

Greater Vernon Water (GVW) Water Quality Report for August 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	-----	3	9	5.75
E.coli²	GVW	MPN/100 mL	5	-----	3.1	63	17.24
Total Coliform	Caro	MPN/100 mL	4	-----	1380	2190	1557.5
Total Coliform	GVW	MPN/100 mL	5	-----	816.4	2419.6	1855.7
Turbidity	GVW Grab Sample	NTU	5	-----	1.63	1.89	1.76
Turbidity	SCADA ¹ Hourly Average	NTU	31 Days	-----	0.91	1.11	1.01

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	6	3
E.coli ³	GVW	MPN/100 mL	5	-----	<1	5.2	2.26
Total Coliform	Caro	MPN/100 mL	4	-----	11	22	16.25
Total Coliform	GVW	MPN/100 mL	5	-----	10.9	23.3	16.08
Turbidity ²	GVW Grab Sample	NTU	5	-----	1.41	1.97	1.69
Turbidity ²	SCADA ¹ Hourly Average	NTU	31 Days	-----	0.90	1.66	1.23

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)	9.01	0.00	0.00	4.63
Max (ML/Day)	11.78	3.27	2.61	10.10
Average (ML/Day)	10.44	0.79	0.80	8.12
Monthly Total (ML)	323.49	24.54	24.78	251.77

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	1.92	1.90
E.coli	Caro	CFU/100 mL	4	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	6	-----	A	A	A
Total Coliform	Caro	CFU/100 mL	4	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	6	-----	A	A	A
Turbidity ²	SCADA ¹ Daily Average	NTU	31 Days	-----	0.24	0.27	0.26
Pre UVT ³	SCADA ¹	%	31 Days	-----	86.79	88.14	87.52

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	-----	2.00	2.21	2.18
E.coli	Caro ⁴	CFU/100 mL	4	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	6	-----	A	A	A
Total Coliform	Caro	CFU/100 mL	4	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	6	-----	A	A	A
Turbidity ²	SCADA ¹ Daily Average	NTU	31 Days	-----	0.84	1.71	1.22
Pre UVT	SCADA ¹	%	31 Days	-----	89.62	90.08	89.91

¹SCADA: Supervisory Control and Data Acquisition.

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

This month, 0 m³ of calculated 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.

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)	54.80	27.44
Max (ML/Day)	85.20	37.59
Average (ML/Day)	71.18	33.11
Monthly Total (ML)	2206.50	1026.26

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	63	5 ²	0.00	2.03	1.09
Total Chlorine	GVW grab sample	mg/L	63	-----	0.04	2.2	1.28
E.coli	Caro	CFU/100 mL	18	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	31	-----	A	A	A
Total Coliform	Caro	CFU/100 mL	18	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	31	-----	A	A	A
Turbidity ¹	GVW grab sample	NTU	63	-----	0.23	0.95	0.45

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

²Five samples at three sites had Free Chlorine <0.20 mg/L: Cosens Bay SS, Boss Creek 1 PS Return, Boss Creek 2 PS Return.

Table 9 Kalamalka Distribution

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine ¹	GVW grab sample	mg/L	92	1 ²	0.10	2.16	1.35
Total Chlorine	GVW grab sample	mg/L	92	-----	0.22	2.4	1.62
E.coli	Caro	CFU/100 mL	50	1 ³	<1	1	0.02
E.coli	GVW	MPN/100 mL	33	-----	A	A	A
Total Coliform	Caro	CFU/100 MI	50	3 ⁴	<1	1	0.06
Total Coliform	GVW	MPN/100 mL	33	-----	A	A	A
Turbidity ¹	GVW grab sample	NTU	92	2 ⁵	0.32	3.64	1.17

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

²One site had Free Chlorine <0.20 mg/L: Vernon Reclamation Centre 21st Avenue SS.

³ One site had an *E.coli* count of 1 CFU from CARO Laboratory: 43rd Street SS. This site was resamples and came back <1 for Total Coliform and *E.coli*.

⁴Three sites had total coliform counts from CARO Laboratory: 43rd Street SS, 21st Avenue SS and 4714 Pleasant Valley SS.

⁵Two sites had turbidity over 3 NTU: Kokanee Booster and Okangan Landing 1 PS.

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 8 customer calls in August.

Table 11 Customer calls for the month

NUMBER OF CALLS	TYPE OF CALL	ISSUE	INVESTIGATION	COMMENTS
1	water quality	taste issue	na	flush strata / home
1	water quality	coloured water	yes	mains flushed / home flushed / sampled
1	information	water quality data	na	directed to water quality data online
1	water quality	odor / build up	yes	water mains will be flushed / sampling results came back within range / issue within home
1	water quality	check home is on potable water	yes	confirmed home is on potable water
1	water quality	turbid water after power outage	na	customers continue to flush after power outage / area on list for improvements
1	water quality	coloured water	na	water cleared when called back
1	water quality	concerned about water quality after main break	na	no issues during the main break; contact strata to flush

6. Operational or Maintenance Activity

Operational activity within the GWW service area are tracked and recorded using an online database. There were a total of 49 operational activities in August.

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

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