



MONTHLY REPORTING PERIOD - NOVEMBER, 2017

1. SUMMARY

The list below provides a summary of the water quality information collected by BMID in November, 2017. Documentation and figures are provided on the following pages to support this submission.

November 2017		
Source	Total (US Gals)	Total (Mega Litres)
Mission Creek	58,384,000	220.98
Well 4	0	0
Well 5	395,000	1.50
Scotty Creek (Irrigation Only)	0	0
Total	58,779,000	222.48

1. Turbidity levels at the Distribution Intake remained below 1.0 NTU for all of November. Peak turbidity at the Distribution Intake was 0.43 NTU on November 9 and 10, 2017;
2. The highest monthly turbidity level recorded at the first customer (Booster #1) was 0.52 NTU on November 1, 11, and 15, 2017 and average monthly turbidity was 0.48 NTU;
3. Mission Creek experienced normal flows for November as conditions in the watershed began to freeze for the winter;
4. BMID's Scotty Creek source, used for irrigation in the north end was shut-off for the season on September 10, 2017;
5. *E.Coli* levels at Mission Creek's Point of Diversion were average during November. The highest raw water *E.Coli* count was 36 on November 1, 2017;
6. *E.Coli* levels at the Distribution Intake had zero counts on all samples during November, 2017;
7. No *E.Coli* and no *Coliforms* were found in treated water in the distribution system through third-party analysis. In addition, no positive bacteria tests were found from the in-house presence-absence tests during routine testing;
8. A single positive presence/absence bacterial sample was found on November 7 after a customer called about coloured water in their home. Two samples were taken from their inside tap with one of the two samples turning positive for bacteria. BMID staff thoroughly flushed the homeowner's line then took two samples which were subsequently brought to CARO for testing. Additional samples were taken from PRVs 22 and 23 immediately upstream and downstream from the home and these were also analyzed by CARO. All tests analyzed by CARO came back negative for both Total *Coliform* Bacterial as well as *E.Coli* Bacteria;

9. Well #5 was temporarily shut down for most of November to allow for construction of a new well on an adjacent location on the same property. The well ran for the final eight days of the month supplying domestic water to the north end of the district;
10. BMID's Water Treatment Plant was placed on stand-by on October 13. The WTP resumed operations on November 24-29 as water quality in Mission Creek was not of sufficient quality to by-pass treatment. The WTP was again placed on stand-by on November 29;

1.0 FLOWS - NOVEMBER, 2017

Maximum est. Daily Flow was on November 10, 2017 at 2,667,000 US gallons (10.09 ML)

Minimum est. Daily Flow was on November 5, 2017 at 1,520,000 US gallons (5.75 ML)

Mission Creek provided 99% of domestic flow throughout November.

Figure 1.1 - Domestic Water System Flow

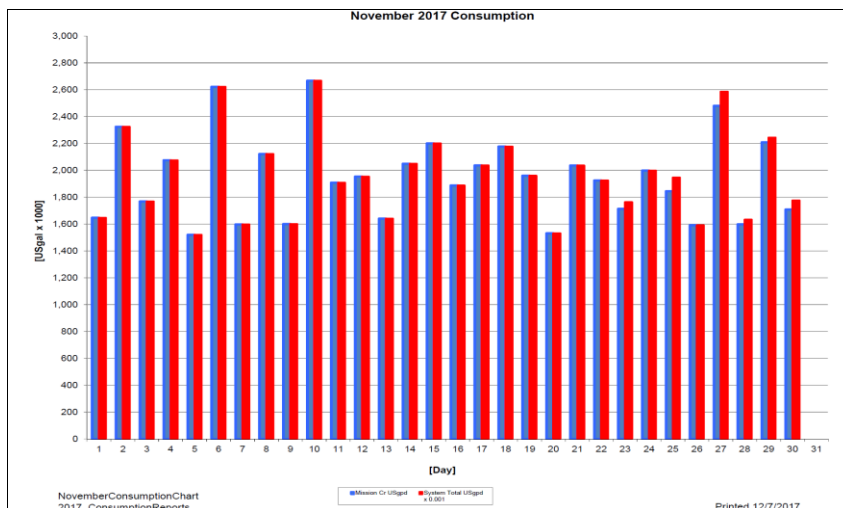


Table 1.2 - November, 2017 Daily Consumption Report

Year	Mission Cr	Well #4	Well #5	System Total	System Total
2017	Usgpd	Usgpd	Usgpd	Usgpd	ML/Day
1-Nov	1647000.0	0.0	0.0	1647000.0	6.23
2-Nov	2324000.0	0.0	0.0	2324000.0	8.80
3-Nov	1768000.0	0.0	0.0	1768000.0	6.69
4-Nov	2075000.0	0.0	0.0	2075000.0	7.85
5-Nov	1520000.0	0.0	0.0	1520000.0	5.75
6-Nov	2622000.0	0.0	0.0	2622000.0	9.92
7-Nov	1597000.0	0.0	0.0	1597000.0	6.04
8-Nov	2122000.0	0.0	0.0	2122000.0	8.03
9-Nov	1600000.0	0.0	0.0	1600000.0	6.06
10-Nov	2667000.0	0.0	0.0	2667000.0	10.09
11-Nov	1908000.0	0.0	0.0	1908000.0	7.22
12-Nov	1953000.0	0.0	0.0	1953000.0	7.39
13-Nov	1640000.0	0.0	0.0	1640000.0	6.21
14-Nov	2049000.0	0.0	0.0	2049000.0	7.76
15-Nov	2200000.0	0.0	0.0	2200000.0	8.33
16-Nov	1887000.0	0.0	0.0	1887000.0	7.14
17-Nov	2037000.0	0.0	0.0	2037000.0	7.71
18-Nov	2177000.0	0.0	0.0	2177000.0	8.24
19-Nov	1960000.0	0.0	0.0	1960000.0	7.42
20-Nov	1531000.0	0.0	0.0	1531000.0	5.79
21-Nov	2036000.0	0.0	0.0	2036000.0	7.71
22-Nov	1924000.0	0.0	0.0	1924000.0	7.28
23-Nov	1713000.0	0.0	50000.0	1763000.0	6.67
24-Nov	1998000.0	0.0	0.0	1998000.0	7.56
25-Nov	1844000.0	0.0	102000.0	1946000.0	7.37
26-Nov	1591000.0	0.0	0.0	1591000.0	6.02
27-Nov	2480000.0	0.0	105000.0	2585000.0	9.78
28-Nov	1598000.0	0.0	35000.0	1633000.0	6.18
29-Nov	2208000.0	0.0	36000.0	2244000.0	8.49
30-Nov	1708000.0	0.0	67000.0	1775000.0	6.72
Totals Usgpd	58384000.0	0.0	395000.0	58779000.0	222.48
Totals ML	220.98	0.00	1.5		
Avg's	1946133.3	7.37		1959300.0	7.42
Max	2667000.0	10.09		2667000.0	10.09
Min	1520000.0	5.75		1520000.0	5.75

2.0 RAW WATER QUALITY - BACTERIOLOGICAL MONITORING

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

Samples were taken twice per week at the Distribution Intake's Point of Disinfection and at the Mission Creek raw water Point of Diversion; one sample is taken per week 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

Figure 2.1 - E.Coli Readings (CARO Lab results) October 2017 - November 2017

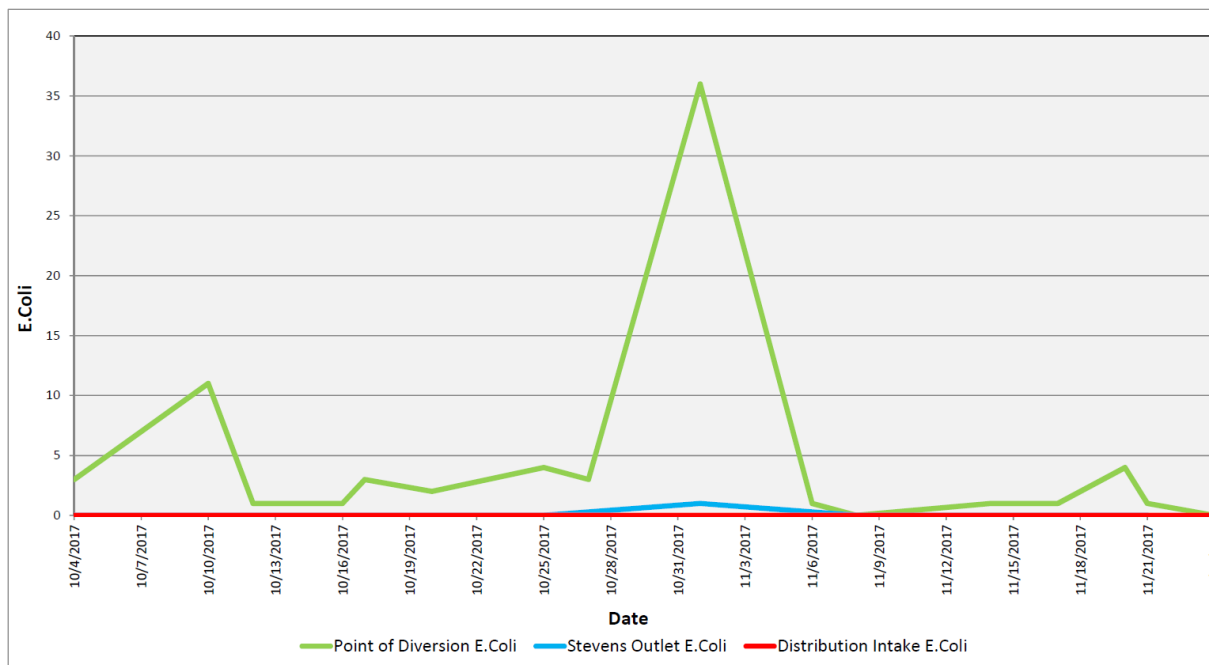


Table 2.2 - E.Coli Readings (CARO Labs)

Date	Point of Diversion E.Coli	Stevens Outlet E.Coli	Distribution Intake E.Coli
4-Oct-17	3	0	0
10-Oct-17	11	0	0
12-Oct-17	1	0	0
16-Oct-17	1	0	0
17-Oct-17	3	0	0
20-Oct-17	2	0	0
25-Oct-17	4	0	0
27-Oct-17	3	0	0
1-Nov-17	36	1	0
6-Nov-17	1	0	0
8-Nov-17	0	0	0
14-Nov-17	1	0	0
17-Nov-17	1	0	0
20-Nov-17	4	0	0
21-Nov-17	1	0	0
24-Nov-17	0	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

Turbidity for the Mission Creek source was measured at Booster Station No. 1 on Gallagher's Road, the first-customer, through November 2017. The highest turbidity recorded at this location was 0.52 NTU on November 1, 11, and 15, 2017.

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

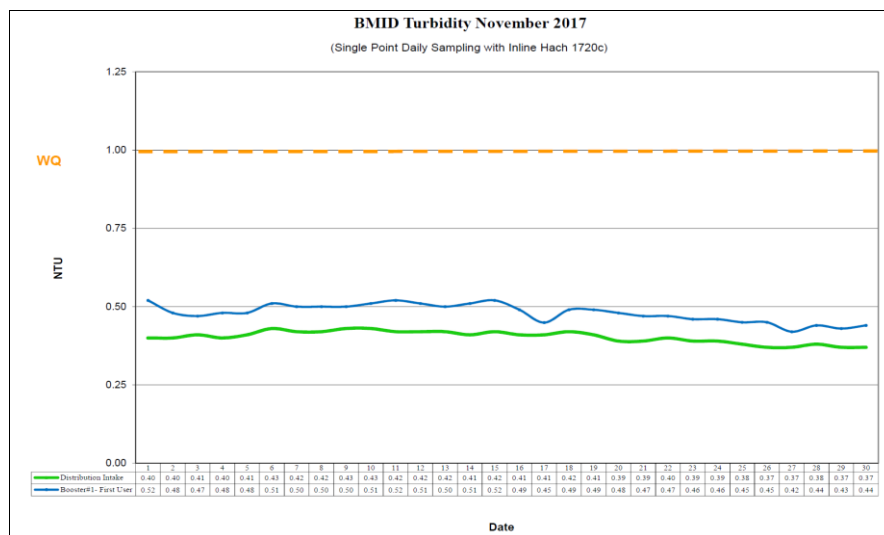


Table 3.2 - Daily Monitoring Record – Turbidity at Distribution Intake & Bst Stn 1

Turbidity Point Sampling for November 2017				
Date	Distribution Intake		Booster#1- First User	
	Sample Time	[NTU]	Sample Time	[NTU]
1	9:10 AM	0.40	8:41 AM	0.52
2	11:50 AM	0.40	9:40 AM	0.48
3	1:07 PM	0.41	8:50 AM	0.47
4	9:38 AM	0.40	8:32 AM	0.48
5	9:27 AM	0.41	7:14 AM	0.48
6	10:45 AM	0.43	10:08 AM	0.51
7	8:28 AM	0.42	7:57 AM	0.50
8	8:34 AM	0.42	7:57 AM	0.50
9	8:35 AM	0.43	7:58 AM	0.50
10	11:35 AM	0.43	11:03 AM	0.51
11	1:34 PM	0.42	11:02 AM	0.52
12	10:42 AM	0.42	10:20 AM	0.51
13	8:25 AM	0.42	7:50 AM	0.50
14	8:27 AM	0.41	7:54 AM	0.51
15	8:36 AM	0.42	7:57 AM	0.52
16	8:23 AM	0.41	7:48 AM	0.49
17	9:25 AM	0.41	8:45 AM	0.45
18	1:14 PM	0.42	11:50 AM	0.49
19	1:02 PM	0.41	12:01 PM	0.49
20	8:39 AM	0.39	7:55 AM	0.48
21	8:44 AM	0.39	8:13 AM	0.47
22	8:48 AM	0.40	8:00 AM	0.47
23	8:45 AM	0.39	7:54 AM	0.46
24	8:35 AM	0.39	7:55 AM	0.46
25	9:08 AM	0.38	8:46 AM	0.45
26	6:16 AM	0.37	5:47 AM	0.45
27	11:45 AM	0.37	11:06 AM	0.42
28	8:34 AM	0.38	7:46 AM	0.44
29	8:00 AM	0.37	9:15 AM	0.43
30	8:23 AM	0.37	7:47 AM	0.44
AVG		0.40		0.48

4.0 CHLORINE CONTACT TIME

Temperature, pH, current 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 Lambdia* throughout the month of November, 2017.

Figure 4.1 - CT Trending – BMID Mission Creek Source – November 2017

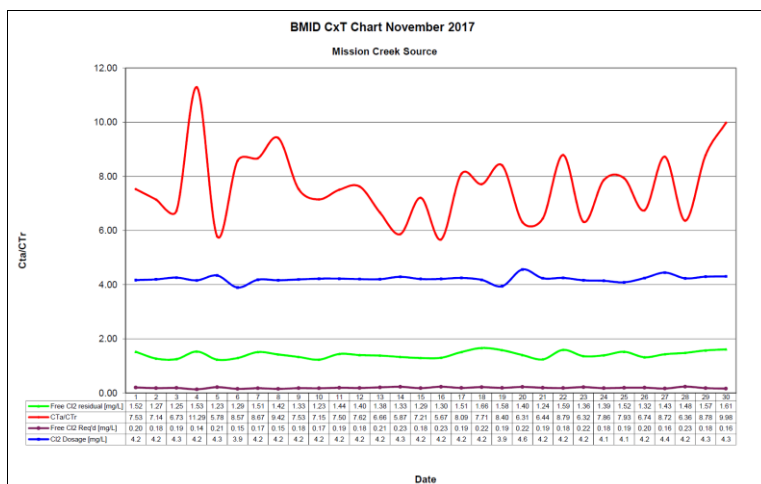


Table 4.2 - CT Table – Mission Creek Source

BMID November 2017 Mission Creek Source													
DATE	pH (highest)	TEMP (lowest)	PEAK FLOW	Free Cl ₂ residual	CT achieved	CT req'd	CTa/CTr	Free Cl ₂ Req'd	Cl ₂ Dosage	VOLUME TOTAL	TIME	FLOW PRESENT	CL ₂ DOSAGE PRESENT
November		[°C]	[USgpm]	[mg/L]				[mg/L]	[mg/L]	[USgal]	[mins]	[USGPM]	[PPD]
1	7.59	6.2	2763	1.52	1457.6	193.6	7.53	0.20	4.2	2649600	959	2336	117
2	7.60	5.8	2427	1.27	1386.5	194.2	7.14	0.18	4.2	2649600	1092	1111	56
3	7.57	5.7	2538	1.25	1305.0	194.0	6.73	0.19	4.3	2649600	1044	1094	56
4	7.55	5.5	1789	1.53	2266.0	200.7	11.29	0.14	4.2	2649600	1481	1541	77
5	7.57	5.3	2840	1.23	1147.5	198.4	5.78	0.21	4.3	2649600	933	1554	81
6	7.60	4.5	1865	1.29	1832.7	213.9	8.57	0.15	3.9	2649600	1421	1282	60
7	7.63	4.5	2087	1.51	1917.1	221.2	8.67	0.17	4.2	2649600	1270	1473	74
8	7.63	4.5	1827	1.42	2059.3	218.7	9.42	0.15	4.2	2649600	1450	1300	65
9	7.60	7.4	2668	1.33	1320.8	175.4	7.53	0.18	4.2	2649600	993	1350	68
10	7.63	4.6	2145	1.23	1519.4	212.6	7.15	0.17	4.2	2649600	1235	1814	92
11	7.62	4.6	2335	1.44	1634.0	217.8	7.50	0.19	4.2	2649600	1135	1518	77
12	7.63	4.5	2225	1.40	1667.2	218.7	7.62	0.18	4.2	2649600	1191	1465	74
13	7.64	4.6	2520	1.38	1451.0	217.8	6.66	0.21	4.2	2649600	1051	1902	96
14	7.67	4.5	2739	1.33	1286.6	219.3	5.87	0.23	4.3	2649600	967	1358	70
15	7.68	4.4	2148	1.29	1591.2	220.8	7.21	0.18	4.2	2649600	1234	2017	102
16	7.66	4.6	2796	1.30	1231.9	217.4	5.67	0.23	4.2	2649600	948	1383	70
17	7.71	4.4	2167	1.51	1846.3	228.3	8.09	0.19	4.2	2649600	1223	1763	90
18	7.72	4.4	2445	1.66	1798.9	233.3	7.71	0.22	4.2	2649600	1084	1335	67
19	7.73	4.4	2146	1.58	1950.8	232.1	8.40	0.19	3.9	2649600	1235	1921	91
20	7.73	4.3	2564	1.40	1446.7	229.4	6.31	0.22	4.6	2649600	1033	1898	104
21	7.75	4.5	2278	1.24	1442.3	224.0	6.44	0.19	4.2	2649600	1163	1434	73
22	7.74	4.5	2067	1.59	2038.2	232.0	8.79	0.18	4.2	2649600	1282	1978	101
23	7.75	4.6	2535	1.36	1421.5	224.9	6.32	0.22	4.2	2649600	1045	1480	74
24	7.77	4.4	2024	1.39	1819.6	231.5	7.86	0.18	4.1	2649600	1309	1386	69
25	7.76	4.4	2183	1.52	1844.9	232.7	7.93	0.19	4.1	2649600	1214	1222	60
26	7.79	4.5	2270	1.32	1540.7	228.4	6.74	0.20	4.2	2649600	1167	1157	59
27	7.80	6.1	2086	1.43	1816.4	208.2	8.72	0.16	4.4	2649600	1270	1554	83
28	7.88	4.3	2524	1.48	1553.6	244.2	6.36	0.23	4.2	2649600	1050	1435	73
29	7.63	4.1	2073	1.57	2006.7	228.6	8.78	0.18	4.3	2649600	1278	1395	72
30	7.60	4.1	1882	1.61	2266.7	227.2	9.98	0.16	4.3	2649600	1408	1605	83
Averages	7.67	4.81	2298.5	1.41	1662.23	218	7.62	0.19	4.21				

5.0 WATER DISTRIBUTION SAMPLING (TREATED)

Third Party Analysis (CARO Analytical Services)

- Samples taken once per week at eight 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 5.1 - CARO Independent Lab Testing – Total Coliforms – E.Coli

Date	PRV 7		Booster 1		Elison Blow-Off		Elison School		612 Adams Rd		Prospect Reservoir		Tower Reservoir		Well #5	
	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli
7-Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12-Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Oct-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12-Oct-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Oct-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Oct-17	0	0	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 ten sites around the BMID service area.
- All samples were found to be absent of both Total Coliforms and *E.Coli*.

Table 5.2 - BMID In-house Testing – Presence Absence

Location	10/2/2017				10/10/2017				10/16/2017				10/23/2017				10/30/2017			
	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.
2670 Enterprise Way	0.93	10.0	-	X									0.96	14.0	-	X				
#5 217 Franklin Rd									0.77	/	-	X								
2105 Morrison	0.97	11.0	-	X									0.38	14.0	-	X				
Pearson School					0.76	8.8	-	X									1.13	11.0	-	X
800 Galbraith Ct									0.62	/	-	X								
Staymen Rd													0.84	11.0	-	X				
PRV #10	0.74	7.5	-	X																
260 Campion Rd					0.05	14.0	-	X									0.47	15.0	-	X
Fenwick Rd									1.04	/	-	X								
2931 Belgo Rd					0.56	12.0	-	X									0.52	12.4	-	X

- BMID Population = 22,550

RECOMMENDED TESTS

- Recommended number of samples per month = 22
(as per Guide for Canadian Drinking Water Quality)

ACTUAL TESTS

- Total tests by BMID staff (presence/absence) = 15
- Total tests sampled by BMID and tested by Caro Labs = 31
- Total tests sampled in BMID treated distribution system = 46 (Zero Positive Samples)