



MONTHLY REPORTING PERIOD - JULY, 2022

1. SUMMARY

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

Source	Total (US Gals)	Total (Mega Litres)
Mission Creek	766,893,429	2,902.69
Well 4	9,526,234	36.06
Well 5	5,799,511	21.88
Well 6 (Irrigation Only)	28,444,944	107.66
Scotty Creek (Irrigation Only)	17,746,800	67.17
Total	828,390,919	3,135.46

1. 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;
2. The WTP resumed operation on February 8th and remained in operation throughout July as raw water quality in Mission Creek required treatment to lower both turbidity and colour;
3. Raw water turbidity levels in Mission Creek peaked at 49.89 NTU (average daily turbidity) on July 3. Average daily raw water turbidity for July was 7.19 NTU the Mission Creek intake;
4. Turbidity levels at the Distribution Intake (end of Hadden Reservoir) high reading was 0.38 NTU on July 30, 2022. Average clarified water turbidity for July was 0.30 NTU at the Distribution Intake at the lower end of Hadden Reservoir;
5. The highest recorded monthly turbidity level at the first customer (Booster #1) was 0.41 NTU on July 8. Average monthly turbidity at the first customer was 0.30 NTU for July;
6. The highest monthly turbidity daily average at the UV plant was 0.43 NTU on July 26. Average monthly turbidity at the UV plant was 0.28 NTU throughout July;
7. BMID's Ultraviolet Treatment Facility treated 2,219,134 m³ of water, with only 183 m³ of which was "Off-Spec" (0.008%) This off-spec portion was the result of a temporary lag in the UV dose during the reactor changeover on both July 27 and July 28. In both cases, the issue lasted a matter of minutes before quickly reverted back to normal treatment operations;
8. 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;

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9. Well #4, used as a source for domestic water in the north-end of the distribution system was in operation from July 1 to July 30. Well #4 will remain in stand-by mode until flows reduce later in the fall;
 10. 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 reactivated on July 27 after undergoing repairs to the pump motor. Well #5 will continue to operate throughout the remainder of the summer;
 11. 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;
 12. *E.Coli* levels at Mission Creek's Point-of-Diversion (creek intake prior to WTP) had normal counts for summer. The peak count was on the July 25th sample with a count of 24 coliforms. The average monthly *E.Coli* was 16.25, based on 4 samples;
 13. *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 normal counts on all 4 samples. A peak count of 2 was sampled on July 11th. Average *E.Coli* results for the month indicated 1 *E.Coli* coliforms based on 4 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;
 14. 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 July;

1.0 FLOWS - JULY, 2022

The Maximum Daily Flow was on July 1, at 32,676,142 US gallons (123.68 ML)

The Minimum Daily Flow was on July 8, at 23,590,152 US gallons (89.29 ML)

Mission Creek provided 93% of domestic and irrigation flow throughout July.

Figure 1.1 - Domestic Water System Flow

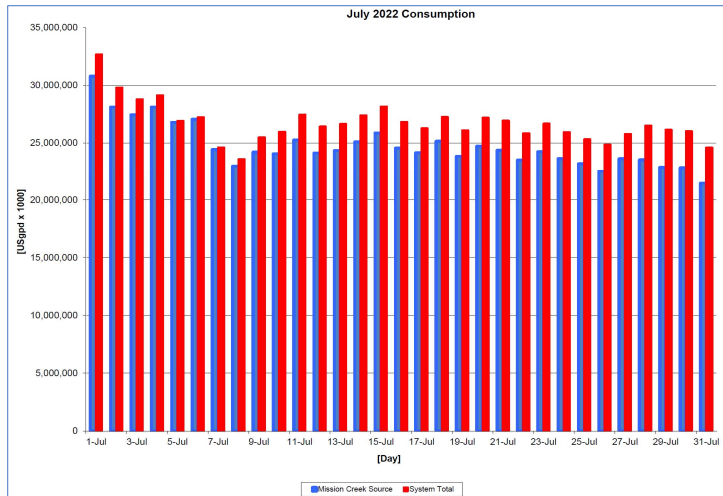


Table 1.2 - July 2022 - Daily Consumption Report

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-Jul	30,779,868	238,810	0	1,062,864	594,600	32,676,142	123.68
2-Jul	28,106,923	252,018	0	1,072,368	356,800	29,788,110	112.75
3-Jul	27,447,286	259,151	0	1,074,216	0	28,780,653	108.93
4-Jul	28,116,301	146,086	0	870,408	0	29,132,795	110.27
5-Jul	26,788,388	127,858	0	-	0	26,916,246	101.88
6-Jul	27,048,941	182,277	0	-	0	27,231,218	103.07
7-Jul	24,429,253	184,919	0	-	0	24,614,172	93.16
8-Jul	22,988,617	222,431	0	379,104	0	23,590,152	89.29
9-Jul	24,210,386	230,092	0	939,840	103,700	25,484,018	96.46
10-Jul	24,063,058	305,645	0	1,000,824	597,500	25,967,026	98.29
11-Jul	25,253,522	336,553	0	1,024,584	844,400	27,459,059	103.93
12-Jul	24,133,142	380,405	0	1,048,872	861,200	26,423,619	100.01
13-Jul	24,348,628	391,500	0	1,075,536	828,800	26,644,464	100.85
14-Jul	25,095,521	383,311	0	1,072,632	835,200	27,386,664	103.66
15-Jul	25,876,123	390,179	0	1,072,368	812,600	28,151,270	106.55
16-Jul	24,551,432	389,387	0	1,068,144	809,800	26,818,763	101.51
17-Jul	24,152,638	408,671	0	1,064,976	647,100	26,273,385	99.44
18-Jul	25,147,827	420,030	0	1,062,072	612,100	27,242,029	103.11
19-Jul	23,848,867	402,859	0	949,080	886,400	26,087,206	98.74
20-Jul	24,726,763	414,219	0	1,042,800	998,300	27,182,082	102.88
21-Jul	24,368,837	413,690	0	1,070,784	1,076,700	26,930,011	101.93
22-Jul	23,507,028	412,105	0	1,068,672	849,800	25,837,606	97.80
23-Jul	24,243,408	390,443	0	1,065,504	973,500	26,672,855	100.96
24-Jul	23,643,922	406,293	0	1,066,032	809,500	25,925,748	98.13
25-Jul	23,201,012	417,653	0	1,060,752	634,600	25,314,016	95.81
26-Jul	22,478,792	398,633	0	1,059,432	899,000	24,835,856	94.00
27-Jul	23,631,823	421,879	26,417	1,057,584	636,700	25,774,404	97.56
28-Jul	23,539,627	433,503	998,827	1,045,176	488,300	26,505,433	100.32
29-Jul	22,874,389	165,635	1,569,170	1,006,896	517,100	26,133,190	98.91
30-Jul	22,843,323	0	1,611,173	1,034,088	531,300	26,019,884	98.49
31-Jul	21,447,781	0	1,573,925	1,029,336	541,800	24,592,842	93.08
Totals Usgpd	766,893,429	9,526,234	5,779,511	28,444,944	17,746,800	828,390,919	3135.46
Totals ML	2,902.69	36.06	21.88	107.66	67.17		
Avg's	24,738,498	93.64				26,722,288	101.14
Max	30,779,868	116.50				32,676,142	123.68
Min	21,447,781	81.18				23,590,152	89.29

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) June 2022 - July 2022

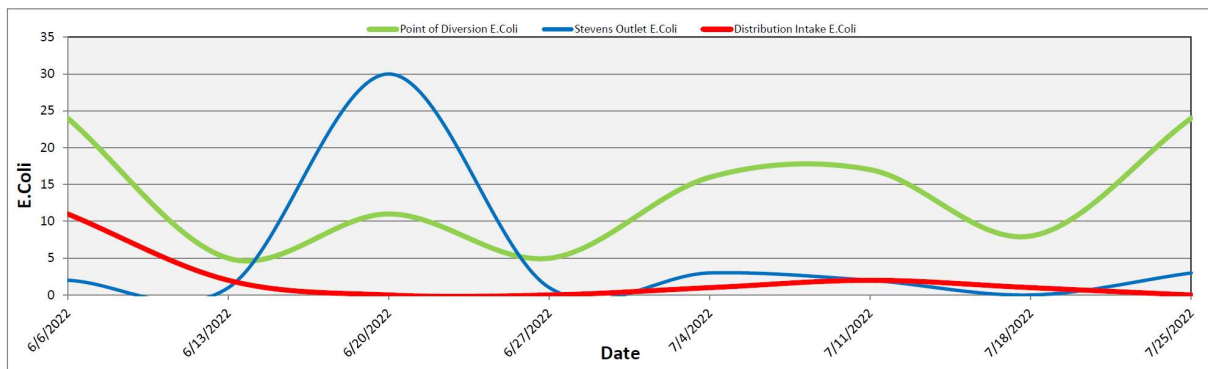


Table 2.1 - *E. Coli* Readings (CARO Labs)

Date	Point of Diversion E.Coli	Stevens Outlet E.Coli	Distribution Intake E.Coli
6-Jun-22	24	2	11
13-Jun-22	5	1	2
20-Jun-22	11	30	0
27-Jun-22	5	1	0
4-Jul-22	16	3	1
11-Jul-22	17	2	2
18-Jul-22	8	0	1
25-Jul-22	24	3	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 July 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 0.41 NTU on July 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)

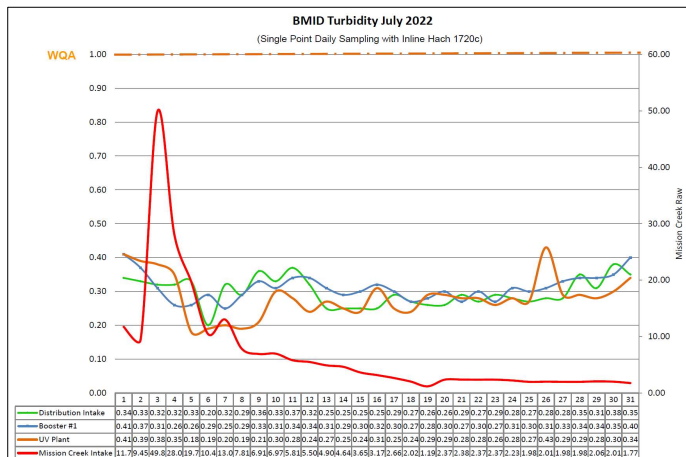


Table 3.1 - Daily Monitoring Record – Turbidity at Distribution Intake & Bst Stn 1

Turbidity Point Sampling for July 2022				
Date	Mission Creek Intake	Distribution Intake	Booster#1- First User	UV Plant
	Daily Average [NTU]	Daily Average [NTU]	Daily Average [NTU]	Daily Average [NTU]
1	11.72	0.34	0.41	0.41
2	9.45	0.33	0.37	0.39
3	49.89	0.32	0.31	0.38
4	28.03	0.32	0.26	0.35
5	19.70	0.33	0.26	0.18
6	10.43	0.20	0.29	0.19
7	13.02	0.32	0.25	0.20
8	7.81	0.29	0.29	0.19
9	6.91	0.36	0.33	0.21
10	6.97	0.33	0.31	0.30
11	5.81	0.37	0.34	0.28
12	5.50	0.32	0.34	0.24
13	4.90	0.25	0.31	0.27
14	4.64	0.25	0.29	0.25
15	3.65	0.25	0.30	0.24
16	3.17	0.25	0.32	0.31
17	2.66	0.29	0.30	0.25
18	2.02	0.27	0.27	0.24
19	1.19	0.26	0.28	0.29
20	2.37	0.26	0.30	0.29
21	2.38	0.29	0.27	0.28
22	2.37	0.27	0.30	0.28
23	2.37	0.29	0.27	0.26
24	2.23	0.28	0.31	0.28
25	1.98	0.27	0.30	0.27
26	2.01	0.28	0.31	0.43
27	1.98	0.28	0.33	0.29
28	1.98	0.35	0.34	0.29
29	2.06	0.31	0.34	0.28
30	2.01	0.38	0.35	0.30
31	1.77	0.35	0.40	0.34
AVG	7.19	0.30	0.31	0.28

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 July, 2022.

Figure 4.1 - CT Trending – BMID Mission Creek Source – July 2022

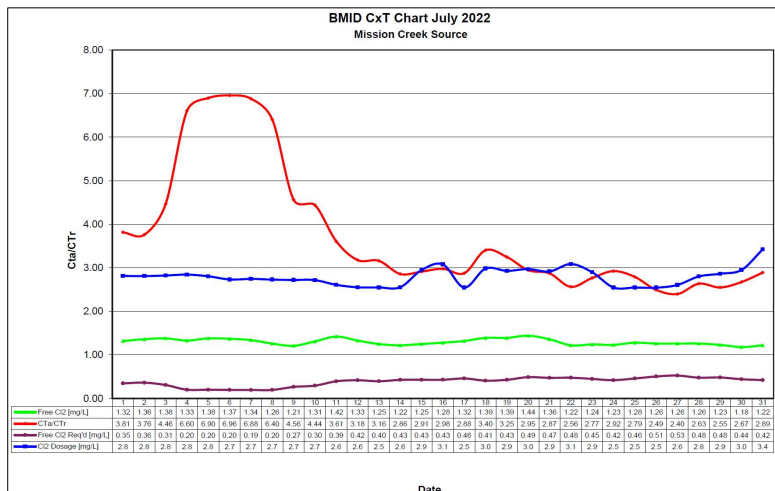


Table 4.2 - CT Table – Mission Creek Source

DATE	BMID July 2022 Mission Creek Source												
	pH	TEMP	PEAK	Free Cl ₂	CT	CTa/CTr	Free Cl ₂	Cl ₂	VOLUME	TIME	FLOW	CL ₂ DOSAGE	
	(Average)	(Present)	FLOW		achieved	req'd	Req'd	Dosage	TOTAL		Daily Average	Average	
		[°C]	[Usgpm]	[mg/L]			[mg/L]	[mg/L]	[USgal]	[mins]	[USGPM]	[PPD]	
July 1	7.12	16.9	12,046	1.32	290.3	76.1	3.81	0.35	2.8	2649600	220	10,445	353
2	7.04	17.0	13,013	1.36	276.9	73.7	3.76	0.36	2.8	2649600	204	10,921	369
3	7.04	17.3	11,333	1.38	322.6	72.3	4.46	0.31	2.8	2649600	234	8,131	276
4	7.04	16.5	7,022	1.33	501.9	76.0	6.60	0.20	2.8	2649600	377	4,961	170
5	7.02	16.3	6,895	1.38	530.3	76.9	6.90	0.20	2.8	2649600	384	4,914	166
6	6.98	17.1	7,291	1.37	497.9	71.6	6.96	0.20	2.7	2649600	363	4,945	162
7	7.13	17.0	6,784	1.34	523.4	76.0	6.88	0.19	2.7	2649600	391	3,931	130
8	7.33	17.2	6,515	1.26	512.5	80.0	6.40	0.20	2.7	2649600	407	4,708	154
9	7.31	17.8	9,272	1.21	345.8	75.8	4.56	0.27	2.7	2649600	286	6,927	226
10	7.32	18.0	10,303	1.31	336.9	75.9	4.44	0.30	2.7	2649600	257	8,971	293
11	7.24	18.4	14,376	1.42	261.7	72.5	3.61	0.39	2.6	2649600	184	11,571	363
12	7.16	19.0	16,579	1.33	212.5	66.9	3.18	0.42	2.6	2649600	160	13,806	424
13	7.19	20.3	17,118	1.25	193.5	61.2	3.16	0.40	2.5	2649600	155	14,456	443
14	7.26	20.0	17,689	1.22	182.7	63.9	2.86	0.43	2.6	2649600	150	15,296	470
15	7.26	20.0	17,721	1.25	186.9	64.2	2.91	0.43	2.9	2649600	150	13,172	466
16	7.31	20.0	17,372	1.28	195.2	65.6	2.98	0.43	3.1	2649600	153	12,585	466
17	7.35	19.6	17,689	1.32	197.7	68.7	2.88	0.46	2.5	2649600	150	15,882	486
18	7.38	20.0	15,882	1.39	231.9	68.1	3.40	0.41	3.0	2649600	167	11,476	411
19	7.42	20.8	17,340	1.39	212.4	65.4	3.25	0.43	2.9	2649600	153	12,823	452
20	7.43	20.8	19,623	1.44	194.4	66.0	2.95	0.49	3.0	2649600	135	14,313	511
21	7.43	20.6	18,909	1.36	190.6	66.3	2.87	0.47	2.9	2649600	140	14,757	517
22	7.45	20.3	18,783	1.22	172.1	67.1	2.56	0.48	3.1	2649600	141	13,695	508
23	7.46	20.6	17,958	1.24	183.0	66.1	2.77	0.45	2.9	2649600	148	13,473	469
24	7.48	20.8	16,992	1.23	191.8	65.6	2.92	0.42	2.5	2649600	156	15,296	468
25	7.51	21.4	18,989	1.28	178.6	64.0	2.79	0.46	2.5	2649600	140	16,437	503
26	7.50	20.8	20,193	1.26	165.3	66.3	2.49	0.51	2.5	2649600	131	17,974	550
27	7.50	20.3	20,273	1.26	164.7	68.7	2.40	0.53	2.6	2649600	131	17,689	554
28	7.51	21.4	19,845	1.26	168.2	63.9	2.63	0.48	2.8	2649600	134	17,562	591
29	7.50	22.3	21,461	1.23	151.9	59.6	2.55	0.48	2.9	2649600	123	18,466	635
30	7.52	22.3	19,623	1.18	159.3	59.6	2.67	0.44	3.0	2649600	135	16,881	599
31	7.53	22.6	18,989	1.22	170.2	58.9	2.89	0.42	3.4	2649600	140	14,630	602
Averages	7.31	19.46	15286	1.30	261.391	68.5	3.73	0.3863	2.795				

5.0 ULTRAVIOLET DISINFECTION

Total Water Treated:	2,219,134 m ³	100.00%
On-Spec Water:	2,218,951 m ³	99.992%
Off-Spec Water:	183 m ³	0.008%

Average monthly chlorine residual before UV Treatment was 1.35 mg/L
The average monthly chlorine residual after UV treatment and re-chlorination was 1.39 mg/L.

Figure 5.1 - UV Disinfection – BMID Mission Creek Source – July 2022

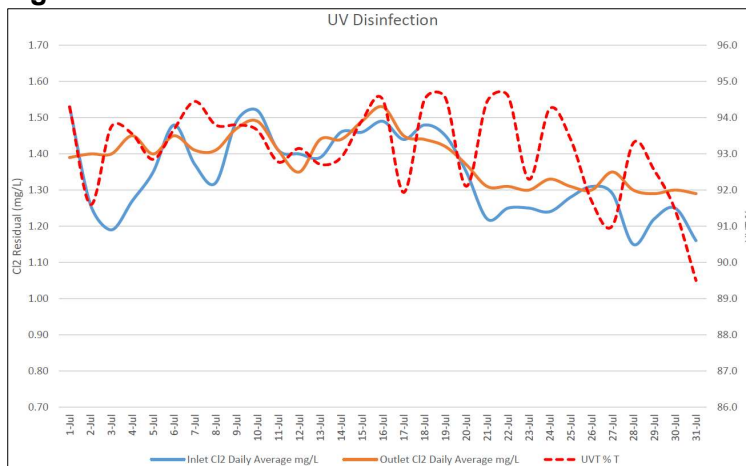


Table 5.2 - UV Disinfection Table – Mission Creek Source

	Inlet Cl2 Daily	Outlet Cl2 Daily		UVT	Turbidity		In Spec Water Volume	Off Spec Water Volume
Date	mg/L	mg/L		% T	NTU		Cubic Meters	Cubic Meters
1-Jul	1.53	1.39		94.3	0.41		55,884.50	0
2-Jul	1.26	1.40		91.6	0.39		58,390.80	0
3-Jul	1.19	1.40		93.8	0.38		58,431.20	0
4-Jul	1.27	1.45		93.6	0.35		43,580.90	0
5-Jul	1.35	1.40		92.9	0.18		26,653.80	0
6-Jul	1.48	1.45		93.7	0.19		26,532.90	0
7-Jul	1.37	1.41		94.5	0.20		26,547.60	0
8-Jul	1.32	1.41		93.8	0.19		25,206.00	0
9-Jul	1.49	1.47		93.8	0.21		37,143.10	0
10-Jul	1.52	1.49		93.7	0.30		48,127.80	0
11-Jul	1.41	1.41		92.8	0.28		61,925.30	0
12-Jul	1.40	1.35		93.2	0.24		74,003.20	0
13-Jul	1.39	1.44		92.7	0.27		77,328.10	0
14-Jul	1.46	1.44		92.9	0.25		82,038.80	0
15-Jul	1.46	1.49		93.9	0.24		82,096.50	0
16-Jul	1.49	1.53		94.5	0.31		81,592.10	0
17-Jul	1.44	1.45		91.9	0.25		85,001.50	0
18-Jul	1.48	1.44		94.5	0.24		85,060.70	0
19-Jul	1.45	1.42		94.6	0.29		78,873.50	0
20-Jul	1.35	1.37		92.1	0.29		89,367.50	0
21-Jul	1.22	1.31		94.5	0.28		90,436.50	0
22-Jul	1.25	1.31		94.6	0.28		90,497.50	0
23-Jul	1.25	1.30		92.3	0.26		88,829.70	0
24-Jul	1.24	1.33		94.3	0.28		82,089.00	0
25-Jul	1.28	1.31		93.4	0.27		87,957.90	0
26-Jul	1.31	1.30		91.7	0.43		96,157.90	0
27-Jul	1.29	1.35		91.0	0.29		96,225.10	91.5
28-Jul	1.15	1.30		93.3	0.29		94,733.10	91.5
29-Jul	1.22	1.29		92.6	0.28		98,793.40	0
30-Jul	1.25	1.30		91.5	0.30		98,856.70	0
31-Jul	1.16	1.29		89.5	0.34		90,588.00	0
Average	1.35	1.39		93.13		Total	2,218,950.60	183

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
- 26 samples were found to be absent of Coliforms.
- 26 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		3076 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
6-Jun-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Jun-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Jun-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Jun-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Jul-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Jul-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Jul-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Jul-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 9 samples were found to be absent of both *Total Coliforms* and *E. Coli*.

Table 6.2 - BMID In-house Testing – Presence Absence

Location	7/4/2022				7/11/2022				7/20/2022				7/25/2022			
	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.
Sylvania Cres					0.92	18.4	-	X								
170 Kneller Rd					0.97	17.4	-	X								
2105 Morrison Staymen Rd													1.31	16.0	-	X
260 Campion Rd	0.42	17.8	-	X					0.24	23.0	-	X	1.03	18.4	-	X
Ferwick Rd	0.44	17.6	-	X					0.39	24.2	-	X				
Solly Ct					0.96	18.6	-	X								

Table 6.3 - Disinfection By-Products

4-Jul-22		
Location	THM (mg/L)	HAA (mg/L)
UV Plant	0.0392	0.0294
Pearson School	0.0537	0.0420

- All four samples were found to be below the maximum acceptable concentration for both THMs and HAAs
- 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) = 9
- Total tests sampled by BMID and tested by Caro Labs 26
- Total tests sampled in BMID treated distribution system = 35