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BRADY ROAD RESOURCE MANAGEMENT FACILITY ANNUAL REPORT - 2023

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EXECUTIVE SUMMARY

The Brady Road Resource Management Facility (BRRMF) is the City of Winnipeg's only active landfill. The site is bordered by the Perimeter Highway on the north, Waverley Street on the east, Brady Road and the R.M. of Macdonald on the west, and Rue des Trappistes on the south. The landfill has been in operation since 1973 and is estimated to have sufficient capacity for over 100 years, assuming current waste diversion practices are continued.

Environment Act Licence No. 3081 R, issued on April 23, 2014, requires the City of Winnipeg to submit an annual report on or before April 15th, detailing activities conducted at BRRMF in the previous year. This report provides a summary of major expenditures and construction, major incidents, waste diversion operations, ground water management, surface water management, leachate management, landfill gas management, and nuisance management for 2023.

Major construction in 2023 included construction and commissioning of a new waste cell (Cell 34), landscaping around the administration building, and completion of the wood waste storage pad. In 2023, there was a compost fire that required fire suppression assistance from the local fire department. Other than the fire, there were no disruptions or failures of waste management practices due to equipment breakdown, no major spills occurred, and no alarms were activated.

In 2023, approximately 27% of the 409,107 metric tonnes of material received at the BRRMF were beneficially re-used, composted, or removed from the site for further processing or beneficial re-use. In addition, 31,600 kL of leachate was hauled to the North End Sewage Treatment Plant for treatment.

Monitoring programs for leachate, ground water, surface water, and subsurface gas migration followed the sampling and analysis plans in 2023 and contingency plans were not activated.

Statistical analyses of analytical results obtained for leachate, ground water, and surface water indicate that the BRRMF has not had a negative impact on the ground water and surface water downstream of the site.

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1.0 INTRODUCTION

The Brady Road Resource Management Facility (BRRMF) is located south of the Perimeter Highway, between Brady Road and Waverley Street. Residential land use is present within 500 m of the site to the east and within 120 m north of the site (Waverly West development), other surrounding land use is agricultural. Opened in 1973, the 790-hectare, Class 1 Solid Waste Disposal facility currently holds approximately 12 million metric tonnes of waste, with over 300,000 metric tonnes of waste materials landfilled on an annual basis. The site has capacity for over 100 additional years of waste disposal, assuming current waste diversion practices are continued.

The BRRMF operates in accordance with Environment Act Licence No. 3081 R, which was issued on April 23, 2014. Clause 127 of the license requires the City of Winnipeg to prepare and submit an Annual Report on the activities undertaken at the site during the previous year on or before April 15th of each year. This report contains results and/or comments for each of the clauses of Licence No. 3081 R under which the BRRMF has generated pertinent information during 2023. The report also provides information on the BRRMF proposed activities for 2024.

The layouts of the primary components of the BRRMF are shown on Figure 1. Surface water flows are managed by perimeter ditching and retention ponds. The ground water monitoring network consists of wells in the bedrock, till, and clay layers. The leachate collection system is a network of manholes/risers, drains, and sumps around the perimeter of the landfill cells, which feed into a centralized collection tank/truck fill station. The landfill gas (LFG) management system includes extraction wells, collection piping, and a blower/enclosed flare station.

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2.0 MAJOR ACTIVITIES AND CONSTRUCTION

Major activities and construction undertaken in 2023 included:

- Construction and commissioning of a new waste cell (Cell 34). The cell was operational in early December.
- Landscaping around the administration building, completed in the fall.
- Construction of the wood waste storage pad, completed in the fall. This allows us to access an area where we can store and grind wood waste as needed in all weather conditions.

Major activities and construction planned for 2024 include:

- Shelter belt planting on the North West of BRRMF, to re-establish trees that were removed for the construction of the service road (Ethan Boyer Way).
- Design for the next landfill fill area (Area B). This includes cell layout, leachate collection and integration into existing infrastructure, surface water management, and access roads.

3.0 MAJOR INCIDENTS

On May 23, 2023, there was a compost fire that required fire suppression assistance from the local fire department. The fire was completely suppressed on May 24, 2023. Aside from the fire, there were no disruptions or failures of waste management practices due to equipment breakdown, no major spills occurred, and no alarms were activated.

The incident report is provided in Appendix A.

4.0 WASTE DIVERSION OPERATIONS

In 2023, the BRRMF received 409,107 metric tonnes of material from a variety of sources including residential waste collection, residential food waste collection, commercial wastes, wastes from City operations, and materials dropped off at the 4R depots. Composting programs, on-site re-use of materials, and removal of materials from the site for re-use or further processing allowed 110,823 metric tonnes of material to be diverted from the landfill. The remaining 298,285 metric tonnes of material was landfilled. The 27% diversion rate in 2023 is a decrease from the previous year due to a decrease in the amount of clean fill and biosolids received, which are typically beneficially reused on-site.

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The 2-year Residential Food Waste Collection Pilot Project concluded in 2022. The data from this project provided supplemental information for the Organics Diversion Strategy, which was presented to council in Q3 of 2023 with the recommendation to proceed with the program. The current timeline is 2030 for the full implementation, although the city is looking at ways to expedite the process.

In 2023, 9,925 metric tonnes of biosolids were mixed with woodchips and clay to create a fabricated soil that will be used as final cover at the BRRMF. No biosolids were landfilled or composted at the biosolids composting facility. In 2024, biosolids composting will occur on an as-needed basis to meet final cover needs.

In 2024, we will continue divert wood waste, street sweepings, and biosolids from the landfill to Soil Fabrication Programs for use as final cover at BRRMF and Summit Road Landfills.

A summary of the BRRMF Waste Diversion Operations is provided in Table 1.

Table 1. 2019-2023 BRRMF Waste Diversion Summary

	2019	2020	2021	2022	2023
Materials Landfilled					
Commercial Wastes	93,621	90,755	100,965	97,489	81,172
Residential Wastes	174,050	194,570	184,930	175,964	171,411
Wastes from City Operations	52,571	60,957	29,617	43,411	45,702
Wastes from Other Municipalities	0	0	0	0	0
Total Materials Landfilled	**320,242**	**346,282**	**315,511**	**316,864**	**298,285**
Materials Diverted from Landfill					
Batteries	74	79	84	92	82
Bicycles	9	14	15	18	15
Biosolids	1,916	1,219	8,793	9,925	4,418
Ceramic	331	281	290	249	273
Clean Fill	252,113	136,675	104,728	109,640	39,899
Compostable Materials	47,834	53,694	45,338	58,053	56,383
Concrete	6,565	10,145	8,170	9,822	7,093
Electronics	665	713	607	611	560
Glass	80	79	40	57	62
Household Hazardous Waste	686	826	660	569	519
Lumber	192	91	12	20	45
Mattresses	233	316	395	308	300
Oil	90	124	121	149	160
Oversized Plastics	43	22	15	14	31
Ozone-Containing Appliances	166	190	201	199	182
Recyclables	278	283	232	80	0
Residential Food Waste Collection	na	115	411	258	0
Scrap Metal	635	726	685	621	601
Tires	134	277	140	259	202
Total Materials Diverted from Landfill	**312,046**	**205,869**	**170,936**	**190,943**	**110,823**
Total Materials Received	**632,288**	**552,151**	**486,446**	**507,807**	**409,107**
Diversion Rate	**49%**	**37%**	**35%**	**38%**	**27%**

Note: biosolids weighed on arrival at the BRRMF scale

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5.0 GROUND WATER, SURFACE WATER, LEACHATE, AND LANDFILL GAS MONITORING

5.1 GROUND WATER

The land beneath the BRRMF consists of three layers: the uppermost layer is clay (averaging 12 m in thickness), the second layer is till (averaging 6 m in thickness), and the lowest layer is bedrock. Ground water flows downwards through the clay and till layers into the bedrock aquifer, which flows in a north-east direction. The ground water in all three layers is saline and non-potable. The major ions in the ground water from the clay layer are calcium, magnesium, sulfate and bicarbonate. Sodium and chloride are the major ions in the bedrock aquifer. Ground water in the till layer is generally intermediate in brackishness and shows a gradual change with depth. The ground water monitoring system includes 34 nested wells: 13 bedrock wells, 13 till wells, and 8 clay wells. The locations of the ground water monitoring wells are shown on Figure 2.

As per the BRRMF Operating Plan, ground water is monitored in accordance with the Ground Water Sampling and Analysis Plan (SAP), as specified under Clause 123. Sampling frequency is twice per year for bedrock wells and downgradient till wells, and once per year for clay wells and other till wells distant from the waste areas. As neither Federal nor Manitoba Provincial Governments regulate non-potable ground water quality, the Ontario Ministry of Environment (MOE) guidelines for non-potable groundwater quality are used as the regulatory guideline (MOE, 2011).

In 2023, a total of 48 ground water samples were analyzed – 4 samples from wells upgradient of the site (background water quality), and 44 samples from wells cross gradient and downgradient of the site. Clay well 6N60DR was purged to dryness and was sampled once recharged, however, polycyclic aromatic hydrocarbons, volatile organic compounds and pesticides were not submitted for analysis because there was insufficient volume in the well to analyze all parameters. Aside from 6N60DR, there were no deviations from the Ground Water SAP or from normal sample collection and preservation practices. Results for several parameters were variable between different wells of the same type, and also between spring and autumn results at the same well. The results met the guidelines with the exception of chloride in two till wells and most of the bedrock wells. The 2023 ground water results are provided in Tables 2.1-2.3.

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Table 2.1 2023 Ground Water Monitoring - Clay Wells

			Upgradient	Downgradient and Cross Gradient					
			GWQ25-6N60DR	GWQ25-5N62D	GWQ25-6N63E	GWQ25-6N57DR	GWQ25-6N67E	GWQ25-4N34B	GWQ25-4N34C
	Units	Criteria*	Spring	Spring	Spring	Spring	Spring	Spring	Spring
Inorganic Parameters									
Alkalinity - Bicarbonate	mg/L		523	483	590	544	451	524	295
Alkalinity - Carbonate	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Hydroxide	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Total	mg/L		523	483	590	544	451	524	295
Dissolved Hardness (CaCO3)	mg/L		1,510	2,060	1,930	1,630	1,400	1,760	998
pH	units		6.79	6.81	6.76	6.85	6.92	7.26	7.35
Specific Conductivity	(µS/cm)		4,380	7,870	6,100	5,220	4,420	6,710	4,970
Turbidity	(ntu)		65.3	48.2	18.6	41.6	28.7	16.4	35.3
Total Dissolved Solids	mg/L		4,280	7,050	5,440	4,560	4,090	6,840	5,030
Total Suspended Solids	mg/L		<3.0	326	270	292	<3.0	309	5,620
Total Solids	mg/L		4,100	7,380	5,710	4,860	3,990	7,150	10,600
Dissolved Chloride (Cl)	mg/L	2,300*	426	1,690	956	642	554	996	918
Dissolved Sulphate (SO4)	mg/L		1,570	2,190	2,130	1,900	1,490	2,670	1,560
Nutrients									
Ammonia - Dissolved	mg/L N		0.246	0.308	0.792	0.207	0.748	<0.003	0.077
Nitrate - Dissolved	mg/L N		0.420	0.655	0.085	0.961	0.067	<0.003	0.233
Total Kjeldahl Nitrogen	mg/L N		0.80	1.20	1.20	0.60	1.40	>0.60	0.90
Phosphorus - Dissolved	mg/L P		0.029	0.039	0.028	0.026	0.028	0.018	0.014
Other									
Cyanide - Total (CN)	mg/L	0.066	*ns	*ns	*ns	*ns	*ns	*ns	*ns
Organic Indicators									
Carbonaceous Oxygen Demand	mg/L		71	137	75	62	59	115	138
Total Organic Carbon	mg/L		13.2	21.8	14.3	11.4	9.3	14.9	18.3
Metals									
Arsenic (As)- Dissolved	mg/L	1.9*	0.00041	0.00097	0.00157	0.00190	0.00057	0.00085	0.00099
Barium (Ba)- Dissolved	mg/L	29*	0.0088	0.0164	0.0119	0.0105	0.0090	0.0101	0.0090
Beryllium (Be)- Dissolved	mg/L	0.067*	0.00003	0.00004	<0.00002	<0.00002	0.00002	<0.00002	<0.00002
Cadmium (Cd)- Dissolved	mg/L	0.0027*	0.000079	0.000204	0.000386	0.000246	0.000084	0.000113	0.000059
Calcium (Ca)- Dissolved	mg/L		614	883	788	728	552	696	406
Chromium (Cr)- Dissolved	mg/L	0.81*	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Copper (Cu)- Dissolved	mg/L	0.087*	0.00156	0.00166	0.00316	0.00171	0.00154	0.00239	0.00174
Iron (Fe)- Dissolved	mg/L		0.0330	0.0130	0.018	0.240	<0.0100	0.0150	0.0340
Lead (Pb)- Dissolved	mg/L	0.025*	<0.000050	0.000056	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Magnesium (Mg)- Dissolved	mg/L		217	374	335	271	221	611	397
Manganese (Mn)- Dissolved	mg/L		1.66	3.16	2.56	2.32	1.10	0.617	0.441
Mercury (Hg)- Total	mg/L	0.0028*	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000076	0.000054
Nickel (Ni)- Dissolved	mg/L	0.49*	0.00756	0.01340	0.01180	0.01060	0.00633	0.01200	0.00608
Potassium (K)- Dissolved	mg/L		10.1	14.6	15.1	14.7	9.53	10.1	8.86
Selenium (Se)- Dissolved	mg/L	0.063*	0.000072	0.000137	0.000961	0.000214	0.000112	0.000503	0.000255
Silver (Ag)- Dissolved	mg/L	0.0015*	0.000015	0.000029	<0.000010	<0.000010	0.000014	<0.000010	<0.000010
Sodium (na)- Dissolved	mg/L	2300*	333	876	610	565	322	451	376
Zinc (Zn)- Dissolved	mg/L	1.1*	0.0051	0.0084	0.0103	0.0061	0.0031	0.0024	0.0042
Field Parameters									
pH	units		*nr	*nr	6.55	6.70	*nr	6.85	6.87
Specific Conductivity	(µS/cm)		*nr	*nr	6,370	5,760	*nr	7,560	7,140
Polycyclic Aromatic Hydrocarbons									
Naphthalene	ug/L	6,400	*ns						
Benzo(a)pyrene	ug/L	0.81	*ns						
Anthracene	ug/L	2.40	*ns						
Petroleum Hydrocarbons									
F1 (C6-C10 Hydrocarbons)	mg/L	0.75	*ns						
F2 (C10-C16 Hydrocarbons)	mg/L	0.15	*ns						
F3 (C16-C34 Hydrocarbons)	mg/L	0.50	*ns						
F4 (C34-C50 Hydrocarbons)	mg/L	0.50	*ns						
Benzene	ug/L	430	*ns						
EthylBenzene	ug/L	2,300	*ns						
Toluene	ug/L	18,000	*ns						
Xylene (Total)	ug/L	4,200	*ns						
Volatile Organic Carbons									
Vinyl chloride	ug/L	1.7	*ns						
Pesticides									
Diazinon	µg/L		*ns						
Herbicides									
2,4-D	ug/L		*ns						

Note: Criteria from Ontario Ministry of the Environment. (2011, July 1). Soil, Ground Water and Sediment Standards for Use Under Part XV.I of the *Environmental Protection Act* Table 3: Full Depth Generic Site Condition Standards in a Non-Potable
* Criteria for total chloride and total metals

*ns - not submitted
*nr - no result; technician error

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Table 2.2 2023 Ground Water Monitoring - Till Wells

			Upgradient	Downgradient and Cross Gradient							
			GWQ25-6N60ER	GWQ25-5N62E		GWQ25-W13A		GWQ25-W14A		GWQ25-W15A	
	Units	Criteria*	Spring	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
Inorganic Parameters											
Alkalinity - Bicarbonate	mg/L		582	238	176	827	643	161	177	447	482
Alkalinity - Carbonate	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Hydroxide	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Total	mg/L		582	238	176	827	643	161	177	447	482
Dissolved Hardness (CaCO3)	mg/L		1,360	1,960	1,670	5,020	3,520	1,350	8,120	2,280	9,450
pH	units		6.83	7.28	7.37	7.38	7.13	7.39	7.31	6.89	6.83
Specific Conductivity	(µS/cm)		3,880	7,960	7,920	4,360	5,540	7,970	7,630	6,500	6,490
Turbidity	(ntu)		536	2,793	1,417	1321	>4,800	569	>4,800	372	>4,800
Total Dissolved Solids	mg/L		3,490	6,330	4,810	8,960	1,590	12,000	3,310	6,020	946
Total Suspended Solids	mg/L		712	2,688	2,580	16,200	15,860	3,750	27,600	3,735	38,680
Total Solids	mg/L		4,200	9,020	7,390	25,200	17,400	15,700	30,910	9,760	39,600
Dissolved Chloride (Cl)	mg/L	2,300*	362	2,370	2,210	625	1,130	2,330	1,220	1,280	2,290
Dissolved Sulphate (SO4)	mg/L		1,360	828	730	1,050	1,020	705	1,900	1,910	795
Nutrients											
Ammonia - Dissolved	mg/L N		0.545	0.872	1.00	0.018	0.190	1.14	1.17	0.685	1.39
Nitrate - Dissolved	mg/L N		0.163	0.214	<1.0	0.037	<1.0	0.032	<1.0	0.326	<1.0
Total Kjeldahl Nitrogen	mg/L N		1.4	1.6	<1.0	nr	<1.0	1.0	<1.0	1.4	1.6
Phosphorus - Dissolved	mg/L P		0.026	0.031	0.005	0.027	0.008	0.066	0.012	0.024	0.022
Other											
Cyanide - Total (CN)	mg/L	0.066	<0.0050	<0.0050	<0.0050	<0.0050		<0.0050		<0.0050	
Organic Indicators											
Carbonaceous Oxygen Demand	mg/L		59	132	160	545	440	180	560	215	1,650
Total Organic Carbon	mg/L		7.9	3.7	4.9	107.3	62.0	5.9	37.4	30.9	86.9
Metals											
Arsenic (As)- Dissolved	mg/L	1.9*	0.00125	0.00536	0.00131	0.00746	0.00108	0.00453	0.00061	0.00342	0.00092
Barium (Ba)- Dissolved	mg/L	29*	0.0082	0.0119	0.0115	0.0640	0.0147	0.0138	0.0131	0.0124	0.0136
Beryllium (Be)- Dissolved	mg/L	0.067*	0.00003	0.00005	<0.00002	0.00057	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Cadmium (Cd)- Dissolved	mg/L	0.0027*	0.000022	0.000030	0.000013	0.000276	0.000025	0.000019	0.000019	0.000035	0.000058
Calcium (Ca)- Dissolved	mg/L		454	342	298	348	226	356	317	781	766
Chromium (Cr)- Dissolved	mg/L	0.81*	<0.00050	<0.00050	<0.00050	0.00866	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Copper (Cu)- Dissolved	mg/L	0.087*	0.00157	0.00054	0.00059	0.01900	0.00588	0.00036	0.00039	0.00055	0.02360
Iron (Fe)- Dissolved	mg/L		0.104	0.622	0.282	7.340	0.024	0.716	<0.010	1.710	0.024
Lead (Pb)- Dissolved	mg/L	0.025*	<0.000050	<0.000050	<0.000050	0.010800	<0.000050	0.000110	<0.000050	<0.000050	0.000837
Magnesium (Mg)- Dissolved	mg/L		192	168	157	478	362	174	171	311	275
Manganese (Mn)- Dissolved	mg/L		1.39	0.0546	0.0446	0.644	0.0581	0.296	0.218	1.94	1.84
Mercury (Hg)- Total	mg/L	0.0028*	0.0000050	0.0000164	<0.0000050	<0.0000050	<0.0000050	0.0000289	0.0000830	0.0000119	<0.0000050
Nickel (Ni)- Dissolved	mg/L	0.49*	0.00802	0.00134	0.00098	0.01820	0.00500	0.00226	0.00173	0.00981	0.00975
Potassium (K)- Dissolved	mg/L		8.64	34.2	38.1	8.48	11.50	32.3	33.5	14.9	14.0
Selenium (Se)- Dissolved	mg/L	0.063*	<0.000050	<0.000050	<0.000050	0.001570	0.001300	<0.000050	<0.000050	0.000103	0.000161
Silver (Ag)- Dissolved	mg/L	0.0015*	0.000011	0.000016	0.000076	0.000043	<0.000010	<0.000010	0.000055	<0.000010	0.000028
Sodium (na)- Dissolved	mg/L	2300*	344	1,370	1,280	436	527	1,160	1,240	534	599
Zinc (Zn)- Dissolved	mg/L	1.1*	0.0032	0.0025	0.0027	0.0337	0.0029	0.0016	0.0014	0.0054	0.0235
Field Parameters											
pH	units		6.82	*nr	7.78	*nr	7.21	7.23	7.49	7.15	6.80
Specific Conductivity	(µS/cm)		4,309	*nr	9,280	*nr	6,444	8,820	8,768	7,990	7,915
Polycyclic Aromatic Hydrocarbons											
Naphthalene	ug/L	6,400	<0.05	<0.05		<0.05		<0.05		<0.05	
Benzo(a)pyrene	ug/L	0.81	<0.01	<0.005		<0.01		<0.01		<0.01	
Anthracene	ug/L	2.40	0.01	<0.01		<0.01		<0.01		<0.01	
Petroleum Hydrocarbons											
F1 (C6-C10 Hydrocarbons)	mg/L	0.75	<0.10	<0.10		<0.10		<0.10		<0.10	
F2 (C10-C16 Hydrocarbons)	mg/L	0.15	<0.10	<0.10		<0.10		<0.10		<0.10	
F3 (C16-C34 Hydrocarbons)	mg/L	0.50	<0.25	<0.25		<0.25		<0.25		<0.25	
F4 (C34-C50 Hydrocarbons)	mg/L	0.50	<0.25	<0.25		<0.25		<0.25		<0.25	
Benzene	ug/L	430	<0.50	<0.50		<0.50		<0.50		<0.50	
EthylBenzene	ug/L	2,300	<0.50	<0.50		<0.50		<0.50		<0.50	
Toluene	ug/L	18,000	<0.50	<0.50		<0.50		<0.50		<0.50	
Xylene (Total)	ug/L	4,200	<0.50	<0.50		<0.50		<0.50		<0.50	
Volatile Organic Carbons											
Vinyl chloride	ug/L	1.7	<0.50	<0.50		<0.50		<0.50		<0.50	
Pesticides											
Diazinon	µg/L		<0.10	<0.10		<0.10		<0.10		<0.10	
Herbicides											
2,4-D	ug/L		<0.05	<0.05		<0.50		<0.05		<0.25	

Note: Criteria from Ontario Ministry of the Environment. (2011, July 1). Soil, Ground Water and Sediment Standards for Use Under Part XV.I of the Environmental Protection Act Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
* Criteria for total chloride and total metals

*nr - no result; technician error

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Table 2.2 2023 Ground Water Monitoring - Till Wells

			Downgradient and Cross Gradient					
			GWQ25-W16A		GWQ25-6N63F	GWQ25-6N57F	GWQ25-6N67F	GWQ25-4N34DR
	Units	Criteria*	Spring	Autumn	Spring	Spring	Spring	Spring
Inorganic Parameters								
Alkalinity - Bicarbonate	mg/L		427	581	334	356	378	696
Alkalinity - Carbonate	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Hydroxide	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Total	mg/L		427	581	334	356	378	696
Dissolved Hardness (CaCO3)	mg/L		1,850	2,440	1,790	2,610	1,150	2,350
pH	units		7.11	6.95	6.94	7.14	7.12	7.44
Specific Conductivity	(µS/cm)		5,470	5,150	6,110	5,660	4,230	7,090
Turbidity	(ntu)		363	2471	423	300	238	1,436
Total Dissolved Solids	mg/L		4,730	3,770	5,530	5,750	3,670	7,770
Total Suspended Solids	mg/L		1,400	5,040	748	3,820	244	4,260
Total Solids	mg/L		6,130	8,810	6,280	9,570	3,920	12,000
Dissolved Chloride (Cl)	mg/L	2,300*	882	700	1,500	1,060	664	308
Dissolved Sulphate (SO4)	mg/L		1,530	1,560	1,210	1,330	1,200	4,760
Nutrients								
Ammonia - Dissolved	mg/L N		0.882	1.08	0.771	1.14	1.1	0.111
Nitrate - Dissolved	mg/L N		0.054	<0.40	0.209	0.010	0.005	0.089
Total Kjeldahl Nitrogen	mg/L N		1.5	1.0	1.1	3.0	1.1	2.2
Phosphorus - Dissolved	mg/L P		0.020	0.012	0.048	0.067	0.028	0.028
Other								
Cyanide - Total (CN)	mg/L	0.066	<0.0050					<0.0050
Organic Indicators								
Carbonaceous Oxygen Demand	mg/L		108	245	103	134	59	98
Total Organic Carbon	mg/L		14.7	22.5	9.0	17.8	6.4	19.1
Metals								
Arsenic (As)- Dissolved	mg/L	1.9*	0.00139	0.00058	0.00186	0.0118	0.00540	0.00366
Barium (Ba)- Dissolved	mg/L	29*	0.0128	0.0117	0.0117	0.0105	0.0116	0.0161
Beryllium (Be)- Dissolved	mg/L	0.067*	<0.00002	<0.00002	0.00002	0.00004	<0.00002	<0.00002
Cadmium (Cd)- Dissolved	mg/L	0.0027*	0.000043	0.000068	0.000215	0.000015	0.000017	0.000014
Calcium (Ca)- Dissolved	mg/L		818	500	571	520	536	631
Chromium (Cr)- Dissolved	mg/L	0.81*	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Copper (Cu)- Dissolved	mg/L	0.087*	0.00221	0.00199	0.00036	<0.00020	0.00055	0.00323
Iron (Fe)- Dissolved	mg/L		<0.010	0.011	1.26	1.66	0.779	0.014
Lead (Pb)- Dissolved	mg/L	0.025*	<0.000050	0.000086	<0.000050	0.000083	<0.000050	<0.000050
Magnesium (Mg)- Dissolved	mg/L		322	190	306	230	347	730
Manganese (Mn)- Dissolved	mg/L		1.820	0.530	0.274	0.435	0.2140	0.0612
Mercury (Hg)- Total	mg/L	0.0028*	0.0000108	<0.0000050	<0.0000050	0.0000631	<0.0000050	0.0000101
Nickel (Ni)- Dissolved	mg/L	0.49*	0.00996	0.00526	0.00425	0.00520	0.00405	0.00816
Potassium (K)- Dissolved	mg/L		15.0	11.0	12.1	14.3	14.0	26.7
Selenium (Se)- Dissolved	mg/L	0.063*	0.000248	0.000496	<0.000050	<0.000050	<0.000050	0.00025
Silver (Ag)- Dissolved	mg/L	0.0015*	<0.000010	<0.000010	0.000017	0.000018	<0.000010	<0.000010
Sodium (na)- Dissolved	mg/L	2300*	548	510	552	621	539	659
Zinc (Zn)- Dissolved	mg/L	1.1*	0.0022	0.0079	0.0017	0.0019	0.0014	0.0018
Field Parameters								
pH	units		*nr	7.10	*nr	7.09	6.90	7.13
Specific Conductivity	(µS/cm)		*nr	12,880	*nr	5,620	4,006	4,130
Polycyclic Aromatic Hydrocarbons								
Naphthalene	ug/L	6,400	<0.05					<0.05
Benzo(a)pyrene	ug/L	0.81	<0.01					<0.01
Anthracene	ug/L	2.40	<0.01					<0.01
Petroleum Hydrocarbons								
F1 (C6-C10 Hydrocarbons)	mg/L	0.75	<0.10					<0.10
F2 (C10-C16 Hydrocarbons)	mg/L	0.15	<0.10					<0.10
F3 (C16-C34 Hydrocarbons)	mg/L	0.50	<0.25					<0.25
F4 (C34-C50 Hydrocarbons)	mg/L	0.50	<0.25					<0.25
Benzene	ug/L	430	<0.50					<0.50
EthylBenzene	ug/L	2,300	<0.50					<0.50
Toluene	ug/L	18,000	<0.50					<0.50
Xylene (Total)	ug/L	4,200	<0.50					<0.50
Volatile Organic Carbons								
Vinyl chloride	ug/L	1.7	<0.50					<0.50
Pesticides								
Diazinon	µg/L		<0.10					<0.10
Herbicides								
2,4-D	ug/L		<0.05					<0.05

Note: Criteria from Ontario Ministry of the Environment. (2011, July 1). Soil, Ground Water and Sediment Standards for Use Under Part XV.I of the Environmental Protection Act Table 3: Full Depth Generic Site Condition
* Criteria for total chloride and total metals

*nr - no result; technician error

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Table 2.3 2023 Ground Water Monitoring - Bedrock Wells

			Upgradient		Downgradient and Cross Gradient											
			GWQ25-W6		GWQ25-W8		GWQ25-W11		GWQ25-W13		GWQ25-W14		GWQ25-W15		GWQ25-W16	
	Units	Criteria*	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
Inorganic Parameters																
Alkalinity - Bicarbonate	mg/L		142	145	141	139	166	129	224	229	142	143	144	143	141	142
Alkalinity - Carbonate	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Hydroxide	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Total	mg/L		142	145	141	139	166	129	224	229	142	143	144	143	141	142
Dissolved Hardness (CaCO3)	mg/L		909	476	814	834	893	801	1,150	1,020	859	797	767	751	838	762
pH	units		7.36	7.41	7.48	7.44	7.59	7.56	7.16	7.16	7.49	7.49	7.50	7.41	7.51	7.54
Specific Conductivity	(µS/cm)		9,620	9,040	7,890	7,960	8,120	7,730	7,800	7,490	8,260	8,050	7,540	7,370	7,610	7,440
Turbidity	(ntu)		3.80	11.5	9.71	2.65	27.5	20.0	1.61	1.16	8.28	7.42	7.50	2.29	7.51	11.2
Total Dissolved Solids	mg/L		6,270	6,160	5,490	5,230	5,900	5,190	5,260	5,150	5,690	5,370	5,200	4,950	5,250	4,980
Total Suspended Solids	mg/L		564	473	445	472	910	366	927	753	466	476	58	487	175	585
Total Solids	mg/L		6,830	6,630	5,930	5,700	6,810	5,550	6,190	5,900	6,150	5,850	5,260	5,430	5,420	5,560
Dissolved Chloride (Cl)	mg/L	2,300*	2,770	2,770	2,320	2,310	2,270	2,320	2,260	2,220	2,390	2,400	2,300	2,080	2,250	2,170
Dissolved Sulphate (SO4)	mg/L		850	895	680	785	590	660	650	765	655	745	640	725	650	750
Nutrients																
Ammonia - Dissolved	mg/L N		1.42	1.28	1.13	1.17	1.09	0.949	1.16	1.12	1.20	1.26	1.00	1.15	1.02	1.08
Nitrate - Dissolved	mg/L N		0.009	0.007	<0.003	0.027	<0.003	<0.003	<0.003	0.006	<0.003	<1.0	<0.003	0.027	<0.003	<1.0
Total Kjeldahl Nitrogen	mg/L N		1.4	1.3	>1.1	0.9	>1.1	>0.9	>1.2	1.0	>0.8	<1.0	>1.0	0.7	>1.0	<1.0
Phosphorus - Dissolved	mg/L P		<0.013	<0.013	<0.013	0.033	<0.013	<0.013	0.050	0.018	<0.013	<0.003	<0.013	0.140	<0.013	<0.003
Other																
Cyanide - Total (CN)	mg/L	0.066	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Organic Indicators																
Carbonaceous Oxygen Demand	mg/L		133	134	116	120	140	109	110	124	137	113	123	108	124	115
Total Organic Carbon	mg/L		1.2	1.9	1.2	1.8	2.6	1.4	2.9	2.6	1.1	1.9	1.4	1.9	1.7	1.9
Metals																
Arsenic (As)- Dissolved	mg/L	1.9*	*na	0.00916	0.00619	0.00629	0.00630	0.00840	*na	0.00520	0.00594	0.00934	0.00549	0.00545	0.00497	0.00870
Barium (Ba)- Dissolved	mg/L	29*	*na	0.0119	0.0119	0.0127	0.0127	0.0134	*na	0.0117	0.0131	0.0136	0.0127	0.0126	0.0115	0.0117
Beryllium (Be)- Dissolved	mg/L	0.067*	*na	<0.00002	<0.00002	<0.00020	<0.00002	<0.00002	*na	<0.0002	<0.00002	<0.00002	0.00004	<0.0002	0.00003	<0.00002
Cadmium (Cd)- Dissolved	mg/L	0.0027*	*na	0.000008	<0.000005	<0.000050	<0.000005	<0.000005	*na	<0.00005	<0.000005	<0.000005	<0.000005	<0.00005	<0.000005	0.000005
Calcium (Ca)- Dissolved	mg/L		*na	355	307	289	279	288	*na	364	303	289	270	273	283	285
Chromium (Cr)- Dissolved	mg/L	0.81*	*na	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	*na	<0.0050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050
Copper (Cu)- Dissolved	mg/L	0.087*	*na	0.00211	0.00066	<0.0020	<0.00020	0.00037	*na	<0.0020	<0.00020	<0.00020	0.00093	<0.0020	0.00075	0.00175
Iron (Fe)- Dissolved	mg/L		*na	1.38	0.779	0.761	0.499	0.514	*na	0.511	0.722	0.734	0.486	0.598	0.453	0.722
Lead (Pb)- Dissolved	mg/L	0.025*	*na	0.000089	<0.000050	<0.00050	<0.000050	<0.000050	*na	<0.00050	<0.000050	<0.000050	<0.000050	<0.00050	<0.000050	<0.000050
Magnesium (Mg)- Dissolved	mg/L		*na	162	176	159	130	144	*na	188	168	147	154	152	154	151
Manganese (Mn)- Dissolved	mg/L		*na	0.0315	0.0302	0.0299	0.0295	0.0284	*na	0.0532	0.0259	0.0256	0.0326	0.0321	0.0352	0.0368
Mercury (Hg)- Total	mg/L	0.0028*	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
Nickel (Ni)- Dissolved	mg/L	0.49*	*na	0.00115	0.00153	<0.0050	0.00060	0.00057	*na	<0.00500	0.00130	0.00115	0.00138	<0.00500	0.00123	0.00125
Potassium (K)- Dissolved	mg/L		*na	48.0	40.2	35.8	36.1	43.9	*na	24.7	42.6	37.8	31.9	31.0	32.0	34.1
Selenium (Se)- Dissolved	mg/L	0.063*	*na	<0.000050	0.000055	<0.00050	<0.000050	<0.000050	*na	<0.00050	0.000057	<0.000050	<0.000050	<0.00050	0.000052	<0.000050
Silver (Ag)- Dissolved	mg/L	0.0015*	*na	<0.000010	0.00004	<0.00010	<0.000010	0.000019	*na	<0.00010	0.00009	0.000012	<0.000010	<0.00010	<0.000010	<0.000010
Sodium (na)- Dissolved	mg/L	2300*	*na	1,600	1,380	1,360	1,440	1,320	*na	1,120	1,510	1,410	1,220	1,220	1,190	1,250
Zinc (Zn)- Dissolved	mg/L	1.1*	*na	0.0032	0.0012	<0.010	<0.0010	<0.0010	*na	<0.010	<0.0010	0.0019	0.0020	<0.010	0.0023	0.0020
Bacteria																
Total Coliforms (MTF)	MPN/100mL		<1	<1	<1	<1	17	<1	<1	<1	<1	<1	<1	41	<1	<1
Fecal Coliforms (MTF)	MPN/100mL		<1	<1	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
E. coli (MTF)	MPN/100mL		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Field Parameters																
pH	units		7.48	7.15	7.58	7.57	7.24	7.14	7.25	7.27	7.35	7.56	7.75	7.59	7.55	7.79
Specific Conductivity	(µS/cm)		10,310	9,812	4,223	8,530	9,700	8,222	7,886	8,358	4,106	9,371	8,330	7,986	7,651	8,539
Polycyclic Aromatic Hydrocarbons																
Naphthalene	ug/L	6,400	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	ug/L	0.81	<0.005	<0.005	<0.01	<0.005	<0.01	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005
Anthracene	ug/L	2.40	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Petroleum Hydrocarbons																
F1 (C6-C10 Hydrocarbons)	mg/L	0.75	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
F2 (C10-C16 Hydrocarbons)	mg/L	0.15	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
F3 (C16-C34 Hydrocarbons)	mg/L	0.50	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
F4 (C34-C50 Hydrocarbons)	mg/L	0.50	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Benzene	ug/L	430	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
EthylBenzene	ug/L	2,300	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Toluene	ug/L	18,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Xylene (Total)	ug/L	4,200	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Volatile Organic Carbons																
Vinyl chloride	ug/L	1.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Pesticides																
Diazinon	µg/L		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Herbicides																
2,4-D	ug/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Note: Criteria from Ontario Ministry of the Environment. (2011, July 1). Soil, Ground Water and Sediment Standards for Use Under Part XV.I of the Environmental Protection Act Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition

* Criteria for total chloride and total metals

*na - not analysed; contract lab error

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Table 2.3 2023 Ground Water Monitoring - Bedrock Wells

			Downgradient and Cross Gradient											
			GWQ25-W9		GWQ25-W10		GWQ25-W7		GWQ25-W12		GWQ25-W4		GWQ25-W5	
	Units	Criteria*	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
Inorganic Parameters														
Alkalinity - Bicarbonate	mg/L		142	145	228	201	126	129	135	152	49.8	59.6	136	167
Alkalinity - Carbonate	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Hydroxide	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Total	mg/L		142	145	228	201	126	129	135	152	49.8	59.6	136	167
Dissolved Hardness (CaCO3)	mg/L		796	686	852	825	674	610	827	746	487	405	856	508
pH	units		7.49	7.44	7.15	7.25	7.46	7.53	7.46	7.46	7.38	7.73	7.42	7.42
Specific Conductivity	(µS/cm)		8,860	8,800	8,540	8,490	6,720	6,540	8,410	7,560	7,000	6,780	7,910	7,790
Turbidity	(ntu)		7.49	4.09	2.03	7.55	2.47	5.04	5.67	9.35	37.1	15.4	2.86	5.78
Total Dissolved Solids	mg/L		6,290	6,250	5,620	5,800	4,110	4,290	5,450	5,680	4,270	4,370	5,170	5,360
Total Suspended Solids	mg/L		35	178	437	350	600	445	499	381	299	122	415	300
Total Solids	mg/L		6,320	6,430	6,050	6,150	4,710	4,730	5,950	6,060	4,570	4,490	5,580	5,660
Dissolved Chloride (Cl)	mg/L	2,300*	2,630	2,220	2,480	2,420	1,830	1,940	2,510	2,580	636	1,960	2,260	2,600
Dissolved Sulphate (SO4)	mg/L		810	788	935	762	415	610	850	820	590	489	950	786
Nutrients														
Ammonia - Dissolved	mg/L N		1.35	1.41	1.21	1.4	1.95	1.89	1.18	1.20	0.796	0.790	1.01	0.99
Nitrate - Dissolved	mg/L N		<0.003	<1.0	<0.003	<1.0	<0.003	<1.0	0.003	<1.0	<0.003	<1.0	<0.003	<1.0
Total Kjeldahl Nitrogen	mg/L N		>1.3	<0.2	>1.3	<0.2	>2.0	0.8	1.0	<1.0	>0.7	<1.0	>1.1	<1.0
Phosphorus - Dissolved	mg/L P		0.017	<0.003	0.106	0.058	0.043	<0.003	0.017	<0.003	<0.013	<0.003	<0.013	<0.003
Other														
Cyanide - Total (CN)	mg/L	0.066	<0.0050	<0.0050	<0.0050		<0.0050		<0.0050		<0.0050	<0.0050	<0.0050	
Organic Indicators														
Carbonaceous Oxygen Demand	mg/L		146	120	116	125	97	80	118	101	91	112	107	114
Total Organic Carbon	mg/L		1.6	2.6	6.2	3.1	1.5	2.7	1.4	2.6	0.9	6.5	1.5	2.0
Metals														
Arsenic (As)- Dissolved	mg/L	1.9*	0.00717	0.00760	0.00546	0.00634	*na	0.00318	0.00649	0.00536	0.00221	0.00020	0.00451	0.00618
Barium (Ba)- Dissolved	mg/L	29*	0.0109	0.0118	0.0136	0.0144	*na	0.0118	0.0138	0.0137	0.0102	0.0086	0.0158	0.0147
Beryllium (Be)- Dissolved	mg/L	0.067*	0.00004	<0.00002	0.00003	<0.00002	*na	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Cadmium (Cd)- Dissolved	mg/L	0.0027*	<0.000005	<0.000005	<0.000005	<0.000005	*na	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
Calcium (Ca)- Dissolved	mg/L		307	319	309	306	*na	212	353	282	193	171	350	292
Chromium (Cr)- Dissolved	mg/L	0.81*	<0.00050	<0.00050	<0.00050	<0.00050	*na	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Copper (Cu)- Dissolved	mg/L	0.087*	<0.00020	<0.00020	<0.00020	0.00294	*na	0.00035	<0.00020	<0.00020	0.00051	<0.00020	0.00028	0.00048
Iron (Fe)- Dissolved	mg/L		0.882	0.990	1.90	1.39	*na	0.803	0.653	0.621	4.32	2.77	0.690	0.736
Lead (Pb)- Dissolved	mg/L	0.025*	<0.000050	<0.000050	<0.000050	<0.000050	*na	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Magnesium (Mg)- Dissolved	mg/L		160	181	159	174	*na	119	187	166	118	104	218	190
Manganese (Mn)- Dissolved	mg/L		0.0205	0.0212	0.0582	0.0443	*na	0.0091	0.0273	0.0296	0.0747	0.0745	0.0266	0.0338
Mercury (Hg)- Total	mg/L	0.0028*	<0.000005	<0.000005	1.05E-05	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.0000050
Nickel (Ni)- Dissolved	mg/L	0.49*	0.00142	0.00150	0.00239	0.00220	*na	<0.00050	0.00142	0.00151	<0.00050	<0.00050	0.00106	0.00160
Potassium (K)- Dissolved	mg/L		38.8	43.6	39.8	44.0	*na	30.7	49.2	41.6	40.0	32.1	48.8	38.8
Selenium (Se)- Dissolved	mg/L	0.063*	<0.000050	<0.000050	<0.000050	<0.000050	*na	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silver (Ag)- Dissolved	mg/L	0.0015*	<0.000010	<0.000010	<0.000010	<0.000010	*na	<0.000010	<0.000010	0.000028	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (na)- Dissolved	mg/L	2300*	1,510	1,450	1,410	1,460	*na	1,060	1,450	1,420	1,180	1,130	1,230	1,280
Zinc (Zn)- Dissolved	mg/L	1.1*	<0.0010	0.0011	0.0013	0.0020	*na	0.0061	0.0010	0.0011	<0.0010	<0.0010	0.0202	0.0526
Bacteria														
Total Coliforms (MTF)	MPN/100mL		1	1	<1		<1	<1	<1	<1	>2,420	17	<1	
Fecal Coliforms (MTF)	MPN/100mL		<1	<1	<1		<1	<1	<1	<1	517	<1	<1	
E. coli (MTF)	MPN/100mL		<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	
Field Parameters														
pH	units		7.57	7.71	7.32	7.49	7.66	7.85	7.31	7.55	8.58	8.05	7.61	7.86
Specific Conductivity	(µS/cm)		10,600	10,520	8612	10,710	770	7,742	7,593	8,794	7,056	7,474	8,347	8,880
Polycyclic Aromatic Hydrocarbons														
Naphthalene	ug/L	6,400	<0.05	<0.05	<0.05		<0.05		<0.05		<0.05	0.05	<0.05	
Benzo(a)pyrene	ug/L	0.81	<0.005	<0.005	<0.01		<0.005		<0.01		<0.01	<0.005	<0.005	
Anthracene	ug/L	2.40	<0.01	<0.01	<0.01		<0.01		<0.01		<0.01	<0.01	<0.01	
Petroleum Hydrocarbons														
F1 (C6-C10 Hydrocarbons)	mg/L	0.75	<0.10	<0.10	<0.10		<0.10		<0.10		<0.10	<0.10	<0.10	
F2 (C10-C16 Hydrocarbons)	mg/L	0.15	<0.10	<0.10	<0.10		<0.10		<0.10		<0.10	<0.10	<0.10	
F3 (C16-C34 Hydrocarbons)	mg/L	0.50	<0.25	<0.25	<0.25		<0.25		<0.25		<0.25	<0.25	<0.25	
F4 (C34-C50 Hydrocarbons)	mg/L	0.50	<0.25	<0.25	<0.25		<0.25		<0.25		<0.25	<0.25	<0.25	
Benzene	ug/L	430	<0.50	<0.50	<0.50		<0.50		<0.50		<0.50	<0.50	<0.50	
EthylBenzene	ug/L	2,300	<0.50	<0.50	<0.50		<0.50		<0.50		<0.50	<0.50	<0.50	
Toluene	ug/L	18,000	<0.50	<0.50	<0.50		<0.50		<0.50		<0.50	<0.50	<0.50	
Xylene (Total)	ug/L	4,200	<0.50	<0.50	<0.50		<0.50		<0.50		<0.50	<0.50	<0.50	
Volatile Organic Carbons														
Vinyl chloride	ug/L	1.7	<0.50	<0.50	<0.50		<0.50		<0.50		<0.50	<0.50	<0.50	
Pesticides														
Diazinon	µg/L		<0.10	<0.10	<0.10		<0.10		<0.10		<0.10	<0.10	<0.10	
Herbicides														
2,4-D	ug/L		<0.05	<0.05	<0.05		<0.05		<0.05		<0.05	<0.05	<0.05	

Note: Criteria from Ontario Ministry of the Environment. (2011, July 1). Soil, Ground Water and Sediment Standards for Use Under Part XV.I of the Environmental Protection Act Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water
* Criteria for total chloride and total metals

*na - not analysed; contract lab error

The 2019-2023 average results are provided in Tables 3.1-3.3. Although the average concentration of some metals are higher in the downgradient and cross gradient samples than in the upgradient samples, they are below the MOE guidelines. The average dissolved chloride concentration often exceeds the MOE guideline of 2,300 mg/L in upgradient, downgradient, and cross gradient samples.

The Piper diagrams provided in Appendix B display tight groupings of ground water sampling data, which is indicative of no significant ground water chemical changes.

Time versus concentration graphs provided in Appendix C show the historical relationship of the analytical parameters at each monitoring location. In general, the analytical results for ground water obtained in 2023 were found to be similar to those obtained in 2018-2022, and are consistent with background levels.

The Contingency Action Plan identified under Clause 125 was not implemented in 2023.

In 2023, we were unable to finalize any recommendations for changes. In 2024, we will be completing our re-evaluation of the SAP to put forth recommendations for sampling frequency and analyte changes in the Annual Report.

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Table 3.1 2019-2023 Ground Water Quality Comparison - Clay Wells

	Units	Criteria	2019 Average		2020 Average		2021 Average		2022 Average		2023 Average	
Inorganic Parameters			**Upgradient**	**Downgradient**	**Upgradient**	**Downgradient**	**Upgradient**	**Downgradient**	**Upgradient**	**Downgradient**	**Upgradient**	**Downgradient**
Alkalinity - Bicarbonate	mg/L		530	546	528	555	519	509	512	462	523	481
Alkalinity - Carbonate	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Hydroxide	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Total	mg/L		530	546	528	555	519	509	512	462	523	481
Dissolved Hardness (CaCO3)	mg/L		1,720	2,202	1,370	1,777	1,360	1,713	1,430	1,434	1,510	1,630
pH	units		6.89	6.98	6.81	6.91	6.87	6.87	6.95	7.11	6.79	6.99
Specific Conductivity	(µS/cm)		4,800	6,622	4,820	6,523	4,680	6,528	4,640	6,208	4,380	5,882
Turbidity	(ntu)		24.3	42.2	122.0	329.5	26.8	51.8	50.6	227.7	65.3	31.5
Total Dissolved Solids	mg/L		3,880	6,783	3,960	5,376	3,900	4,823	3,870	4,850	4,280	5,502
Total Suspended Solids	mg/L		268	970	183	1,143	175	2,919	589	905	<3.0	1,136
Total Solids	mg/L		4,150	7,753	4,140	6,516	4,070	7,748	4,450	5,753	4,100	6,615
Dissolved Chloride (Cl)	mg/L	2,300 *	570	1,067	369	1,057	765	1,892	425	1,018	426	959
Dissolved Sulphate (SO4)	mg/L		1,730	2,160	1,680	2,110	1,730	2,052	2,070	2,056	1,570	1,990
Nutrients												
Ammonia - Dissolved	mg/L N		0.005	0.356	0.012	0.362	0.098	0.604	0.048	0.386	0.246	0.356
Nitrate - Dissolved	mg/L N		0.855	0.356	0.923	0.408	0.654	0.200	0.788	0.335	0.420	0.334
Total Kjeldahl Nitrogen	mg/L N		0.2	0.9	0.2	1.2	1.2	1.6	0.3	1.0	0.8	1.0
Phosphorus - Dissolved	mg/L P		<0.013	0.017	0.027	0.027	<0.013	<0.013	<0.013	0.015	0.029	0.026
Other												
Cyanide - Total (CN)	mg/L	0.066	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.00	*ns	*ns
Organic Indicators												
Chemical Oxygen Demand	mg/L		32	156	47	97	37	80	54	105	71	98
Total Organic Carbon	mg/L		10.0	23.0	9.9	37.7	8.7	17.6	8.1	13.9	13.2	15.0
Metals												
Arsenic (As)- Dissolved	mg/L	1.9*	0.000480	0.000758	0.000480	0.000876	0.000500	0.000722	0.000370	0.005130	0.000410	0.001142
Barium (Ba)- Dissolved	mg/L	29*	0.00810	0.01083	0.00870	0.01166	0.00870	0.01157	0.01390	0.01340	0.00880	0.01115
Beryllium (Be)- Dissolved	mg/L	0.067*	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00003	<0.00002
Cadmium (Cd)- Dissolved	mg/L	0.0027*	0.000047	0.000155	0.000026	0.000141	0.000050	0.000120	0.000043	0.000078	0.000079	0.000182
Calcium (Ca)- Dissolved	mg/L		579	697	405	597	531	652	610	532	614	676
Chromium (Cr)- Dissolved	mg/L	0.81*	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	0.00	0.00026	<0.00050	<0.00050
Copper (Cu)- Dissolved	mg/L	0.087*	0.0014	0.0021	0.00187	0.00278	0.00313	0.00329	0.00282	0.00345	0.00156	0.00203
Iron (Fe)- Dissolved	mg/L		<0.010	0.058	0.016	0.011	0.013	0.012	<0.010	0.717	0.033	0.054
Lead (Pb)- Dissolved	mg/L	0.025*	<0.000050	<0.000050	<0.000050	<0.000050	0.000106	0.000094	0.000078	0.000203	<0.000050	<0.000050
Magnesium (Mg)- Dissolved	mg/L		212	334	160	285	202	295	206	259	217	368
Manganese (Mn)- Dissolved	mg/L		0.86	1.54	1.10	1.47	1.42	1.67	0.16	1.49	1.66	1.70
Mercury (Hg)- Total	mg/L	0.0028	<0.0000050	0.0000710	<0.0000050	0.0000680	<0.0000050	0.0000852	<0.0000050	<0.0000050	<0.0000050	0.0000095
Nickel (Ni)- Dissolved	mg/L	0.49*	0.00667	0.00972	0.00640	0.00925	0.00696	0.01119	0.00672	0.00719	0.00756	0.01004
Potassium (K)- Dissolved	mg/L		10.2	11.4	9.8	10.7	9.7	11.4	9.9	17.5	10.1	12.1
Selenium (Se)- Dissolved	mg/L	0.063*	0.00014	0.01189	0.000069	0.00048	0.000114	0.00021	0.000121	0.00474	0.000072	0.00036
Silver (Ag)- Dissolved	mg/L	0.0015*	0.000010	0.000020	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000015	0.000011
Sodium (na)- Dissolved	mg/L	2,300*	332	550	267	415	309	509	319	699	333	533
Zinc (Zn)- Dissolved	mg/L	1.1*	0.00450	0.00547	0.00640	0.00611	0.00530	0.00607	0.00480	0.00633	0.00510	0.00575
Field Parameters												
pH	units		7.44	7.67	7.44	7.34	7.24	7.26	7.19	7.19	*nr	6.74
Specific Conductivity	(µS/cm)		4,050	5,295	4,050	5,010	4,310	5,693	4,570	5,613	*nr	7,140
Polycyclic Aromatic Hydrocarbons												
Naphthalene	ug/L	6,400	<0.050		<0.050		<0.050		*ns		*ns	
Benzo(a)pyrene	ug/L	0.81	<0.0050		<0.0050		<0.0050		*ns		*ns	
Anthracene	ug/L	2.40	<0.010		<0.010		<0.010		*ns		*ns	
Petroleum Hydrocarbons												
F1 (C6-C10 Hydrocarbons)	mg/L	0.75	<0.10		<0.10		<0.10		*ns		*ns	
F2 (C10-C16 Hydrocarbons)	mg/L	0.15	<0.10		<0.10		<0.10		*ns		*ns	
F3 (C16-C34 Hydrocarbons)	mg/L	0.50	<0.25		<0.25		<0.25		*ns		*ns	
F4 (C34-C50 Hydrocarbons)	mg/L	0.50	<0.25		<0.25		<0.25		*ns		*ns	
Benzene	ug/L	430	<0.50		<0.50		<0.50		*ns		*ns	
EthylBenzene	ug/L	2,300	<0.50		<0.50		<0.50		*ns		*ns	
Toluene	ug/L	18,000	<0.50		<0.50		<0.50		*ns		*ns	
Xylene (Total)	ug/L	4,200	<0.50		<0.64		<0.64		*ns		*ns	
Volatile Organic Carbons												
Vinyl chloride	ug/L	1.7	<0.50		<0.50		<0.50		*ns		*ns	
Pesticides												
Diazinon	µg/L		<0.10		<0.10		<0.10		*ns		*ns	
Herbicides												
2,4-D	ug/L		<0.10		<0.10		<0.10		*ns		*ns	

Note: Criteria from Ontario Ministry of the Environment. (2011, July 1). Soil, Ground Water and Sediment Standards for Use Under Part XV.I of the Environmental Protection Act Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition

Note: Where value is expressed as less than (<), the value is halved and used in the calculations, where value is expressed as (>), the value is used in the calculations.
* Criteria for total chloride, total metals and xylene mixture

*ns - not submitted
*nr - no result technician error

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Table 3.2 2019-2023 Ground Water Quality Comparison - Till Wells

	Units	Criteria	2019 Average		2020 Average		2021 Average		2022 Average		2023 Average	
Inorganic Parameters			**Upgradient**	**Downgradient**	**Upgradient**	**Downgradient**	**Upgradient**	**Downgradient**	**Upgradient**	**Downgradient**	**Upgradient**	**Downgradient**
Alkalinity - Bicarbonate	mg/L		604	1,007	572	554	576	539	174	446	582	423
Alkalinity - Carbonate	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Hydroxide	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Total	mg/L		604	1,007	572	554	576	539	174	446	582	423
Dissolved Hardness (CaCO3)	mg/L		1,510	3,436	1,240	2,435	1,170	3,216	1,470	4,599	1,360	3,254
pH	units		6.93	7.12	6.95	7.13	6.90	7.12	6.81	7.16	6.83	7.16
Specific Conductivity	(µS/cm)		4,270	7,049	4,080	6,694	4,185	6,874	4,200	6,590	3,880	6,291
Turbidity	(ntu)		247	3,338	186	1,636	150	2,747	401	2,953	536	1,865
Total Dissolved Solids	mg/L		3,300	4,297	3,285	4,318	3,285	4,734	3,910	5,994	3,490	5,370
Total Suspended Solids	mg/L		880	9,199	581	7,044	325	11,398	780	12,110	712	8,500
Total Solids	mg/L		4,180	12,768	3,865	11,355	3,615	16,131	4,690	18,101	4,200	12,534
Dissolved Chloride (Cl)	mg/L	2,300 *	436	1,643	405	1,415	3,200	1,898	505	1,361	362	1,267
Dissolved Sulphate (SO4)	mg/L		1,375	1,101	1,405	1,500	1,063	1,340	3,590	1,478	1,360	1,466
Nutrients												
Ammonia - Dissolved	mg/L N		0.386	0.859	0.198	0.758	0.612	0.892	0.103	0.718	0.545	0.825
Nitrate - Dissolved	mg/L N		0.206	0.048	0.588	0.189	0.502	0.412	0.670	0.166	0.163	0.108
Total Kjeldahl Nitrogen	mg/L N		0.7	1.5	0.3	1.3	0.7	1.6	0.4	1.4	1.4	1.6
Phosphorus - Dissolved	mg/L P		<0.013	0.013	0.023	0.030	0.081	1.667	<0.013	0.018	0.026	0.028
Other												
Cyanide - Total (CN)	mg/L	0.066	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050
Organic Indicators												
Chemical Oxygen Demand	mg/L		43	354	43	252	42	299	60	579	59	331
Total Organic Carbon	mg/L		9.4	18.1	8.4	47.0	8.1	18.9	8.7	30.8	7.9	30.6
Metals												
Arsenic (As)- Dissolved	mg/L	1.9*	0.001110	0.003034	0.000975	0.001805	0.000865	0.002219	0.000970	0.002403	0.001250	0.003527
Barium (Ba)- Dissolved	mg/L	29*	0.00804	0.01161	0.00840	0.01268	0.00800	0.01244	0.00900	0.01415	0.00820	0.01639
Beryllium (Be)- Dissolved	mg/L	0.067*	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000030	0.000056
Cadmium (Cd)- Dissolved	mg/L	0.0027*	0.000057	0.000033	0.000022	0.000050	0.000022	0.000027	0.000021	0.000037	0.000022	0.000061
Calcium (Ca)- Dissolved	mg/L		432	495	416	473	419	439	401	433	454	501
Chromium (Cr)- Dissolved	mg/L	0.81*	<0.00010	<0.00010	<0.00010	0.00010	<0.00010	0.00016	<0.00010	0.00039	<0.00050	0.00085
Copper (Cu)- Dissolved	mg/L	0.087*	0.0014	0.0002	0.0016	0.0013	0.0025	0.0016	0.0023	0.0028	0.0016	0.0042
Iron (Fe)- Dissolved	mg/L		0.022	0.530	0.058	0.318	0.014	0.488	<0.010	0.454	0.104	1.032
Lead (Pb)- Dissolved	mg/L	0.025*	<0.000050	<0.000050	<0.000050	0.000064	0.000055	0.000142	0.000063	0.000217	<0.000050	0.000867
Magnesium (Mg)- Dissolved	mg/L		195	231	166	214	174	224	151	258	192	302
Manganese (Mn)- Dissolved	mg/L		1.17	0.55	1.25	0.78	1.28	0.58	1.54	0.53	1.39	0.60
Mercury (Hg)- Total	mg/L	0.0028	0.0000190	0.0000650	0.0000063	0.0001407	0.0000090	0.0000537	<0.0000050	0.0000376	0.0000050	0.0000173
Nickel (Ni)- Dissolved	mg/L	0.49*	0.00791	0.00418	0.00763	0.00487	0.00768	0.00445	0.00840	0.00464	0.00802	0.00614
Potassium (K)- Dissolved	mg/L		8.6	19.6	8.6	16.9	7.8	17.6	7.8	15.7	8.6	20.0
Selenium (Se)- Dissolved	mg/L	0.063*	0.00008	0.00025	<0.000050	0.00010	0.000080	0.000082	0.000096	0.010769	<0.000050	0.000307
Silver (Ag)- Dissolved	mg/L	0.0015*	0.000015	0.000021	0.000013	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000011	0.000021
Sodium (na)- Dissolved	mg/L	2,300*	371	835	318	676	311	717	281	633	344	755
Zinc (Zn)- Dissolved	mg/L	1.1*	0.00360	0.00250	0.00340	0.00380	0.00410	0.00350	0.00450	0.00416	0.00320	0.00647
Field Parameters												
pH	units		7.59	7.80	7.27	7.34	7.39	7.60	7.25	7.50	6.82	7.19
Specific Conductivity	(µS/cm)		4,650	5,581	3,875	5,768	3,620	6,181	4,380	6,291	4,309	7,585
Polycyclic Aromatic Hydrocarbons												
Naphthalene	ug/L	6,400	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	ug/L	0.81	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.005
Anthracene	ug/L	2.40	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	<0.01
Petroleum Hydrocarbons												
F1 (C6-C10 Hydrocarbons)	mg/L	0.75	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
F2 (C10-C16 Hydrocarbons)	mg/L	0.15	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
F3 (C16-C34 Hydrocarbons)	mg/L	0.50	<0.25	<0.25	<0.25	0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
F4 (C34-C50 Hydrocarbons)	mg/L	0.50	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Benzene	ug/L	430	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
EthylBenzene	ug/L	2,300	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Toluene	ug/L	18,000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Xylene (Total)	ug/L	4,200	<0.50	<0.50	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.50	<0.50
Volatile Organic Carbons												
Vinyl chloride	ug/L	1.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Pesticides												
Diazinon	µg/L		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Herbicides												
2,4-D	ug/L		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.05	<0.50

Note: Criteria from Ontario Ministry of the Environment. (2011, July 1). Soil, Ground Water and Sediment Standards for Use Under Part XV.I of the Environmental Protection Act Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition

Note: Where value is expressed as less than (<), the value is halved and used in the calculations, where value is expressed as (>), the value is used in the calculations.
** Total phosphorus results, dissolved phosphorus not analysed
* Criteria for total chloride, total metals and xylene mixture

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Table 3.3 2019-2023 Ground Water Quality Comparison - Bedrock Wells

			2019		2020		2021		2022		2023	
			Average		Average		Average		Average		Average	
Inorganic Parameters	Units	Criteria	**Upgradient**	**Downgradient**	**Upgradient**	**Downgradient**	**Upgradient**	**Downgradient**	**Upgradient**	**Downgradient**	**Upgradient**	**Downgradient**
Alkalinity - Bicarbonate	mg/L		150	154	141	138	137	140	145	145	144	148
Alkalinity - Carbonate	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Hydroxide	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Total	mg/L		150	154	141	138	137	140	145	145	144	148
Dissolved Hardness (CaCO3)	mg/L		998	872	819	811	908	809	865	760	693	773
pH	units		7.58	7.51	7.47	7.57	7.36	7.49	7.43	7.52	7.39	7.44
Specific Conductivity	(µS/cm)		10,100	8,433	10,105	8,263	10,050	8,400	10,100	8,401	9,330	7,778
Turbidity	(ntu)		6.8	12.4	11.6	8.0	9.6	10.4	6.5	9.5	7.7	17.2
Total Dissolved Solids	mg/L		6,220	4,989	6,245	5,032	6,370	5,263	6,255	5,115	6,215	5,263
Total Suspended Solids	mg/L		401	475	359	334	144	221	323	457	519	424
Total Solids	mg/L		6,625	5,463	6,610	5,366	6,515	5,484	6,580	5,570	6,730	5,685
Dissolved Chloride (Cl)	mg/L	2,300 *	1,855	2,281	2,800	2,393	5,185	3,045	3,100	2,439	2,770	2,223
Dissolved Sulphate (SO4)	mg/L		833	680	949	882	512	547	1,003	834	873	713
Nutrients												
Ammonia - Dissolved	mg/L N		1.44	1.11	1.43	1.12	1.27	1.06	1.32	1.15	1.35	1.19
Nitrate - Dissolved	mg/L N		<0.003	0.035	0.010	0.005	0.013	0.023	0.069	0.017	0.008	0.170
Total Kjeldahl Nitrogen	mg/L N		2.0	1.5	1.7	1.1	1.7	1.3	1.4	1.1	1.4	0.9
Phosphorus - Dissolved	mg/L P		<0.013	<0.013	<0.013	<0.013	0.017	0.015	0.020	0.013	<0.013	0.023
Other												
Cyanide - Total (CN)	mg/L	0.066	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050
Organic Indicators												
Chemical Oxygen Demand	mg/L		118	81	177	115	185	119	128	105	134	115
Total Organic Carbon	mg/L		1.9	2.3	1.5	1.1	1.2	1.0	1.2	1.0	1.6	4.8
Metals												
Arsenic (As)- Dissolved	mg/L	1.9*	0.000865	0.003519	0.005830	0.006633	0.005455	0.005001	0.003620	0.004445	0.009160	0.005771
Barium (Ba)- Dissolved	mg/L	29*	0.01490	0.02337	0.01250	0.01287	0.01210	0.01260	0.01225	0.01315	0.01190	0.01259
Beryllium (Be)- Dissolved	mg/L	0.067*	<0.00010	<0.010	<0.00010	<0.00010	<0.00100	<0.00100	<0.00010	<0.00010	<0.00002	0.000027
Cadmium (Cd)- Dissolved	mg/L	0.0027*	0.000140	0.000130	0.000006	<0.000005	0.000016	0.000008	0.000007	<0.000005	0.000008	0.000006
Calcium (Ca)- Dissolved	mg/L		353	326	315	295	331	294	359	302	355	287
Chromium (Cr)- Dissolved	mg/L	0.81*	0.00052	0.00645	<0.00010	0.00012	<0.00100	0.00015	<0.00010	<0.00010	<0.00050	<0.0050
Copper (Cu)- Dissolved	mg/L	0.087*	0.0036	0.0042	<0.0002	0.0003	0.0012	0.0009	0.0002	0.0004	0.0021	0.0006
Iron (Fe)- Dissolved	mg/L		<0.010	0.516	1.305	0.750	1.310	0.772	0.650	0.421	1.380	1.024
Lead (Pb)- Dissolved	mg/L	0.025*	0.000094	0.000186	0.000152	<0.000050	0.000210	0.000085	0.000090	<0.000050	0.000089	<0.00050
Magnesium (Mg)- Dissolved	mg/L		166	129	151	160	162	152	166	160	162	159
Manganese (Mn)- Dissolved	mg/L		0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04
Mercury (Hg)- Total	mg/L	0.0028	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000096	<0.0000050	<0.0000050
Nickel (Ni)- Dissolved	mg/L	0.49*	0.00289	0.00280	0.00136	0.00119	0.00184	0.00145	0.00121	0.00122	0.00115	0.00111
Potassium (K)- Dissolved	mg/L		49.0	30.8	46.6	36.9	43.2	34.4	45.1	36.3	48.0	38.1
Selenium (Se)- Dissolved	mg/L	0.063*	<0.000050	0.00036	<0.000050	<0.000050	<0.000500	0.00011	<0.000050	0.00006	<0.000050	0.000060
Silver (Ag)- Dissolved	mg/L	0.0015*	0.000014	0.000036	0.000020	0.000028	<0.000100	0.000069	<0.000010	<0.000010	<0.000010	0.000019
Sodium (na)- Dissolved	mg/L	2,300*	1,750	1,129	1,645	1,306	1,675	1,308	1,585	1,285	1,600	1,318
Zinc (Zn)- Dissolved	mg/L	1.1*	0.05180	0.01720	0.00465	0.00400	0.00440	0.00421	0.00330	0.00368	0.00320	0.00513
Bacteria												
Total Coliforms (MTF)	MPN/100mL		<1	2	<1	5	<1	<1	<1	2	<1	114
Fecal Coliforms (MTF)	MPN/100mL		<1	1	<1	<1	<1	<1	<1	<1	<1	24
E. coli (MTF)	MPN/100mL		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Field Parameters												
pH	units		7.77	7.78	8.16	8.09	7.88	7.96	7.59	7.71	7.32	7.59
Specific Conductivity	(µS/cm)		8,215	6,961	9,185	7,403	8,735	6,635	8,155	9,436	10,061	7,917
Polycyclic Aromatic Hydrocarbons												
Naphthalene	ug/L	6,400	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	ug/L	0.81	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Anthracene	ug/L	2.40	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Petroleum Hydrocarbons												
F1 (C6-C10 Hydrocarbons)	mg/L	0.75	<0.10	<0.10	<0.10	<0.10	0.20	<0.10	<0.10	<0.10	<0.10	<0.10
F2 (C10-C16 Hydrocarbons)	mg/L	0.15	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
F3 (C16-C34 Hydrocarbons)	mg/L	0.50	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
F4 (C34-C50 Hydrocarbons)	mg/L	0.50	<0.25	<0.25	0.27	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Benzene	ug/L	430	<0.50	<0.50	<0.50	<0.50	3.26	<0.50	<0.50	<0.50	<0.50	<0.50
EthylBenzene	ug/L	2,300	<0.50	<0.50	<0.50	<0.50	7.58	<0.50	<0.50	<0.50	<0.50	<0.50
Toluene	ug/L	18,000	<0.50	<0.50	<0.50	<0.50	25.3	<0.50	<0.50	<0.50	<0.50	<0.50
Xylene (Total)	ug/L	4,200	<0.50	<0.50	<0.64	<0.64	32.9	<0.64	<0.64	<0.64	<0.50	<0.50
Volatile Organic Carbons												
Vinyl chloride	ug/L	1.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Pesticides												
Diazinon	µg/L		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Herbicides												
2,4-D	ug/L		<0.10	<0.10	<0.10	<0.10	<0.10	0.0002	<0.10	<0.10	<0.05	<0.05

Note: Criteria from Ontario Ministry of the Environment. (2011, July 1). Soil, Ground Water and Sediment Standards for Use Under Part XV.I of the Environmental Protection Act Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition

* Criteria for total chloride, total metals and xylene mixture

5.2 SURFACE WATER

Surface water flows at the BRRMF are managed by perimeter ditching and the central access road, which creates a barrier between the impacted water ditches on the north and the clean water ditches on the south; there are also eight surface water retention ponds. The system is designed to run dry for most of the year, as such, grab sampling is performed three times per year: spring run-off, summer run-off, and autumn run-off. The surface water sampling points are shown in Figure 3.

As per the BRRMF Operating Plan, surface water is managed in accordance with the Surface Water Sampling and Analysis Plan (SAP), as specified under Clause 115. Compliance parameters are applied to the upstream and downstream sampling points, with modifications at other locations interior to the site. Sampling for the clean water ponds (SWQ-25-9a and b) is similar to sampling for perimeter ditching. Sampling for impacted water ponds: Active Area Collection Pond (SWQ-25-6), Biosolids Storm Water Pond (SWQ-25-7), Leaf and Yard Waste Storm Water Pond (SWQ-25-8) and dry ponds (SWQ-25-11 a, b, and c) is performed prior to discharge events. The Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines for the Protection of Freshwater Aquatic Life are used as the regulatory guideline (CCME, 2019). Weekly field monitoring is performed at the weir from spring thaw to freeze-up.

In 2023, a total of 18 surface water samples were analyzed – one upstream sample, four downstream samples, nine interior samples, and four pond samples. There were no deviations from the Surface Water SAP or from normal sample collection and preservation practices. Weekly weir data is provided in Table 4 and the 2023 surface water results are provided in Table 5.

The analytical results for some of the pond samples exceeded the guidelines for pH, arsenic, and iron; the water was retained in the ponds or hauled for treatment as required. Some of the analytical results for perimeter ditching were highly variable between sample points, and between sample dates at the same location, but most were below the CCME guidelines. The concentration of iron exceeded the CCME guideline at the upstream location, one of the downstream locations and at five interior locations. Arsenic and chloride exceeded the guideline at some interior and downstream locations, this is due to its natural occurrence in Manitoba soils.

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Table 4. 2023 Weekly Weir Data

Date	Flow (m/s)	pH (units)	Conductivity (m/s)	DO (mg/L)	Temp (°C)
14-Apr-23	0.0	8.01	0.67	18.1	15.8
21-Apr-23	0.0	8.03	0.40	16.6	17.2
27-Apr-23	0.0	8.04	0.50	12.7	15.6
3-May-23	0.0	7.60	0.68	8.83	22.8
12-May-23	0.0	7.97	1.09	*na	24.3
19-May-23	0.0	7.75	1.57	6.60	17.3
23-May-23	0.0	7.75	1.82	7.51	18.2
2-Jun-23	0.0	8.05	3.60	8.04	22.0
9-Jun-23	0.0	7.95	3.26	7.00	27.0
16-Jun-23	0.0	8.00	1.77	6.78	18.0
20-Jun-23	0.0	8.08	4.68	4.96	30.5
30-Jun-23	0.0	8.18	4.07	6.80	28.9
4-Jul-23	0.0	8.25	4.13	6.95	22.8
14-Jul-23	0.0	8.09	4.20	2.26	24.3
19-Jul-23	0.0	8.05	4.29	5.21	24.5
27-Jul-23	0.0	8.10	3.53	3.41	28.2
11-Aug-23	0.0	8.12	3.34	7.37	26.4
18-Aug-23	0.0	8.21	3.77	5.95	25.0
22-Aug-23	0.0	8.13	3.82	2.32	19.9
1-Sep-23	0.0	8.14	4.13	2.35	21.2
8-Sep-23	**ns	**ns	**ns	**ns	**ns
13-Sep-23	0.0	8.46	5.24	9.58	10.0
20-Sep-23	**ns	**ns	**ns	**ns	**ns
25-Sep-23	0.0	8.31	3.77	8.80	13.0
6-Oct-23	0.0	7.53	8.78	3.89	10.0
13-Oct-23	**ns	**ns	**ns	**ns	**ns
20-Oct-23	0.0	8.18	4.42	8.67	20.0

*na - not analysed due to equipment malfunction
**ns - no sample due to inadequate staffing

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Table 5. 2023 Surface Water Monitoring

			Ponds				Upstream	Downstream			
			SW25-9A		SW25-9B		SW25-1	SW25-2			SW25-16
	Units	Criteria*	3-May-23	19-Jul-23	3-May-23	20-Jul-23	3-May-23	3-May-23	20-Jul-23	7-Sep-23	3-May-23
Inorganic Parameters											
Alkalinity - Bicarbonate	mg/L		367	115	363	85	351	223	1,340	1,240	373
Alkalinity - Carbonate	mg/L		<3.0	99	<3.0	129	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Hydroxide	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Total	mg/L		367	214	363	213	351	223	1,340	1,240	373
Dissolved Hardness (CaCO3)	mg/L		238	281	222	291	145	264	1,351	1,218	253
pH	units	6.5-9.0	7.78	9.37	7.79	9.52	7.48	7.68	7.92	8.10	7.96
Specific Conductivity	(µS/cm)		605	808	487	777	325	668	4,220	3,980	656
Turbidity	(ntu)		31.4	33.4	47.3	25.7	269	93.9	91.9	233	5.41
Total Dissolved Solids	mg/L		368	539	305	586	240	432	2,950	2,630	386
Total Suspended Solids	mg/L		48	107	63	68	490	252	223	156	50.0
Total Solids	mg/L		416	646	368	654	730	684	3,180	2,780	436
Dissolved Chloride (Cl)	mg/L	640*	51.5	124	37.0	21.0	13.7	59.5	710	710	77.5
Dissolved Sulphate (SO4)	mg/L		15.1	52.0	33.7	43.4	2.5	60	175	74	42.9
Nutrients											
Ammonia - Dissolved	mg/L N		2.170	0.257	1.990	0.069	0.131	0.317	<0.003	0.142	0.006
Nitrate - Dissolved	mg/L N	13	0.854	0.05	1.790	0.386	0.034	2.030	<0.003	0.014	<0.003
Total Kjeldahl Nitrogen	mg/L N		3.00	1.90	3.20	1.80	0.60	2.2	>9.3	10.7	>1.2
Phosphorus - Dissolved	mg/L P		0.285	0.109	0.395	0.050	0.075	0.299	0.881	0.205	0.051
Other											
Cyanide - Total (CN)	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Organic Indicators											
Carbonaceous Oxygen Demand	mg/L		72	84	73	99	133	108	432	360	55
Biochemical Oxygen Demand	mg/L		4	5	7	16	7	16	26	11	<3
Metals											
Arsenic (As)- Dissolved	mg/L	0.0050*	0.0040	0.0097	0.0041	0.0095	0.00215	0.00551	0.03640	0.02500	0.00372
Barium (Ba)- Dissolved	mg/L		0.0618	0.0554	0.0612	0.0536	0.0309	0.0676	0.2660	0.3050	0.0571
Beryllium (Be)- Dissolved	mg/L		0.00003	<0.00002	0.00006	<0.00002	0.00003	0.00005	0.00005	0.00006	0.00004
Cadmium (Cd)- Dissolved	mg/L	0.00009*	0.000020	<0.000005	0.000028	<0.000005	0.000025	0.000036	0.000020	0.000007	0.000011
Calcium (Ca)- Dissolved	mg/L		42.2	32.7	39.8	32.3	28.5	45.2	160	115	46.9
Chromium (Cr)- Dissolved	mg/L		0.00073	<0.00050	0.00093	<0.00050	0.00111	0.00108	0.00265	0.00103	<0.00050
Copper (Cu)- Dissolved	mg/L	0.0040*	0.00275	0.00080	0.00359	0.00085	0.00231	0.00399	0.00181	0.00058	0.00308
Iron (Fe)- Dissolved	mg/L	0.30*	0.396	0.035	0.518	0.102	0.544	0.508	1.040	0.067	0.120
Lead (Pb)- Dissolved	mg/L	0.0070*	0.000511	0.000072	0.000929	0.000151	0.000572	0.000783	0.000818	<0.000050	0.000253
Magnesium (Mg)- Dissolved	mg/L		32.2	48.3	29.7	51.1	18.0	36.7	231.0	226	33.0
Manganese (Mn)- Dissolved	mg/L		0.1630	0.0137	0.1670	0.0540	0.0295	0.0578	1.670	0.588	0.0169
Mercury (Hg)- Dissolved	mg/L	0.000026*	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000055	<0.0000050	<0.0000050
Nickel (Ni)- Dissolved	mg/L	0.150*	0.0053	0.0049	0.0056	0.0053	0.00237	0.00800	0.06200	0.05340	0.00372
Potassium (K)- Dissolved	mg/L		15.5	19.8	14.8	18.6	9.3	22.3	144	128	15.2
Selenium (Se)- Dissolved	mg/L	0.0010*	0.000162	0.000231	0.000156	0.000167	0.000125	0.000168	0.000564	0.000617	0.000245
Sodium (Na)- Dissolved	mg/L		23.8	47.1	20.1	49.4	8.68	31.6	388	367	38.6
Zinc (Zn)- Dissolved	mg/L	0.030*	0.0084	0.0022	0.0085	0.0016	0.0046	0.0089	0.0048	0.0018	0.0045
Bacteria											
Total Coliforms (MTF)	MPN/100mL		411	>2,420	1,120	>2,420	>2,420	687	2,420	>2,420	548
Fecal Coliforms (MTF)	MPN/100mL		3	201	25	178	64	16	>2,420	870	236
E. coli (MTF)	MPN/100mL		23	248	88	326	67	2	>2,420	>2,420	<1
Field Parameters											
pH	units	6.5-9.0	7.85	9.64	7.56	8.21	6.83	7.60	8.20	8.33	7.88
Specific Conductivity	(µS/cm)		587	1,053	493	4,680	300	679	4,280	3,881	635
Temperature	°C		18.7	21.8	25.1	20.4	20.0	22.8	20.6	16.0	23.1

Note: Criteria from Canadian Council of Ministers of the Environment. Canadian Environmental Quality Guidelines Summary Table. Water Quality Guidelines for the Protection of Freshwater Aquatic Life. (CCME, 2019)

* Criteria for total chloride and total metals

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Table 5. 2023 Surface Water Monitoring

			Interior								
			SW25-12		SW25-14A	SW25-14B		SW25-15A		SW25-15B	
	Units	Criteria*	3-May-23	19-Jul-23	3-May-23	3-May-23	20-Jul-23	3-May-23	19-Jul-23	3-May-23	19-Jul-23
Inorganic Parameters											
Alkalinity - Bicarbonate	mg/L		360	293	378	365	106	369	930	372	1,030
Alkalinity - Carbonate	mg/L		<3.0	<3.0	<3.0	<3.0	108	<3.0	252	<3.0	186
Alkalinity - Hydroxide	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Total	mg/L		360	293	378	365	213	369	1,180	372	1,210
Dissolved Hardness (CaCO3)	mg/L		154	925	266	221	290	206	1,630	216	1,632
pH	units	6.5-9.0	7.54	8.15	7.87	7.67	9.41	7.76	8.71	7.67	8.57
Specific Conductivity	(µS/cm)		341	2,760	599	484	823	511	5,360	548	5,420
Turbidity	(ntu)		14.0	64.7	66.4	130	93.2	34.1	34.8	104	56.9
Total Dissolved Solids	mg/L		227	1,740	377	350	574	310	3,800	408	3,810
Total Suspended Solids	mg/L		53	425	185.0	140	108	62	387	196	347
Total Solids	mg/L		280	2,160	562	490	682	372	4,190	604	4,150
Dissolved Chloride (Cl)	mg/L	640*	13.9	489	66.8	36.2	123	37.4	1,010	44.0	1,020
Dissolved Sulphate (SO4)	mg/L		0.7	321	13.6	5.2	48.8	20.0	461	26.5	449
Nutrients											
Ammonia - Dissolved	mg/L N		0.066	0.134	1.130	2.130	0.015	1.460	0.102	1.450	0.108
Nitrate - Dissolved	mg/L N	13	0.043	0.616	0.299	1.760	0.052	1.650	<0.003	1.820	<0.003
Total Kjeldahl Nitrogen	mg/L N		0.6	1.2	2.2	3.3	4.0	2.8	>18.1	3.2	>17.5
Phosphorus - Dissolved	mg/L P		0.092	<0.013	0.044	0.415	0.050	0.342	2.380	0.366	2.510
Other											
Cyanide - Total (CN)	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Organic Indicators											
Carbonaceous Oxygen Demand	mg/L		57	87	95	90	173	59	535	115	527
Biochemical Oxygen Demand	mg/L		<3	6	9	13	13	<3	19	17	18
Metals											
Arsenic (As)- Dissolved	mg/L	0.0050*	0.00266	0.00136	0.00311	0.00522	0.00972	0.00452	0.05100	0.00466	0.05250
Barium (Ba)- Dissolved	mg/L		0.0343	0.1410	0.0601	0.1070	0.0548	0.0588	0.1780	0.0627	0.2010
Beryllium (Be)- Dissolved	mg/L		0.00003	<0.00002	0.00003	0.0003	<0.00002	0.00004	0.00006	0.00005	0.00007
Cadmium (Cd)- Dissolved	mg/L	0.00009*	0.000018	<0.000005	0.000030	0.000124	0.000005	0.000021	<0.000005	0.000033	0.000014
Calcium (Ca)- Dissolved	mg/L		31	110	49.3	43.1	34.2	38.0	88.7	39.3	94.3
Chromium (Cr)- Dissolved	mg/L		0.00102	<0.00050	0.00098	0.00234	<0.00050	0.00125	0.00223	0.00104	0.00254
Copper (Cu)- Dissolved	mg/L	0.0040*	0.00226	0.00140	0.00392	0.01000	0.00082	0.00300	0.00174	0.00383	0.00173
Iron (Fe)- Dissolved	mg/L	0.30*	0.553	0.013	0.557	1.510	0.082	0.529	0.124	0.609	0.269
Lead (Pb)- Dissolved	mg/L	0.0070*	0.000547	0.000060	0.001440	0.004770	0.000108	0.000539	0.000205	0.000915	0.000544
Magnesium (Mg)- Dissolved	mg/L		18.7	158.0	34.6	27.4	49.6	27.0	342	28.7	339
Manganese (Mn)- Dissolved	mg/L		0.0232	0.1810	0.0506	0.8040	0.0760	0.0300	0.3120	0.0644	0.3110
Mercury (Hg)- Dissolved	mg/L	0.000026*	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000079
Nickel (Ni)- Dissolved	mg/L	0.150*	0.00269	0.00510	0.00467	0.00980	0.00540	0.00504	0.08320	0.00626	0.08610
Potassium (K)- Dissolved	mg/L		9.48	16.2	12.8	15.5	18.8	15.3	284	16.5	280
Selenium (Se)- Dissolved	mg/L	0.0010*	0.000136	0.000481	0.000165	0.000162	0.000178	0.000180	0.001130	0.000163	0.001120
Sodium (Na)- Dissolved	mg/L		9.31	233	22.8	20.9	52.4	18.3	549	22.6	556
Zinc (Zn)- Dissolved	mg/L	0.030*	0.0079	2.21	0.0230	0.0291	0.0017	0.0056	0.0032	0.0081	0.0055
Bacteria											
Total Coliforms (MTF)	MPN/100mL		687	>2,420	1,990	>2,420	1,010	1,300	>2,420	>2,420	>2,420
Fecal Coliforms (MTF)	MPN/100mL		30	>2,420	131	59	411	21	980	22	>2,420
E. coli (MTF)	MPN/100mL		23	>2,420	36	186	186	19	579	22	>2,420
Field Parameters											
pH	units	6.5-9.0	7.36	8.42	7.93	7.64	7.92	7.70	8.47	7.75	8.91
Specific Conductivity	(µS/cm)		359	2,630	620	498	4,310	449	3,940	543	5,520
Temperature	°C		18.8	18.6	19.6	28.4	19.2	20.3	18.7	23.0	19.9

Note: Criteria from Canadian Council of Ministers of the Environment. Canadian Environmental Quality Guidelines Summary Table. Water Quality Guidelines for the Protection of Freshwater Aquatic Life. (CCME, 2019)

* Criteria for total chloride and total metals

The 2019-2023 results for upstream and downstream locations are provided in Table 6 and time versus concentration graphs showing the historical relationship of the analytical parameters at each monitoring location are provided in Appendix C. The analytical results for surface water are variable between locations and year over year, but are generally higher at the downstream locations, although only arsenic, iron, and chloride exceeded the CCME guidelines at downstream locations in 2023.

The Contingency Action Plan identified under Clause 125 was not implemented in 2023.

In 2023, we were unable to finalize any recommendations for changes. In 2024, we will be completing our re-evaluation of the SAP in 2024 to put forth recommendations for sampling frequency and analyte changes in the Annual Report.

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Table 6. 2019-2023 Surface Water Monitoring - Perimeter Ditch Comparison

	Units	Criteria*	2019		2020		2021		2022		2023	
Inorganic Parameters			**Upstream**	**Downstream**	**Upstream**	**Downstream**	**Upstream**	**Downstream**	**Upstream**	**Downstream**	**Upstream**	**Downstream**
Alkalinity - Bicarbonate	mg/L		243	447	149	252	185	213	207	438	351	934
Alkalinity - Carbonate	mg/L		<3.0	16	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Hydroxide	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Total	mg/L		243	462	149	252	185	213	207	438	351	934
Dissolved Hardness (CaCO3)	mg/L		175	188	71	77	105	319	112	178	145	944
pH	units	6.5-9.0	7.51	8.35	7.35	7.76	7.28	8.00	7.21	7.77	7.48	7.90
Specific Conductivity	(µS/cm)		573	4,637	344	741	433	1,100	423	1,627	325	2,956
Turbidity	(ntu)		279.7	22.1	7.0	12.6	28.4	683.0	165.8	39.6	269.0	139.6
Total Dissolved Solids	mg/L		373	1,345	208	424	270	706	295	1,016	240	2,004
Total Suspended Solids	mg/L		499	149	54	252	52	2,750	351	135	490	210
Total Solids	mg/L		871	1,495	262	676	322	3,460	647	1,148	730	2,215
Dissolved Chloride (Cl)	mg/L	640*	30	376	13	51	22	89	18	171	14	493
Dissolved Sulphate (SO4)	mg/L		16	129	<0.4	55	20	285	1	181	2.5	103
Nutrients												
Ammonia - Dissolved	mg/L N		0.043	0.688	0.062	0.026	0.013	**na	0.174	0.805	0.131	0.154
Nitrate - Dissolved	mg/L N	13	0.008	0.282	0.006	0.863	<0.003	<0.003	<0.003	0.554	0.034	0.682
Total Kjeldahl Nitrogen	mg/L N		1.63	5.80	0.30	2.10	0.97	2.74	1.43	5.23	0.60	7.40
Phosphorus - Dissolved	mg/L P		0.127	0.567	0.140	0.283	0.077	0.036	0.690	0.884	0.075	0.462
Other												
Cyanide - Total (CN)	mg/L	0.0050	<0.0010	0.0019	<0.0010	0.0010	<0.0010	0.0026	<0.0010	0.0027	<0.0050	<0.0050
Organic Indicators												
Chemical Oxygen Demand	mg/L		143	169	49	154	63	220	149	158	133	300
Biochemical Oxygen Demand	mg/L		6	8	4	13	<4	<4	6	<4	7	18
Metals												
Arsenic (As)- Dissolved	mg/L	0.0050*	0.0040	0.0134	0.0030	0.0054	0.0045	0.0040	0.0049	0.0121	0.0022	0.0223
Barium (Ba)- Dissolved	mg/L		0.0501	0.0946	0.0276	0.0482	0.0422	0.0514	0.0334	0.1079	0.0309	0.2129
Beryllium (Be)- Dissolved	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00003	0.00005
Cadmium (Cd)- Dissolved	mg/L	0.00009*	0.000012	0.000013	0.000013	0.000400	0.000024	0.000010	0.000006	0.000012	0.000025	0.000021
Calcium (Ca)- Dissolved	mg/L		50.4	64.1	30.7	45.1	37.9	70.8	40.7	71.3	28.5	106.7
Chromium (Cr)- Dissolved	mg/L		0.00018	0.00093	0.00014	0.00042	0.00015	0.00013	0.00018	0.00083	0.00111	0.00159
Copper (Cu)- Dissolved	mg/L	0.0040*	0.00134	0.00210	0.00191	0.00117	0.00159	0.00286	0.00105	0.00430	0.00231	0.00213
Iron (Fe)- Dissolved	mg/L	0.30*	0.163	0.062	0.095	0.082	0.070	0.058	0.632	0.116	0.544	0.538
Lead (Pb)- Dissolved	mg/L	0.0070*	0.000077	<0.000050	0.000096	0.000102	0.000089	<0.000050	0.000055	0.000108	0.000572	0.000542
Magnesium (Mg)- Dissolved	mg/L		32.4	120.9	20.1	44.8	20.8	61.6	21.0	82.4	18.0	164.6
Manganese (Mn)- Dissolved	mg/L		0.0892	0.0660	0.0616	0.0611	0.2550	0.0613	0.1977	0.3623	0.0295	0.7719
Mercury (Hg)- Dissolved	mg/L	0.000026*	<0.000005	<0.000005	<0.000010	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Nickel (Ni)- Dissolved	mg/L	0.150*	0.00340	0.02620	0.00214	0.00781	0.00263	0.00537	0.00426	0.01905	0.00237	0.04113
Potassium (K)- Dissolved	mg/L		12.0	73.0	9.2	22.9	9.5	30.3	8.7	83.3	9.3	98.1
Selenium (Se)- Dissolved	mg/L	0.0010*	0.000229	0.000403	0.000188	0.000370	0.000115	0.000411	0.000211	0.000464	0.000125	0.000450
Sodium (Na)- Dissolved	mg/L		20	171	8.9	39	13.9	49	9.8	95	8.7	262
Zinc (Zn)- Dissolved	mg/L	0.030*	0.0014	0.0026	0.0037	0.0057	0.0015	0.0058	0.0012	0.0048	0.0046	0.0052
Bacteria												
Total Coliforms (MTF)	MPN/100mL		2,253	1,950	365	461	>2,420	387	9,390	3,966	>2,420	1,842
Fecal Coliforms (MTF)	MPN/100mL		118	1,076	3	17	31	3	409	215	64	1,102
E. coli (MTF)	MPN/100mL		86	972	1	3	12	4	580	235	67	1,614
Field Parameters												
pH	units	6.5-9.0	8.18	8.65	8.19	8.02	8.95	9.16	7.28	7.68	6.83	8.04
Specific Conductivity	(µS/cm)		2,029	1,850	3,780	7,060	413	1,205	525	1,579	300	2,947
Temperature	°C		11.3	12.1	9.3	10.4	3.6	6.5	18.5	19.3	20.0	19.8

Note: Criteria from Canadian Council of Ministers of the Environment. Canadian Environmental Quality Guidelines Summary Table. Water Quality Guidelines for the Protection of Freshwater Aquatic Life. (CCME, 2019)
* Criteria for total chloride and total metals

5.3 LEACHATE

The leachate management system is a network of manholes/risers, drains, and sumps around the perimeter of the landfill cells, which feed into a header pipe. The leachate flows via gravity and lift stations into a 300,000L storage tank located at the intersection of Charette Road and the access road, which acts as a truck fill station for hauling to the North End Sewage Treatment Plant for treatment. Leachate can also be pumped from eleven collection manholes and one riser if needed; these sites also serve as sampling points. The locations of the manholes and riser are shown on Figure 1.

As per the BRRMF Operating Plan, leachate is managed in accordance with the Leachate Sampling and Analysis Plan (SAP), as specified under Clause 100. The MOE guidelines for non-potable groundwater quality are used as the regulatory guideline (MOE, 2011).

The total volume of leachate removed from the BRRMF in 2023 was 31,600 kL. There were no occurrences of leachate breakout from the development in 2023. The Contingency Action Plan identified under Clause 125 was not implemented in 2023.

In 2023, thirteen leachate samples were analyzed; there were no deviations from the Leachate SAP or from normal sample collection and preservation practices. Monthly leachate elevations are provided in Table 7, and the 2023 leachate results are provided in Table 8. The majority of parameters were highly variable between manholes; some of the samples exceeded the MOE guidelines for chloride, copper, lead, nickel, sodium, zinc, extractables, hydrocarbons, and dioxins and furans. Leachate is highly variable due to waste composition, amount of precipitation, site hydrology, waste compaction, cover, and interaction of leachate with the environment.

The 2019-2023 average results are provided in Table 9, and Piper diagrams showing the historical relationship of cations and anions at each monitoring location are provided in Appendix B. Many of the parameters measured vary significantly from year to year, although the average results usually meet the MOE guidelines. In 2023, the average results for anthracene and petroleum hydrocarbons exceeded the MOE guidelines.

In 2023, we were unable to finalize any recommendations for changes. In 2024, we will be completing our re-evaluation of the SAP in 2024 to put forth recommendations for sampling frequency and analyte changes in the Annual Report.

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Table 7. 2023 Leachate Levels

	Date	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23
Manhole 3	Top of Manhole Elevation (m)	233.66	233.66	233.66	233.66	233.66	233.66	233.66	233.66	233.66	233.66	233.66	233.66
	Depth to Leachate (m)	2.71	4.54	8.06	1.05	2.65	8.22	8.09	8.26	8.53	3.64	5.30	3.93
	Manhole Leachate Elevation (m)	230.95	229.12	225.60	232.61	231.01	225.44	225.57	225.40	225.13	230.02	228.36	229.73
Manhole 8	Top of Manhole Elevation (m)	236.61	236.61	236.61	236.61	236.61	236.61	236.61	236.61	236.61	236.61	236.61	236.61
	Depth to Leachate (m)	9.97	10.08	10.50	7.70	8.99	10.32	9.59	10.32	8.15	11.32	9.85	9.62
	Manhole Leachate Elevation (m)	226.64	226.53	226.11	228.91	227.62	226.29	227.02	226.29	228.46	225.29	226.76	226.99
Manhole 13	Top of Manhole Elevation (m)	234.89	234.89	234.89	234.89	234.89	234.89	234.89	234.89	234.89	234.89	234.89	234.89
	Depth to Leachate (m)	10.05	9.21	5.42	4.51	5.67	9.64	9.58	9.26	9.92	10.04	9.65	8.77
	Manhole Leachate Elevation (m)	224.84	225.68	229.47	230.38	229.22	225.25	225.31	225.63	224.97	224.85	225.24	226.12
Manhole 24	Top of Manhole Elevation (m)	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00
	Depth to Leachate (m)	8.15	8.57	8.68	2.27	8.81	8.71	8.58	8.63	9.09	9.04	8.80	7.81
	Manhole Leachate Elevation (m)	226.85	226.43	226.32	232.73	226.19	226.29	226.42	226.37	225.91	225.96	226.20	227.19
Manhole 27	Top of Manhole Elevation (m)	235.71	235.71	235.71	235.71	235.71	235.71	235.71	235.71	235.71	235.71	235.71	235.71
	Depth to Leachate (m)	1.92	2.11	2.08	2.05	2.24	2.06	2.07	2.13	2.47	2.00	2.10	2.20
	Manhole Leachate Elevation (m)	233.79	233.60	233.63	233.66	233.47	233.65	233.64	233.58	233.24	233.71	233.61	233.51
Manhole 31	Top of Manhole Elevation (m)	234.74	234.74	234.74	234.74	234.74	234.74	234.74	234.74	234.74	234.74	234.74	234.74
	Depth to Leachate (m)	0.73	4.26	1.87	1.66	1.11	4.70	7.19	7.17	5.27	7.39	7.25	2.67
	Manhole Leachate Elevation (m)	234.01	230.48	232.87	233.08	233.63	230.04	227.55	227.57	229.47	227.35	227.49	232.07
Manhole 34	Top of Manhole Elevation (m)	235.42	235.42	235.42	235.42	235.42	235.42	235.42	235.42	235.42	235.42	235.42	235.42
	Depth to Leachate (m)	1.91	1.44	1.80	1.75	1.77	1.47	1.38	1.41	1.77	1.33	1.34	1.40
	Manhole Leachate Elevation (m)	233.51	233.98	233.62	233.67	233.65	233.95	234.04	234.01	233.65	234.09	234.08	234.02
Manhole 46	Top of Manhole Elevation (m)	235.04	235.04	235.04	235.04	235.04	235.04	235.04	235.04	235.04	235.04	235.04	235.04
	Depth to Leachate (m)	5.04	5.58	5.75	5.85	5.10	4.06	3.99	5.31	5.83	5.04	5.97	5.99
	Manhole Leachate Elevation (m)	230.00	229.46	229.29	229.19	229.94	230.98	231.05	229.73	229.21	230.00	229.07	229.05
Manhole 47	Top of Manhole Elevation (m)	234.54	234.54	234.54	234.54	234.54	234.54	234.54	234.54	234.54	234.54	234.54	234.54
	Depth to Leachate (m)	5.36	3.92	4.00	4.17	3.89	3.66	3.58	3.84	4.10	4.03	4.00	4.05
	Manhole Leachate Elevation (m)	229.18	230.62	230.54	230.37	230.65	230.88	230.96	230.70	230.44	230.51	230.54	230.49
Bio	Top of Manhole Elevation (m)	234.18	234.18	234.18	234.18	234.18	234.18	234.18	234.18	234.18	234.18	234.18	234.18
	Depth to Leachate (m)	4.93	4.46	4.70	1.27	1.40	3.82	2.80	4.23	4.04	3.34	4.90	4.62
	Manhole Leachate Elevation (m)	229.25	229.72	229.48	232.91	232.78	230.36	231.38	229.95	230.14	230.84	229.28	229.56
Riser 1	Top of Riser Elevation (m)	234.97	234.97	234.97	234.97	234.97	234.97	234.97	234.97	234.97	234.97	234.97	234.97
	Depth to Leachate (m)	13.23*	15.24*	24.44*	15.67*	16.34	16.21*	17.66	16.27	16.47	12.17	13.90	14.58
	Riser Leachate Elevation (m)	221.74	219.73	210.53	219.30	218.63	218.76	217.31	218.70	218.50	222.80	221.07	220.39

*filled with clay, took reading from Cleanout 1 in lieu

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Table 8. 2023 Leachate Monitoring

	Units	Criteria*	LQ25-MH3	LQ25-MH8	LQ25-MH13	LQ25-MH24	LQ25-MH27	LQ25-MH31	LQ25-MH34	LQ25-MH46	LQ25-MH47	LQ25-MH48	Leachate Tank	BIO 1	RISER 1
			May-23	May-23	May-23	May-23	May-23	Jun-23	May-23	May-23	Jun-23	Jun-23	May-23	May-23	May-23
Field Parameters															
pH	units		6.91	7.17	7.16	6.96	7.60	7.67	6.94	7.46	6.12	5.75	7.59	7.25	7.59
Turbidity	ntu		260	28.8	45.1	474	4.35	126	234	119	657	452	119	na	143
Specific Conductivity	uS/cm		8,390	12,970	13,330	7,078	655	10,780	11,740	19,400	34,920	26,320	17,300	930	18,070
Temperature	°C		12.4	6.0	16.9	7.5	13.2	17.0	14.0	12.4	16.3	17.0	13.2	6.0	17.0
Inorganic Parameters															
Alkalinity - Bicarbonate	mg/L		2,960	5,670	5,930	3,530	351	4,380	3,440	7,170	14,800	8,480	7,300	251	88,400
Alkalinity - Carbonate	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Hydroxide	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Total	mg/L		2,960	5,670	5,930	3,530	351	4,380	3,440	7,170	14,800	8,480	7,300	251	88,400
Hardness (as CaCO3)	mg/L		501	489	476	799	183	405	439	492	10,500	5,050	874	125	250
pH	units		6.87	7.20	7.14	6.95	7.41	7.57	6.86	7.46	6.12	5.76	7.50	7.38	7.48
Specific Conductivity	uS/cm		8,080	13,500	12,500	8,340	731	10,500	10,900	16,600	nr	nr	17,000	907	18,800
Turbidity	ntu		260	220	46.2	369	11.1	140	206	33.6	463	573	119	5.01	158
Total Dissolved Solids	mg/L		4,930	6,660	7,220	3,900	493	5,800	6,140	8,080	64,100	36,000	10,500	681	8,700
Total Suspended Solids	mg/L		190	770	387	2,650	11	125	755	613	1,210	580	145	117	523
Total Solids	mg/L		5,120	7,430	7,610	6,550	504	5,920	6,890	8,690	65,300	36,600	10,700	798	9,220
Chloride (dissolved)	mg/L	2,300*	1,080	1,580	1,780	780	19.6	1,370	2,420	1,840	4,130	2,330	1,830	130	2,020
Sulphate (dissolved)	mg/L		528	14.0	1.0	764	12.0	342	<0.4	<0.4	1,820	925	<0.4	<0.4	<0.4
Other															
Cyanide (CN)	mg/L	0.066	<0.20	<0.10	<0.020	<0.0050	<0.0050	0.0205	<0.020	<0.20	<0.20	<0.20	<0.20	<0.020	<0.20
Nutrients															
Dissolved Ammonia	mg/L		332	615	459	348	0.010	564	318	818	826	811	757	9.88	931
Nitrate Nitrite Nitrogen	mg/L		<0.003	0.399	0.045	<0.003	0.320	0.289	0.369	<0.003	<0.003	<0.003	0.241	1.11	<0.003
Total Kjeldhal Nitrogen	mg/L		>370	918	727	>532	1.30	640	372	>1,150	>3,950	>2,650	1,310	15.6	>1180
Phosphorus (Total)	mg/L		1.385	9.767	2.541	5.289	0.374	2.464	0.853	12.493	44.531	24.900	11.924	1.776	6.765
Organic Indicators															
Biological Oxygen Demand	mg/L		53	147	77	241	7	83	65	329	55,400	34,300	3,100	11	231
Chemical Oxygen Demand	mg/L		930	1,680	1,300	1,660	75	1,170	938	2,350	>20,000	>20,000	6,440	270	2,450
Metals															
Total Arsenic (As)	mg/L	1.9	0.028065	0.031441	0.010051	0.030698	0.002225	0.016736	0.007332	0.031910	0.050858	0.045728	0.028510	0.005651	0.078606
Total Barium (Ba)	mg/L	29	0.50928	1.21680	0.55959	1.24850	0.09981	0.44298	0.84500	0.62224	0.16143	0.14779	0.56651	0.02601	0.27059
Total Beryllium (Be)	mg/L	0.067	0.00047	0.00093	0.00095	0.00097	0.00023	<0.00003	0.00048	0.00014	0.00105	<0.00003	0.00055	<0.00003	<0.00003
Total Cadmium (Cd)	mg/L	0.0027	0.000760	0.001066	0.000238	0.001201	0.000111	0.000114	0.000259	0.000346	0.000264	0.00193	0.000884	0.000153	0.000346
Total Calcium (Ca)	mg/L		200.63	195.89	190.42	319.92	73.430	162.17	175.90	197.00	4209.3	2021.7	349.89	50.001	100.14
Total Chromium (Cr)	mg/L	0.81	0.07601	0.13334	0.04006	0.14374	0.00255	0.07628	0.03249	0.20161	0.47257	0.38392	0.19179	0.00352	0.19383
Total Chromium (Hexavalent)	mg/L	0.14	0.00108	0.00154	<0.00050	<0.00050	0.00067	0.00125	<0.00050	0.00110	<0.010	<0.50	0.00103	0.00102	0.00259
Total Copper (Cu)	mg/L	0.087	0.029078	0.034805	0.010868	0.143090	0.019536	0.016423	0.009415	0.020488	0.026708	0.018041	0.022767	0.042176	0.027847
Total Iron (Fe)	mg/L		57.364	30.895	4.6161	153.97	0.42594	21.946	22.214	9.8442	319.77	239.97	23.801	0.89857	1.9868
Total Lead (Pb)	mg/L	0.025	0.013290	0.021144	0.013035	0.065124	0.001009	0.007836	0.008080	0.007759	0.004334	0.004505	0.012299	0.002214	0.015723
Total Magnesium (Mg)	mg/L		268.67	344.08	512.03	286.26	35.53	304.08	435.08	439.34	676.83	542.55	374.06	29.56	425.05
Total Manganese (Mn)	mg/L		0.621	0.428	0.477	1.935	0.049	0.369	0.173	0.414	15.883	11.448	1.073	0.084	0.201
Total Mercury (Hg)	mg/L	0.0028	<0.000050	<0.000050	<0.000050	0.0000981	0.0000186	<0.000050	<0.000050	<0.000050	0.0001210	0.0000564	<0.000050	0.000005	0.000142
Total Nickel (Ni)	mg/L	0.49	0.26350	0.19374	0.23292	0.21977	0.00874	0.21067	0.05443	0.32947	1.25760	0.49408	0.32124	0.02312	0.53693
Total Potassium (K)	mg/L		209.57	398.66	406.49	239.52	12.61	295.79	193.08	515.58	1443.60	1233.60	548.68	83.58	451.81
Dissolved Selenium (Se)	mg/L	0.063*	0.00174	0.00149	0.00090	0.00065	0.00018	0.00155	0.00089	0.00017	0.02430	0.0111	0.00304	0.00043	0.00302
Total Silver (Ag)	mg/L	0.0015	0.000189	0.000108	0.000130	0.000996	0.000012	0.000122	0.000053	0.000258	0.000055	0.000048	0.000193	0.000199	0.000691
Total Sodium (Na)	mg/L	2,300	782.0	1,192.1	1,236.5	594.6	20.1	966.2	1,244.6	1,589.2	3,079.3	2,221.7	1,617.0	29.6	1,829.4
Total Zinc (Zn)	mg/L	1.1	0.11209	1.50410	0.14303	0.64123	0.05564	0.06420	0.04226	0.09219	1.98750	1.03670	0.14399	0.09210	0.22681
Extractables															
Benzo (a) Pyrene (PAH)	ug/L	0.81	0.05	1.37	0.15	<3.96	0.15	0.04	0.26	0.04	<0.01	0.02	0.08	<0.01	<0.01
Anthracene	ug/L	2.4	0.28	4.72	0.80	25.9	0.26	0.30	4.90	<0.36	<0.53	<0.14	0.38	<0.01	<0.02
4'4' Methylenebis 2 Chloroaniline	ug/L		<2.0	<2.0	<2.0	<2.0	<0.50	<1.0	<2.0	<2.0	<4.0	<2.0	<2.0	<0.50	<2.0
Benzo (a) anthracene (PAH)	ug/L	4.7	0.17	3.59	0.54	5.06	<0.14	0.14	0.75	<0.10	<0.01	0.02	<0.18	<0.01	<0.03
Benzo (b/j) fluoroanthene (PAH)	ug/L		0.09	1.96	0.10	<6.00	0.23	0.06	0.35	0.03	<0.01	0.02	0.08	<0.01	<0.01
Benzo (g,h,i) Perylene (PAH)	ug/L	0.2	0.02	0.55	0.08	<3.10	0.05	0.01	0.04	0.02	<0.01	<0.01	0.02	<0.01	<0.01
Hexachlorobenzene	ug/L	3.1	<0.0080	<0.0080	<0.0080	<0.040	<0.0080	<0.0080	<0.0080	<0.0080	<0.040	<0.0080	<0.0080	<0.0080	<0.0080
Phenanthrene	ug/L	580	1.38	15.4	4.67	113	1.45	1.48	24.0	1.81	0.07	<0.61	2.10	<0.02	0.12
Phenol	mg/L	12	0.023	0.029	0.098	0.082	0.001	<0.10	<0.10	0.29	7.75	6.81	0.78	<0.010	0.331

Note: Criteria from Ontario Ministry of the Environment. (2011, July 1). Soil, Ground Water and Sediment Standards for Use Under Part XV.I of the Environmental Protection Act Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
*Criteria for total chloride and total selenium.

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Table 8. 2023 Leachate Monitoring

	Units	Criteria*	LQ25-MH3	LQ25-MH8	LQ25-MH13	LQ25-MH24	LQ25-MH27	LQ25-MH31	LQ25-MH34	LQ25-MH46	LQ25-MH47	LQ25-MH48	Leachate Tank	BIO 1	RISER 1
			May-23	May-23	May-23	May-23	May-23	Jun-23	May-23	May-23	Jun-23	Jun-23	May-23	May-23	May-23
Petroleum Hydrocarbons															
CCME Petroleum Hydrocarbon Fraction F1	mg/L	0.75	0.59	<0.10	0.48	0.25	<0.10	<0.10	0.26	<0.10	8.13	10.9	0.37	<0.10	0.19
CCME Petroleum Hydrocarbon Fraction F2	mg/L	0.15	0.84	1.40	1.65	6.63	<0.10	0.70	1.45	1.44	67.4	270	1.54	<0.10	1.44
CCME Petroleum Hydrocarbon Fraction F3	mg/L	0.50	0.59	1.52	1.54	48.0	<0.25	0.59	0.48	1.39	4.22	4.66	1.28	<0.25	0.86
CCME Petroleum Hydrocarbon Fraction F4	mg/L	0.50	<0.50	<0.25	<0.25	6.82	<0.25	<0.25	<0.25	<0.25	1.35	<0.25	<0.25	<0.25	<0.25
Volatile Organic Carbons															
Vinyl Chloride	ug/L	1.7	0.95	<0.50	<0.50	0.81	<0.50	<0.50	<0.50	0.81	<0.50	0.74	<0.50	<0.50	<0.50
1,4 Dichlorobenzene	ug/L	67	13.0	9.10	8.35	4.47	<0.50	5.76	2.92	4.04	<0.50	0.91	3.14	<0.50	0.97
Chloroform	ug/L	22	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethene	ug/L	17	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.54	1.15	<0.50	<0.50	<0.50
Tetrachloroethene	ug/L	17	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.06	<0.50	<0.50	<0.50
Dioxins and Furans															
2378 TeCDD	ng/L	14											<2.40		
12378 PeCDD	ng/L	14											<2.80		
123478 HxCDD	ng/L	14											<2.80		
123678 HxCDD	ng/L	14											19.0		
123789 HxCDD	ng/L	14											9.0		
1234678 HpCDD	ng/L	14											514		
OCDD	ng/L	14											2,760		
Total TCDDs	ng/L	14											<2.40		
Total PeCDD	ng/L	14											6.70		
Total HxCDD	ng/L	14											1,310		
Total HpCDD	ng/L	14											1,160		
2378 TeCDF	ng/L	14											<2.90		
12378 PeCDF	ng/L	14											6.10		
23478 PeCDF	ng/L	14											<0.99		
123478 HxCDF	ng/L	14											1.60		
123678 HxCDF	ng/L	14											<1.40		
123789 HxCDF	ng/L	14											<1.60		
234678 HxCDF	ng/L	14											<1.20		
1234678 HpCDF	ng/L	14											10.0		
1234789 HpCDF	ng/L	14											<3.70		
OCDF	ng/L	14											48.0		
Total TCDF	ng/L	14											<2.90		
Total PeCDF	ng/L	14											<1.10		
Total HxCDF	ng/L	14											5.00		
Total HpCDF	ng/L	14											<3.70		
Polychlorinated Biphenyls															
Aroclor 1016	ug/L		<0.040	<0.020	<0.40	<1.0	<0.020	<0.020	<0.020	<0.040	<0.20	<0.0410	<0.020	<0.0340	<0.260
Aroclor 1221	ug/L		<0.040	<0.020	<0.40	<1.0	<0.020	<0.020	<0.020	<0.040	<0.20	<0.0410	<0.020	<0.0340	<0.260
Aroclor 1232	ug/L		<0.040	<0.020	<0.40	<1.0	<0.020	<0.020	<0.020	<0.040	<0.20	<0.0410	<0.020	<0.0340	<0.260
Aroclor 1242	ug/L		<0.040	0.764	<0.40	<1.0	<0.020	0.282	0.111	<0.040	<0.20	<0.0410	0.555	<0.0340	<0.260
Aroclor 1248	ug/L		<0.040	<0.020	<0.40	<1.0	<0.020	<0.020	<0.020	<0.040	<0.20	<0.0410	<0.020	<0.0340	<0.260
Aroclor 1254	ug/L		<0.020	<0.040	<0.020	<1.0	<0.020	0.041	<0.0220	<0.020	<0.20	<0.0200	<0.050	<0.020	<0.020
Aroclor 1260	ug/L		<0.020	<0.040	<0.040	<2.0	<0.020	<0.060	<0.040	<0.040	<1.20	<0.0200	<0.040	<0.020	<0.020
Total PCBs	ug/L	15	<0.0980	0.7640	<0.8970	<4.24	<0.060	0.3230	0.1110	<0.1150	<2.14	<0.10	0.5550	<0.0860	<0.5830
Pesticides and Herbicides															
Diazinon	ug/L		<0.26	<0.14	<0.65	<7.45	<0.10	<0.70	<9.40	<0.20	<0.27	<0.35	<1.30	<0.15	<0.30
2, 4-D	ug/L		<5.0	<10.0	<5.0	<5.0	<0.50	<10.0	<5.0	<10.0	99.6	63.8	<10.0	<0.50	<5.0
Aldrin	ug/L	8.5	<0.0080	<0.0080	<0.0080	<0.040	<0.0080	<0.0080	<0.0080	<0.0080	<0.040	<0.0080	<0.0080	<0.0080	<0.0080
Hexachlorocyclohexane (Lindane)	ug/L	1.2	<0.0080	<0.0080	<0.0080	<0.040	<0.0080	<0.0080	<0.0080	<0.0080	<0.040	<0.0080	<0.0080	<0.0080	<0.0080
MCPA	ug/L		<5.0	<10.0	<5.0	<5.0	<0.50	<10.0	<5.0	<10.0	<10.0	<10.0	<10.0	<0.50	<5.0
Mirex	ug/L		<0.0080	<0.0080	<0.0080	<0.040	<0.0080	<0.0080	<0.0080	<0.0080	<0.040	<0.0080	<0.0080	<0.0080	<0.0080
Methoxyclor	ug/L	6.5	<0.0080	<0.0480	<0.0080	<0.040	<0.0080	<0.040	<0.0080	<0.0160	<0.040	<0.0080	<0.0560	<0.0080	<0.0080
Bacteria															
Total Coliforms	MPN/100mL		12,000	510	10	17,300	659	2,760	600	680	nr	nr	6,130	4,570	40
Fecal Coliforms	MPN/100mL		230	30	<10	460	9	nr	10	<10	nr	nr	<10	580	<10
E. coli	MPN/100mL		90	30	<10	480	3	10	<10	<10	nr	nr	10	60	<10

Note: Criteria from Ontario Ministry of the Environment. (2011, July 1). Soil, Ground Water and Sediment Standards for Use Under Part XV.I of the Environmental Protection Act Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition

*nr - Contract lab QC Failure

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Table 9. 2019-2023 Leachate Quality Comparison

	Units	Criteria	2019 Average	2020 Average	2021 Average	2022 Average	2023 Average
Field Parameters							
pH	units		7.79	7.39	7.80	7.38	7.09
Turbidity - NTU	ntu		166	77.0	112	125	222
Specific Conductivity	uS/cm		8,663	10,160	10,444	10,853	13,991
Temperature	°C		13.9	11.5	19.5	15.9	13.0
Inorganic Parameters							
Alkalinity - Bicarbonate	mg/L		4,059	5,438	5,346	4,549	11,743
Alkalinity - Carbonate	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Hydroxide	mg/L		<3.0	<3.0	<3.0	<3.0	<3.0
Alkalinity - Total	mg/L		4,059	5,438	5,346	4,549	11,743
Hardness (as CaCO3)	mg/L		2,704	2,164	871	1,505	1,546
pH - units	units		7.24	7.33	7.30	7.23	nr
Specific Conductivity	uS/cm		11,170	11,893	13,656	12,100	9,482
Turbidity - NTU	ntu		100	78.4	426	198	200
Total Dissolved Solids	mg/L		6,348	7,315	8,109	10,069	12,554
Total Suspended Solids	mg/L		635	374	1,495	540	621
Total Solids	mg/L		6,980	7,686	9,610	10,611	13,179
Chloride (dissolved)	mg/L	2300 *	2,183	1,456	1,628	1,611	1,639
Sulphate (dissolved)	mg/L		205	97	117	276	339
Other							
Cyanide (CN)	mg/L	0.066	0.014	0.011	0.015	0.017	0.054
Nutrients							
Dissolved Ammonia	mg/L		545	642	459	511	522
Nitrate Nitrogen	mg/L		1.01	1.75	1.82	0.27	0.21
Total Kjeldhal Nitrogen	mg/L		699	978	977	1,059	972
Phosphorus (Total)	mg/L		7.77	3.49	9.70	8.61	9.62
Organic Indicators							
Biological Oxygen Demand	mg/L		1,493	1,340	2,483	4,791	7,234
Chemical Oxygen Demand	mg/L		2,045	2,049	3,793	1,630	4,559
Metals							
Total Arsenic (As)	mg/L	1.9	0.0220	0.0179	0.0218	0.0171	0.0283
Total Barium (Ba)	mg/L	29	0.391	0.393	0.479	0.342	0.517
Total Beryllium (Be)	mg/L	0.067	<0.00003	<0.00003	<0.00003	<0.00003	0.00045
Total Cadmium (Cd)	mg/L	0.0027	<0.000007	<0.000007	0.000582	0.000156	0.000590
Total Calcium (Ca)	mg/L		309	297	349	603	634
Total Chromium (Cr)	mg/L	0.81	0.1354	0.1253	0.1673	0.1278	0.1501
Total Chromium (Hexavalent)	mg/L		<0.010	0.00068	0.00067	0.00036	0.02046
Total Copper (Cu)	mg/L	0.087	0.0218	0.0147	0.0647	0.0244	0.0324
Total Iron (Fe)	mg/L		7.9	24.3	49.2	45.4	68.3
Total Lead (Pb)	mg/L	0.025	0.00490	0.00345	0.02170	0.00471	0.01357
Total Magnesium (Mg)	mg/L		469	345	323	325	359
Total Manganese (Mn)	mg/L		1.246	1.749	1.723	2.245	2.550
Total Mercury (Hg)	mg/L	0.0028	0.000016	0.000031	0.000044	0.000015	0.000047
Total Nickel (Ni)	mg/L	0.49	0.2962	0.2481	0.2903	0.2871	0.3189
Total Potassium (K)	mg/L		468	392	401	429	464
Dissolved Selenium (Se)	mg/L	0.063 *	0.00137	0.00176	0.00206	0.00215	0.00380
Total Silver (Ag)	mg/L	0.0015	0.000095	0.000092	0.000151	0.000102	0.000235
Total Sodium (Na)	mg/L	2,300	1,365	1,103	1,116	1,155	1,262
Total Zinc (Zn)	mg/L	1.1	0.530	0.263	1.13	0.317	0.472

Note: Criteria from Ontario Ministry of the Environment. (2011, July 1). Soil, Ground Water and Sediment Standards for Use Under Part XV.I of the Environmental Protection Act Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition

*Criteria for total chloride and total selenium

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Table 9. 2019-2023 Leachate Quality Comparison

	Units	Criteria	2019 Average	2020 Average	2021 Average	2022 Average	2023 Average
Extractables							
Benzo (a) Pyrene (PAH)	ug/L	0.81	1.17	0.31	1.01	0.36	0.47
Anthracene	ug/L	2.4	2.01	1.01	1.44	1.51	2.93
4'4' Methylenebis 2 Chloroaniline	ug/L		<5.0	<1.0	<5.0	<50.0	<4.0
Benzo (a) anthracene (PAH)	ug/L	4.7	2.52	0.10	1.74	0.50	0.81
Benzo (b/j) fluoroanthene (PAH)	ug/L		1.66	0.81	0.69	0.47	0.46
Benzo (g,h,i) Perylene (PAH)	ug/L	0.2	0.70	0.17	0.85	0.15	0.18
Hexachlorobenzene	ug/L	3.1	<50	<0.040	<0.080	0.0028	<0.0080
Phenanthrene	ug/L	580	7.48	4.00	5.53	6.07	12.75
Phenol	mg/L	12	0.445	0.183	0.366	0.877	1.690
Petroleum Hydrocarbons							
CCME Petroleum Hydrocarbon Fraction F1	mg/L	0.75	0.31	0.92	2.75	2.45	1.65
CCME Petroleum Hydrocarbon Fraction F2	mg/L	0.15	2.01	0.47	1.91	2.71	27.28
CCME Petroleum Hydrocarbon Fraction F3	mg/L	0.50	12.3	8.45	19.0	2.49	5.03
CCME Petroleum Hydrocarbon Fraction F4	mg/L	0.50	2.04	1.61	2.68	0.40	0.74
Volatile Organic Carbons							
Vinyl Chloride	ug/L	1.7	0.70	0.90	0.60	0.40	0.43
1,4 Dichlorobenzene	ug/L	67	3.10	3.80	3.80	3.90	4.11
Chloroform	ug/L	22	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethene	ug/L	17	0.53	<0.50	0.59	<0.50	0.34
Tetrachloroethene	ug/L	17	<0.50	0.56	0.98	<0.50	0.31
Polychlorinated Biphenyls							
Aroclor 1016	ug/L		<8.0	<0.13	<2.0	<3.5	<1.0
Aroclor 1221	ug/L		<8.0	<0.13	<2.0	<3.5	<1.0
Aroclor 1232	ug/L		<8.0	<0.13	<2.0	<3.5	<1.0
Aroclor 1242	ug/L		<3.0	1.3	<2.0	0.4	0.21
Aroclor 1248	ug/L		<8.0	<0.13	<2.0	<3.5	<1.0
Aroclor 1254	ug/L		<8.0	<0.10	0.15	0.04	0.06
Aroclor 1260	ug/L		<8.0	<0.20	<0.40	<0.40	<2.0
Total PCBs	ug/L	15	3.3	1.3	<6.0	0.7	0.45
Pesticides and Herbicides							
Diazinon	ug/L		1.4	<62	<0.5	<0.4	<9.4
2, 4-D	ug/L		1.1	4.1	10.4	21.7	15.1
Aldrin	ug/L	8.5	<0.050	<0.040	<0.080	<0.020	<0.0080
gamma-Hexachlorocyclohexane (Lindane)	ug/L	1.2	<0.050	<0.040	<0.080	0.0052	<0.0080
MCPA	ug/L		<1.0	5.0	5.0	<5.0	<10.0
Mirex	ug/L		<0.050	<0.080	<0.040	0.033	<0.0080
Methoxyclor	ug/L	6.5	<0.050	<0.120	<0.030	<0.020	<0.056
Bacteria							
Total Coliforms	MPN/100mL		18,210	9,056	309,209	11,836	4,114
Fecal Coliforms	MPN/100mL		5,033	831	77,707	2,581	134
E. coli	MPN/100mL		2,817	770	6,354	2,635	64

Note: Criteria from Ontario Ministry of the Environment. (2011, July 1). Soil, Ground Water and Sediment Standards for Use Under Part XV.I of the Environmental Protection Act Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition

Note: NA - not analysed

5.4 LANDFILL GAS

5.4.1 COLLECTION AND FLARING SYSTEM

Landfill gas (LFG) produced at the BRRMF is comprised primarily of methane (CH_4) and carbon dioxide (CO_2) in approximately equal amounts. These greenhouse gases contribute to global warming, but CH_4 has a global warming potential 25 times that of CO_2. To reduce emissions, the LFG is collected via a series of pipes beneath the BRRMF, and sent to a flare where the CH_4 is reduced to CO_2 and water vapor. The landfill gas collection and flaring system (LFGCFS) is run by Integrated Gas Recovery Systems Inc. on behalf of the City of Winnipeg.

As per the BRRMF Operating Plan, LFG operations and monitoring are managed through the Landfill Gas Operating Plan, submitted October 23, 2014, as per Clause 110.

During operation in 2023, the LFGCFS operated as was intended. During surface emission monitoring, some areas with weak surface cap were noted where gas was escaping.

The 2023 Landfill Gas Collection and Flaring Report, prepared by Integrated Gas Recovery Services Inc., is attached in Appendix D.

5.4.2 SUBSURFACE LANDFILL GAS MONITORING PROGRAM

LFG that is not collected or that cannot escape into the atmosphere may migrate into neighboring land below the ground surface. The purpose of LFG migration monitoring is to detect gas migration before it becomes a safety hazard to neighbouring properties.

As per the BRRMF Operating Plan, subsurface LFG migration is managed in accordance with the Subsurface Landfill Gas Monitoring Program, submitted on October 23, 2014, as specified under Clause 111. Probes are monitored monthly for methane (CH_4), oxygen (O_2), carbon monoxide (CO), and hydrogen sulphide (H_2S).

In 2023, the maximum level of CH_4 measured was 0.1%. The Subsurface Landfill Gas Contingency Plan was not activated, indicating that the LFGCFS is operating effectively.

The 2023 subsurface gas migration probe data is provided in Table 10.

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Table 10. 2023 External Gas Probe Monitoring

Well No.	Date	CH4	O2	CO	H2S
		% LEL	(%)	PPM	PPM
1	26-Jan-23	*ns	*ns	*ns	*ns
1	28-Feb-23	0.0	20.2	0.0	0.0
1	15-Mar-23	0.0	22.0	0.0	0.0
1	27-Apr-23	0.0	20.3	0.0	0.0
1	24-May-23	0.0	20.1	0.0	0.0
1	27-Jun-23	0.0	20.1	**nr	0.0
1	31-Jul-23	0.0	21.0	1.0	0.0
1	21-Aug-23	0.0	20.9	0.0	0.0
1	13-Sep-23	0.0	21.3	0.0	0.0
1	16-Oct-23	0.1	20.9	1.0	0.0
1	3-Nov-23	0.1	21.5	0.0	0.0
1	6-Dec-23	0.0	21.0	0.0	0.0
2	26-Jan-23	*ns	*ns	*ns	*ns
2	28-Feb-23	0.0	21.2	0.0	0.0
2	15-Mar-23	0.0	20.7	0.0	0.0
2	27-Apr-23	0.0	16.6	0.0	0.0
2	24-May-23	0.0	20.0	0.0	1.0
2	27-Jun-23	0.0	20.7	**nr	0.0
2	31-Jul-23	0.0	20.4	1.0	0.0
2	21-Aug-23	0.0	20.7	0.0	0.0
2	13-Sep-23	0.0	20.8	0.0	0.0
2	16-Oct-23	0.1	20.5	0.0	0.0
2	3-Nov-23	0.1	20.5	0.0	0.0
2	6-Dec-23	0.0	21.2	0.0	0.0
3	26-Jan-23	*ns	*ns	*ns	*ns
3	9-Feb-23	0.1	20.1	0.0	0.0
3	7-Mar-23	0.0	22.4	0.0	0.0
3	17-Apr-23	0.0	20.8	0.0	0.0
3	24-May-23	0.0	21.0	0.0	1.0
3	27-Jun-23	0.0	20.9	**nr	0.0
3	31-Jul-23	0.0	20.5	1.0	0.0
3	22-Aug-23	0.0	20.8	1.0	0.0
3	13-Sep-23	0.0	21.4	0.0	0.0
3	16-Oct-23	0.0	20.5	1.0	0.0
3	3-Nov-23	0.1	12.7	0.0	0.0
3	6-Dec-23	0.1	20.7	0.0	0.0

*ns - no sample due to snow cover, flooding, or freezing
**nr - no result due to instrument malfunction

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Table 10. 2023 External Gas Probe Monitoring

Well No.	Date	CH4	O2	CO	H2S
		% LEL	(%)	PPM	PPM
4	26-Jan-23	*ns	*ns	*ns	*ns
4	9-Feb-23	0.1	20.7	0.0	0.0
4	7-Mar-23	0.0	22.2	0.0	0.0
4	27-Apr-23	*ns	*ns	*ns	*ns
4	24-May-23	0.0	21.3	0.0	0.0
4	27-Jun-23	0.0	20.5	**nr	0.0
4	31-Jul-23	0.0	21.1	2.0	0.0
4	22-Aug-23	0.0	20.8	0.0	0.0
4	13-Sep-23	0.0	21.6	1.0	0.0
4	16-Oct-23	0.1	21.0	1.0	0.0
4	3-Nov-23	0.1	21.9	0.0	0.0
4	6-Dec-23	0.1	20.2	0.0	0.0
5	26-Jan-23	*ns	*ns	*ns	*ns
5	9-Feb-23	*ns	*ns	*ns	*ns
5	7-Mar-23	0.0	21.1	0.0	0.0
5	27-Apr-23	*ns	*ns	*ns	*ns
5	29-May-23	0.0	20.5	0.0	0.0
5	27-Jun-23	0.0	21.1	**nr	0.0
5	31-Jul-23	0.0	20.9	1.0	0.0
5	22-Aug-23	0.0	20.8	0.0	0.0
5	13-Sep-23	0.0	21.6	1.0	0.0
5	16-Oct-23	0.1	20.9	1.0	0.0
5	3-Nov-23	0.1	21.9	0.0	0.0
5	6-Dec-23	0.1	19.9	0.0	0.0
6	26-Jan-23	0.0	23.1	0.0	0.0
6	1-Mar-23	0.0	21.4	0.0	0.0
6	7-Mar-23	0.0	21.8	0.0	0.0
6	11-Apr-23	0.0	20.5	0.0	0.0
6	24-May-23	0.0	20.1	0.0	1.0
6	27-Jun-23	0.0	21.0	**nr	0.0
6	31-Jul-23	0.0	20.9	1.0	0.0
6	16-Aug-23	0.0	20.3	0.0	0.0
6	13-Sep-23	0.0	21.5	1.0	0.0
6	16-Oct-23	0.0	21.5	0.0	0.0
6	3-Nov-23	0.1	22.8	1.0	0.0
6	6-Dec-23	0.1	21.0	0.0	0.0

*ns - no sample due to snow cover, flooding, or freezing
**nr - no result due to instrument malfunction

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Table 10. 2023 External Gas Probe Monitoring

Well No.	Date	CH4	O2	CO	H2S
		% LEL	(%)	PPM	PPM
7	26-Jan-23	0.0	22.4	0.0	0.0
7	28-Feb-23	0.0	21.0	0.0	0.0
7	7-Mar-23	0.0	21.7	0.0	0.0
7	11-Apr-23	0.0	19.9	0.0	0.0
7	24-May-23	0.0	20.5	0.0	0.0
7	27-Jun-23	0.0	19.9	**nr	0.0
7	31-Jul-23	0.0	19.6	1.0	0.0
7	16-Aug-23	0.0	20.3	0.0	0.0
7	13-Sep-23	0.0	21.5	0.0	0.0
7	16-Oct-23	0.1	21.4	0.0	0.0
7	3-Nov-23	0.1	22.0	0.0	0.0
7	6-Dec-23	0.1	20.7	0.0	0.0
8	26-Jan-23	0.0	22.5	0.0	0.0
8	28-Feb-23	0.0	21.0	0.0	0.0
8	7-Mar-23	0.0	21.1	0.0	0.0
8	11-Apr-23	0.0	20.4	0.0	0.0
8	24-May-23	0.0	20.6	0.0	0.0
8	27-Jun-23	0.0	20.7	**nr	1.0
8	31-Jul-23	0.0	20.6	1.0	0.0
8	16-Aug-23	0.0	20.1	0.0	0.0
8	13-Sep-23	0.0	20.7	0.0	0.0
8	16-Oct-23	0.1	21.5	0.0	0.0
8	3-Nov-23	0.1	22.0	0.0	0.0
8	6-Dec-23	0.0	21.6	0.0	0.0
9	26-Jan-23	0.0	20.7	0.0	0.0
9	28-Feb-23	0.0	20.2	0.0	0.0
9	7-Mar-23	0.0	19.2	0.0	0.0
9	11-Apr-23	0.0	16.7	0.0	0.0
9	24-May-23	0.0	20.5	0.0	0.0
9	27-Jun-23	0.0	18.9	**nr	0.0
9	31-Jul-23	0.0	18.5	1.0	0.0
9	16-Aug-23	0.0	19.6	1.0	0.0
9	13-Sep-23	0.0	20.1	0.0	0.0
9	12-Oct-23	0.0	20.1	0.0	0.0
9	3-Nov-23	0.1	21.0	0.0	0.0
9	6-Dec-23	0.0	20.6	0.0	0.0

**nr - no result due to instrument malfunction

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Table 10. 2023 External Gas Probe Monitoring

Well No.	Date	CH4	O2	CO	H2S
		% LEL	(%)	PPM	PPM
10	**26-Jan-23**	0.0	21.2	0.0	0.0
10	**28-Feb-23**	0.0	20.6	0.0	0.0
10	**7-Mar-23**	0.0	22.1	0.0	0.0
10	**11-Apr-23**	0.0	21.2	0.0	0.0
10	**23-May-23**	0.0	20.4	0.0	0.0
10	**27-Jun-23**	0.0	20.4	**nr	1.0
10	**31-Jul-23**	0.0	20.0	1.0	0.0
10	**16-Aug-23**	0.0	20.9	0.0	0.0
10	**13-Sep-23**	0.0	19.8	0.0	0.0
10	**12-Oct-23**	0.1	20.9	0.0	0.0
10	**3-Nov-23**	0.0	21.3	0.0	0.0
10	**6-Dec-23**	0.0	21.2	0.0	0.0
P26E	**26-Jan-23**	*ns	*ns	*ns	*ns
P26E	**9-Feb-23**	0.1	20.0	0.0	0.0
P26E	**8-Mar-23**	0.0	19.9	0.0	0.0
P26E	**11-Apr-23**	0.0	12.1	0.0	0.0
P26E	**24-May-23**	0.0	21.0	1.0	0.0
P26E	**27-Jun-23**	0.0	19.7	**nr	0.0
P26E	**31-Jul-23**	0.0	19.1	1.0	0.0
P26E	**21-Aug-23**	0.0	20.7	1.0	0.0
P26E	**13-Sep-23**	0.0	19.4	0.0	0.0
P26E	**16-Oct-23**	0.0	20.5	0.0	0.0
P26E	**3-Nov-23**	0.0	21.0	0.0	0.0
P26E	**6-Dec-23**	0.0	19.8	0.0	0.0
P28E	**26-Jan-23**	*ns	*ns	*ns	*ns
P28E	**9-Feb-23**	0.1	21.3	0.0	0.0
P28E	**8-Mar-23**	0.0	20.7	0.0	0.0
P28E	**11-Apr-23**	0.0	18.0	0.0	0.0
P28E	**24-May-23**	0.0	21.0	0.0	0.0
P28E	**27-Jun-23**	0.0	19.8	**nr	0.0
P28E	**31-Jul-23**	0.0	19.2	1.0	0.0
P28E	**21-Aug-23**	0.0	20.7	0.0	0.0
P28E	**13-Sep-23**	0.0	19.8	0.0	0.0
P28E	**16-Oct-23**	0.1	21.5	0.0	0.0
P28E	**3-Nov-23**	0.1	21.7	0.0	0.0
P28E	**6-Dec-23**	0.0	21.2	0.0	0.0

*ns - no sample due to snow cover, flooding, or freezing
**nr - no result due to instrument malfunction

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Table 10. 2023 External Gas Probe Monitoring

Well No.	Date	CH4	O2	CO	H2S
		% LEL	(%)	PPM	PPM
P30E	**26-Jan-23**	0.0	22.6	0.0	0.0
P30E	**1-Mar-23**	0.0	22.0	0.0	0.0
P30E	**7-Mar-23**	0.0	20.0	0.0	0.0
P30E	**11-Apr-23**	0.0	19.1	0.0	0.0
P30E	**23-May-23**	0.0	20.4	0.0	0.0
P30E	**27-Jun-23**	0.0	18.9	**nr	1.0
P30E	**31-Jul-23**	0.0	19.5	0.0	1.0
P30E	**16-Aug-23**	0.0	20.7	0.0	0.0
P30E	**13-Sep-23**	0.0	20.1	0.0	0.0
P30E	**16-Oct-23**	0.1	20.8	1.0	0.0
P30E	**3-Nov-23**	0.1	21.3	1.0	0.0
P30E	**7-Dec-23**	0.0	21.3	0.0	0.0
P34E	**26-Jan-23**	*ns	*ns	*ns	*ns
P34E	**28-Feb-23**	0.0	20.1	0.0	0.0
P34E	**10-Mar-23**	0.0	22.4	0.0	0.0
P34E	**17-Apr-23**	0.0	20.8	0.0	0.0
P34E	**23-May-23**	0.0	20.2	0.0	1.0
P34E	**27-Jun-23**	0.0	19.9	**nr	1.0
P34E	**31-Jul-23**	*ns	*ns	*ns	*ns
P34E	**21-Aug-23**	0.0	20.9	0.0	0.0
P34E	**13-Sep-23**	0.0	20.7	0.0	0.0
P34E	**16-Oct-23**	0.1	20.8	0.0	0.0
P34E	**3-Nov-23**	0.0	21.0	0.0	0.0
P34E	**6-Dec-23**	0.1	21.5	0.0	0.0
P106E	**26-Jan-23**	0.0	22.4	0.0	0.0
P106E	**28-Feb-23**	0.0	21.4	0.0	0.0
P106E	**7-Mar-23**	0.0	21.6	0.0	0.0
P106E	**14-Apr-23**	0.0	20.6	0.0	0.0
P106E	**24-May-23**	0.0	21.0	0.0	0.0
P106E	**27-Jun-23**	0.0	20.4	**nr	0.0
P106E	**31-Jul-23**	0.0	20.5	1.0	1.0
P106E	**22-Aug-23**	0.0	20.1	0.0	0.0
P106E	**13-Sep-23**	0.0	21.5	1.0	0.0
P106E	**16-Oct-23**	0.1	20.8	0.0	0.0
P106E	**3-Nov-23**	0.1	22.0	0.0	0.0
P106E	**6-Dec-23**	0.0	21.1	0.0	0.0

*ns - no sample due to snow cover, flooding, or freezing
**nr - no result due to instrument malfunction

Winnipeg | Water and Waste
Eaux et déchets

Table 10. 2023 External Gas Probe Monitoring

Well No.	Date	CH4	O2	CO	H2S
		% LEL	(%)	PPM	PPM
P107E	**26-Jan-23**	*ns	*ns	*ns	*ns
P107E	**28-Feb-23**	0.0	21.5	0.0	0.0
P107E	**7-Mar-23**	0.0	21.5	0.0	0.0
P107E	**14-Apr-23**	0.0	20.5	0.0	0.0
P107E	**24-May-23**	0.0	21.2	0.0	0.0
P107E	**27-Jun-23**	0.0	20.8	**nr	0.0
P107E	**31-Jul-23**	0.0	20.5	1.0	1.0
P107E	**22-Aug-23**	0.0	20.1	1.0	0.0
P107E	**13-Sep-23**	0.0	20.5	0.0	0.0
P107E	**16-Oct-23**	0.1	21.2	0.0	0.0
P107E	**3-Nov-23**	0.1	22.1	1.0	0.0
P107E	**6-Dec-23**	0.0	21.1	0.0	0.0
P108E	**26-Jan-23**	0.0	22.4	0.0	0.0
P108E	**28-Feb-23**	0.0	21.5	0.0	0.0
P108E	**7-Mar-23**	0.0	21.6	0.0	0.0
P108E	**14-Apr-23**	0.0	20.5	0.0	0.0
P108E	**24-May-23**	0.0	21.3	0.0	0.0
P108E	**27-Jun-23**	0.0	20.4	**nr	0.0
P108E	**31-Jul-23**	0.0	20.5	0.0	1.0
P108E	**22-Aug-23**	0.0	20.1	0.0	0.0
P108E	**13-Sep-23**	0.0	21.5	0.0	0.0
P108E	**16-Oct-23**	0.1	21.2	0.0	0.0
P108E	**3-Nov-23**	0.1	22.4	0.0	0.0
P108E	**6-Dec-23**	0.0	21.2	0.0	0.0
P109E	**26-Jan-23**	0.0	18.0	0.0	0.0
P109E	**28-Feb-23**	0.0	21.6	0.0	0.0
P109E	**7-Mar-23**	0.0	18.1	0.0	0.0
P109E	**11-Apr-23**	0.0	8.6	0.0	0.0
P109E	**24-May-23**	0.0	20.4	0.0	0.0
P109E	**27-Jun-23**	0.0	20.4	**nr	0.0
P109E	**31-Jul-23**	0.0	18.0	0.0	0.0
P109E	**22-Aug-23**	0.1	19.7	0.0	0.0
P109E	**13-Sep-23**	0.0	20.3	0.0	0.0
P109E	**12-Oct-23**	0.1	18.4	0.0	0.0
P109E	**3-Nov-23**	0.0	19.9	0.0	0.0
P109E	**6-Dec-23**	0.0	19.5	0.0	0.0

*ns - no sample due to snow cover, flooding, or freezing
**nr - no result due to instrument malfunction

Water and Waste
Eaux et déchets

Table 10. 2023 External Gas Probe Monitoring

Well No.	Date	CH4	O2	CO	H2S
		% LEL	(%)	PPM	PPM
P110E	**26-Jan-23**	0.0	7.1	6.0	0.0
P110E	**1-Mar-23**	0.0	22.5	0.0	0.0
P110E	**7-Mar-23**	0.0	11.0	2.0	0.0
P110E	**14-Apr-23**	0.0	20.8	0.0	0.0
P110E	**24-May-23**	0.0	8.5	1.0	0.0
P110E	**27-Jun-23**	0.0	20.7	**nr	0.0
P110E	**31-Jul-23**	0.0	8.9	1.0	1.0
P110E	**22-Aug-23**	0.0	19.9	0.0	0.0
P110E	**13-Sep-23**	0.0	7.4	0.0	0.0
P110E	**12-Oct-23**	0.1	7.4	0.0	0.0
P110E	**3-Nov-23**	0.0	0.5	0.0	0.0
P110E	**6-Dec-23**	0.0	11.6	4.0	0.0
P111E	**26-Jan-23**	*ns	*ns	*ns	*ns
P111E	**28-Feb-23**	0.0	21.7	0.0	0.0
P111E	**10-Mar-23**	0.0	22.5	0.0	0.0
P111E	**14-Apr-23**	0.0	20.9	45.0	0.0
P111E	**29-May-23**	0.0	21.1	0.0	0.0
P111E	**27-Jun-23**	0.0	12.8	**nr	1.0
P111E	**31-Jul-23**	0.0	20.6	1.0	0.0
P111E	**22-Aug-23**	0.0	19.9	0.0	0.0
P111E	**13-Sep-23**	0.0	21.4	1.0	0.0
P111E	**12-Oct-23**	0.1	21.2	0.0	0.0
P111E	**3-Nov-23**	0.0	21.5	0.0	0.0
P111E	**6-Dec-23**	0.0	21.2	0.0	0.0
P112E	**26-Jan-23**	*ns	*ns	*ns	*ns
P112E	**9-Feb-23**	*ns	*ns	*ns	*ns
P112E	**1-Mar-23**	0.0	22.9	0.0	0.0
P112E	**8-Mar-23**	0.0	21.0	0.0	0.0
P112E	**14-Apr-23**	0.0	21.0	0.0	0.0
P112E	**29-May-23**	0.0	21.7	0.0	0.0
P112E	**27-Jun-23**	0.0	18.7	**nr	0.0
P112E	**31-Jul-23**	0.0	18.5	1.0	0.0
P112E	**22-Aug-23**	0.0	20.9	0.0	0.0
P112E	**13-Sep-23**	0.0	20.8	0.0	0.0
P112E	**12-Oct-23**	0.1	19.7	0.0	0.0
P112E	**3-Nov-23**	0.1	20.3	0.0	0.0
P112E	**6-Dec-23**	0.1	20.1	0.0	0.0

*ns - no sample due to snow cover, flooding, or freezing

**nr - no result due to instrument malfunction

6.0 NUISANCE MANAGEMENT

In order to reduce odour, litter, and vector nuisances at the landfill, several best practices and operating procedures are used, such as placement of screens, minimizing the working face of each cell, application of appropriate cover material (daily, intermediate, or final), site landscaping, weekly litter control patrols, and odour monitoring. If necessary, a licensed professional will apply vector control products, ensuring that appropriate chemicals are used and are properly handled. Noise is not a significant issue due to the separation from surrounding homes. Fugitive dust emissions are minimized by spraying site roads with uncontaminated surface water.

In 2023, there were 56 odour complaints from 24 customers; in all cases the source of the odour was investigated. If the source of the odour could be located within the BRRMF, if possible, we immediately covered the odour causing material, moved the tipping face to a more favorable area if available, and used compost or wood chips to reduce the odour and prevent further occurrence. Appendix E provides a summary of nuisance complaints received in 2023.

ENVIRONMENTAL STANDARDS DIVISION
2230 Main Street, Winnipeg, Manitoba R2V 4T8
DIVISION DES NORMES ENVIRONNEMENTALES
2230, rue Main, Winnipeg (Manitoba) R2V 4T8

T. | Tél. : 204-986-4684
F. | Fax : 204-339-2147
winnipeg.ca/waterandwaste

7.0 CONCLUSION

The diversion operations taking place at the BRRMF have been effective in diverting tens of thousands of metric tonnes of material from the landfill.

The quality of the ground water beneath the site has not been negatively impacted, as demonstrated by the comparison of upstream to downstream ground water quality.

The quality of the surface water measured at the weir is statistically similar to the quality of the surface water upstream of the BRRMF.

Leachate management was successful in 2023 as there were no breakouts of leachate.

The areas where landfill gas is escaping should be repaired.

The BRRMF will continue to operate so as to ensure that the environment is maintained in such a manner as to sustain a high quality of life, including social and economic development, recreation and leisure for present and future Manitobans.

8.0 REFERENCES

1. Brady Road Resource Management Facility – Manitoba Environment Act Licence No. 3081 R

https://www.winnipeg.ca/waterandwaste/pdfs/garbage/bradylicence.pdf

2. Ontario Ministry of the Environment. (2011, July 1). Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act. Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition.

https://www.ontario.ca/page/soil-ground-water-and-sediment-standards-use-under-part-xv1-environmental-protection-act

3. Canadian Council of Ministers of the Environment. Canadian Environmental Quality Guidelines Summary Table. Water Quality Guidelines for the Protection of Freshwater Aquatic Life. (CCME, 2019).

http://ceqg-rcqe.ccme.ca/download/en/221

ENVIRONMENTAL STANDARDS DIVISION
2230 Main Street, Winnipeg, Manitoba R2V 4T8
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T. | Tél. : 204-986-4684
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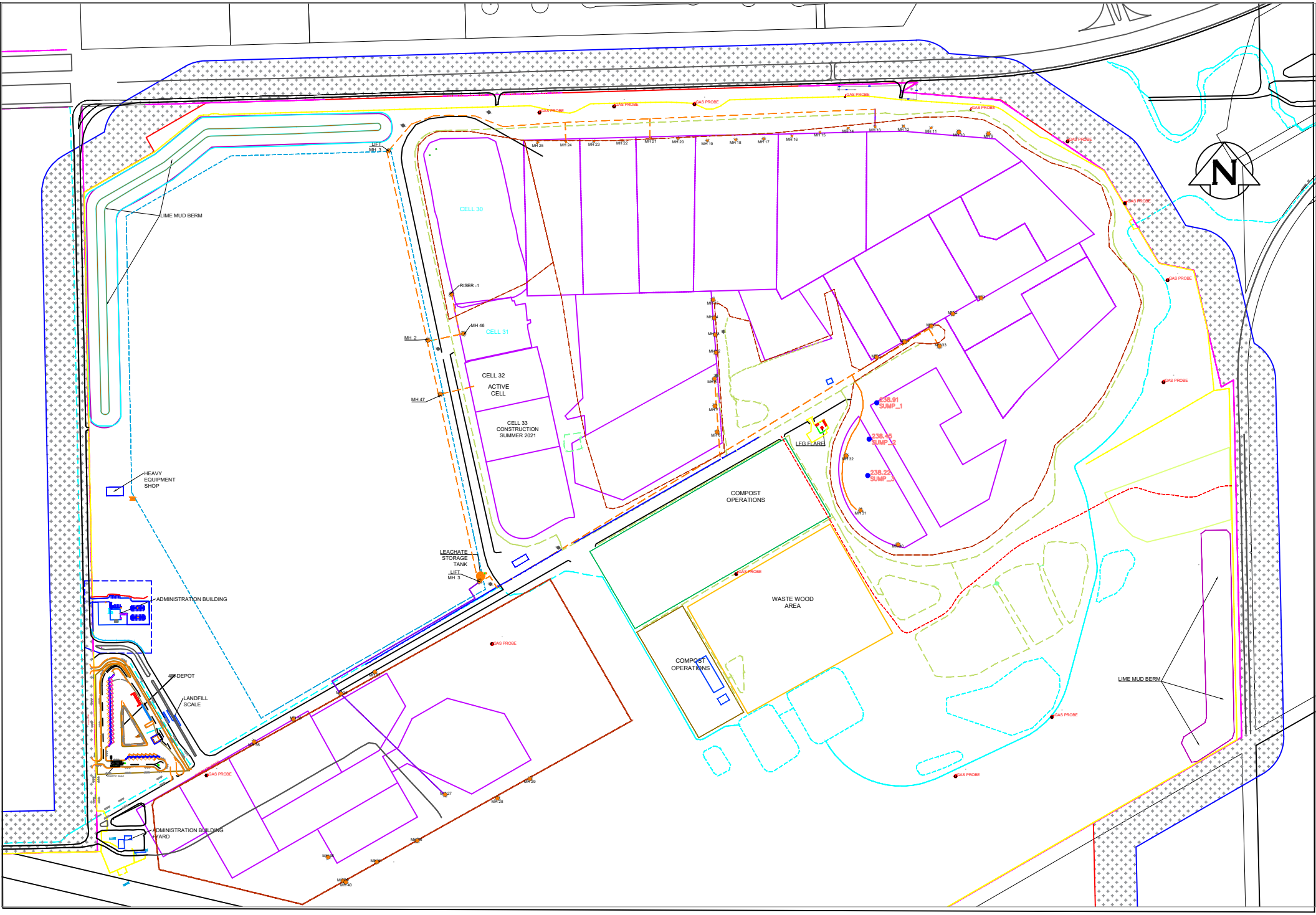
winnipeg.ca/waterandwaste

FIGURE 1
BRRMF LAYOUT AND LEACHATE COLLECTION SYSTEM



La Ville de Winnipeg
City of Winnipeg

Brady Rd.

LEGEND/LÉGENDE

- CONTROL ZONE / Zone de contrôle
- LANDFILL SITE/ Site d'enfouissement
- GW Flow Direction
- MANHOLE
- GAS PROBE
- LEACHATE PROBE
- HYDRANT
- THERMOCOUPLE
- GW Well
- CL
- CB
- GW Well/Lysimeter
- Wastewater System
- Storm Drain System
- Water Main
- Railway
- ADMIN. BUILDING
- CONTOURS LINES @ 0.05m.

Scale in metres / Échelle en mètres

METRIC / MÉTRIQUE
WHOLE NUMBERS INDICATE MILLIMETERS
DECIMAL NUMBERS INDICATE CENTIMETERS
LES NOMBRES ENTIERS INDIQUENT LES MILLIMETRES
LES NOMBRES DÉCIMALES INDIQUENT LES METRES

ORTHOPHOTO Date	December 23, 2019
FIELD BOOK #:	
UPDATED FEATURES	
WELLS FEATURES SURVEYED	2017 BM/MN
UPDATED FOR CK	2021 BM
NO. REVISIONS	DATE BY

BRRMF
ADMINISTRATIVE BUILDING
Bâtiment Administratif

SURVEY BY: KB/BM	VALIDATED BY: GR
DRAWN BY: MO	APPROVED BY:
HOR. SCALE 1: 10	PRINTED
VERTICAL	
DATE May 15, 2020	DATE : April 12, 2021

THE CITY OF WINNIPEG / LA VILLE DE WINNIPEG
WATER AND WASTE DEPARTMENT
SOLID WASTE DIVISION

"WARNING"
THE EXACT BOUNDARY OF REFUSE CAN BE CERTIFIED ONLY BY DETAILED INVESTIGATION. THE EXISTENCE AND EXACT LOCATION OF ALL UNDERGROUND SERVICES INCLUDING NEW CONNECTIONS, MUST BE CHECKED WITH THE APPROPRIATE UTILITIES.

"ATTENTION"
LA LIMITE EXACTE DU REFUS PEUT ÊTRE CERTIFIÉE UNIQUEMENT PAR UNE ENQUÊTE DÉTAILLÉE. L'EXISTENCE ET LA SITUATION EXACTE DE TOUS LES SERVICES SOUTERRAINS, Y COMPRIS LES NOUVELLES CONNEXIONS DOIT ÊTRE VÉRIFIÉ AVEC LES UTILITAIRES APPROPRIÉS

Site No. 25
Brady Rd.
DUMP SITE & DETAIL

SHEET 1 OF 2

CITY DRAWING NUMBER

BRRMF_MasterPlan_IMG_R6.DWG

FIGURE 2
GROUND WATER SAMPLING LOCATIONS

BRADY ROAD LANDFILL

LEGEND

▲ OVERBURDEN PIEOZOMETER NEST
⬢ GROUNDWATER WELL

0.0 0.05 0.1 0.2 0.3 0.4 0.5
DISTANCES IN KM

B.M. ELEV.		FIELD BOOK #:	
POSTED TO LBIS			
1		11/11/25	KB
NO.	REVISIONS	DATE	BY

Winnipeg

THE CITY OF WINNIPEG
WATER AND WASTE DEPARTMENT

BRADY ROAD LANDFILL

SHEET 1 OF 1

WELL LOCATIONS

FIGURE 1_R1

FIGURE 3
SURFACE WATER SAMPLING LOCATIONS

LEGEND:

- IMPACTED WATER POND
- DRY POND
- CLEAN WATER POND
- SWQ-25-16 SURFACE WATER SAMPLING LOCATION
- SURFACE WATER FLOW DIRECTION
- CLOSED LANDFILL BOUNDARY
- LAND DRAINAGE DITCH

NOTES:

1. TOPOGRAPHY SOURCES ARE CITY OF WINNIPEG, KGS GROUP 2013 TOPOGRAPHY OF ACTIVE LANDFILL OPERATING AREA AND ADDITIONAL LANDFILL PERIMETER SURVEY BY KGS GROUP 2013.
2. EXACT SURFACE WATER SAMPLING LOCATION TO BE DETERMINDED IN FIELD.

100 0 100 200 300 400m

SCALE: 1:10000 METRIC

NO.	YY/MM/DD	DESCRIPTION	BY
A	14/05/30	ISSUED WITH DRAFT REPORT	MFH

REVISIONS / ISSUE

KGS GROUP CONSULTING ENGINEERS

THE CITY OF WINNIPEG
WATER AND WASTE DEPARTMENT

BRADY ROAD RESOURCE MANAGEMENT FACILITY SURFACE WATER MANAGEMENT PLAN

PROPOSED SURFACE WATER MONITORING LOCATIONS

MAY 2014 | FIGURE 10 | REV: A

APPENDIX A
2023 INCIDENT REPORTS

WORKPLACE SAFETY INCIDENT
INVESTIGATION FORM

This form is to be used to document details regarding an incident investigation in supplement to information provided on the Incident and Injury Form.

People Soft Incident Number (Office Use Only):

Worker's Name: **Sean Steeves**	***Worker's Job Title:*** **Landfill Supervisor**
Department Name: **Water and Waste Department** **CITY OF WINNIPEG**	***Division/Branch:*** **Solid Waste Services**
Direct Supervisor's Name: **Chris Kozak**	***Direct Supervisor's Job Title:*** **Operations Superintendent**

Incident Details

Was this a: ☐ ***Near Miss*** ☒ ***Incident*** ☐ ***"Serious" incident (see definition on page 2)***

Date of Incident: **05/23/23**	***Time of Incident:*** **1700**	***Location of Incident:*** **Brady Landfill-Leaf and Yard Waste Compost Area**
Nature of Injury(s): Choose an item. *N/A* Click here to enter alternate/additional text		
Name of Hospital/Clinic (if applicable):		
Police Incident # (if applicable):		

Incident Description

Describe fully what happened: **On May 23, 2023, a fire was discovered by operational staff working on the leaf and yard waste composting pad at the Brady Road Landfill. The fire was detected at approximately 17:00, and emergency services were immediately contacted. The Winnipeg Fire Department responded promptly, arriving at the scene at 18:15 PM and remaining onsite until 12:30 AM on May 24th.**
Upon arrival, it was observed that the fire was spreading rapidly due to the hot and dry weather conditions, with light winds coming from the southeast. To contain and extinguish the fire, heavy equipment was utilized to place soil on the open flames, effectively smothering the fire and preventing further spread. Additionally, two 6-inch water cannons were deployed to assist the heavy equipment. These water cannons were used to cool the equipment, saturate adjacent areas, and soak the burning yard waste as it was being placed onto a soil pad located to the west of the burning compost windrow, where it was extinguished.
The area was secured, and landfill customers needing access to the compost area were segregated to a safe area away from the fire and smoke for disposal needs. Landfill service was uninterrupted.
City Staff and heavy equipment operators worked throughout the night to ensure the safety of personnel and surrounding areas while implementing firefighting measures to bring the situation under control. There were no injuries to City staff, customers, responding firefighters and contractors, or the public.

Statement of Causes *(please attach any supporting evidence such as scene sketches, photos or witness statements)*

Identify the hazards that were the primary cause of the incident: Fire/Flame/Explosion Click here to enter alternate/additional text.
What were the contributing factors: Weather Conditions Click to select factor 2 Click to select factor 3 Click here to enter alternate/additional text.

Recommendations

Identify the IMMEDIATE and LONG-TERM corrective actions that will be taken to prevent reoccurrence.		
Recommended Corrective Action	**Action by whom**	**Action by date (29)**
1) **Introduce additional equipment to respond to Fire hazards**		
2) **Ensure adequate equipment and resources are available for fire emergencies and perform regular scheduled inspections on fire response equipment.**		
3) **Conduct ongoing training with Landfill and Compost staff and first responders and continually update, review and train personnel on emergency response procedures to prevent injury and property damage.**		

Persons conducting investigation

Name	**Signature**	**Type of Representative**			**Date**
Sean Steeves		Mgmt. ☐	Worker ☐	Other ☐	
		Mgmt. ☐	Worker ☐	Other ☐	
		Mgmt. ☐	Worker ☐	Other ☐	

When a “serious” workplace safety incident occurs, Departmental Safety Resources must be immediately notified so that a report can be made to the Workplace Safety and Health Division.

“Serious” Workplace Safety Incidents have been defined by the City of Winnipeg as:

- a fatality
- a worker is taken for emergency medical treatment as the result of a workplace accident
- the collapse of a structure

- an explosion; or
- an uncontrolled release of a hazardous substance

For additional information on the City of Winnipeg Workplace Safety Incident Protocol and on the requirements for incident investigations, please refer to the following website:

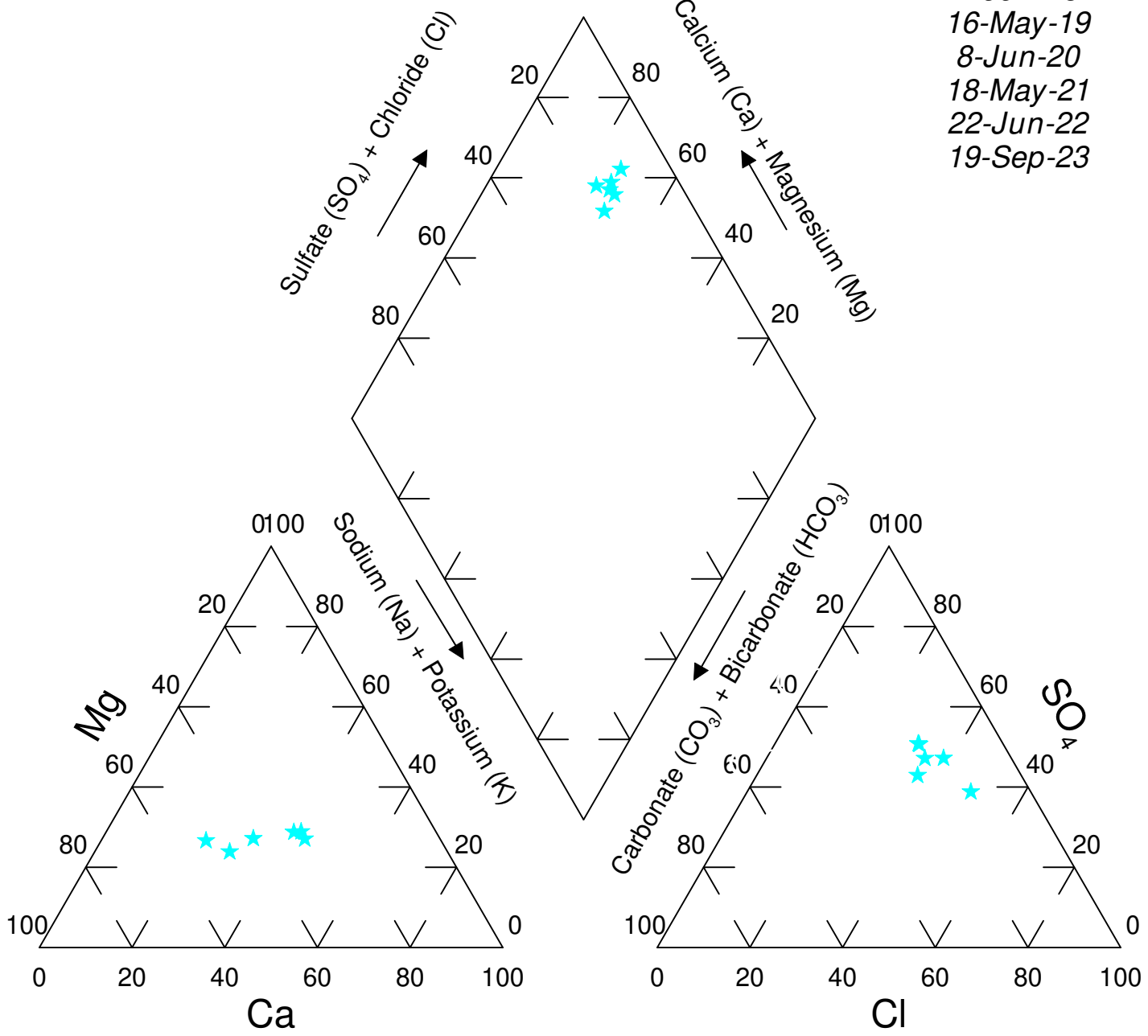
http://citynet/hrintra/workplacewellness/Safety/Investigating/Investigating_MainPage.stm

APPENDIX B
2023 PIPER DIAGRAMS

2023 Groundwater Piper Diagrams

Site: Brady
Location : GWQ25-4N34-CR

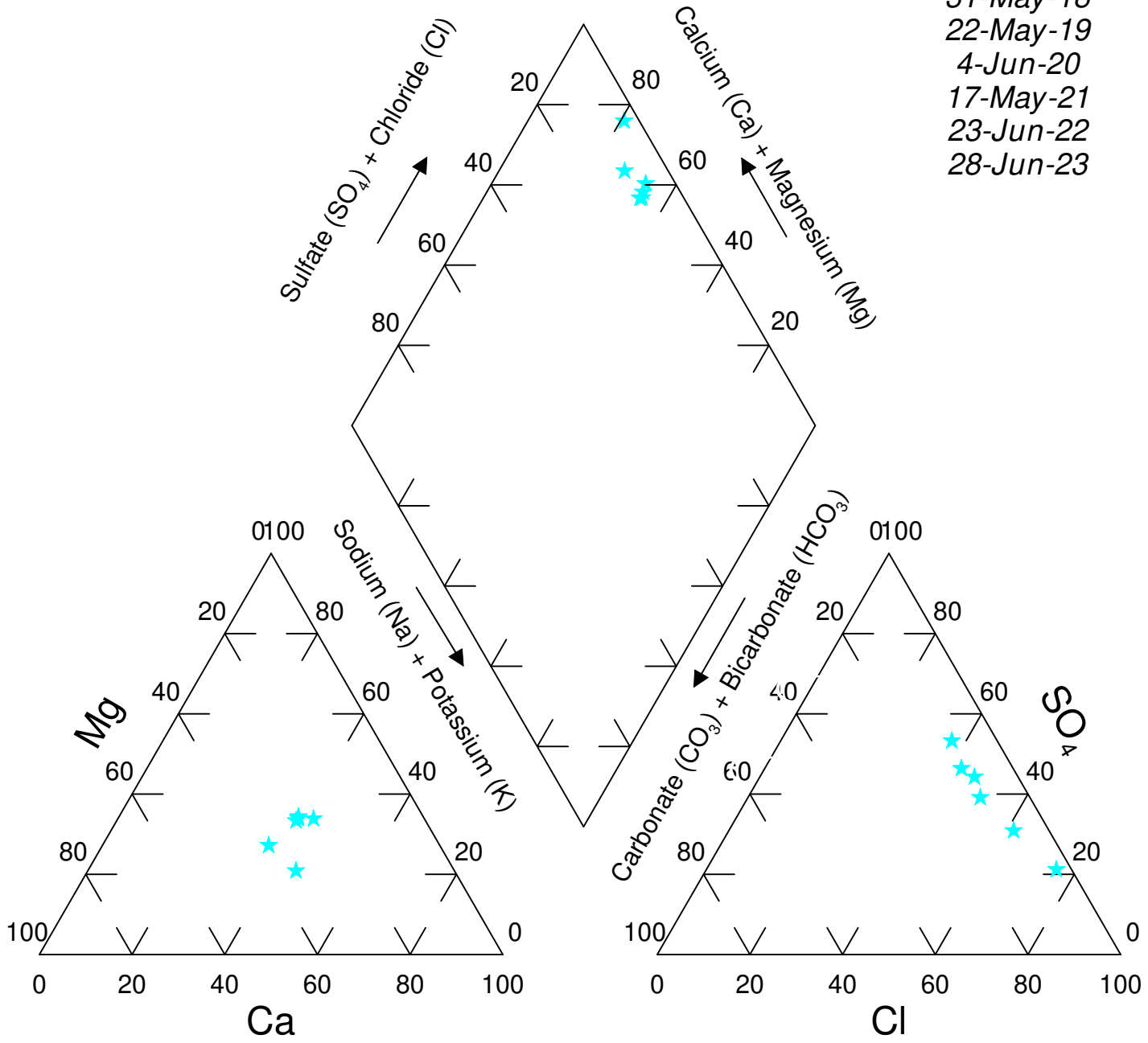
Dates:
4-Jun-18
16-May-19
8-Jun-20
18-May-21
22-Jun-22
19-Sep-23



Winnipeg
Water and Waste Department

Site: Brady
Location : GWQ25-5N62-D

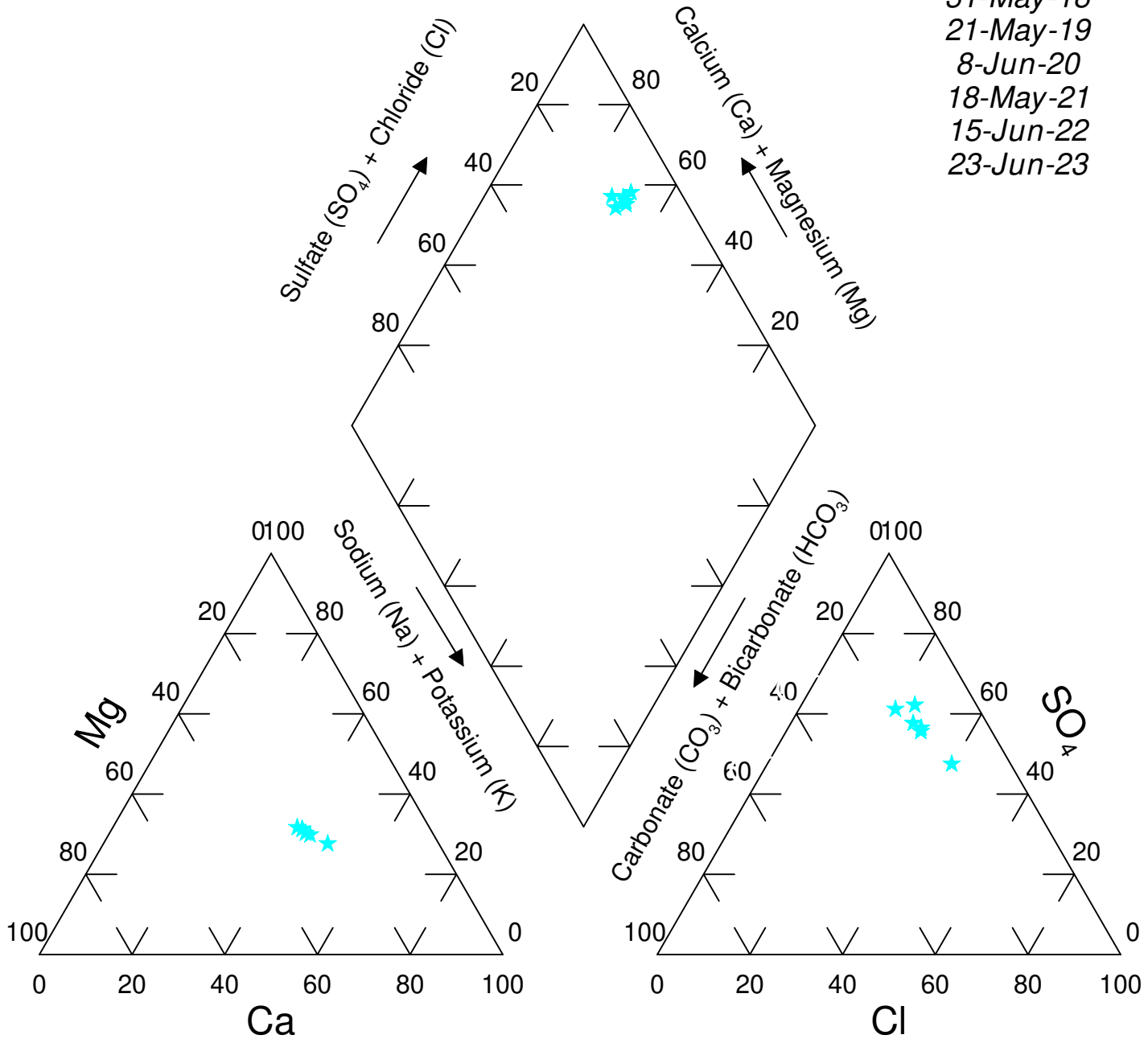
Dates:
31-May-18
22-May-19
4-Jun-20
17-May-21
23-Jun-22
28-Jun-23



Winnipeg
Water and Waste Department

Site: Brady
Location : GWQ25-6N57-DR

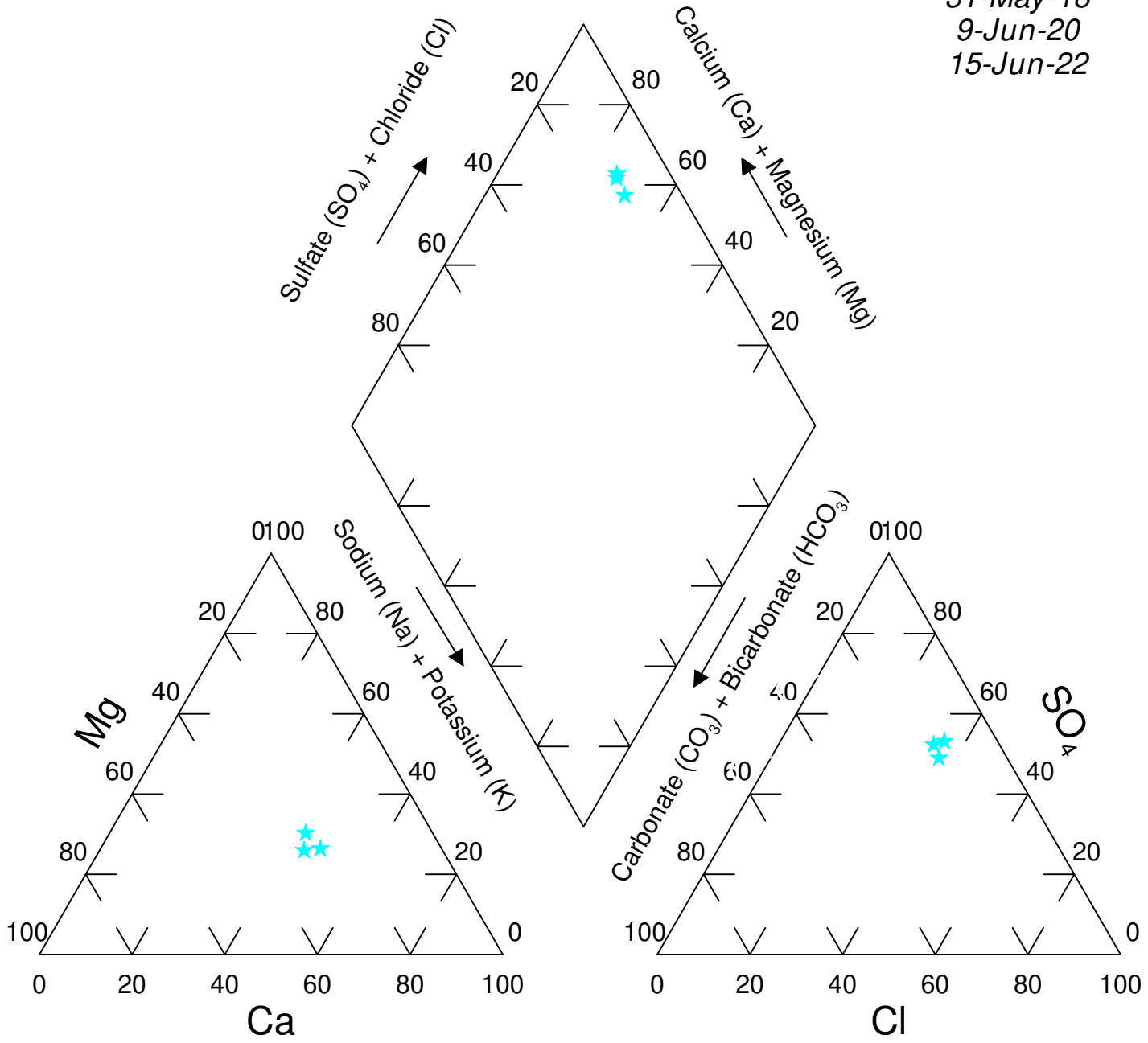
Dates:
31-May-18
21-May-19
8-Jun-20
18-May-21
15-Jun-22
23-Jun-23



Winnipeg
Water and Waste Department

Site: Brady
Location : GWQ25-6N58-DR

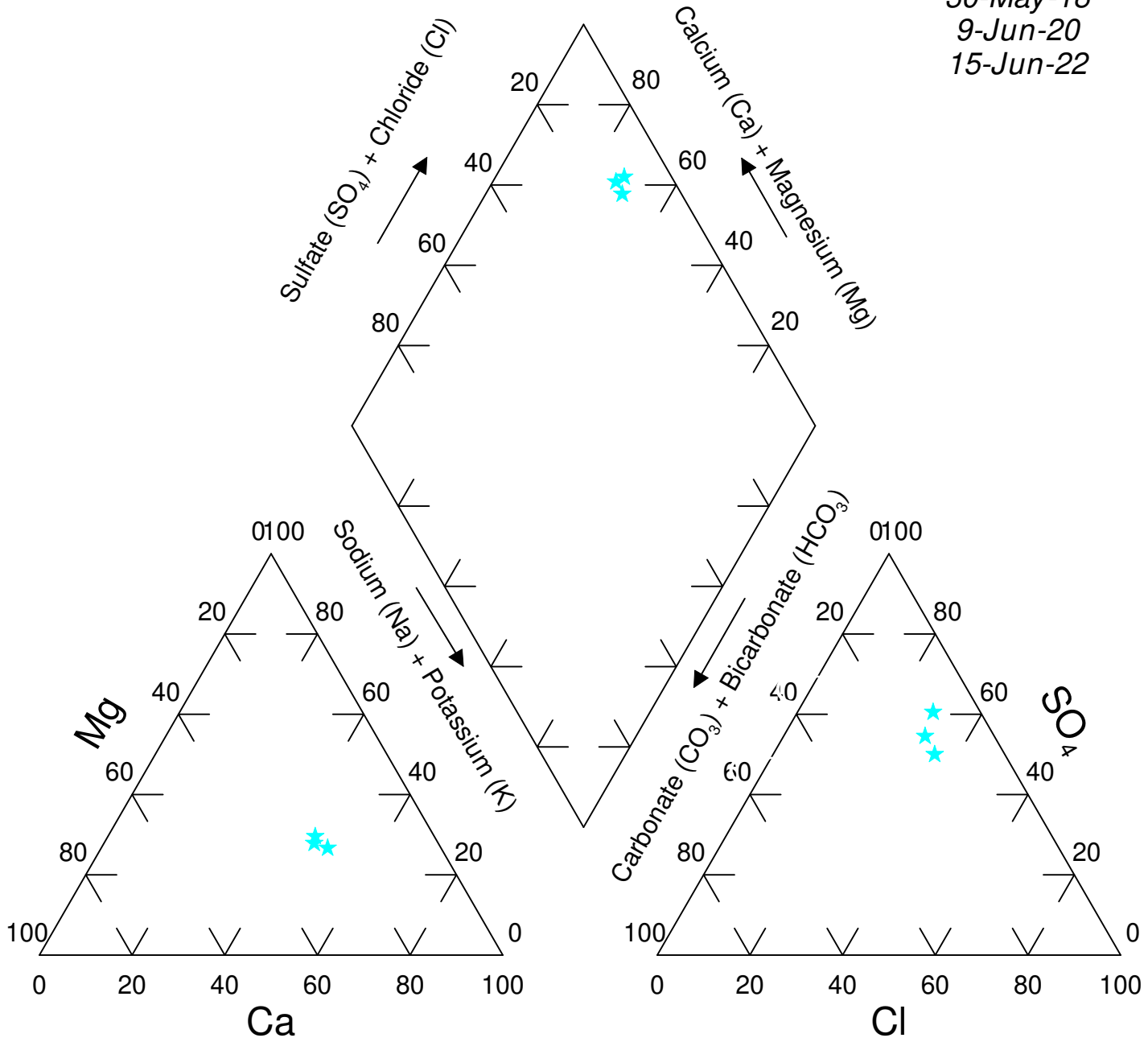
Dates:
31-May-18
9-Jun-20
15-Jun-22



Winnipeg
Water and Waste Department

Site: Brady
Location : GWQ25-6N59-DR

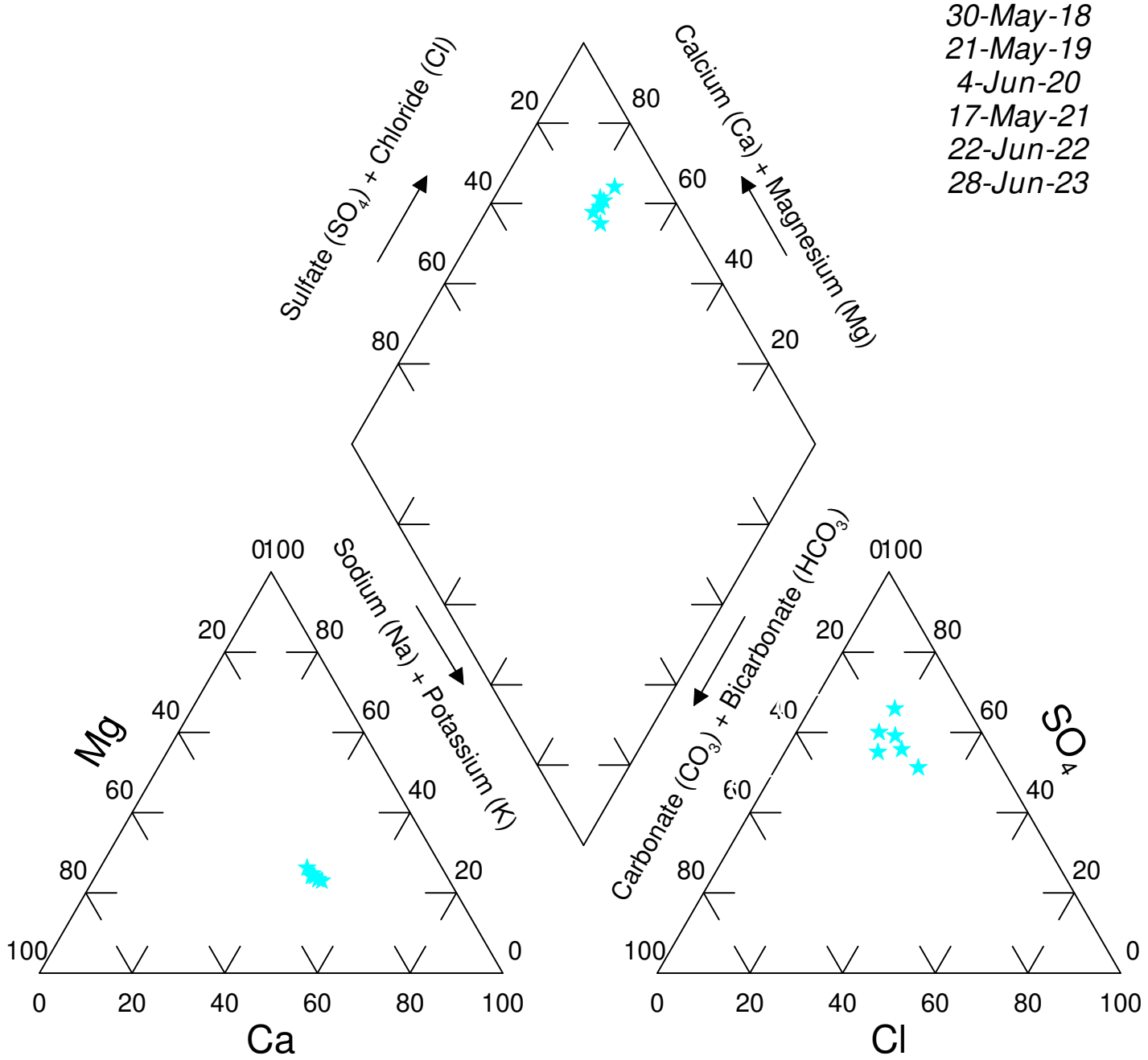
Dates:
30-May-18
9-Jun-20
15-Jun-22



Winnipeg
Water and Waste Department

Site: Brady
Location : GWQ25-6N60-DR

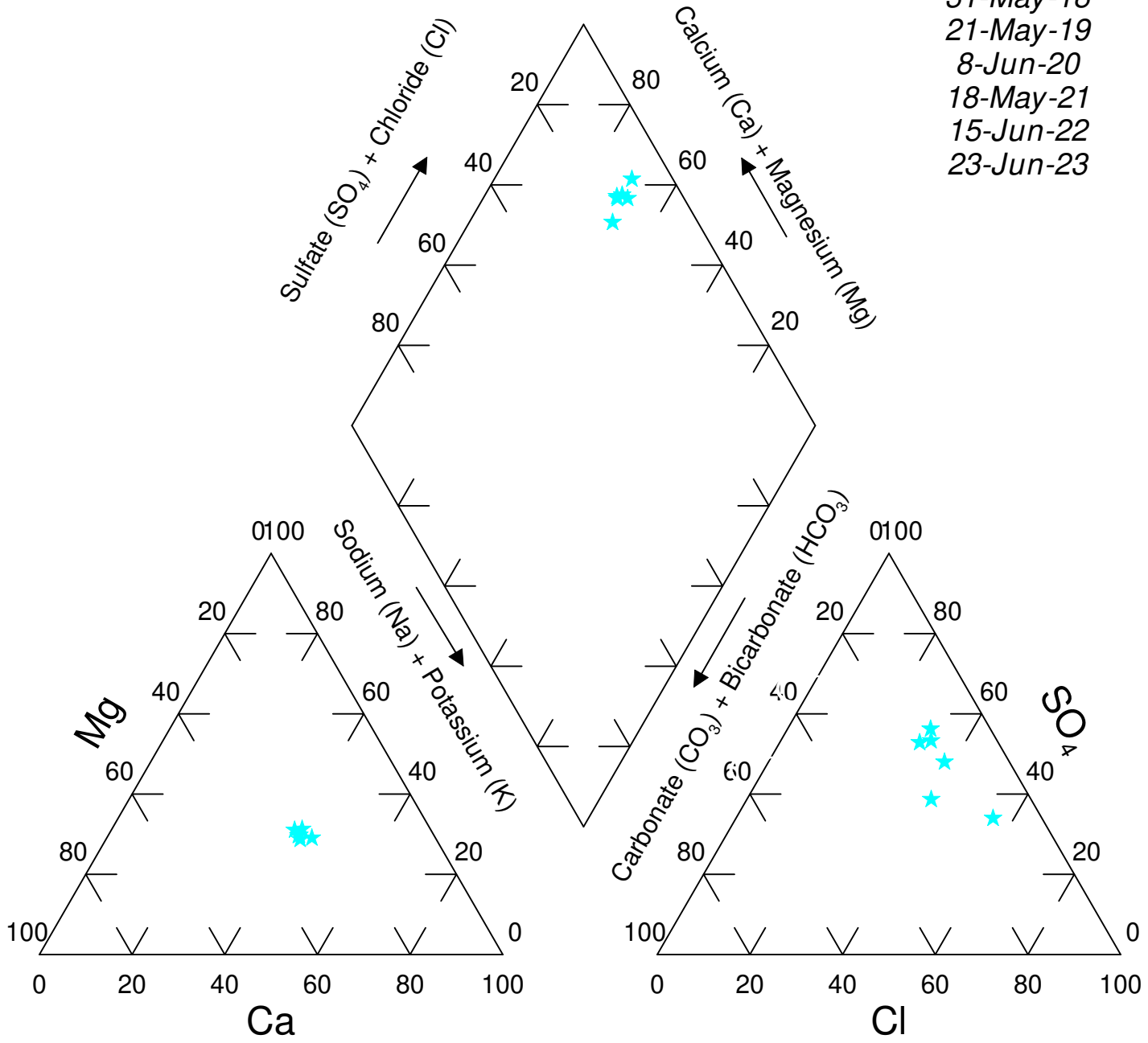
Dates:
30-May-18
21-May-19
4-Jun-20
17-May-21
22-Jun-22
28-Jun-23



Winnipeg
Water and Waste Department

Site: Brady
Location : GWQ25-6N63-E

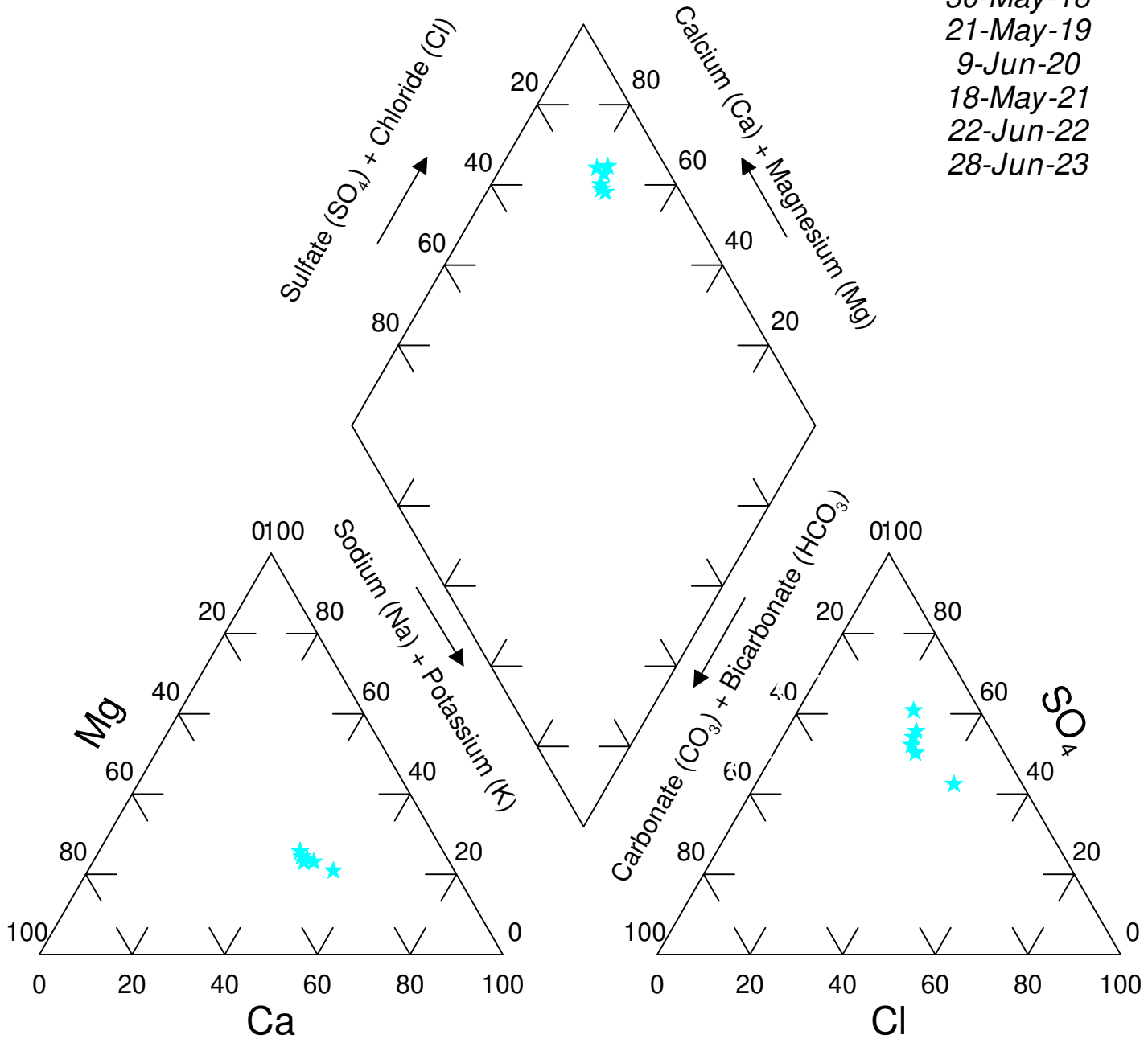
Dates:
31-May-18
21-May-19
8-Jun-20
18-May-21
15-Jun-22
23-Jun-23



Winnipeg
Water and Waste Department

Site: Brady
Location : GWQ25-6N67-E

Dates:
30-May-18
21-May-19
9-Jun-20
18-May-21
22-Jun-22
28-Jun-23



Winnipeg
Water and Waste Department

Site: Brady
Well #: 4N34-D/DR

Dates:
4-May-18
16-May-19
8-Jun-20
17-May-21
12-Jul-22
28-Jun-23

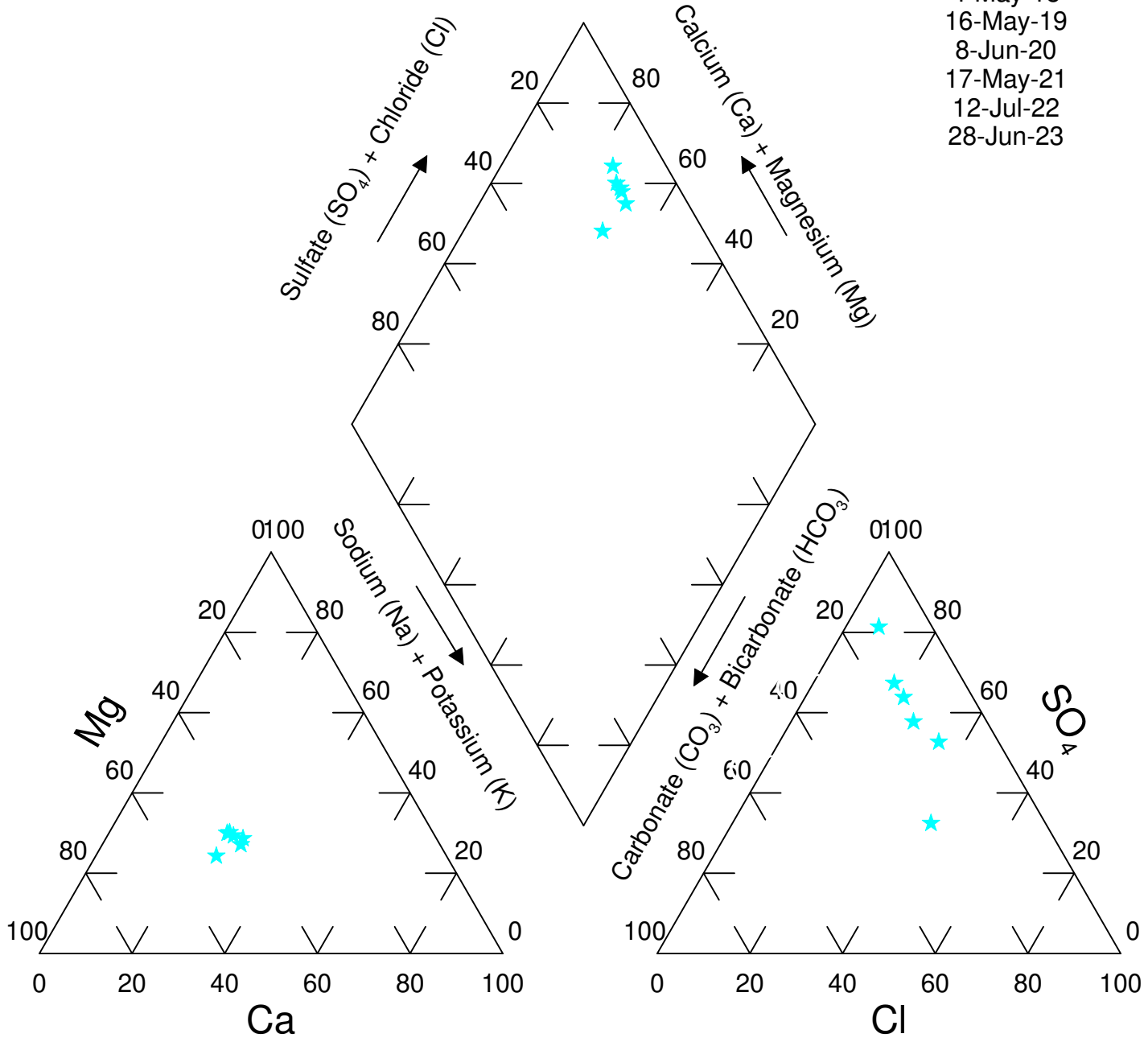


FIGURE: 10P

Winnipeg
Water and Waste Department

Site: Brady
Well #: 5N62-E

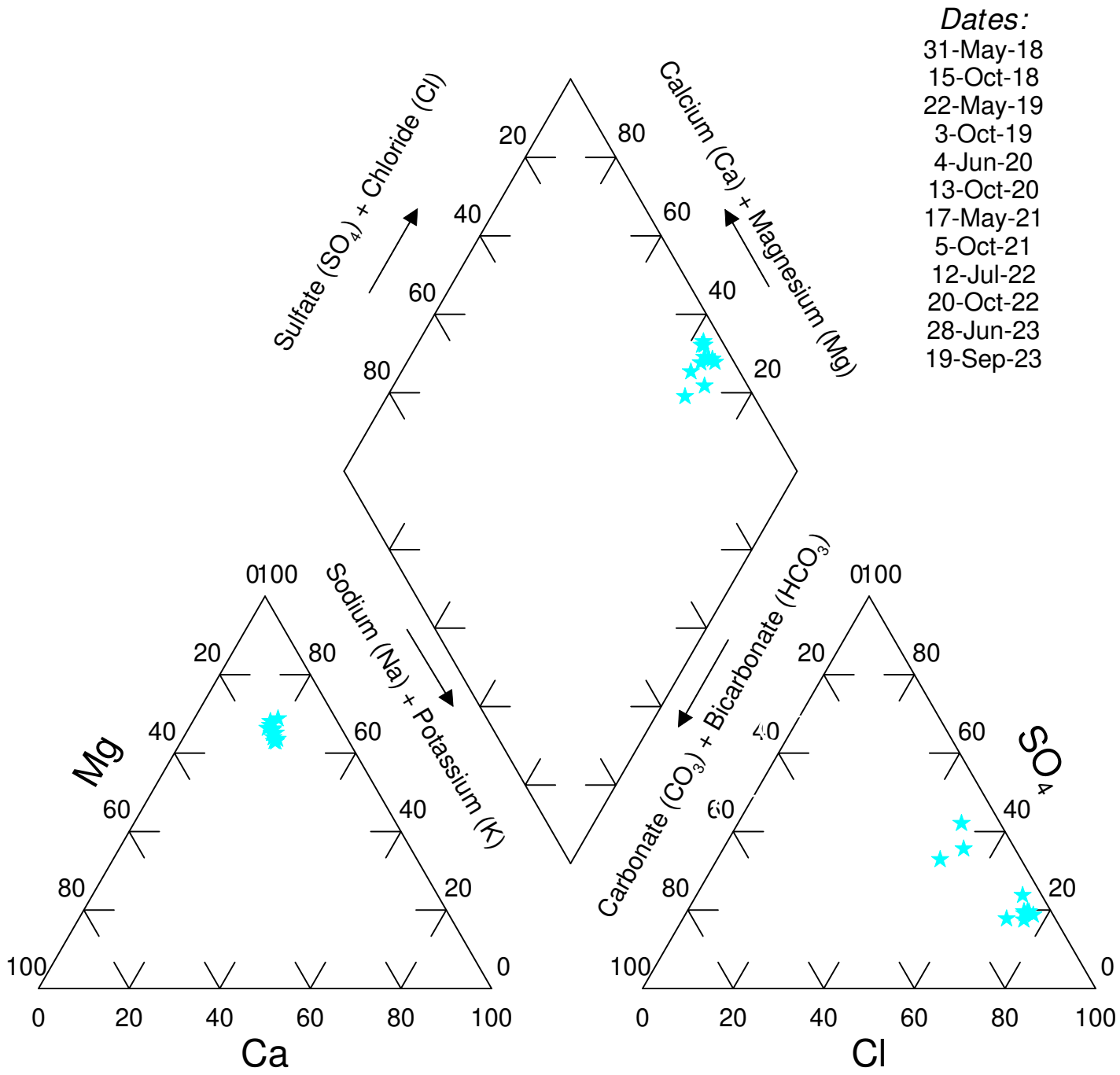


FIGURE: 11P

Winnipeg
Water and Waste Department

Site: Brady
Well #: 6N57-F/FR

Dates:
30-May-18
21-May-19
8-Jun-20
19-May-21
15-Jun-22
23-Jun-23

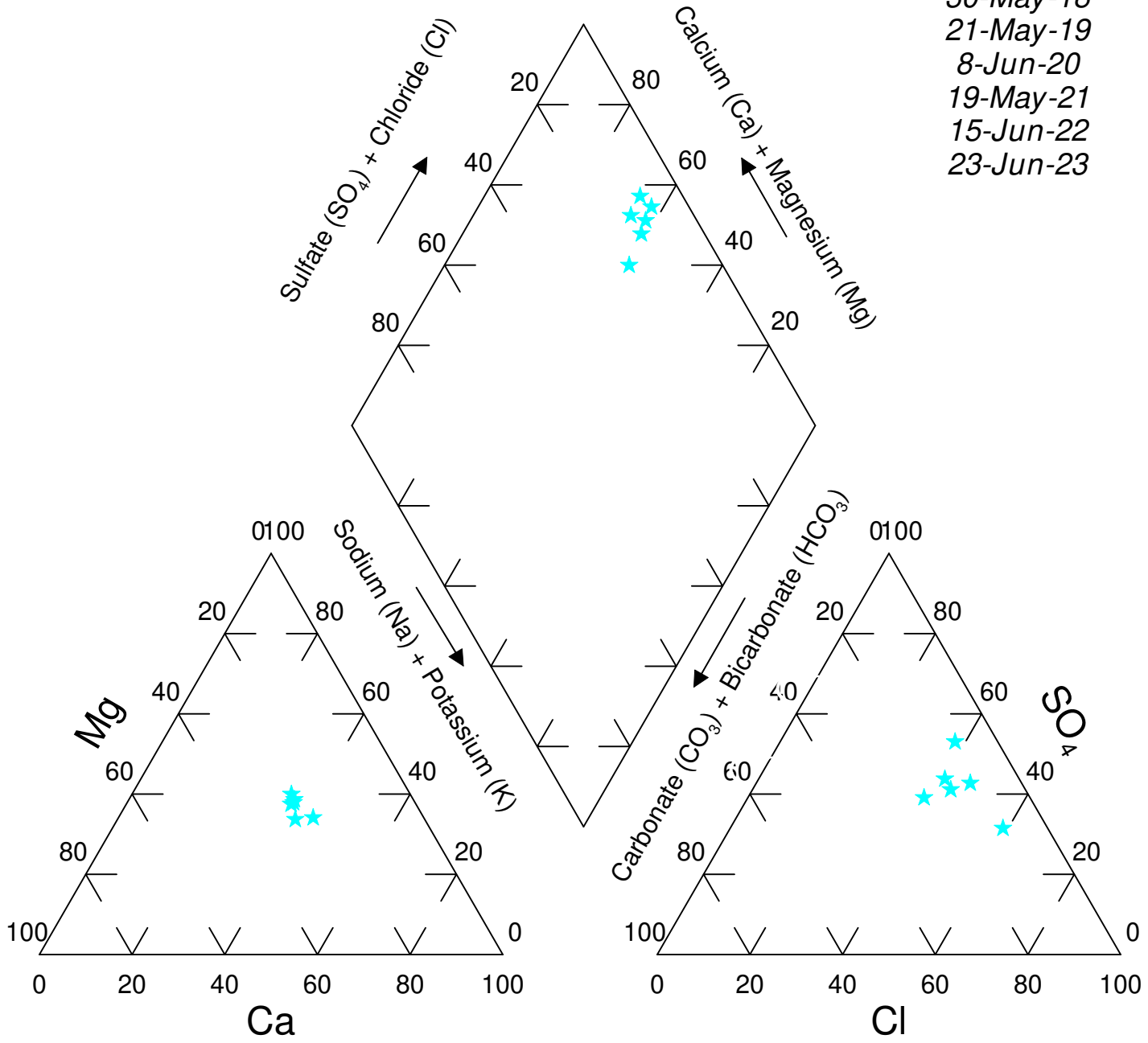
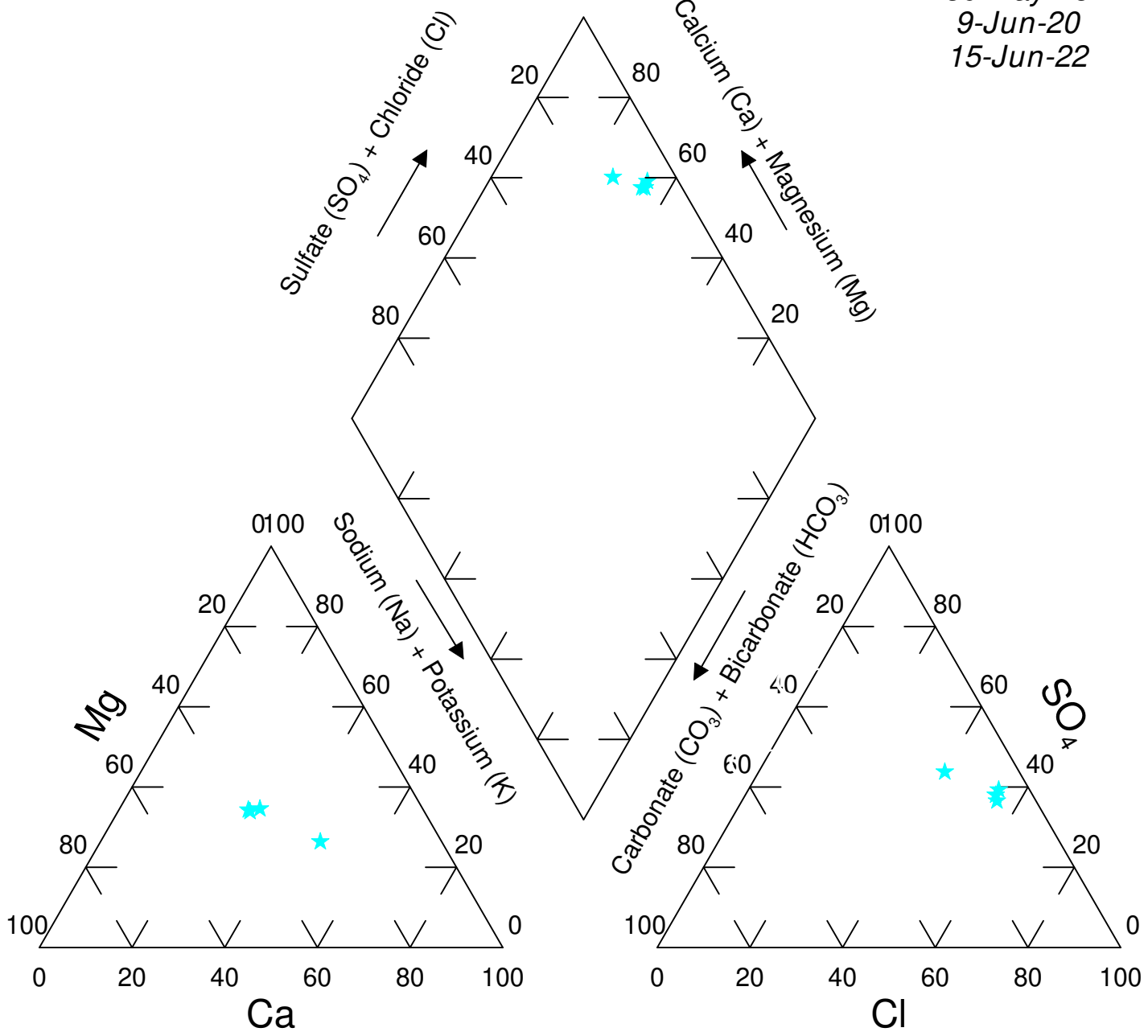


FIGURE: 12P

Winnipeg
Water and Waste Department

Site: Brady
Well #: 6N58FR

Dates:
30-May-18
9-Jun-20
15-Jun-22



Winnipeg
Water and Waste Department

Site: Brady
Well #: 6N59-F/FR

Dates:
30-May-18
9-Jun-20
15-Jun-22

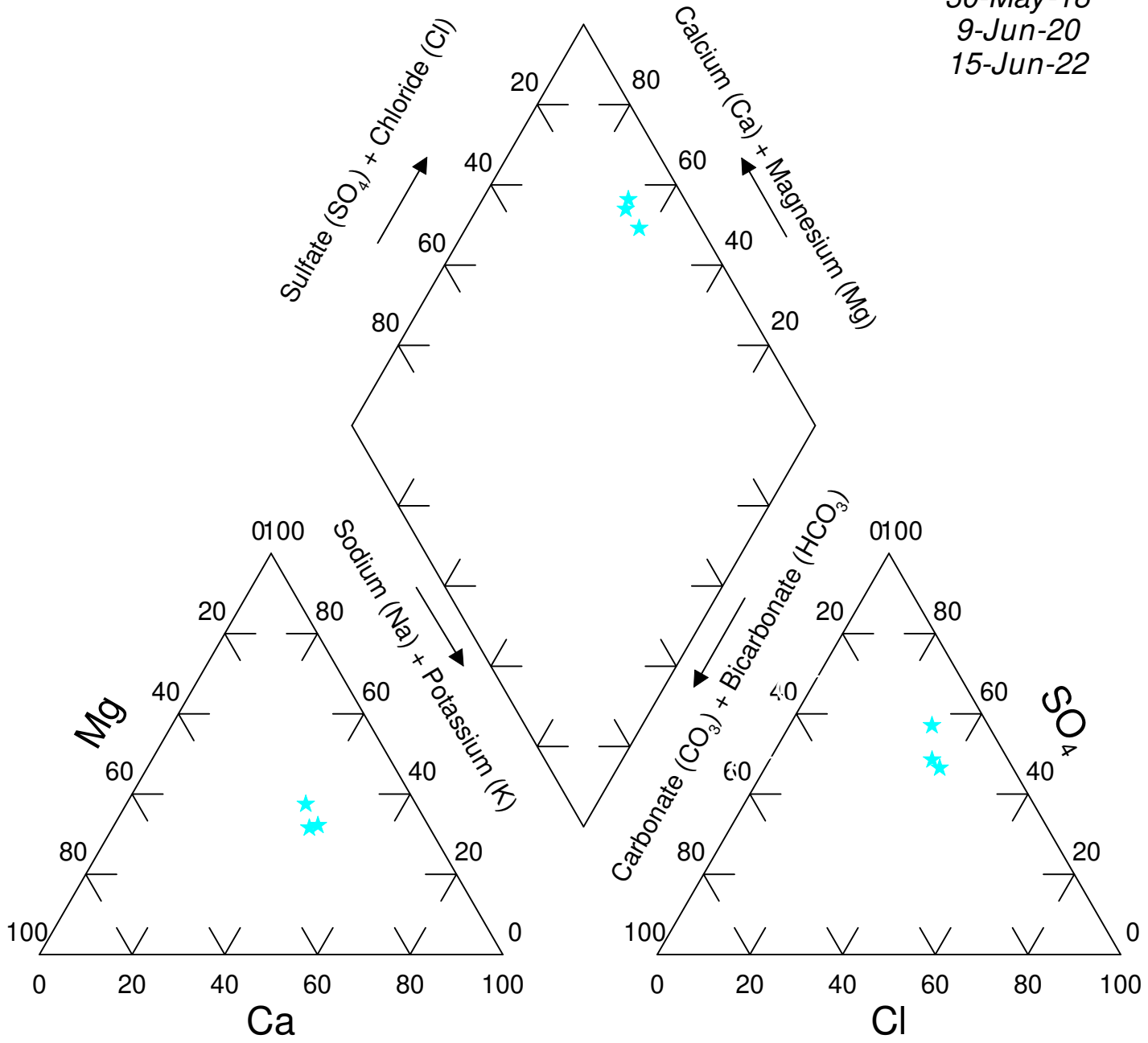


FIGURE: 14P

Winnipeg
Water and Waste Department

Site: Brady
Well #: 6N60-E/ER

Dates:
30-May-18
15-Oct-18
21-May-19
3-Oct-19
4-Jun-20
15-Oct-20
17-May-21
5-Oct-21
12-Jul-22
28-Jun-23

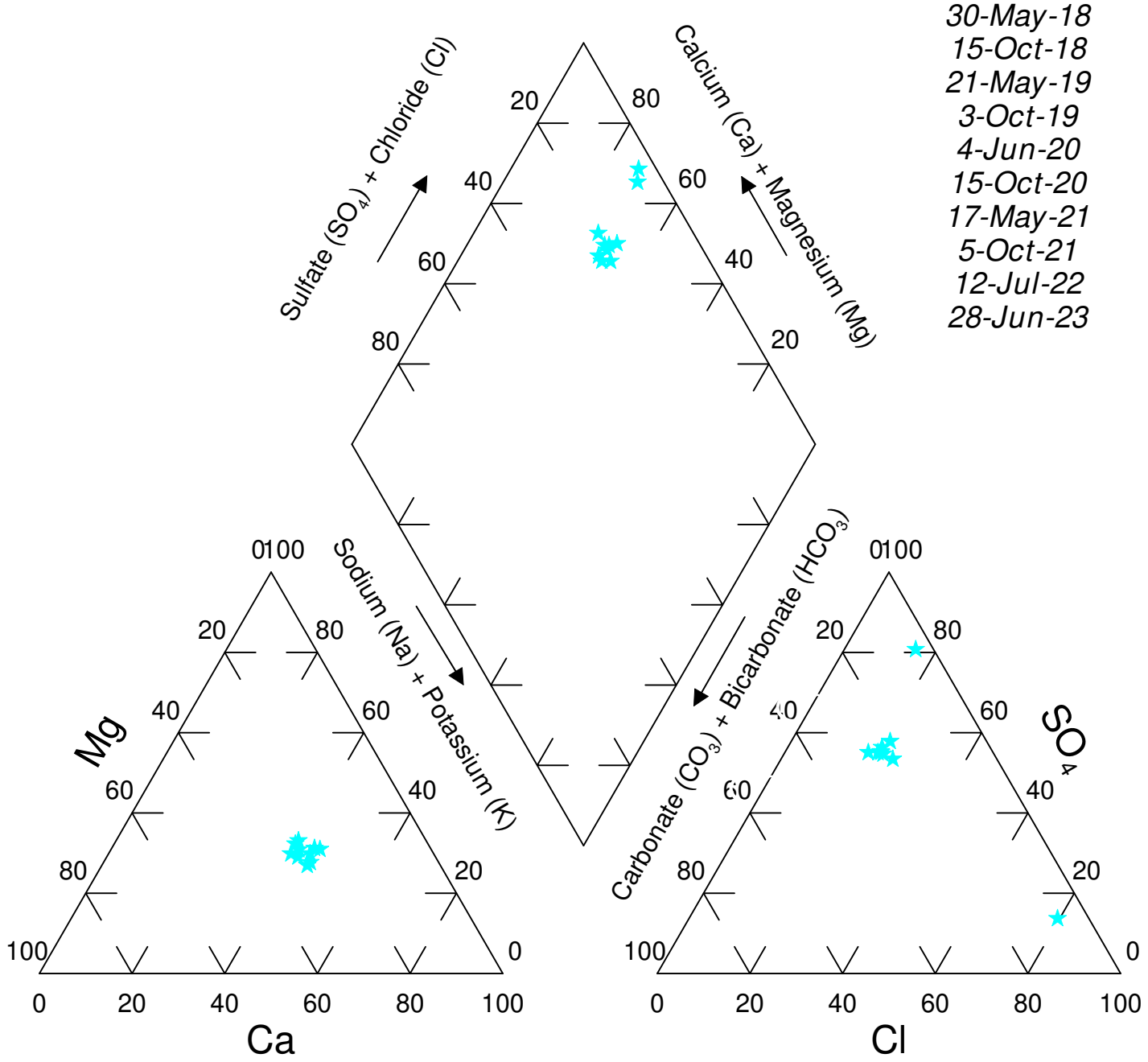


FIGURE: 15P

Winnipeg
Water and Waste Department

Site: Brady
Well #: 6N63-F

Dates:
31-May-18
21-May-19
10-Jun-20
18-May-21
15-Jun-22
28-Jun-23

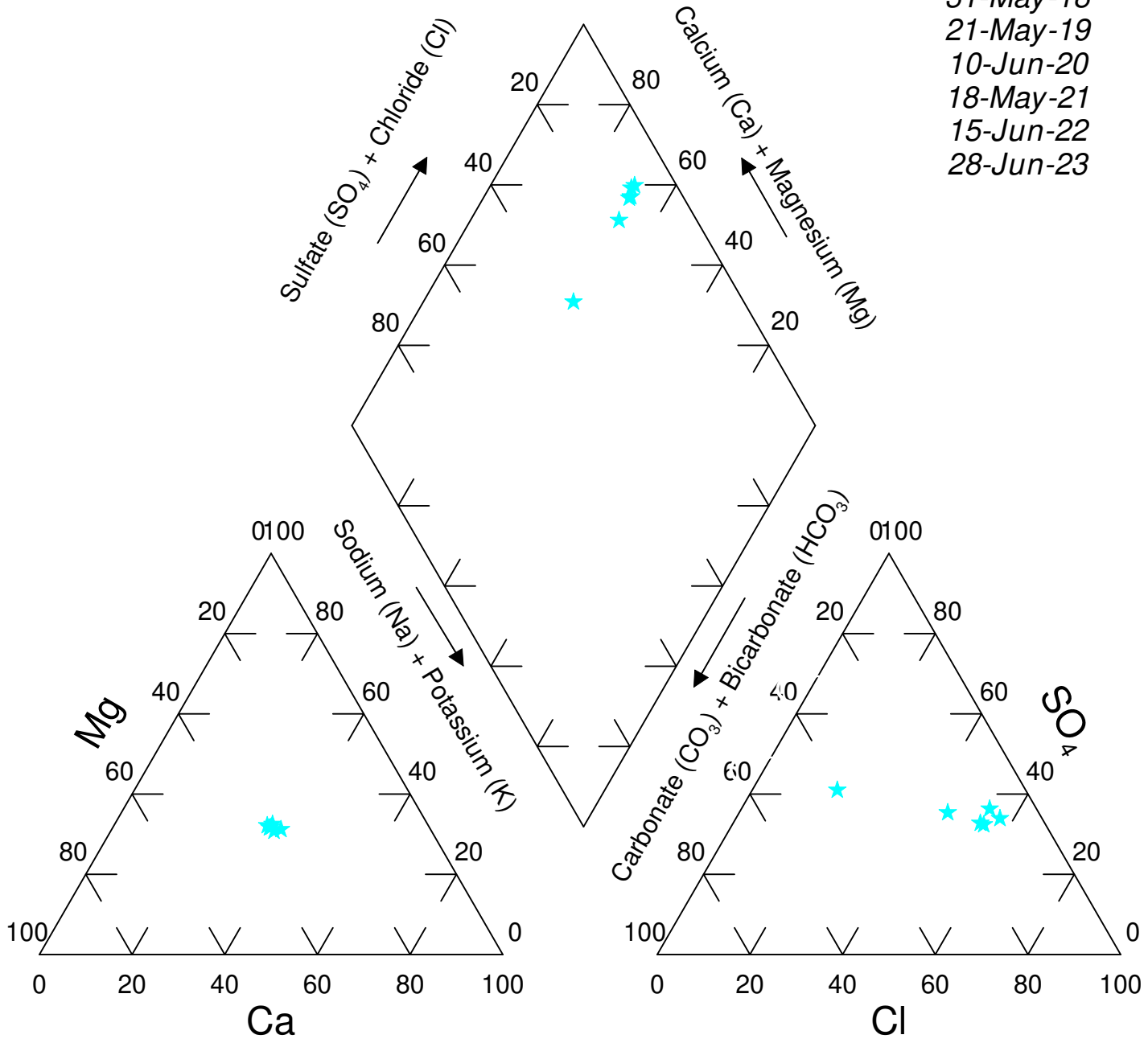


FIGURE: 16P

Winnipeg
Water and Waste Department

Site: Brady
Well #: 6N67-F

Dates:
30-May-18
21-May-19
9-Jun-20
18-May-21
22-Jun-22
28-Jun-23

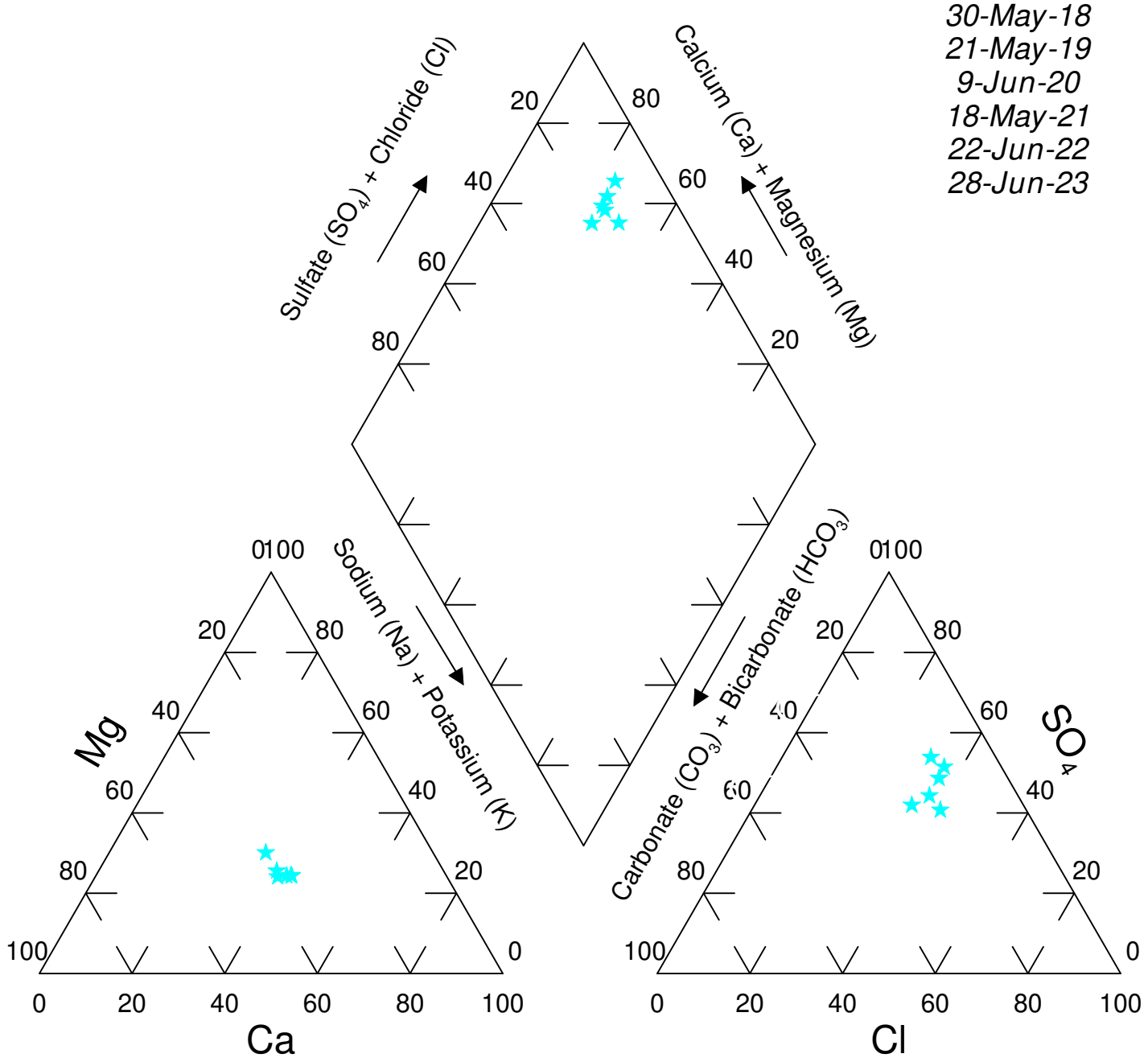
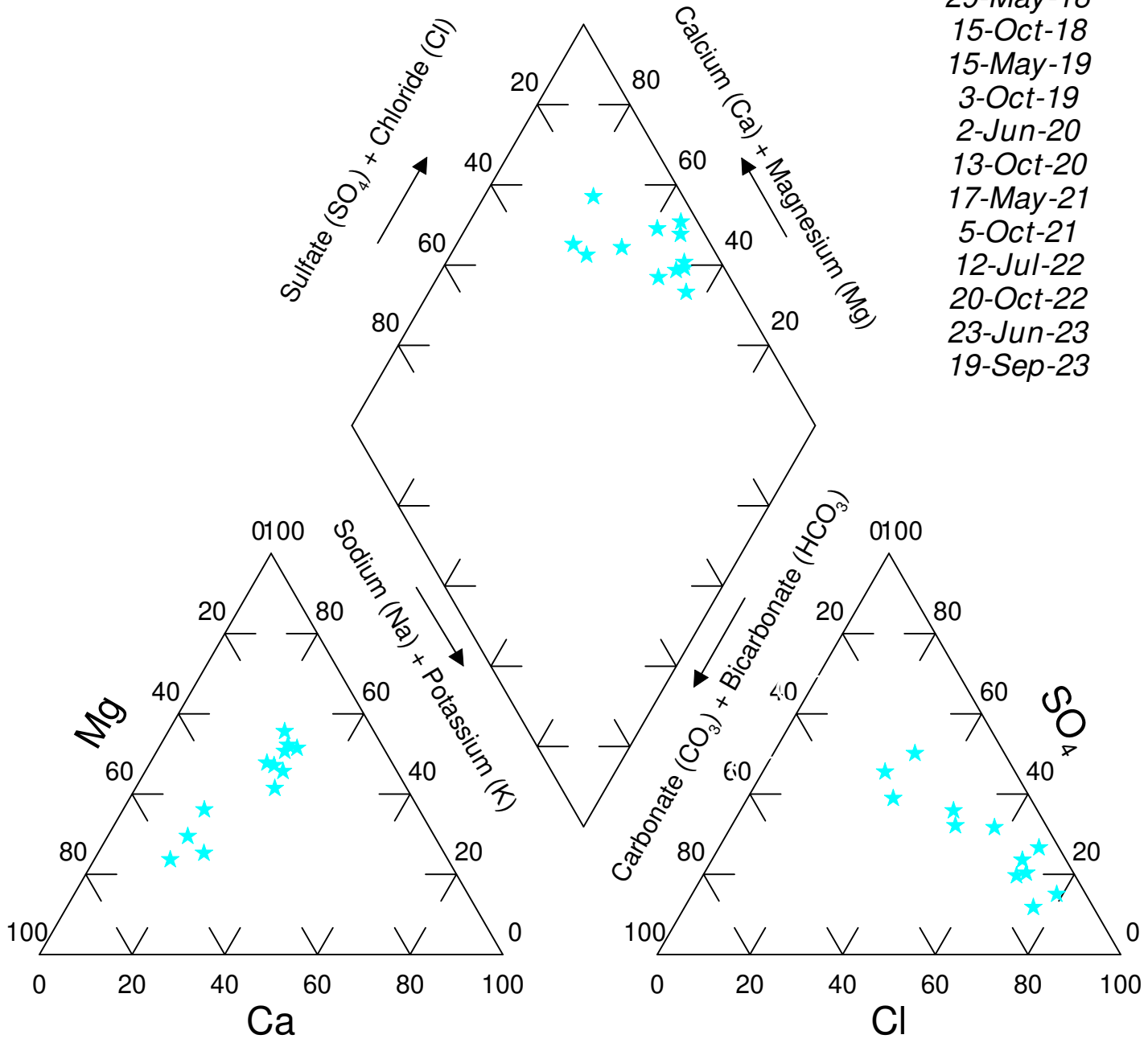


FIGURE: 17P

Winnipeg
Water and Waste Department

Site: Brady
Well #: 13A

Dates:
29-May-18
15-Oct-18
15-May-19
3-Oct-19
2-Jun-20
13-Oct-20
17-May-21
5-Oct-21
12-Jul-22
20-Oct-22
23-Jun-23
19-Sep-23



Winnipeg
Water and Waste Department

Site: Brady
Well #: 14A

Dates:
29-May-18
16-Oct-18
15-May-19
3-Oct-19
3-Jun-20
15-Oct-20
17-May-21
5-Oct-21
12-Jul-22
21-Oct-22
20-Jun-23
19-Sep-23

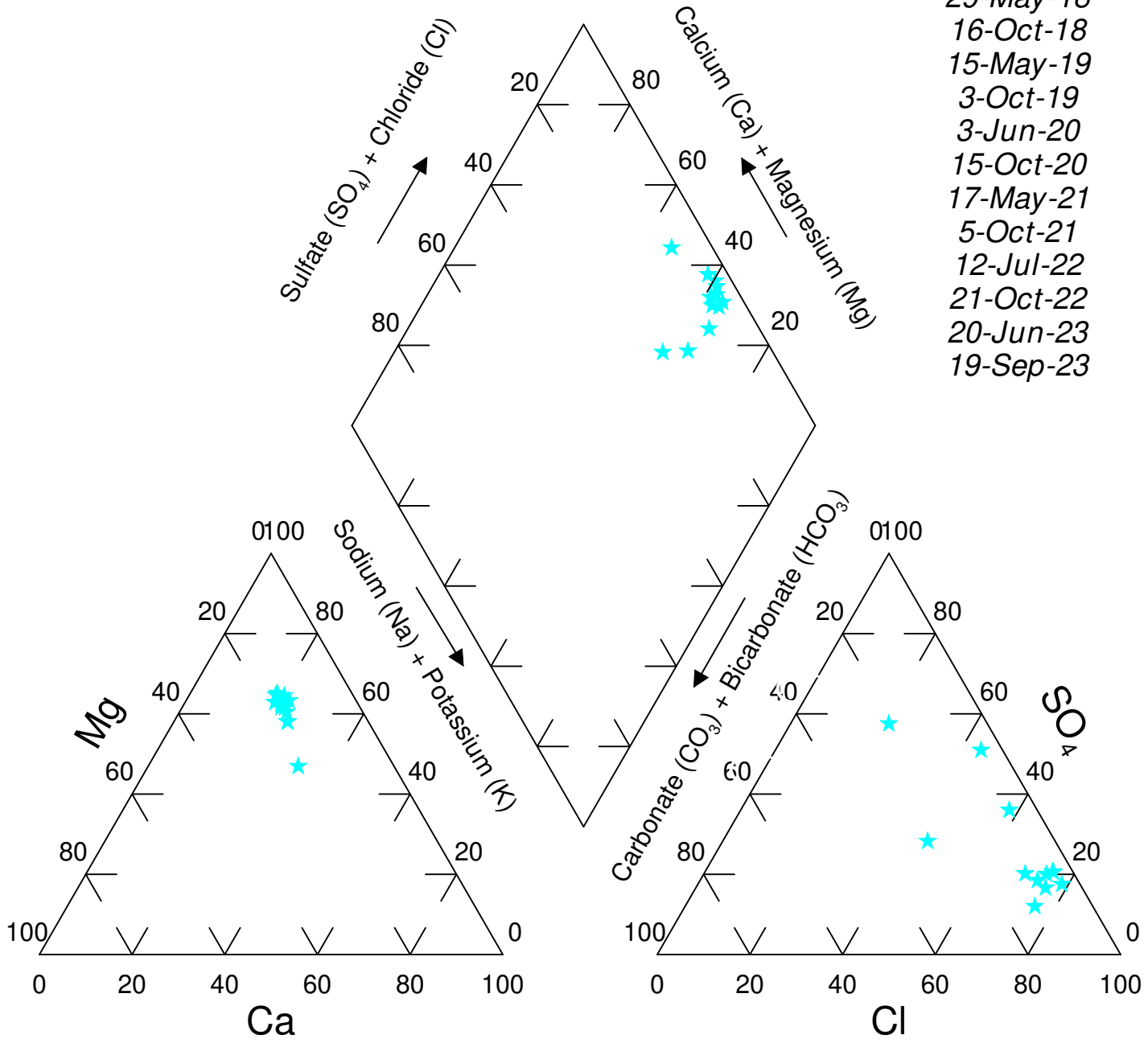
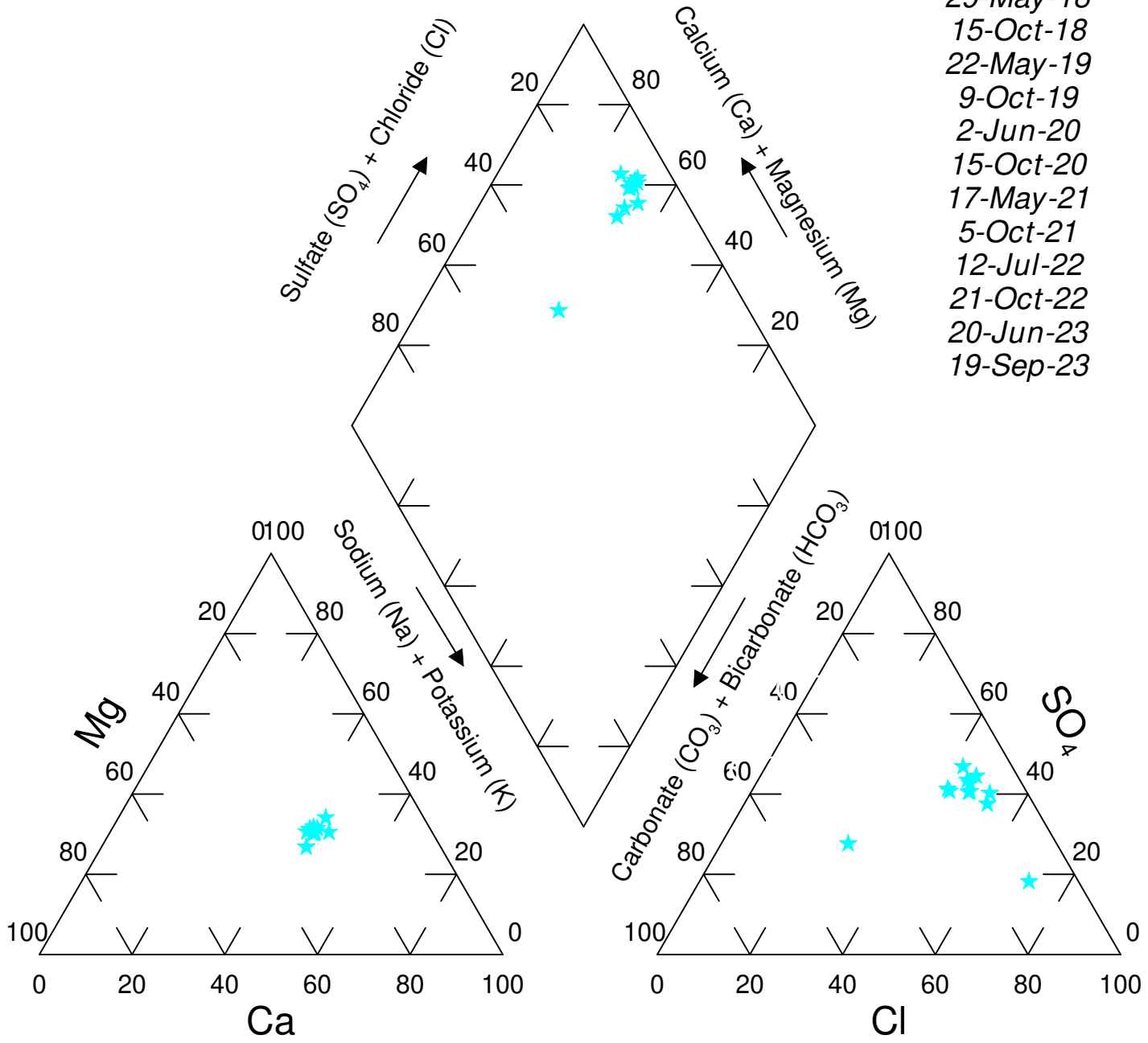


FIGURE: 13P

Winnipeg
Water and Waste Department

Site: Brady
Well #: 15A

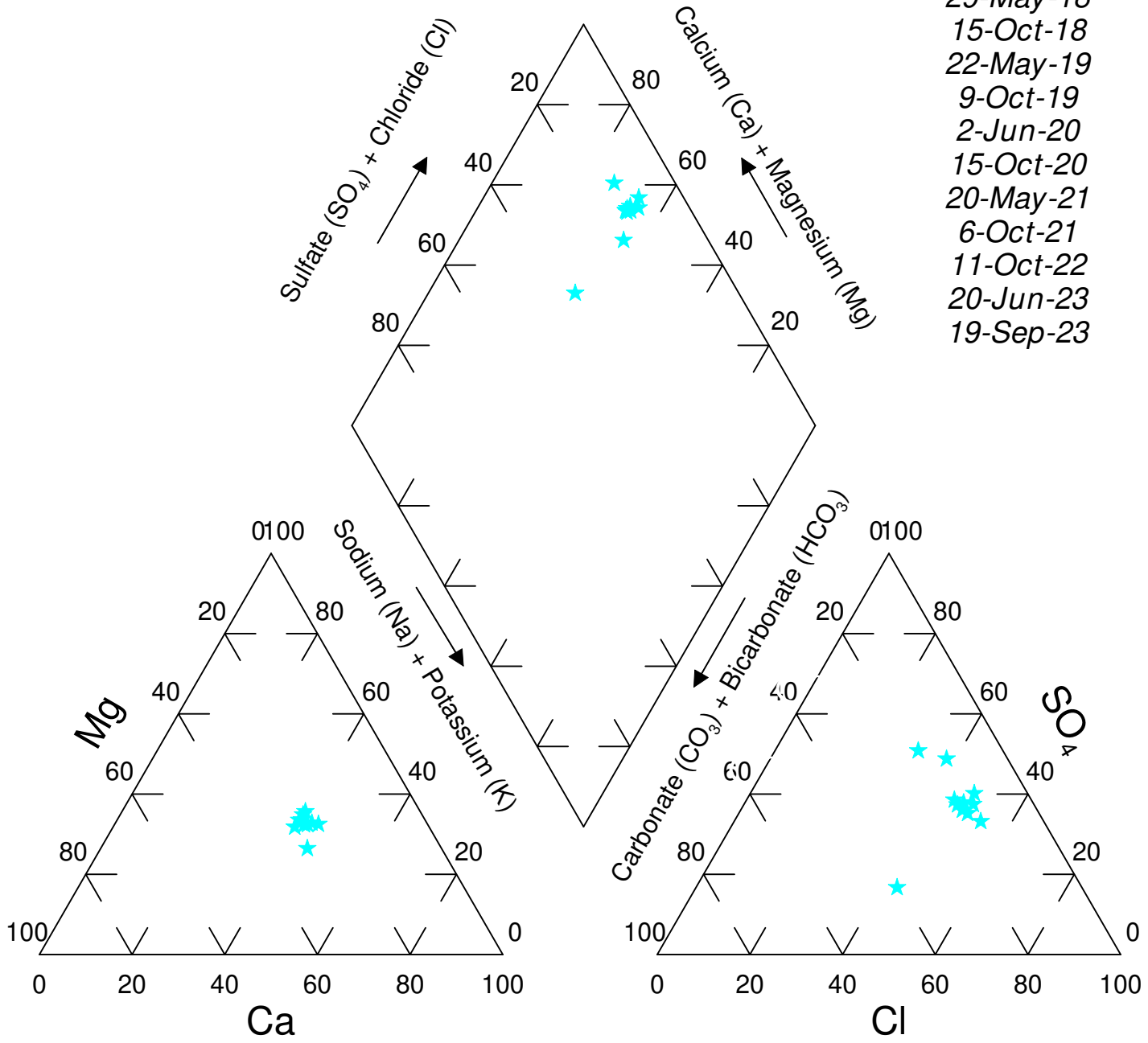
Dates:
29-May-18
15-Oct-18
22-May-19
9-Oct-19
2-Jun-20
15-Oct-20
17-May-21
5-Oct-21
12-Jul-22
21-Oct-22
20-Jun-23
19-Sep-23



Winnipeg
Water and Waste Department

Site: Brady
Well #: 16A

Dates:
29-May-18
15-Oct-18
22-May-19
9-Oct-19
2-Jun-20
15-Oct-20
20-May-21
6-Oct-21
11-Oct-22
20-Jun-23
19-Sep-23



Winnipeg
Water and Waste Department

Site: Brady
Well #: W4

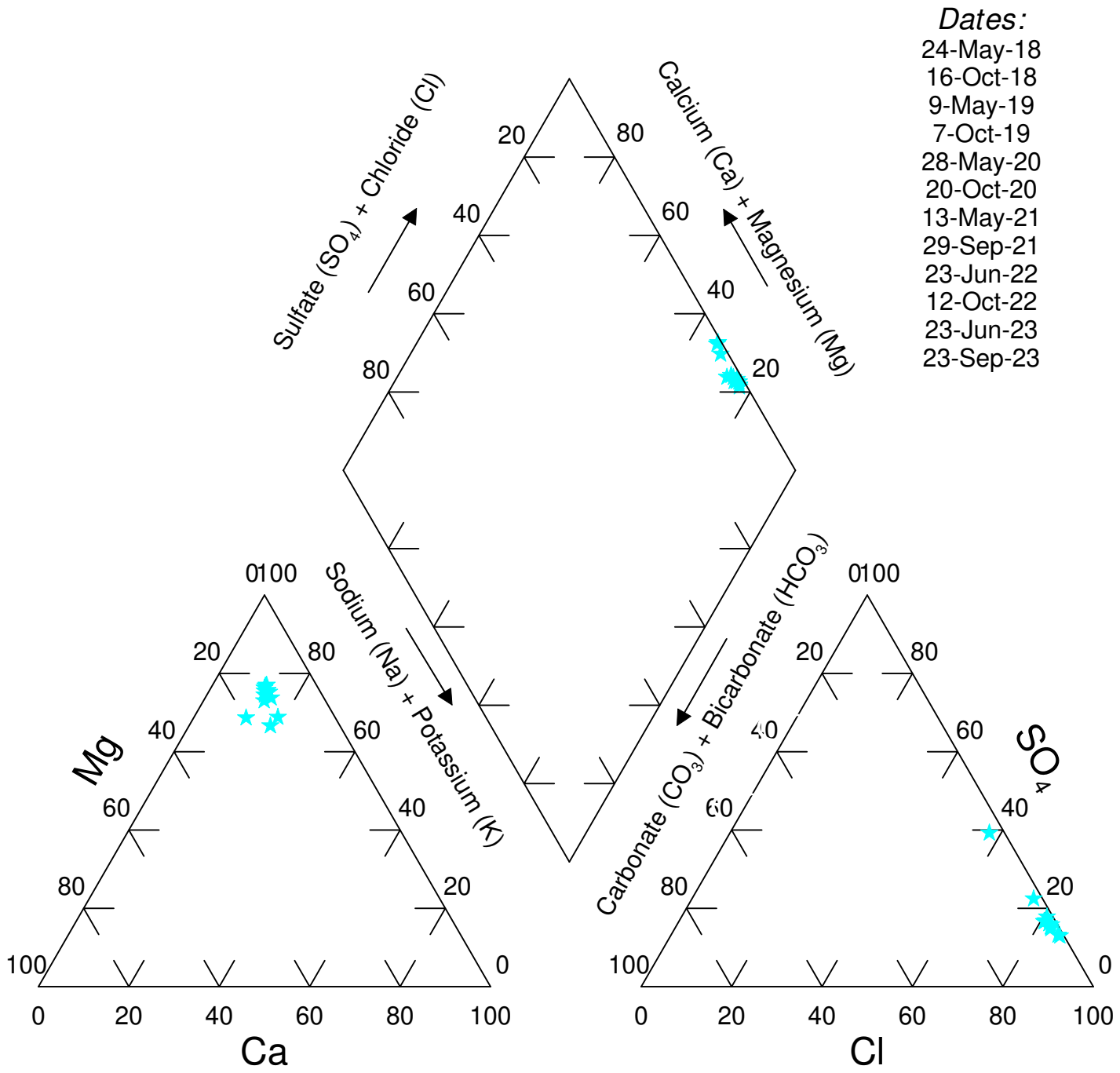


FIGURE: 1P

Winnipeg
Water and Waste Department

Site: Brady
Well #: W5

Dates:
24-May-18
18-Oct-18
9-May-19
7-Oct-19
28-May-20
15-Oct-20
13-May-21
29-Sep-21
6-Jul-22
20-Oct-22
No Spring 2023 data
20-Sep-23

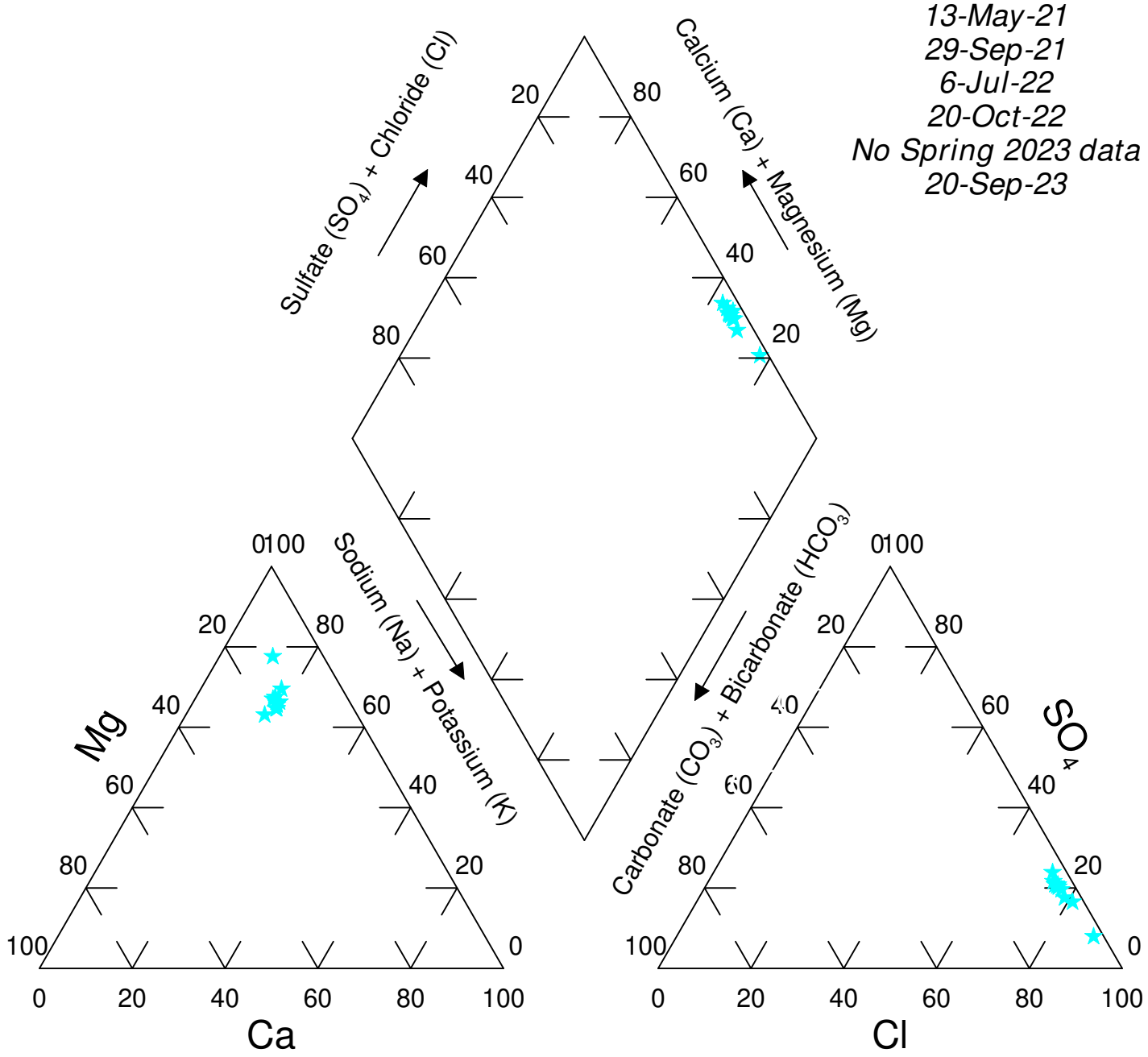


FIGURE: 2P

Winnipeg
Water and Waste Department

Site: Brady
Well #: W6

Dates:
23-May-18
18-Oct-18
14-May-19
13-Nov-19
4-Jun-20
15-Oct-20
13-May-21
4-Oct-21
7-Jul-22
6-Oct-22
No Spring 2023 Data
18-Sep-23

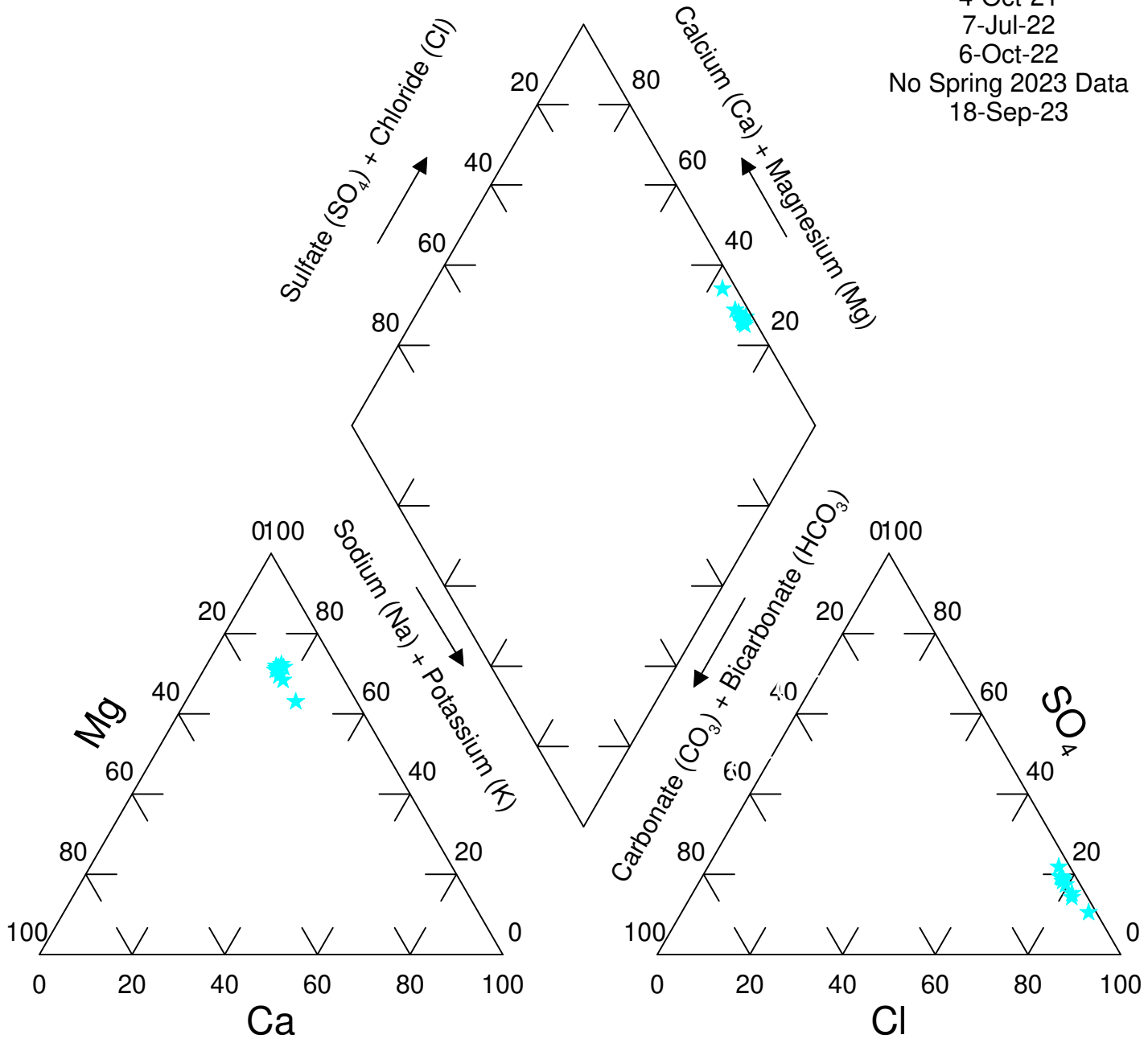


FIGURE: 3P

Winnipeg
Water and Waste Department

Site: Brady
Well #: W7

Dates:
23-May-18
17-Oct-18
14-May-19
13-Nov-19
4-Jun-20
20-Oct-20
13-May-21
5-Oct-21
23-Jun-22
17-Oct-22
No Spring 2023 Data
18-Sep-23

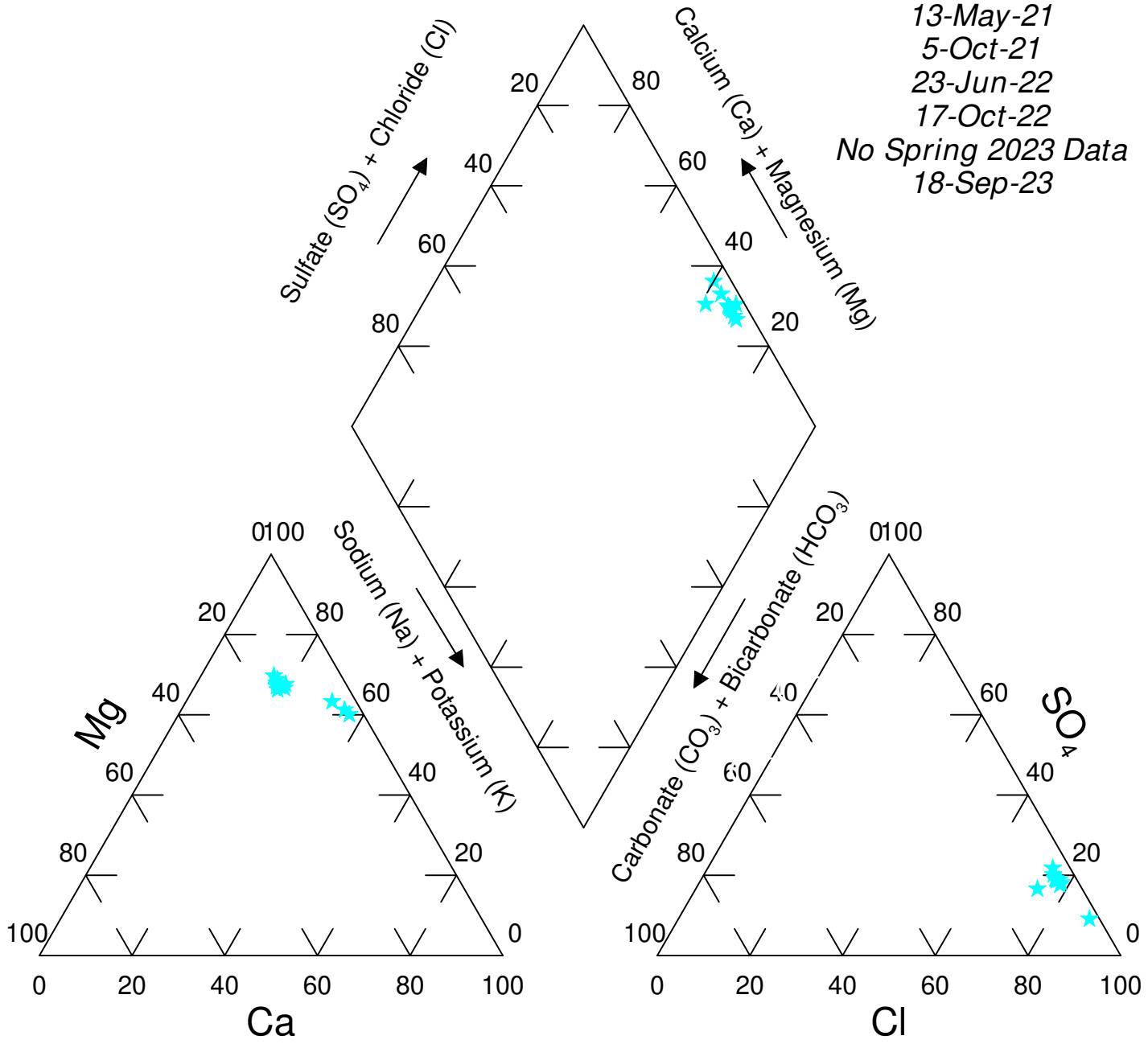


FIGURE: 4P

Winnipeg
Water and Waste Department

Site: Brady
Well #: W8

Dates:
29-May-18
18-Oct-18
13-May-19
13-Nov-19
4-Jun-20
20-Oct-20
13-May-21
4-Oct-21
29-Jun-22
4-Oct-22
19-Jun-23
26-Sep-23

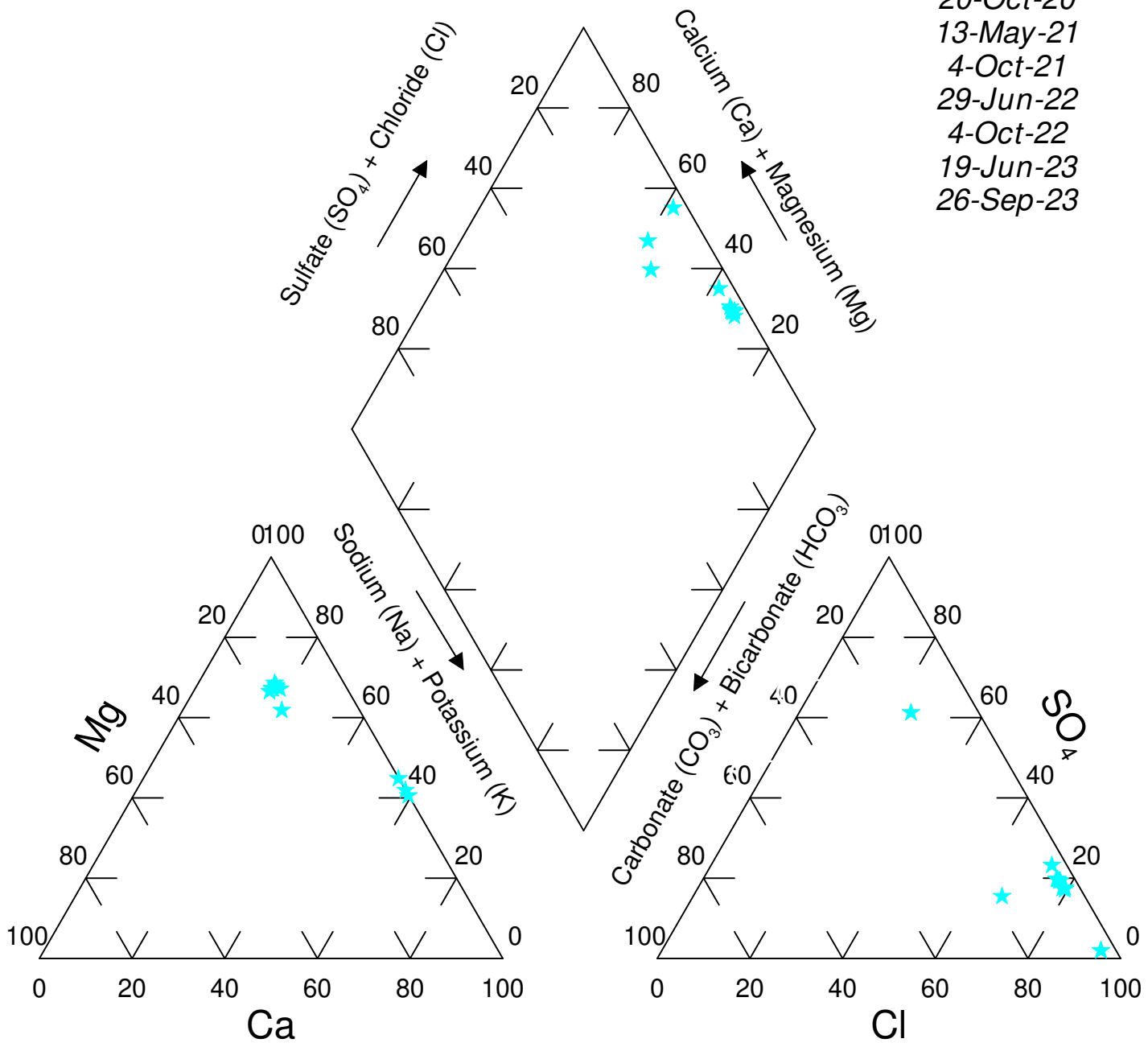


FIGURE: 5P

Winnipeg
Water and Waste Department

Site: Brady
Well #: W9

Dates:
24-May-18
18-Oct-18
15-May-19
8-Oct-19
4-Jun-20
20-Oct-20
12-May-21
5-Oct-21
22-Jun-22
12-Oct-22
14-Jun-23
23-Sep-23

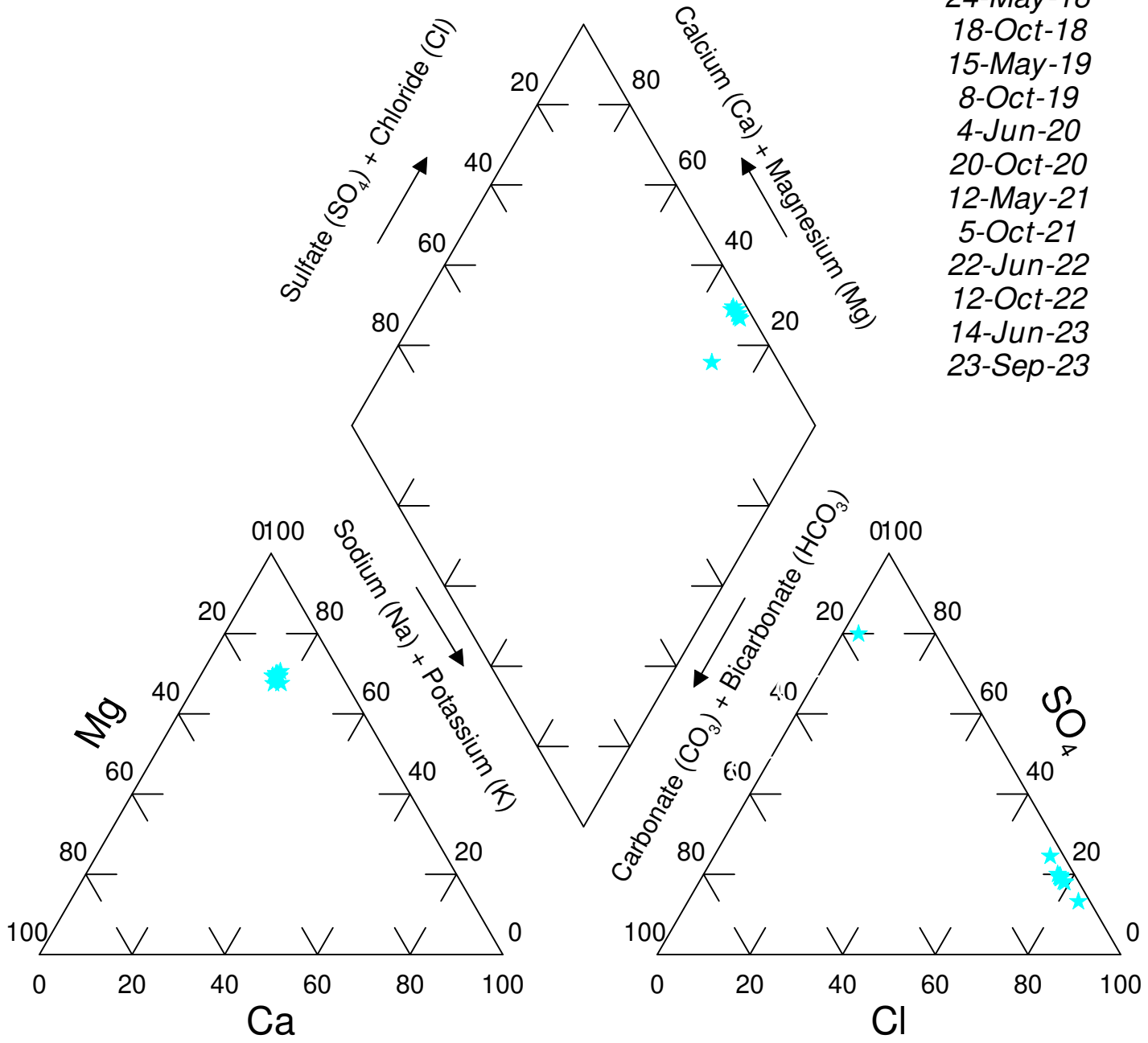
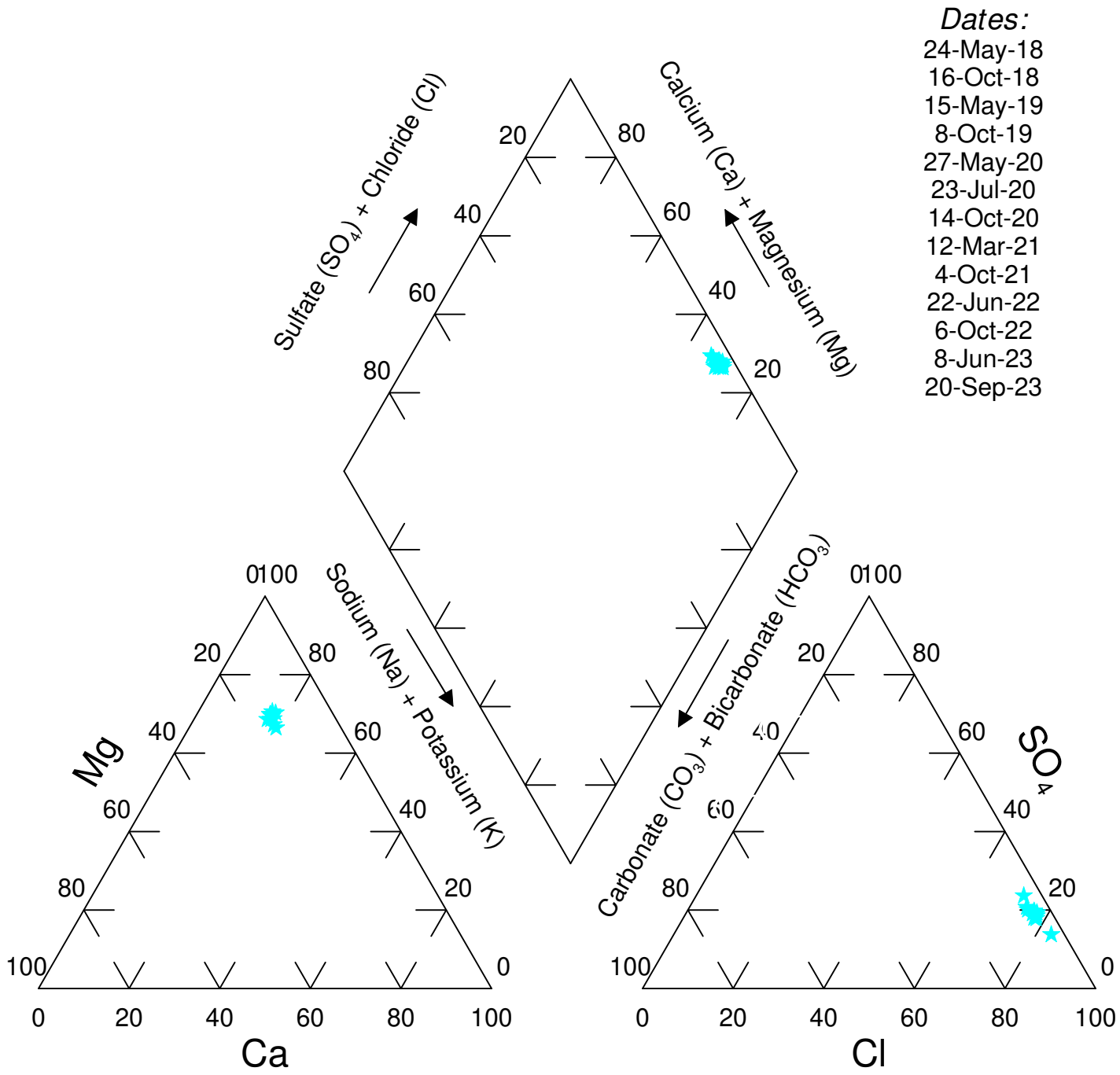


FIGURE: 6P

Winnipeg
Water and Waste Department

Site: Brady
Well #: W10/W10R



Dates:
24-May-18
16-Oct-18
15-May-19
8-Oct-19
27-May-20
23-Jul-20
14-Oct-20
12-Mar-21
4-Oct-21
22-Jun-22
6-Oct-22
8-Jun-23
20-Sep-23

FIGURE: 7P

Winnipeg
Water and Waste Department

Site: Brady
Well #: W11

Dates:
24-May-18
17-Oct-18
15-May-19
8-Oct-19
12-May-21
4-Oct-21
6-Jul-22
4-Oct-22
15-Jun-23
27-Sep-23

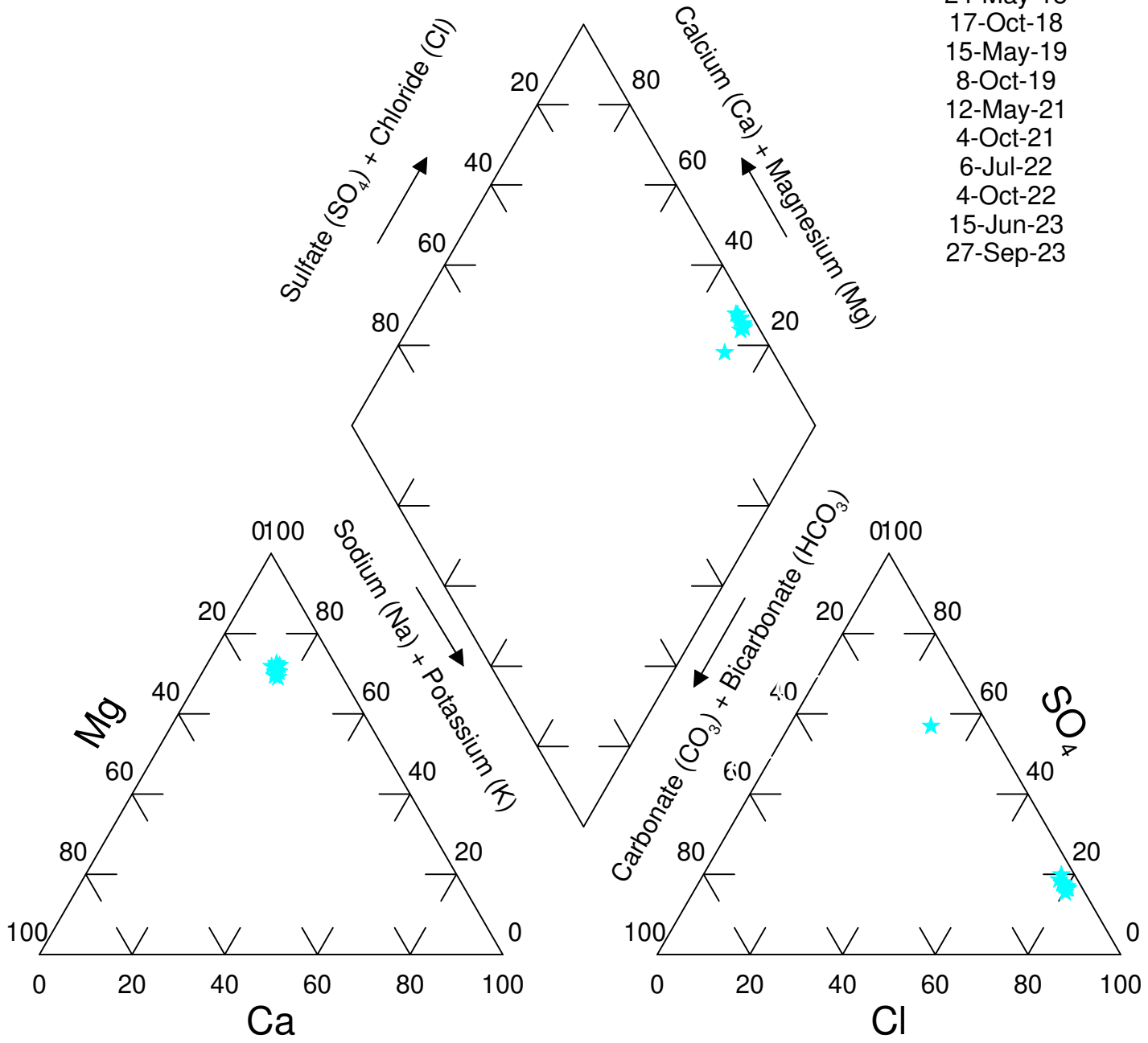


FIGURE: 8P

Winnipeg
Water and Waste Department

Site: Brady
Well #: W12

Dates:
24-May-18
17-Oct-18
15-May-19
14-Oct-19
24-May-20
14-Oct-20
12-May-21
4-Oct-21
7-Jul-22
19-Oct-22
23-Jun-23
18-Sep-23

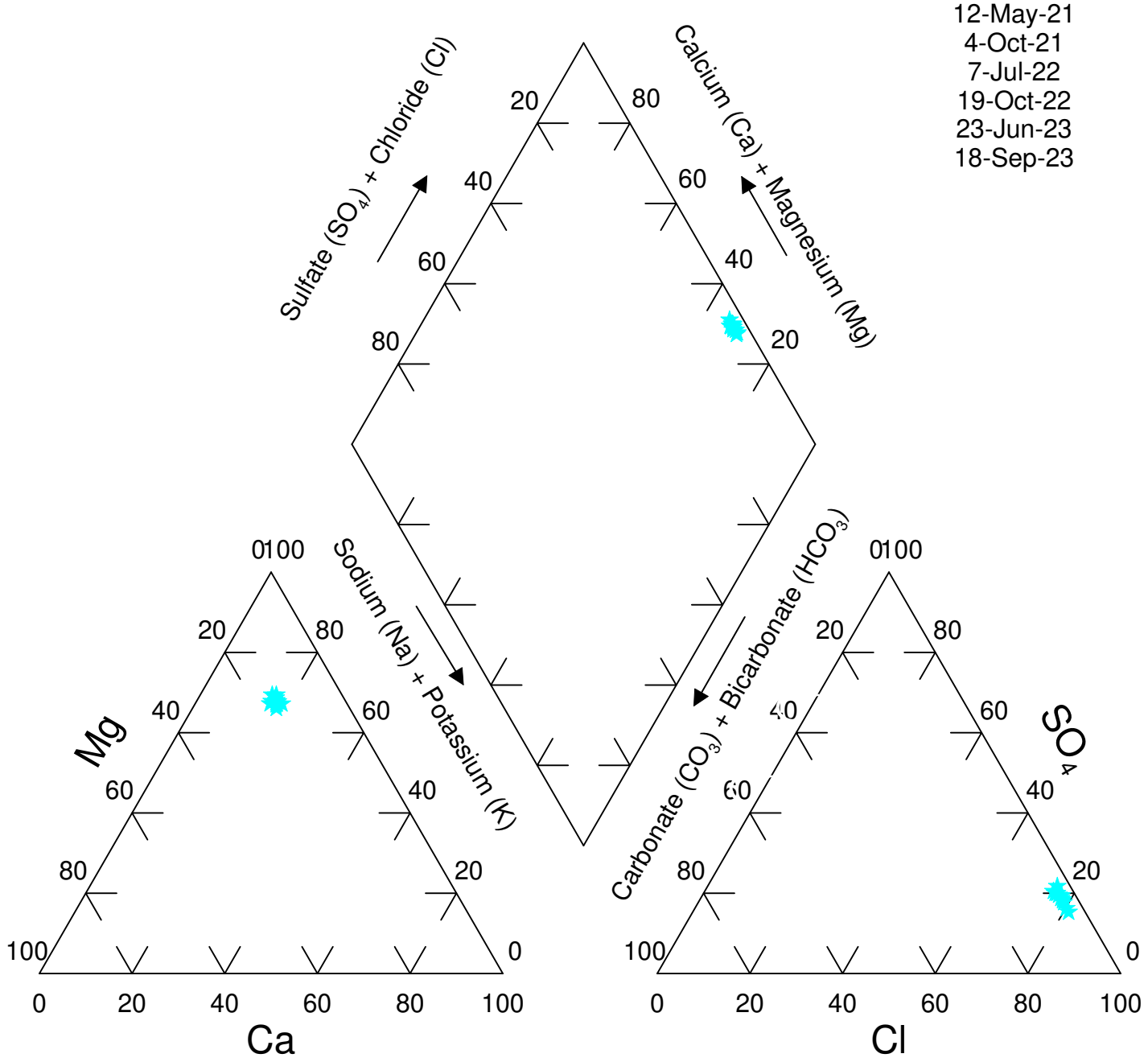


FIGURE: 9P

Winnipeg
Water and Waste Department

Site: Brady
Location : W13

Dates:
28-May-18
17-Oct-18
13-May-19
8-Oct-19
2-Jun-20
20-Oct-20
12-May-21
29-Sep-21
7-Jul-22
4-Oct-22
No Spring 2023 Data
26-Sep-23

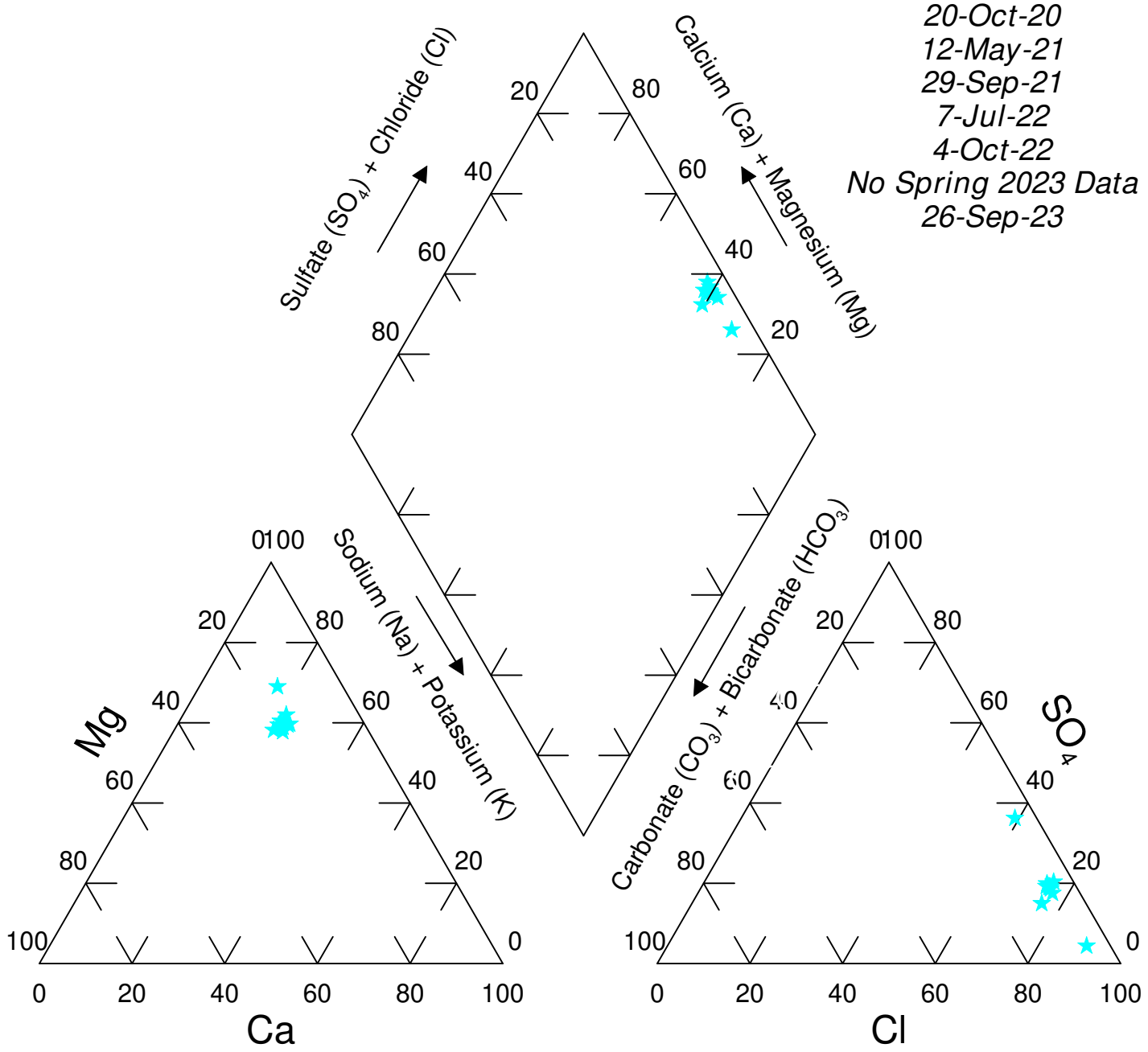


FIGURE: 1z

Winnipeg
Water and Waste Department

Site: Brady
Location : GWQ25-W14

Dates:
28-May-18
18-Oct-18
15-May-19
13-Nov-19
3-Jun-20
15-Oct-20
12-May-21
4-Oct-21
7-Jul-22
11-Oct-22
14-Jun-23
26-Sep-23

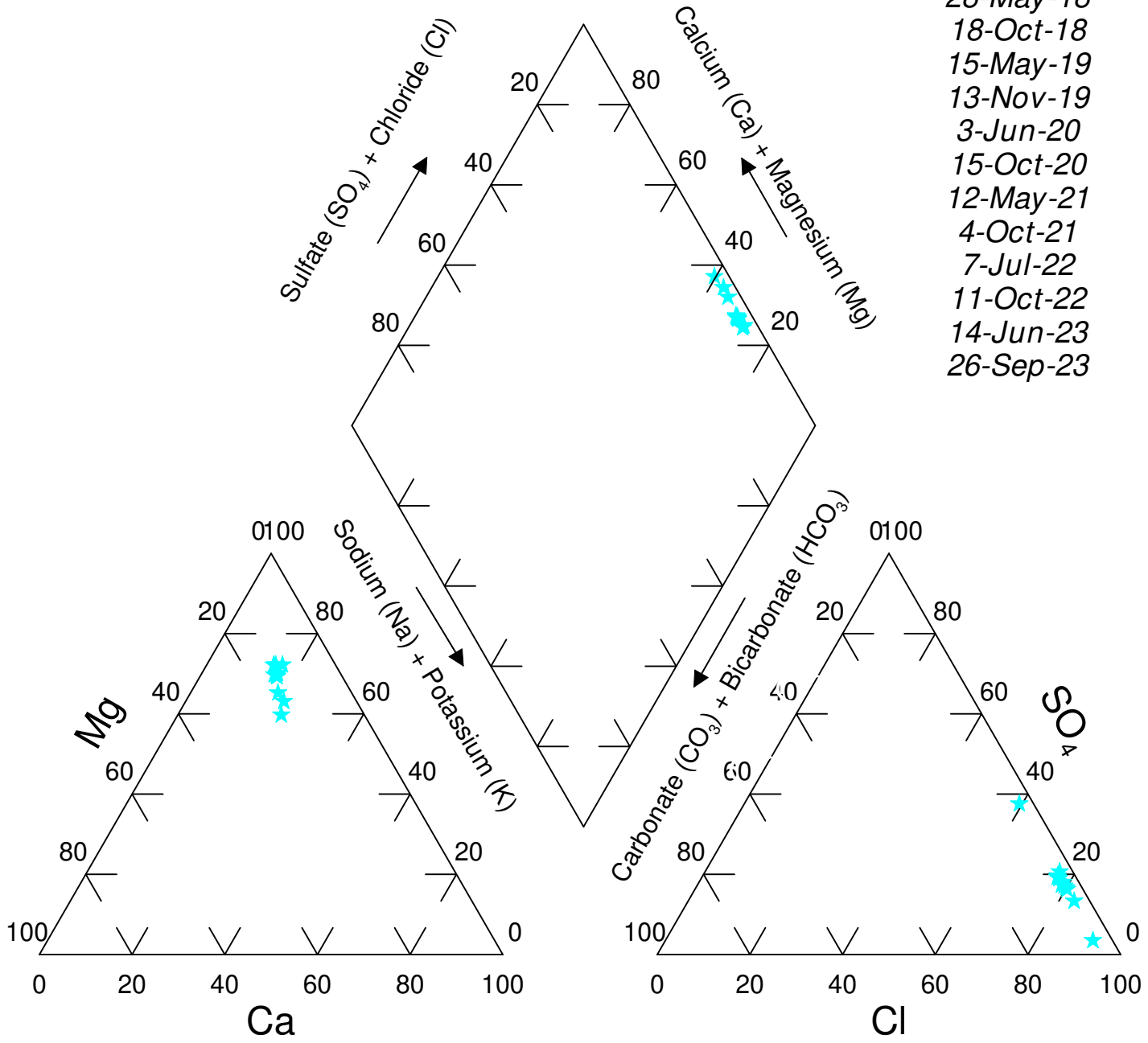


FIGURE: 2z

Winnipeg
Water and Waste Department

Site: Brady
Location : GWQ25-W15

Dates:
28-May-18
22-Oct-18
15-May-19
13-Oct-19
2-Jun-20
20-Oct-20
12-May-21
29-Sep-21
8-Jul-22
11-Oct-22
14-Jun-23
26-Sep-23

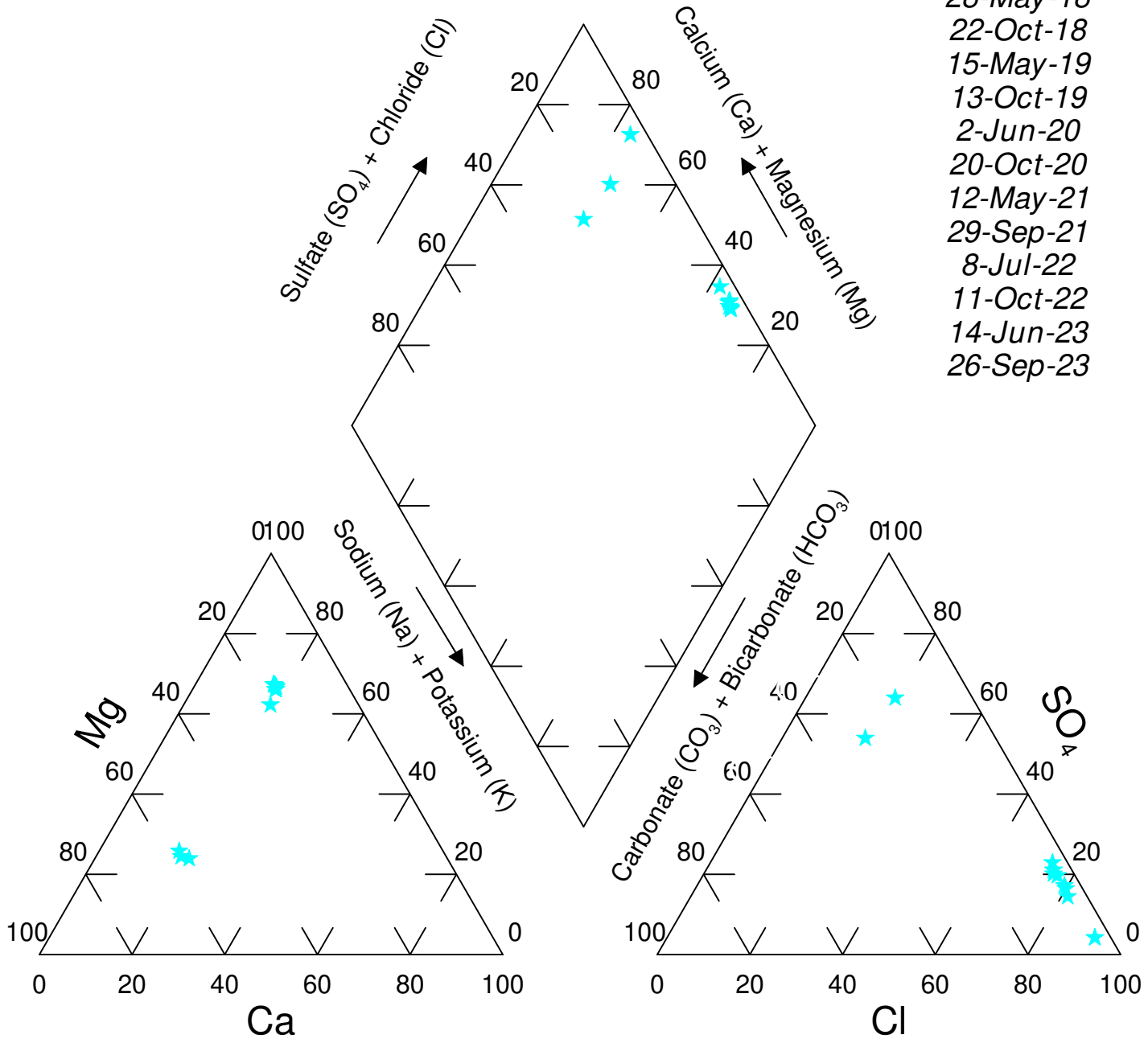


FIGURE: 3z

Winnipeg
Water and Waste Department

Site: Brady
Location : GWQ25-W16

Dates:
28-May-18
22-Oct-18
15-May-19
8-Dec-19
2-Jun-20
21-Oct-20
12-May-21
29-Sep-21
30-Jun-22
19-Oct-22
14-Jun-23
25-Sep-23

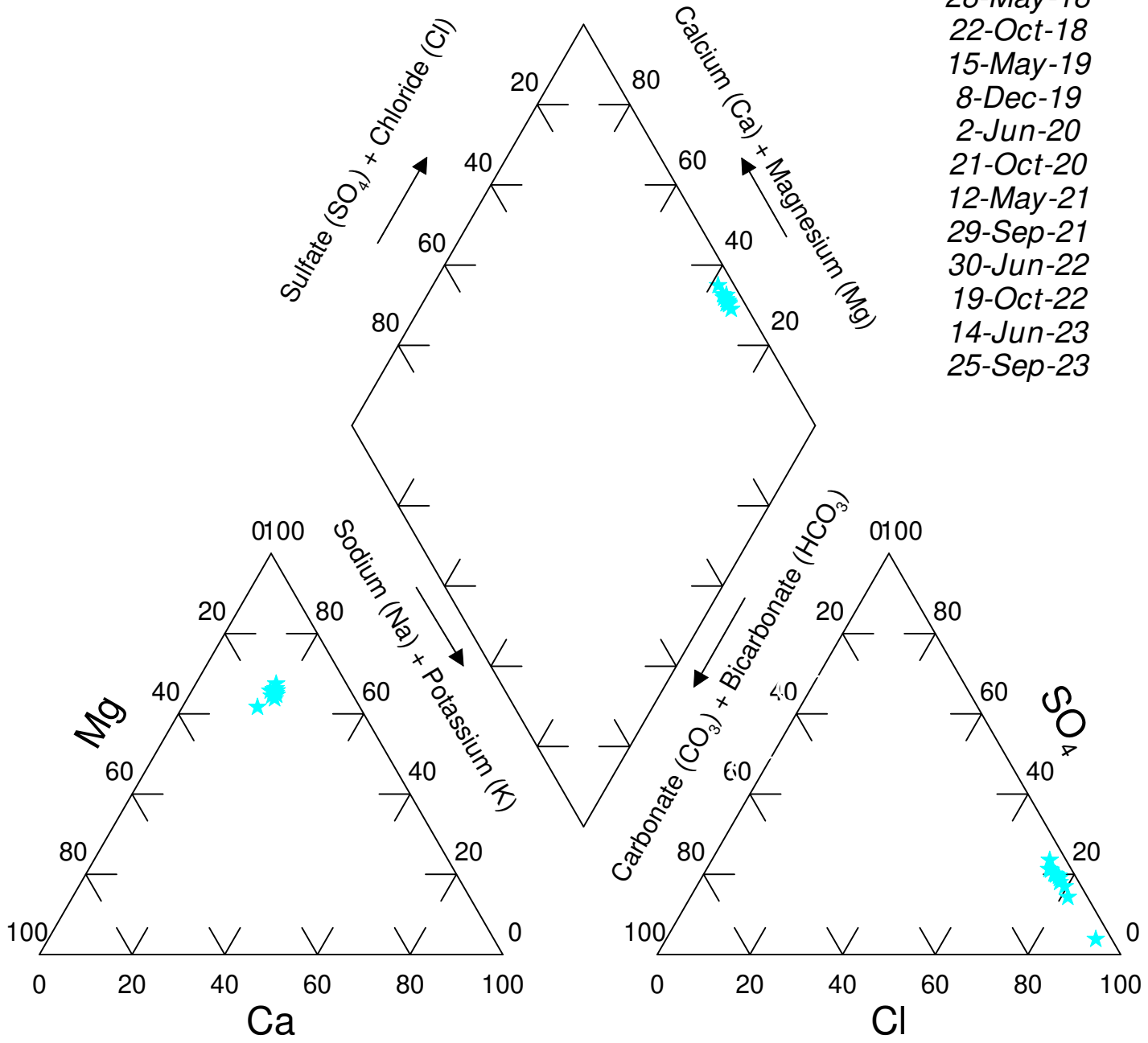


FIGURE: 4z

Winnipeg
Water and Waste Department

2023 Leachate Piper Diagrams

Site: Brady
Location: *MH3*

Dates:
31-Jul-18
11-Sep-19
8-Sep-20
10-Aug-21
9-Sep-22
29-May-23

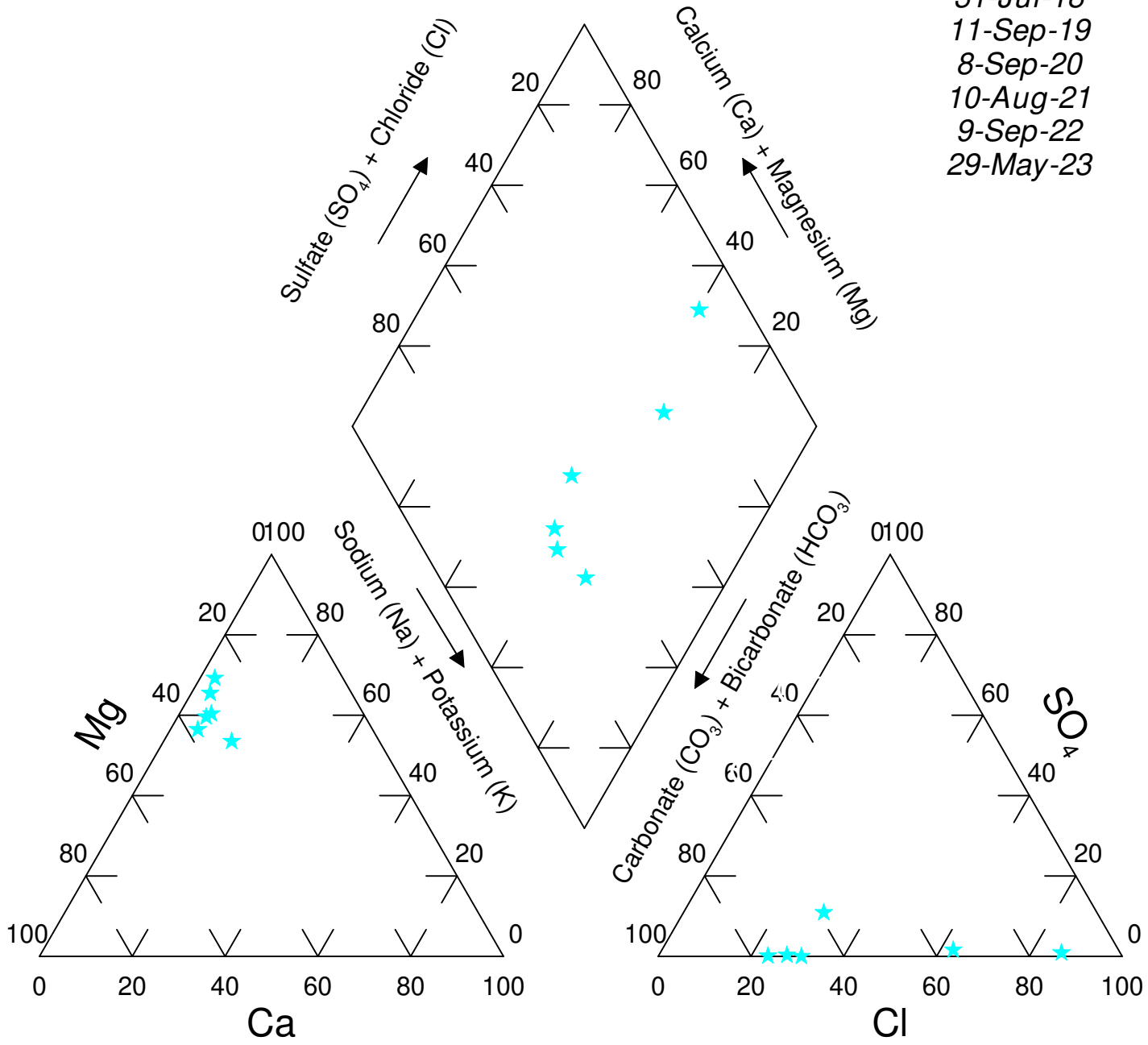


FIGURE: 18P

Winnipeg
Water and Waste Department

Site: Brady
Location: MH8

Dates:
31-Jul-18
11-Sep-19
9-Sep-20
10-Aug-21
8-Sep-22
25-May-23

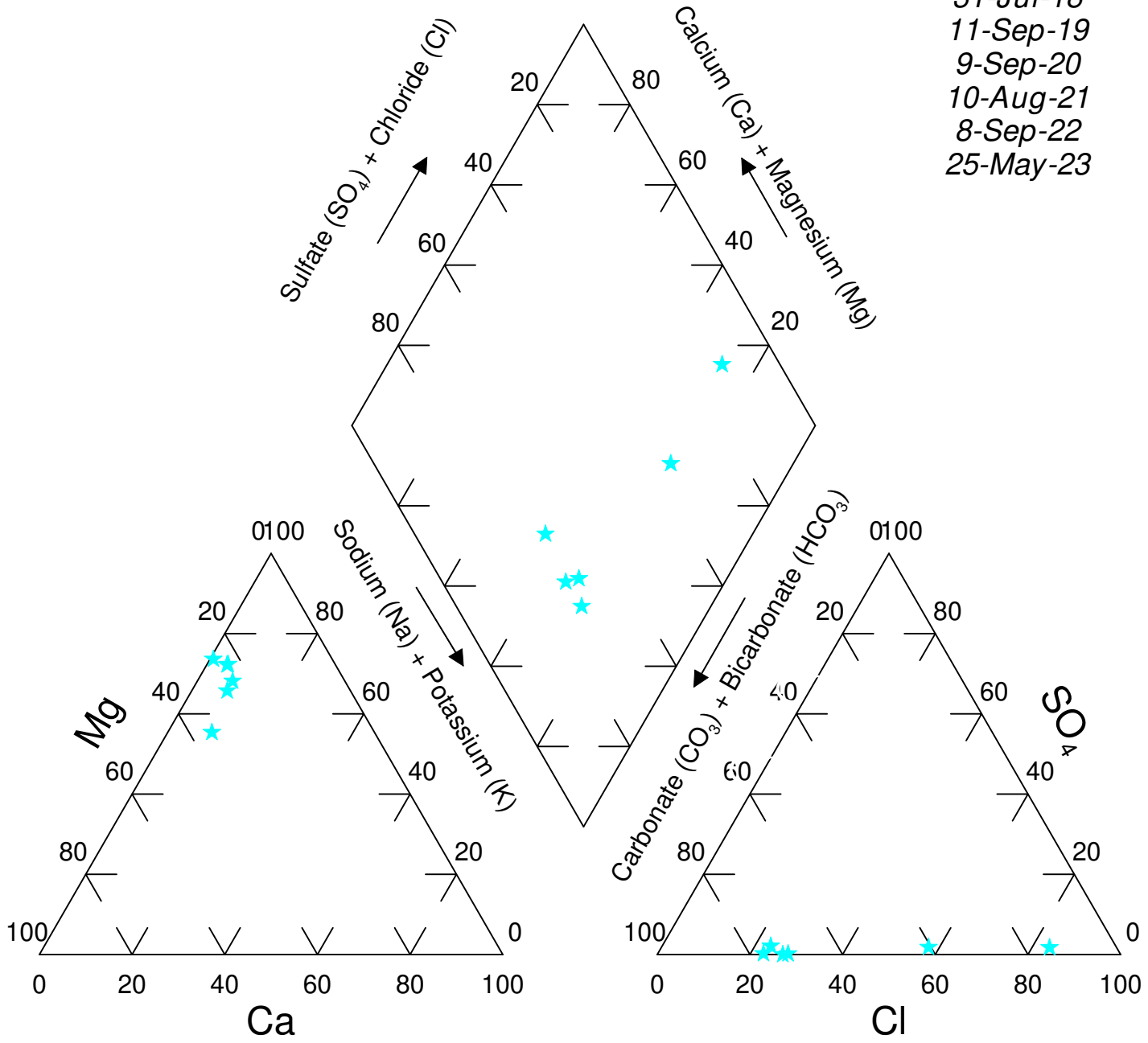


FIGURE: 19P

Winnipeg
Water and Waste Department

Site: Brady
Location: MH13

Dates:
31-Jul-18
12-Sep-19
8-Sep-20
10-Aug-21
8-Sep-22
25-May-23

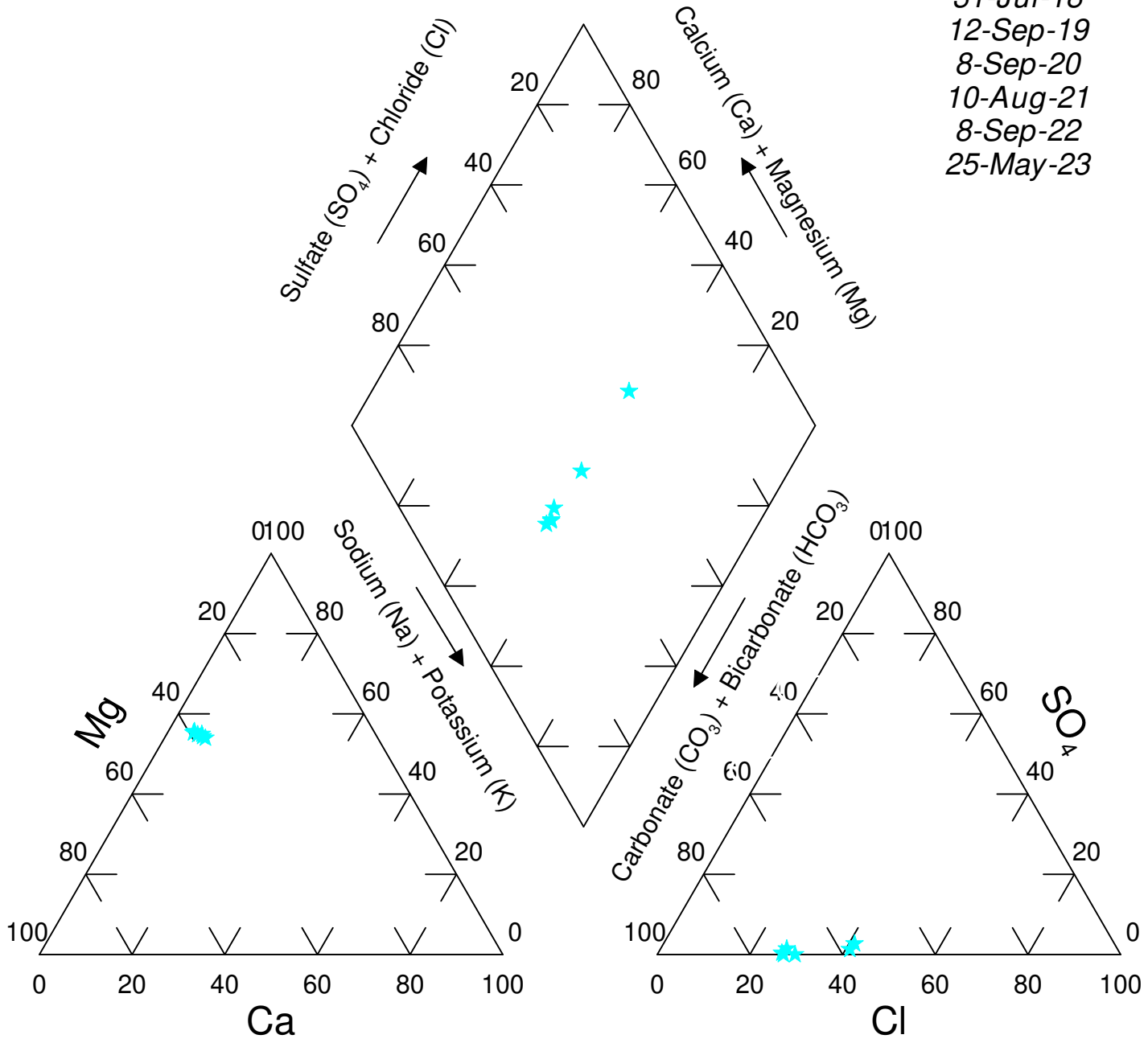


FIGURE: 20P

Winnipeg
Water and Waste Department

Site: Brady
Location: MH24

Dates:
31-Jul-18
11-Sep-19
8-Sep-20
10-Aug-21
8-Sep-22
25-May-23

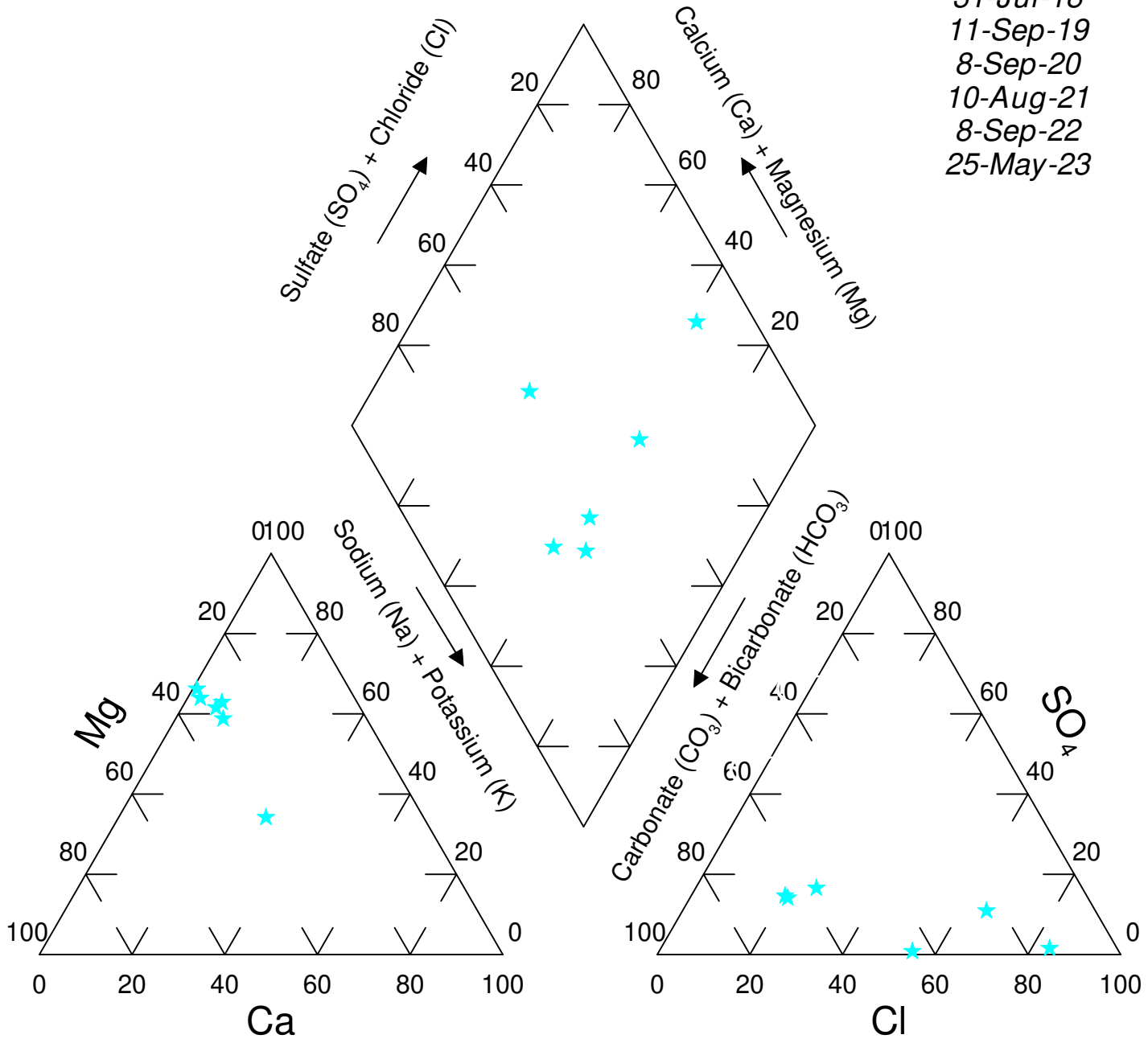


FIGURE: 21P

Winnipeg
Water and Waste Department

Site: Brady
Location: MH27

Dates:
31-Jul-18
11-Sep-19
8-Sep-20
10-Aug-21
8-Sep-22
30-May-23

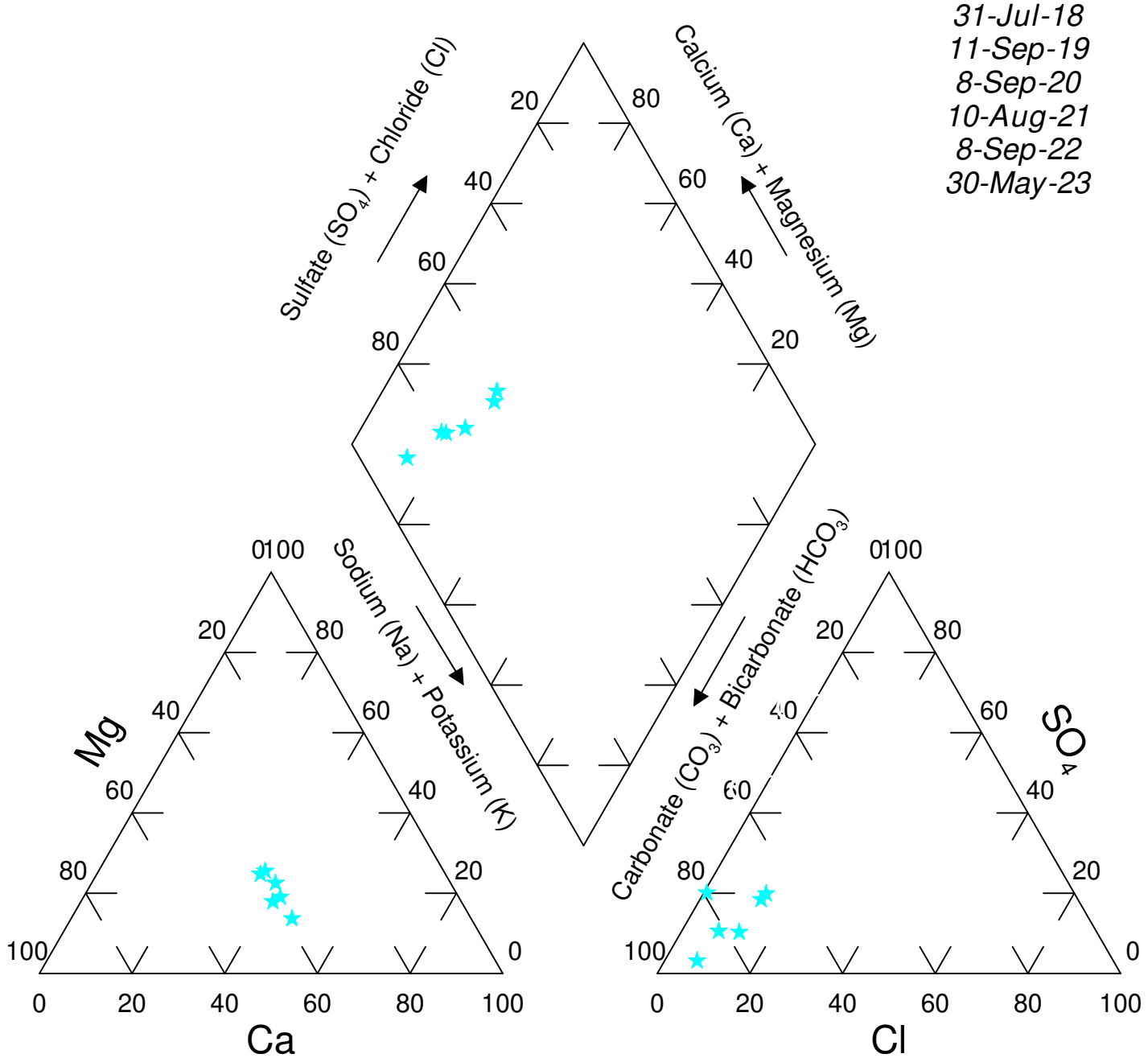


FIGURE: 22P

Winnipeg
Water and Waste Department

Site: Brady
Location: MH31

Dates:
31-Jul-18
11-Sep-19
8-Sep-20
10-Aug-21
8-Sep-22
1-Jun-23

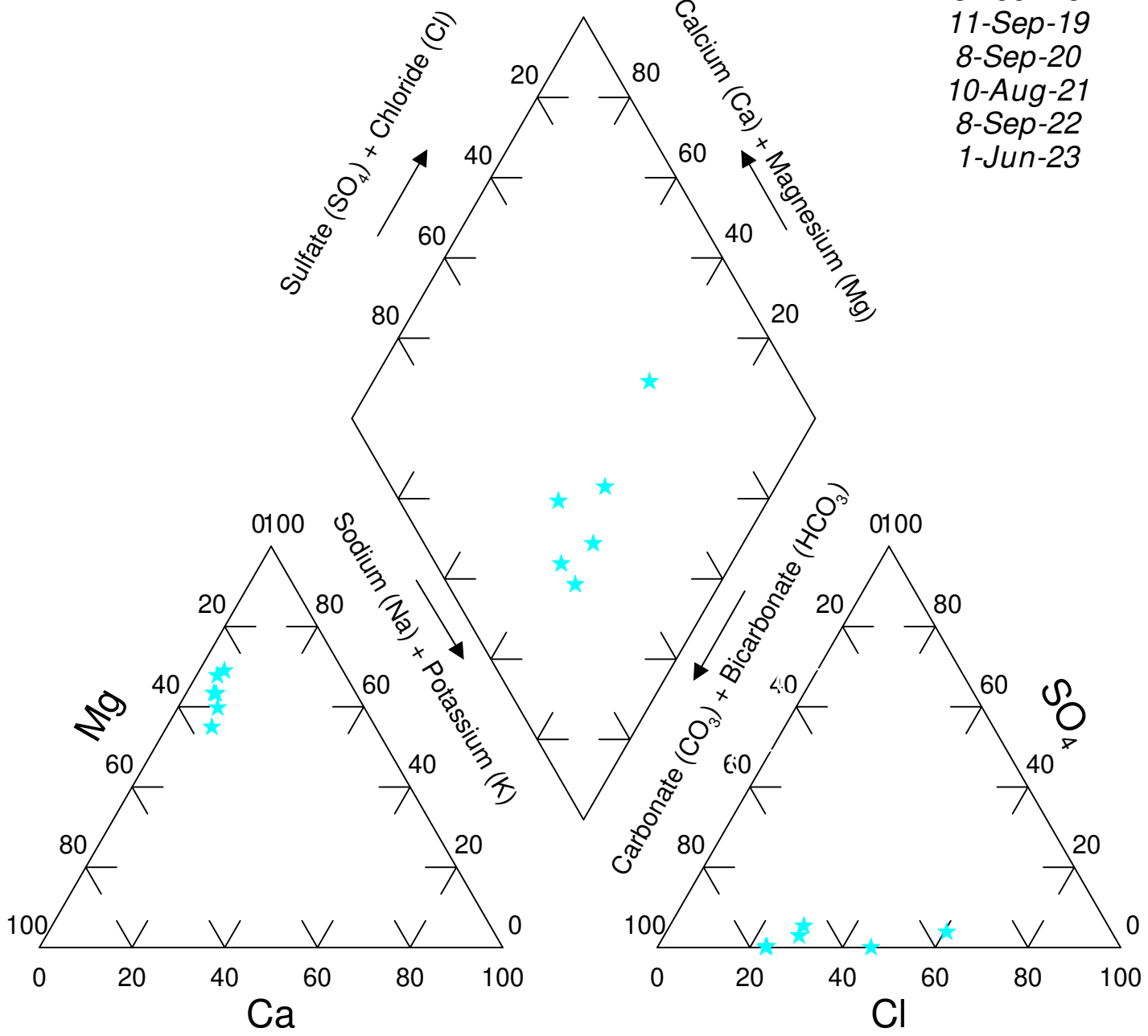


FIGURE: 23P

Winnipeg
Water and Waste Department

Site: Brady
Location: MH34

Dates:
31-Jul-18
11-Sep-19
8-Sep-20
10-Aug-21
8-Sep-22
30-May-23

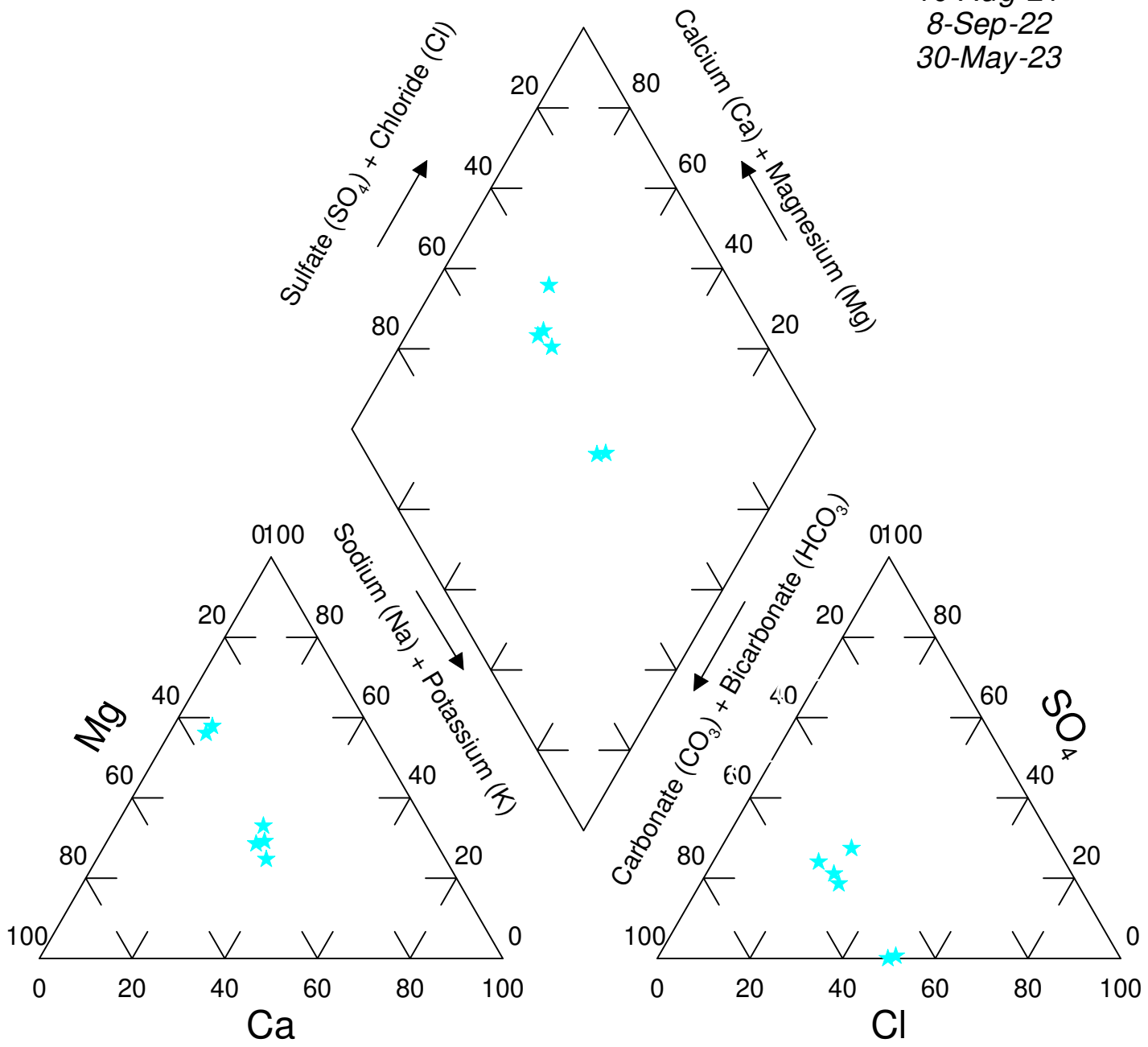


FIGURE: 24P

Winnipeg
Water and Waste Department

Site: Brady
Location: MH46

Date:
31-Jul-18
11-Sep-19
8-Sep-20
10-Aug-21
14-Sep-22
29-May-23

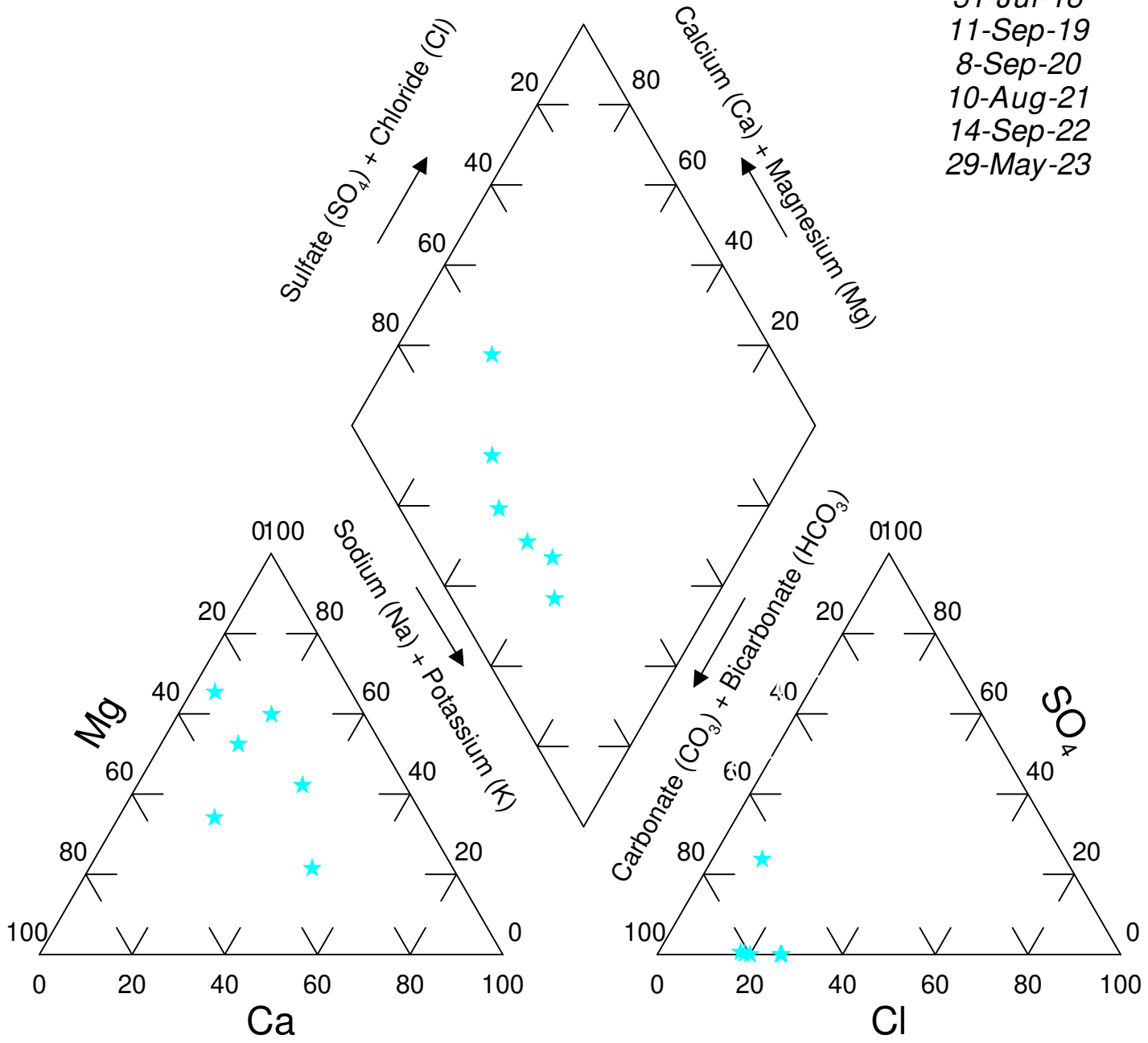


FIGURE: 21P

Winnipeg
Water and Waste Department

Site: Brady
Location: MH47

Date:
8-Sep-20
10-Aug-21
14-Sep-22
1-Jun-23

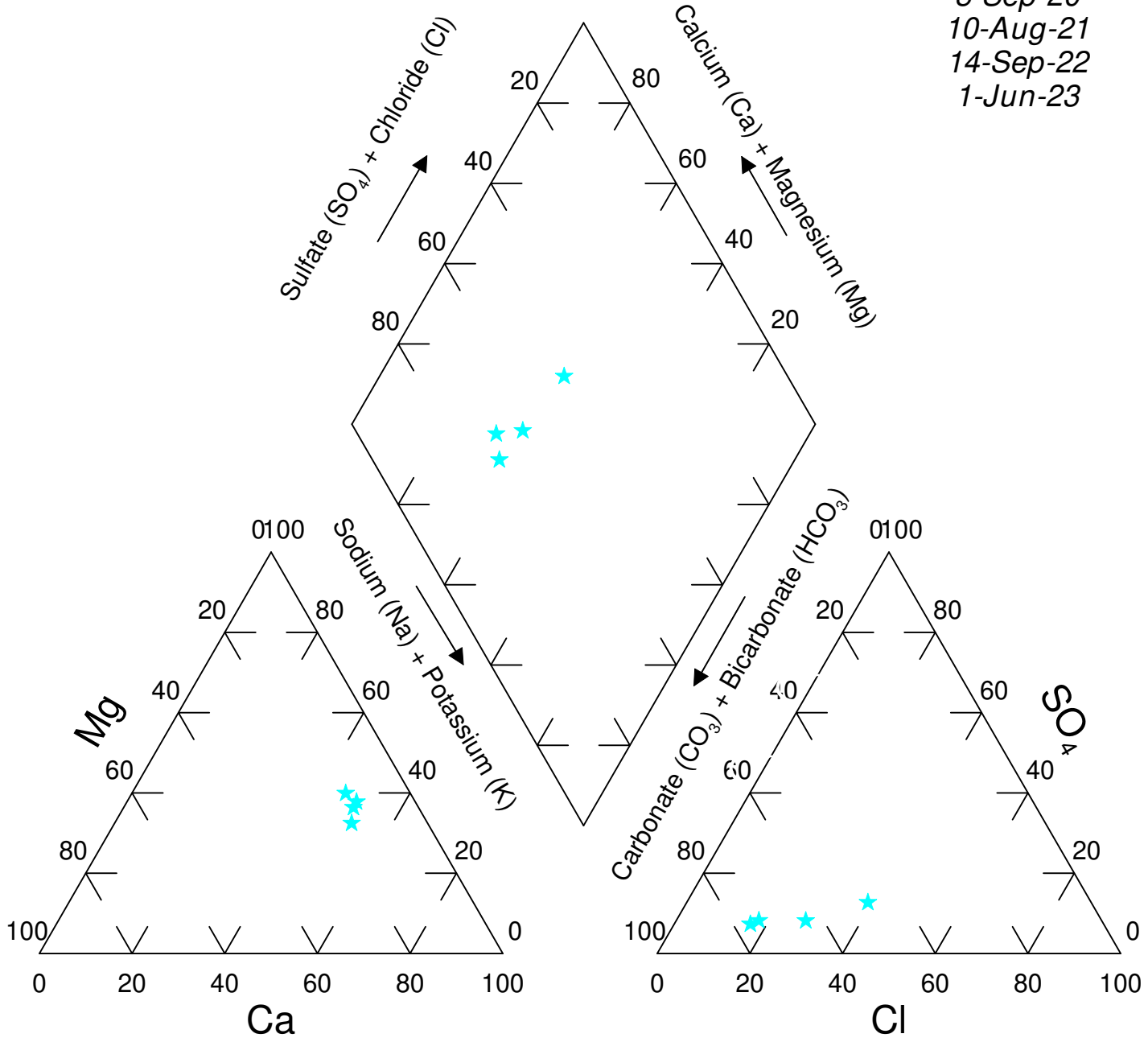


FIGURE: 21P

Winnipeg
Water and Waste Department

Site: Brady
Location: MH48

Date:
1-Jun-23

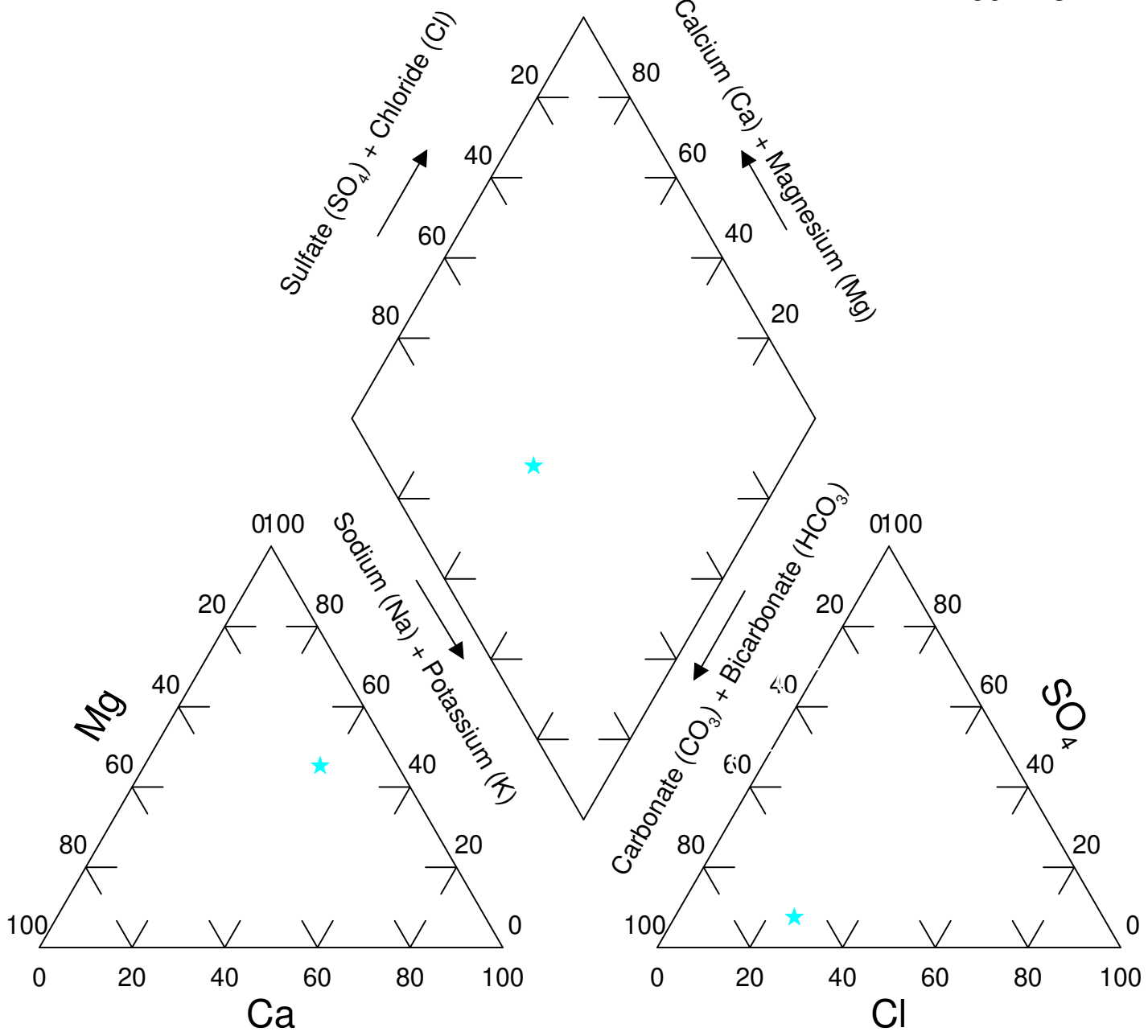


FIGURE: 21P

Winnipeg
Water and Waste Department

Site: Brady
Location: *Riser 1*

Dates:
31-Jul-18
10-Sep-19
8-Sep-20
10-Aug-21
14-Sep-22
26-May-23

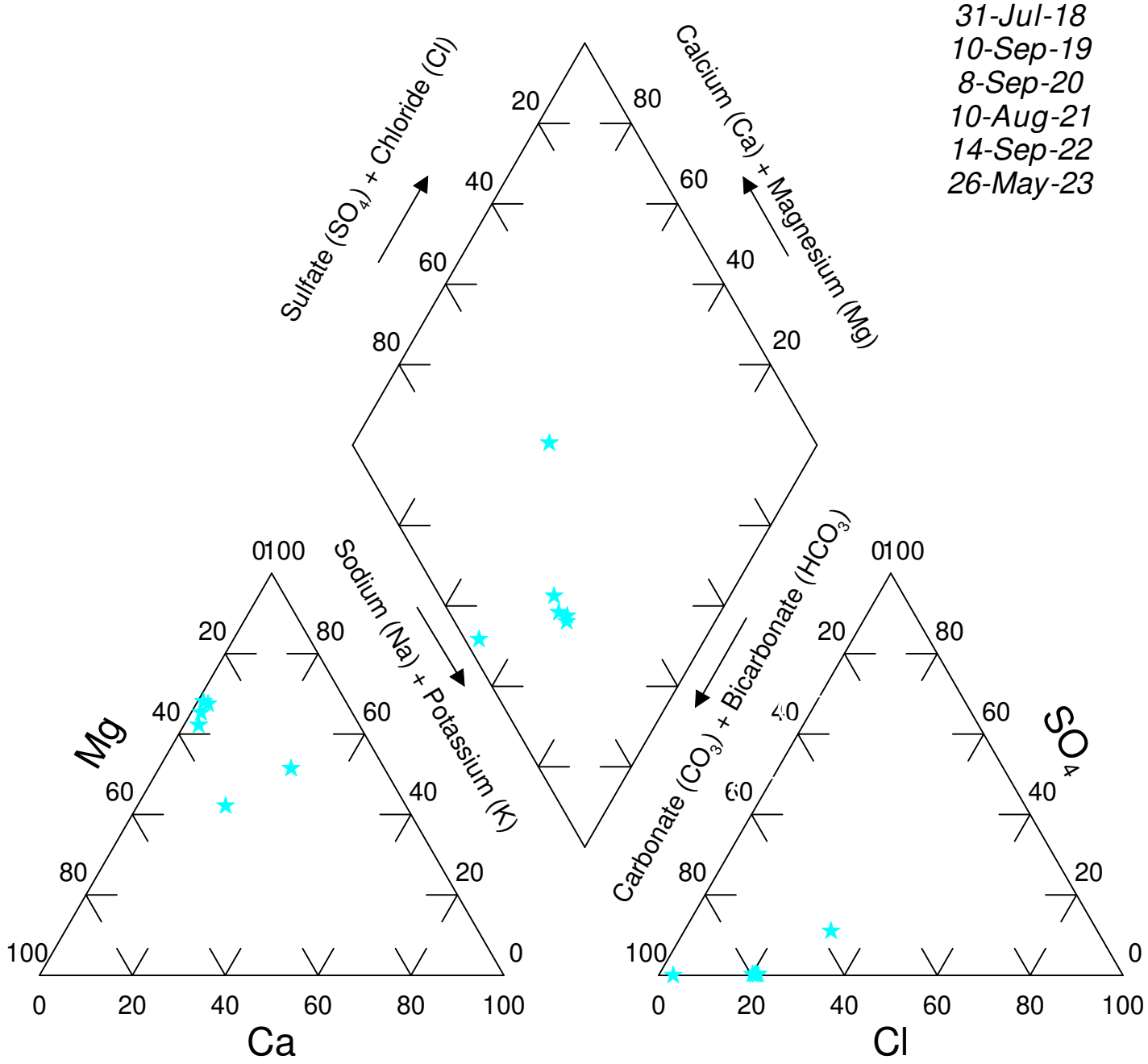


FIGURE: 18P

Winnipeg
Water and Waste Department

Site: Brady
Location: *MH BIO*

Dates:
31-Jul-18
10-Sep-19
8-Sep-20
10-Aug-21
8-Sep-22
26-May-23

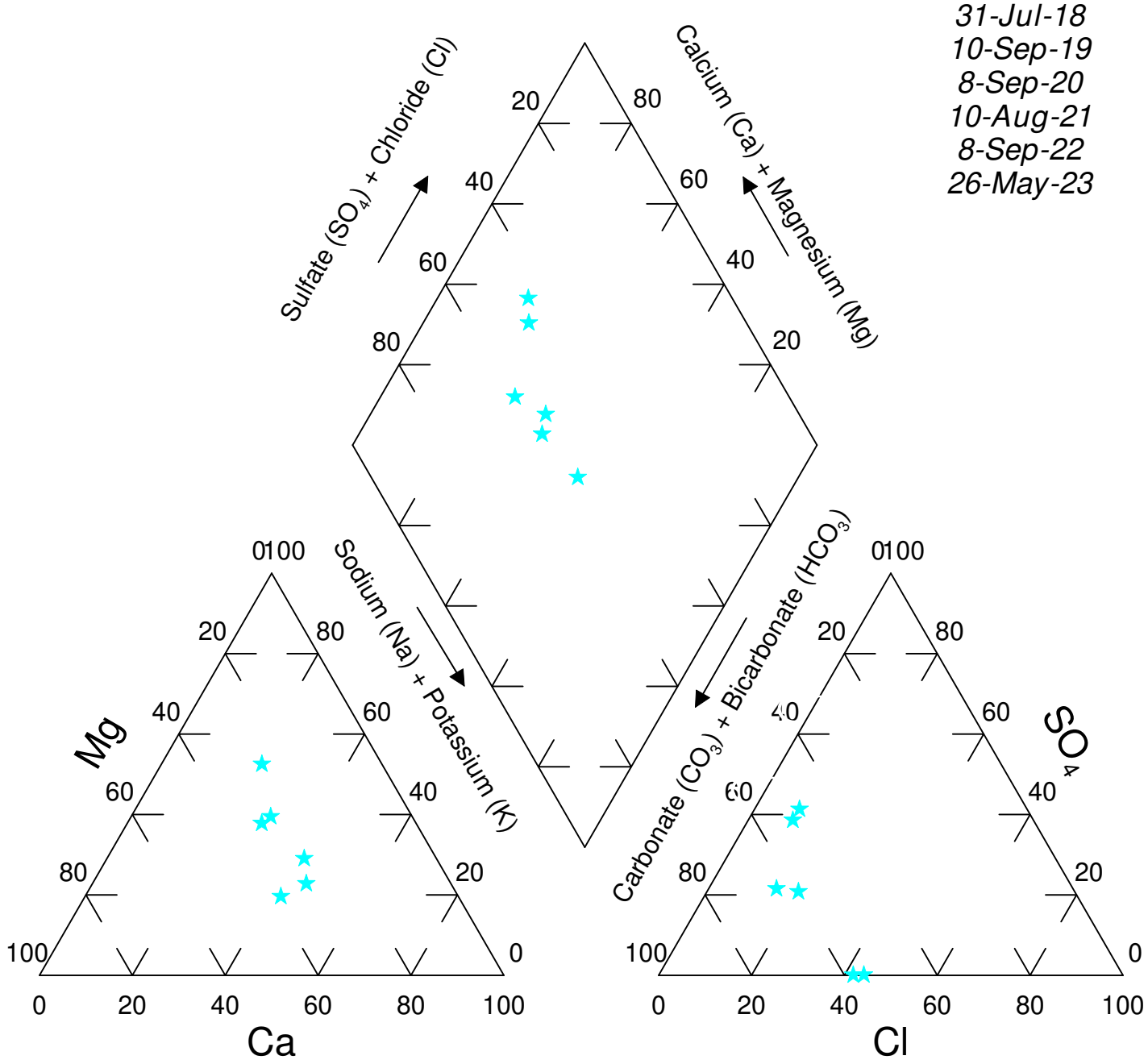
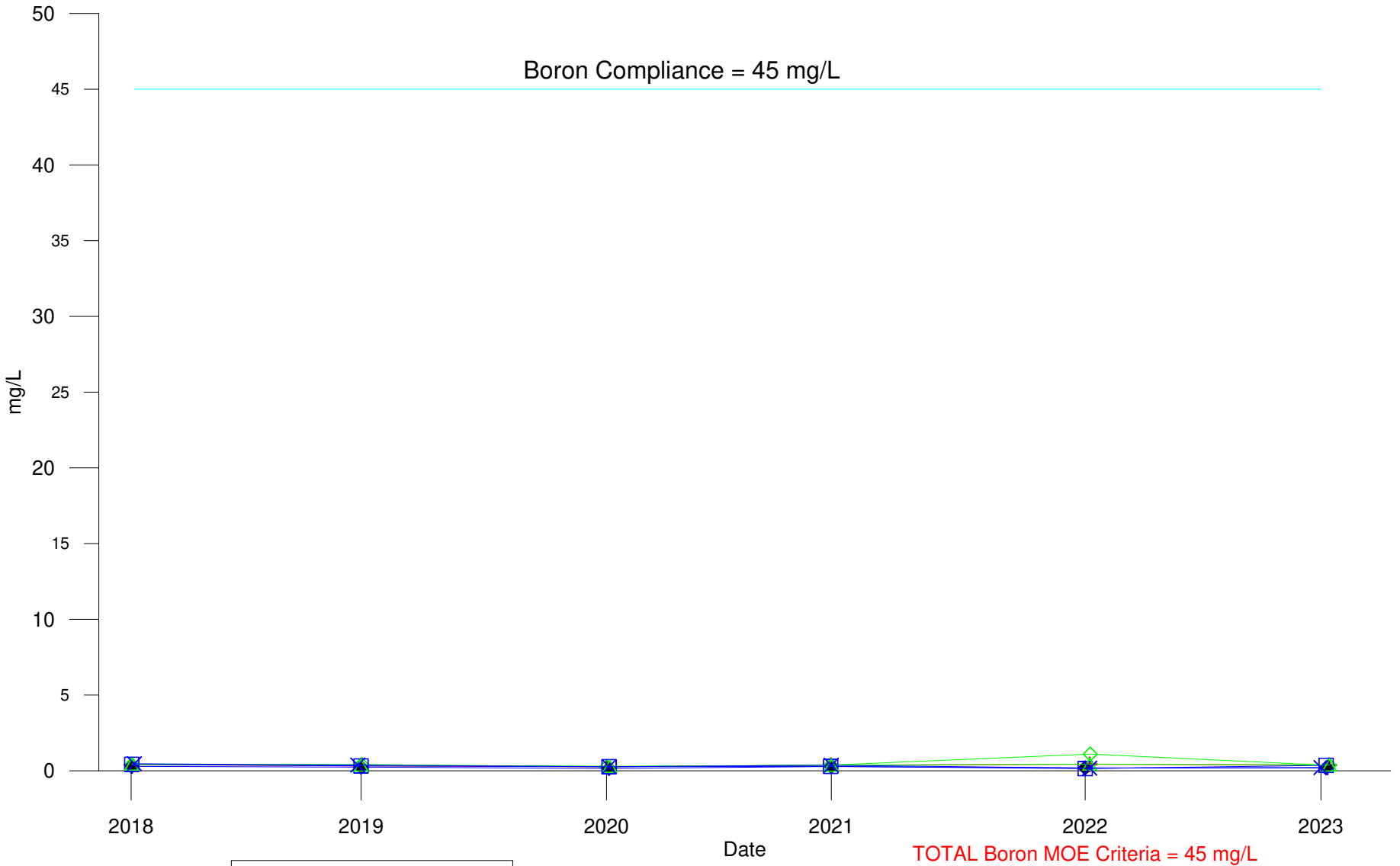


FIGURE: 18P

Winnipeg
Water and Waste Department

APPENDIX C
2023 TIME VS CONCENTRATION GRAPHS

2023 Groundwater
Time vs Concentration Graphs



TOTAL Boron MOE Criteria = 45 mg/L

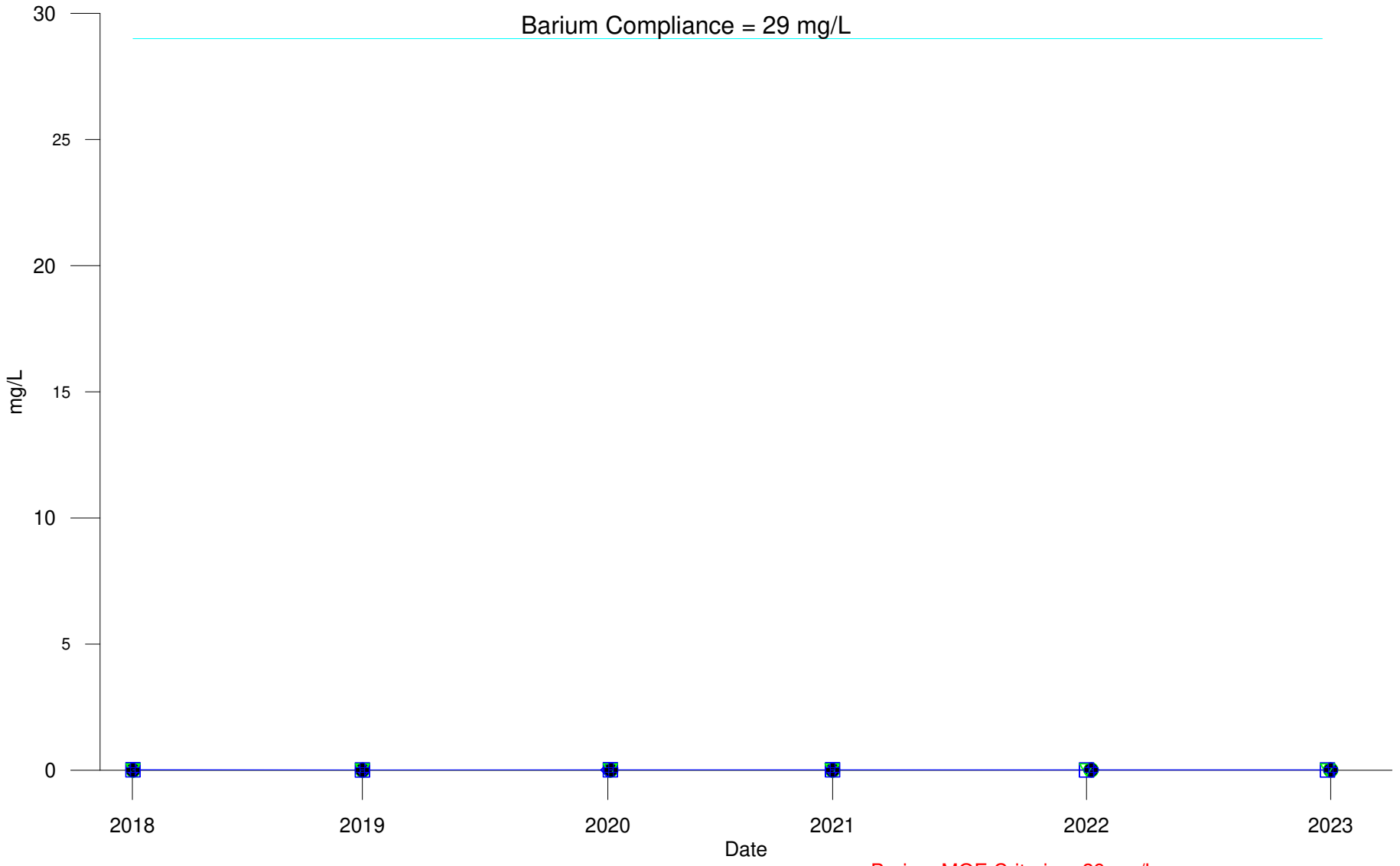
Winnipeg
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Boron
Clay Wells

APRIL 2024	FIGURE 16	REV 0



Barium MOE Criteria = 29 mg/L

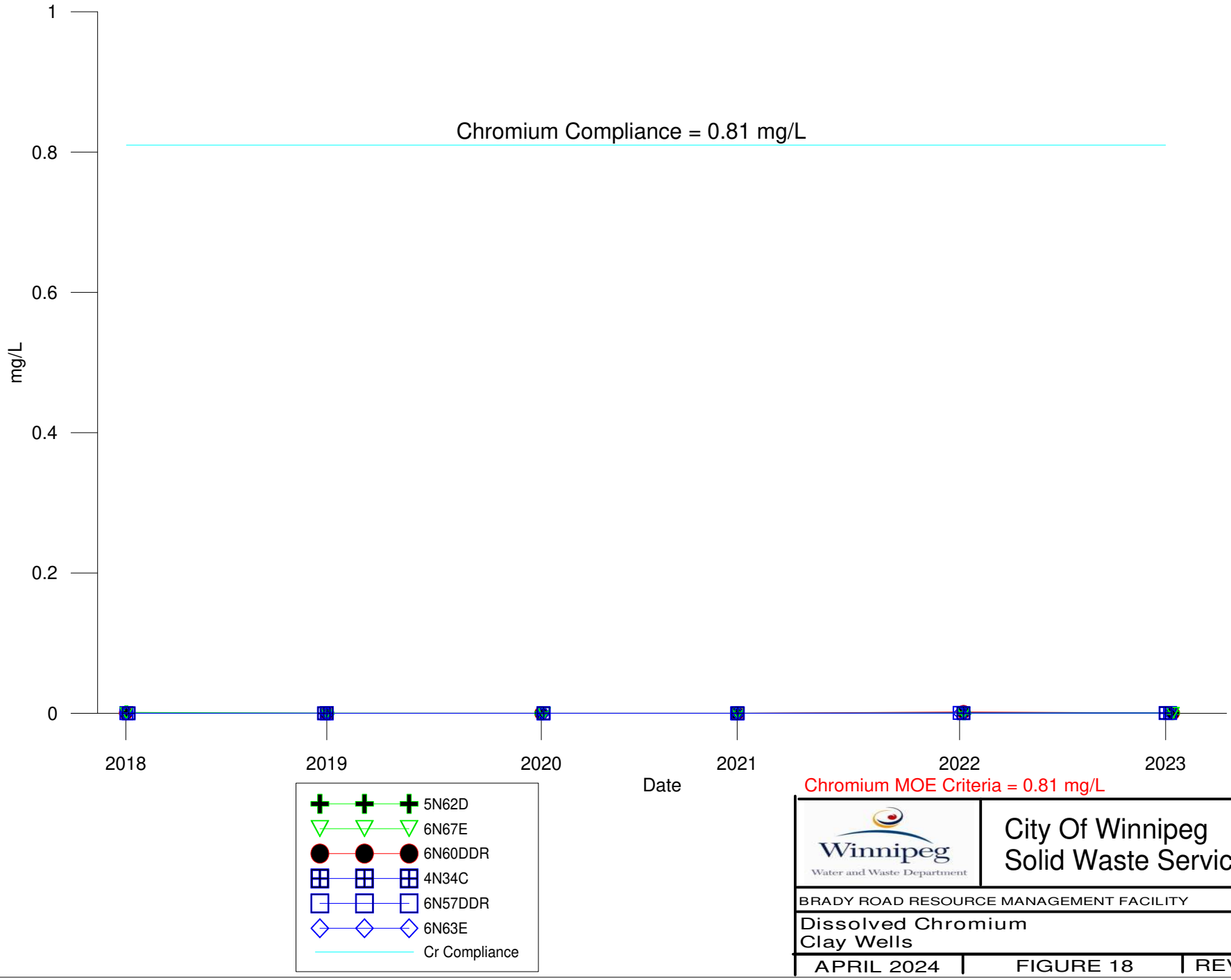
Winnipeg
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Barium
Clay Wells

APRIL 2024	FIGURE 17	REV 0



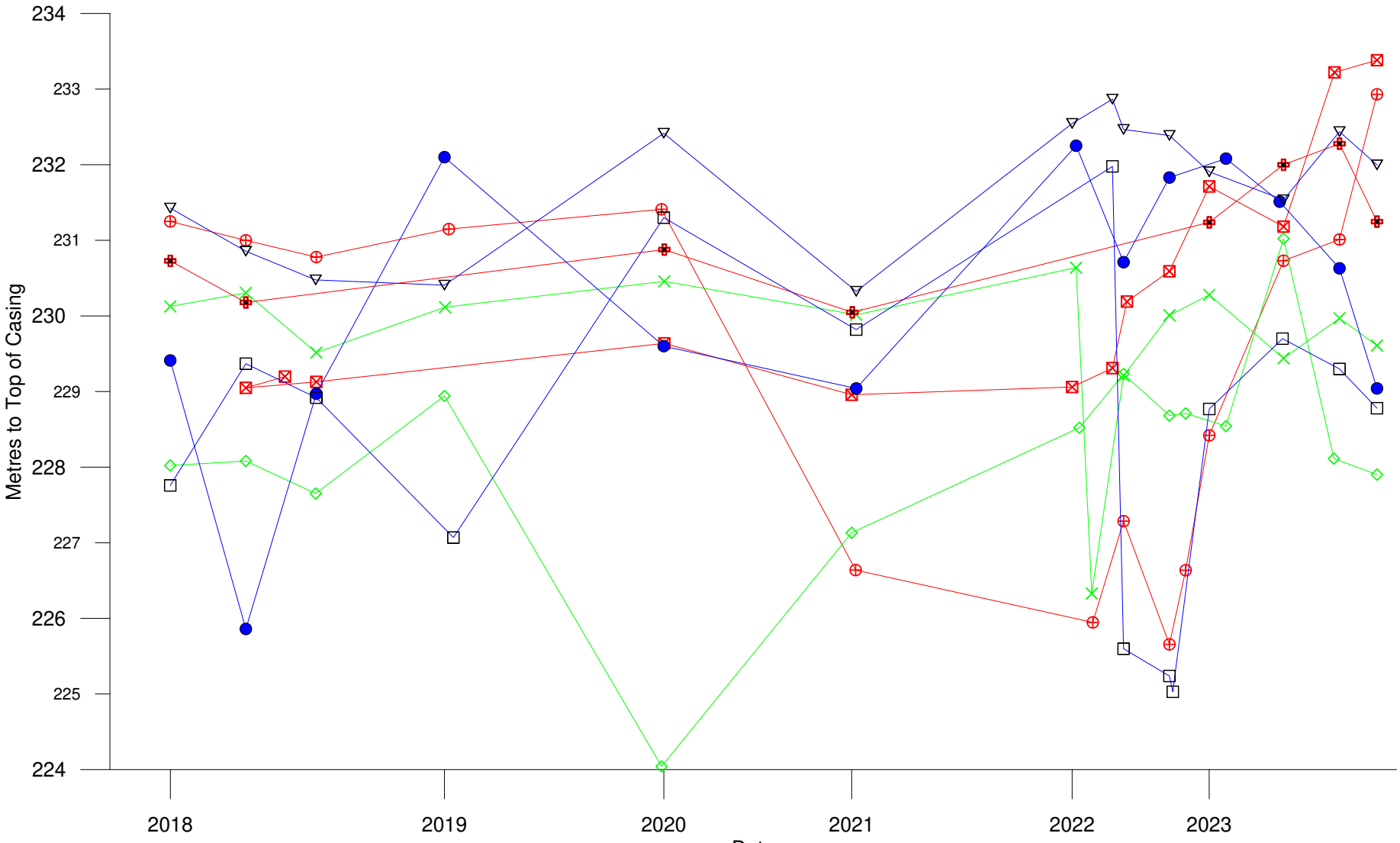
Winnipeg
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Chromium
Clay Wells

APRIL 2024 | FIGURE 18 | REV 0



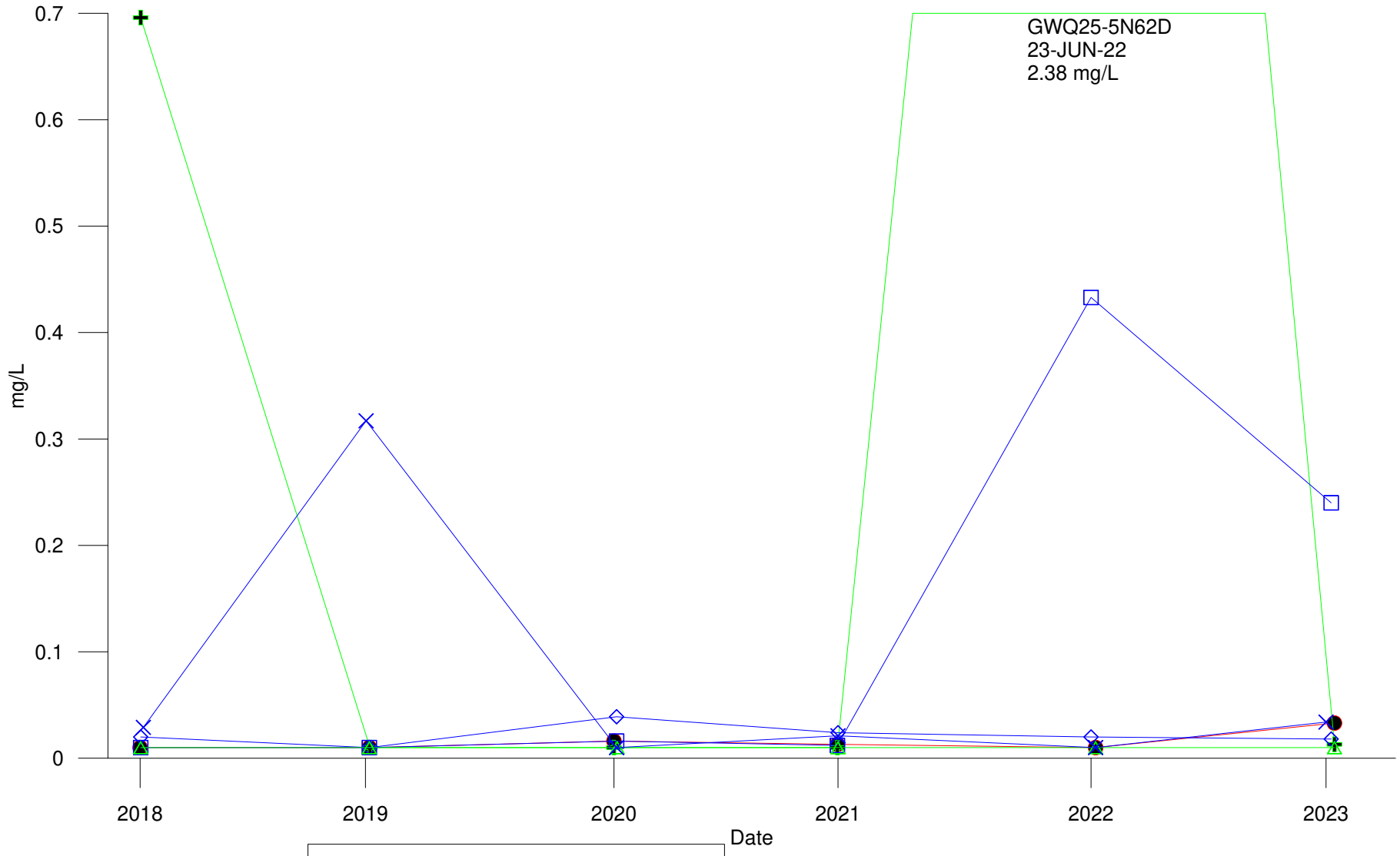
Winnipeg
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

GROUNDWATER ELEVATIONS
CLAY WELLS

APRIL 2024 | FIGURE GW-3-2 | REV 0



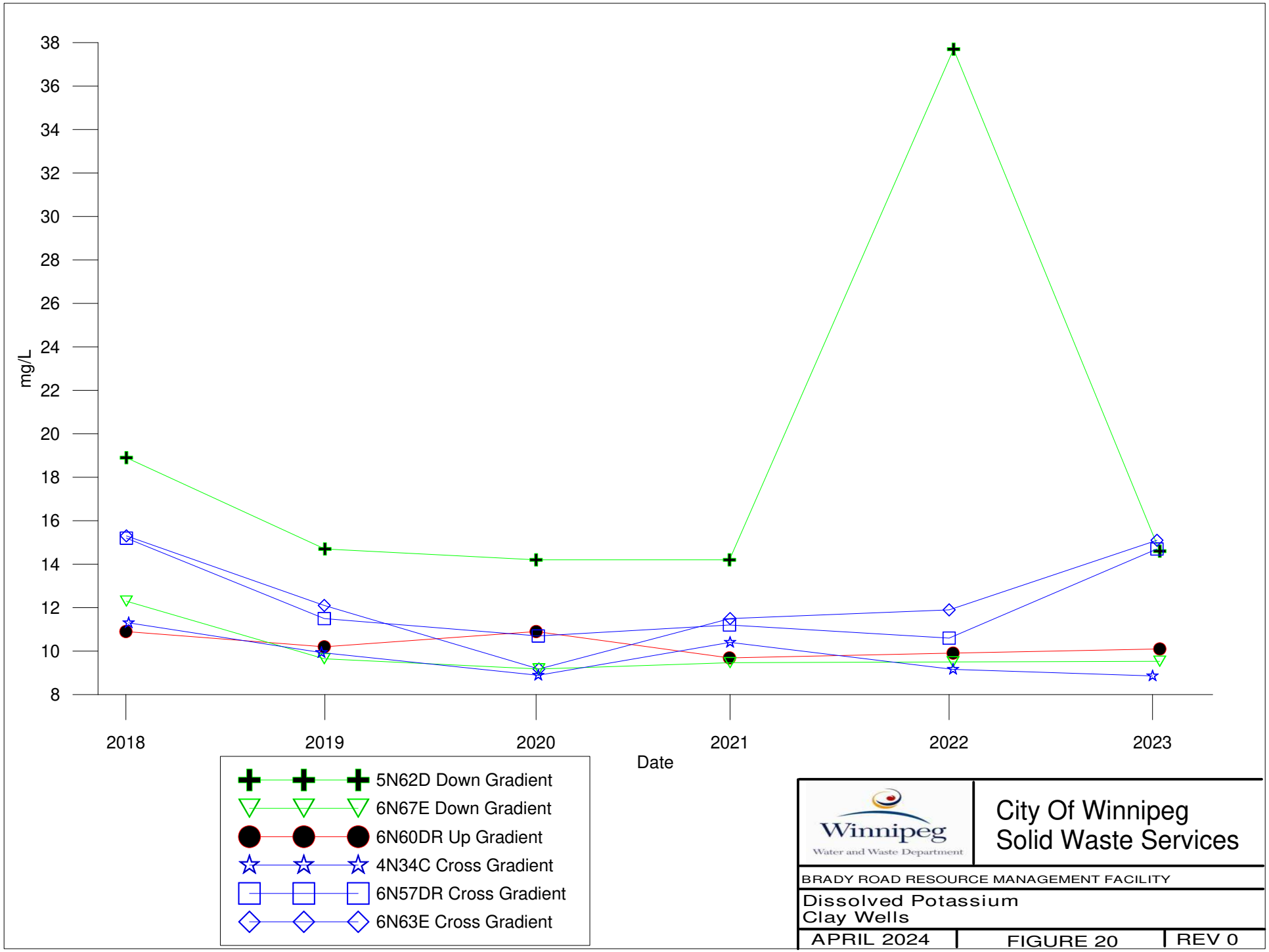
Winnipeg
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Iron
Clay Wells

APRIL 2024 | FIGURE 19 | REV 0



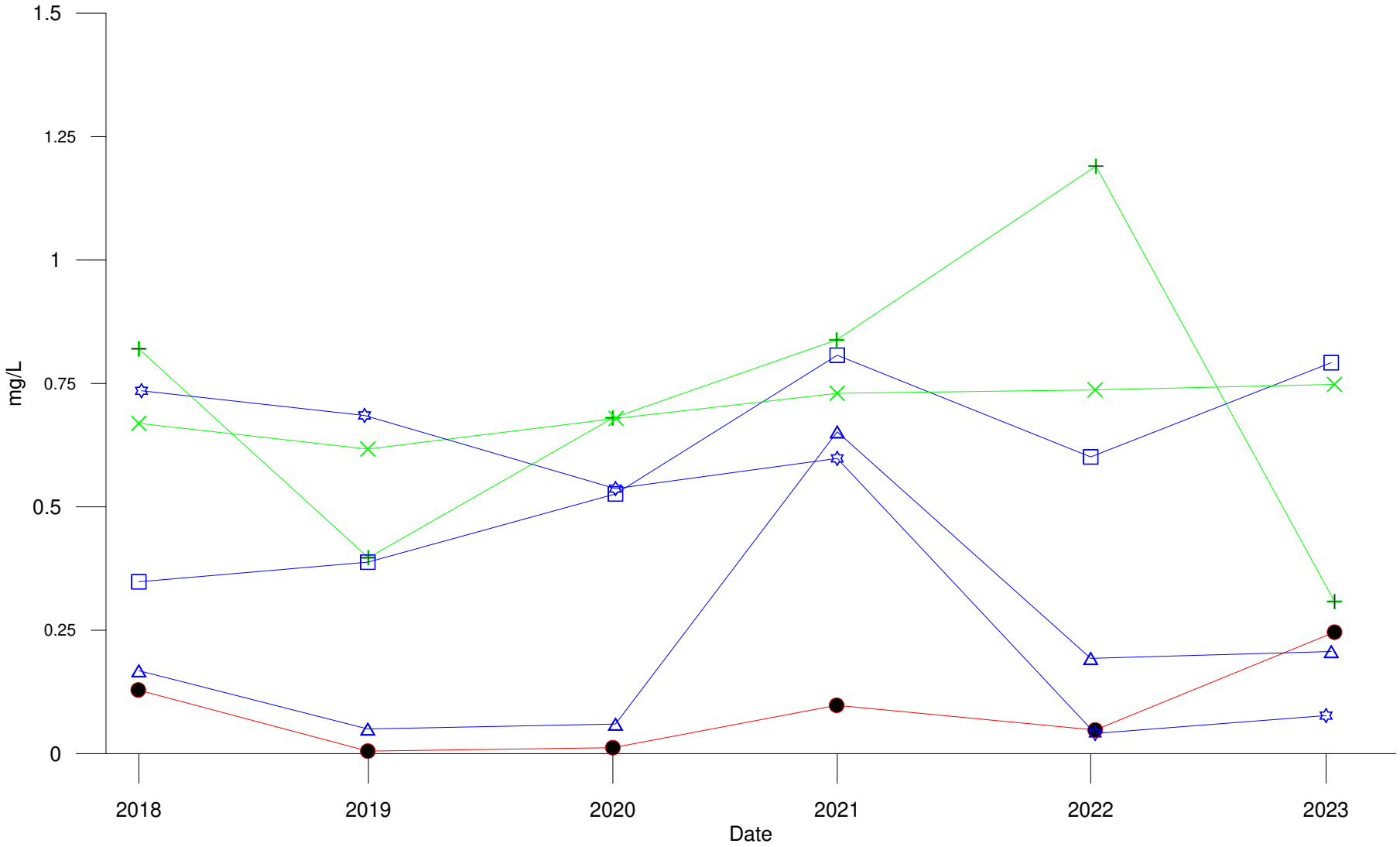
Winnipeg
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Potassium
Clay Wells

APRIL 2024 | FIGURE 20 | REV 0



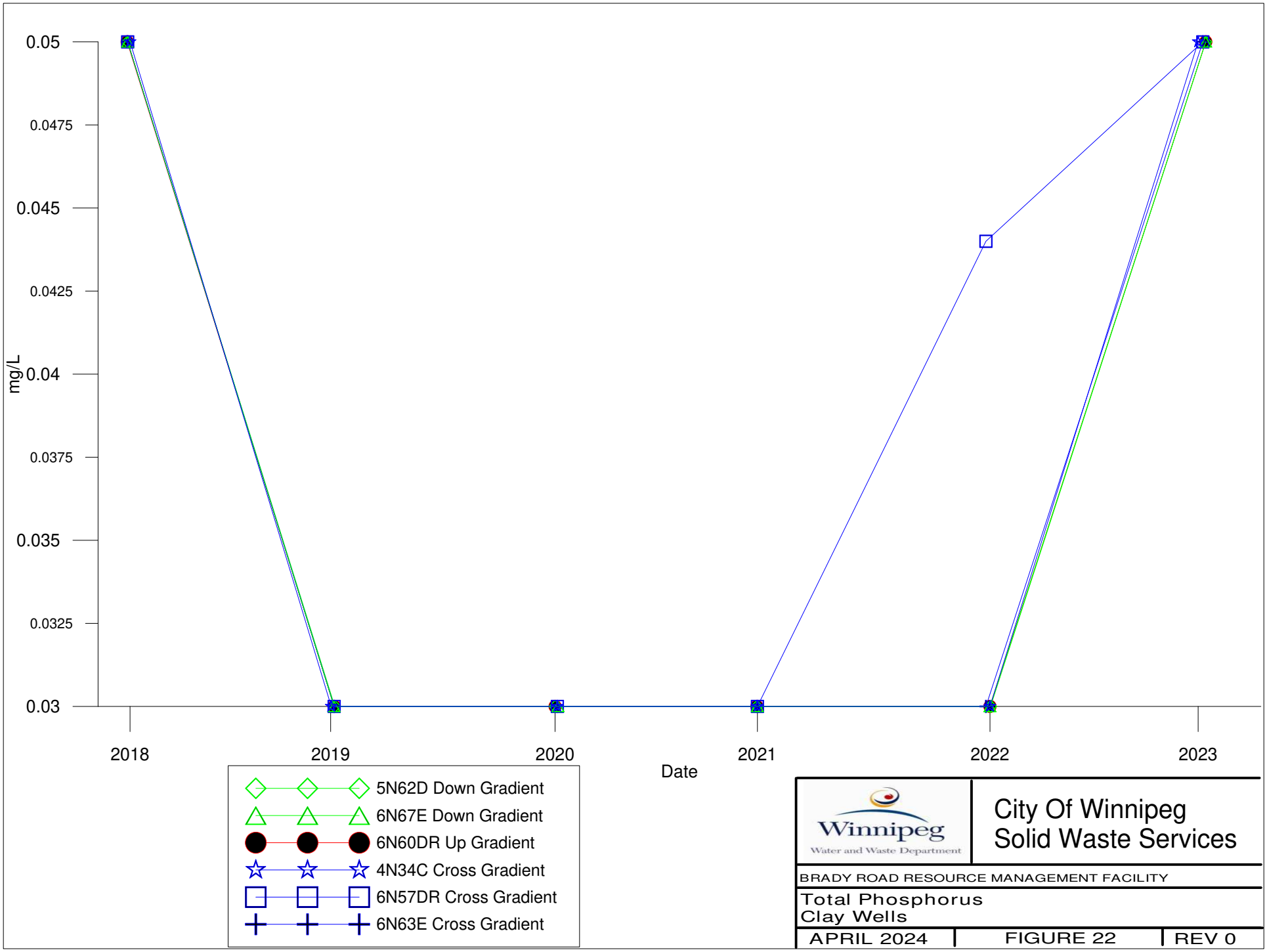
Winnipeg
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Total Ammonia
Clay Wells

APRIL 2024 | FIGURE 21 | REV 0



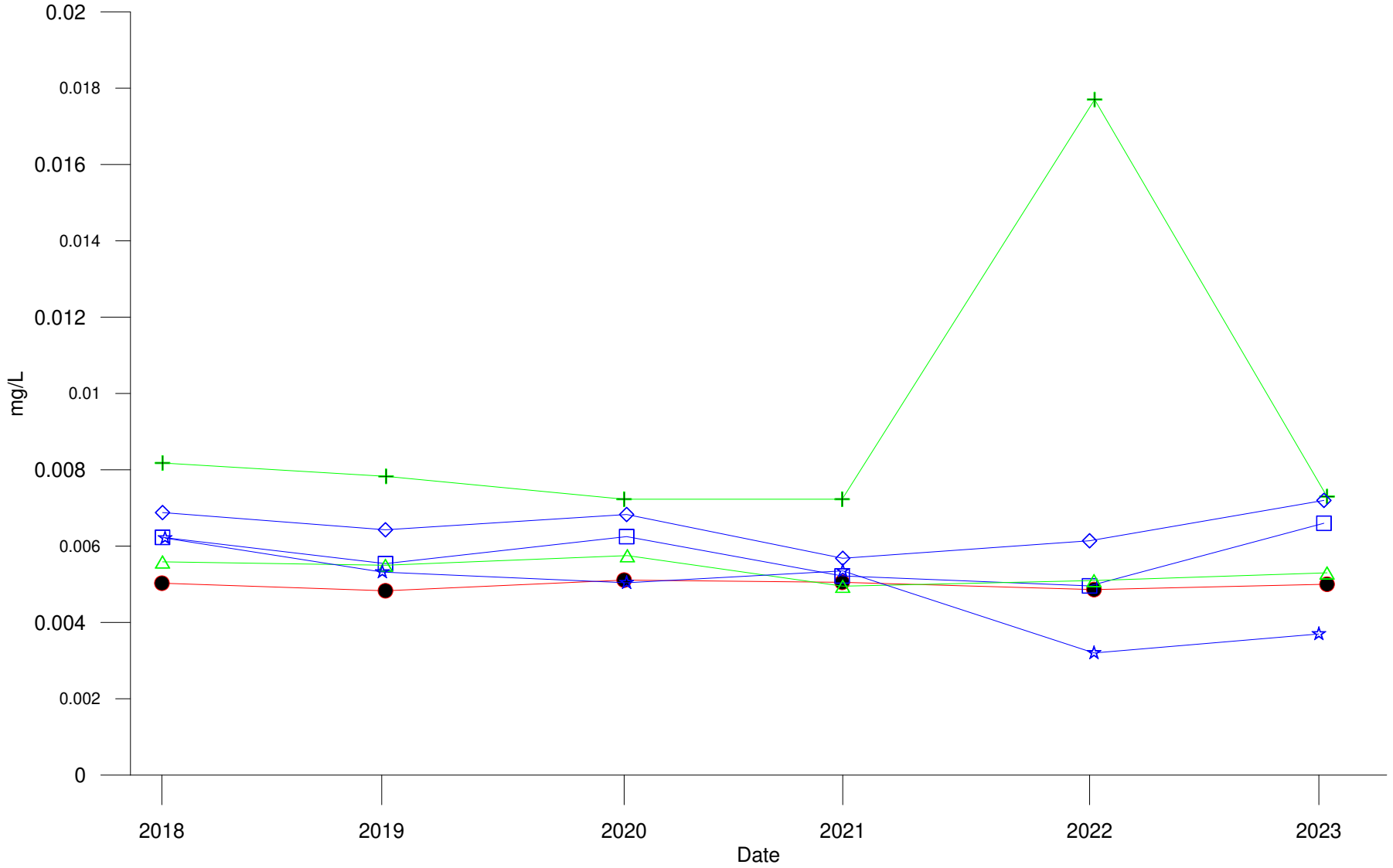
Winnipeg
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Total Phosphorus
Clay Wells

APRIL 2024 | FIGURE 22 | REV 0



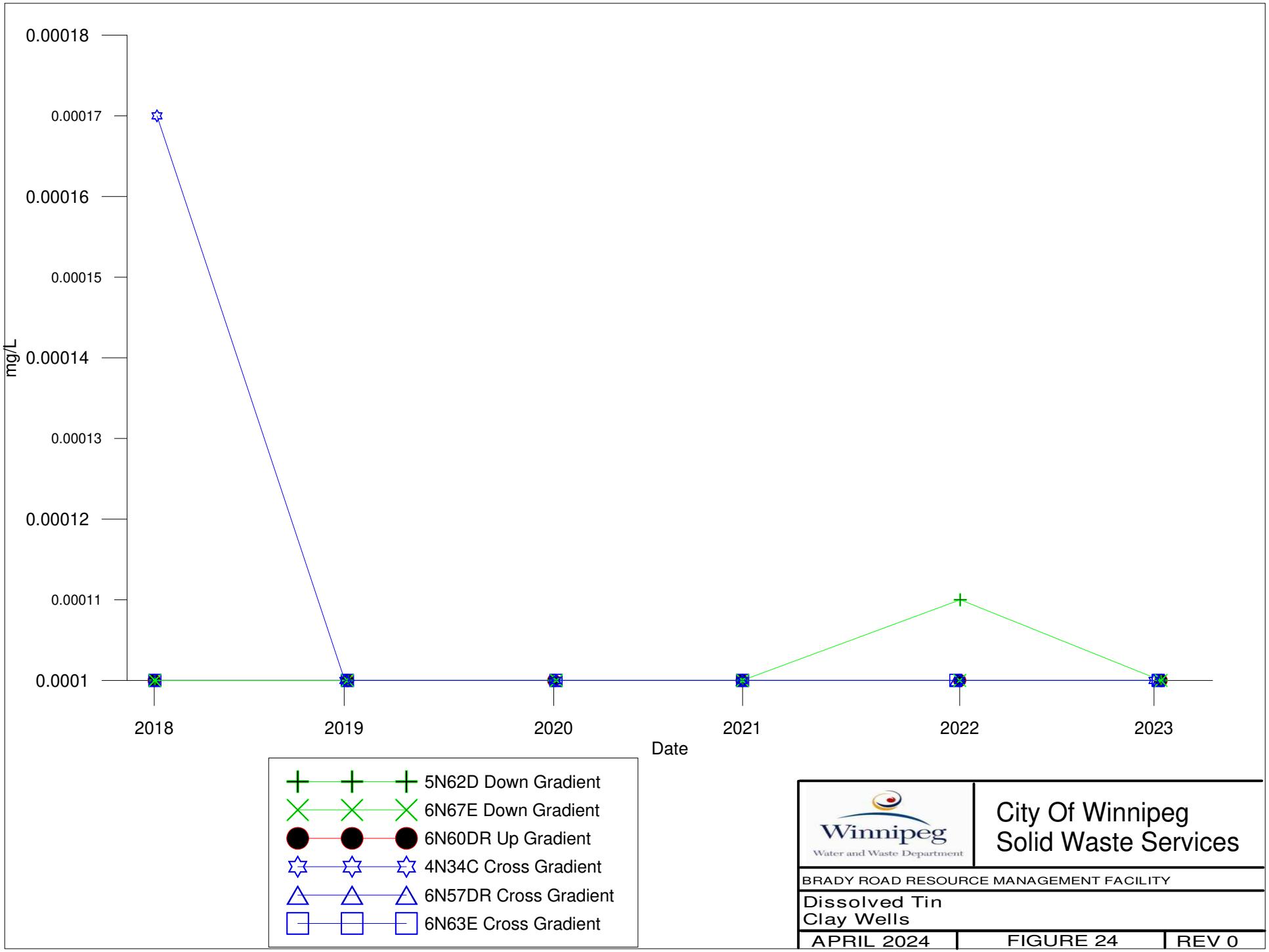
Winnipeg
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Rubidium
Clay Wells

APRIL 2024	FIGURE 23	REV 0



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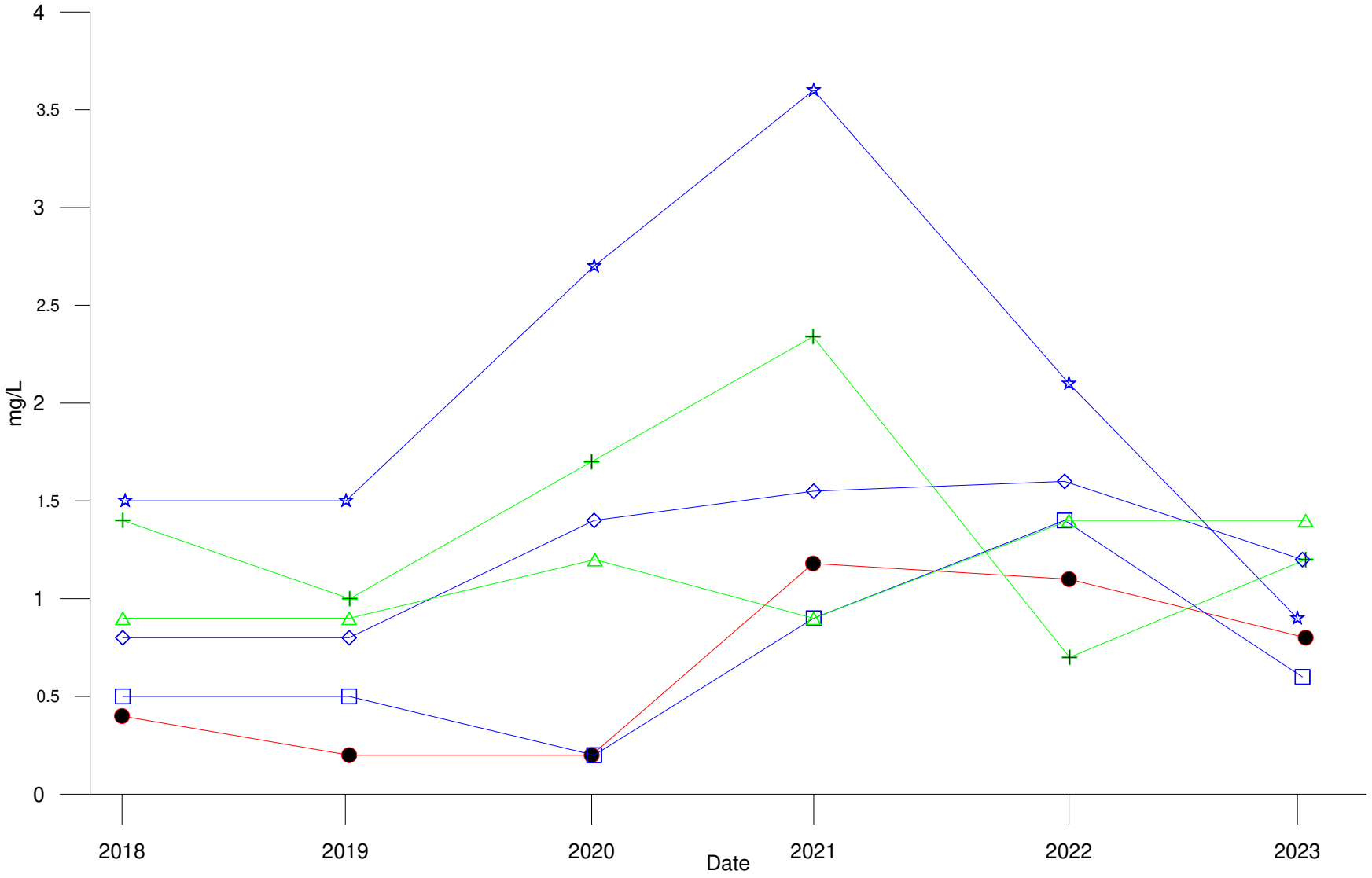
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Tin
Clay Wells

APRIL 2024	FIGURE 24	REV 0



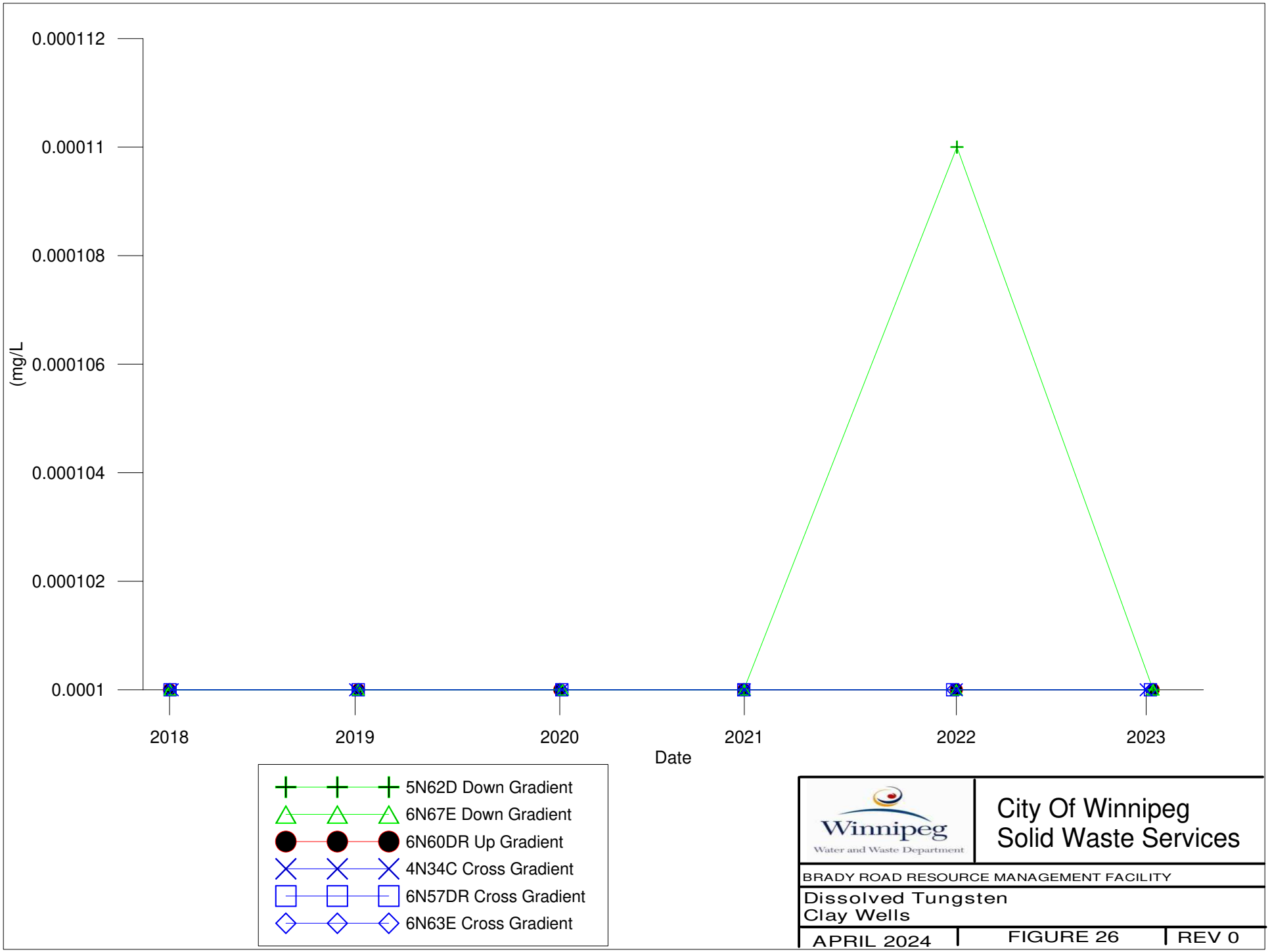
Winnipeg
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Total Kjeldahl Nitrogen
Clay Wells

APRIL 2024	FIGURE 25	REV 0



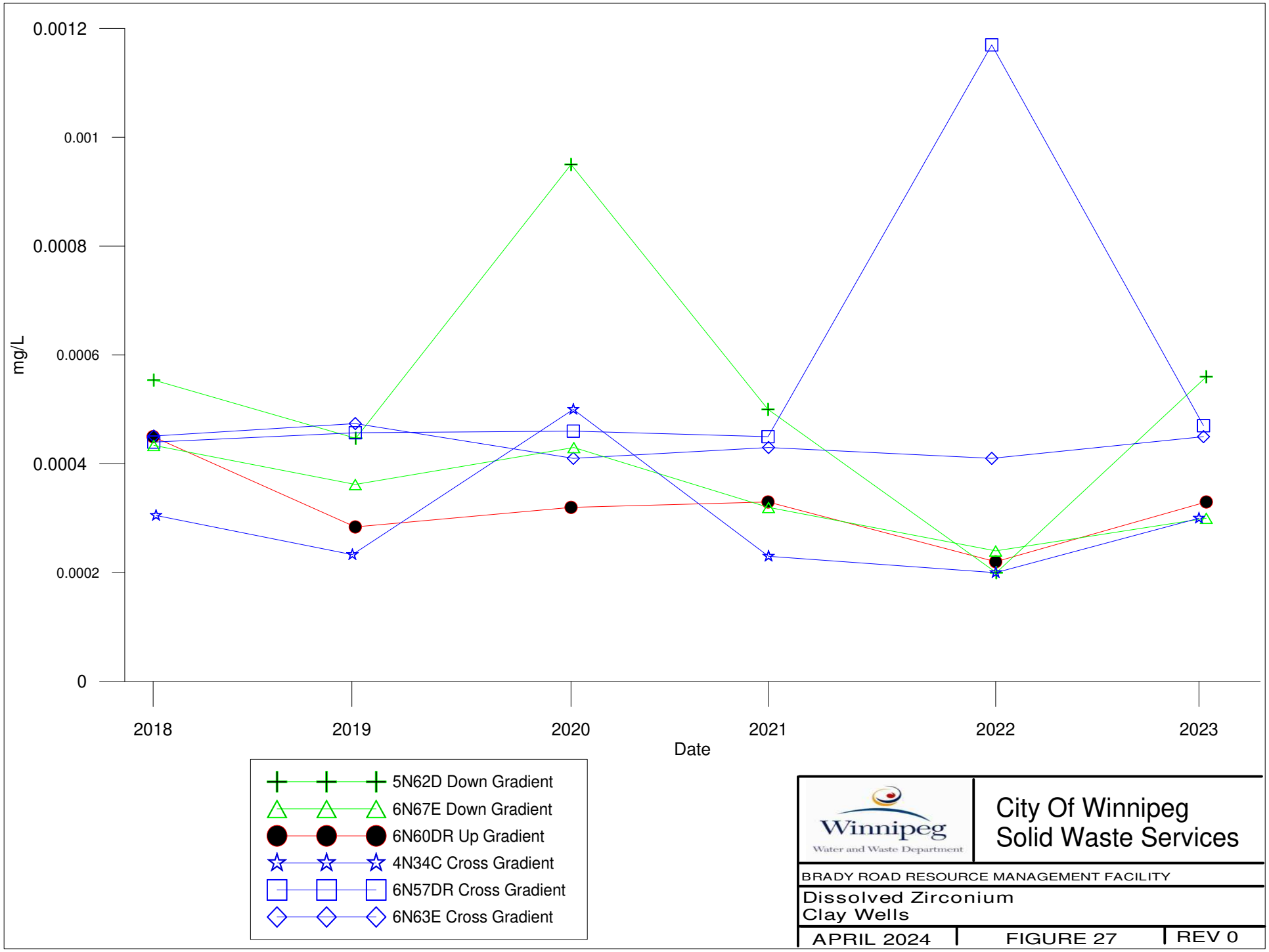
Winnipeg
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Tungsten
Clay Wells

APRIL 2024 | FIGURE 26 | REV 0



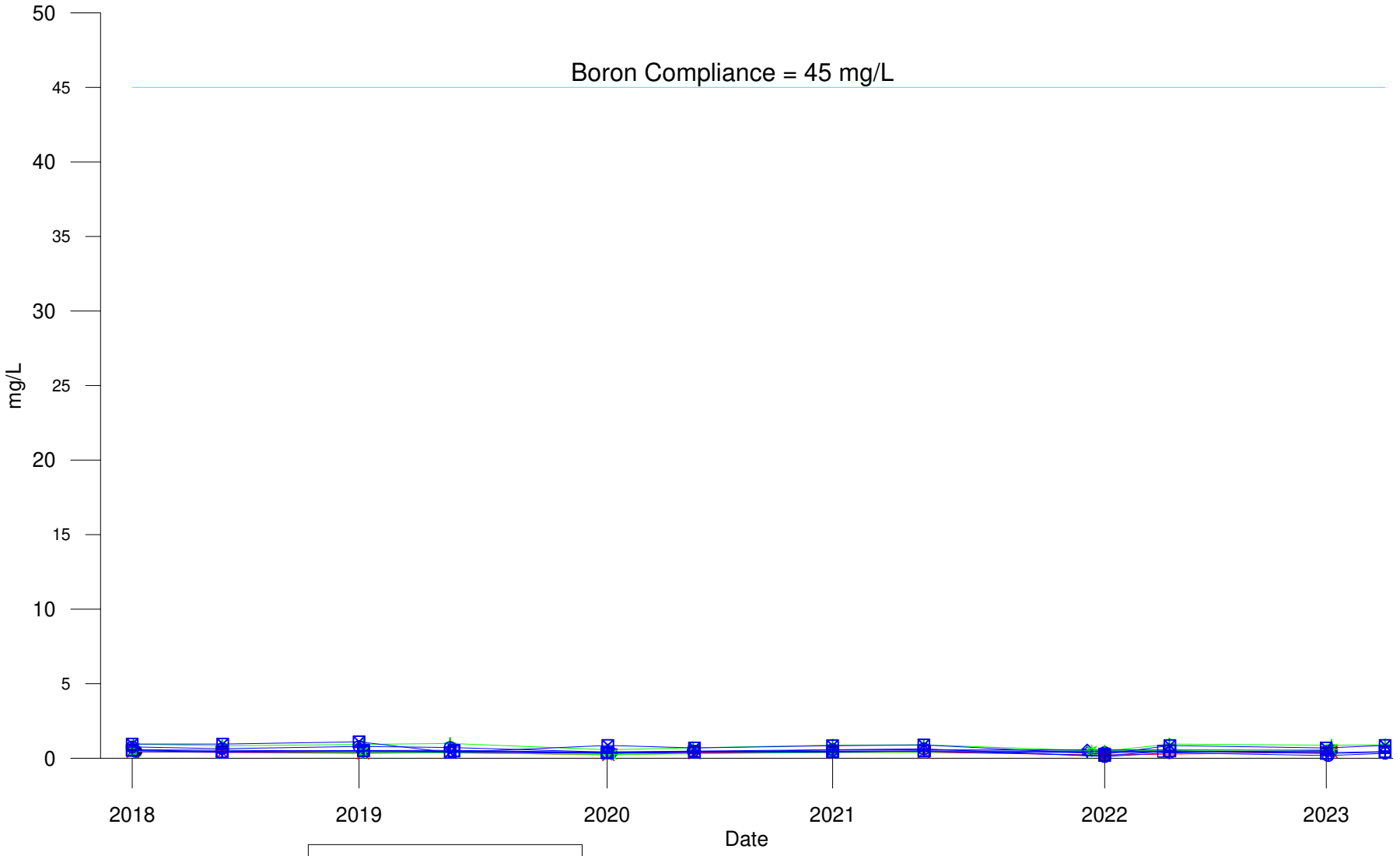
Winnipeg
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Zirconium
Clay Wells

APRIL 2024 | FIGURE 27 | REV 0



Up gradient
6N60EER

Down gradient
5N62E
6N67F

Cross gradient
13A
14A

Cross gradient
15A
16A
4N34DDR
6N57F
6N63F

Boron MOE Criteria = 45 mg/L

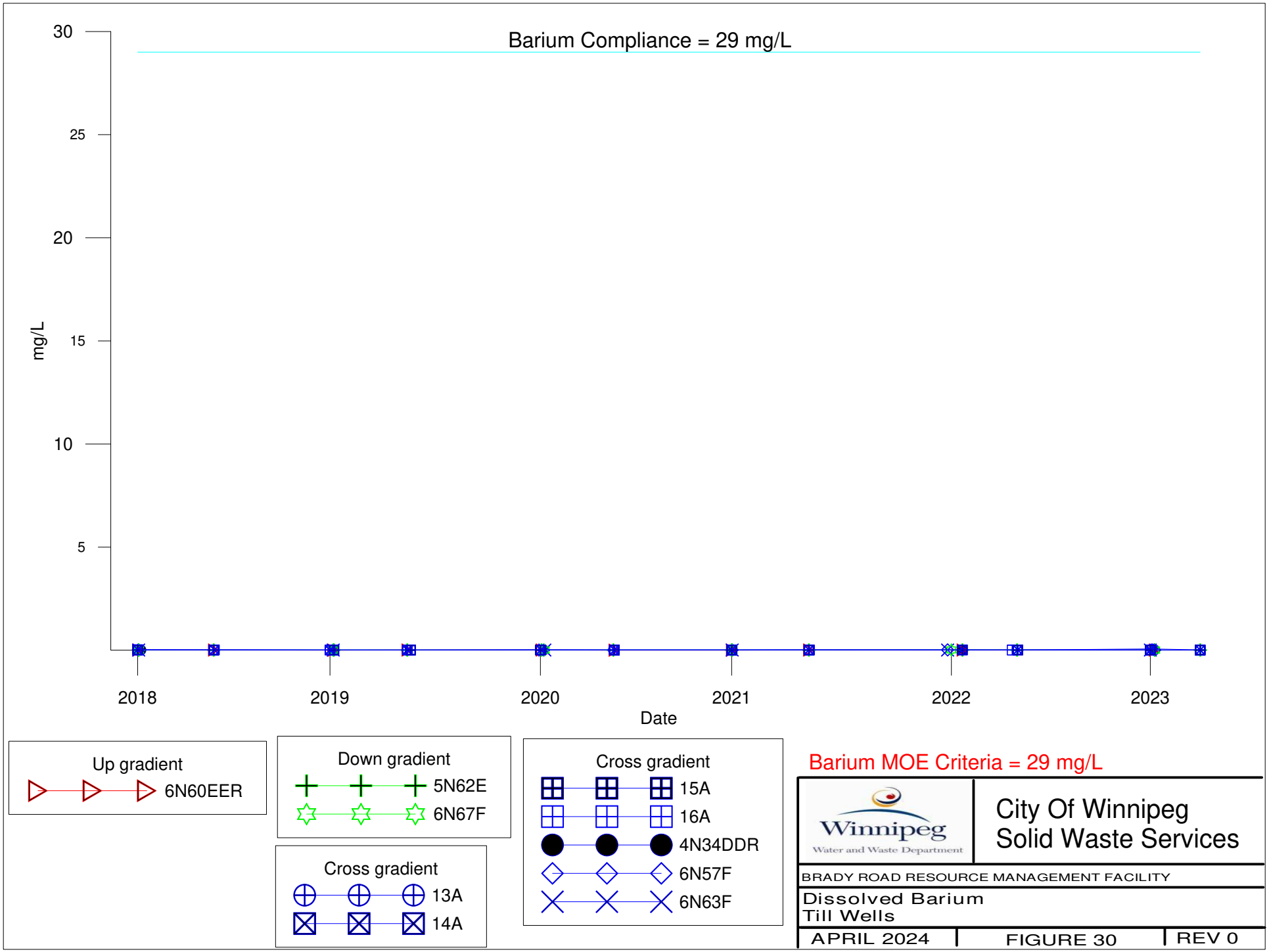
Winnipeg
Water and Waste Department

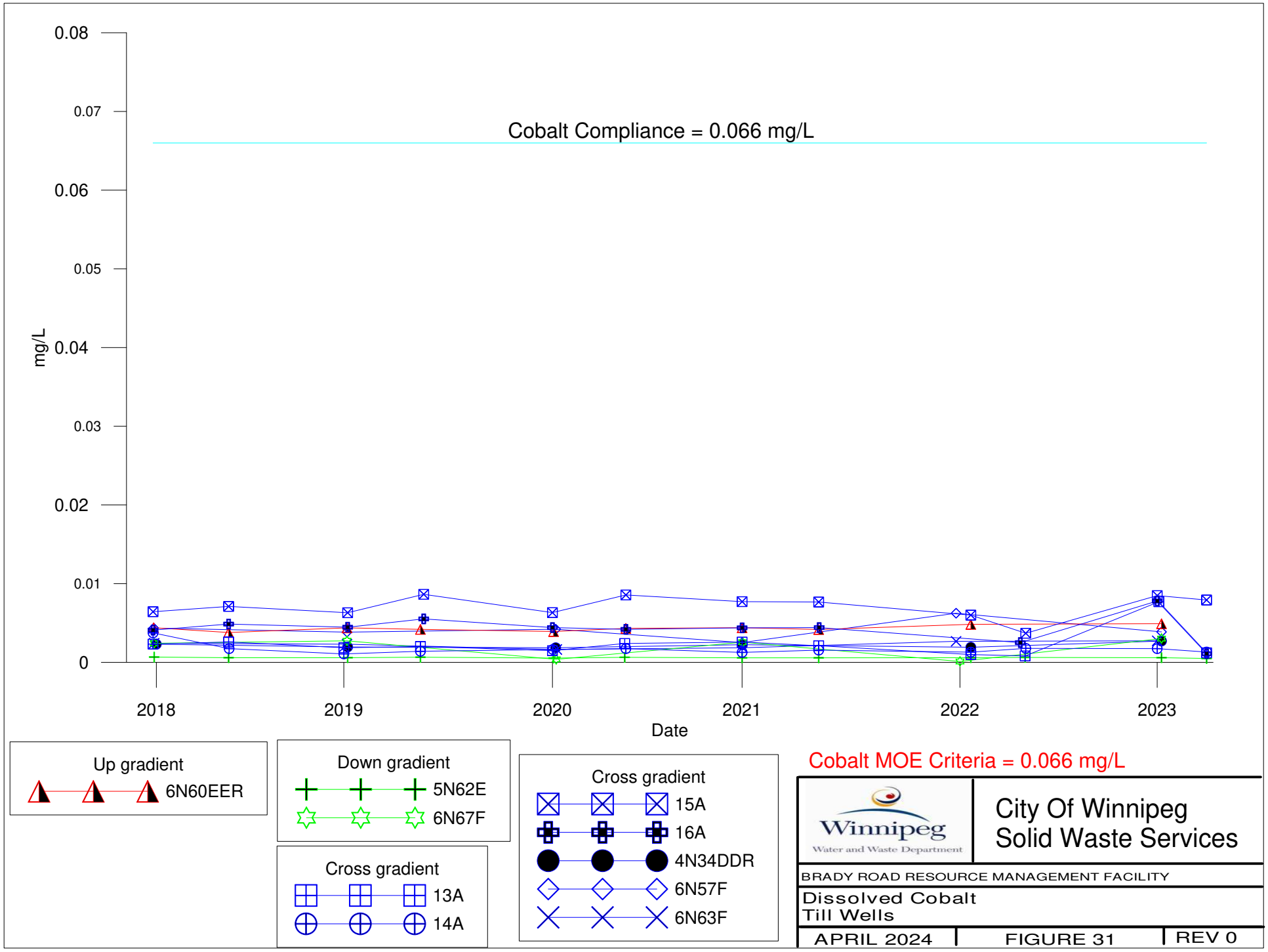
City Of Winnipeg
Solid Waste Services

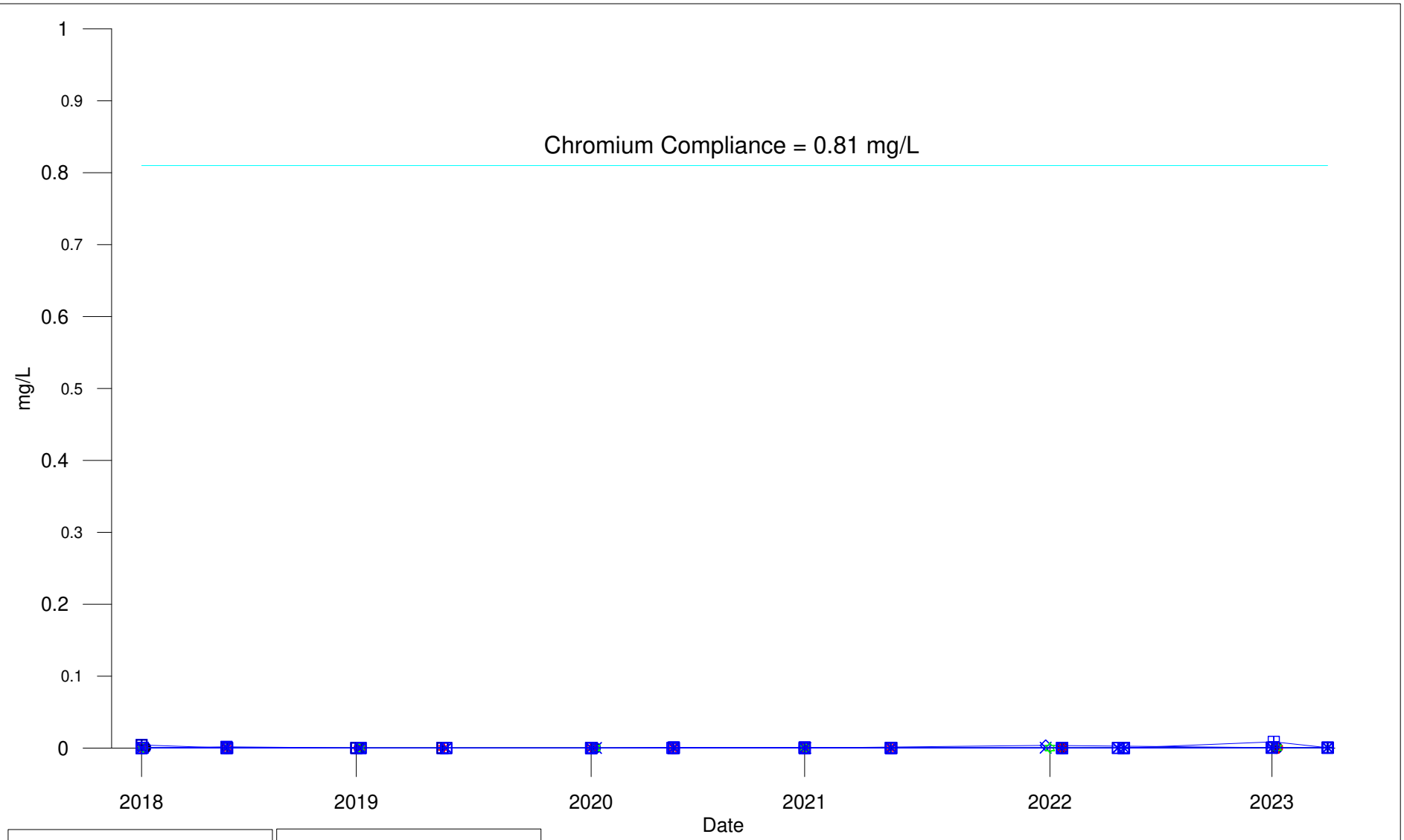
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Boron
Till Wells

APRIL 2024 | FIGURE 29 | REV 0


Barium Compliance = 29 mg/L
30
25
20
15
10
5
mg/L
2018
2019
2020
2021
2022
2023
Date
Up gradient
6N60EER
Down gradient
5N62E
6N67F
Cross gradient
13A
14A
Cross gradient
15A
16A
4N34DDR
6N57F
6N63F
Barium MOE Criteria = 29 mg/L
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Barium
Till Wells
APRIL 2024
FIGURE 30
REV 0


0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
mg/L
Cobalt Compliance = 0.066 mg/L
2018
2019
2020
2021
2022
2023
Date
Up gradient
6N60EER
Down gradient
5N62E
6N67F
Cross gradient
13A
14A
Cross gradient
15A
16A
4N34DDR
6N57F
6N63F
Cobalt MOE Criteria = 0.066 mg/L
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Cobalt
Till Wells
APRIL 2024
FIGURE 31
REV 0



Chromium MOE Criteria = 0.81 mg/L

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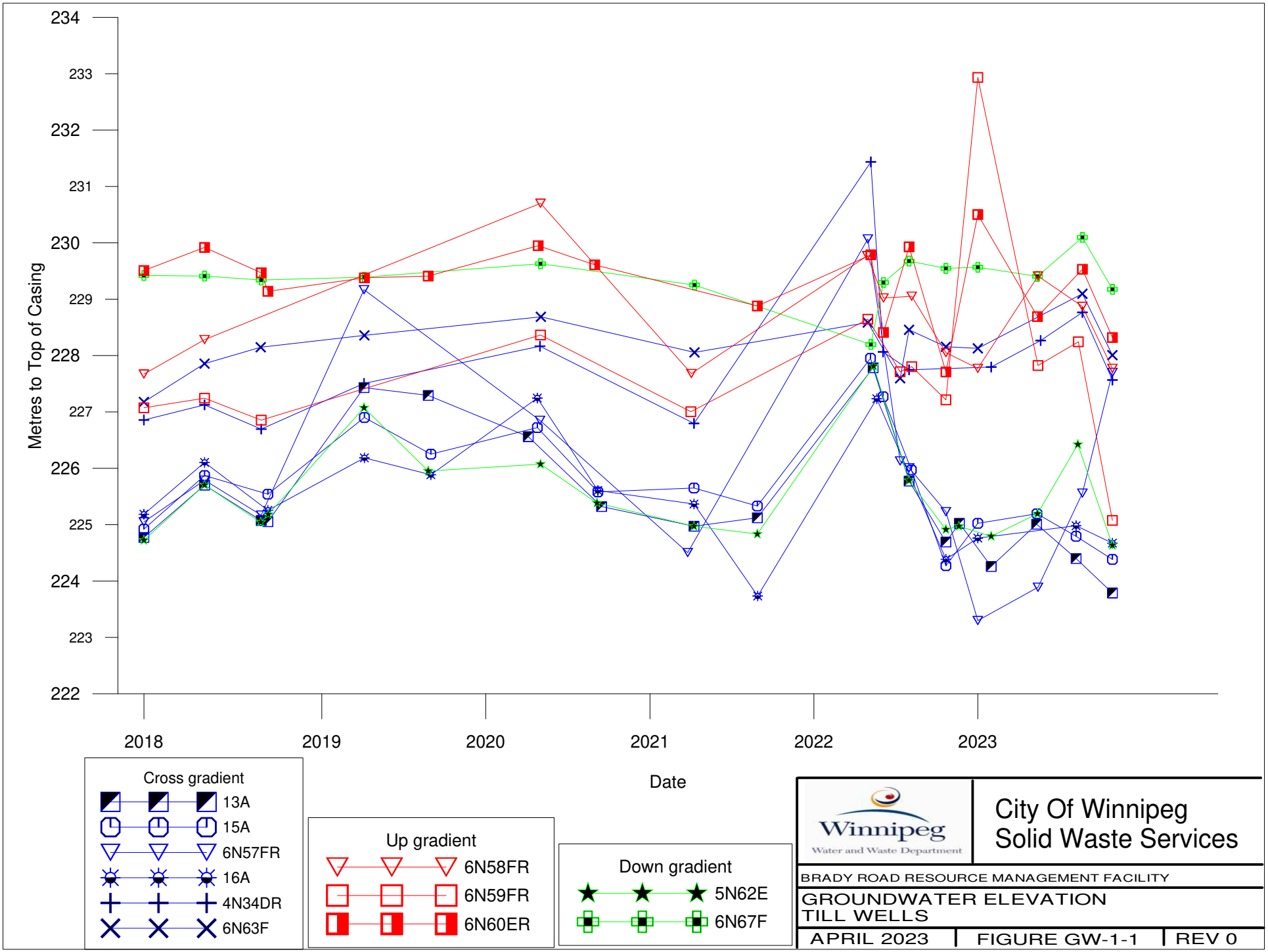
Water and Waste Department

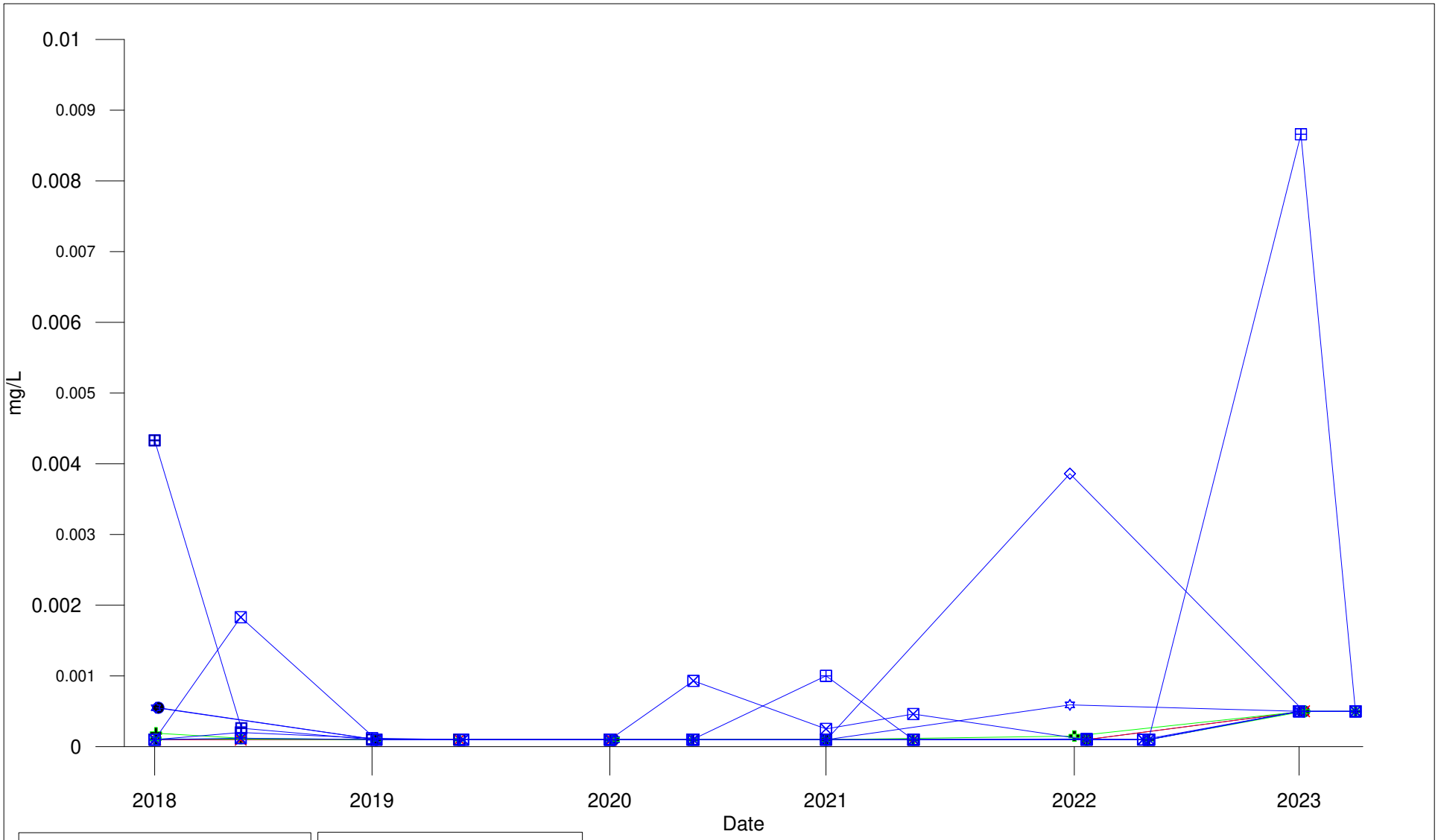
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Chromium
Till Wells

APRIL 2024 | FIGURE 32 | REV 0


234
233
232
231
230
229
228
227
226
225
224
223
222
Metres to Top of Casing
2018
2019
2020
2021
2022
2023
Date
Cross gradient
13A
15A
6N57FR
16A
4N34DR
6N63F
Up gradient
6N58FR
6N59FR
6N60ER
Down gradient
5N62E
6N67F
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
GROUNDWATER ELEVATION
TILL WELLS
APRIL 2023
FIGURE GW-1-1
REV 0



Up gradient
6N60EER

Down gradient
5N62E
6N67F

Cross gradient
13A
14A

Cross gradient
15A
16A
4N34DDR
6N57F
6N63F

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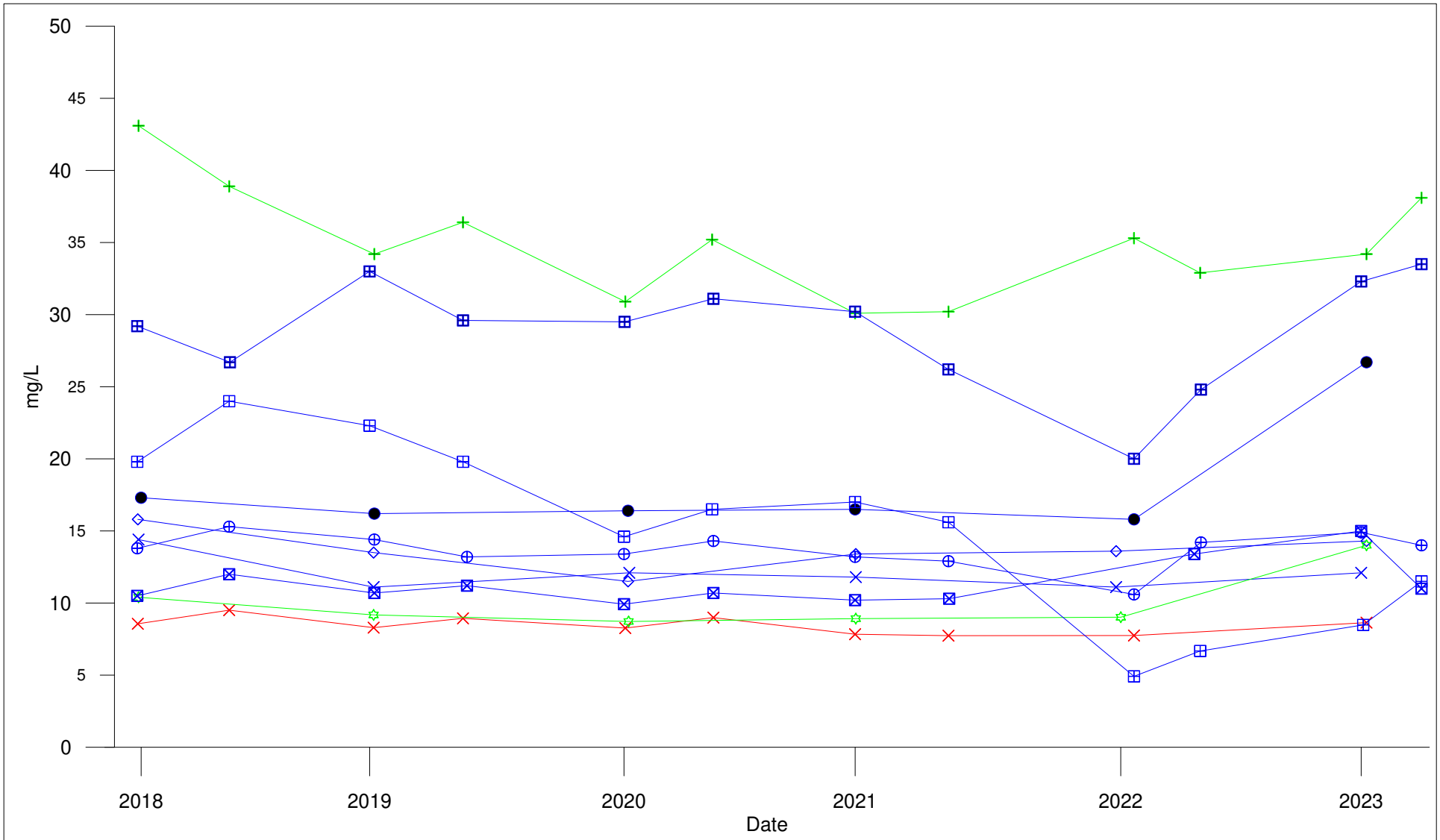
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Iron
Till Wells

APRIL 2024 | FIGURE 33 | REV 0



Up gradient
6N60EER

Down gradient
5N62E
6N67F

Cross gradient
13A
14A

Cross gradient
15A
16A
4N34DDR
6N57F
6N63F

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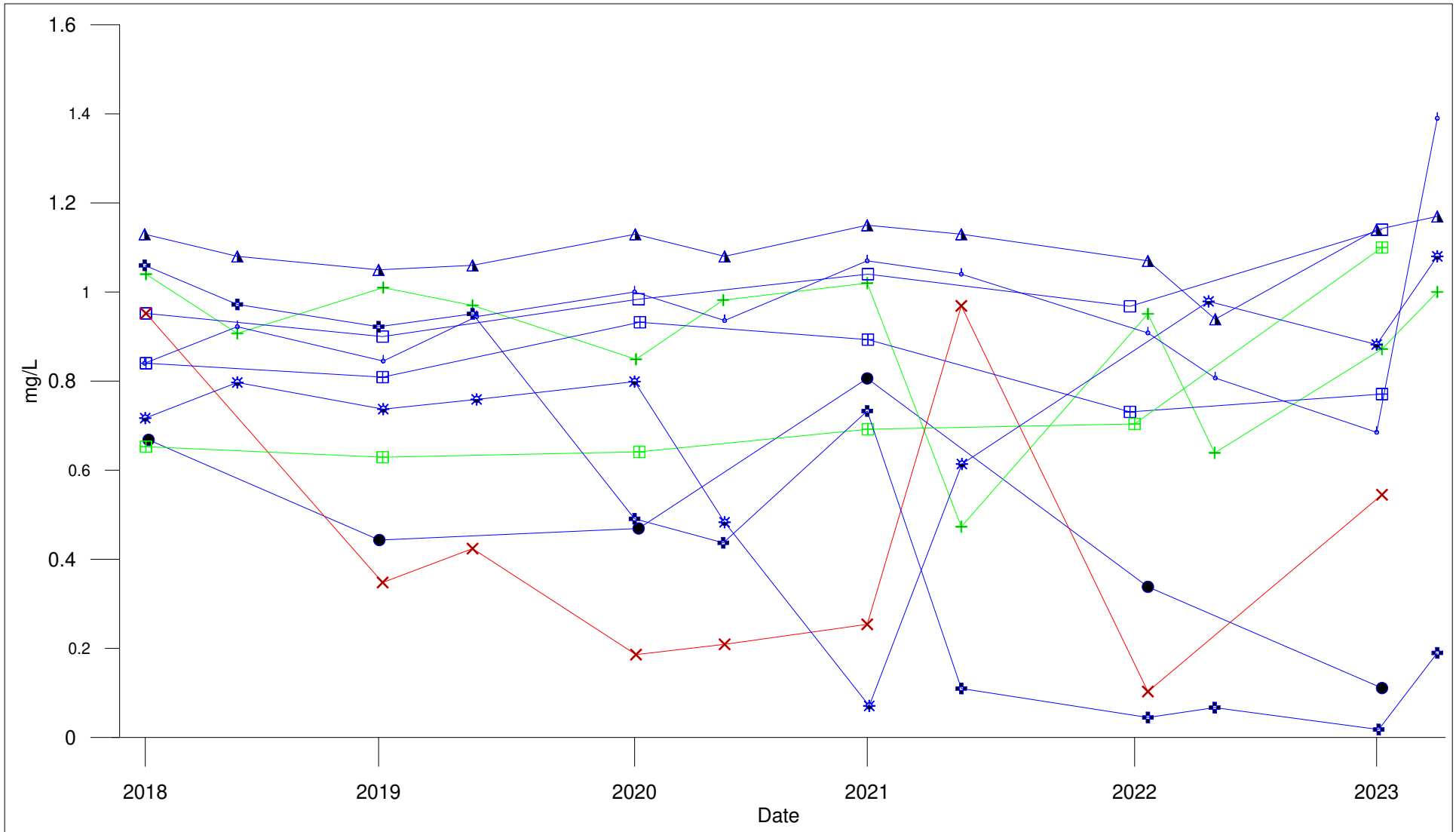
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Potassium
Till Wells

APRIL 2024 | FIGURE 34 | REV 0



Up gradient
6N60EER

Cross gradient
13A
14A

Down gradient
5N62E
6N67F

Cross gradient
15A
16A
4N34DDR
6N57F
6N63F

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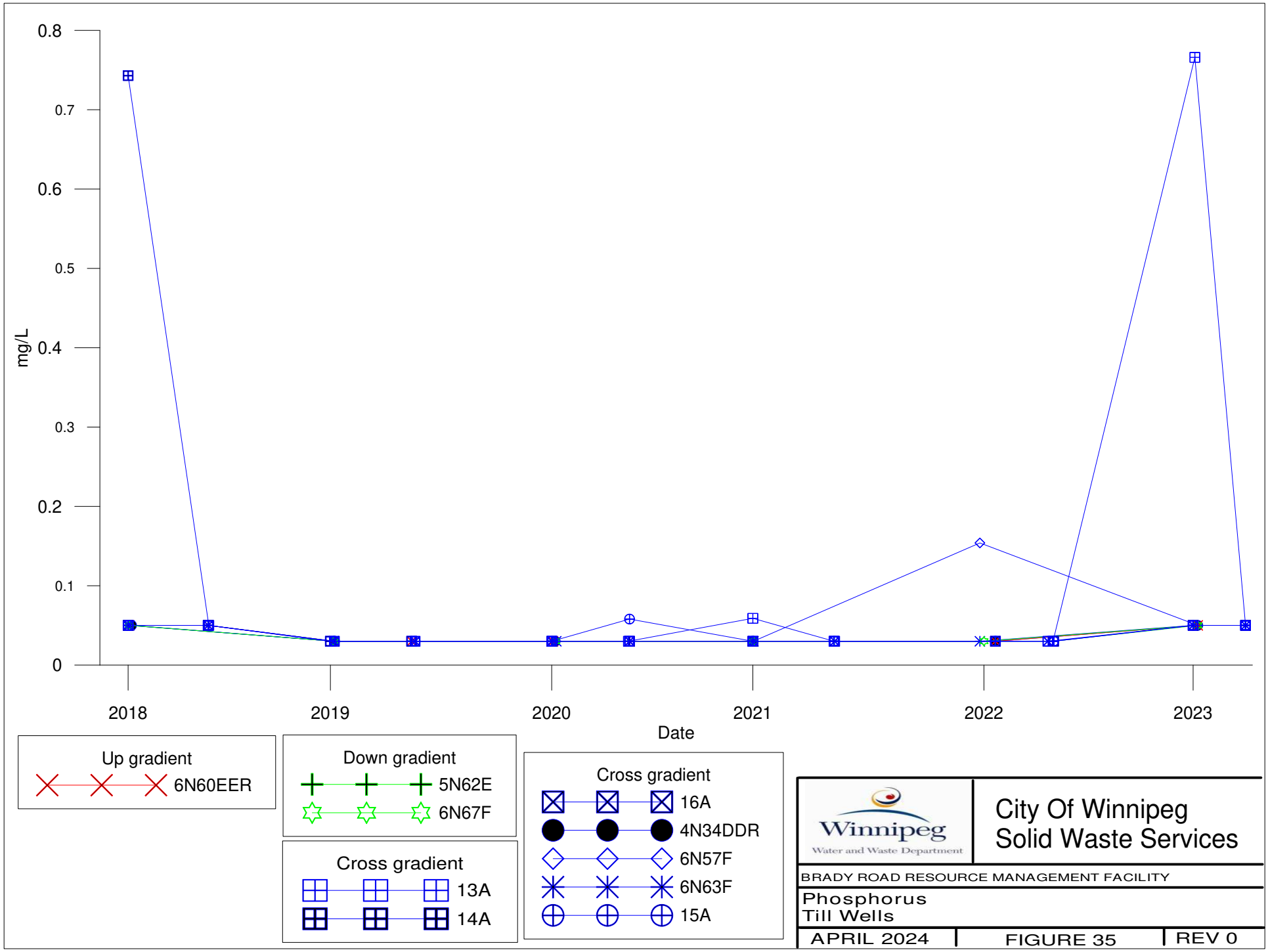
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Total Ammonia
Till Wells

APRIL 2024 | FIGURE 37 | REV 0



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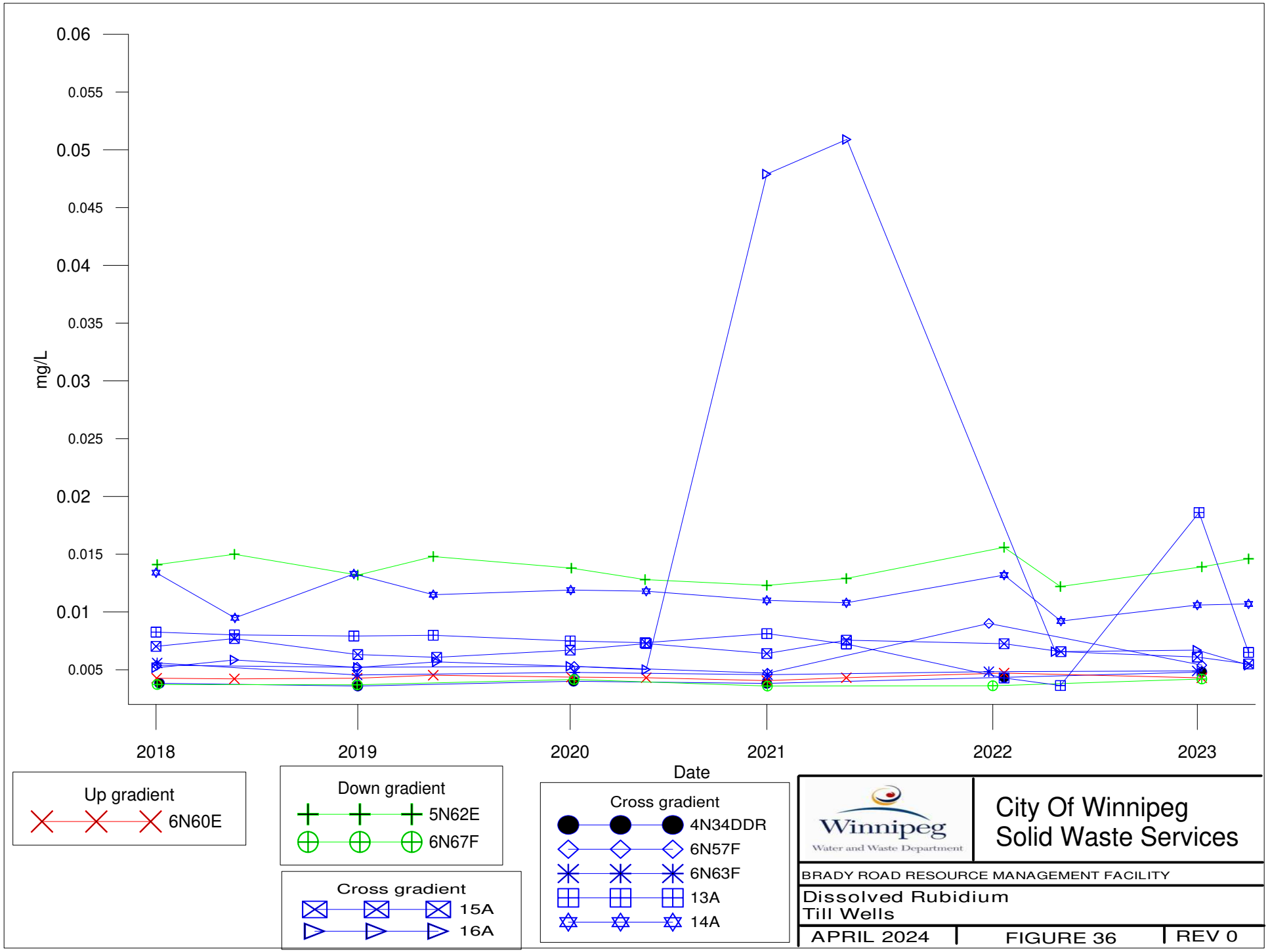
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Phosphorus
Till Wells

APRIL 2024 | FIGURE 35 | REV 0



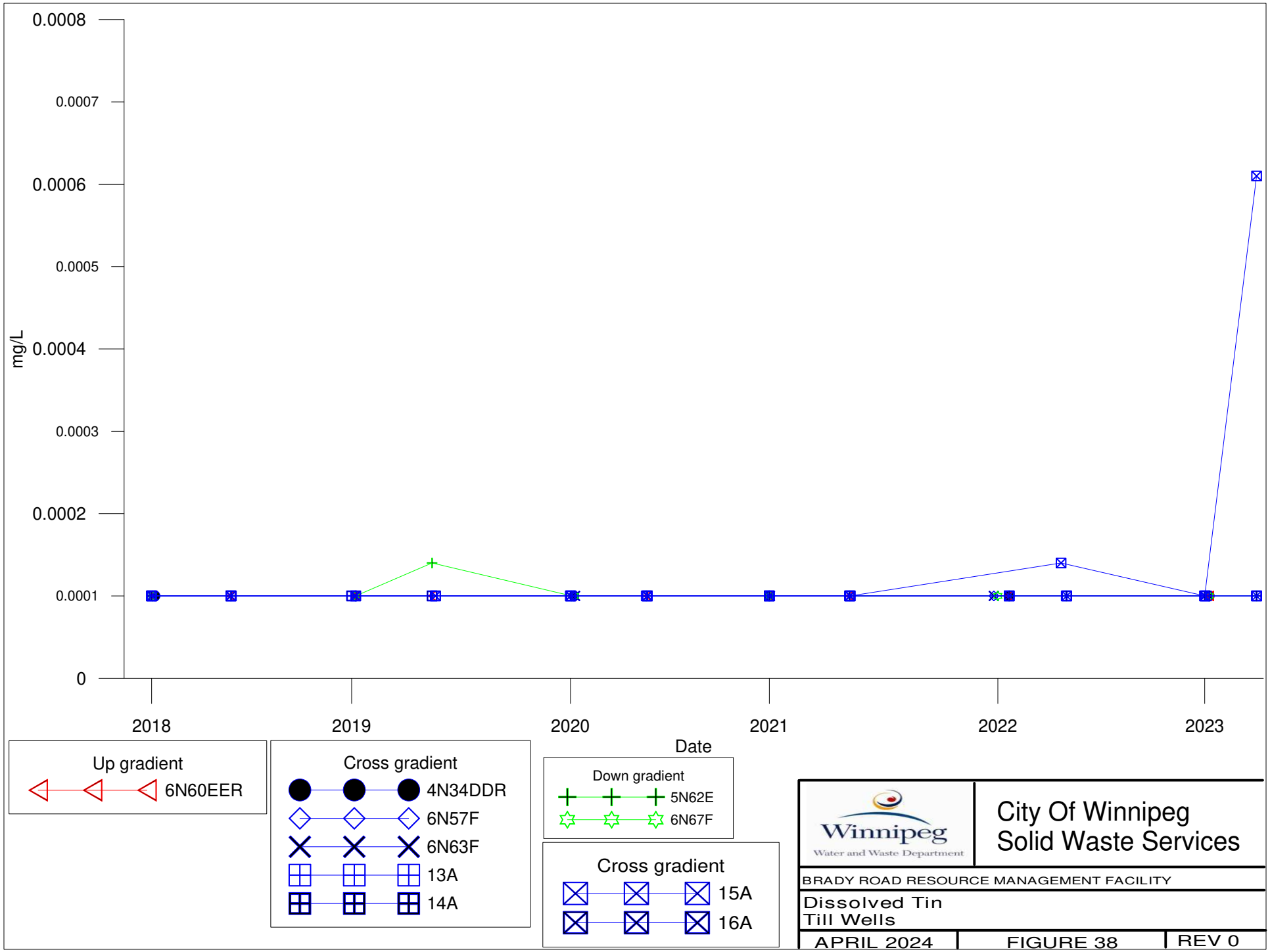
Winnipeg
Water and Waste Department

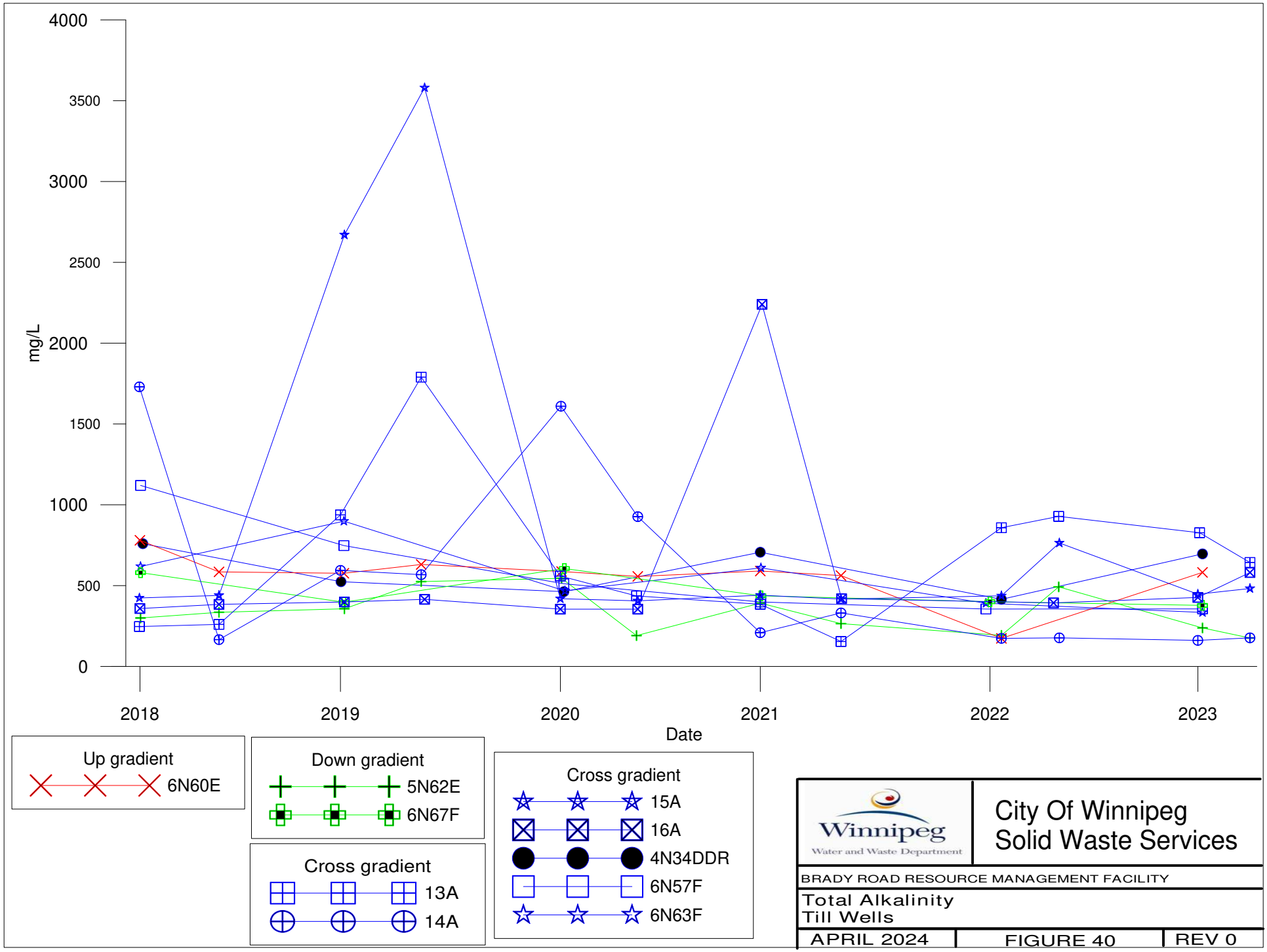
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Rubidium
Till Wells

APRIL 2024 | FIGURE 36 | REV 0


0.0008
0.0007
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
0
mg/L
2018
2019
2020
2021
2022
2023
Date
Up gradient
6N60EER
Cross gradient
4N34DDR
6N57F
6N63F
13A
14A
Down gradient
5N62E
6N67F
Cross gradient
15A
16A
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Tin
Till Wells
APRIL 2024
FIGURE 38
REV 0



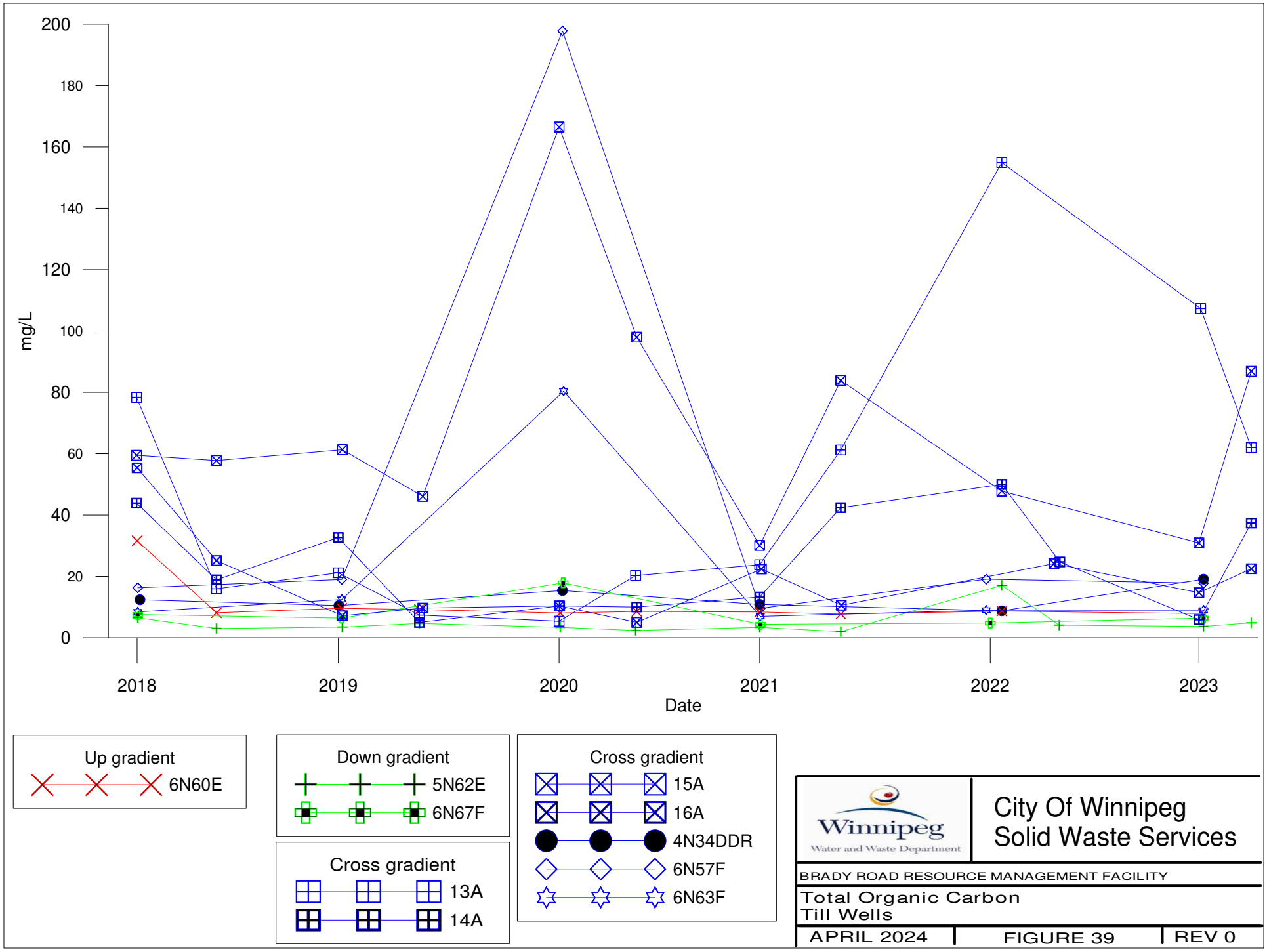
Winnipeg
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Total Alkalinity
Till Wells

APRIL 2024	FIGURE 40	REV 0



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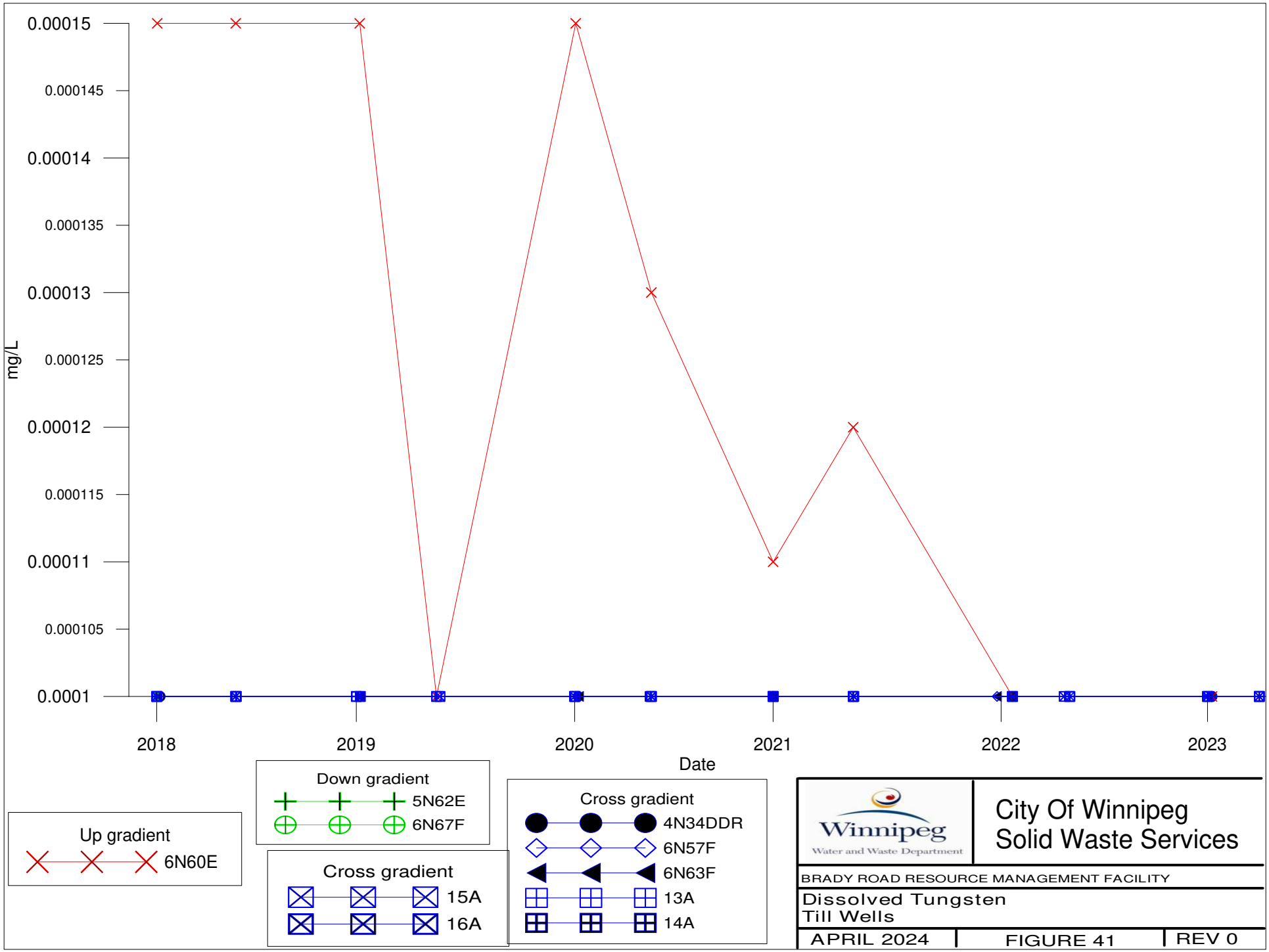
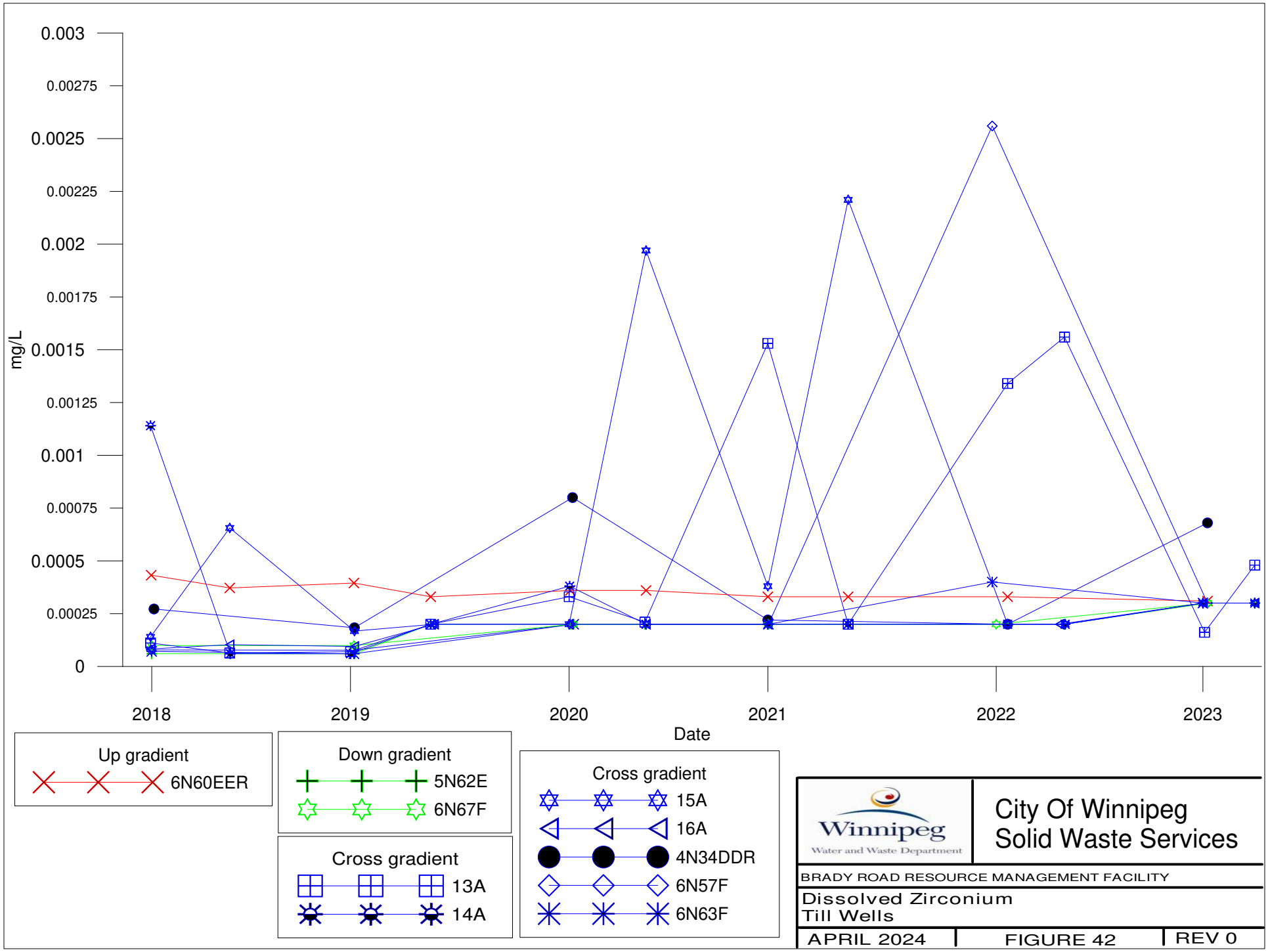
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Total Organic Carbon
Till Wells

APRIL 2024 | FIGURE 39 | REV 0


0.00015
0.000145
0.00014
0.000135
0.00013
0.000125
0.00012
0.000115
0.00011
0.000105
0.0001
mg/L
2018
2019
2020
2021
2022
2023
Date
Up gradient
6N60E
Down gradient
5N62E
6N67F
Cross gradient
15A
16A
Cross gradient
4N34DDR
6N57F
6N63F
13A
14A
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Tungsten
Till Wells
APRIL 2024
FIGURE 41
REV 0



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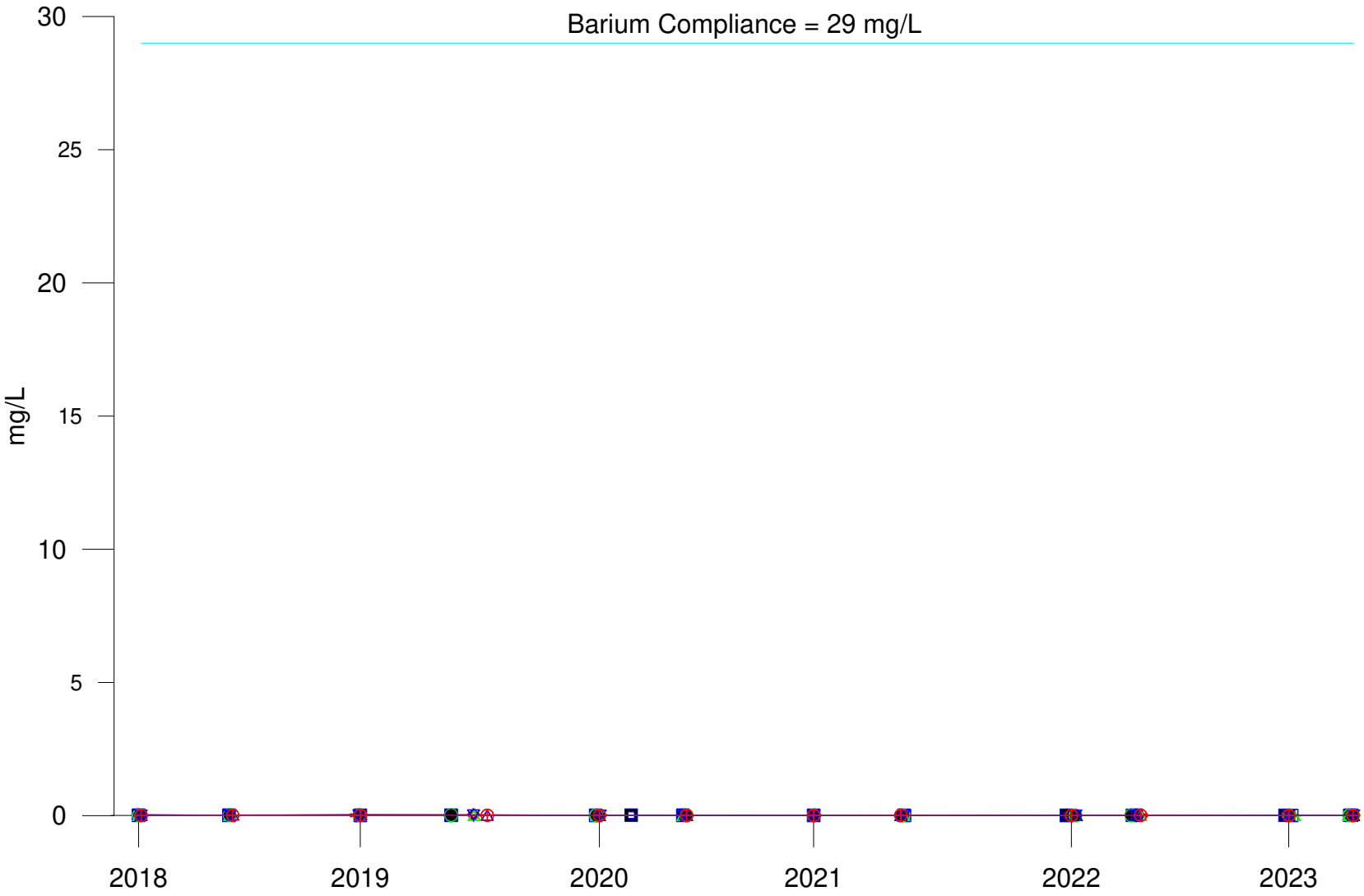
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Zirconium
Till Wells

APRIL 2024 | FIGURE 42 | REV 0



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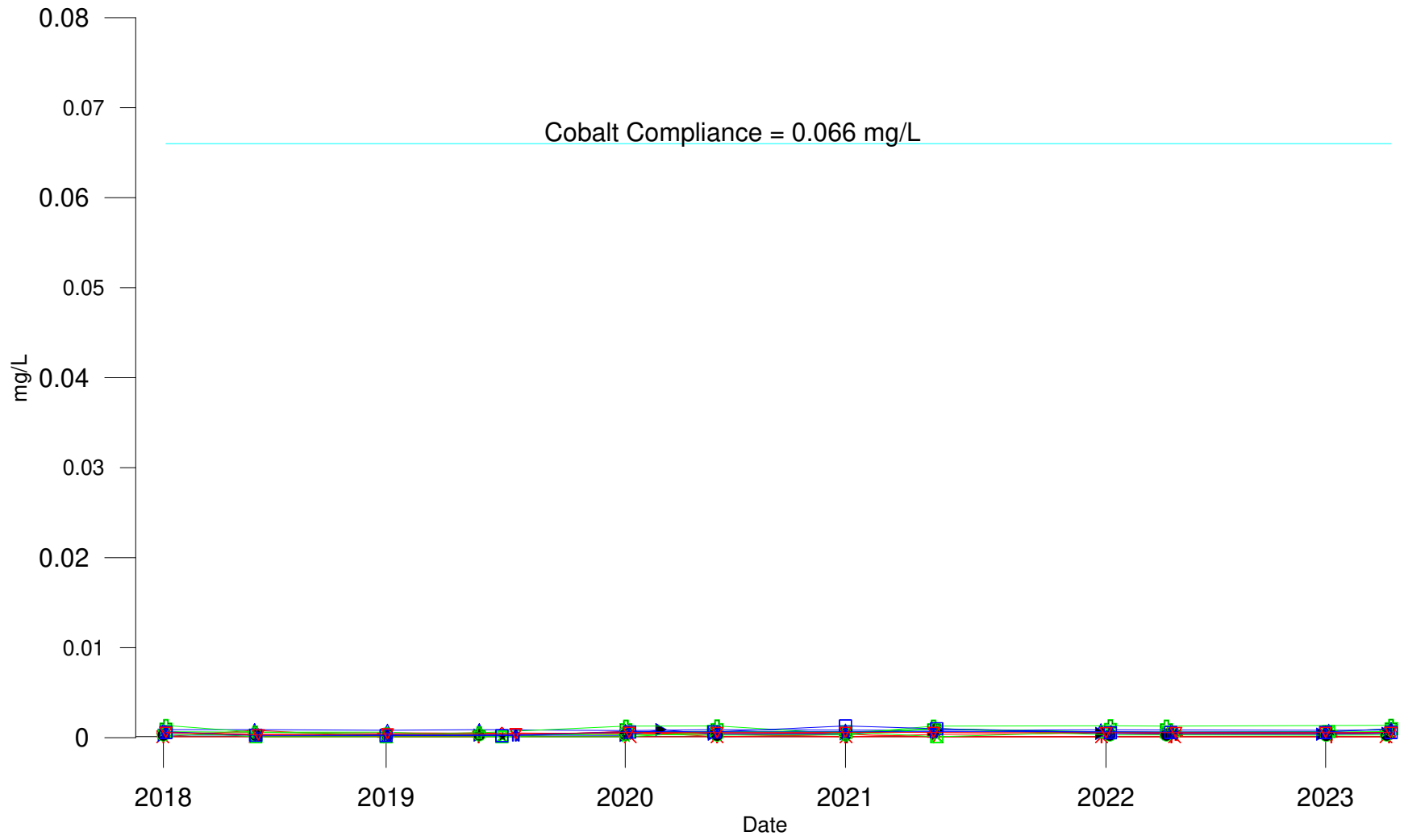
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Barium Concentration
Bedrock Wells

APRIL 2024	FIGURE 2	REV 0



Cross gradient
W9
W10
W14
W15

Up gradient
W4
W5
W6
W7
W16

Down gradient
W8
W11
W12
W13

MOE Cobalt Criteria = 0.066 mg/L

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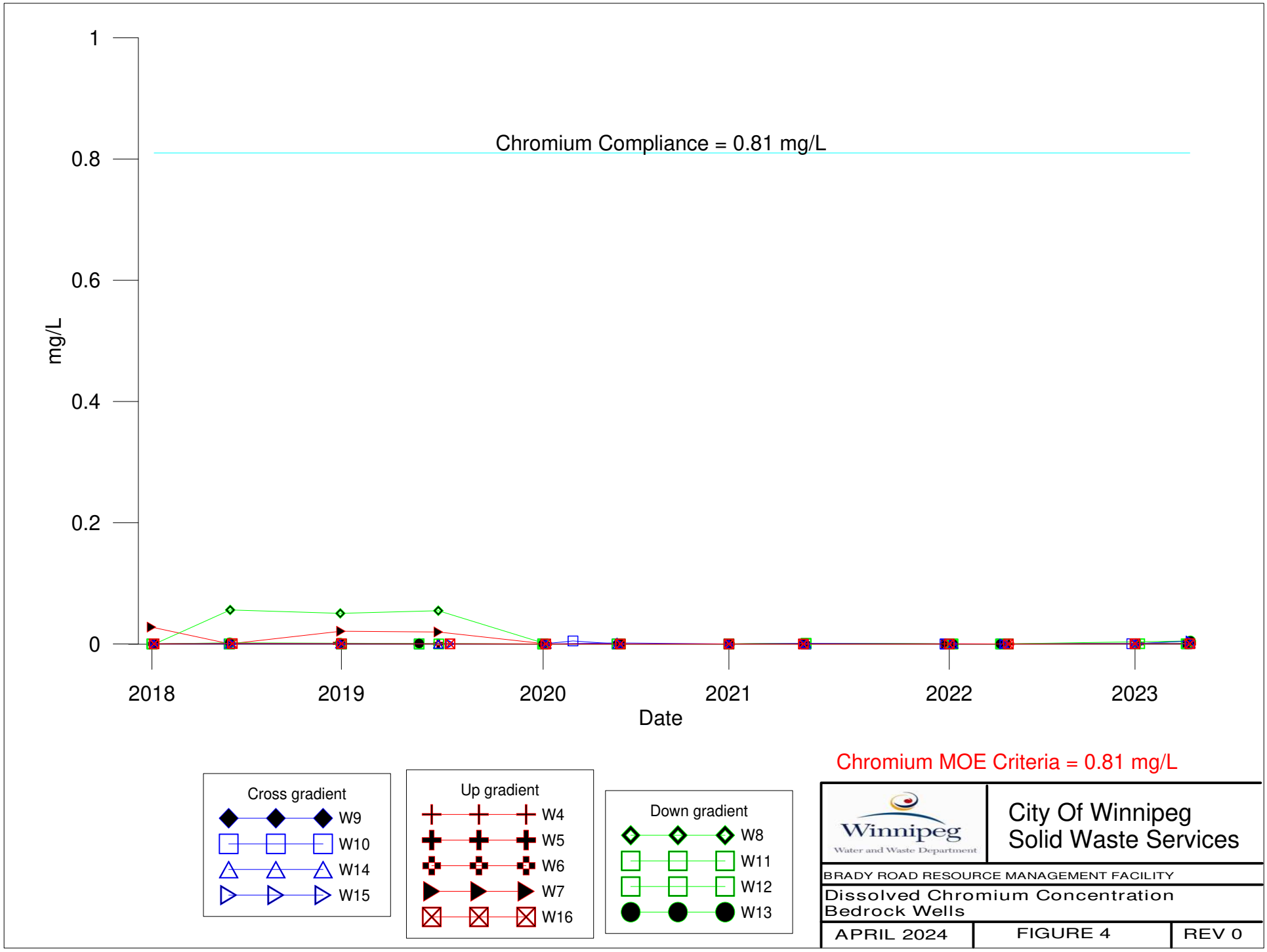
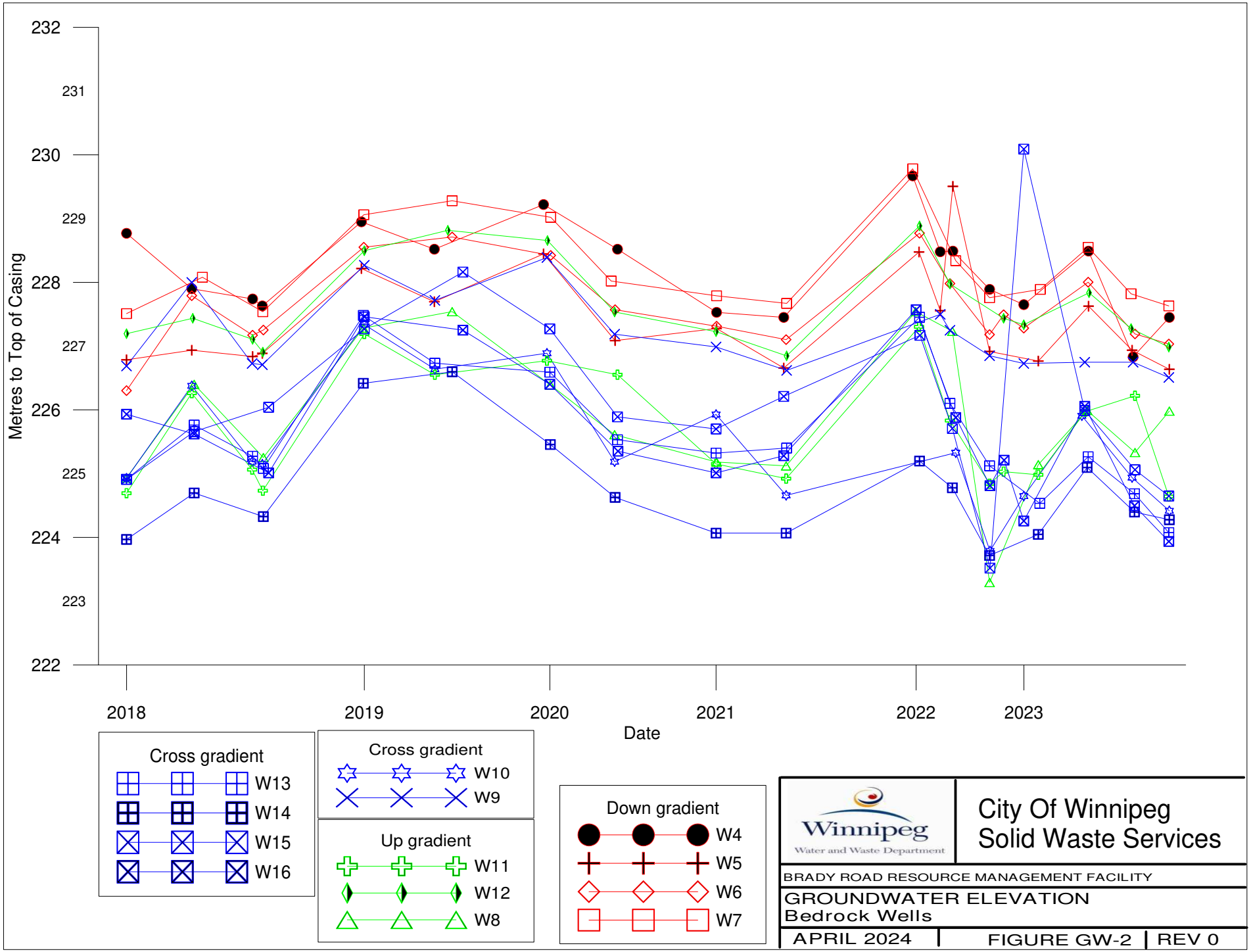
City Of Winnipeg
Solid Waste Services

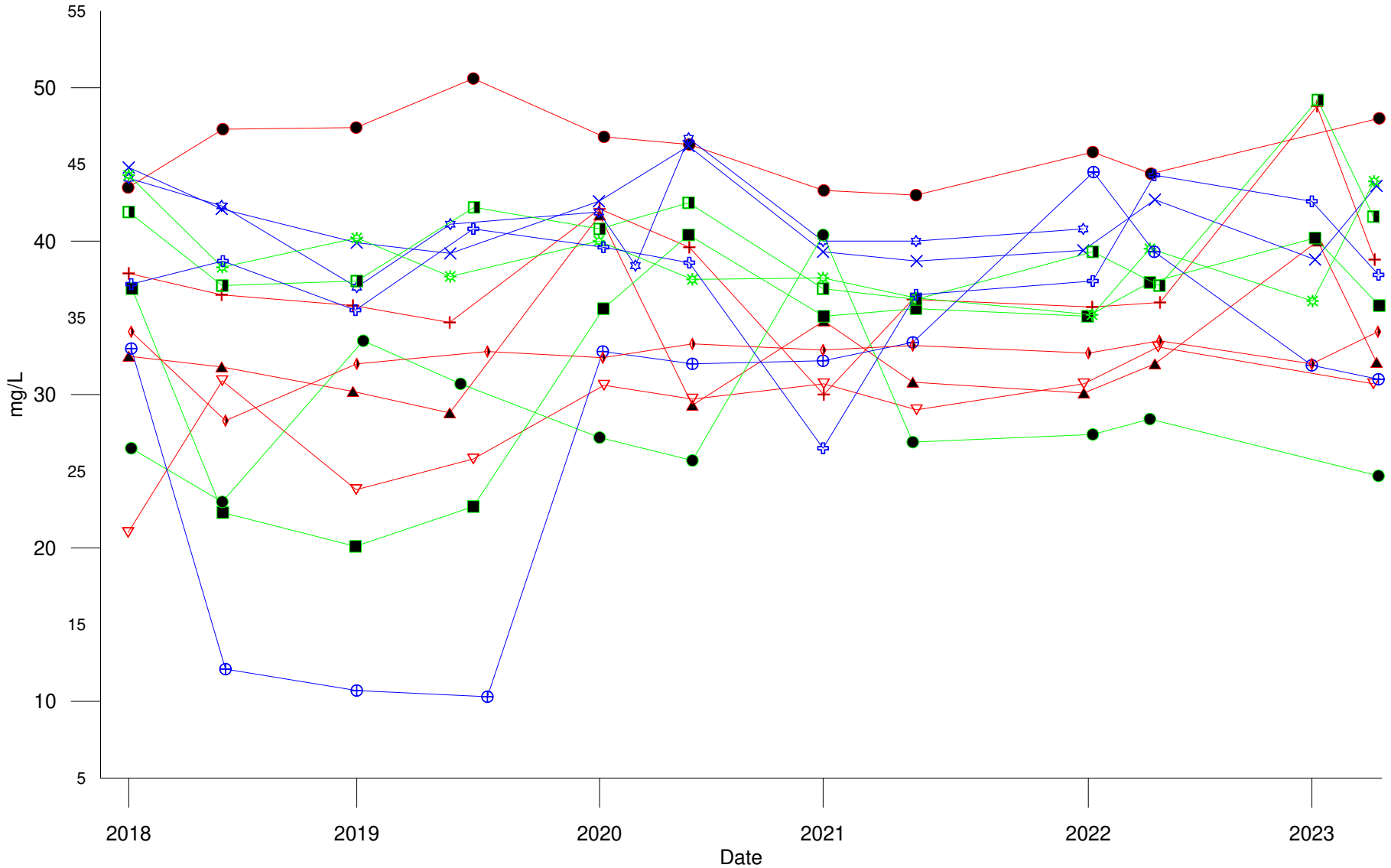
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Cobalt Concentration
Bedrock Wells

APRIL 2024	FIGURE 3	REV 0


1
0.8
0.6
0.4
0.2
0
mg/L
Chromium Compliance = 0.81 mg/L
2018
2019
2020
2021
2022
2023
Date
Chromium MOE Criteria = 0.81 mg/L
Cross gradient
W9
W10
W14
W15
Up gradient
W4
W5
W6
W7
W16
Down gradient
W8
W11
W12
W13
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Chromium Concentration
Bedrock Wells
APRIL 2024
FIGURE 4
REV 0


232
231
230
229
228
227
226
225
224
223
222
Metres to Top of Casing
2018
2019
2020
2021
2022
2023
Date
Cross gradient
W13
W14
W15
W16
Cross gradient
W10
W9
Up gradient
W11
W12
W8
Down gradient
W4
W5
W6
W7
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
GROUNDWATER ELEVATION
Bedrock Wells
APRIL 2024
FIGURE GW-2
REV 0



Cross gradient
W9
W10
W14
W15

Up gradient
W4
W5
W6
W7
W16

Down gradient
W8
W11
W12
W13

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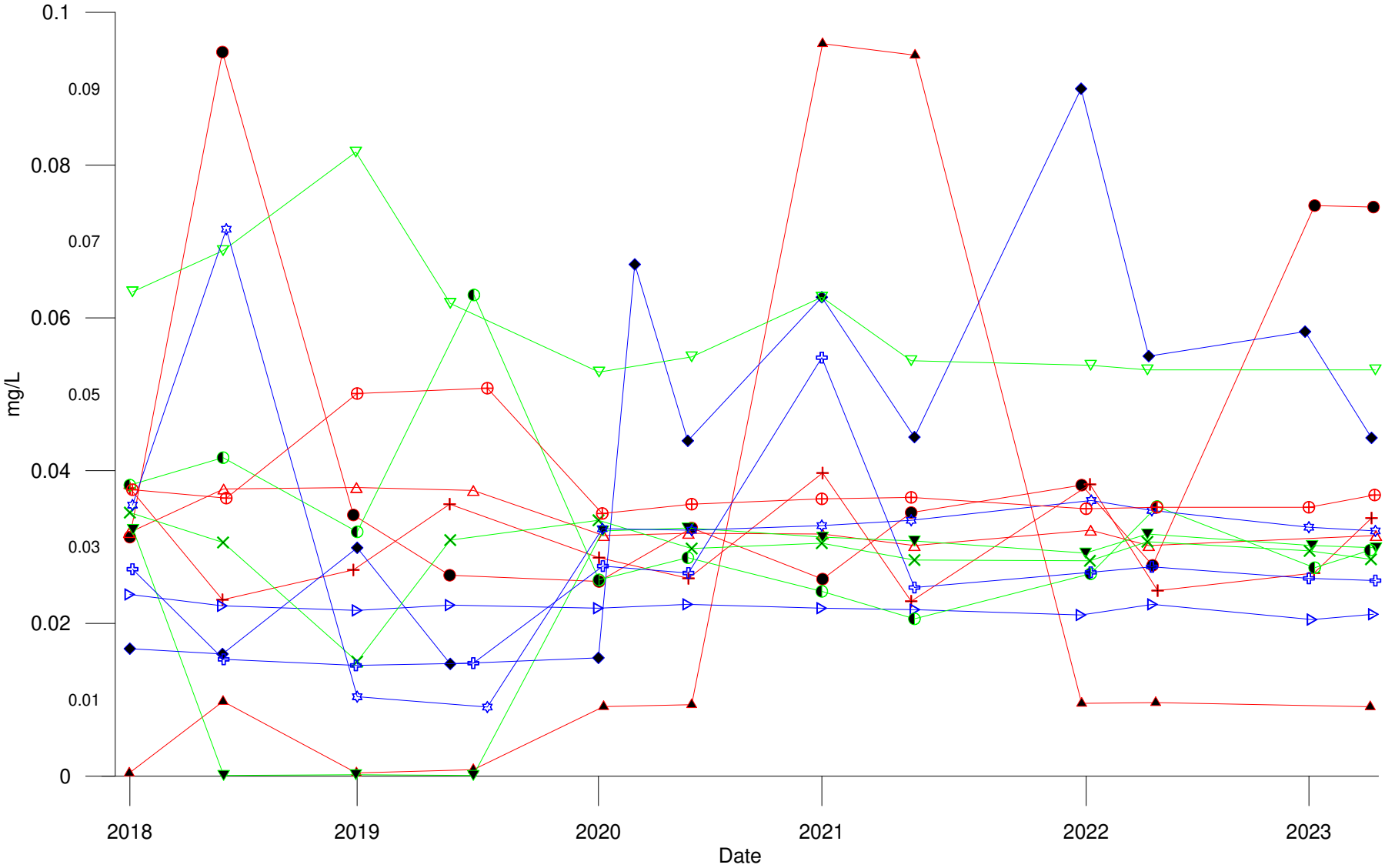
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Potassium Concentration
Bedrock Wells

APRIL 2024	FIGURE 5	REV 0



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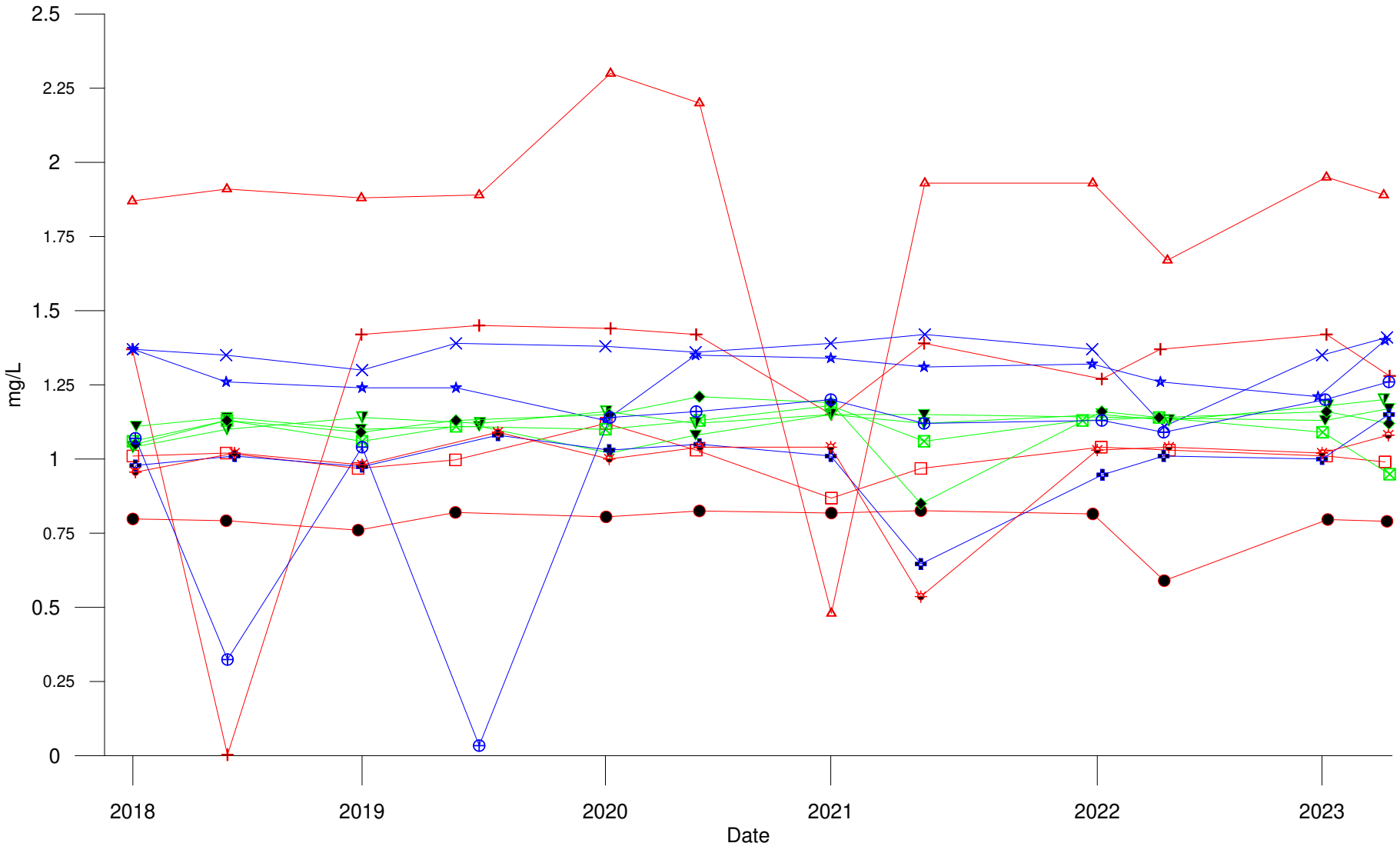
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Manganese Concentration
Bedrock Wells

APRIL 2024	FIGURE 7	REV 0



Cross gradient
W9
W10
W14
W15

Up gradient
W4
W5
W6
W7
W16

Down gradient
W8
W11
W12
W13

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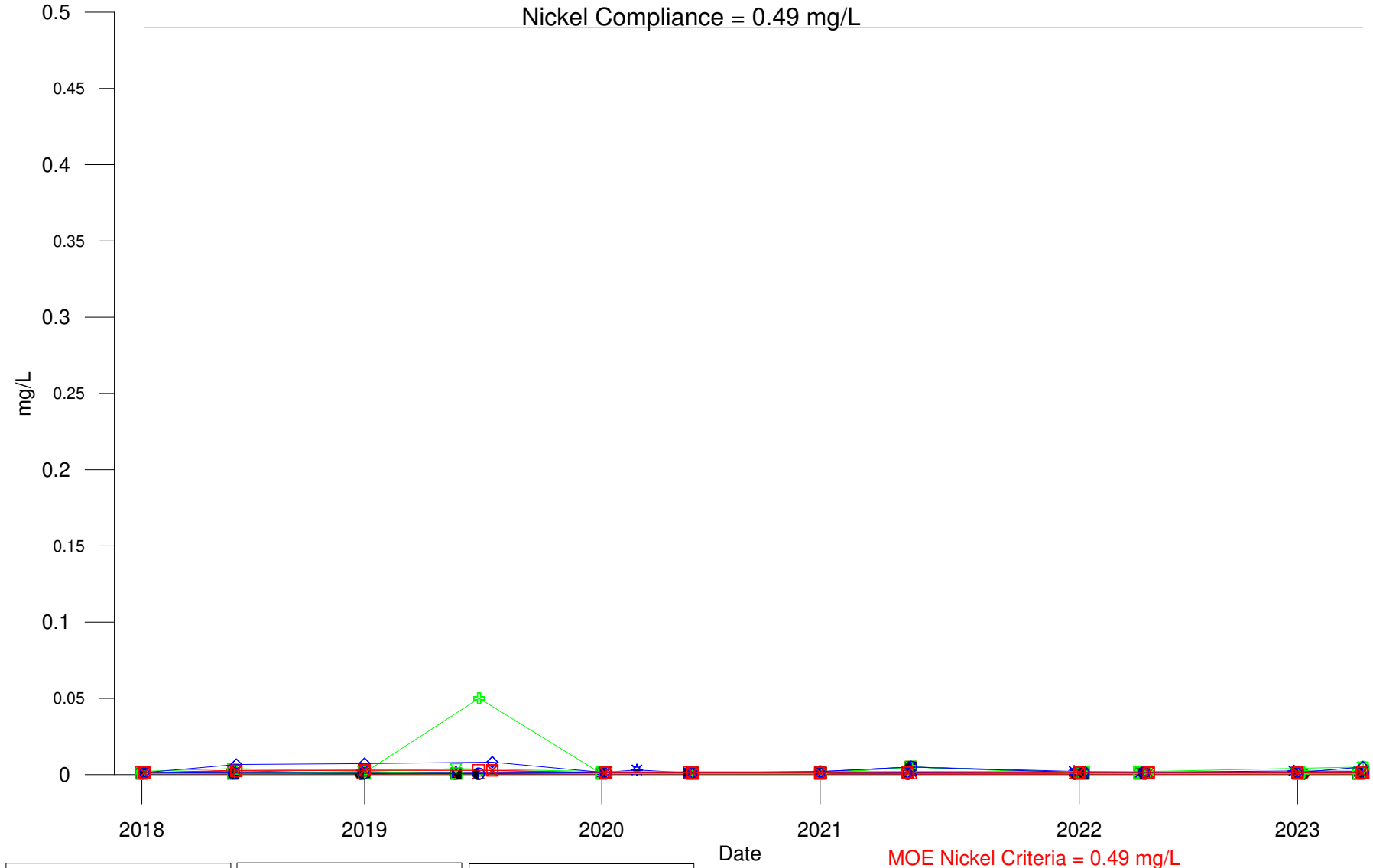
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Ammonia Concentration
Bedrock Wells

APRIL 2024 | FIGURE 8 | REV 0



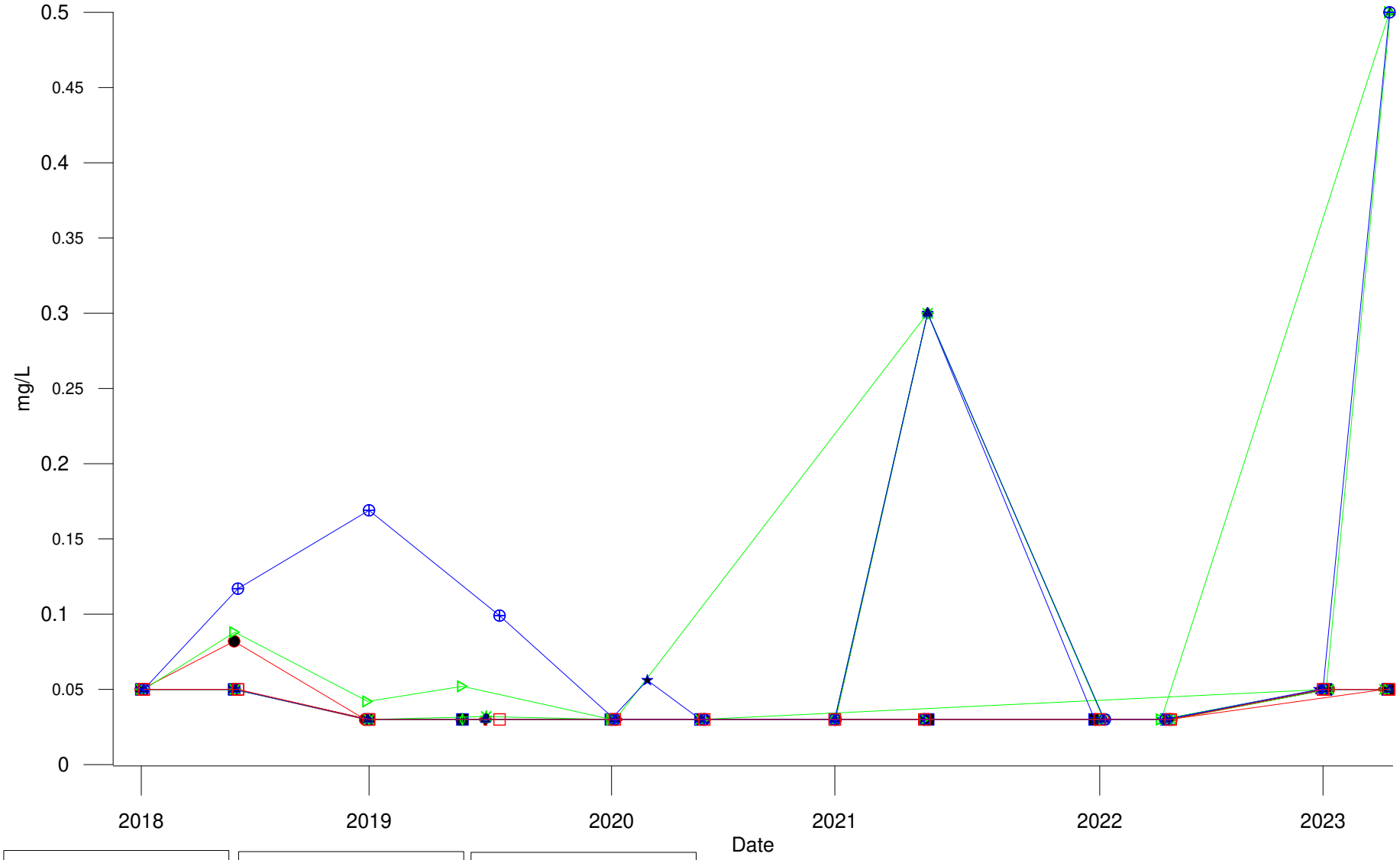
Winnipeg
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Nickel Concentration
Bedrock Wells

APRIL 2024	FIGURE 9	REV 0



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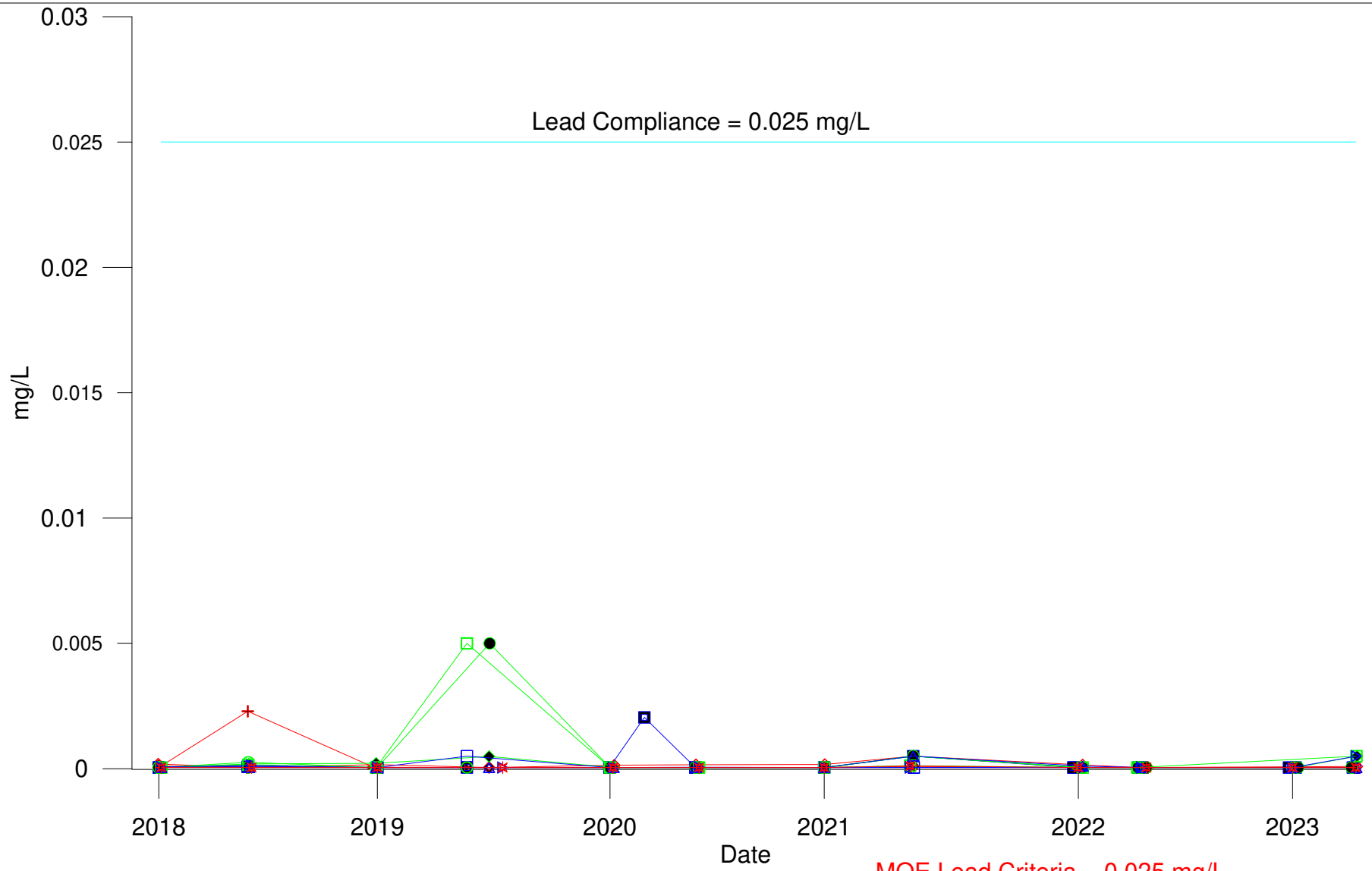
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Phosphorus Concentration
Bedrock Wells

APRIL 2024	FIGURE 10	REV 0



MOE Lead Criteria = 0.025 mg/L

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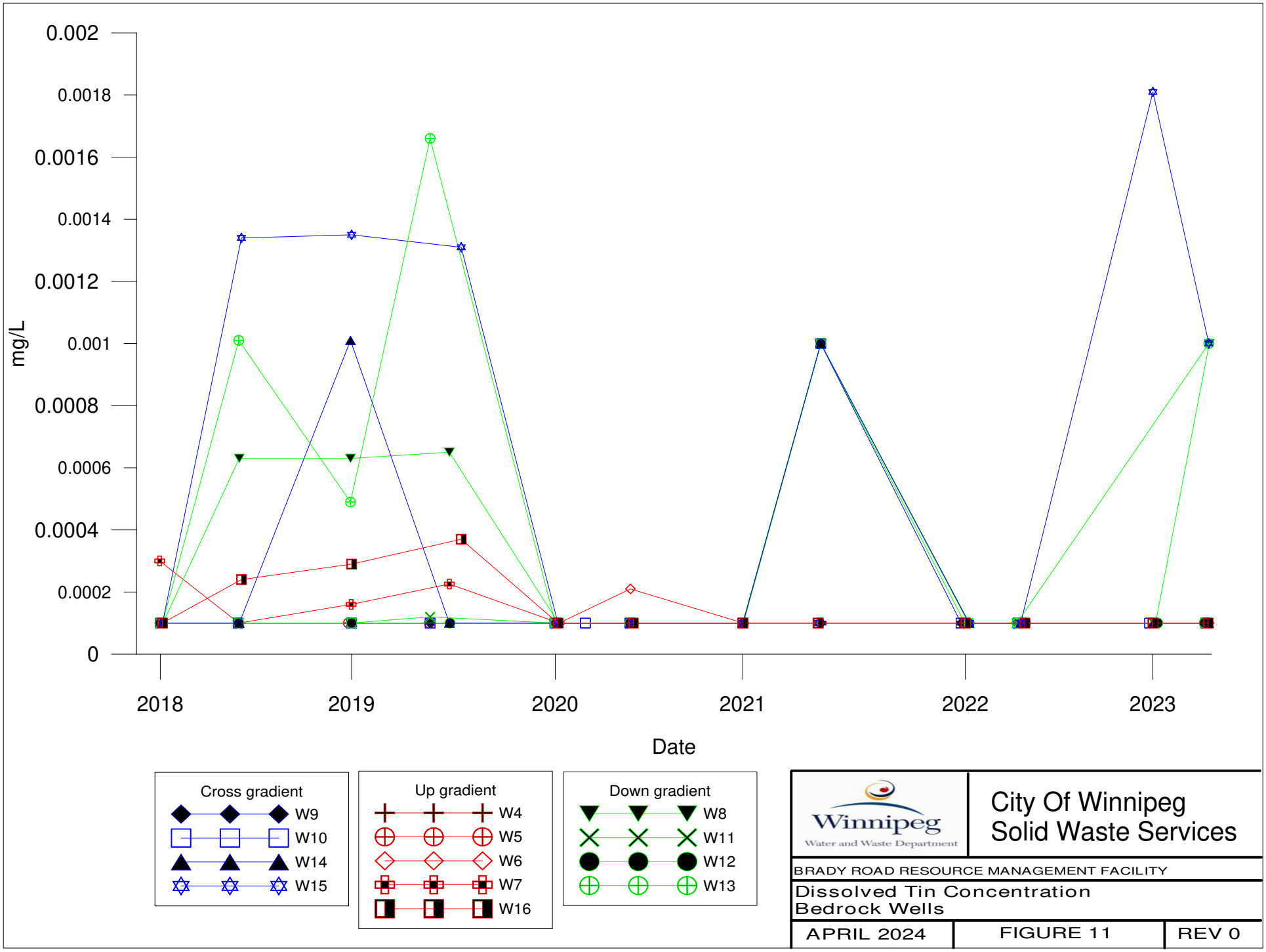
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Lead Concentration
Bedrock Wells

APRIL 2024 | FIGURE 6 | REV 0



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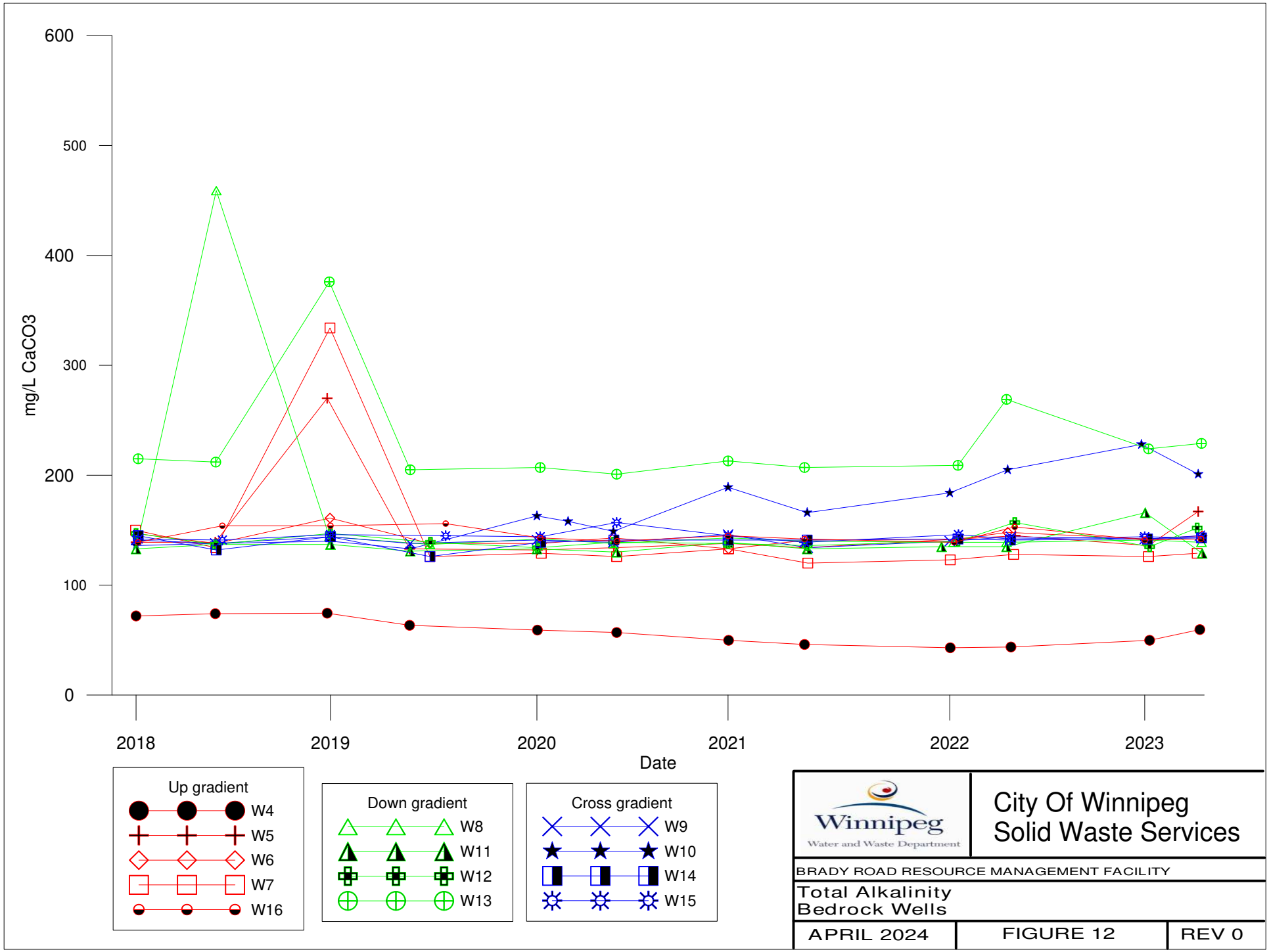
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Tin Concentration
Bedrock Wells

APRIL 2024	FIGURE 11	REV 0



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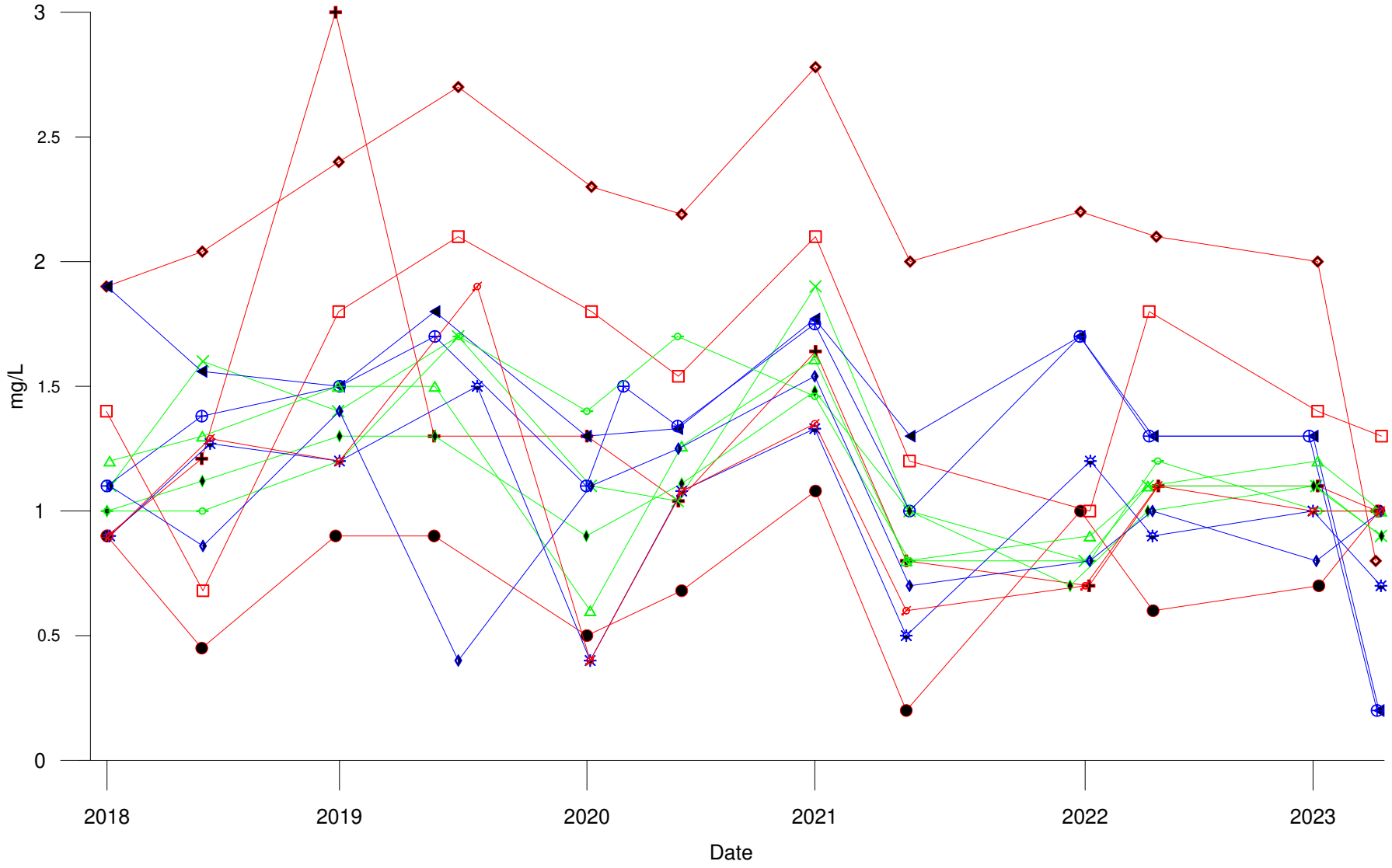
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Total Alkalinity
Bedrock Wells

APRIL 2024	FIGURE 12	REV 0



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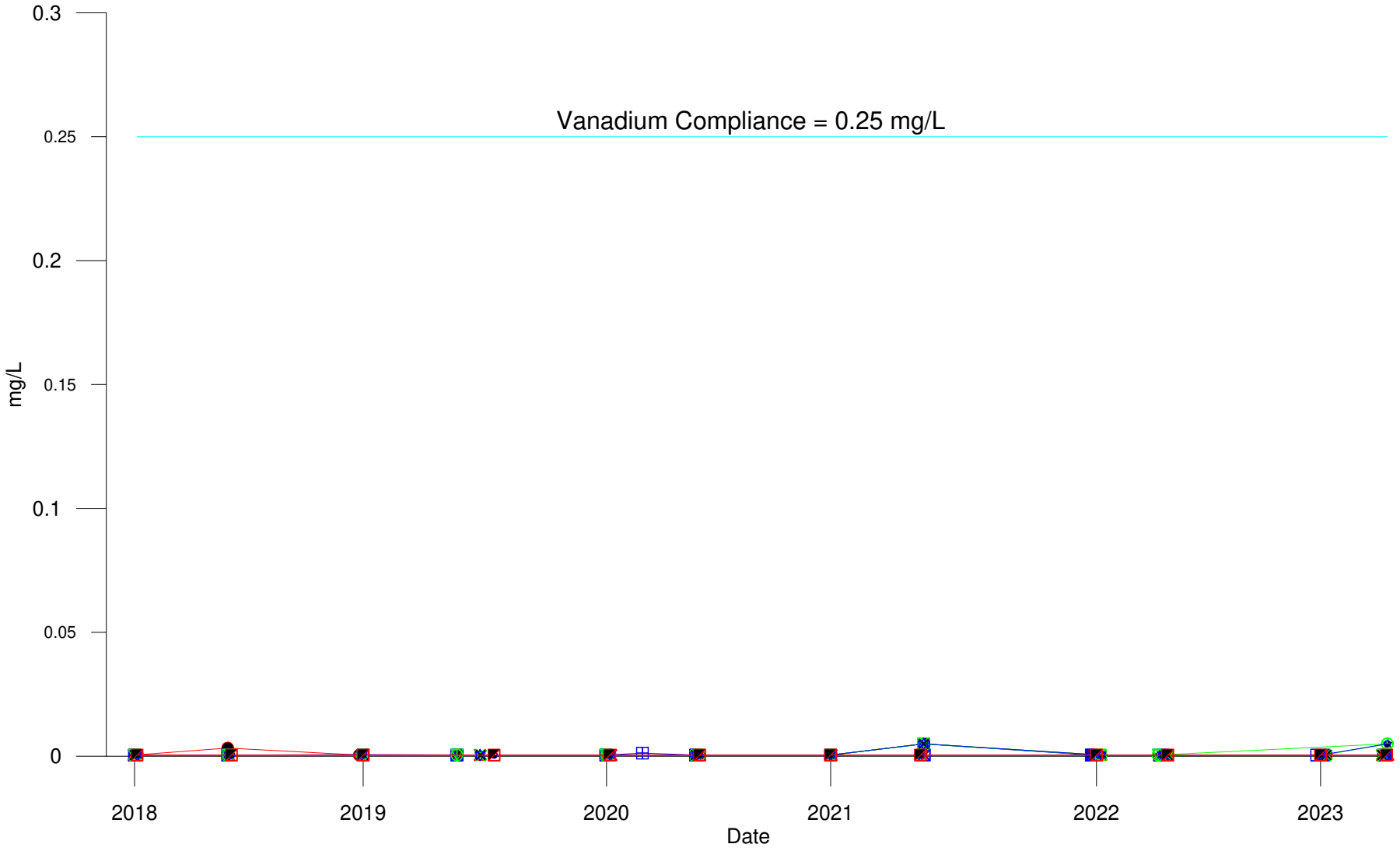
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

TKN Concentration
Bedrock Wells

APRIL 2024	FIGURE 12	REV 0



Cross gradient
W9
W10
W14
W15

Up gradient
W4
W5
W6
W7
W16

Down gradient
W8
W11
W12
W13

Vanadium MOE Criteria = 0.25 mg/L

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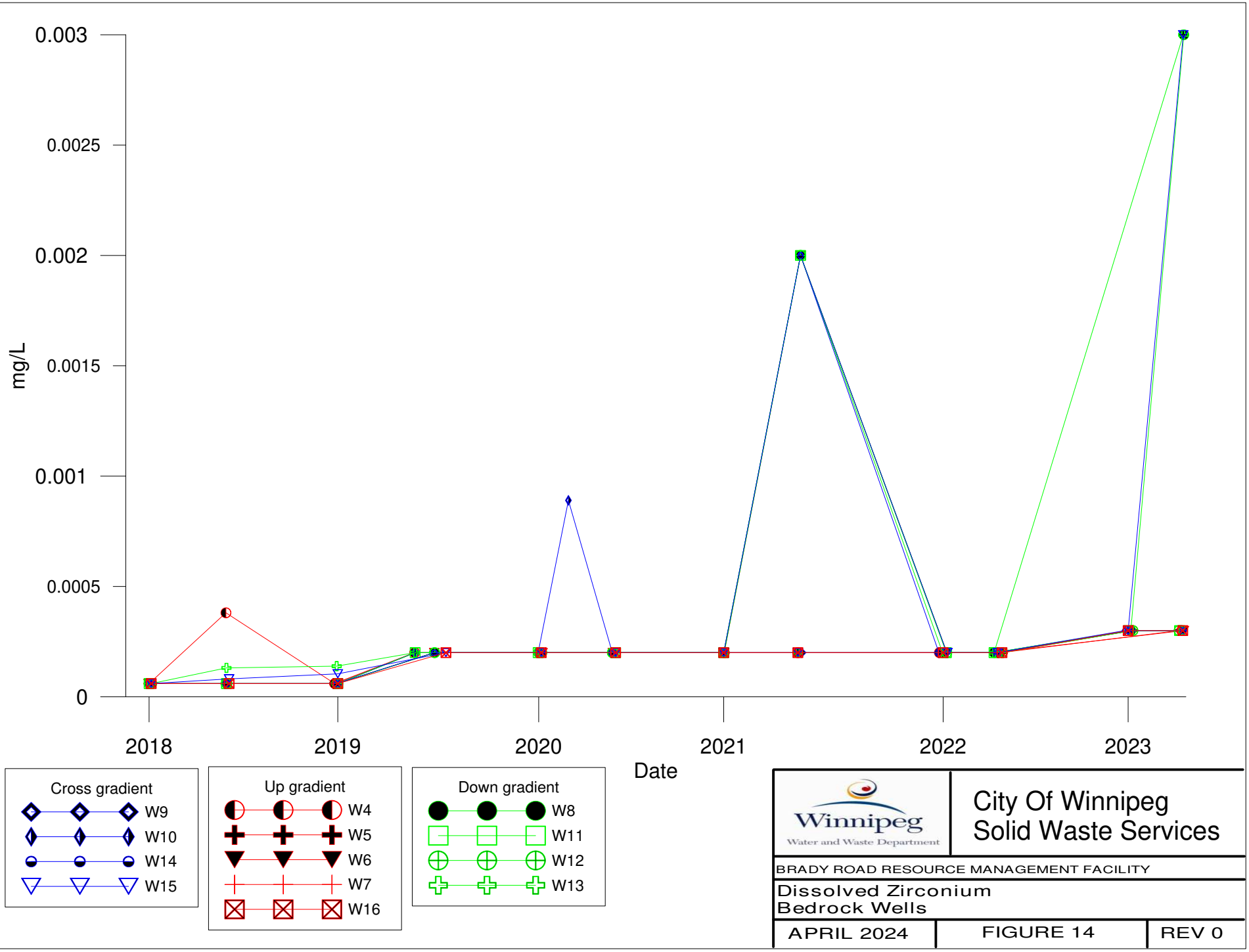
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Vanadium
Bedrock Wells

APRIL 2024 | FIGURE 13 | REV 0



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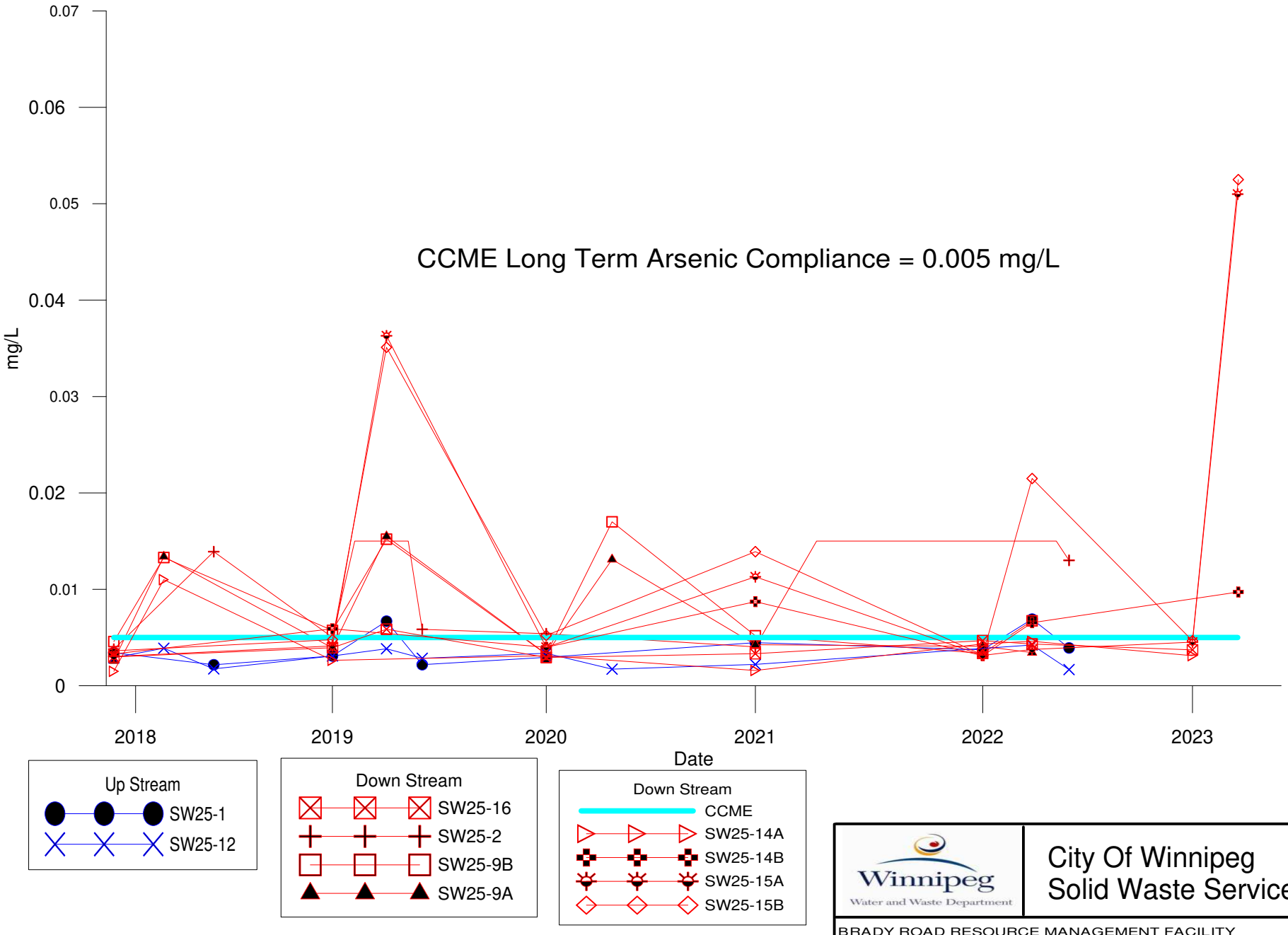
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Zirconium
Bedrock Wells

APRIL 2024	FIGURE 14	REV 0

2023 Surface Water
Time vs Concentration Graphs



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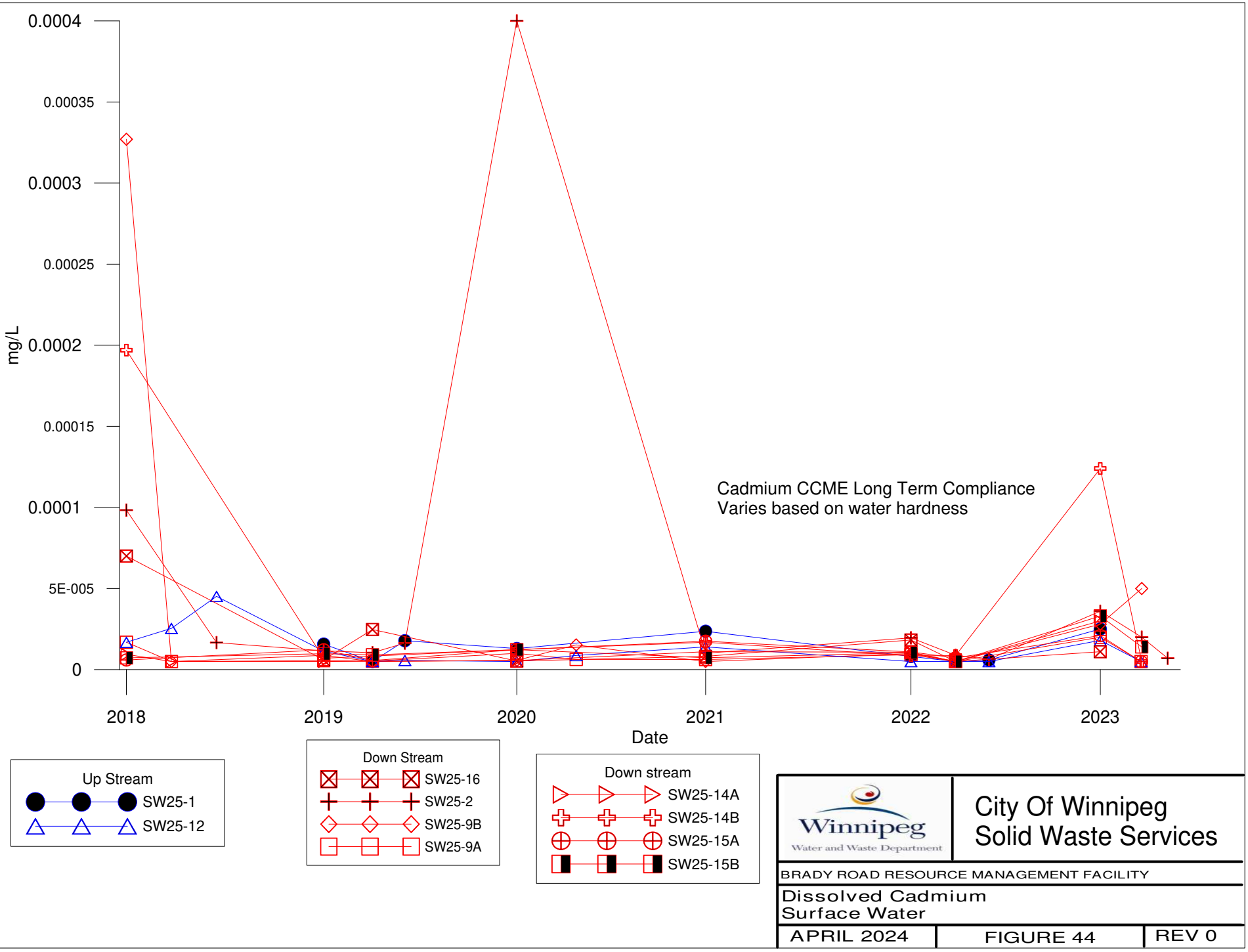
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Arsenic
Surface Water

APRIL 2024 | FIGURE 43 | REV 0



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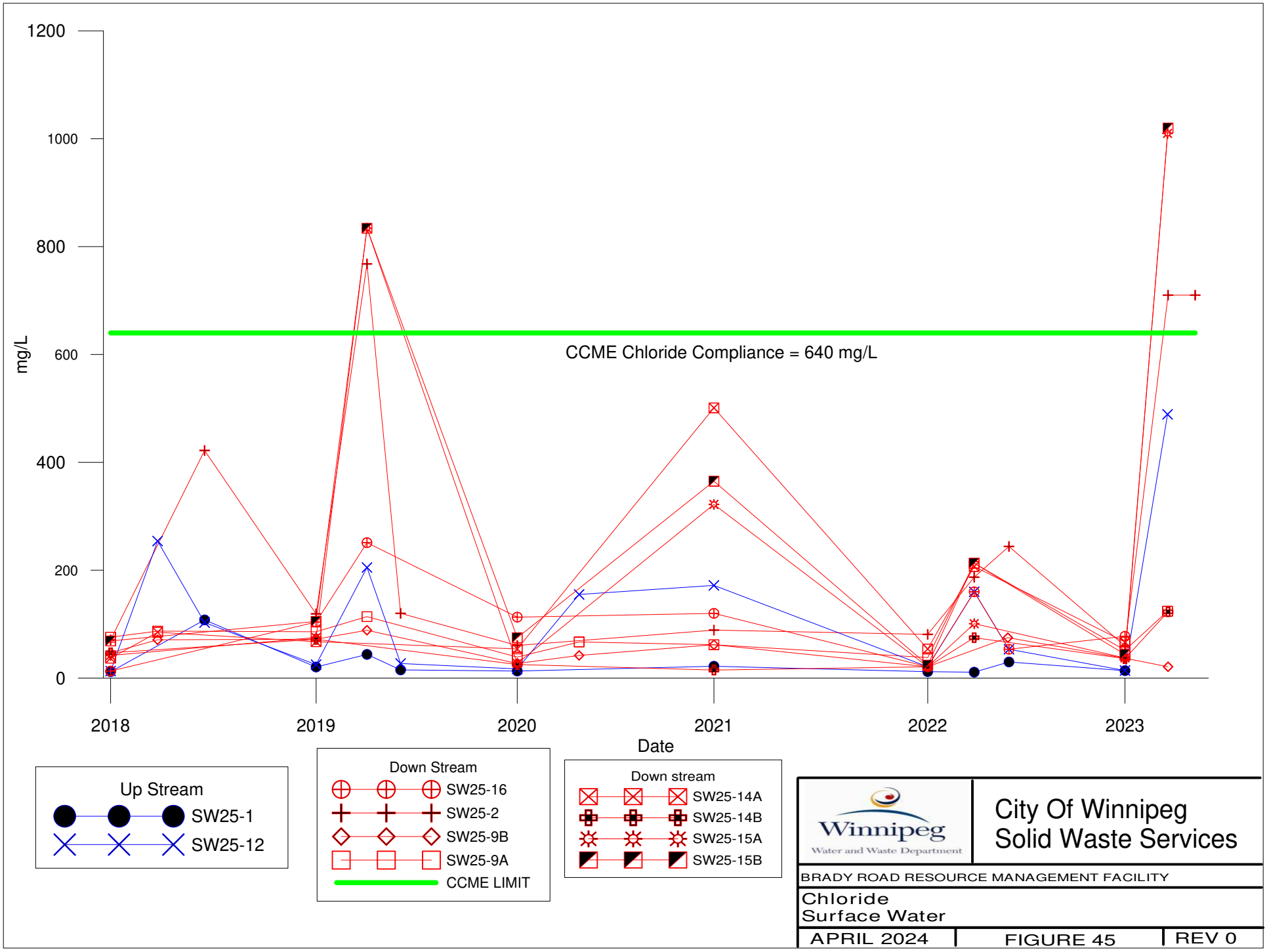
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Cadmium
Surface Water

APRIL 2024	FIGURE 44	REV 0



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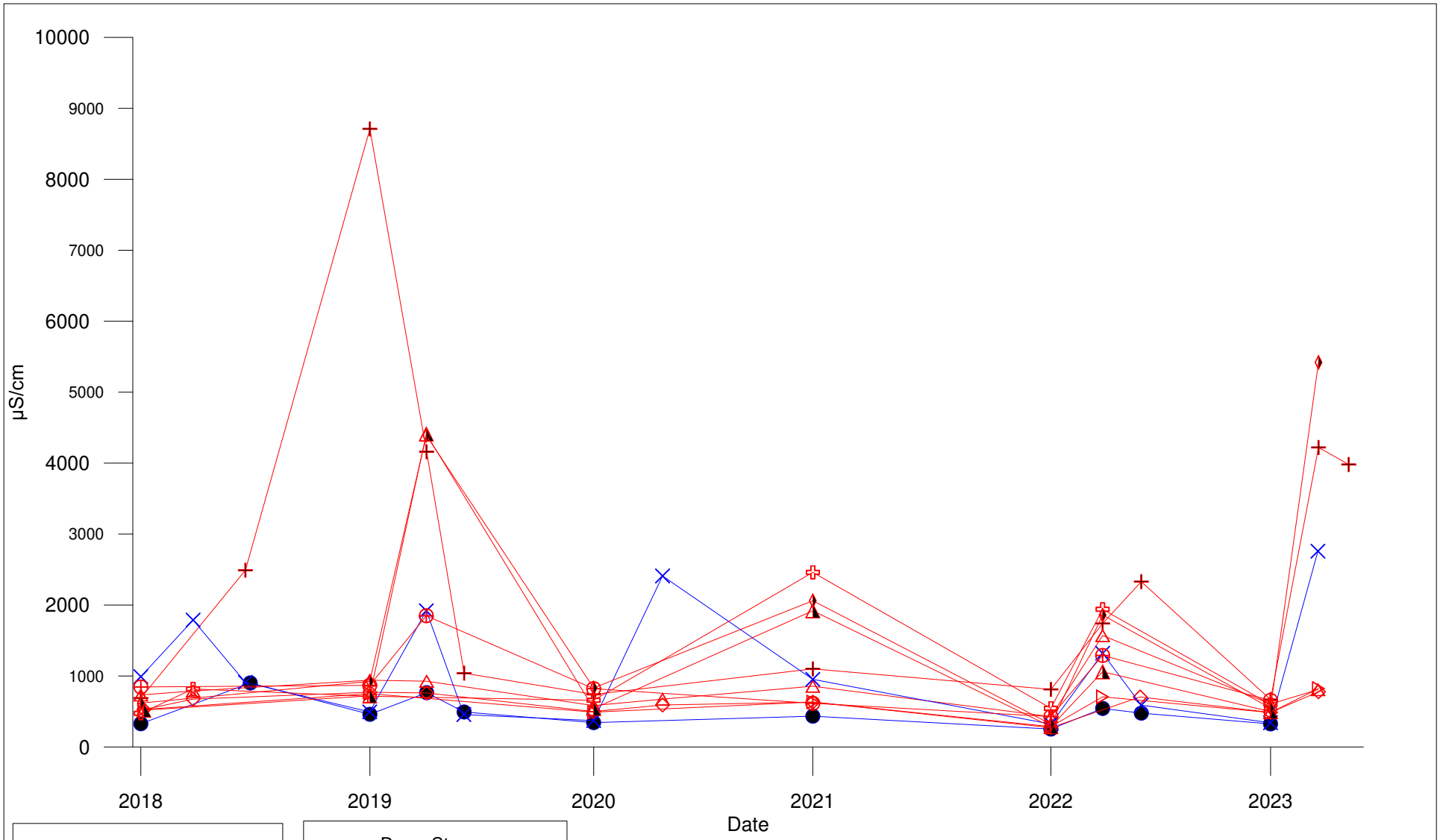
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Chloride
Surface Water

APRIL 2024 | FIGURE 45 | REV 0



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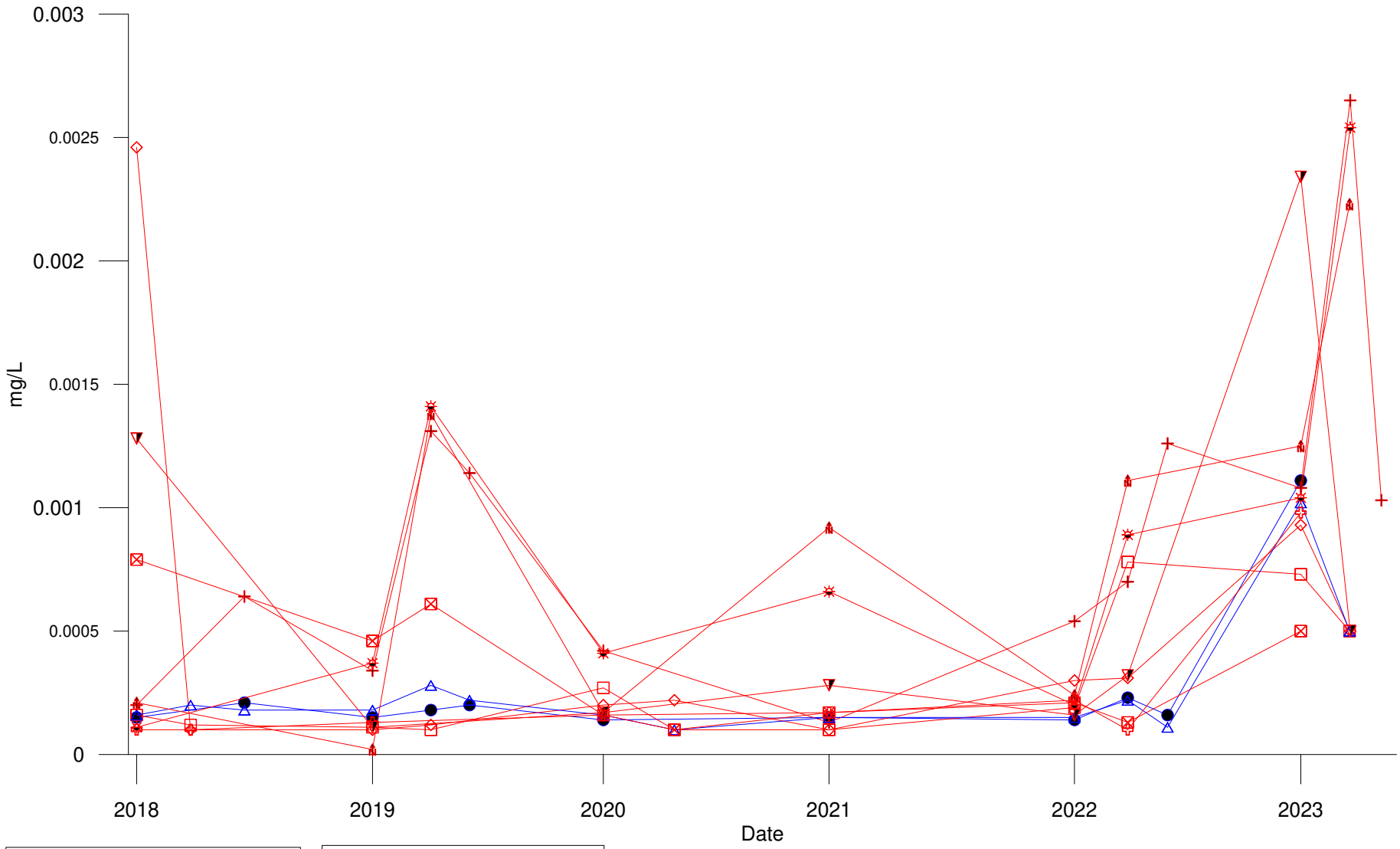
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Specific Conductance
Surface Water

APRIL 2024 | FIGURE 51 | REV 0



Up Stream
SW25-1
SW25-12

Down Stream
SW25-16
SW25-2
SW25-9B
SW25-9A

Down stream
SW25-14A
SW25-14B
SW25-15A
SW25-15B

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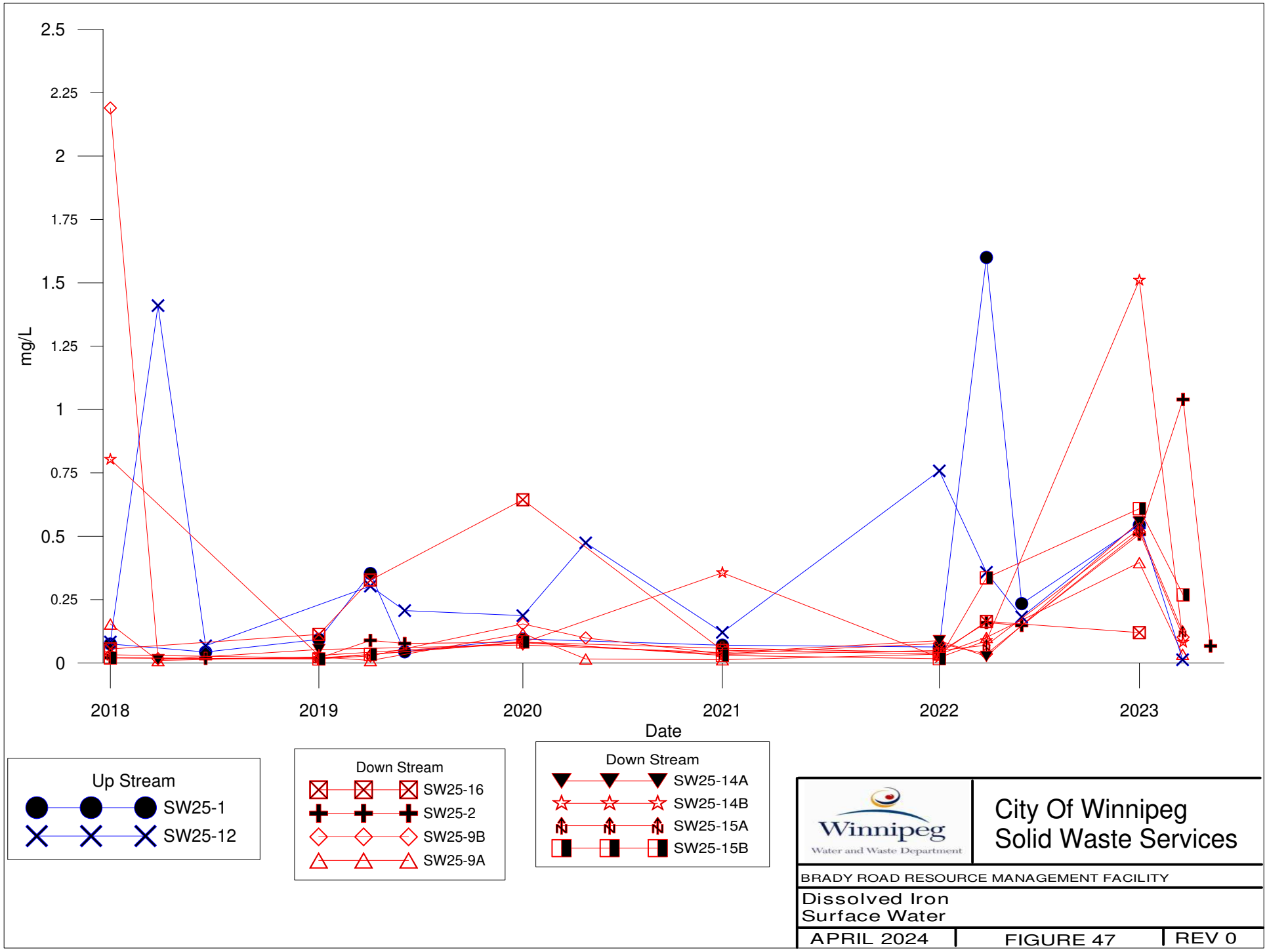
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Chromium
Surface Water

APRIL 2024	FIGURE 46	REV 0



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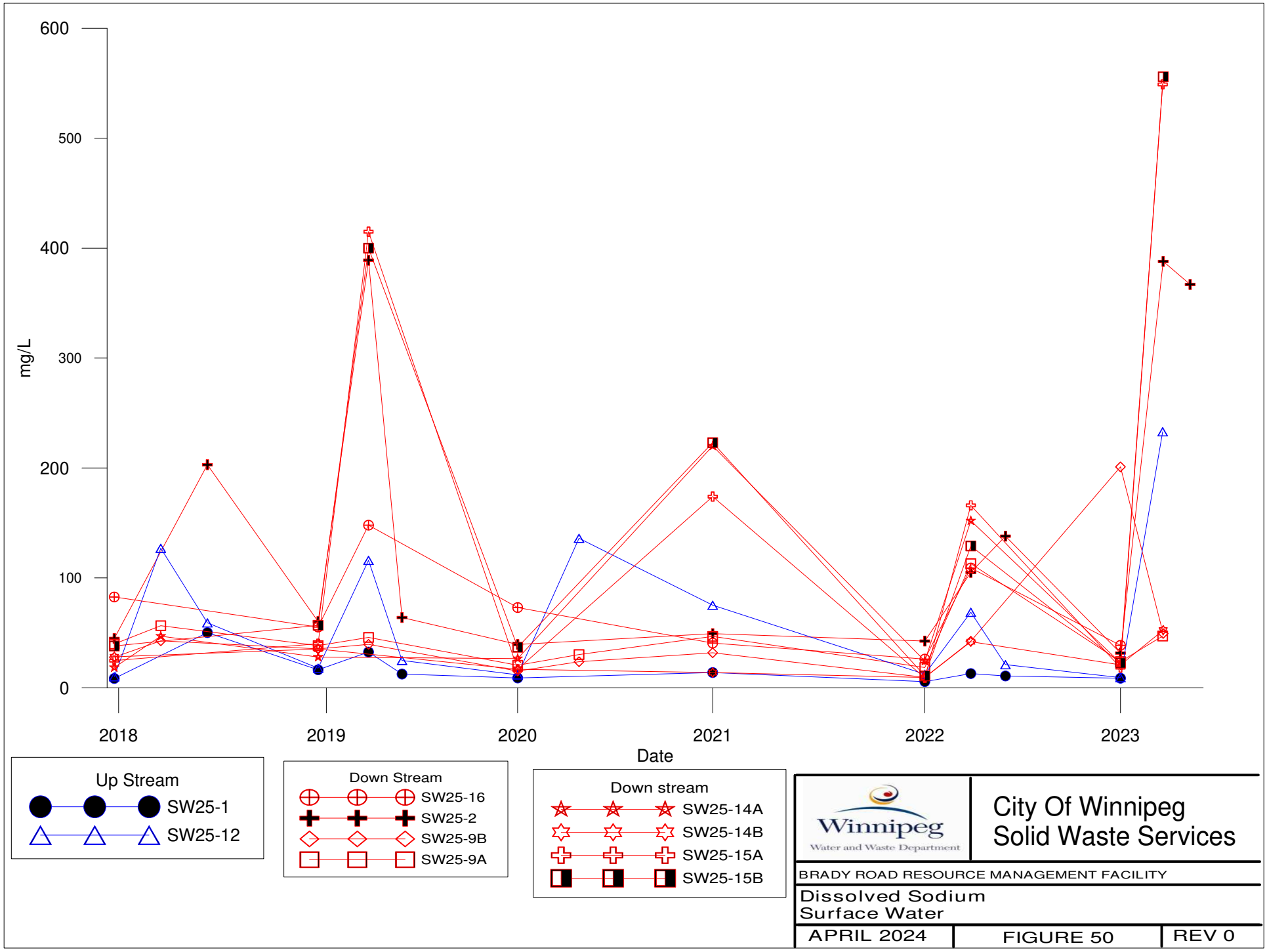
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Iron
Surface Water

APRIL 2024 | FIGURE 47 | REV 0



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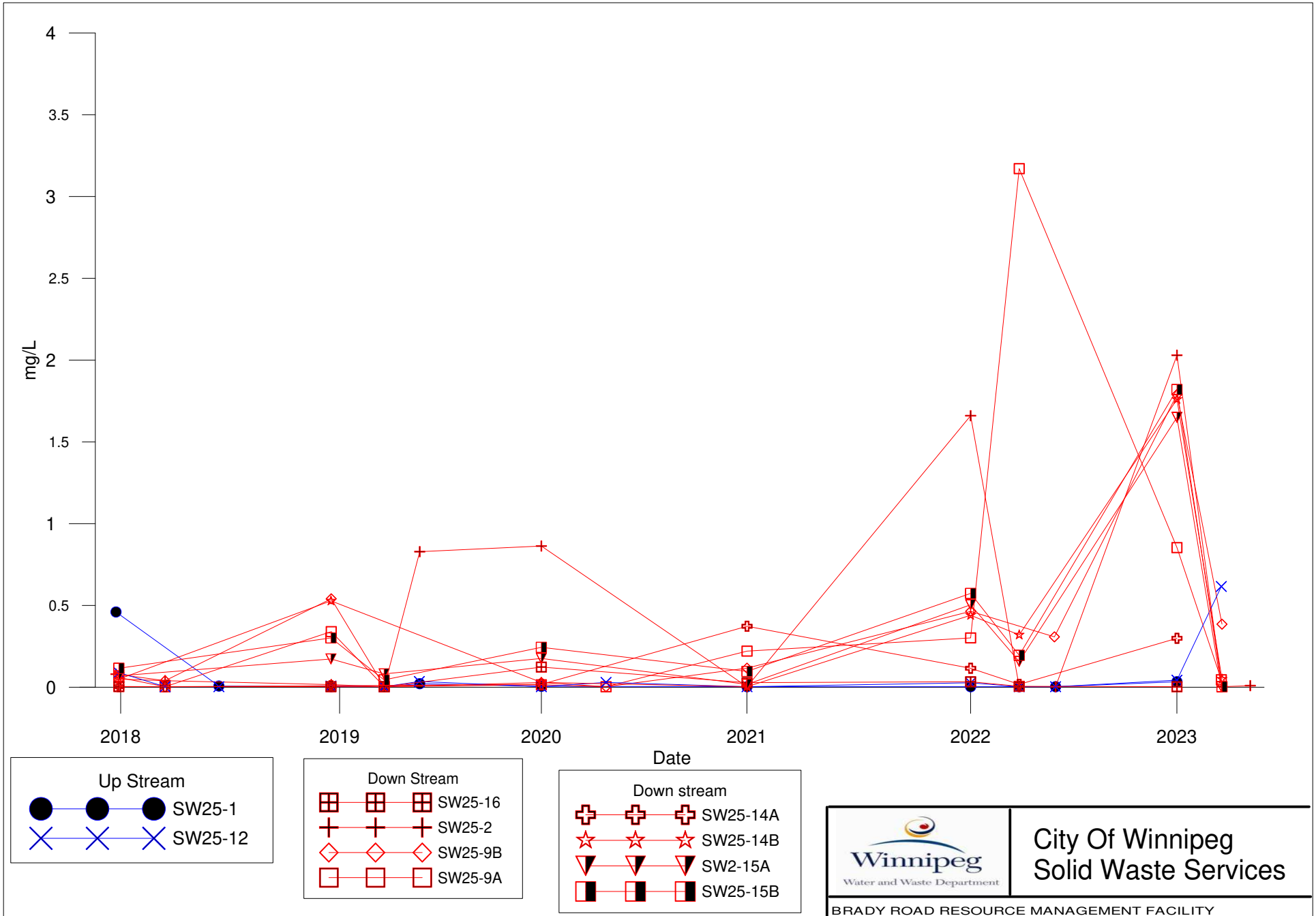
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Sodium
Surface Water

APRIL 2024 | FIGURE 50 | REV 0



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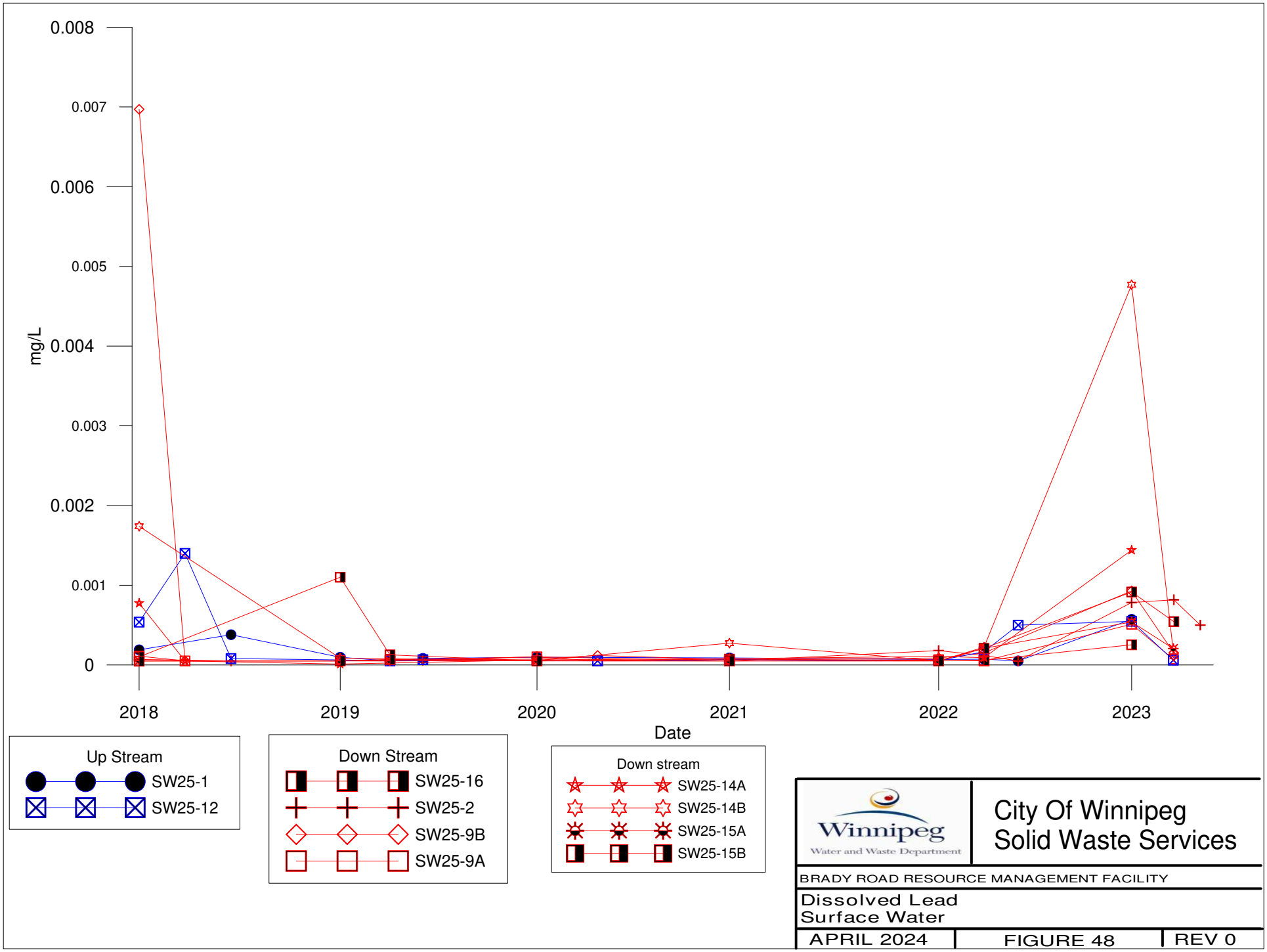
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Nitrate Nitrite as Nitrogen
Surface Water

APRIL 2024 | FIGURE 49 | REV 0



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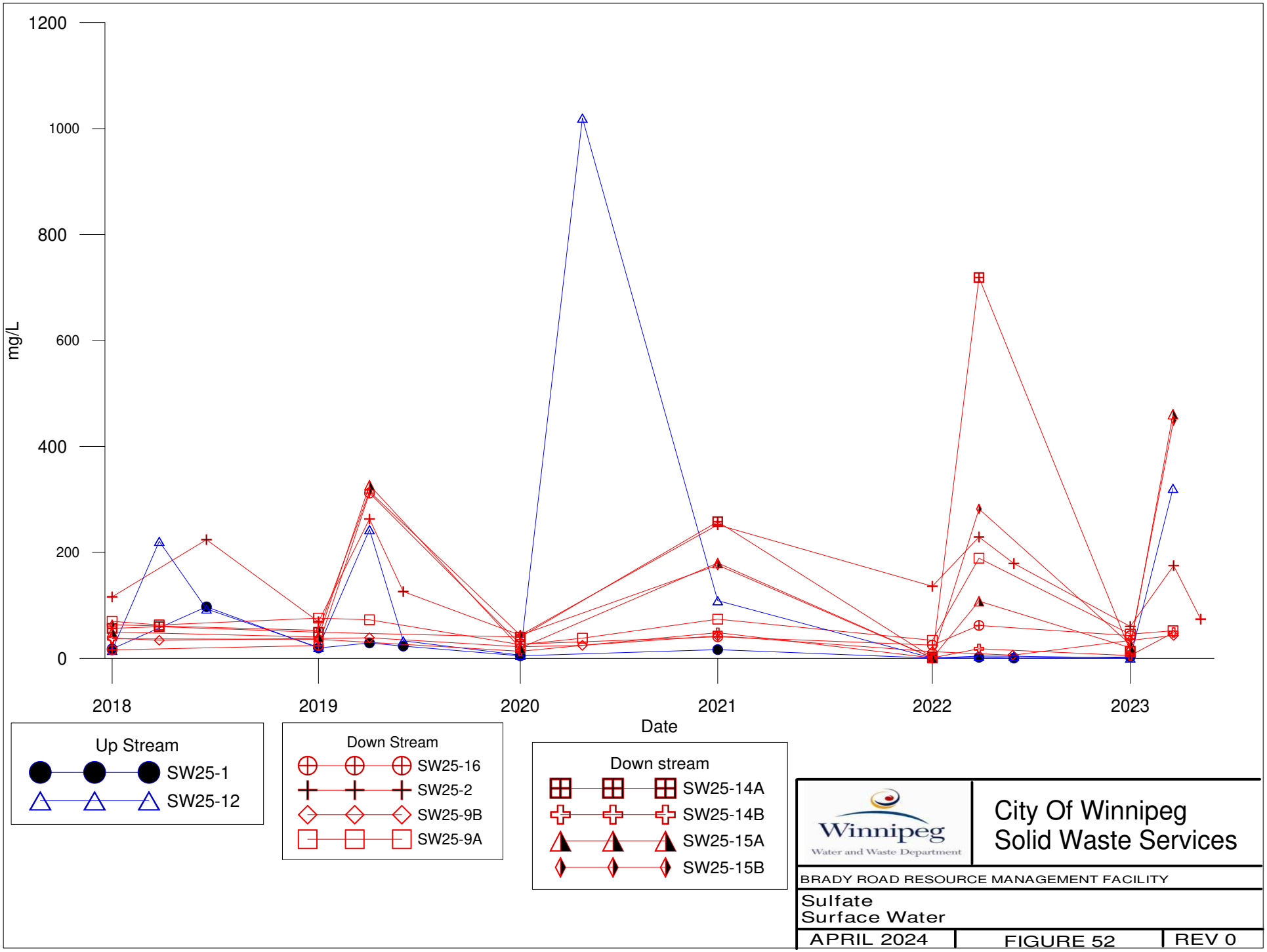
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Lead
Surface Water

APRIL 2024 | FIGURE 48 | REV 0



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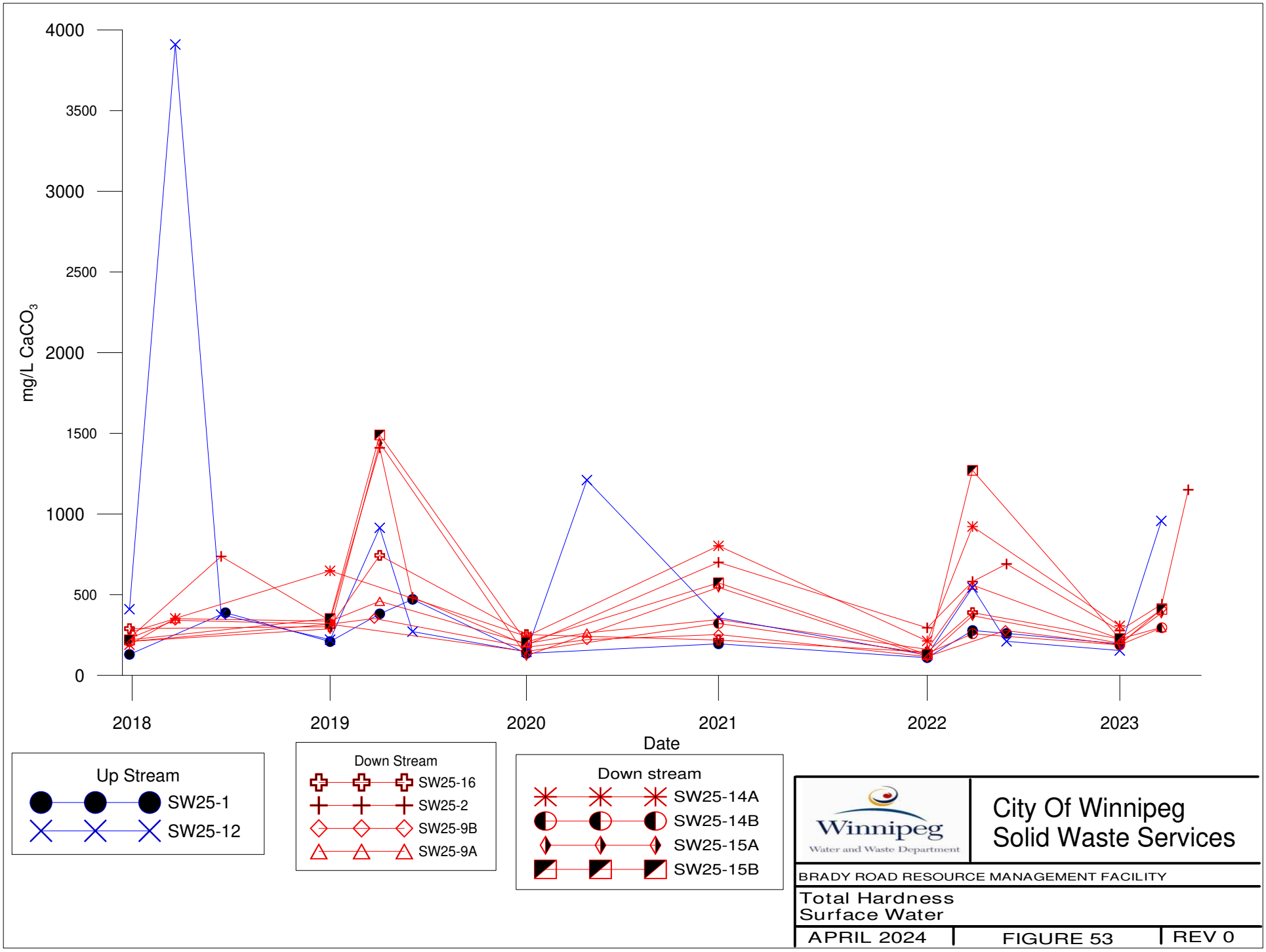
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Sulfate
Surface Water

APRIL 2024 | FIGURE 52 | REV 0



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City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Total Hardness
Surface Water

APRIL 2024 | FIGURE 53 | REV 0

APPENDIX D
2023 LANDFILL GAS COLLECTION AND FLARING REPORT

2023 ANNUAL MONITORING REPORT
BRADY ROAD RESOURCE MANAGEMENT FACILITY
LANDFILL GAS COLLECTION AND FLARING SYSTEM

CITY OF WINNIPEG

April 8, 2024

Project No. 468

INTEGRATED GAS RECOVERY SERVICES

A Landfill Gas Utilization Company

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1.0 INTRODUCTION

The City of Winnipeg operates the Landfill Gas Collection and Flaring System (LGCFS) at the Brady Road Resource Management Facility in Winnipeg, Manitoba, which operates under Manitoba Conservation Licence 3081. After a commissioning phase, the system became operational full time in August 2013 after approval to operate was received by the Office of the Fire Commissioner.

Operation of the system, including maintenance and monitoring in 2023, was completed by Comcor Environmental Limited (Comcor) on behalf of its partner Integrated Gas Recovery Services (IGRS).

This report outlines work performed and data collected during the operation of the Landfill Gas Collection and Flaring System in 2023.

2.0 LANDFILL GAS COLLECTION SYSTEM

There are two main components of the LGCFS that require monitoring. These include:

- Landfill Gas Collection Wellfield
- Mechanical System

The purpose and procedures associated with the monitoring of each of these components are discussed separately below. The recommended monitoring frequency is presented in Table 1.

Table 1: Summary of Monitoring Frequency

System Component	Monitoring Frequency
Wellfield Monitoring	Monthly
Remote Mechanical System Monitoring	Weekly
Mechanical System Monitoring	Weekly

2.1 Wellfield System Expansions and Repairs

No wellfield expansions occurred in 2023.

In June 2023, the following repairs were completed on site by Secure Energy Services Inc. (Secure)[CL1]:

- At Well 8-74, a repair was completed due to vacuum issues at the well. The issue was found to be a result of a low point along the sublateral caused by differential settlement. The low point had filled with water and caused a lack of vacuum at the well. The low point was repaired and vacuum was restored to the well.
- On the West Header at GDT 6, repairs were completed following a long-standing vacuum issue on the lateral. Four wells were non-operational due to a low point along the lateral caused by differential settlement. This low point had filled with water and caused a lack of vacuum to some wells. The low point was repaired and vacuum was restored to all four wells successfully.
- A break on the Lateral 2 compressed air line was excavated and successfully repaired.

In July 2023, following the wellfield repair work by Secure:

- A cross-connect on the discharge line of MH 32 was installed to allow it to be connected to the south condensate / leachate line. This shortened this distance the pump in MH 32 would need to pump liquid to the leachate holding tank.

Figure 1 presents existing wellfield conditions at the site.

2.2 Wellfield System Monitoring

The wellfield system monitoring consists of measuring vacuum/pressure at each well and lateral pipe, the percentage of methane, oxygen and carbon dioxide in the landfill gas, and parts per million of carbon monoxide and hydrogen sulphide at each location. These measurements were taken using a portable gas meter/analyzer such as a Landtec GEM-5000, or equivalent. Vacuum fluctuations were noted, as it can be an indication of water within the piping system.

Each wellhead was monitored for the velocity of gas using an anemometer. The measured velocities were used to calculate landfill gas flow rates by multiplying the velocity by the pipe cross-sectional area.

The monitoring data collected during the monthly round is beneficial to determine if the wellfield is operating as intended. Changes to the wellhead valve position were made to ensure maximum gas collection from the landfill. The system was monitored and field balanced by a technician experienced in the operation of this type of system.

During 2023, there were no elevated levels of Carbon Monoxide (CO) (>500 ppm). During the 2023 monitoring period, the highest CO level recorded was at GW 7-61 of 130 ppm. Elevated carbon monoxide within landfill gas can be an indicator of a subsurface fire within the waste. There was no indication of a subsurface fire in 2023[CL2][AS3].

The wellfield monitoring data and valve positions can be found in Table 2.

Pump counter measurements were recorded on a monthly basis at all active dual-purpose gas/leachate collection wells. During the monthly pump counter measurements, the following items were noted:

- A large number of the pumps were frozen due to the extreme cold and were not functional during most of the winter.
- Various counters were replaced as needed.
- The pump counters at PDT4, PDT5, PDT7 and PDT9 were not functioning throughout the 2023 reporting year due to flooding in the chamber, thus readings were not able to be recorded.

In instances when there was a lack of a functioning pump counter, the pumps were checked on a monthly basis to confirm operation, and most were found to be operating as intended at inspections. Table 3 presents the pump counter measurements recorded at both the pump drain traps and active dual-purpose wells in 2023.

Water level monitoring requirements are for water levels to be measured on a semi-annual basis. In 2023, two additional rounds were completed to total four events in April, July, October and December. Table 4 presents the water levels measured in 2023. The percent of open screen available for gas collection at each well is estimated based on water levels.

Based on pump counters and water levels recorded throughout 2023, dual purpose well pumps continue to remove leachate consistently. In 2023, the average open screen percentage of the monitored dual-purpose wells was 43.7%.

Throughout the year. various pumps were pulled and checked for operation. Few issues were found with the pumps and they were generally found to be in good condition, with the exception of six wells, where the pumps are currently stuck inside the wells and are unable to be retrieved. Where issues were found, the pumps were replaced with functioning pumps.

The gaskets in the air line connecting to the dual-purpose wells were an intermittent problem throughout 2023. Comcor has explored other options for these gaskets and is testing some to find the best gasket for this application.

Winter operations of the dual purpose wells have been a concern since their installations. As an attempt to alleviate freezing in these wells, well insulation was purchased and installed. Although the insulation was initially successful, freezing is still an ongoing issues and is expected to occur at a large number of the wells. Comcor is currently investigating other insulation options in an effort to increase winter-time collection efficiency.

2.3 Surface Emission Monitoring

As required by the City, surface emission monitoring is requested to be carried out on a quarterly basis, weather conditions permitting, by Comcor. In 2023 the surface emissions monitoring was completed two times due to restrictions with weather conditions. This monitoring is performed using a Landtec SEM or similar with integral GPS, marking locations where concentrations of hydrocarbons were greater than 500 ppm. The surface emission monitoring was completed in May and October for the 2023 reporting year. Several areas were noted where there were significant volumes of gas detected, including areas where the cap was weak and pipe penetrated the landfill cap. The reports from the two surface emission monitoring events in 2023 have been included in Appendix B.

As part of a grant provided by Environment and Climate Change Canada, Comcor and the City of Winnipeg worked together to complete a round of drone monitoring during the same time period as the October surface emission monitoring event. The purpose of this federally funded study was to compare and contrast the two types of emission monitoring. Final results from this study will be available in April of 2024.

2.4 Mechanical System Monitoring

The main operational control of the mechanical system is carried out by the Programmable Logic Controller (PLC). The PLC also provides information on the operating status of the system, and records all data electronically which can be downloaded when required. Specific details on these items are included in the Flare Operation and Maintenance Manual. At a minimum the PLC records:

- Landfill gas composition and temperature;
- Flare operating times;
- Blower operating times;
- Landfill gas flow rate;
- Volume of landfill gas collected and flared; and
- Greenhouse Gas Emission Reduction in CO_2 equivalents.

These items were also monitored remotely and were reviewed at minimum on a weekly basis to ensure that all parameters outlined above are being recorded and that all system data indicates that the overall system is operating properly. The system review was carried out by a technician experienced in the operation of such systems.

Comcor staff also carried out the maintenance of the system as outlined by the Operations and Maintenance Manual. Other notable maintenance that was performed in 2023 included:

- Replacement of flare flame scanners; and
- Replacement of the condensate chamber pump

Data for 2023 has been compiled, and is found in Appendix A.

2.4.1 System Pressure Measurements

Monitoring ports at the inlet and outlet to the blower were measured and recorded on a monthly frequency, using a suitably scaled pressure gauge. Gauge fluctuations were noted, as it can be an indication of water within the system.

Data for 2023 has been compiled, and is found in Table 2.

2.4.2 System Gas Measurements

The purpose of the main blower skid gas analyzer system is to monitor the oxygen and methane concentrations of the landfill gas being transferred by the LGCFS to the flare. As a safety precaution, if either the oxygen concentration becomes too high, or the methane concentration becomes too low, an alarm is sent to the main computer control panel PLC to shut the system down. Having records of the gas concentrations also allows for better analysis of the system and aids in troubleshooting when problems arise.

A pump, located within the gas analyzer system cabinet in the control room, is used to draw a continuous sample of process gas from the header pipe on the blower discharge side. After entering the analyzer, the sample is drawn through a de-mister and a series of filters to remove any particulate or moisture that may affect the monitoring equipment. The methane and oxygen concentrations of the sample are then measured by an infra-red methane analyzer and oxygen analyzer. The methane and oxygen concentrations are displayed on separate LED display screens mounted on the front face of the gas analyzer panel. The gas analyzer system will send signals to the PLC that will trigger a number of system alarms/warnings including low methane and high oxygen.

All system failures and/or alarms are displayed on the main control circuit panel. Any alarms that shut down the system are relayed by the auto messaging to the system operator.

During 2023, the system operated as intended, with the analyzer data recorded at an interval of five minutes or better and any system alarms were sent to the operator. This data was recorded and summarized into a daily value and can be found in Appendix A.

In addition to the main system analyser, concentrations of methane (CH_4), carbon dioxide (CO_2) and oxygen (O_2) were measured manually, recorded monthly at the blower inlet and blower outlet, and compared to the in-situ monitoring devices to ensure accuracy. These measurements were taken using a gas meter/analyzer such as a Landtec GEM-5000+, or equivalent.

2.4.3 System Flow Rate Measurements

Landfill gas velocities and temperatures at each landfill gas extraction well in the wellfield were measured and recorded on a monthly basis using an anemometer, if possible. These velocities were used to calculate landfill gas flow rates by multiplying by the pipe's cross-sectional area.

A thermal mass flow meter continuously calculates flows to the flare and this data was recorded on an interval of 5 minutes or less.

The monitoring completed in 2023 is found in Table 2 and a summary of daily plant data can be found in Appendix A.

3.0 FLARE AND GREENHOUSE GAS EMISSIONS

3.1 Flare Emissions

The flare stack is equipped with four thermocouples that measure the temperature in the flare stack. These thermocouples are monitored by the system control panel PLC at intervals of 5 minutes or better. The control system is continuously monitoring the flame conditions and will shut down the LGCFS system immediately if flame is lost.

If the system shuts down for any reason, the fail-safe valve will close and prevent any non-combusted landfill gas from being released to the atmosphere, thereby controlling the emissions from the flare.

3.2 Greenhouse Gas Emissions

The landfill gas is comprised of primarily methane and carbon dioxide in approximately equal amounts. In addition, there are other trace amounts of a large number of compounds. Methane and carbon dioxide are greenhouse gases but methane has a global warming potential 25 times that of carbon dioxide. By combusting the methane in the flare, the resultant products are carbon dioxide and water vapour which reduces its global warming potential by approximately 95 percent.

The control panel records both flow and methane gas concentration being collected from the system and being sent to be combusted in the flare. These quantities are measured and recorded at intervals of 5 minutes or less. The data collected can be readily processed to calculate the greenhouse gas emission reduction expressed as carbon dioxide equivalents.

For the Brady Road Landfill, greenhouse gas emissions have been calculated based on operational data and can be found in Appendix A.

4.0 CONDENSATE COLLECTION SYSTEM

The purpose of the Condensate Collection System component of the LGCFS is to remove moisture from the landfill gas and to collect condensate from the collection laterals/header pipes. Collection and removal of the condensate increases the efficiency of the landfill gas collection in the wellfield and minimizes the moisture being passed through the mechanical system.

Condensate and moisture are removed from the system at three main locations. First, relative low points have been provided in the gas collection header to allow any free moisture to drain by gravity out of the underground gas collection system. In the wellfield, this moisture drains into condensate gravity style and pump style drain traps which have pneumatic pumps installed inside the sump. Next, prior to the gas entering the blowers, a condensate moisture separator removes most of the residual water droplets remaining in the gas. At this stage, the residual water drains by gravity into the main condensate chamber.

The condensate chamber stores the water until the pump at the bottom of the chamber is activated either manually or automatically through a series of floats. The water is then pumped through a 75 mm diameter HDPE forcemain and is discharged into the leachate collection system.

Condensate/leachate collected from the dual-purpose wells, pump drain traps, and the condensate chamber can either be sent directly to the storage tank or to MH32. Under normal operating conditions, condensate/leachate will be sent directly to the storage tank. If the storage tank is offline, leachate/condensate can be sent to MH32 by opening the isolation valve located on the condensate line to MH32.

5.0 CONCLUSIONS AND RECOMMENDATIONS

1. During operation in 2023, the Brady Road Resource Management Facility Gas Collection and Flaring System operated as intended.

2. During surface emission monitoring, some areas were noted where gas was escaping. These were identified in areas where surface cap was weak and pipe emanated from the landfill surface. In order to get maximum efficiency from the LGCFS, these issues should be looked at in the future.

3. Continue to investigate and develop a consistent maintenance program for the dual purpose pumps.

4. Add additional insulation or means to protect the dual purpose wells from freezing.

5. The system should continue to operate on a full-time basis and be monitored according to the Operation and Maintenance Manual for the site.

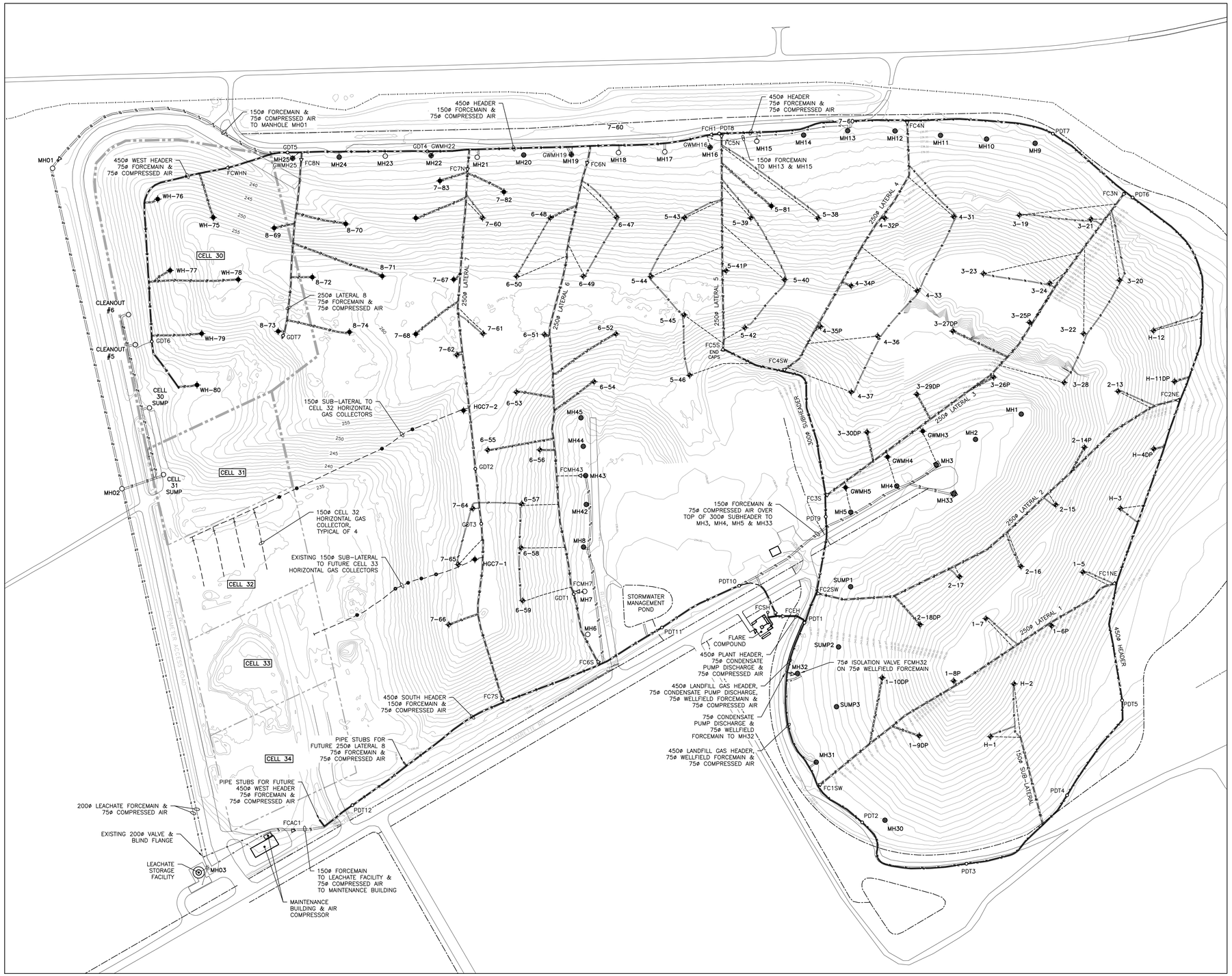
All of which is Respectfully Submitted,

INTEGRATED GAS RECOVERY SERVICES

Jordan Demerchant
Environmental Technician

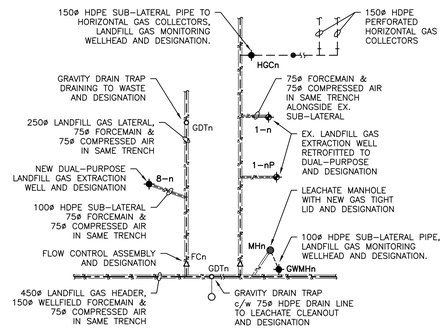
Shannan McGarr, B.Sc.
Director of Operations

Lux Burgess, CET, LET
Wellfield Operations Supervisor



LEGEND

- ROADS
- HYDRO POLES
- MANHOLES
- BUILDINGS
- PERIMETER DITCHES/POND EDGE
- FENCE



Scale: 0 50 100 200 250 metres

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INTEGRATED GAS RECOVERY SERVICES
A Landfill Gas Utilization Company

City of Winnipeg
Brady Road
Resource Management
Facility

FIGURE 1
EXISTING SITE CONDITIONS
MARCH 2022

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
Weather Conditions			cloudy	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear
Ambient Temperature		^{o}C	-16	-15	-10	10	20	20	20	20	15	15	-10	-15
Control Panel	*Flow Rate*	*CFM*	900	900	900	900	1000	1000	1000	1000	950	950	950	900
	CH_4	*%*	45.6	47.1	46.6	47.0	49.5	47.5	47.3	46.1	45.1	47.4	44.2	42.6
	O_2	*%*	2.6	2.8	3.1	2.9	3.0	3.5	3.2	3.2	3.2	1.4	2.6	3.6
	Wellfield Vac	*"H_2O*	-14.2	-12.5	-11.5	-11.4	-9.8	-9.8	-9.7	-10.2	-10.1	-13.3	-13.6	-12.8
	Outlet Press.	*"H_2O*	3.5	3.6	3.5	3.2	3.7	3.6	3.5	3.6	3.4	3.6	3.5	3.6
LOCATIONS														
H-1	*Well*	*"H_2O*	-0.02	-0.01	0.02	0.01	0.03	-0.58	-1.00	-1.69	0.03			
well bore seal	*Lateral*	*"H_2O*	-4.58	-5.11	-4.95	-4.23	-3.89	-4.25	-4.49	-4.50	-3.31		-10.17	-9.89
	CH_4	*%*	32.6	34.9	36.8	39.6	55.0	50.1	52.0	41.0	45.7	37.3	24.0	48.1
	CO_2	*%*	29.1	27.5	26.1	28.7	26.8	28.3	33.9	34.3	33.0	31.9	17.8	29.3
	O_2	*%*	2.5	2.7	3.2	3.6	5.2	4.8	0.9	0.2	0.5	1.3	11.7	14.8
	BAL (N_2)	*%*	35.8	34.9	33.9	28.1	13.0	16.8	13.2	24.5	20.8	29.5	46.5	7.8
	CO	*PPM*	15	11	12	15	7	10	6	6	6	6	1	1
	H_2S	*PPM*	15	9	5	10	35	15	29	32	21	15	8	2
	Vel Min	*m/s*	-	-	-	-	0.00	0.00	0.84	0.00	0.44	-	-	-
	Vel Max	*m/s*	-	-	-	-	0.00	0.00	1.65	0.00	0.95	-	0.00	0.00
	Flow	*CFM*	-	-	-	-	0	0	11.76	0	6.57		0	0
	Temp	*^{o}C*	-	-	-	-	29.6	24.6	26.9	24.7	27.1	-	-	-
	Comments		closed	closed	closed	closed	1/2T	1/2T	1	1/2T	1/2T\	1/2T	1/2T	1/2T
H-2	*Well*	*"H_2O*	-1.24	-1.57	-1.24	0.03	0.02	-0.58	-1.57	-1.22	-1.38			
	Lateral	*"H_2O*	-4.58	-6.57	-5.47	-4.99	-4.15	-4.58	-4.66	-4.22	-3.22		-10.55	-9.62
	CH_4	*%*	41.3	41.5	40.6	41.4	58.2	52.1	59.1	54.5	53.1	52.1	49.5	51.4
	CO_2	*%*	30.2	30.2	28.6	29.2	41.1	40.9	39.0	37.9	37.6	37.7	36.1	35.8
	O_2	*%*	3.0	3.5	4.8	4.2	0.7	1.0	0.2	0.4	0.1	0.2	5.0	4.2
	BAL (N_2)	*%*	25.5	24.8	26.0	25.2	0.0	6.0	1.7	7.2	9.2	10.0	9.4	8.6
	CO	*PPM*	15	12	15	20	3	10	4	4	3	5	4	0
	H_2S	*PPM*	27	40	27	21	37	48	37	29	28	19	9	0
	Vel Min	*m/s*	1.11	1.11	-	-	0.00	0.84	1.57	1.85	1.48	-	-	-
	Vel Max	*m/s*	1.68	4.36	-	-	0.95	1.27	20.10	2.24	1.95	-	5.70	4.90
	Flow	*CFM*	13.18	25.84	-	-	4.49	9.97	102.38	19.32	16.21	-	94.6	94.6
	Temp	*^{o}C*	15.1	13.2	-	-	31.4	32.5	30.8	31.5	26.1	-	-	-
	Comments		1/2T	1/2T	closed	closed	1/2T	1/2T	2t	2t	2t	2T	2	2

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
H-3	*Well*	*"H_2O*	-2.02	-2.57	-2.68	-1.68	-2.15	-1.58	-1.24	-1.95	-1.57	-	-	-
	Lateral	*"H_2O*	-5.39	-6.01	-5.97	-5.61	-6.06	-5.27	-4.00	-4.21	-3.33	-	-10.58	-9.26
	CH_4	*%*	50.8	51.6	52.8	50.8	49.3	48.6	58.6	57.4	53.2	50.7	44.1	25.6
	CO_2	*%*	30.2	32.9	31.6	30.6	33.8	32.7	40.6	40.8	38.6	37.1	33.0	32.6
	O_2	*%*	1.8	1.5	1.8	2.5	4.3	4.0	0.3	0.3	0.8	2.8	4.2	4.3
	BAL (N_2)	*%*	17.2	14.0	13.8	16.1	12.6	14.7	0.5	1.5	7.4	9.4	18.7	37.5
	CO	*PPM*	20	12	15	18	10	15	22	15	9	15	17	4
	H_2S	*PPM*	17	12	10	14	14	20	18	18	14	11	13	10
	Vel Min	*m/s*	1.11	1.28	1.33	1.45	1.55	1.27	1.63	1.67	1.24	-	-	-
	Vel Max	*m/s*	1.28	1.69	1.58	1.85	1.96	1.94	2.17	2.14	1.66	-	3.60	0.00
	Flow	*CFM*	11.29	14.03	13.75	15.59	16.58	15.17	17.95	18.00	13.70	-	60	60
	Temp	*^oC*	13.4	18.2	19.6	22.1	26.7	29.6	28.2	26.3	28.5	-	-	-
	Comments		2	2	2	2	1	1	2	2	2	2	2	2
H-4 DP	*Well*	*"H_2O*	0.03	0.03	0.01	0.03	0.02	-1.57	-1.68	-1.55	-1.24			
	Lateral	*"H_2O*	-5.21	-6.92	-5.47	-5.02	-4.38	-4.92	-4.52	-4.47	-3.93		-11.63	-10.58
	CH_4	*%*	24.8	24.8	29.6	33.6	58.7	55.1	53.1	51.8	44.2	49.5	46.0	47.1
	CO_2	*%*	21.8	19.6	20.4	22.7	39.8	36.1	37.4	36.8	32.3	35.5	33.0	37.8
	O_2	*%*	6.8	8.8	6.9	5.2	1.5	1.4	1.6	1.9	3.6	2.5	4.6	5.1
	BAL (N_2)	*%*	46.6	46.8	43.1	38.5	0.0	7.4	7.9	9.5	19.9	12.5	16.4	10.0
	CO	*PPM*	10	14	18	24	4	10	7	0	5	1	0	1
	H_2S	*PPM*	10	19	22	19	19	17	16	17	16	29	28	35
	Vel Min	*m/s*	-	-	-	-	1.27	1.25	1.54	1.24	1.01	-	-	-
	Vel Max	*m/s*	-	-	-	-	1.96	1.64	1.80	1.66	1.33	-	1.90	2.20
	Flow	*CFM*	-	-	-	-	15.26	13.65	15.78	13.70	11.06	-	31.8	31.8
	Temp	*^oC*	-	-	-	-	21.7	25.7	26.8	28.3	25.9	-	-	-
	Comments		closed	closed	closed	closed	1	1	1	1	1/2T	1/2T	1/2T	1/2T
1-5	*Well*	*"H_2O*	0.00	0.02	0.01	0.01	0.01	0.03	-0.52	-1.11	-1.11			
well bore seal	*Lateral*	*"H_2O*	-4.20	-4.99	-4.68	-4.12	-4.68	-2.77	-4.67	-4.19	-3.92		-9.60	-9.74
	CH_4	*%*	28.3	26.9	29.4	32.5	34.3	51.1	58.9	47.2	38.2	39.4	55.8	53.9
	CO_2	*%*	25.4	24.8	25.6	26.9	26.1	35.7	39.9	35.6	30.8	28.5	38.6	37.6
	O_2	*%*	8.1	8.7	7.4	6.5	7.5	2.8	0.3	1.7	3.5	3.7	4.3	4.1
	BAL (N_2)	*%*	38.2	39.6	37.6	34.1	32.1	10.4	0.9	15.5	27.5	28.4	1.3	4.4
	CO	*PPM*	15	10	15	20	12	6	3	8	0	2	2	3
	H_2S	*PPM*	9	12	17	14	10	12	76	30	36	116	145	199
	Vel Min	*m/s*	-	-	-	-	-	0.00	0.55	1.03	-	-	-	-
	Vel Max	*m/s*	-	-	-	-	-	0.00	0.98	1.35	-	-	0.70	0.40
	Flow	*CFM*	-	-	-	-	-	0	7.23	11.24	-	-	12.4	12.4
	Temp	*^oC*	-	-	-	-	-	29.5	26.2	24.1	-	-	-	-
	Comments		closed	closed	closed	closed	closed	cracked	1/2T	1/2T	closed	closed	cracked	1/2T

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
1-6 DP	*Well*	*"H_2O*	-0.04	0.02	0.01	0.01	0.03	-1.27	-1.57	-0.02	-1.14			
	Lateral	*"H_2O*	-3.98	5.47	-4.95	-4.21	-3.51	-4.28	-4.58	-4.52	-4.49		-11.08	-8.99
	CH_4	*%*	30.2	31.6	33.6	36.3	50.3	52.9	12.2	49.1	17.4	38.4	54.8	52.8
	CO_2	*%*	25.4	27.9	28.4	29.8	35.2	33.7	10.6	38.7	15.0	26.3	37.2	38.1
	O_2	*%*	5.6	5.2	5.0	4.7	1.4	2.1	13.1	0.4	10.5	5.2	1.1	1.6
	BAL (N_2)	*%*	38.8	35.3	33.0	29.2	13.1	11.3	64.1	11.8	57.1	30.1	6.9	7.5
	CO	*PPM*	10	9	14	12	17	18	2	2	5	1	2	2
	H_2S	*PPM*	15	14	19	10	68	64	13	86	41	65	68	32
	Vel Min	*m/s*	-	-	-	-	0.59	1.00	-	1.11	-	-	-	-
	Vel Max	*m/s*	-	-	-	-	1.37	1.63	-	1.69	-	-	0.00	1.70
	Flow	*CFM*	-	-	-	-	9.26	12.43	-	13.23	-	-	0	0
	Temp	*^oC*	-	-	-	-	30.1	33.8	-	25.7	-	-	-	-
	Comments		closed	closed	closed	closed	1	1	closed	1/2T	closed	closed	cracked	cracked
1-7	*Well*	*"H_2O*	-1.25	-1.22	-1.00	-1.24	-1.24	-1.01	-0.85	-0.99	0.03	-	-	-
	Lateral	*"H_2O*	-5.95	-6.03	-5.47	-5.27	-5.42	-4.66	-3.89	-4.16	-3.81	-	-9.54	-8.92
	CH_4	*%*	45.2	45.8	47.5	50.9	54.3	53.2	45.3	44.5	37.5	0.0	3.5	40.8
	CO_2	*%*	25.1	28.3	29.4	30.2	37.8	36.9	34.1	32.1	31.2	0.1	1.8	19.6
	O_2	*%*	5.2	3.4	3.9	2.8	2.1	2.0	3.1	4.3	4.1	20.2	7.6	18.5
	BAL (N_2)	*%*	24.5	22.5	19.2	16.1	5.8	7.9	17.5	19.1	27.2	79.7	87.1	21.1
	CO	*PPM*	21	40	45	56	44	50	60	34	44	0	3	20
	H_2S	*PPM*	36	21	22	155	239	199	290	226	229	2	9	1
	Vel Min	*m/s*	1.24	1.10	1.21	1.30	1.27	1.62	1.11	1.01	-	-	-	-
	Vel Max	*m/s*	1.60	1.53	1.65	1.94	1.84	2.11	1.69	1.24	-	-	0.00	0.00
	Flow	*CFM*	13.42	12.43	13.51	15.31	14.69	17.62	13.23	10.63	-	-	0	0
	Temp	*^oC*	10.5	15.9	18.4	22.4	25.1	28.4	26.8	27.1	-	-	-	-
	Comments		1/2T	1/2T	1/2T	1/2T	1T	1T	1/2T	1/2T	closed	closed	closed	closed
1-8	*Well*	*"H_2O*	-1.25	-1.55	-1.57	0.03	0.02	-0.32	-1.00	-1.11	0.02	-	-	-
	Lateral	*"H_2O*	-4.02	-5.22	-5.00	-4.51	-4.09	-4.20	-4.84	-4.31	-3.64	-	-9.52	-10.29
	CH_4	*%*	38.2	41.6	43.6	45.8	51.9	52.0	50.3	43.7	37.9	35.3	41.6	53.1
	CO_2	*%*	28.6	28.0	29.5	30.2	34.0	32.9	35.1	31.8	29.5	26.5	18.5	31.5
	O_2	*%*	5.2	4.0	4.1	3.3	4.7	4.2	2.9	4.8	5.0	12.0	7.4	7.8
	BAL (N_2)	*%*	28.0	26.4	22.8	20.7	9.4	10.9	11.7	19.7	27.6	26.2	32.5	7.6
	CO	*PPM*	15	12	15	24	4	10	6	5	4	1	3	3
	H_2S	*PPM*	56	66	63	55	112	101	114	95	57	104	17	10
	Vel Min	*m/s*	1.00	1.23	1.34	-	0.44	0.00	0.69	1.24	-	-	-	-
	Vel Max	*m/s*	1.62	1.69	1.66	-	0.96	0.00	1.02	1.55	-	-	0.00	3.00
	Flow	*CFM*	12.38	13.80	14.17	-	6.61460625	0	8.08	13.18	-	-	0	0
	Temp	*^oC*	12.8	14.7	17.4	-	22.7	28.6	27.1	25.1	-	-	-	-
	Comments		1/2T	1/2T	1/2T	closed	cracked	cracked	1/2T	1/2T	closed	closed	closed	closed

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
1-9 DP	*Well*	*"H_2O*	-1.54	-2.54	-2.01	0.02	0.00	-0.01	-0.29	-0.21	0.02			
	Lateral	*"H_2O*	-5.29	-6.69	-5.98	-4.68	-4.55	-4.21	-4.60	-4.51	-3.79		-10.92	-10.24
	CH_4	*%*	40.3	42.5	43.5	45.8	48.3	47.3	31.2	30.6	39.9	0.2	24.0	25.8
	CO_2	*%*	25.9	27.6	28.4	30.2	25.7	26.9	25.4	27.6	31.2	0.3	17.8	21.7
	O_2	*%*	2.1	1.9	2.2	2.8	6.5	5.7	4.7	1.8	1.5	19.9	11.7	10.4
	BAL (N_2)	*%*	31.7	28.0	25.9	21.2	19.5	20.1	38.7	40.0	27.4	79.6	46.5	42.1
	CO	*PPM*	15	15	18	25	5	10	13	11	10	0	1	0
	H_2S	*PPM*	17	17	20	24	11	8	3	1	2	0	8	12
	Vel Min	*m/s*	1.22	1.17	1.14	-	1.24	1.44	-	-	-	-	-	-
	Vel Max	*m/s*	1.69	1.62	1.55	-	1.84	1.60	-	-	-	-	0.00	0.00
	Flow	*CFM*	13.75	13.18	12.71	-	14.55	14.36	-	-	-	-	0	0.2
	Temp	*^oC*	17.3	14.8	16.3	-	24.8	25.8	-	-	-	-	-	-
	Comments		1/2T	1/2T	1/2T	closed	1/2T	1/2T	closed	closed	closed	closed	closed	closed
1-10 DP	*Well*	*"H_2O*	-0.02	0.02	-0.01	0.02	-0.02	-0.85	-2.14	-1.68	0.02			
	Lateral	*"H_2O*	-6.32	-6.84	-5.88	-5.11	-4.33	-4.00	-4.53	-4.23	-4.08		-9.62	-10.24
	CH_4	*%*	30.6	32.6	33.6	35.2	45.6	44.6	46.1	43.2	23.0	12.7	41.4	52.9
	CO_2	*%*	25.1	26.8	28.4	29.8	22.5	23.8	30.7	30.1	14.8	8.0	18.3	29.6
	O_2	*%*	6.3	5.4	5.1	4.6	7.8	7.0	2.3	2.4	11.6	8.1	9.2	12.3
	BAL (N_2)	*%*	38.0	35.2	32.9	30.4	24.1	24.6	20.9	24.3	50.6	71.2	31.1	5.2
	CO	*PPM*	8	9	12	14	4	5	8	10	4	4	2	3
	H_2S	*PPM*	6	12	12	11	8	5	13	4	1	1	17	27
	Vel Min	*m/s*	-	-	-	-	0.00	0.00	1.24	1.47	-	-	-	-
	Vel Max	*m/s*	-	-	-	-	0.00	0.00	1.85	1.68	-	-	0.00	2.40
	Flow	*CFM*	-	-	-	-	0	0	14.60	14.88	-	-	0	0
	Temp	*^oC*	-	-	-	-	27.1	30.7	27.0	25.6	-	-	-	-
	Comments		closed	closed	closed	closed	cracked	cracked	1	1/2T	closed	closed	closed	closed
H-11 DP	*Well*	*"H_2O*	-1.33	-1.57	-1.10	-1.22	-1.25	0.02	-0.02	-1.21	-1.57	-	-	-
	Lateral	*"H_2O*	-6.17	-6.21	-5.69	-4.68	-6.46	-4.61	-4.01	-4.29	-3.81	-	-9.98	-10.63
	CH_4	*%*	50.2	49.6	47.6	45.2	29.5	32.8	53.1	51.8	45.9	51.0	45.2	31.6
	CO_2	*%*	30.2	31.6	30.3	28.6	18.9	20.1	34.6	34.3	31.9	38.7	34.0	36.8
	O_2	*%*	2.8	2.1	2.4	3.6	10.7	9.9	2.6	3.1	3.5	1.7	1.5	1.1
	BAL (N_2)	*%*	16.8	16.7	19.7	22.6	40.9	37.2	9.7	10.8	18.7	8.6	19.3	30.5
	CO	*PPM*	15	14	17	15	0	1	0	0	2	1	4	5
	H_2S	*PPM*	69	19	22	26	44	53	99	88	56	68	49	30
	Vel Min	*m/s*	1.24	1.65	1.33	1.11	-	-	1.58	1.55	1.22	-	-	-
	Vel Max	*m/s*	1.99	1.84	1.94	1.57	-	-	2.68	2.03	1.47	-	1.10	0.00
	Flow	*CFM*	15.26	16.49	15.45	12.66	-	-	20.13	16.91	12.71	-	19.2	19.2
	Temp	*^oC*	12.5	14.2	15.4	20.1	-	-	25.1	26.3	23.9	-	-	-
	Comments		1/2T	1/2T	1/2T	1/2T	closed	closed	2	2	1	1	1	1

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
H-12	*Well*	*"H_2O*	-2.41	-2.65	-2.34	-2.15	-2.15	-1.98	-2.57	-2.55	-1.51	-	-	-
well bore seal	*Lateral*	*"H_2O*	-6.27	-6.95	-6.14	-5.17	-5.35	-4.58	-4.62	-4.26	-3.60	-	-10.43	-10.58
	CH_4	*%*	47.3	50.3	51.9	50.3	46.5	47.2	55.9	57.6	54.4	50.9	59.2	55.2
	CO_2	*%*	28.2	28.1	29.6	30.2	31.1	30.6	36.0	39.3	38.3	36.8	40.4	39.0
	O_2	*%*	5.5	4.2	3.4	3.6	4.8	4.5	1.4	0.2	0.3	2.8	0.3	1.2
	BAL (N_2)	*%*	19.0	17.4	15.1	15.9	17.6	17.7	6.7	2.9	7.0	9.5	0.1	4.6
	CO	*PPM*	8	9	15	12	0	1	4	0	4	2	0	1
	H_2S	*PPM*	14	14	17	84	99	83	30	120	98	63	124	155
	Vel Min	*m/s*	1.22	1.33	1.12	1.36	1.25	1.11	1.58	1.57	1.54	-	-	-
	Vel Max	*m/s*	1.69	1.68	1.55	1.84	1.68	1.95	2.03	2.14	1.95	-	0.00	1.90
	Flow	*CFM*	13.75	14.22	12.61	15.12	13.84	14.46	17.06	17.53	16.49	-	0	0
	Temp	*^oC*	14.0	17.4	18.6	22.7	25.9	28.4	27.1	28.3	24.0	-	-	-
	Comments		2T	2T	2T	2T	1T	1T	2 T	2 T	2 T	2	2	2
2-13	*Well*	*"H_2O*	-1.96	-2.14	-2.03	-2.17	-2.14	-2.19	-2.55	-2.34	-2.57	-	-	-
	Lateral	*"H_2O*	-5.44	-6.22	-6.00	-5.62	-5.48	-5.07	-3.58	-4.25	-4.02	-	-7.77	-9.84
	CH_4	*%*	46.2	50.3	51.4	51.7	50.8	51.2	52.5	56.5	56.8	58.2	56.9	40.3
	CO_2	*%*	29.6	30.4	29.6	30.2	34.0	32.8	35.5	37.5	39.1	39.2	38.9	20.4
	O_2	*%*	4.0	2.5	2.6	3.1	3.6	3.3	2.7	2.3	1.0	1.1	3.5	5.2
	BAL (N_2)	*%*	20.2	16.8	16.4	15.0	11.6	12.7	9.3	3.7	3.1	1.5	0.7	34.1
	CO	*PPM*	26	48	51	60	56	68	63	57	63	55	53	1
	H_2S	*PPM*	102	132	103	198	230	222	211	219	265	238	198	58
	Vel Min	*m/s*	1.36	1.42	1.22	1.66	1.35	1.62	1.58	1.47	1.28	-	-	-
	Vel Max	*m/s*	1.97	1.86	1.84	1.94	1.96	2.08	2.01	1.96	1.66	-	2.10	0.00
	Flow	*CFM*	15.73	15.50	14.46	17.01	15.64	17.48	16.96	16.21	13.89	-	34.3	0
	Temp	*^oC*	13.4	19.2	21.6	22.4	25.7	29.6	24.7	27.1	21.7	-	-	-
	Comments		2	2	2	2	2	2	2	2	2	2	2	2
2-14	*Well*	*"H_2O*	-1.68	-1.96	-1.11	-1.36	-2.11	-1.57	-1.21	-1.24	0.03			
well bore seal	*Lateral*	*"H_2O*	-5.27	-5.48	-5.12	-4.57	-3.93	-4.02	-3.19	-3.98	-2.47	-7.25	-10.42	-9.69
	CH_4	*%*	42.8	46.3	47.3	45.8	41.5	43.6	48.1	31.0	37.2	40.1	43.0	54.8
	CO_2	*%*	25.7	28.5	29.1	30.1	28.3	30.2	34.1	23.0	28.9	29.1	34.9	41.2
	O_2	*%*	2.6	2.1	2.2	2.3	6.3	5.4	3.7	8.3	5.9	8.3	0.1	1.1
	BAL (N_2)	*%*	28.9	23.1	21.4	21.8	23.9	20.8	14.1	37.7	28.0	22.5	22.0	2.9
	CO	*PPM*	10	10	14	10	2	3	0	5	4	3	16	0
	H_2S	*PPM*	14	17	19	28	57	69	77	61	83	199	20	52
	Vel Min	*m/s*	1.74	1.62	1.24	1.00	1.27	1.36	1.24	-	-	1.30	-	-
	Vel Max	*m/s*	1.90	1.99	1.58	1.26	1.66	1.90	1.85	-	-	1.30	0.20	1.20
	Flow	*CFM*	17.20	17.06	13.32	10.68	13.84	15.40	14.60	-	-	-	3.3	0
	Temp	*^oC*	12.4	16.2	18.6	18.9	23.9	28.4	29.3	-	-	-	-	-
	Comments		1/2T	1/2T	1/2T	1/2T	1/2T	1/2T	1/2T	closed	closed	closed	closed	closed

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
2-15	*Well*	*"H_2O*	-1.00	-1.25	-1.05	-1.22	-0.98	-0.01	-0.02	-1.14	-1.54	-	-	-
	Lateral	*"H_2O*	-5.7	-5.7	-5.2	-6.0	-5.4	-4.9	-3.5	-4.0	-3.8	-7.84	-10.35	-9.84
	CH_4	*%*	44.0	44.2	43.6	42.8	41.0	43.2	58.5	58.8	51.2	52.2	42.7	52.8
	CO_2	*%*	28.4	29.5	28.6	29.6	28.0	29.3	40.6	40.4	37.1	37.3	34.7	407.0
	O_2	*%*	4.5	3.8	5.2	6.0	6.8	7.5	0.3	0.2	1.2	2.3	2.3	4.7
	BAL (N_2)	*%*	23.1	22.5	22.6	21.6	24.2	20.0	0.6	0.6	10.5	8.2	20.3	-364.5
	CO	*PPM*	10.0	16.0	15.0	10.0	6.0	5.0	56.0	17.0	27.0	10	15	0
	H_2S	*PPM*	12.0	17.0	15.0	12.0	30.0	32.0	50.0	73.0	37.0	22	20	88
	Vel Min	*m/s*	1.2	1.3	1.3	1.2	-	-	0.0	1.2	1.2	2.20	-	-
	Vel Max	*m/s*	1.7	1.7	1.8	1.5	-	-	0.0	1.9	1.8	2.20	0.10	1.90
	Flow	*CFM*	13.80	13.80	14.84	12.76	-	-	0	14.69	14.55	-	2.3	0
	Temp	*^oC*	14.0	17.6	18.9	20.1	-	-	25.7	28.1	26.9	-	-	-
	Comments		1/2T	1/2T	cracked	cracked	closed	closed	1/2T	1	1	1	1	1
2-16	*Well*	*"H_2O*	-1.72	-1.84	-1.64	-1.55	-1.24	-1.69	-2.01	-1.24	0.05	-	-	-
	Lateral	*"H_2O*	-6.34	-5.24	-5.00	-5.21	-5.85	-4.55	-3.61	-3.99	-2.93	-	-9.62	-9.34
	CH_4	*%*	42.8	45.9	46.9	45.8	42.5	43.6	57.6	43.7	44.4	55.4	55.9	55.1
	CO_2	*%*	28.3	28.3	29.6	30.1	29.7	30.1	41.1	32.6	33.1	39.2	40.9	35.7
	O_2	*%*	5.2	3.9	4.1	4.5	5.0	5.1	1.3	4.0	4.7	1.2	3.2	8.8
	BAL (N_2)	*%*	23.7	21.9	19.4	19.6	22.8	21.2	0.0	19.7	17.8	4.2	0.0	0.4
	CO	*PPM*	15	15	19	10	9	10	23	0	18	12	17	18
	H_2S	*PPM*	28	26	17	26	38	57	42	48	37	59	57	26
	Vel Min	*m/s*	1.17	1.24	1.44	1.03	1.00	1.00	1.57	1.24	-	-	-	-
	Vel Max	*m/s*	1.37	1.69	1.62	1.62	1.52	1.84	1.98	1.66	-	-	2.50	2.70
	Flow	*CFM*	12.00	13.84	14.46	12.52	11.91	13.42	16.77	13.70	-	-	41.6	0
	Temp	*^oC*	14.0	17.2	19.6	24.8	28.1	30.5	25.4	26.3	-	-	-	-
	Comments		1T	1T	1/2T	1/2T	1/2T	1/2T	1T	1/2T	closed	closed	cracked	cracked
2-17	*Well*	*"H_2O*	-2.36	-2.68	-2.70	-2.34	-3.65	-2.15	-1.66	-1.24	0.02	-	-	-
	Lateral	*"H_2O*	-5.20	-5.33	-5.61	-5.84	-6.19	-5.63	-3.71	-4.05	-4.09	-7.99	-9.12	-10.47
	CH_4	*%*	47.2	50.1	51.9	52.6	55.8	54.8	45.7	26.4	11.8	0.7	27.8	0.0
	CO_2	*%*	28.3	29.9	30.6	31.4	38.0	37.2	32.7	19.0	10.7	0.9	21.2	0.6
	O_2	*%*	2.3	1.8	1.7	2.1	0.7	1.0	4.1	10.1	13.5	18.6	16.8	19.6
	BAL (N_2)	*%*	22.2	18.2	15.8	13.9	5.5	7.0	17.5	44.5	64.0	79.8	34.2	79.8
	CO	*PPM*	4	10	5	8	8	10	4	0	1	0	0	0
	H_2S	*PPM*	5	4	9	9	11	15	13	9	13	3	28	27
	Vel Min	*m/s*	1.02	1.24	1.34	1.62	1.95	1.66	1.11	-	-	0.00	-	-
	Vel Max	*m/s*	1.66	1.80	1.66	1.85	2.15	2.06	1.28	-	-	0.00	0.00	0.00
	Flow	*CFM*	12.66	14.36	14.17	16.39	19.37	17.58	11.29	-	-	0	0	0
	Temp	*^oC*	14.8	19.6	20.7	21.4	28.1	30.8	25.4	-	-	-	-	-
	Comments		2T	2T	2T	2T	2T	2T	1	closed	closed	closed	closed	closed

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
2-18	*Well*	*"H_2O*	-1.02	-1.32	-1.01	-0.02	-0.01	-1.55	-1.55	-0.98	-1.24	-	-	-
	Lateral	*"H_2O*	-4.68	-5.91	-5.27	-5.01	-3.71	-4.01	-3.63	-4.27	-4.36	7.95	-10.26	-10.62
	CH_4	*%*	42.8	45.3	46.8	42.5	59.3	57.4	56.7	49.9	52.2	44.6	42.0	42.8
	CO_2	*%*	30.0	30.2	38.4	39.1	34.3	33.2	37.7	36.2	37.6	34.4	33.5	35.4
	O_2	*%*	3.6	2.2	2.1	2.5	1.9	1.6	0.1	1.3	0.0	12.7	13.4	18.6
	BAL (N_2)	*%*	23.6	22.3	12.7	15.9	4.5	7.8	5.5	12.6	10.2	8.3	11.1	3.2
	CO	*PPM*	18	15	19	25	7	10	0	13	6	0	2	2
	H_2S	*PPM*	36	23	20	14	24	32	80	32	30	3	15	19
	Vel Min	*m/s*	1.01	1.03	1.24	-	1.55	1.54	0.44	0.00	0.95	0.00	0.00	-
	Vel Max	*m/s*	1.85	1.67	1.85	-	2.03	2.03	0.85	0.85	1.24	0.00	0.00	0.00
	Flow	*CFM*	13.51	12.76	14.60	-	16.91	16.87	6.09	4.02	10.35	0	0	0
	Temp	*^oC*	10.8	16.2	18.3	-	28.3	33.6	31.4	30.2	26.4	-	-	-
	Comments		1/2T	1/2T	1/2T	closed	1/2T	1/2T	cracked	cracked	1/2T	1/2T	1/2T	1/2T
3-19	*Well*	*"H_2O*	0.00	0.05	0.02	0.01	0.02	-1.03	-1.85	-1.22	0.02	-	-	-
	Lateral	*"H_2O*	-3.28	-6.32	-5.44	-5.11	-3.11	-3.62	-4.19	-3.50	-4.11	-	-9.69	-10.25
	CH_4	*%*	15.0	25.4	29.6	32.8	57.1	55.9	58.2	37.2	40.2	0.0	56.3	18.4
	CO_2	*%*	19.6	16.2	17.5	20.1	42.5	40.1	39.3	26.6	29.6	0.2	25.1	8.5
	O_2	*%*	10.8	10.8	11.6	10.4	0.4	0.6	2.0	6.5	5.8	20.2	18.6	11.8
	BAL (N_2)	*%*	54.6	47.6	41.3	36.7	0.0	3.4	0.5	29.7	24.4	79.6	0.0	61.3
	CO	*PPM*	5	5	8	10	3	5	2	2	5	0	2	10
	H_2S	*PPM*	10	5	4	5	49	33	49	39	44	2	8	1
	Vel Min	*m/s*	-	-	-	-	1.27	1.25	1.57	-	-	-	-	-
	Vel Max	*m/s*	-	-	-	-	1.66	1.87	1.99	-	-	-	0.00	0.00
	Flow	*CFM*	-	-	-	-	13.84	14.74	16.82	-	-	-	0	0
	Temp	*^oC*	-	-	-	-	21.7	23.6	28.4	-	-	-	-	-
	Comments		closed	closed	closed	closed	1/2T	1/2T	1	closed	closed	closed	closed	closed
3-20	*Well*	*"H_2O*	-1.85	-1.87	-1.44	-1.62	-1.02	-1.33	-1.48	-1.11	-1.57	-	-	-
	Lateral	*"H_2O*	-6.30	-6.68	-5.68	-4.57	-2.89	-3.68	-4.20	-4.03	-4.21	-	-10.33	-9.95
	CH_4	*%*	46.0	46.8	44.2	50.1	52.3	53.2	55.8	54.1	53.5	54.8	44.0	40.8
	CO_2	*%*	28.6	31.6	30.6	32.6	37.1	36.8	35.9	39.9	41.3	41.2	34.1	32.5
	O_2	*%*	5.7	2.8	3.6	2.8	2.9	2.4	2.1	1.2	0.6	2.5	4.8	4.2
	BAL (N_2)	*%*	19.7	18.8	21.6	14.5	7.7	7.6	6.2	4.8	4.6	1.5	17.1	22.5
	CO	*PPM*	20	20	24	20	16	16	18	13	12	14	8	10
	H_2S	*PPM*	10	17	15	14	11	10	14	19	14	16	15	10
	Vel Min	*m/s*	1.03	1.33	1.24	1.33	1.33	1.46	1.55	1.47	1.55	-	-	-
	Vel Max	*m/s*	1.48	1.60	1.58	1.94	1.84	1.69	2.01	1.88	1.95	-	2.20	0.00
	Flow	*CFM*	11.86	13.84	13.32	15.45	14.98	14.88	16.82	15.83	16.54	-	36	36
	Temp	*^oC*	15.9	18.4	17.6	20.7	22.4	25.8	28.4	24.1	22.0	-	-	-
	Comments		1T	1T	1/2T	1/2T	1	1	1	1	1	1	1	1

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
3-21	*Well*	*"H_2O*	-2.03	-1.68	-1.44	-1.65	-1.22	-0.01	0.02	-0.01	0.03	-	-	-
	Lateral	*"H_2O*	-5.74	-6.95	-5.99	-4.58	-3.88	-3.45	-4.34	-3.61	-3.95	-	-9.43	-9.84
	CH_4	*%*	43.9	46.2	47.0	50.1	1.0	5.5	14.8	11.7	15.8	0.1	37.4	0.0
	CO_2	*%*	27.8	27.5	28.3	29.6	0.1	20.1	12.2	9.6	10.6	0.3	16.7	2.2
	O_2	*%*	3.6	3.6	3.5	3.5	17.8	18.6	13.9	15.0	14.8	20.1	19.6	15.7
	BAL (N_2)	*%*	24.7	22.7	21.2	16.8	81.1	55.8	59.1	63.7	58.8	79.5	26.3	82.1
	CO	*PPM*	10	9	12	15	3	4	0	1	2	0	1	2
	H_2S	*PPM*	19	14	13	15	0	1	12	2	2	3	2	15
	Vel Min	*m/s*	1.11	1.25	1.28	1.66	-	-	-	-	-	-	-	-
	Vel Max	*m/s*	1.58	1.54	1.69	2.31	-	-	-	-	-	-	0.00	0.00
	Flow	*CFM*	12.71	13.18	14.03	18.76	-	-	-	-	-	-	0	0
	Temp	*^oC*	14.2	19.6	20.4	27.5	-	-	-	-	-	-	-	-
	Comments		1T	1T	1T	1T	closed	closed	closed	closed	closed	closed	closed	closed
3-22	*Well*	*"H_2O*	-3.24	-2.47	-2.18	-1.25	-1.02	-1.96	-1.28	-1.54	-1.54	-	-	-
well bore seal	*Lateral*	*"H_2O*	-8.20	-7.22	-6.51	-2.58	-1.55	-2.57	-2.42	-3.05	-4.05	-	-6.91	-1048.00
	CH_4	*%*	55.5	54.9	53.9	55.3	59.5	60.1	41.0	59.3	57.5	57.0	58.6	4.9
	CO_2	*%*	35.1	33.6	32.5	30.1	39.5	37.6	28.4	40.3	40.6	40.0	41.1	2.8
	O_2	*%*	1.4	2.0	2.1	1.8	1.0	0.5	7.4	0.4	0.9	3.0	0.4	4.9
	BAL (N_2)	*%*	8.0	9.5	11.5	12.8	0.0	1.8	23.2	0.0	1.0	0.0	-0.1	87.4
	CO	*PPM*	15	16	19	17	16	15	21	30	31	15	22	0
	H_2S	*PPM*	36	40	32	64	51	69	22	57	59	45	50	4
	Vel Min	*m/s*	1.24	1.36	1.08	1.00	1.01	1.24	1.00	1.25	1.34	-	-	-
	Vel Max	*m/s*	2.00	1.70	1.66	1.54	1.54	1.98	1.36	1.84	1.00	-	2.00	0.00
	Flow	*CFM*	15.30	14.46	12.95	12.00	12.05	15.21	11.15	14.60	85	-	33.9	0
	Temp	*^oC*	16.2	18.5	19.6	23.5	26.1	30.1	28.4	28.1	22.8	-	-	-
	Comments		2T	2T	2T	2T	2T	2T	1T	1T	1T	1	1	1
3-23	*Well*	*"H_2O*	0.00	0.01	0.02	0.02	0.02	-0.37	-0.65	-0.25	-0.51	-	-	-
	Lateral	*"H_2O*	-4.21	-4.28	-4.88	-4.35	-3.99	-3.26	-2.59	Surging	Surging	-7.25	-1.69	-8.51
	CH_4	*%*	23.9	26.9	29.6	35.8	57.2	56.8	49.6	51.7	44.0	40.1	0.2	52.8
	CO_2	*%*	20.1	18.4	20.4	22.4	41.9	40.1	34.3	35.0	32.7	29.1	0.6	40.2
	O_2	*%*	9.8	9.5	8.6	8.1	0.9	1.3	3.1	2.3	3.7	8.3	3.8	3.7
	BAL (N_2)	*%*	46.2	45.2	41.4	33.7	0.0	1.8	13.0	11.0	19.6	22.5	95.4	3.3
	CO	*PPM*	8	10	15	32	3	5	2	2	3	5	1	24
	H_2S	*PPM*	50	64	52	48	134	101	117	130	293	84	48	145
	Vel Min	*m/s*	-	-	-	-	0.00	0.00	0.00	-	0.44	-	-	-
	Vel Max	*m/s*	-	-	-	-	0.00	0.00	0.00	-	1.01	0.70	0.00	2.20
	Flow	*CFM*	-	-	-	-	0	0	0	-	6.85	11	0	34.3
	Temp	*^oC*	-	-	-	-	29.3	30.2	25.7	-	20.9	-	-	-
	Comments		closed	closed	closed	closed	cracked	cracked	cracked	cracked	cracked	cracked	cracked	1

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
3-24	*Well*	*"H_2O*	-0.01	0.05	0.01	0.00	0.02	0.03	0.02	0.03	0.01			
	Lateral	*"H_2O*	-4.28	-5.98	-5.22	-4.86	-3.68	-3.99	-3.95	-3.39	-3.65	-7.40	-10.27	-8.14
	CH_4	*%*	31.6	32.9	36.9	38.2	35.1	36.8	30.9	31.2	36.8	0.0	0.1	41.6
	CO_2	*%*	24.8	24.8	24.7	25.0	23.1	24.0	22.5	22.9	24.8	0.2	1.9	35.0
	O_2	*%*	9.2	8.8	8.1	8.2	8.9	8.1	9.1	8.0	9.3	20.8	18.6	3.3
	BAL (N_2)	*%*	34.4	33.5	30.3	28.6	32.9	31.1	37.5	37.9	29.1	79.0	79.4	20.1
	CO	*PPM*	17	15	18	26	12	15	11	10	15	1	0	8
	H_2S	*PPM*	103	107	97	101	111	136	107	204	157	4	6	5
	Vel Min	*m/s*	-	-	-	-	-	-	-	-	-	-	-	-
	Vel Max	*m/s*	-	-	-	-	-	-	-	-	-	0.00	0.00	0.00
	Flow	*CFM*	-	-	-	-	-	-	-	-	-	0	0	0
	Temp	*^oC*	-	-	-	-	-	-	-	-	-	-	-	-
	Comments		closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed
3-25	*Well*	*"H_2O*	0.01	0.01	0.01	-0.01	0.03	-0.62	-0.58	0.03	0.02	-	-	-
	Lateral	*"H_2O*	-5.29	-6.98	-6.31	-5.84	-3.95	-4.03	-3.82	-3.68	-4.02	-6.37	-9.09	-9.68
	CH_4	*%*	26.0	29.4	31.6	33.6	40.8	42.8	9.2	15.7	19.8	57.9	48.0	56.3
	CO_2	*%*	24.9	26.8	28.6	29.5	26.3	29.3	6.7	27.5	27.1	39.5	34.8	41.6
	O_2	*%*	9.2	7.4	8.3	5.8	7.8	6.6	15.2	14.8	12.4	1.0	3.8	3.3
	BAL (N_2)	*%*	39.9	36.4	31.5	31.1	25.1	21.3	68.9	42.0	40.7	1.6	13.4	-1.2
	CO	*PPM*	10	15	17	21	0	1	0	1	2	0	0	16
	H_2S	*PPM*	43	42	36	62	29	30	6	1	0	81	67	39
	Vel Min	*m/s*	-	-	-	-	0.00	0.00	-	-	-	1.30	-	-
	Vel Max	*m/s*	-	-	-	-	0.00	0.00	-	-	-	-	0.90	2.50
	Flow	*CFM*	-	-	-	-	0	0	-	-	-	21	14.7	41.6
	Temp	*^oC*	-	-	-	-	24.9	28.6	-	-	-	-	-	-
	Comments		closed	closed	closed	closed	cracked	cracked	closed	closed	closed	1	1	1
3-26	*Well*	*"H_2O*	-1.99	-1.89	-1.65	-1.22	-1.54	0.02	-0.01	-0.02	0.01	-	-	-
	Lateral	*"H_2O*	-4.27	-6.31	-5.94	-4.98	-4.05	-3.58	-4.39	-4.27	-4.10	-5.45	-9.97	-10.20
	CH_4	*%*	46.2	46.9	48.2	50.0	23.7	29.4	32.8	30.5	35.6	0.0	39.5	29.6
	CO_2	*%*	30.2	30.1	38.9	36.4	13.3	15.2	22.0	23.6	27.4	0.2	40.4	24.3
	O_2	*%*	5.0	3.6	3.5	2.4	13.2	10.9	8.7	8.5	10.2	19.8	20.1	3.6
	BAL (N_2)	*%*	18.6	19.4	9.4	11.2	49.8	44.5	36.5	37.4	26.8	80.0	0.0	42.5
	CO	*PPM*	10	15	19	23	1	2	2	3	5	0	0	1
	H_2S	*PPM*	68	60	54	47	20	15	22	21	14	2	16	36
	Vel Min	*m/s*	1.47	1.33	1.11	1.52	-	-	-	-	-	0.00	-	-
	Vel Max	*m/s*	1.59	1.58	1.68	2.07	-	-	-	-	-	0.00	0.00	0.00
	Flow	*CFM*	14.46	13.75	13.18	16.96	-	-	-	-	-	0	0	0
	Temp	*^oC*	14.0	18.0	19.3	23.6	-	-	-	-	-	-	-	-
	Comments		1T	1T	1T	1T	closed	closed	closed	closed	closed	closed	closed	closed

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
3-27 DP	*Well*	*"H_2O*	-1.32	-1.22	-1.01	-0.89	-1.00	-0.68	-0.57	-0.47	-0.58			
	Lateral	*"H_2O*	-4.87	-6.91	-5.96	-5.01	-3.91	-3.66	-3.66	-4.72	-4.25	-7.94	-9.18	-8.12
	CH_4	*%*	41.0	42.8	40.8	42.5	59.3	55.1	41.9	47.8	51.2	48.5	53.8	50.7
	CO_2	*%*	28.6	28.6	29.6	30.1	37.9	36.2	29.4	32.8	35.4	33.8	36.5	42.6
	O_2	*%*	4.2	3.7	4.5	3.3	2.2	2.5	4.7	3.8	3.8	3.3	3.6	8.0
	BAL (N_2)	*%*	26.2	24.9	25.1	24.1	0.6	6.2	24.0	15.6	9.6	14.4	6.1	-1.3
	CO	*PPM*	10	11	18	23	3	5	3	2	3	5	5	13
	H_2S	*PPM*	48	52	44	50	86	99	73	86	65	84	82	21
	Vel Min	*m/s*	1.07	1.44	1.34	1.64	1.11	1.51	0.57	0.44	0.57	-	-	-
	Vel Max	*m/s*	1.57	1.81	1.65	2.32	1.68	1.70	1.02	1.22	1.24	0.70	0.00	2.90
	Flow	*CFM*	12.47	15.36	14.13	18.71	13.18	15.17	7.51	7.84	8.55	11	0	33.9
	Temp	*^oC*	14.3	16.9	19.6	29.4	22.5	28.5	31.6	26.7	21.8	-	-	-
	Comments		1/2T	1/2T	cracked	cracked	cracked	cracked	cracked	1/2T	1/2T	1/2T	1/2T	1/2T
3-28	*Well*	*"H_2O*	-0.48	-0.47	-0.33	-0.26	-0.18	-0.01	-0.01	0.02	0.01	-	-	-
	Lateral	*"H_2O*	-5.22	-5.98	-5.17	-4.12	-3.92	-4.01	-1.39	-2.57	-3.29	-7.83	-9.93	-8.49
	CH_4	*%*	41.0	41.6	40.3	42.7	21.9	25.8	32.1	36.9	41.2	0.0	0.0	25.9
	CO_2	*%*	29.6	29.8	30.2	32.6	13.1	15.6	22.7	24.7	26.9	0.3	0.8	25.4
	O_2	*%*	6.0	5.6	5.5	4.8	14.2	15.8	11.0	12.3	13.5	10.3	19.6	19.6
	BAL (N_2)	*%*	23.4	23.0	24.0	19.9	50.8	42.8	34.2	26.1	18.4	89.4	79.6	29.1
	CO	*PPM*	8	10	11	15	2	2	3	5	7	0	0	5
	H_2S	*PPM*	42	37	42	62	39	41	19	17	12	14	15	5
	Vel Min	*m/s*	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-
	Vel Max	*m/s*	0.00	0.00	0.00	0.00	-	-	-	-	-	0.40	0.00	0.00
	Flow	*CFM*	0	0	0	0	-	-	-	-	-	7.2	0	0
	Temp	*^oC*	12.7	18.6	20.4	30.4	-	-	-	-	-	-	-	-
	Comments		cracked	cracked	cracked	cracked	closed	closed	closed	closed	closed	closed	closed	closed
3-29 DP	*Well*	*"H_2O*	-2.55	-2.55	-2.34	-2.11	-2.01	-2.14	-1.58	-2.14	-1.95	-	-	-
	Lateral	*"H_2O*	-5.28	-6.94	-6.28	-5.68	-4.27	-4.36	-3.65	-4.22	-3.13	-7.47	-9.92	-10.26
	CH_4	*%*	50.2	50.6	51.8	55.0	60.9	59.5	56.7	51.7	5.0	27.5	54.7	36.7
	CO_2	*%*	30.6	29.9	30.1	31.2	37.3	36.4	35.7	34.6	4.3	18.5	41.3	25.5
	O_2	*%*	2.3	2.2	2.3	2.6	1.8	1.4	2.0	2.5	17.5	9.7	4.0	2.8
	BAL (N_2)	*%*	16.9	17.3	15.8	11.2	0.0	2.7	5.6	11.2	73.2	44.3	0.0	35.0
	CO	*PPM*	15	17	18	24	3	5	7	15	0	0	0	0
	H_2S	*PPM*	69	49	53	63	78	99	123	144	1	6	70	51
	Vel Min	*m/s*	1.58	1.46	1.28	1.55	1.66	1.58	1.47	1.47	-	0.00	-	-
	Vel Max	*m/s*	2.01	1.80	1.69	2.01	2.17	2.14	1.62	1.68	-	0.20	0.00	0.00
	Flow	*CFM*	16.96	15.40	14.03	16.82	18.10	17.58	14.60	14.88	-	-	0	0
	Temp	*^oC*	14.3	20.1	21.7	24.7	28.4	30.1	31.5	30.6	-	-	-	-
	Comments		2T	2T	2T	2T	2T	2T	2T	2T	closed	closed	closed	closed

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
3-30 DP	*Well*	*"H_2O*	0.05	0.01	0.02	0.01	-0.01	0.02	-0.03	0.02	0.03	-	-	-
	Lateral	*"H_2O*	-4.98	-6.91	-6.38	-5.24	-3.92	-4.01	-3.58	-4.14	-4.00	-0.09	-10.05	-9.82
	CH_4	*%*	23.5	29.4	31.2	35.6	19.3	22.6	29.4	33.6	36.9	0.0	7.4	15.8
	CO_2	*%*	20.1	23.3	24.6	26.7	10.0	12.8	15.2	20.1	21.5	0.3	5.9	10.9
	O_2	*%*	10.3	8.9	6.9	6.6	14.2	15.6	14.7	15.7	16.2	11.7	17.7	2.4
	BAL (N_2)	*%*	46.1	38.4	37.3	31.1	56.5	49.0	40.7	30.6	25.4	88.0	69.0	70.9
	CO	*PPM*	15	12	15	11	1	2	5	1	4	0	0	2
	H_2S	*PPM*	26	32	35	42	11	10	5	7	5	2	17	10
	Vel Min	*m/s*	-	-	-	-	-	-	-	-	-	-	-	-
	Vel Max	*m/s*	-	-	-	-	-	-	-	-	-	0.00	0.00	0.00
	Flow	*CFM*	-	-	-	-	-	-	-	-	-	0	0	0
	Temp	*^oC*	-	-	-	-	-	-	-	-	-	-	-	-
	Comments		closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed
4-31	*Well*	*"H_2O*	-1.85	-1.99	-1.00	-1.24	-1.34	-1.11	-2.01	-2.01	-2.95	-	-	-
	Lateral	*"H_2O*	-5.27	-6.38	-5.85	-5.32	-2.99	-3.66	-4.08	-3.75	-6.05	-6.55	-8.38	0.02
	CH_4	*%*	45.8	48.1	45.9	45.8	44.2	45.8	55.7	54.8	53.9	54.4	52.1	56.2
	CO_2	*%*	29.5	30.2	29.6	30.1	31.7	30.2	39.7	39.0	38.5	38.8	36.7	33.9
	O_2	*%*	3.6	3.3	3.9	3.6	5.2	5.0	1.1	2.8	3.5	1.6	3.1	1.0
	BAL (N_2)	*%*	21.1	18.4	20.6	20.5	18.9	19.0	3.5	3.4	4.1	5.2	8.1	8.9
	CO	*PPM*	15	15	19	19	35	17	3	3	2	2	1	5
	H_2S	*PPM*	200	200	168	154	62	60	186	166	127	123	52	101
	Vel Min	*m/s*	1.03	1.36	1.01	1.22	1.66	1.55	1.69	1.47	1.57	-	-	-
	Vel Max	*m/s*	1.40	1.96	1.36	1.84	2.04	2.20	2.14	2.03	2.03	1.30	3.40	0.00
	Flow	*CFM*	11.48	15.69	11.20	14.46	17.48	17.72	18.10	16.54	17.01	22	56.5	0
	Temp	*^oC*	13.9	15.0	19.6	20.4	24.8	28.4	30.5	32.6	25.7	-	-	-
	Comments		1T	1T	1/2T	1/2T	1/2T	1/2T	1	1	1	1	1	1
4-32	*Well*	*"H_2O*	-2.87	-2.25	-1.94	-1.64	-2.14	-2.36	-2.48	-2.15	-2.58	-	-	-
	Lateral	*"H_2O*	-6.31	-7.58	-6.58	-5.26	-4.10	-4.57	-4.27	-3.60	-6.16	-5.96	-8.26	0.35
	CH_4	*%*	50.2	52.3	51.6	54.6	55.5	54.8	54.8	55.2	51.8	54.2	55.6	55.2
	CO_2	*%*	31.9	32.6	32.6	33.5	43.0	42.6	40.8	41.0	39.7	41.0	42.8	37.2
	O_2	*%*	3.3	3.0	2.5	2.1	1.5	1.4	1.5	1.0	1.0	0.5	1.6	1.9
	BAL (N_2)	*%*	14.6	12.1	13.3	9.8	0.0	1.2	2.9	2.8	7.5	4.3	0.0	5.7
	CO	*PPM*	17	15	19	58	3	5	3	3	3	2	2	2
	H_2S	*PPM*	128	126	103	122	147	150	156	152	119	113	123	155
	Vel Min	*m/s*	1.25	1.55	1.24	1.62	1.55	1.68	1.28	1.54	1.57	-	-	-
	Vel Max	*m/s*	1.88	1.93	1.68	2.24	1.97	2.47	2.03	1.99	2.01	1.50	1.10	0.00
	Flow	*CFM*	14.79	16.44	13.80	18.24	16.63	19.61	15.64	16.68	16.91	24.3	19.2	0
	Temp	*^oC*	14.8	19.3	21.5	28.4	28.4	32.5	30.8	30.7	24.9	-	-	-
	Comments		2	2	2	2	2	2	2	2	2	2	2	2

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
4-33	*Well*	*"H_2O*	0.00	-0.01	0.00	0.02	0.01	-0.01	0.01	-1.24	-2.66	-	-	-
	Lateral	*"H_2O*	-5.84	-7.12	-6.51	-5.69	-5.24	-4.68	-3.98	-2.81	-4.95	-7.44	-8.17	-8.95
	CH_4	*%*	25.3	19.6	26.8	32.5	30.1	28.4	30.4	54.5	57.1	58.8	59.8	50.6
	CO_2	*%*	22.1	20.3	24.1	29.6	25.7	25.6	26.4	36.1	40.2	39.7	39.8	32.5
	O_2	*%*	9.8	9.8	9.5	8.7	9.2	9.5	8.8	1.8	0.8	1.1	0.1	2.5
	BAL (N_2)	*%*	42.8	50.3	39.6	29.2	35.0	36.5	34.4	7.6	1.9	0.4	0.3	14.4
	CO	*PPM*	24	15	16	18	15	16	17	2	3	4	6	1
	H_2S	*PPM*	63	63	53	47	34	53	47	281	236	208	205	32
	Vel Min	*m/s*	-	-	-	-	-	-	-	1.11	1.58	-	-	-
	Vel Max	*m/s*	-	-	-	-	-	-	-	1.68	2.17	1.90	5.30	1.20
	Flow	*CFM*	-	-	-	-	-	-	-	13.18	17.72	31.3	87.9	14.7
	Temp	*^oC*	-	-	-	-	-	-	-	25.0	26.9	-	-	-
	Comments		closed	closed	closed	closed	closed	closed	closed	2	2	2	2	2
4-34	*Well*	*"H_2O*	-2.68	-2.94	-2.03	-1.84	-1.27	-1.57	-1.84	-1.57	-1.24	-	-	-
	Lateral	*"H_2O*	-5.27	-6.95	-5.99	-4.65	-4.25	-3.23	-2.92	-2.61	-2.51	-4.15	-0.02	-3.65
	CH_4	*%*	50.0	50.8	51.7	52.1	48.2	42.8	55.4	58.8	53.7	49.7	1.1	0.0
	CO_2	*%*	31.6	29.6	30.6	31.2	28.1	30.3	40.2	38.7	37.9	33.8	2.8	0.2
	O_2	*%*	3.4	2.4	2.9	2.5	3.1	5.7	4.4	1.4	2.0	5.7	18.4	14.8
	BAL (N_2)	*%*	15.0	17.2	14.8	14.2	20.6	21.2	0.0	1.1	6.4	10.8	77.7	85.0
	CO	*PPM*	24	20	26	33	20	2	3	2	3	3	3	0
	H_2S	*PPM*	>>>>	>>>>	>>>>	>>>>	>>>>	255	345	354	287	354	15	54
	Vel Min	*m/s*	1.78	1.03	1.22	1.48	1.11	1.11	1.57	1.66	1.27		-	-
	Vel Max	*m/s*	2.65	1.62	1.84	2.01	1.48	1.68	1.99	1.87	1.66	1.70	0.00	0.00
	Flow	*CFM*	20.93	12.52	14.46	16.49	12.24	13.18	16.82	16.68	13.84	29	0	0
	Temp	*^oC*	14.0	18.2	20.6	25.3	24.1	28.4	28.1	25.0	21.8	-	-	-
	Comments		2T	2T	2T	2T	1	1/2T	1/2T	2	2	2	2	2
4-35	*Well*	*"H_2O*	-2.66	-2.98	-2.11	-1.84	-1.24	-2.01	-0.01	0.02	0.01	-	-	-
well bore seal	*Lateral*	*"H_2O*	-5.95	-6.26	-5.89	-4.39	-2.70	-4.03	-4.12	-3.58	-4.01	-7.14	-7.93	-10.27
	CH_4	*%*	47.1	51.2	50.8	52.7	53.9	18.5	24.7	24.1	29.6	45.8	0.0	52.6
	CO_2	*%*	28.3	29.7	30.4	31.0	36.3	13.1	19.6	17.6	19.5	33.5	0.3	40.9
	O_2	*%*	2.5	2.0	2.1	1.5	2.4	12.9	13.5	10.9	11.4	4.8	20.2	2.2
	BAL (N_2)	*%*	22.1	17.1	16.7	14.8	7.4	55.5	42.2	47.4	39.5	15.9	79.5	4.3
	CO	*PPM*	26	22	26	20	6	1	2	2	5	3	2	0
	H_2S	*PPM*	198	231	208	266	381	134	100	207	111	348	11	81
	Vel Min	*m/s*	1.11	1.68	1.66	1.84	1.27	-	-	-	-	-	-	-
	Vel Max	*m/s*	1.67	2.01	2.04	2.30	1.99	-	-	-	-	0.20	0.00	1.80
	Flow	*CFM*	13.13	17.43	17.48	19.56	15.40	-	-	-	-	2.2	0	0
	Temp	*^oC*	14.0	18.4	20.1	21.5	25.7	-	-	-	-	-	-	-
	Comments		2T	2T	2T	2T	2T	closed	closed	closed	closed	closed	closed	closed

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
4-36	*Well*	*"H_2O*	-	-	-	-	-2.58	-2.47	-2.15	0.09	0.15	-	-	-
	Lateral	*"H_2O*	NLV	NLV	NLV	NLV	-3.16	-3.69	-3.91	-3.38	-4.03	-7.44	-0.03	-8.30
	CH_4	*%*	-	-	-	-	36.1	39.5	37.5	44.7	40.2	44.1	0.0	40.1
	CO_2	*%*	-	-	-	-	23.0	20.7	25.5	29.8	28.5	29.7	0.2	33.7
	O_2	*%*	-	-	-	-	9.4	8.2	6.7	4.8	3.6	5.0	20.5	1.8
	BAL (N_2)	*%*	-	-	-	-	31.5	31.6	30.3	20.7	27.7	21.2	79.3	24.4
	CO	*PPM*	-	-	-	-	3	5	1	1	2	3	2	2
	H_2S	*PPM*	-	-	-	-	231	157	202	346	256	253	3	251
	Vel Min	*m/s*	-	-	-	-	1.22	1.66	-	-	-	-	-	-
	Vel Max	*m/s*	-	-	-	-	1.58	2.01	-	-	-	2.60	0.00	0.00
	Flow	*CFM*	-	-	-	-	13.23	17.34	-	-	-	43	0	0
	Temp	*^oC*	-	-	-	-	20.1	27.0	-	-	-	-	-	-
	Comments		NLV	NLV	NLV	NLV	`1	1	closed	closed	closed	cracked	cracked	cracked
4-37	*Well*	*"H_2O*	-0.05	0.02	-0.01	0.00	-0.02	-0.02	0.01	-0.01	0.02	-	-	-
	Lateral	*"H_2O*	-4.21	-6.94	-6.13	-4.22	-5.24	-4.57	-5.17	-3.62	-3.66	-7.24	-10.29	-10.28
	CH_4	*%*	26.3	25.7	29.8	31.6	31.2	33.6	32.5	14.8	18.4	35.9	7.4	0.0
	CO_2	*%*	19.4	19.6	21.5	25.7	25.4	26.8	22.7	14.5	20.5	26.9	5.9	1.4
	O_2	*%*	11.0	9.9	9.6	10.0	8.8	8.0	10.5	10.6	8.6	7.0	17.7	15.8
	BAL (N_2)	*%*	43.3	44.8	39.1	32.7	34.6	31.6	34.3	60.1	52.5	30.2	69.0	82.8
	CO	*PPM*	15	12	18	24	20	17	22	4	5	2	0	1
	H_2S	*PPM*	14	18	22	19	22	25	20	49	71	76	17	10
	Vel Min	*m/s*	-	-	-	-	-	-	-	-	-	-	-	-
	Vel Max	*m/s*	-	-	-	-	-	-	-	-	-	0.00	0.00	0.00
	Flow	*CFM*	-	-	-	-	-	-	-	-	-	0.7	0	0
	Temp	*^oC*	-	-	-	-	-	-	-	-	-	-	-	-
	Comments		closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed
5-38	*Well*	*"H_2O*	0.01	0.03	0.04	0.01	0.01	0.07	0.01	-0.01	-0.02	-	-	-
	Lateral	*"H_2O*	-4.96	-6.58	-6.04	-5.12	-5.28	-4.92	-5.17	-3.34	-3.68	0.43	0.03	-6.95
	CH_4	*%*	16.3	19.4	23.4	29.6	25.1	29.5	29.6	36.2	40.1	55.6	39.1	56.7
	CO_2	*%*	18.2	18.3	19.6	22.4	20.1	24.8	22.8	26.6	28.6	41.7	41.6	40.1
	O_2	*%*	11.5	12.4	11.8	12.6	10.7	10.0	10.1	7.0	5.4	0.1	19.3	1.2
	BAL (N_2)	*%*	54.0	49.9	45.2	35.4	44.1	35.7	37.5	30.2	25.9	2.6	0.0	2.0
	CO	*PPM*	18	15	19	15	24	26	17	7	10	9	0	0
	H_2S	*PPM*	44	27	30	24	11	14	26	29	22	15	23	27
	Vel Min	*m/s*	-	-	-	-	-	-	-	-	-	-	-	-
	Vel Max	*m/s*	-	-	-	-	-	-	-	-	-	0.00	0.00	3.60
	Flow	*CFM*	-	-	-	-	-	-	-	-	-	0	0	41.8
	Temp	*^oC*	-	-	-	-	-	-	-	-	-	-	-	-
	Comments		closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	1

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
5-39	*Well*	*"H_2O*	-1.38	-1.54	-1.23	-1.00	-1.03	-1.57	0.02	0.05	0.00	-	-	-
well bore seal	*Lateral*	*"H_2O*	-4.22	-6.02	-5.32	-4.86	-4.29	-4.13	-4.57	-4.21	-3.99	-0.13	-0.01	-6.95
	CH_4	*%*	45.3	44.8	45.8	46.2	40.1	38.8	40.2	35.2	40.2	0.3	60.8	55.9
	CO_2	*%*	28.3	25.3	26.3	28.3	28.6	28.7	29.4	30.5	28.4	1.1	39.0	41.9
	O_2	*%*	5.4	4.7	4.2	4.0	4.3	5.8	6.6	5.8	4.5	0.3	0.2	4.4
	BAL (N_2)	*%*	21.0	25.2	23.7	21.5	27.0	26.7	23.8	28.5	26.9	98.3	0.0	-2.2
	CO	*PPM*	19	18	19	15	27	5	10	14	15	4	3	27
	H_2S	*PPM*	36	63	57	47	66	55	41	33	15	22	98	100
	Vel Min	*m/s*	1.54	1.25	1.11	1.10	1.00	-	-	-	-	-	-	-
	Vel Max	*m/s*	2.03	1.69	1.87	1.64	1.24	-	-	-	-	0.00	0.00	1.80
	Flow	*CFM*	16.87	13.89	14.08	12.95	10.58	-	-	-	-	0	0	11.7
	Temp	*^oC*	13.6	18.4	20.3	21.4	28.6	-	-	-	-	-	-	-
	Comments		1/2T	1/2T	1/2T	1/2T	1/2T	closed	closed	closed	closed	closed	closed	1
5-40	*Well*	*"H_2O*	-2.68	-2.95	-2.21	-2.03	-1.27	-1.27	-1.55	-0.01	-0.57	-	-	-
	Lateral	*"H_2O*	-4.02	-5.71	-5.84	-4.95	-4.02	-4.49	-3.53	-2.67	-3.58	0.65	0.12	-9.82
	CH_4	*%*	52.1	53.2	55.9	54.8	49.4	42.3	32.8	53.3	51.8	58.6	0.0	58.5
	CO_2	*%*	29.2	29.6	30.1	32.6	28.4	31.7	23.9	37.0	35.8	38.4	0.6	38.6
	O_2	*%*	3.6	2.3	2.5	2.1	3.1	5.0	7.1	1.5	1.9	0.4	20.1	0.6
	BAL (N_2)	*%*	15.1	14.9	11.5	10.5	19.1	21.0	36.2	8.2	10.5	2.6	79.3	2.3
	CO	*PPM*	15	14	19	26	15	0	1	2	3	2	2	4
	H_2S	*PPM*	263	237	244	211	155	165	183	286	321	183	11	157
	Vel Min	*m/s*	1.25	1.88	1.36	1.56	1.12	1.00	-	1.02	1.00	-	-	-
	Vel Max	*m/s*	1.89	2.04	2.00	1.88	1.85	1.57	-	1.17	1.27	0.00	0.00	4.60
	Flow	*CFM*	14.84	18.52	15.88	16.25	14.03	12.14	-	10.35	10.73	0	0	87.9
	Temp	*^oC*	14.0	18.2	19.7	24.1	27.0	26.8	-	16.3	20.1	-	-	-
	Comments		2T	2T	2T	2T	1	1/2T	closed	1/2T	1/2T	1/2T	1/2T	1/2T
5-41	*Well*	*"H_2O*	-1.03	-1.00	-0.08	-0.15	-0.87	-1.22	-1.44	-1.57	-1.11	-	-	-
well bore seal	*Lateral*	*"H_2O*	-5.38	-6.31	-5.88	-4.56	-4.28	-4.04	-3.42	-3.16	-1.95	0.38	0.03	-0.01
	CH_4	*%*	47.3	48.2	49.3	49.6	48.7	49.6	50.8	56.1	51.6	54.6	0.0	39.6
	CO_2	*%*	29.5	27.6	28.1	29.5	27.5	33.6	33.7	36.4	35.5	40.1	0.1	16.9
	O_2	*%*	4.2	3.2	3.0	2.5	2.5	2.8	4.5	2.0	1.6	5.3	20.5	17.5
	BAL (N_2)	*%*	19.0	21.0	19.6	18.4	21.3	14.0	11.0	5.5	11.3	0.0	79.4	26.0
	CO	*PPM*	15	15	19	19	24	3	3	4	4	2	1	0
	H_2S	*PPM*	187	184	147	147	136	388	267	297	331	156	3	8
	Vel Min	*m/s*	1.33	1.14	1.57	1.57	1.03	1.34	1.22	1.44	1.11	-	-	-
	Vel Max	*m/s*	1.63	1.85	2.14	2.14	1.57	1.85	1.84	1.59	1.54	1.00	0.00	0.00
	Flow	*CFM*	13.99	14.13	17.53	17.53	12.28	15.07	14.46	14.32	12.52	1.2	0	0
	Temp	*^oC*	13.2	18.0	19.5	19.5	24.1	28.4	27.4	25.7	23.6	-	-	-
	Comments		1/2T	1/2T	1/2T	1/2T	1/2T	1/2T	1/2T	1	1	1	1	1

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
5-42	*Well*	*"H_2O*	-0.29	-0.98	-0.84	-0.51	-0.51	-0.68	-1.24	-1.57	-1.22	-	-	-
	Lateral	*"H_2O*	-5.31	-6.32	-5.21	-4.57	-4.20	-4.13	-3.65	-3.32	-3.13	-6.60	-8.26	-7.15
	CH_4	*%*	38.2	40.1	41.3	42.8	44.6	54.8	53.2	47.5	25.8	49.4	46.6	14.8
	CO_2	*%*	28.1	28.6	28.6	30.2	27.5	38.1	36.8	34.0	20.0	35.5	39.9	4.8
	O_2	*%*	5.5	5.2	5.1	4.4	4.1	1.3	4.3	2.5	9.6	3.3	13.5	14.8
	BAL (N_2)	*%*	28.2	26.1	25.0	22.6	23.8	5.8	5.7	16.0	44.6	11.8	0.0	65.6
	CO	*PPM*	14	14	19	25	10	2	3	3	1	2	1	1
	H_2S	*PPM*	216	199	233	220	157	>>>>	414	425	259	358	242	4
	Vel Min	*m/s*	0.00	0.00	0.00	0.00	0.00	1.22	1.48	1.66	-	-	-	-
	Vel Max	*m/s*	0.00	0.00	0.00	0.00	0.00	1.68	1.66	2.04	-	0.30	0.00	0.00
	Flow	*CFM*	0	0	0	0	0	13.70	14.84	17.48	-	4.2	0	0
	Temp	*^oC*	13.6	15.9	19.4	26.3	29.3	29.4	30.4	28.1	-	-	-	-
	Comments		cracked	cracked	cracked	cracked	cracked	1/2T	1%	1%	closed	1	1	1
5-43	*Well*	*"H_2O*	-2.65	-2.89	-2.18	-1.89	-2.68	-2.57	-1.98	-1.57	-0.03	-	-	-
	Lateral	*"H_2O*	-6.28	-7.15	-6.57	-4.99	-5.47	-3.92	-4.03	-4.21	-4.00	1.44	0.11	0.14
	CH_4	*%*	50.1	52.9	53.6	54.2	54.0	57.0	52.1	40.0	41.2	0.6	59.2	0.0
	CO_2	*%*	29.5	31.2	30.7	31.8	31.2	38.6	36.8	28.2	27.5	2.0	39.0	0.1
	O_2	*%*	3.9	2.9	2.4	2.2	1.5	0.8	3.6	5.9	4.5	17.6	1.8	19.6
	BAL (N_2)	*%*	16.5	13.0	13.3	11.8	13.3	3.6	7.5	25.9	26.8	79.8	0.0	80.3
	CO	*PPM*	12	14	19	22	10	4	5	2	5	0	4	2
	H_2S	*PPM*	124	87	101	132	143	149	120	101	87	14	108	25
	Vel Min	*m/s*	1.37	1.36	1.55	1.66	1.27	1.47	1.25	1.22	-	-	-	-
	Vel Max	*m/s*	1.96	1.99	2.03	2.24	2.01	2.01	1.68	1.38	-	0.00	0.00	0.00
	Flow	*CFM*	15.73	15.83	16.91	18.43	15.50	16.44	13.84	12.28	-	0	0	0
	Temp	*^oC*	14.7	17.4	19.6	29.6	24.0	26.7	26.3	25.7	-	-	-	-
	Comments		2T	2T	2T	2T	2T	2T	2T	1/2T	closed	closed	closed	closed
5-44	*Well*	*"H_2O*	-2.36	-2.57	-2.03	.1.85	-2.18	-2.34	-1.58	-1.25	-0.24	-	-	-
	Lateral	*"H_2O*	-5.84	-5.14	-5.10	-4.85	-4.96	-4.11	-3.70	-3.36	-0.64	0.65	0.06	-8.47
	CH_4	*%*	52.1	52.1	53.6	52.4	55.2	57.6	59.9	59.1	56.6	56.5	57.0	50.2
	CO_2	*%*	30.9	32.5	30.6	31.6	31.0	38.0	39.7	39.4	39.0	39.4	40.8	37.2
	O_2	*%*	2.2	1.6	1.9	1.8	1.0	0.6	0.3	1.5	0.4	4.0	2.2	3.0
	BAL (N_2)	*%*	14.8	13.8	13.9	14.2	12.8	3.8	0.1	0.0	4.0	0.1	0.0	9.6
	CO	*PPM*	15	15	18	22	10	3	4	4	2	2	2	2
	H_2S	*PPM*	>>>>.	>>>>.	>>>>.	>>>>.	>>>>.	>>>>.	>>>>.	>>>>.	>>>>.	>>>>>	>>>>	41
	Vel Min	*m/s*	1.30	1.57	1.44	1.63	1.57	1.57	1.66	1.68	0.44	-	-	-
	Vel Max	*m/s*	1.89	1.96	2.03	1.99	2.17	1.84	2.01	2.01	0.69	1.20	0.00	3.30
	Flow	*CFM*	15.07	16.68	16.39	17.10	17.67	16.11	17.34	17.43	5.34	19.6	0	56.5
	Temp	*^oC*	13.5	17.2	19.6	28.0	22.6	25.3	28.6	29.6	24.1	-	-	-
	Comments		2T	2T	2T	2T	2T	2T	2T	2T	2T	2	2	2

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
5-45	*Well*	*"H_2O*	-1.95	-1.66	-1.25	-1.57	-1.68	-1.98	-1.44	-1.57	-1.44	-	-	-
	Lateral	*"H_2O*	-4.87	-5.27	-5.01	-5.33	-4.88	-4.30	-3.39	-3.22	-3.66	-5.09	-7.92	0.33
	CH_4	*%*	48.2	48.3	49.6	50.2	51.0	50.8	59.2	54.2	57.7	44.9	39.5	41.6
	CO_2	*%*	29.3	28.4	27.1	28.4	33.5	35.8	40.5	40.2	39.8	36.9	32.9	40.2
	O_2	*%*	2.6	2.8	3.1	3.3	3.1	2.4	0.3	0.3	0.0	1.9	1.2	18.0
	BAL (N_2)	*%*	19.9	20.5	20.2	18.1	12.4	11.0	0.0	5.3	2.5	16.3	26.4	0.2
	CO	*PPM*	12	12	16	20	4	5	4	4	3	3	3	1
	H_2S	*PPM*	40	22	25	66	93	69	189	145	214	69	88	35
	Vel Min	*m/s*	1.74	1.55	1.84	1.62	1.28	1.41	1.00	1.25	1.55	-	-	-
	Vel Max	*m/s*	2.39	1.80	2.14	1.97	2.03	1.86	1.94	1.84	1.90	5.60	0.30	0.00
	Flow	*CFM*	19.51	15.83	18.80	16.96	15.64	15.45	13.89	14.60	16.30	93.5	4.4	0
	Temp	*^oC*	14.0	18.6	18.6	24.0	29.3	30.5	28.5	29.0	21.7	-	-	-
	Comments		1T	1T	1T	1T	1T	1T	1T	1T	2	2	2	2
5-46	*Well*	*"H_2O*	0.03	0.01	0.03	0.01	0.05	0.03	0.10	0.08	0.04	-	-	-
	Lateral	*"H_2O*	-4.69	-5.69	-5.11	-4.21	-4.58	-4.99	-4.68	-4.62	-4.21	-1.35	-9.63	-9.62
	CH_4	*%*	30.6	31.2	35.6	38.6	40.2	41.2	39.5	41.5	40.2	0.1	37.2	48.4
	CO_2	*%*	28.6	25.6	26.8	29.4	28.5	29.5	27.4	28.6	29.3	0.5	31.7	44.9
	O_2	*%*	9.9	10.5	8.5	6.6	8.1	6.6	7.4	8.5	6.6	0.9	0.6	2.6
	BAL (N_2)	*%*	30.9	32.7	29.1	25.4	23.2	22.7	25.7	21.4	23.9	98.5	30.5	4.1
	CO	*PPM*	12	11	17	26	15	19	24	25	30	1	2	0
	H_2S	*PPM*	24	18	22	17	15	21	29	12	11	437	44	144
	Vel Min	*m/s*	-	-	-	-	-	-	-	-	-	-	-	-
	Vel Max	*m/s*	-	-	-	-	-	-	-	-	-	0.00	0.00	2.80
	Flow	*CFM*	-	-	-	-	-	-	-	-	-	0	0	19.2
	Temp	*^oC*	-	-	-	-	-	-	-	-	-	-	-	-
	Comments		closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed
6-47	*Well*	*"H_2O*	-2.68	-2.58	-2.00	-1.95	-2.14	-1.57	-1.55	-1.65	-2.49	-	-	-
	Lateral	*"H_2O*	-5.28	-6.94	-5.96	-4.75	-4.56	-4.05	-4.21	-4.61	-5.83	-7.64	-5.28	-6.57
	CH_4	*%*	50.3	53.6	51.7	52.9	52.8	55.3	53.9	52.5	57.7	58.7	59.4	15.8
	CO_2	*%*	29.4	31.2	30.6	30.4	31.6	36.8	38.0	34.9	39.0	36.3	38.4	10.8
	O_2	*%*	3.3	2.4	2.6	2.1	3.4	1.3	2.0	2.2	1.2	1.2	1.1	14.8
	BAL (N_2)	*%*	17.0	12.8	15.1	14.6	12.2	6.6	6.1	10.4	2.1	3.8	1.1	58.6
	CO	*PPM*	10	12	15	22	19	2	5	3	2	1	2	1
	H_2S	*PPM*	21	20	26	36	51	113	111	107	110	63	49	17
	Vel Min	*m/s*	1.33	1.47	1.66	1.50	1.57	1.27	1.36	1.57	1.66	-	-	-
	Vel Max	*m/s*	1.86	2.02	2.07	1.96	2.17	1.85	1.88	2.01	2.07	1.10	2.50	0.00
	Flow	*CFM*	15.07	16.49	17.62	16.35	17.67	14.74	15.31	16.91	17.62	18.5	41.8	0.9
	Temp	*^oC*	14.7	16.9	20.7	25.3	22.8	27.1	25.1	28.6	24.0	-	-	-
	Comments		2	2	2	2	2	2	2	2	2	2	2	1

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
6-48	*Well*	*"H_2O*	-1.86	-1.22	-1.00	-1.20	-1.42	-1.25	-1.28	-1.66	-2.57	-	-	-
	Lateral	*"H_2O*	-5.63	-6.95	-5.69	-4.95	-4.98	-4.22	-4.35	-4.75	-6.29	-7.39	-5.43	-5.68
	CH_4	*%*	45.2	48.6	50.1	50.3	51.6	50.6	52.8	54.8	54.3	48.2	60.7	32.9
	CO_2	*%*	28.6	28.6	29.3	30.6	28.0	33.4	36.4	43.3	40.9	33.5	34.7	14.4
	O_2	*%*	2.2	2.1	2.5	2.3	3.4	0.0	0.9	1.3	0.8	1.1	0.9	10.2
	BAL (N_2)	*%*	24.0	20.7	18.1	16.8	17.0	16.0	9.9	0.6	4.0	17.2		42.5
	CO	*PPM*	10	10	17	20	17	3	5	3	1	3	2	0
	H_2S	*PPM*	14	12	15	14	19	44	122	210	109	24	40	27
	Vel Min	*m/s*	1.12	1.20	1.27	1.66	1.25	1.17	1.55	1.24	1.55	-		-
	Vel Max	*m/s*	1.63	1.66	1.66	2.14	1.94	1.59	2.05	1.85	1.83	2.20	1.90	0.00
	Flow	*CFM*	12.99	13.51	13.84	17.95	15.07	13.04	17.01	14.60	15.97	36.9	32	0.2
	Temp	*^oC*	13.0	18.2	20.7	25.8	25.1	27.4	28.5	25.4	22.8	-	-	-
	Comments		1/2T	1/2T	1/2T	1/2T	1/2T	1/2T	1/2T	1/2T	1	1	1	1
6-49	*Well*	*"H_2O*	0.02	0.01	-0.02	0.03	0.01	0.02	0.01	-0.25	-0.89	-	-	-
	Lateral	*"H_2O*	-4.87	-5.96	-5.14	-4.40	-4.68	-5.11	-4.57	-3.43	-6.05	-6.23	-5.55	-8.25
	CH_4	*%*	31.6	31.4	35.6	39.6	38.6	39.4	39.6	48.8	46.3	50.3	55.1	45.7
	CO_2	*%*	29.7	29.6	28.6	29.1	29.3	30.0	30.7	35.8	35.2	36.1	37.9	30.4
	O_2	*%*	10.5	12.5	10.4	8.8	9.9	8.8	8.5	0.8	0.3	5.8	0.6	1.5
	BAL (N_2)	*%*	28.2	26.5	25.4	22.5	22.2	21.8	21.2	14.6	18.2	7.8	6.4	22.4
	CO	*PPM*	14	14	18	24	17	22	27	3	3	2	3	1
	H_2S	*PPM*	168	200	204	210	217	187	168	250	241	201	278	122
	Vel Min	*m/s*	-	-	-	-	-	-	-	0.00	0.00	-	-	-
	Vel Max	*m/s*	-	-	-	-	-	-	-	0.00	0.00	2.50	2.30	0.80
	Flow	*CFM*	-	-	-	-	-	-	-	0	0	42.3	37.9	4.4
	Temp	*^oC*	-	-	-	-	-	-	-	18.4	19.6	-	-	-
	Comments		closed	closed	closed	closed	closed	closed	closed	1/2T	1/2T	1/2T	1/2T	1/2T
6-50	*Well*	*"H_2O*	0.00	0.01	0.02	0.03	0.03	0.03	0.01	-0.03	0.01	-	-	-
	Lateral	*"H_2O*	-3.62	-4.21	-5.27	-4.22	-5.11	-4.85	-4.81	-3.76	-3.74	-6.03	-9.39	-8.62
	CH_4	*%*	31.4	31.6	32.0	35.6	25.7	30.5	35.8	16.6	20.1	0.4	0.1	26.8
	CO_2	*%*	25.8	25.9	26.9	28.4	30.6	28.4	25.8	15.1	22.8	1.7	1.0	2.4
	O_2	*%*	8.1	8.6	8.4	6.6	9.5	8.2	7.1	9.6	10.2	18.5	16.1	16.8
	BAL (N_2)	*%*	34.7	33.9	32.7	29.4	34.2	32.9	31.3	58.7	46.9	79.4	82.8	54.0
	CO	*PPM*	12	17	12	15	18	18	17	3	5	0	0	3
	H_2S	*PPM*	22	20	50	43	66	57	42	7	7	38	13	15
	Vel Min	*m/s*	-	-	-	-	-	-	-	-	-	-	-	-
	Vel Max	*m/s*	-	-	-	-	-	-	-	-	-	0.00	0.00	0.00
	Flow	*CFM*	-	-	-	-	-	-	-	-	-	0	0	0
	Temp	*^oC*	-	-	-	-	-	-	-	-	-	-	-	-
	Comments		closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
6-51	*Well*	*"H_2O*	-1.55	-1.22	-1.01	-0.81	-1.28	-2.33	-1.25	-0.02	0.00	-	-	-
	Lateral	*"H_2O*	-4.21	-5.24	-5.01	-3.65	-4.96	-4.71	-4.52	-4.17	-4.01	data	4.54	0.11
	CH_4	*%*	44.6	43.6	44.8	45.8	50.4	53.3	45.2	43.2	45.8	not	51.7	51.2
	CO_2	*%*	32.0	32.1	30.6	31.2	31.6	37.8	29.5	35.0	34.1	recorded	35.0	35.8
	O_2	*%*	2.4	2.3	2.8	2.1	3.2	4.0	2.6	2.4	2.1		13.3	1.6
	BAL (N_2)	*%*	21.0	22.0	21.8	20.9	14.8	4.9	22.7	19.4	18.0	#VALUE!	0.0	11.4
	CO	*PPM*	5	10	15	19	20	4	10	7	10		1	2
	H_2S	*PPM*	12	55	84	57	55	69	58	82	55		127	>>>>
	Vel Min	*m/s*	1.02	1.24	1.66	1.50	1.67	1.74	-	-	-	-	-	-
	Vel Max	*m/s*	1.74	1.93	2.00	1.69	1.99	2.15	-	-	-	-	5.80	0.00
	Flow	*CFM*	13.04	14.98	17.29	15.07	17.29	18.38	-	-	-		97	0
	Temp	*°C*	13.6	17.2	19.8	22.8	25.1	28.4	-	-	-	-	-	-
	Comments		1/2T	1/2T	1/2T	1/2T	1/2T	1/2T	closed	closed	closed		cracked	cracked
6-52	*Well*	*"H_2O*	0.03	0.02	0.01	0.02	0.02	0.01	0.00	-1.44	-0.03	-	-	-
	Lateral	*"H_2O*	-3.26	-4.27	-4.03	-4.00	-4.58	-5.01	-4.21	-4.05	-3.65	-5.87	-5.81	-9.93
	CH_4	*%*	28.1	26.9	29.6	36.5	38.4	33.9	35.8	45.9	44.7	0.0	0.0	41.9
	CO_2	*%*	27.6	28.6	29.6	30.8	30.1	30.1	30.1	32.0	30.2	0.3	0.1	32.9
	O_2	*%*	4.2	4.5	4.0	3.6	4.1	4.5	4.5	3.6	4.6	11.3	20.3	11.8
	BAL (N_2)	*%*	40.1	40.0	36.8	29.1	27.4	31.5	29.6	18.5	20.5	88.4	79.6	13.4
	CO	*PPM*	5	10	12	15	15	14	15	3	5	0	0	0
	H_2S	*PPM*	6	6	7	15	8	9	7	9	19	40	17	268
	Vel Min	*m/s*	-	-	-	-	-	-	-	1.00	-	-	-	-
	Vel Max	*m/s*	-	-	-	-	-	-	-	1.27	-	0.40	0.50	0.00
	Flow	*CFM*	-	-	-	-	-	-	-	10.73	-	6.5	8.6	0
	Temp	*°C*	-	-	-	-	-	-	-	25.3	-	-	-	-
	Comments		closed	closed	closed	closed	closed	closed	closed	1/2T	closed	closed	closed	closed
6-53	*Well*	*"H_2O*	-2.03	-2.17	-1.57	-1.64	-1.85	-2.01	-2.00	-2.15	-2.35	-	-	-
	Lateral	*"H_2O*	-2.98	-3.62	-3.33	-3.22	-3.66	-3.25	-3.62	-3.11	-4.61	-0.40	-4.19	-5.88
	CH_4	*%*	56.2	58.2	55.8	54.8	57.1	61.3	54.8	57.4	54.2	0.3	49.9	49.9
	CO_2	*%*	35.7	35.9	34.2	33.6	33.2	34.2	35.4	37.9	37.4	1.1	32.2	36.6
	O_2	*%*	1.6	1.4	2.6	2.0	1.1	0.0	0.5	0.1	0.0	14.4	1.4	10.1
	BAL (N_2)	*%*	6.5	4.5	7.4	9.6	8.6	4.5	9.3	4.6	8.4	84.2	16.5	3.4
	CO	*PPM*	5	5	6	10	10	4	8	5	4	0	2	0
	H_2S	*PPM*	366	301	248	222	215	364	211	349	361	22	80	124
	Vel Min	*m/s*	1.58	1.55	1.68	1.62	1.95	1.58	1.58	1.84	1.85	-	-	-
	Vel Max	*m/s*	1.99	2.03	2.03	2.88	2.47	1.94	1.96	2.14	2.68	0.00	0.40	2.00
	Flow	*CFM*	16.87	16.91	17.53	21.26	20.88	16.63	16.73	18.80	21.40	0	5.8	39.5
	Temp	*°C*	13.5	15.0	19.6	22.6	24.1	25.1	25.4	29.4	25.7	-	-	-
	Comments		2	2	2	2	2	2	2	2	2	closed	cracked	cracked

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
6-54	*Well*	*"H_2O*	0.01	0.02	0.00	0.02	0.01	0.02	0.01	0.02	0.01	-	-	-
	Lateral	*"H_2O*	-3.02	-4.00	-3.89	-4.22	-4.21	-4.68	-4.12	-4.14	-3.48	-8.42	-9.00	-5.68
	CH_4	*%*	33.2	35.7	32.5	35.6	36.9	39.6	40.1	42.2	40.2	5.7	22.3	49.6
	CO_2	*%*	29.7	29.1	30.1	31.2	31.2	28.4	32.6	29.6	28.5	4.3	21.5	36.0
	O_2	*%*	6.1	6.9	9.6	5.4	8.4	8.8	8.4	4.2	3.7	19.3	20.5	0.4
	BAL (N_2)	*%*	31.0	28.3	27.8	27.8	23.5	23.2	18.9	24.0	27.6	70.7	35.7	14.0
	CO	*PPM*	12	14	17	22	19	15	19	4	15	0	0	.
	H_2S	*PPM*	25	47	55	61	27	63	47	48	23	4	8	250
	Vel Min	*m/s*	-	-	-	-	-	-	-	-	-	-	-	-
	Vel Max	*m/s*	-	-	-	-	-	-	-	-	-	0.00	0.00	1.40
	Flow	*CFM*	-	-	-	-	-	-	-	-	-	0	0	0.9
	Temp	*^oC*	-	-	-	-	-	-	-	-	-	-	-	-
	Comments		closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed
6-55	*Well*	*"H_2O*	-	-	-	-	-	-	-	-	-	-	-	-
	Lateral	*"H_2O*	-4.21	-4.00	-4.22	-3.36	-4.22	-4.22	-4.00	-3.65	-3.54	-0.17	-5.28	-4.22
	CH_4	*%*	Not	Not	Not	Not	Not	Not	Not	Not	Not	Not	51.4	51.8
	CO_2	*%*	connected	connected	connected	connected	connected	connected	connected	connected	connected	Connected	35.8	31.5
	O_2	*%*	-	-	-	-	-	-	-	-	-	-	1.4	3.6
	BAL (N_2)	*%*	-	-	-	-	-	-	-	-	-	-	11.4	13.1
	CO	*PPM*	-	-	-	-	-	-	-	-	-	-	2	3
	H_2S	*PPM*	-	-	-	-	-	-	-	-	-	-	196	98
	Vel Min	*m/s*	-	-	-	-	-	-	-	-	-	-	-	-
	Vel Max	*m/s*	-	-	-	-	-	-	-	-	-	-	Not	Not
	Flow	*CFM*	-	-	-	-	-	-	-	-	-	-	Connected	Connected
	Temp	*^oC*	-	-	-	-	-	-	-	-	-	-	-	-
	Comments		2	2	2	2	2	2	2	2	2	2	2	2
6-56	*Well*	*"H_2O*	0.02	0.01	0.02	-0.03	0.01	0.02	0.01	0.03	0.01	-	-	-
	Lateral	*"H_2O*	-3.68	-4.36	-4.02	-3.98	-4.57	-4.32	-3.68	-3.92	-4.11	-8.93	-7.81	-5.84
	CH_4	*%*	28.1	28.9	29.8	31.8	32.6	35.0	32.6	12.2	15.9	0.0	0.4	51.2
	CO_2	*%*	28.3	28.4	29.4	30.2	30.1	27.4	30.1	14.9	17.2	0.1	0.9	33.8
	O_2	*%*	3.6	3.6	4.1	2.5	5.2	5.3	3.9	6.5	8.3	18.8	17.1	0.8
	BAL (N_2)	*%*	40.0	39.1	36.7	35.5	32.1	32.3	33.4	66.4	58.6	81.1	81.6	14.2
	CO	*PPM*	10	8	12	15	17	15	15	15	12	0	0	1
	H_2S	*PPM*	7	7	9	4	10	11	10	4	7	6	20	107
	Vel Min	*m/s*	-	-	-	-	-	-	-	-	-	-	-	-
	Vel Max	*m/s*	-	-	-	-	-	-	-	-	-	0.00	0.00	2.80
	Flow	*CFM*	-	-	-	-	-	-	-	-	-	0.7	0	5.8
	Temp	*^oC*	-	-	-	-	-	-	-	-	-	-	-	-
	Comments		closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
6-57	*Well*	*"H_2O*	-1.54	-1.64	-1.44	-1.32	-1.50	-2.14	-0.01	-0.02	0.00	-	-	-
	Lateral	*"H_2O*	-3.62	-4.21	-4.08	-3.54	-3.65	-4.64	-5.00	-5.13	-4.32	-9.05	-4.22	-9.62
	CH_4	*%*	51.2	51.8	50.6	51.3	45.2	31.8	39.5	37.6	39.6	0.0	0.2	40.9
	CO_2	*%*	30.6	33.6	31.6	30.1	30.1	24.0	30.1	26.9	27.1	0.1	0.6	32.8
	O_2	*%*	1.9	1.1	1.9	2.0	3.6	7.4	5.8	6.5	5.5	19.2	1.2	0.5
	BAL (N_2)	*%*	16.3	13.5	15.9	16.6	21.1	36.8	24.6	29.0	27.8	80.7	98.0	25.8
	CO	*PPM*	25	29	20	29	25	4	14	9	12	0	2	3
	H_2S	*PPM*	25	47	68	78	96	24	54	18	15	3	168	24
	Vel Min	*m/s*	1.14	1.66	1.58	1.28	1.24	1.34	-	-	-	-	-	-
	Vel Max	*m/s*	1.66	1.97	2.33	2.06	1.68	2.01	-	-	-	0.30	0.00	0.00
	Flow	*CFM*	13.23	17.15	18.47	15.78	13.80	15.83	-	-	-	4.2	0	0
	Temp	*^oC*	14.9	18.2	21.7	22.8	25.8	25.8	-	-	-	-	-	-
	Comments		2	2	2	2	1	closed	closed	closed	closed	closed	closed	closed
6-58	*Well*	*"H_2O*	-1.59	-1.66	-1.05	-1.58	-2.15	-1.86	-1.47	-2.14	-0.01	-	-	-
	Lateral	*"H_2O*	-4.62	-5.99	-5.20	-4.62	-4.95	-4.52	-4.24	-4.19	-3.88	-8.81	-8.78	1.24
	CH_4	*%*	48.1	48.6	50.6	60.3	62.3	60.8	52.8	26.8	33.5	22.6	22.7	52.7
	CO_2	*%*	35.2	33.4	31.4	33.6	35.7	38.4	37.4	23.9	28.4	22.3	23.4	35.2
	O_2	*%*	2.2	1.8	2.8	0.5	0.2	0.5	1.5	4.7	5.3	10.9	3.2	1.6
	BAL (N_2)	*%*	14.5	16.2	15.2	5.6	1.8	0.3	8.3	44.6	32.8	44.2	50.7	10.5
	CO	*PPM*	14	19	25	10	4	5	10	12	17	1	4	2
	H_2S	*PPM*	137	174	144	199	260	214	177	77	53	215	22	180
	Vel Min	*m/s*	1.28	1.88	1.74	1.32	1.11	1.45	1.02	-	-	-	-	-
	Vel Max	*m/s*	2.01	2.34	2.36	1.84	1.68	1.99	1.32	-	-	0.00	0.00	0.00
	Flow	*CFM*	15.54	19.94	19.37	14.93	13.18	16.25	11.07	-	-	0	0	0
	Temp	*^oC*	15.4	19.6	21.8	26.8	28.3	30.5	25.8	-	-	-	-	-
	Comments		1T	1T	1T	2T	2T	2T	2T	closed	closed	closed	closed	closed
6-59	*Well*	*"H_2O*	0.02	0.00	0.02	0.02	-0.01	0.02	0.01	-1.24	-4.25	-	-	-
	Lateral	*"H_2O*	-3.27	-5.88	-5.24	-4.25	-4.52	-4.21	-4.68	-4.91	-8.27	-0.01	-8.76	-1.24
	CH_4	*%*	36.3	40.1	42.0	43.6	43.6	41.6	38.4	52.7	50.4	32.4	6.8	50.9
	CO_2	*%*	24.8	28.3	29.3	30.1	30.1	30.2	30.2	32.1	27.9	26.3	7.4	36.9
	O_2	*%*	10.1	10.8	9.6	8.5	8.4	9.5	6.6	3.9	5.3	5.2	3.2	0.9
	BAL (N_2)	*%*	28.8	20.8	19.1	17.8	17.9	18.7	24.8	11.3	16.4	36.1	82.6	11.3
	CO	*PPM*	12	14	18	22	15	26	20	5	5	3	4	1
	H_2S	*PPM*	17	16	11	14	10	17	8	43	104	49	22	142
	Vel Min	*m/s*	-	-	-	-	-	-	-	1.24	1.86	-	-	-
	Vel Max	*m/s*	-	-	-	-	-	-	-	1.66	2.45	0.00	0.00	0.30
	Flow	*CFM*	-	-	-	-	-	-	-	13.70	20.36	0	0	0
	Temp	*^oC*	-	-	-	-	-	-	-	25.7	21.8	-	-	-
	Comments		closed	closed	closed	closed	closed	closed	closed	2T	2T	closed	closed	closed

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
7-60	*Well*	*"H_2O*	-1.98	-1.11	-1.00	-1.24	-2.14	-1.58	-1.52	-1.36	-2.40	-	-	-
	Lateral	*"H_2O*	-3.64	-2.42	-2.65	-2.15	-3.21	-3.27	-3.22	2.43	-5.24	-7.36	-4.78	0.06
	CH_4	*%*	57.1	56.1	55.4	56.3	56.8	54.2	58.6	60.4	38.0	0.0	0.0	0.0
	CO_2	*%*	28.3	33.7	32.1	30.4	31.4	32.5	35.4	38.2	28.0	0.3	0.2	0.0
	O_2	*%*	1.0	0.3	1.1	1.5	1.5	1.4	0.5	0.2	0.8	12.3	18.3	20.5
	BAL (N_2)	*%*	13.6	9.9	11.4	11.8	10.3	11.9	5.5	1.2	33.2	87.4	81.5	79.5
	CO	*PPM*	5	3	5	15	10	14	8	3	1	0	0	2
	H_2S	*PPM*	63	40	38	66	27	33	120	177	22	8	16	2
	Vel Min	*m/s*	1.27	1.66	1.84	1.64	1.55	1.58	1.55	1.65	-	-	-	-
	Vel Max	*m/s*	2.00	1.84	2.15	1.99	2.03	2.17	2.01	2.30	-	0.00	0.00	0.00
	Flow	*CFM*	15.45	16.54	18.85	17.15	16.91	17.72	16.82	18.66	-	0	0	0
	Temp	*^oC*	15.2	13.8	19.6	23.0	25.7	25.4	25.9	28.4	-	-	-	-
	Comments		2	2	2	2	2	2	2	2	closed	closed	closed	closed
7-61	*Well*	*"H_2O*	-1.28	-2.55	-2.14	-1.57	-2.01	-1.02	-1.54	-0.68	-1.69	-	-	-
	Lateral	*"H_2O*	-4.28	-4.51	-4.62	-3.22	-3.68	-1.78	-3.62	-1.57	-5.94	-5.54	-4.36	-7.14
	CH_4	*%*	52.6	58.3	57.4	55.9	56.4	57.9	59.4	58.4	56.4	55.6	45.5	0.6
	CO_2	*%*	28.4	41.1	40.2	39.0	37.5	41.7	39.6	39.2	40.7	39.8	30.9	1.9
	O_2	*%*	2.3	0.6	0.5	1.0	1.0	0.4	0.3	0.5	0.7	0.2	6.6	1.3
	BAL (N_2)	*%*	16.7	0.0	1.9	4.1	5.1	0.0	0.7	1.9	2.2	4.4	17.0	96.2
	CO	*PPM*	12	21	62	103	130	25	44	55	19	14	2	1
	H_2S	*PPM*	>>>>>	>>>>>	>>>>>	>>>>>	>>>>>	>>>>>	>>>>>	>>>>>	>>>>>	>>>>	132	211
	Vel Min	*m/s*	1.22	1.59	1.66	1.58	1.86	1.24	1.14	1.00	1.48	-	-	-
	Vel Max	*m/s*	1.68	2.35	1.87	2.30	2.41	1.66	1.66	1.27	2.17	3.00	1.80	0.00
	Flow	*CFM*	13.70	18.62	16.68	18.33	20.17	13.70	13.23	10.73	17.25	49.5	30.4	0
	Temp	*^oC*	15.7	12.7	18.4	22.5	26.1	28.4	25.7	28.6	20.5	-	-	-
	Comments		2	2	2	2	2	2	2	2	2	2	2	closed
7-62	*Well*	*"H_2O*	-1.54	-0.14	-0.27	-1.27	-1.04	-0.24	-1.00	-0.58	-1.58	-	-	-
	Lateral	*"H_2O*	-4.05	Frozen	-4.00	-3.61	-3.01	-0.94	-2.14	-2.54	-5.54	-5.47	-4.35	-5.92
	CH_4	*%*	53.6	60.3	57.6	58.2	52.8	50.9	57.2	58.1	56.0	56.4	45.5	47.2
	CO_2	*%*	29.7	39.0	38.1	37.2	34.9	33.9	36.4	35.4	39.3	39.1	30.9	34.6
	O_2	*%*	2.1	0.7	1.0	1.1	1.4	1.7	1.2	1.1	0.5	4.6	6.6	11.0
	BAL (N_2)	*%*	14.6	0.0	3.3	3.5	10.9	13.5	5.2	5.4	4.2	-0.1	17.0	7.2
	CO	*PPM*	12	3	9	15	14	2	14	10	5	3	2	5
	H_2S	*PPM*	101	>>>>	>>>>	>>>>	>>>>	>>>>	>>>>	>>>>	>>>>	>>>>	132	137
	Vel Min	*m/s*	1.03	0.00	0.44	0.44	1.22	0.44	0.77	0.66	1.27	-	-	-
	Vel Max	*m/s*	1.95	0.00	0.68	1.27	1.57	0.84	1.34	1.24	1.66	2.90	1.80	2.20
	Flow	*CFM*	14.08	0.00	5.29	8.08	13.18	6.05	9.97	8.98	13.84	48.8	30.4	97
	Temp	*^oC*	12.8	frozen	18.4	22.1	27.1	23.0	25.7	28.4	23.0	-	-	-
	Comments		closed	2	2	2	2	1	2	2	2	2	2	2

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
7-63	*Well*	*"H_2O*	-1.20	-1.00	-1.02	-0.03	0.02	-0.01	0.02	-0.24	0.02	-	-	-
	Lateral	*"H_2O*	-2.96	-2.81	-2.48	-2.22	-3.25	-3.66	-3.01	-0.68	-1.11	-0.22	-4.76	-1.24
	CH_4	*%*	33.2	28.9	30.6	31.6	31.7	33.8	36.7	46.5	43.2	0.0	6.1	36.9
	CO_2	*%*	17.3	16.9	19.4	20.4	20.4	20.4	20.1	31.4	30.9	0.3	4.7	12.8
	O_2	*%*	10.1	11.0	12.7	10.6	9.9	8.4	10.8	4.2	3.8	18.8	17.5	20.3
	BAL (N_2)	*%*	39.4	43.2	37.3	37.4	38.0	37.4	32.4	17.9	22.1	80.9	71.7	30.0
	CO	*PPM*	7	2	5	10	7	10	8	2	5	0	0	8
	H_2S	*PPM*	13	47	61	57	41	57	55	88	45	11	33	1
	Vel Min	*m/s*	0.00	0.00	0.00	-	-	-	-	0.00	-	-	-	-
	Vel Max	*m/s*	0.00	0.87	0.00	-	-	-	-	0.00	-	0.00	0.10	0.00
	Flow	*CFM*	0	4.11	0	-	-	-	-	0	-	0	0.9	0
	Temp	*^oC*	14.2	12.1	19.6	-	-	-	-	25.1	-	-	-	-
	Comments		Frozen	Frozen	closed	closed	closed	closed	closed	1/2T	closed	closed	closed	closed
7-64	*Well*	*"H_2O*	-2.01	-2.07	-1.84	-1.47	-1.24	-0.39	-1.57	-0.98	-1.95	-	-	-
	Lateral	*"H_2O*	-3.28	-3.01	-2.66	-2.03	-1.58	-0.74	-2.14	-1.45	-3.60	-2.81	-5.16	-5.55
	CH_4	*%*	58.1	58.7	55.7	58.4	56.8	60.4	54.8	56.6	57.5	48.2	52.2	46.5
	CO_2	*%*	36.2	35.6	33.6	32.6	35.8	39.6	32.6	40.3	39.9	36.9	36.1	33.0
	O_2	*%*	1.5	1.9	2.5	2.0	0.5	0.0	2.4	2.7	0.0	0.5	0.5	1.1
	BAL (N_2)	*%*	4.2	3.8	8.2	7.0	6.9	0.0	10.2	0.4	2.6	14.4	11.2	19.4
	CO	*PPM*	10	10	14	19	10	4	10	8	0	3	3	5
	H_2S	*PPM*	233	203	188	222	199	398	188	230	262	152	195	127
	Vel Min	*m/s*	1.02	1.17	1.24	1.65	1.57	1.00	1.02	1.00	1.98	-	-	-
	Vel Max	*m/s*	1.66	1.68	1.88	2.03	2.17	1.54	1.55	1.24	2.48	9.20	2.70	1.60
	Flow	*CFM*	12.66	13.47	14.74	17.39	17.67	12.00	12.14	10.58	21.07	153.2	45.3	24.8
	Temp	*^oC*	13.8	15.8	19.6	25.7	25.8	26.3	27.0	27.0	24.6	-	-	-
	Comments		2T	2T	2T	2T	2T	2T	2T	2	2	2	2	2
7-65	*Well*	*"H_2O*	-0.11	-0.03	-0.01	0.02	0.02	0.02	0.02	0.42	0.55	-	-	-
	Lateral	*"H_2O*	-2.55	-2.57	-2.54	-2.14	-3.24	-2.37	-3.62	NLV	NLV	-2.99	-9.18	-5.70
	CH_4	*%*	32.6	35.6	36.9	38.6	38.4	35.7	39.4	58.2	57.4	43.4	22.6	51.7
	CO_2	*%*	27.1	29.4	30.1	29.5	31.2	31.8	29.5	39.3	38.5	33.3	23.1	37.9
	O_2	*%*	6.9	4.8	5.2	6.7	6.8	5.0	4.4	2.5	1.6	4.3	4.4	1.1
	BAL (N_2)	*%*	33.4	30.2	27.8	25.2	23.6	27.5	26.7	0.0	2.5	19.0	49.9	9.3
	CO	*PPM*	9	6	10	18	17	11	15	5	12	2	4	2
	H_2S	*PPM*	68	77	58	62	55	39	63	120	165	56	29	186
	Vel Min	*m/s*	-	-	-	-	-	-	-	-	-	-	-	-
	Vel Max	*m/s*	-	-	-	-	-	-	-	-	-	5.70	0.00	3.00
	Flow	*CFM*	-	-	-	-	-	-	-	-	-	95.6	0	45.3
	Temp	*^oC*	-	-	-	-	-	-	-	-	-	-	-	-
	Comments		closed	closed	closed	closed	closed	closed	closed	2	2	2	2	2

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
7-66	*Well*	*"H_2O*	-	-	-	-	0.18	0.22	0.15	0.09	0.04	-	-	-
	Lateral	*"H_2O*	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	-5.62
	CH_4	*%*	-	-	-	63.2	64.2	63.2	60.9	61.7	60.8	2.5	52.6	47.5
	CO_2	*%*	-	-	-	34.8	35.6	34.7	35.6	35.2	34.2	2.5	36.3	34.9
	O_2	*%*	-	-	-	0.5	0.2	0.3	1.0	2.7	3.0	2.7	3.0	1.5
	BAL (N_2)	*%*	-	-	-	1.5	0.0	1.8	2.5	0.4	2.0	92.3	8.1	16.1
	CO	*PPM*	-	-	-	6	4	5	7	2	5	1	2	1
	H_2S	*PPM*	-	-	-	>>>>	>>>>	>>>>	>>>>	>>>>	>>>>	174	181	85
	Vel Min	*m/s*	-	-	-	-	-	-	-	-	-	-	-	-
	Vel Max	*m/s*	-	-	-	-	-	-	-	-	-	0.00	0.00	1.20
	Flow	*CFM*	-	-	-	-	-	-	-	-	-	0	0	9.3
	Temp	*^oC*	-	-	-	-	-	-	-	-	-	-	-	-
	Comments		2T	2T	2T	2T	2T	2T	2T	2T	2T	2	2	2
7-67	*Well*	*"H_2O*	-1.24	-0.68	-0.88	-0.69	0.69	-0.22	1.00	-0.58	-1.22	-	-	-
	Lateral	*"H_2O*	-3.62	-1.07	-2.14	-2.01	-1.57	-0.46	-3.27	-1.37	-4.53	-3.81	-4.39	-6.95
	CH_4	*%*	52.8	45.5	46.8	48.6	50.1	55.0	52.8	55.4	42.4	49.2	53.6	1.2
	CO_2	*%*	34.6	32.0	31.2	30.4	30.9	37.9	32.7	32.6	33.0	35.2	35.6	1.3
	O_2	*%*	2.3	2.0	2.6	3.6	3.3	0.9	1.9	1.2	1.6	1.7	1.8	19.7
	BAL (N_2)	*%*	10.3	20.5	19.4	17.4	15.7	6.2	12.6	10.8	23.0	13.9	9.0	77.8
	CO	*PPM*	5	12	18	25	10	3	14	22	3	0	1	1
	H_2S	*PPM*	254	6	9	11	327	319	10	8	190	178	137	14
	Vel Min	*m/s*	1.36	0.00	0.00	0.44	0.00	0.00	1.01	1.24	1.00	-	-	-
	Vel Max	*m/s*	1.98	0.00	0.00	0.62	0.00	0.00	1.37	1.88	1.54	4.00	3.10	0.00
	Flow	*CFM*	15.78	0.00	0.00	5.01	0.00	0.00	11.24	14.74	12.00	67.3	51.4	8.6
	Temp	*^oC*	13.2	10.9	15.8	20.7	22.8	20.9	24.7	28.6	21.0	-	-	-
	Comments		2T	1T	1/2T	1/2T	1/2T	1	2	2	1	1	1	closed
7-68	*Well*	*"H_2O*	-1.27	-1.24	-1.17	-0.54	-1.00	-0.35	-1.02	-1.24	-1.69	-	-	-
	Lateral	*"H_2O*	-3.66	-2.02	-2.00	-1.32	-2.63	-0.70	-1.59	-2.47	-6.17	-5.64	-4.59	-7.25
	CH_4	*%*	52.7	52.0	51.6	67.7	55.8	58.7	52.8	55.4	56.2	53.1	54.3	53.9
	CO_2	*%*	30.6	35.9	34.6	28.1	36.9	41.2	30.1	35.2	40.3	37.3	36.3	38.5
	O_2	*%*	1.8	3.1	3.2	2.6	2.1	0.0	1.7	1.9	0.4	2.0	1.1	0.8
	BAL (N_2)	*%*	14.9	9.0	10.6	1.6	5.2	0.1	15.4	7.5	3.1	7.6	8.3	6.8
	CO	*PPM*	15	4	8	14	8	1	12	10	4	0	2	0
	H_2S	*PPM*	203	142	134	162	>>>>	>>>>	222	120	324	39	171	185
	Vel Min	*m/s*	1.54	1.00	1.15	1.65	1.54	1.11	1.40	1.26	1.84	-	-	-
	Vel Max	*m/s*	2.31	1.56	1.65	2.14	2.18	1.84	1.85	1.47	2.65	2.40	5.20	2.50
	Flow	*CFM*	18.19	12.10	13.23	17.91	17.58	13.94	15.36	12.90	21.21	39.3	86.9	37.9
	Temp	*^oC*	14.9	12.8	15.7	25.7	25.7	27.1	25.1	20.1	20.7	-	-	-
	Comments		2	2	2	2	2	2	2	2	2	2	2	2

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
8-69	*Well*	*"H_2O*	0.04	0.04	0.02	0.03	0.01	0.02	0.01	0.06	-0.05	-	-	-
	Lateral	*"H_2O*	-4.02	-3.62	-3.21	-2.98	-2.57	-2.01	-3.62	-3.54	-5.21	-4.25	-4.78	-5.19
	CH_4	*%*	37.6	38.1	39.6	38.6	40.2	40.5	41.2	59.1	55.9	55.2	48.2	54.4
	CO_2	*%*	25.2	25.9	24.8	25.5	26.9	29.4	25.9	30.0	28.4	37.7	35.4	37.4
	O_2	*%*	8.0	6.4	5.5	6.2	6.8	8.4	5.9	0.1	0.4	0.8	1.1	0.5
	BAL (N_2)	*%*	29.2	29.6	30.1	29.7	26.1	21.7	27.0	10.8	15.3	6.3	15.3	7.7
	CO	*PPM*	10	8	15	27	27	10	22	4	4	2	3	2
	H_2S	*PPM*	89	97	84	70	54	57	69	15	19	285	137	222
	Vel Min	*m/s*	-	-	-	-	-	-	-	1.00	1.02	-	-	-
	Vel Max	*m/s*	-	-	-	-	-	-	-	1.54	1.59	64.00	0.60	1.10
	Flow	*CFM*	-	-	-	-	-	-	-	12.00	12.33	107.9	9.3	4.4
	Temp	*^oC*	-	-	-	-	-	-	-	29.6	25.1	-	-	-
	Comments		closed	closed	closed	closed	closed	closed	closed	cracked	cracked	1	1	1
8-70	*Well*	*"H_2O*	0.02	0.01	0.00	0.02	0.01	0.02	0.00	0.01	0.03	-	-	-
	Lateral	*"H_2O*	-1.84	-2.22	-2.10	-2.03	-2.17	-1.47	-3.01	-3.65	-3.84	0.91	1.13	-8.92
	CH_4	*%*	35.6	35.6	38.6	40.5	41.5	38.2	40.1	39.5	40.2	57.0	49.7	25.7
	CO_2	*%*	29.6	28.4	29.4	30.9	31.2	32.6	30.2	29.5	30.1	31.6	31.9	15.5
	O_2	*%*	7.8	9.3	8.6	8.1	7.2	8.6	7.5	8.1	5.5	11.3	18.4	19.5
	BAL (N_2)	*%*	27.0	26.7	23.4	20.5	20.1	20.6	22.2	22.9	24.2	0.1	0.0	39.3
	CO	*PPM*	8	8	10	15	18	17	17	20	14	1	1	1
	H_2S	*PPM*	4	7	12	15	10	19	15	19	12	78	35	4
	Vel Min	*m/s*	-	-	-	-	-	-	-	-	-	-	-	-
	Vel Max	*m/s*	-	-	-	-	-	-	-	-	-	0.00	0.80	0.00
	Flow	*CFM*	-	-	-	-	-	-	-	-	-	0	13.3	0
	Temp	*^oC*	-	-	-	-	-	-	-	-	-	-	-	-
	Comments		closed	closed	closed	closed	closed	closed	closed	closed	closed	cracked	cracked	closed
8-71	*Well*	*"H_2O*	-1.03	-1.03	-1.24	-1.00	-0.25	-0.65	-1.24	-1.57	-2.47	-	-	-
	Lateral	*"H_2O*	-1.54	-1.95	-2.35	-1.24	-0.63	-1.11	-2.66	-3.50	4.95	-3.54	-1.59	-6.24
	CH_4	*%*	55.6	55.8	54.8	55.3	56.5	53.2	55.8	59.1	53.0	52.9	55.4	51.8
	CO_2	*%*	35.2	35.7	33.6	40.2	42.9	40.2	39.6	40.7	39.3	38.0	37.0	35.6
	O_2	*%*	2.0	2.3	2.7	1.0	0.6	1.0	1.2	0.2	1.1	4.3	1.5	1.5
	BAL (N_2)	*%*	7.2	6.2	8.9	3.5	0.0	5.6	3.4	0.0	6.6	4.8	6.1	11.1
	CO	*PPM*	5	8	15	10	3	5	8	5	4	3	1	1
	H_2S	*PPM*	198	194	134	168	260	238	187	318	260	181	128	162
	Vel Min	*m/s*	1.47	1.32	1.44	1.01	1.00	1.24	1.47	1.66	1.74	-	-	-
	Vel Max	*m/s*	1.99	1.85	1.85	1.37	1.34	1.66	1.99	2.04	2.01	1.80	2.40	2.80
	Flow	*CFM*	16.35	14.98	15.54	11.24	11.06	13.70	16.35	17.48	17.72	29.9	40	51.4
	Temp	*^oC*	13.6	16.8	20.7	20.4	25.9	29.6	31.5	27.4	21.8	-	-	-
	Comments		2T	2T	2T	2T	2T	2T	2T	2T	2T	2	2	2

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
8-72	*Well*	*"H_2O*	-2.01	-2.00	-1.87	-1.62	-1.51	-1.37	-1.57	-1.74	-2.14	-	-	-
	Lateral	*"H_2O*	-3.22	-3.06	-2.58	-2.65	-2.18	-2.65	-3.02	-3.49	-4.63	-6.21	-1.86	6.85
	CH_4	*%*	58.2	58.4	57.1	57.3	57.4	56.8	57.5	59.3	57.9	54.6	56.1	56.3
	CO_2	*%*	38.1	38.6	36.5	41.5	42.0	41.7	40.5	39.6	39.5	38.0	38.9	38.1
	O_2	*%*	1.0	1.1	1.6	0.9	0.6	1.0	0.8	0.7	0.2	7.0	0.9	1.6
	BAL (N_2)	*%*	2.7	1.9	4.8	0.3	0.0	0.5	1.2	0.4	2.4	0.4	4.1	4.0
	CO	*PPM*	8	6	10	12	5	10	15	6	5	3	3	2
	H_2S	*PPM*	168	247	211	302	227	202	222	204	193	123	188	100
	Vel Min	*m/s*	1.14	1.60	1.44	1.65	1.36	1.62	1.96	1.58	1.68	-	-	-
	Vel Max	*m/s*	1.58	1.98	1.95	2.00	1.96	2.11	2.30	2.03	2.41	6.10	4.00	4.60
	Flow	*CFM*	12.85	16.91	16.02	17.25	15.69	17.62	20.13	17.06	19.32	101.9	66.1	86.9
	Temp	*^oC*	14.2	16.3	19.6	20.1	25.1	30.6	28.7	28.4	20.9	-	-	-
	Comments		2	2	2	2	2	2	2	2	2	2	2	2
8-73	*Well*	*"H_2O*	too tall	too tall	too tall	too tall	too tall	too tall	too tall	too tall	too tall	-	-	-
	Lateral	*"H_2O*	-2.68	-3.22	-2.15	-1.95	-1.79	-1.85	-2.57	-3.50	-4.24	-6.94	-2.86	-6.23
	CH_4	*%*	58.3	58.4	59.6	58.6	57.3	56.9	57.6	58.9	56.2	57.7	56.0	25.7
	CO_2	*%*	38.6	39.6	38.2	37.9	41.4	41.5	40.1	40.0	39.6	39.2	39.0	31.6
	O_2	*%*	0.4	0.9	1.0	2.0	1.3	1.0	0.8	1.1	1.8	1.8	0.6	2.3
	BAL (N_2)	*%*	2.7	1.1	1.2	1.5	0.0	0.6	1.5	0.0	2.4	1.3	4.4	40.4
	CO	*PPM*	5	5	2	5	4	6	5	3	5	3	3	3
	H_2S	*PPM*	>>>>	>>>>	>>>>	>>>>	472	385	244	338	249	213	202	124
	Vel Min	*m/s*	Surging	Surging	Surging	Surging	Surging	Surging	Surging	Surging	Surging	-	-	-
	Vel Max	*m/s*	-	-	-	-	-	-	-	-	-	1.10	1.10	0.00
	Flow	*CFM*	-	-	-	-	-	-	-	-	-	18	18.5	286.9
	Temp	*^oC*	-	-	-	-	-	-	-	-	-	-	-	-
	Comments		2	2	2	2	2	2	2	2	2	2	2	2
8-74	*Well*	*"H_2O*	-	-	-	-	-	-2.57	-2.00	-2.14	-2.18	-	-	-
	Lateral	*"H_2O*	NLV	NLV	NLV	NLV	NLV	-3.07	-3.47	-4.25	-4.76	-6.28	-2.88	-6.82
	CH_4	*%*	-	-	-	57.2	58.4	56.8	55.8	57.2	54.3	55.5	54.1	35.9
	CO_2	*%*	-	-	-	39.5	40.5	41.3	38.5	39.5	42.8	42.4	40.2	32.0
	O_2	*%*	-	-	-	1.5	1.0	0.8	1.5	1.2	0.6	2.0	5.0	5.6
	BAL (N_2)	*%*	-	-	-	1.0	0.1	1.1	4.2	2.1	2.3	0.1	0.7	26.5
	CO	*PPM*	-	-	-	16	10	0	7	15	7	6	37	4
	H_2S	*PPM*	-	-	-	365	499	419	201	247	309	276	121	185
	Vel Min	*m/s*	-	-	-	-	-	1.25	1.25	1.57	1.85	-	-	-
	Vel Max	*m/s*	-	-	-	-	-	1.98	1.95	2.31	2.14	5.40	0.70	0.00
	Flow	*CFM*	-	-	-	-	-	15.26	15.12	18.33	18.85	29.9	11.7	30.4
	Temp	*^oC*	-	-	-	-	-	26.1	25.4	27.4	25.8	-	-	-
	Comments		2	2	2	2	2	2	2	2	2	2	2	2

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
WH-75	*Well*	*"H_2O*	-1.59	-1.03	-1.02	-1.32	-1.54	-1.69	-1.55	-1.27	-2.57	-	-	-
	Lateral	*"H_2O*	-2.68	-2.88	-2.57	-2.55	-2.96	-3.05	-3.62	-3.95	-4.62	-5.50	4.86	-5.57
	CH_4	*%*	52.8	51.6	52.6	55.9	59.9	58.4	55.1	48.2	50.2	56.3	49.1	57.9
	CO_2	*%*	36.5	33.6	31.6	36.1	37.9	36.2	38.2	37.0	36.5	37.5	35.8	40.2
	O_2	*%*	1.5	2.4	2.8	1.4	1.3	1.6	1.6	0.7	0.9	0.7	1.0	2.0
	BAL (N_2)	*%*	9.2	12.4	13.0	6.6	0.9	3.8	5.1	14.1	12.4	5.5	14.1	-0.1
	CO	*PPM*	8	7	10	5	4	9	8	3	5	2	4	1
	H_2S	*PPM*	103	100	124	120	113	100	124	78	66	255	147	289
	Vel Min	*m/s*	1.36	1.26	1.55	1.55	1.36	1.62	1.66	1.22	1.47	-	-	-
	Vel Max	*m/s*	1.75	1.96	1.96	1.87	1.84	2.31	2.01	1.68	1.66	2.10	1.50	1.90
	Flow	*CFM*	14.69	15.21	16.58	16.16	15.12	18.57	17.34	13.70	14.79	35	24.8	0
	Temp	*^oC*	14.2	17.2	20.3	22.3	25.4	29.7	24.7	26.3	21.8	-	-	-
	Comments		2	2	2	2	2	2	2	2	2	2	2	2
WH-76	*Well*	*"H_2O*	-1.24	-1.57	-1.36	-1.55	-1.68	-1.57	-1.58	-2.14	-2.54	-	-	-
	Lateral	*"H_2O*	-3.00	-3.18	-3.00	-3.01	-3.17	-3.25	-3.65	-4.23	-5.02	-4.89	-4.82	-6.82
	CH_4	*%*	51.3	51.6	50.8	56.1	60.1	59.6	58.4	56.3	55.8	0.0	49.5	42.6
	CO_2	*%*	32.6	30.8	29.6	32.6	36.9	37.4	39.1	35.8	34.0	0.4	36.1	41.7
	O_2	*%*	2.8	3.3	3.5	2.0	2.2	2.5	1.4	1.4	1.5	11.7	2.9	1.5
	BAL (N_2)	*%*	13.3	14.3	16.1	9.3	0.8	0.5	1.1	6.5	8.7	87.9	11.5	14.2
	CO	*PPM*	2	5	10	5	3	9	5	3	15	0	3	5
	H_2S	*PPM*	398	362	311	>>>>	>>>>	>>>>	>>>>	>>>>	>>>>	67	137	188
	Vel Min	*m/s*	1.48	1.03	1.24	1.94	1.66	1.58	1.66	1.44	1.20	-	-	-
	Vel Max	*m/s*	2.03	1.62	1.85	2.36	2.15.	2.11	1.94	1.83	1.68	0.00	0.40	0.00
	Flow	*CFM*	16.58	12.52	14.60	20.32	#VALUE!	17.43	17.01	15.45	13.61	0	6.8	50.5
	Temp	*^oC*	14.0	17.2	20.3	23.0	25.8	29.2	28.5	30.2	24.8	-	-	-
	Comments		2	2	2	2	2	2	2	2	2	closed	cracked	cracked
WH-77	*Well*	*"H_2O*			0.15	0.23	0.34	-0.57	-1.25	-1.25	-1.55	-	-	-
	Lateral	*"H_2O*	NLV	NLV	NLV	NLV	NLV	-2.47	-3.01	-2.50	-3.06	-5.95	-4.75	-4.68
	CH_4	*%*	-	-	59.4	60.1	58.4	60.2	58.4	60.2	59.8	45.4	47.0	48.4
	CO_2	*%*	-	-	33.6	32.9	34.2	31.8	35.2	39.0	38.4	34.5	35.6	34.2
	O_2	*%*	-	-	0.5	0.6	0.4	0.4	0.7	0.8	1.2	15.4	17.4	2.8
	BAL (N_2)	*%*	-	-	6.5	6.4	7.0	7.6	5.7	0.0	0.6	4.7	0.0	14.6
	CO	*PPM*	-	-	15	22	28	14	6	4	5	3	1	3
	H_2S	*PPM*	-	-	214	198	134	169	>>>	>>>	>>>	102	69	120
	Vel Min	*m/s*	-	-	-	-	-	1.24	1.55	1.66	1.55	-	-	-
	Vel Max	*m/s*	-	-	-	-	-	1.69	2.03	2.14	1.97	3.90	2.40	2.50
	Flow	*CFM*	-	-	-	-	-	13.84	16.91	17.95	16.63	65.4	39.5	20.7
	Temp	*^oC*	-	-	-	-	-	28.5	26.9	25.8	22.0	-		-
	Comments		1/2T	1/2T	1/2T	1/2T	1/2T	1/2T	2	2	2	2	2	2

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
WH-78	*Well*	*"H_2O*	-	-	0.26	0.19	0.33	0.52	too tall	too tall	too tall	-	-	-
	Lateral	*"H_2O*	NLV	NLV	NLV	NLV	NLV	-1.27	-3.54	-4.01	-5.39	-6.97	-4.72	-2.74
	CH_4	*%*	-	-	58.3	56.3	59.6	56.2	53.8	52.3	56.4	56.4	52.5	56.2
	CO_2	*%*	-	-	32.6	31.0	32.5	31.8	36.2	35.7	38.7	37.8	44.2	36.6
	O_2	*%*	-	-	0.1	0.2	0.8	0.2	1.9	2.8	1.1	1.9	2.3	2.7
	BAL (N_2)	*%*	-	-	9.0	12.5	7.1	11.8	8.1	9.2	3.8	3.9	1.0	4.5
	CO	*PPM*	-	-	25	62	42	57	20	4	4	3	2	0
	H_2S	*PPM*	-	-	>>>>	>>>>	>>>>	>>>>	>>>>	>>>>	500	372	128	127
	Vel Min	*m/s*	-	-	-	-	-	1.28	1.54	1.27	1.68	-	-	-
	Vel Max	*m/s*	-	-	-	-	-	2.11	1.99	1.84	2.03	3.00	3.00	1.00
	Flow	*CFM*	-	-	-	-	-	16.02	16.68	14.69	17.53	50.7	50.5	40
	Temp	*^oC*	-	-	-	-	-	-	29.8	28.4	23.8	-	-	-
	Comments		2	2	2	2	2	2	2	2	2	2	2	2
WH-79	*Well*	*"H_2O*	-	-	0.32	0.21	0.27	0.20	-	-	-	-	-	-
	Lateral	*"H_2O*	NLV	NLV	NLV	NLV	NLV	-1.92	-3.21	-3.68	-3.24	0.44	-4.62	-3.58
	CH_4	*%*	-	-	60.1	59.2	58.6	55.8	not connected	not connected	not connected	43.2	58.1	54.7
	CO_2	*%*	-	-	33.2	31.2	32.0	31.5	-	-	-	33.4	39.5	37.4
	O_2	*%*	-	-	0.2	0.5	0.3	0.3	-	-	-	0.4	2.4	1.1
	BAL (N_2)	*%*	-	-	6.5	9.1	9.1	12.4	-	-	-	23.0	0.0	6.8
	CO	*PPM*	-	-	45	63	55	66	-	-	-	4	2	1
	H_2S	*PPM*	-	-	211	210	199	201	-	-	-	132	356	182
	Vel Min	*m/s*	-	-	-	-	-	1.57	-	-	-	-	-	-
	Vel Max	*m/s*	-	-	-	-	-	2.03	-	-	-	0.00	0.00	3.20
	Flow	*CFM*	-	-	-	-	-	17.01	-	-	-	0	0	66.1
	Temp	*^oC*	-	-	-	-	-	28.6	-	-	-	-	-	-
	Comments		1	1	1	1	1	1	1	1	1	1	1	1
WH-80	*Well*	*"H_2O*	-	-	0.19	0.35	0.20	0.33	-0.69	-1.25	-1.68	-	-	-
	Lateral	*"H_2O*	NLV	NLV	NLV	NLV	NLV	-1.57	-3.57	-4.48	-5.02	-6.57	-4.60	-4.25
	CH_4	*%*	-	-	58.2	59.4	59.6	56.8	50.4	45.3	48.2	45.6	58.8	54.9
	CO_2	*%*	-	-	31.1	30.4	32.6	30.6	32.6	38.6	33.6	34.7	39.4	39.9
	O_2	*%*	-	-	0.5	1.2	0.4	1.0	1.0	3.0	4.8	0.8	0.6	1.7
	BAL (N_2)	*%*	-	-	10.2	9.0	7.4	11.6	16.0	77.0	77.0	18.9	1.2	3.5
	CO	*PPM*	-	-	66	62	101	127	57	66	98	6	2	2
	H_2S	*PPM*	-	-	184	144	154	198	122	184	157	151	378	63
	Vel Min	*m/s*	-	-	-	-	-	1.22	1.58	1.24	1.62	-	-	-
	Vel Max	*m/s*	-	-	-	-	-	1.84	2.01	1.68	2.01	5.40	0.30	1.50
	Flow	*CFM*	-	-	-	-	-	14.46	16.96	13.80	17.15	89.7	4.4	18.5
	Temp	*^oC*	-	-	-	-	-	25.8	29.6	25.7	23.1	-	-	-
	Comments		1	1	1	1	1	1	1	1	1	1	1	1

Table 2: Wellfield Monitoring Data

		Units	31-Jan-23	28-Feb-23	28-Mar-23	28-Apr-23	28-May-23	28-Jun-23	28-Jul-23	28-Aug-23	28-Sep-23	25-Oct-23	25-Nov-23	5-Dec-23
5-81	*Well*	*"H_2O*	-1.95	-1.87	-1.61	-1.47	-1.25	-1.27	-1.33	-1.57	-1.01	-	-	-
	Lateral	*"H_2O*	-4.00	-3.89	-3.26	-2.98	-2.57	-4.49	-4.00	-4.03	-1.20	-0.07	0.40	1.25
	CH_4	*%*	50.3	51.2	50.8	51.2	52.8	55.4	53.7	54.0	54.3	55.1	0.1	61.5
	CO_2	*%*	32.6	31.6	30.2	29.6	29.6	42.2	39.6	40.1	40.7	41.4	0.5	32.6
	O_2	*%*	2.0	2.4	2.1	2.4	2.5	2.1	2.1	2.2	0.7	0.2	17.4	1.3
	BAL (N_2)	*%*	15.1	14.8	16.9	16.8	15.1	0.3	4.6	3.7	4.3	3.3	82.0	4.6
	CO	*PPM*	20	18	22	29	27	8	15	11	12	5	0	1
	H_2S	*PPM*	27	36	59	68	61	34	19	42	27	16	10	98
	Vel Min	*m/s*	1.55	1.22	1.55	1.02	1.27	1.27	1.47	1.54	0.00	-	-	-
	Vel Max	*m/s*	1.99	1.87	2.03	1.69	1.88	1.68	1.78	1.98	0.00	0.00	0.00	3.70
	Flow	*CFM*	16.73	14.60	16.91	12.80	14.88	13.94	15.36	16.63	0	0	0	32
	Temp	*^oC*	13.0	15.3	19.0	22.1	28.4	28.7	27.0	30.5	27.1	-	-	-
	Comments		2T	2T	2T	2T	2T	1T	1T	1T	1T	1	closed	closed
7-82	*Well*	*"H_2O*	-1.20	-1.37	-1.11	-1.00	-1.24	-1.00	-1.11	0.62	-0.29	-	-	-
	Lateral	*"H_2O*	surging	surging	surging	surging	surging	surging	NLV	NLV	-5.71	-6.65	-4.45	-8.10
	CH_4	*%*	42.5	38.9	40.9	43.5	41.5	42.5	58.6	62.4	47.5	45.2	54.8	50.2
	CO_2	*%*	28.3	27.5	23.4	25.1	31.0	26.9	30.5	36.1	34.6	33.4	40.2	32.8
	O_2	*%*	2.5	7.0	6.1	6.8	5.1	6.6	1.8	1.5	3.6	5.1	5.0	6.3
	BAL (N_2)	*%*	26.7	26.6	29.6	24.6	22.4	24.0	9.1	0.0	14.3	16.3	0.0	10.7
	CO	*PPM*	30	24	55	102	41	51	23	56	48	34	37	0
	H_2S	*PPM*	152	190	184	144	122	101	108	111	86	78	121	62
	Vel Min	*m/s*	1.32	1.01	1.24	1.29	1.27	1.58	-	-	1.22	-	-	-
	Vel Max	*m/s*	1.55	1.38	1.66	1.95	1.69	1.98	-	-	1.99	0.60	0.70	0.00
	Flow	*CFM*	13.56	11.29	13.70	15.31	13.99	16.82	-	-	15.17	10.7	11.7	13.3
	Temp	*^oC*	15.3	13.2	18.4	20.1	28.4	25.6	-	-	24.8	-	-	-
	Comments		1/2T	1/2T	1/2T	1/2T	1/2T	1/2T	1/2T	1/2T	1/2T	1/2T	1/2T	1/2T
7-83	*Well*	*"H_2O*	0.02	0.00	0.01	0.02	0.02	0.03	0.02	0.03	0.01	-	-	-
	Lateral	*"H_2O*	-3.21	-4.58	-3.15	-2.25	-2.15	-1.57	-4.01	-4.15	-3.69	-1.92	-4.95	0.03
	CH_4	*%*	2.5	0.1	1.2	5.1	1.0	1.9	1.0	1.5	22.0	44.5	6.2	50.1
	CO_2	*%*	10.3	0.1	1.2	10.6	1.9	1.4	2.0	2.9	3.6	32.4	4.7	32.5
	O_2	*%*	20.0	20.4	19.6	18.5	18.5	15.8	19.8	19.8	18.4	3.5	10.8	10.2
	BAL (N_2)	*%*	67.2	79.4	78.0	65.8	78.6	80.9	77.2	75.8	56.0	19.6	78.3	7.2
	CO	*PPM*	4	1	2	5	5	7	4	4	5	23	1	3
	H_2S	*PPM*	4	0	2	4	1	1	3	2	1	56	51	6
	Vel Min	*m/s*	-	-	-	-	-	-	-	-	-	-	-	-
	Vel Max	*m/s*	-	-	-	-	-	-	-	-	-	0.00	0.00	0.00
	Flow	*CFM*	-	-	-	-	-	-	-	-	-	0	0	0
	Temp	*^oC*	-	-	-	-	-	-	-	-	-	-	-	-
	Comments		closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed

Table 3: Pump Counters

		January 31, 2023			February 28, 2023			March 28, 2023			April 28, 2023			May 28, 2023			June 28, 2023		
Location	Prev. Counter	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo
PDT 1	1402	1408	6	15.6	1411	3	7.8	1429	18	46.8	2207	778	2022.8	2214	7	18.2	2256	42	109.2
PDT 2	69017	69257	240	624	69401	144	374.4	69815	414	1076.4	66071	-3744	-9734.4	66071	0	0	66071	0	0
PDT 3	18101	18101	0	0	18101	0	0	18101	0	0	18101	0	0	18101	0	0	18101	0	0
PDT 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PDT 5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PDT 6	13965	14218	253	657.8	14599	381	990.6	16584	1985	5161	18544	1960	5096	6297	-12247	-31842.2	6302	5	13
PDT 7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PDT 8	7028	7033	5	13	7055	22	57.2	7055	0	0	7055	0	0	7055	0	0	7055	0	0
PDT 9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PDT 10	7010	7042	32	83.2	7055	13	33.8	7060	5	13	7064	4	10.4	7065	1	2.6	7425	360	936
PDT 11	34895	35047	152	395.2	35097	50	130	35198	101	262.6	35244	46	119.6	36877	1633	4245.8	39517	2640	6864
PDT 12	160495	160495	0	0	160495	0	0	160495	0	0	160495	0	0	160495	0	0	160495	0	0
H-1	22	22	0	0	22	0	0	22	0	0	22	0	0	22	0	0	22	0	0
H-2	17	17	0	0	17	0	0	17	0	0	17	0	0	17	0	0	17	0	0
H-3	97811	97811	0	0	97811	0	0	97811	0	0	97814	3	7.8	97820	6	15.6	97825	5	13
H-4	473600	474158	558	1450.8	474512	354	920.4	474812	300	780	474822	10	26	474822	0	0	474822	0	0
1-5	218366	218659	293	761.8	218803	144	374.4	218987	184	478.4	219247	260	676	276466	57219	148769.4	279366	2900	7540
1-6	632610	633127	517	1344.2	633207	80	208	633447	240	624	633598	151	392.6	809496	175898	457334.8	814552	5056	13145.6
1-7	3504	3504	0	0	3504	0	0	3504	0	0	3504	0	0	3509	5	13	3509	0	0
1-8	171203	172548	1345	3497	172655	107	278.2	172964	309	803.4	174588	1624	4222.4	246238	71650	186290	250111	3873	10069.8
1-9	854258	854488	230	598	854698	210	546	854822	124	322.4	862174	7352	19115.2	871473	9299	24177.4	873629	2156	5605.6
1-10	684517	684958	441	1146.6	685022	64	166.4	685420	398	1034.8	686954	1534	3988.4	693746	6792	17659.2	696488	2742	7129.2
H-11	N/C	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-
H-12	403268	404578	1310	3406	404721	143	371.8	405122	401	1042.6	465187	60065	156169	534064	68877	179080.2	542140	8076	20997.6
2-13	2748	2748	0	0	2748	0	0	2748	0	0	2748	0	0	2748	0	0	2748	0	0
2-14	102499	102499	0	0	102499	0	0	102499	0	0	102499	0	0	102499	0	0	102499	0	0
2-15	47003	47003	0	0	47003	0	0	47003	0	0	47003	0	0	47015	12	31.2	47015	0	0
2-16	40	40	0	0	40	0	0	40	0	0	40	0	0	43	3	7.8	43	0	0
2-17	468687	468687	0	0	468687	0	0	468687	0	0	468687	0	0	468760	73	189.8	468760	0	0
2-18	532345	532345	0	0	532345	0	0	532345	0	0	532345	0	0	532345	0	0	532345	0	0
3-19	122574	123586	1012	2631.2	123855	269	699.4	125421	1566	4071.6	126854	1433	3725.8	126854	0	0	126854	0	0
3-20	131958	132586	628	1632.8	132730	144	374.4	133628	898	2334.8	133855	227	590.2	133966	111	288.6	134568	602	1565.2
3-21	128024	128455	431	1120.6	128455	0	0	128455	0	0	128455	0	0	128455	0	0	128455	0	0
3-22	45835	46012	177	460.2	46054	42	109.2	48551	2497	6492.2	48551	0	0	48551	0	0	48551	0	0
3-23	233541	235647	2106	5475.6	235814	167	434.2	236208	394	1024.4	238111	1903	4947.8	240218	2107	5478.2	241006	788	2048.8
3-24	296915	296915	0	0	296915	0	0	296915	0	0	296915	0	0	296915	0	0	296915	0	0
3-25	450221	452178	1957	5088.2	452317	139	361.4	454029	1712	4451.2	455984	1955	5083	456204	220	572	456339	135	351
3-26	12385	12659	274	712.4	12695	36	93.6	12745	50	130	12966	221	574.6	13144	178	462.8	13168	24	62.4
3-27	283279	283279	0	0	283279	0	0	283279	0	0	283279	0	0	283279	0	0	283279	0	0
3-28	131399	131957	558	1450.8	132058	101	262.6	133659	1601	4162.6	135622	1963	5103.8	135744	122	317.2	135822	78	202.8
3-29	13	13	0	0	13	0	0	13	0	0	13	0	0	13	0	0	13	0	0
3-30	69469	69469	0	0	69469	0	0	69469	0	0	69469	0	0	69469	0	0	69469	0	0
4-31	20	20	0	0	20	0	0	20	0	0	302	282	733.2	376	74	192.4	455	79	205.4
4-32	18024	19035	1011	2628.6	20366	1331	3460.6	21526	1160	3016	22699	1173	3049.8	63537	40838	106178.8	73558	10021	26054.6
4-33	353204	355627	2423	6299.8	355829	202	525.2	356998	1169	3039.4	359451	2453	6377.8	428140	68689	178591.4	488173	60033	156085.8
4-34	281547	284518	2971	7724.6	284703	185	481	285095	392	1019.2	286503	1408	3660.8	517099	230596	0	840783	323684	841578.4
4-35	217366	219550	2184	5678.4	219550	0	0	219550	0	0	219550	0	0	428749	209199	543917.4	495332	66583	173115.8
4-36	16	16	0	0	16	0	0	16	0	0	16	0	0	29	13	33.8	29	0	0
4-37	184588	185477	889	2311.4	185703	226	587.6	186589	886	2303.6	187447	858	2230.8	221847	34400	89440	293154	71307	185398.2
5-38	923880	925687	1807	4698.2	926145	458	1190.8	927014	869	2259.4	928003	989	2571.4	625403	-302600	-786760	872862	247459	643393.4
5-39	193651	196257	2606	6775.6	197524	1267	3294.2	199628	2104	5470.4	201847	2219	5769.4	162876	-38971	-101324.6	162876	0	0
5-40	12	12	0	0	12	0	0	12	0	0	12	0	0	12	0	0	19	7	18.2
5-41	23	23	0	0	23	0	0	23	0	0	23	0	0	23	0	0	23	0	0
5-42	133503	133628	125	325	133806	178	462.8	134587	781	2030.6	135694	1107	2878.2	148241	12547	32622.2	198415	50174	130452.4
5-43	41394	41562	168	436.8	41562	0	0	41659	97	252.2	42104	445	1157	75217	33113	86093.8	98865	23648	61484.8
5-44	14	14	0	0	14	0	0	14	0	0	14	0	0	14	0	0	16	2	5.2
5-45	54	54	0	0	54	0	0	54	0	0	54	0	0	54	0	0	54	0	0
5-46	1401	1401	0	0	1401	0	0	1403	2	5.2	1409	6	15.6	1570	161	418.6	1722	152	395.2
6-47	867922	867922	0	0	867922	0	0	868445	523	1359.8	870211	1766	4591.6	927184	56973	148129.8	102603	-824581	-2143910.6
6-48	7460	7460	0	0	7460	0	0	7815	355	923	7815	0	0	7815	0	0	7815	0	0
6-49	612844	614859	2015	5239	615027	168	436.8	617548	2521	6554.6	619333	1785	4641	716284	96951	252072.6	876162	159878	415682.8
6-50	30675	31587	912	2371.2	31950	363	943.8	32621	671	1744.6	32944	323	839.8	36954	4010	10426	44085	7131	18540.6
6-51	13	13	0	0	13	0	0	13	0	0	13	0	0	13	0	0	21	8	20.8
6-52	35862	37514	1652	4295.2	38245	731	1900.6	39698	1453	3777.8	39698	0	0	43687	3989	10371.4	55821	12134	31548.4
6-53	101	101	0	0	101	0	0	101	0	0	101	0	0	101	0	0	101	0	0
6-54	942114	944127	2013	5233.8	945623	1496	3889.6	945962	339	881.4	948520	2558	6650.8	324551	-623969	-1622319.4	526997	202446	526359.6

Table 3: Pump Counters

		January 31, 2023			February 28, 2023			March 28, 2023			April 28, 2023			May 28, 2023			June 28, 2023		
Location	Prev. Counter	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo
6-55	N/C	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-
6-56	416847	416985	138	358.8	416985	0	0	416985	0	0	416985	0	0	416985	112495	292487	215440	-201545	-524017
6-57	86225	86521	296	769.6	86814	293	761.8	87028	214	556.4	87028	0	0	87028	0	0	87028	0	0
6-58	7	7	0	0	7	0	0	7	0	0	190	183	475.8	197	7	18.2	202	5	13
6-59	43	43	0	0	43	0	0	43	0	0	43	0	0	43	0	0	43	0	0
7-60	575999	586327	10328	26852.8	611438	25111	65288.6	612517	1079	2805.4	618455	5938	15438.8	628475	10020	26052	636284	7809	20303.4
7-61	6397	6698	301	782.6	7890	1192	3099.2	9240	1350	3510	10485	1245	3237	11308	823	2139.8	16244	4936	12833.6
7-62	365048	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-
7-63	673014	684221	11207	29138.2	708380	24159	62813.4	709154	774	2012.4	710255	1101	2862.6	712547	2292	5959.2	714628	2081	5410.6
7-64	119504	120228	724	1882.4	120248	20	52	120536	288	748.8	120536	0	0	136208	15672	40747.2	152480	16272	42307.2
7-65	415190	420588	5398	14034.8	422983	2395	6227	423815	832	2163.2	428651	4836	12573.6	462001	33350	86710	492267	30266	78691.6
7-66	101737	103622	1885	4901	104222	600	1560	105248	1026	2667.6	107156	1908	4960.8	109982	2826	7347.6	110275	293	761.8
7-67	35	35	0	0	35	0	0	35	0	0	35	0	0	35	0	0	35	0	0
7-68	3	3	0	0	5	2	5.2	5	0	0	5	0	0	5	0	0	5	0	0
8-69	258409	259113	704	1830.4	259113	0	0	259113	0	0	259113	0	0	259113	0	0	259113	0	0
8-70	395658	400215	4557	11848.2	401255	1040	2704	402366	1111	2888.6	402366	0	0	402366	0	0	402366	0	0
8-71	53235	33800	-19435	-50531	33800	0	0	33800	0	0	34402	602	1565.2	34555	153	397.8	35041	486	1263.6
8-72	622748	622748	0	0	622750	2	5.2	622750	0	0	N/C	-	-	N/C	-	-	N/C	-	-
8-73	-	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-	416440	-	-	416440	0	0
8-74	103	105	2	5.2	528	423	1099.8	659	131	340.6	677	18	46.8	736	59	153.4	745	9	23.4
WH-75	7	7	0	0	7	0	0	7	0	0	7	0	0	10	3	7.8	11	1	2.6
WH-76	572	572	0	0	572	0	0	572	0	0	594	22	57.2	656	62	161.2	721	65	169
WH-77	50847	50847	0	0	50847	0	0	50847	0	0	50847	0	0	50847	0	0	50847	0	0
WH-78	88044	88044	0	0	88044	0	0	88044	0	0	88044	0	0	88044	0	0	88044	0	0
WH-79	16	16	0	0	16	0	0	16	0	0	16	0	0	16	0	0	16	0	0
WH-80	18	18	0	0	18	0	0	18	0	0	18	0	0	18	0	0	18	0	0
5-81	28064	28064	0	0	28064	0	0	28064	0	0	28064	0	0	32657	4593	11941.8	75593	42936	111633.6
7-82	120455	35247	-85208	-221540.8	75467	40220	104572	76211	744	1934.4	78571	2360	6136	81547	2976	7737.6	86951	5404	14050.4
7-83	24	24	0	0	25	1	2.6	26	1	2.6	26	0	0	26	0	0	26	0	0

Notes:

N/C	No Counter
	Pump counter permanently removed, contain non-functioning pump stuck in well.
-	Incorrect Reading at Counter
-	No reading

there were a couple wells where they were concerned about how wet the ground was, so the City decided to turn these pumps on areas of concern where the ground was saturated with water.
turned the pumps on at those few locations - so they City turned those on early

Table 3: Pump Counters

		July 28, 2023			August 28, 2023			September 28, 2023			October 28, 2023			November 28, 2023			December 28, 2023		
Location	Prev. Counter	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo
PDT 1	1402	2267	11	28.6	2270	3	7.8	2278	8	20.8	2288	10	26	2288	0	0	2289	1	2.6
PDT 2	69017	67285	1214	3156.4	67787	502	1305.2	67815	28	72.8	67900	85	221	68109	209	543.4	68127	18	46.8
PDT 3	18101	18101	0	0	18101	0	0	18101	0	0	18101	0	0	18101	0	0	18101	0	0
PDT 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PDT 5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PDT 6	13965	9649	3347	8702.2	10031	382	993.2	10120	89	231.4	10157	37	96.2	11393	1236	3213.6	11485	92	239.2
PDT 7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PDT 8	7028	7055	0	0	26848	19793	51461.8	36218	9370	24362	38247	2029	5275.4	39147	900	2340	39147	0	0
PDT 9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PDT 10	7010	7925	500	1300	9620	1695	4407	10214	594	1544.4	10421	207	538.2	10424	3	7.8	10435	11	28.6
PDT 11	34895	43588	4071	10584.6	53768	10180	26468	55217	1449	3767.4	55614	397	1032.2	55619	5	13	55629	10	26
PDT 12	160495	160495	0	0	160495	0	0	160495	0	0	160495	0	0	160495	0	0	160495	0	0
H-1	22	22	0	0	22	0	0	N/C	-	-	3525	3503	9107.8	34114	30589	79531.4	35218	1104	2870.4
H-2	17	17	0	0	17	0	0	N/C	-	-	3526	3509	9123.4	3528	2	5.2	3528	0	0
H-3	97811	97825	0	0	97825	0	0	97825	0	0	97988	163	423.8	159407	61419	159689.4	184229	24822	64537.2
H-4	473600	474822	0	0	474822	0	0	N/C	-	-	30303	-	-	53079	22776	59217.6	60320	7241	18826.6
1-5	218366	279431	65	169	299871	20440	53144	310937	11066	28771.6	320520	9583	24915.8	333364	12844	33394.4	334851	1487	3866.2
1-6	632610	847379	32827	85350.2	866213	18834	48968.4	880773	14560	37856	895008	14235	37011	914796	19788	51448.8	924118	9322	24237.2
1-7	3504	3514	5	13	N/C	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-8	171203	272557	22446	58359.6	283776	11219	29169.4	292833	9057	23548.2	302915	10082	26213.2	314570	11655	30303	315998	1428	3712.8
1-9	854258	877109	3480	9048	365864	-511245	-1329237	368390	2526	6567.6	371224	2834	7368.4	373233	2009	5223.4	373520	287	746.2
1-10	684517	701544	5056	13145.6	701932	388	1008.8	703895	1963	5103.8	705481	1586	4123.6	707262	1781	4630.6	707368	106	275.6
H-11	N/C	N/C	-	-	N/C	-	-	N/C	-	-	102548	-	-	185157	82609	214783.4	189523	4366	11351.6
H-12	403268	573284	31144	80974.4	618680	45396	118029.6	638172	19492	50679.2	667951	29779	77425.4	704490	36539	95001.4	715218	10728	27892.8
2-13	2748	2914	166	431.6	N/C	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-14	102499	102518	19	49.4	N/C	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-15	47003	68851	21836	56773.6	75440	6589	17131.4	81243	5803	15087.8	87485	6242	16229.2	87521	36	93.6	87899	378	982.8
2-16	40	4687	4644	12074.4	6911	2224	5782.4	8468	1557	4048.2	9664	1196	3109.6	10575	911	2368.6	10682	107	278.2
2-17	468687	557598	88838	230978.8	613591	55993	145581.8	662230	48639	126461.4	662230	0	0	662230	0	0	662230	0	0
2-18	532345	581453	49108	127680.8	613035	31582	82113.2	614811	1776	4617.6	669971	55160	143416	672158	2187	5686.2	679558	7400	19240
3-19	122574	126854	0	0	127577	723	1879.8	146786	19209	49943.4	148855	2069	5379.4	179116	30261	78678.6	182571	3455	8983
3-20	131958	135004	436	1133.6	135014	10	26	135102	88	228.8	136481	1379	3585.4	215681	79200	205920	226801	11120	28912
3-21	128024	128455	0	0	128455	0	0	224294	95839	249181.4	231887	7593	19741.8	298702	66815	173719	303953	5251	13652.6
3-22	45835	48551	0	0	48551	0	0	50223	1672	4347.2	52961	2738	7118.8	58031	5070	13182	59142	1111	2888.6
3-23	233541	241006	0	0	242155	1149	2987.4	242207	52	135.2	242207	0	0	257443	15236	39613.6	259120	1677	4360.2
3-24	296915	296915	0	0	314040	17125	44525	345314	31274	81312.4	354136	8822	22937.2	367112	12976	33737.6	369157	2045	5317
3-25	450221	456339	0	0	456339	0	0	456574	235	611	458245	1671	4344.6	513437	55192	143499.2	524888	11451	29772.6
3-26	12385	13168	0	0	13168	0	0	13168	0	0	13168	0	0	13168	0	0	13168	0	0
3-27	283279	283279	0	0	283279	0	0	283279	0	0	877119	593840	1543984	877119	0	0	877119	0	0
3-28	131399	6521	-129301	-336182.6	6521	0	0	126896	120375	312975	126896	0	0	126896	0	0	126896	0	0
3-29	13	13	0	0	13	0	0	13	0	0	13	0	0	13	0	0	13	0	0
3-30	69469	69469	0	0	69469	0	0	69471	2	5.2	69472	1	2.6	69472	0	0	69472	0	0
4-31	20	635	180	468	635	0	0	635	0	0	635	0	0	635	0	0	635	0	0
4-32	18024	160507	86949	226067.4	185002	24495	63687	225184	40182	104473.2	245972	20788	54048.8	340967	94995	246987	362557	21590	56134
4-33	353204	488173	0	0	488627	454	1180.4	527888	39261	102078.6	N/C	-	-	N/C	-	-	N/C	-	-
4-34	281547	907971	67188	174688.8	927296	19325	50245	10247	82951	215672.6	32810	22563	58663.8	32811	1	2.6	32824	13	33.8
4-35	217366	237111	-258221	-671374.6	237111	0	0	237111	0	0	237111	0	0	237111	0	0	237111	0	0
4-36	16	29	0	0	29	0	0	29	0	0	29	0	0	29	0	0	29	0	0
4-37	184588	302485	9331	24260.6	329040	26555	69043	333689	4649	12087.4	367363	33674	87552.4	367418	55	143	368214	796	2069.6
5-38	923880	873558	696	1809.6	878364	4806	12495.6	879522	1158	3010.8	900698	21176	55057.6	918976	18278	47522.8	919284	308	800.8
5-39	193651	162876	0	0	162883	7	18.2	162884	1	2.6	162886	2	5.2	162886	0	0	162886	0	0
5-40	12	19	0	0	19	0	0	19	0	0	19	0	0	19	0	0	19	0	0
5-41	23	24	1	2.6	24	0	0	24	0	0	24	0	0	24	0	0	24	0	0
5-42	133503	225449	27034	70288.4	231163	5714	14856.4	248119	16956	44085.6	262377	14258	37070.8	277845	15468	40216.8	280210	2365	6149
5-43	41394	103502	4637	12056.2	116825	13323	34639.8	118204	1379	3585.4	218653	100449	261167.4	271980	53327	138650.2	284550	12570	32682
5-44	14	16	0	0	16	0	0	17	1	2.6	17	0	0	17	0	0	17	0	0
5-45	54	100528	100474	261232.4	100528	0	0	100529	1	2.6	100529	0	0	100529	0	0	100529	0	0
5-46	1401	1722	0	0	1722	0	0	1722	0	0	1722	0	0	1732	10	26	1732	0	0
6-47	867922	154778	52175	135655	278766	123988	322368.8	326559	47793	124261.8	467005	140446	365159.6	597572	130567	339474.2	597572	0	0
6-48	7460	7815	0	0	450372	442557	1150648.2	548512	98140	255164	624440	75928	197412.8	624469	29	75.4	624513	44	114.4
6-49	612844	886210	10048	26124.8	919856	33646	87479.6	936558	16702	43425.2	967872	31314	81416.4	11905	-955967	-2485514.2	32558	20653	53697.8
6-50	30675	46217	2132	5543.2	48254	2037	5296.2	49280	1026	2667.6	54358	5078	13202.8	57520	3162	8221.2	57781	261	678.6
6-51	13	21	0	0	21	0	0	21	0	0	21	0	0	21	0	0	21	0	0
6-52	35862	73505	17684	45978.4	76727	3222	8377.2	77368	641	1666.6	81559	4191	10896.6	84990	3431	8920.6	85012	22	57.2
6-53	101	102	1	2.6	102	0	0	102	0	0	102	0	0	102	0	0	102	0	0
6-54	942114	717980	190983	496555.8	717980	0	0	717980	0	0	717980	0	0	717980	0	0	717980	0	0

Table 3: Pump Counters

		July 28, 2023			August 28, 2023			September 28, 2023			October 28, 2023			November 28, 2023			December 28, 2023		
Location	Prev. Counter	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo
6-55	N/C	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-
6-56	416847	350468	135028	351072.8	350469	1	2.6	350469	0	0	350470	1	2.6	350470	0	0	350470	0	0
6-57	86225	87028	0	0	87028	0	0	87028	0	0	87028	0	0	87028	0	0	87028	0	0
6-58	7	202	0	0	49130	48928	127212.8	49215	85	221	49352	137	356.2	49352	0	0	49352	0	0
6-59	43	307	264	686.4	314	7	18.2	325	11	28.6	325	0	0	325	0	0	325	0	0
7-60	575999	862559	226275	588315	426352	-436207	-1134138.2	522477	96125	249925	629614	107137	278556.2	652147	22533	58585.8	666921	14774	38412.4
7-61	6397	19624	3380	8788	22850	3226	8387.6	23598	748	1944.8	28696	5098	13254.8	28854	158	410.8	28854	0	0
7-62	365048	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-
7-63	673014	715484	856	2225.6	963152	247668	643936.8	985302	22150	57590	14182	28880	75088	19657	5475	14235	21000	1343	3491.8
7-64	119504	160894	8414	21876.4	171078	10184	26478.4	179500	8422	21897.2	186153	6653	17297.8	191588	5435	14131	193255	1667	4334.2
7-65	415190	525200	32933	85625.8	594015	68815	178919	624853	30838	80178.8	675070	50217	130564.2	675841	771	2004.6	675986	145	377
7-66	101737	118403	8128	21132.8	125480	7077	18400.2	130287	4807	12498.2	156155	25868	67256.8	157248	1093	2841.8	158222	974	2532.4
7-67	35	42	7	18.2	42	0	0	42	0	0	43	1	2.6	43	0	0	43	0	0
7-68	3	5	0	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0	0
8-69	258409	259113	0	0	259257	144	374.4	260399	1142	2969.2	260487	88	228.8	260487	0	0	260487	0	0
8-70	395658	448117	45751	118952.6	508960	60843	158191.8	526449	17489	45471.4	526449	0	0	578690	52241	135826.6	589621	10931	28420.6
8-71	53235	35041	0	0	35041	0	0	35041	35311	91808.6	35267	226	587.6	35327	60	156	35330	3	7.8
8-72	622748	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-	N/C	-	-
8-73	-	416440	0	0	416443	3	7.8	416588	145	377	416703	115	299	416821	118	306.8	416855	34	88.4
8-74	103	745	0	0	745	0	0	745	0	0	786	41	106.6	811	25	65	811	0	0
WH-75	7	11	0	0	11	0	0	11	0	0	11	0	0	11	0	0	11	0	0
WH-76	572	721	0	0	941	220	572	1025	84	218.4	1050	25	65	1051	1	2.6	1051	0	0
WH-77	50847	66200	15353	39917.8	103917	37717	98064.2	116847	12930	33618	118527	1680	4368	119522	995	2587	120255	733	1905.8
WH-78	88044	95487	7443	19351.8	125447	29960	77896	129501	4054	10540.4	150371	20870	54262	152444	2073	5389.8	153629	1185	3081
WH-79	16	16	0	0	16	0	0	16	0	0	16	0	0	16	0	0	16	0	0
WH-80	18	18	0	0	18	0	0	18	0	0	18	0	0	18	0	0	18	0	0
5-81	28064	79521	3928	10212.8	89648	10127	26330.2	96281	6633	17245.8	96702	421	1094.6	99845	3143	8171.8	100214	369	959.4
7-82	120455	152447	65496	170289.6	312083	159636	415053.6	312083	0	0	312083	0	0	312083	0	0	312083	0	0
7-83	24	26	0	0	26	0	0	26	0	0	26	0	0	37	11	28.6	46	9	23.4

Notes:

N/C	
-	
-	

Notes:

N/C	No Counter
	Pump counter permanently removed, contain non-functioning pump stuck in well.
-	Incorrect Reading at Counter
-	No reading

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Table 4: Water Levels

			April 2023				July 2023				October 2023				December 2023			
Units	meters	meters	meters	meters	°C	%	meters	meters	°C	%	meters	meters	°C	%	meters	meters	°C	%
Locations	Screen Length	Installed Well Depth	Depth to Water	Depth to Bottom	Tempera ture	Open Screen	Depth to Water	Depth to Bottom	Tempera ture	Open Screen	Depth to Water	Depth to Bottom	Tempera ture	Open Screen	Depth to Water	Depth to Bottom	Tempera ture	Open Screen
H-1	12	14.63	7.10	14.00	42.3	31.85	7.30	14.00	28.4	33.22	7.20	14.10	30.6	32.53	9.20	14.20	33.6	46.20
H-2	14	16.77	8.40	17.30	39.9	31.91	8.50	17.50	32.6	32.51	8.30	17.40	24.9	31.32	10.20	17.20	30.7	42.65
H-3	12	15.24	6.40	15.30	32.2	21.98	6.30	15.30	31.9	21.33	4.20	15.60	41.8	7.55	7.10	15.20	25.9	26.58
H-4	11	14.02	6.40	9.40	35.6	23.90	3.70	9.20	31.4	4.64	4.20	9.60	28.4	8.21	6.80	9.50	22.4	26.75
1-5	11	13.72	11.40	14.40	45.8	60.87	11.00	14.30	42.5	57.96	10.80	14.20	40.2	56.50	11.00	14.40	26.9	57.96
1-6	12	15.55	9.10	15.50	40.1	36.96	8.80	15.40	39.0	35.03	9.00	15.50	39.1	36.31	11.50	15.60	28.4	52.39
1-7	18	21.34	7.40	14.40	38.2	20.39	7.20	14.50	40.1	19.45	7.50	14.50	41.5	20.86	8.00	14.20	27.1	23.20
1-8	21	24.39	8.60	13.50	40.9	22.76	8.90	13.50	42.5	23.99	8.80	13.40	41.6	23.58	9.20	13.90	26.3	25.22
1-9	12	14.63	10.30	14.40	42.1	53.72	9.90	14.50	40.3	50.98	9.90	14.60	38.6	50.98	10.20	14.20	30.5	53.03
1-10	9	12.20	9.40	11.50	43.2	52.08	8.40	11.50	41.6	43.88	8.50	11.50	37.4	44.70	9.50	11.50	37.1	52.90
H-11	9	12.80	Foam	12.10	36.9	-	Foam	12.20	28.5	-	Foam	12.10	25.9	-	Foam	12.40	25.9	-
H-12	13	16.16	13.90	15.80	42.7	67.15	13.10	14.20	36.9	62.20	12.40	14.00	32.6	57.87	14.00	15.40	29.4	67.77
2-13	21	25.00	8.00	10.00	55.8	17.37	7.90	10.10	48.1	16.97	8.20	10.00	41.7	18.17	7.50	10.00	25.4	15.37
2-14	20	22.56	7.00	13.90	50.1	18.86	4.50	14.00	26.9	4.30	4.30	14.10	24.7	6.90	7.60	13.60	37.4	21.52
2-15	18	21.65	8.20	18.10	35.7	22.39	8.40	18.00	24.9	23.31	8.80	18.20	20.3	25.16	8.30	18.20	30.6	22.85
2-16	26	28.35	23.20	28.00	39.2	73.22	23.50	28.00	28.6	74.28	20.50	28.10	29.6	63.70	24.10	28.10	36.9	76.40
2-17	15	18.29	13.80	16.00	35.6	58.77	14.00	16.00	33.6	59.87	14.20	15.80	31.8	60.96	14.60	16.00	28.4	63.15
2-18	15	18.29	18.00	20.00	39.5	81.73	18.10	20.00	34.5	82.28	18.30	20.30	35.6	83.37	17.40	20.00	30.1	78.45
3-19	12	14.94	9.90	14.50	32.5	47.90	7.60	14.40	27.1	32.51	7.50	14.30	28.9	31.84	10.10	14.40	25.8	49.24
3-20	11	13.26	12.10	14.00	36.8	71.70	5.80	13.40	29.3	24.19	5.90	13.50	24.1	24.95	12.30	14.10	23.6	73.20
3-21	5	7.62	6.00	7.90	40.7	38.72	3.50	7.90	36.7	5.92	3.40	7.80	29.3	4.61	6.80	8.00	28.8	49.22
3-22	24	26.68	13.30	20.10	25.8	40.14	11.80	20.10	28.5	34.52	11.50	20.10	32.9	33.39	14.80	20.00	30.6	45.76
3-23	23	25.91	14.10	18.50	29.6	42.64	10.10	20.20	21.7	27.21	10.00	20.00	35.7	26.82	14.00	18.60	40.2	42.26
3-24	21	23.48	12.80	20.10	35.7	45.43	11.60	21.80	27.6	40.32	10.90	21.70	30.8	37.34	13.30	20.20	36.4	47.56
3-25	18	21.34	9.80	18.50	32.4	31.63	8.40	18.60	31.7	25.07	8.80	18.50	31.0	26.95	9.60	18.80	34.6	30.70
3-26	9	12.20	10.10	13.90	39.5	57.82	9.90	14.10	38.6	56.18	10.00	14.20	35.6	57.00	10.00	14.10	32.3	57.00
3-27	21	24.09	12.50	19.50	41.2	40.51	10.50	19.60	40.1	32.20	10.20	19.30	39.2	30.96	12.80	19.40	38.4	41.75
3-28	12	15.24	9.90	15.10	43.6	44.94	9.20	15.00	38.2	40.35	9.30	15.20	35.1	41.01	10.20	15.20	36.2	46.91
3-29	12	14.63	11.10	15.20	35.4	59.18	10.70	15.30	34.6	56.45	10.50	15.10	35.7	55.08	10.60	15.40	34.1	55.77
3-30	7	9.76	6.90	8.20	32.6	45.73	6.50	8.50	30.1	41.63	7.50	8.80	31.6	51.88	7.60	8.10	32.0	52.90
4-31	16	18.75	14.50	18.10	31.4	62.70	14.40	18.20	24.8	62.17	14.10	18.10	26.9	60.57	13.40	18.20	31.9	56.83
4-32	10	12.50	5.00	12.10	44.8	18.05	5.10	12.00	36.2	18.85	5.80	12.10	35.8	24.45	6.10	11.40	36.4	26.85
4-33	24	26.68	13.20	20.40	36.8	40.91	Dirty	20.50	25.8	-	Dirty	20.40	21.9	-	Dirty	20.40	34.2	-
4-34	20	22.56	-	-	-	-	8.90	18.50	26.9	27.29	9.10	18.50	29.6	28.17	9.40	18.40	24.7	29.50
4-35	15	17.38	11.70	18.60	31.4	55.05	10.60	18.50	30.6	48.72	10.20	18.40	28.4	46.41	11.00	18.40	30.9	51.02
4-36	15	18.29	10.10	17.80	35.8	38.55	9.70	17.90	32.8	36.36	9.50	18.00	30.2	35.27	9.50	17.50	30.6	35.27
4-37	12	14.94	11.60	15.00	27.5	59.28	8.50	15.20	29.8	38.53	8.80	15.30	30.6	40.54	11.40	15.20	31.5	57.94
5-38	8	10.67	6.80	12.50	50.2	35.15	5.30	12.40	44.7	21.10	5.10	12.50	42.8	19.22	8.60	12.50	24.8	52.02
5-39	8	10.67	6.50	11.90	32.6	32.34	6.20	12.00	30.2	29.53	6.00	12.10	31.6	27.66	6.80	12.00	20.6	35.15

Table 4: Water Levels

			April 2023				July 2023				October 2023				December 2023			
Units	meters	meters	meters	meters	°C	%	meters	meters	°C	%	meters	meters	°C	%	meters	meters	°C	%
Locations	Screen Length	Installed Well Depth	Depth to Water	Depth to Bottom	Tempera ture	Open Screen	Depth to Water	Depth to Bottom	Tempera ture	Open Screen	Depth to Water	Depth to Bottom	Tempera ture	Open Screen	Depth to Water	Depth to Bottom	Tempera ture	Open Screen
5-40	18	21.95	6.70	21.20	40.1	13.86	6.90	21.00	29.6	14.77	6.80	21.10	35.6	14.31	8.50	21.00	31.9	22.06
5-41	17	18.90	11.00	15.90	33.6	46.90	12.50	16.00	35.7	54.84	12.50	16.20	36.7	54.84	10.40	15.70	26.8	43.73
5-42	12	16.16	11.80	15.20	35.8	48.50	12.40	15.30	34.2	52.21	12.20	15.20	32.6	50.97	11.50	15.40	30.4	46.64
5-43	14	16.16	7.6	12	27.5	31.94	8.9	11.8	29.7	39.98	9	11.9	25.7	40.60	8.1	12.1	30.8	35.03
5-44	19	21.95	11.6	14	32.8	38.96	12.4	13.8	30.6	42.60	12.3	14	31.2	42.14	11.4	14.2	33.6	38.04
5-45	15	16.77	8.2	17.3	42.8	39.81	10.6	17.5	37.2	54.12	10.8	17.3	40.8	55.32	9.6	17.5	29.8	48.16
5-46	16	18.90	11.4	17.2	36.8	44.18	10.6	17.1	33.2	39.95	10.5	17.2	31.6	39.42	11	17.3	25.2	42.06
6-47	14	15.85	8.5	16.8	27.5	40.15	5.1	14.4	36.8	18.71	5.3	14.6	32.8	19.97	9.3	16.5	26	45.20
6-48	15	17.68	10.2	15.1	33.1	40.44	16.2	17.5	41.8	74.37	16	17.4	39.6	73.24	9.4	15	25.4	35.92
6-49	20	23.48	16.9	23.2	33.9	59.00	17.8	23.3	28.4	62.84	18.1	23.1	31.4	64.11	15.4	23.4	32.6	52.61
6-50	14	17.38	12	17.1	35.7	51.51	13.6	17.5	29.6	60.72	14.2	17.3	25.8	64.17	11.6	17.1	34.2	49.21
6-51	12	14.94	7.7	10.7	26.9	33.18	8.1	11	30.5	35.85	8	11.1	26.7	35.18	7.4	10.8	26.7	31.17
6-52	6	9.15	5	7.9	31.1	21.33	5.9	8	33.6	31.17	5.6	8	35.6	27.89	5.1	8	30.9	22.43
6-53	22	23.63	17.8	21	34	68.88	16.8	21.1	25.7	64.65	16.4	21	26.8	62.96	16.3	21.3	32.4	62.53
6-54	13	15.85	10.2	15.3	26.9	47.03	10.5	15.3	29.5	48.92	10.2	15.3	24.5	47.03	10.3	15.1	26.8	47.66
6-55	18	21.34	14.9	21.8	40.2	55.53	12.5	21.5	42.1	44.29	12.4	21.4	36.8	43.82	15	21.7	24.5	56.00
6-56	10	12.80	10.8	12.4	33.5	62.91	11.4	12.5	35.8	67.60	12.4	12.5	33.2	75.41	11	13	33.6	64.48
6-57	-	-	9.5	14.4	36.4	-	6.7	19.3	36.8	-	6.9	19.4	31	-	9.6	14.5	31.5	-
6-58	-	-	10.8	21.3	24.7	-	8.7	22	29.4	-	9.1	22.1	32.5	-	10.4	21.1	22.8	-
6-59	17	20.12	16.6	21.6	28.6	67.35	16.4	21.5	41.8	66.35	15.2	21.4	40.9	60.39	16.9	21.5	26.8	68.84
7-60	13	15.55	13.2	21.4	32.6	65.29	7.2	14.5	36.8	26.70	8.3	14.6	32.6	33.77	13.2	21.4	25.6	65.29
7-61	13	15.24	8.8	12.4	32.8	41.73	11.5	12.5	35.6	59.44	11.2	12.6	25	57.47	10.6	12.3	30.9	53.54
7-62	17	18.29	12.7	16.8	29.9	61.09	14.9	17	30.7	73.12	15.2	17.1	31.2	74.76	12.8	17	32.5	61.64
7-63	11	13.41	10.5	12.1	35.7	60.09	4.2	14.9	28.2	13.13	5.6	14.5	29	23.56	11.4	12	35.2	66.80
7-64	22	24.09	18.6	25.3	28.5	68.36	19.4	25	29.6	71.69	20.9	25.1	31.8	77.91	19.5	25.4	27.4	72.10
7-65	24	26.22	21.1	27	30.4	71.17	23.6	26.7	35.4	80.71	22.6	26.8	28.5	76.89	22.1	27.1	31.6	74.99
7-66	19	21.95	18.4	22.5	31.6	69.93	18.4	22.2	33.9	69.93	18.2	22	36.1	69.02	19.5	22.6	30.9	74.94
7-67	6	9.45	6	8.8	29.6	31.23	5.4	8.9	35.8	24.88	6.1	9	31.8	32.28	6.2	9	25.8	33.34
7-68	14	19.51	5.1	8.3	31.5	0.00	6.9	8.3	32.5	5.68	6.9	8.3	30.9	5.68	5.3	8.1	31.6	0.00
8-69	15	17.68	9.8	15.2	27.4	41.63	10.4	15.1	25.1	45.02	10.5	15	28.4	45.59	9.9	15.4	26.8	42.19
8-70	8	10.67	10.4	13.9	33.3	68.89	11.2	12	28.6	76.39	11	12.3	36.1	74.51	11.2	13.7	30.1	76.39
8-71	13	15.85	8.6	14.5	42.1	35.02	9.9	15.3	45.7	43.22	10.1	15.5	37.4	44.48	8.9	14.6	27.5	36.91
8-72	23	25.91	19.5	26.6	29.6	63.48	10.5	16.4	41.8	28.75	9.9	14.3	41.5	26.44	14.5	26.5	26.3	44.19
8-73	21	24.39	14.7	19.1	33.5	47.77	14.8	18.4	26.7	48.18	14.8	18.2	32.6	48.18	15.6	19.2	32.6	51.46
8-74	24	27.44	16.6	19	28.4	49.39	16.2	17.6	31.7	47.93	16	17.5	30.7	47.20	17.2	19	26.8	51.57
WH-75	16	18.60	11	13.5	35.5	42.75	11.2	14.1	36.6	43.83	11.3	14.2	29.5	44.37	10.7	13.4	31.4	41.14
WH-76	12	15.24	8.5	12	31.2	35.76	11.3	12.3	30.2	54.13	11	12	35.4	52.16	8.2	12.2	24.8	33.79
WH-77	11	14.33	10.5	13.3	36.9	52.00	11.4	13.2	34.1	58.28	11.6	13	36.9	59.68	10.9	13.5	30.6	54.79
WH-78	23	25.61	12.8	20.1	40.1	38.08	14.8	20	39.5	45.89	15.2	20.3	35.7	47.45	13.9	20	28.7	42.37

Table 4: Water Levels

			April 2023				July 2023				October 2023				December 2023			
Units	**meters**	**meters**	**meters**	**meters**	**°C**	**%**	**meters**	**meters**	**°C**	**%**	**meters**	**meters**	**°C**	**%**	**meters**	**meters**	**°C**	**%**
Locations	**Screen Length**	**Installed Well Depth**	**Depth to Water**	**Depth to Bottom**	**Temperature**	**Open Screen**	**Depth to Water**	**Depth to Bottom**	**Temperature**	**Open Screen**	**Depth to Water**	**Depth to Bottom**	**Temperature**	**Open Screen**	**Depth to Water**	**Depth to Bottom**	**Temperature**	**Open Screen**
WH-79	9	12.50	10.9	16.7	35.8	62.81	12.4	16.5	34.2	74.81	13.2	16.8	33.1	81.21	12.8	16.5	21.4	78.01
WH-80	15	17.99	10.4	16.6	29.6	42.56	8.8	17.4	25.4	33.67	9.2	17.2	29.8	35.89	11.4	16.5	31.6	48.12
5-81	6	8.84	3.1	8.7	30.2	4.03	3.2	8.4	20.1	5.16	2.5	8.5	225	0.00	2.3	8.9	28.9	0.00
7-82	7	7.01	4.2	6.2	27.4	55.55	1	6	25.7	9.91	1.9	6.1	30.1	22.75	3.6	6.5	24.8	46.99
7-83	2	3.96	3.2	5.5	26.9	42.28	1.1	3.1	26.8	0.00	1.5	3.1	24.5	0.00	2.9	5.2	31.9	34.71

Notes:

- Could Not Measure

APPENDIX A

Flare Data

Appendix A: Flare Data

		CO2 Equivalents			Landfill Gas Flow						Methane	Oxygen	Flare	Flare	Temperature			Blower 1		Blower 2	
	Data Reliability	Yearly	Monthly	Daily	Yearly	Monthly	Daily	Daily	Avg	Total	Avg	Avg	Run Hours	Starts	Min.	Avg.	Max.	Daily	Cumu.	Daily	Cumu.
Date		Tonnes CO2	Tonnes CO2	Tonnes CO2	scf	scf	scf	meter3	scfm	MMBTU	(%)	(%)			°C	°C	°C	Hours	Hours	Hours	Hours
2023 Totals		97515			462209012																
1-Jan-2023	98.75	266	266	266	1295644	1295644	1295644	36703	900	585	44.6	3.3	24	0	870	900	921	24.8	36253.2	0	39509.8
2-Jan-2023	46.94	392	392	126	1909880	1909880	614236	17400	900	277	44.6	3.1	11.3	1	884	900	915	12.3	36265.5	0	39509.8
3-Jan-2023	56.11	543	543	151	2624726	2624726	714846	20250	898	332	45.9	2.8	13.3	2	-6	891	930	34.9	36300.4	0	39509.8
4-Jan-2023	99.03	804	804	261	3913169	3913169	1288443	36499	899	574	44	3.3	23.9	1	32	898	926	24.7	36325.1	0	39509.8
5-Jan-2023	99.03	1064	1064	260	5208627	5208627	1295458	36698	900	573	43.7	3.4	24	0	885	900	920	24.7	36349.8	0	39509.8
6-Jan-2023	99.17	1332	1332	268	6503323	6503323	1294696	36676	899	590	45	2.8	24	0	854	900	948	23.7	36373.4	0	39509.8
7-Jan-2023	99.03	1612	1612	280	7798732	7798732	1295409	36696	900	616	47	2.1	24	0	886	900	913	24.7	36398.1	0	39509.8
8-Jan-2023	98.89	1893	1893	281	9094998	9094998	1296266	36721	900	617	47	2.3	24	0	876	900	918	24.7	36422.8	0	39509.8
9-Jan-2023	99.03	2175	2175	282	10391819	10391819	1296821	36736	901	620	47.3	2.2	24	0	876	900	913	23.7	36446.5	0	39509.8
10-Jan-2023	99.03	2455	2455	280	11688115	11688115	1296296	36721	900	617	47	2.3	24	0	874	900	923	24.7	36471.1	0	39509.8
11-Jan-2023	98.89	2727	2727	272	12983740	12983740	1295625	36702	900	598	45.7	2.6	24	0	878	900	926	24.8	36495.9	0	39509.8
12-Jan-2023	98.89	2993	2993	266	14279358	14279358	1295618	36702	900	584	44.6	2.7	24	0	878	900	927	23.7	36519.6	0	39509.8
13-Jan-2023	98.89	3273	3273	280	15574733	15574733	1295375	36695	900	615	46.9	2	24	0	852	900	932	24.7	36544.3	0	39509.8
14-Jan-2023	98.89	3556	3556	283	16869853	16869853	1295120	36688	899	623	47.6	2.1	24	0	879	900	920	24.8	36569	0	39509.8
15-Jan-2023	99.03	3838	3838	282	18165601	18165601	1295748	36706	900	620	47.3	2.2	24	0	888	900	912	23.7	36592.7	0	39509.8
16-Jan-2023	98.89	4116	4116	278	19461753	19461753	1296152	36717	900	612	46.7	2.3	24	0	870	900	929	24.7	36617.4	0	39509.8
17-Jan-2023	98.89	4390	4390	274	20757798	20757798	1296045	36714	900	603	46	2.5	24	0	880	900	930	24.7	36642.1	0	39509.8
18-Jan-2023	98.89	4644	4644	254	22037116	22037116	1279318	36241	898	559	43.2	2.6	23.7	1	28	898	912	23.5	36665.5	0	39509.8
19-Jan-2023	98.75	4898	4898	254	23329814	23329814	1292698	36620	900	558	42.6	2.7	23.4	1	876	900	914	24.8	36690.3	0	39509.8
20-Jan-2023	98.89	5173	5173	275	24625736	24625736	1295922	36711	900	605	46.1	2.6	24	0	871	900	915	24.8	36715.1	0	39509.8
21-Jan-2023	98.75	5452	5452	279	25921030	25921030	1295294	36693	899	613	46.8	2.5	24	0	876	900	915	23.7	36738.8	0	39509.8
22-Jan-2023	98.61	5737	5737	285	27216003	27216003	1294973	36684	899	627	47.9	2.1	24	0	886	900	915	24.9	36763.6	0	39509.8
23-Jan-2023	98.61	6014	6014	277	28512186	28512186	1296183	36718	900	610	46.5	2.5	24	0	866	900	923	23.7	36787.3	0	39509.8
24-Jan-2023	98.61	6290	6290	276	29807300	29807300	1295114	36688	899	606	46.3	2.5	24	0	885	900	914	24.8	36812.1	0	39509.8
25-Jan-2023	98.61	6565	6565	275	31102401	31102401	1295101	36688	899	605	46.2	2.5	24	0	880	900	920	24.9	36837	0	39509.8
26-Jan-2023	98.61	6856	6856	291	32397564	32397564	1295163	36689	899	640	48.8	1.8	24	0	853	900	946	23.7	36860.6	0	39509.8
27-Jan-2023	65.42	7036	7036	180	33256981	33256981	859417	24346	900	397	45.6	2.8	15.9	0	865	900	925	16.6	36877.2	0	39509.8
28-Jan-2023	0.14	7036	7036	0	33256981	33256981	0	0	0	0	0	0	0	0	0	0	0	0	36877.2	0	39509.8
29-Jan-2023	0.14	7036	7036	0	33256981	33256981	0	0	0	0	0	0	0	0	0	0	0	0	36877.2	0	39509.8
30-Jan-2023	53.33	7181	7181	145	33953251	33953251	696270	19724	900	320	45.4	2.6	24	1	0	898	915	81	36958.1	0	39509.8
31-Jan-2023	99.03	7449	7449	268	35249645	35249645	1296394	36724	900	589	44.9	2.8	24	0	887	900	915	24.7	36982.8	0	39509.8
1-Feb-2023	98.89	7716	267	267	36545155	1295510	1295510	36699	900	587	44.8	2.8	24	0	872	900	931	24.7	37007.5	0	39509.8
2-Feb-2023	99.03	7967	518	251	37841436	2591791	1296281	36721	900	552	42.1	3.5	24	0	878	900	928	23.8	37031.3	0	39509.8
3-Feb-2023	98.89	8236	787	269	39137038	3887393	1295602	36702	900	591	45.1	2.5	24	0	862	900	928	24.7	37055.9	0	39509.8
4-Feb-2023	98.89	8506	1057	270	40433619	5183974	1296581	36730	900	595	45.3	2.7	24	0	885	900	912	24.7	37080.6	0	39509.8
5-Feb-2023	98.89	8770	1321	264	41729376	6479731	1295757	36706	900	581	44.3	2.9	24	0	883	900	915	23.7	37104.3	0	39509.8
6-Feb-2023	99.03	9048	1599	278	43025077	7775432	1295701	36705	900	612	46.7	2.3	24	0	875	900	928	24.8	37129.1	0	39509.8
7-Feb-2023	98.89	9324	1875	276	44319993	9070348	1294916	36682	899	606	46.3	2.6	24	0	878	900	922	24.7	37153.7	0	39509.8
8-Feb-2023	98.89	9603	2154	279	45616415	10366770	1296422	36725	900	614	46.8	2.4	24	0	870	900	918	23.7	37177.4	0	39509.8
9-Feb-2023	98.75	9875	2426	272	46912691	11663046	1296276	36721	900	598	45.6	2.8	24	0	871	900	942	24.8	37202.2	0	39509.8
10-Feb-2023	98.75	10165	2716	290	48208235	12958590	1295544	36700	900	638	48.6	1.9	24	0	875	900	921	24.8	37227	0	39509.8
11-Feb-2023	98.89	10448	2999	283	49503685	14254040	1295450	36698	900	622	47.5	2.7	24	0	877	900	928	23.7	37250.6	0	39509.8
12-Feb-2023	98.89	10731	3282	283	50799401	15549756	1295716	36705	900	623	47.5	2.8	24	0	875	900	914	24.8	37275.4	0	39509.8
13-Feb-2023	98.75	11022	3573	291	52095253	16845608	1295852	36709	900	640	48.8	2.4	24	0	858	900	941	24.7	37300.1	0	39509.8
14-Feb-2023	98.75	11306	3857	284	53391338	18141693	1296085	36715	900	626	47.7	2.5	24	0	850	900	942	23.8	37323.9	0	39509.8
15-Feb-2023	98.89	11579	4130	273	54686854	19437209	1295516	36699	900	601	45.8	2.8	24	0	866	900	930	24.7	37348.5	0	39509.8
16-Feb-2023	98.89	11857	4408	278	55969409	20719764	1282555	36332	898	611	47.1	2.3	23.8	1	20	898	911	23.5	37372	0	39509.8
17-Feb-2023	98.75	12147	4698	290	57264044	22014399	1294635	36674	899	638	48.7	2	24	0	856	900	930	24.8	37396.8	0	39509.8
18-Feb-2023	98.75	12436	4987	289	58560373	23310728	1296329	36722	900	635	48.4	2.3	24	0	877	900	926	24.8	37421.6	0	39509.8
19-Feb-2023	98.75	12717	5268	281	59856156	24606511	1295783	36707	900	619	47.2	2.5	24	0	873	900	925	23.7	37445.2	0	39509.8
20-Feb-2023	98.61	13004	5555	287	61148827	25899182	1292671	36619	900	632	48.3	2.1	24	1	0	899	932	24.4	37469.6	0	39509.8
21-Feb-2023	98.89	13284	5835	280	62445066	27195421	1296239	36720	900	617	47	2.5	24	0	884	900	916	24.7	37494.3	0	39509.8
22-Feb-2023	98.75	13553	6104	269	63741561	28491916	1296495	36727	900	593	45.2	2.8	24	0	877	900	920	24.8	37519.1	0	39509.8
23-Feb-2023	98.75	13821	6372	268	65037138	29787493	1295577	36701	900	590	45	2.8	24	0	882	900	918	23.7	37542.7	0	39509.8
24-Feb-2023	98.75	14093	6644	272	66332923	31083278	1295785	36707	900	598	45.6	2.6	24	0	878	900	921	24.8	37567.5	0	39509.8
25-Feb-2023	98.75	14376	6927	283	67629475	32379830	1296552	36729	900	623	47.5	2.2	24	0	885	900	915	24.8	37592.3	0	39509.8
26-Feb-2023	98.61	14659	7210	283	68924539	33674894	1295064	36687	899	623	47.6	2.3	24	0	856	900	925	23.8	37616.1	0	39509.8
27-Feb-2023	98.75	14946	7497	287	70220728	34971083	1296189	36718	900	632	48.2	2.2	24	0	880	900	923	24.7	37640.7	0	39509.8
28-Feb-2023	98.75	15221	7772	275	71516980	36267335	1296252	36720	900	604	46	2.8	24	0	867	900	936	23.8	37664.5	0	39509.8
1-Mar-2023	98.75	15494	273	273	72813064	1296084	1296084	36715	900	601	45.8	2.7	24	0	877	900	922	24.8	37689.3	0	39509.8
2-Mar-2023	98.33	15695	474	201	73711093	2194113	898029	25439	900	443	48.7	1.8	16.6	0	863	900	929	17.5	37706.8	0	39509.8
3-Mar-2023	98.19	15864	643	169	74451355	2934375	740262	20970	899	371	49.5	2.4	13.7	1	-15	897	972	13.3	37720.1	0	39509.8
4-Mar-2023	98.75	16140	919	276	75746928	4229948	1295573	36701	900	607	46.3	3.3	24	0	885	900	919	24.8	37744.8	0	39509.8
5-Mar-2023	98.75	16410	1189	270	77042327	5525347	1295399	36696	900	594	45.3	3.3	24	0	871	900	923	23.8	37768.6	0	39509.8
6-Mar-2023	98.75	16675	1454	265	78337639	6820659	1295312	36694	900	584	44.5	3.3	24	0	870	900	923	24.8	37793.4	0	39509.8

Appendix A: Flare Data

		CO2 Equivalents			Landfill Gas Flow						Methane	Oxygen	Flare	Flare	Temperature			Blower 1		Blower 2	
	Data Reliability	Yearly	Monthly	Daily	Yearly	Monthly	Daily	Daily	Avg	Total	Avg	Avg	Run Hours	Starts	Min.	Avg.	Max.	Daily	Cumu.	Daily	Cumu.
Date		Tonnes CO2	Tonnes CO2	Tonnes CO2	scf	scf	scf	meter3	scfm	MMBTU	(%)	(%)			°C	°C	°C	Hours	Hours	Hours	Hours
7-Mar-2023	98.75	16951	1730	276	79634206	8117226	1296567	36729	900	608	46.3	2.6	24	0	882	900	915	24.7	37818.1	0	39509.8
8-Mar-2023	98.89	17233	2012	282	80930994	9414014	1296788	36735	901	620	47.3	2.4	24	0	881	900	918	23.8	37841.8	0	39509.8
9-Mar-2023	98.75	17516	2295	283	82226985	10710005	1295991	36713	900	622	47.5	2.4	24	0	870	900	919	24.8	37866.6	0	39509.8
10-Mar-2023	98.75	17801	2580	285	83522828	12005848	1295843	36709	900	627	47.8	2.4	24	0	886	900	912	24.7	37891.3	0	39509.8
11-Mar-2023	98.75	18075	2854	274	84818714	13301734	1295886	36710	900	602	45.9	3.4	24	0	882	900	919	23.8	37915.1	0	39509.8
12-Mar-2023	94.58	18338	3117	263	86113813	14596833	1295099	36688	900	579	44.2	4	24	0	881	900	917	23.8	37938.8	0	39509.8
13-Mar-2023	98.61	18605	3384	267	87408922	15891942	1295109	36688	899	587	44.8	3.7	24	0	883	900	917	23.8	37962.6	0	39509.8
14-Mar-2023	98.61	18882	3661	277	88701271	17184291	1292349	36610	900	609	46.5	3.2	24	1	0	899	933	24.3	37986.9	0	39509.8
15-Mar-2023	99.03	19151	3930	269	89996620	18479640	1295349	36695	900	591	45.1	3.8	24	0	874	900	918	24.8	38011.6	0	39509.8
16-Mar-2023	98.75	19414	4193	263	91292486	19775506	1295866	36709	900	578	44.1	4	24	0	874	900	924	24.7	38036.3	0	39509.8
17-Mar-2023	98.75	19677	4456	263	92587929	21070949	1295443	36697	900	578	44.1	4	24	0	865	900	936	23.8	38060.1	0	39509.8
18-Mar-2023	98.75	19941	4720	264	93883970	22366990	1296041	36714	900	580	44.2	3.9	24	0	884	900	920	24.8	38084.9	0	39509.8
19-Mar-2023	98.75	20214	4993	273	95179261	23662281	1295291	36693	900	601	45.9	3.4	24	0	875	900	927	24.8	38109.6	0	39509.8
20-Mar-2023	98.75	20475	5254	261	96475506	24958526	1296245	36720	900	574	43.8	4.2	24	0	888	900	912	23.7	38133.3	0	39509.8
21-Mar-2023	98.75	20744	5523	269	97771126	26254146	1295620	36702	900	591	45	3.8	24	0	886	900	919	24.8	38158.1	0	39509.8
22-Mar-2023	98.61	21012	5791	268	99066900	27549920	1295774	36707	900	590	45	3.9	24	0	872	900	923	23.8	38181.9	0	39509.8
23-Mar-2023	98.61	21281	6060	269	100363076	28846096	1296176	36718	900	591	45.1	3.8	24	0	885	900	913	24.8	38206.6	0	39509.8
24-Mar-2023	98.75	21553	6332	272	101659109	30142129	1296033	36714	900	598	45.6	3.7	24	0	885	900	915	24.8	38231.4	0	39509.8
25-Mar-2023	98.75	21818	6597	265	102954469	31437489	1295360	36695	900	584	44.5	4.1	24	0	875	900	930	23.7	38255.1	0	39509.8
26-Mar-2023	98.61	22080	6859	262	104249653	32732673	1295184	36690	899	576	44	4.2	24	0	883	900	919	24.8	38279.9	0	39509.8
27-Mar-2023	98.75	22337	7116	257	105544893	34027913	1295240	36692	899	565	43.1	4.3	24	0	872	900	925	24.8	38304.6	0	39509.8
28-Mar-2023	98.75	22604	7383	267	106840674	35323694	1295781	36707	900	586	44.7	3.9	24	0	884	900	918	23.8	38328.4	0	39509.8
29-Mar-2023	98.75	22873	7652	269	108136840	36619860	1296166	36718	900	591	45.1	3.7	24	0	883	900	918	24.7	38353.1	0	39509.8
30-Mar-2023	98.75	23145	7924	272	109432645	37915665	1295805	36708	900	599	45.7	3.5	24	0	882	900	915	23.8	38376.9	0	39509.8
31-Mar-2023	98.75	23412	8191	267	110728667	39211687	1296022	36714	900	586	44.7	4	24	0	878	900	918	24.8	38401.6	0	39509.8
1-Apr-2023	98.75	23680	268	268	112024758	1296091	1296091	36716	900	590	45	3.9	24	0	871	900	931	24.8	38426.4	0	39509.8
2-Apr-2023	98.75	23954	542	274	113319924	2591257	1295166	36689	899	603	46	3.7	24	0	856	900	938	23.7	38450.1	0	39509.8
3-Apr-2023	98.75	24208	796	254	114615862	3887195	1295938	36711	900	558	42.6	4.7	24	0	872	900	925	24.8	38474.9	0	39509.8
4-Apr-2023	98.75	24466	1054	258	115910875	5182208	1295013	36685	899	567	43.3	4.4	24	0	885	900	922	24.8	38499.6	0	39509.8
5-Apr-2023	98.75	24729	1317	263	117206630	6477963	1295755	36706	900	578	44.1	4.2	24	0	868	900	931	23.7	38523.3	0	39509.8
6-Apr-2023	98.75	24963	1551	234	118502914	7774247	1296284	36721	900	514	39.2	5.5	24	0	884	900	918	24.8	38548.1	0	39509.8
7-Apr-2023	98.75	25208	1796	245	119799065	9070398	1296151	36717	900	540	41.1	4.7	24	0	883	900	912	24.8	38572.9	0	39509.8
8-Apr-2023	98.61	25461	2049	253	121095888	10367221	1296823	36736	901	557	42.4	4.5	24	0	878	900	921	23.7	38596.5	0	39509.8
9-Apr-2023	98.75	25716	2304	255	122392011	11663344	1296123	36717	900	561	42.7	4.5	24	0	886	900	913	24.8	38621.3	0	39509.8
10-Apr-2023	98.75	25976	2564	260	123687469	12958802	1295458	36698	900	573	43.7	4.1	24	0	879	900	915	23.8	38645.1	0	39509.8
11-Apr-2023	98.75	26248	2836	272	124983220	14254553	1295751	36706	900	598	45.6	3.6	24	0	861	900	933	24.8	38669.9	0	39509.8
12-Apr-2023	98.75	26512	3100	264	126279317	15550650	1296097	36716	900	581	44.3	3.8	24	0	864	900	927	24.7	38694.5	0	39509.8
13-Apr-2023	98.75	26765	3353	253	127575423	16846756	1296106	36716	900	557	42.5	4	24	0	880	900	918	23.8	38718.3	0	39509.8
14-Apr-2023	98.75	27006	3594	241	128872662	18143995	1297239	36748	901	530	40.4	4.7	24	0	888	900	918	24.8	38743.1	0	39509.8
15-Apr-2023	98.75	27231	3819	225	130169034	19440367	1296372	36724	900	495	37.7	5.3	24	0	881	900	925	24.8	38767.9	0	39509.8
16-Apr-2023	98.75	27457	4045	226	131465374	20736707	1296340	36723	900	497	37.9	5.1	24	0	865	900	927	23.7	38791.5	0	39509.8
17-Apr-2023	98.75	27686	4274	229	132760611	22031944	1295237	36691	899	503	38.3	4.9	24	0	884	900	918	24.8	38816.3	0	39509.8
18-Apr-2023	98.75	27914	4502	228	134058033	23329366	1297422	36753	901	501	38.1	5	24	0	883	900	916	23.8	38840.1	0	39509.8
19-Apr-2023	98.75	28140	4728	226	135353221	24624554	1295188	36690	899	497	37.9	5.1	24	0	884	900	915	24.8	38864.9	0	39509.8
20-Apr-2023	98.75	28377	4965	237	136649073	25920406	1295852	36709	900	520	39.7	4.4	24	0	874	900	919	24.7	38889.5	0	39509.8
21-Apr-2023	98.89	28640	5228	263	137944436	27215769	1295363	36695	900	577	44	3.6	24	0	855	900	948	23.8	38913.3	0	39509.8
22-Apr-2023	98.75	28905	5493	265	139240293	28511626	1295857	36709	900	582	44.4	3.6	24	0	862	900	942	24.8	38938.1	0	39509.8
23-Apr-2023	98.75	29174	5762	269	140535819	29807152	1295526	36700	900	592	45.2	3.5	24	0	854	900	945	24.7	38962.8	0	39509.8
24-Apr-2023	98.75	29442	6030	268	141832337	31103670	1296518	36728	900	589	44.9	3.7	24	0	857	900	927	23.8	38986.5	0	39509.8
25-Apr-2023	98.89	29712	6300	270	143126758	32398091	1294421	36668	899	593	45.3	3.6	24	0	874	900	921	24.7	39011.2	0	39509.8
26-Apr-2023	98.89	29996	6584	284	144422694	33694027	1295936	36711	900	624	47.6	2.8	24	0	842	900	936	23.8	39035	0	39509.8
27-Apr-2023	98.89	30274	6862	278	145717908	34989241	1295214	36691	899	610	46.6	3.4	24	0	872	900	932	24.8	39059.8	0	39509.8
28-Apr-2023	98.75	30549	7137	275	147013885	36285218	1295977	36712	900	606	46.2	3.5	24	0	869	900	926	24.7	39084.4	0	39509.8
29-Apr-2023	98.75	30827	7415	278	148309984	37581317	1296099	36716	900	612	46.6	3.4	24	0	846	900	936	23.8	39108.2	0	39509.8
30-Apr-2023	98.75	31104	7692	277	149605569	38876902	1295585	36701	900	608	46.4	3.5	24	0	851	900	949	24.8	39133	0	39509.8
1-May-2023	98.75	31381	277	277	150900964	1295395	1295395	36696	900	610	46.6	3.5	24	0	851	900	949	24.8	39157.8	0	39509.8
2-May-2023	98.75	31661	557	280	152197542	2591973	1296578	36729	900	616	47	3.4	24	0	861	900	940	23.7	39181.4	0	39509.8
3-May-2023	98.75	31946	842	285	153492890	3887321	1295348	36695	900	626	47.8	3.1	24	0	853	900	949	24.8	39206.2	0	39509.8
4-May-2023	98.61	32230	1126	284	154788722	5183153	1295832	36708	900	624	47.6	3	24	0	850	900	950	23.7	39229.9	0	39509.8
5-May-2023	98.75	32516	1412	286	156084393	6478824	1295671	36704	900	629	48	2.8	24	0	866	900	930	24.8	39254.7	0	39509.8
6-May-2023	98.75	32806	1702	290	157380009	7774440	1295616	36702	900	639	48.7	2.5	24	0	872	900	923	24.8	39279.4	0	39509.8
7-May-2023	98.75	33096	1992	290	158676324	9070755	1296315	36722	900	638	48.6	2.5	24	0	877	900	926	23.8	39303.2	0	39509.8
8-May-2023	98.89	33387	2283	291	159972767	10367198	1296443	36726	900	640	48.8	2.5	24	0	880	900	919	24.7	39327.9	0	39509.8
9-May-2023	98.89	33675	2571	288	161267911	11662342	1295144	36689	899	633	48.3	2.7	24	0	859	900	951	24.8	39352.7	0	39509.8
10-May-2023	98.75	33967	2863	292	162564110	12958541	1296199	36719	900	642	48.9	2.5	24	0	822	900	998	23.8	39376.4	0	39509.8
11-May-2023	98.75	34249	3145	282	163860097	14254528	1295987	36713	900	621	47.3	3.3	24	0	860	900	940	24.7	39401.1	0	39509.8

Appendix A: Flare Data

		CO2 Equivalents			Landfill Gas Flow						Methane	Oxygen	Flare	Flare	Temperature			Blower 1		Blower 2	
	Data Reliability	Yearly	Monthly	Daily	Yearly	Monthly	Daily	Daily	Avg	Total	Avg	Avg	Run Hours	Starts	Min.	Avg.	Max.	Daily	Cumu.	Daily	Cumu.
Date		Tonnes CO2	Tonnes CO2	Tonnes CO2	scf	scf	scf	meter3	scfm	MMBTU	(%)	(%)			°C	°C	°C	Hours	Hours	Hours	Hours
12-May-2023	98.75	34532	3428	283	165156621	15551052	1296524	36728	900	622	47.4	3.2	24	0	860	900	934	24.8	39425.9	0	39509.8
13-May-2023	98.75	34813	3709	281	166452150	16846581	1295529	36700	900	617	47.1	3.3	24	0	868	900	933	23.7	39449.6	0	39509.8
14-May-2023	98.75	35097	3993	284	167748263	18142694	1296113	36716	900	625	47.7	3.1	24	0	856	900	932	24.8	39474.3	0	39509.8
15-May-2023	98.75	35390	4286	293	169044748	19439179	1296485	36727	900	645	49.2	2.7	24	0	851	900	946	23.8	39498.1	0	39509.8
16-May-2023	98.89	35681	4577	291	170340963	20735394	1296215	36719	900	640	48.8	2.8	24	0	865	900	929	24.7	39522.8	0	39509.8
17-May-2023	98.89	35974	4870	293	171637309	22031740	1296346	36723	900	645	49.2	2.6	24	0	854	900	958	24.8	39547.6	0	39509.8
18-May-2023	98.75	36259	5155	285	172933235	23327666	1295926	36711	900	627	47.8	3.1	24	0	843	900	947	23.7	39571.2	0	39509.8
19-May-2023	98.75	36543	5439	284	174229448	24623879	1296213	36719	900	624	47.5	3.2	24	0	865	900	934	24.8	39596	0	39509.8
20-May-2023	98.89	36836	5732	293	175526011	25920442	1296563	36729	900	644	49.1	2.7	24	0	873	900	928	24.7	39620.7	0	39509.8
21-May-2023	98.89	37124	6020	288	176821549	27215980	1295538	36700	900	633	48.3	2.9	24	0	865	900	932	23.8	39644.5	0	39509.8
22-May-2023	98.89	37418	6314	294	178117994	28512425	1296445	36726	900	646	49.2	2.7	24	0	867	900	929	24.7	39669.1	0	39509.8
23-May-2023	98.89	37721	6617	303	179484917	29879348	1366923	38722	949	666	48.2	3	24	0	861	900	942	24.8	39693.9	0	39509.8
24-May-2023	98.89	38038	6934	317	180924755	31319186	1439838	40788	1000	698	47.9	2.9	24	0	831	900	994	23.7	39717.6	0	39509.8
25-May-2023	98.89	38363	7259	325	182364649	32759080	1439894	40789	1000	714	49	2.7	24	0	840	900	962	24.8	39742.4	0	39509.8
26-May-2023	98.61	38686	7582	323	183804122	34198553	1439473	40777	1000	710	48.7	2.8	24	0	863	900	943	24.7	39767	0	39509.8
27-May-2023	98.75	39005	7901	319	185243171	35637602	1439049	40765	999	702	48.2	2.9	24	0	859	900	950	23.8	39790.8	0	39509.8
28-May-2023	98.75	39326	8222	321	186683063	37077494	1439892	40789	1000	706	48.5	2.9	24	0	852	900	970	24.8	39815.6	0	39509.8
29-May-2023	98.75	39646	8542	320	188122727	38517158	1439664	40783	1000	704	48.4	2.9	24	0	834	900	965	24.7	39840.3	0	39509.8
30-May-2023	98.89	39959	8855	313	189562446	39956877	1439719	40784	1000	688	47.2	3.3	24	0	866	900	931	23.8	39864	0	39509.8
31-May-2023	98.75	40266	9162	307	191001767	41396198	1439321	40773	1000	675	46.3	3.5	24	0	868	900	929	24.8	39888.8	0	39509.8
1-Jun-2023	98.75	40573	307	307	192441647	1439880	1439880	40789	1000	675	46.3	3.6	24	0	871	900	926	23.7	39912.5	0	39509.8
2-Jun-2023	98.75	40773	507	200	193389442	2387675	947795	26849	1000	439	45.8	3.8	15.8	0	833	900	949	17.1	39929.5	0	39509.8
3-Jun-2023	98.33	40773	507	0	193389442	2387675	0	0	0	0	0	0	0	0	0	0	0	0	39929.5	0	39509.8
4-Jun-2023	98.47	40911	645	138	194002602	3000835	613160	17370	999	304	48.9	3.3	10.3	1	26	897	976	9.7	39939.2	0	39509.8
5-Jun-2023	98.89	41129	863	218	194999142	3997375	996540	28230	1000	479	47.5	3.7	16.6	0	854	900	934	17.6	39956.8	0	39509.8
6-Jun-2023	99.03	41281	1015	152	195663438	4661671	664296	18818	998	334	49.7	3.1	11.1	1	30	897	1013	10.3	39967	0	39509.8
7-Jun-2023	98.75	41597	1331	316	197103244	6101477	1439806	40787	1000	696	47.7	3.5	24	0	863	900	944	24.8	39991.8	0	39509.8
8-Jun-2023	98.61	41911	1645	314	198544355	7542588	1441111	40824	1001	691	47.4	3.6	24	0	876	900	938	24.8	40016.6	0	39509.8
9-Jun-2023	57.22	42092	1826	181	199377754	8375987	833399	23609	1000	397	47.1	3.7	13.9	1	0	899	943	13.8	40030.4	0	39509.8
10-Jun-2023	0.14	42092	1826	0	199377754	8375987	0	0	0	0	0	0	0	0	0	0	0	0	40030.4	0	39509.8
11-Jun-2023	0.14	42092	1826	0	199377754	8375987	0	0	0	0	0	0	0	0	0	0	0	0	40030.4	0	39509.8
12-Jun-2023	56.25	42255	1989	163	200200085	9198318	822331	23295	999	358	43	5.3	13.7	1	0	899	943	83.4	40113.8	0	39509.8
13-Jun-2023	98.19	42546	2280	291	201639694	10637927	1439609	40781	1000	639	43.9	4.8	24	0	847	900	955	23.9	40137.6	0	39509.8
14-Jun-2023	98.89	42840	2574	294	203079556	12077789	1439862	40788	1000	647	44.4	4.5	24	0	876	900	923	24.8	40162.4	0	39509.8
15-Jun-2023	98.75	43147	2881	307	204519007	13517240	1439451	40777	1000	676	46.4	3.7	24	0	870	900	934	24.8	40187.2	0	39509.8
16-Jun-2023	98.75	43458	3192	311	205958673	14956906	1439666	40783	1000	684	47	3.4	24	0	869	900	919	23.7	40210.9	0	39509.8
17-Jun-2023	98.75	43775	3509	317	207398194	16396427	1439521	40779	1000	697	47.9	3.1	24	0	876	900	921	24.8	40235.7	0	39509.8
18-Jun-2023	98.75	44091	3825	316	208838657	17836890	1440463	40805	1000	696	47.7	3.2	24	0	872	900	925	24.8	40260.4	0	39509.8
19-Jun-2023	98.75	44399	4133	308	210278111	19276344	1439454	40777	1000	677	46.5	3.6	24	0	854	900	944	23.7	40284.1	0	39509.8
20-Jun-2023	98.75	44710	4444	311	211717513	20715746	1439402	40775	1000	684	47	3.4	24	0	855	900	932	24.8	40308.9	0	39509.8
21-Jun-2023	98.61	45014	4748	304	213156941	22155174	1439428	40776	1000	669	45.9	3.5	24	0	851	900	958	23.8	40332.6	0	39509.8
22-Jun-2023	98.75	45323	5057	309	214596493	23594726	1439552	40780	1000	679	46.6	3.2	24	0	854	900	939	24.8	40357.4	0	39509.8
23-Jun-2023	98.89	45637	5371	314	216036967	25035200	1440474	40806	1000	690	47.3	3	24	0	864	900	923	24.7	40382.1	0	39509.8
24-Jun-2023	98.89	45954	5688	317	217476920	26475153	1439953	40791	1000	697	47.8	2.9	24	0	864	900	927	23.8	40405.9	0	39509.8
25-Jun-2023	98.89	46264	5998	310	218916835	27915068	1439915	40790	1000	682	46.8	3.3	24	0	842	900	946	24.8	40430.7	0	39509.8
26-Jun-2023	98.89	46572	6306	308	220355598	29353831	1438763	40757	999	676	46.5	3.4	24	0	857	900	935	24.7	40455.3	0	39509.8
27-Jun-2023	98.89	46885	6619	313	221794951	30793184	1439353	40774	1000	688	47.2	3.1	24	0	863	900	927	23.8	40479.1	0	39509.8
28-Jun-2023	98.75	47196	6930	311	223234563	32232796	1439612	40781	1000	684	47	3.2	24	0	877	900	934	24.7	40503.8	0	39509.8
29-Jun-2023	98.75	47500	7234	304	224674389	33672622	1439826	40787	1000	668	45.9	3.5	24	0	845	900	957	24.8	40528.6	0	39509.8
30-Jun-2023	98.89	47806	7540	306	226114136	35112369	1439747	40785	1000	672	46.1	3.4	24	0	854	900	940	23.7	40552.2	0	39509.8
1-Jul-2023	98.89	48118	312	312	227555055	1440919	1440919	40818	1001	686	47	3	24	0	872	900	928	24.8	40577	0	39509.8
2-Jul-2023	99.03	48203	397	85	227941868	1827732	386813	10958	1000	186	47.6	2.8	6.4	0	881	900	914	6.9	40583.9	0	39509.8
3-Jul-2023	99.03	48203	397	0	227941868	1827732	0	0	0	0	0	0	0	0	0	0	0	0	40583.9	0	39509.8
4-Jul-2023	98.89	48370	564	167	228722815	2608679	780947	22123	998	367	46.4	3.9	13.1	1	17	896	948	12.8	40596.7	0	39509.8
5-Jul-2023	98.89	48666	860	296	230162415	4048279	1439600	40781	1000	651	44.7	4.2	24	0	850	900	936	24.7	40621.4	0	39509.8
6-Jul-2023	98.75	48972	1166	306	231602862	5488726	1440447	40805	1000	674	46.2	3.6	24	0	843	900	948	23.8	40645.2	0	39509.8
7-Jul-2023	98.75	49271	1465	299	233042287	6928151	1439425	40776	1000	658	45.2	3.8	24	0	845	900	950	24.8	40669.9	0	39509.8
8-Jul-2023	98.89	49425	1619	154	233790295	7676159	748008	21190	999	339	44.8	3.8	12.5	0	875	900	924	13	40682.9	0	39509.8
9-Jul-2023	99.03	49425	1619	0	233790295	7676159	0	0	0	0	0	0	0	0	0	0	0	0	40682.9	0	39509.8
10-Jul-2023	98.89	49606	1800	181	234634007	8519871	843712	23901	999	398	46.6	3.8	14.1	1	12	897	1005	13.9	40696.9	0	39509.8
11-Jul-2023	98.89	49905	2099	299	236073777	9959641	1439770	40786	1000	658	45.1	3.9	24	0	850	900	952	24.8	40721.6	0	39509.8
12-Jul-2023	98.89	50207	2401	302	237513793	11399657	1440016	40793	1000	663	45.5	3.7	24	0	880	900	917	23.7	40745.3	0	39509.8
13-Jul-2023	98.75	50511	2705	304	238952827	12838691	1439034	40765	999	669	45.9	3.6	24	0	852	900	934	24.8	40770.1	0	39509.8
14-Jul-2023	98.75	50805	2999	294	240388082	14273946	1435255	40658	1000	647	44.6	4	23.9	1	858	900	939	24.7	40794.8	0	39509.8
15-Jul-2023	99.03	51098	3292	293	241827557	15713421	1439475	40777	1000	644	44.2	4	24	0	847	900	956	23.6	40818.3	0	39509.8
16-Jul-2023	99.03	51387	3581	289	243266090	17151954	1438533	40751	999	636	43.7	4.1	24	0	845	900	948	24.7	40843	0	39509.8

Appendix A: Flare Data

		CO2 Equivalents			Landfill Gas Flow						Methane	Oxygen	Flare	Flare	Temperature			Blower 1		Blower 2	
	Data Reliability	Yearly	Monthly	Daily	Yearly	Monthly	Daily	Daily	Avg	Total	Avg	Avg	Run Hours	Starts	Min.	Avg.	Max.	Daily	Cumu.	Daily	Cumu.
Date		Tonnes CO2	Tonnes CO2	Tonnes CO2	scf	scf	scf	meter3	scfm	MMBTU	(%)	(%)			°C	°C	°C	Hours	Hours	Hours	Hours
17-Jul-2023	99.03	51677	3871	290	244707192	18593056	1441102	40824	1001	638	43.8	4	24	0	842	900	954	24.7	40867.7	0	39509.8
18-Jul-2023	98.89	51968	4162	291	246147454	20033318	1440262	40800	1000	640	43.9	4	24	0	873	900	917	23.8	40891.4	0	39509.8
19-Jul-2023	98.89	52259	4453	291	247586841	21472705	1439387	40775	1000	640	43.9	4	24	0	871	900	927	24.7	40916.1	0	39509.8
20-Jul-2023	98.89	52548	4742	289	249027080	22912944	1440239	40799	1000	635	43.6	4	24	0	870	900	931	24.7	40940.8	0	39509.8
21-Jul-2023	99.03	52845	5039	297	250466613	24352477	1439533	40779	1000	654	44.9	3.6	24	0	881	900	916	23.7	40964.5	0	39509.8
22-Jul-2023	98.89	53140	5334	295	251905173	25791037	1438560	40752	999	648	44.5	3.8	24	0	853	900	942	24.8	40989.3	0	39509.8
23-Jul-2023	98.89	53429	5623	289	253344434	27230298	1439261	40771	1000	635	43.6	4.1	24	0	850	900	929	24.7	41013.9	0	39509.8
24-Jul-2023	99.03	53717	5911	288	254784241	28670105	1439807	40787	1000	634	43.5	4.1	24	0	842	900	960	23.7	41037.6	0	39509.8
25-Jul-2023	99.03	54025	6219	308	256223072	30108936	1438831	40759	999	678	46.6	3.3	24	0	845	900	940	24.7	41062.3	0	39509.8
26-Jul-2023	99.03	54308	6502	283	257528211	31414075	1305139	36972	999	622	47.1	3.2	21.8	1	22	898	977	22.4	41084.7	0	39509.8
27-Jul-2023	98.89	54602	6796	294	258967858	32853722	1439647	40782	1000	647	44.4	4.2	24	0	860	900	932	23.7	41108.4	0	39509.8
28-Jul-2023	98.89	54889	7083	287	260406659	34292523	1438801	40758	999	630	43.3	4.5	24	0	855	900	934	24.8	41133.2	0	39509.8
29-Jul-2023	99.03	55180	7374	291	261847405	35733269	1440746	40813	1001	639	43.8	4.3	24	0	862	900	927	24.7	41157.8	0	39509.8
30-Jul-2023	98.89	55474	7668	294	263286555	37172419	1439150	40768	999	646	44.4	4.2	24	0	874	900	922	23.7	41181.5	0	39509.8
31-Jul-2023	98.89	55768	7962	294	264726415	38612279	1439860	40788	1000	647	44.4	4.3	24	0	878	900	919	24.7	41206.2	0	39509.8
1-Aug-2023	99.03	56053	285	285	266095635	1369220	1369220	38787	999	626	45.2	4	22.9	1	24	898	954	23.6	41229.8	0	39509.8
2-Aug-2023	99.03	56349	581	296	267535437	2809022	1439802	40787	1000	651	44.7	4.2	24	0	854	900	928	24.7	41254.4	0	39509.8
3-Aug-2023	99.03	56639	871	290	268975235	4248820	1439798	40787	1000	638	43.8	4.4	24	0	862	900	940	23.6	41278	0	39509.8
4-Aug-2023	99.17	56930	1162	291	270414456	5688041	1439221	40770	999	641	44	4.3	24	0	883	900	917	24.7	41302.7	0	39509.8
5-Aug-2023	99.17	57221	1453	291	271854366	7127951	1439910	40790	1000	640	43.9	4.4	24	0	857	900	933	24.7	41327.4	0	39509.8
6-Aug-2023	99.17	57510	1742	289	273294511	8568096	1440145	40796	1000	636	43.7	4.4	24	0	855	900	940	23.7	41351	0	39509.8
7-Aug-2023	99.03	57800	2032	290	274733755	10007340	1439244	40771	999	639	43.9	4.4	24	0	880	900	918	24.7	41375.7	0	39509.8
8-Aug-2023	99.03	58091	2323	291	276173744	11447329	1439989	40792	1000	639	43.9	4.4	24	0	842	900	943	24.7	41400.4	0	39509.8
9-Aug-2023	99.03	58376	2608	285	277613516	12887101	1439772	40786	1000	627	43	4.7	24	0	854	900	938	23.7	41424	0	39509.8
10-Aug-2023	99.03	58664	2896	288	279052507	14326092	1438991	40764	999	634	43.5	4.5	24	0	874	900	925	24.7	41448.7	0	39509.8
11-Aug-2023	99.17	58954	3186	290	280491453	15765038	1438946	40762	999	637	43.7	4.4	24	0	870	900	927	24.7	41473.4	0	39509.8
12-Aug-2023	99.17	59235	3467	281	281931043	17204628	1439590	40781	1000	618	42.4	4.8	24	0	879	900	918	24.7	41498.1	0	39509.8
13-Aug-2023	99.03	59515	3747	280	283370448	18644033	1439405	40775	1000	616	42.3	4.9	24	0	883	900	921	23.7	41521.7	0	39509.8
14-Aug-2023	99.03	59800	4032	285	284810191	20083776	1439743	40785	1000	627	43	4.7	24	0	881	900	917	24.7	41546.4	0	39509.8
15-Aug-2023	99.03	60100	4332	300	286250466	21524051	1440275	40800	1000	660	45.3	4	24	0	865	900	942	24.7	41571.1	0	39509.8
16-Aug-2023	99.03	60415	4647	315	287689876	22963461	1439410	40776	1000	692	47.5	3	24	0	858	900	956	23.7	41594.8	0	39509.8
17-Aug-2023	99.03	60716	4948	301	289129704	24403289	1439828	40787	1000	662	45.5	3.5	24	0	860	900	945	24.7	41619.4	0	39509.8
18-Aug-2023	98.89	61025	5257	309	290569768	25843353	1440064	40794	1000	679	46.6	3.2	24	0	855	900	935	24.7	41644.1	0	39509.8
19-Aug-2023	99.03	61318	5550	293	292009074	27282659	1439306	40773	1000	644	44.2	3.8	24	0	851	900	938	24.7	41668.8	0	39509.8
20-Aug-2023	99.03	61605	5837	287	293448287	28721872	1439213	40770	999	631	43.4	3.9	24	0	865	900	927	23.7	41692.5	0	39509.8
21-Aug-2023	98.89	61895	6127	290	294889102	30162687	1440815	40815	1001	638	43.7	3.7	24	0	878	900	920	24.7	41717.1	0	39509.8
22-Aug-2023	99.03	62182	6414	287	296328352	31601937	1439250	40771	999	632	43.4	4	24	0	883	900	923	24.7	41741.8	0	39509.8
23-Aug-2023	99.17	62474	6706	292	297767710	33041295	1439358	40774	1000	643	44.1	3.9	24	0	878	900	921	23.7	41765.5	0	39509.8
24-Aug-2023	99.03	62770	7002	296	299208457	34482042	1440747	40813	1001	651	44.7	3.7	24	0	872	900	921	24.7	41790.2	0	39509.8
25-Aug-2023	99.17	63057	7289	287	300648064	35921649	1439607	40781	1000	630	43.3	4.1	24	0	858	900	943	24.7	41814.9	0	39509.8
26-Aug-2023	99.03	63353	7585	296	302087209	37360794	1439145	40768	999	651	44.7	3.5	24	0	873	900	929	23.7	41838.5	0	39509.8
27-Aug-2023	99.03	63658	7890	305	303528079	38801664	1440870	40817	1001	671	46	3.2	24	0	877	900	927	24.7	41863.2	0	39509.8
28-Aug-2023	99.03	63957	8189	299	304968326	40241911	1440247	40799	1000	657	45.1	3.5	24	0	844	900	948	24.8	41888	0	39509.8
29-Aug-2023	98.89	64252	8484	295	306408070	41681655	1439744	40785	1000	648	44.5	3.6	24	0	861	900	948	23.7	41911.6	0	39509.8
30-Aug-2023	98.89	64434	8666	182	307291813	42565398	883743	25035	1001	400	44.7	3.5	14.7	0	864	900	928	15.8	41927.5	0	39509.8
31-Aug-2023	99.03	64563	8795	129	307884326	43157911	592513	16785	995	283	47.2	3.1	10	2	18	891	979	9.9	41937.3	0	39509.8
1-Sep-2023	99.17	64863	300	300	309324160	1439834	1439834	40788	1000	661	45.3	3.6	24	0	863	900	942	23.7	41961	0	39509.8
2-Sep-2023	99.03	65161	598	298	310763865	2879539	1439705	40784	1000	656	45.1	3.6	24	0	876	900	921	24.7	41985.7	0	39509.8
3-Sep-2023	98.89	65350	787	189	311699026	3814700	935161	26491	1001	415	43.9	3.8	15.5	0	877	900	920	16.5	42002.1	0	39509.8
4-Sep-2023	98.89	65350	787	0	311699026	3814700	0	0	0	0	0	0	0	0	0	0	0	0	42002.1	0	39509.8
5-Sep-2023	98.89	65505	942	155	312449246	4564920	750220	21252	950	340	44.8	3.6	13.2	1	12	897	939	12.7	42014.8	0	39509.8
6-Sep-2023	99.03	65787	1224	282	313816897	5932571	1367651	38743	950	620	44.8	3.6	24	0	872	900	919	24.8	42039.6	0	39509.8
7-Sep-2023	99.17	66069	1506	282	315184623	7300297	1367726	38745	950	620	44.8	3.6	24	0	856	900	938	24.7	42064.3	0	39509.8
8-Sep-2023	99.03	66351	1788	282	316553110	8668784	1368487	38767	950	620	44.8	3.6	24	0	859	900	924	23.7	42088	0	39509.8
9-Sep-2023	99.03	66633	2070	282	317921106	10036780	1367996	38753	950	620	44.8	3.6	24	0	864	900	939	24.7	42112.6	0	39509.8
10-Sep-2023	98.89	66915	2352	282	319288991	11404665	1367885	38749	950	620	44.8	3.6	24	0	884	900	921	24.7	42137.3	0	39509.8
11-Sep-2023	99.03	67197	2634	282	320656958	12772632	1367967	38752	950	620	44.8	3.6	24	0	868	900	930	23.7	42161	0	39509.8
12-Sep-2023	99.03	67479	2916	282	322024901	14140575	1367943	38751	950	620	44.8	3.6	24	0	879	900	919	24.7	42185.7	0	39509.8
13-Sep-2023	99.03	67761	3198	282	323392200	15507874	1367299	38733	950	620	44.8	3.6	24	0	866	900	932	24.7	42210.3	0	39509.8
14-Sep-2023	99.03	68039	3476	278	324759984	16875658	1367784	38747	950	612	44.2	3.9	24	0	870	900	932	23.7	42234	0	39509.8
15-Sep-2023	98.47	68311	3748	272	326123858	18239532	1363874	38636	950	598	43.3	4.1	23.9	1	872	900	930	24.3	42258.3	0	39509.8
16-Sep-2023	98.61	68580	4017	269	327491459	19607133	1367601	38741	950	592	42.8	4.1	24	0	870	900	924	24.8	42283.1	0	39509.8
17-Sep-2023	98.61	68853	4290	273	328859943	20975617	1368484	38766	950	601	43.4	4	24	0	860	900	940	24.8	42307.8	0	39509.8
18-Sep-2023	98.89	69132	4569	279	330226724	22342398	1366781	38718	949	614	44.4	3.8	24	0	848	900	961	23.7	42331.5	0	39509.8
19-Sep-2023	68.33	69328	4765	196	331175715	23291389	948991	26883	950	431	44.9	3.6	16.7	0	877	900	924	17.6	42349.1	0	39509.8
20-Sep-2023	0.14	69328	4765	0	331175715	23291389	0	0	0	0	0	0	0	0	0	0	0	0	42349.1	0	39509.8

Appendix A: Flare Data

		CO2 Equivalents			Landfill Gas Flow						Methane	Oxygen	Flare	Flare	Temperature			Blower 1		Blower 2	
	Data Reliability	Yearly	Monthly	Daily	Yearly	Monthly	Daily	Daily	Avg	Total	Avg	Avg	Run Hours	Starts	Min.	Avg.	Max.	Daily	Cumu.	Daily	Cumu.
Date		Tonnes CO2	Tonnes CO2	Tonnes CO2	scf	scf	scf	meter3	scfm	MMBTU	(%)	(%)			°C	°C	°C	Hours	Hours	Hours	Hours
21-Sep-2023	0.14	69328	4765	0	331175715	23291389	0	0	0	0	0	0	0	0	0	0	0	0	42349.1	0	39509.8
22-Sep-2023	64.58	69508	4945	180	332065238	24180912	889523	25198	951	396	44	3.6	24	1	0	899	913	80.3	42429.4	0	39509.8
23-Sep-2023	99.17	69788	5225	280	333432779	25548453	1367541	38740	950	616	44.5	3.5	24	0	873	900	918	24.7	42454.1	0	39509.8
24-Sep-2023	99.17	70067	5504	279	334802022	26917696	1369243	38788	951	613	44.2	3.6	24	0	886	900	920	23.7	42477.8	0	39509.8
25-Sep-2023	99.17	70340	5777	273	336169972	28285646	1367950	38751	950	600	43.4	3.8	24	0	878	900	928	24.6	42502.3	0	39509.8
26-Sep-2023	99.31	70623	6060	283	337538394	29654068	1368422	38765	950	623	45	3.1	24	0	856	900	938	24.7	42527	0	39509.8
27-Sep-2023	99.31	70911	6348	288	338905461	31021135	1367067	38726	949	634	45.8	2.8	24	0	857	900	942	24.7	42551.7	0	39509.8
28-Sep-2023	7.36	70931	6368	20	339003638	31119312	98177	2781	951	45	45.1	3.2	1.7	0	887	900	918	1	42552.7	0	39509.8
29-Sep-2023	31.67	71019	6456	88	339436386	31552060	432748	12259	950	193	44.1	3.4	24	0	0	897	917	47.2	42599.9	0	39509.8
30-Sep-2023	98.89	71295	6732	276	340804646	32920320	1368260	38760	950	607	43.8	3.4	24	0	875	900	927	24.7	42624.6	0	39509.8
1-Oct-2023	98.89	71577	282	282	342173408	1368762	1368762	38774	951	621	44.8	3.2	24	0	863	900	926	23.8	42648.4	0	39509.8
2-Oct-2023	99.17	71864	569	287	343541913	2737267	1368505	38767	950	630	45.5	2.7	24	0	861	900	935	24.6	42673	0	39509.8
3-Oct-2023	99.03	72166	871	302	344910370	4105724	1368457	38766	950	663	47.9	1.9	24	0	867	900	937	24.7	42697.6	0	39509.8
4-Oct-2023	98.89	72464	1169	298	346278506	5473860	1368136	38757	950	655	47.3	2	24	0	848	900	941	23.7	42721.3	0	39509.8
5-Oct-2023	98.89	72763	1468	299	347647298	6842652	1368792	38775	951	657	47.5	2	24	0	854	900	942	24.8	42746.1	0	39509.8
6-Oct-2023	99.03	73054	1759	291	349014749	8210103	1367451	38737	950	640	46.3	2.2	24	0	843	900	947	24.7	42770.8	0	39509.8
7-Oct-2023	99.03	73351	2056	297	350382932	9578286	1368183	38758	950	653	47.2	2	24	0	873	900	923	24.7	42795.4	0	39509.8
8-Oct-2023	99.03	73647	2352	296	351751313	10946667	1368381	38763	950	651	47	2.1	24	0	850	900	927	23.7	42819.1	0	39509.8
9-Oct-2023	99.03	73944	2649	297	353119897	12315251	1368584	38769	950	654	47.2	2.1	24	0	842	900	942	24.8	42843.9	0	39509.8
10-Oct-2023	99.03	74242	2947	298	354487740	13683094	1367843	38748	950	656	47.4	2.1	24	0	859	900	927	24.7	42868.6	0	39509.8
11-Oct-2023	98.89	74538	3243	296	355856336	15051690	1368596	38770	950	651	47	2.2	24	0	860	900	929	23.7	42892.2	0	39509.8
12-Oct-2023	99.03	74839	3544	301	357224842	16420196	1368506	38767	950	662	47.8	1.7	24	0	874	900	931	24.7	42916.9	0	39509.8
13-Oct-2023	99.03	75145	3850	306	358592865	17788219	1368023	38753	950	674	48.7	1.1	24	0	870	900	924	24.7	42941.6	0	39509.8
14-Oct-2023	99.03	75447	4152	302	359960743	19156097	1367878	38749	950	664	47.9	1.2	24	0	877	900	923	23.7	42965.3	0	39509.8
15-Oct-2023	98.89	75750	4455	303	361329058	20524412	1368315	38762	950	666	48.1	1.2	24	0	852	900	938	24.7	42989.9	0	39509.8
16-Oct-2023	99.03	76057	4762	307	362697679	21893033	1368621	38770	950	676	48.8	1.1	24	0	872	900	923	24.7	43014.6	0	39509.8
17-Oct-2023	98.89	76371	5076	314	364065367	23260721	1367688	38744	950	690	49.8	1.1	24	0	865	900	930	23.7	43038.3	0	39509.8
18-Oct-2023	98.89	76683	5388	312	365432272	24627626	1366905	38722	949	687	49.7	1.1	24	0	850	900	935	24.8	43063.1	0	39509.8
19-Oct-2023	98.89	76995	5700	312	366800422	25995776	1368150	38757	950	686	49.5	1.1	24	0	888	900	913	24.7	43087.7	0	39509.8
20-Oct-2023	98.89	77309	6014	314	368168654	27364008	1368232	38759	950	690	49.9	1.1	24	0	845	900	936	23.7	43111.4	0	39509.8
21-Oct-2023	98.89	77614	6319	305	369536299	28731653	1367645	38743	950	671	48.5	1.3	24	0	848	900	941	24.8	43136.2	0	39509.8
22-Oct-2023	98.89	77922	6627	308	370904634	30099988	1368335	38762	950	678	49	1.1	24	0	878	900	922	24.7	43160.9	0	39509.8
23-Oct-2023	98.89	78230	6935	308	372272310	31467664	1367676	38744	950	678	49	1.1	24	0	848	900	939	23.7	43184.5	0	39509.8
24-Oct-2023	99.03	78531	7236	301	373639790	32835144	1367480	38738	950	663	47.9	1.2	24	0	839	900	932	24.8	43209.3	0	39509.8
25-Oct-2023	98.89	78831	7536	300	375007305	34202659	1367515	38739	950	661	47.8	1.2	24	0	855	900	939	24.7	43234	0	39509.8
26-Oct-2023	98.89	79134	7839	303	376374912	35570266	1367607	38742	950	667	48.2	1.2	24	0	858	900	938	23.7	43257.6	0	39509.8
27-Oct-2023	99.03	79435	8140	301	377743989	36939343	1369077	38783	951	663	47.9	1.2	24	0	849	900	937	24.7	43282.3	0	39509.8
28-Oct-2023	99.03	79734	8439	299	379111917	38307271	1367928	38751	950	657	47.5	1.3	24	0	881	900	921	24.8	43307.1	0	39509.8
29-Oct-2023	98.89	80034	8739	300	380479537	39674891	1367620	38742	950	659	47.6	1.2	24	0	860	900	939	23.7	43330.8	0	39509.8
30-Oct-2023	98.89	80337	9042	303	381847153	41042507	1367616	38742	950	667	48.2	1.2	24	0	853	900	954	24.7	43355.5	0	39509.8
31-Oct-2023	98.89	80632	9337	295	383214979	42410333	1367826	38748	950	648	46.8	1.3	24	0	872	900	936	24.8	43380.2	0	39509.8
1-Nov-2023	98.89	80936	304	304	384582144	1367165	1367165	38729	949	669	48.4	1.1	24	0	871	900	929	23.7	43403.9	0	39509.8
2-Nov-2023	99.03	81244	612	308	385951195	2736216	1369051	38782	951	677	48.9	1	24	0	882	900	916	24.7	43428.6	0	39509.8
3-Nov-2023	98.89	81542	910	298	387319022	4104043	1367827	38748	950	655	47.3	1.4	24	0	870	900	929	24.7	43453.3	0	39509.8
4-Nov-2023	98.89	81840	1208	298	388687327	5472348	1368305	38761	950	655	47.3	1.3	24	0	880	900	918	23.8	43477	0	39509.8
5-Nov-2023	98.89	82148	1516	308	390054906	6839927	1367579	38741	950	678	49	1.1	24	0	870	900	930	25.7	43502.7	0	39509.8
6-Nov-2023	98.89	82449	1817	301	391423981	8209002	1369075	38783	951	663	47.8	1.3	24	0	850	900	940	24.7	43527.4	0	39509.8
7-Nov-2023	98.89	82751	2119	302	392792181	9577202	1368200	38758	950	663	47.9	1.3	24	0	852	900	941	23.7	43551.1	0	39509.8
8-Nov-2023	98.89	83058	2426	307	394159767	10944788	1367586	38741	950	675	48.8	1.1	24	0	878	900	924	24.8	43575.8	0	39509.8
9-Nov-2023	96.39	83348	2716	290	395492645	12277666	1332878	37758	950	638	47.3	1.4	23.4	0	850	900	945	23.7	43599.5	0	39509.8
10-Nov-2023	46.39	83487	2855	139	396124813	12909834	632168	17908	949	305	47.8	1.3	11.1	1	4	896	944	23.8	43623.3	0	39509.8
11-Nov-2023	98.89	83788	3156	301	397492811	14277832	1367998	38753	950	662	47.8	1.3	24	0	852	900	938	23.7	43646.9	0	39509.8
12-Nov-2023	98.89	84093	3461	305	398860502	15645523	1367691	38744	950	672	48.5	1.2	24	0	867	900	934	24.8	43671.7	0	39509.8
13-Nov-2023	98.75	84392	3760	299	400229234	17014255	1368732	38773	950	657	47.4	1.3	24	0	866	900	923	24.7	43696.4	0	39509.8
14-Nov-2023	98.75	84697	4065	305	401596987	18382008	1367753	38746	950	671	48.5	1.3	24	0	872	900	925	23.8	43720.2	0	39509.8
15-Nov-2023	98.75	85000	4368	303	402965785	19750806	1368798	38775	951	667	48.1	1.3	24	0	862	900	925	24.8	43744.9	0	39509.8
16-Nov-2023	98.75	85303	4671	303	404332741	21117762	1366956	38723	949	667	48.2	1.3	24	0	854	900	952	23.7	43768.6	0	39509.8
17-Nov-2023	98.75	85606	4974	303	405701051	22486072	1368310	38762	950	666	48.1	1.2	24	0	869	900	924	24.8	43793.4	0	39509.8
18-Nov-2023	98.89	85905	5273	299	407068345	23853366	1367294	38733	950	658	47.6	1.3	24	0	883	900	916	24.8	43818.2	0	39509.8
19-Nov-2023	98.75	86205	5573	300	408436860	25221881	1368515	38767	950	659	47.6	1.3	24	0	872	900	928	23.8	43841.9	0	39509.8
20-Nov-2023	98.75	86502	5870	297	409804554	26589575	1367694	38744	950	653	47.2	1.5	24	0	864	900	940	24.7	43866.6	0	39509.8
21-Nov-2023	98.89	86796	6164	294	411173087	27958108	1368533	38768	950	647	46.7	1.6	24	0	844	900	951	24.8	43891.4	0	39509.8
22-Nov-2023	98.89	87094	6462	298	412541934	29326955	1368847	38777	951	655	47.3	1.5	24	0	856	900	947	23.8	43915.2	0	39509.8
23-Nov-2023	98.75	87378	6746	284	413909194	30694215	1367260	38732	949	625	45.1	1.8	24	0	854	900	940	24.7	43939.8	0	39509.8
24-Nov-2023	98.75	87668	7036	290	415277412	32062433	1368218	38759	950	637	46	1.6	24	0	865	900	932	23.8	43963.6	0	39509.8
25-Nov-2023	98.75	87970	7338	302	416644737	33429758	1367325	38734	950	664	48	1.5	24	0	884	900	917	24.7	43988.3	0	39509.8

Appendix A: Flare Data

		CO2 Equivalents			Landfill Gas Flow						Methane	Oxygen	Flare	Flare	Temperature			Blower 1		Blower 2	
	Data Reliability	Yearly	Monthly	Daily	Yearly	Monthly	Daily	Daily	Avg	Total	Avg	Avg	Run Hours	Starts	Min.	Avg.	Max.	Daily	Cumu.	Daily	Cumu.
Date		Tonnes CO2	Tonnes CO2	Tonnes CO2	scf	scf	scf	meter3	scfm	MMBTU	(%)	(%)			°C	°C	°C	Hours	Hours	Hours	Hours
26-Nov-2023	98.75	88261	7629	291	418012046	34797067	1367309	38733	950	641	46.3	1.9	24	0	834	900	947	24.8	44013.1	0	39509.8
27-Nov-2023	98.75	88547	7915	286	419380240	36165261	1368194	38758	950	629	45.5	2	24	0	863	900	939	23.8	44036.8	0	39509.8
28-Nov-2023	98.75	88843	8211	296	420748672	37533693	1368432	38765	950	651	47	1.8	24	0	879	900	929	24.7	44061.5	0	39509.8
29-Nov-2023	98.75	89139	8507	296	422116825	38901846	1368153	38757	950	651	47	2	24	0	864	900	926	24.8	44086.3	0	39509.8
30-Nov-2023	98.75	89428	8796	289	423484861	40269882	1368036	38754	950	636	45.9	2.1	24	0	866	900	930	23.7	44110	0	39509.8
1-Dec-2023	98.89	89719	291	291	424853687	1368826	1368826	38776	951	639	46.2	2	24	0	881	900	912	24.8	44134.7	0	39509.8
2-Dec-2023	98.89	90012	584	293	426221575	2736714	1367888	38750	950	645	46.6	2	24	0	868	900	934	24.7	44159.4	0	39509.8
3-Dec-2023	90.42	90281	853	269	427474485	3989624	1252910	35492	950	591	46.6	2	22	0	883	900	914	21.7	44181.2	0	39509.8
4-Dec-2023	0.14	90281	853	0	427474485	3989624	0	0	0	0	0	0	0	0	0	0	0	0	44181.2	0	39509.8
5-Dec-2023	0.14	90281	853	0	427474485	3989624	0	0	0	0	0	0	0	0	0	0	0	0	44181.2	0	39509.8
6-Dec-2023	48.33	90422	994	141	428133070	4648209	658585	18656	949	311	46.6	2	23.9	0	28	897	954	75.3	44256.4	0	39509.8
7-Dec-2023	98.75	90722	1294	300	429501199	6016338	1368129	38756	950	659	47.6	1.9	24	0	873	900	931	24.8	44281.2	0	39509.8
8-Dec-2023	98.89	91017	1589	295	430868091	7383230	1366892	38721	949	649	46.9	2.2	24	0	853	900	955	23.8	44305	0	39509.8
9-Dec-2023	98.89	91297	1869	280	432236641	8751780	1368550	38768	950	616	44.5	2.5	24	0	849	900	943	24.7	44329.6	0	39509.8
10-Dec-2023	98.75	91582	2154	285	433605006	10120145	1368365	38763	950	628	45.3	2.3	24	0	882	900	918	24.8	44354.4	0	39509.8
11-Dec-2023	98.75	91869	2441	287	434973623	11488762	1368617	38770	950	631	45.6	2.4	24	0	864	900	937	23.8	44378.2	0	39509.8
12-Dec-2023	98.75	92146	2718	277	436341418	12856557	1367795	38747	950	609	44	2.7	24	0	874	900	921	24.7	44402.9	0	39509.8
13-Dec-2023	98.75	92429	3001	283	437709323	14224462	1367905	38750	950	622	44.9	2.4	24	0	880	900	917	23.8	44426.6	0	39509.8
14-Dec-2023	98.75	92716	3288	287	439078049	15593188	1368726	38773	951	630	45.5	2.4	24	0	872	900	918	24.8	44451.4	0	39509.8
15-Dec-2023	98.89	92995	3567	279	440446404	16961543	1368355	38763	950	614	44.3	2.6	24	0	884	900	920	24.8	44476.2	0	39509.8
16-Dec-2023	98.75	93290	3862	295	441814464	18329603	1368060	38754	950	650	46.9	2	24	0	873	900	918	23.7	44499.9	0	39509.8
17-Dec-2023	98.89	93575	4147	285	443181656	19696795	1367192	38730	950	626	45.3	2.6	24	0	859	900	934	24.8	44524.6	0	39509.8
18-Dec-2023	98.89	93899	4471	324	444549817	21064956	1368161	38757	950	713	51.5	2.8	24	0	883	900	923	24.8	44549.4	0	39509.8
19-Dec-2023	98.75	94201	4773	302	445918192	22433331	1368375	38763	950	665	48	2.8	24	0	881	900	919	23.7	44573.1	0	39509.8
20-Dec-2023	98.75	94481	5053	280	447286436	23801575	1368244	38760	950	615	44.4	2.6	24	0	859	900	938	24.8	44597.9	0	39509.8
21-Dec-2023	98.89	94768	5340	287	448653270	25168409	1366834	38720	950	631	45.7	2.4	24	0	888	900	918	23.8	44621.6	0	39509.8
22-Dec-2023	98.75	95058	5630	290	450021151	26536290	1367881	38749	950	638	46.1	2.3	24	0	880	900	917	24.8	44646.4	0	39509.8
23-Dec-2023	98.75	95350	5922	292	451389240	27904379	1368089	38755	950	643	46.5	2.2	24	0	866	900	929	24.7	44671.1	0	39509.8
24-Dec-2023	98.61	95625	6197	275	452756604	29271743	1367364	38735	950	606	43.8	3.3	24	0	866	900	943	23.8	44694.9	0	39509.8
25-Dec-2023	98.75	95894	6466	269	454124809	30639948	1368205	38759	950	591	42.7	3.6	24	0	887	900	922	24.8	44719.6	0	39509.8
26-Dec-2023	99.03	96167	6739	273	455491390	32006529	1366581	38713	950	600	43.4	3.6	24	0	-2	899	916	24.8	44744.4	0	39509.8
27-Dec-2023	98.75	96440	7012	273	456859820	33374959	1368430	38765	950	600	43.3	3.5	24	0	880	900	917	23.7	44768.1	0	39509.8
28-Dec-2023	98.75	96721	7293	281	458227720	34742859	1367900	38750	950	618	44.7	3	24	0	891	900	912	24.8	44792.9	0	39509.8
29-Dec-2023	100	96974	7546	253	459473204	35988343	1245484	35282	950	556	44.2	3.4	21	313	870	900	919	24.8	44817.6	0	39509.8
30-Dec-2023	98.89	97242	7814	268	460840672	37355811	1367468	38738	950	589	42.6	3.9	0		0	0	0	23.7	44841.3	0	39509.8
31-Dec-2023	98.75	97515	8087	273	462209012	38724151	1368340	38762	950	600	43.3	3.5	0		0	0	0	24.8	44866.1	0	39509.8

APPENDIX B

Surface Emission Reports

COMCOR
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May 18, 2023

Mr. Duy Doan
Project Coordinator
City of Winnipeg
1120 Waverly Street
Winnipeg, MB R3T 0P4

Project No. 9-468

Dear Mr. Doan:

RE: Surface Emission Survey – May 2023
Area 1 - Landfill Gas Collection and Flaring System
Brady Road Resource Management Facility, Winnipeg, MB

1.0 INTRODUCTION/BACKGROUND

As part of the Operations contract with the City of Winnipeg (City), Integrated Gas Recovery Services (IGRS) is required to perform surface emission surveys during each calendar year to assess the effectiveness of the landfill gas (LFG) collection wellfield at the Brady Road Resource Management Facility (Site). On May 3rd to 5th, IGRS performed the first surface emission survey (SES) of 2023. The results of the SES provide information on the performance of the LFG collection system as well as identify any areas on the landfill surface that may require additional attention to limit amounts of LFG being released into the atmosphere. The results of the May 2023 SES can be compared to previous SESs completed at the Site, as well as any future SESs in order to determine areas that may consistently have high surface emissions of LFG.

The flaring system at the Site was commissioned in July of 2013, the same month the first initial SES was completed. Since then, the system has been running on a consistent basis, with flow rates ranging between 800 to 1000 cfm. This report discusses the results of the May 2023 SES, evaluates the emission and odour sources, and provides recommended remedial measures.

2.0 METHODOLOGY

The May 2023 SES was completed using Comcor's Surface Emissions Survey Protocol (Protocol), which is based on the United States Environmental Protection Agency's (USEPA) New Source Performance Standards (NSPS) for surface emissions monitoring at municipal solid waste landfills. The Protocol's methodology generally involves walking in a 30-meter grid to detect fugitive LFG emissions across the waste mound. Comcor's SES Protocol is provided as Attachment A.

A Landtec SEM5000 Portable Methane Detector (Detector) was used to perform the SES. The Detector uses laser technology to detect methane emissions with a detection limit of 1 part per million (ppm), and is able to continuously sample and store readings at a frequency as high as once per second. The Detector is equipped with a global positioning system (GPS) sensor, which tracks the survey grid and location of all methane readings. The Detector was calibrated according to the manufacturers' specifications prior to being used for the SES.

A serpentine pattern was used to cover the entirety of the landfill site survey area. This path was tracked by the GPS and is displayed in Figure 1. The path was deviated from in an effort to identify major surface emissions when potential areas of more concern were noted.

The results of a SES are a good initial indicator of the effectiveness of the landfill cap and the overall LFG collection system. SESs have been used to identify high levels of surface emissions from the waste and identify areas that may require further investigation or remediation

3.0 OPERATIONAL AND SITE CONDITIONS

On May 3rd to 5th, 2023, Comcor staff carried out an SES of the entire capped waste disposal fill area. The SES was conducted both where LFG collection wells are installed, as well as on the newly capped area where there is no LFG collection system. It is noted that there currently is a large active area without cover and on-going filling operations that was not able to be effectively monitored due to the work in the area. Focus was placed on wells and infrastructure that penetrates the clay cap, as these points can often be a pathway for emissions. Comcor also inspected the area for evidence of LFG build-up, stressed vegetation, and/or areas of obvious odour.

Figure 1 provides a site plan reflective of the existing LFG wellfield. All wells had been previously balanced, and the LFG collection and flaring system had been running consistently prior to performing the SES. With these operating conditions, the results of the SES are a better representation of surface emissions under optimal operations. The results of the May 2023 SES have been transferred on to the site plan and are shown in Figure 1.

Weather conditions during the May 2023 SES were average for the season and fell within the acceptable guidelines as outlined in Attachment A.

4.0 RESULTS

Background Emissions

Background methane concentration readings are taken before a SES is conducted in order to identify which surface emissions are results of the landfill, and which are from alternative sources offsite. Background readings are taken upwind from the landfill site to ensure that emissions from the landfill do not influence the background concentrations. Each day, prior to commencing the SES, Comcor took background concentration readings both upwind and downwind at a distance of 30 meters or more from the limit of waste. In all cases, readings were between 0 to 2 ppm. These readings were considered negligible, and no further action was required to correct readings taken during the SES.

Measured Emissions and Remedial Measures

In accordance with the Protocol, a minimum concentration of 1,000 ppm is commonly used as the emission exceedance threshold. However, as a conservative measure, Comcor reports all readings with concentrations above 500 ppm that were measured during the SES.

Figure 1 presents the locations of the emission exceedances, and is categorized into a gas concentration range as indicated by the colour coding on the figure. When overlayed on to the site plan of the existing LFG wellfield, it is evident that the majority of the exceedances coincide with the locations of the wellfield piping and/or aboveground wellheads. The elevated concentrations identified at the wellheads are likely due to the well providing a pathway of least resistance for the movement of gas. The elevated concentrations located along the wellfield piping network are potential indicators of ineffective recapping following installation. These areas have contributed to increased surface emissions and are identifiable by the distinct lack of vegetation regrowth. The majority of the exceedances identified in the May 2023 SES were associated with areas of stressed or missing vegetation.

Special attention was given to areas associated with the 2020 construction project, which involved the installation of compressed air and force main lines to various collection system infrastructure. Overall, these areas did not provide an indication of excessive methane escape. However, four locations surrounding wells, specifically in the vicinity of wells H-12, WH-76, WH-80 and 8-69, all showed significant methane escape.

Extensive investigation of Cell 30 was also completed as a result of the odors that had been identified over the past winter. For the most part, the odors had dissipated and were not identified during the May 2023 SES. It is assumed that the recent capping activities have effectively reduced the odors. However, wells WH-76, WH-80 and 8-69 have yet to be capped, and could have been contributing to the odours. These wells all recorded high levels or surface emissions in the May 2023 SES, and thus, the potential for odors to re-emerge is possible.

It is noted that capping activities have also been completed over the older parts of the landfill. While exceedances are not typically located in these areas, additional cap only serves to further prevent/reduce methane escape and oxygen intrusion through the landfill surface, and is recommended to continue.

Vegetation and Clay Cap Condition

Special attention and observation were also given to the condition of the clay cap and vegetation in these areas. Large cracks and ruts in the clay cap can allow gas to escape the landfill mound, and stressed or missing vegetation indicates that gas is escaping through the clay cap and is affecting the health of the plant.

While conducting the May 2023 SES, Comcor observed many areas of stressed vegetation in addition to those which were previously noted above. Many of these locations did not exceed the methane threshold of the SES Protocol, but require continued monitoring to ensure potential gas emissions are remediated effectively.

5.0 RECOMMENDED REMEDIAL MEASURES

The most evident indicator of methane escape on site is the presence of stressed and/or lacking vegetation, of which the majority of the exceedances recorded in the May 2023 SES were associated with. It is recommended that capping activities be prioritized for areas where a lack of vegetation is clearly visible. Since many of the exceedances were found in Cells 30 and 31, it is recommended that capping should be completed in these areas first. This capping is expected to help reduce methane escape as well as oxygen intrusion, and reduce odor complaints.

Following any repair/capping work, a follow-up SES should be conducted to ensure the final cap is adequate in controlling emissions. Future surveys should continue to evaluate previous areas of concern to ensure they did not go unnoticed in the May 2023 SES as well as identify any further areas that may require remediation.

6.0 CONCLUSIONS

The results of the May 2023 SES indicate that there are a few areas of higher surface emissions throughout the site, however the number of exceedances did reduce since the last SES. That said, it is possible that this reduction was influenced by the lack of vegetative growth at this time of the year that could be used as a visual indicator of potential areas of concern/hot spots. Future 2023 SESs may provide more information on where the cap may not be performing as intended, however, overall, the majority of the landfill has sufficient capping. Continued monitoring and

future SESs will also determine if the exceedances recorded in the May 2023 SES have been remediated and if overall, surface emissions have decreased or increased throughout the Site.

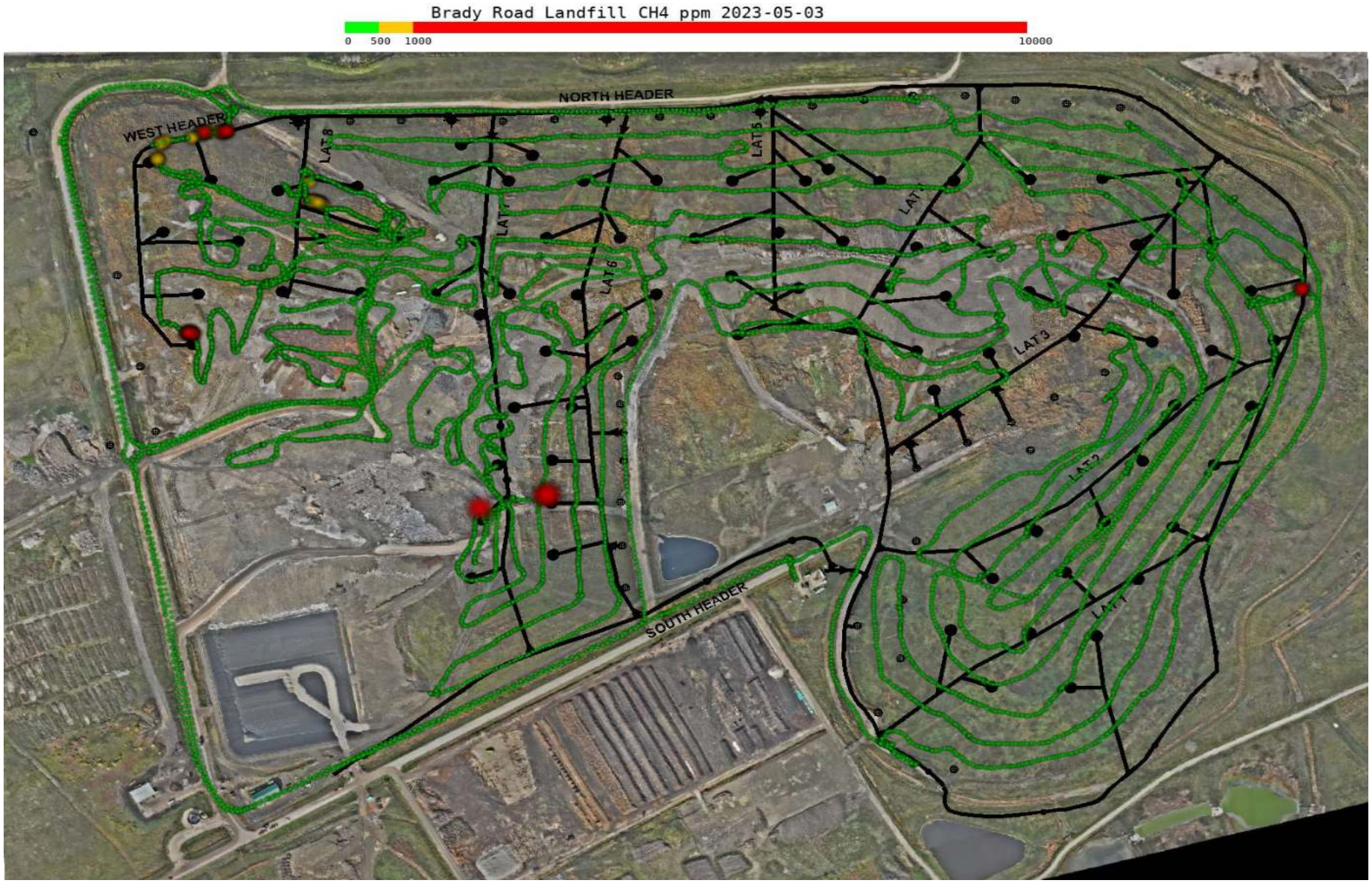
If you have any questions or concerns, please contact the undersigned.

Yours truly,

COMCOR ENVIRONMENTAL LIMITED

Jordan DeMerchant
Environmental Technician

Lux Burgess
Wellfield Operations Supervisor



COMCOR
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Consulting Engineers and Landfill Gas Specialists

2023 Surface Emission Sweep

BRADY ROAD LANDFILL
Winnipeg, Manitoba

Figure 1

PATH WALKED AND METHANE EXCEEDANCES

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ATTACHMENT A
Surface Emissions Survey Protocol

SURFACE EMISSIONS SURVEY
PROTOCOL

Prepared by
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SURFACE EMISSIONS SURVEY PROTOCOL

1. OBJECTIVE AND BACKGROUND INFORMATION

The objective of a Surface Emission Monitoring Plan is to complete a gas assessment within a landfill footprint.

The landfill gas emissions survey is based on the United States Environmental Protection Agency's (USEPA) New Source Performance Standards (NSPS) for surface emissions monitoring at municipal solid waste landfills. Background methane concentration should be taken before each emissions survey and will be determined by monitoring upwind and downwind outside the boundary of the landfill at a distance of at least 30 metres from the limit of waste. The on-site emission survey is to be conducted as described within this document.

2. MONITORING MAP

- A grid will be imposed on the available site maps. This grid will cover all areas of the landfill. The grid shows the path to be followed by the individual(s) who perform surface monitoring. The grid will be set up at 30 meter intervals.

- The maps will show the location of all gas monitors, each of which is shown with a unique identifier.

- The monitoring grid map may also indicate each area that is excluded from surface monitoring. Each excluded area is labeled and an attachment to the map has been prepared to explain the basis for each area's exclusion from monitoring. The following areas are excluded from required monitoring:

    1) Slopes that are determined by the individual(s) performing the monitoring to be too steep to be safely traversed while carrying the monitor.
    2) Areas containing only waste other than Municipal Solid Waste (for example, "construction and demolition" debris, kiln ash, etc.).
    3) Areas of known asbestos disposal.

3. INSTRUMENT AND CALIBRATION GAS SPECIFICATIONS

- All instruments will be field calibrated and have certification from the manufacturer or rental supplier.

4. MONITORING SCHEDULE

- Under the NSPS, quarterly monitoring is required for all landfills that require a gas collection system (GCS). A landfill that can demonstrate that surface concentrations are below 500 parts per million by volume (ppmv) measured as methane in four consecutive quarters do not require a GCS.
- Any closed landfills that has surface concentrations not to exceed 500 parts per million by volume (ppmv) measured as methane in four consecutive quarterly monitoring periods may conduct annual monitoring.
- Monitoring will only occur if conditions are appropriate. Below is an outline of reasons that monitoring may not be able to be completed.

1) Weather that is determined by the individual(s) who perform the surface monitoring to be unsafe in which to conduct outdoor activities or which may be damaging to health (i.e. , extremes of temperature, high winds, rain-snow-ice or thunder storms, snow and ice accumulation, darkness, ozone alerts, other air pollution alerts).

2) Occurrence of meteorological conditions considered to be other than "typical".

3) For Tier 4 Landfills, average wind speed (on a 5-minute interval) must not exceed 40 km/h (25 mph).

4) Ambient temperatures which do not rise above the minimum required ambient operational temperature of the monitoring instrument.

5) Ambient temperatures which do not fall below the maximum allowable ambient operational temperature of the monitoring instrument.

6) Accumulation of snow/ice to a depth in excess of the maximum allowable monitoring height-above-surface (i.e., 10 cm. = 4 inches).

7) Wet surface conditions such that traversing the landfill would either present a hazard to the individual(s) performing the monitoring, or would damage the cover and potentially result in the creation of methane leaks.

- Where a delay in the monitoring schedule has been caused by one or more of the above conditions, monitoring will resume as soon as the condition(s) which precluded meeting the monitoring schedule subside. Documentation will be entered into the report detailing the regular monitoring schedule and conditions in which they were completed.

5. MONITORING PROCEDURE

- Conduct monitoring ***only if*** ambient temperatures are within acceptable operating limits for the monitoring instrument; there is no snow/ice cover greater than four inches deep, weather conditions are "typical" for the area, and weather and site conditions are such that it is not dangerous to conduct monitoring.

- For Tier 4 Landfills, conduct monitoring ***only if*** average wind speeds are below 40 km/h (25 mph). Utilize a wind barrier if average wind speeds exceed 6.4 km/h (4 mph) or gusts exceed 16.1 km/h (10 mph). Average wind speed to be determined every 5-minutes in an open area using an on-site anemometer with a continuous recorder and data logger for the entire monitoring event.

- Warm up the instrument per the manufacturer's recommendations.

- Perform an instrument calibration prior to each monitoring day.

- At a distance of 30 meters (98 feet) from the perimeter wells on the upwind side of the landfill, face into the wind and move the probe in the air for at least 30 seconds.

- Note the meter reading and record it as "upwind reading".

- Perform the same procedure at a distance of 30 meters (98 feet) from the perimeter wells on the downwind side of the landfill and record the meter reading as "downwind reading".

- Average the upwind and downwind readings and record the average in "background concentration".

- Using the surface monitoring grid map, begin walking the sampling path at the starting point on the map holding the monitor probe no more than four inches above the landfill surface. Walk at a steady pace of approximately 1.5 mph (approximately 1 step per second).

- When the instrument gives a meter reading of $\geq$ 500 ppm, stop walking and note the maximum meter reading. Record the time of detection and a unique location identifier from the GPS unit. It may be necessary to create a location identifier on the sampling grid map.

- Continue walking the sampling grid path until the entire route has been traversed.

- While traversing the grid, if any areas are seen off of the grid path that appear to have a high potential for methane leaks (i.e., stressed vegetation, noticeable surface cracks, sunken areas, etc.), deviate from the grid path and monitor these areas as if they were on the grid path. Cover penetrations such as wellheads, vents and posts that pass through the cover of the landfill must also be monitored. Document these areas only if a leak is recorded.

- If the portable PID/FID gas monitor gives a reading above its detectable limits use the GEM to determine methane levels.

- All areas of stressed vegetation, noticeable surface cracks, sunken areas, etc. should also be noted and the location recorded. If possible take digital pictures to record any extreme conditions.

6. MEASURED EXCEEDANCES

- If methane is detected at a concentration greater than 1000 ppm above background, the following steps may be taken until the exceedance is remedied:

    1. The location and concentration of the exceedance will be recorded.

    2. Adjustments to adjacent extraction wells will be made to increase gas collection in the vicinity of the exceedance. The location will be re-monitored within ten (10) calendar days of detecting the exceedance.

    3. If re-monitoring the location shows a second exceedance, cover maintenance will be performed. The location will be re-monitored within ten (10) calendar days of maintenance.

    4. If re-monitoring shows a third exceedance, consideration will be given to installing additional landfill gas extraction wells.

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October 31, 2023

Mr. Duy Doan
Project Coordinator
City of Winnipeg
1120 Waverly Street
Winnipeg, MB R3T 0P4

Project No. 9-468

Dear Mr. Doan:

RE: Surface Emission Survey – October 2023
Area 1 - Landfill Gas Collection and Flaring System
Brady Road Resource Management Facility, Winnipeg, MB

1.0 Introduction and Background

As part of the Operations contract with the City of Winnipeg (City), Integrated Gas Recovery Services (IGRS) is required to perform surface emission surveys during each calendar year to assess the effectiveness of the landfill gas (LFG) collection wellfield at the Brady Road Resource Management Facility (Site). On October 4th to 6th, 2023, IGRS performed the third surface emission survey (SES) of 2023. The results of the SES provide information on the performance of the LFG collection system. The results identify any areas on the landfill surface that may require additional attention to limit amounts of LFG being released into the atmosphere. The results of the October 2023 SES can be compared to previous SESs completed at the Site, as well as any future SESs in order to determine areas that may consistently have high surface emissions of LFG.

The flaring system at the Site was commissioned in July of 2013, the same month the first initial SES was completed. Since then, the system has been running on a consistent basis, with flow rates ranging between 800 to 1000 cfm. This report discusses the results of the October 2023 SES, evaluates the emission and odour sources, and provides recommended remedial measures.

This sweep was also done in coordination with a drone SES sweep to compare results. While the results of the drone sweep will not be included in this report, they will be used for comparison purposes in reporting for Environment Canada research.

2.0 Methodology

The October 2023 SES was completed using Comcor's Surface Emissions Survey Protocol (Protocol), which is based on the United States Environmental Protection Agency's (USEPA)

New Source Performance Standards (NSPS) for surface emissions monitoring at municipal solid waste landfills. The Protocol's methodology generally involves walking in a 30-meter grid to detect fugitive LFG emissions across the waste mound. Comcor's SES Protocol is provided as Attachment A.

A Landtec SEM5000 Portable Methane Detector (Detector) was used to perform the SES. The Detector uses laser technology to detect methane emissions with a detection limit of 1 part per million (ppm), and is able to continuously sample and store readings at a frequency as high as once per second. The Detector is equipped with a global positioning system (GPS) sensor, which tracks the survey grid and location of all methane readings. The Detector was calibrated according to the manufacturers' specifications prior to being used for the SES.

A serpentine pattern was used to cover the entirety of the landfill site survey area. This path was tracked by the GPS and is displayed in Figure 1. At times, there were deviations from the path in an effort to identify major surface emissions where areas of potentially higher concern were noted.

The results of a SES are a good initial indicator of the effectiveness of the landfill cap and the overall LFG collection system. SESs have been used to identify high levels of surface emissions from the waste and identify areas that may require further investigation or remediation.

3.0 Operational and Site Conditions

On October 4rd to 6th, 2023, Comcor staff carried out an SES of the entire capped waste disposal fill area. The SES was conducted both where LFG collection wells are installed, as well as on the newly capped area where there is not an LFG collection system. It is noted that there is currently a large active area with on-going filling operations, and without cover that was not able to be effectively monitored, due to the work in the area. Focus was placed on wells and infrastructure that penetrates the clay cap, as these points can often be a pathway for emissions. Comcor also inspected the area for evidence of LFG build-up, stressed vegetation, and/or areas of obvious odour.

Figure 1 provides a site plan reflective of the existing LFG wellfield. All wells had been previously balanced, and the LFG collection and flaring system had been running consistently prior to performing the SES. With these operating conditions, the results of the SES are a better representation of surface emissions under optimal operations.

Weather conditions during the October 2023 SES were average for the season but did not meet the guidelines outlined in Attachment A, as heavy rainfall had occurred just prior to and during the SES sweep. Despite these difficulties the sweep was completed.

4.0 Results

Background Emissions

Background methane concentration readings are taken before a SES is conducted in order to identify which surface emissions are the result of the landfill, and which are from alternative sources offsite. Background readings are taken upwind from the landfill site to ensure that emissions from the landfill do not influence the background concentrations. Each day, prior to commencing the SES, Comcor took background concentration readings both upwind and downwind at a distance of 30 meters or more from the limit of waste. In all cases, readings were between 0 to 2 ppm. These readings were considered negligible, and no further action was required to correct readings taken during the SES.

Measured Emissions and Remedial Measures

In accordance with the Protocol, a minimum concentration of 1,000 ppm is commonly used as the emission exceedance threshold. However, as a conservative measure, Comcor reports all readings with concentrations above 500 ppm that were measured during the SES.

Figure 1 presents the locations of the emission exceedances, and is categorized into a gas concentration range as indicated by the colour coding on the figure. Due to the large amount of rain that had fallen during and prior too the sweep no exceedances were recorded during the sweep. This is due to the rain sealing many of the cracks in the cap, and not allowing methane to escape as it normally would under dryer conditions. Areas that historically were known as being sources of methane escape showed no exceedances due to this issue.

Special attention was given to areas associated with the 2020 construction project, which involved the installation of compressed air and forcemain lines to various collection system infrastructure. Overall, these areas did not provide an indication of excessive methane escape, however, due to the rainy conditions, these areas should be checked again during future sweeps to ensure they have been properly capped. .

An extensive investigation of Cell 30 was also completed, due to the odors that had been identified over the past winter. The odors had generally dissipated and were not identified during the October 2023 SES. It is likely that the recent capping activities have effectively reduced the odors.

It is noted that capping activities have also been completed over the older parts of the landfill. While exceedances are not typically located in these areas, additional cap only serves to further prevent/reduce methane escape and oxygen intrusion through the landfill surface. It is recommended that additional capping activities in older parts of the landfill continue.

Vegetation and Clay Cap Condition

Special attention and observation were also given to the condition of the clay cap and vegetation. Large cracks and ruts in the clay cap can allow gas to escape the landfill mound, and stressed or missing vegetation indicate that gas is escaping through the clay cap and is affecting plant/vegetation health.

While conducting the October 2023 SES, Comcor observed many areas of stressed vegetation in addition to those which were previously noted above. While these locations did not exceed the methane threshold of the SES Protocol, they are still the best indicator of methane escape and will require continued monitoring to ensure potential gas emissions are remediated effectively.

5.0 Recommended Remedial Measures

The most evident indicator of methane escape on Site is the presence of stressed and/or lacking vegetation. It is recommended that capping activities be prioritized for areas where a lack of vegetation is clearly visible. Since the majority of the exceedances in previous SES were found in Cells 30 and 31, it is recommended that capping should be completed in these areas first. This capping is expected to help reduce methane escape as well as oxygen intrusion, and reduce odor complaints.

Following any repair/capping work, a follow-up SES should be conducted to ensure the final cap is adequate in controlling emissions. Future surveys should continue to evaluate previous areas of concern to ensure they did not go unnoticed in the October 2023 SES, and to identify any further areas that may require remediation.

6.0 Conclusions

The results of the October 2023 SES while not able to provide any conclusive data due to the weather conditions; show that there are no large areas of methane escape in the area surveyed. Future SESs may provide more information on where the cap may not be performing as intended, however, overall the majority of the landfill has sufficient capping.

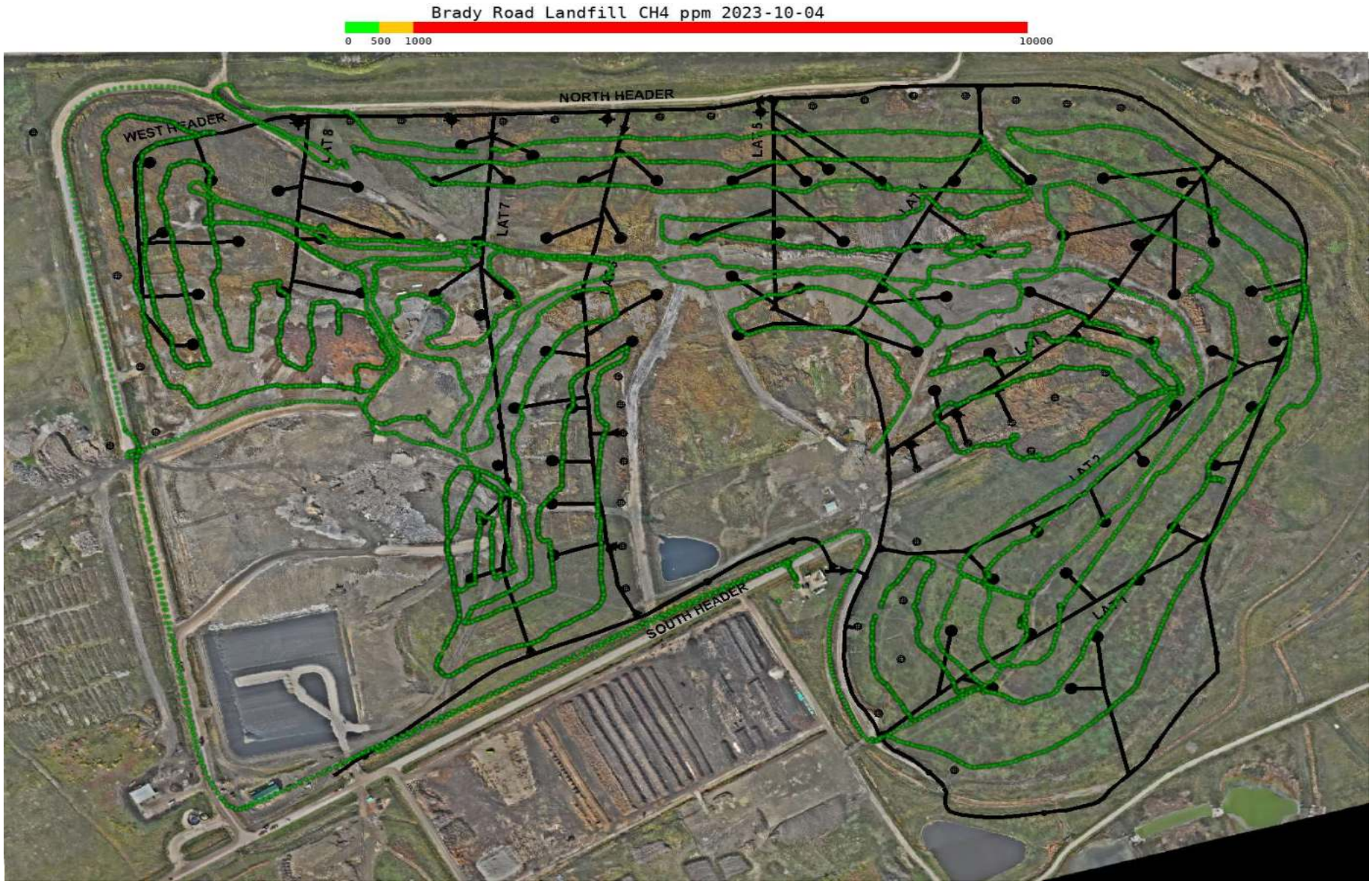
If you have any questions or concerns, please contact the undersigned.

Yours truly,

COMCOR ENVIRONMENTAL LIMITED

Jordan DeMerchant
Environmental Technician

Lux Burgess, CET
Wellfield Operations Supervisor



COMCOR ENVIRONMENTAL LIMITED Consulting Engineers and Landfill Gas Specialists	October 2023 Surface Emission Sweep Brady Road Waste Management Facility Winnipeg, Manitoba	Figure 1 PATH WALKED AND METHANE EXCEEDANCES

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ATTACHMENT A
Surface Emissions Survey Protocol

SURFACE EMISSIONS SURVEY
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2. MONITORING MAP

- A grid will be imposed on the available site maps. This grid will cover all areas of the landfill. The grid shows the path to be followed by the individual(s) who perform surface monitoring. The grid will be set up at 30 meter intervals.

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2) Occurrence of meteorological conditions considered to be other than "typical".

3) For Tier 4 Landfills, average wind speed (on a 5-minute interval) must not exceed 40 km/h (25 mph).

4) Ambient temperatures which do not rise above the minimum required ambient operational temperature of the monitoring instrument.

5) Ambient temperatures which do not fall below the maximum allowable ambient operational temperature of the monitoring instrument.

6) Accumulation of snow/ice to a depth in excess of the maximum allowable monitoring height-above-surface (i.e., 10 cm. = 4 inches).

7) Wet surface conditions such that traversing the landfill would either present a hazard to the individual(s) performing the monitoring, or would damage the cover and potentially result in the creation of methane leaks.

- Where a delay in the monitoring schedule has been caused by one or more of the above conditions, monitoring will resume as soon as the condition(s) which precluded meeting the monitoring schedule subside. Documentation will be entered into the report detailing the regular monitoring schedule and conditions in which they were completed.

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- Conduct monitoring ***only if*** ambient temperatures are within acceptable operating limits for the monitoring instrument; there is no snow/ice cover greater than four inches deep, weather conditions are "typical" for the area, and weather and site conditions are such that it is not dangerous to conduct monitoring.

- For Tier 4 Landfills, conduct monitoring ***only if*** average wind speeds are below 40 km/h (25 mph). Utilize a wind barrier if average wind speeds exceed 6.4 km/h (4 mph) or gusts exceed 16.1 km/h (10 mph). Average wind speed to be determined every 5-minutes in an open area using an on-site anemometer with a continuous recorder and data logger for the entire monitoring event.

- Warm up the instrument per the manufacturer's recommendations.

- Perform an instrument calibration prior to each monitoring day.

- At a distance of 30 meters (98 feet) from the perimeter wells on the upwind side of the landfill, face into the wind and move the probe in the air for at least 30 seconds.

- Note the meter reading and record it as "upwind reading".

- Perform the same procedure at a distance of 30 meters (98 feet) from the perimeter wells on the downwind side of the landfill and record the meter reading as "downwind reading".

- Average the upwind and downwind readings and record the average in "background concentration".

- Using the surface monitoring grid map, begin walking the sampling path at the starting point on the map holding the monitor probe no more than four inches above the landfill surface. Walk at a steady pace of approximately 1.5 mph (approximately 1 step per second).

- When the instrument gives a meter reading of $\geq$ 500 ppm, stop walking and note the maximum meter reading. Record the time of detection and a unique location identifier from the GPS unit. It may be necessary to create a location identifier on the sampling grid map.

- Continue walking the sampling grid path until the entire route has been traversed.

- While traversing the grid, if any areas are seen off of the grid path that appear to have a high potential for methane leaks (i.e., stressed vegetation, noticeable surface cracks, sunken areas, etc.), deviate from the grid path and monitor these areas as if they were on the grid path. Cover penetrations such as wellheads, vents and posts that pass through the cover of the landfill must also be monitored. Document these areas only if a leak is recorded.

- If the portable PID/FID gas monitor gives a reading above its detectable limits use the GEM to determine methane levels.

- All areas of stressed vegetation, noticeable surface cracks, sunken areas, etc. should also be noted and the location recorded. If possible take digital pictures to record any extreme conditions.

6. MEASURED EXCEEDANCES

- If methane is detected at a concentration greater than 1000 ppm above background, the following steps may be taken until the exceedance is remedied:

    1. The location and concentration of the exceedance will be recorded.

    2. Adjustments to adjacent extraction wells will be made to increase gas collection in the vicinity of the exceedance. The location will be re-monitored within ten (10) calendar days of detecting the exceedance.

    3. If re-monitoring the location shows a second exceedance, cover maintenance will be performed. The location will be re-monitored within ten (10) calendar days of maintenance.

    4. If re-monitoring shows a third exceedance, consideration will be given to installing additional landfill gas extraction wells.

APPENDIX E
2023 NUISANCE COMPLAINT MONITORING

Winnipeg | Water and Waste / Eaux et déchets

Table 11. 2023 Nuisance Complaint Monitoring

Date	Complaint	Response
1/4/2023	Caller is reporting that odor from Brady Landfill is still getting into their apartment. This has been ongoing since August 2022. Caller is wondering if they are digging up the landfill.	Contacted customer to explain that it was unlikely the odour was generated from Brady due to their distance; however, there were recent repairs to the landfill gas collection system which may have caused unpleasant odours in the area of the landfill
1/6/2023	Caller is asking for a solution to lessen the intensity of the foul smell emanating from the Brady Landfill, it is affecting health and breathable air quality, citizens are having to stay indoors.	Responded to customer that there were repairs to the landfill gas system this week and the Brady closure was causing some delays. These repairs can be a source of unpleasant odour temporarily.
1/15/2023	Citizen sent an email wanting to report another strong garbage like odour this evening. Started about 45 minutes before 6:11pm (time email was sent)	Responded to customer that there were repairs to the landfill gas system this week and the Brady closure was causing some delays. These repairs can be a source of unpleasant odour temporarily.
1/30/2023	Customer reporting that the landfill odour is very strong in Bridgewater trails is today.	Responded to customer that there were repairs to the landfill gas system this week and the Brady closure was causing some delays. These repairs can be a source of unpleasant odour temporarily.
1/31/2023	Caller asking if repairs were ongoing to fix the landfill gas collection system? It smells really horrible outside the home and inside again today. The smell is quite strong.	Responded to customer that there were repairs to the landfill gas system this week and the Brady closure was causing some delays. These repairs can be a source of unpleasant odour temporarily.
2/14/2023	Citizen is complaining about the odour from the dump. Citizen stating it is very bad, even with the car doors firmly shut. Citizen stating the odour is offensive and affecting the quality of life in their neighbourhood.	Told the citizen that the atmospheric conditions and wind on that day suggest that it would be likely the odour originated from Brady Landfill. Also described the steps taken to reduce the impact of the landfill on our community.
2/14/2023	Caller is a resident of Prairie pointe (South Winnipeg). Residents of this area are now seriously concerned about the ongoing bad smell. This problem is refraining us for any outdoor activities.	Informed citizen that we are working on identifying the source of the odour in the area by monitoring the surrounding neighborhoods to collect odour data within the past few days to help us further identify the source onsite.
2/14/2023	Caller is a resident of Prairie pointe (South Winnipeg). The odour from Brady landfill has been a nuisance since they moved into their home in 2021, however there has been no improvement since 2021. Requesting the city look into this.	Informed citizen that we are working on identifying the source of the odour in the area by monitoring the surrounding neighborhoods to collect odour data within the past few days to help us further identify the source onsite.
2/24/2023	Caller is complaining about the smell from the Brady Road Landfill. It's making the whole area smell very badly. Caller wants to formalize a complaint.	Informed citizen that we are working on identifying the source of the odour in the area by monitoring the surrounding neighborhoods to collect odour data within the past few days to help us further identify the source onsite.
3/14/2023	Email stating there was a very strong odor at her location, Monday, March 13th in the afternoon	Correspondence through councillor
3/20/2023	Caller is looking to make a complaint about the smell that occurred on Saturday for the entire day.	Left voicemail message for resident providing contact information if they would like to discuss complaint further. Resident called back and the odour complaint was discussed.
3/21/2023	Customer complaining about very bad odour on 12 February - from later afternoon throughout the night. Originating from the dump. Smells like rotten food and garbage."	Added complaint to database. Duplicate, case closed.
4/4/2023	Customer noticed this past Saturday morning that the smell of gas was quite strong outdoors. Customer requesting an update in regards to the repairs to fix the landfill gas collection system.	Responded to the customer that the repairs are mostly completed, however a small bit of work is outstanding as we wait for the ground to thaw and the snow to melt. Repairs will be completed as soon as possible, but have seen some delays due to recent landfill closures.
4/9/2023	Email stating on Sunday April 9th around 6:50am there was a funky smell in the house, after stepping outside it only got stronger. The smell was coming from Brady.	Told the citizen that the atmospheric conditions and wind on that day suggest that it would be likely the odour originated from Brady Landfill. Also described the steps taken to reduce the impact of the landfill on our community.
4/11/2023	Customer reporting a foul smell of rotten garbage at the house, customer stating that they previously complained but nothing was done. At least 2-3 times a week the smell is unbearable.	Replied to customer that we are continuing to look into the source of the odours.
4/11/2023	Email reporting a very foul smell of rotten garbage. Customer reporting that they have made so many complaints but nothing is being done.	Added complaint to database. Duplicate, case closed. Customer has been informed on landfill operations efforts to mitigate odours.
4/25/2023	Citizen is reporting a rotten garbage smell at Prairie Pointe.	Added complaint to database. Duplicate, case closed. Customer has been informed on landfill operations efforts to mitigate odours.
4/25/2023	Customer reporting a strong foul odour coming from the Brady dump tonight around 5PM. It is a very strong smell.	Informed citizen that we are working on identifying the source of the odour in the area by monitoring the surrounding neighborhoods to collect odour data within the past few days to help us further identify the source onsite.
4/26/2023	Citizen reporting that the neighbourhood smells like gas again this morning. Not as strong as it was a few months back but you can still definitely smell it.	Responded to customer, the information was passed on to our Landfill Superintendent and we are continually working to mitigate the odours produced by the landfill. Thus far, we are still experiencing some logistical challenges due to closures that are ongoing at the landfill.

Date	Complaint	Response
4/26/2023	Customer is reporting a foul smell coming from the dump tonight. It started after 6PM. The smell is strong enough that it is coming into the home.	Added complaint to database. Duplicate, case closed. Customer has been informed on landfill operations efforts to mitigate odours.
4/29/2023	Customer complaining about the methane smell from Brady Landfill tonight near to 11 pm.	Informed citizen that we are working on identifying the source of the odour in the area by monitoring the surrounding neighborhoods to collect odour data within the past few days to help us further identify the source onsite.
5/20/2023	Email from resident of Prairie Pointe in Winnipeg stating that the foul smell as of right now, 9.30 pm, is very bad and smells like sewage.	Informed citizen that we are working on identifying the source of the odour in the area by monitoring the surrounding neighborhoods to collect odour data within the past few days to help us further identify the source onsite.
6/5/2023	Caller stating there is a bad smell coming from the area, caller wants to know if it is been moved or not?	Informed citizen that we are working on identifying the source of the odour in the area by monitoring the surrounding neighborhoods to collect odour data within the past few days to help us further identify the source onsite.
7/1/2023	Customer is reporting that the smell of garbage and gas in the air this evening is absolutely putrid smelling. On a scale of 1 to 10, it probably ranks a 50. It's really awful. The smell has caused the customer to go indoors.	Informed citizen that we are working on identifying the source of the odour in the area by monitoring the surrounding neighborhoods to collect odour data within the past few days to help us further identify the source onsite. Also assured the customer that the smell was not methane.
7/1/2023	Caller reporting a smell possibly coming from the Brady landfill. They had noticed this smell for 2 days ago especially when there is wind gusts coming from the south/landfill.	Informed citizen that we are working on identifying the source of the odour in the area by monitoring the surrounding neighborhoods to collect odour data within the past few days to help us further identify the source onsite.
7/12/2023	Citizen calling in saying the smell is so bad that they were having a hard time breathing whilst taking a walk. The smell is 15/10 really really bad.	Told the citizen that the atmospheric conditions and wind on that day suggest that it would be likely the odour originated from Brady Landfill. Also described the steps taken to reduce the impact of the landfill on our community.
7/21/2023	Customer experiencing a foul smell coming from Brady landfill between 6 pm - 10 pm.	Informed citizen that we are working on identifying the source of the odour in the area by monitoring the surrounding neighborhoods to collect odour data within the past few days to help us further identify the source onsite.
7/30/2023	Resident is reporting a foul smell from Brady until 7pm on Saturday, start time was not provided.	Told the citizen that the atmospheric conditions and wind on that day suggest that it would be likely the odour originated from Brady Landfill. Also described the steps taken to reduce the impact of the landfill on our community.
8/9/2023	Customer is stating that the smelll from the Brady Dump is over-powering.	Informed citizen that we are working on identifying the source of the odour in the area by monitoring the surrounding neighborhoods to collect odour data within the past few days to help us further identify the source onsite. Also assured the customer that the smell was not methane.
8/14/2023	Citizen is stating there is a foul smell coming from Brady landfill since morning.	Told the citizen that the atmospheric conditions and wind on that day suggest that it would be likely the odour originated from Brady Landfill. Also described the steps taken to reduce the impact of the landfill on our community.
8/15/2023	Resident is reporting a smell possibly coming from the Brady landfill. The smell is like a farm-like smell mixed with garbage. The smell is preventing people from going outdoors.	Informed citizen that we are working on identifying the source of the odour in the area by monitoring the surrounding neighborhoods to collect odour data within the past few days to help us further identify the source onsite. Also assured the customer that the smell was not methane.
8/15/2023	Citizen stating there is a very strong smell from the Brady Landfill last night. Citizen stating they rarely smell the dump except when the wind is just right and it's a very light smell. Last night however, it smelled really bad.	Told the citizen that the atmospheric conditions and wind on that day suggest that it would be likely the odour originated from Brady Landfill. Also described the steps taken to reduce the impact of the landfill on our community.
8/17/2023	Resident is reporting a foul smell from Brady from 7pm - 9 pm.	Told the citizen that the atmospheric conditions and wind on that day suggest that it would be likely the odour originated from Brady Landfill. Also described the steps taken to reduce the impact of the landfill on our community.
8/17/2023	Citizen stating that there is a very strong odour from the Brady landfill this evening.	Told the citizen that the atmospheric conditions and wind on that day suggest that it would be likely the odour originated from Brady Landfill. Also described the steps taken to reduce the impact of the landfill on our community.
8/20/2023	Resident is reporting a foul smell from Brady from 7:30pm - 9 pm.	Explained to citizen that on the north side of the site there was a landfill gas probe which had been faulty and leaking. In addition the wind direction changing around that time, would cause the unpleasant odours.
9/1/2023	Caller is stating there is a strong odour from Brady	Informed citizen that we will be completing an odour assessment. In addition to a surface sweep to check for possible odourous pockets that could be resulting in the issues. Also mentioned that although we cannot eliminate odour completely onsite we will continue to reduce and identify any source so it does not leave the site.
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8/26/2023	Citizen reporting a smell possibly coming from the Brady landfill. Citizen describing the smell as something like a farm-like smell mixed with garbage. This has been happening more often.	Informed citizen that we will be completing an odour assessment. In addition to a surface sweep to check for possible odourous pockets that could be resulting in the issues. Also mentioned that although we cannot eliminate odour completely onsite we will continue to reduce and identify any source so it does not leave the site.
8/31/2023	Email from citizen reporting a smell possibly coming from the Brady landfill. Citizen describing the smell as something like a farm-like smell mixed with garbage.	Informed citizen that we will be completing an odour assessment. In addition to a surface sweep to check for possible odourous pockets that could be resulting in the issues. Also mentioned that although we cannot eliminate odour completely onsite we will continue to reduce and identify any source so it does not leave the site.

Date	Complaint	Response
8/26/2023	Citizen is reporting rotten garbage smell at Praire Pointe, in the afternoon coming from Brady landfill.	Informed citizen that we will be completing an odour assessment. In addition to a surface sweep to check for possible odourous pockets that could be resulting in the issues. Also mentioned that although we cannot eliminate odour completely onsite we will continue to reduce and identify any source so it does not leave the site.
8/31/2023	Caller is complaining that the odor from the Brady Landfill is extreme today. Caller stating that the people in the Prairie Point area are having to cover their mouths.	Told the citizen that the atmospheric conditions and wind on that day suggest that it would be likely the odour originated from Brady Landfill. Also described the steps taken to reduce the impact of the landfill on our community.
9/1/2023	Resident is reporting that it smells very strong of gas/garbage in Bridgewater this morning at 8:03 a.m.	Informed citizen that we will be completing an odour assessment. In addition to a surface sweep to check for possible odourous pockets that could be resulting in the issues. Also mentioned that although we cannot eliminate odour completely onsite we will continue to reduce and identify any source so it does not leave the site.
9/1/2023	Caller stating there is a sour odour coming from the landfill and she can't have the windows open today. It is making her nauseous and she cannot go outside.	Told the citizen that the atmospheric conditions and wind on that day suggest that it would be likely the odour originated from Brady Landfill. Also described the steps taken to reduce the impact of the landfill on our community.
9/2/2023	Citizen is reporting an awful smell from Brady Land Fill in the Prairie Pointe neighborhood.	Told the citizen that the atmospheric conditions and wind on that day suggest that it would be likely the odour originated from Brady Landfill. Also described the steps taken to reduce the impact of the landfill on our community.
9/3/2023	Caller saying behind the Brady Landfill there is a strong odor this morning. It is unbearable and prevents any outdoor activity. The wind is coming from the landfill's direction.	Told the citizen that the atmospheric conditions and wind on that day suggest that it would be likely the odour originated from Brady Landfill. Also described the steps taken to reduce the impact of the landfill on our community.
9/7/2023	Citizen stating that this morning at 9:20 a.m. it smells very strongly of garbage/gas in the neighborhood.	Informed citizen that we will be completing an odour assessment. In addition to a surface sweep to check for possible odourous pockets that could be resulting in the issues. Also mentioned that although we cannot eliminate odour completely onsite we will continue to reduce and identify any source so it does not leave the site.
9/14/2023	Citizen reporting that since about 1 p.m. today it has smelled like garbage outside in the Bridgwater neighbourhood.	Informed citizen that we will be completing an odour assessment. In addition to a surface sweep to check for possible odourous pockets that could be resulting in the issues. Also mentioned that although we cannot eliminate odour completely onsite we will continue to reduce and identify any source so it does not leave the site.
10/3/2023	Citizen is complaining about smell from Brady landfill. Citizen states it is unbearable this evening.	Assured the citizen that we are looking into their complaint to have it resolved as soon as possible
10/6/2023	Customer reporting an unpleasant odour coming from Brady Landfill October 3rd in the evening.	Assured the citizen that we are looking into their complaint to have it resolved as soon as possible
10/31/2023	Citizen stating that on Saturday, Sunday, and Monday there was "funky" smell around their property. Stronger outside and appears to be coming from the Brady Rd landfill.	After speaking with the landfill supervisor, operations and wind direction would suggest that it is not likely the odour is coming from Brady. We are working on adding additional cover and continuing our odour monitoring rounds to identify possible sources.
11/1/2023	Customer stating there was a foul odour coming from Brady on Saturday, Sunday and Tuesday.	After speaking with the landfill supervisor, operations and wind direction would suggest that it is not likely the odour is coming from Brady. We are working on adding additional cover and continuing our odour monitoring rounds to identify possible sources.
11/3/2023	Citizen emailing that there has been a funky smell in their house for a week now, after stepping outside it only got stronger. The smell is coming from Brady Landfill.	Explained to customer that their complaint was received and after a site investigation the odour causing areas have had additional cover placed to mitigate the issue.
11/17/2023	Citizen wanting to report another strong garbage like odour, ongoing for the last three days.	Explained to customer that their complaint was received and after a site investigation the odour causing areas have had additional cover placed to mitigate the issue.
11/23/2023	Citizen reporting that the smell coming from Brady Landfill has been overwhelming lately, and was wondering if there was something hazardous that was causing this	Explained to customer that their complaint was received and after a site investigation the odour causing areas have had additional cover placed to mitigate the issue.
12/1/2023	Citizen stating odor has returned and in a more substantial way.	Explained to customer that their complaint was received and after a site investigation the odour causing areas have had additional cover placed to mitigate the issue.