



Greater Vernon Water (GVW) Water Quality Report for January 2024

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 per week. Tables 1 and 2 summarize the results for bacteria and turbidity.

Table 1 Duteau Creek Intake

| Parameter | Laboratory | | # of Samples | # of Deviations | Min | Max | Average |
|------------------------------|--|------------|--------------|-----------------|------|-------|---------|
| E.coli³ | Caro | MPN/100 mL | 6 | ----- | <1 | 2 | 1.3 |
| E.coli³ | RDNO Lab | MPN/100 mL | 10 | ----- | <1 | 6.3 | 3.1 |
| Total Coliform | Caro | MPN/100 mL | 6 | ----- | 26 | 161 | 62.8 |
| Total Coliform | RDNO Lab | MPN/100 mL | 10 | ----- | 36.4 | 178.5 | 78.3 |
| Turbidity² | GVW WQ Tech | NTU | 5 | ----- | 0.7 | 1 | 0.8 |
| Turbidity² | SCADA ¹ Daily Average ⁴ | NTU | 31 Days | ----- | 0.40 | 0.61 | 0.51 |

¹SCADA: Supervisory Control and Data Acquisition.

²Operation Guideline: As outlined in Deviation Response Plan, turbidity <1 NTU.

³Drinking Water Treatment Objectives (Microbiological) for Surface Water Supplies in British Columbia (Sec 4.3): The number of E. coli in raw water samples should not exceed 20/100 mL in at least 90% of the weekly samples from the previous six months.

⁴SCADA data for this online analyzer is an average of 24 readings taken on the hour.

Table 2 Kalamalka Lake Intake

| Parameter | Laboratory | | # of Samples | # of Deviations | Min | Max | Average |
|------------------------|---|------------|--------------|-----------------|------|-------|---------|
| E.coli ³ | Caro | MPN/100 mL | 5 | ----- | <1 | 88 | 28.5 |
| E.coli ³ | RDNO Lab | MPN/100 mL | 10 | ----- | <1 | 84.5 | 23.2 |
| Total Coliform | Caro | MPN/100 mL | 5 | ----- | 2 | 155 | 37 |
| Total Coliform | RDNO Lab | MPN/100 mL | 10 | ----- | 2 | 167.4 | 40.2 |
| Turbidity ² | GVW WQ Tech | NTU | 5 | ----- | 0.51 | 0.68 | 0.57 |
| Turbidity ² | SCADA ¹ Average ⁴ | NTU | 31 Days | ----- | 0.27 | 0.48 | 0.32 |

¹SCADA: Supervisory Control and Data Acquisition.

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

³Drinking Water Treatment Objectives (Microbiological) for Surface Water Supplies in British Columbia (Sec 4.3): The number of E. coli in raw water samples should not exceed 20/100 mL in at least 90% of the weekly samples from the previous six months.

⁴SCADA data for this online analyzer is an average of 24 readings taken on the hour.

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. 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 Well #2, 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) | 0.00 | 0.00 | 0.00 | 0.00 |
| Max (ML/Day) | 10.63 | 0.16 | 0.09 | 0.09 |
| Average (ML/Day) | 0.86 | 0.02 | 0.02 | 0.00 |
| Monthly Total (ML) | 26.65 | 0.66 | 0.69 | 0.09 |

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 treated with a coagulant and mixed to create a floc before clarification is achieved by Dissolved Air Flotation (DAF). Chlorine is added after clarification to ensure contact time for the removal of viruses, followed by Ultra-violet (UV) disinfection. Finally, an additional dose chlorine is added before entering the distribution system to maintain a set point for the residual chlorine value. MHWTP uses a dual disinfection process of UV and chlorine.

Tables 4 and 6 summarize results for chlorine, bacteria, turbidity, and UV Transmittance (UVT). 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 | ----- | 1.87 | 1.95 | 1.90 |
| E.coli | Caro | CFU/100 mL | 5 | ----- | <1 | <1 | <1 |
| E.coli | RDNO Lab | MPN/100 mL | 5 | ----- | <1 | <1 | <1 |
| Total Coliform | Caro | CFU/100 mL | 5 | ----- | <1 | <1 | <1 |
| Total Coliform | RDNO Lab | MPN/100 mL | 5 | ----- | <1 | <1 | <1 |
| Turbidity ² | SCADA ¹ Daily Average | NTU | 31 Days | ----- | 0.24 | 0.35 | 0.28 |
| Pre UVT ³ | SCADA ¹ Daily Average | % | 31 Days | ----- | 87.35 | 91.32 | 89.90 |

¹SCADA: Supervisory Control and Data Acquisition.

²Operation Guideline: As outlined in 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, no off-spec water occurred at DCWTP.

Table 5 DCWTP – Log Removal of Viruses

| Log Removal of Viruses ¹ | |
|-------------------------------------|---------|
| Days Monitored | 31 Days |
| Days 4-Log Removal Achieved | 30 Days |

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 | SCADA ¹ Daily Average | mg/L | 31 Days | ----- | 1.94 | 2.02 | 2.00 |
| E.coli | Caro | CFU/100 mL | 6 | ----- | <1 | <1 | <1 |
| E.coli | RDNO Lab | MPN/100 mL | 6 | ----- | <1 | <1 | <1 |
| Total Coliform | Caro | CFU/100 mL | 6 | ----- | <1 | <1 | <1 |
| Total Coliform | RDNO Lab | MPN/100 mL | 6 | ----- | <1 | <1 | <1 |
| Turbidity ² | SCADA ¹ Daily Average | NTU | 31 Days | ----- | 0.29 | 0.53 | 0.34 |
| Pre UVT | SCADA ¹ Daily Average | % | 31 Days | ----- | 90.89 | 92.05 | 91.53 |

¹SCADA: Supervisory Control and Data Acquisition.

²Operation Guideline: As outlined in Deviation Response Plan, free chlorine >0.20 mg/L, turbidity <3.0 NTU.

This month, no off-spec water occurred at MHWTP.

4. Distribution

GVW has two distribution systems that interconnect: Duteau System typically supplied by Duteau Creek and Kalamalka System typically 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) | 3.70 | 15.67 |
| Max (ML/Day) | 5.90 | 18.66 |
| Average (ML/Day) | 4.65 | 17.41 |
| Monthly Total (ML) | 144.30 | 539.81 |

Tables 8 and 9 summarize results for chlorine, bacteria, 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 Chlorine¹ | Operator Grab Samples | mg/L | 68 | 1 ² | 0.16 | 2.20 | 1.17 |
| Total Chlorine | Operator Grab Samples | mg/L | 68 | ----- | 0.20 | 2.40 | 1.42 |
| E.coli | Caro | CFU/100 mL | 24 | ----- | <1 | <1 | <1 |
| E.coli | RDNO lab | MPN/100 mL | 40 | ----- | <1 | <1 | <1 |
| Total Coliform | Caro | CFU/100 mL | 24 | ----- | <1 | <1 | <1 |
| Total Coliform | RDNO Lab | MPN/100 mL | 40 | ----- | <1 | <1 | <1 |
| Turbidity | Operator Grab Samples | NTU | 68 | 2 ² | 0.26 | 1.75 | 0.53 |

¹GVW WQ Deviation Response Plan: free chlorine >0.20 mg/L, turbidity <1 NTU.

²Sample site was flushed until free chlorine >0.20 mg/L and turbidity <1 NTU.

Table 9 Kalamalka Distribution

| Parameter | Laboratory | | # of Samples | # of Deviations | Min | Max | Average |
|----------------------------------|-----------------------|------------|--------------|-----------------|------|------|---------|
| Free Chlorine¹ | Operator Grab Samples | mg/L | 73 | ----- | 0.40 | 2.20 | 1.21 |
| Total Chlorine | Operator Grab Samples | mg/L | 73 | ----- | 0.73 | 2.49 | 1.48 |
| E.coli | Caro | CFU/100 mL | 47 | ----- | <1 | <1 | <1 |
| E.coli | RDNO Lab | MPN/100 mL | 35 | ----- | <1 | <1 | <1 |
| Total Coliform | Caro | CFU/100 MI | 47 | ----- | <1 | <1 | <1 |
| Total Coliform | RDNO Lab | MPN/100 mL | 35 | ----- | <1 | <1 | <1 |
| Turbidity¹ | Operator Grab Samples | NTU | 73 | ----- | 0.27 | 1.01 | 0.53 |

¹Operation Guidelines: free chlorine >0.20 mg/L, turbidity <3 NTU.

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 |
| 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. Water Quality and Customer Calls and Notifications

Water Quality Customer calls within the GVW Service area are tracked and recorded. There was a total of 1 customer calls this month.

Table 11 Water Quality Customer Calls for the month

| # of Calls | Type of Call | Issue/Inquiry | Investigation | Comments |
|------------|--------------|---------------|---------------|--|
| 1 | Issue | Water Quality | Yes | Water quality staff sampled, all parameters with normal range. |

6. Operational or Maintenance Activity

Operational activity within the GVW service area are tracked and recorded using an online database. There was a total of 22 operational activities this month outlined in Table 12.

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

| NUMBER OF LOCATIONS | TYPE OF WORK |
|---------------------|----------------------------------|
| 9 | Hydrant Maintenance |
| 0 | Hydrant Maintenance – Corrective |
| 0 | New Hydrant Install |
| 0 | Water Service GIS Locate |
| 3 | Water Main Break Repair |
| 3 | Property Damage Repair |
| 1 | Water Valve Maintenance |
| 3 | Water Valve Repair |
| 1 | Water Service Install |
| 1 | Water Service Repair |
| 0 | Reservoirs Cleaned |
| 1 | New Hydrant Sticker Install |