



## MONTHLY REPORTING PERIOD - MAY, 2017

### 1. SUMMARY

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

Source	May 2017	
	Total (US Gals)	Total (Mega Litres)
Mission Creek	169,833,000	642.82
Well 4	0	0
Well 5	10,924,000	41.35
Scotty Creek (Irrigation Only)	0	0
Total	180,757,000	684.17

1. Turbidity levels at Hadden Pond Outlet, remained below 1.0 NTU for all of May. Peak turbidity at the Hadden Pond intake was 0.59 NTU on May 31, 2017;
2. The highest monthly turbidity level recorded at the first customer (Booster #1) was 0.63 NTU on May 13, 2017 and average monthly turbidity was 0.51 NTU;
3. Mission Creek witnessed periods of extreme high flows in mid-late May as temperatures in the Mission Creek watershed exceeded seasonal norms which, combined with periods of significant precipitation, resulted in near record level high flows for the month and a rise in raw water turbidity. However, BMID's WTP was able to maintain acceptable turbidity levels throughout the event;
4. BMID's Scotty Creek intake, used for irrigation water, experienced heavy run-off from the region's flooding events. As a consequence of the flooding, large amounts of rock debris filled the Scotty Creek Reservoir making this secondary intake unusable. All efforts are being undertaken to get the reservoir cleaned and on-line for the irrigation season;
5. *E.Coli* levels at the raw water intake on Mission Creek were low during May as the watershed continued its spring freshet. The highest raw water *E.Coli* count was 12 on May 26, 2017;
6. *E.Coli* levels at the point immediately prior to disinfection (Hadden Outlet) had low counts on all samples during May, with a peak count of 3 on May 29, 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 ;
8. Well #5 was used throughout May as a source for domestic and irrigation water in the north-end of the system in conjunction with Mission Creek system water as determined by usage and pressures in the area;
9. BMID's Water Treatment Plant resumed operations on March 15, 2017 as water quality in Mission Creek began to diminish due to melting conditions in the watershed which initiated the yearly spring freshet resulting in high turbidity;

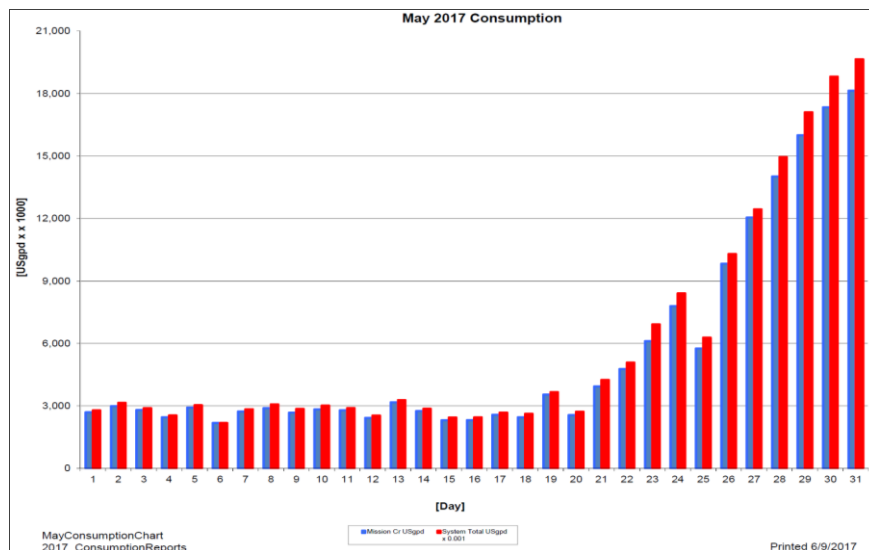
## 1.0 FLOWS - MAY, 2017

Maximum est. Daily Flow was on May 31, 2017 at 19,649,000 US gallons (74.37 ML)

Minimum est. Daily Flow was on May 6, 2017 at 2,180,000 US gallons (8.25 ML)

Mission Creek provided 96% of domestic flow throughout May.

**Figure 1.1 - Domestic Water System Flow**



**Table 1.2 - May, 2017 Daily Consumption Report**

Year	Mission Cr	Well #4	Well #5	Scotty Crk	System Total	System Total
2017	Usgpd	Usgpd	Usgpd	Usgpd	Usgpd	ML/Day
1-May	2,693,000	0	100,000.0	0	2,793,000	10.57
2-May	2,993,000	0	160,000.0	0	3,153,000	11.93
3-May	2,802,000	0	89,000.0	0	2,891,000	10.94
4-May	2,453,000	0	90,000.0	0	2,543,000	9.63
5-May	2,924,000	0	113,000.0	0	3,037,000	11.50
6-May	2,180,000	0	0.0	0	2,180,000	8.25
7-May	2,732,000	0	108,000.0	0	2,840,000	10.75
8-May	2,892,000	0	182,000.0	0	3,074,000	11.64
9-May	2,678,000	0	181,000.0	0	2,859,000	10.82
10-May	2,836,000	0	182,000.0	0	3,018,000	11.42
11-May	2,790,000	0	107,000.0	0	2,897,000	10.97
12-May	2,425,000	0	116,000.0	0	2,541,000	9.62
13-May	3,174,000	0	108,000.0	0	3,282,000	12.42
14-May	2,757,000	0	110,000.0	0	2,867,000	10.85
15-May	2,309,000	0	133,000.0	0	2,442,000	9.24
16-May	2,319,000	0	133,000.0	0	2,452,000	9.28
17-May	2,572,000	0	113,000.0	0	2,685,000	10.16
18-May	2,455,000	0	168,000.0	0	2,623,000	9.93
19-May	3,544,000	0	117,000.0	0	3,661,000	13.86
20-May	2,560,000	0	160,000.0	0	2,720,000	10.30
21-May	3,940,000	0	310,000.0	0	4,250,000	16.09
22-May	4,770,000	0	315,000.0	0	5,085,000	19.25
23-May	6,108,000	0	809,000.0	0	6,917,000	26.18
24-May	7,795,000	0	615,000.0	0	8,410,000	31.83
25-May	5,759,000	0	521,000.0	0	6,280,000	23.77
26-May	9,829,000	0	465,000.0	0	10,294,000	38.96
27-May	12,045,000	0	396,000.0	0	12,441,000	47.09
28-May	14,020,000	0	931,000.0	0	14,951,000	56.59
29-May	16,000,000	0	1,105,000.0	0	17,105,000	64.74
30-May	17,340,000	0	1,477,000.0	0	18,817,000	71.22
31-May	18,139,000	0	1,510,000.0	0	19,649,000	74.37
Totals Usgpd	169,833,000	0	10,924,000	0	180,757,000	684.17
Totals ML	642.82	0.00	41.35	0.00		
Avg's	5,478,484	20.74			5,830,871	22.07
Max	18,139,000	68.66			18,817,000	74.37
Min	2,180,000	8.25			2,180,000	8.25

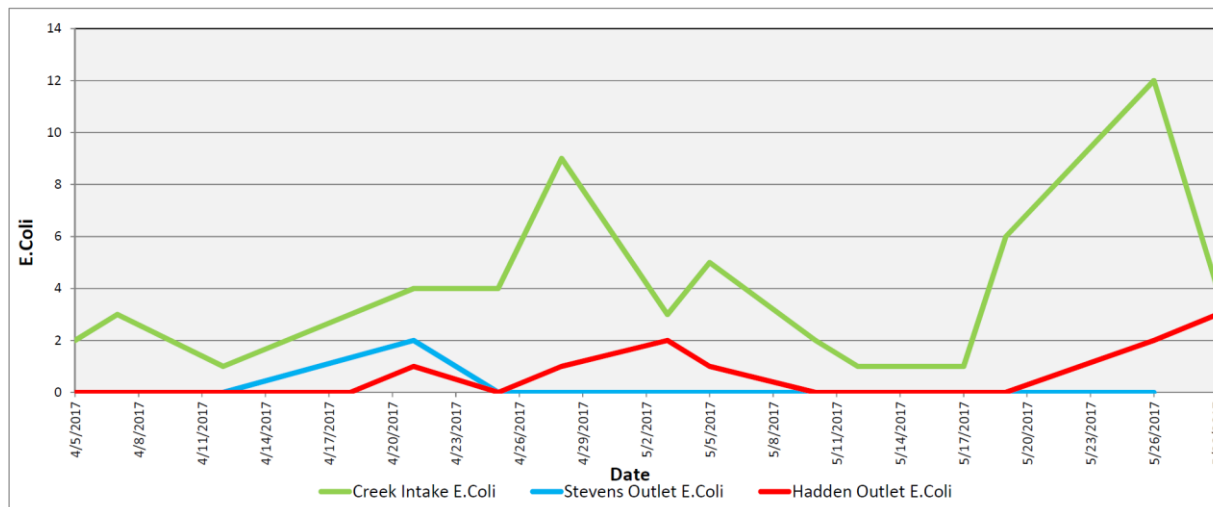
## 2.0 RAW WATER QUALITY - BACTERIOLOGICAL MONITORING

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

Samples were taken twice per week at Hadden Reservoir Outlet (point of disinfection) and at the raw water intake on Mission Creek; one sample is taken per week at Stevens (east, upstream settling basin) outlet.

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

**Figure 2.1 - E.Coli Readings (CARO Lab results) April 2017 - May 2017**



**Table 2.2 - E.Coli Readings (CARO Labs)**

Date	Creek Intake E.Coli	Stevens Outlet E.Coli	Hadden Outlet E.Coli
5-Apr-17	2	0	0
7-Apr-17	3	0	0
12-Apr-17	1	0	0
18-Apr-17	3	0	0
21-Apr-17	4	2	1
25-Apr-17	4	0	0
28-Apr-17	9	0	1
3-May-17	3	0	2
5-May-17	5	0	1
10-May-17	2	0	0
12-May-17	1	0	0
17-May-17	1	0	0
19-May-17	6	0	0
26-May-17	12	0	2
29-May-17	4	0	3

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

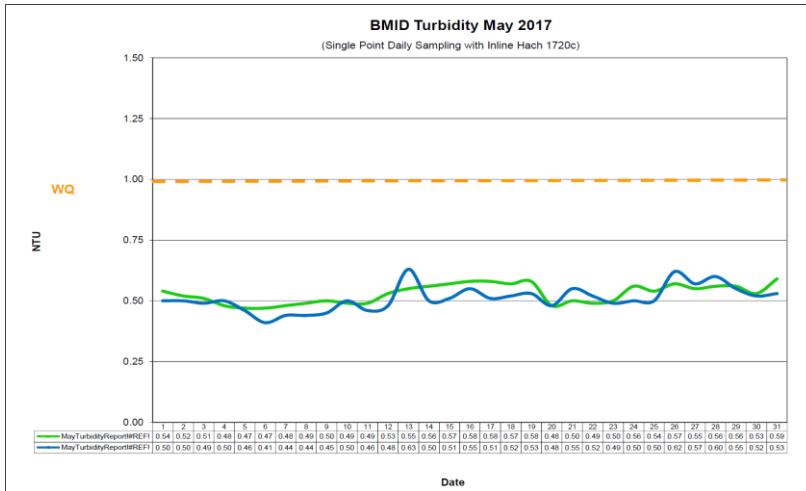
Stevens Outlet (Raw) - Sampling point after exiting 142,000 m<sup>3</sup> 1<sup>st</sup> upper balancing reservoir (Stevens Res.)

Hadden Outlet (Raw) - Sampling point after exiting 75,000 m<sup>3</sup> 2<sup>nd</sup> lower balancing reservoir (Hadden Res.)  
(Hadden Outlet = 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 May 2017. The highest turbidity recorded at this location was 0.63 NTU on May 13, 2017.

**Figure 3.1 – Daily Turbidity Readings (Hadden Outlet and Booster Station 1)**



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

Turbidity Point Sampling for May 2017				
Date	Intake		Booster#1- First User	
	Sample Time	[NTU]	Sample Time	[NTU]
1	11:34 AM	0.54	10:49 AM	0.50
2	1:32 PM	0.52	1:00 PM	0.50
3	5:49 PM	0.51	1:16 PM	0.49
4	11:25 AM	0.48	9:50 AM	0.50
5	8:25 AM	0.47	7:52 AM	0.46
6	6:32 AM	0.47	6:55 AM	0.41
7	8:10 AM	0.48	7:05 AM	0.44
8	8:41 AM	0.49	8:03 AM	0.44
9	8:17 AM	0.50	7:41 AM	0.45
10	8:41 AM	0.49	7:54 AM	0.50
11	8:24 AM	0.49	7:42 AM	0.46
12	8:38 AM	0.53	7:51 AM	0.48
13	12:07 PM	0.55	11:45 AM	0.63
14	12:12 PM	0.56	12:06 PM	0.50
15	11:59 AM	0.57	9:26 AM	0.51
16	8:24 AM	0.58	7:47 AM	0.55
17	8:32 AM	0.58	7:54 AM	0.51
18	8:25 AM	0.57	7:52 AM	0.52
19	11:52 AM	0.58	11:03 AM	0.53
20	7:58 AM	0.48	7:33 AM	0.48
21	7:45 AM	0.50	7:13 AM	0.55
22	7:02 AM	0.49	6:38 AM	0.52
23	8:41 AM	0.50	7:55 AM	0.49
24	8:36 AM	0.56	8:10 AM	0.50
25	8:28 AM	0.54	7:52 AM	0.50
26	8:36 AM	0.57	8:03 AM	0.62
27	8:45 AM	0.55	8:15 AM	0.57
28	8:27 AM	0.56	8:05 AM	0.60
29	8:48 AM	0.56	7:43 AM	0.55
30	8:54 AM	0.53	8:05 AM	0.52
31	1:51 PM	0.59	9:36 AM	0.53
AVG		0.53		0.51

### 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 Lamblia* throughout the month of May, 2017.

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

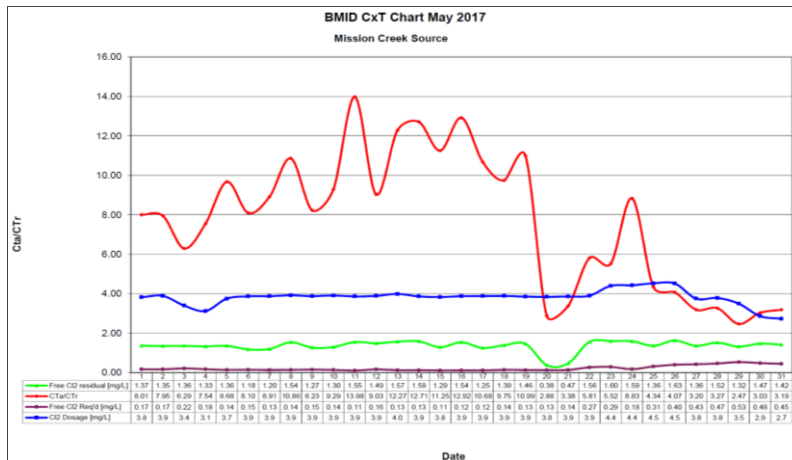


Table 4.2 - CT Table – Mission Creek Source

BMID May 2017													
Mission Creek Source													
DATE	pH	TEMP	PEAK	Free Cl <sub>2</sub>	CT	CT	CTa/CTr	Free Cl <sub>2</sub>	Cl <sub>2</sub>	VOLUME	TIME	FLOW	Cl <sub>2</sub> DOSAGE
	(highest)	(lowest)	FLOW	residual	achieved	req'd		Req'd	Dosage	TOTAL		PRESENT	PRESENT
May		[°C]	[Usgpm]	[mg/L]				[mg/L]	[mg/L]	[USgal]	[mins]	[Usgpm]	[PPD]
1	7.43	9.6	3173	1.37	1144.0	142.9	8.01	0.17	3.8	2649600	835	1763	81
2	7.42	9.6	3166	1.35	1129.8	142.1	7.95	0.17	3.9	2649600	837	2566	120
3	7.39	9.0	3917	1.36	920.0	146.2	6.29	0.22	3.4	2649600	676	2398	98
4	7.38	9.5	3326	1.33	1059.5	140.5	7.54	0.18	3.1	2649600	797	2504	94
5	7.34	10.1	2801	1.36	1286.5	133.0	9.68	0.14	3.7	2649600	946	1598	72
6	7.33	10.5	3061	1.18	1021.4	126.1	8.10	0.15	3.9	2649600	866	1183	55
7	7.32	11.3	2994	1.20	1062.0	119.2	8.91	0.13	3.9	2649600	885	1696	79
8	7.34	11.7	3098	1.54	1317.1	121.2	10.86	0.14	3.9	2649600	855	1867	88
9	7.35	12.0	3532	1.27	952.7	115.8	8.23	0.15	3.9	2649600	750	2703	126
10	7.33	11.7	3148	1.30	1094.2	117.8	9.29	0.14	3.9	2649600	842	2489	117
11	7.31	12.1	2516	1.55	1632.3	116.7	13.98	0.11	3.9	2649600	1053	1830	85
12	7.31	12.3	3819	1.49	1033.8	114.5	9.03	0.16	3.9	2649600	694	2310	108
13	7.32	11.9	2847	1.57	1461.1	119.0	12.27	0.13	4.0	2649600	931	2295	110
14	7.30	11.9	2799	1.59	1505.1	118.4	12.71	0.13	3.9	2649600	947	2131	99
15	7.29	12.1	2695	1.29	1268.3	112.7	11.25	0.11	3.8	2649600	983	1628	75
16	7.29	12.1	2728	1.54	1495.7	115.8	12.92	0.12	3.9	2649600	971	2425	113
17	7.27	11.8	2728	1.25	1214.1	113.7	10.68	0.12	3.9	2649600	971	2057	96
18	7.24	11.8	3307	1.39	1113.7	114.3	9.75	0.14	3.9	2649600	801	1776	83
19	7.22	12.2	3166	1.46	1221.9	111.1	10.99	0.13	3.9	2649600	837	2181	101
20	7.19	12.6	4008	0.38	251.2	87.4	2.88	0.13	3.8	2649600	661	2361	109
21	7.18	13.3	4310	0.47	288.9	85.6	3.38	0.14	3.9	2649600	615	2393	111
22	7.13	14.1	7479	1.56	552.7	95.1	5.81	0.27	3.9	2649600	354	3200	150
23	7.15	15.3	8672	1.60	488.9	88.5	5.52	0.29	4.4	2649600	306	5109	270
24	7.09	15.2	5478	1.59	769.1	87.1	8.83	0.18	4.4	2649600	484	4323	230
25	7.12	14.6	9257	1.36	389.3	89.7	4.34	0.31	4.5	2649600	286	4852	264
26	7.03	14.5	11826	1.63	365.2	89.7	4.07	0.40	4.5	2649600	224	6775	368
27	7.08	15.0	13126	1.36	274.5	85.9	3.20	0.43	3.8	2649600	202	9004	406
28	7.05	15.3	14579	1.52	276.2	84.6	3.27	0.47	3.8	2649600	182	11257	512
29	7.07	15.0	16635	1.32	210.2	85.2	2.47	0.53	3.5	2649600	159	9899	416
30	7.06	14.7	14591	1.47	266.9	88.1	3.03	0.48	2.9	2649600	182	11119	383
31	7.08	14.1	12820	1.42	293.5	92.0	3.19	0.45	2.7	2649600	207	8532	280

## 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		Ellison Blow-Off		Ellison 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
5-Apr-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12-Apr-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Apr-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Apr-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3-May-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10-May-17	0	0	0	0	-	-	0	0	0	0	0	0	0	0	0	0
17-May-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26-May-17	0	0	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	5/1/2017				5/8/2017				5/15/2017				5/23/2017				5/30/2017			
	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.
2670 Enterprise Way					0.6	11.6	-	X									1.09	16.2	-	X
#5 217 Franklyn Rd									0.95	12.4	-	X								
2105 Morrison Rd					0.71	8.6	-	X									1.29	14.3	-	X
654 Mayfair Ct	0.95		-	X									0.98	17.8	-	X				
800 Galbraith Ct									1.23	12.2	-	X								
1200 Belgo Rd									0.95	14.2	-	X								
PRV 10					0.72	8.2	-	X									1.09	14.1	-	X
260 Champion Rd	0.59		-	X									0.57	16.4	-	X				
2821 Fenwick Rd									0.57	16.6	-	X								
2931 Belgo Rd	0.78		-	X									1.01	22	-	X				

- BMID Population = 22,400

#### 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) = 16
- Total tests sampled by BMID and tested by Caro Labs = 31
- Total tests sampled in BMID treated distribution system = 47 (Zero positive samples)