

## Greater Vernon Water (GVW) Water Quality Report for September 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	5	-----	3	16	7.4
<b>E.coli<sup>2</sup></b>	GVW	MPN/100 mL	5	-----	2.0	12.4	6.5
<b>Total Coliform</b>	Caro	MPN/100 mL	5	-----	1410	2460	1844
<b>Total Coliform</b>	GVW	MPN/100 mL	5	-----	200.5	>200.5	>200.5
<b>Turbidity</b>	GVW Grab Sample	NTU	5	-----	1.64	1.80	1.70
<b>Turbidity</b>	SCADA <sup>1</sup> Hourly Average	NTU	30 Days	-----	1.02	1.49	1.20

<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	5	----	2	7	4
E.coli <sup>3</sup>	GVW	MPN/100 mL	5	----	<1	8.7	4.5
<b>Total Coliform</b>	Caro	MPN/100 mL	5	----	13	106	41.2
<b>Total Coliform</b>	GVW	MPN/100 mL	5	----	15.0	62.4	39.1
<b>Turbidity<sup>2</sup></b>	GVW Grab Sample	NTU	5	----	1.23	2.15	2.15
<b>Turbidity<sup>2</sup></b>	SCADA <sup>1</sup> Hourly Average	NTU	30 Days	----	0.94	1.53	1.17

<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 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
<b>Min (ML/Day)</b>	0.04	0.00	0.00	0.00
<b>Max (ML/Day)</b>	10.17	1.47	0.55	9.04
<b>Average (ML/Day)</b>	5.32	0.07	0.04	3.24
<b>Monthly Total (ML)</b>	159.57	2.23	1.31	97.14

### 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	30 Days	----	1.88	1.93	1.90
<b>E.coli</b>	Caro	CFU/100 mL	5	----	<1	<1	<1
<b>E.coli</b>	GVW	MPN/100 mL	6	----	A	A	A
<b>Total Coliform</b>	Caro	CFU/100 mL	5	----	<1	<1	<1
<b>Total Coliform</b>	GVW	MPN/100 mL	6	----	A	A	A
<b>Turbidity<sup>2</sup></b>	SCADA <sup>1</sup> Daily Average	NTU	30 Days	----	0.22	0.44	0.29
<b>UVT (unfiltered)</b>	GVW	%	13	----	87.8	92.6	90.1
<b>Pre UVT<sup>3</sup></b>	SCADA <sup>1</sup>	%	30 Days	----	87.99	92.04	89.84

<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 at DCWTP.

**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>	30	30	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	30 Days	-----	2.11	2.22	2.18
Free Chlorine (550 Pressure Zone)	SCADA <sup>1</sup> Daily Average	mg/L	30 Days	-----	1.78	2.17	1.99
E.coli	Caro	CFU/100 mL	5	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	6	-----	A	A	A
Total Coliform	Caro	CFU/100 MI	5	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	6	-----	A	A	A
Turbidity <sup>2</sup>	SCADA <sup>1</sup> Daily Average	NTU	30 Days	-----	0.93	2.01	1.29
Pre UVT	SCADA <sup>1</sup>	%	30 Days	-----	89.60	88.62	85.11

<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)	13.80	13.76
Max (ML/Day)	70.60	24.06
Average (ML/Day)	41.11	20.48
Monthly Total (ML)	1233.20	614.52

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	85	<b>20<sup>2,3</sup></b>	0.01	2.50	1.02
<b>Total Chlorine</b>	GVW grab sample	mg/L	85	----	0.01	2.70	1.16
<b>E.coli</b>	Caro	CFU/100 mL	25	----	<1	<1	<1
<b>E.coli</b>	GVW	MPN/100 mL	61	----	A	A	A
<b>Total Coliform</b>	Caro	CFU/100 mL	25	<b>1<sup>4</sup></b>	<1	OG	OG
<b>Total Coliform</b>	GVW	MPN/100 mL	61	----	A	A	A
<b>Turbidity<sup>1</sup></b>	GVW grab sample	NTU	85	<b>1<sup>5</sup></b>	0.16	1.32	0.36

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

<sup>2</sup>Nineteen samples had free chlorine < 0.20 mg/L, see paragraph above, including 6 sites that are not commonly known for low free chlorine, 9007 Aberdeen Rd SS, Boss Creek PH 1 Return, Boss Creek PH 2 Discharge, Boss Creek PH 2 Return, Cosens Bay Rd SS, and O'Keefe Ranch SS. All bacterial results for these sites were non-detect except for Boss Creek PH 2 Inlet, which was Overgrown on September 24<sup>th</sup>.

<sup>3</sup>One site had chlorine >2.20 mg/L.

<sup>4</sup>Boss Creek PH 2 Discharge was OG with visible Total Coliform but without visible E.coli.

<sup>5</sup>Two samples had turbidity >1 NTU: BX Park SS and O'Keefe Ranch.

**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	103	<b>2<sup>2</sup></b>	0.00	2.60	1.14
<b>Total Chlorine</b>	GVW grab sample	mg/L	103	----	0.23	2.70	1.42
<b>E.coli</b>	Caro	CFU/100 mL	48	----	<1	<1	<1
<b>E.coli</b>	GVW	MPN/100 mL	34	----	A	A	A
<b>Total Coliform</b>	Caro	CFU/100 mL	48	----	<1	<1	<1
<b>Total Coliform</b>	GVW	MPN/100 mL	34	----	A	A	A
<b>Turbidity<sup>1</sup></b>	GVW grab sample	NTU	97	----	0.25	2.44	1.00

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

<sup>2</sup>One site had free chlorine >2.2.

## 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 10 customer calls in September; three required investigations, four were home owner issues, two were inquiries, one a CoV transfer.

Date	Types of Concern	Action	Comments	Service Area
September 2	Coloured water	Stata issue.	No water quality concerns in area. Customer will have strata flush.	Vernon
September 10	Water pressure issue	Transferred to the CoV	na	Vernon
September 10	Colour and odour	Large building that needed to be flushed	Customer will have building flushed; if issue continued, customer would call back.	Vernon
September 10	Coloured water	DoC flushed water mains	Water mains stirred up during hydrant testing.	Coldstream
September 10	Coloured water	DoC flushed water mains	Water mains stirred up during hydrant testing.	Coldstream
September 10	Water Odour	No action necessary	Customer inquired if there were changes in the water as the water smells different. Informed customer nothing has changed and sample sites are all within normal range.	Vernon
September 10	Inquiry	NA	Temperature inquiry	Vernon
September 10	Corroded anode	NA	Corroded anode within the hot water tank. This is a home owner issue.	Vernon
September 24	Inquiry	NA	Customer has leak on property. Gave information where to get tested if needed. Home owner issue.	Vernon
September 30	Colour water	No action necessary	Coloured water was temporary due to fire practice.	Vernon

## 6. Operational or Maintenance Activity

The annual water main flushing program began in May and continued through September. There were eight water main break in the GVW system in September.