrate (as N)	0.074	MAC = 10	0.010	mg/L	2024-11-21	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2024-11-21	
Sulfate	22.5	AO ≤ 500	1.0	mg/L	2024-11-21	

Calculated Parameters

Total Trihalomethanes	0.0298	MAC = 0.1	0.00400	mg/L	N/A	
Hardness, Total (as CaCO3)	93.7	None Required	0.500	mg/L	N/A	
Langelier Index	-0.4	N/A	-5.0		2024-11-27	CT6
Nitrogen, Organic	0.106	N/A	0.0500	mg/L	N/A	
Solids, Total Dissolved	126	AO ≤ 500	1.00	mg/L	N/A	

General Parameters

Alkalinity, Total (as CaCO3)	77.8	N/A	1.0	mg/L	2024-11-21	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2024-11-21	
Alkalinity, Bicarbonate (as CaCO3)	77.8	N/A	1.0	mg/L	2024-11-21	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2024-11-21	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2024-11-21	
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2024-11-22	
Carbon, Total Organic	3.95	N/A	0.50	mg/L	2024-11-27	
Colour, True	< 5.0	AO ≤ 15	5.0	CU	2024-11-22	

TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24K2420
2024-11-28 12:52

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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PRV Station (24K2420-04) | Matrix: Water | Sampled: 2024-11-19 14:30, Continued

General Parameters, Continued

Conductivity (EC)	237	N/A	2.0	µS/cm	2024-11-21	
Cyanide, Total	< 0.0020	MAC = 0.2	0.0020	mg/L	2024-11-22	
Nitrogen, Total Kjeldahl	0.106	N/A	0.050	mg/L	2024-11-22	
pH	7.87	7.0-10.5	0.10	pH units	2024-11-21	HT2
Phosphorus, Total (as P)	0.0091	N/A	0.0050	mg/L	2024-11-22	
Sulfide, Total	< 0.020	AO ≤ 0.05	0.020	mg/L	2024-11-25	
Temperature, at pH	22.9	N/A		°C	2024-11-21	HT2
Turbidity	0.19	OG < 1	0.10	NTU	2024-11-22	
UV Transmittance @ 254 nm - Unfiltered	92.8	N/A	0.10	% T	2024-11-23	HT1

Haloacetic Acids

Monochloroacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-11-26	
Monobromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-11-26	
Dichloroacetic Acid	0.0155	N/A	0.0020	mg/L	2024-11-26	
Trichloroacetic Acid	0.0218	N/A	0.0020	mg/L	2024-11-26	
Dibromoacetic Acid	< 0.0020	N/A	0.0020	mg/L	2024-11-26	
Total Haloacetic Acids (HAA5)	0.0373	MAC = 0.08	0.00200	mg/L	N/A	
Surrogate: 2-Bromopropionic Acid	110		70-130	%	2024-11-26	

Total Metals

Aluminum, total	0.0113	OG < 0.1	0.0050	mg/L	2024-11-22	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2024-11-22	
Arsenic, total	< 0.00050	MAC = 0.01	0.00050	mg/L	2024-11-22	
Barium, total	0.0170	MAC = 2	0.0050	mg/L	2024-11-22	
Boron, total	< 0.0500	MAC = 5	0.0500	mg/L	2024-11-22	
Cadmium, total	< 0.000010	MAC = 0.007	0.000010	mg/L	2024-11-22	
Calcium, total	26.2	None Required	0.20	mg/L	2024-11-22	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-11-22	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2024-11-22	
Copper, total	0.00082	MAC = 2	0.00040	mg/L	2024-11-22	
Iron, total	< 0.010	AO ≤ 0.3	0.010	mg/L	2024-11-22	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2024-11-22	
Magnesium, total	6.87	None Required	0.010	mg/L	2024-11-22	
Manganese, total	0.00121	MAC = 0.12	0.00020	mg/L	2024-11-22	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2024-11-26	
Molybdenum, total	0.00255	N/A	0.00010	mg/L	2024-11-22	
Nickel, total	< 0.00040	N/A	0.00040	mg/L	2024-11-22	
Potassium, total	1.85	N/A	0.10	mg/L	2024-11-22	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-11-22	
Sodium, total	11.5	AO ≤ 200	0.10	mg/L	2024-11-22	
Strontium, total	0.207	MAC = 7	0.0010	mg/L	2024-11-22	
Uranium, total	0.000093	MAC = 0.02	0.000020	mg/L	2024-11-22	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2024-11-22	

TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24K2420
2024-11-28 12:52

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
PRV Station (24K2420-04) Matrix: Water Sampled: 2024-11-19 14:30, Continued						
Volatile Organic Compounds (VOC)						
Bromodichloromethane	0.0022	N/A	0.0010	mg/L	2024-11-27	
Bromoform	< 0.0010	N/A	0.0010	mg/L	2024-11-27	
Chloroform	0.0276	N/A	0.0010	mg/L	2024-11-27	
Dibromochloromethane	< 0.0010	N/A	0.0010	mg/L	2024-11-27	
Surrogate: Toluene-d8	83		70-130	%	2024-11-27	
Surrogate: 4-Bromofluorobenzene	81		70-130	%	2024-11-27	

Lawrence Ave Stn (24K2420-05) | Matrix: Water | Sampled: 2024-11-19 14:00

Anions

Chloride	9.05	AO ≤ 250	0.10	mg/L	2024-11-21	
Fluoride	0.15	MAC = 1.5	0.10	mg/L	2024-11-21	
Nitrate (as N)	0.065	MAC = 10	0.010	mg/L	2024-11-21	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2024-11-21	
Sulfate	22.5	AO ≤ 500	1.0	mg/L	2024-11-21	

Calculated Parameters

Hardness, Total (as CaCO3)	94.2	None Required	0.500	mg/L	N/A	
Langelier Index	-0.2	N/A	-5.0		2024-11-27	CT6
Nitrogen, Organic	0.166	N/A	0.0500	mg/L	N/A	
Solids, Total Dissolved	126	AO ≤ 500	1.00	mg/L	N/A	

General Parameters

Alkalinity, Total (as CaCO3)	78.9	N/A	1.0	mg/L	2024-11-21	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2024-11-21	
Alkalinity, Bicarbonate (as CaCO3)	78.9	N/A	1.0	mg/L	2024-11-21	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2024-11-21	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2024-11-21	
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2024-11-22	
Carbon, Total Organic	3.30	N/A	0.50	mg/L	2024-11-27	
Colour, True	< 5.0	AO ≤ 15	5.0	CU	2024-11-22	
Conductivity (EC)	239	N/A	2.0	µS/cm	2024-11-21	
Cyanide, Total	< 0.0020	MAC = 0.2	0.0020	mg/L	2024-11-22	
Nitrogen, Total Kjeldahl	0.166	N/A	0.050	mg/L	2024-11-25	
pH	8.00	7.0-10.5	0.10	pH units	2024-11-21	HT2
Phosphorus, Total (as P)	0.0082	N/A	0.0050	mg/L	2024-11-22	
Sulfide, Total	< 0.020	AO ≤ 0.05	0.020	mg/L	2024-11-25	
Temperature, at pH	22.7	N/A		°C	2024-11-21	HT2
Turbidity	0.12	OG < 1	0.10	NTU	2024-11-21	
UV Transmittance @ 254 nm - Unfiltered	93.0	N/A	0.10	% T	2024-11-23	HT1

Total Metals

Aluminum, total	0.0132	OG < 0.1	0.0050	mg/L	2024-11-22	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2024-11-22	

TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24K2420
2024-11-28 12:52

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Lawrence Ave Stn (24K2420-05) Matrix: Water Sampled: 2024-11-19 14:00, Continued						
Total Metals, Continued						
Arsenic, total	< 0.00050	MAC = 0.01	0.00050	mg/L	2024-11-22	
Barium, total	0.0169	MAC = 2	0.0050	mg/L	2024-11-22	
Boron, total	< 0.0500	MAC = 5	0.0500	mg/L	2024-11-22	
Cadmium, total	< 0.000010	MAC = 0.007	0.000010	mg/L	2024-11-22	
Calcium, total	26.3	None Required	0.20	mg/L	2024-11-22	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-11-22	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2024-11-22	
Copper, total	0.00508	MAC = 2	0.00040	mg/L	2024-11-22	
Iron, total	< 0.010	AO ≤ 0.3	0.010	mg/L	2024-11-22	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2024-11-22	
Magnesium, total	6.93	None Required	0.010	mg/L	2024-11-22	
Manganese, total	0.00022	MAC = 0.12	0.00020	mg/L	2024-11-22	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2024-11-26	
Molybdenum, total	0.00257	N/A	0.00010	mg/L	2024-11-22	
Nickel, total	< 0.00040	N/A	0.00040	mg/L	2024-11-22	
Potassium, total	1.85	N/A	0.10	mg/L	2024-11-22	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-11-22	
Sodium, total	11.1	AO ≤ 200	0.10	mg/L	2024-11-22	
Strontium, total	0.207	MAC = 7	0.0010	mg/L	2024-11-22	
Uranium, total	0.000085	MAC = 0.02	0.000020	mg/L	2024-11-22	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2024-11-22	

Okangan Lake (24K2420-06) | Matrix: Water | Sampled: 2024-11-19 11:00

Anions

Chloride	6.09	AO ≤ 250	0.10	mg/L	2024-11-21	
Fluoride	0.20	MAC = 1.5	0.10	mg/L	2024-11-21	
Nitrate (as N)	0.097	MAC = 10	0.010	mg/L	2024-11-21	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2024-11-21	
Sulfate	31.6	AO ≤ 500	1.0	mg/L	2024-11-21	

Calculated Parameters

Hardness, Total (as CaCO ₃)	126	None Required	0.500	mg/L	N/A	
Langelier Index	0.08	N/A	-5.0		2024-11-27	CT6
Nitrogen, Organic	0.236	N/A	0.0500	mg/L	N/A	
Solids, Total Dissolved	161	AO ≤ 500	1.00	mg/L	N/A	

General Parameters

Alkalinity, Total (as CaCO ₃)	104	N/A	1.0	mg/L	2024-11-21	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-11-21	
Alkalinity, Bicarbonate (as CaCO ₃)	104	N/A	1.0	mg/L	2024-11-21	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-11-21	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-11-21	

TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24K2420
2024-11-28 12:52

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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Okangan Lake (24K2420-06) | Matrix: Water | Sampled: 2024-11-19 11:00, Continued

General Parameters, Continued

Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2024-11-22	
Carbon, Total Organic	4.02	N/A	0.50	mg/L	2024-11-27	
Colour, True	< 5.0	AO ≤ 15	5.0	CU	2024-11-22	
Conductivity (EC)	298	N/A	2.0	µS/cm	2024-11-21	
Cyanide, Total	< 0.0020	MAC = 0.2	0.0020	mg/L	2024-11-22	
Nitrogen, Total Kjeldahl	0.236	N/A	0.050	mg/L	2024-11-25	
pH	8.07	7.0-10.5	0.10	pH units	2024-11-21	HT2
Phosphorus, Total (as P)	0.121	N/A	0.0050	mg/L	2024-11-22	
Sulfide, Total	< 0.020	AO ≤ 0.05	0.020	mg/L	2024-11-25	
Temperature, at pH	22.6	N/A		°C	2024-11-21	HT2
Turbidity	0.21	OG < 1	0.10	NTU	2024-11-21	
UV Transmittance @ 254 nm - Unfiltered	86.6	N/A	0.10	% T	2024-11-23	HT1

Total Metals

Aluminum, total	< 0.0050	OG < 0.1	0.0050	mg/L	2024-11-22	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2024-11-22	
Arsenic, total	< 0.00050	MAC = 0.01	0.00050	mg/L	2024-11-22	
Barium, total	0.0210	MAC = 2	0.0050	mg/L	2024-11-22	
Boron, total	< 0.0500	MAC = 5	0.0500	mg/L	2024-11-22	
Cadmium, total	< 0.000010	MAC = 0.007	0.000010	mg/L	2024-11-22	
Calcium, total	34.9	None Required	0.20	mg/L	2024-11-22	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-11-22	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2024-11-22	
Copper, total	0.00389	MAC = 2	0.00040	mg/L	2024-11-22	
Iron, total	< 0.010	AO ≤ 0.3	0.010	mg/L	2024-11-22	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2024-11-22	
Magnesium, total	9.47	None Required	0.010	mg/L	2024-11-22	
Manganese, total	0.00077	MAC = 0.12	0.00020	mg/L	2024-11-22	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2024-11-26	
Molybdenum, total	0.00338	N/A	0.00010	mg/L	2024-11-22	
Nickel, total	0.00058	N/A	0.00040	mg/L	2024-11-22	
Potassium, total	2.56	N/A	0.10	mg/L	2024-11-22	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-11-22	
Sodium, total	12.1	AO ≤ 200	0.10	mg/L	2024-11-22	
Strontium, total	0.301	MAC = 7	0.0010	mg/L	2024-11-22	
Uranium, total	0.00243	MAC = 0.02	0.000020	mg/L	2024-11-22	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2024-11-22	

Penticton Creek (24K2420-07) | Matrix: Water | Sampled: 2024-11-19 11:15

Anions

Chloride	0.40	AO ≤ 250	0.10	mg/L	2024-11-21	
Fluoride	< 0.10	MAC = 1.5	0.10	mg/L	2024-11-21	

TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24K2420
2024-11-28 12:52

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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Penticton Creek (24K2420-07) | Matrix: Water | Sampled: 2024-11-19 11:15, Continued

Anions, Continued

Nitrate (as N)	< 0.010	MAC = 10	0.010	mg/L	2024-11-21	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2024-11-21	
Sulfate	1.4	AO ≤ 500	1.0	mg/L	2024-11-21	

Calculated Parameters

Hardness, Total (as CaCO ₃)	14.2	None Required	0.500	mg/L	N/A	
Langelier Index	-2.9	N/A	-5.0		2024-11-27	CT6
Nitrogen, Organic	0.199	N/A	0.0500	mg/L	N/A	
Solids, Total Dissolved	13.7	AO ≤ 500	1.00	mg/L	N/A	

General Parameters

Alkalinity, Total (as CaCO ₃)	6.8	N/A	1.0	mg/L	2024-11-21	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-11-21	
Alkalinity, Bicarbonate (as CaCO ₃)	6.8	N/A	1.0	mg/L	2024-11-21	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-11-21	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2024-11-21	
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2024-11-22	
Carbon, Total Organic	5.83	N/A	0.50	mg/L	2024-11-27	
Colour, True	35	AO ≤ 15	5.0	CU	2024-11-22	
Conductivity (EC)	38.5	N/A	2.0	µS/cm	2024-11-21	
Cyanide, Total	< 0.0020	MAC = 0.2	0.0020	mg/L	2024-11-22	
Nitrogen, Total Kjeldahl	0.199	N/A	0.050	mg/L	2024-11-25	
pH	7.12	7.0-10.5	0.10	pH units	2024-11-21	HT2
Phosphorus, Total (as P)	0.0141	N/A	0.0050	mg/L	2024-11-22	
Sulfide, Total	< 0.020	AO ≤ 0.05	0.020	mg/L	2024-11-25	
Temperature, at pH	22.7	N/A		°C	2024-11-21	HT2
Turbidity	0.68	OG < 1	0.10	NTU	2024-11-21	
UV Transmittance @ 254 nm - Unfiltered	61.5	N/A	0.10	% T	2024-11-23	HT1

Total Metals

Aluminum, total	0.0869	OG < 0.1	0.0050	mg/L	2024-11-22	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2024-11-22	
Arsenic, total	< 0.00050	MAC = 0.01	0.00050	mg/L	2024-11-22	
Barium, total	0.0057	MAC = 2	0.0050	mg/L	2024-11-22	
Boron, total	< 0.0500	MAC = 5	0.0500	mg/L	2024-11-22	
Cadmium, total	< 0.000010	MAC = 0.007	0.000010	mg/L	2024-11-22	
Calcium, total	4.03	None Required	0.20	mg/L	2024-11-22	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-11-22	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2024-11-22	
Copper, total	0.00160	MAC = 2	0.00040	mg/L	2024-11-22	
Iron, total	0.321	AO ≤ 0.3	0.010	mg/L	2024-11-22	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2024-11-22	
Magnesium, total	1.00	None Required	0.010	mg/L	2024-11-22	
Manganese, total	0.00446	MAC = 0.12	0.00020	mg/L	2024-11-22	

TEST RESULTS

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

WORK ORDER REPORTED 24K2420
2024-11-28 12:52

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Penticton Creek (24K2420-07) Matrix: Water Sampled: 2024-11-19 11:15, Continued						
Total Metals, Continued						
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2024-11-26	
Molybdenum, total	0.00055	N/A	0.00010	mg/L	2024-11-22	
Nickel, total	< 0.00040	N/A	0.00040	mg/L	2024-11-22	
Potassium, total	0.48	N/A	0.10	mg/L	2024-11-22	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2024-11-22	
Sodium, total	2.19	AO ≤ 200	0.10	mg/L	2024-11-22	
Strontium, total	0.0446	MAC = 7	0.0010	mg/L	2024-11-22	
Uranium, total	0.000407	MAC = 0.02	0.000020	mg/L	2024-11-22	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2024-11-22	

Sample Qualifiers:

CT6 Results were based on lab temperature & lab pH.
HT1 The sample was prepared and/or analyzed past the recommended holding time.
HT2 The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO PROJECT Penticton, City of - DW & STP
Quarterly Samples

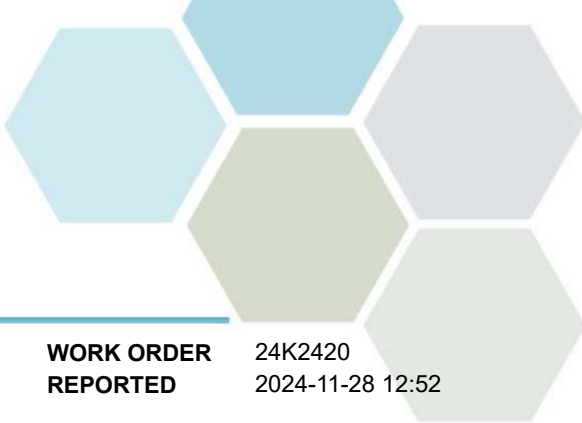
WORK ORDER REPORTED 24K2420
2024-11-28 12:52

Analysis Description	Method Ref.	Technique	Accredited	Location
Alkalinity in Water	SM 2320 B* (2021)	Titration with H2SO4	✓	Kelowna
Ammonia, Total in Water	SM 4500-NH3 G* (2021)	Automated Colorimetry (Phenate)	✓	Kelowna
Anions in Water	SM 4110 B (2020)	Ion Chromatography	✓	Kelowna
Carbon, Total Organic in Water	SM 5310 B (2022)	Combustion, Infrared CO2 Detection	✓	Kelowna
Colour, True in Water	SM 2120 C (2021)	Spectrophotometry (456 nm)	✓	Kelowna
Conductivity in Water	SM 2510 B (2021)	Conductivity Meter	✓	Kelowna
Cyanide, SAD in Water	ASTM D7511-12	Flow Injection with In-Line UV Digestion and Amperometry	✓	Kelowna
Haloacetic Acids in Water	EPA 552.3*	Liquid-Liquid Microextraction, Derivatization and GC-ECD	✓	Richmond
Hardness in Water	SM 2340 B* (2021)	Calculation: 2.497 [total Ca] + 4.118 [total Mg] (Est)	✓	N/A
Langelier Index in Water	SM 2330 B (2021)	Calculation		N/A
Mercury, total in Water	EPA 245.7*	BrCl2 Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	✓	Richmond
Nitrogen, Total Kjeldahl in Water	SM 4500-Norg D* (2021)	Block Digestion and Flow Injection Analysis	✓	Kelowna
pH in Water	SM 4500-H+ B (2021)	Electrometry	✓	Kelowna
Phosphorus, Total in Water	SM 4500-P B.5* (2011) / SM 4500-P F (2021)	Persulfate Digestion / Automated Colorimetry (Ascorbic Acid)	✓	Kelowna
Solids, Total Dissolved in Water	SM 1030 E (2021)	SM 1030 E		N/A
Sulfide, Total in Water	SM 4500-S2 D* (2021)	Colorimetry (Methylene Blue)	✓	Edmonton
Total Metals in Water	EPA 200.2 / EPA 6020B	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	✓	Richmond
Transmittance at 254 nm - Unfiltered in Water	SM 5910 B* (2021)	Ultraviolet Absorption	✓	Kelowna
Trihalomethanes in Water	EPA 5030B / EPA 8260D	Purge&Trap / GC-MSD (SIM)	✓	Richmond
Turbidity in Water	SM 2130 B (2020)	Nephelometry	✓	Kelowna

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Glossary of Terms:

RL	Reporting Limit (default)
% T	Percent Transmittance
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
°C	Degrees Celcius
AO	Aesthetic Objective
CU	Colour Units (referenced against a platinum cobalt standard)
MAC	Maximum Acceptable Concentration (health based)
mg/L	Milligrams per litre
NTU	Nephelometric Turbidity Units
OG	Operational Guideline (treated water)
pH units	pH < 7 = acidic, pH > 7 = basic
µS/cm	Microsiemens per centimetre
ASTM	ASTM International Test Methods
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association



APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO PROJECT	Penticton, City of - DW & STP Quarterly Samples	WORK ORDER REPORTED	24K2420 2024-11-28 12:52
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General Comments:
The results in this report apply to the received samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Caro will dispose of all samples within 30 days of sample receipt, unless otherwise agreed. The quality control (QC) data is available upon request

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager:hhannaoui@caro.ca

Please note any regulatory guidelines applied to this report are added as a convenience to the client, at their request, to help provide some initial context to analytical results obtained. Although CARO makes every effort to ensure accuracy of the associated regulatory guideline(s) applied, the guidelines applied cannot be assumed to be correct due to a variety of factors and as such CARO Analytical Services assumes no liability or responsibility for the use of those guidelines to make any decisions. The original source of the regulation should be verified and a review of the guideline(s) should be validated as correct in order to make any decisions arising from the comparison of the analytical data obtained to the relevant regulatory guideline for one's particular circumstances. Further, CARO Analytical Services assumes no liability or responsibility for any loss attributed from the use of these guidelines in any way.

CITY OF PENTICTON

PFAS Testing Plan

Project No.: 203746-00
Date: February 25, 2025
Prepared By: Martin Earle, PhD, EIT
Reviewed By: Kyle Thompson, PhD, PE, Piero Galvagno, PhD, P.Eng.
Subject: Summary of PFAS Sampling Results to Date

1.0 INTRODUCTION

The City of Penticton (City) proactively monitors water, wastewater, and solids produced during wastewater treatment (biosolids) for contaminants which may pose risk to human health or the environment. In 2023, the City began an initiative to monitor a group of contaminants called Per- and Polyfluoroalkyl Substances (PFAS). These synthetic chemicals have special properties which make them very useful in consumer products, manufacturing, and fighting fuel fires. Unfortunately, these same properties also cause many PFAS to be persistent in the environment (e.g., they do not fully biodegrade). The combination of their widespread use and their environmental persistence has resulted in PFAS being universally present across the globe in water and wastewater. A few specific PFAS such as perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic (PFOS) have many studies linking them to human health effects.

Early testing results demonstrate that the City's drinking water is safe and there is no known environmental impact from PFAS in the City's wastewater or biosolids. However, continued monitoring is required to ensure that this remains true. This memorandum provides a brief overview of PFAS and a summary of the testing results to date.

2.0 PFAS BACKGROUND

2.1 What Are PFAS?

You may have seen the term "PFAS" in the news over the last several years. They are commonly referred to as "forever chemicals" in the news or media because of their non-biodegradability. The scientific term PFAS describes a large group of thousands of chemicals which have special chemical bonds between carbon and fluorine – this is where the "fluoro" comes from in "Per- and Poly**fluoro**alkyl Substances." Within this group there are many subgroups which have varying properties which affect how hazardous they are to humans and the environment.

In general, PFAS are used as surfactants or as components in surface coatings. They are stain, heat, oil, and water resistant which makes them incredibly useful in many products and manufacturing processes. For example, PFAS have been used in waterproof fabrics, carpets, furniture, cleaning products, electronics, food packaging, cosmetics, specialized firefighting foams, and, notoriously, in non-stick pots and pans. It is the residue from these products and pollution from manufacturing processes which causes environmental contamination. A small group of some of the most well studied PFAS have been banned for import and manufacture in Canada but many more are still used.



Figure 1 Common Historical Uses for PFAS in Consumer Products

2.2 How Might PFAS Affect Me?

Some PFAS have been linked to health problems, specifically increased risk of developing some cancers, increased cholesterol levels, reduced immune system function, and low birth weight. That said, our overall understanding of the health impacts of PFAS is unclear because there are many less-studied or unstudied compounds.

2.3 What is Being Done About PFAS in Drinking Water?

Drinking water is one of many PFAS exposure pathways, but controlling PFAS concentrations in drinking water can have a direct impact on public health. The province of British Columbia currently recommends following Health Canada guidelines, which include limits for PFOA and PFOS specifically. However, these guidelines are outdated and are set to be replaced by a new PFAS objective, which recommends limiting PFAS as a class of compounds to a much lower value than previous guidelines. This objective is 30 nanograms per litre (ng/L, sometimes called parts per trillion). This approach precautionarily assumes that many PFAS are equally as toxic as PFOA and PFOS, even though evidence suggests certain “short-chain” PFAS such as perfluorobutane sulfonic acid (PFBS) are less toxic. The United States Environmental Protection Agency (USEPA) has taken a different approach from Health Canada and has instead implemented limits for specific PFAS. These limit PFOA and PFOS to 4 ng/L and three other substances to 10 ng/L in US drinking water.

The City of Penticton takes protecting drinking water and the environment very seriously. The City operates sophisticated drinking water and wastewater treatment systems which remove regulated contaminants, consistently meeting and exceeding treatment standards and guidelines. Monitoring PFAS concentrations in water and wastewater is a proactive step beyond what is required to meet current regulations and guidelines in British Columbia.

3.0 PFAS SAMPLING IN PENTICTON

To date, the City has sampled the water supply (i.e., Okanagan Lake and Penticton Creek), treated drinking water, raw and treated wastewater, the Okanagan Channel, and wastewater biosolids. Additional samples will be taken throughout 2025 and in future years from these locations and others to evaluate the risk of PFAS in the City.

The initial results show that the City’s drinking water is safe and the risk from PFAS is low (Figure 2). Since 2023, the drinking water was sampled three times and each time the total PFAS concentrations were well below the Health Canada objective value and were below guidelines made by other agencies, such as the US Environmental Protection Agency. Very low concentrations were also detected in Okanagan Lake and Penticton Creek, similar to those detected in the treated drinking water. PFAS concentrations in the City’s drinking water were also well below the limits imposed by the USEPA south of the border (Figure 3).

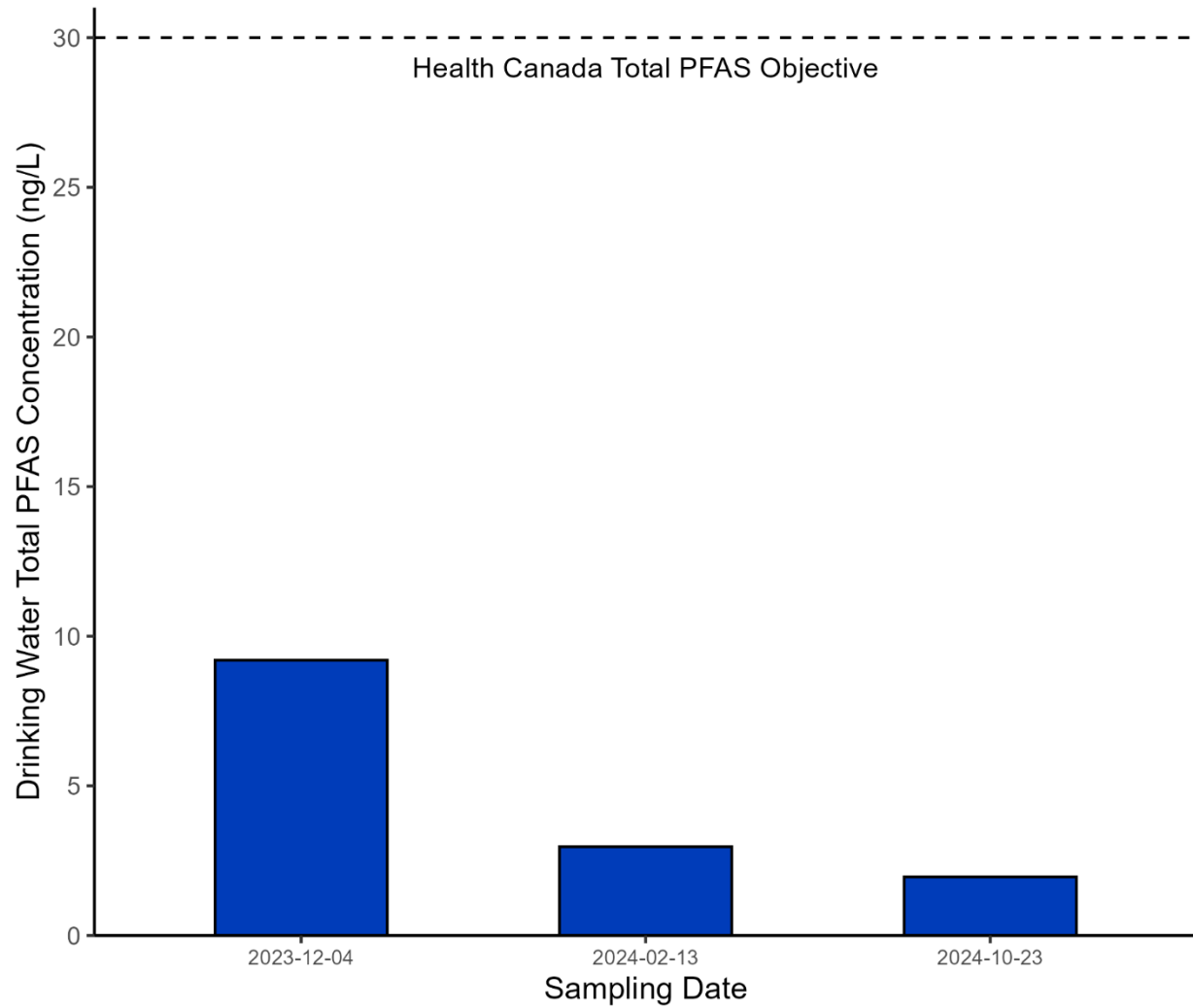


Figure 2 Total PFAS Concentrations Measured in the City's Drinking Water Compared to the Health Canada PFAS Objective

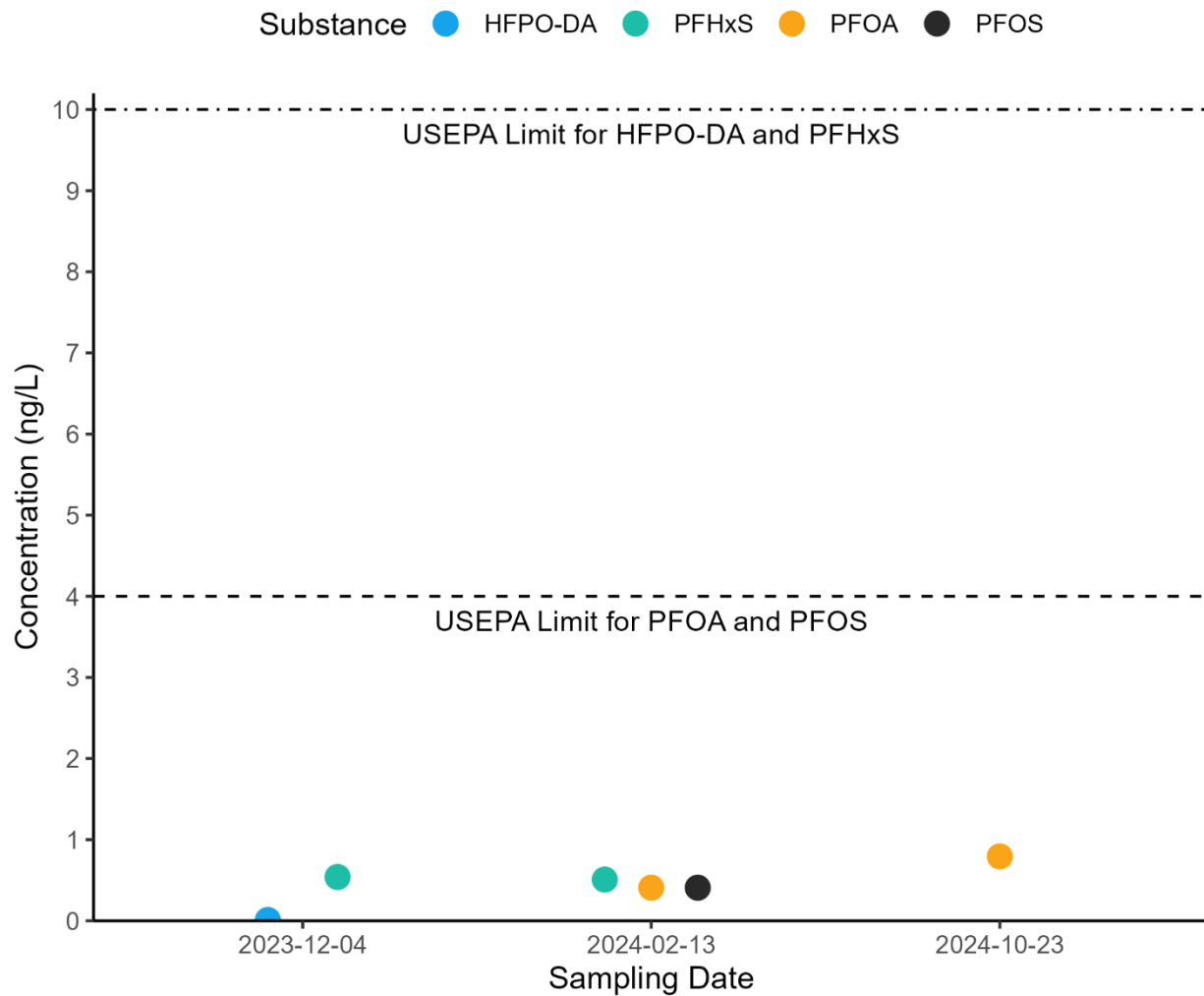


Figure 3 City Drinking Water Compared to the USEPA PFAS Limits

The initial samples also indicate that only low levels of PFAS are present in the City's wastewater. There currently are no regulations or guidelines for PFAS in wastewater in Canada, however, the concentrations in the City's wastewater are actually below the Health Canada drinking water objective of 30 ng/L. Samples taken from the Okanagan Channel showed that the PFAS concentration only increased by 1 to 2 ng/L after treated wastewater is discharged to the Channel. Accordingly, the data indicates that PFAS in the City's wastewater is having little impact on the environment and on downstream communities.

Samples taken from the Campell Mountain Landfill's composting facility had low PFAS concentrations as well. This compost product is used for landscaping and has limited potential for impacting human health. PFOS concentrations in this compost were below 3 micrograms per kilogram ($\mu\text{g}/\text{kg}$), far below the Canadian Food Inspection Agency's interim limit for PFOS in fertilizers of 50 $\mu\text{g}/\text{kg}$, demonstrating that it is safe for use based on current guidelines.

4.0 SUMMARY

The City of Penticton has begun monitoring PFAS concentrations in drinking water, wastewater, and the environment. These substances are known human health hazards and are universally present in the environment. Fortunately, initial sampling demonstrates that the City's drinking water is safe from PFAS contamination and the City's wastewater has little impact on PFAS concentrations in the environment. The City will continue to monitor PFAS concentrations as part of an ongoing effort to protect public health and the environment.