



## MONTHLY REPORTING PERIOD - MAY, 2022

### 1. SUMMARY

The list below provides a summary of the water quality information collected by BMID in May 2022. Documentation and figures are provided on the following pages to support this submission.

Source	Total (US Gals)	Total (Mega Litres)
Mission Creek	240,296,425	909.52
Well 4	5,381,407	20.37
Well 5	16,661,730	63.06
Well 6 (Irrigation Only)	882,000	3.34
Scotty Creek (Irrigation Only)	808,843	3.06
Total	264,030,406	999.36

1. HAA testing took place on May 2 and 9 at the Pearson Rd sample station and the UV plant respectively. Both samples came back in the acceptable range for HAAs;
2. 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 continues to be monitored. It is currently stable and not moving;
3. The May 30 Kirschner Reservoir sample had background bacterial colonies present. However, there were no detectable *E.Coli* bacteria or *Total Coliform* bacteria. Subsequent resampling in June did not indicate any background colonies at this location. It is assumed that the sample in question was a result of operator error;
4. The WTP resumed operation on February 8<sup>th</sup> and remained in operation throughout May as raw water quality in Mission Creek required treatment to lower both turbidity and colour;
5. Raw water turbidity levels in Mission Creek peaked at 58.4 NTU (average daily turbidity) on May 6. Average daily raw water turbidity for May was 8.25 NTU at the Mission Creek intake;
6. Turbidity levels at the Distribution Intake (end of Hadden Reservoir) high reading was 0.59 NTU on May 30, 2022. Average clarified water turbidity for May was 0.49 NTU at the Distribution Intake at the lower end of Hadden Reservoir;
7. The highest recorded monthly turbidity level at the first customer (Booster #1) was 0.90 NTU on May 1. Average monthly turbidity at the first customer was 0.57 NTU for May;
8. The highest monthly turbidity daily average at the UV plant was 0.91 NTU on May 29. Average monthly turbidity at the UV plant was 0.54 NTU throughout May;
9. BMID's Ultraviolet Treatment Facility treated 909,621 m<sup>3</sup> of water, 537 m<sup>3</sup> of which was "Off-Spec" (0.059%). The "Off-Spec" portion of the water was caused by an instrumentation error in the on-line UVT meter during routine maintenance;

10. BMID's Scotty Creek source, used for irrigation in the north-end, resumed operations on May 27, 2022. The Scotty Creek source will remain in operation until irrigation demands reduce in the fall of 2022;
11. Well #4, used as a source for domestic water in the north-end of the distribution system during low-flow was placed on stand-by mode on May 28. Well #4 will remain in stand-by until the autumn of 2022 when system flows are reduced;
12. Well #5, used as the primary domestic water source in the north-end of the system for both irrigation and domestic consumption during the summer months, was activated on April 25 as irrigation demands in the north-end of the system increased. Well #5 will continue to operate until flows reduce in the fall;
13. Well #6, which supplies irrigation water to the twinned north-end water distribution systems, resumed operations for the summer on May 26. Well #6 will continue to operate until flows reduce later in the fall of 2022;
14. *E.Coli* levels at Mission Creek's Point-of-Diversion (creek intake prior to WTP) had normal counts for late spring. The peak count for May was the May 30<sup>th</sup> sample with a count of 30 coliforms. The average monthly *E.Coli* was 8, based on 5 samples;
15. *E.Coli* levels in the raw water at the water distribution system intake at the east end of Hadden Reservoir, immediately prior to disinfection, had low counts on all 5 samples. A peak count of 3 was sampled on May 30<sup>th</sup>. Average *E.Coli* results for the month indicated 0.8 *E.Coli* coliforms based on 5 samples. Reduction in *E.Coli* levels is credited to the clarification process and the further 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, zero positive samples were detected by BMID's in-house presence/absence testing throughout May;

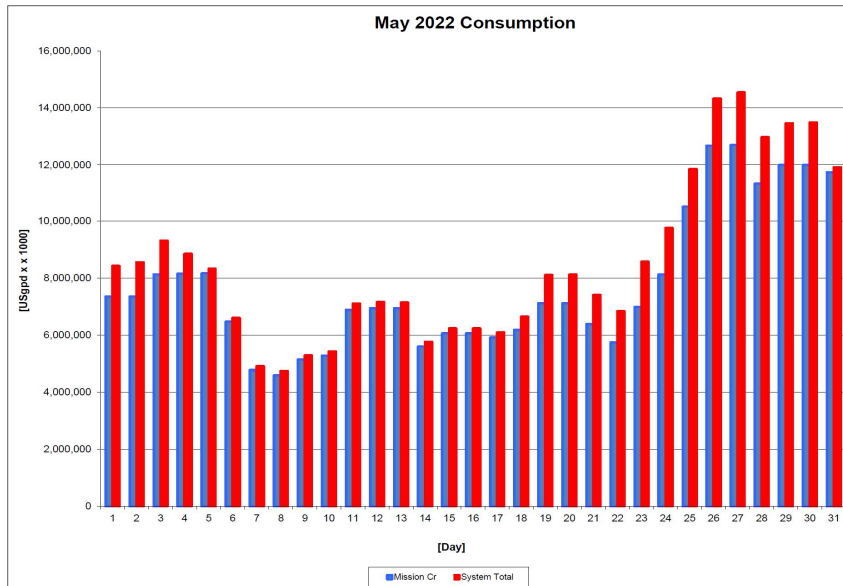
## 1.0 FLOWS - MAY, 2022

The Maximum Daily Flow was on May 27, at 14,541,913 US gallons (55.04 ML)

The Minimum Daily Flow was on May 8, at 4,733,697 US gallons (17.62 ML)

Mission Creek provided 91% of domestic and irrigation flow throughout May.

**Figure 1.1 - Domestic Water System Flow**



**Table 1.2 - May 2022 - Daily Consumption Report**

Year	Mission Cr	Well #4	Well #5	Well #6	Scotty Crk	System Total	System Total
2022	Usgpd	Usgpd	Usgpd	Usgpd	Usgpd	Usgpd	ML/Day
1-May	7,343,136	261,000	813,115	-	-	8,417,251	31.86
2-May	7,343,348	267,076	934,633	-	-	8,545,057	32.34
3-May	8,122,972	227,186	954,446	-	-	9,304,604	35.22
4-May	8,153,642	232,734	457,278	-	-	8,843,654	33.47
5-May	8,153,907	166,163	-	-	-	8,320,069	31.49
6-May	6,469,625	127,330	-	-	-	6,596,955	24.97
7-May	4,770,101	134,991	-	-	-	4,905,092	18.57
8-May	4,585,762	147,935	-	-	-	4,733,697	17.92
9-May	5,134,817	147,935	-	-	-	5,282,752	20.00
10-May	5,274,564	149,520	-	-	-	5,424,084	20.53
11-May	6,882,077	219,261	-	-	-	7,101,338	26.88
12-May	6,933,987	219,261	-	-	-	7,153,248	27.08
13-May	6,934,172	202,090	-	-	-	7,136,262	27.01
14-May	5,593,182	164,314	-	-	-	5,757,495	21.79
15-May	6,059,049	173,031	-	-	-	6,232,080	23.59
16-May	6,059,181	173,031	-	-	-	6,232,212	23.59
17-May	5,910,267	178,315	-	-	-	6,088,582	23.05
18-May	6,183,316	188,882	267,868	-	-	6,640,065	25.13
19-May	7,118,009	189,410	793,038	-	-	8,100,457	30.66
20-May	7,118,194	191,259	808,624	-	-	8,118,077	30.73
21-May	6,381,735	185,183	832,664	-	-	7,399,582	28.01
22-May	5,739,744	240,659	851,156	-	-	6,831,559	25.86
23-May	6,983,572	267,076	1,312,397	-	-	8,563,044	32.41
24-May	8,120,700	272,888	1,354,400	-	-	9,747,987	36.90
25-May	10,489,927	253,339	1,105,287	-	-	11,848,553	44.85
26-May	12,672,886	255,188	1,061,963	341,000	-	14,331,037	54.24
27-May	12,695,895	146,350	1,223,371	341,000	135,297	14,541,913	55.04
28-May	11,338,024	-	1,265,638	200,000	167,712	12,971,375	49.10
29-May	11,994,016	-	1,299,981	-	168,135	13,462,132	50.95
30-May	11,994,360	-	1,325,869	-	167,645	13,487,874	51.05
31-May	11,742,260	-	-	-	170,054	11,912,314	45.09
Totals Usgpd	240,296,425	5,381,407	16,661,730	882,000	808,843	264,030,406	999.36
Totals ML	909.52	20.37	63.06	3.34	3.06	999	
Avg's	7,751,498	29.34				8,517,110	32.24
Max	12,695,895	48.05				14,541,913	55.04
Min	4,585,762	17.36				4,733,697	17.92

## 2.0 RAW WATER QUALITY - BACTERIOLOGICAL MONITORING

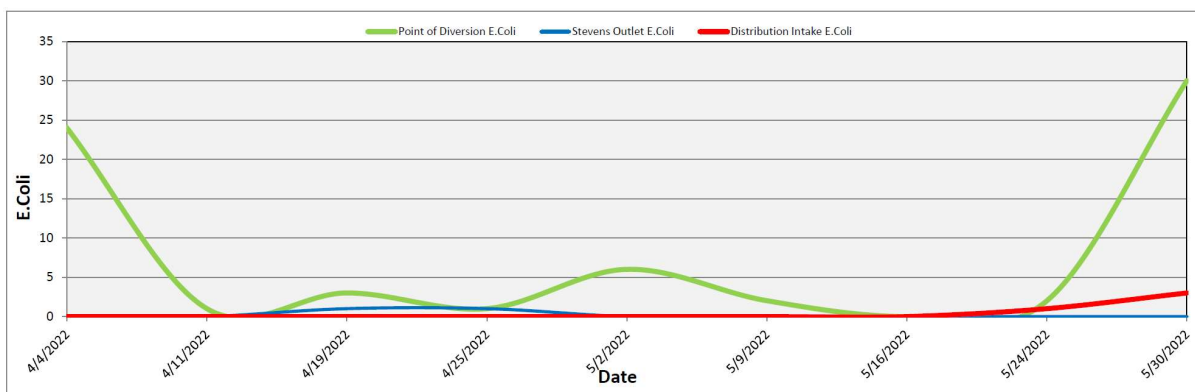
Raw water samples were taken at three points at BMID settling ponds before chlorination

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) April 2022 - May 2022**



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

Date	Point of Diversion E. Coli	Stevens Outlet E. Coli	Distribution Intake E. Coli
4-Apr-22	24	0	0
11-Apr-22	1	0	0
19-Apr-22	3	1	0
25-Apr-22	1	1	0
2-May-22	6	0	0
9-May-22	2	0	0
16-May-22	0	0	0
24-May-22	2	0	1
30-May-22	30	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.)

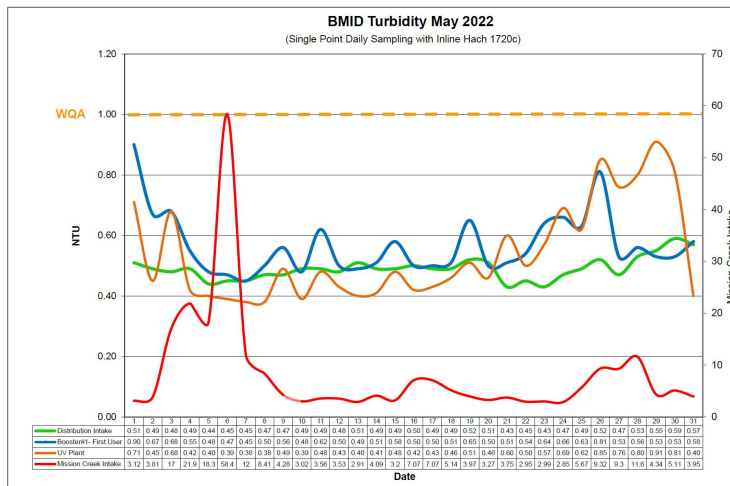
Hadden Outlet (Raw) - Sampling point after exiting 75,000 m<sup>3</sup> 2<sup>nd</sup> lower balancing reservoir (Hadden Res.)  
(Hadden Outlet = Distribution Intake - Point of Disinfection)

### 3.0 RAW AND TREATED WATER TURBIDITY

Through May 2022, 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 0.90 NTU on May 1, 2022.

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**

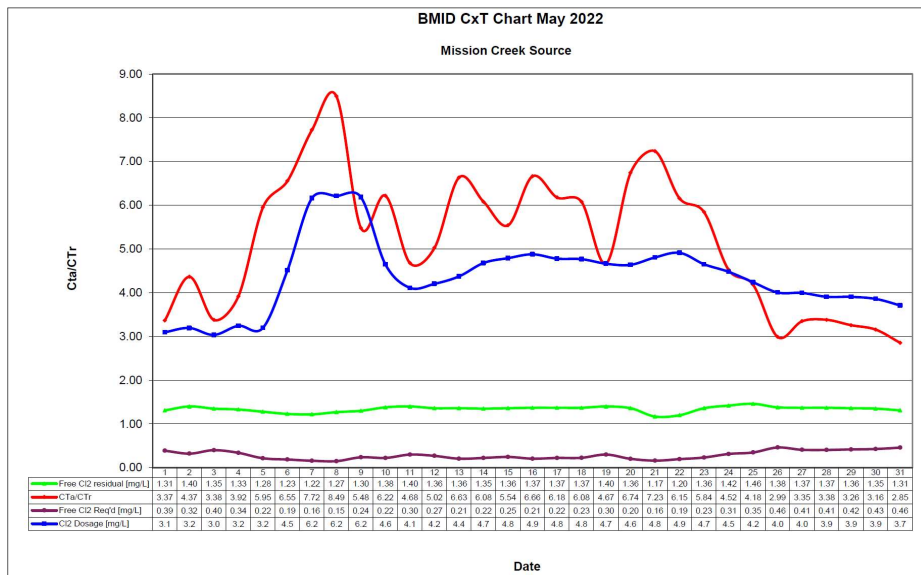
Date	Mission Creek Intake Daily Average [NTU]	Distribution Intake Daily Average [NTU]	Booster#1- First User Daily Average [NTU]	UV Plant Daily Average [NTU]
1	3.12	0.51	0.90	0.71
2	3.81	0.49	0.67	0.45
3	17	0.48	0.68	0.68
4	21.9	0.49	0.55	0.42
5	18.3	0.44	0.48	0.40
6	58.4	0.45	0.47	0.39
7	12	0.45	0.45	0.38
8	8.41	0.47	0.50	0.38
9	4.28	0.47	0.56	0.49
10	3.02	0.49	0.48	0.39
11	3.56	0.49	0.62	0.48
12	3.53	0.48	0.50	0.43
13	2.91	0.51	0.49	0.40
14	4.09	0.49	0.51	0.41
15	3.2	0.49	0.58	0.48
16	7.07	0.50	0.50	0.42
17	7.07	0.49	0.50	0.43
18	5.14	0.49	0.51	0.46
19	3.97	0.52	0.65	0.51
20	3.27	0.51	0.50	0.46
21	3.75	0.43	0.51	0.60
22	2.95	0.45	0.54	0.50
23	2.99	0.43	0.64	0.57
24	2.85	0.47	0.66	0.69
25	5.67	0.49	0.63	0.62
26	9.32	0.52	0.81	0.85
27	9.3	0.47	0.53	0.76
28	11.6	0.53	0.56	0.80
29	4.34	0.55	0.53	0.91
30	5.11	0.59	0.53	0.81
31	3.95	0.57	0.58	0.40
AVG	8.25	0.49	0.57	0.54



## 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 May, 2022.

**Figure 4.1 - CT Trending – BMID Mission Creek Source – May 2022**



**Table 4.2 - CT Table – Mission Creek Source**

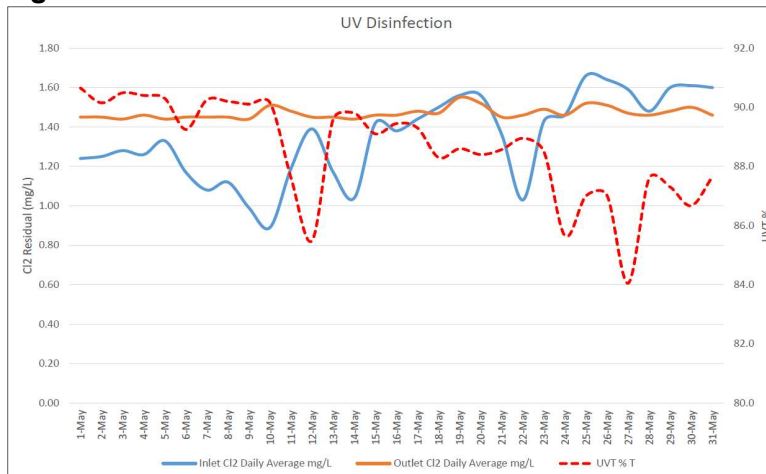
BMID May 2022													
Mission Creek Source													
DATE	pH	TEMP	PEAK	Free Cl <sub>2</sub>	CT	CT	CTa/CTr	Free Cl <sub>2</sub>	Cl <sub>2</sub>	VOLUME	TIME	FLOW	CL <sub>2</sub> DOSAGE
	(Average)	(Present)	FLOW	residual	achieved	req'd		Req'd	Dosage	TOTAL		Daily Average	Average
May		[°C]	[Usgpm]	[mg/L]				[mg/L]	[mg/L]	[USgal]	[mins]	[Usgpm]	[PPD]
1	7.42	11.7	8464	1.31	410.1	121.8	3.37	0.39	3.1	2649600	313	5183	193
2	7.41	12.4	7275	1.40	509.9	116.8	4.37	0.32	3.2	2649600	364	4961	190
3	7.39	12.3	9114	1.35	392.5	116.1	3.38	0.40	3.0	2649600	291	5738	209
4	7.36	12.0	7687	1.33	458.4	117.0	3.92	0.34	3.2	2649600	345	5754	224
5	7.30	14.7	6039	1.28	561.6	94.4	5.95	0.22	3.2	2649600	439	4565	175
6	7.25	14.2	5215	1.23	625.0	95.3	6.55	0.19	4.5	2649600	508	3360	182
7	7.30	14.5	4406	1.22	733.6	95.0	7.72	0.16	6.2	2649600	601	3249	241
8	7.26	14.2	4121	1.27	816.5	96.2	8.49	0.15	6.2	2649600	643	3218	240
9	7.27	12.7	5849	1.30	588.9	107.5	5.48	0.24	6.2	2649600	453	3630	270
10	7.32	12.4	5215	1.38	701.2	112.8	6.22	0.22	4.6	2649600	508	3709	207
11	7.24	12.4	7228	1.40	513.2	109.7	4.68	0.30	4.1	2649600	367	4850	240
12	7.24	12.5	6610	1.36	545.2	108.5	5.02	0.27	4.2	2649600	401	4898	247
13	7.11	12.9	5405	1.36	666.7	100.5	6.63	0.21	4.4	2649600	490	3947	207
14	7.10	12.7	5801	1.35	616.6	101.4	6.08	0.22	4.7	2649600	457	3582	201
15	7.12	12.7	6356	1.36	566.9	102.3	5.54	0.25	4.8	2649600	417	4280	246
16	7.10	12.3	5215	1.37	696.1	104.5	6.66	0.21	4.9	2649600	508	3772	221
17	7.14	12.2	5500	1.37	660.0	106.8	6.18	0.22	4.8	2649600	482	4169	239
18	7.15	13.1	5928	1.37	612.3	100.7	6.08	0.23	4.8	2649600	447	4359	250
19	7.17	12.3	7386	1.40	502.2	107.6	4.67	0.30	4.7	2649600	359	5025	282
20	7.16	13.7	5516	1.36	653.3	96.9	6.74	0.20	4.6	2649600	480	4470	249
21	7.22	14.6	4708	1.17	658.5	91.0	7.23	0.16	4.8	2649600	563	3630	210
22	7.26	14.5	5532	1.20	574.8	93.4	6.15	0.19	4.9	2649600	479	4010	237
23	7.20	14.6	6673	1.36	540.0	92.4	5.84	0.23	4.7	2649600	397	4929	276
24	7.24	14.5	8749	1.42	430.0	95.1	4.52	0.31	4.5	2649600	303	5754	310
25	7.26	15.0	9954	1.46	388.6	92.9	4.18	0.35	4.2	2649600	266	7434	379
26	7.28	14.5	12728	1.38	287.3	96.1	2.99	0.46	4.0	2649600	208	8955	431
27	7.31	14.4	11095	1.37	327.2	97.7	3.35	0.41	4.0	2649600	239	7291	350
28	7.36	14.7	11016	1.37	329.5	97.5	3.38	0.41	3.9	2649600	241	8020	377
29	7.32	15.1	11856	1.36	303.9	93.3	3.26	0.42	3.9	2649600	223	8464	397
30	7.36	14.4	11412	1.35	313.4	99.3	3.16	0.43	3.9	2649600	232	8131	377
31	7.33	14.2	12268	1.31	282.9	99.1	2.85	0.46	3.7	2649600	216	8290	370
Average	7.26	13.50	7430	1.3394	524.72	102	5.18	0.285	4.4				

## 5.0 ULTRAVIOLET DISINFECTION

Total Water Treated: 909,621 m<sup>3</sup> 100.00%  
On-Spec Water: 909,084m<sup>3</sup> 99.941%  
Off-Spec Water: 537 m<sup>3</sup> 0.059%

Average monthly chlorine residual before UV Treatment was 1.35 mg/L  
The average monthly chlorine residual after UV treatment and re-chlorination was 1.47 mg/L.

**Figure 5.1 - UV Disinfection – BMID Mission Creek Source – May 2022**



**Table 5.2 - UV Disinfection Table – Mission Creek Source**

	Inlet Cl2 Daily	Outlet Cl2 Daily	UVT	Turbidity		In Spec Water	Off Spec Water
Date	mg/L	mg/L	% T	NTU		Cubic Meters	Cubic Meters
1-May	1.24	1.45	90.7	0.71		27797	0
2-May	1.25	1.45	90.2	0.45		27798	0
3-May	1.28	1.44	90.5	0.68		30749	0
4-May	1.26	1.46	90.4	0.42		30865	0
5-May	1.33	1.44	90.3	0.40		30866	0
6-May	1.17	1.45	89.3	0.39		24490	0
7-May	1.08	1.45	90.3	0.38		18057	0
8-May	1.12	1.45	90.2	0.38		17359	0
9-May	0.99	1.44	90.1	0.49		19437	0
10-May	0.89	1.51	90.2	0.39		19966	0
11-May	1.19	1.48	87.6	0.48		26052	0
12-May	1.39	1.45	85.5	0.43		26248	0
13-May	1.17	1.45	89.6	0.40		26249	0
14-May	1.04	1.44	89.8	0.41		21173	0
15-May	1.42	1.46	89.1	0.48		22936	0
16-May	1.38	1.46	89.5	0.42		22937	0
17-May	1.44	1.48	89.3	0.43		22373	0
18-May	1.50	1.47	88.3	0.46		23406	0
19-May	1.56	1.55	88.6	0.51		26945	0
20-May	1.56	1.52	88.4	0.46		26945	0
21-May	1.36	1.45	88.6	0.60		23975	183
22-May	1.03	1.46	89.0	0.50		21545	183
23-May	1.43	1.49	88.5	0.57		26436	0
24-May	1.46	1.46	85.7	0.69		30740	0
25-May	1.66	1.52	87.0	0.62		39709	0
26-May	1.64	1.51	87.0	0.85		47972	0
27-May	1.59	1.47	84.1	0.76		47974	86
28-May	1.48	1.46	87.6	0.80		42833	86
29-May	1.60	1.48	87.3	0.91		45402	0
30-May	1.61	1.50	86.7	0.81		45404	0
31-May	1.60	1.46	87.7	0.40		44449	0
Average	1.35	1.47	88.6	0.54	Total	909084	537

## 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
- 32 samples were found to be absent of Coliforms.
- 32 samples were found to be absent of *E. Coli*.

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

Date	2921 Belgo Rd		Booster 1		Ellison Blow-Off		Ellison School		3976 Highway 97		Prospect Reservoir		Tower Reservoir		Well #5		Well #4		Kinschner 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	Coliforms	E. coli
4-Apr-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Apr-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19-Apr-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Apr-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8-May-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24-May-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30-May-22	0	0	0	0	0	0	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 seven sites around the BMID service area.
- All 12 samples were found to be absent of both *Total Coliforms* and *E. Coli*.

**Table 6.2 - BMID In-house Testing – Presence Absence**

Location	5/2/2022				5/9/2022				05/16, 2022				5/24/2022				5/30/2022			
	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.
Sylvania Cres									0.81	13.8	-	X					0.70	15.6	-	X
170 Kneller Rd									0.84	14.0	-	X					0.81	17.4	-	X
2105 Morrison					0.86	12.8	-	X												
Staymen Rd					0.75	13.6	-	X												
260 Campion Rd	0.31	16.4	-	X									0.23	13.6	-	X				
Fenwick Rd	0.21	16.6	-	X									0.23	14.0	-	X				
Solly Ct									0.94	13.8	-	X					1.04	13.4	-	X

**Table 6.3 - BMID Disinfection By-products – CARO Independent Lab Testing**

May 2, 2022 / May 09, 2022		
Location	THM (mg/L)	HAA (mg/L)
UV Plant	-	0.0496
Pearson School	-	0.0406

- HAA results are acceptable on both samples (<0.08 mg/L)
- BMID Population = 28,000

#### RECOMMENDED TESTS

- Recommended number of samples per month = 28  
(as per Guide for Canadian Drinking Water Quality)

#### ACTUAL TESTS

- Total tests by BMID staff (presence/absence) = 12
- Total tests sampled by BMID and tested by Caro Labs 32
- Total tests sampled in BMID treated distribution system = 47