

## Greater Vernon Water (GVW) Water Quality Report for August 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
<b>E.coli<sup>2</sup></b>	Caro	MPN/100 mL	4	-----	5	15	9
<b>E.coli<sup>2</sup></b>	GVW	MPN/100 mL	4	-----	3.1	16.4	7.6
<b>Total Coliform</b>	Caro	MPN/100 mL	4	-----	1910	>2420	2065
<b>Total Coliform</b>	GVW	MPN/100 mL	4	-----	200.5	>200.5	>200.5
<b>Turbidity</b>	GVW Grab Sample	NTU	4	-----	1.47	1.74	1.59
<b>Turbidity</b>	SCADA <sup>1</sup> Hourly Average	NTU	31 Days	-----	0.94	1.33	1.11

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

<sup>2</sup>Drinking Water Treatment Objectives\_ BC (Sec 4.3): Determine number of raw water samples with E. coli >20 CFU. The number of E. coli in raw water does 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	4	----	3	5	4
E.coli <sup>3</sup>	GVW	MPN/100 mL	4	----	<1	3.1	1.8
Total Coliform	Caro	MPN/100 mL	4	----	190	1940	574
Total Coliform	GVW	MPN/100 mL	4	----	165.2	>200.5	191.7
Turbidity <sup>2</sup>	GVW Grab Sample	NTU	5	----	0.95	1.32	1.18
Turbidity <sup>2</sup>	SCADA <sup>1</sup> Hourly Average	NTU	31 Days	----	0.70	1.61	1.01

<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): Determine number of raw water samples with E. coli >20 CFU. The number of E. coli in raw water does 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 on April 15, 2020. The sources used for irrigation supply include Duteau Creek, King Edward/Deer Creek, Goose Lake, Well #1 and Well #2 located on Coldstream Ranch.

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

**Table 2 Monthly Flows for Irrigation Sources**

Irrigation Sources	DCWTP	Well 1	Well 2	King Ed
Min (ML/Day)	7.70	0.00	0.00	3.84
Max (ML/Day)	11.65	0.81	1.37	14.22
Average (ML/Day)	10.08	0.18	0.29	10.45
Monthly Total (ML)	312.52	5.56	9.02	323.99

### 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 DCWTP contact time (CT) 4-log inactivation of Viruses.

**Table 4 Duteau Creek Water Treatment Plant Reservoir**

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
<b>Free Chlorine<sup>2</sup></b>	SCADA <sup>1</sup> Daily Average	mg/L	31 Days	----	1.82	1.91	1.90
<b>E.coli</b>	Caro	CFU/100 mL	4	----	<1	<1	<1
<b>E.coli</b>	GVW	MPN/100 mL	3	----	A	A	A
<b>Total Coliform</b>	Caro	CFU/100 mL	4	----	<1	<1	<1
<b>Total Coliform</b>	GVW	MPN/100 mL	3	----	A	A	A
<b>Turbidity<sup>2</sup></b>	SCADA <sup>1</sup> Daily Average	NTU	31 Days	----	0.26	0.40	0.32
<b>UVT (unfiltered)</b>	GVW	%	11	----	87.7	89.6	88.8
<b>Pre UVT<sup>3</sup></b>	SCADA <sup>1</sup>	%	31 Days	----	85.7	91.02	88.6

<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>The UV Plant is now operational. UVT is monitored pre-UV treatment which is used to determine UV dosage.

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

**Table 5 DCWTP – Contact Time (CT) 4-log inactivation of Viruses**

Parameter	Days Monitored	Days 4-log inactivation ACHIEVED	Days 4-log inactivation NOT ACHIEVED
> 4-log Removal of Viruses <sup>1</sup>	31	31	0

<sup>1</sup>99.99%, 4-log inactivation of Viruses; CT is logged by the minute on SCADA as of February 2019.

**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	-----	1.99	2.22	2.12
Free Chlorine (550 Pressure Zone)	SCADA <sup>1</sup> Daily Average	mg/L	31 Days	-----	1.91	2.20	2.11
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 <sup>2</sup>	SCADA <sup>1</sup> Daily Average	NTU	31 Days	-----	0.60	1.24	0.93
Pre UVT	SCADA <sup>1</sup>	%	31 Days	-----	89.58	90.68	90.07

<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.

#### 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 that 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)	49.40	19.65
Max (ML/Day)	88.90	28.31
Average (ML/Day)	71.55	23.84
Monthly Total (ML)	2218.00	738.91

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
<b>Free Chlorine<sup>1</sup></b>	GVW grab sample	mg/L	72	<b>15<sup>1,2</sup></b>	0.00	2.05	0.98
<b>Total Chlorine</b>	GVW grab sample	mg/L	72	----	0.01	2.20	1.15
<b>E.coli</b>	Caro	CFU/100 mL	26	----	<1	<1	<1
<b>E.coli</b>	GVW	MPN/100 mL	41	----	A	A	A
<b>Total Coliform</b>	Caro	CFU/100 mL	26		<1	4	<1
<b>Total Coliform</b>	GVW	MPN/100 mL	41	<b>1<sup>3</sup></b>	A	8.7	NA
<b>Turbidity<sup>1</sup></b>	GVW grab sample	NTU	69	<b>1<sup>4</sup></b>	0.18	1.15	0.43

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

<sup>2</sup>Twelve samples had free chlorine < 0.20 mg/L, see paragraph above, including 3 sites that are not commonly known for low free chlorine, Kalamalka Secondary, Cosens Bay Rd SS, and Springfield SS. All bacteria results for these sites were non detect.

<sup>3</sup>O'Keefe Ranch had a total in house total coliform count of 8.7. CARO bacterial results were non-detect. All other bacterial results for this site were non detect for the rest of the month.

<sup>4</sup>NBX #2 had turbidity > 1 NTU. Bacterial results were non detect.

**Table 10 Kalamalka Distribution**

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
<b>Free Chlorine<sup>1</sup></b>	GVW grab sample	mg/L	69	----	0.47	2.05	1.20
<b>Total Chlorine</b>	GVW grab sample	mg/L	69	----	0.71	2.30	1.47
<b>E.coli</b>	Caro	CFU/100 mL	41	----	<1	<1	<1
<b>E.coli</b>	GVW	MPN/100 mL	23	----	A	A	A
<b>Total Coliform</b>	Caro	CFU/100 mL	41	----	<1	<1	<1
<b>Total Coliform</b>	GVW	MPN/100 mL	23	----	A	A	A
<b>Turbidity<sup>1</sup></b>	GVW grab sample	NTU	67	----	0.44	1.66	0.91

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

**5. Customer Calls and Notifications**

Customer calls within the GVW Service area are tracked and recorded. There were two customer calls that required investigations in August.

Date	Types of Concern	Action	Comments	Service Area
August 18	Coloured water	Investigated area for water quality issues. Water Quality Staff sampled.	No water quality concerns in area. All parameters within guidelines. Home owner issue.	Vernon
August 21	Coloured water and tastes issues	Water Quality Staff sampled.	All parameters within guidelines.	Vernon

**6. Operational or Maintenance Activity**

The annual water main flushing program began in May. There were four water main break in the GVW system in August.