

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

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

On December 15, 2023, a water source change was issued for some areas normally on the Duteau Creek source. Due to lower than normal reservoir levels and lack of fall precipitation the Kalamalka Lake source is being used in a broader area of the distribution system.

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	-----	1.0	4.0	2.5
E.coli ²	RDNO Lab	MPN/100 mL	6	-----	1.0	5.2	2.58
Total Coliform	Caro	MPN/100 mL	4	-----	64	206	123.5
Total Coliform	RDNO Lab	MPN/100 mL	6	-----	59.1	105	81.20
Turbidity	GVW WQ Tech	NTU	4	-----	0.9	1.26	1.14
Turbidity	SCADA ¹ Daily Average ³	NTU	31 Days	-----	0.54	0.86	0.66

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.

³SCADA data for this online analyzer is an average of 24 readings taken on the hour.

Table 2 Kalamalka Lake Intake

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
E.coli ³	Caro	MPN/100 mL	4	-----	3.0	11.0	7.75
E.coli ³	RDNO Lab	MPN/100 mL	6	-----	2.0	12.2	7.97
Total Coliform	Caro	MPN/100 mL	4	-----	8.0	31.0	18.75
Total Coliform	RDNO Lab	MPN/100 mL	6	-----	6.3	34.5	18.88
Turbidity²	GVW WQ Tech	NTU	4	-----	0.57	0.61	0.58
Turbidity²	SCADA ¹ Average ⁴	NTU	31 Days	-----	0.29	0.41	0.34

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.

⁴SCADA data for this online analyzer is an average of 24 readings taken on the hour.

2. Agriculture/ Irrigation Sources

The sources used for irrigation supply include Duteau Creek, King Edward/Deer Creek, Goose Lake, Coldstream Ranch Well #2 and Well #3. Table 3 summarizes the daily flows for each irrigation system.

The majority of the Duteau Creek water (approx. 85%) is treated but the other sources are separated from the potable system and are not chlorinated.

The irrigation season is from April 15 to September 15. Irrigation water used during the off season is used mainly for livestock watering. This water comes from Ranch Well #2 and Ranch Well #3, King Edward and Duteau Creek.

Table 3 Irrigation Volumes for Irrigation Sources over the Month

Irrigation Sources	DCWTP	Well 3	Well 2	King Edward
Min (ML/Day)	0.00	0.00	0.00	0.00
Max (ML/Day)	0.00	0.17	0.00	0.00
Average (ML/Day)	0.00	0.03	0.00	0.00
Monthly Total (ML)	0.00	0.89	0.00	0.00

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 4 and 6 summarize results for chlorine, bacterial, turbidity, and UV Transmittance (UVT). Table 5 summarizes the log removal of viruses at the DCWTP.

Table 4 Duteau Creek Water Treatment Plant Reservoir

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine ²	SCADA ¹ Daily Average	mg/L	31 Days	-----	1.88	2.00	1.92
E.coli	Caro	CFU/100 mL	4	-----	<1	<1	<1
E.coli	RDNO Lab	MPN/100 mL	4	-----	<1	<1	<1
Total Coliform	Caro	CFU/100 mL	4	-----	<1	<1	<1
Total Coliform	RDNO Lab	MPN/100 mL	4	-----	<1	<1	<1
Turbidity ²	SCADA ¹ Daily Average	NTU	31 Days	-----	0.25	0.32	0.29
Pre UVT ³	SCADA ¹ Daily Average	%	31 Days	-----	88.01	91.78	89.59

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.

Table 5 DCWTP – Log Removal of Viruses

Log Removal of Viruses ¹	
Days Monitored	31 Days
Days 4-Log Removal Achieved	31 Days

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

Table 6 Mission Hill Water Treatment Plant

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine	SCADA ¹ Daily Average	mg/L	31 Days	-----	1.98	2.01	2.00
E.coli	Caro	CFU/100 mL	4	-----	<1	<1	<1
E.coli	RDNO Lab	MPN/100 mL	5	-----	<1	<1	<1
Total Coliform	Caro	CFU/100 mL	4	-----	<1	<1	<1
Total Coliform	RDNO Lab	MPN/100 mL	5	-----	<1	<1	<1
Turbidity ²	SCADA ¹ Daily Average	NTU	31 Days	-----	0.30	0.43	0.35
Pre UVT	SCADA ¹ Daily Average	%	31 Days	-----	90.97	91.52	91.17

¹SCADA: Supervisory Control and Data Acquisition.

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

³ Deviations were resampled in accordance with Interior Health Authority.

This month, There was 0.0383ML (38.3 cubic meters) of off-spec water calculated in December 2023 based on one flow event where the flow increase was not met be the reactor ramping up bulb intensity quickly enough. This represents 0.0074% of the total treated water produced at MHWTP for the month of December.

4. Distribution

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

Table 7 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 7 Volumes for GVW Distribution Systems over the Month

Volumes	DCWTP	MHWTP
Min (ML/Day)	3.70	14.10
Max (ML/Day)	6.90	18.33
Average (ML/Day)	4.82	16.67
Monthly Total (ML)	149.50	516.86

Tables 8 and 9 summarize results for chlorine, bacterial, and turbidity for each distribution system. These systems are monitored by handheld instruments weekly.

Table 8 Duteau Distribution

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine ¹	Operator Grab Samples	mg/L	53	-----	0.20	2.01	1.04
Total Chlorine	Operator Grab Samples	mg/L	53	-----	0.30	2.30	1.24
E.coli	Caro	CFU/100 mL	22	-----	<1	<1	<1
E.coli	RDNO lab	MPN/100 mL	27	-----	<1	<1	<1
Total Coliform	Caro	CFU/100 mL	22	-----	<1	<1	<1
Total Coliform	RDNO Lab	MPN/100 mL	27	-----	<1	<1	<1
Turbidity	Operator Grab Samples	NTU	53	-----	0.27	0.97	0.49

¹GVW WQ Deviation Response Plan: free chlorine < 0.20 mg/L

Table 9 Kalamalka Distribution

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine¹	Operator Grab Samples	mg/L	65	-----	0.39	1.93	1.20
Total Chlorine	Operator Grab Samples	mg/L	65	-----	0.50	2.06	1.48
E.coli	Caro	CFU/100 mL	45	-----	<1	<1	<1
E.coli	RDNO Lab	MPN/100 mL	23	-----	<1	<1	<1
Total Coliform	Caro	CFU/100 MI	45	-----	<1	<1	<1
Total Coliform	RDNO Lab	MPN/100 mL	23	-----	<1	<1	<1
Turbidity¹	Operator Grab Samples	NTU	65	-----	0.23	2.03	0.56

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

² Deviations were resampled in accordance with Interior Health.

The GVW distribution system contains six sampling sites (Table 10) 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 10 Low Chlorine Sites and Mitigation Measures

Frequent Low Free Chlorine Sites	Mitigation Measures
O'Keefe Ranch SS	On a localized Water Quality Advisory
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 and Customer Calls and Notifications

Water Quality Customer calls within the GVW Service area are tracked and recorded. There was a total of 8 customer calls this month.

Table 11 Water Quality Customer Calls for the month

# of Calls	Type of Call	Issue/Inquiry	Investigation	Comments
1	Issue	Illness	No	Recommend customer go to the doctor.
2	Inquiry	Water Source	No	Spoke to customer about water source and water quality questions.
3	Inquiry	Water Quality	No	Spoke with customer about water quality questions.
4	Inquiry	Water Quality	No	Spoke with customer about water quality questions.
5	Issue	Water Quality	No	Spoke with customer about water quality.
6	Issue	Dirty Water	No	Customer did not call back.
7	Inquiry	Water Quality	No	Spoke with customer about water quality questions.
8	Issue	Water Quality	No	Customer had air in their water.

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 13 operational activities this month.

Table 12 Monthly operational work and maintenance for the City of Vernon

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