

Greater Vernon Water (GVW) Water Quality Report for July 2022

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

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 – Headgates

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
E.coli²	Caro	MPN/100 mL	4	-----	6	10	9
E.coli²	GVW	MPN/100 mL	4	-----	4.1	13.4	10.1
Total Coliform	Caro	MPN/100 mL	4	-----	473	1470	802
Total Coliform	GVW	MPN/100 mL	4	-----	344.8	1046.2	613.9
Turbidity	GVW Grab Sample	NTU	4	-----	1.63	2.22	1.86
Turbidity	SCADA ¹ Hourly Average	NTU	31 Days	-----	0.85	1.74	1.09

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.

³GVW uses the MPN method which has a Detection Limit of 200.5 MPN/100 mL.

Table 2 North Kalamalka Intake

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
E.coli ³	Caro	MPN/100 mL	4	-----	<1	2	0.5
E.coli ³	GVW	MPN/100 mL	5	-----	<1	1	0.2
Total Coliform	Caro	MPN/100 mL	4	-----	8	19	11.75
Total Coliform	GVW	MPN/100 mL	5	-----	3	25.3	14.0
Turbidity ²	GVW Grab Sample	NTU	4	-----	0.84	0.99	0.93
Turbidity ²	SCADA ¹ Hourly Average	NTU	31 Days	-----	0.52	0.84	0.65

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 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 Wells #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)	0.01	0.00	0.00	0.03
Max (ML/Day)	13.14	1.12	2.61	10.48
Average (ML/Day)	6.23	0.32	0.79	6.07
Monthly Total (ML)	193.00	9.99	24.48	188.20

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, UV Transmittance (UVT) and UV Dosage (UVD). 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	----	1.89	1.91	1.90
E.coli	Caro	CFU/100 mL	4	----	<1	<1	<1
E.coli	GVW	MPN/100 mL	4	----	A	A	A
Total Coliform	Caro	CFU/100 mL	4	----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	4	----	A	A	A
Turbidity ²	SCADA ¹ Daily Average	NTU	31 Days	----	0.24	0.46	0.32
Pre UVT ³	SCADA ¹	%	31 Days	----	86.35	88.29	87.41

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.

This month, 0 m³ off-spec water occurred at DCWTP.

Table 5 DCWTP – Log Removal of Viruses

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

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 (483 Pressure Zone)	SCADA ¹ Daily Average	mg/L	31 Days	-----	1.97	2.02	2.00
Free Chlorine (550 Pressure Zone)	SCADA ¹ Daily Average	mg/L	31 Days	-----	1.81	2.00	1.90
E.coli	Caro ⁴	CFU/100 mL	4	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	5	-----	A	A	A
Total Coliform	Caro	CFU/100 mL	4	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	5	-----	A	A	A
Turbidity ²	SCADA ¹ Daily Average	NTU	31 Days	-----	0.38	0.80	0.64
Pre UVT	SCADA ¹	%	31 Days	-----	89.89	90.32	90.09

¹SCADA: Supervisory Control and Data Acquisition.

²GVW WQ Deviation Response Plan – Free Chlorine >0.20 mg/L Turbidity <1.0 NTU.

This month, 103.5 m³ of calculated off-spec water occurred at MHWTP. This was due to increases in flow associated with pump starts. This equates to 0.013% of the total monthly volume of water treated 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.

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)	14.50	16.69
Max (ML/Day)	86.70	36.89
Average (ML/Day)	57.95	25.94
Monthly Total (ML)	1796.40	804.11

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	GVW grab sample	mg/L	54	1²	0.13	1.97	1.17
Total Chlorine	GVW grab sample	mg/L	54	-----	0.22	2.21	1.39
E.coli	Caro	CFU/100 mL	20	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	23	-----	A	A	A
Total Coliform	Caro	CFU/100 mL	20	1³	<1	1	<1
Total Coliform	GVW	MPN/100 mL	23	-----	A	A	A
Turbidity ¹	GVW grab sample	NTU	54	1⁴	0.30	1.07	0.51

¹Operation Guidelines: Free Chlorine >0.20 mg/L or <2.20 mg/L, Turbidity < 1 NTU.

²One site had Free Chlorine <0.20 mg/L: Cosens Bay SS.

³ One site had a total coliforms count of 1 from Caro Analytical: PRV 2.

⁴One sites had turbidity over 1 NTU: Pleasant Valley Road SS.

Table 9 Kalamalka Distribution

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine ¹	GVW grab sample	mg/L	71	-----	0.56	1.82	1.21
Total Chlorine	GVW grab sample	mg/L	71	-----	0.79	2.15	1.50
E.coli	Caro	CFU/100 mL	45	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	19	-----	A	A	A
Total Coliform	Caro	CFU/100 MI	45	1²	<1	6	<1
Total Coliform	GVW	MPN/100 mL	19	1³	A	1	A
Turbidity ¹	GVW grab sample	NTU	49	2⁴	0.22	2.52	0.76

¹Operation Guidelines: Free Chlorine >0.20 mg/L or <2.20 mg/L, Turbidity < 3 NTU.

²One site had a total coliform count of 6 from Caro analytical: 21st Avenue SS.

³ One site had a total coliforms count of 1 from RDNO Laboratory: Dunsmuir Road SS.

⁴Six sites had turbidity over 1 NTU: Pottery Road SS, 43rd Street SS, Okanagan Landing Road SS, Anderson Way SS, 15th Street SS, 21st Avenue SS on July 19 and 26.

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, 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. Customer Calls and Notifications

Customer calls within the GVW Service area are tracked and recorded. There were a total of 4 customer calls in July.

Table 11 Customer calls for the month

NUMBER OF CALLS	TYPE OF CALL	ISSUE	INVESTIGATION	COMMENTS
1	Water Quality	white water	na	air in lines; flush home
1	Water Quality	coloured water	na	service line switched to new line
1	Water Quality	debris coming out of irrigation taps	na	internal issue; irrigation system has breaks
1	Water Quality	taste issue	yes	sampling results came back within range; water mains will be flushed

6. Operational or Maintenance Activity

Operational activity within the GVW service area are tracked and recorded using an online database. There were a total of 78 operational activities in July.

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

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