



MONTHLY REPORTING PERIOD - MARCH, 2021

1. SUMMARY

The list below provides a summary of the water quality information collected by BMID in March 2021. Documentation and figures are provided on the following pages to support this submission.

Source	Total (US Gals)	Total (Mega Litres)
Mission Creek	66,462,664	251.6
Well 4	2,276,000	8.6
Well 5	0	0
Well 6 (Irrigation Only)	0	0
Scotty Creek (Irrigation Only)	0	0
Total	68,738,664	260.2

1. Beginning on March the 22nd, BMID became aware that a number of customers had noticed taste and odor issues with BMID's Mission Creek source. None of BMID's on-line instrumentation or staff-collected grab samples indicated any measurable water quality issues. The taste and odour was noticeable by some customers and not at all by others. The incident may have been the result of mixing or blending of raw Mission Creek water and treated water from the Water Treatment Plant. The issue cleared up after a few days when treated/clarified water displaced the unclarified water that had caused the event. A taste & odour advisory was issued within the first day of customers notifying BMID;
2. No Presence/Absence tests were not taken for the first two weeks of the month as BMID did not receive the necessary test broth from the distributor due to a disruption in the supply chain. An alternative broth was sourced and was utilized for the second half of the month;
3. A positive Presence/Absence sample occurred on March 15 at the Stayman Road sampling station. The positive sample resulted from improper handling of the new style Presence/Absence broth which has a higher chance of resulting in a false positive. Subsequent tests have been negative for bacteria;
4. A portion of the BMID's transmission main west of the Mission Creek Intake and east of the tunnel is located on an unstable slope. Slope movement has been minimal over the past 12 months. Monitoring has showed minor variations in groundwater levels, but no substantial changes. The hillside is being monitored for surface movement on a monthly basis and groundwater levels as required.
5. The WTP resumed part-time operations on February 21, 2021 as turbidity levels began to necessitate treatment. The WTP alternated between treated and raw water from February 21 until March 16 depending on raw water quality. Since March 16, The WTP has continued to run full-time until raw water in Mission Creek is of sufficient quality to bypass treatment, later in winter;
6. Raw water turbidity levels in Mission Creek peaked at 9.63 (average daily turbidity) on March 21. Starting on March 24, the on-line turbidity meter was relocated to the Grit-

- pond from the creek to avoid damage during freshet. Turbidity levels will be lower at this location as the gates are closed off during peak turbidity overnight;
7. Turbidity levels at the Distribution Intake (end of Hadden Reservoir) high reading was 0.62 NTU on March 29, 2021. Average turbidity for March was 0.45 NTU at the Distribution Intake at the lower end of Hadden Reservoir;
 8. The highest recorded monthly turbidity level at the first customer (Booster #1) was 0.74 NTU on March 23, 2021. Average monthly turbidity at the first customer was 0.47 NTU for March;
 9. BMID's Ultraviolet Treatment Facility treated 251,588.6 m³ of water, none of which was "Off-Spec" (0.0%). Average UV Transmissivity was 90.5%. The average inlet chlorine residual level at the UV site was 1.04 mg/L. The average outgoing chlorine was 1.36 mg/L after the sodium hypochlorite top-up system;
 10. BMID's Scotty Creek source, used for irrigation in the north-end, was placed on Stand-by in September 2020;
 11. Well # 4 resumed operations as the primary domestic water source for the north-end on September 11, 2020. Well #4 will continue to operate until spring 2021;
 12. Well #5, used as the primary domestic water source in the north-end of the system for both irrigation and domestic consumption was turned off for the year on September 11, 2020. Well #5 is undergoing maintenance which will continue until the spring of 2021;
 13. Well #6, which supplies irrigation water to the twinned north-end water distribution systems, was placed in stand-by for the year in October. Well #6 will remain in stand-by mode for fire protection only until flows increase in spring 2021;
 14. *E.Coli* levels at Mission Creek's Point-of-Diversion (creek intake prior to WTP) had normal counts for late-winter with a peak count of 12 on March 29, 2021. The average *E.Coli* count was 6.2 for the month based on 5 samples;
 15. *E.Coli* levels in the raw water at the water distribution system intake down-stream of the WTP, immediately prior to disinfection, had zero counts on 4 out of 5 samples with a peak count of 1 on March 1, 2021. The reduction in *E.Coli* levels is credited to the settling of particles in the water in Stevens and Hadden Reservoirs;
 16. No *E.Coli* or *Total Coliforms* were found in treated water in the distribution system through third-party analysis. In addition, one positive sample was detected by BMID's in-house presence/absence testing due to operator error;

1.0 FLOWS - MARCH, 2021

The Maximum Daily Flow was on March 24, at 3,565,441 US gallons (13.5 ML)

The Minimum Daily Flow was on March 13, at 1,983,522 US gallons (7.51 ML)

Mission Creek provided 97% of domestic and irrigation flow throughout March.

Figure 1.1 - Domestic Water System Flow

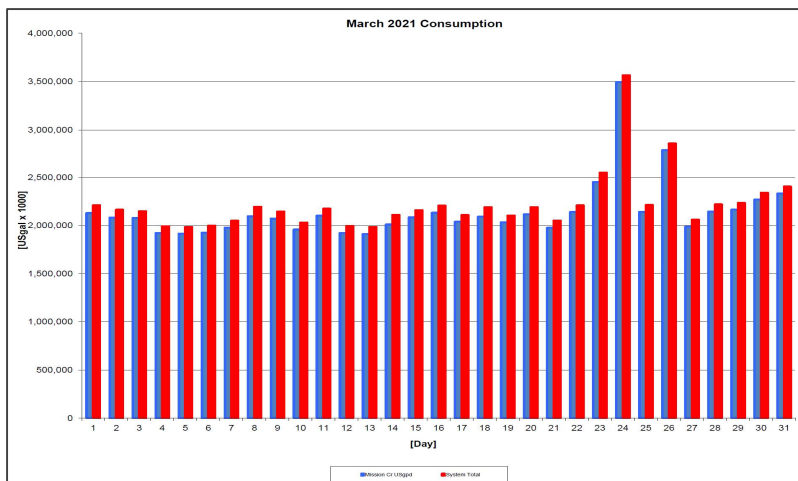


Table 1.2 - March 2021 - Daily Consumption Report

Year	Mission Cr	Well #4	Well #5	System Total	System Total
2021	Usgpd	Usgpd	Usgpd	Usgpd	ML/Day
1-Mar	2,128,355	81,000	0.0	2,209,355	8.36
2-Mar	2,079,641	83,000	0.0	2,162,641	8.19
3-Mar	2,077,369	70,000	0.0	2,147,369	8.13
4-Mar	1,921,217	69,000	0.0	1,990,217	7.53
5-Mar	1,914,507	69,000	0.0	1,983,507	7.51
6-Mar	1,924,255	73,000	0.0	1,997,255	7.56
7-Mar	1,976,112	72,000	0.0	2,048,112	7.75
8-Mar	2,093,959	99,000	0.0	2,192,959	8.30
9-Mar	2,071,610	72,000	0.0	2,143,610	8.11
10-Mar	1,956,643	73,000	0.0	2,029,643	7.68
11-Mar	2,101,198	72,000	0.0	2,173,198	8.23
12-Mar	1,921,455	72,000	0.0	1,993,455	7.55
13-Mar	1,911,522	72,000	0.0	1,983,522	7.51
14-Mar	2,009,319	100,000	0.0	2,109,319	7.98
15-Mar	2,085,215	73,000	0.0	2,158,215	8.17
16-Mar	2,131,340	74,000	0.0	2,205,340	8.35
17-Mar	2,038,061	69,000	0.0	2,107,061	7.98
18-Mar	2,090,314	99,000	0.0	2,189,314	8.29
19-Mar	2,031,430	71,000	0.0	2,102,430	7.96
20-Mar	2,115,225	74,000	0.0	2,189,225	8.29
21-Mar	1,974,739	75,000	0.0	2,049,739	7.76
22-Mar	2,138,393	70,000	0.0	2,208,393	8.36
23-Mar	2,450,195	98,000	0.0	2,548,195	9.64
24-Mar	3,494,441	71,000	0.0	3,565,441	13.50
25-Mar	2,140,639	71,000	0.0	2,211,639	8.37
26-Mar	2,791,400	68,000	0.0	2,859,400	10.82
27-Mar	1,986,996	72,000	0.0	2,058,996	7.79
28-Mar	2,144,126	74,000	0.0	2,218,126	8.40
29-Mar	2,163,331	70,000	0.0	2,233,331	8.45
30-Mar	2,268,286	70,000	0.0	2,338,286	8.85
31-Mar	2,331,371	72,000	0.0	2,403,371	9.10
Totals Usgpd	66,462,664	2,276,000	0	68,738,664	260.18
Totals ML	251.56	8.61	0.00	260.18	
Avg's	2,137,710	8.09		2,213,576	8.38
Max	3,494,441	13.23		3,565,441	13.50
Min	1,911,522	7.24		1,983,507	7.51

2.0 RAW WATER QUALITY - BACTERIOLOGICAL MONITORING

Raw water samples were taken at three points at BMID settling ponds before chlorination

Samples were taken at the Distribution Intake's Point of Disinfection and at the Mission Creek raw water Point of Diversion and at Stevens Pond outlet (point halfway between WTP Outlet and Distribution Intake).

Samples from the previous month are also provided to show a two-month trend

The WTP lowers colour, turbidity and particle counts in the raw water. The *E.Coli* readings are consistent with the reduction in those other parameters. The *E.Coli* readings confirm the WTP's effectiveness in reducing raw water quality risks with coagulation, flocculation, and sedimentation process followed by settling times across Stevens and Hadden Reservoirs.

Figure 2.1 - Raw Water *E.Coli* Readings (CARO Lab results) February 2021 - March 2021

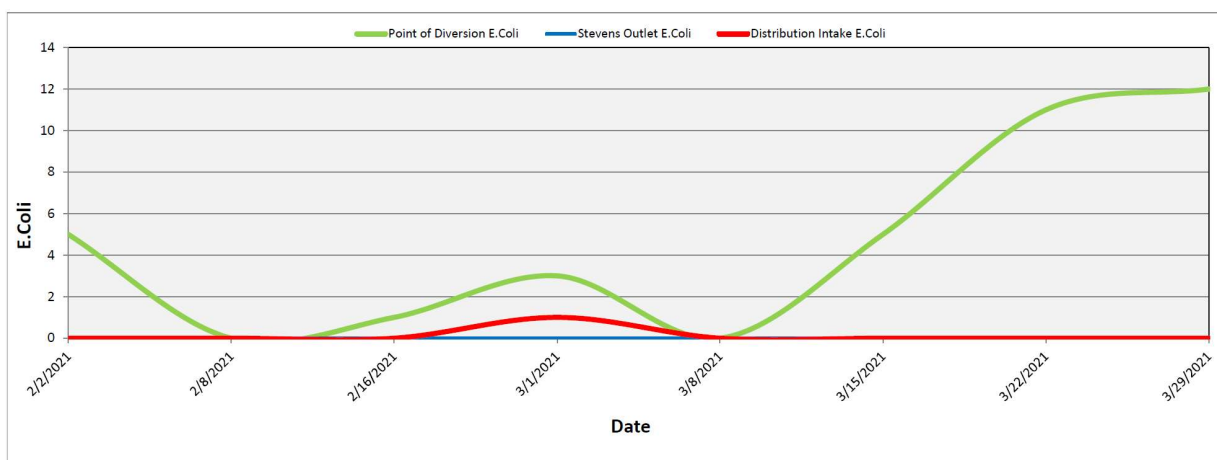


Table 2.1 - *E.Coli* Readings (CARO Labs)

Date	Point of Diversion E.Coli	Stevens Outlet E.Coli	Distribution Intake E.Coli
2-Feb-21	5	0	0
8-Feb-21	0	0	0
16-Feb-21	1	0	0
1-Mar-21	3	0	1
8-Mar-21	0	0	0
15-Mar-21	5	0	0
22-Mar-21	11	0	0
29-Mar-21	12	0	0

Stevens or WTP Intake (Raw) - Sampling of raw water at intake from Mission Creek

Stevens Outlet (Raw) - Sampling point after exiting 142,000 m³ 1st upper balancing reservoir (Stevens Res.)

Hadden Outlet (Raw) - Sampling point after exiting 75,000 m³ 2nd lower balancing reservoir (Hadden Res.)
 (Hadden Outlet = Distribution Intake - Point of Disinfection)

3.0 RAW AND TREATED WATER TURBIDITY

Through March 2021, turbidity for the Mission Creek source was measured at Booster Station No. 1 on Gallagher’s Road, which is the approximate location of the first-customer. The highest turbidity level recorded at this location was 0.74 NTU on March 23, 2021.

The distribution intake is where the water leaves Hadden Reservoir. Turbidity levels are greatly reduced through the settling process as Mission Creek treated water makes its way through the reservoirs.

Figure 3.1 – Daily Turbidity Readings (Distribution Intake and Booster Station 1)

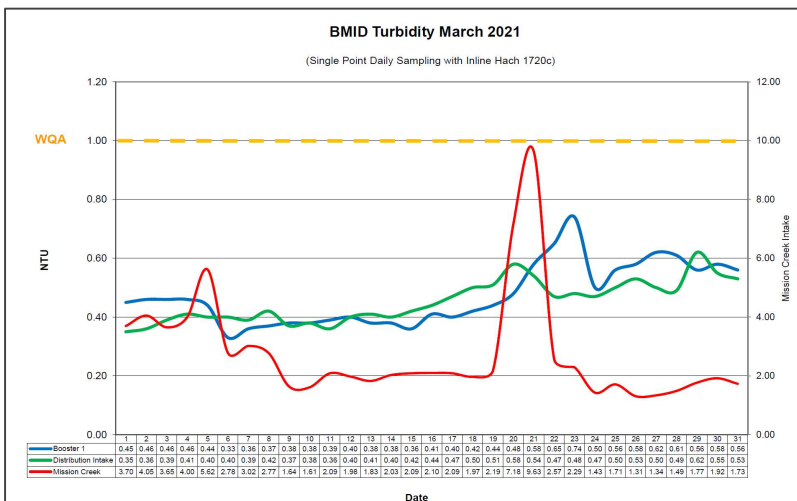


Table 3.1 - Daily Monitoring Record – Turbidity at Distribution Intake & Bst Stn 1

Date	Mission Creek Intake Daily Average [NTU]	Distribution Intake Daily Average NTU	Booster#1- First User Daily Average NTU
1	3.70	0.35	0.45
2	4.05	0.36	0.46
3	3.65	0.39	0.46
4	4.00	0.41	0.46
5	5.62	0.40	0.44
6	2.78	0.40	0.33
7	3.02	0.39	0.36
8	2.77	0.42	0.37
9	1.64	0.37	0.38
10	1.61	0.38	0.38
11	2.09	0.36	0.39
12	1.98	0.40	0.40
13	1.83	0.41	0.38
14	2.03	0.40	0.38
15	2.09	0.42	0.36
16	2.10	0.44	0.41
17	2.09	0.47	0.40
18	1.97	0.50	0.42
19	2.19	0.51	0.44
20	7.18	0.58	0.48
21	9.63	0.54	0.58
22	2.57	0.47	0.65
23	2.29	0.48	0.74
24	1.43	0.47	0.50
25	1.71	0.50	0.56
26	1.31	0.53	0.58
27	1.34	0.50	0.62
28	1.49	0.49	0.61
29	1.77	0.62	0.56
30	1.92	0.55	0.58
31	1.73	0.53	0.56
AVG	2.76	0.45	0.47

4.0 CHLORINE CONTACT TIME

Temperature, pH, peak flow and chlorine residual levels are recorded to determine the CT levels that are required to provide 3 log inactivation of *Giardia*. Chlorine Contact times exceeded the CT levels required to provide 3 log (99.9%) inactivation of *Giardia Lamblia* throughout the month of March, 2021.

Figure 4.1 - CT Trending – BMID Mission Creek Source – March 2021

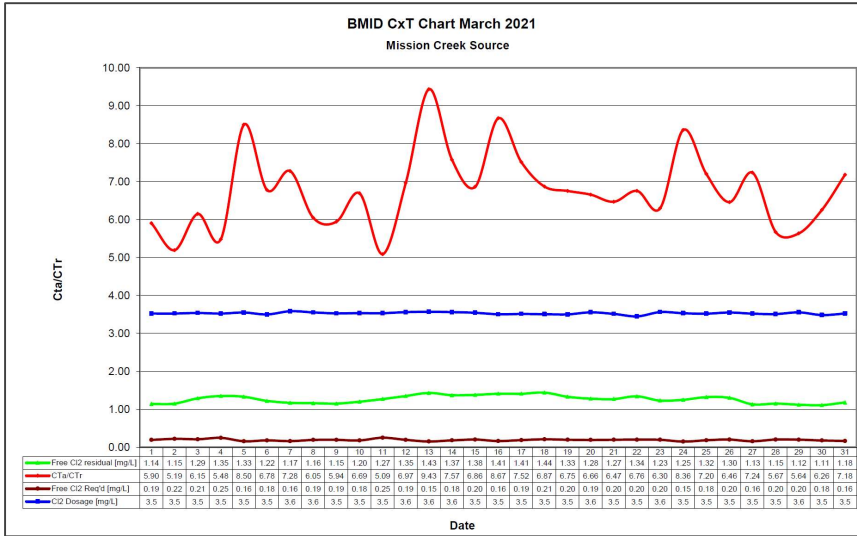


Table 4.2 - CT Table – Mission Creek Source

BMID March 2021 Mission Creek Source													
DATE	pH (Average)	TEMP (Present) [°C]	PEAK FLOW [Usgpm]	Free Cl2 residual [mg/L]	CT achieved	CT req'd	CTa/CTr	Free Cl2 Req'd [mg/L]	Cl2 Dosage [mg/L]	VOLUME TOTAL [USgal]	TIME [mins]	FLOW Daily Average [USGPM]	CL2 DOSAGE Average [PPD]
March 1	8.19	6.5	2292	1.14	1317.9	223.2	5.90	0.19	3.5	2649600	1156	1493	63.2
2	8.19	6.1	2553	1.15	1193.3	229.8	5.19	0.22	3.5	2649600	1038	1464	62.0
3	8.20	6.4	2420	1.29	1412.6	229.7	6.15	0.21	3.5	2649600	1095	1455	61.9
4	8.22	6.4	2803	1.35	1276.1	232.8	5.48	0.25	3.5	2649600	945	1356	57.4
5	8.24	6.9	1835	1.33	1919.9	225.8	8.50	0.16	3.5	2649600	1444	1346	57.4
6	8.19	6.4	2100	1.22	1539.2	227.1	6.78	0.18	3.5	2649600	1262	1371	57.7
7	8.19	6.8	1941	1.17	1597.2	219.5	7.28	0.16	3.6	2649600	1365	1374	59.2
8	8.19	6.4	2256	1.16	1362.7	225.3	6.05	0.19	3.6	2649600	1175	1466	62.6
9	8.19	5.9	2200	1.15	1385.0	233.0	5.94	0.19	3.5	2649600	1204	1457	61.8
10	8.19	5.3	1943	1.20	1636.2	244.4	6.69	0.18	3.5	2649600	1363	1377	58.5
11	8.19	5.1	2645	1.27	1272.0	250.0	5.09	0.25	3.5	2649600	1002	1477	62.7
12	8.19	4.9	2007	1.35	1781.8	255.8	6.97	0.19	3.6	2649600	1320	1346	57.6
13	8.19	8.1	1943	1.43	1949.8	206.7	9.43	0.15	3.6	2649600	1363	1338	57.4
14	8.19	8.5	2400	1.37	1512.6	199.7	7.57	0.18	3.6	2649600	1104	1458	62.4
15	8.16	7.8	2563	1.38	1426.6	207.8	6.86	0.20	3.5	2649600	1034	1498	63.8
16	8.18	7.0	1942	1.41	1923.3	221.8	8.67	0.16	3.5	2649600	1364	1380	58.1
17	8.20	7.4	2289	1.41	1632.3	217.2	7.52	0.19	3.5	2649600	1158	1478	62.4
18	8.19	8.0	2666	1.44	1431.1	208.3	6.87	0.21	3.5	2649600	994	1434	60.4
19	8.18	8.3	2596	1.33	1357.3	201.0	6.75	0.20	3.5	2649600	1021	1412	59.4
20	8.17	8.2	2541	1.28	1334.8	200.5	6.66	0.19	3.6	2649600	1043	1475	63.0
21	8.15	8.2	2614	1.27	1287.4	199.0	6.47	0.20	3.5	2649600	1014	1399	59.1
22	8.17	8.1	2584	1.34	1373.8	203.3	6.76	0.20	3.5	2649600	1025	1534	63.6
23	8.18	7.7	2500	1.23	1303.4	207.0	6.30	0.20	3.6	2649600	1060	1692	72.4
24	8.20	8.5	2004	1.25	1652.5	197.6	8.36	0.15	3.5	2649600	1322	1427	60.6
25	8.21	8.8	2480	1.32	1410.4	195.8	7.20	0.18	3.5	2649600	1068	1508	63.8
26	8.21	8.4	2655	1.30	1297.4	200.9	6.46	0.20	3.5	2649600	998	1491	63.6
27	8.22	8.4	2097	1.13	1427.8	197.3	7.24	0.16	3.5	2649600	1264	1408	59.6
28	8.22	9.3	2890	1.15	1054.2	185.9	5.67	0.20	3.5	2649600	917	1515	63.9
29	8.23	8.2	2626	1.12	1129.9	200.5	5.64	0.20	3.6	2649600	1009	1508	64.4
30	8.23	9.8	2624	1.11	1120.8	179.2	6.26	0.18	3.5	2649600	1010	1607	67.3
31	8.24	11.1	2626	1.18	1190.4	165.8	7.18	0.16	3.5	2649600	1009	1632	69.1
Averages	8.20	7.51	2375	1.27	1333.6	212.6	6.75	0.19	3.5				

5.0 ULTRAVIOLET DISINFECTION

Total Water Treated: 251,588.6 m³ 100.0%
 On-Spec Water: 251,588.6 m³ 100.0%
 Off-Spec Water: 0.0 m³ 0.0%

Average monthly chlorine residual before UV Treatment was 1.04 mg/L
 The average monthly chlorine residual after UV treatment and re-chlorination was 1.36 mg/L.

Figure 5.1 - UV Disinfection – BMID Mission Creek Source – March 2021

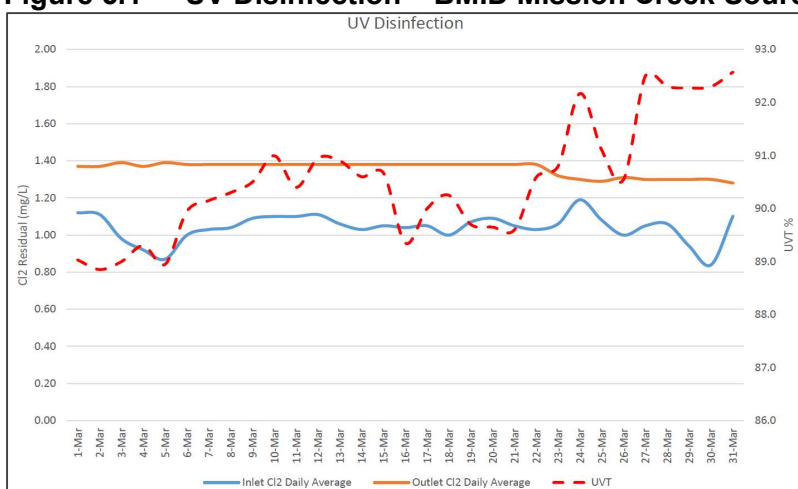


Table 5.2 - UV Disinfection Table – Mission Creek Source

Date	Inlet Cl2 Daily mg/L	Outlet Cl2 Daily mg/L	UVT % T	In Spec Water Volume Cubic Meters	Off Spec Water Volume Cubic Meters	Off Spec % of Water Percentage
1-Mar	1.12	1.37	89.0	8056.7	0	0.00%
2-Mar	1.11	1.37	88.9	7872.3	0	0.00%
3-Mar	0.98	1.39	89.0	7863.7	0	0.00%
4-Mar	0.92	1.37	89.3	7272.6	0	0.00%
5-Mar	0.87	1.39	89.0	7247.2	0	0.00%
6-Mar	1.00	1.38	90.0	7284.1	0	0.00%
7-Mar	1.03	1.38	90.2	7480.4	0	0.00%
8-Mar	1.04	1.38	90.3	7926.5	0	0.00%
9-Mar	1.09	1.38	90.5	7841.9	0	0.00%
10-Mar	1.10	1.38	91.0	7406.7	0	0.00%
11-Mar	1.10	1.38	90.4	7953.9	0	0.00%
12-Mar	1.11	1.38	91.0	7273.5	0	0.00%
13-Mar	1.06	1.38	90.9	7235.9	0	0.00%
14-Mar	1.03	1.38	90.6	7606.1	0	0.00%
15-Mar	1.05	1.38	90.7	7893.4	0	0.00%
16-Mar	1.04	1.38	89.4	8068.0	0	0.00%
17-Mar	1.05	1.38	90.0	7714.9	0	0.00%
18-Mar	1.00	1.38	90.3	7912.7	0	0.00%
19-Mar	1.07	1.38	89.7	7689.8	0	0.00%
20-Mar	1.09	1.38	89.7	8007.0	0	0.00%
21-Mar	1.05	1.38	89.6	7475.2	0	0.00%
22-Mar	1.03	1.38	90.6	8094.7	0	0.00%
23-Mar	1.06	1.32	90.8	9275.0	0	0.00%
24-Mar	1.19	1.30	92.2	13227.9	0	0.00%
25-Mar	1.08	1.29	91.1	8103.2	0	0.00%
26-Mar	1.00	1.31	90.6	10566.6	0	0.00%
27-Mar	1.05	1.30	92.5	7521.6	0	0.00%
28-Mar	1.06	1.30	92.3	8116.4	0	0.00%
29-Mar	0.94	1.30	92.3	8189.1	0	0.00%
30-Mar	0.84	1.30	92.3	8586.4	0	0.00%
31-Mar	1.10	1.28	92.6	8825.2	0	0.00%
Average	1.04	1.36	90.5	Total 251588.6	0	0.000%

6.0 WATER DISTRIBUTION SAMPLING (TREATED)

Third Party Analysis (CARO Analytical Services)

- Samples taken once per week at ten locations around the BMID service area
- 31 samples were found to be absent of Coliforms.
- 31 samples were found to be absent of *E. Coli*.

Table 6.1 - CARO Independent Lab Testing – Total Coliforms – E.Coli

Date	2021 Belgo Rd		Booster 1		Elison Blow-Off		Elison School		3976 Highway 97		Prospect Reservoir		Tower Reservoir		Well #4		Kirschner Res		Pearson School	
	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli
2-Feb-21	0	0	0	0	-	-	-	-	-	-	0	0	-	-	0	0	0	0	0	0
8-Feb-21	-	-	0	0	0	0	0	0	0	0	-	-	0	0	0	0	-	-	0	0
16-Feb-21	0	0	0	0	-	-	-	-	-	-	0	0	-	-	0	0	0	0	0	0
22-Feb-21	-	-	0	0	0	0	0	0	0	0	-	-	0	0	0	0	-	-	-	-
1-Mar-21	0	0	0	0	-	-	-	-	-	-	0	0	-	-	0	0	0	0	0	0
8-Mar-21	-	-	0	0	0	0	0	0	0	0	-	-	0	0	0	0	-	-	-	-
15-Mar-21	0	0	0	0	-	-	-	-	-	-	0	0	-	-	0	0	0	0	0	0
22-Mar-21	-	-	0	0	0	0	0	0	0	0	-	-	0	0	0	0	-	-	-	-
29-Mar-21	0	0	0	0	-	-	-	-	-	-	0	0	-	-	0	0	0	0	0	0

In-House Analysis (BMID Staff)

- Presence/Absence samples taken on a three-week cycle at seven sites around the BMID service area.
- 6 samples were found to be absent of bacteria, 1 sample was found positive for bacteria however, this is believed to be a false positive.

Table 6.2 - BMID In-house Testing – Presence Absence

Location	3/15/2021				3/22/2021				3/29/2021			
	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.
Sylvania Cres					0.79	12.6	-	X				
170 Kneller Rd					0.75	11.2	-	X				
2105 Morrison	0.59	12.2	-	X								
Staymen Rd	0.55	11.1	X	-								
260 Campion Rd									0.32	9.4	-	X
Fenwick Rd									0.22	10.4	-	X
Solly Ct					0.99	10	-	X				

- BMID Population = 25,000

RECOMMENDED TESTS

- Recommended number of samples per month = 25
(as per Guide for Canadian Drinking Water Quality)

ACTUAL TESTS

- Total tests by BMID staff (presence/absence) = 7
- Total tests sampled by BMID and tested by Caro Labs = 31
- Total tests sampled in BMID treated distribution system = 38 (One Positive Sample)