2024 Annual Drinking Water Quality Report
Facility No. 12-098-00001

June 03, 2025

Well 7 Borehole Extraction

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1.0 Introduction

The purpose of this report is to provide information on the monitoring and maintenance of the Town of Golden's water distribution system over the course of the last calendar year, as directed in the municipality's Interior Health Authority (IHA) Conditions on Permit (CoP) and mandated by the Drinking Water Protection Act.

The Drinking Water Quality Monitoring program generates data for the continuous trending of the community's water quality, as well as the performance of the entire distribution system in a reliable and systematic way. The program allows for potential health hazards to be quickly identified and corrected and for consumer enquiries to be accurately addressed in a timely manner.

Included in this document is:

- A brief introduction to the Town of Golden's water distribution system;
- 2024 consumption information;
- Drinking water monitoring and testing program information;
- A description of any major improvements made to the system within the last calendar year;
- A brief summary of planned initiatives for the current year;
- A summary of all water sample results collected in 2024.

The information contained herein collectively serves to confirm and verify the water system's continued performance in delivering a safe and sufficient supply of drinking water to the community.

2.0 Water Distribution System Overview

Groundwater Wells:
Currently there are four production wells in operation with a rated total (100% or 24 hour) pumping capacity of 1358 Imperial Gallons per Minute (Igpm) or 103 Litres per second (Lps) providing water to a common distribution system. One well is located on the north side of the Kicking Horse River and three are located on the south side.

Best practices in well pump operation suggest that wells be designed to operate at a maximum of eighteen hours per day allowing for maintenance over the workday. Based on this premise, the current actual total pumping capacity (75% or 18 hour) that should be relied upon is 1019 Igpm or 77 Lps.

Booster Stations:
There are two booster stations servicing the benchlands of the community. The NE Booster Station supplies water to the north bench while the Selkirk Booster Station supplies water to the south bench. The NE Booster Station houses two pumps with rated capacities of 14 Lps and 17 Lps and the SE Booster Station houses two pumps with a matched capacity of 10 Lps each. Best practices in booster station operation suggest they be designed to operate at a maximum of twenty-one hours per day allowing for maintenance over the workday.

Reservoirs:
There are five reservoirs located at three reservoir sites within the municipality. The total available reservoir storage capacity is 1,530,000 Igal or 6.96 Mega Litres (ML). The first site is located on the Northeast Bench, the second and third sites are both located on the Southeast Bench.

Pressure Zones:
There are four pressure zones throughout the system. Two pressure zones service the NE Bench, one services the SE Bench, and the remainder of the community comprises the fourth pressure zone.

Distribution System:
Pipe sizes range from 150mm to 300mm. The pipe network includes asbestos cement (AC), polyvinylchloride (PVC), yellow jacket ductile iron (YJDI), ductile iron (DI), cast iron (CI) and polyethylene (PE) types.

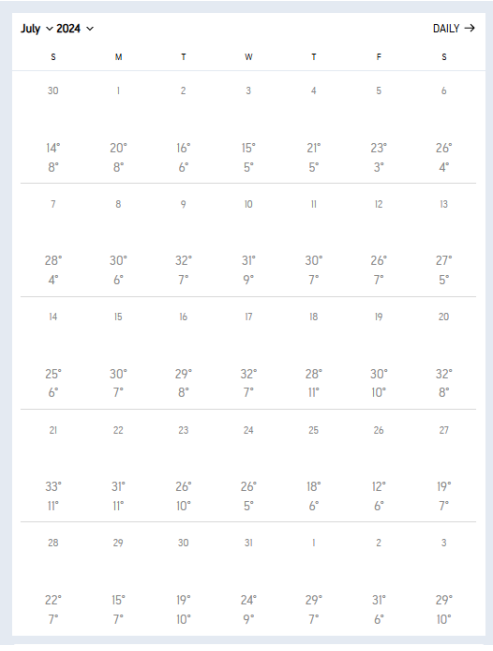
There are about 182 fire hydrants included in an annual spring and fall maintenance program. Hydrant reports are required to be forwarded to operations staff each time a hydrant is used by the fire department to ensure those hydrants are rechecked and maintained as necessary. Hydrants are <u>not</u> typically used for filling tankards other than fire trucks; however occasionally select hydrants are used for the purposes of fire department training or filling the municipal water truck and street sweeper for street cleaning purposes.

13th Street Well:
This well is not connected to the distribution system. It is used for non-potable water use by the municipality as well as authorized contractors.

Potable Bulk Water Filling Station:
This facility serves as a potable filling station for authorized potable water haulers and rural citizens requiring potable water and is supplied by the water distribution system.

Consumption Stats:
For overall annual system demand values refer to Section 11.0. For a visual representation of consumption by sector refer to Figure 1.

In 2024, Maximum Day Demand (MDD) increased by 8.6%, occurring on Sunday, July 21st, while overall consumption decreased by 0.6% from 2023.



The 2024 MDD figure is typically assumed to be reflective of residential and municipal irrigating as extensive irrigating on a given day would be a main contributor to this demand type. This assumption is further supported as the MDD occurred on a weekend while many residents may have been home from work and when Bylaw may not have been scheduled to work.

Weather conditions leading up to and occurring on the maximum consumption day are thought to be a main factor influencing this demand figure as well. Reviewing the weather for July, 2024, this too makes sense considering there were several days prior to the MDD event in the high 20's and low 30's.

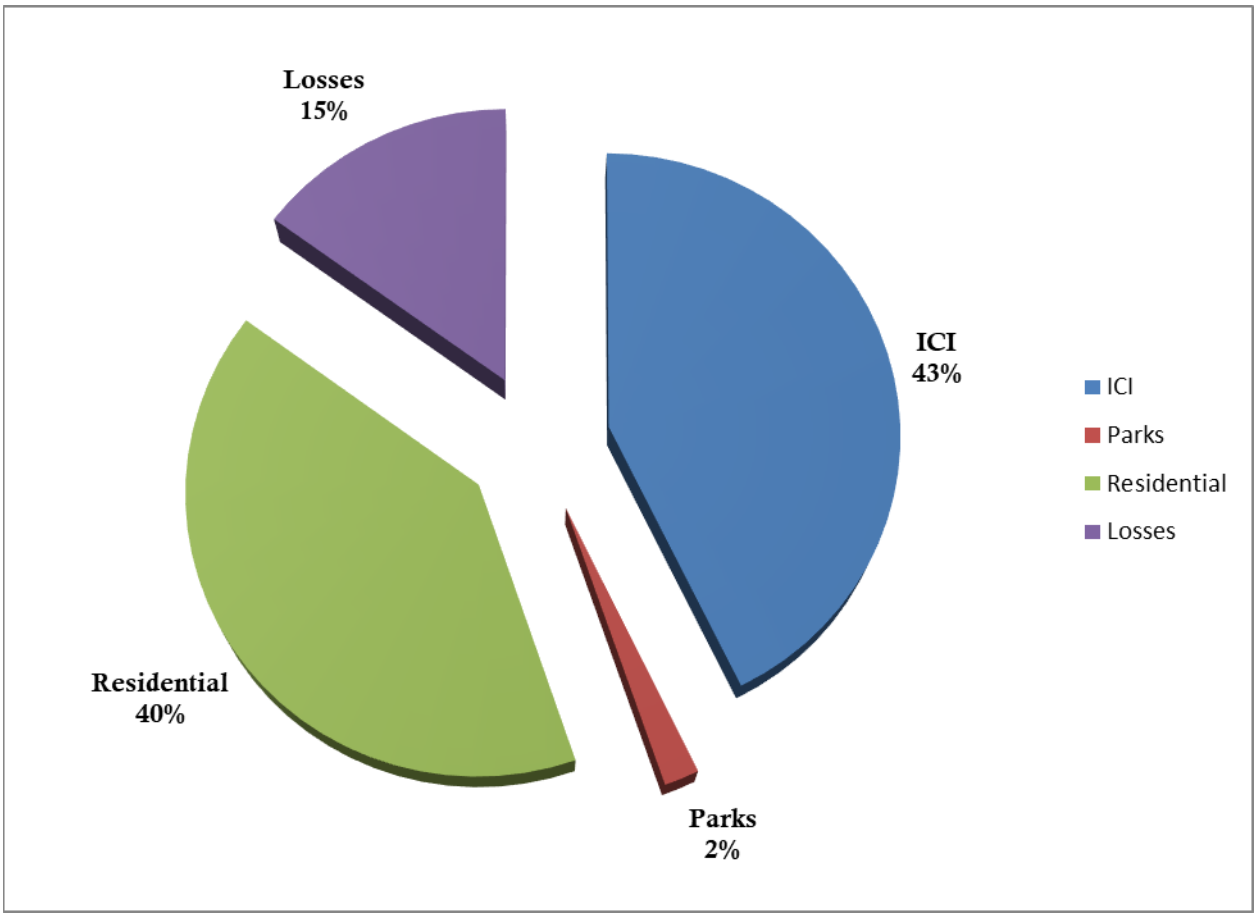
Corporate communications and Bylaw play critical roles in terms of necessary education and enforcement of bylaw sprinkling regulations to reduce non=permitted off hour/off day residential irrigation.

In 2024, Industrial, Commercial, and Institutional (ICI) demand accounted for about 42.8% of the total water pumped, an increase of 1.4% of total water pumped over 2023.

Municipal parks demand accounted for about 1.9% of the total water pumped, an increase of 0.4% of total water pumped over 2023.

The remaining portion of the total volume pumped, represented as 55.3%, is in large part residential demand. Of that percentage, about 15%[1] is considered attributable to system losses through leakage and other unaccounted-for water usage. Unaccounted-for usage may include fire flow demand and municipal and contractor usage from hydrants for example. Therefore, approximately 40.3% of the total water pumped is assumed to be residential demand, which is an increase of 3.2% over 2023.

Figure 1 – 2024 Water Use by Sector



[1] Based on the 2024 Total Pumped volume, 15% represents about 84,972 Igpd or about 59 Igpm. This percentage has been reduced from the former 20% assumed in the 2023 report as the community-wide public infrastructure leak detection program was completed in September, 2024 with a limited number of public-side system leaks detected. Environment Canada estimates that an average of 13% of municipal water is unaccounted for.

3.0 Testing and Monitoring Program

The water quality monitoring program includes source and distribution system monitoring with tabulated results shown in Section 12.

Routine weekly samples are collected at each well head and at alternating reservoir sites. These samples are collected by staff and forwarded to a private lab for microbiological testing. Lab results along with consumption and turbidity are reported to the Public Health inspector on a monthly basis.

In 2024 a total of 230 samples were analyzed for total coliforms and E.coli. with two samples testing positive with total coliform counts of one or more. Both positive Total Coliform samples were related to samples taken from the NE Reservoir Complex, with clear resampling being the result.

As per schedule B of the Drinking Water Protection Act, the Town of Golden is required to analyze four (4) samples per month (population less than 5000). To emphasize the commitment to providing safe drinking water, the number of samples analyzed in 2024 averaged nineteen (19) per month.

The Town of Golden also conducts full spectrum analyses on each well source on an annual basis for physical and chemical parameters; these results are summarized in the appended tables.

4.0 System Maintenance and Repairs

Groundwater Wells:
During the first half of 2024, Well 2 was offline for mechanical[2] and electrical equipment renewals. Work completed included pump and pump column pipe replacement, station piping replacement and electrical panel replacement.

Well 5 continues to experience hydro service voltage fluctuations resulting in protective automatic shut-down. BC Hydro has since discontinued actively monitoring power supply at this location after having installed a voltage monitoring/recording device with no apparent cause of the infrequent fluctuations determined. Protective shut-down controls are in-place and functioning, however periodic voltage related shut-downs can result in nuisance call-outs and standby overtime charges for pump resetting.

Well 7 planning work continued in 2024 including discussions with IHA regarding the GARP[3] assessment that was completed for the well, the resulting potential requirement for continuous disinfection with Ultraviolet (UV) light and chlorination, and possible approaches to argue for disinfection avoidance. The GARP assessment determined that the source was moderately vulnerable to pathogens. The GARP assessment was peer reviewed with the same determination of moderate vulnerability being the result. Next, a drilling program was developed to determine the extent of the underlying confining sediment layer with a hope of revising the GARP assessment. Through prior discussion with IHA, with sufficient evidence of an adequate confining layer determined, regular disinfection might be avoided; otherwise, it is likely to be required to ensure the potable integrity of the water delivered from the well. Results of the drilling program conducted in

[2] Well 2's electric well-pump motor was replaced in 2023.
[3] GARP refers to Groundwater at Risk of Containing Pathogens. It is a standard assessment completed by a hydrotechnical engineer when determining the vulnerability to contamination of groundwater sources including their potential for containing pathogens. A resultant determination can be a requirement to provide disinfection barriers to ensure public health when consuming the water.

early 2025 supported the original GARP assessment and a station design incorporating disinfection equipment is now underway.

Reservoirs:
The Town of Golden has adopted an operations and maintenance (O&M) program that includes reservoir disinfections, draining, cleaning and inspections on an approximate 5-year cycle.

In 2024 no reservoir inspections were undertaken as all reservoirs with the exception of the Hypalon were inspected with a Remotely Operated Vehicle (ROV) in 2021. A new liner was installed in the Hypalon reservoir in 2019.

Distribution System:
Hydrant inspections and maintenance, valve exercising, and dead-end main flushing occur on an annual basis.

Current and historic maintenance records are available. The Town of Golden has GIS mapping which is under continuous development and is intended to be used to access maintenance information by Systems staff.

All of the Town's visible water infrastructure (i.e. water main valves, fire hydrant service valves and fire hydrants) were surveyed by Global Position Satellite (GPS) and added to the mapping database.

5.0 System Improvements and Updates

Emergency Response and Contingency Plan (ECRP):
In 2024 work began on a major update to the ERCP, including transitioning into the Provincial Ministry of Health template format. This document is reviewed annually with all contacts updated as necessary for delivery with this report to IHA.

Integrated Water Plan:
Work continued on an update to the 2014 Water Distribution System Study (renamed the Integrated Water Strategy). With climate change effects contemplated, the plan will include modelling analysis of the complete supply/pumping, storage and distribution network, considering current demands as well as demand related to 10 and 25-year development horizon scenarios for the community.

Leak Detection Work:
In 2024, no main breaks occurred.

2024 was to be the second year of a three-year program to undertake system-wide leak detection through a contracted service but all work was completed ahead of schedule and under budget in 2024.

A handful of public-side leaks were detected through the survey with repairs scheduled in 2025.

Metering:
In 2024 work continued with the replacement of non-radio frequency (RF) compatible water meters with three units replaced and six new units installed for new ICI accounts. Work continues with meter updating with priority given to meters which are difficult to access or where high hazard cross connection control can be addressed along with a meter update/retrofit. In 2024, the six new ICI meter installations included CCC devices and two existing CCC devices were replaced.

New Infrastructure: Ministry of Transportation and Transit (MoTT)
As a part of MoTT's Kicking Horse Bridge (KHR) construction work their contractor installed:

South of KHR:

- 100m of 200mm PVC watermain on 8th Street South between 10th and 11th Avenues South replacing a 150mm asbestos cement watermain. This work included the installation of two new hydrants.

- 100m of 250mm PVC watermain from the theatre to the left abutment of the existing south bridge. This work included the removal of an existing hydrant and installation of a relocated new hydrant.

Existing KHR Bridges:

- 100m of temporary 300mm steel watermain on the existing bridges for existing under-river crossing redundancy during construction of the north bridge pier.

North of KHR:

- 65m of 250mm PVC from the right abutment of the existing north bridge to the 9th Avenue North tie-in point.

Source Water Protection Plan:
Work began in 2024 on an update to Golden's water system Source Water Protection Plan with consultant Western Water Associates Ltd. to update many of the findings detailed in the Aquifer Protection Plan (Golder, 2006) and the Municipal Groundwater Supply Protection Strategy (Golder, 2013).

For other source protection work in 2024, Waterline Resources Inc. and Ecoscape Environmental Consultants Ltd. provided Well 4 Sentry Well monitoring support with lab analysis data review.

Urban Systems Ltd. provided ongoing contaminated site report reviews/guidance and were responsible for development reviews to identify possible impacts to the community groundwater resource, and to the supply and distribution system capacities on an as needed basis.

Supervisory Control and Data Acquisition (SCADA) Equipment, Radio Equipment and Programmable Logic Controller (PLC) System Upgrades:
2024 was the final year of a five-year program to undertake upgrades to all water system SCADA infrastructure including associated radio communications equipment, and PLC systems. This work included installation of a backup parallel-operating SCADA computer at Public Works.

Water Quality Monitoring Plan:
In 2024 staff developed a Water Quality Monitoring Plan with guidance from IHA satisfying a condition on the new CoP issued in July, 2024.

6.0 Operator Education and Training

The Town of Golden has an established training program that follows Environmental Operator Certification Program (EOCP) guidelines for required training and certification maintenance. Operators maintain EOCP certifications annually through a variety of EOCP accredited and relevant training opportunities typically available from a variety of sources.

EOCP Current Certification:

EMPLOYEE	CERTIFICATION #	CERTIFICATION LEVEL
Chief Systems Operator	6101	WD-III, CCC Tester
Senior Systems Operator	1000185	WD-II, CCC Tester

7.0 Cross Connection Control (CCC)

Both Systems operators are certified testers and carry out tests on all municipally owned backflow assemblies. The Town of Golden currently tests and tracks 34 backflow assembly devices (all testable devices) located on various Town owned/operated facilities.

The Town is able to confirm the proper device for any new construction according to hazard level. After construction, backflow devices installed in private buildings are added to our database so that we can track and record the testing history of each assembly installed within the Town.

The Town is a client of Maintenance Training Systems (MTS) and is using their FAST software for our CCC program. More information on this software can be found at:
http://www.mtsinc.ca/index.php?m=public&p=software&s=fast&v=features

Work continues with the CCC program with priority given to all high and prioritized medium-hazard ICI service connections.

8.0 SCADA System

Within the SCADA system numerous control parameters are in place, allowing Town of Golden staff to make changes on an as-needed basis according to ongoing process changes. All trending is done on a daily basis and is in "real time". Trending and reporting continues to be compiled into monthly and yearly reports.

The following lists itemize all currently in-place SCADA control parameters at the various water facilities.

SE Booster Station:
Discharge flow in GPM's as well as total flow
Discharge pressure
Two pump run status
Booster pump run times
Room temperature
Flood alarm
Reservoir levels
Reservoir hatch intrusion alarm

NE Booster Station:
Discharge flow in GPM's
Room temperature
Suction pressure
Booster pump run times
Discharge pressure

Flood alarm
Generator run status
Reservoir levels
Reservoir hatch intrusion alarm

Well Stations:
Flow totalizers in Gallons
Pump run times
Distribution system pressure transducers in "psi" at all wells
Level transducers at Wells 4 and 5
Room temperatures
Flood alarms
Generator run status (where applicable)

Bulk Water Filling Station:
No flow, valve not closing
Room temperature
Flood alarm
Intrusion alarm
Power/communication failure

9.0 Events/Emergency Response

Over the course of 2024 no distribution system main breaks occurred. No water quality issues occurred requiring public notification.

10.0 Recurring and 2025 Initiatives

- Schedule leak detection repair work as identified;
- Continue with CCC Program and prioritize installs of back flow devices, concentrating first on those facilities with a high hazard rating. Replace existing water meters with new meters that use e-coders for totalizing and billing;
- Continue with public education campaign relating to source-to-tap education, water conservation tips and tricks, and education and enforcement relating to sprinkling bylaw regulations through proactive communications and active Bylaw patrols;
- Continue with school classroom visits and/or facility tours by staff;
- Proceed with Well 7 design and tender preparation of pumphouse for 2026 construction;
- Minor system upgrades and service repairs on an as-required basis;
- Continue to advance the Groundwater Protection Program; proceed with recommendations contained within the Groundwater Monitoring Plan, Protection Strategy, and Screening Study for Potential Groundwater at Risk of Pathogens (GARP) where and when practicable to do so;
- Update the Operations and Maintenance Plan per guidance received from IHA;

- Update the Asset Management Plan for the water system per guidance received from IHA.

11.0 Annual Consumption

Year	Total Annual Pumped			Maximum Day Demand				Average Day Demand (estimated)
	Volume Pumped				Volume Pumped			Volume Pumped
	Imperial Gallons	M3	Increase/Decrease Over Prior Year	Date	Imperial Gallons	M3	Increase/Decrease Over Prior Year	Imperial Gallons
2014	228,361,075	1,038,150	3.7% increase	Jul-13	1,304,971	5,933	19.4% increase	625,232
2015	223,125,807	1,014,350	2.3% decrease	Jul-05	1,325,686	6,027	1.6% increase	611,394
2016	240,422,993	1,092,985	7.8% increase	Aug-17	1,188,284	5,402	11.6% decrease	658,693
2017	277,272,091	1,260,504	15.3% increase	Jul-09	1,434,451	6,521	20.7% increase	759,650
2018	222,444,280	1,011,252	24.6% decrease	Jul-29	1,244,857	5,659	13.2% decrease	609,436
2019	213,660,331	971,319	4.1% decrease	Aug-11	1,107,329	5,034	12.4% decrease	585,371
2020	212,013,642	963,833	1.1% decrease	Aug-02	1,126,713	5,122	1.0% increase	580,859
2021	235,451,009	1,070,381	11.1% increase	Jun-29	1,373,824	6,246	21.9% increase	645,071
2022	241,672,154	1,098,663	2.6% increase	Aug-19	1,242,672	5,649	10.6% decrease	662,115
2023	207,921,753	945,231	16.2% decrease	Jul-09	1,102,046	5,010	12.8% decrease	569,649
2024	206,764,274	939,969	0.6% decrease	Jul-21	1,196,413	5,439	8.6% increase	566,477

12.0 Bacteriological Sample Analysis Results

DATE	WELLS					RESERVOIRS		
2024	#2	#3	#4	#5	Future #7	NE (yellow)	NE (green)	BEARS PAW
Jan 8	Offline	<1	<1	<1			<1	<1
Jan 15	Offline	<1	<1	<1		<1		<1
Jan 22	Offline	<1	<1	<1			<1	<1
Jan 29	Offline	<1	Offline	<1		<1		<1
Feb 5	Offline	<1	<1	<1			<1	<1
Feb 12	Offline	<1	Offline	<1		<1		<1
Feb 26	Offline	<1	<1	<1			<1	<1
Mar 4	Offline	<1	<1	<1		<1		<1
Mar 11	Offline	<1	<1	<1			<1	<1
Mar 18	Offline	<1	<1	<1		<1		<1
Mar 25	Offline	<1	<1	<1			<1	<1
Apr 8	Offline	<1	<1	<1		<1		<1
Apr 15	Offline	<1	<1	<1			<1	<1
Apr 22	Offline	<1	<1	<1		<1		<1
Apr 29	Offline	<1	<1	<1			<1	<1
May 6	Offline	<1	<1	<1		<1		<1
May 13	Offline	<1	<1	<1			<1	<1
May 27	Offline	<1	<1	<1		<1		<1
Jun 3	<1	<1	<1	<1			<1	<1
Jun 10	<1	<1	<1	<1		<1		<1
Jun 17	<1	<1	<1	<1			<1	<1
Jun 24	<1	<1	<1	<1		T-4, E<1		<1

Jul 2						<1		
Jul 8	<1	<1	<1	<1			<1	<1
Jul 15	<1	<1	<1	<1		<1		<1
Jul 22	<1	<1	<1	<1			<1	<1
Jul 29	<1	<1	<1	<1		<1		<1
Aug 12							<1	<1
Aug 19	<1	<1	<1	<1		<1		<1
Aug 26	<1	<1	<1	<1			<1	<1
Sep 9	<1	<1	<1	<1		<1		<1
Sep 16	<1	<1	<1	<1			<1	<1
Sep 23	<1	<1	<1	<1		<1		<1
Oct 7	<1	<1	<1	<1			T-2, E<1	<1
Oct 15							<1	
Oct 21	<1	<1	<1	<1		<1		<1
Oct 28	<1	<1	<1	<1			<1	<1
Nov 4	<1	<1	<1	<1		<1		<1
Nov 19	<1	<1	<1	<1			<1	<1
Nov 25	<1	<1	<1	<1		<1		<1
Dec 2	<1	<1	<1	<1			<1	<1
Dec 9	<1	<1	<1	<1		<1		<1
Dec 16	<1	<1	<1	<1			<1	<1

13.0 Turbidity Analysis (NTU)

DATE	WELLS				
2024	#2	#3	#4	#5	Future #7
Jan 8	Offline	0.06	0.06	0.05	
Jan 15	Offline	0.05	0.06	0.07	
Jan 22	Offline	0.06	0.06	0.05	
Jan 29	Offline	0.06	0.06	0.07	
Feb 5	Offline	0.06	0.06	0.06	
Feb 12	Offline	0.06	0.06	0.05	
Mar 4	Offline	0.06	0.06	0.06	
Mar 11	Offline	0.06	0.06	0.06	
Mar 18	Offline	0.06	0.05	0.05	
Mar 25	Offline	0.06	0.06	0.05	
Apr 8	Offline	0.05	0.06	0.06	
Apr 15	Offline	0.05	0.06	0.05	
April 22	Offline	0.06	0.06	0.05	
April 29	Offline	0.05	0.06	0.05	
May 6	Offline	0.06	0.06	0.06	
May 27	Offline	0.06	0.07	0.06	
Jun 3	0.06	0.06	0.05	0.05	
Jun 10	0.06	0.06	0.05	0.06	
Jun 17	0.06	0.06	0.05	0.05	

Jun 24	0.05	0.05	0.05	0.06	
Jul 8	0.05	0.05	0.06	0.06	
Jul 15	0.06	0.06	0.06	0.06	
Jul 22	0.05	0.06	0.06	0.07	
Jul 29	0.05	0.06	0.06	0.05	
Aug 12	0.06	0.06	0.06	0.05	
Aug 19	0.06	0.05	0.06	0.06	
Sept 9	0.05	0.06	0.06	0.06	
Sept 16	0.06	0.06	0.05	0.06	
Sept 23	0.06	0.06	0.06	0.05	
Oct 7	0.06	0.06	0.06	0.06	
Oct 21	0.06	0.06	0.07	0.06	
Oct 28	0.06	0.06	0.06	0.06	
Nov 4	0.06	0.05	0.06	0.05	
Nov 18	0.05	0.05	0.06	0.05	
Nov 25	0.05	0.05	0.05	0.06	
Dec 2	0.05	0.06	0.06	0.06	
Dec 9	0.06	0.06	0.07	0.05	
Dec 16	0.06	0.07	0.06	0.06	
Dec 30	0.07	0.06	0.06	0.05	
Average	0.06	0.06	0.06	0.06	
Hi	0.07	0.07	0.07	0.07	
Low	0.05	0.05	0.05	0.05	

14.0 Summary

The Town of Golden has worked with Interior Health officials since 2002 to develop and maintain a water quality monitoring program that exceeds the Drinking Water Regulation. The Town will continue with this monitoring program as part of its commitment to deliver a safe potable water supply to the community.

This report will be posted on the Town of Golden's website for public information following receipt by Council.

Respectfully,

Chris Cochran, AScT,
Director of Public Works/DCAO

Attachment

Drinking Water Package - ALS Environmental

Well #2										
Year	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**RDL**	**Units**	**GCDWQ**
Misc. Inorganics						OFFLINE				
Fluoride (F)	0.09	0.070	0.068	0.065	0.086		0.084	0.02	mg/L	1.5
ANIONS										
Nitrite (N)	<0.010	<0.0010	<0.0010	<0.0010	<0.0010		<0.0010	0.001	mg/L	1
Calculated Parameters										
Total Hardness (CaCO3)		138	158	153	144		144	0.50	mg/L	
Nitrate (N)	0.21	0.22	0.209	0.222	0.252		0.188	0.005	mg/L	10
Misc. Inorganics										
Alkalinity (Total as CaCO3)	130	142	134	141	144		129	1.0	mg/L	
Alkalinity (PP as CaCO3)	<1.0	<2.0	<2.0	<1.0	<1.0		1.3	2.0	mg/L	
Bicarbonate (HCO3)	160	142	134	141	144		126	1.0	mg/L	
Carbonate (CO3)	<1.0	<1.0	<1.0	<1.0	<1.0		2.6	0.5	mg/L	
Hydroxide (OH)	<1.0	<1.0	<1.0	<1.0	<1.0		<1.0	0.5	mg/L	
Anions										
Dissolved Sulphate (SO4)	20	18.5	18.2	16.4	18.3		19.8	0.3	mg/L	500
Dissolved Chloride (Cl)	11	10.4	8.08	8.75	11.4		7.6	0.5	mg/L	250
MISCELLANEOUS										
True Colour	<2	<5	<5.0	<5.0	<5.0		<5.0	5.0	TCU	15
Nutrients										
Nitrate plus Nitrite (N)	0.21	0.216	0.209	0.222	0.252		0.188	0.005	mg/L	
Physical Properties										
Conductivity	310	303	295	306	303		276	2.0	uS/cm	
pH	8.2	8.15	8.11	8.09	7.92		8.37	0.1	pH Units	7.0-10.5
Physical Properties										
Total Dissolved Solids	200	174	189	158	186		177	20	mg/L	500
Turbidity	<0.1	<0.1	<0.10	<0.10	<0.10		<0.10	0.1	NTU	1
Total Metals by Atomic Spectroscopy										
Total Aluminum (Al)	0.012	0.0041	0.0039	<0.0030	0.0044		<0.0030	0.003	mg/L	0.1
Total Antimony (Sb)	<0.0006	<0.0001	<0.00010	<0.00010	<0.00010		<0.00010	0.0001	mg/L	0.006
Total Arsenic (As)	<0.0002	<0.0001	<0.00010	<0.00010	<0.00010		<0.00010	0.0001	mg/L	0.01
Total Barium (Ba)		0.0552	0.0553	0.0572	0.0554		0.0540	0.0001	mg/L	1
Total Boron (B)		<0.010	<0.010	<0.010	<0.010		<0.010	0.01	mg/L	5
Total Cadmium (Cd)	0.00003	<0.000005	<0.0000050	<0.0000050	<0.0000050		<0.0000050	0.000005	mg/L	0.005
Total Chromium (Cr)	<0.001	0.00019	38.0	<0.00050	<0.00050		<0.00050	0.0001	mg/L	0.05
Total Cobalt (Co)	<0.0003	<0.00010	0.00018	<0.00010	<0.00010		<0.00010	0.00010	mg/L	
Total Copper (Cu)	0.0009	0.00112	<0.00010	0.00127	0.00106		0.00055	0.00050	mg/L	1
Total Iron (Fe)		<0.010	0.00108	<0.010	<0.010		<0.010	0.010	mg/L	0.3
Total Lead (Pb)	<0.0002	0.000056	<0.00005	<0.000050	<0.000050		<0.000050	0.000050	mg/L	0.01
Total Manganese (Mn)		<0.00010	<0.00010	<0.00010	<0.00010		<0.00010	0.00010	mg/L	0.05
Total Mercury (Hg)	<0.0020	<0.0000050	<0.0000050	<0.0000050	<0.0000050		<0.0000050	0.0000050	mg/L	0.001
Total Molybdenum (Mo)	0.00076	0.000575	0.000614	0.000673	0.000651		0.000652	0.000050	mg/L	
Total Nickel (Ni)	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050		<0.00050	0.00050	mg/L	
Total Selenium (Se)	<0.0002	<0.000050	<0.000050	<0.000050	<0.000050		<0.000050	0.000050	mg/L	0.05
Total Silver (Ag)	<0.0001	<0.000010	<0.000010	<0.000010	<0.000010		<0.000010	0.000010	mg/L	
Total Uranium (U)	0.00054	0.000481	0.000540	0.000511	0.000453		0.000532	0.000010	mg/L	0.02
Total Vanadium (V)	<0.001	<0.00050	<0.00050	<0.00050	<0.00050		<0.00050	0.00050	mg/L	
Total Zinc (Zn)	<0.003	<0.0030	<0.0030	<0.0030	<0.0030		<0.0030	0.0030	mg/L	5
Total Calcium (Ca)		32.7	38.0	35.9	36.5		34.1	0.050	mg/L	
Total Magnesium (Mg)		13.7	15.2	15.4	13.7		14.2	0.0050	mg/L	
Total Potassium (K)		0.562	0.535	0.572	0.554		0.526	0.050	mg/L	
Total Sodium (Na)		6.74	6.46	7.38	8.26		5.90	0.050	mg/L	200
Total Sulphur (S)		6.01	6.56	6.63	6.87		7.13	0.50	mg/L	

Maximum Acceptable Concentration
Interem Maximum Allowable Concentration
Operation Guidline
Asthetic Objective

RDL - Reported Detection Limit
mg/L - Milligrams Per Litre
TCU - True Colour Unit
mS/cm - Microsiemens Per Centimeter
NTU - Nephelometric Colour Unit

Well #3										
Year	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**RDL**	**Units**	**GCDWQ**
Misc. Inorganics										
Fluoride (F)	0.10	0.071	0.069	0.064	0.086	0.086	0.084	0.02	mg/L	1.5
ANIONS										
Nitrite (N)	<0.010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	mg/L	1
Calculated Parameters										
Total Hardness (CaCO3)		163	184	178	186	175	168	0.50	mg/L	
Nitrate (N)	0.61	0.589	0.636	0.550	0.633	0.564	0.526	0.005	mg/L	10
Misc. Inorganics										
Alkalinity (Total as CaCO3)	150	159	151	162	156	162	150	1.0	mg/L	
Alkalinity (PP as CaCO3)	<1.0	<2.0	<2.0	<1.0	<1.0	<1.0	1.6	2.0	mg/L	
Bicarbonate (HCO3)	180	159	151	162	156	162	147	1.0	mg/L	
Carbonate (CO3)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.2	0.5	mg/L	
Hydroxide (OH)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.5	mg/L	
Anions										
Dissolved Sulphate (SO4)	20.0	18.4	18.9	17.8	19.1	19.7	24.7	0.3	mg/L	500
Dissolved Chloride (Cl)	19	15.3	15.4	15.2	15.9	14.6	15.4	0.5	mg/L	250
MISCELLANEOUS										
True Colour	<2	<5	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	TCU	15
Nutrients										
Nitrate plus Nitrite (N)	0.61	0.589	0.636	0.550	0.633	0.564	0.526	0.005	mg/L	
Physical Properties										
Conductivity	360	303	347	358	344	315	326	2.0	uS/cm	
pH	8.1	8.20	8.18	8.10	7.99	8.10	8.38	0.1	pH Units	7.0-10.5
Physical Properties										
Total Dissolved Solids	220	189	181	182	195	220	204	20	mg/L	500
Turbidity	<0.1	<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	0.1	NTU	1
Total Metals by Atomic Spectroscopy										
Total Aluminum (Al)	0.004	0.0049	0.0030	<0.0030	0.0038	<0.0030	<0.0030	0.003	mg/L	0.1
Total Antimony (Sb)	<0.0006	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	mg/L	0.006
Total Arsenic (As)	<0.0002	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	mg/L	0.01
Total Barium (Ba)		0.1290	0.127	0.144	0.126	0.136	0.126	0.0001	mg/L	1
Total Boron (B)		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.01	mg/L	5
Total Cadmium (Cd)	<0.00002	<0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000005	mg/L	0.005
Total Chromium (Cr)	<0.0010	0.00057	0.00055	0.00050	<0.00050	0.00052	0.00053	0.0001	mg/L	0.05
Total Cobalt (Co)	<0.0003	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	mg/L	
Total Copper (Cu)	0.0009	0.00132	0.00061	0.00097	0.00083	0.00094	0.00104	0.00050	mg/L	1
Total Iron (Fe)		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	mg/L	0.3
Total Lead (Pb)	<0.0002	0.000065	<0.000050	<0.000050	<0.000050	<0.000058	0.000066	0.000050	mg/L	0.01
Total Manganese (Mn)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	mg/L	0.05
Total Mercury (Hg)	<0.0020	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	mg/L	0.001
Total Molybdenum (Mo)	0.001	0.000573	0.000590	0.000631	0.000662	0.000618	0.000613	0.000050	mg/L	
Total Nickel (Ni)	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	mg/L	
Total Selenium (Se)	<0.0002	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000050	mg/L	0.05
Total Silver (Ag)	<0.0001	<0.000010	3.16	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	mg/L	
Total Uranium (U)	0.00070	0.000656	0.000693	0.000666	0.000611	0.000662	0.000708	0.000010	mg/L	0.02
Total Vanadium (V)	0.0014	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	mg/L	
Total Zinc (Zn)	<0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0030	mg/L	5
Total Calcium (Ca)		30.8	34.8	33.5	35.7	33.8	31.6	0.050	mg/L	
Total Magnesium (Mg)		20.8	23.6	22.8	23.4	22.0	21.6	0.0050	mg/L	
Total Potassium (K)		0.817	0.852	0.761	0.843	0.784	0.817	0.050	mg/L	
Total Sodium (Na)		9.85	11.0	9.82	10.10	8.50	9.73	0.050	mg/L	200
Total Sulphur (S)		6.17	6.79	7.17	7.93	7.67	7.08	0.50	mg/L	

Maximum Acceptable Concentration
Interem Maximum Allowable Concentration
Operation Guidline
Asthetic Objective

RDL - Reported Detection Limit
mg/L - Milligrams Per Litre
TCU - True Colour Unit
mS/cm - Microsiemens Per Centimeter
NTU - Nephelometric Colour Unit

Well #4										
Year	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**RDL**	**Units**	**GCDWQ**
Misc. Inorganics										
Fluoride (F)		0.036	0.041	0.037	0.051	<0.100	<0.100	0.02	mg/L	1.5
ANIONS										
Nitrite (N)	<0.03	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	0.001	mg/L	1
Calculated Parameters										
Total Hardness (CaCO3)		420	424	411	434	433	410	0.50	mg/L	
Nitrate (N)	7.8	1.76	1.75	1.73	1.74	1.80	1.67	0.005	mg/L	10
Misc. Inorganics										
Alkalinity (Total as CaCO3)	370	362	351	358	360	382	364	1.0	mg/L	
Alkalinity (PP as CaCO3)	<1.0	<2.0	<2.0	<1.0	<1.0	<1.0	<1.0	2.0	mg/L	
Bicarbonate (HCO3)	450	362	351	358	360	382	364	1.0	mg/L	
Carbonate (CO3)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.5	mg/L	
Hydroxide (OH)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.5	mg/L	
Anions										
Dissolved Sulphate (SO4)	41	39.2	39.7	38.1	40.8	41.7	40.3	0.3	mg/L	500
Dissolved Chloride (Cl)	110	101.0	99.5	98.7	108.0	112.0	113.0	0.5	mg/L	250
MISCELLANEOUS										
True Colour	2.2	<5	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	TCU	15
Nutrients										
Nitrate plus Nitrite (N)	1.8	1.760	1.75	1.73	1.74	1.8	1.67	0.005	mg/L	
Physical Properties										
Conductivity	1000	968	922	984	980	972	945	2.0	uS/cm	
pH	7.9	7.95	8.14	8.04	7.79	7.57	7.55	0.1		7.0-10.5
Physical Properties										
Total Dissolved Solids	560	544	557	494	585	468	498	20	mg/L	500
Turbidity	<0.1	0.17	0.12	<0.10	<0.10	<0.10	<0.10	0.1	NTU	1
Total Metals by Atomic Spectroscopy										
Total Aluminum (Al)	0.0035	<0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.003	mg/L	0.1
Total Antimony (Sb)	<0.0006	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	mg/L	0.006
Total Arsenic (As)	<0.0002	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	mg/L	0.01
Total Barium (Ba)		0.2290	0.209	0.245	0.222	0.254	0.240	0.0001	mg/L	1
Total Boron (B)		0.014	0.012	0.014	0.013	0.016	0.014	0.01	mg/L	5
Total Cadmium (Cd)	<0.00002	<0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000005	mg/L	0.005
Total Chromium (Cr)	<0.001	0.00012	0.00012	<0.00050	<0.00050	<0.00050	<0.00050	0.0001	mg/L	0.05
Total Cobalt (Co)	<0.0003	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	mg/L	
Total Copper (Cu)	0.0023	0.00654	0.00250	0.00338	0.00304	0.00136	0.00335	0.00050	mg/L	1
Total Iron (Fe)		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	mg/L	0.3
Total Lead (Pb)	<0.0002	0.000697	0.000314	0.000401	0.000263	0.000139	0.000394	0.000050	mg/L	0.01
Total Manganese (Mn)		<0.00010	<0.00010	<0.00010	0.00010	<0.00010	<0.00010	0.00010	mg/L	0.05
Total Mercury (Hg)	<0.0020	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	mg/L	0.001
Total Molybdenum (Mo)	<0.0002	0.000243	0.000173	0.000235	0.000178	0.000194	0.000181	0.000050	mg/L	
Total Nickel (Ni)	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00067	0.00050	mg/L	
Total Selenium (Se)	<0.0002	0.000101	<0.000050	0.000111	0.000069	0.000113	0.000089	0.000050	mg/L	0.05
Total Silver (Ag)	<0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	mg/L	
Total Uranium (U)	0.0014	0.00128	0.00124	0.00118	0.00111	0.00124	0.00130	0.000010	mg/L	0.02
Total Vanadium (V)	0.001	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	mg/L	
Total Zinc (Zn)	0.005	0.0217	0.0121	0.0143	0.0127	0.0046	0.0244	0.0030	mg/L	5
Total Calcium (Ca)		95.1	97.8	93.1	100.0	99.3	93.2	0.050	mg/L	
Total Magnesium (Mg)		44.3	43.7	43.4	44.7	44.9	43.0	0.0050	mg/L	
Total Potassium (K)		2.02	1.89	1.91	2.06	2.10	2.13	0.050	mg/L	
Total Sodium (Na)		62.0	59.8	61.0	71.0	67.0	67.9	0.050	mg/L	200
Total Sulphur (S)		14.6	14.8	14.8	17.1	16.4	15.2	0.50	mg/L	

Maximum Acceptable Concentration
Interem Maximum Allowable Concentration
Operation Guidline
Asthetic Objective

RDL - Reported Detection Limit
mg/L - Milligrams Per Litre
TCU - True Colour Unit
mS/cm - Microsiemens Per Centimeter
NTU - Nephelometric Colour Unit

Well #5										
Year	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**RDL**	**Units**	**GCDWQ**
Misc. Inorganics										
Fluoride (F)		0.065	0.067	0.063	0.083	0.084	0.085	0.02	mg/L	1.5
ANIONS										
Nitrite (N)	<0.033	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	mg/L	1
Calculated Parameters										
Total Hardness (CaCO3)		177	199	199	192	185	181	0.50	mg/L	
Nitrate (N)	2.1	0.497	0.520	0.552	0.482	0.440	0.469	0.005	mg/L	10
Misc. Inorganics										
Alkalinity (Total as CaCO3)	160	174	172	192	174	176	164	1.0	mg/L	
Alkalinity (PP as CaCO3)	<1.0	<2.0	<2.0	<1.0	<1.0	<1.0	2.4	2.0	mg/L	
Bicarbonate (HCO3)	190	174	172	192	174	176	159	1.0	mg/L	
Carbonate (CO3)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	4.8	0.5	mg/L	
Hydroxide (OH)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.5	mg/L	
Anions										
Dissolved Sulphate (SO4)	23	20.8	21.3	20.3	21.6	22.6	22.0	0.3	mg/L	500
Dissolved Chloride (Cl)	16	17.0	18.0	21.3	16.4	14.5	15.3	0.5	mg/L	250
MISCELLANEOUS										
True Colour		<5	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	TCU	15
Nutrients										
Nitrate plus Nitrite (N)	0.47	0.497	0.52	0.552	0.482	0.44	0.469	0.005	mg/L	
Physical Properties										
Conductivity	390	391	374	433	369	350	352	2.0	uS/cm	
pH	8.13	8.23	8.20	8.16	7.99	8.08	8.29	0.1		7.0-10.5
Physical Properties										
Total Dissolved Solids	190	222	218	214	216	226	236	20	mg/L	500
Turbidity		<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	0.1	NTU	1
Total Metals by Atomic Spectroscopy										
Total Aluminum (Al)	0.005	0.0088	0.0036	<0.0030	<0.0030	0.0031	<0.0030	0.003	mg/L	0.1
Total Antimony (Sb)	<0.0006	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	mg/L	0.006
Total Arsenic (As)	<0.0002	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	mg/L	0.01
Total Barium (Ba)		0.0762	0.0796	0.0834	0.0779	0.0772	0.0788	0.0001	mg/L	1
Total Boron (B)		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.01	mg/L	5
Total Cadmium (Cd)	<0.00002	<0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000005	mg/L	0.005
Total Chromium (Cr)	<0.001	0.00033	0.00038	<0.00050	<0.00050	<0.00050	<0.00050	0.0001	mg/L	0.05
Total Cobalt (Co)	<0.0003	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	mg/L	
Total Copper (Cu)	0.0007	0.00142	0.00062	0.00129	0.00054	<0.00050	0.00054	0.00050	mg/L	1
Total Iron (Fe)		0.011	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	mg/L	0.3
Total Lead (Pb)	<0.0002	0.000057	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000050	mg/L	0.01
Total Manganese (Mn)		0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	mg/L	0.05
Total Mercury (Hg)	<0.0020	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000050	mg/L	0.001
Total Molybdenum (Mo)	0.0005	0.000528	0.000502	0.000773	0.000545	0.000557	0.000525	0.000050	mg/L	
Total Nickel (Ni)	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	mg/L	
Total Selenium (Se)	<0.0002	0.000055	<0.000050	0.000069	<0.000050	0.000063	<0.000050	0.000050	mg/L	0.05
Total Silver (Ag)	<0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	mg/L	
Total Uranium (U)	0.00063	0.00058	0.000570	0.000600	0.000542	0.000596	0.000624	0.000010	mg/L	0.02
Total Vanadium (V)	0.002	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	mg/L	
Total Zinc (Zn)	<0.003	0.0038	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0030	mg/L	5
Total Calcium (Ca)		40.9	45.1	45.9	46.0	43.2	41.3	0.050	mg/L	
Total Magnesium (Mg)		18.3	21.1	20.5	18.7	18.8	18.9	0.0050	mg/L	
Total Potassium (K)		0.98	1.01	1.04	0.977	0.935	0.971	0.050	mg/L	
Total Sodium (Na)		10.6	12.1	13.7	12.2	10.2	10.9	0.050	mg/L	200
Total Sulphur (S)		7.04	7.03	8.20	9.04	8.72	7.83	0.50	mg/L	

Maximum Acceptable Concentration
Interem Maximum Allowable Concentration
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RDL - Reported Detection Limit
mg/L - Milligrams Per Litre
TCU - True Colour Unit
mS/cm - Microsiemens Per Centimeter
NTU - Nephelometric Colour Unit