

Greater Vernon Water (GVW) Water Quality Report for February 2023

The following is the water quality summary for the Greater Vernon Water (GVW) utility.

GVW continues to work on a large infrastructure project increasing the size of the spillway at Headgates Dam in our watershed. Throughout construction, UV treatment on the Duteau Creek source may be intermittently affected, and GVW has to maintain a lower level of water flow to complete the project.

On February 3, 2023, the Precautionary Water Quality Advisory issued on January 31, 2023 was rescinded due to bacterial results and disinfection levels being within normal drinking water standards.

On February 17, 2023, an advanced water shutdown notice was given to agricultural customers in the Bella Vista and Old Kamloops Road area for February 22, 2023. A section of the non-potable water main was shut down as part of an investigation for the water main renewal project.

1. Sources

GVW has two sources that are used for potable water. The two sources are Duteau Creek and Kalamalka Lake. Raw (untreated) water samples are taken at the intakes of Duteau Creek and Kalamalka Lake once a week. Tables 1 and 2 summarize the results for bacteria and turbidity.

Table 1 Duteau Creek Intake

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
E.coli ²	Caro	MPN/100 mL	4	-----	<1	1	0.25
E.coli ²	RDNO Lab	MPN/100 mL	7	-----	<1	28.5	4.79
Total Coliform	Caro	MPN/100 mL	4	-----	16	40	25.5
Total Coliform	RDNO Lab	MPN/100 mL	7	-----	2	29.9	18.09
Turbidity	Operator Grab Sample	NTU	4	-----	0.61	0.90	0.75
Turbidity	SCADA ¹ Hourly Average	NTU	28 Days	-----	0.47	1.04	0.59

¹SCADA: Supervisory Control and Data Acquisition.

²Drinking Water Treatment Objectives_ BC (Sec 4.3): The number of raw water samples should not exceed 20/100 mL in at least 90% of the weekly samples from the previous six months.

Table 2 Kalamalka Lake Intake

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
E.coli ³	Caro	MPN/100 mL	4	-----	3	6	4
E.coli ³	RDNO Lab	MPN/100 mL	7	-----	2	6.30	3.84
Total Coliform	Caro	MPN/100 mL	4	-----	4	12	7.75
Total Coliform	RDNO Lab	MPN/100 mL	7	-----	6	11	7.14
Turbidity ²	Operator Grab Sample	NTU	4	-----	0.46	0.60	0.52
Turbidity ²	SCADA ¹ Hourly Average	NTU	28 Days	-----	0.21	0.38	0.31

¹SCADA: Supervisory Control and Data Acquisition.

²Operation Guideline: As outlined in Deviation Response Plan, turbidity < 3 NTU.

³Drinking Water Treatment Objectives_ BC (Sec 4.3): The number of raw water samples should not exceed 20/100 mL in at least 90% of the weekly samples from the previous six months.

2. Agriculture/ Irrigation Sources

The 2023 irrigation season starts April.15.

3. Treatment Plants

GVW has two treatment plants: Duteau Creek Water Treatment Plant (DCWTP) and Mission Hill Water Treatment Plant (MHWTP). At the DCWTP water is first treated with a coagulant and mixed to create a floc, next clarification is achieved by Dissolved Air Floatation (DAF). Chlorine is added after treatment to ensure contact time for the removal of viruses, followed by Ultra-violet (UV) disinfection, and finally chlorine is added before entering the distribution system for residual. MHWTP uses a dual disinfection process of UV and chlorine.

Tables 3 and 5 summarize results for chlorine, bacterial, turbidity, UV Transmittance (UVT) and UV Dosage (UVD). Table 4 summarizes the log removal of viruses at the DCWTP.

Table 3 Duteau Creek Water Treatment Plant Reservoir

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine²	SCADA ¹ Daily Average	mg/L	28 Days	-----	1.89	1.91	1.90
E.coli	Caro	CFU/100 mL	4	-----	<1	<1	<1
E.coli	RDNO Lab	MPN/100 mL	7	-----	<1	<1	<1
Total Coliform	Caro	CFU/100 mL	4	-----	<1	<1	<1
Total Coliform	RDNO Lab	MPN/100 mL	7	-----	<1	<1	<1
Turbidity²	SCADA ¹ Daily Average	NTU	28 Days	-----	0.26	0.37	0.32
Pre UVT³	SCADA ¹	%	28 Days	-----	87.16	89.80	88.59

¹SCADA: Supervisory Control and Data Acquisition.

²GVW WQ Deviation Response Plan – free chlorine < 0.20 mg/L, turbidity > 1.0 NTU.

³UVT is monitored pre-UV treatment which is used to determine UV dosage.

Due to the infrastructure project, low flows make it difficult to track volumes and UV off spec water.

Table 4 DCWTP – Log Removal of Viruses

Log Removal of Viruses¹	
Days Monitored	28
Days 4-Log Removal Achieved	28

¹4-log virus removal logged by the minute on SCADA.

Table 5 Mission Hill Water Treatment Plant

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine (483 Pressure Zone)	SCADA ¹ Daily Average	mg/L	24 Days ³	-----	1.94	2.02	1.99
E.coli	Caro	CFU/100 mL	5	-----	<1	<1	<1
E.coli	RDNO Lab	MPN/100 mL	7	-----	<1	<1	<1
Total Coliform	Caro	CFU/100 mL	5	-----	<1	<1	<1
Total Coliform	RDNO Lab	MPN/100 mL	7	-----	<1	<1	<1
Turbidity ²	SCADA ¹ Daily Average	NTU	24 Days ³	-----	0.21	0.38	0.31
Pre UVT	SCADA ¹ Daily Average	%	28 Days	-----	90.96	91.65	91.41

¹SCADA: Supervisory Control and Data Acquisition.

²GVW WQ Deviation Response Plan – free chlorine < 0.20 mg/L, turbidity > 3.0 NTU.

³Some of the recorded data was lost, but regular monitoring did not note a WQ deviation.

This month, 9.97 m³ of off-spec water occurred at MHWTP.

4. Distribution

GVW has two distribution systems that interconnect: Duteau System supplied by Duteau Creek and Kalamalka System supplied by Kalamalka Lake. GVW has approximately 22,350 service connections.

During the large infrastructure project the Mission Hill WTP will be supplying the normal distribution system as well as supplementing flows into the 580 Zone when demand in the distribution system normally fed from Duteau Creek source cannot be met by Duteau WTP.

Table 6 summarizes the daily flow for each distribution system. The Duteau and Kalamalka systems have many locations where they can be interconnected. This means there are areas where there is a blend of water quality and can be identified by the conductivity of the water.

Table 6 Volumes for GVW Distribution Systems over the Month

Volumes	DCWTP	MHWTP
Min (ML/Day)	3.70	15.59
Max (ML/Day)	5.80	20.15
Average (ML/Day)	4.67	18.27
Monthly Total (ML)	130.90	511.68

Tables 7 and 8 summarize results for chlorine, bacterial, and turbidity for each distribution system. These systems are monitored by handheld instruments weekly.

Table 7 Duteau Distribution

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine ¹	Operator Grab Sample	mg/L	49	-----	0.10	1.71	1.08
Total Chlorine	Operator Grab Sample	mg/L	49	-----	0.35	1.97	1.29
E.coli	Caro	CFU/100 mL	18	-----	<1	<1	<1
E.coli	RDNO lab	MPN/100 mL	36	-----	<1	<1	<1
Total Coliform	Caro	CFU/100 mL	18	-----	<1	<1	<1
Total Coliform	RDNO Lab	MPN/100 mL	36	-----	<1	<1	<1
Turbidity ¹	Operator Grab Sample	NTU	49	3 ³	0.19	3.31	0.63

¹Operation Guidelines: free chlorine > 0.20 mg/L, turbidity < 1 NTU.

²One site had free chlorine < 0.20 mg/L: Braeburn Drive SS.

³Three sites had turbidity > 1 NTU: Galiano Road BO, Noble Canyon Road Hydrant and Goose Lake Road PS.

Table 8 Kalamalka Distribution

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine ¹	Operator Grab Sample	mg/L	63	-----	0.56	1.83	1.25
Total Chlorine	Operator Grab Sample	mg/L	63		0.75	2.16	1.51
E.coli	Caro	CFU/100 mL	43	-----	<1	<1	<1
E.coli	RDNO Lab	MPN/100 mL	49	-----	<1	<1	<1
Total Coliform	Caro	CFU/100 MI	43	-----	<1	<1	<1
Total Coliform	RDNO Lab	MPN/100 mL	49	-----	<1	<1	<1
Turbidity ¹	Operator Grab Sample	NTU	63	-----	0.22	0.88	0.49

¹Operation Guidelines: free chlorine > 0.20 mg/L, turbidity < 3 NTU.

The GVW distribution system contains six sampling sites (Table 9) that frequently have free chlorine < 0.2 mg/L due to the sample sites being located at the end of the distribution line. Measures are currently in place to mitigate this issue including regular monitoring and flushing. The three sites at Boss Creek represent a localized area.

Table 9 Low Chlorine Sites and Mitigation Measures

Frequent Low Free Chlorine Sites	Mitigation Measures
O'Keefe Ranch SS	On a localized Water Quality Advisory, regular monitoring
9007 Aberdeen Rd SS	Regular monitoring and flushing
Noble Canyon B/O	Regular monitoring and flushing
Boss Creek PH 1 (Lower) Return/Inlet	Regular monitoring
Boss Creek PH 2 (Upper) Discharge/Outlet	Regular monitoring
Boss Creek PH 2 (Upper) return/inlet	Regular monitoring

5. Water Quality Customer Calls and Notifications

Customer calls within the GVW Service area are tracked and recorded. There was a total of 6 customer calls this month.

Table 10 Water Quality Customer Calls this month

# of Calls	Type of Call	Issue/Inquiry	Investigation	Comments
1	Inquiry	Self-sampling	No	Given information about CARO sampling protocol
1	Issue	Water Quality Concern	No	N/A
2	Issue	Water Quality Concern	Yes	Verbal response of bacterial testing results being within normal drinking water standards
1	Inquiry	WQA for Headgates	No	Responded with information on precautionary advisory
1	Issue	Water Quality Concern	No	Responded with current WQ data

6. Operational or Maintenance Activity

Operational activity within the GVW service area are tracked and recorded using an online database. There was a total of 15 operational activities this month.

Table 11 Monthly operational work and maintenance for the City of Vernon

NUMBER OF LOCATIONS	TYPE OF WORK
0	Hydrant Maintenance
1	Hydrant Maintenance – Corrective
0	New Hydrant Install
6	Water Service GIS Locate
0	Water Main Break Repair
2	Property Damage Repair
2	Water Valve Maintenance
1	Water Valve Repair
0	Water Service Install
3	Water Service Repair
0	Reservoirs Cleaned
0	New Hydrant Sticker Install