

## Greater Vernon Water (GVW) Water Quality Report for December 2020

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.coli <sup>2</sup>	Caro	MPN/100 mL	5	-----	<1	2	1.4
E.coli <sup>2</sup>	GVW	MPN/100 mL	4	-----	<1	2.0	0.75
Total Coliform	Caro	MPN/100 mL	5	-----	42	93	58
Total Coliform	GVW	MPN/100 mL	4	-----	25.4	45.3	34.1
Turbidity	GVW Grab Sample	NTU	5	-----	0.78	2.00	1.29
Turbidity	SCADA <sup>1</sup> Hourly Average	NTU	31 Days	-----	0.66	1.15	0.86

<sup>1</sup>SCADA: Supervisory Control and Data Acquisition.

<sup>2</sup>Drinking 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 North Kalamalka Intake**

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
E.coli <sup>3</sup>	Caro	MPN/100 mL	5	----	5	13	8.2
E.coli <sup>3</sup>	GVW	MPN/100 mL	4	----	1	9.9	7.1
Total Coliform	Caro	MPN/100 mL	5	----	9	33	18.2
Total Coliform	GVW	MPN/100 mL	4	----	20.7	36.4	26.2
Turbidity <sup>2</sup>	GVW Grab Sample	NTU	5	----	0.42	0.65	0.52
Turbidity <sup>2</sup>	SCADA <sup>1</sup> Hourly Average	NTU	31 Days	----	0.32	0.58	0.42

<sup>1</sup>SCADA: Supervisory Control and Data Acquisition.

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

<sup>3</sup>Drinking 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 Agriculture irrigation supply was turned off September 15, 2020. The sources used for irrigation supply include Duteau Creek, King Edward/Deer Creek, Goose Lake, and Well #2 located on Coldstream Ranch. 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.

Irrigation water used after September 15 mainly comes from Wells 2 and 3 along with King Edward. This water is mainly used for livestock watering.

**Table 2 Monthly Flows for Irrigation Sources**

Irrigation Sources	DCWTP	Well 3	Well 2	King Edward
Min (ML/Day)	0.00	0.00	0.00	0.00
Max (ML/Day)	0.03	0.00	0.08	0.04
Average (ML/Day)	0.00	0.00	0.03	0.02
Monthly Total (ML)	0.00	0.00	1.05	0.58

### 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 <sup>2</sup>	SCADA <sup>1</sup> Daily Average	mg/L	30 Days	----	1.89	2.12	1.95
E.coli	Caro	CFU/100 mL	5	----	<1	<1	<1
E.coli	GVW	MPN/100 mL	4	----	A	A	A
Total Coliform	Caro	CFU/100 mL	5	----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	4	----	A	A	A
Turbidity <sup>2</sup>	SCADA <sup>1</sup> Daily Average	NTU	31 Days	----	0.29	0.43	0.35
UVT (unfiltered)	GVW	%	13	----	85.7	88.7	87.9
Pre UVT <sup>3</sup>	SCADA <sup>1</sup>	%	31 Days	----	84.77	91.36	88.43

<sup>1</sup>SCADA: Supervisory Control and Data Acquisition.

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

<sup>3</sup>UVT is monitored pre-UV treatment which is used to determine UV dosage.

This month, 0 m<sup>3</sup> off-spec water occurred at DCWTP.

**Table 5 DCWTP – Log Removal of Viruses**

Parameter	Days Monitored	Min (log)	Max (log)	Average (log)
Log Removal of Viruses <sup>1</sup>	31	21.26	52.09	38.81

<sup>1</sup>4-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 <sup>1</sup> Daily Average	mg/L	31 Days	-----	2.04	2.11	2.10
Free Chlorine (550 Pressure Zone)	SCADA <sup>1</sup> Daily Average	mg/L	31 Days	-----	1.96	2.32	2.17
E.coli	Caro	CFU/100 mL	5	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	4	-----	A	A	A
Total Coliform	Caro	CFU/100 mL	5	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	4	-----	A	A	A
Turbidity <sup>2</sup>	SCADA <sup>1</sup> Daily Average	NTU	31 Days	-----	0.32	0.50	0.39
Pre UVT	SCADA <sup>1</sup>	%	31 Days	-----	90.15	90.85	90.54
<b>UVD</b>	SCADA <sup>1</sup>	mJ/cm <sup>2</sup>	31 Days	-----	90.15	90.85	90.54

<sup>1</sup>SCADA: Supervisory Control and Data Acquisition.

<sup>2</sup>GVW WQ Deviation Response Plan – Free Chlorine >0.20 mg/L Turbidity < 3.0 NTU.

This month, 0 m<sup>3</sup> 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 Monthly Usage for GVW Distribution Systems**

Distribution Systems	DCWTP	MHWTP
Min (ML/Day)	7.20	9.50
Max (ML/Day)	10.70	12.77
Average (ML/Day)	8.19	10.78
Monthly Total (ML)	254.00	334.31

The GVW distribution system contains six sampling sites (Table 8) that frequently have free chlorine < 0.2 mg/L due to the sample sites being located at the end of the distribution line (Tables 9 and 10). 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 8 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 and flushing
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

Tables 9 and 10 summarize results for chlorine, bacterial, and turbidity for each distribution system. These systems are monitored by handheld instruments weekly.

**Table 9 Duteau Distribution**

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine <sup>1</sup>	GVW grab sample	mg/L	80	10 <sup>2</sup>	0.01	2.3	1.0
Total Chlorine	GVW grab sample	mg/L	80	-----	0.09	2.5	1.16
E.coli	Caro	CFU/100 mL	23	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	40	-----	A	A	A
Total Coliform	Caro	CFU/100 mL	23	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	40	-----	A	A	A
Turbidity <sup>1</sup>	GVW grab sample	NTU	75	1 <sup>3</sup>	0.16	1.49	0.48

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

<sup>2</sup>Ten samples had free chlorine < 0.20 mg/L at sites commonly known for low free chlorine, see paragraph above, these include: 9007 Aberdeen Rd SS, Boss Creek PH 1 Return, Boss Creek PH 2 Discharge, Boss Creek PH 2 Return, and O'Keefe Ranch SS. All bacterial results for these sites were non-detect.

<sup>3</sup>One sample had turbidity >1 NTU: 1101 Galliano Road B/O.

**Table 10 Kalamalka Distribution**

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine <sup>1</sup>	GVW grab sample	mg/L	100	1 <sup>2</sup>	0.06	1.94	1.22
Total Chlorine	GVW grab sample	mg/L	100	-----	0.18	2.3	1.46
E.coli	Caro	CFU/100 mL	54	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	35	-----	A	A	A
Total Coliform	Caro	CFU/100 MI	54	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	35	-----	A	A	A
Turbidity <sup>1</sup>	GVW grab sample	NTU	100	1 <sup>3</sup>	0.23	1.26	0.50

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

<sup>2</sup>One sample had free chlorine <0.20 mg/L: 1802 Pottery Road.

<sup>3</sup>One sample had turbidity >1 NTU: Kidston SS.

**5. Customer Calls and Notifications**

Customer calls within the GVW Service area are tracked and recorded. As of September, customer calls will include water quality inquiries, therefore the number of calls will increase. There were a total of 4 customer calls in December.

NUMBER OF CALLS	TYPE OF CALL	ISSUE	INVESTIGATION	COMMENTS
1	inquiries	-----	-----	-----
1	water quality	particles	na	particles are from the algae bloom in Kalamalka Lake
1	water quality	odour	Na	customer in a strata therefore the strata will flush
1	water quality	cloudy	na	cloudy on weekend but cleared up

**6. Operational or Maintenance Activity**

The annual water main flushing program began in May and continued through October. As of November 12<sup>th</sup>, flushing has been concluded for the year. There was 1 water main break in the GVW system in December.