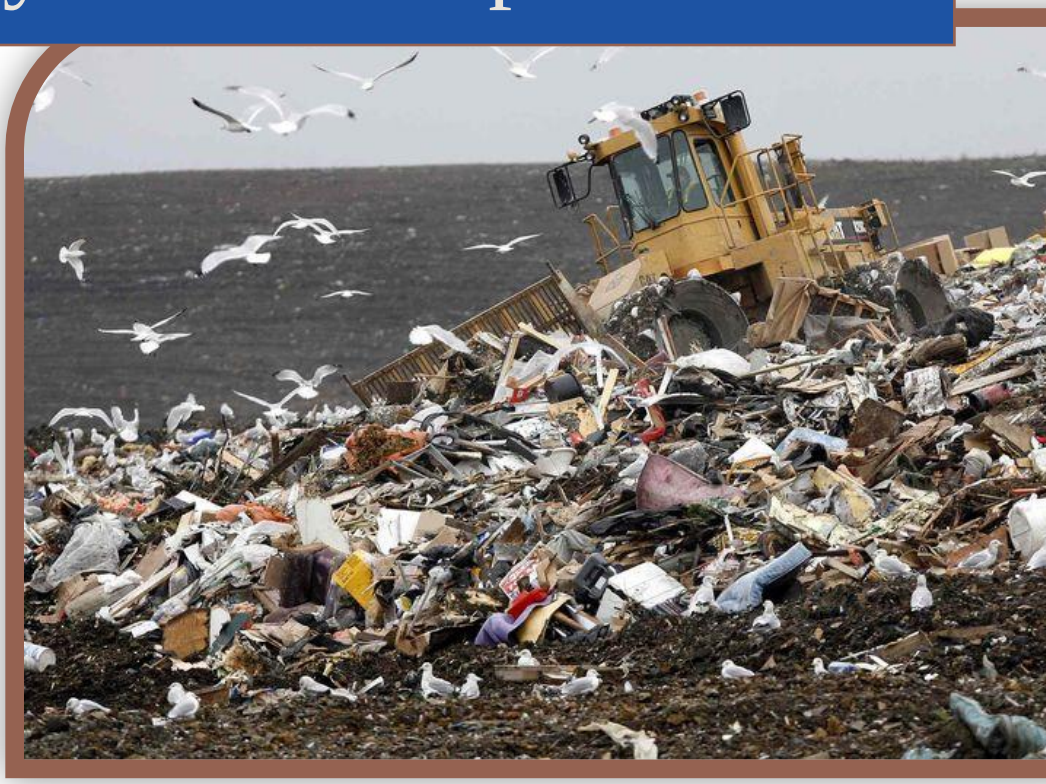
Brady Road Resource Management Facility Annual Report - 2014



Heather Demchenko B.Sc.
Compliance Reporting Technician

Nancy Crawford B.Sc.
Compliance Reporting Branch Head

Renée Grosselle B.Sc.
Manager of Environmental Standards

EXECUTIVE SUMMARY

Environment Act Licence No. 3081 R, issued on April 23, 2014, requires that the City of Winnipeg monitor all activities conducted pursuant to the licence at the Brady Road Resource Management Facility (BRRMF) during the previous calendar year and submit an annual report on or before the 15th of April of each year. This Annual Report covers the requirements described in clause 127 regarding activities at the BRRMF for 2014. The report also includes information as identified in the Operating Plan submitted to Manitoba Conservation on October 23, 2014 as per Clause 41 of the licence.

The BRRMF is located in the South end of the City of Winnipeg and is the City's only active landfill. The current site activities are 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 site opened in 1973, with disposal taking place in the southwest portion of the property until 1978. Disposals took place in the northeast section of the property until December 2014 when a new disposal cell in the northwest portion of the property was put into use.

Of the 395,468.7 metric tonnes of material received at the BRRMF in 2014, 64,671.6 metric tonnes were redirected to various stockpiles for beneficial re-use, composting facilities, or were removed from the site for recycling or further processing.

This report provides a summary of the following activities of the BRRMF in 2014: major expenditures and construction activities, equipment breakdown and fire reports, waste diversion operations, groundwater management, surface water management, leachate management, landfill gas management, and nuisance management.

Monitoring programs for leachate, subsurface gas migration, groundwater and surface water were expanded in 2014 to meet increased regulatory requirements. No statistically significant increases over established background levels were noted, and no contingency plans were activated in 2014.

The Appendices of the report contain incident reports submitted to the regulating authority in 2014, statistical analyses of groundwater quality and surface water quality, and the 2014 Landfill Gas Collection and Flaring Report, prepared for the City of Winnipeg by Integrated Gas Recovery Systems Inc.

There were no disruptions to waste disposal functions in 2014 as a result of equipment failures. Three fires occurred at the BRRMF in 2014, all were dealt with according to safety procedures, and all were reported to an Environment Officer as required.

Best practices and effective operating procedures are used to control nuisances such as odours, noise, litter, vector and vermin, and mud and dust. Seven odour complaints and one vector complaint were received in 2014. In all cases, the customers were contacted for follow-up, and cases were completed. Additional odour monitoring at the complaint location was performed if necessary.

Sampling and monitoring programs introduced in 2014 will be continued in 2015. Future Annual Reports will compare historical results in order to identify any variations, identify the cause of the variations, and identify any actions taken.

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TABLES

APPENDICES

1.0 INTRODUCTION

The Brady Road Resource Management Facility (BRRMF) was issued an Environment Act Licence No. 3081 R on April 23, 2014. Clause 127 of the licence 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 15 of each year. Clause 41 of the licence requires the development of the BRRMF Operating Plan, which was submitted on October 23, 2014. As specified in the BRRMF Operating Plan, a Groundwater Sampling and Analysis Plan (SAP), Surface Water SAP, Leachate SAP, and Subsurface Landfill Gas Monitoring Program were developed to meet requirements of the Licence. The BRRMF also performed various construction activities to satisfy conditions of the Licence; major construction activities included:

1. Design and construction of a new waste cell in the northwest quadrant of the property was partially completed. The new cell was put into use in December 2014.
2. Road construction for access to the new disposal cell and future disposal access was partially completed.
3. Construction of a pilot plant for biosolids composting. The BRRMF receives biosolids from the City of Winnipeg North End Pollution Control Centre, the pilot plant can accept up to 20% of the biosolids for composting.
4. Surface water management upgrades, which included the clean-out of sedimentation from ditches downstream of the weir.
5. Groundwater management upgrades, which included the drilling of eight new wells along the east boundary of the property.
6. Subsurface gas migration monitoring upgrades, which included the drilling of ten new wells for gas probe placement.

In 2014, there were no disruptions or failures of waste management practices due to equipment breakdown. Three fires occurred in 2014 at the BRRMF, which required assistance from the fire department. In all cases, staff contacted the fire department, monitored to ensure the fire was extinguished, and reported the fire to the regulating authority. In addition, there was one spill of hydraulic oil which was reported to the regulating authority and corrective actions were taken. Fire and spill reports are attached in Appendix A.

This report contains results and/or comments for each of the clauses of licence 3081 R under which the BRRMF has generated pertinent information during 2014. The report also provides information on the BRRMF proposed activities in 2015.

2.0 WASTE DIVERSION OPERATIONS

In 2014, the BRRMF received 395,468.7 metric tonnes of waste. The leaf and yard waste composting facility was opened in 2014, diverting 24,736.8 metric tonnes of compostable material from the landfill. The pilot plant for composting biosolids from wastewater treatment processes was also constructed in 2014. The plant came online in November 2014, diverting 222.3 metric tonnes of biosolids from the landfill in November and December during commissioning.

In 2014, the BRRMF segregated beneficially re-usable materials into stockpiles including:

- Wood Chips – 462.1 metric tonnes
- Dutch Elm – 5,304 metric tonnes
- Clean Fill – 16,438.8 metric tonnes
- Sand/Street Sweeping Stockpile – 6,924.5 metric tonnes
- Glass – 12,826.0 metric tonnes
- Concrete – 1,903.3 metric tonnes

In addition, 921.6 metric tonnes of scrap metal, 27.5 metric tonnes of automotive batteries, and 96.5 metric tonnes of appliances containing ozone-depleting substances were removed from BRRMF for further processing or recycling.

In 2015, the BRRMF will build a Community Resource Recovery Centre (4R Depot). Waste from residential traffic and small loads will be segregated into separate streams (e.g. garbage, recyclable material, compostable leaf and yard waste, appliances, etc...) and forwarded for further processing or disposal.

Assuming continued waste diversion practices, the estimated remaining landfill life is 100 years.

3.0 GROUNDWATER, SURFACE WATER, LEACHATE, AND LANDFILL GAS MONITORING

3.1 GROUNDWATER

Groundwater is monitored to ensure that operation of the BRRMF does not cause a statistically significant increase (SSI) over established background groundwater quality parameters. Groundwater beneath the BRRMF flows from south west to north east as determined by well elevation data. It is saline and is not used as potable water for rural residences surrounding the site.

As per the BRRMF Operating Plan, groundwater is monitored in accordance with the Groundwater Sampling and Analysis Plan (SAP), submitted on October 23, 2014, as specified under Clause 123. The Groundwater SAP proposed a monitoring program that includes 13 bedrock wells, 8 clay wells, and 13 till wells; implementation of the plan required the installation of 8 new wells. The program focuses on bedrock monitoring, with a secondary focus on till monitoring downgradient of waste areas. Sampling frequency was proposed to be twice per year (May and October) for bedrock wells and downgradient till wells, and once per year (May) for clay wells and other till wells distant from the waste areas. The parameters analysed varied depending on well type and location.

In 2014, the majority of samples were collected prior to the development and implementation of the SAP, and some of the new wells were installed after the conclusion of the 2014 sampling season. Sampling that occurred prior to the development of the SAP followed historical sampling and analysis practices. The 2015 sampling program will reflect the sampling locations and frequency described in the Groundwater SAP. There were no deviations from normal sample collection and preservation practices, and the Contingency Action Plan required under Clause 125 was not implemented in 2014 because there were no occurrences of SSI over existing background groundwater quality data. The data collected in 2014 has been used to enhance the existing groundwater quality data in order to better evaluate occurrences of SSI.

A summary of the 2014 groundwater results are provided in Table 1. Statistical analyses of background groundwater quality data are attached in Appendix B.

Groundwater Monitoring 2014

		GWQ25-W4		GWQ25-W5		GWQ25-W6		GWQ25-W7		GWQ25-W8	
		Bedrock		Bedrock		Bedrock		Bedrock		Bedrock	
Sampling Date	Units	11-Jun-14	23-Oct-14	11-Jun-14	23-Oct-14	11-Jun-14	20-Oct-14	9-Jun-14	20-Oct-14	11-Jun-14	23-Oct-14
Inorganics											
Alkalinity - Bicarbonate	mg/L	98.0	76.5	157.0	127.0	162.0	129.0	140.0	115.0	161.0	132.0
Alkalinity - Carbonate	mg/L	<0.50	93.40	<0.50	156.00	<0.50	157.00	<0.50	141.00	<0.50	161.00
Alkalinity - Hydroxide	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Alkalinity - Total	mg/L	80.40	<0.50	129.00	<0.50	132.00	<0.50	115.00	<0.50	132.00	<0.50
Dissolved Hardness (CaCO3)	mg/L	856	900	1390	4110	1440	1510	1030	1060	1330	2260
pH - units	units	7.74	7.74	7.90	7.90	7.99	7.57	7.61	7.73	8.08	8.08
Specific Conductivity	uS/cm	6940	6940	7970	7970	9700	9680	6450	6520	8200	8200
Turbidity - NTU	ntu	50.60	50.60	23.60	23.60	13.70	3.22	20.90	14.90	13.30	13.30
Total Solids	mg/L	5450	5450	6310	6310	7240	6990	4570	4690	6240	6240
Total Dissolved Solids	mg/L	5020	5020	5840	5840	7020	6540	4510	4630	5980	5980
Total Suspended Solids	mg/L	430	430	470	470	220	450	60	60	260	260
Dissolved Chloride (Cl)	mg/L	810	2000	850	2400	940	3200	800	1700	870	2500
Dissolved Sulphate (SO4)	mg/L	524	562	822	854	919	938	614	592	791	845
Cyanide - Total	mg/L	NA	<0.0005	NA	<0.0005	NA	<0.0005	NA	<0.0005	NA	<0.0005
Nutrients											
Ammonia - total	mg/L	0.82	0.87	1.10	0.98	1.40	1.10	1.60	18.00	0.73	1.10
Nitrate Nitrite Nitrogen	mg/L	<0.003	<0.003	0.005	0.005	0.006	0.011	0.033	0.014	0.005	0.005
Total Kjeldhal Nitrogen	mg/L	3.7	3.7	3.3	3.3	3.6	2.7	4.0	3.5	3.1	3.1
Dissolved Phosphorus	mg/L	<0.20 (*)	NA	0.20 (*)	NA	0.20 (*)	<0.20 (*)	<0.20 (*)	0.50 (*)	0.20 (*)	NA
Metals by ICPMS											
Dissolved Arsenic (As)	ug/L	0.22	<0.20	5.12	6.59	5.23	5.29	2.54	2.55	6.06	0.24
Dissolved Barium (Ba)	ug/L	10.4	11.3	14.6	209.0	11.6	14.5	13.4	12.2	12.7	87.6
Dissolved Beryllium (Be)	ug/L	<0.100	<0.100	<0.100	<0.100	<0.100	<0.200	<0.050	<0.100	<0.100	<0.100
Dissolved Cadmium (Cd)	ug/L	<0.050	<0.050	<0.050	0.143	<0.050	<0.100	0.055	<0.050	<0.050	<0.050
Dissolved Calcium (Ca)	mg/L	191	196	303	1280	331	330	230	238	298	904
Dissolved Chromium (Cr)	ug/L	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<0.50	<1.00	<1.00	54.30
Dissolved Copper (Cu)	ug/L	<0.50	1.09	<0.50	1.34	<0.50	2.40	0.48	1.11	<0.50	0.64
Dissolved Iron (Fe)	ug/L	3850	4550	729	15300	1570	1100	690	728	692	<10
Dissolved Lead (Pb)	ug/L	<0.050	0.058	0.060	0.119	0.927	0.230	0.077	0.108	0.275	0.263
Dissolved Magnesium (Mg)	ug/L	91.80	99.60	154.00	226.00	149.00	166.00	111.00	114.00	143.00	<0.25
Dissolved Manganese (Mn)	ug/L	42.4	51.9	39.2	1280.0	33.7	31.3	8.8	9.6	29.0	<0.5
Total Mercury (Hg)	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Nickel (Ni)	ug/L	<0.20	0.49	1.63	9.24	1.38	2.70	0.53	1.10	2.07	0.56
Dissolved Potassium (K)	mg/L	29.40	30.10	35.40	38.10	42.80	45.50	28.30	30.30	34.00	15.20
Dissolved Selenium (Se)	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.80	<0.20	<0.40	<0.40	0.55
Dissolved Silver (Ag)	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.100	<0.025	<0.050	<0.050	<0.050
Dissolved Sodium (Na)	mg/L	1160	1250	1240	53	1640	1750	1010	1030	1290	499
Dissolved Zinc (Zn)	ug/L	<1.00	4.30	56.40	35.30	4.10	10.60	6.41	7.90	2.10	<1.00
Extractables											
Naphthalene	mg/L	0.00005	0.00008	<0.00005	<0.00005	<0.00005	<0.00005	0.00016	0.00013	<0.00005	<0.00005
Benzo (a) Pyrene (PAH)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Anthracene	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Petroleum Hydrocarbons											
CCME Petroleum Hydrocarbon Fraction F1	ug/L	<25	<25	<25	NA	<25	<25	<25	<25	<25	<25
CCME Petroleum Hydrocarbon Fraction F2	ug/L	<100	<100	<100	NA	<100	<100	<100	<100	<100	<100
CCME Petroleum Hydrocarbon Fraction F3	ug/L	<200	<200	<200	NA	<200	<200	<200	<200	<200	<200
CCME Petroleum Hydrocarbon Fraction F4	ug/L	<200	<200	<200	NA	<200	<200	<200	<200	<200	<200
Volatile Organic Carbons											
Leachable Lead	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	1.70
Xylene	ug/L	<0.10	0.12	0.13	<0.10	0.13	<0.10	0.12	0.17	<0.10	<0.10
Vinyl Chloride	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Miscellaneous											
Diazinon	ug/L	NA	<2.0	NA	<2.0	NA	<2.0	NA	<2.0	NA	<2.0
2,4-D	ug/L	NA	<2.0	NA	<2.0	NA	<2.0	NA	<2.0	NA	<2.0
Elevation	metres	NA	227.880	NA	227.106	NA	227.472	NA	227.940	NA	225.402
Microbiological Parameters											
Fecal Coliforms (MTF)	MPN/100mL	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
E. coli (MTF)	MPN/100mL	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Total Coliforms (MTF)	MPN/100mL	<3	43	<3	<3	<3	<3	38	<3	<3	<3

Winnipeg

Groundwater Monitoring 2014

		GWQ25-W9		GWQ25-W10		GWQ25-W11		GWQ25-W12		GWQ25-5N62E	
		Bedrock		Bedrock		Bedrock		Bedrock		Till	
Sampling Date	Units	9-Jun-14	20-Oct-14	10-Jun-14	20-Oct-14	10-Jun-14	23-Oct-14	12-Jun-14	20-Oct-14	16-Jun-14	21-Oct-14
Inorganics											
Alkalinity - Bicarbonate	mg/L	162.0	128.0	152.0	122.0	147.0	120.0	161.0	127.0	187.0	156.0
Alkalinity - Carbonate	mg/L	<0.50	156.00	<0.50	149.00	<0.50	146.00	<0.50	155.00	<0.50	190.00
Alkalinity - Hydroxide	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Alkalinity - Total	mg/L	133.00	<0.50	125.00	<0.50	120.00	<0.50	132.00	<0.50	154.00	<0.50
Dissolved Hardness (CaCO3)	mg/L	1410	1520	1260	1400	1120	1250	1350	1400	1340	1520
pH - units	units	7.45	7.52	7.74	7.52	7.97	7.97	8.37	7.52	7.58	7.77
Specific Conductivity	uS/cm	9110	9170	8690	8530	8190	8190	8310	8420	8210	8070
Turbidity - NTU	ntu	7.43	7.60	18.30	18.10	716.00	716.00	132.00	32.10	2170.00	176.00
Total Solids	mg/L	6870	6640	6200	6180	7650	7650	8050	7420	8890	13100
Total Dissolved Solids	mg/L	6870	6560	6120	6070	5980	5980	6170	5320	5840	5690
Total Suspended Solids	mg/L	0	80	80	110	1670	1670	1880	2100	3050	7410
Dissolved Chloride (Cl)	mg/L	970	2900	940	2700	920	2400	2600	2600	2500	2500
Dissolved Sulphate (SO4)	mg/L	925	885	829	789	693	723	843	812	770	830
Cyanide - Total	mg/L	NA	<0.0005	NA	<0.0005	NA	<0.0005	NA	<0.0005	NA	NA
Nutrients											
Ammonia - total	mg/L	1.50	1.30	0.95	1.00	1.10	1.40	1.20	1.10	0.96	0.98
Nitrate Nitrite Nitrogen	mg/L	<0.003	0.007	<0.003	<0.003	0.018	0.018	<0.003	<0.003	0.010	0.007
Total Kjeldhal Nitrogen	mg/L	3.5	2.9	3.5	2.8	0.6	0.6	3.6	2.7	3.4	3.0
Dissolved Phosphorus	mg/L	<0.20 (*)	0.30 (*)	<0.20 (*)	0.30 (*)	0.60 (*)	NA	<0.20 (*)	0.30 (*)	1.20 (*)	1.40 (*)
Metals by ICPMS											
Dissolved Arsenic (As)	ug/L	6.86	6.91	4.61	4.95	4.83	5.19	4.59	4.59	3.78	1.40
Dissolved Barium (Ba)	ug/L	11.6	12.9	15.8	14.9	16.4	18.3	13.5	13.6	12.6	12.7
Dissolved Beryllium (Be)	ug/L	<0.100	<0.200	<0.100	<0.200	<0.100	<0.100	<0.100	<0.200	<0.100	<0.200
Dissolved Cadmium (Cd)	ug/L	<0.050	<0.100	<0.050	<0.100	0.098	<0.050	<0.050	<0.100	<0.050	<0.100
Dissolved Calcium (Ca)	mg/L	308	329	300	309	261	290	296	300	308	350
Dissolved Chromium (Cr)	ug/L	<1.00	<2.00	<1.00	<2.00	<1.00	<1.00	<1.00	<2.00	<1.00	<2.00
Dissolved Copper (Cu)	ug/L	<0.50	2.00	0.71	1.80	<0.50	<0.50	1.39	1.30	<0.50	<1.00
Dissolved Iron (Fe)	ug/L	829	921	754	827	389	377	586	609	465	251
Dissolved Lead (Pb)	ug/L	0.195	<0.100	0.119	0.100	<0.050	0.076	0.338	0.110	<0.050	<0.100
Dissolved Magnesium (Mg)	ug/L	156.00	170.00	125.00	153.00	113.00	128.00	147.00	158.00	138.00	156.00
Dissolved Manganese (Mn)	ug/L	21.0	21.7	14.1	37.6	31.2	36.6	24.4	22.3	82.2	85.3
Total Mercury (Hg)	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Nickel (Ni)	ug/L	1.99	2.18	2.00	2.40	0.51	0.65	1.68	1.71	2.26	8.98
Dissolved Potassium (K)	mg/L	39.40	42.70	36.80	41.60	35.00	36.80	35.60	38.80	30.90	31.90
Dissolved Selenium (Se)	ug/L	<0.40	<0.80	<0.40	<0.80	<0.40	<0.40	<0.40	<0.80	<0.40	<0.80
Dissolved Silver (Ag)	ug/L	<0.050	<0.100	<0.050	<0.100	<0.050	<0.050	<0.050	<0.100	<0.050	<0.100
Dissolved Sodium (Na)	mg/L	1540	1610	1240	1520	1200	1370	1370	1490	1250	1340
Dissolved Zinc (Zn)	ug/L	1.30	5.90	10.20	8.70	2.40	<1.00	5.50	4.10	1.10	8.20
Extractables											
Naphthalene	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	NA
Benzo (a) Pyrene (PAH)	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	NA
Anthracene	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	NA
Petroleum Hydrocarbons											
CCME Petroleum Hydrocarbon Fraction F1	ug/L	<25	<25	<25	<25	<25	<25	<25	<25	<25	NA
CCME Petroleum Hydrocarbon Fraction F2	ug/L	<100	<100	<100	<100	<100	<100	<100	<100	<100	NA
CCME Petroleum Hydrocarbon Fraction F3	ug/L	<200	<200	<200	<200	<200	<200	<200	<200	<200	NA
CCME Petroleum Hydrocarbon Fraction F4	ug/L	<200	<200	<200	<200	<200	<200	<200	<200	<200	NA
Volatile Organic Carbons											
Leachable Lead	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Ethylbenzene	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Toluene	ug/L	<0.20	<0.20	0.73	0.59	<0.20	<0.20	<0.20	<0.20	<0.20	NA
Xylene	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	NA
Vinyl Chloride	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	NA
Miscellaneous											
Diazinon	ug/L	NA	<2.0	NA	<2.0	NA	<2.0	NA	<2.0	NA	NA
2,4-D	ug/L	NA	<2.0	NA	<2.0	NA	<2.1	NA	<2.0	NA	NA
Elevation	metres	NA	227.008	NA	225.378	NA	227.692	NA	228.806	NA	NA
Microbiological Parameters											
Fecal Coliforms (MTF)	MPN/100mL	<3	<3	<3	<3	<3	<3	<3	<3	<3	NA
E. coli (MTF)	MPN/100mL	<3	<3	<3	<3	<3	<3	<3	<3	<3	NA
Total Coliforms (MTF)	MPN/100mL	<3	<3	<3	<3	<3	23	<3	<3	<3	NA

Groundwater Monitoring 2014

		GWQ25-4N34DR	GWQ25-6N58DR	GWQ25-6N58F	GWQ25-6N59F	GWQ25-6N60ER	GWQ25-6N63F
		Till	Till	Til	Till	Till	Till
Sampling Date	**Units**	12-Jun-14	16-Jun-14	16-Jun-14	16-Jun-14	21-Oct-14	12-Jun-14
Inorganics							
Alkalinity - Bicarbonate	mg/L	489.0	557.0	377.0	390.0	437.0	368.0
Alkalinity - Carbonate	mg/L	<0.50	<0.50	<0.50	<0.50	533.00	<0.50
Alkalinity - Hydroxide	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Alkalinity - Total	mg/L	400.00	456.00	309.00	320.00	<0.50	302.00
Dissolved Hardness (CaCO3)	mg/L	2880	2730	5080	3260	1660	2450
pH - units	units	8.36	7.05	7.43	7.16	7.74	8.30
Specific Conductivity	uS/cm	5710	6360	5480	6280	3670	6220
Turbidity - NTU	ntu	1420.00	213.00	19500.00	7450.00	62.20	445.00
Total Solids	mg/L	7970	6220	38800	15800	5280	16400
Total Dissolved Solids	mg/L	6140	5800	4970	5860	3160	6570
Total Suspended Solids	mg/L	1830	420	33830	9940	2120	9830
Dissolved Chloride (Cl)	mg/L	520	1000	1100	1400	480	1400
Dissolved Sulphate (SO4)	mg/L	2930	1890	1220	993	1020	1210
Cyanide - Total	mg/L	NA	NA	NA	NA	NA	NA
Nutrients							
Ammonia - total	mg/L	0.67	0.19	1.60	0.32 (*)	0.87	0.88
Nitrate Nitrite Nitrogen	mg/L	0.376	1.280	0.007	0.008	0.040	0.030
Total Kjeldhal Nitrogen	mg/L	2.3	3.0	11.2	6.8	1.4	4.2
Dissolved Phosphorus	mg/L	0.60 (*)	0.70 (*)	9.60 (*)	4.60 (*)	0.80 (*)	2.40 (*)
Metals by ICPMS							
Dissolved Arsenic (As)	ug/L	0.70	0.41	6.56	10.0	2.19	2.34
Dissolved Barium (Ba)	ug/L	12.9	10.4	86.5	33.9	24.5	12.7
Dissolved Beryllium (Be)	ug/L	<0.100	<0.100	0.110	1.640	<0.200	<0.100
Dissolved Cadmium (Cd)	ug/L	<0.050	0.146	0.466	1.030	<0.100	<0.050
Dissolved Calcium (Ca)	mg/L	446	683	1520	813	357	517
Dissolved Chromium (Cr)	ug/L	<1.00	<1.00	<1.00	7.50	<2.00	<1.00
Dissolved Copper (Cu)	ug/L	<0.50	3.93	<0.50	21.90	2.10	1.17
Dissolved Iron (Fe)	ug/L	40	<10	6850	11900	<20	718
Dissolved Lead (Pb)	ug/L	0.068	<0.050	0.170	30.100	0.170	0.069
Dissolved Magnesium (Mg)	ug/L	430.00	248.00	313.00	300.00	187.00	282.00
Dissolved Manganese (Mn)	ug/L	75.0	3600.0	2760.0	2150.0	251.0	243.0
Total Mercury (Hg)	mg/L	NA	NA	NA	NA	NA	NA
Dissolved Nickel (Ni)	ug/L	4.92	13.10	15.10	31.30	9.54	3.84
Dissolved Potassium (K)	mg/L	17.10	11.70	12.00	11.70	15.70	11.00
Dissolved Selenium (Se)	ug/L	<0.40	<0.40	<0.40	<0.40	<0.80	<0.40
Dissolved Silver (Ag)	ug/L	<0.050	<0.050	<0.050	<0.050	<0.100	<0.050
Dissolved Sodium (Na)	mg/L	541	543	508	552	313	547
Dissolved Zinc (Zn)	ug/L	2.70	6.80	37.80	86.60	2.50	9.00
Extractables							
Naphthalene	mg/L	NA	<0.00005	<0.00005	<0.00005	NA	NA
Benzo (a) Pyrene (PAH)	mg/L	NA	<0.00001	<0.00001	<0.00001	NA	NA
Anthracene	mg/L	NA	<0.00005	<0.00005	<0.00005	NA	NA
Petroleum Hydrocarbons							
CCME Petroleum Hydrocarbon Fraction F1	ug/L	<25	<25	<25	<25	NA	<25
CCME Petroleum Hydrocarbon Fraction F2	ug/L	<100	<100	<100	<100	NA	<100
CCME Petroleum Hydrocarbon Fraction F3	ug/L	<200	<200	<200	<200	NA	<200
CCME Petroleum Hydrocarbon Fraction F4	ug/L	<200	<200	<200	<200	NA	<200
Volatile Organic Carbons							
Leachable Lead	ug/L	NA	NA	NA	NA	NA	NA
Benzene	ug/L	<0.1	<0.1	<0.1	<0.1	NA	<0.1
Ethylbenzene	ug/L	<0.1	<0.1	<0.1	<0.1	NA	<0.1
Toluene	ug/L	<0.20	<0.20	<0.20	<0.20	NA	0.27
Xylene	ug/L	<0.10	<0.10	<0.10	<0.10	NA	<0.10
Vinyl Chloride	ug/L	<0.2	<0.2	<0.2	<0.2	NA	<0.2
Miscellaneous							
Diazinon	ug/L	NA	NA	NA	NA	NA	NA
2,4-D	ug/L	NA	NA	NA	NA	NA	NA
Elevation	metres	NA	NA	NA	NA	NA	NA
Microbiological Parameters							
Fecal Coliforms (MTF)	MPN/100mL	<3	<3	<3	<3	NA	<3
E. coli (MTF)	MPN/100mL	<3	<3	<3	<3	NA	<3
Total Coliforms (MTF)	MPN/100mL	<3	<3	<3	<3	NA	<3

Groundwater Monitoring 2014

		GWQ25-6N67F	GWQ25-13A	GWQ25-14A	GWQ25-15A	GWQ25-16A	GWQ25-4N34B
		Till	Till	Till	Till	Till	Clay
Sampling Date	**Units**	12-Jun-14	21-Oct-14	21-Oct-14	21-Oct-14	21-Oct-14	12-Jun-14
Inorganics							
Alkalinity - Bicarbonate	mg/L	438.0	204.0	153.0	263.0	310.0	820.0
Alkalinity - Carbonate	mg/L	<0.50	249.00	186.00	321.00	378.00	<0.50
Alkalinity - Hydroxide	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Alkalinity - Total	mg/L	359.00	<0.50	<0.50	<0.50	<0.50	672.00
Dissolved Hardness (CaCO3)	mg/L	1920	1970	2380	2160	2090	3160
pH - units	units	8.01	7.69	7.82	7.70	7.75	8.32
Specific Conductivity	uS/cm	4120	7610	6940	6840	4910	5520
Turbidity - NTU	ntu	6680.00	221.00	17.50	34.30	4.91	306.00
Total Solids	mg/L	13300	28100	19400	15600	5960	7920
Total Dissolved Solids	mg/L	4170	6410	5730	5470	4630	5990
Total Suspended Solids	mg/L	9130	21690	13670	10130	1330	1930
Dissolved Chloride (Cl)	mg/L	710	2400	1900	1700	1100	550
Dissolved Sulphate (SO4)	mg/L	1160	797	930	801	1090	2410
Cyanide - Total	mg/L	NA	NA	NA	NA	NA	NA
Nutrients							
Ammonia - total	mg/L	0.78	1.10	1.20	1.40	1.20	0.07
Nitrate Nitrite Nitrogen	mg/L	0.046	0.105	<0.003	0.016	0.017	0.080
Total Kjeldhal Nitrogen	mg/L	3.2	5.7	3.9	3.7	3.4	2.2
Dissolved Phosphorus	mg/L	2.00 (*)	4.70 (*)	4.10 (*)	2.20 (*)	1.10 (*)	0.20 (*)
Metals by ICPMS							
Dissolved Arsenic (As)	ug/L	0.58	3.68	1.86	1.61	0.66	0.53
Dissolved Barium (Ba)	ug/L	12.2	16.0	21.0	16.4	17.6	10.9
Dissolved Beryllium (Be)	ug/L	<0.100	<0.200	<0.200	<0.200	<0.200	<0.100
Dissolved Cadmium (Cd)	ug/L	<0.050	<0.100	<0.100	0.260	0.140	0.156
Dissolved Calcium (Ca)	mg/L	407	474	608	559	526	585
Dissolved Chromium (Cr)	ug/L	<1.00	<2.00	<2.00	<2.00	<2.00	<1.00
Dissolved Copper (Cu)	ug/L	<0.50	<1.00	1.80	<1.00	2.60	3.46
Dissolved Iron (Fe)	ug/L	38	77	30	<20	<20	<10
Dissolved Lead (Pb)	ug/L	<0.050	0.480	2.830	0.310	<0.100	<0.050
Dissolved Magnesium (Mg)	ug/L	219.00	191.00	210.00	185.00	189.00	413.00
Dissolved Manganese (Mn)	ug/L	165.0	94.3	434.0	981.0	332.0	58.1
Total Mercury (Hg)	mg/L	NA	NA	NA	NA	NA	NA
Dissolved Nickel (Ni)	ug/L	4.07	3.43	10.20	7.40	8.53	12.10
Dissolved Potassium (K)	mg/L	9.29	23.20	14.30	13.20	12.50	10.80
Dissolved Selenium (Se)	ug/L	<0.40	<0.80	<0.80	<0.80	<0.80	3.48
Dissolved Silver (Ag)	ug/L	<0.050	<0.100	<0.100	<0.100	<0.100	<0.050
Dissolved Sodium (Na)	mg/L	298	1120	753	679	460	350
Dissolved Zinc (Zn)	ug/L	2.00	<2.00	3.70	8.20	8.40	7.00
Extractables							
Naphthalene	mg/L	NA	NA	NA	NA	NA	NA
Benzo (a) Pyrene (PAH)	mg/L	NA	NA	NA	NA	NA	NA
Anthracene	mg/L	NA	NA	NA	NA	NA	NA
Petroleum Hydrocarbons							
CCME Petroleum Hydrocarbon Fraction F1	ug/L	<25	NA	NA	NA	NA	<25
CCME Petroleum Hydrocarbon Fraction F2	ug/L	<100	NA	NA	NA	NA	<100
CCME Petroleum Hydrocarbon Fraction F3	ug/L	<200	NA	NA	NA	NA	<200
CCME Petroleum Hydrocarbon Fraction F4	ug/L	<200	NA	NA	NA	NA	<200
Volatile Organic Carbons							
Leachable Lead	ug/L	NA	NA	NA	NA	NA	NA
Benzene	ug/L	<0.1	NA	NA	NA	NA	<0.1
Ethylbenzene	ug/L	<0.1	NA	NA	NA	NA	<0.1
Toluene	ug/L	<0.20	NA	NA	NA	NA	<0.20
Xylene	ug/L	<0.10	NA	NA	NA	NA	<0.10
Vinyl Chloride	ug/L	<0.2	NA	NA	NA	NA	<0.2
Miscellaneous							
Diazinon	ug/L	NA	NA	NA	NA	NA	NA
2,4-D	ug/L	NA	NA	NA	NA	NA	NA
Elevation	metres	NA	NA	NA	NA	NA	NA
Microbiological Parameters							
Fecal Coliforms (MTF)	MPN/100mL	<3	NA	NA	NA	NA	<3
E. coli (MTF)	MPN/100mL	<3	NA	NA	NA	NA	<3
Total Coliforms (MTF)	MPN/100mL	<3	NA	NA	NA	NA	4

Groundwater Monitoring 2014

		GWQ25-5N62D	GWQ25-6N57DR	GWQ25-6N59DR	GWQ25-6N60DR	GWQ25-6N63E	GWQ25-6N67E
		Clay	Clay	Clay	Clay	Clay	Clay
Sampling Date	**Units**	16-Jun-14	12-Jun-14	16-Jun-14	16-Jun-14	12-Jun-14	12-Jun-14
Inorganics							
Alkalinity - Bicarbonate	mg/L	505.0	553.0	544.0	582.0	535.0	547.0
Alkalinity - Carbonate	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Alkalinity - Hydroxide	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Alkalinity - Total	mg/L	414.00	454.00	446.00	477.00	439.00	448.00
Dissolved Hardness (CaCO3)	mg/L	3000	2650	2590	2110	2860	2220
pH - units	units	7.13	8.28	7.23	8.23	8.30	8.20
Specific Conductivity	uS/cm	8390	6030	5840	4590	6420	4570
Turbidity - NTU	ntu	19.60	447.00	75.00	370.00	630.00	21.20
Total Solids	mg/L	7470	5990	5590	5980	6430	4790
Total Dissolved Solids	mg/L	7450	5890	5460	4500	6220	4600
Total Suspended Solids	mg/L	20	100	130	1480	210	190
Dissolved Chloride (Cl)	mg/L	1800	840	900	460	1100	600
Dissolved Sulphate (SO4)	mg/L	1790	2360	1820	1680	1690	1560
Cyanide - Total	mg/L	NA	NA	NA	NA	NA	NA
Nutrients							
Ammonia - total	mg/L	0.89	0.11	0.07	0.25	0.83	0.83
Nitrate Nitrite Nitrogen	mg/L	0.309	2.110	1.660	1.570	0.208	0.267
Total Kjeldhal Nitrogen	mg/L	3.3	2.5	2.3	2.1	3.2	2.7
Dissolved Phosphorus	mg/L	0.20 (*)	0.40 (*)	0.40 (*)	0.70 (*)	<0.20 (*)	0.30 (*)
Metals by ICPMS							
Dissolved Arsenic (As)	ug/L	1.20	0.48	0.35	0.37	0.36	0.40
Dissolved Barium (Ba)	ug/L	15.5	10.8	12.2	9.5	10.6	11.3
Dissolved Beryllium (Be)	ug/L	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Dissolved Cadmium (Cd)	ug/L	0.144	0.150	0.126	0.081	0.151	0.141
Dissolved Calcium (Ca)	mg/L	758	676	680	536	677	542
Dissolved Chromium (Cr)	ug/L	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Dissolved Copper (Cu)	ug/L	4.14	4.30	2.21	1.74	2.08	4.12
Dissolved Iron (Fe)	ug/L	<10	11	37	16	<10	26
Dissolved Lead (Pb)	ug/L	<0.050	0.085	0.062	0.084	<0.050	0.101
Dissolved Magnesium (Mg)	ug/L	269.00	234.00	216.00	187.00	283.00	211.00
Dissolved Manganese (Mn)	ug/L	1840.0	2080.0	2140.0	1550.0	1860.0	1300.0
Total Mercury (Hg)	mg/L	NA	NA	NA	NA	NA	NA
Dissolved Nickel (Ni)	ug/L	10.90	9.85	8.65	6.60	10.20	8.26
Dissolved Potassium (K)	mg/L	12.70	12.00	11.20	9.69	10.60	9.96
Dissolved Selenium (Se)	ug/L	<0.40	0.41	<0.40	<0.40	0.53	<0.40
Dissolved Silver (Ag)	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dissolved Sodium (Na)	mg/L	853	595	497	353	631	397
Dissolved Zinc (Zn)	ug/L	6.70	11.60	10.80	4.10	7.20	9.30
Extractables							
Naphthalene	mg/L	<0.00005	NA	<0.00005	NA	NA	NA
Benzo (a) Pyrene (PAH)	mg/L	<0.00001	NA	<0.00001	NA	NA	NA
Anthracene	mg/L	<0.00005	NA	<0.00005	NA	NA	NA
Petroleum Hydrocarbons							
CCME Petroleum Hydrocarbon Fraction F1	ug/L	<25	<25	<25	<25	<25	<25
CCME Petroleum Hydrocarbon Fraction F2	ug/L	<100	<100	<100	<100	<100	<100
CCME Petroleum Hydrocarbon Fraction F3	ug/L	<200	<200	<200	<200	<200	<200
CCME Petroleum Hydrocarbon Fraction F4	ug/L	<200	<200	<200	<200	<200	<200
Volatile Organic Carbons							
Leachable Lead	ug/L	NA	NA	NA	NA	NA	NA
Benzene	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	ug/L	<0.20	<0.20	0.27	<0.20	<0.20	<0.20
Xylene	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Vinyl Chloride	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Miscellaneous							
Diazinon	ug/L	NA	NA	NA	NA	NA	NA
2,4-D	ug/L	NA	NA	NA	NA	NA	NA
Elevation	metres	NA	NA	NA	NA	NA	NA
Microbiological Parameters							
Fecal Coliforms (MTF)	MPN/100mL	<3	<3	<3	<3	<3	<3
E. coli (MTF)	MPN/100mL	<3	<3	<3	<3	<3	<3
Total Coliforms (MTF)	MPN/100mL	<3	<3	<3	<3	<3	<3

NA = Not Analysed

(*) Total phosphorus results reported, dissolved phosphorus was not analysed.

3.2 SURFACE WATER

The BRRMF surface water management 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 fall run-off.

As per the BRRMF Operating Plan, surface water is managed in accordance with the Surface Water Sampling and Analysis Plan (SAP), submitted on October 23, 2014, as specified under Clause 115. Compliance parameters are applied to the upstream and downstream sampling points and at the weir, with modifications at other locations interior to the site. Sampling for impacted water (Active Area Collection Pond, Biosolids Storm Water Pond, and Leaf and Yard Waste Storm Water Pond) and dry ponds is performed only prior to discharge events. Sampling for the clean water ponds is similar to sampling for perimeter ditching. Weekly field monitoring will be performed at the weir from spring thaw to freeze-up.

The 2014 spring run-off and summer run-off samples were collected prior to the development and implementation of the Surface Water SAP. These samples were analysed according to the previous monitoring program and under a previous naming scheme for the sample locations. The 2014, fall run-off samples were analysed according to the parameters and naming scheme described in the Surface Water SAP. In 2014, there were no deviations from normal sample collection and preservation practices. The Contingency Action Plan required under Clause 125 was not implemented because there were no occurrences of statistically significant increase (SSI) over background surface water quality data. The data collected in 2014 has been used to enhance the existing surface water quality data in order to better evaluate occurrences of SSI. The 2015 surface water sampling program will follow the plan described in the Surface Water SAP.

A summary of the 2014 surface water results are provided in Table 2 and weekly weir data is provided in Table 3. Statistical analyses of background surface water quality data are attached in Appendix C.

Surface Water Monitoring 2014

		SW25-1		SW25-2 (Formerly SW25-4)			SW25-8 (Formerly SW25-3)		
Sampling Date	**Units**	24-Apr-14	28-Jul-14	24-Apr-14	28-Jul-14	10-Nov-14	24-Apr-14	28-May-14	28-Jul-14
Flow	ft/s	0.0	0.0	0.6	0.0	0.0	NA	NA	NA
Inorganics									
Alkalinity - Bicarbonate	mg/L	128.0	318.0	233.0	267.0	569.0	453.0	NA	531.0
Alkalinity - Carbonate	mg/L	<0.50	388.00	<0.50	164.00	5.35	<0.50	NA	641.00
Alkalinity - Hydroxide	mg/L	<0.50	<0.50	<0.50	79.70	<0.50	<0.50	NA	2.93
Alkalinity - Total	mg/L	105.00	<0.50	191.00	<0.50	475.00	371.00	NA	<0.50
Hardness (as CaCO3)	mg/L	128.0	312.0	257.0	373.0	790.0	445.0	NA	706.0
pH - units	units	7.42	7.40	7.88	9.41	8.61	8.05	NA	8.26
Specific Conductivity	uS/cm	194	661	749	1030	2020	1430	NA	1930
Turbidity - NTU	ntu	20.3	1200.0	50.8	1160.0	388.0	52.4	NA	85.0
Total Solids	mg/L	192	3180	566	5770	2500	1090	NA	1700
Total Dissolved Solids	mg/L	178	664	502	808	1580	972	NA	1530
Total Suspended Solids	mg/L	14	2516	64	4962	920	118	NA	170
Chloride (dissolved)	mg/L	19	21	72	120	270	150	170	190
Sulphate (dissolved)	mg/L	14.30	<0.50	79.90	87.60	238.00	149.00	NA	190.00
Cyanide	mg/L	NA	0.00120	NA	0.00224	0.00278	NA	NA	0.00565
Nutrients									
Ammonia	mg/L	0.042	0.083	2.400	0.130	0.100	15.000	NA	5.500
Nitrate Nitrite Nitrogen	mg/L	0.652	<0.003	0.686	0.031	0.013	1.850	NA	0.016
Total Kjeldhal Nitrogen	mg/L	2.6	8.0	6.3	4.2	7.2	22.1	NA	6.9
Dissolved Phosphorus (P)	mg/L	0.278 *	253.000	0.383 *	214.000	1.000 *	0.429 *	NA	1000.000
Biological Oxygen Demand	mg/L	3	31	5	34	31	15	NA	15
Chemical Oxygen Demand	mg/L	31	532	51	284	230	138	NA	304
Dissolved Metals by ICPMS									
Dissolved Arsenic (As)	ug/L	2.64 *	4.43	3.17 *	9.94	2.72	2.18 *	3.34 *	12.20
Dissolved Barium (Ba)	ug/L	34.4 *	44.3	63.8 *	57.6	172.0	69.9 *	69.9 *	118.0
Dissolved Beryllium (Be)	ug/L	0.022 *	<0.010	0.030 *	<0.010	<0.050	0.034 *	<0.010 *	<0.010
Dissolved Cadmium (Cd)	ug/L	0.041 *	0.008	0.044 *	0.017	<0.025	0.098 *	0.034 *	0.037
Dissolved Calcium (Ca)	mg/L	28.4 *	57.5	37.3 *	41.6	99.7	61.3 *	71.6 *	89.6
Dissolved Chromium (Cr)	ug/L	0.33 *	0.15	0.70 *	2.41	0.58	2.41 *	1.18 *	0.83
Dissolved Copper (Cu)	ug/L	4.100 *	0.409	5.060 *	2.980	1.240	15.200 *	13.100 *	6.660
Dissolved Iron (Fe)	ug/L	217.0 *	301.0	333.0 *	44.5	17.6	463.0 *	75.5 *	145
Dissolved Lead (Pb)	ug/L	0.666 *	0.041	0.881 *	0.106	<0.025	1.080 *	0.234 *	0.341
Dissolved Magnesium (Mg)	mg/L	13.90 *	40.90	39.80 *	65.40	131.00	70.90 *	92.40 *	117.00
Dissolved Manganese (Mn)	ug/L	15.4 *	540.0	102.0 *	29.9	117.0	156.0 *	87.6 *	258.0
Dissolved Mercury (Hg)	ug/L	NA	0.0039	NA	0.0039	<0.0020	NA	NA	0.0035
Dissolved Nickel (Ni)	ug/L	2.95 *	1.95	7.52 *	12.50	28.90	22.70 *	24.60 *	29.90
Dissolved Potassium (K)	mg/L	8.85 *	7.14	11.40 *	26.10	43.00	31.50 *	48.40 *	126.00
Dissolved Selenium (Se)	ug/L	0.095 *	0.156	0.295 *	0.360	0.340	0.596 *	0.831 *	0.935
Dissolved Sodium (Na)	mg/L	8.74 *	26.50	46.00 *	71.80	142.00	100.00 *	84.70 *	75.70
Dissolved Zinc (Zn)	ug/L	15.60 *	2.12	10.80 *	6.86	10.40	21.20 *	11.40 *	8.82
Microbiological Parameters									
Fecal Coliforms (MTF)	MPN/100mL	160	230	1500	230	930	930	NA	430
E. coli (MTF)	MPN/100mL	160	230	1500	230	930	930	NA	430
Total Coliforms (MTF)	MPN/100mL	2400	430	11000	2400	930	1500	NA	2400

Surface Water Monitoring 2014

		SW25-12 (Formerly SW25-2)			SW25-16 (Formerly SW25-5)		SW25-9a (Formerly SW25-EASTPOND)		SW25-9b (Formerly SW25-WESTPOND)	
Sampling Date	**Units**	24-Apr-14	28-Jul-14	10-Nov-14	24-Apr-14	28-Jul-14	24-Apr-14	28-Jul-14	24-Apr-14	28-Jul-14
Flow	ft/s	2.8	0.0	0.0	0.4	0.0	NA	NA	NA	NA
Inorganics										
Alkalinity - Bicarbonate	mg/L	93.2	799.0	768.0	226.0	305.0	207.0	193.0	145.0	196.0
Alkalinity - Carbonate	mg/L	<0.50	975.00	<0.50	<0.50	323.00	<0.50	190.00	<0.50	221.00
Alkalinity - Hydroxide	mg/L	<0.50	<0.50	<0.50	<0.50	24.50	<0.50	22.40	<0.50	8.99
Alkalinity - Total	mg/L	76.40	<0.50	629.00	185.00	<0.50	170.00	<0.50	119.00	<0.50
Hardness (as CaCO3)	mg/L	83.7	1390.0	1700.0	260.0	356.0	209.0	263.0	145.0	289.0
pH - units	units	7.58	8.14	8.04	7.79	8.67	7.84	8.70	7.63	8.63
Specific Conductivity	uS/cm	282	4370	2830	742	1000	594	690	373	699
Turbidity - NTU	ntu	33.4	134.0	550.0	42.8	2210.0	60.6	710.0	34.4	191.0
Total Solids	mg/L	294	3780	4750	536	6210	514	2890	356	1390
Total Dissolved Solids	mg/L	228	3310	2320	498	720	458	500	280	534
Total Suspended Solids	mg/L	66	470	2430	38	5490	56	2390	76	856
Chloride (dissolved)	mg/L	8.8	530	280	70	100	45	53	28	50
Sulphate (dissolved)	mg/L	6.88	784.00	638.00	78.80	48.40	48.00	52.20	25.90	76.80
Cyanide	mg/L	NA	0.00847	0.00123	NA	0.00208	NA	0.00157	NA	0.00122
Nutrients										
Ammonia	mg/L	0.120	37.000	0.067	2.300	0.420	2.300	0.360	0.900	0.330
Nitrate Nitrite Nitrogen	mg/L	0.497	3.800	<0.003	0.716	<0.003	0.600	<0.003	0.386	0.049
Total Kjeldhal Nitrogen	mg/L	2.7	24.7	12.0	5.7	8.0	5.9	6.5	3.6	6.7
Dissolved Phosphorus (P)	mg/L	0.356 *	127.000	2.300 *	0.194 *	119.000	0.322 *	89.400	0.211 *	182.000
Biological Oxygen Demand	mg/L	3	10	>14	5	<52	5	26	4	3
Chemical Oxygen Demand	mg/L	38	409	405	47	493	50	323	38	88
Dissolved Metals by ICPMS										
Dissolved Arsenic (As)	ug/L	2.25 *	8.94	2.05	2.90 *	10.90	3.34 *	7.95	2.29 *	7.39
Dissolved Barium (Ba)	ug/L	24.6 *	132.0	135.0	57.1 *	93.1	45.0 *	70.6	36.6 *	65.5
Dissolved Beryllium (Be)	ug/L	0.016 *	<0.050	<0.050	0.031 *	<0.010	0.024 *	<0.010	0.023 *	<0.010
Dissolved Cadmium (Cd)	ug/L	0.016 *	0.149	<0.025	0.031 *	0.041	0.025 *	0.017	0.021 *	<0.005
Dissolved Calcium (Ca)	mg/L	18.2 *	164.0	209.0	39.9 *	52.0	34.6 *	45.1	26.5 *	48.6
Dissolved Chromium (Cr)	ug/L	0.92 *	10.50	<0.50	0.79 *	0.48	0.62 *	0.14	0.48 *	0.11
Dissolved Copper (Cu)	ug/L	3.040 *	19.300	0.490	5.160 *	1.580	4.130 *	3.180	3.680 *	1.940
Dissolved Iron (Fe)	ug/L	329.0 *	29.6	108.0	393.0 *	160.0	332.0 *	52.9	325.0 *	30.9
Dissolved Lead (Pb)	ug/L	0.623 *	0.426	0.063	0.675 *	0.263	0.525 *	0.132	0.573 *	0.081
Dissolved Magnesium (Mg)	mg/L	9.28 *	238.00	287.00	39.00 *	54.90	29.70 *	36.50	19.20 *	40.60
Dissolved Manganese (Mn)	ug/L	28.3 *	320.0	388.0	86.4 *	640.0	122.0 *	98.0	85.3 *	34.4
Dissolved Mercury (Hg)	ug/L	NA	0.0045	<0.0020	NA	0.0043	NA	0.0034	NA	0.0045
Dissolved Nickel (Ni)	ug/L	2.32 *	95.00	6.65	7.68 *	15.40	5.68 *	5.96	3.80 *	5.87
Dissolved Potassium (K)	mg/L	7.80 *	59.10	17.20	11.00 *	17.60	9.75 *	14.00	9.06 *	12.60
Dissolved Selenium (Se)	ug/L	0.114 *	2.600	<0.200	0.332 *	0.409	0.232 *	0.281	0.185 *	0.393
Dissolved Sodium (Na)	mg/L	4.87 *	486.00	215.00	44.40 *	69.40	32.30 *	33.40	17.40 *	31.40
Dissolved Zinc (Zn)	ug/L	5.41 *	10.10	2.49	8.01 *	2.32	5.97 *	4.65	6.63 *	1.91
Microbiological Parameters										
Fecal Coliforms (MTF)	MPN/100mL	43	>11000	4600	430	93	230	750	230	930
E. coli (MTF)	MPN/100mL	43	11000	4600	430	93	230	750	230	930
Total Coliforms (MTF)	MPN/100mL	>11000	>11000	4600	11000	2400	4600	2400	4600	930

NA = Not Analysed

* Total metal results recorded, dissolved metals were not analysed.

Weekly Weir Data 2014

Date	Flow (ft/s)	pH (units)	Conductivity (m/s)	Temp (°C)	Comments
26-Sep-14	0	7.58	1.535	18.6	
1-Oct-14	0	7.71	1.632	13.4	
8-Oct-14	0	7.53	1.438	10.1	
15-Oct-14	0	7.68	1.622	10.4	
22-Oct-14	0	7.59	1.591	6.3	
29-Oct-14	0	7.82	1.911	4.1	
5-Nov-14	0	7.78	1.914	5.0	
12-Nov-14	0	7.55	1.912	3.1	

3.3 LEACHATE

The current leachate management system is a passive collection system which includes a network of drains, sumps, and pumping stations. Leachate is pumped from seven leachate manholes around the perimeter of the landfill cells and hauled for treatment at the City's North End Water Pollution Control Centre (NEWPCC). These manholes also serve as sampling points. Historically, samples were collected once per year and analysed for the same parameters as groundwater samples and leachate elevations were monitored monthly.

As per the BRRMF Operating Plan, leachate will be managed in accordance with the Leachate Sampling and Analysis Plan (SAP), submitted on December 22, 2014, as specified under Clause 100. The Leachate SAP proposes continued annual sampling at the seven leachate manholes until a representative data set is established to identify a potential reduction in sampling frequency for specific sampling points (e.g. old leachate sampling points may demonstrate stabilized leachate characteristics). The current monthly leachate elevation measurements will continue until final cover has been applied to the cell area, and leachate levels are consistently decreasing, indicating that leachate is no longer being generated in the cell/area of the site. Once there is demonstrated consistency in leachate elevations, frequency of measurements will be evaluated and may be reduced to quarterly monitoring.

In 2014, leachate samples were collected prior to the development and implementation of the Leachate SAP. The total volume of leachate removed from the BRRMF in 2014 was 43,051kL. There were no occurrences of leachate breakout in 2014, and the maximum leachate head in the new waste cell was not exceeded in 2014. The 2015 leachate sampling program will follow the Leachate SAP.

A summary of the 2014 leachate results are provided in Table 4 and monthly leachate levels are provided in Table 5.

Leachate Monitoring 2014

	Units	LQ25-MH3	LQ25-MH8	LQ25-MH13	LQ25-MH24	LQ25-MH27	LQ25-MH31	LQ25-MH34
Sampling Date		22-Jul-14	22-Jul-14	23-Jul-14	23-Jul-14	22-Jul-14	22-Jul-14	22-Jul-14
Inorganics								
Alkalinity - Bicarbonate	mg/L	6020	6530	5870	6860	2570	5820	3870
Alkalinity - Carbonate	mg/L	<5.0	448.0	<5.0	593.0	28.4	232.0	32.3
Alkalinity - Hydroxide	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Alkalinity - Total	mg/L	4930	6100	4810	6610	2160	5160	3220
Hardness (as CaCO3)	mg/L	3640	2210	2990	2440	1560	1900	2940
pH - units	units	7.02	7.44	7.53	7.66	7.07	7.29	7.04
Specific Conductivity	uS/cm	14300	15000	12200	15400	7220	14100	13000
Turbidity - NTU	ntu	92.8	60.8	407.0	68.6	833.0	129.0	207.0
Total Solids	mg/L	12100	7810	21200	8490	4170	7070	7900
Total Dissolved Solids	mg/L	10800	7710	13800	8470	4030	6880	7760
Total Suspended Solids	mg/L	1300	100	7400	20	140	190	140
Chloride (dissolved)	mg/L	1600	1700	1600	1600	1200	1600	3000
Sulphate (dissolved)	mg/L	<0.5	19.6	124.0	<5.0	<0.5	174.0	<0.5
Cyanide (CN)	mg/L	0.0134	0.0122	0.0094	0.0118	0.0110	0.0138	0.0181
Nutrients								
Dissolved Ammonia	mg/L	370	520	227	472	139	445	218
Nitrate Nitrite Nitrogen	mg/L	0.023	<0.003	0.014	<0.003	0.029	1.380	0.213
Total Kjeldhal Nitrogen	mg/L	828.3	1162.0	495.9	1008.0	299.9	997.2	463.1
Phosphorus (Total)	mg/L	2.9	8.8	5.4	6.3	1.2	4.3	1.7
Biological Oxygen Demand	mg/L	>211.0	171.0	916.0	<93.0	<34.7	144.0	80.0
Chemical Oxygen Demand	mg/L	NR*	1880	3140	1470	741	1390	1040
Metals								
Total Arsenic (As)	ug/L	15.70	29.50	8.42	15.50	4.77	23.10	7.49
Total Barium (Ba)	ug/L	1230	643	579	454	496	261	1380
Total Beryllium (Be)	ug/L	<0.050	<0.050	<0.100	<0.100	<0.050	<0.050	<0.050
Total Cadmium (Cd)	ug/L	0.545	0.409	0.287	0.099	0.114	0.455	0.332
Total Calcium (Ca)	mg/L	589.0	198.0	236.0	181.0	130.0	144.0	180.0
Total Chromium (Cr)	ug/L	90.5	127.0	38.3	53.9	16.5	74.5	69.1
Total Chromium (Hexavalent)	mg/L	<0.0010	<0.0050	<0.0020	<0.0020	<0.0020	0.0011	<0.0020
Total Copper (Cu)	ug/L	21.00	4.70	1.04	<0.50	3.20	16.20	1.50
Total Iron (Fe)	ug/L	70600	3980	7390	3070	17900	9250	26400
Total Lead (Pb)	ug/L	23.00	19.90	0.87	0.31	9.46	16.10	48.10
Total Magnesium (Mg)	mg/L	526.0	417.0	582.0	483.0	299.0	375.0	603.0
Total Manganese (Mn)	ug/L	1910	247	389	245	234	234	186
Total Mercury (Hg)	ug/L	0.0640	0.0330	0.0049	<0.0020	<0.0200	<0.0200	0.0200
Total Nickel (Ni)	ug/L	365.0	173.0	162.0	210.0	39.8	172.0	77.5
Total Potassium (K)	mg/L	595.0	643.0	449.0	640.0	221.0	594.0	315.0
Dissolved Selenium (Se)	ug/L	0.81	1.47	0.97	1.30	<0.40	1.32	0.51
Total Silver (Ag)	ug/L	0.202	0.196	<0.050	0.063	<0.025	0.171	0.041
Total Sodium (Na)	mg/L	1540	1490	1190	1400	786	1360	1700
Total Zinc (Zn)	ug/L	655.0	108.0	3140.0	14.3	42.5	110.0	53.6
Leachable Lead	ug/L	NA	NA	NA	NA	NA	NA	NA
Extractables								
Benzo (a) Pyrene (PAH)	mg/L	<0.00001	0.00013	<0.00010	<0.00010	0.00014	0.00014	0.00003
Anthracene	mg/L	0.00008	0.00110	<0.00050	<0.00050	0.00022	0.00041	0.00038
3'3' Dichlorobenzidine	mg/L	NA	NA	NA	NA	NA	NA	NA
4'4' Methylenebis 2 Chloroaniline	mg/L	NA	NA	NA	NA	NA	NA	NA
Benzo (a) anthracene (PAH)	mg/L	<0.00005	0.00052	<0.00050	<0.00050	0.00031	0.00006	0.00011
Benzo (b) fluoroanthene (PAH)	mg/L	<0.00005	0.00020	<0.00050	<0.00050	0.00035	<0.00005	<0.00005
Benzo (g,h,i) Perylene (PAH)	mg/L	<0.00005	<0.00005	<0.00050	<0.00050	0.00010	<0.00005	<0.00005
Dinitropyrene	mg/L	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.005
Octachlorostyrene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.005

Leachate Monitoring 2014

	Units	LQ25-MH3	LQ25-MH8	LQ25-MH13	LQ25-MH24	LQ25-MH27	LQ25-MH31	LQ25-MH34
Sampling Date		22-Jul-14	22-Jul-14	23-Jul-14	23-Jul-14	22-Jul-14	22-Jul-14	22-Jul-14
Pentachlorophenol	ug/L	NA	NA	NA	NA	NA	NA	NA
Perylene	ug/L	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	ug/L	NA	NA	NA	NA	NA	NA	NA
Phenol	ug/L	1.210	0.310	0.316	0.312	0.094	0.280	0.199
Toxaphene	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<0.2
Petroleum Hydrocarbons								
CCME Petroleum Hydrocarbon Fraction F1	ug/L	22000	180	160	NA **	560	<250	260
CCME Petroleum Hydrocarbon Fraction F2	ug/L	1300	210	1200	790	<100	<100	360
CCME Petroleum Hydrocarbon Fraction F3	ug/L	<200	<200	75000	2400	<200	<200	<200
CCME Petroleum Hydrocarbon Fraction F4	ug/L	<200	<200	10000	430	<200	<200	<200
Oil and Grease	ug/L	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Carbons								
BTEX	ug/L	21000	<25	<25	NA **	<25	<250	<25
Vinyl Chloride	ug/L	<10	<10	<5	<5	<20	<10	<5
1,4 Dichlorobenzene	ug/L	<10	11	<5	<5	<20	<10	<5
Chloroform	ug/L	<5.0	<5.0	<2.5	<2.5	<10.0	<5.0	<2.5
Trichloroethylene	ug/L	<5.0	<5.0	2.5	<2.5	<10.0	<5.0	<2.5
Tetrachloroethylene	ug/L	<5.0	<5.0	<2.5	<2.5	<10.0	<5.0	<2.5
Polychlorinated Biphenyls								
Aroclor 1232	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00005
Aroclor 1242	mg/L	<0.00050	0.00210	<0.00050	0.00060	0.00050	<0.00050	<0.00005
Aroclor 1248	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00005
Aroclor 1254	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00030	<0.00050	<0.00005
Aroclor 1260	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00005
Total PCBs	mg/L	<0.00050	0.00210	<0.00050	0.00060	0.00080	<0.00005	<0.00005
Pesticides and Herbicides								
Diazinon	ug/L	NA	NA	NA	NA	NA	NA	NA
2, 4-D	ug/L	<4	<4	<8	<8	<4	<4	<4
Aldrin	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.005	<0.005
Chlordane	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.005
Hexachlorocyclohexane (Lindane)	ug/L	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.003
MCPA	ug/L	<8	<8	<16	<16	<8	<8	<8
Mirex	ug/L	<0.05000	<0.00005	<0.20000	<0.05000	<0.05000	<0.05000	<0.00500
Methoxyclor	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.01
DDT	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.005
Microbiological Parameters								
Total Coliforms	MPN/100mL	>11000	2400	11000	430	2400	2400	150
Fecal Coliforms	MPN/100mL	11000	93	11	23	430	430	38
E. coli	MPN/100mL	750	15	<3	4	430	93	7

NA = Not Analysed

NR = No Result

* There was no chemical oxygen demand result for LQ25-MH3 due to interference.

** LQ25-MH24 was not analysed for CCME Petroleum hydrocarbons fraction 1 or BTEX due to subcontract lab error.

Leachate Levels 2014

	Date	24-Jan-14	28-Feb-14	10-Mar-14	4-Apr-14	9-May-14	13-Jun-14	18-Jul-14	22-Aug-14	19-Sep-14	31-Oct-14	26-Nov-14	5-Dec-14
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)	3.68	4.38	4.45	4.90	4.57	3.23	4.69	4.10	0.72	3.10	4.44	3.82
	Manhole Leachate Elevation (m)	229.98	229.28	229.21	228.76	229.09	230.43	228.97	229.56	232.94	230.56	229.22	229.84
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)	11.41	9.70	8.85	8.01	7.77	7.37	9.31	6.50	4.19	8.43	8.80	9.40
	Manhole Leachate Elevation (m)	225.20	226.91	227.76	228.60	228.84	229.24	227.30	230.11	232.42	228.18	227.81	227.21
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)	7.70	8.43	9.60	7.77	7.56	8.83	7.06	6.67	5.90	7.58	8.11	6.43
	Manhole Leachate Elevation (m)	227.19	226.46	225.29	227.12	227.33	226.06	227.83	228.22	228.99	227.31	226.78	228.46
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)	2.94	3.68	3.85	4.46	4.43	3.11	4.05	1.71	2.58	2.45	2.55	2.44
	Manhole Leachate Elevation (m)	232.06	231.32	231.15	230.54	230.57	231.89	230.95	233.29	232.42	232.55	232.45	232.56
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)	3.88	3.67	4.01	4.11	3.86	2.40	2.73	2.35	2.52	3.62	4.24	4.00
	Manhole Leachate Elevation (m)	231.83	232.04	231.70	231.60	231.85	233.31	232.98	233.36	233.19	232.09	231.47	231.71
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)	1.55	1.67	1.89	3.35	3.89	1.45	3.34	3.85	4.58	2.50	5.79	4.45
	Manhole Leachate Elevation (m)	233.19	233.07	232.85	231.39	230.85	233.29	231.40	230.89	230.16	232.24	228.95	230.29
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)	6.33	6.89	7.11	6.55	6.79	6.66	6.62	6.65	6.27	7.51	9.27	9.27
	Manhole Leachate Elevation (m)	229.09	228.53	228.31	228.87	228.63	228.76	228.80	228.77	229.15	227.91	226.15	226.15

3.4 LANDFILL GAS

3.4.1 COLLECTION AND FLARING SYSTEM

The landfill gas collection and flaring system is run by Integrated Gas Recovery Systems Inc. on behalf of the City of Winnipeg.

As per the BRRMF Operating Plan, landfill gas operations and monitoring shall be managed through the Landfill Gas Operating Plan, submitted October 23, 2014, as per Clause 110. The Landfill Gas Operating Plan states that if the flare is operating as per the manufacturer's recommendations, the required particulate matter limits listed in Clause 108 will be met. If the flare is not operating as designed, the system will shut down, and corrective action will be taken.

In 2014, the BRRMF Gas Collection and Flaring System operated as intended and there were no events that caused a shutdown or malfunction of the system. Recommendations identified in the Annual Flare Report will be addressed in the near future. In 2015, the landfill gas collection and flaring system will continue to be managed according to the Landfill Gas Operating Plan.

The 2014 Landfill Gas Collection and Flaring Report, prepared by Integrated Gas Recovery Services Inc, is attached in Appendix D.

3.4.2 SUBSURFACE LANDFILL GAS MONITORING PROGRAM

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

As per the BRRMF Operating Plan, subsurface landfill gas migration will be managed in accordance with the Subsurface Landfill Gas Monitoring Program, submitted on October 23, 2014, as specified under Clause 111. The monitoring program recommended the installation of an additional 10 new monitoring probes, which were installed in November 2014. All new and existing probes are monitored monthly for methane, oxygen, carbon monoxide, and hydrogen sulphide. The monitoring program states that the Subsurface Landfill Gas Contingency Plan will be activated if >1% methane is measured at any probe. In 2014, the contingency plan was not activated, indicating that the collection and flaring system is operating effectively.

The 2014 subsurface gas migration probe data is provided in Table 6.

External Gas Probe Monitoring 2014

Well No.	Date	CH4	O2	CO	H2S
		% LEL	(%)	PPM	PPM
1	23-Dec-14	0.0	20.6	1.0	0.0
2	23-Dec-14	0.0	20.8	1.0	0.0
3	23-Dec-14	0.0	20.3	2.0	0.0
4	23-Dec-14	0.0	20.8	2.0	0.0
5	23-Dec-14	0.0	20.8	2.0	0.0
6	23-Dec-14	0.0	20.5	2.0	0.0
7	23-Dec-14	0.0	19.1	0.0	0.0
8	23-Dec-14	0.0	20.9	0.0	0.0
9	23-Dec-14	0.0	20.9	2.0	0.0
10	23-Dec-14	0.0	20.9	2.0	0.0
P106E	22-Jan-14	0.0			
P106E	20-Feb-14	0.0	20.3	0.0	0.0
P106E	21-Mar-14	0.0	20.1	0.0	0.0
P106E	15-Apr-14	0.0	20.2	0.0	0.0
P106E	17-May-14	0.0	20.9	0.0	0.0
P106E	19-Jun-14	0.1	16.8	0.0	0.0
P106E	21-Jul-14	0.0	20.9	0.0	0.0
P106E	12-Aug-14	0.0	20.8	0.0	0.0
P106E	15-Sep-14	0.0	18.1	0.0	0.0
P106E	17-Oct-14	0.0	19.2	0.0	0.0
P106E	16-Nov-14	0.0	16.2	0.0	0.0
P106E	23-Dec-14	0.0	20.1	3.0	0.0
P107E	22-Jan-14	0.0			
P107E	20-Feb-14	0.0	20.1	0.0	0.0
P107E	21-Mar-14	0.0	20.3	0.0	0.0
P107E	15-Apr-14	0.0	18.6	0.0	0.0
P107E	17-May-14	0.0	20.3	0.0	0.0
P107E	19-Jun-14	0.1	20.5	0.0	0.0
P107E	21-Jul-14	0.0	20.5	0.0	0.0
P107E	12-Aug-14	0.0	20.3	0.0	0.0
P107E	15-Sep-14	0.0	20.1	0.0	0.0
P107E	17-Oct-14	0.0	19.5	0.0	0.0
P107E	16-Nov-14	0.0	18.6	0.0	0.0
P107E	23-Dec-14	0.0	20.3	3.0	0.0

External Gas Probe Monitoring 2014

Well No.	Date	CH4	O2	CO	H2S
		% LEL	(%)	PPM	PPM
P108E	22-Jan-14	0.0			
P108E	20-Feb-14	0.0		0.0	0.0
P108E	21-Mar-14	0.0		0.0	0.0
P108E	15-Apr-14	0.0		0.0	0.0
P108E	17-May-14	0.0		0.0	0.0
P108E	19-Jun-14	0.1	20.5	0.0	1.0
P108E	21-Jul-14	0.0		0.0	0.0
P108E	12-Aug-14	0.0		0.0	0.0
P108E	15-Sep-14	0.0		0.0	0.0
P108E	17-Oct-14	0.0		0.0	0.0
P108E	16-Nov-14	0.0		0.0	0.0
P108E	23-Dec-14	0.0		3.0	0.0
P109E	22-Jan-14	0.0			
P109E	20-Feb-14	0.0		0.0	0.0
P109E	21-Mar-14	0.0		0.0	0.0
P109E	15-Apr-14	0.0		0.0	0.0
P109E	17-May-14	0.0		0.0	0.0
P109E	19-Jun-14	0.0	16.0	0.0	1.0
P109E	21-Jul-14	0.0		0.0	0.0
P109E	12-Aug-14	0.0		0.0	0.0
P109E	15-Sep-14	0.0		0.0	0.0
P109E	17-Oct-14	0.0		0.0	0.0
P109E	16-Nov-14	0.0		0.0	0.0
P109E	23-Dec-14	0.0	20.9	1.0	0.0
P110E	22-Jan-14	0.0			
P110E	20-Feb-14	0.0		0.0	0.0
P110E	21-Mar-14	0.0		0.0	0.0
P110E	15-Apr-14	0.0		0.0	0.0
P110E	17-May-14	0.0		0.0	0.0
P110E	19-Jun-14	0.0	20.6	0.0	1.0
P110E	21-Jul-14	0.0		0.0	0.0
P110E	12-Aug-14	0.0		0.0	0.0
P110E	15-Sep-14	0.0		0.0	0.0
P110E	17-Oct-14	0.0		0.0	0.0
P110E	16-Nov-14	0.0		0.0	0.0
P110E	23-Dec-14	0.0	20.3	1.0	0.0

External Gas Probe Monitoring 2014

Well No.	Date	CH4	O2	CO	H2S
		% LEL	(%)	PPM	PPM
P111E	**22-Jan-14**	0.0			
P111E	**20-Feb-14**	0.0		0.0	0.0
P111E	**21-Mar-14**	0.0		0.0	0.0
P111E	**15-Apr-14**	0.0		0.0	0.0
P111E	**17-May-14**	0.0		0.0	0.0
P111E	**19-Jun-14**	0.0	20.6	0.0	1.0
P111E	**21-Jul-14**	0.0		0.0	0.0
P111E	**12-Aug-14**	0.0		0.0	0.0
P111E	**15-Sep-14**	0.0		0.0	0.0
P111E	**17-Oct-14**	0.0		0.0	0.0
P111E	**16-Nov-14**	0.0		0.0	0.0
P111E	**23-Dec-14**	0.0	20.9	1.0	0.0
P112E	**19-Jun-14**	0.0	20.6	0.0	1.0
P112E	**23-Dec-14**	0.0	20.9	1.0	0.0

4.0 NUISANCE MANAGEMENT

In order to reduce odour, litter, and vector nuisances at the landfill, several best practices and effective operating procedures have been put into place, 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 to ensure that proper chemicals are used and properly handled. Noise is not a significant issue due to the separation distance from surrounding homes. Fugitive dust emissions are minimized through proper operating procedures which include spraying site roads with uncontaminated surface water. Table 7 provides a summary of nuisance complaints received in 2014 and the corrective actions taken to resolve the complaints.

5.0 CONCLUSION

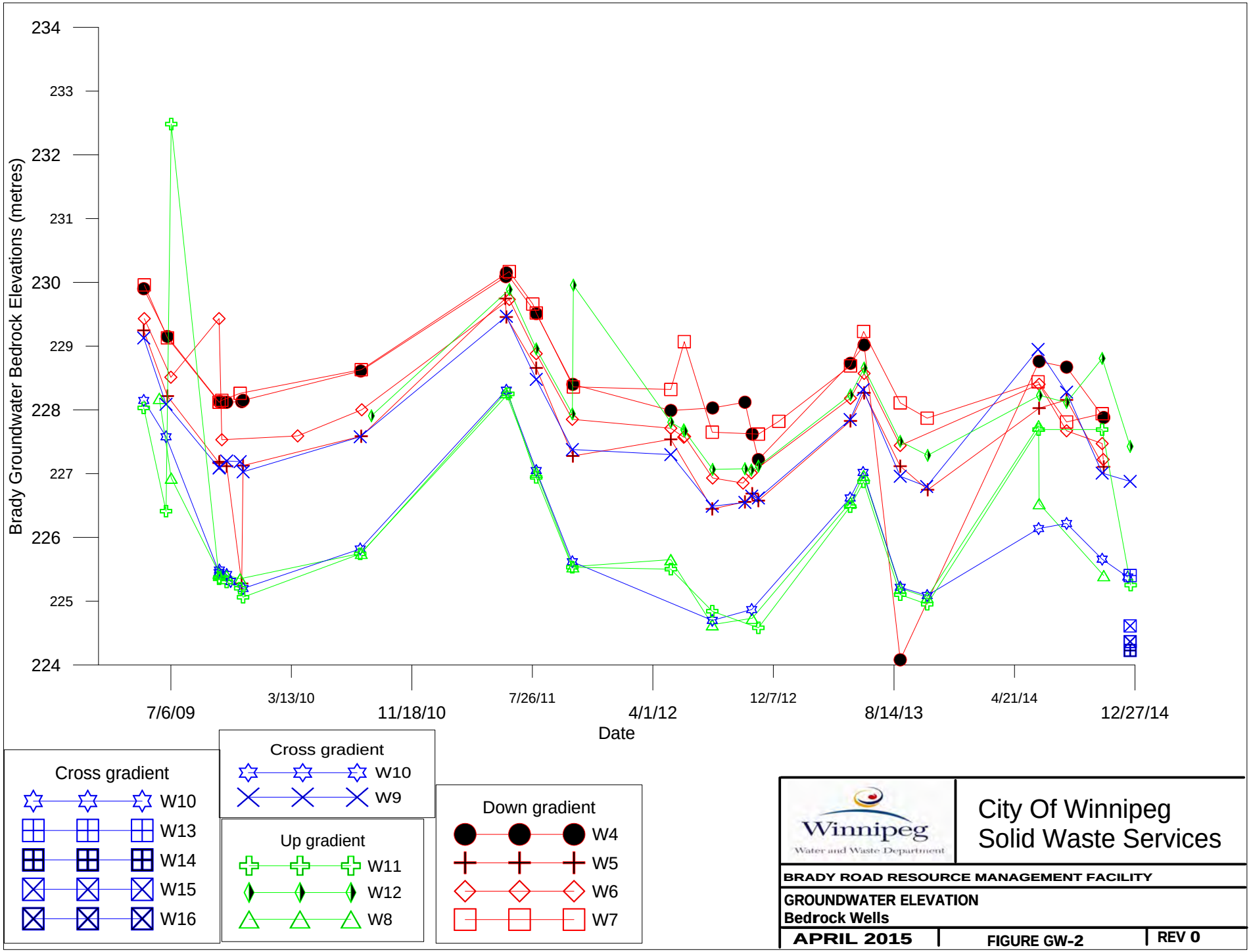
The diversion operations taking place at BRRMF have been effective in diverting tens of thousands of metric tonnes of material from the landfill. Continuing current diversion operations and improving them as necessary will help the City of Winnipeg reach its goal of 50% diversion for residential waste.

The BRRMF implemented several changes to sampling and monitoring programs in response to conditions of the licence. The majority of 2014 sampling was performed according to historical monitoring and sampling programs. Future sampling will be performed according to the new sampling and monitoring programs as identified in the BRRMF Operating Plan. As per Clause 128, future results will be compared to the results from previous years to show trends and variances. Future Annual Reports will identify any significant variances and identify actions to minimize the variations.

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.

APPENDIX B

STATISTICAL ANALYSIS OF GROUNDWATER QUALITY



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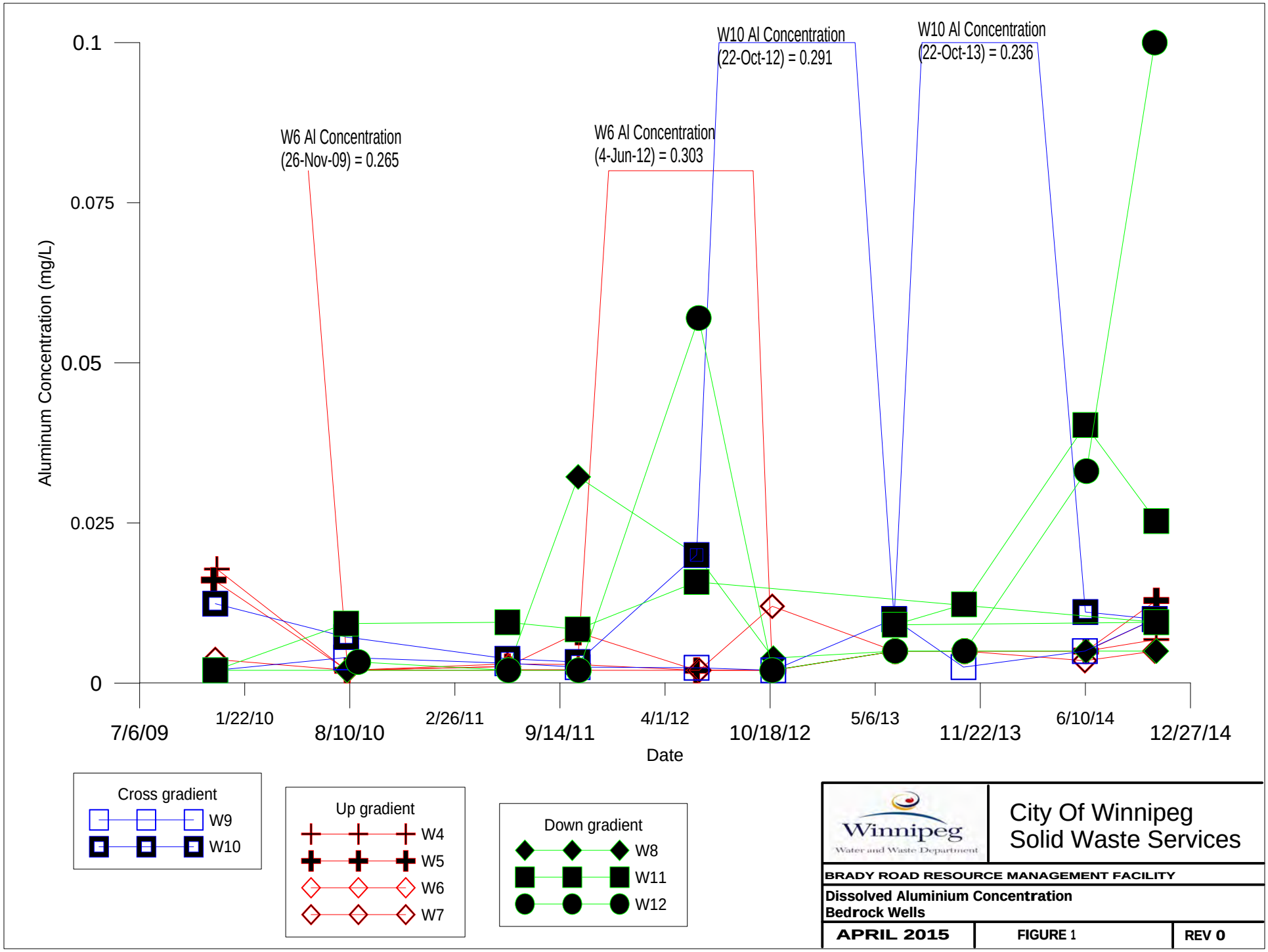
GROUNDWATER ELEVATION
Bedrock Wells

APRIL 2015 | **FIGURE GW-2** | **REV 0**


W6 Al Concentration
(26-Nov-09) = 0.265
W6 Al Concentration
(4-Jun-12) = 0.303
W10 Al Concentration
(22-Oct-12) = 0.291
W10 Al Concentration
(22-Oct-13) = 0.236
Aluminum Concentration (mg/L)
0.1
0.075
0.05
0.025
0
7/6/09
1/22/10
8/10/10
2/26/11
9/14/11
4/1/12
10/18/12
5/6/13
11/22/13
6/10/14
12/27/14
Date
Cross gradient
W9
W10
Up gradient
W4
W5
W6
W7
Down gradient
W8
W11
W12
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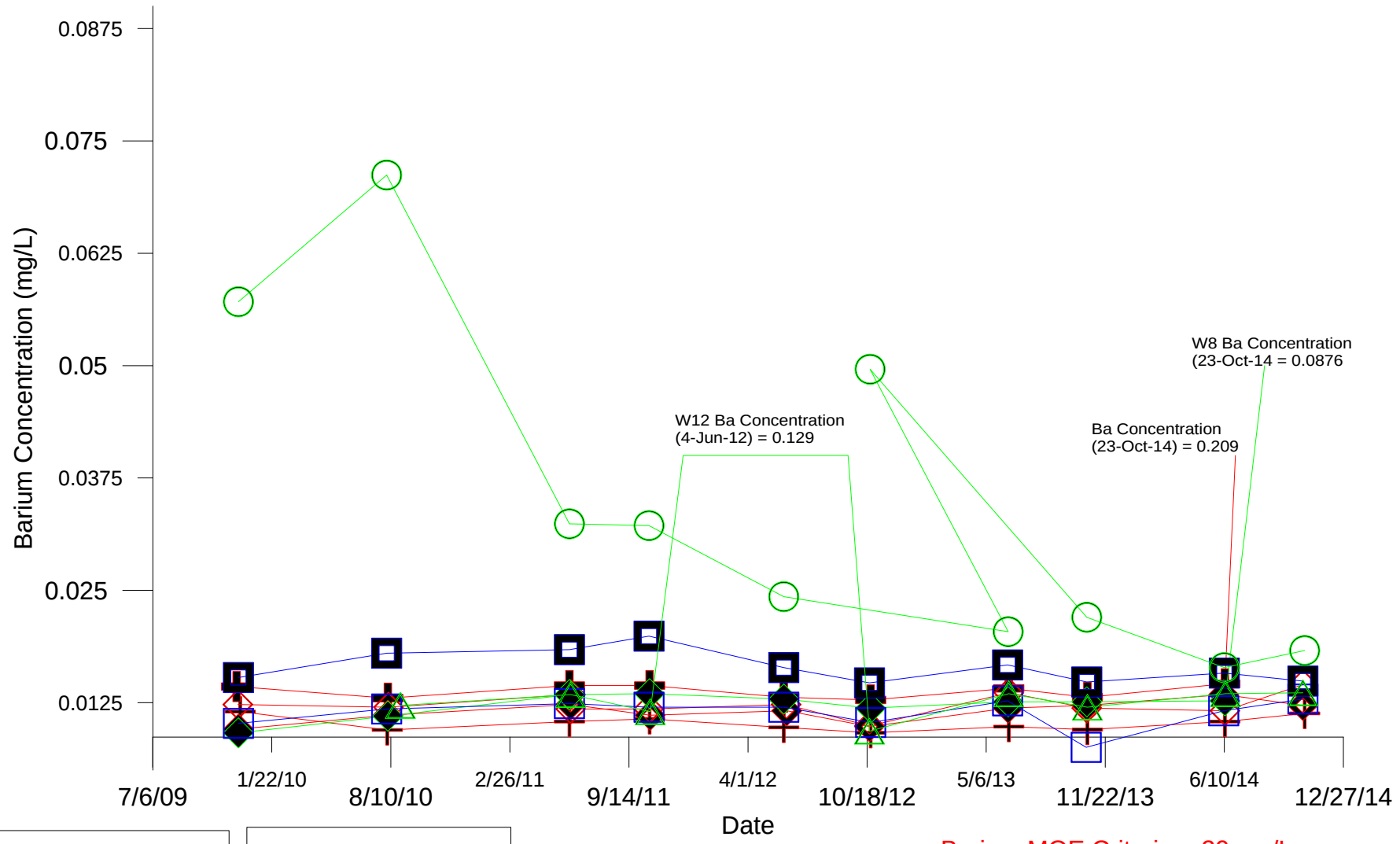
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Aluminium Concentration
Bedrock Wells
APRIL 2015
FIGURE 1
REV 0



Cross gradient
W9
W10

Up gradient
W4
W5
W6
W7

Down gradient
W8
W11
W12

Barium MOE Criteria = 29 mg/L

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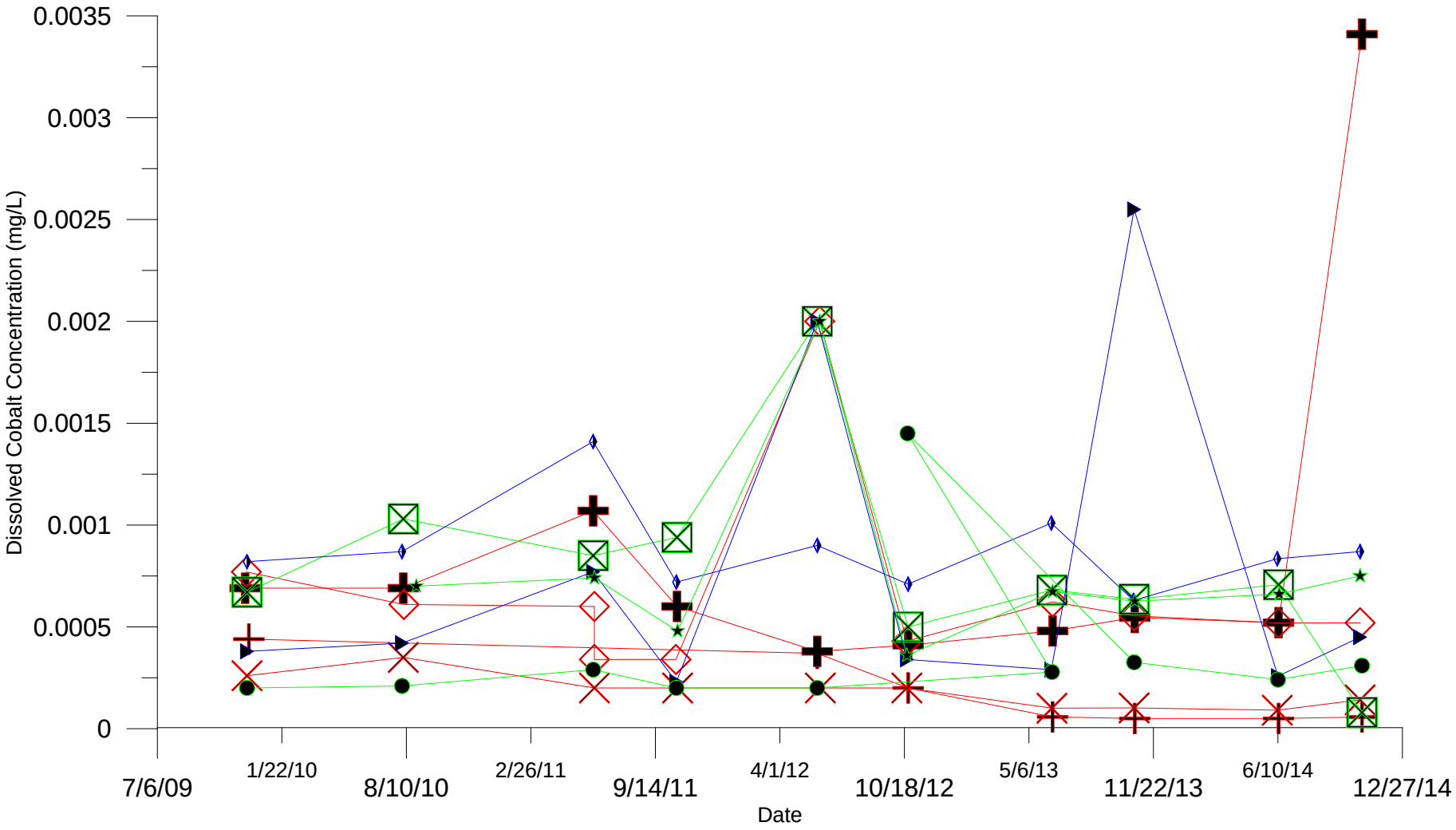
Dissolved Barium Concentration
Bedrock Wells

APRIL 2015 | FIGURE 2 | REV 0



Cross gradient
W9
W10

Up gradient
W4
W5
W6
W7

Down gradient
W8
W11
W12

MOE Cobalt Criteria = 0.066 mg/L

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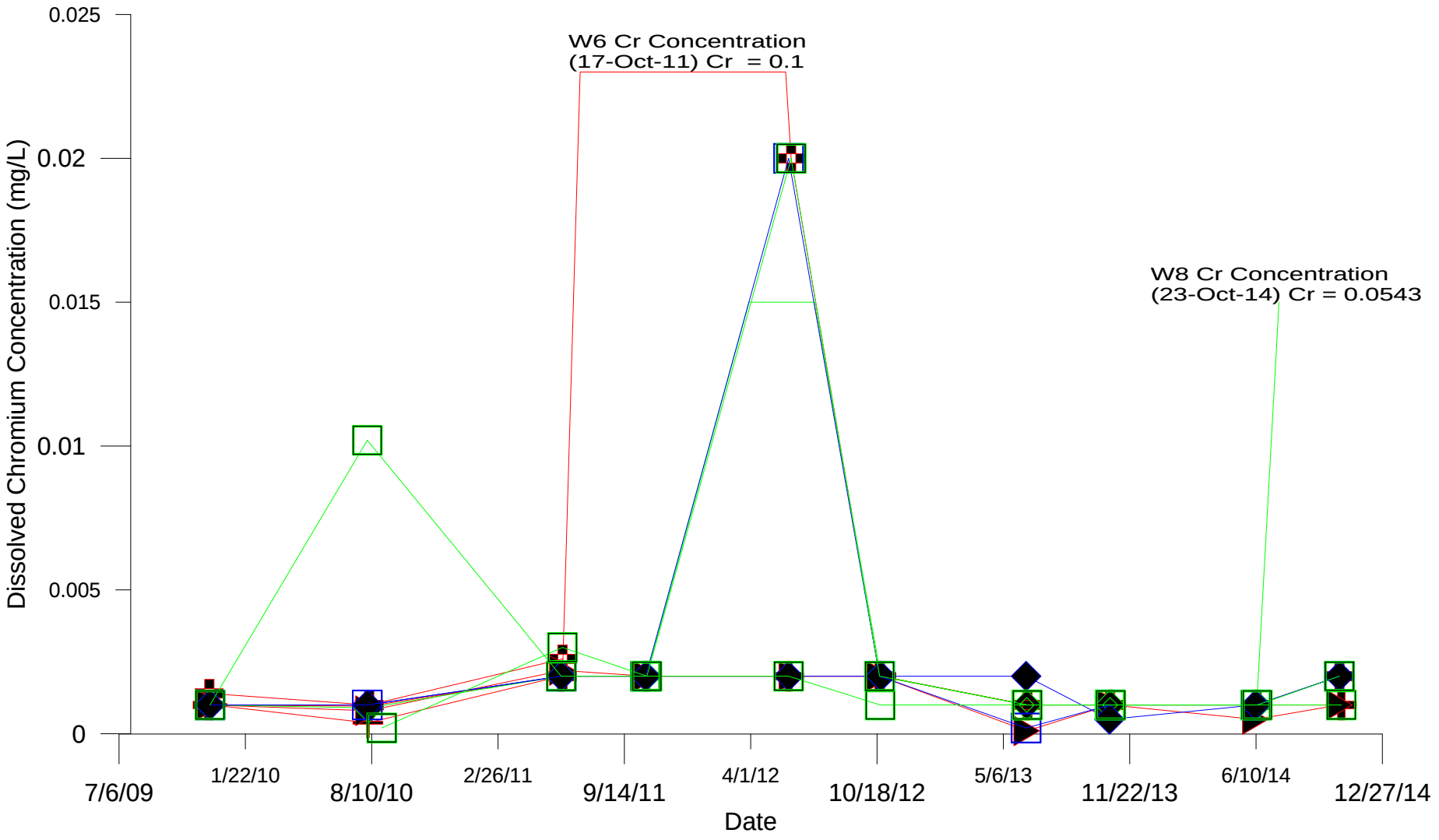
Dissolved Cobalt Concentration
Bedrock Wells

APRIL 2015	FIGURE 3	REV 0



Chromium MOE Criteria = 0.81 mg/L

Cross gradient
W9
W10

Up gradient
W4
W5
W6
W7

Down gradient
W8
W11
W12

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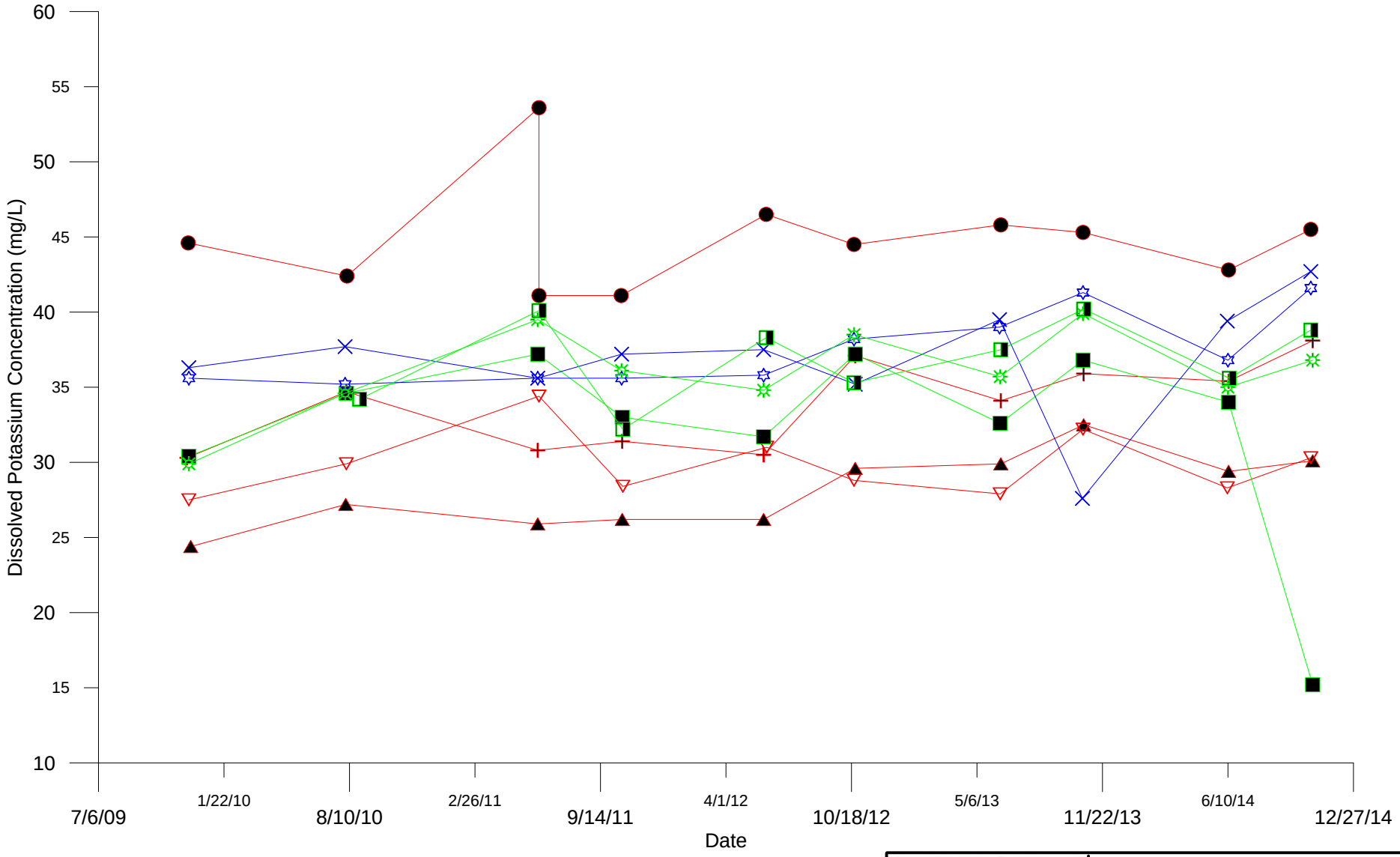
Dissolved Chromium Concentration
Bedrock Wells

APRIL 2015	FIGURE 4	REV 0



Cross gradient
W9
W10

Up gradient
W4
W5
W6
W7

Down gradient
W8
W11
W12

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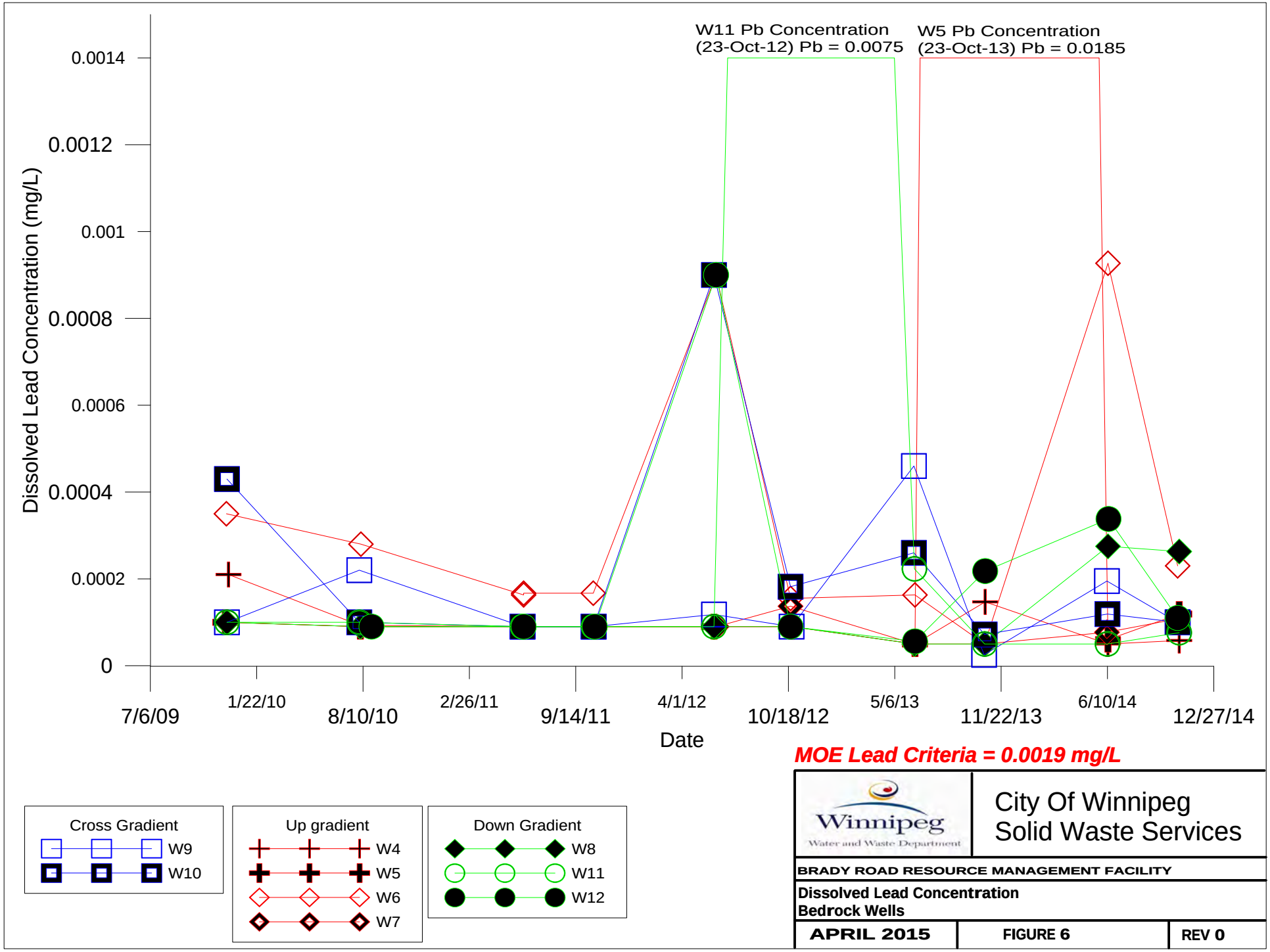
Dissolved Potassium Concentration
Bedrock Wells

APRIL 2015 | FIGURE 5 | REV 0


W11 Pb Concentration
(23-Oct-12) Pb = 0.0075
W5 Pb Concentration
(23-Oct-13) Pb = 0.0185
Dissolved Lead Concentration (mg/L)
0.0014
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
7/6/09
1/22/10
8/10/10
2/26/11
9/14/11
4/1/12
10/18/12
5/6/13
11/22/13
6/10/14
12/27/14
Date
MOE Lead Criteria = 0.0019 mg/L
Cross Gradient
W9
W10
Up gradient
W4
W5
W6
W7
Down Gradient
W8
W11
W12
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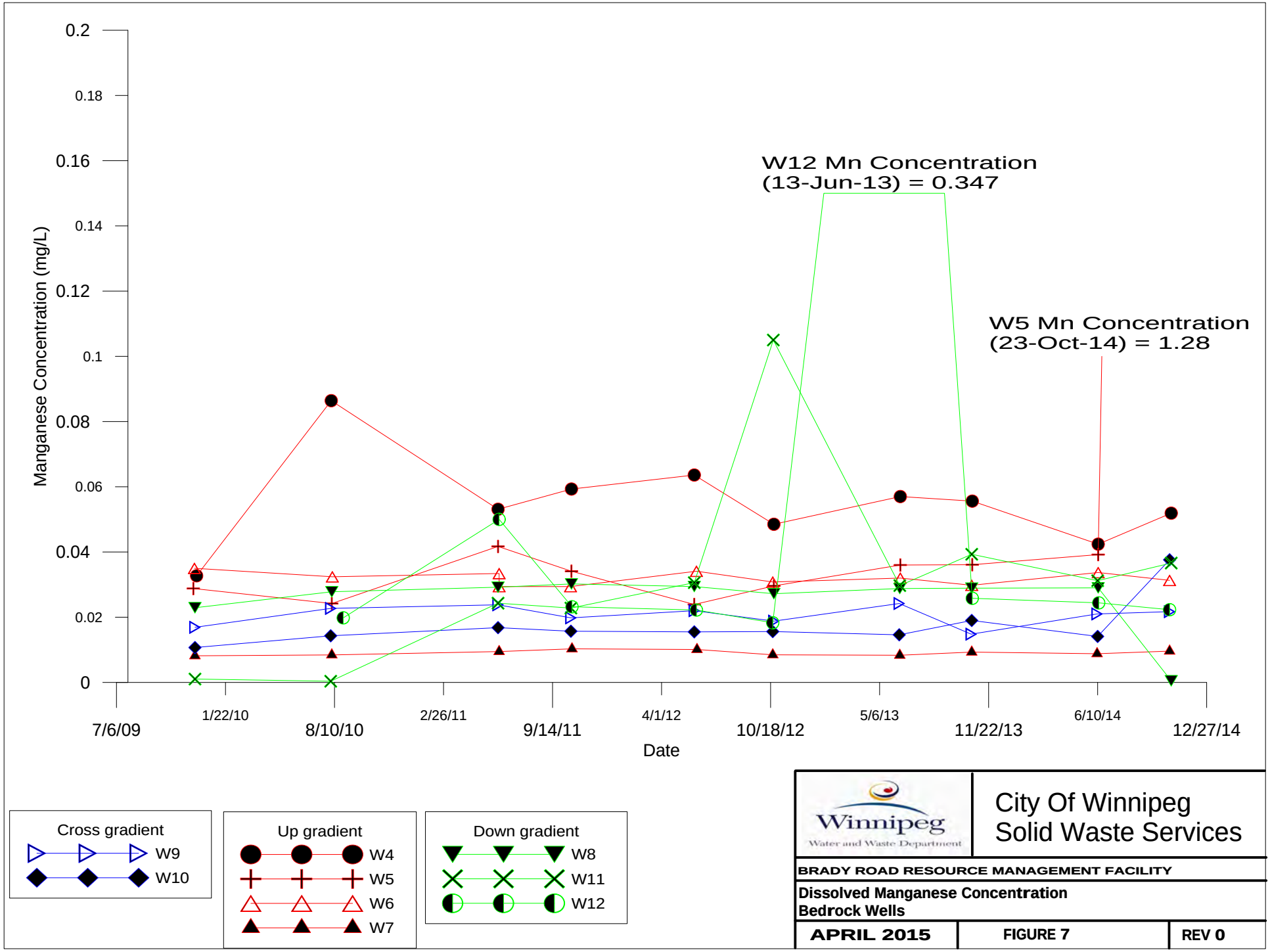
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Lead Concentration
Bedrock Wells
APRIL 2015
FIGURE 6
REV 0



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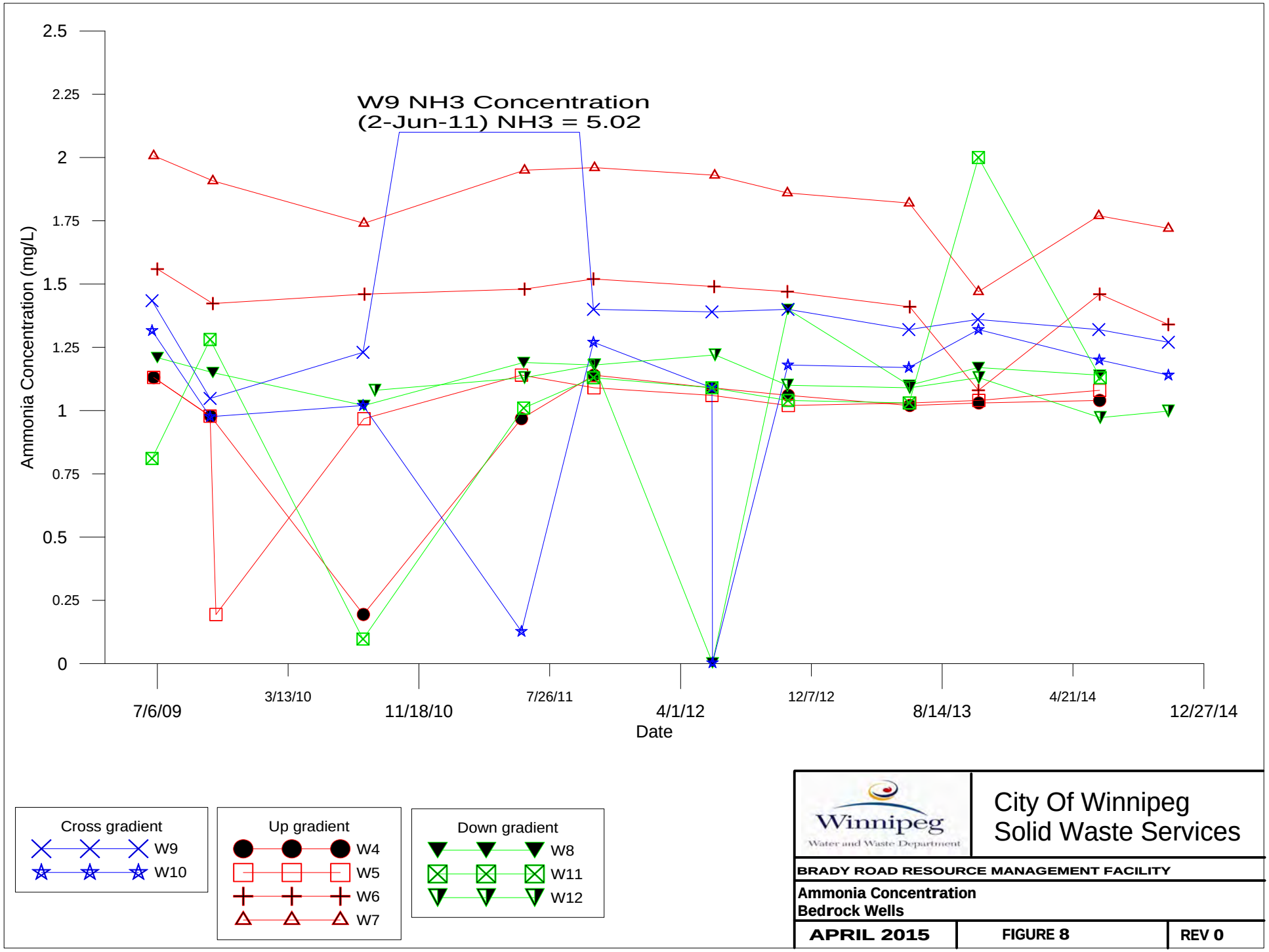
Dissolved Manganese Concentration
Bedrock Wells

APRIL 2015	FIGURE 7	REV 0


W9 NH3 Concentration
(2-Jun-11) NH3 = 5.02
Ammonia Concentration (mg/L)
2.5
2.25
2
1.75
1.5
1.25
1
0.75
0.5
0.25
0
7/6/09
3/13/10
11/18/10
7/26/11
4/1/12
12/7/12
8/14/13
4/21/14
12/27/14
Date
Cross gradient
W9
W10
Up gradient
W4
W5
W6
W7
Down gradient
W8
W11
W12
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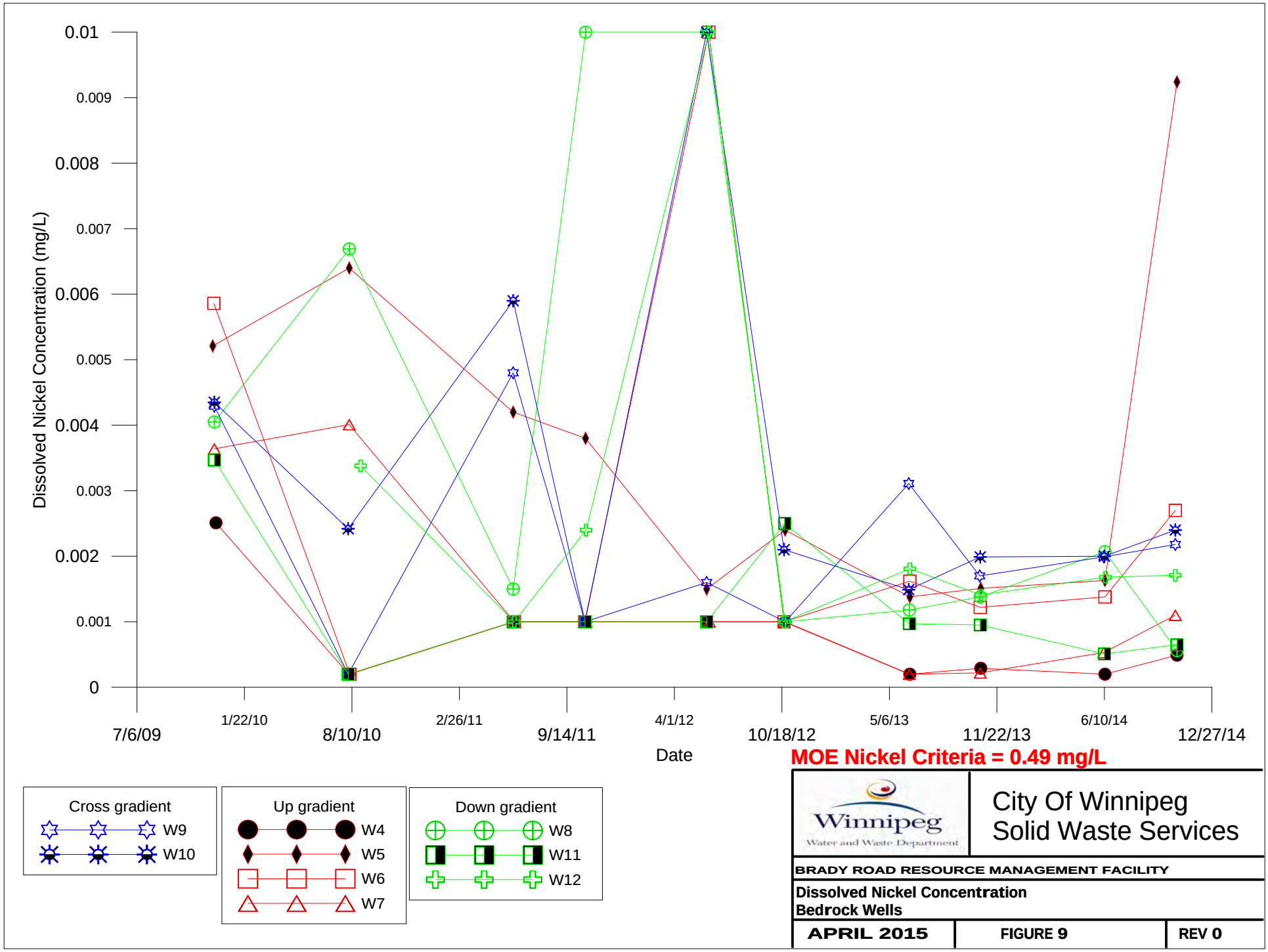
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Ammonia Concentration
Bedrock Wells
APRIL 2015
FIGURE 8
REV 0


Dissolved Nickel Concentration (mg/L)
0.01
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
7/6/09
1/22/10
8/10/10
2/26/11
9/14/11
4/1/12
10/18/12
5/6/13
11/22/13
6/10/14
12/27/14
Date
MOE Nickel Criteria = 0.49 mg/L
Cross gradient
W9
W10
Up gradient
W4
W5
W6
W7
Down gradient
W8
W11
W12
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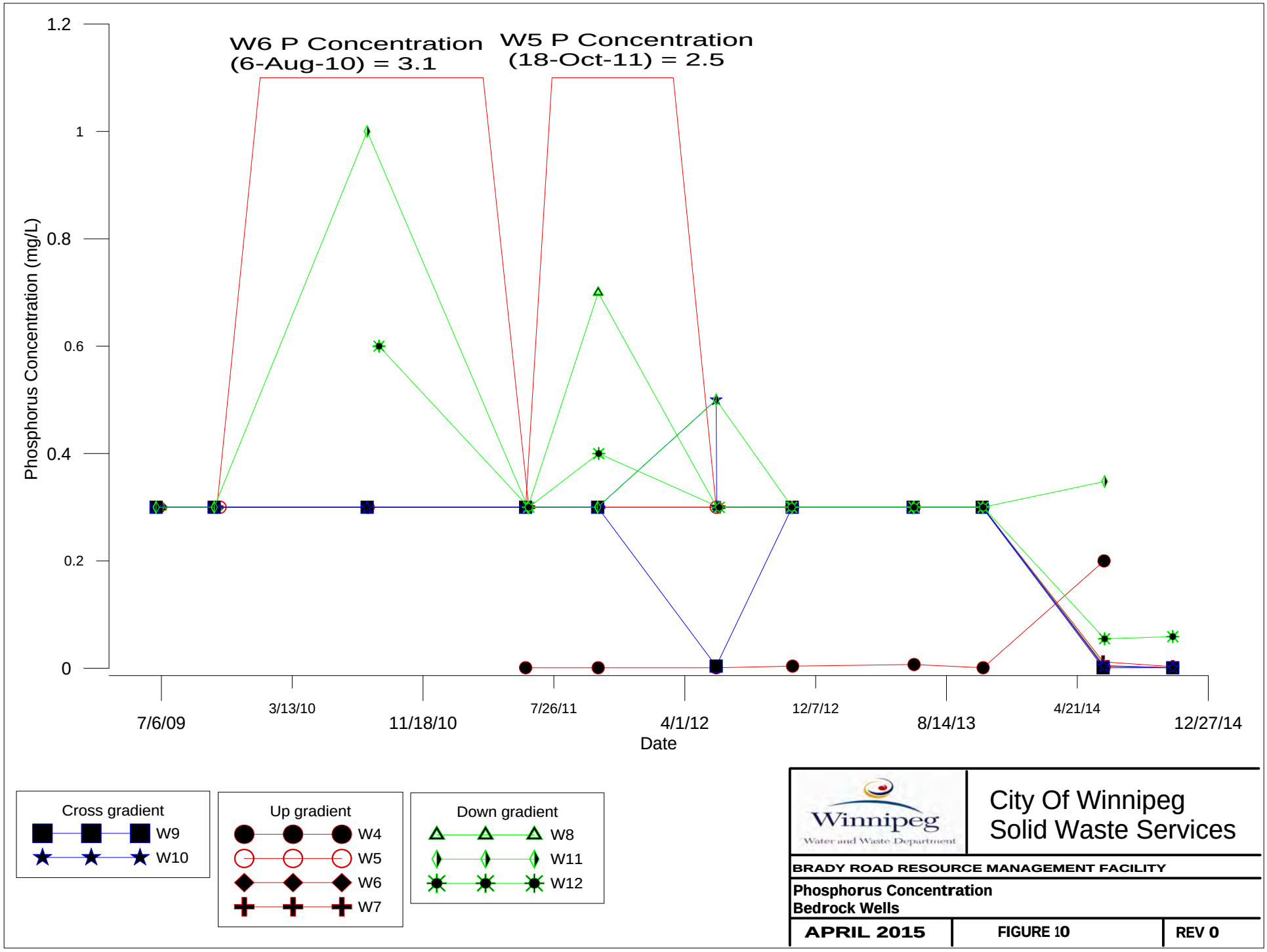
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Nickel Concentration
Bedrock Wells
APRIL 2015
FIGURE 9
REV 0



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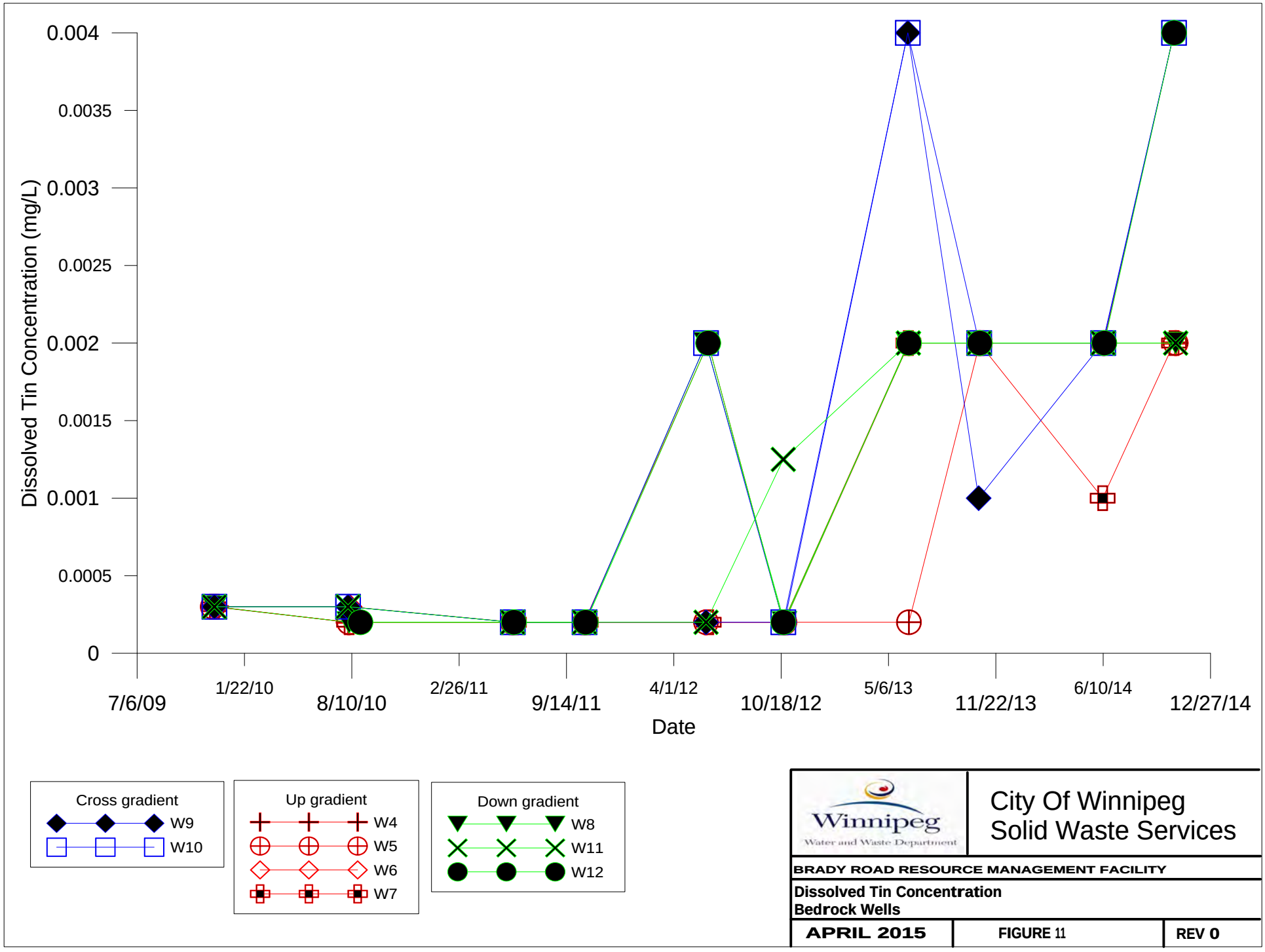
Phosphorus Concentration
Bedrock Wells

APRIL 2015	FIGURE 10	REV 0



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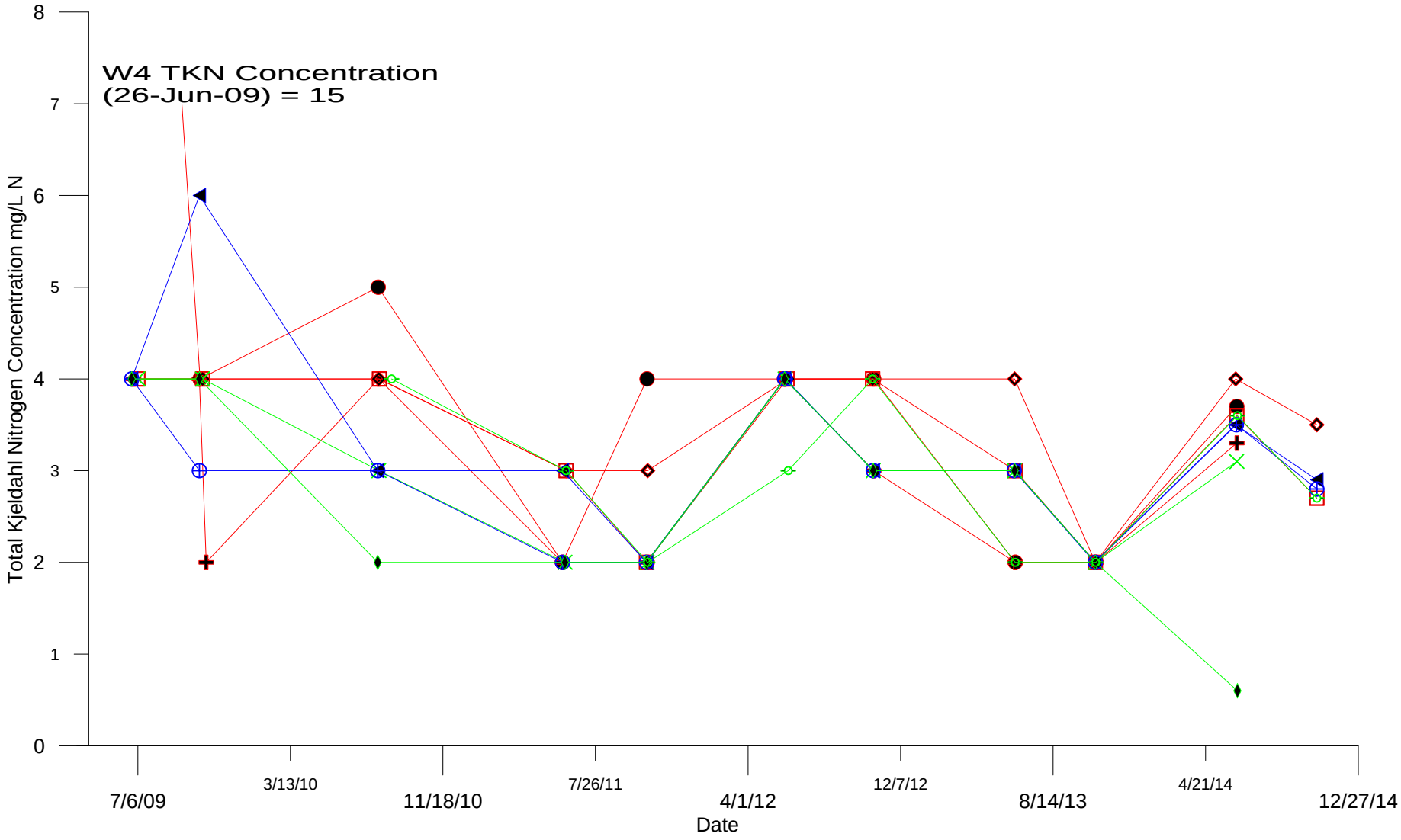
Dissolved Tin Concentration
Bedrock Wells

APRIL 2015	FIGURE 11	REV 0



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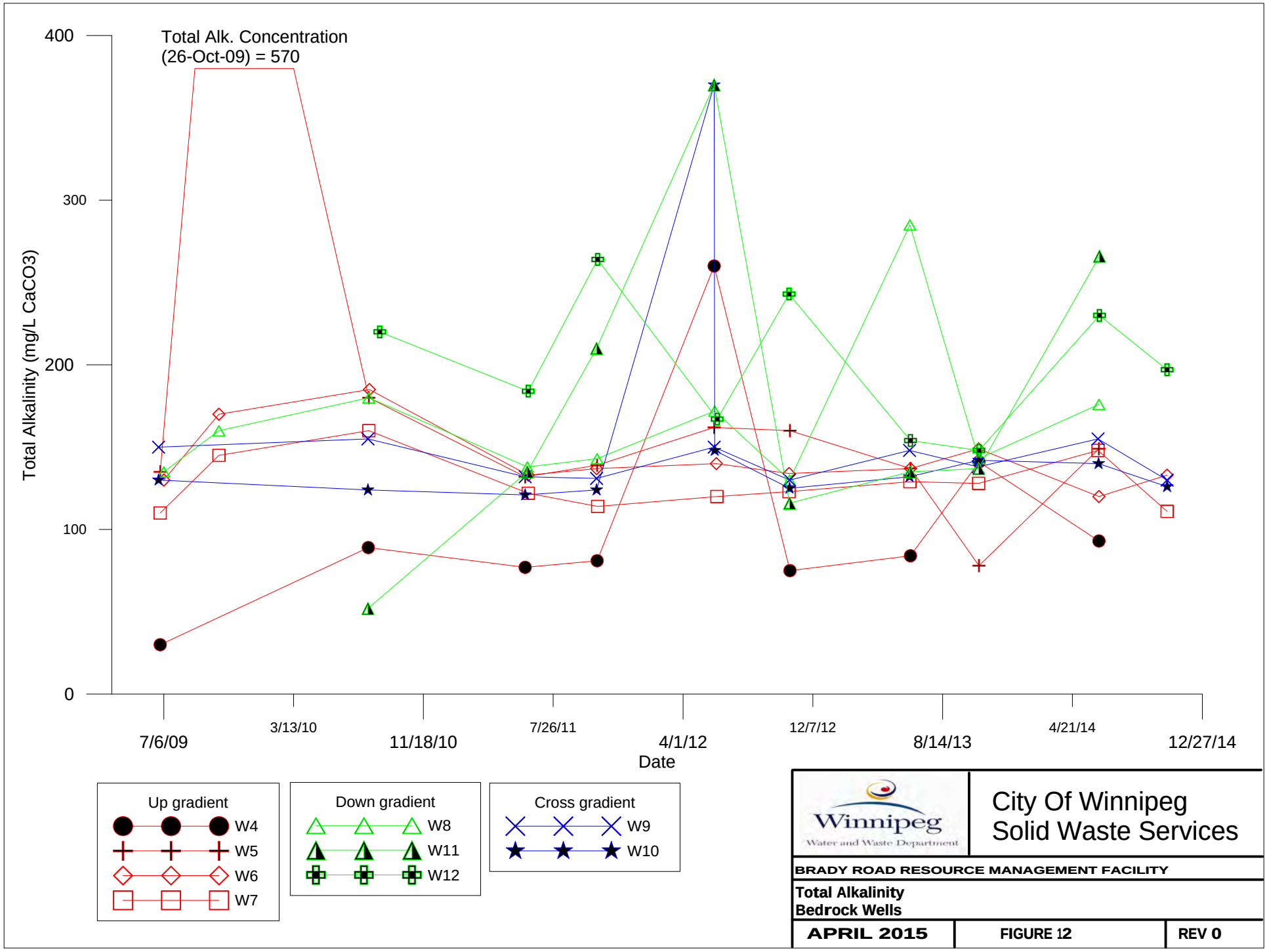
BRADY ROAD RESOURCE MANAGEMENT FACILITY

TKN Concentration
Bedrock Wells

APRIL 2015	FIGURE 12	REV 0



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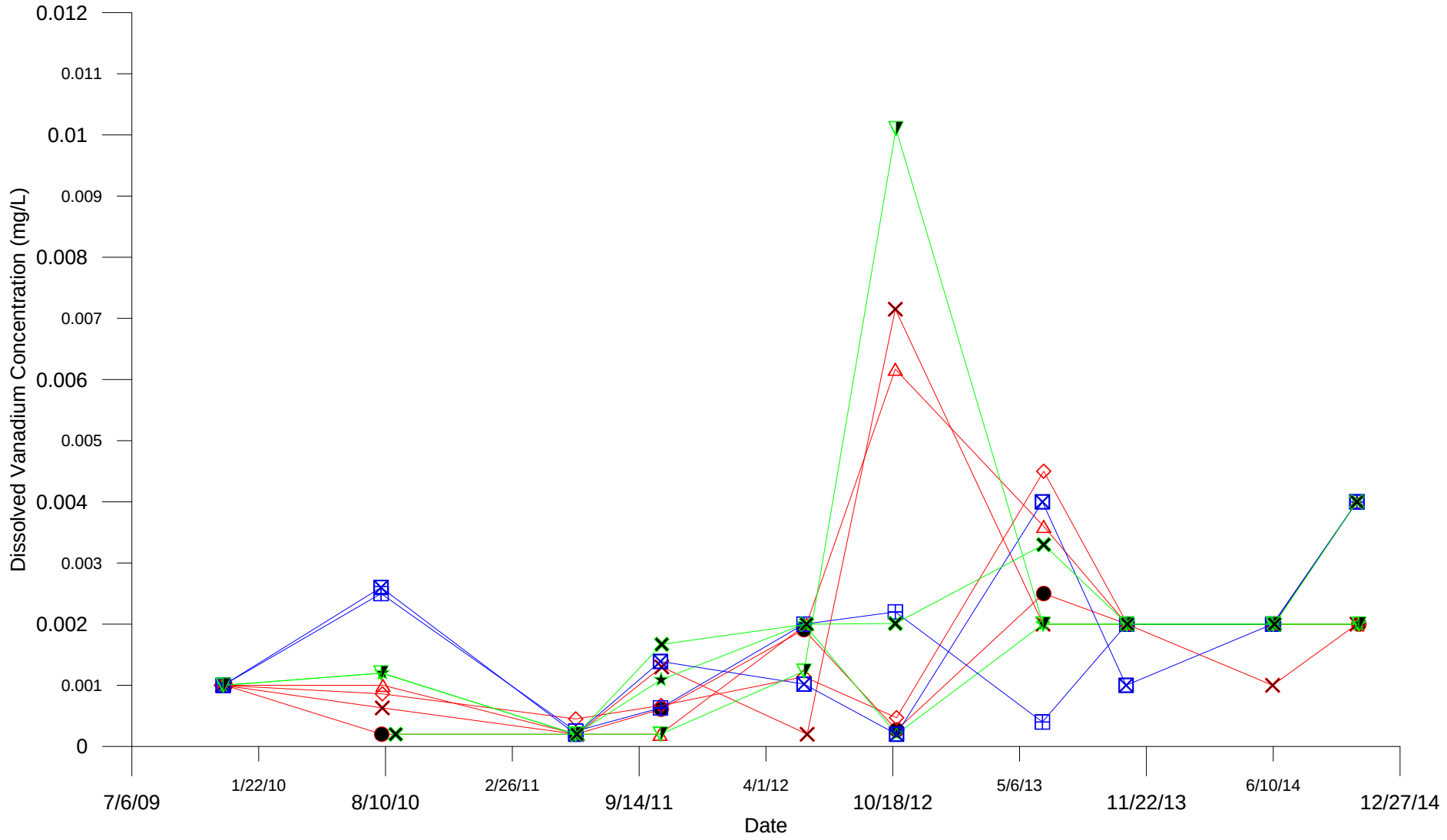
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Total Alkalinity
Bedrock Wells

APRIL 2015	FIGURE 12	REV 0



Vanadium MOE Criteria = 0.25 mg/L

Cross gradient
W9
W10

Up gradient
W4
W5
W6
W7

Down gradient
W8
W11
W12

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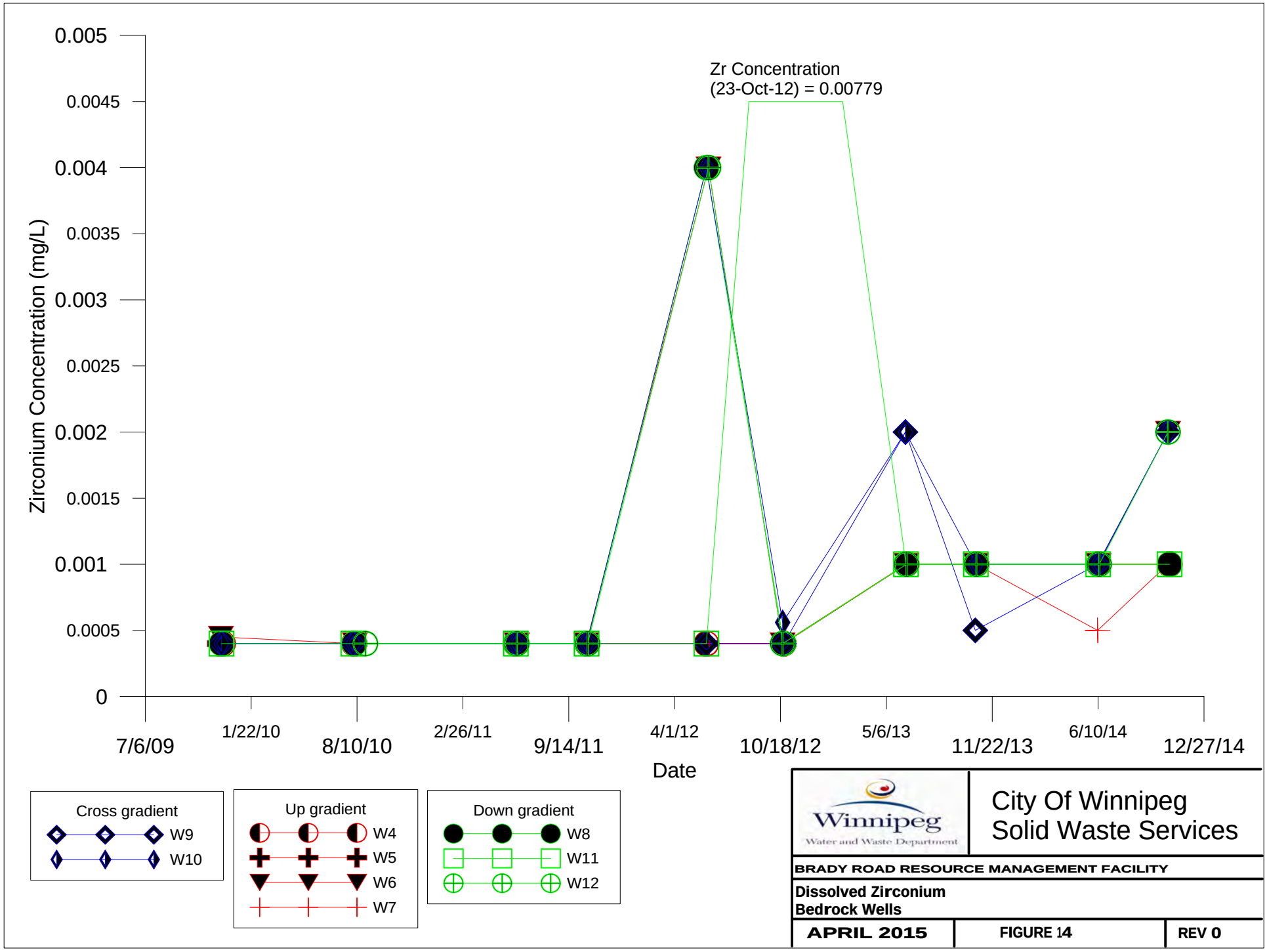
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Vanadium
Bedrock Wells

APRIL 2015	FIGURE 13	REV 0



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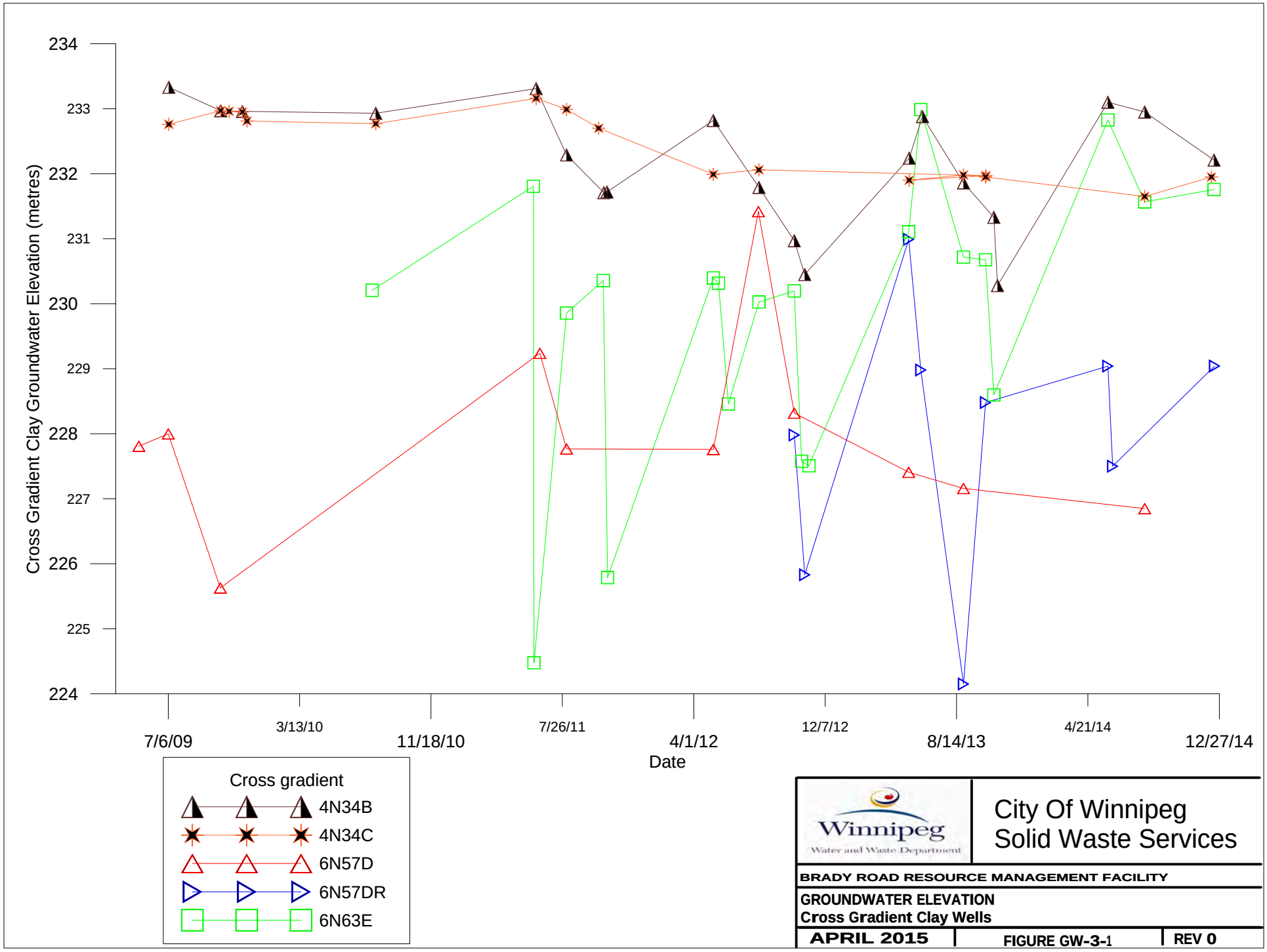
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Zirconium
Bedrock Wells

APRIL 2015	FIGURE 14	REV 0



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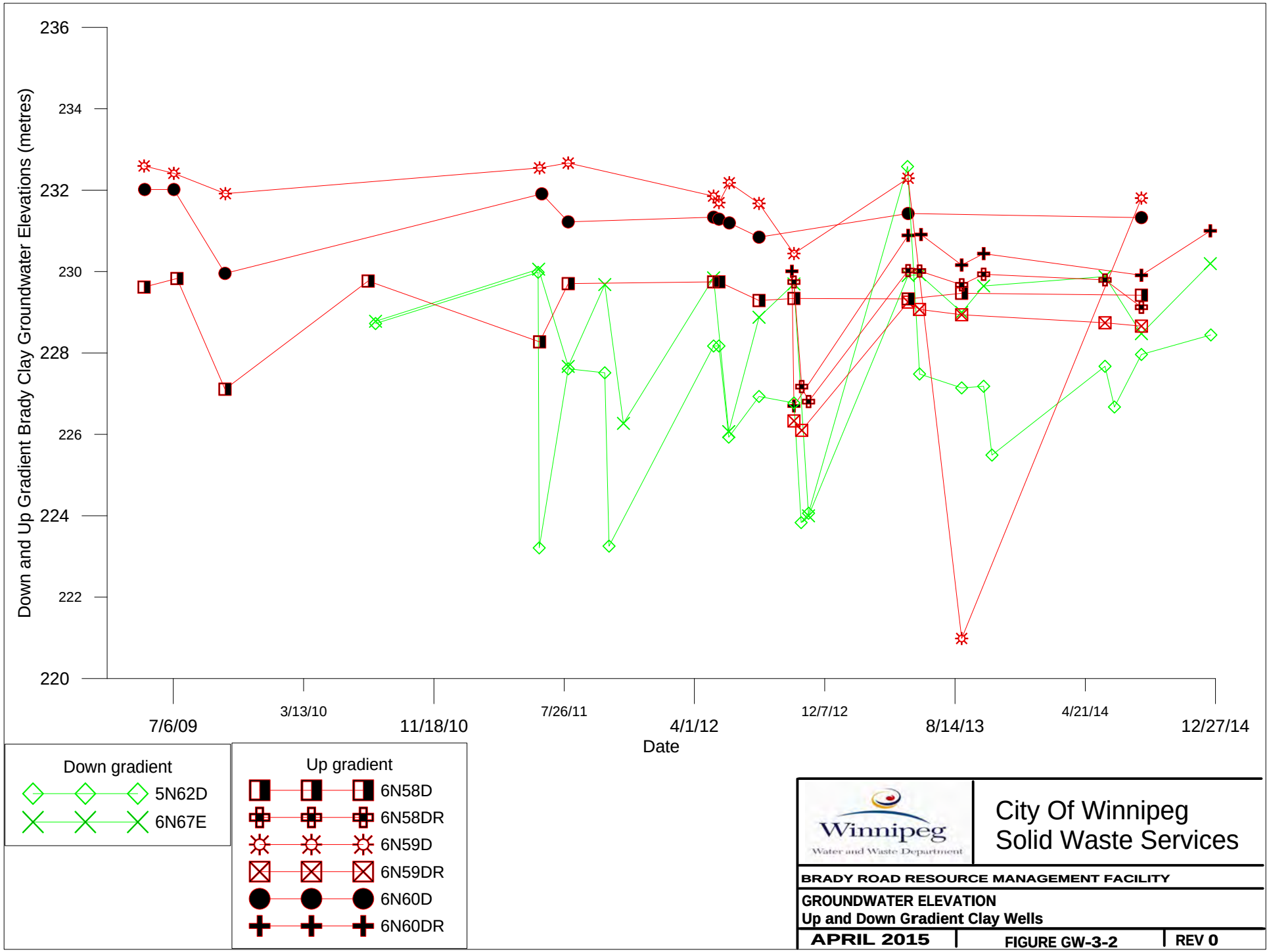
BRADY ROAD RESOURCE MANAGEMENT FACILITY

GROUNDWATER ELEVATION
Cross Gradient Clay Wells

APRIL 2015 | FIGURE GW-3-1 | REV 0



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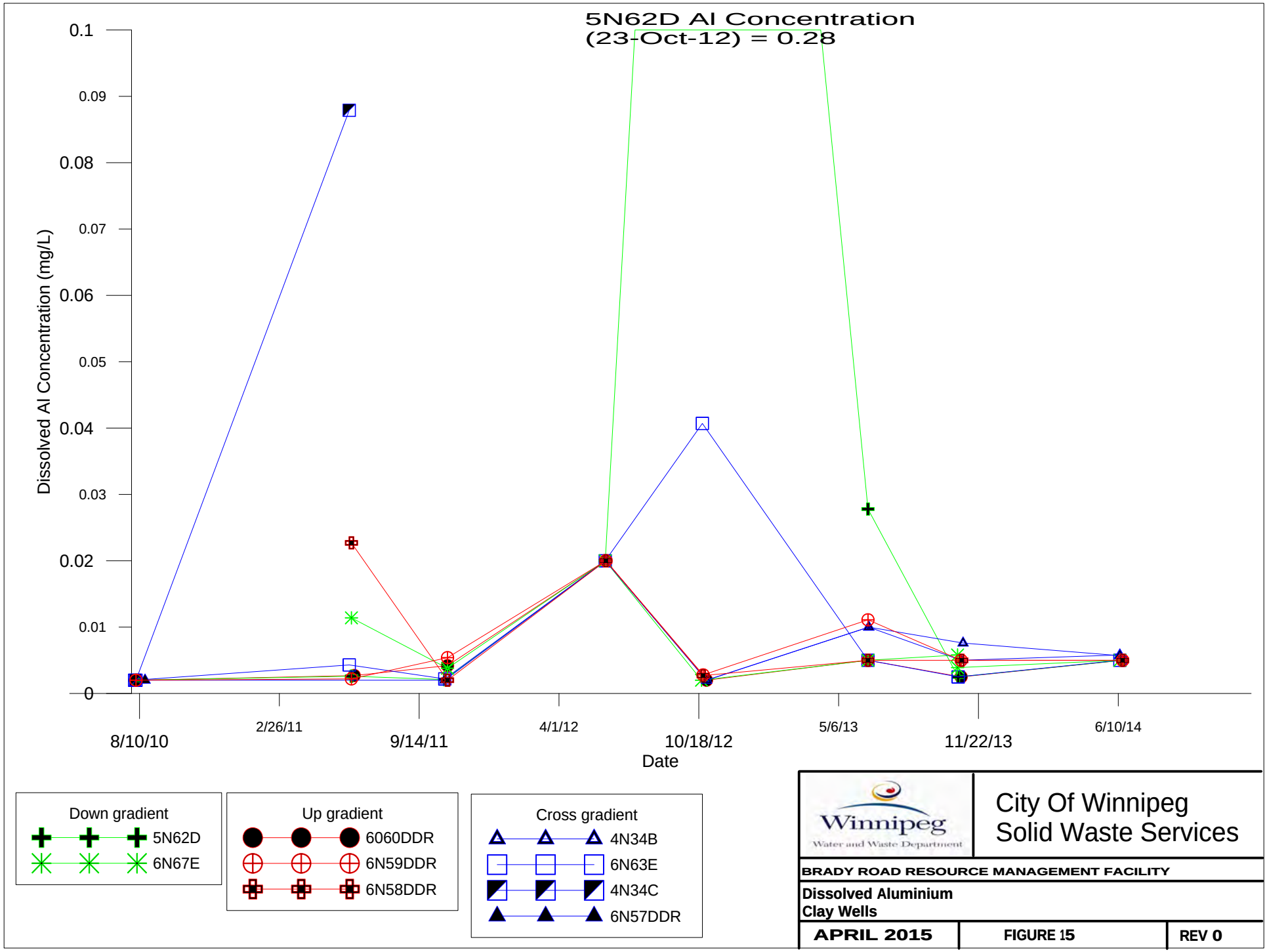
GROUNDWATER ELEVATION
Up and Down Gradient Clay Wells

APRIL 2015 | FIGURE GW-3-2 | REV 0


5N62D Al Concentration
(23-Oct-12) = 0.28
Dissolved Al Concentration (mg/L)
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
8/10/10
2/26/11
9/14/11
4/1/12
10/18/12
5/6/13
11/22/13
6/10/14
Date
Down gradient
5N62D
6N67E
Up gradient
6060DDR
6N59DDR
6N58DDR
Cross gradient
4N34B
6N63E
4N34C
6N57DDR
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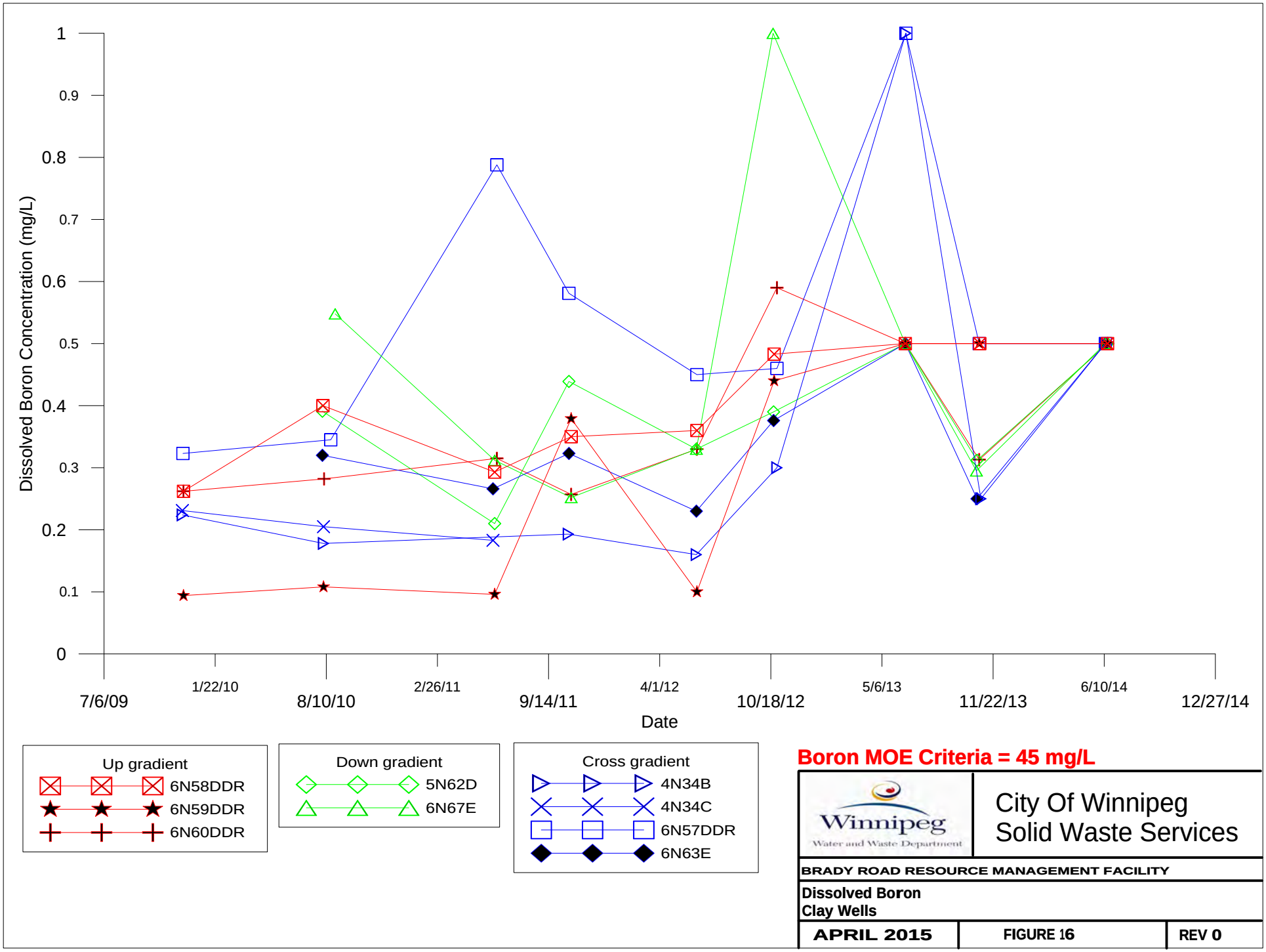
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Aluminium
Clay Wells
APRIL 2015
FIGURE 15
REV 0



Boron MOE Criteria = 45 mg/L

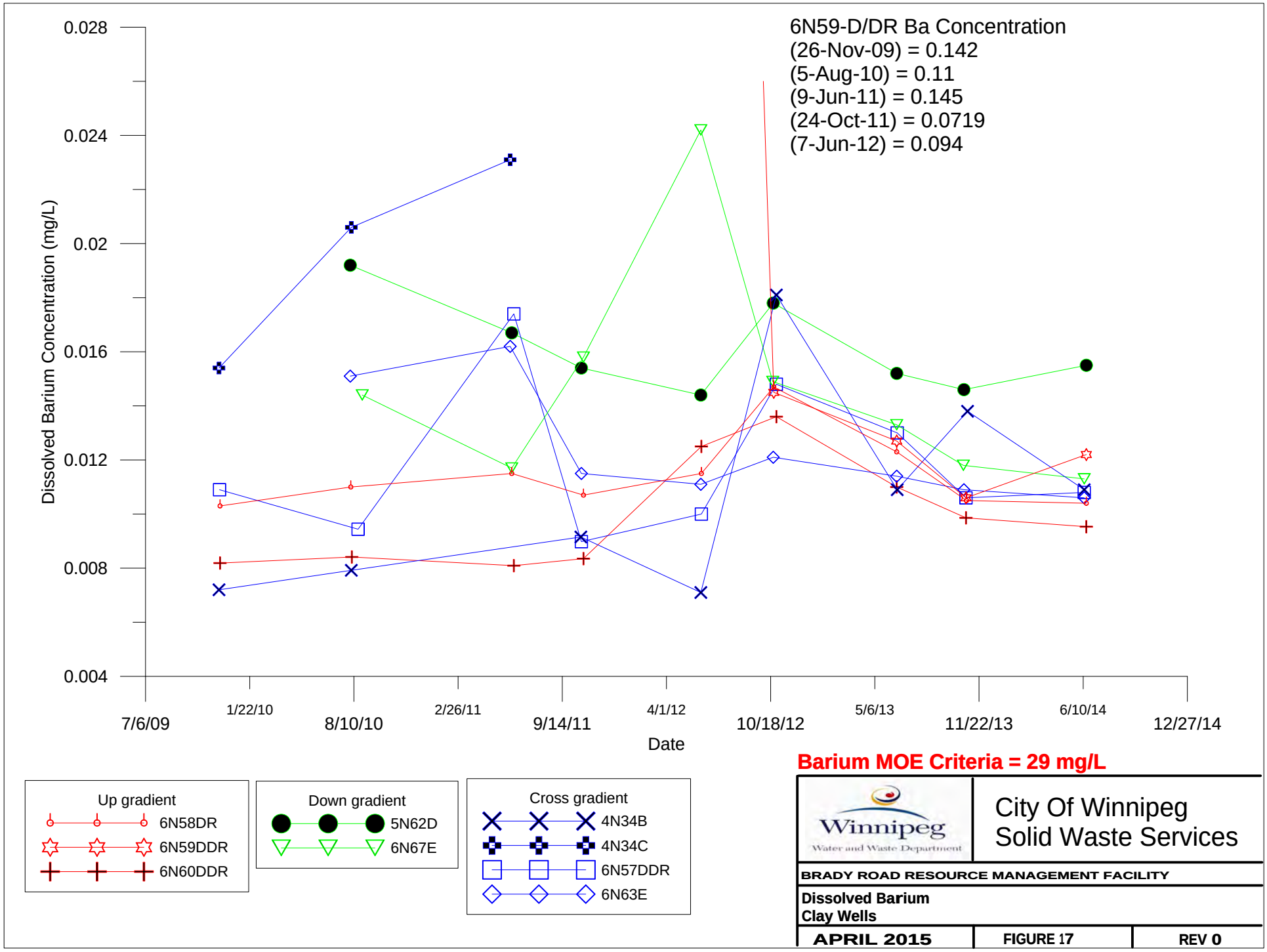
Winnipeg Water and Waste Department

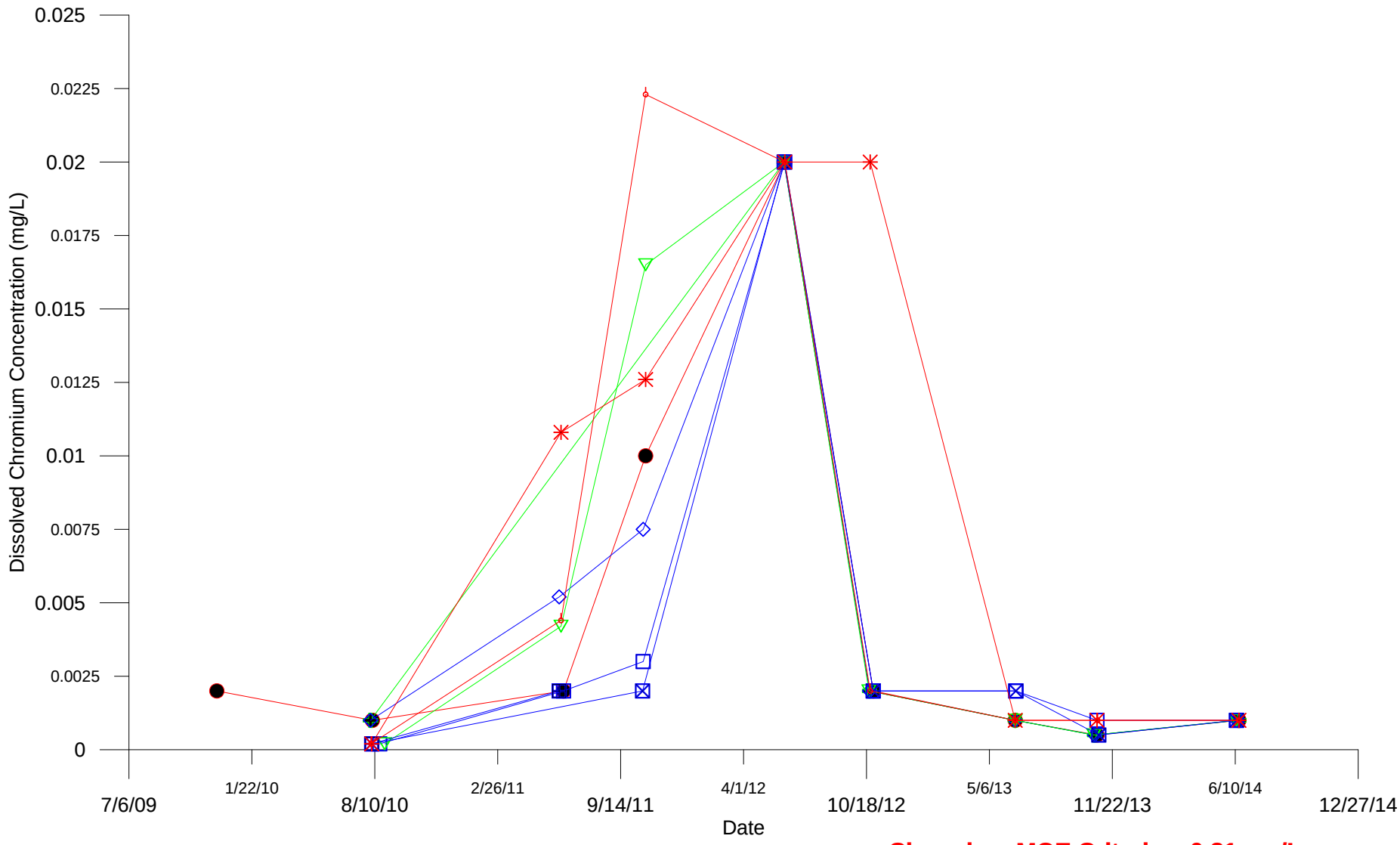
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Boron
Clay Wells

APRIL 2015	FIGURE 16	REV 0


6N59-D/DR Ba Concentration
(26-Nov-09) = 0.142
(5-Aug-10) = 0.11
(9-Jun-11) = 0.145
(24-Oct-11) = 0.0719
(7-Jun-12) = 0.094
Dissolved Barium Concentration (mg/L)
0.028
0.024
0.02
0.016
0.012
0.008
0.004
7/6/09
1/22/10
8/10/10
2/26/11
9/14/11
4/1/12
10/18/12
5/6/13
11/22/13
6/10/14
12/27/14
Date
Up gradient
6N58DR
6N59DDR
6N60DDR
Down gradient
5N62D
6N67E
Cross gradient
4N34B
4N34C
6N57DDR
6N63E
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 2015
FIGURE 17
REV 0



Chromium MOE Criteria = 0.81 mg/L

Up gradient
- 6N58DDR
- 6N59DDR
- 6N60DDR

Down gradient
- 5N62D
- 6N67E

Cross gradient
- 4N34B
- 4N34C
- 6N57DDR
- 6N63E

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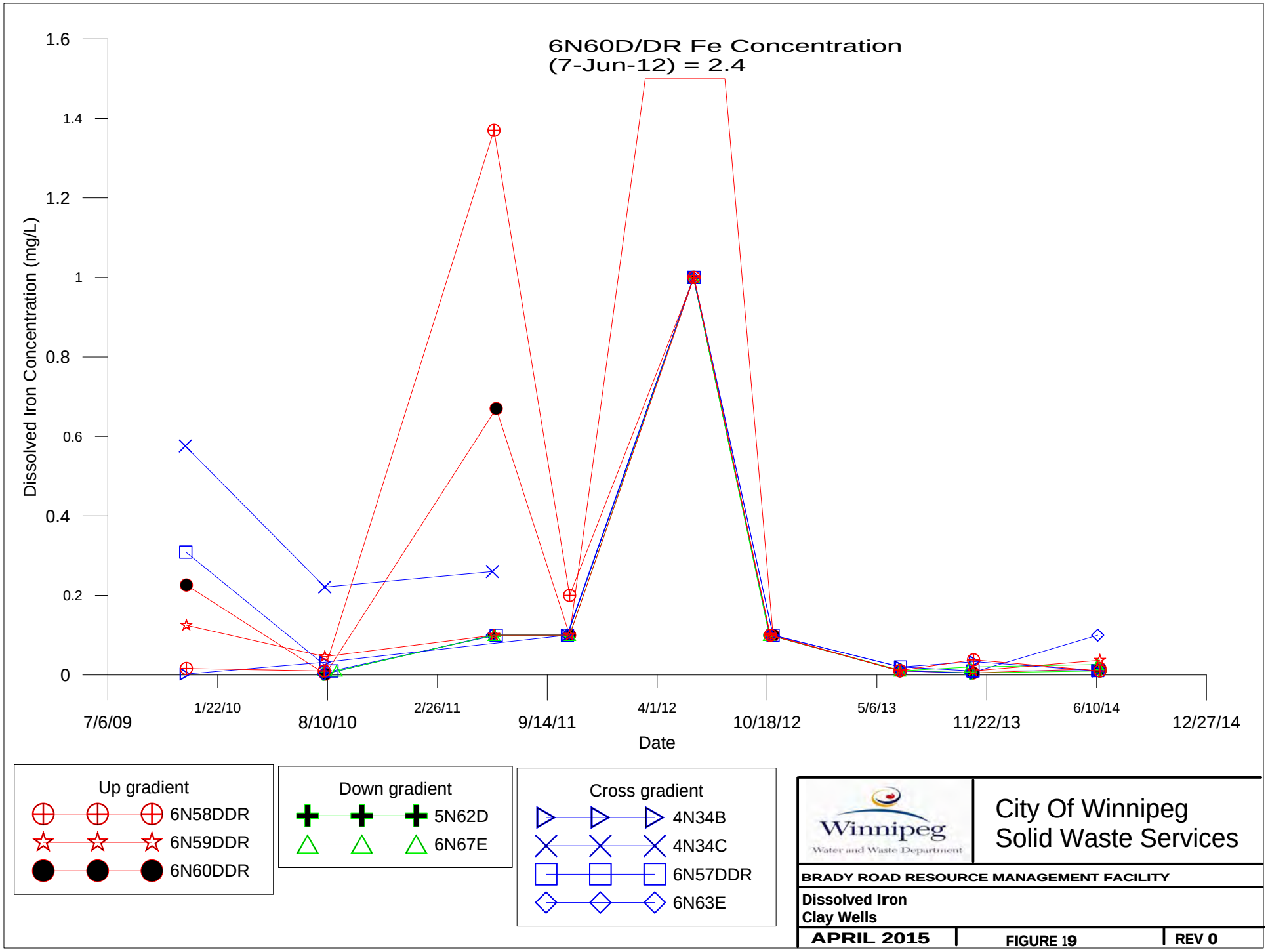
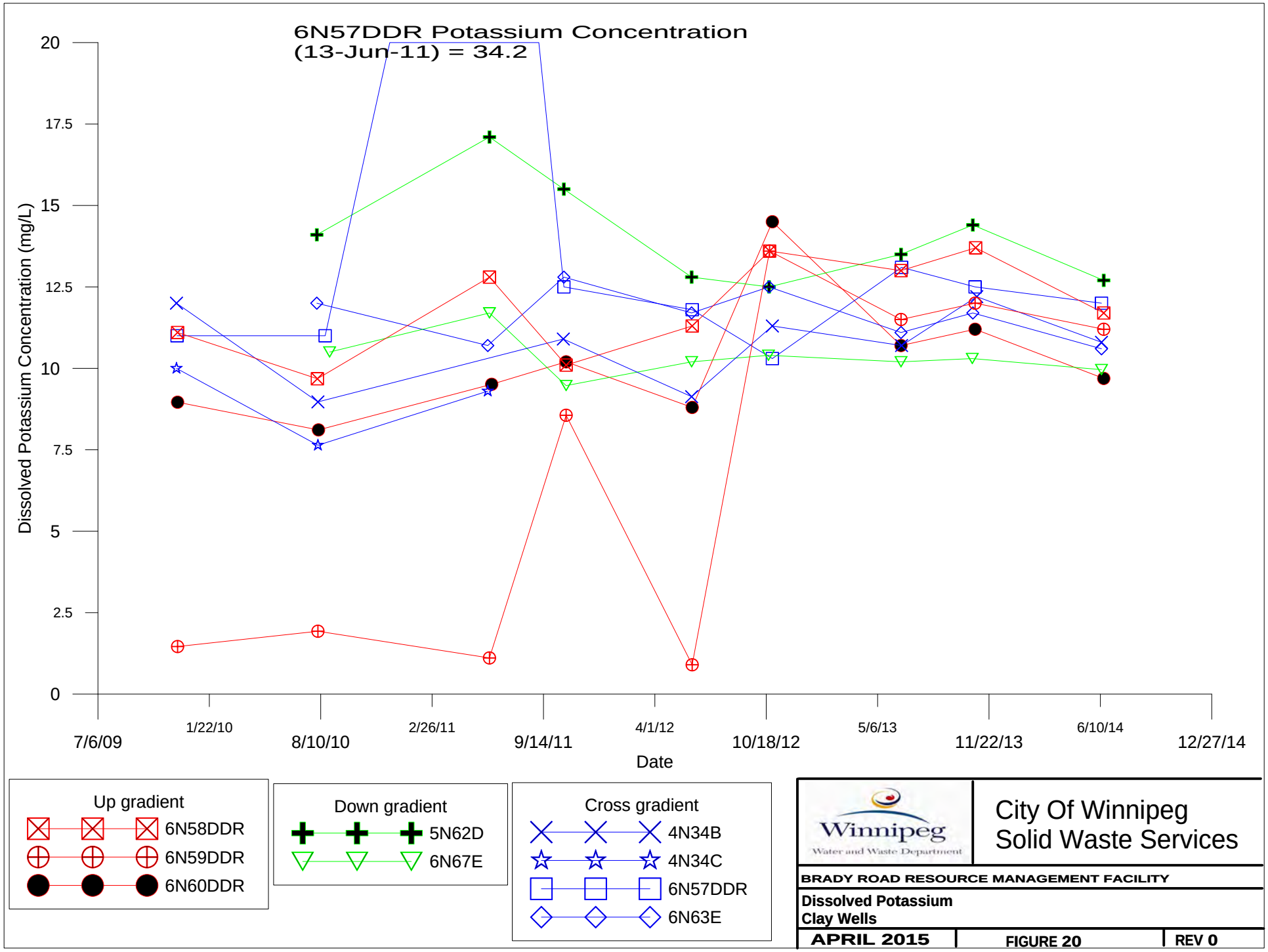
City Of Winnipeg
Solid Waste Services

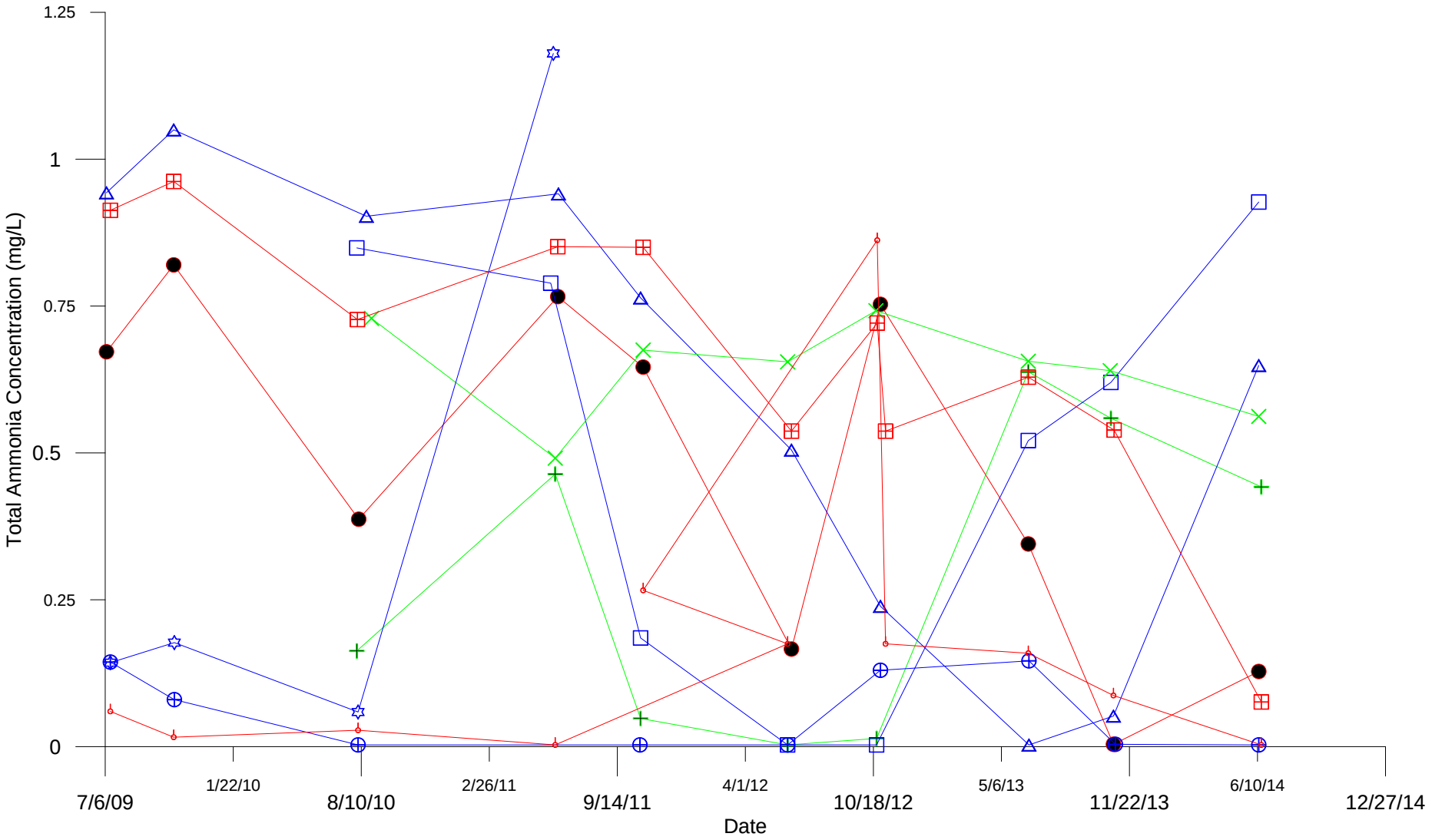
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Chromium
Clay Wells

APRIL 2015 | FIGURE 18 | REV 0


6N60D/DR Fe Concentration
(7-Jun-12) = 2.4
Dissolved Iron Concentration (mg/L)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
7/6/09
1/22/10
8/10/10
2/26/11
9/14/11
4/1/12
10/18/12
5/6/13
11/22/13
6/10/14
12/27/14
Date
Up gradient
6N58DDR
6N59DDR
6N60DDR
Down gradient
5N62D
6N67E
Cross gradient
4N34B
4N34C
6N57DDR
6N63E
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Iron
Clay Wells
APRIL 2015
FIGURE 19
REV 0


6N57DDR Potassium Concentration
(13-Jun-11) = 34.2
Dissolved Potassium Concentration (mg/L)
20
17.5
15
12.5
10
7.5
5
2.5
0
7/6/09
1/22/10
8/10/10
2/26/11
9/14/11
4/1/12
10/18/12
5/6/13
11/22/13
6/10/14
12/27/14
Date
Up gradient
6N58DDR
6N59DDR
6N60DDR
Down gradient
5N62D
6N67E
Cross gradient
4N34B
4N34C
6N57DDR
6N63E
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Potassium
Clay Wells
APRIL 2015
FIGURE 20
REV 0



Up gradient
6N58DDR
6N59DDR
6N60DDR

Down gradient
5N62D
6N67E

Cross gradient
4N34B
4N34C
6N57DDR
6N63E

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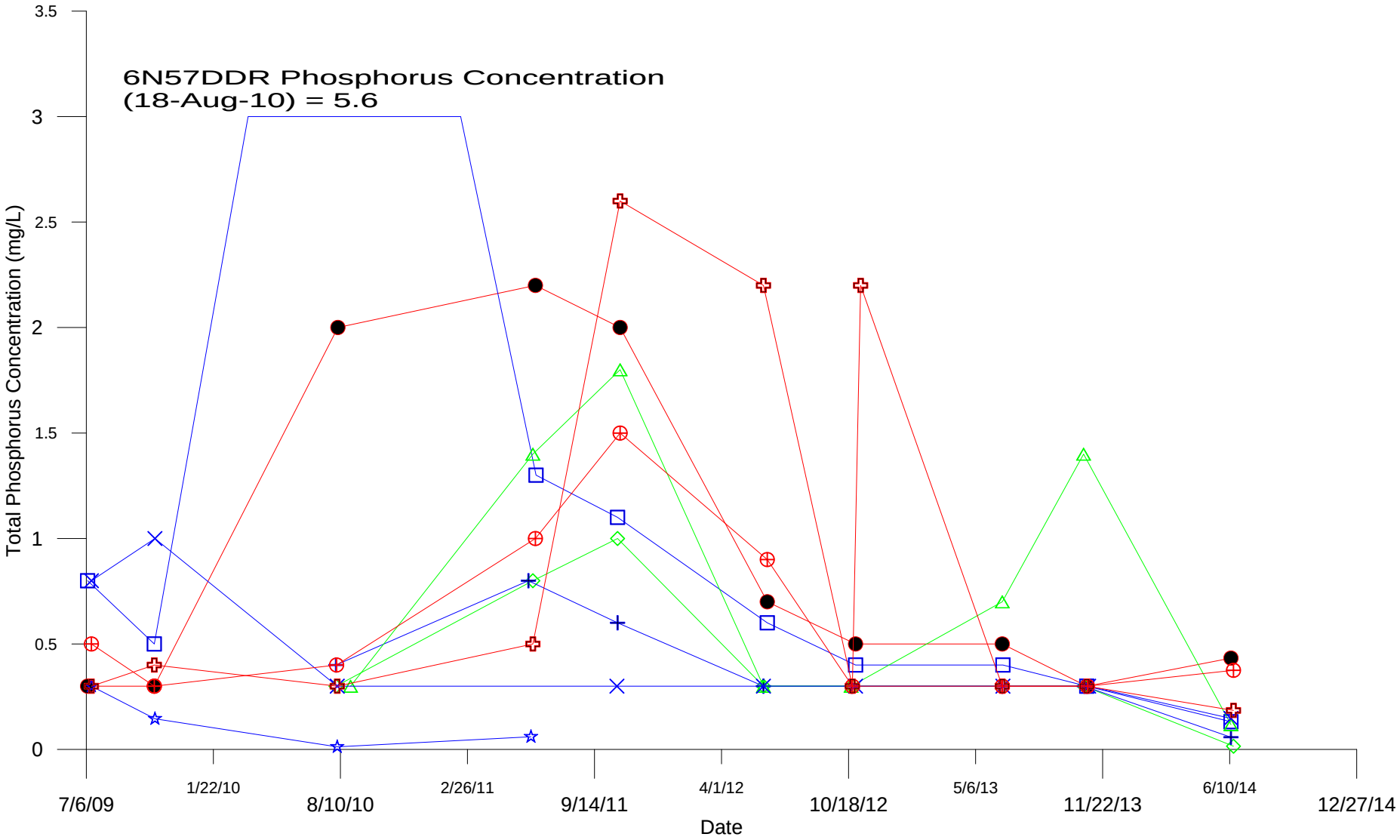
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Total Ammonia
Clay Wells

APRIL 2015 | FIGURE 21 | REV 0



Up gradient
- 6N58DDR
- 6N60DDR
- 6N59DDR

Down gradient
- 5N62D
- 6N67E

Cross gradient
- 4N34B
- 4N34C
- 6N57DDR
- 6N63E

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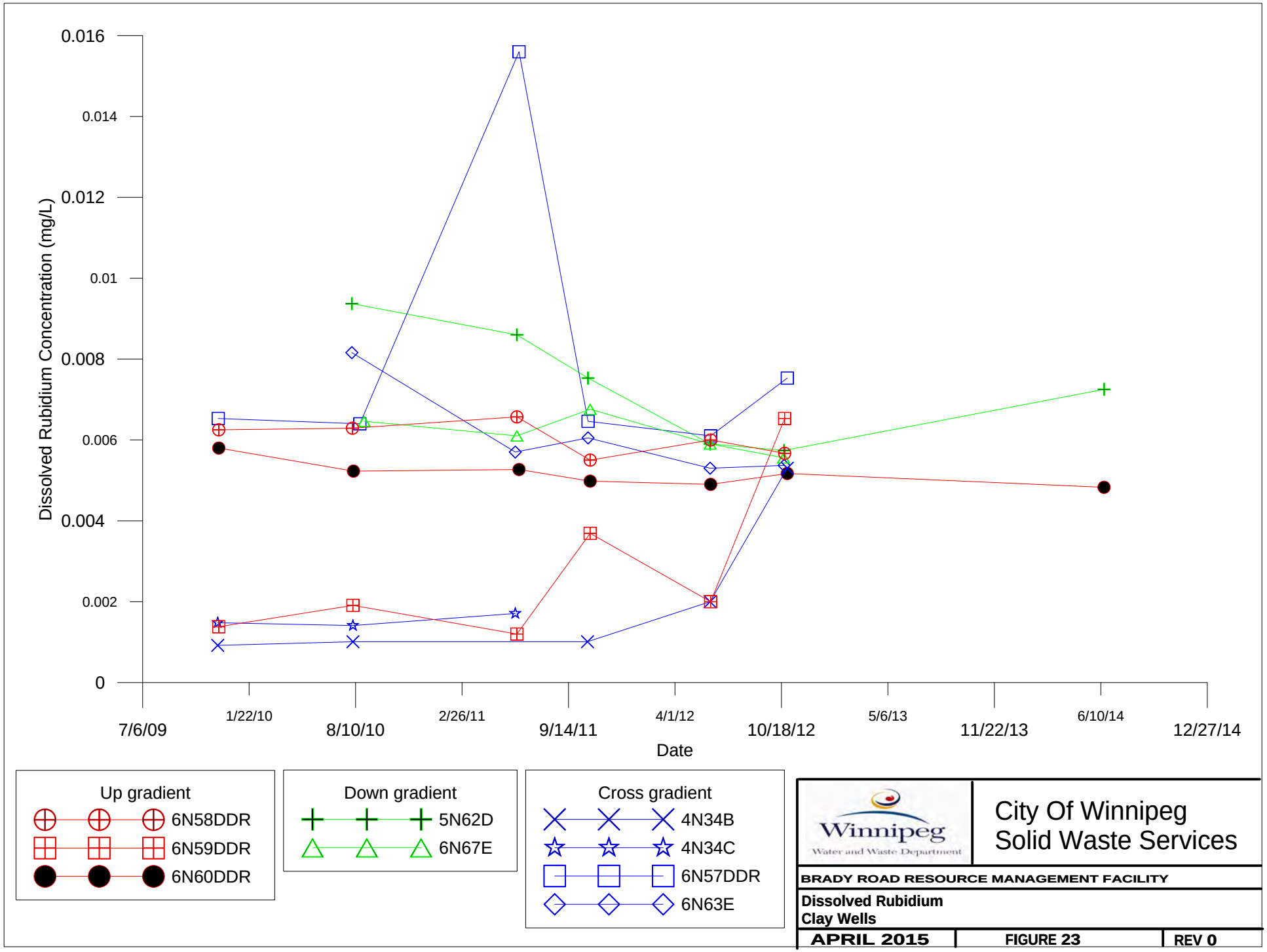
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Total Phosphorus
Clay Wells

APRIL 2015	FIGURE 22	REV 0



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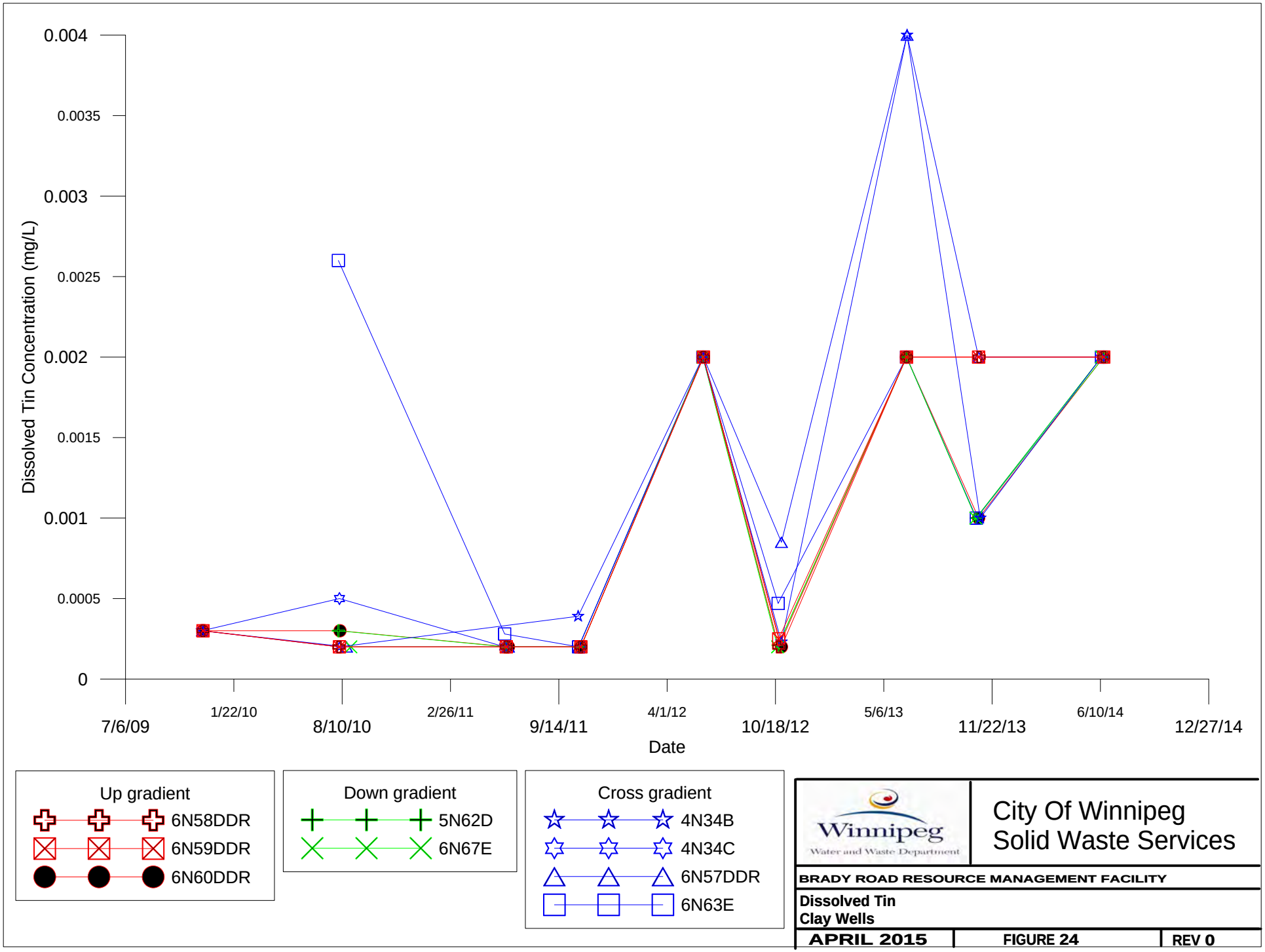
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Rubidium
Clay Wells

APRIL 2015	FIGURE 23	REV 0



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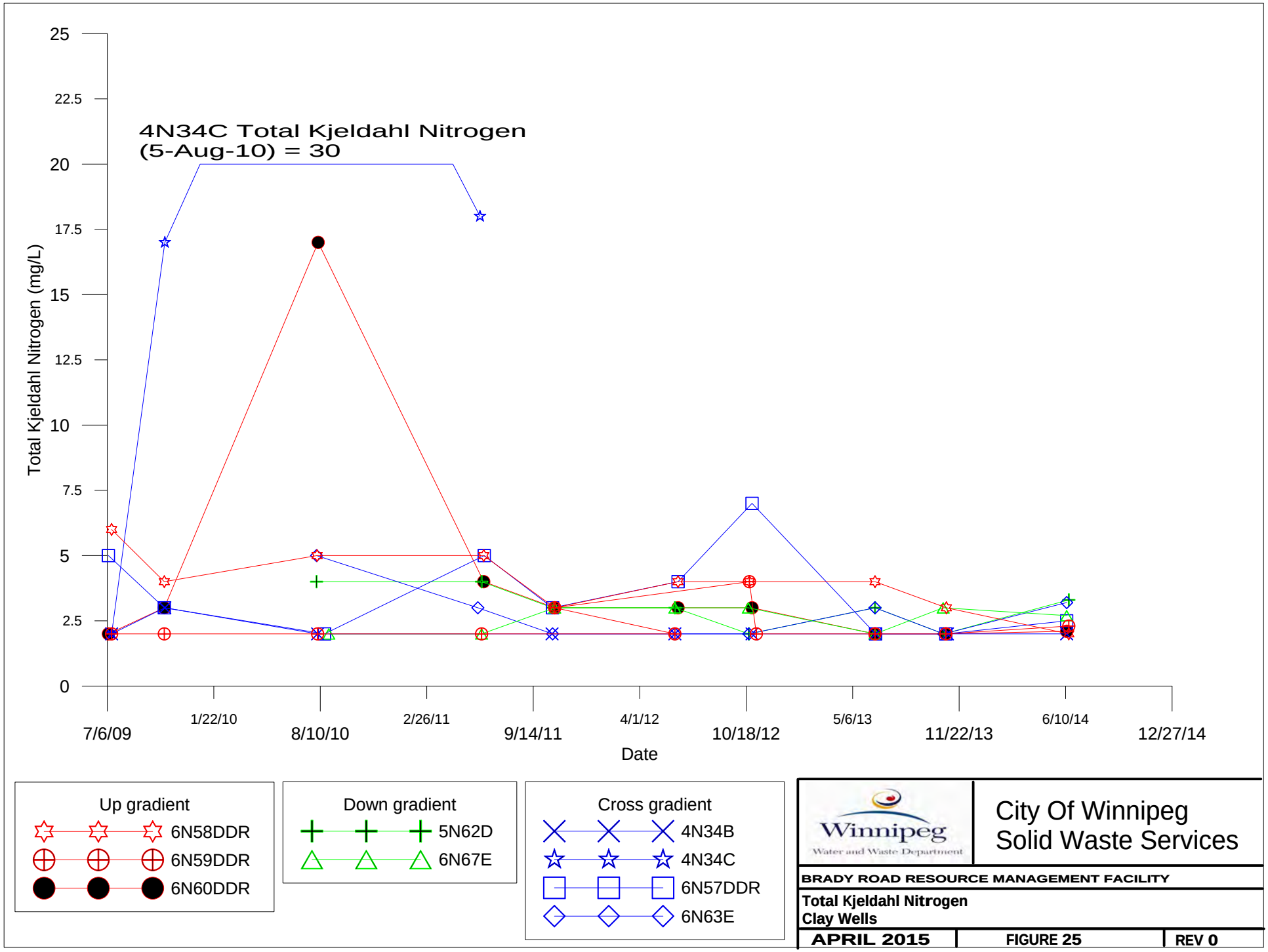
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Tin
Clay Wells

APRIL 2015	FIGURE 24	REV 0



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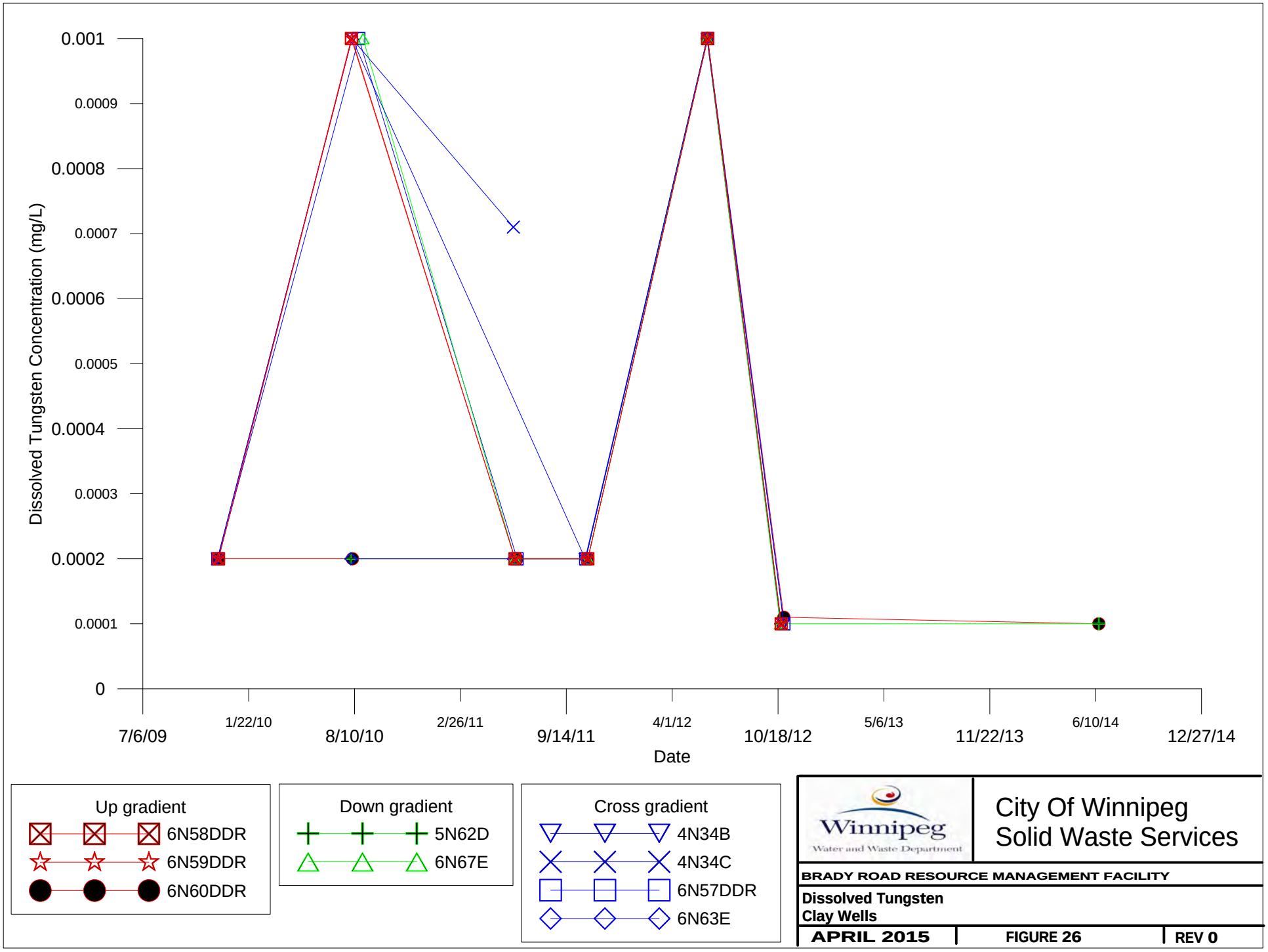
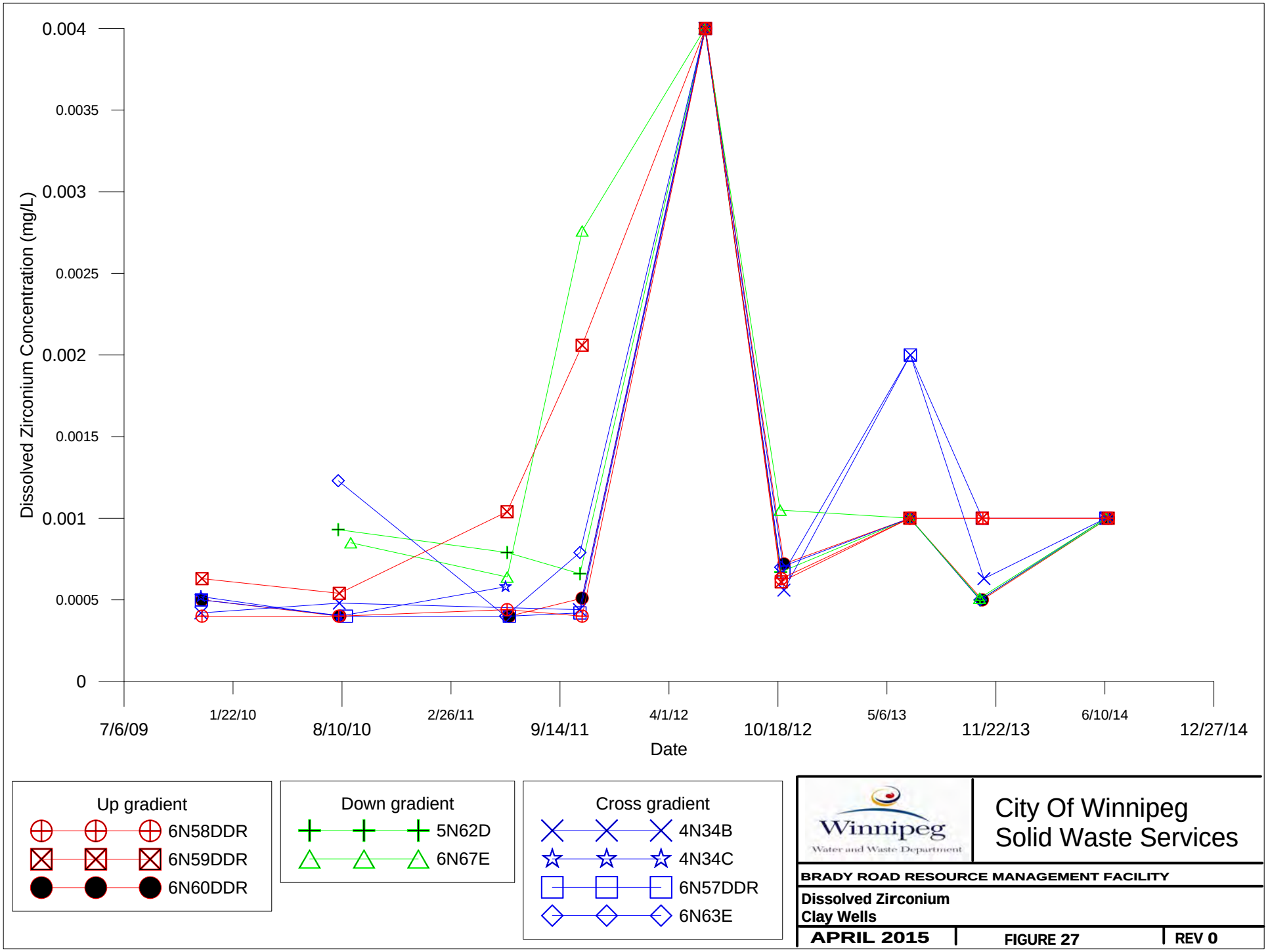
Solid Waste Services

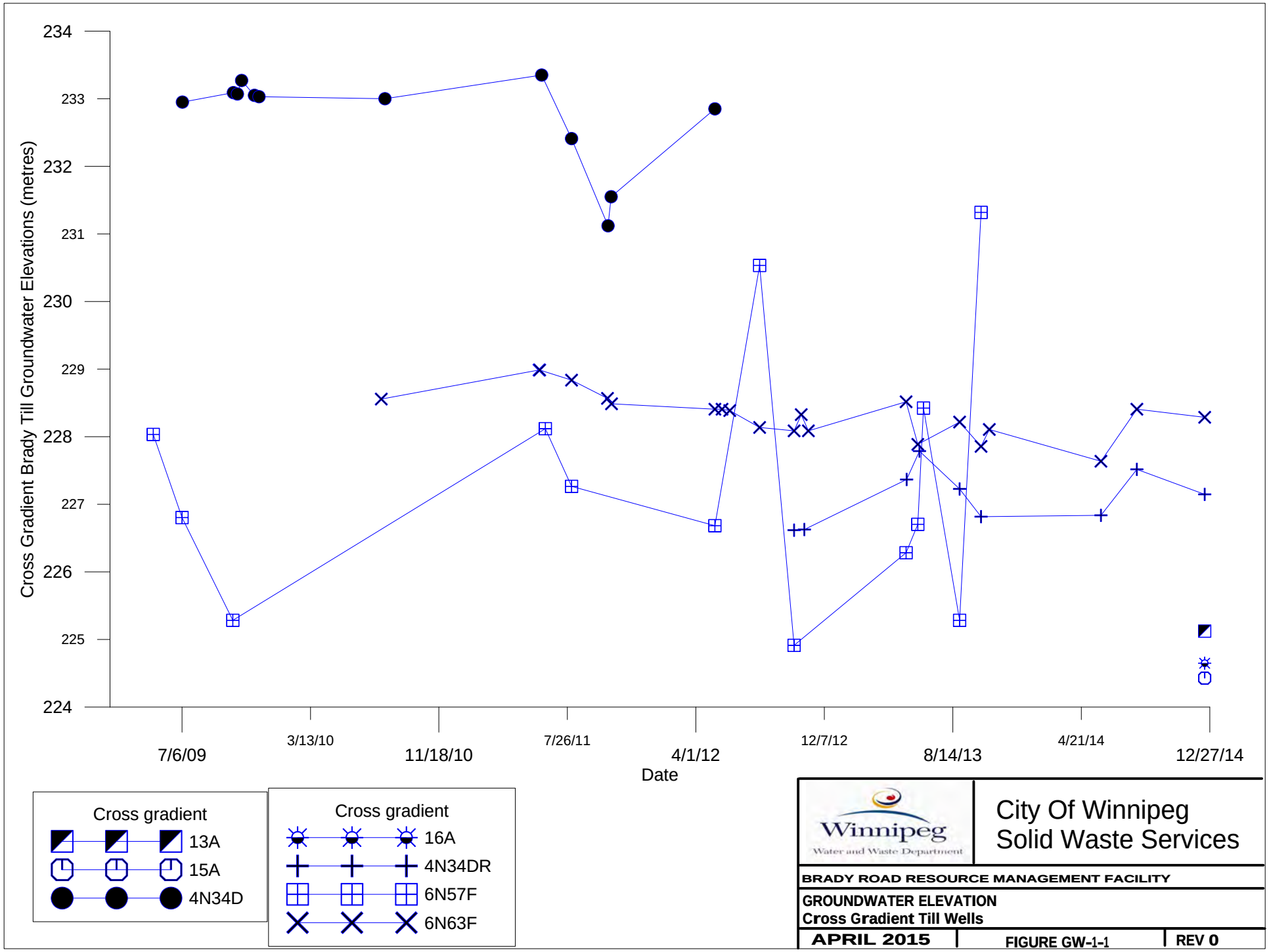
BRADY ROAD RESOURCE MANAGEMENT FACILITY

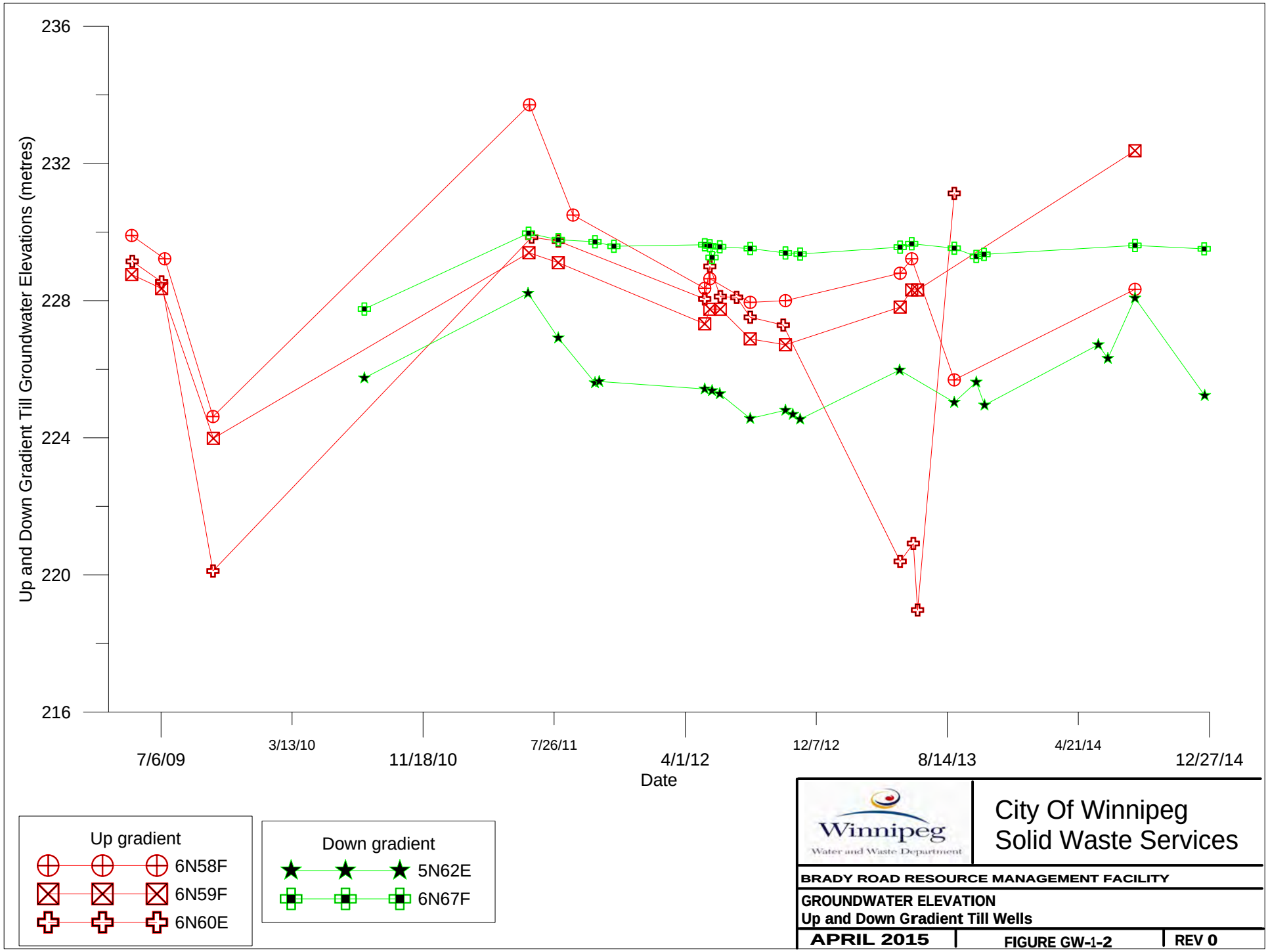
Total Kjeldahl Nitrogen
Clay Wells

APRIL 2015	FIGURE 25	REV 0


0.001
0.0009
0.0008
0.0007
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
0
Dissolved Tungsten Concentration (mg/L)
7/6/09
1/22/10
8/10/10
2/26/11
9/14/11
4/1/12
10/18/12
5/6/13
11/22/13
6/10/14
12/27/14
Date
Up gradient
6N58DDR
6N59DDR
6N60DDR
Down gradient
5N62D
6N67E
Cross gradient
4N34B
4N34C
6N57DDR
6N63E
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Tungsten
Clay Wells
APRIL 2015
FIGURE 26
REV 0


0.004
0.0035
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
Dissolved Zirconium Concentration (mg/L)
7/6/09
1/22/10
8/10/10
2/26/11
9/14/11
4/1/12
10/18/12
5/6/13
11/22/13
6/10/14
12/27/14
Date
Up gradient
6N58DDR
6N59DDR
6N60DDR
Down gradient
5N62D
6N67E
Cross gradient
4N34B
4N34C
6N57DDR
6N63E
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Zirconium
Clay Wells
APRIL 2015
FIGURE 27
REV 0


Cross Gradient Brady Till Groundwater Elevations (metres)
234
233
232
231
230
229
228
227
226
225
224
7/6/09
3/13/10
11/18/10
7/26/11
4/1/12
12/7/12
8/14/13
4/21/14
12/27/14
Date
Cross gradient
13A
15A
4N34D
Cross gradient
16A
4N34DR
6N57F
6N63F
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
GROUNDWATER ELEVATION
Cross Gradient Till Wells
APRIL 2015
FIGURE GW-1-1
REV 0



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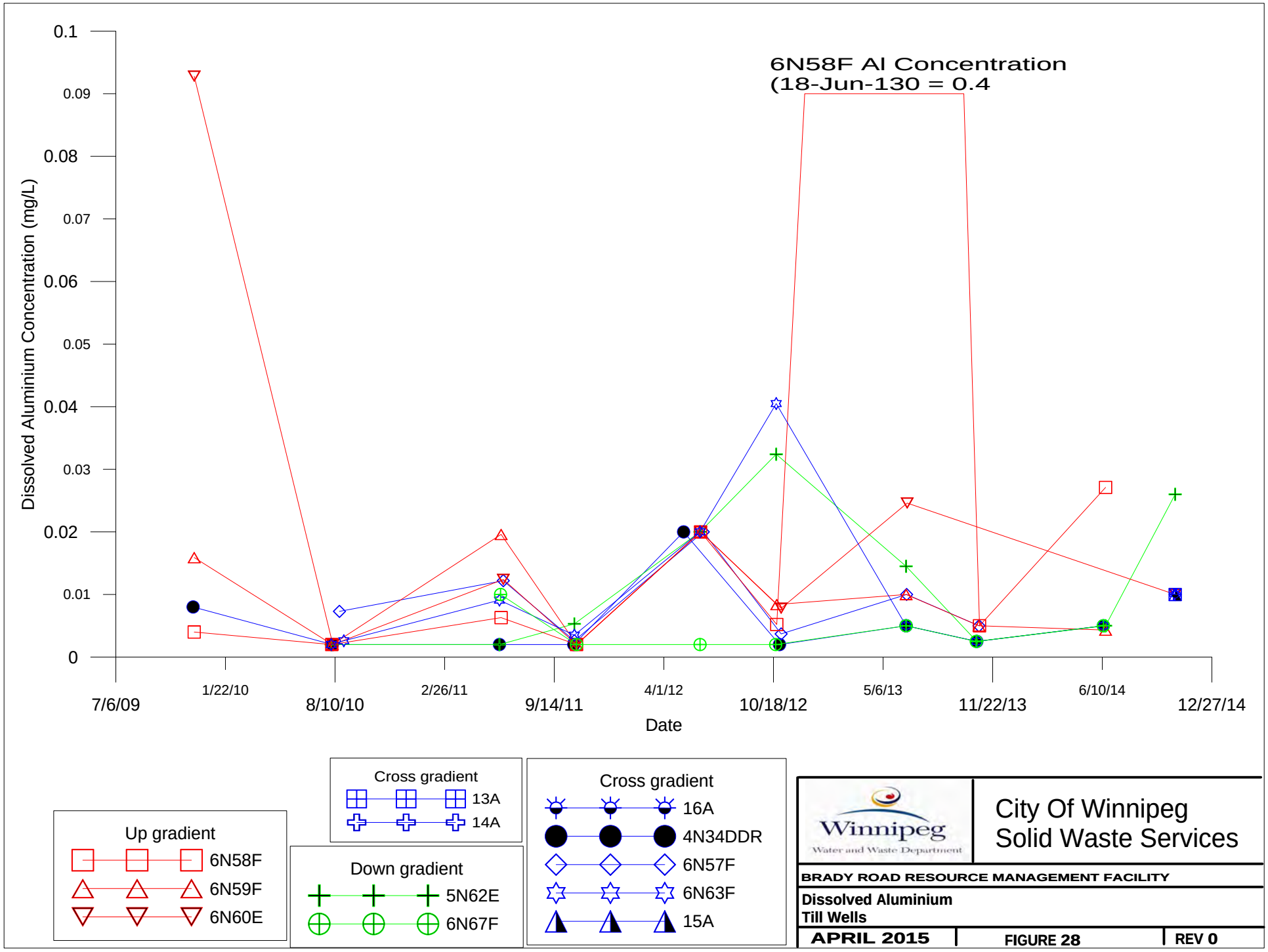
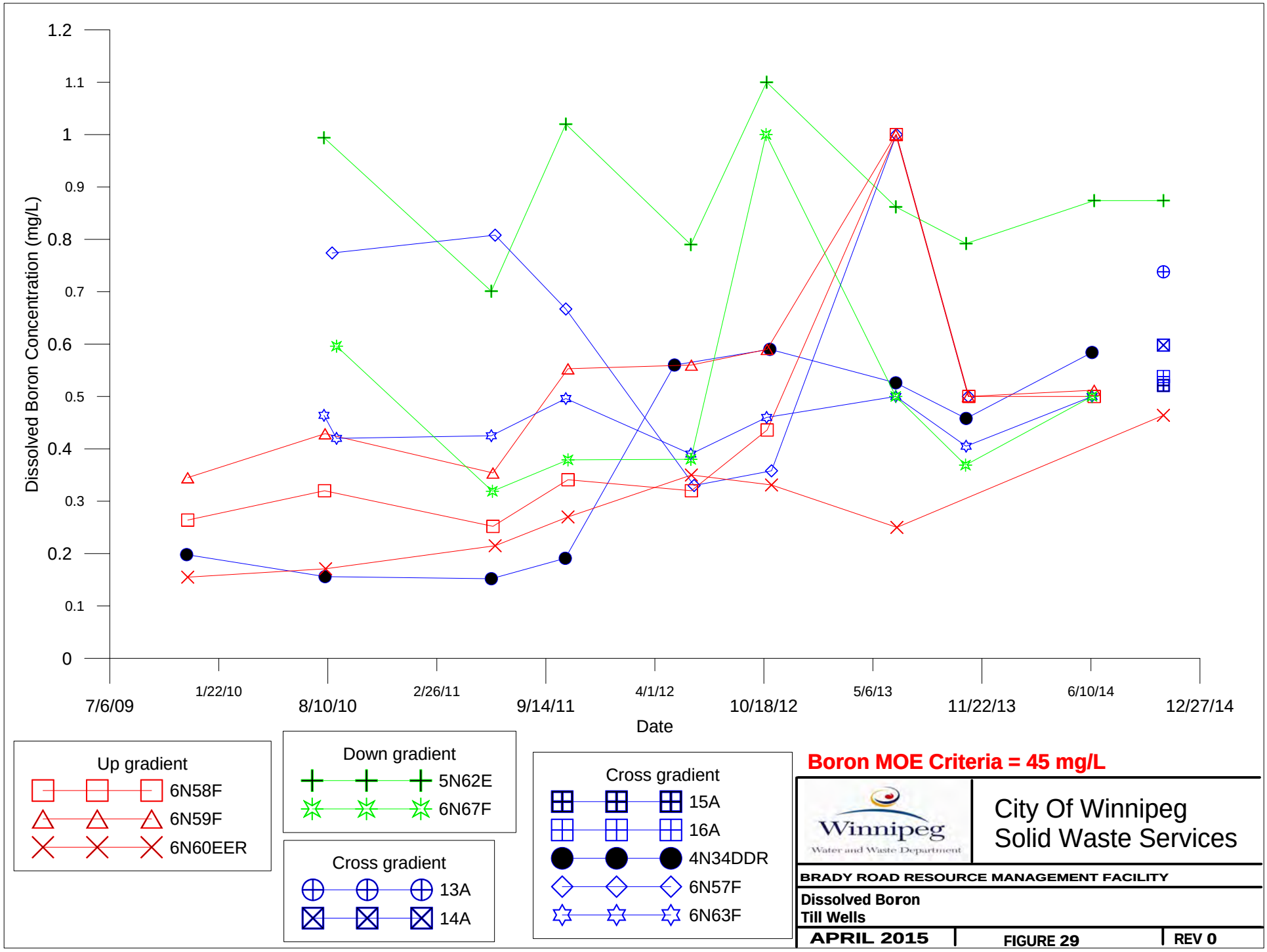
Solid Waste Services

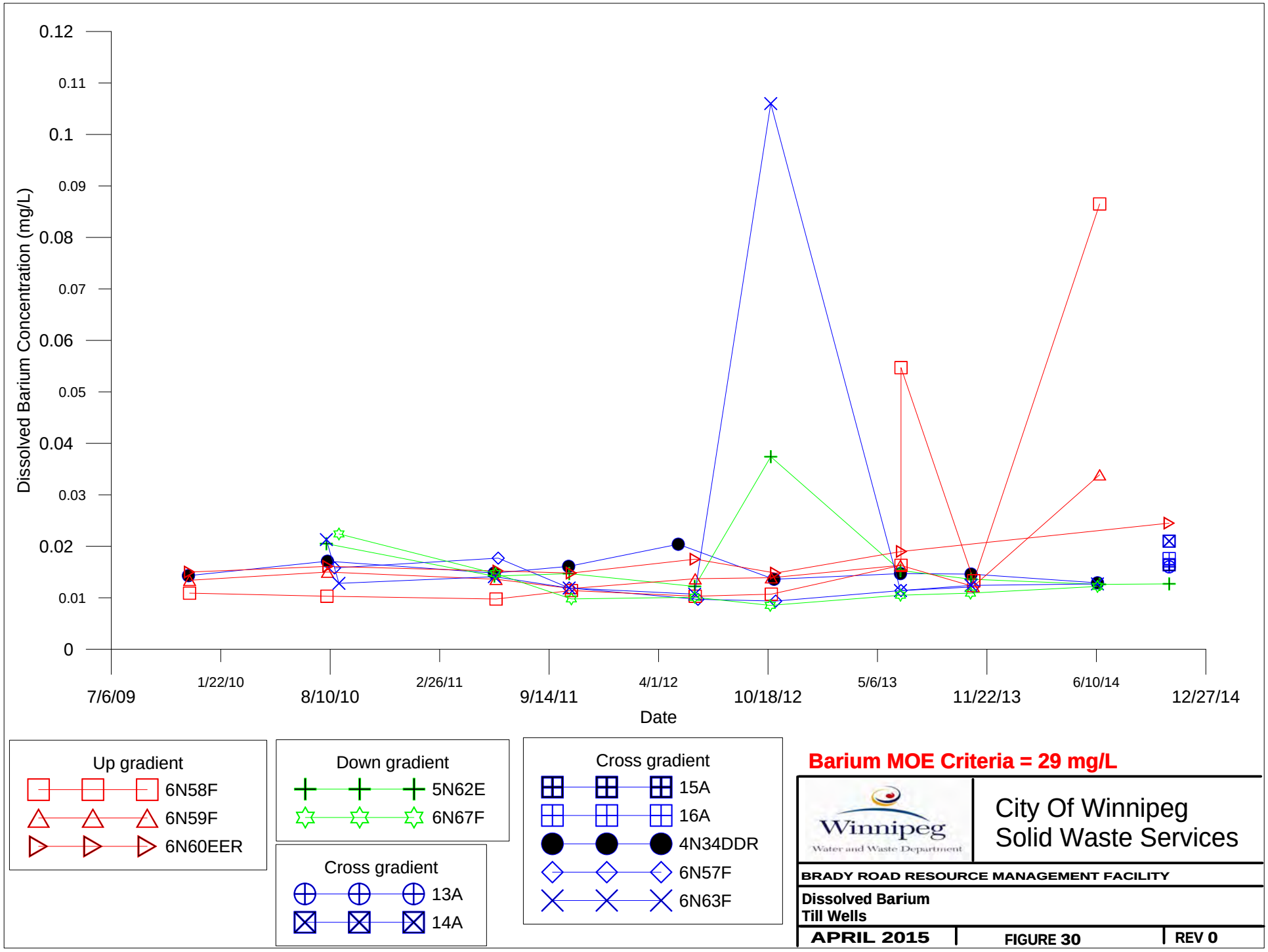
BRADY ROAD RESOURCE MANAGEMENT FACILITY

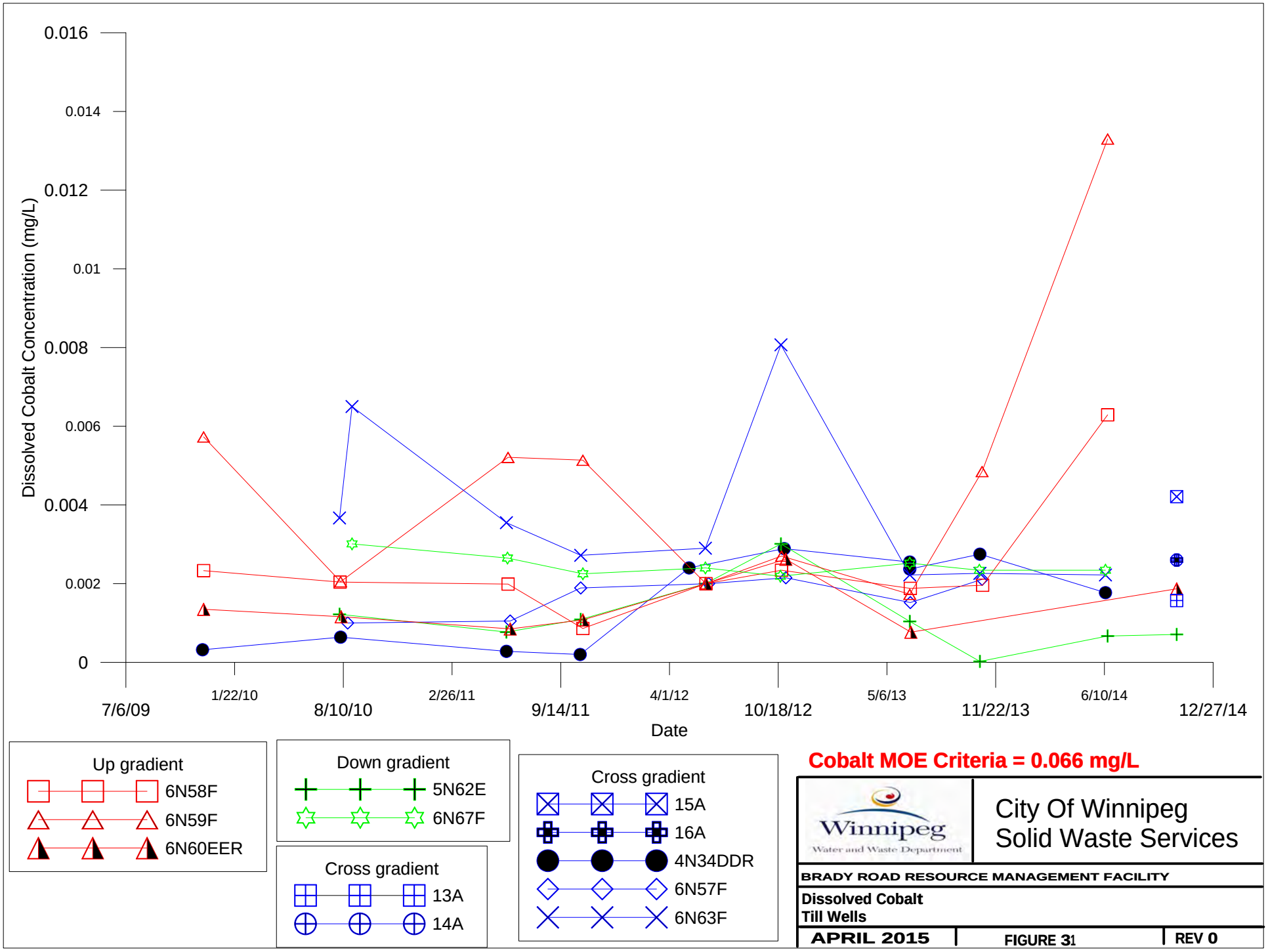
GROUNDWATER ELEVATION
Up and Down Gradient Till Wells

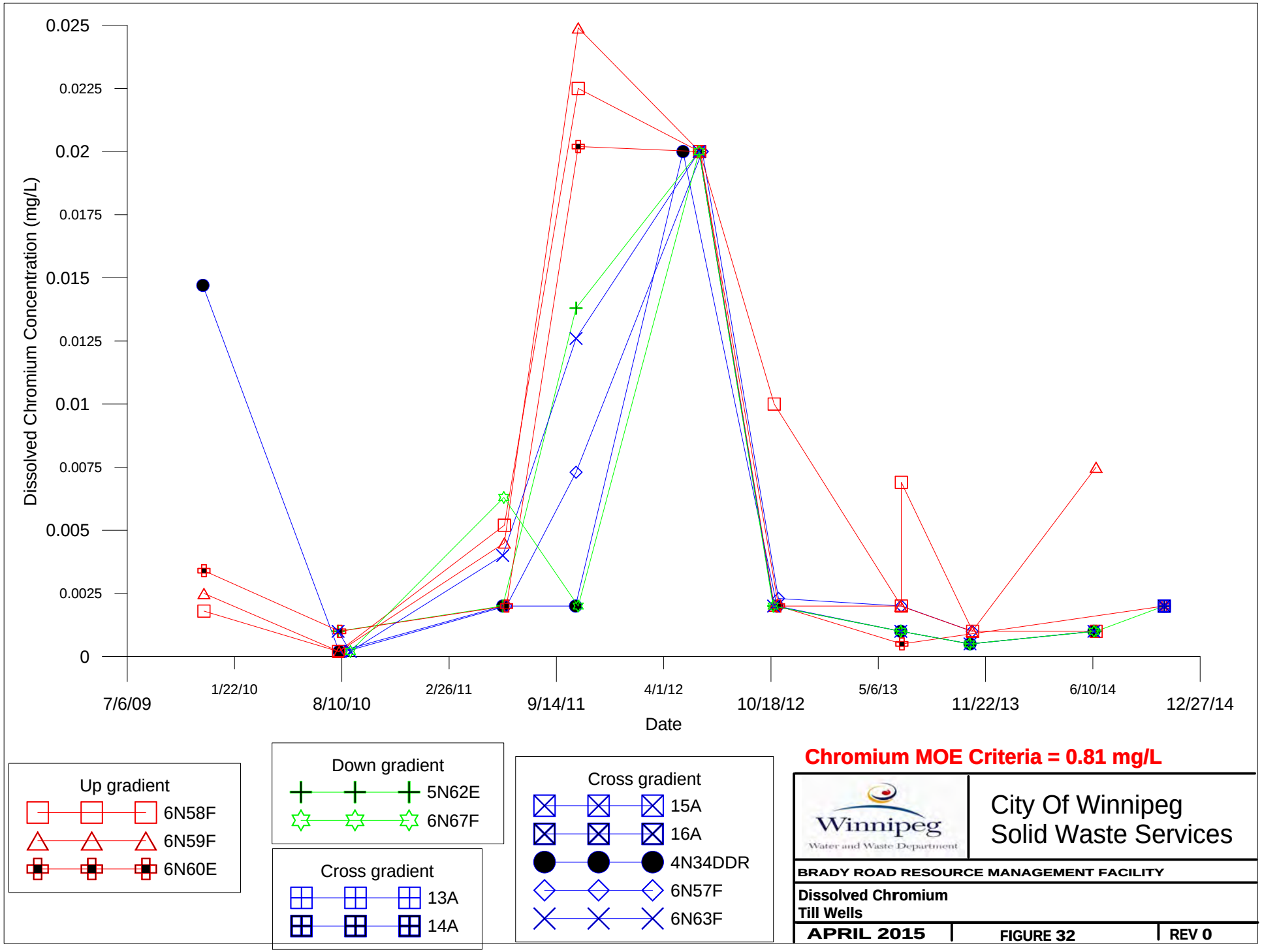
APRIL 2015	FIGURE GW-1-2	REV 0

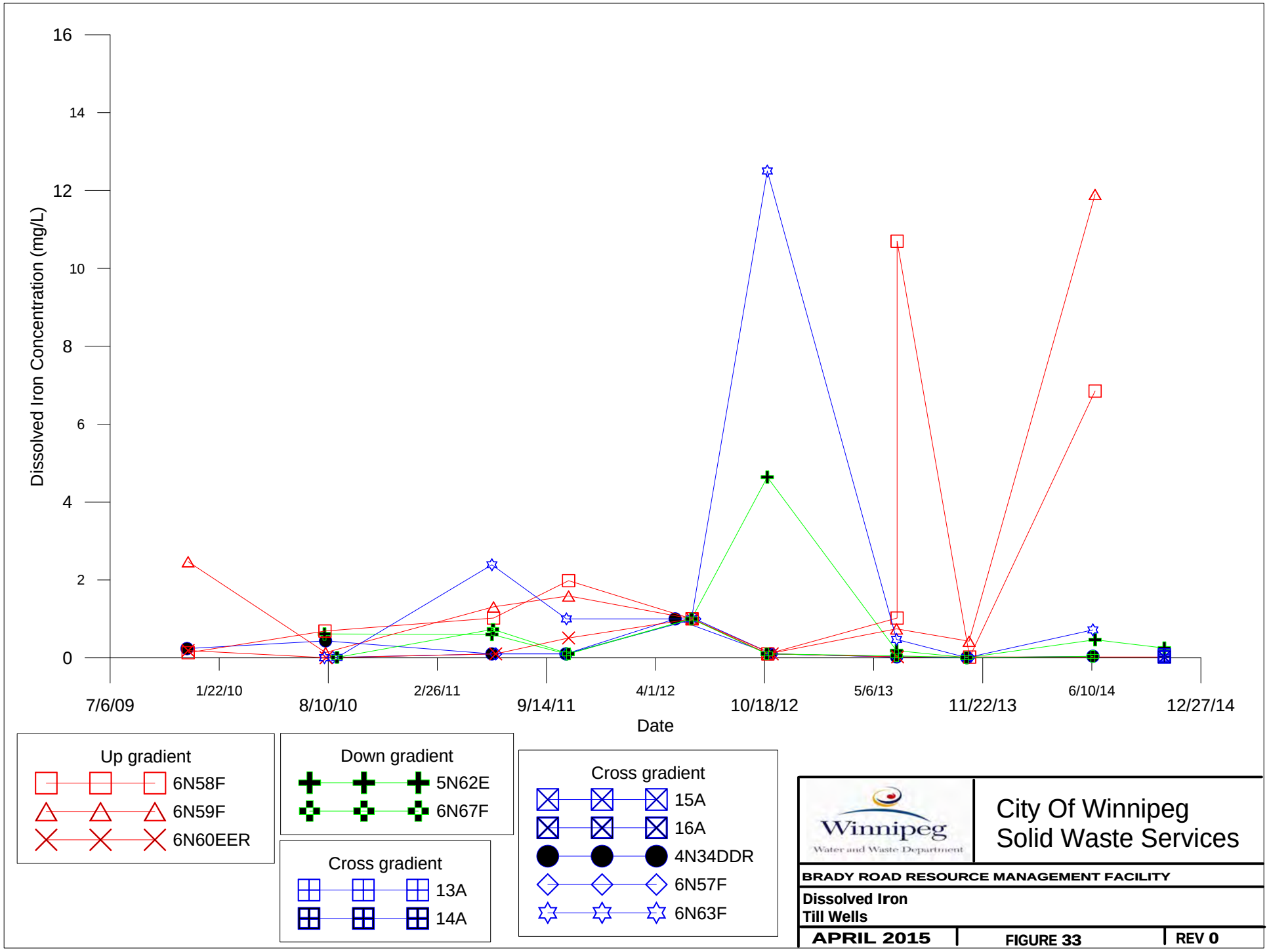

6N58F Al Concentration
(18-Jun-130 = 0.4
Dissolved Aluminium Concentration (mg/L)
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
7/6/09
1/22/10
8/10/10
2/26/11
9/14/11
4/1/12
10/18/12
5/6/13
11/22/13
6/10/14
12/27/14
Date
Up gradient
6N58F
6N59F
6N60E
Cross gradient
13A
14A
Down gradient
5N62E
6N67F
Cross gradient
16A
4N34DDR
6N57F
6N63F
15A
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Aluminium
Till Wells
APRIL 2015
FIGURE 28
REV 0

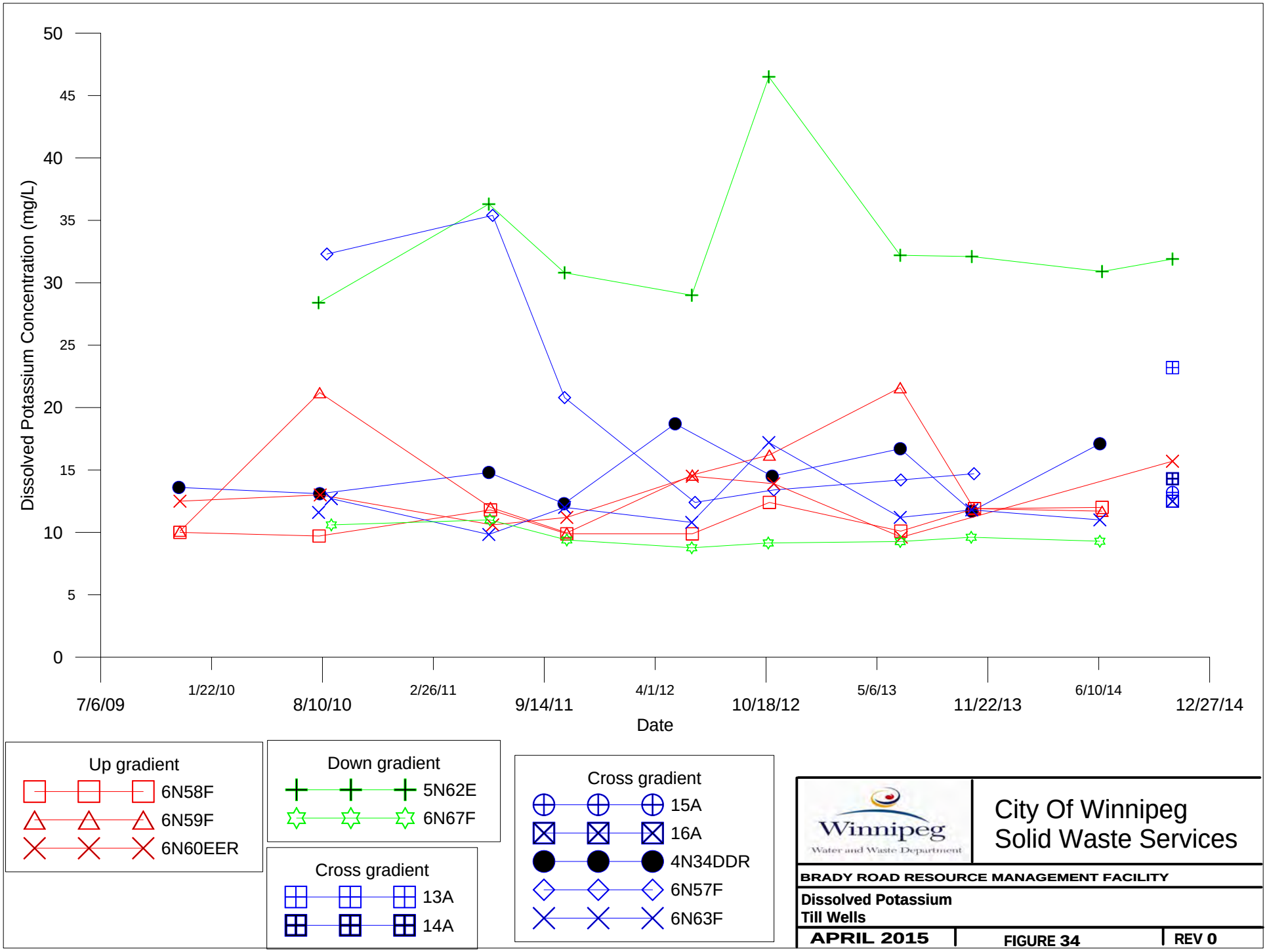

Dissolved Boron Concentration (mg/L)
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
7/6/09
1/22/10
8/10/10
2/26/11
9/14/11
4/1/12
10/18/12
5/6/13
11/22/13
6/10/14
12/27/14
Date
Up gradient
6N58F
6N59F
6N60EER
Down gradient
5N62E
6N67F
Cross gradient
13A
14A
Cross gradient
15A
16A
4N34DDR
6N57F
6N63F
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 2015
FIGURE 29
REV 0

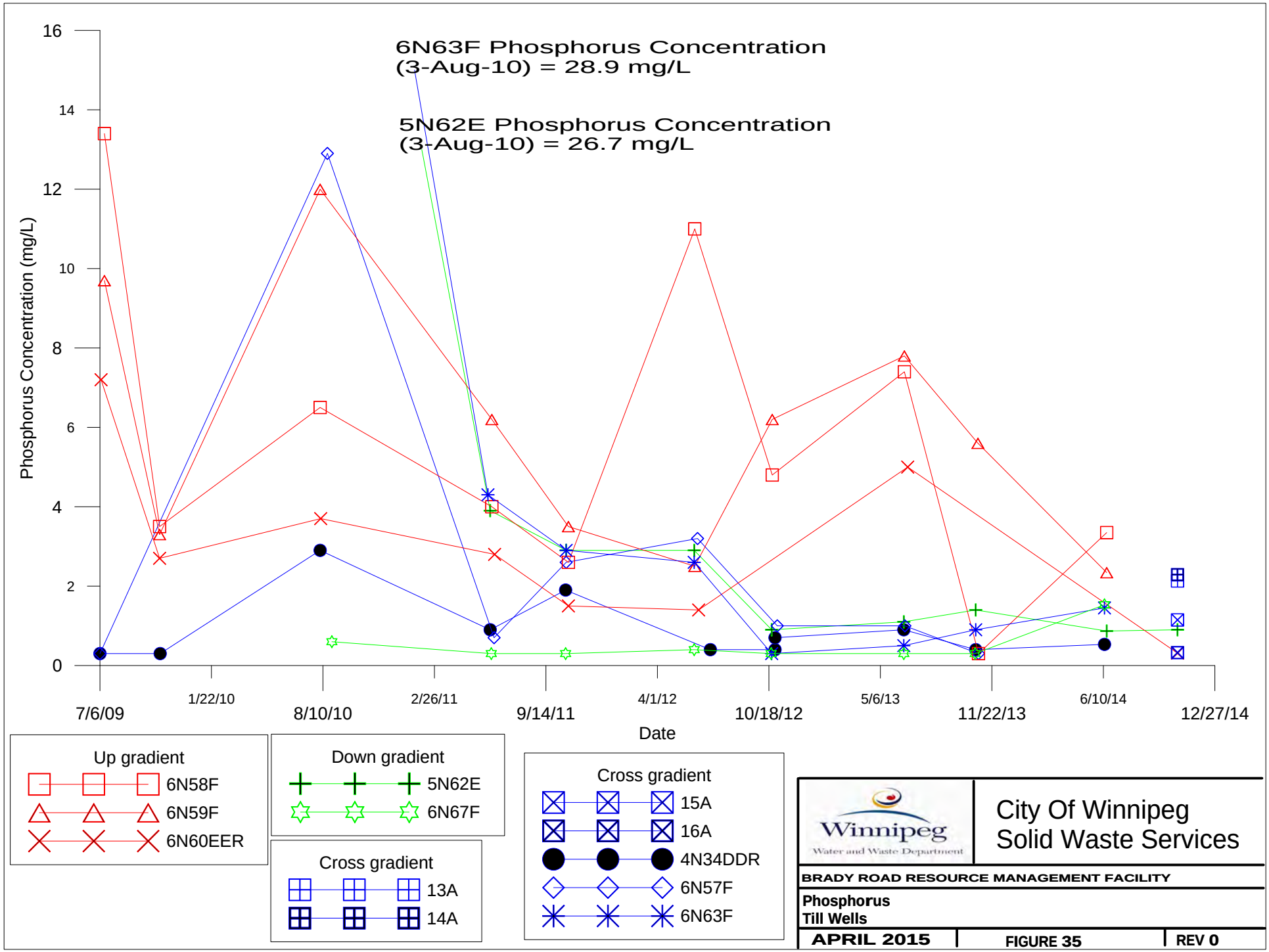

0.12
0.11
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Dissolved Barium Concentration (mg/L)
7/6/09
1/22/10
8/10/10
2/26/11
9/14/11
4/1/12
10/18/12
5/6/13
11/22/13
6/10/14
12/27/14
Date
Up gradient
6N58F
6N59F
6N60EER
Down gradient
5N62E
6N67F
Cross gradient
13A
14A
Cross gradient
15A
16A
4N34DDR
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 2015
FIGURE 30
REV 0


0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
Dissolved Cobalt Concentration (mg/L)
7/6/09
1/22/10
8/10/10
2/26/11
9/14/11
4/1/12
10/18/12
5/6/13
11/22/13
6/10/14
12/27/14
Date
Up gradient
6N58F
6N59F
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 2015
FIGURE 31
REV 0


0.025
0.0225
0.02
0.0175
0.015
0.0125
0.01
0.0075
0.005
0.0025
0
Dissolved Chromium Concentration (mg/L)
7/6/09
1/22/10
8/10/10
2/26/11
9/14/11
4/1/12
10/18/12
5/6/13
11/22/13
6/10/14
12/27/14
Date
Up gradient
6N58F
6N59F
6N60E
Down gradient
5N62E
6N67F
Cross gradient
13A
14A
Cross gradient
15A
16A
4N34DDR
6N57F
6N63F
Chromium MOE Criteria = 0.81 mg/L
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Chromium
Till Wells
APRIL 2015
FIGURE 32
REV 0


Dissolved Iron Concentration (mg/L)
16
14
12
10
8
6
4
2
0
7/6/09
1/22/10
8/10/10
2/26/11
9/14/11
4/1/12
10/18/12
5/6/13
11/22/13
6/10/14
12/27/14
Date
Up gradient
6N58F
6N59F
6N60EER
Down gradient
5N62E
6N67F
Cross gradient
13A
14A
Cross gradient
15A
16A
4N34DDR
6N57F
6N63F
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Iron
Till Wells
APRIL 2015
FIGURE 33
REV 0


Dissolved Potassium Concentration (mg/L)
50
45
40
35
30
25
20
15
10
5
0
7/6/09
1/22/10
8/10/10
2/26/11
9/14/11
4/1/12
10/18/12
5/6/13
11/22/13
6/10/14
12/27/14
Date
Up gradient
6N58F
6N59F
6N60EER
Down gradient
5N62E
6N67F
Cross gradient
13A
14A
Cross gradient
15A
16A
4N34DDR
6N57F
6N63F
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Potassium
Till Wells
APRIL 2015
FIGURE 34
REV 0



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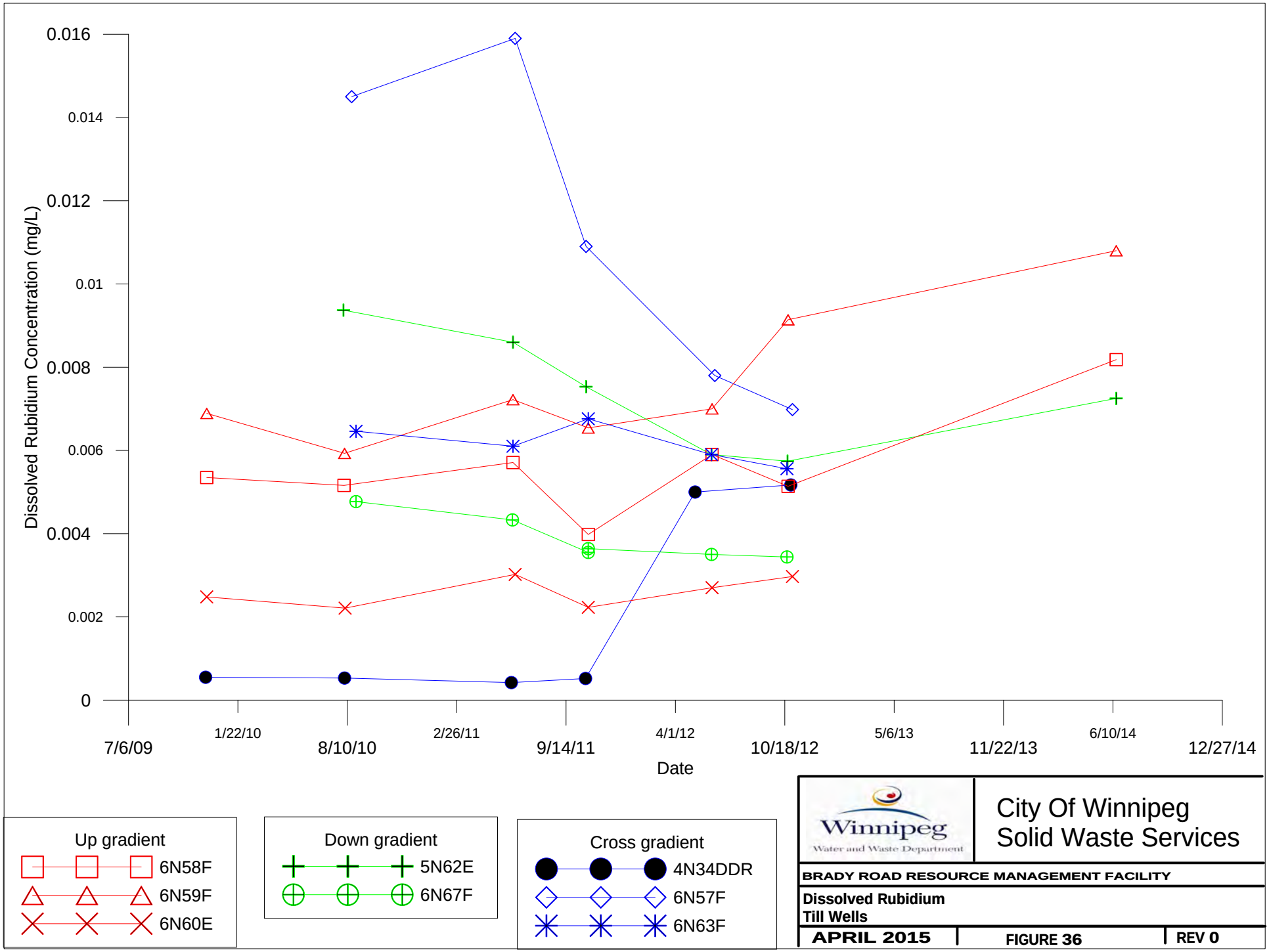
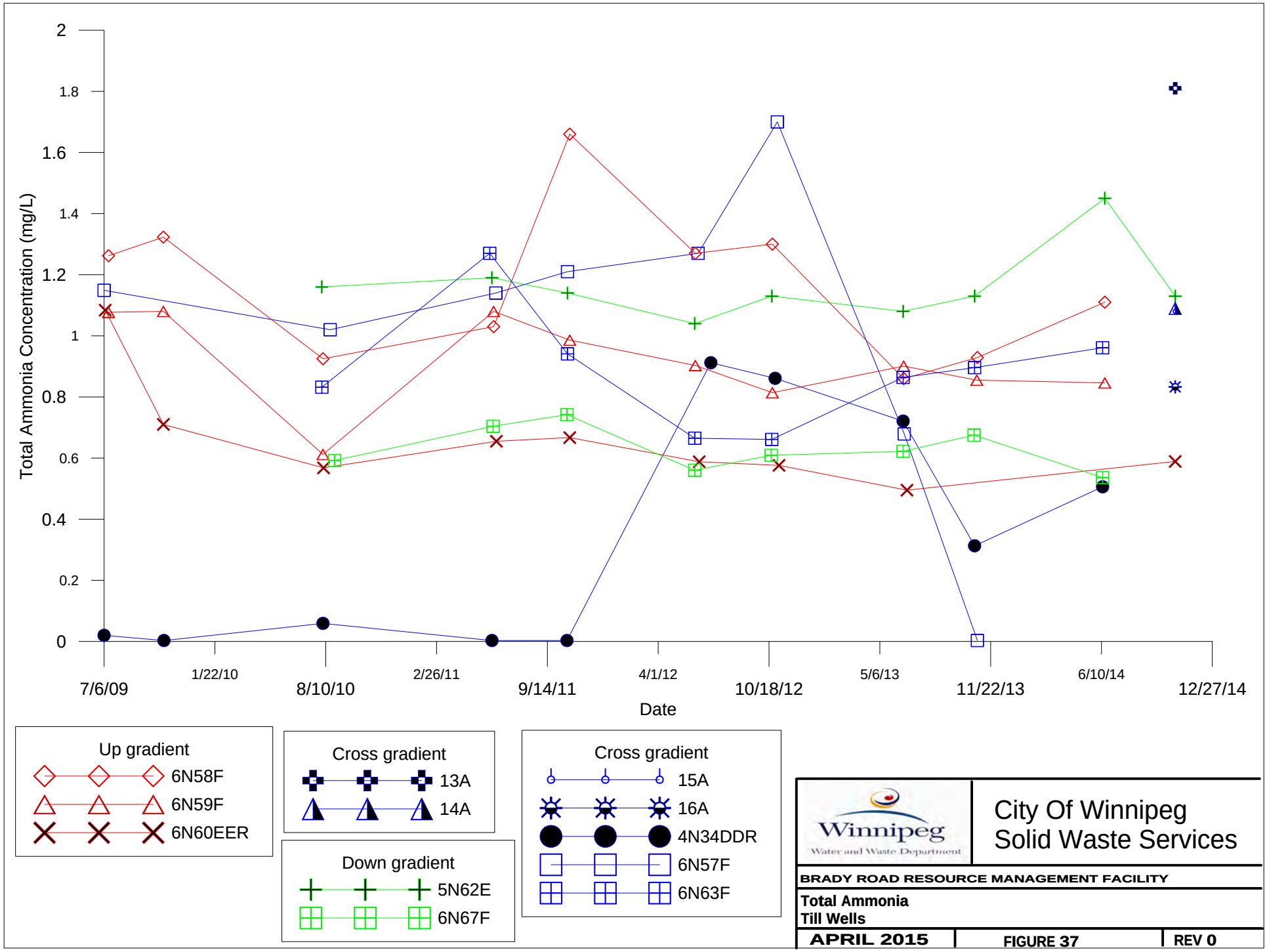
Solid Waste Services

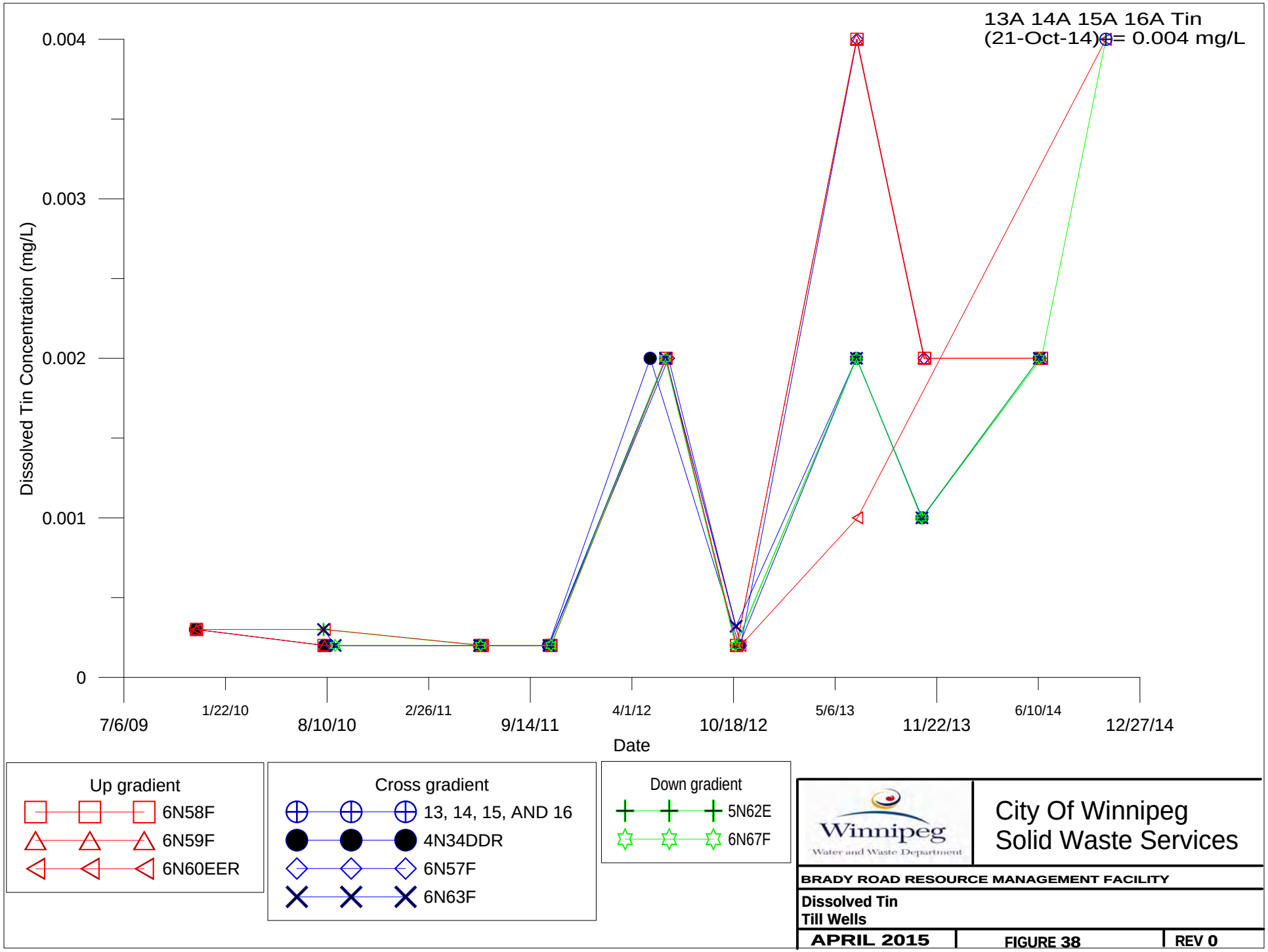
BRADY ROAD RESOURCE MANAGEMENT FACILITY

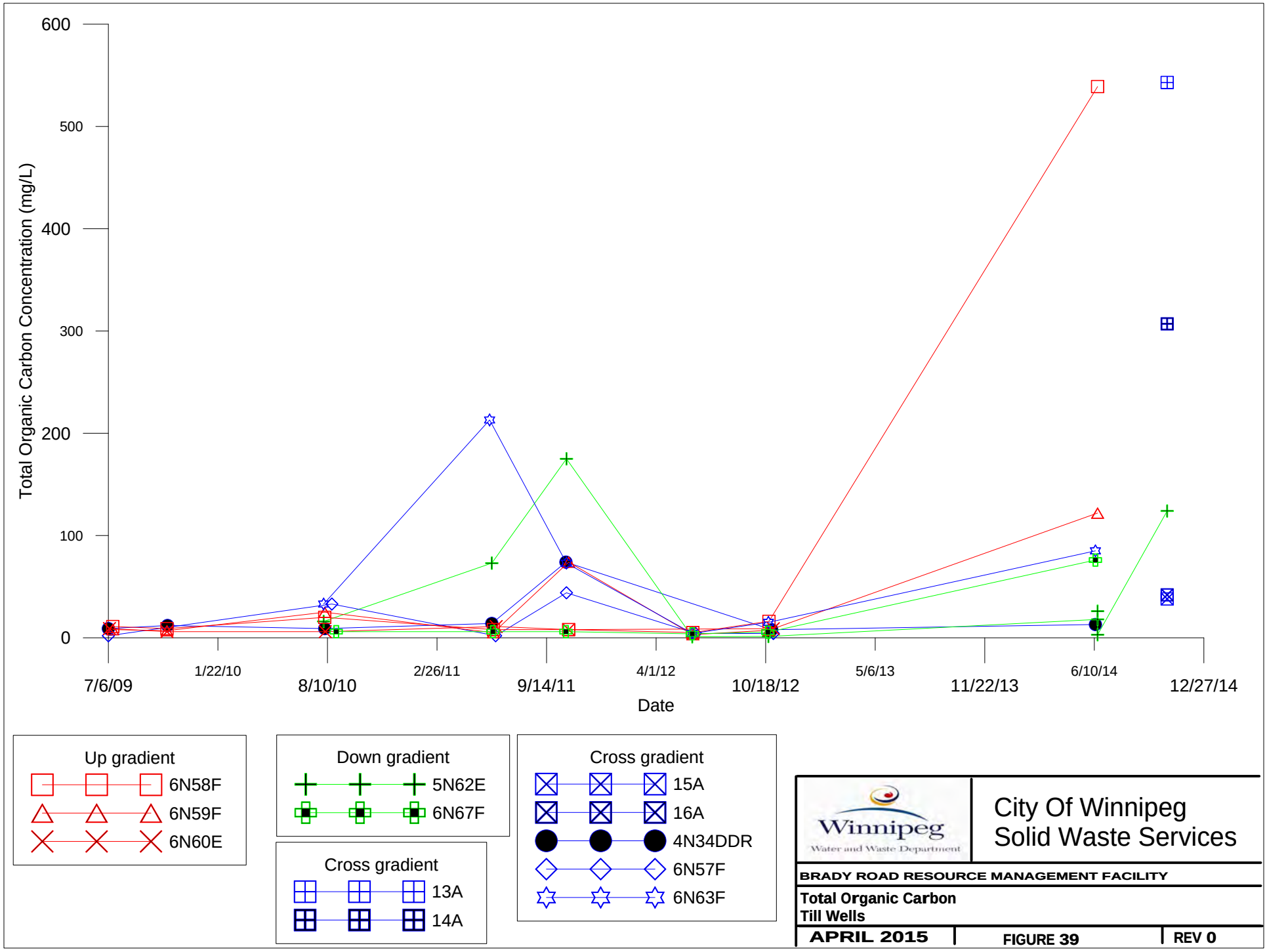
Phosphorus
Till Wells

APRIL 2015	FIGURE 35	REV 0


0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
Dissolved Rubidium Concentration (mg/L)
7/6/09
1/22/10
8/10/10
2/26/11
9/14/11
4/1/12
10/18/12
5/6/13
11/22/13
6/10/14
12/27/14
Date
Up gradient
6N58F
6N59F
6N60E
Down gradient
5N62E
6N67F
Cross gradient
4N34DDR
6N57F
6N63F
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Rubidium
Till Wells
APRIL 2015
FIGURE 36
REV 0


Total Ammonia Concentration (mg/L)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
7/6/09
1/22/10
8/10/10
2/26/11
9/14/11
4/1/12
10/18/12
5/6/13
11/22/13
6/10/14
12/27/14
Date
Up gradient
6N58F
6N59F
6N60EER
Cross gradient
13A
14A
Down gradient
5N62E
6N67F
Cross gradient
15A
16A
4N34DDR
6N57F
6N63F
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Total Ammonia
Till Wells
APRIL 2015
FIGURE 37
REV 0


13A 14A 15A 16A Tin
(21-Oct-14)= 0.004 mg/L
0.004
0.003
0.002
0.001
0
Dissolved Tin Concentration (mg/L)
7/6/09
1/22/10
8/10/10
2/26/11
9/14/11
4/1/12
10/18/12
5/6/13
11/22/13
6/10/14
12/27/14
Date
Up gradient
6N58F
6N59F
6N60EER
Cross gradient
13, 14, 15, AND 16
4N34DDR
6N57F
6N63F
Down gradient
5N62E
6N67F
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Tin
Till Wells
APRIL 2015
FIGURE 38
REV 0



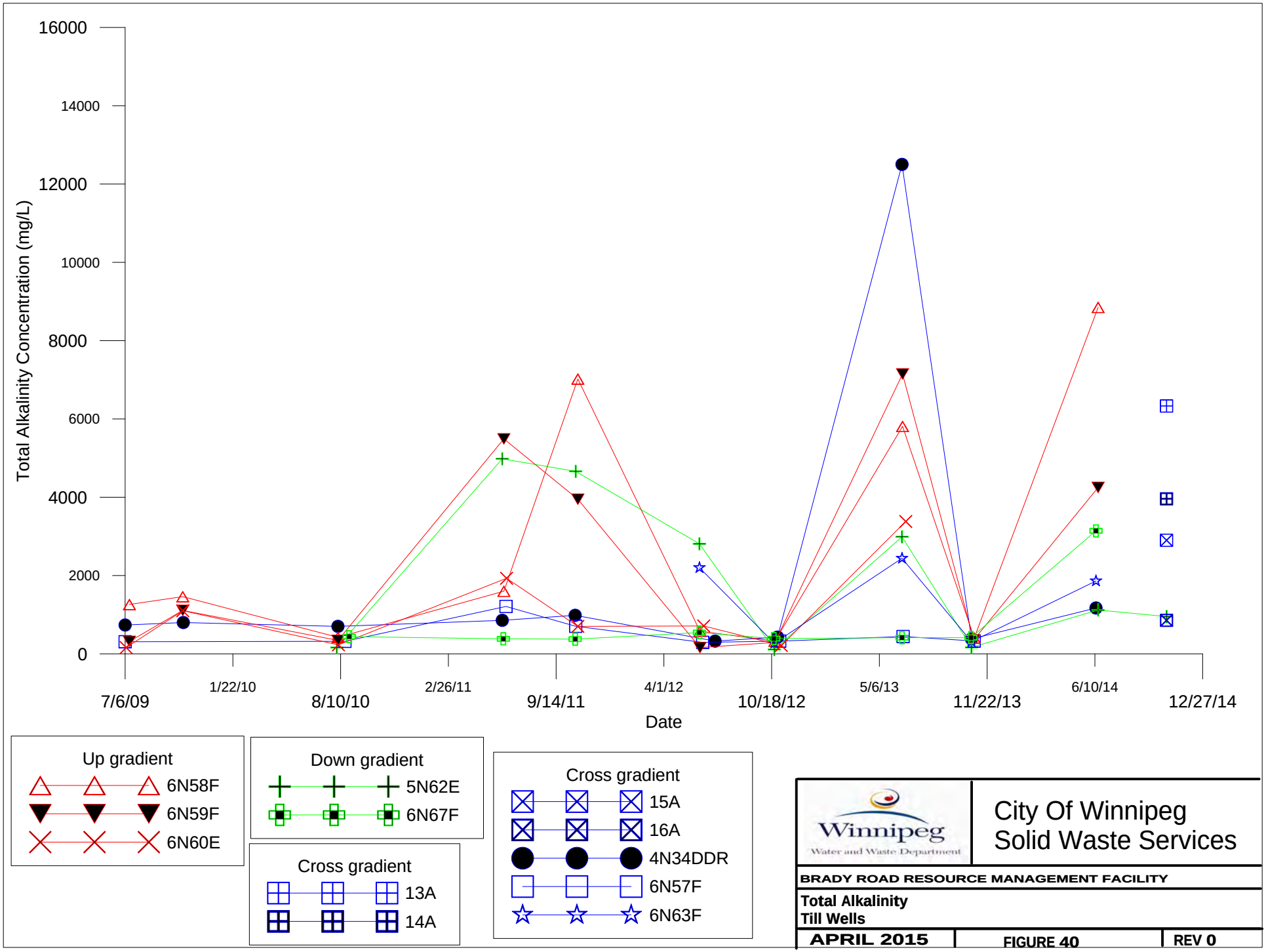
Winnipeg
Water and Waste Department

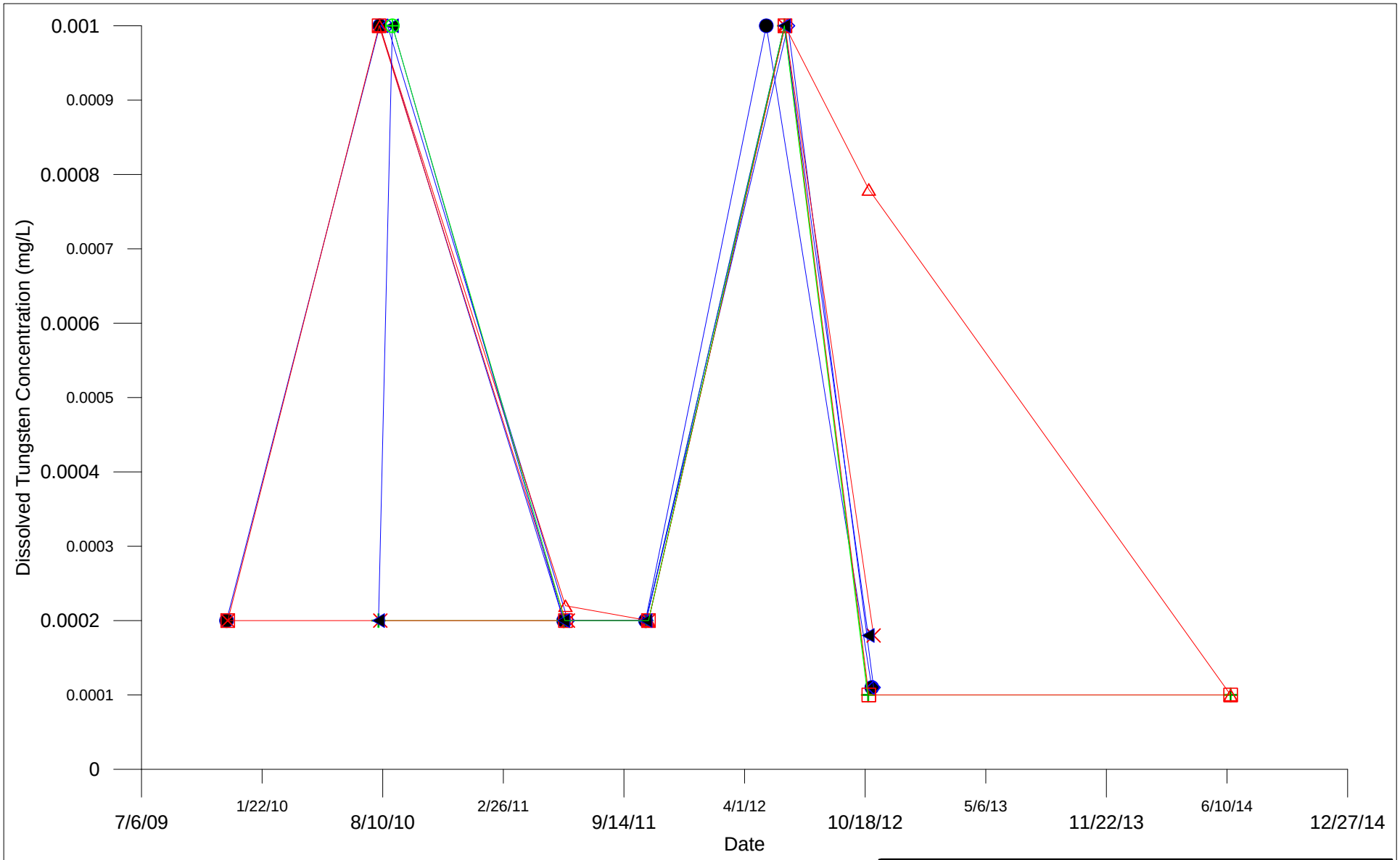
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Total Organic Carbon
Till Wells

APRIL 2015	FIGURE 39	REV 0


16000
14000
12000
10000
8000
6000
4000
2000
0
Total Alkalinity Concentration (mg/L)
7/6/09
1/22/10
8/10/10
2/26/11
9/14/11
4/1/12
10/18/12
5/6/13
11/22/13
6/10/14
12/27/14
Date
Up gradient
6N58F
6N59F
6N60E
Down gradient
5N62E
6N67F
Cross gradient
13A
14A
Cross gradient
15A
16A
4N34DDR
6N57F
6N63F
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Total Alkalinity
Till Wells
APRIL 2015
FIGURE 40
REV 0



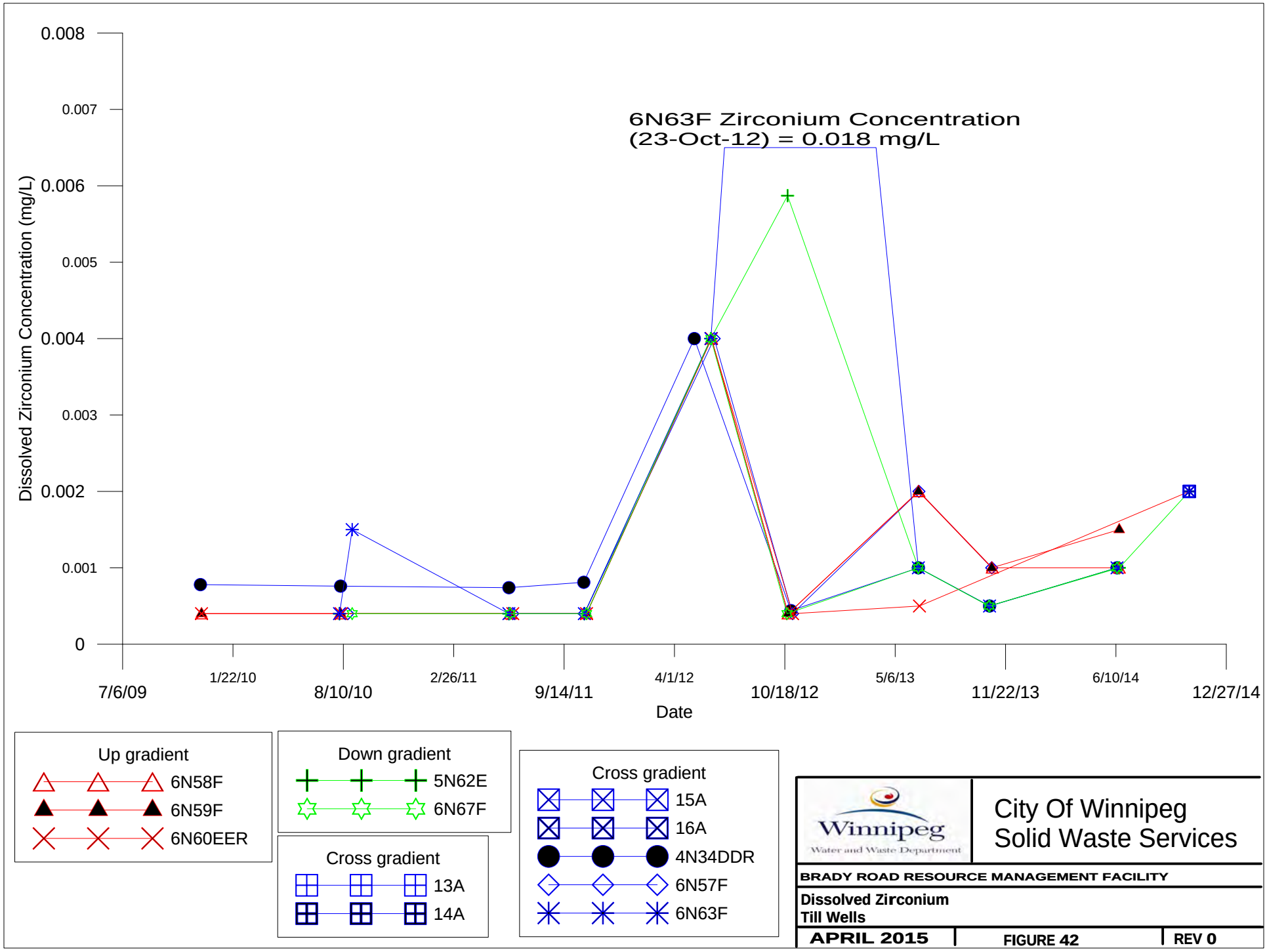
Winnipeg
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Tungsten
Till Wells

APRIL 2015	FIGURE 41	REV 0



Winnipeg
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Zirconium
Till Wells

APRIL 2015 | FIGURE 42 | REV 0

Site: Brady
Well #: W4

Dates:
4-Aug-10
6-Jun-11
18-Oct-11
24-Oct-12
13-Jun-13
23-Oct-13
11-Jun-14
23-Oct-14

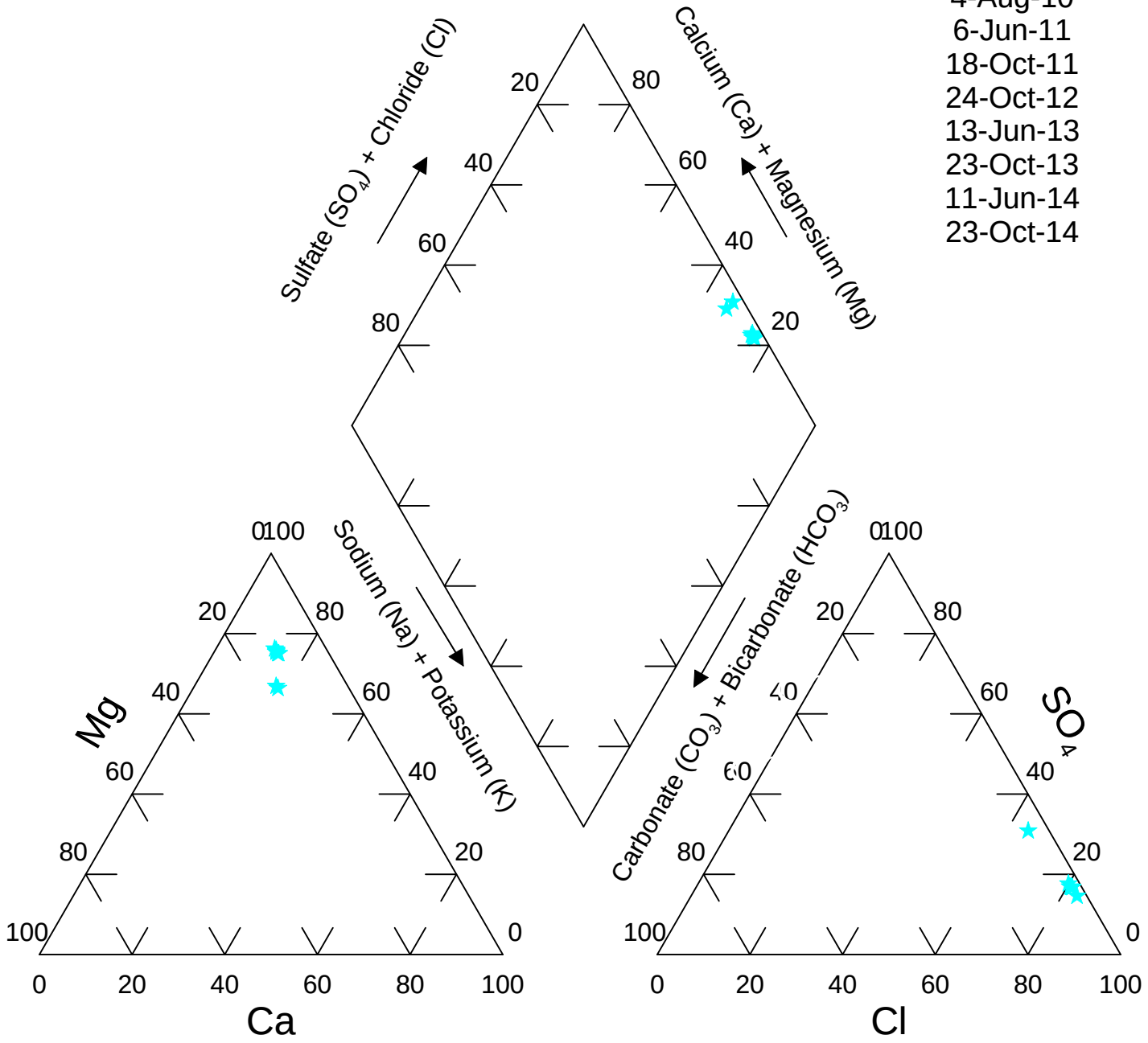


FIGURE: 1P

Winnipeg
Water and Waste Department

Site: Brady
Well #: W5

Dates:
5-Aug-10
6-Jun-11
18-Oct-11
31-May-12
24-Oct-12
13-Jun-13
23-Oct-13
11-Jun-14
23-Oct-14

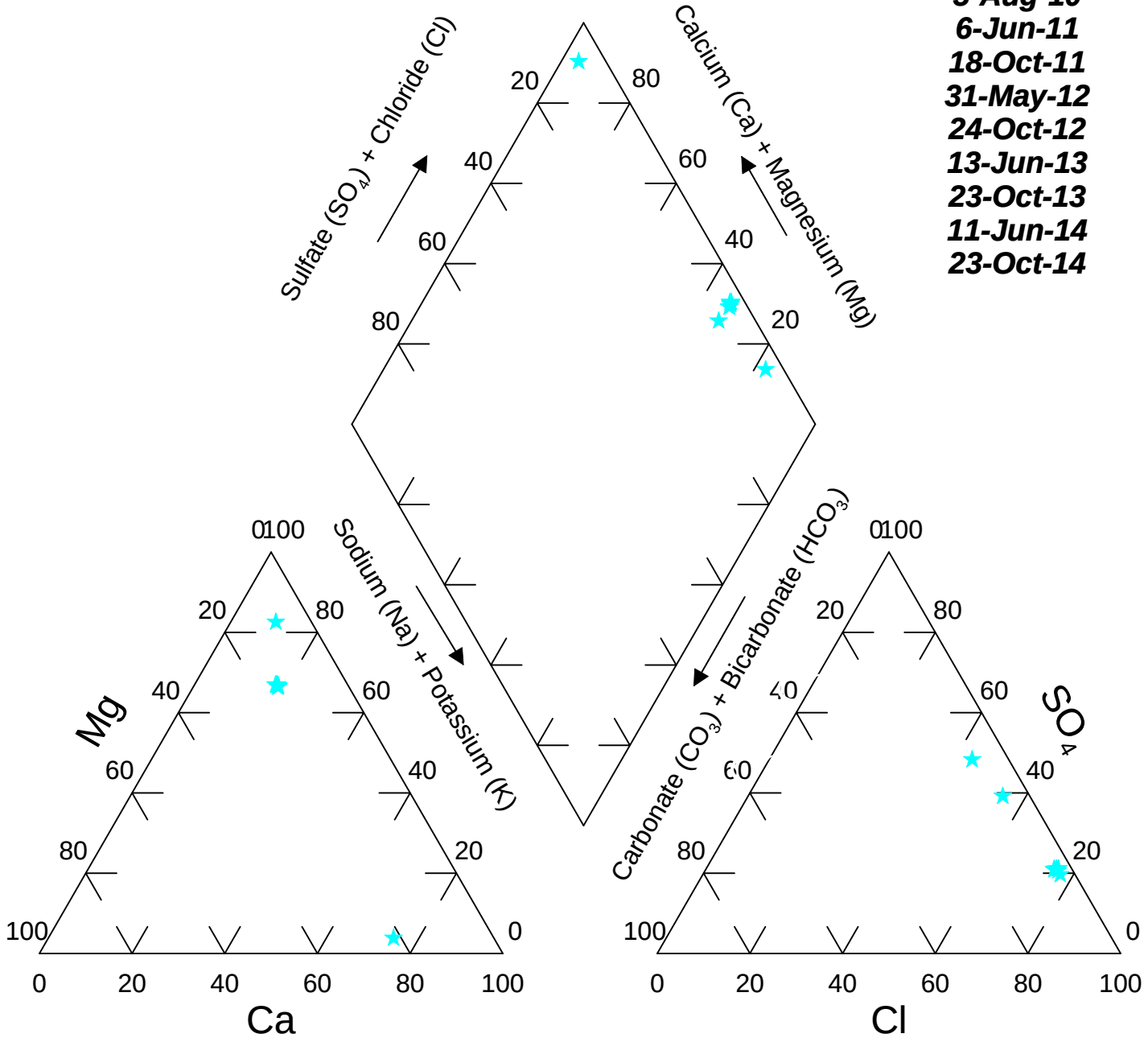


FIGURE: 2P

Winnipeg
Water and Waste Department

Site: Brady
Well #: W6

Dates:

6-Aug-10
8-Jun-11
17-Oct-11
4-Jun-12
22-Oct-12
13-Jun-13
22-Oct-13
11-Jun-14
20-Oct-14

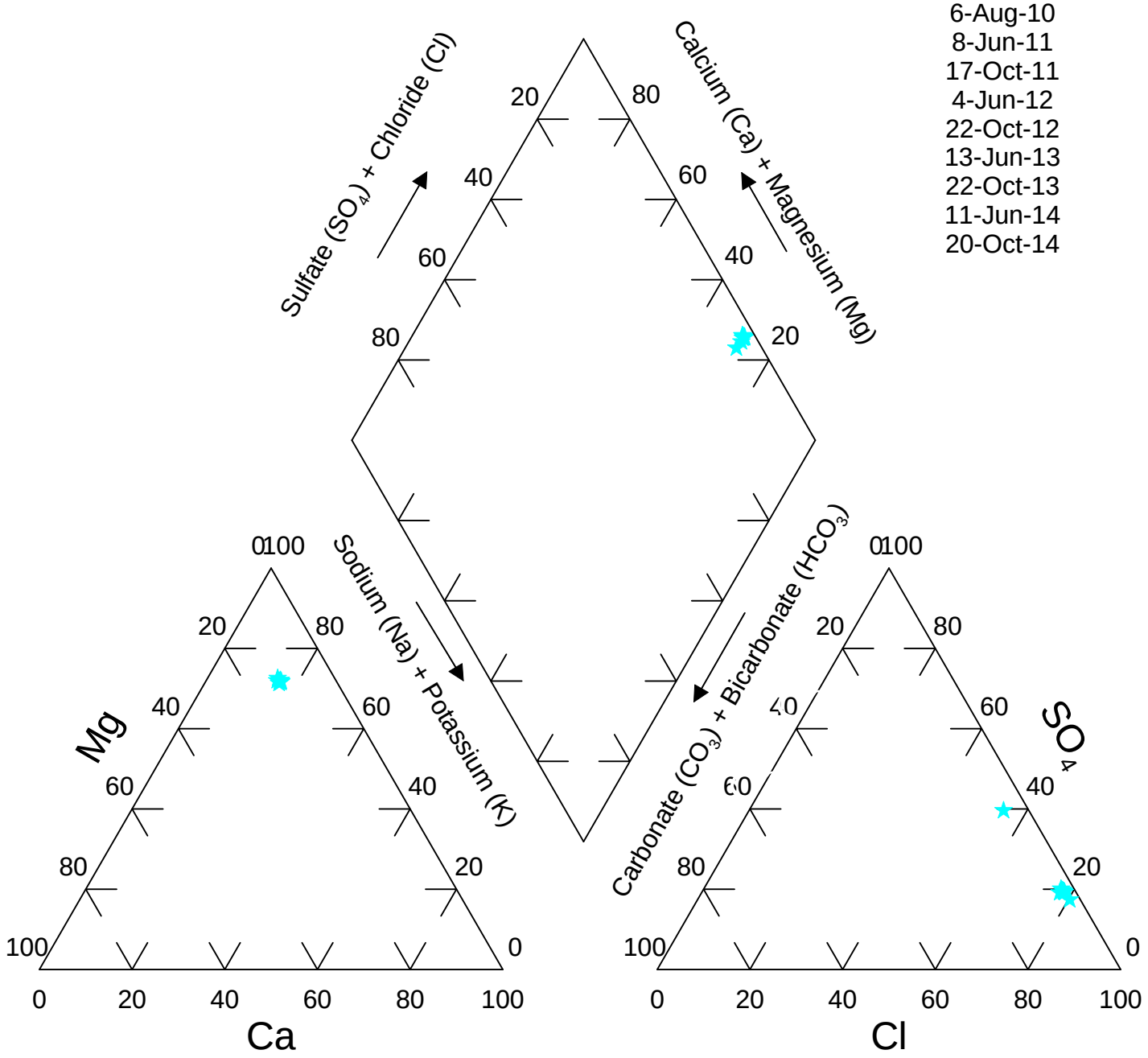


FIGURE: 3P

Winnipeg
Water and Waste Department

Site: Brady
Well #: W7

Dates:
5-Aug-10
8-Jun-11
19-Oct-11
5-Jun-12
22-Oct-12
12-Jun-13
22-Oct-13
11-Jun-14
20-Oct-14

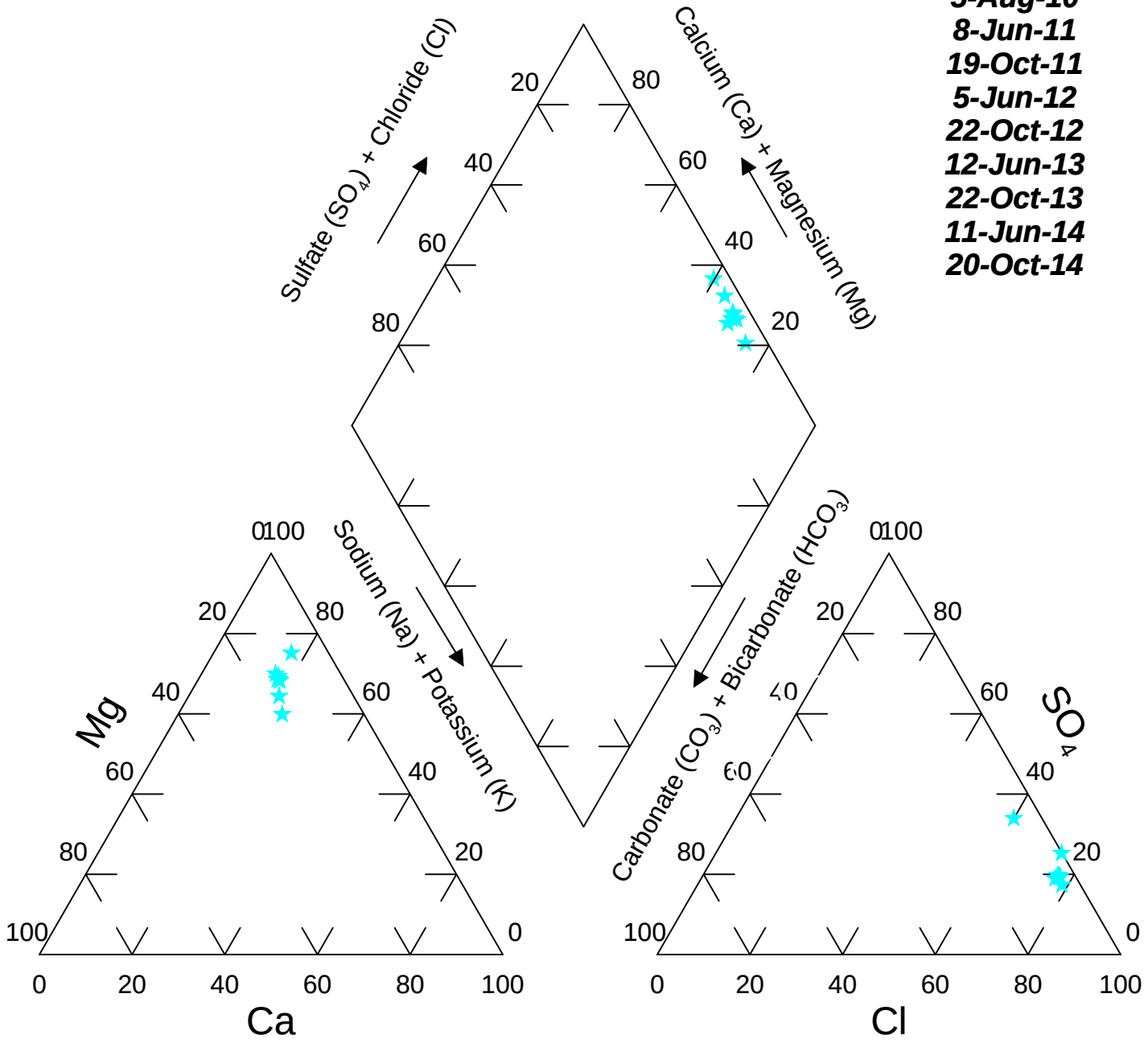


FIGURE: 4P

Winnipeg
Water and Waste Department

Site: Brady
Well #: W8

Dates:
5-Aug-10
6-Jun-11
18-Oct-11
1-Jun-12
23-Oct-12
12-Jun-13
22-Oct-13
11-Jun-14

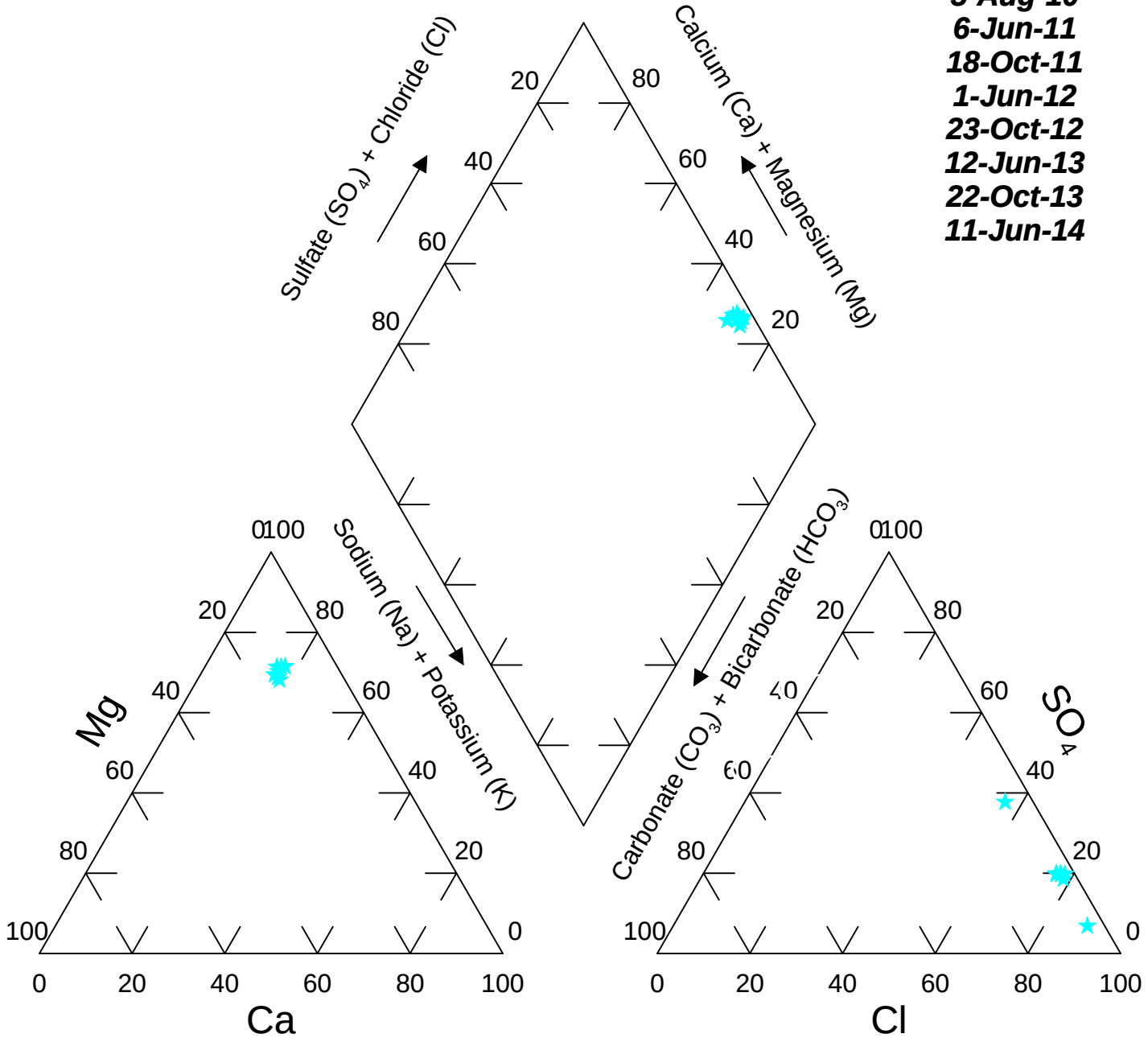


FIGURE: 5P

Winnipeg
Water and Waste Department

Site: Brady
Well #: W9

Dates:
3-Aug-10
6-Jun-11
17-oct-11
31-May-12
23-Oct-12
11-Jun-13
21-Oct-13
1-Jun-14
20-Oct-14

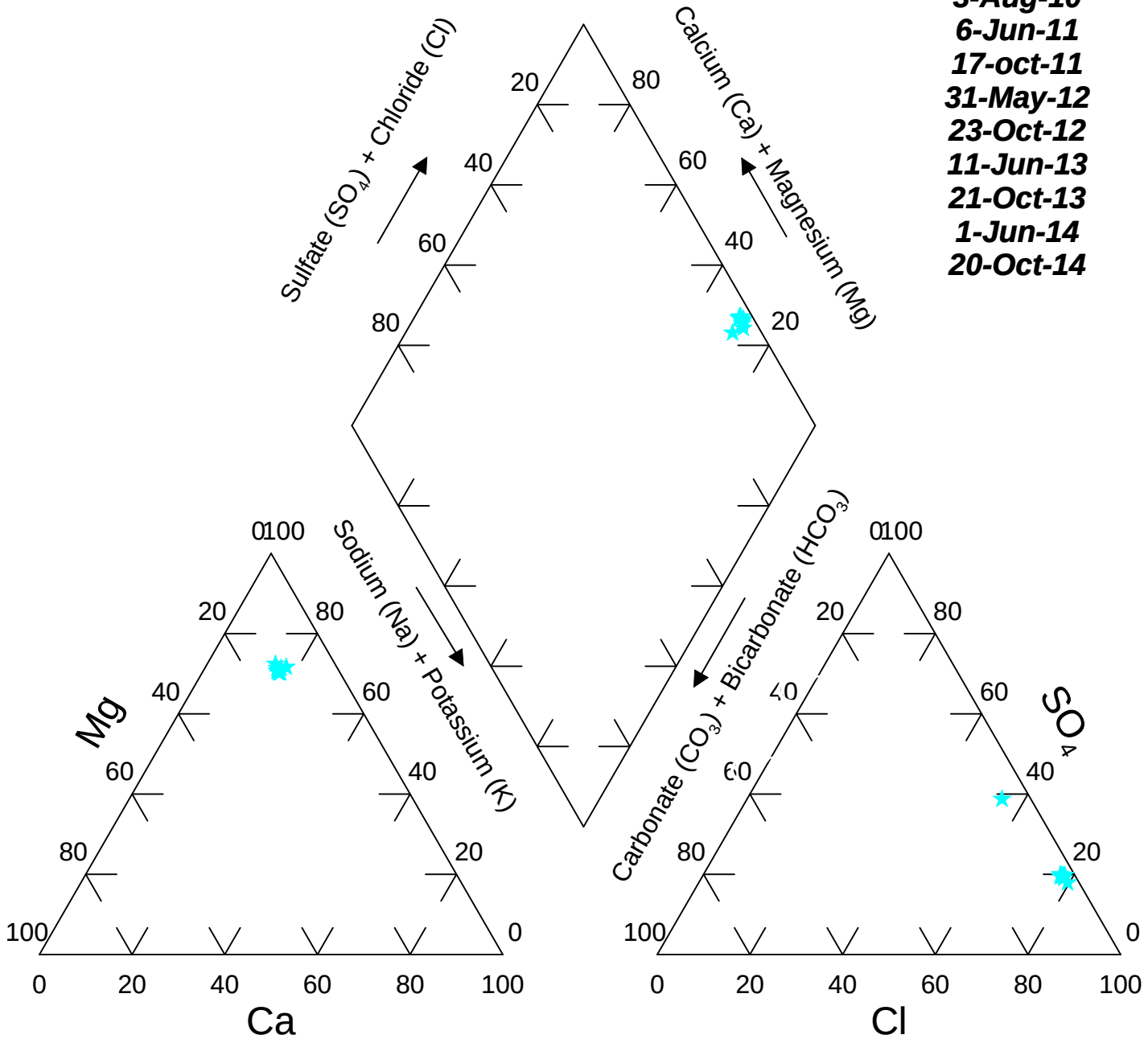


FIGURE: 6P

Winnipeg
Water and Waste Department

Site: Brady
Well #: W10

Dates:

3-Aug-10
6-Jun-11
17-Oct-11
1-Jun-12
23-Oct-12
11-Jun-13
22-Oct-13
10-Jun-14
20-Oct-14

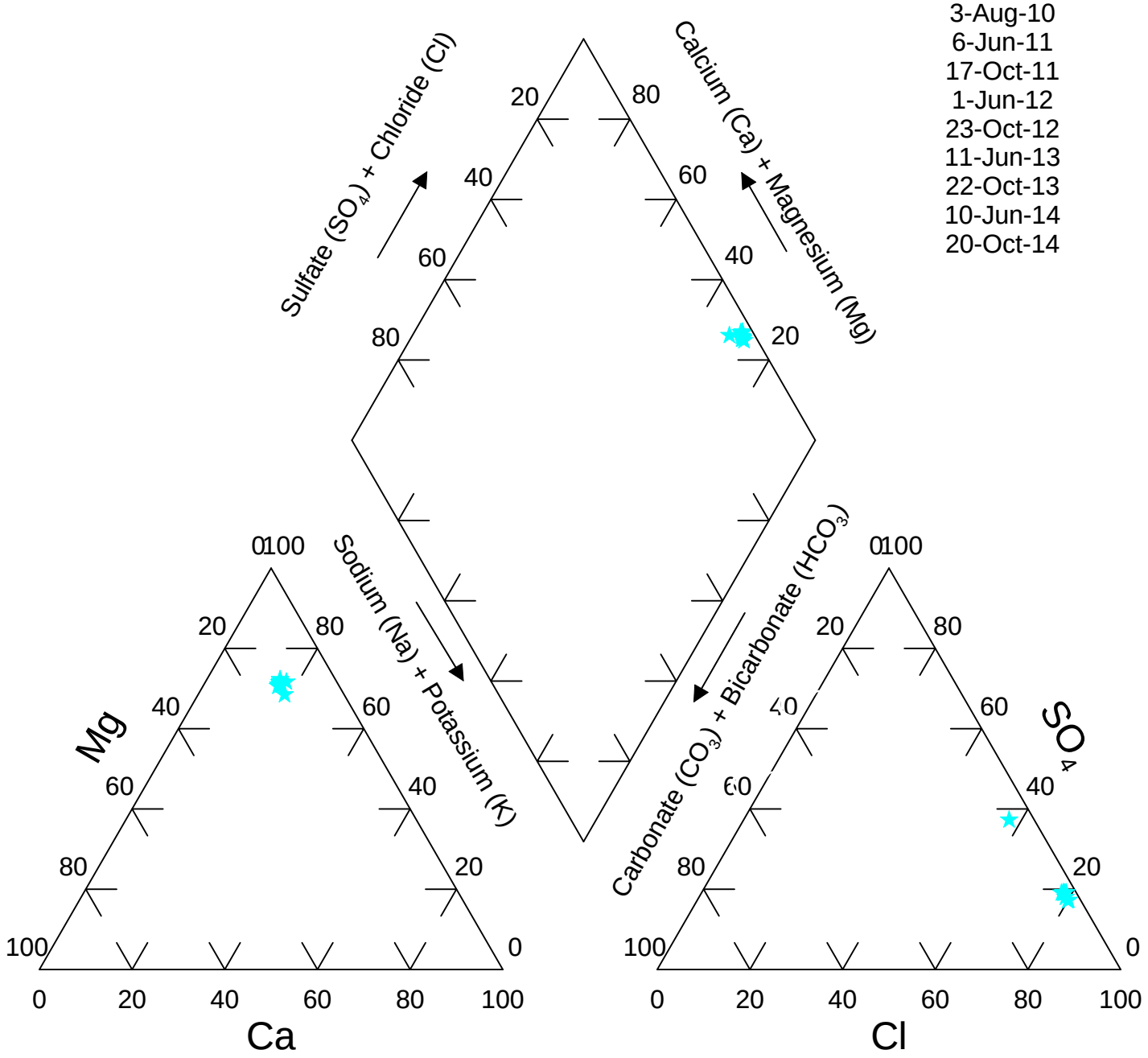


FIGURE: 7P

Winnipeg
Water and Waste Department

Site: Brady
Well #: W11

Dates:

3-Aug-10
6-Jun-11
17-Oct-11
31-May-12
23-Oct-12
12-Jun-13
22-Oct-13
10-Jun-14
23-Oct-14

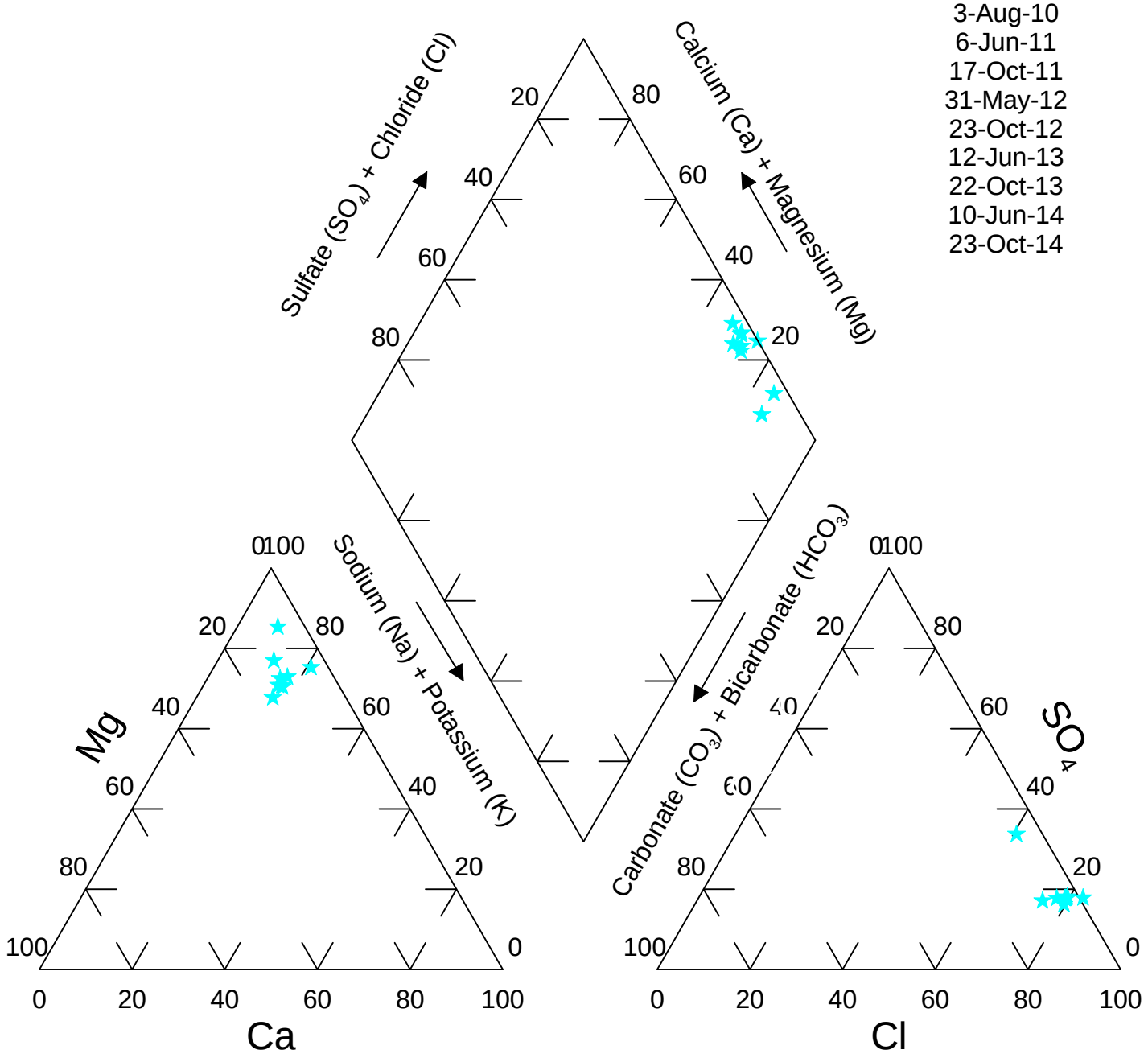


FIGURE: 8P

Winnipeg
Water and Waste Department

Site: Brady
Well #: W12

Dates:

26-Aug-10
6-Jun-11
19-Oct-11
6-Jun-12
22-Oct-12
13-Jun-13
23-Oct-13
12-Jun-14
20-Oct-14

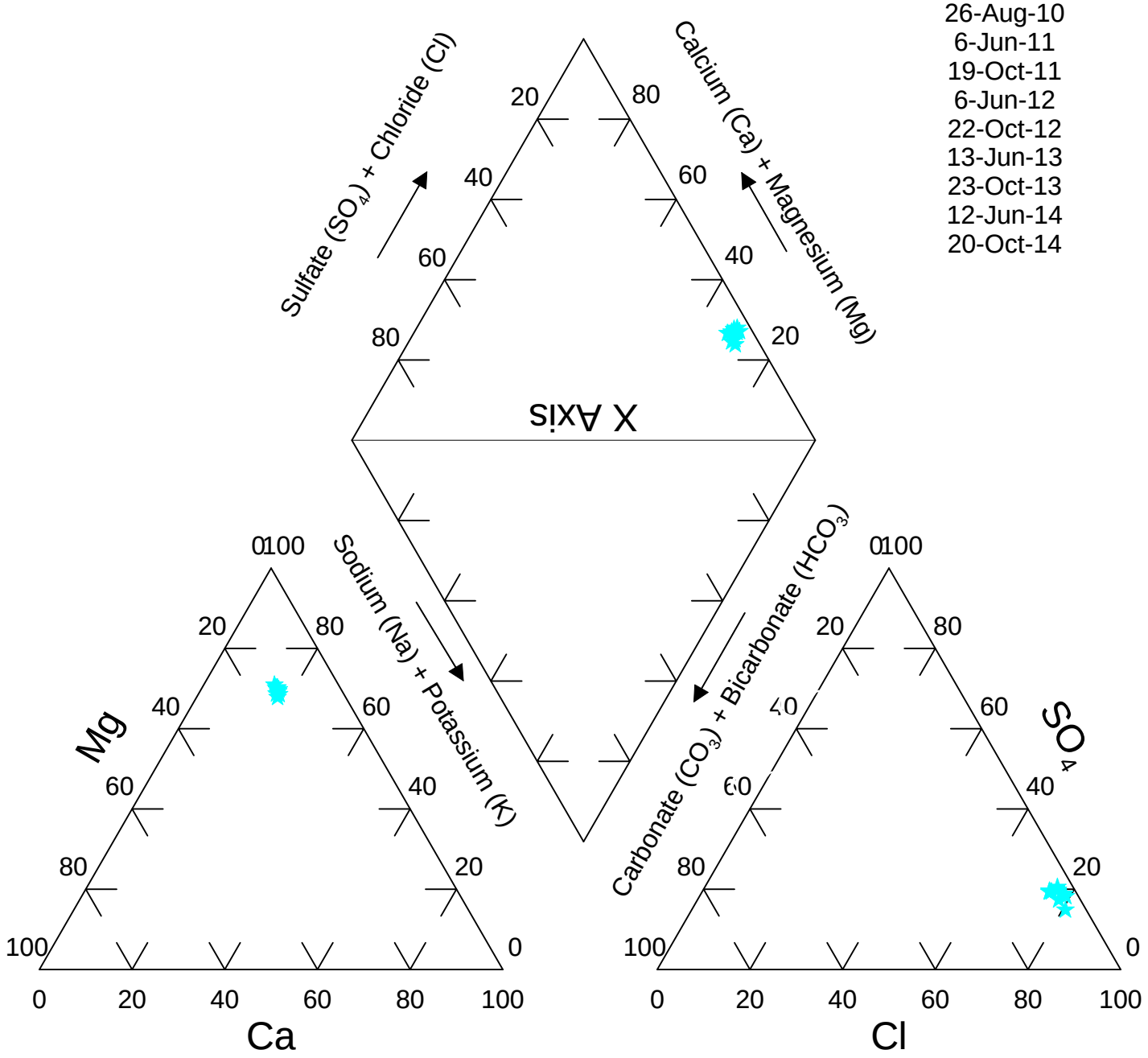


FIGURE: 9P

Winnipeg
Water and Waste Department

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

Dates:

5-Aug-10
6-Jun-11
19-Oct-11
5-Jul-12
29-Oct-12
17-Jun-13
24-Oct-13
12-Jun-14

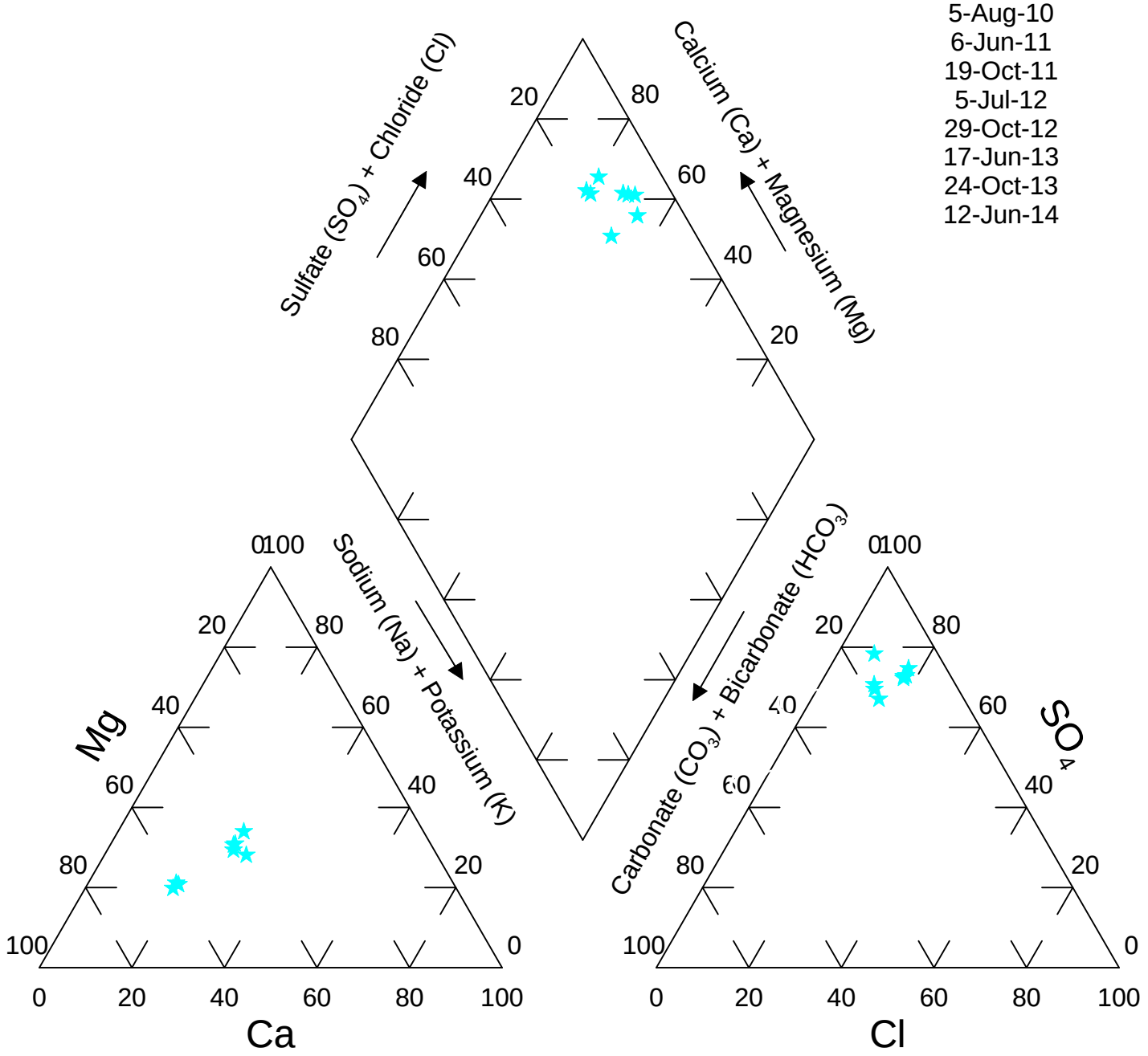


FIGURE: 10P

Winnipeg
Water and Waste Department

Site: Brady
Well #: 5N62-E

Dates:

3-Aug-10
6-Jun-11
20-Oct-11
6-Jun-12
23-Oct-12
17-Jun-13
24-Oct-13
16-Jun-14
23-Oct-14

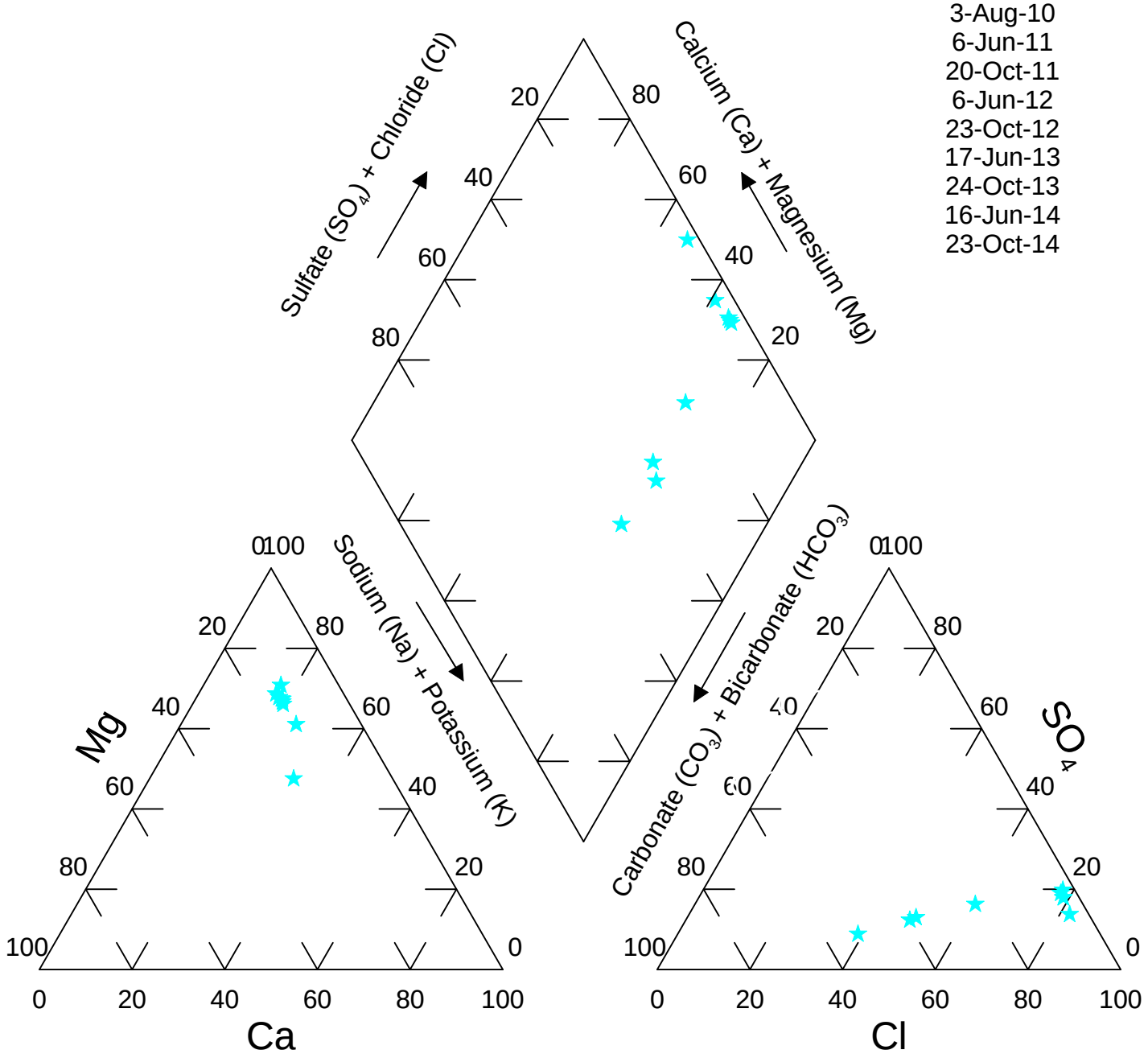


FIGURE: 11P

Winnipeg
Water and Waste Department

Site: Brady
Well #: 6N57-F

Dates:
18-Aug-10
13-Jun-11
20-Oct-11
12-Jun-12
1-Nov-12
19-Jun-13
28-Oct-13

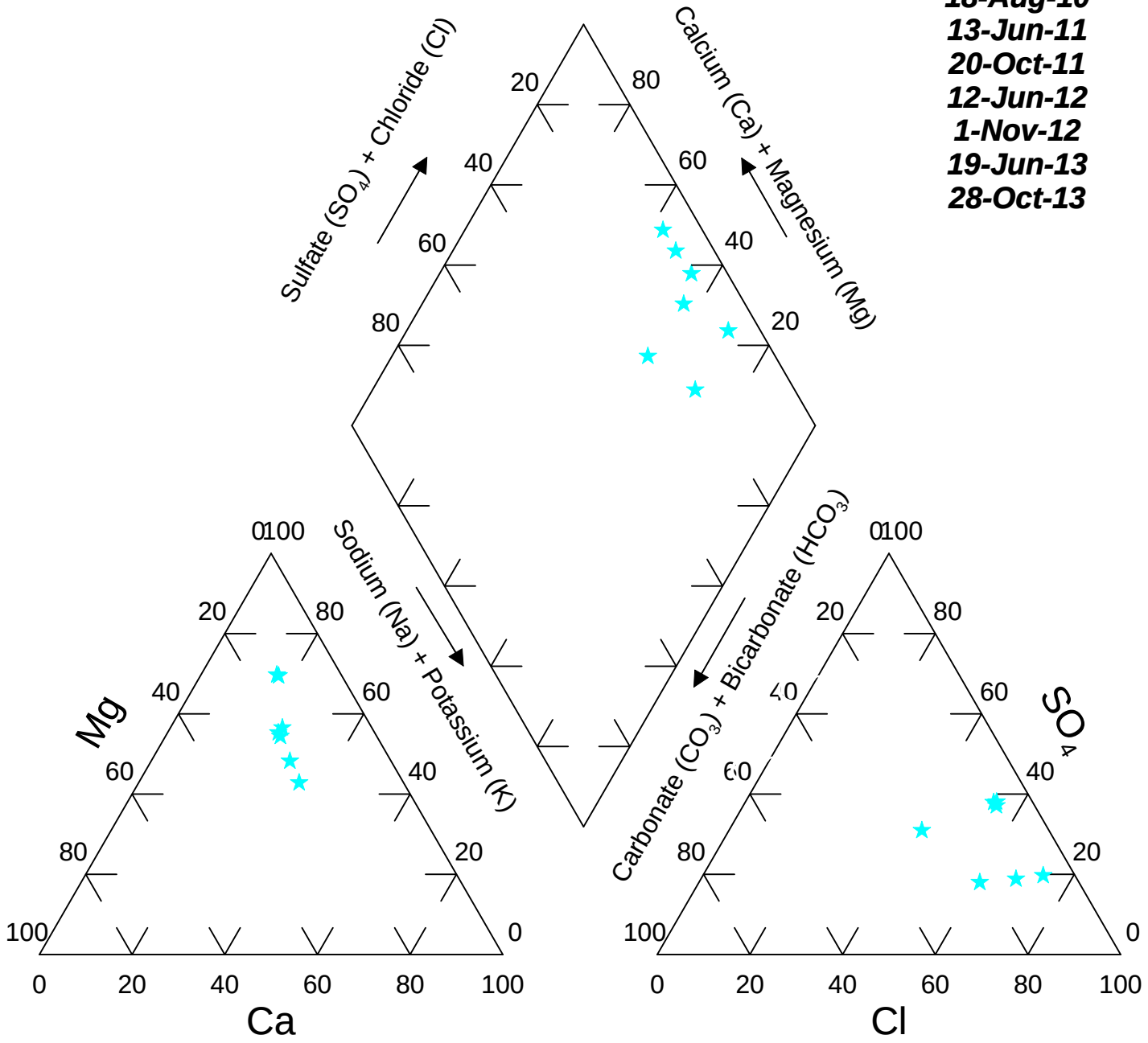


FIGURE: 12P

Winnipeg
Water and Waste Department

Site: Brady
Well #: 6N58-F

Dates:
4-Aug-10
9-Jun-11
24-Oct-11
7-Jun-12
24-Oct-12
18-Jun-13
29-Oct-13
16-Jun-14

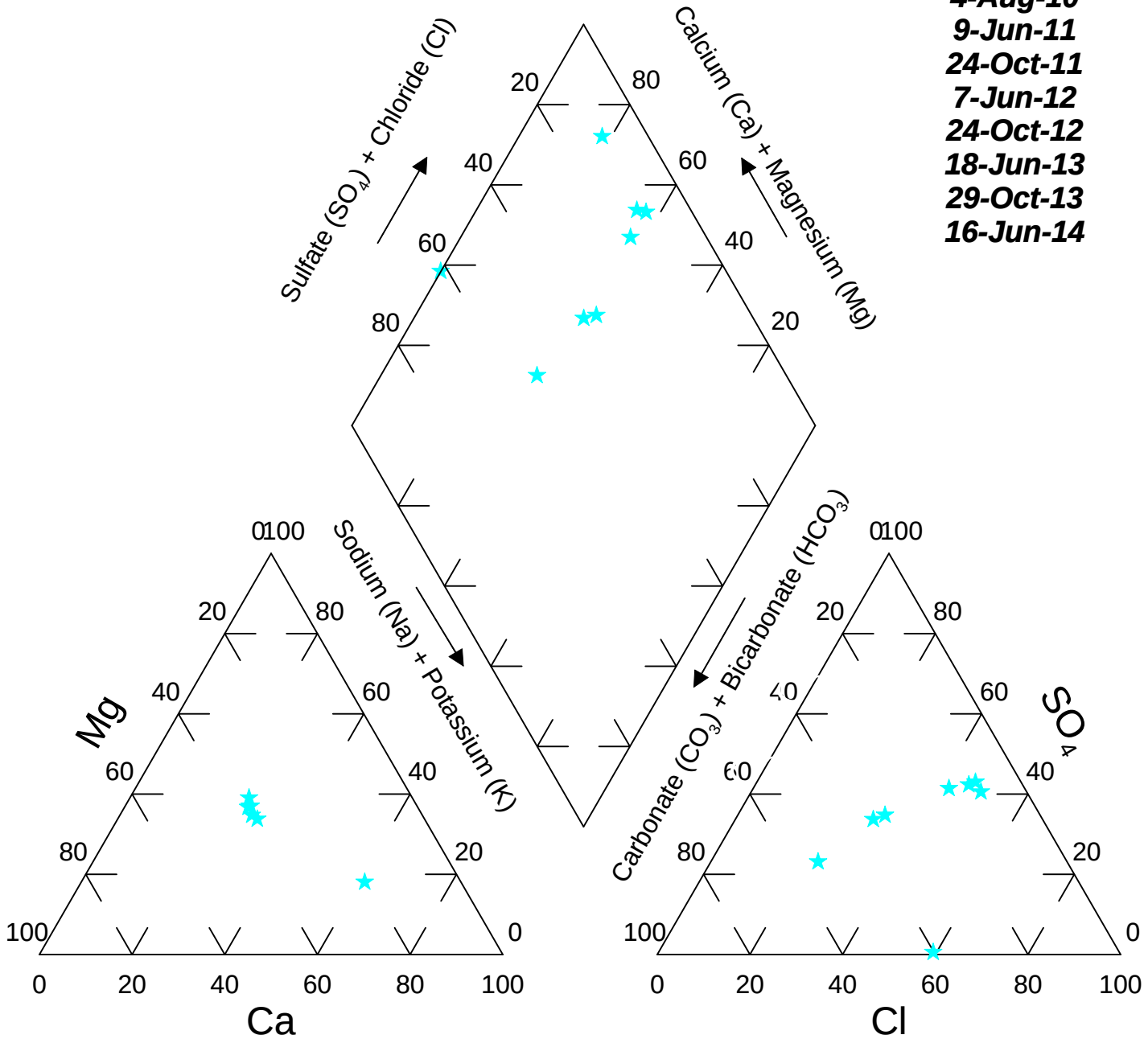


FIGURE: 13P

Winnipeg
Water and Waste Department

Site: Brady
Well #: 6N59-F

Dates:
5-Aug-10
9-Jun-11
24-Oct-11
7-Jun-12
24-Oct-12
17-Jun-13
28-Oct-13
16-Jun-14

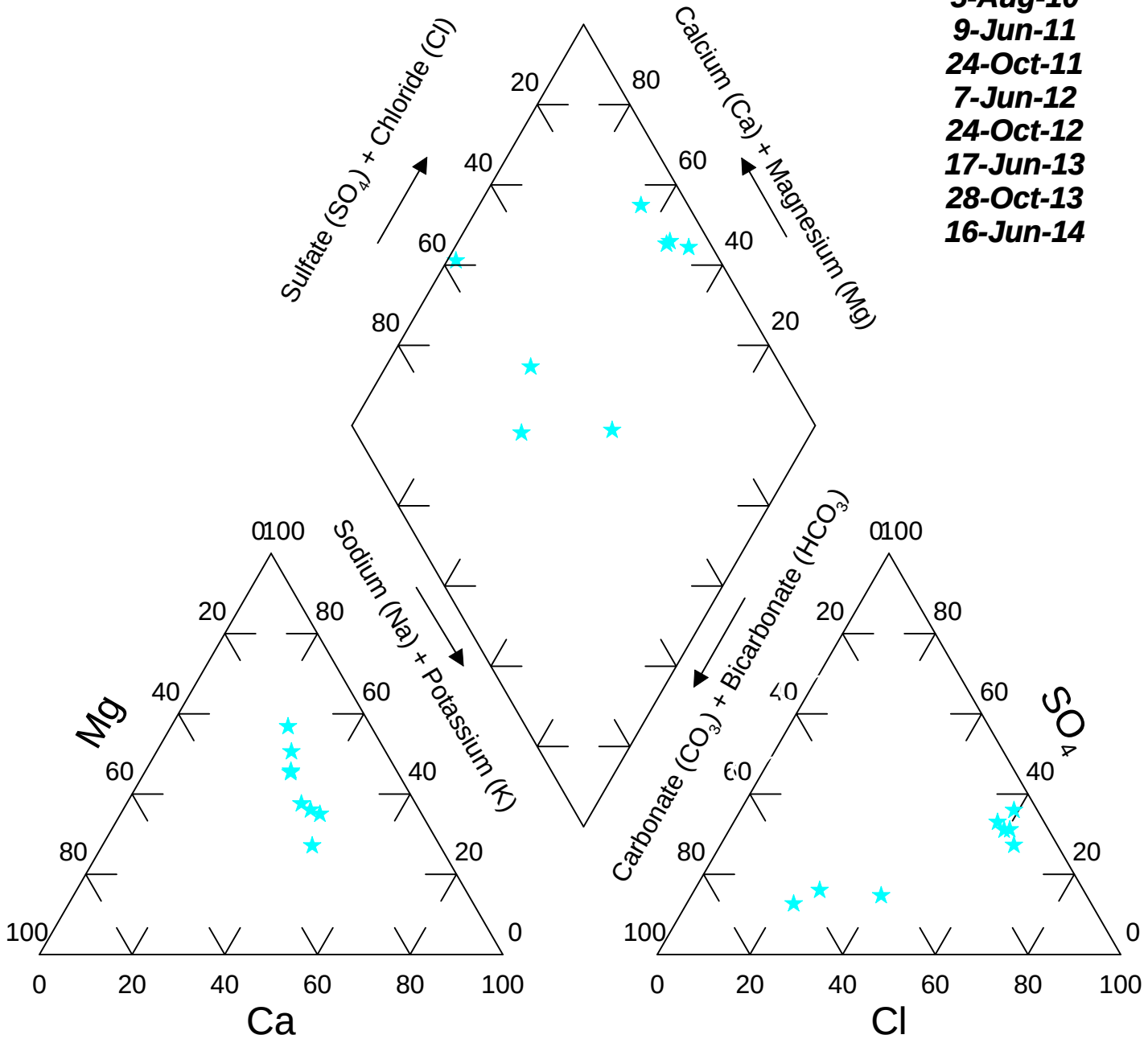


FIGURE: 14P

Winnipeg
Water and Waste Department

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

Dates:
6-Aug-10
14-Jun-11
24-Oct-11
7-Jun-12
1-Nov-12
19-Jun-13
21-Oct-14

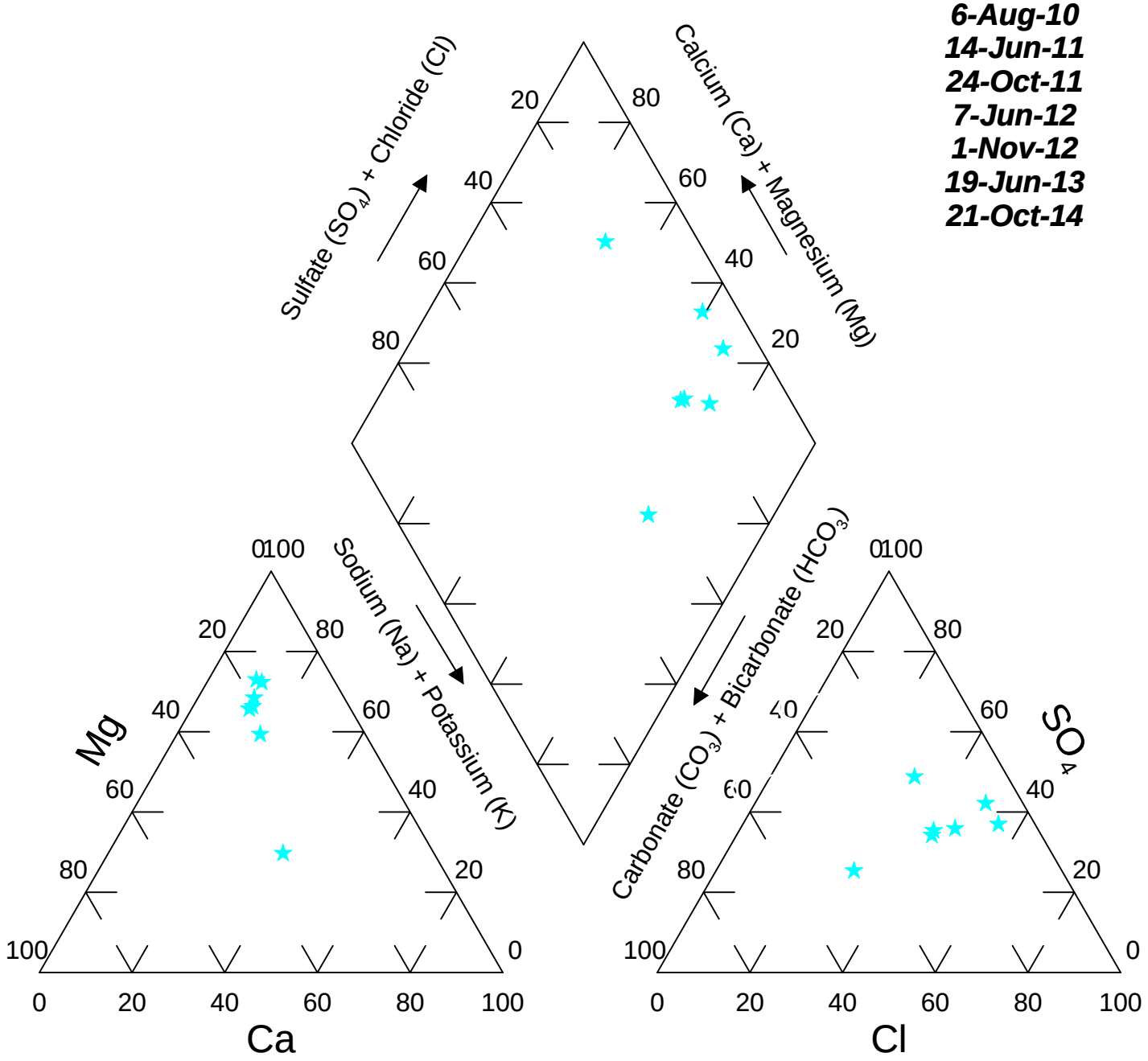


FIGURE: 15P

Winnipeg
Water and Waste Department

Site: Brady
Well #: 6N63-F

Dates:
3-Aug-10
6-Jun-11
20-Oct-11
6-Jun-12
23-Oct-12
17-Jun-13
24-Oct-13
24-Oct-13
12-Jun-14

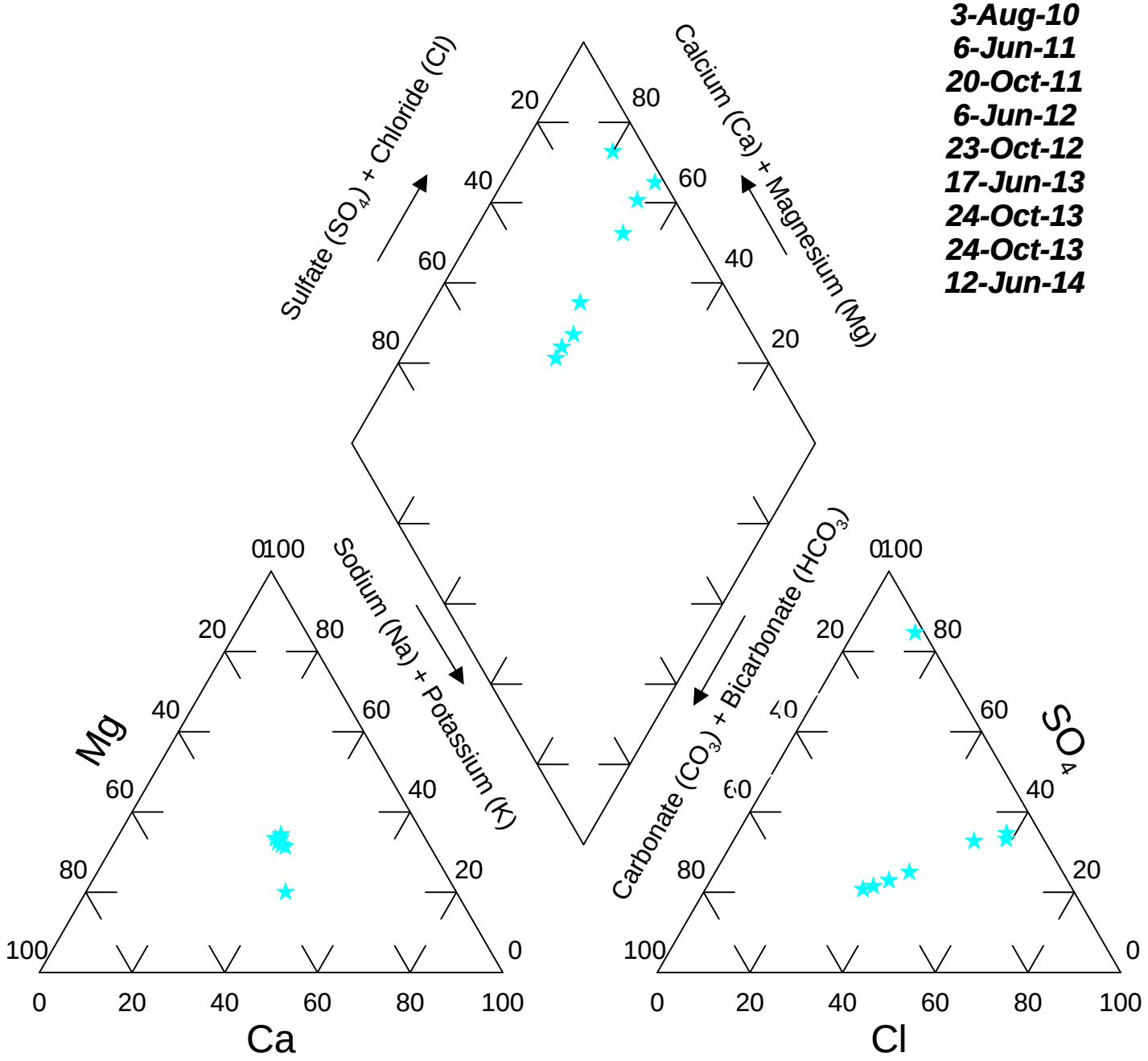


FIGURE: 16P

Winnipeg
Water and Waste Department

Site: Brady
Well #: 6N67-F

Dates:
26-Aug-10
8-Jun-11
24-oct-11
6-Jun-12
22-Oct-12
17-Jun-13
23-Oct-13
12-Jun-14

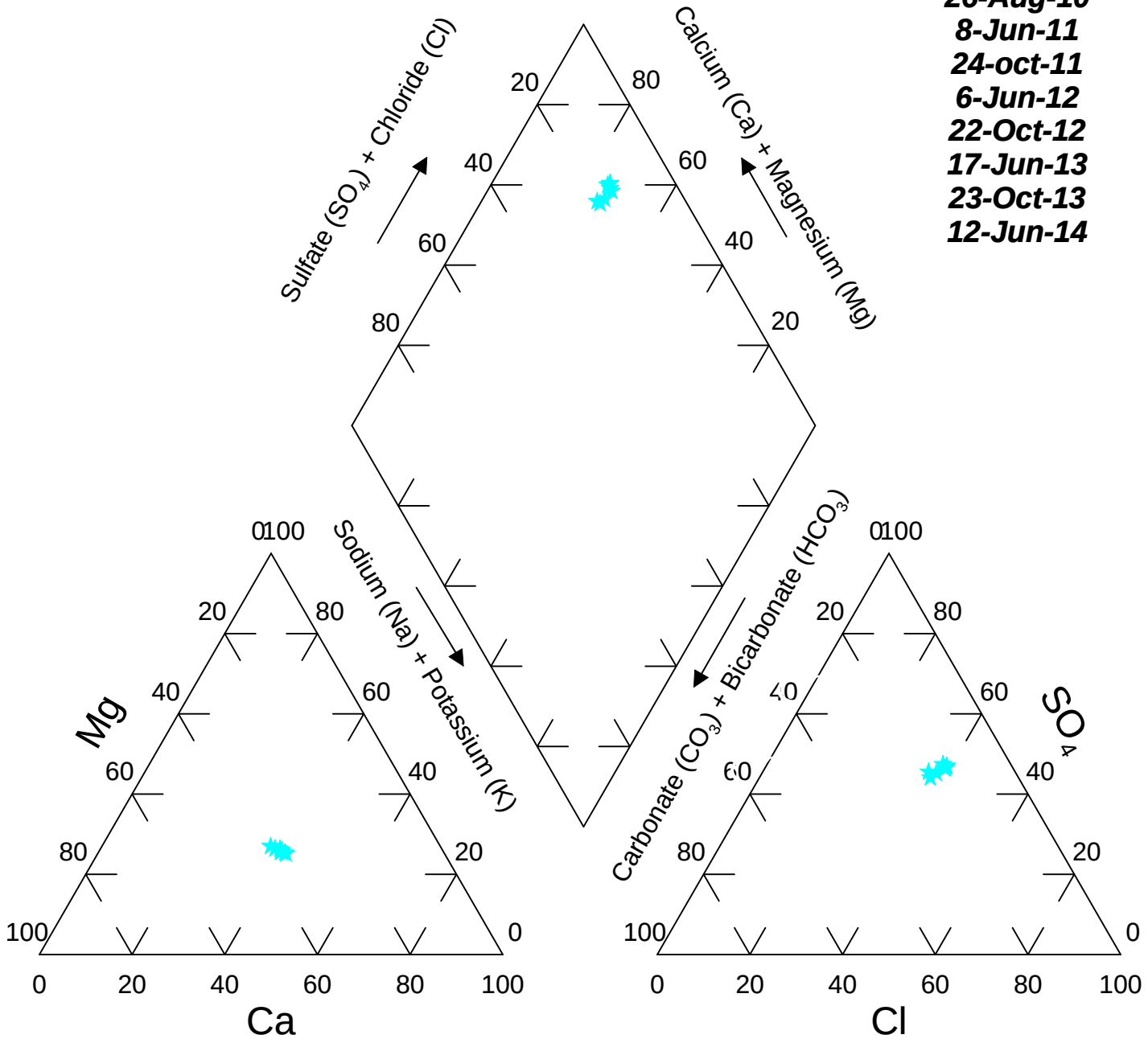
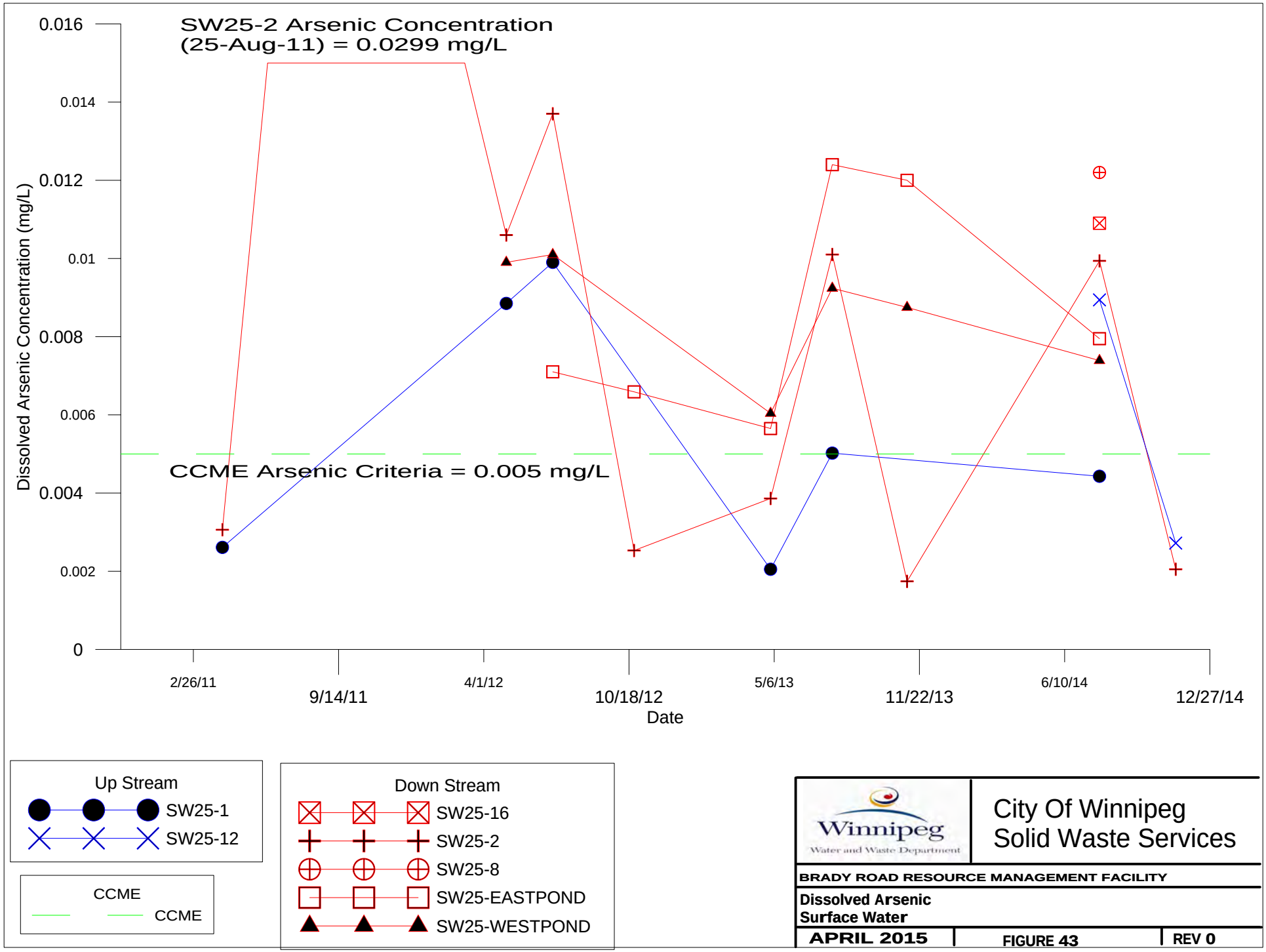


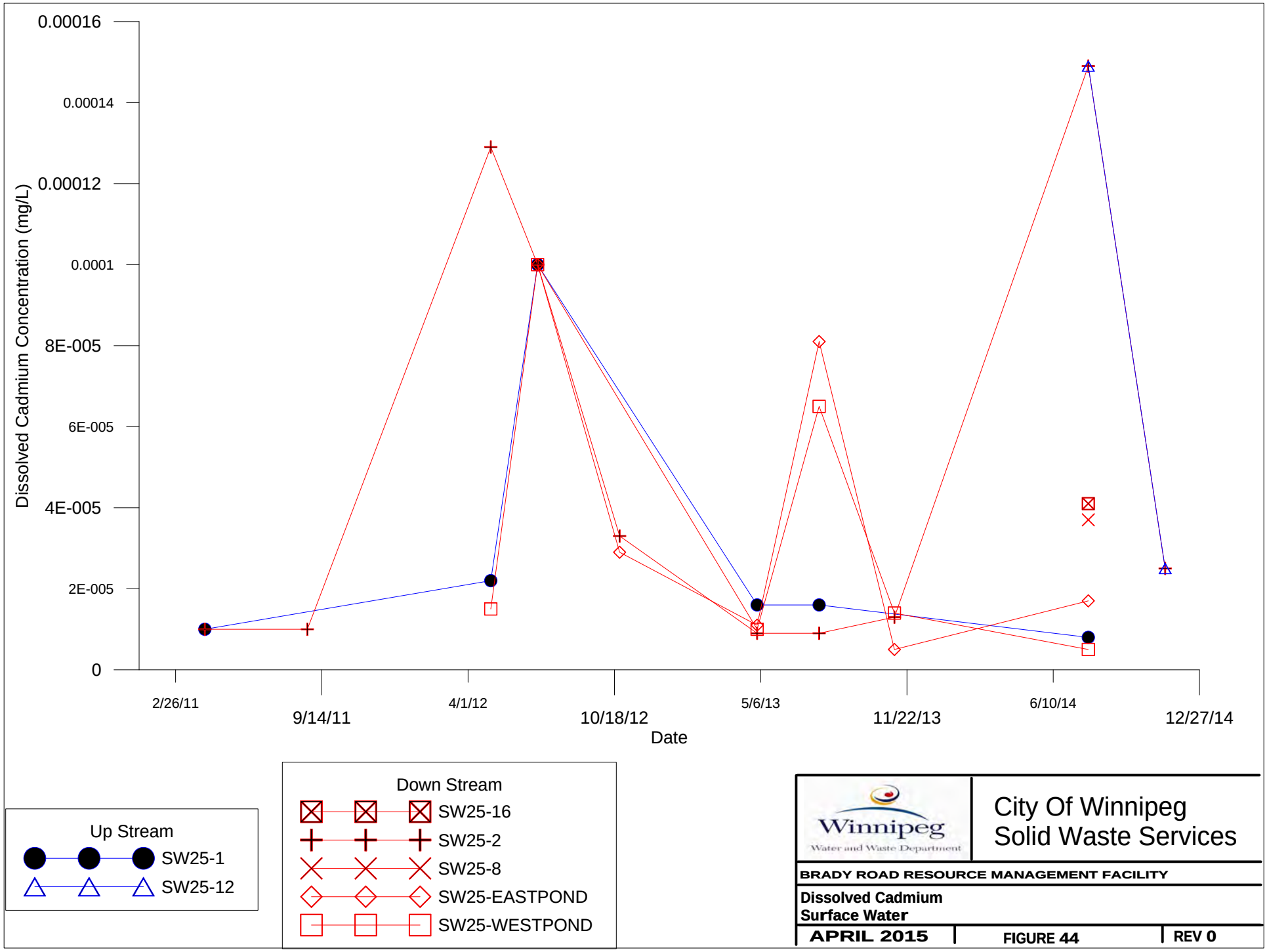
FIGURE: 17P

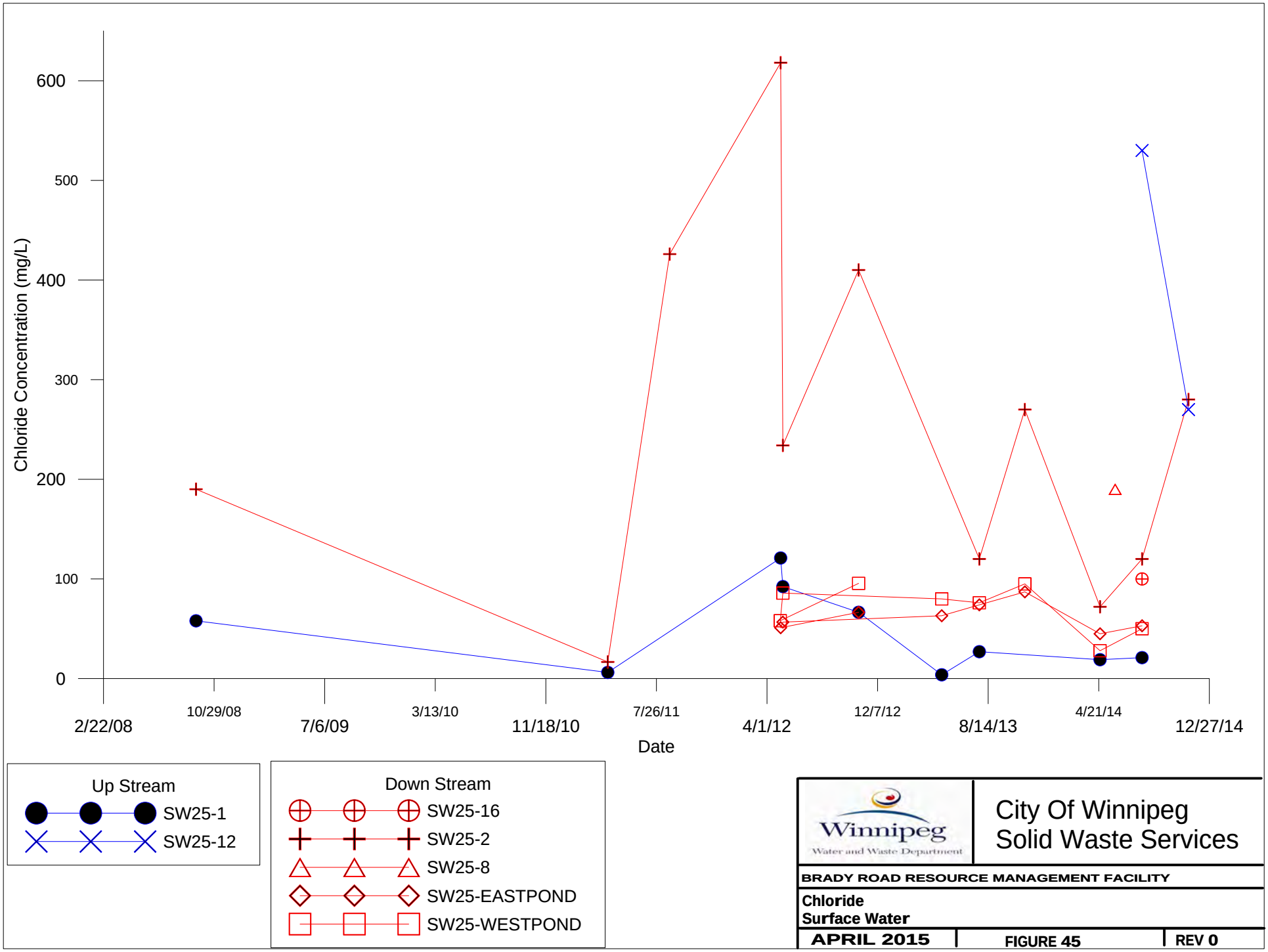
Winnipeg
Water and Waste Department

APPENDIX C

STATISTICAL ANALYSIS OF SURFACE WATER QUALITY


SW25-2 Arsenic Concentration
(25-Aug-11) = 0.0299 mg/L
CCME Arsenic Criteria = 0.005 mg/L
Dissolved Arsenic Concentration (mg/L)
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
2/26/11
9/14/11
4/1/12
10/18/12
5/6/13
11/22/13
6/10/14
12/27/14
Date
Up Stream
SW25-1
SW25-12
CCME
CCME
Down Stream
SW25-16
SW25-2
SW25-8
SW25-EASTPOND
SW25-WESTPOND
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Arsenic
Surface Water
APRIL 2015
FIGURE 43
REV 0


0.00016
0.00014
0.00012
0.0001
8E-005
6E-005
4E-005
2E-005
0
Dissolved Cadmium Concentration (mg/L)
2/26/11
9/14/11
4/1/12
10/18/12
5/6/13
11/22/13
6/10/14
12/27/14
Date
Up Stream
SW25-1
SW25-12
Down Stream
SW25-16
SW25-2
SW25-8
SW25-EASTPOND
SW25-WESTPOND
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Cadmium
Surface Water
APRIL 2015
FIGURE 44
REV 0



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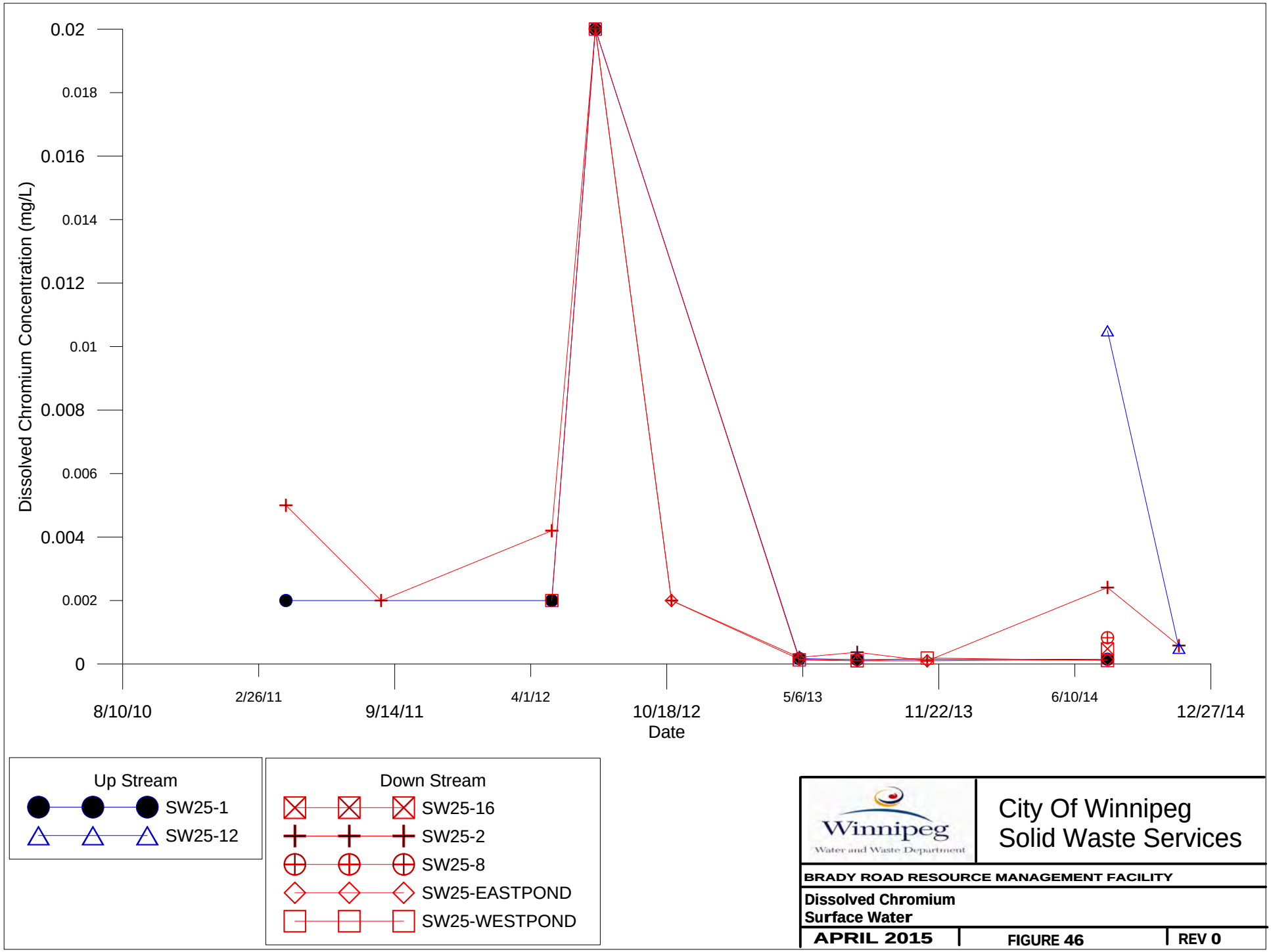
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Chloride
Surface Water

APRIL 2015	FIGURE 45	REV 0



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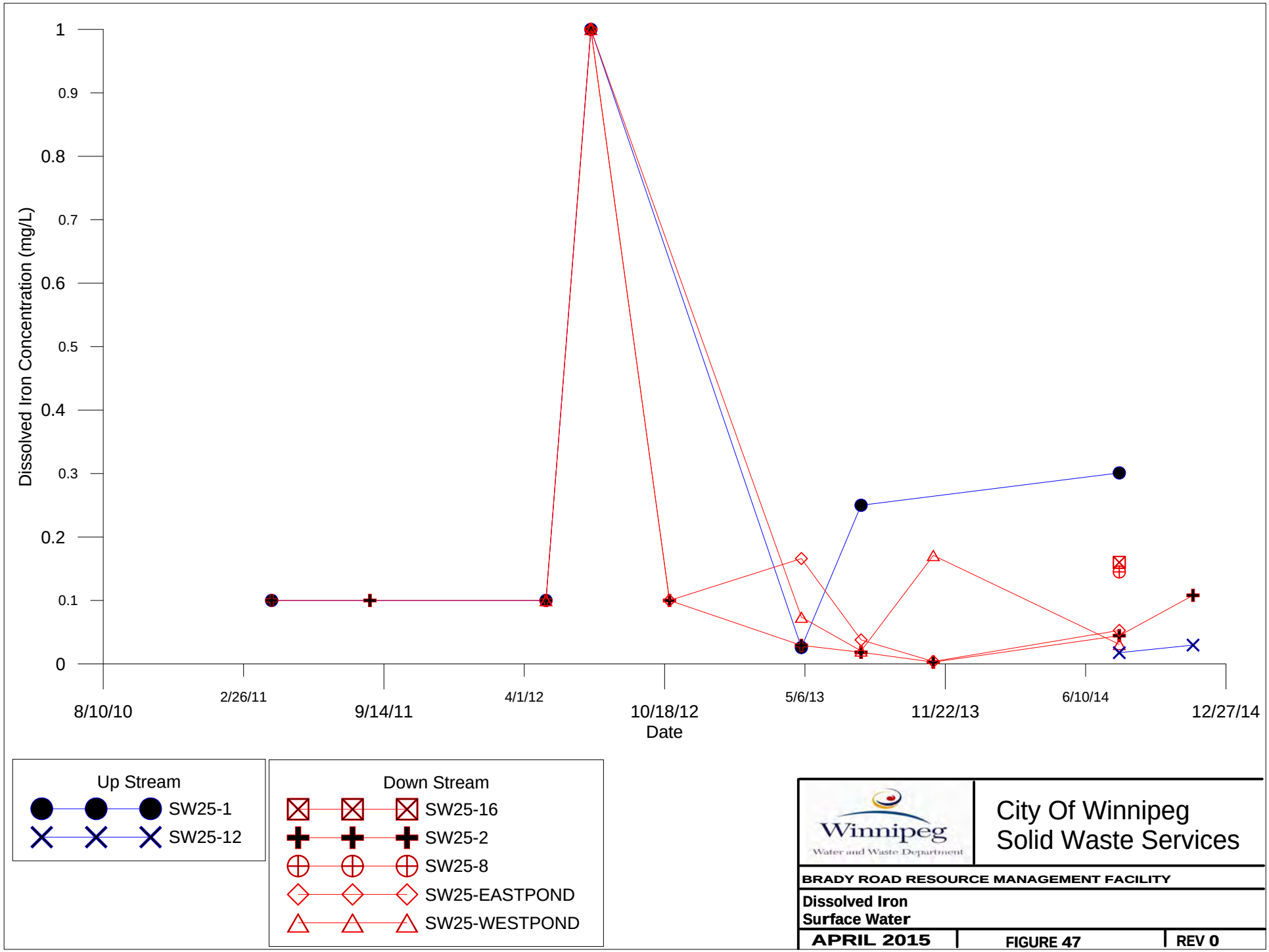
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Chromium
Surface Water

APRIL 2015 | **FIGURE 46** | **REV 0**



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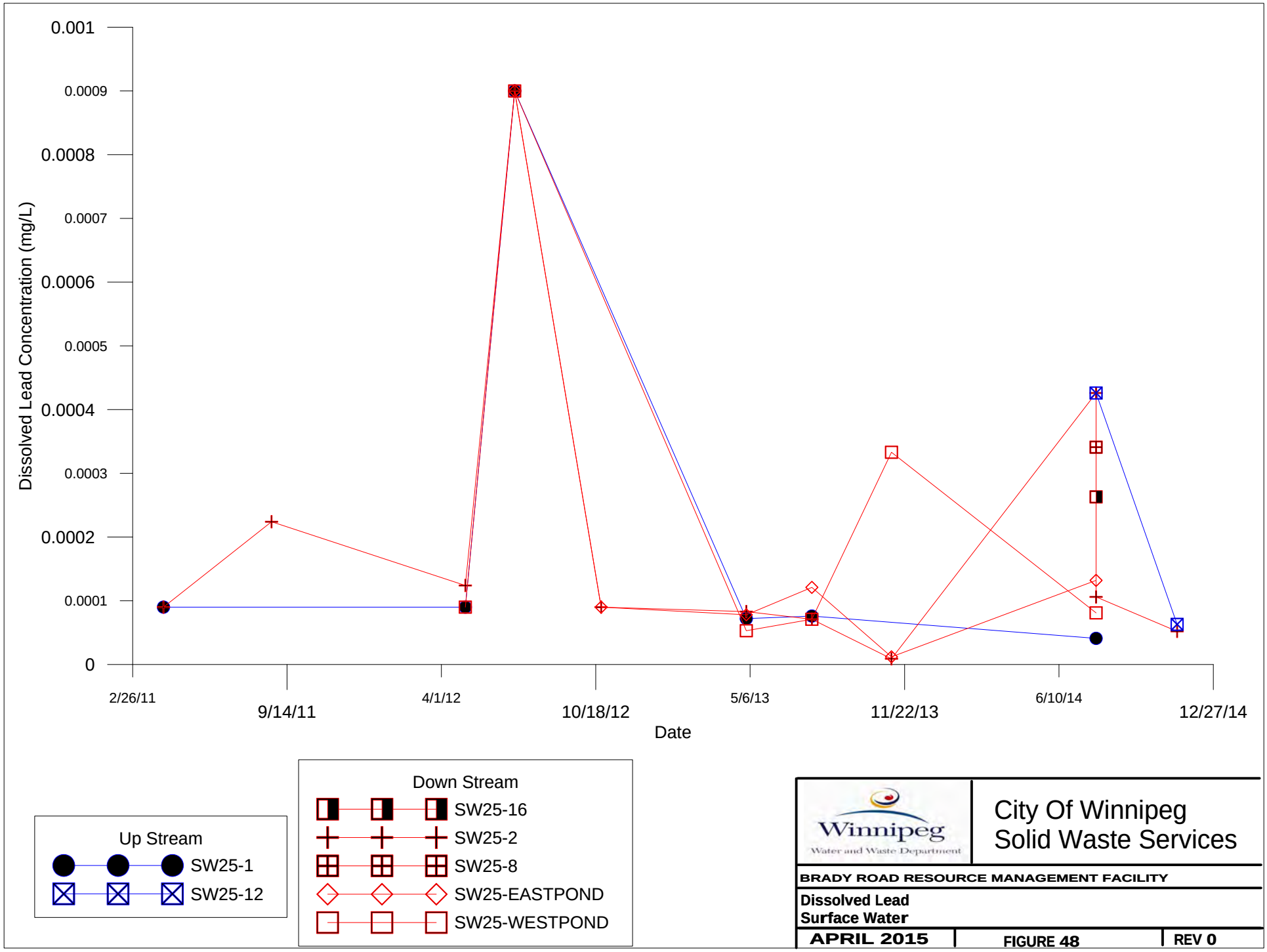
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Iron
Surface Water

APRIL 2015	FIGURE 47	REV 0



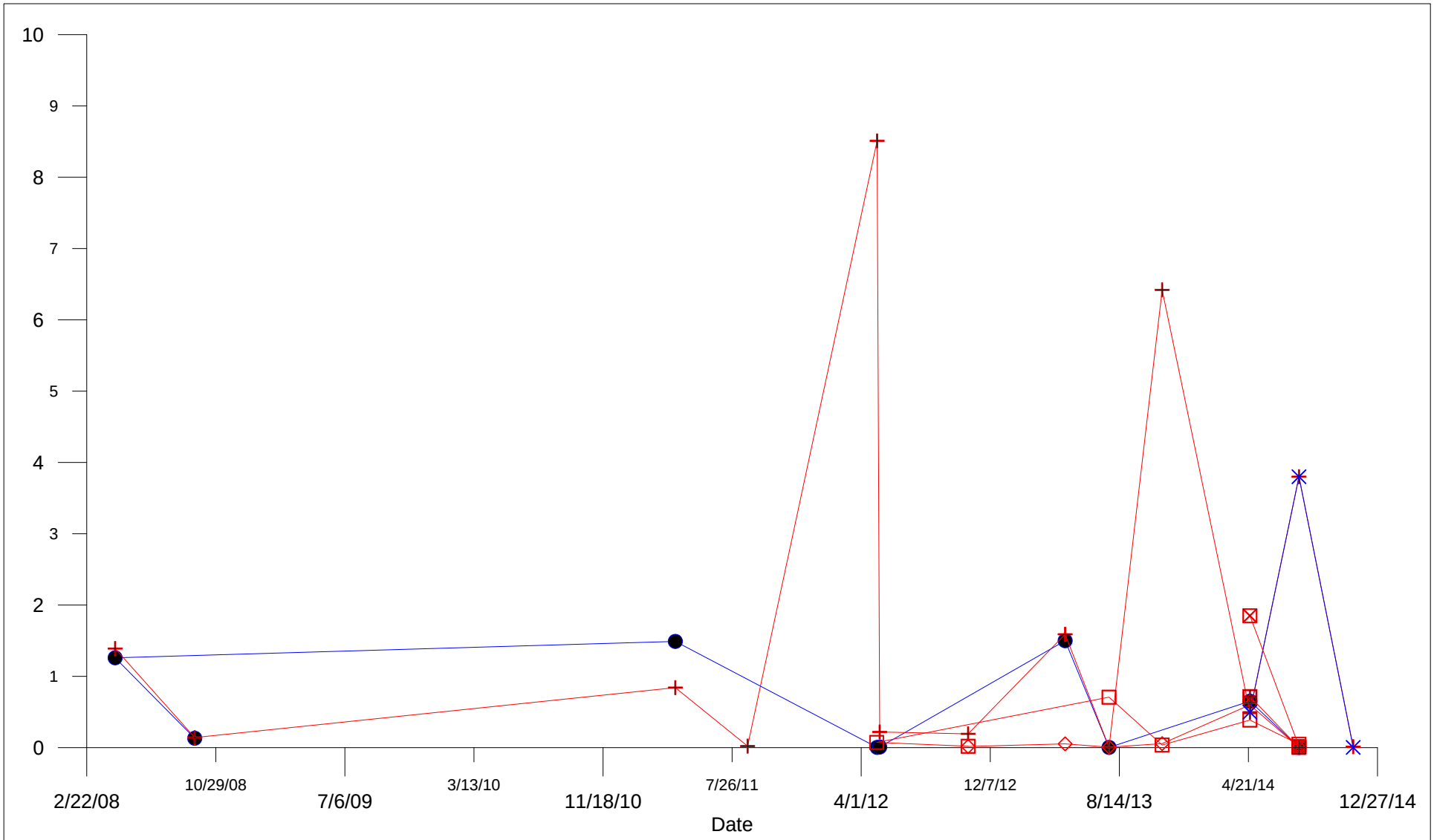
Winnipeg
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Lead
Surface Water

APRIL 2015 | FIGURE 48 | REV 0



Up Stream
- SW25-1
- SW25-12

Down Stream
- SW25-16
- SW25-2
- SW25-8
- SW25-EASTPOND
- SW25-WESTPOND

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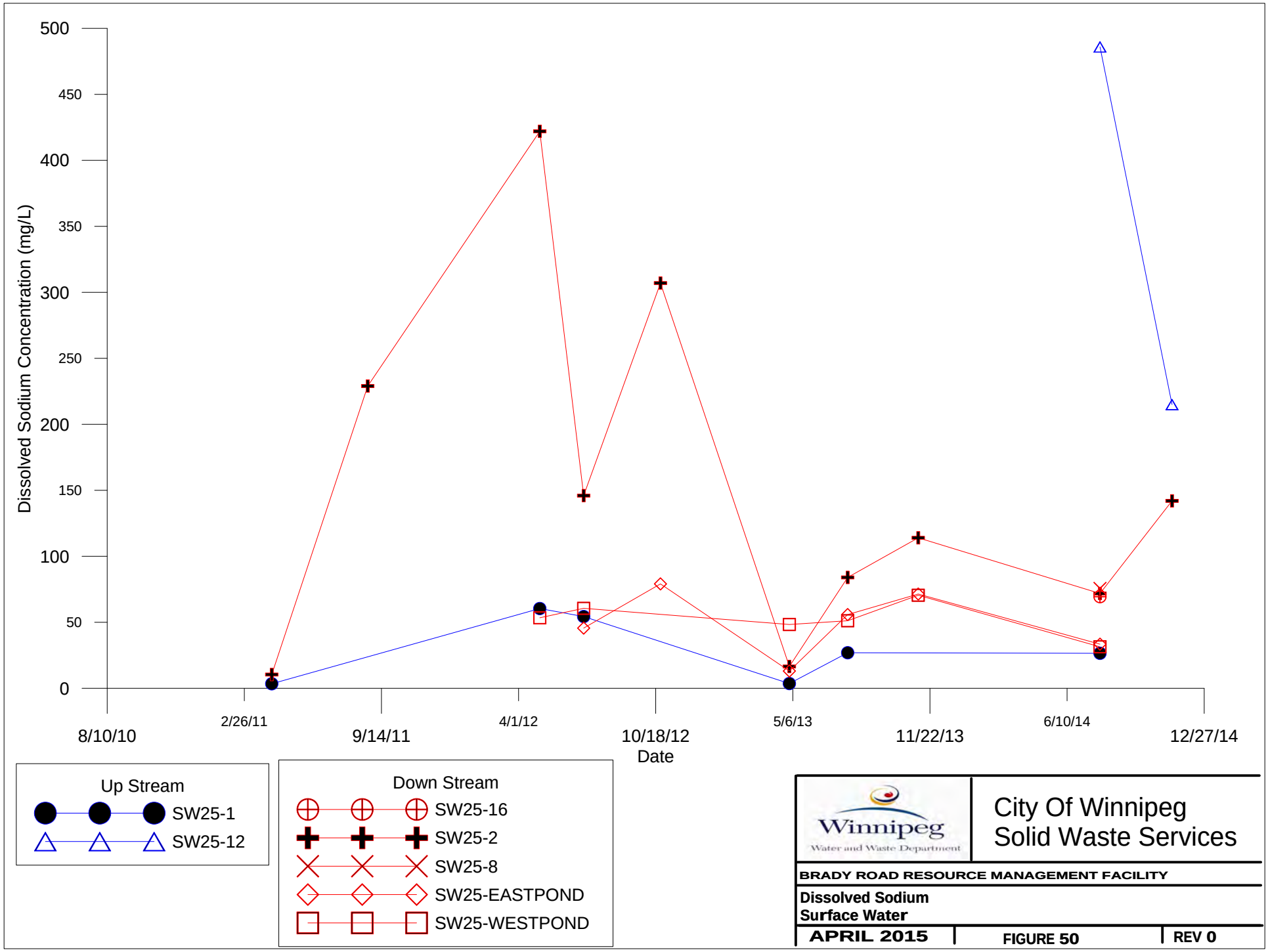
Water and Waste Department

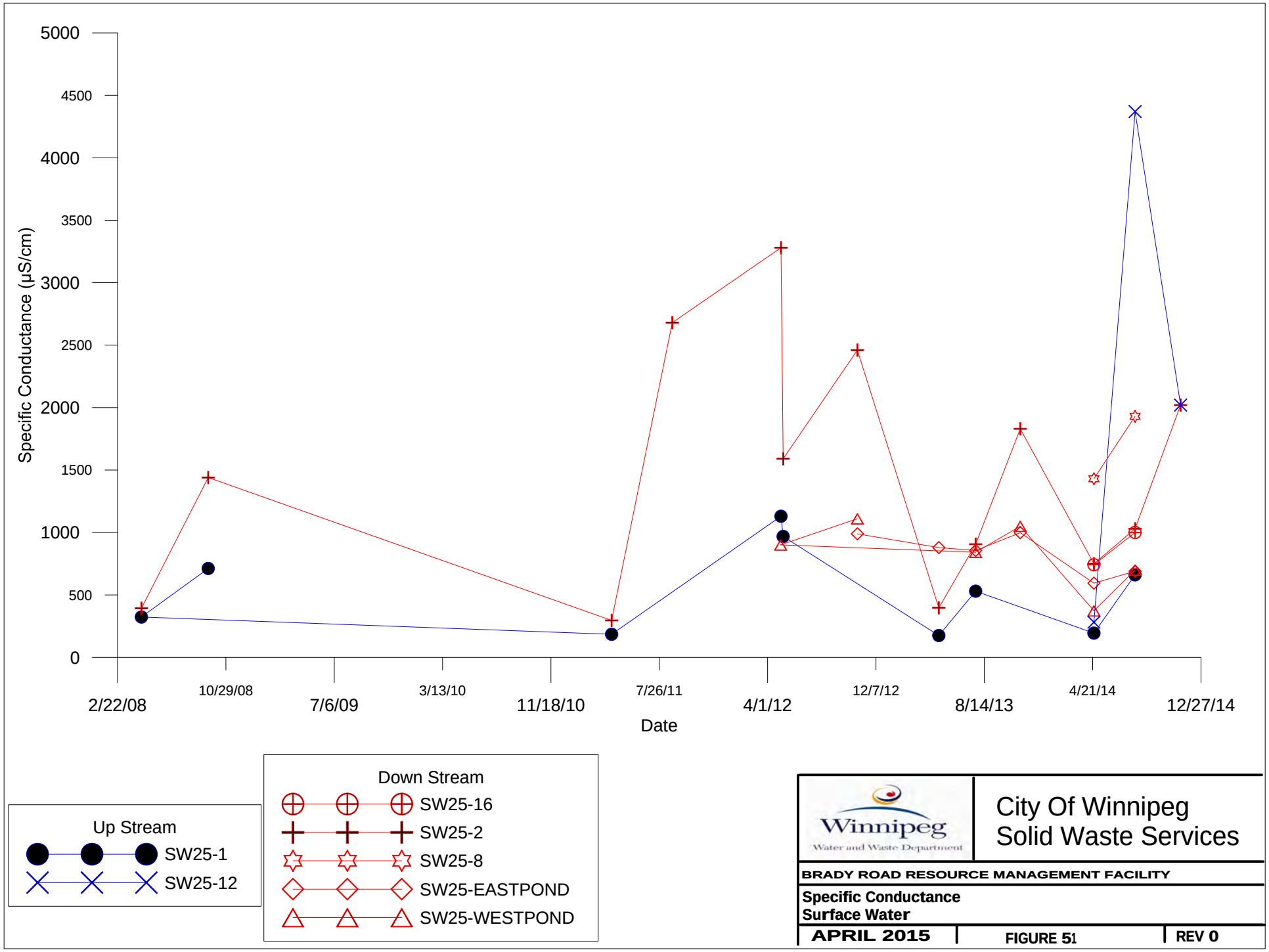
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Nitrate Nitrite as Nitrogen
Surface Water

APRIL 2015	FIGURE 49	REV 0


Dissolved Sodium Concentration (mg/L)
500
450
400
350
300
250
200
150
100
50
0
8/10/10
2/26/11
9/14/11
4/1/12
10/18/12
5/6/13
11/22/13
6/10/14
12/27/14
Date
Up Stream
SW25-1
SW25-12
Down Stream
SW25-16
SW25-2
SW25-8
SW25-EASTPOND
SW25-WESTPOND
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Sodium
Surface Water
APRIL 2015
FIGURE 50
REV 0



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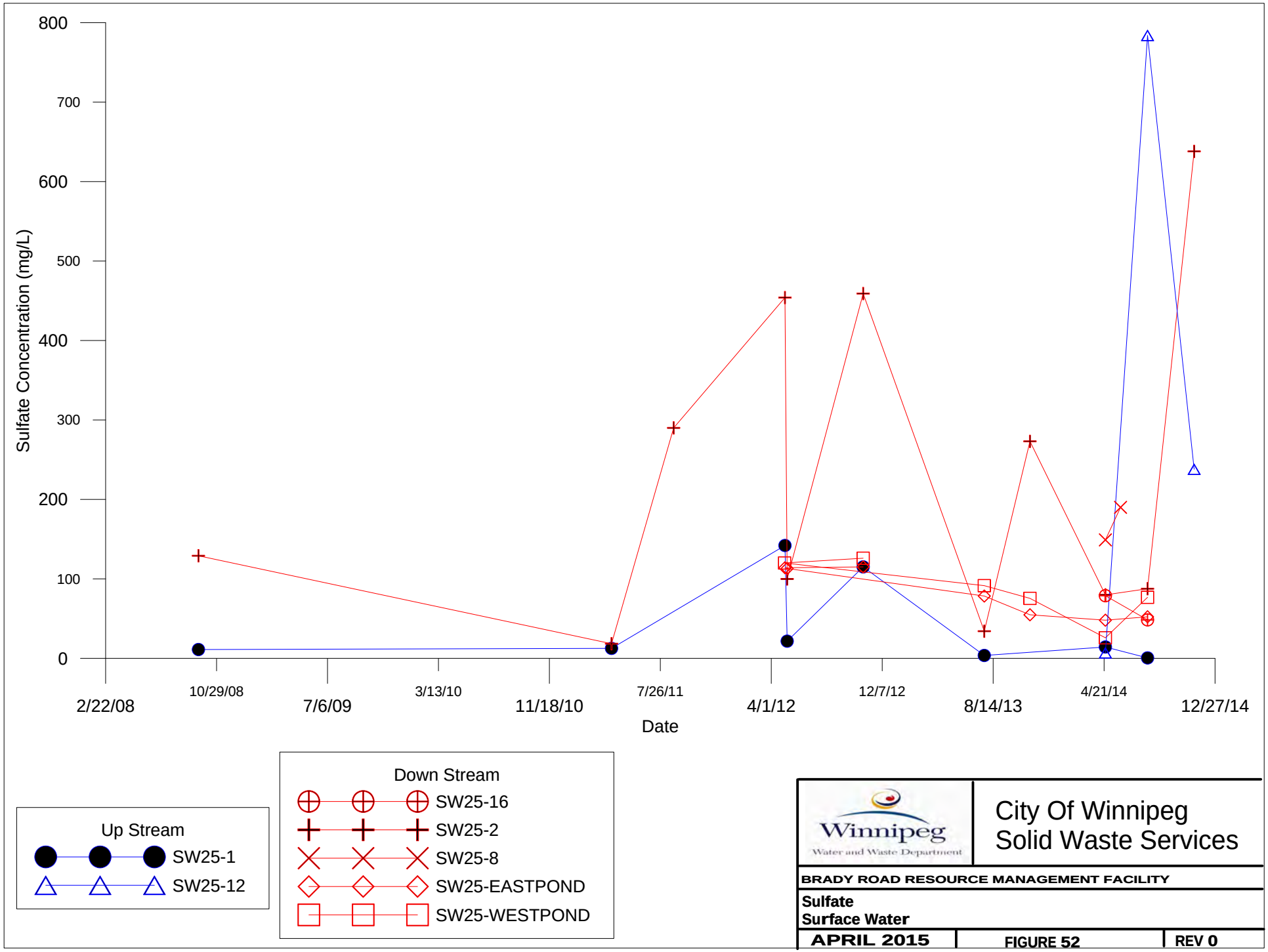
Water and Waste Department

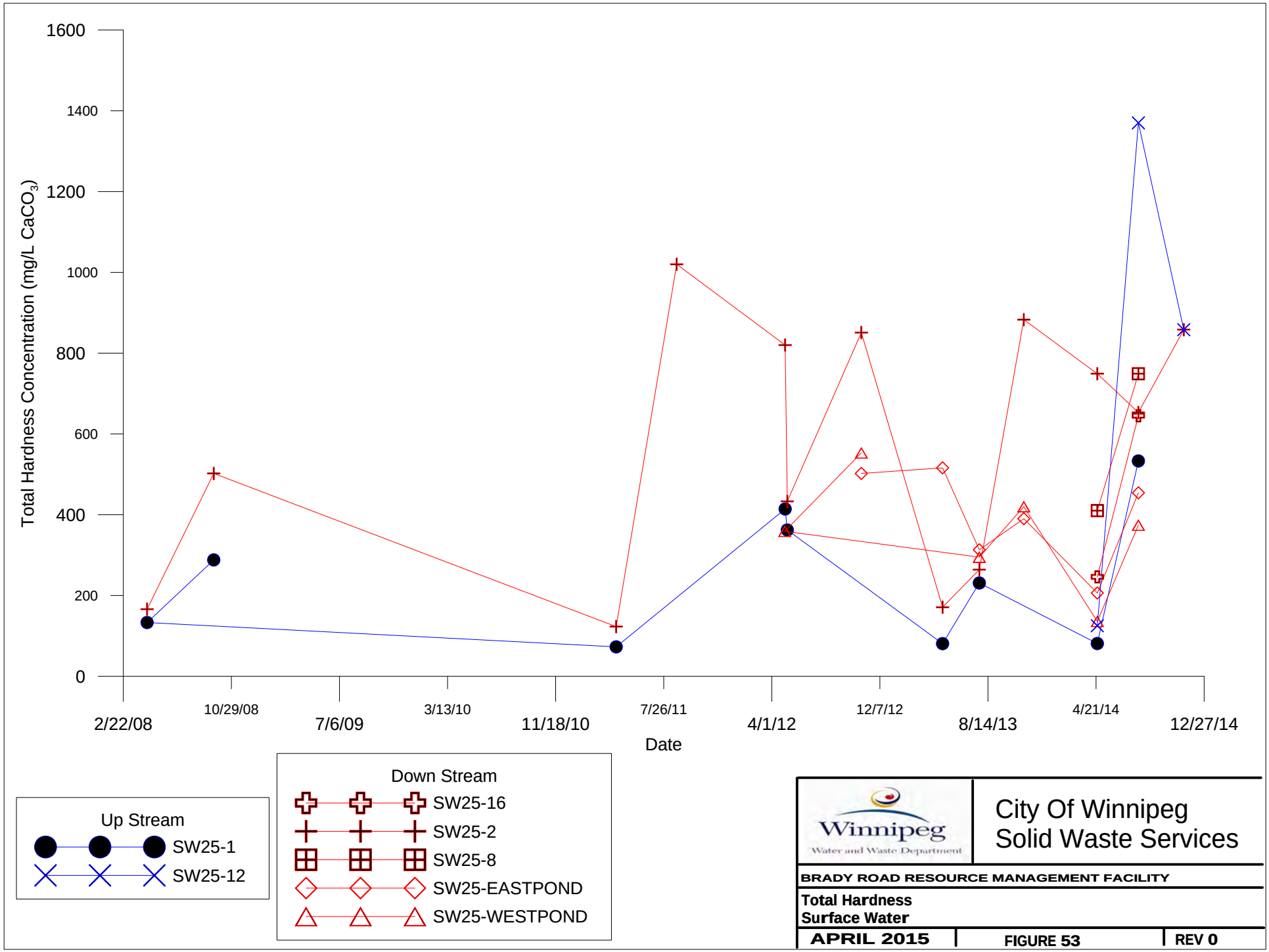
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Specific Conductance
Surface Water

APRIL 2015 | FIGURE 51 | REV 0


800
700
600
500
400
300
200
100
0
Sulfate Concentration (mg/L)
2/22/08
10/29/08
7/6/09
3/13/10
11/18/10
7/26/11
4/1/12
12/7/12
8/14/13
4/21/14
12/27/14
Date
Up Stream
SW25-1
SW25-12
Down Stream
SW25-16
SW25-2
SW25-8
SW25-EASTPOND
SW25-WESTPOND
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Sulfate
Surface Water
APRIL 2015
FIGURE 52
REV 0


1600
1400
1200
1000
800
600
400
200
0
Total Hardness Concentration (mg/L $CaCO_3$)
2/22/08
10/29/08
7/6/09
3/13/10
11/18/10
7/26/11
4/1/12
12/7/12
8/14/13
4/21/14
12/27/14
Date
Up Stream
SW25-1
SW25-12
Down Stream
SW25-16
SW25-2
SW25-8
SW25-EASTPOND
SW25-WESTPOND
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Total Hardness
Surface Water
APRIL 2015
FIGURE 53
REV 0

Site: Brady
Location : SW25-1

Dates:
2-May-12
25-Jul-13
28-Jul-14

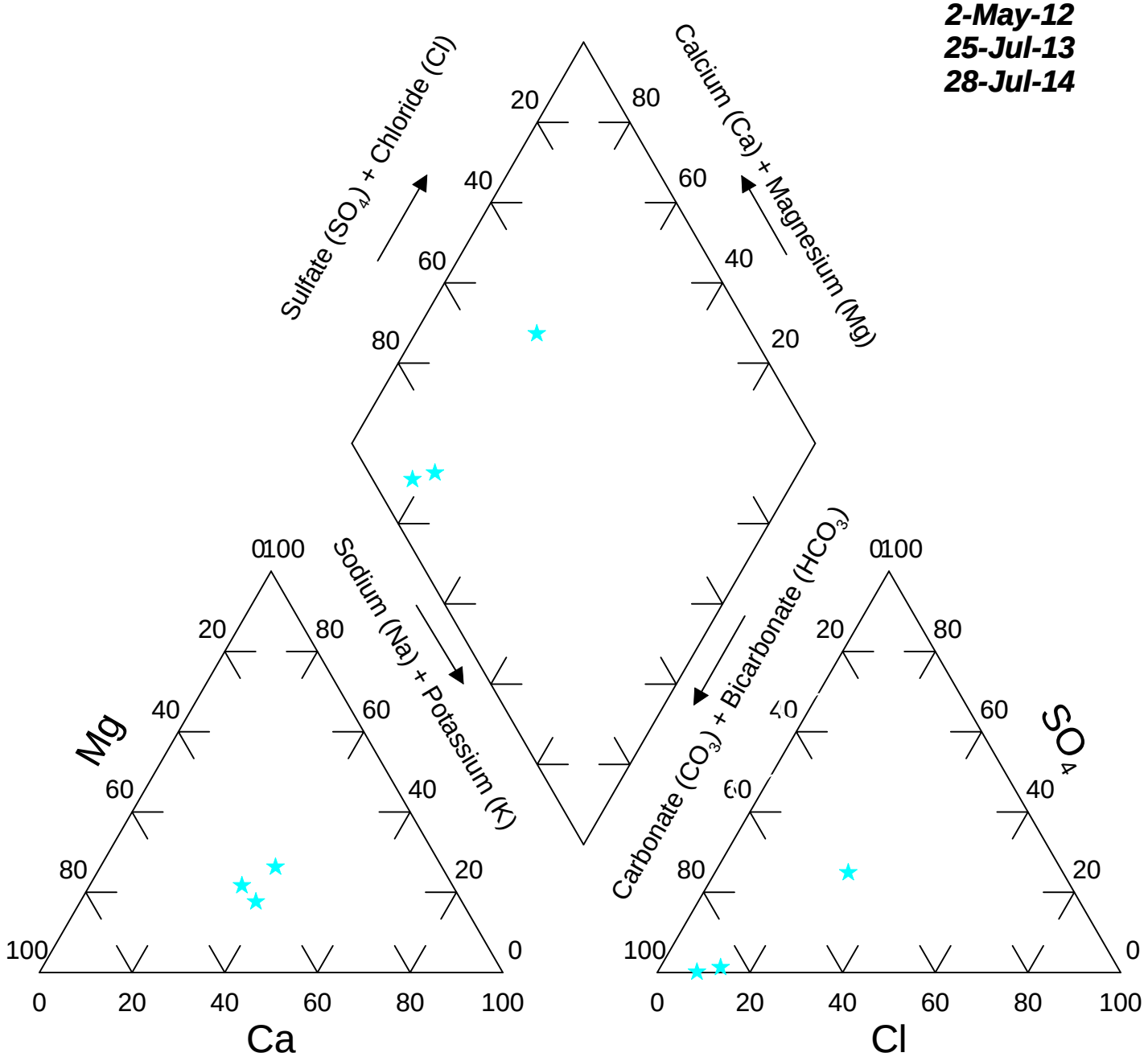


FIGURE: 25P

Winnipeg
Water and Waste Department

Site: Brady
Location : SW25-2

Dates:
2-May-12
25-Oct-12
25-Jul-13
5-Nov-13
28-Jul-14
10-Nov-14

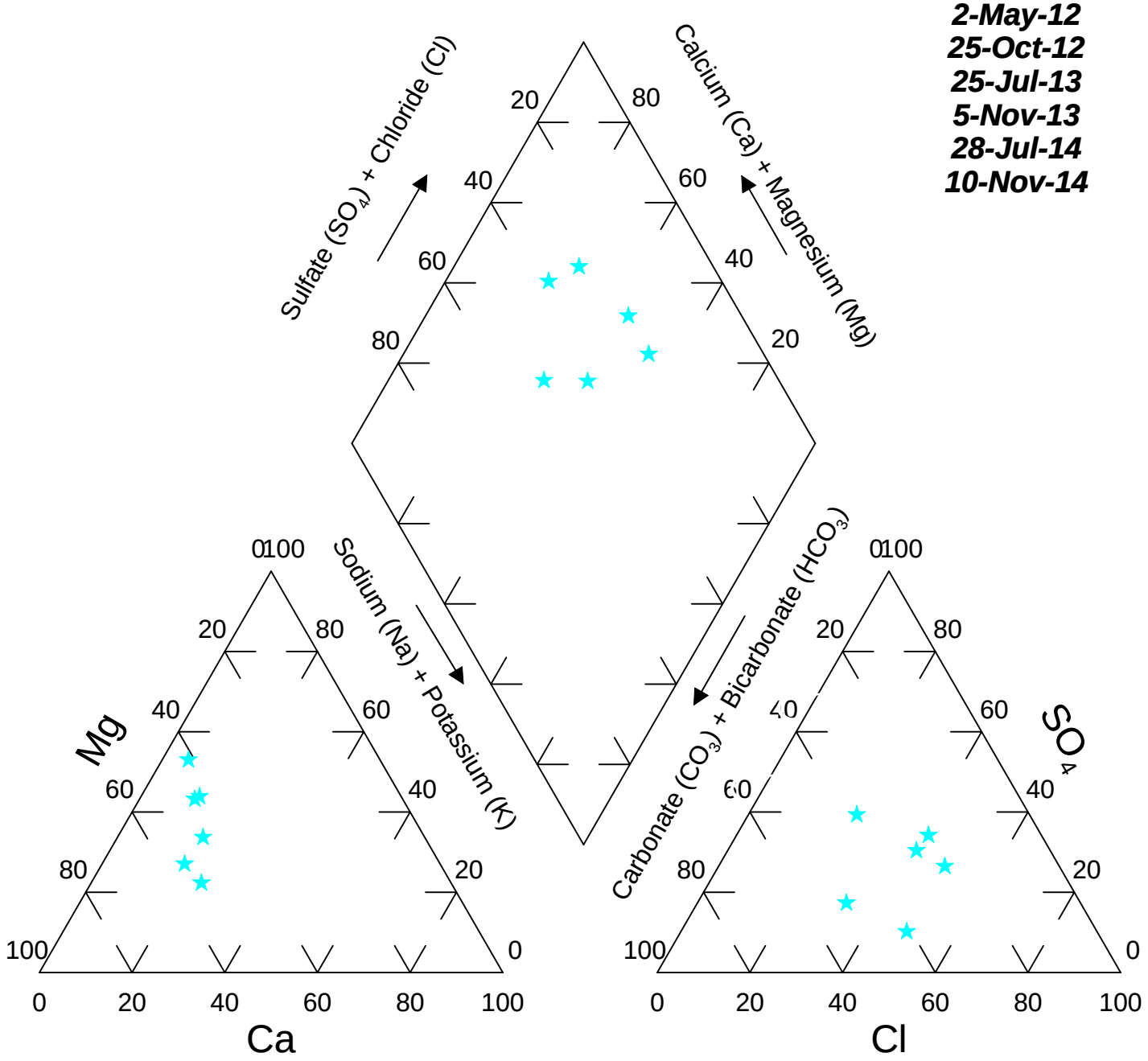


FIGURE: 26P

Winnipeg
Water and Waste Department

Site: Brady
Location : SW25-8

Dates:
28-Jul-14

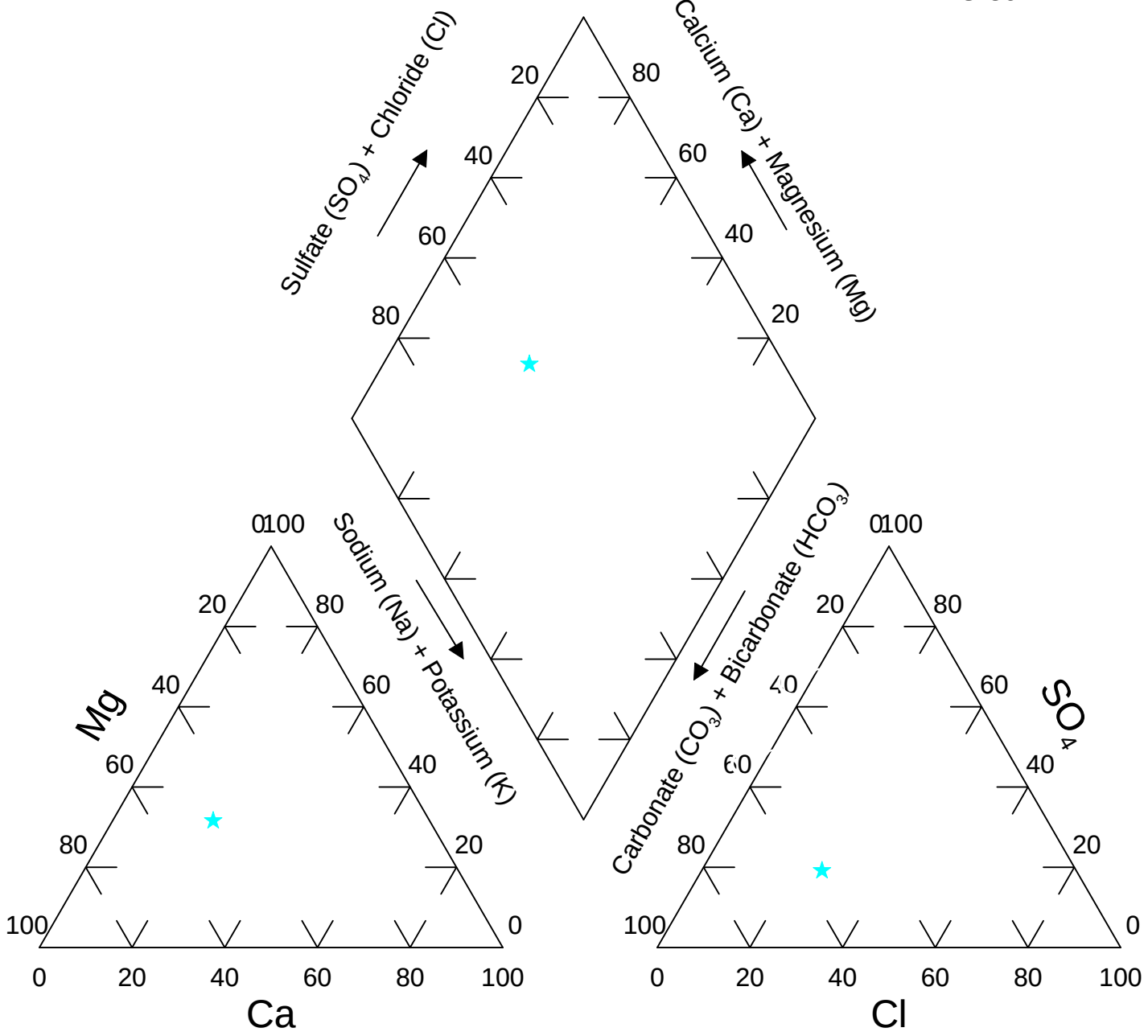


FIGURE: 27P

Winnipeg
Water and Waste Department

Site: Brady
Location : SW25-12

Dates:
28-Jul-14
10-Nov-14

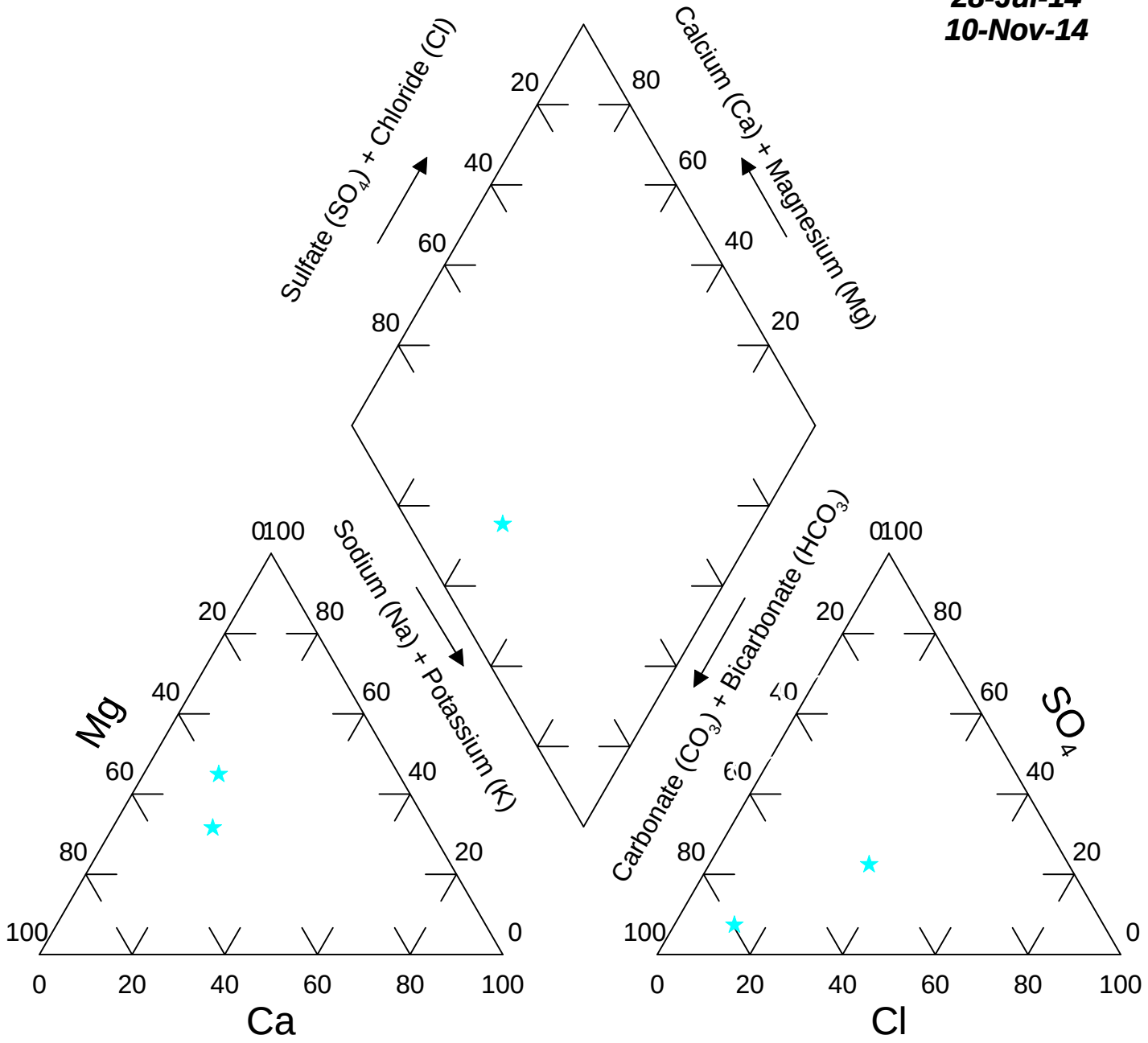


FIGURE: 28P

Winnipeg
Water and Waste Department

Site: Brady
Location : SW25-16

Dates:
28-Jul-14

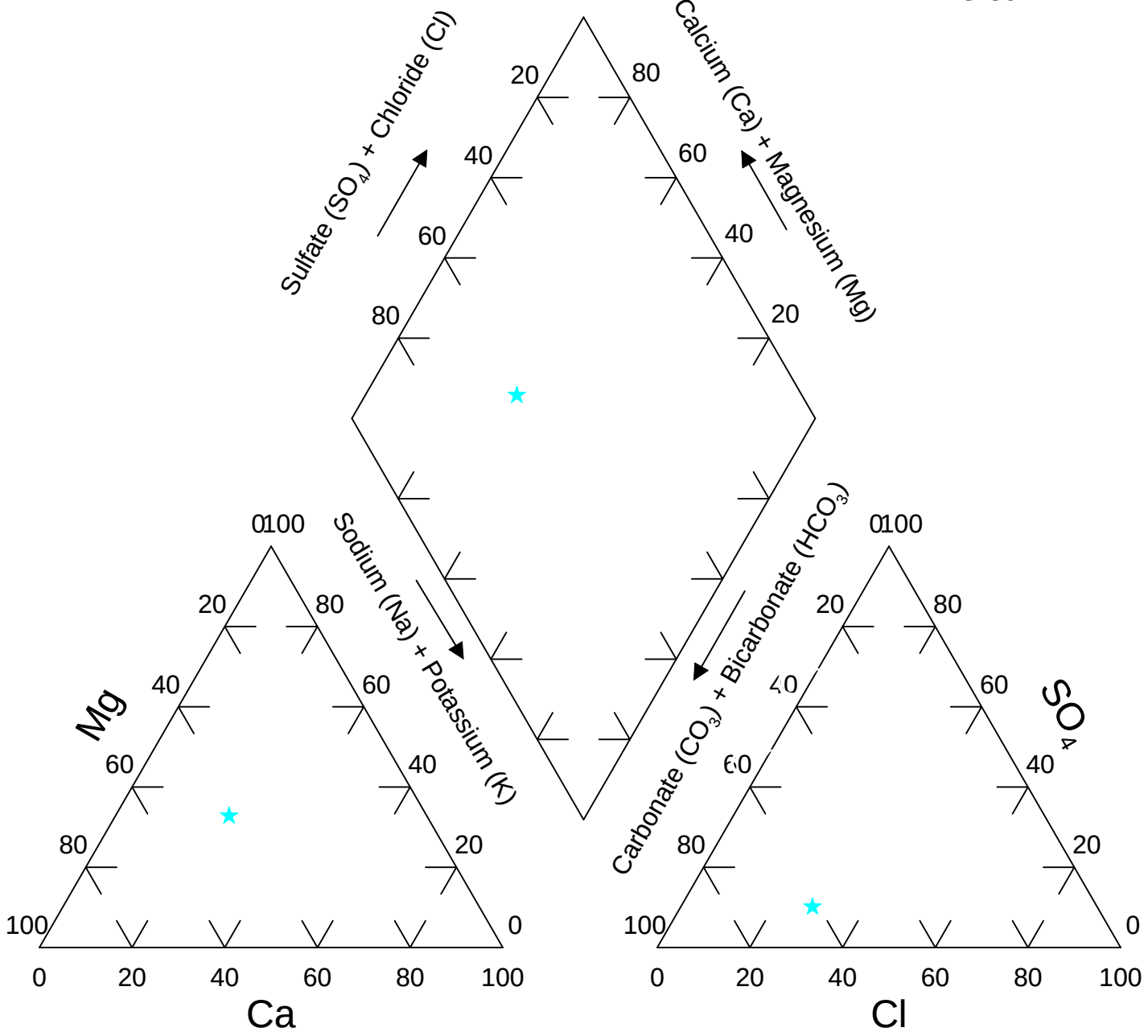


FIGURE: 29P

Winnipeg
Water and Waste Department

Site: Brady
Location : SW25-Eastpond

Dates:
25-Oct-12
25-Jul-13
5-Nov-13
28-Jul-14

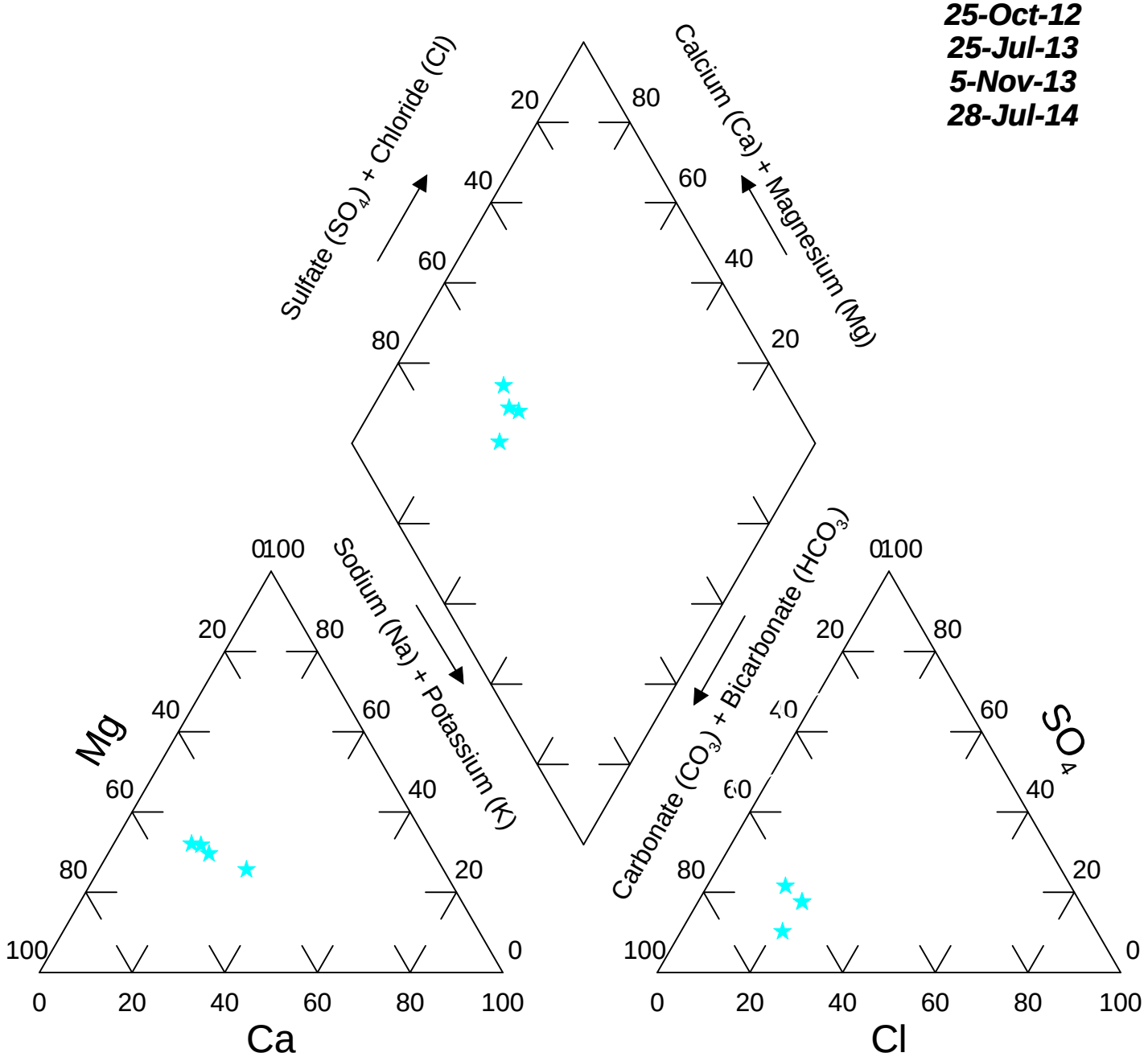


FIGURE: 30P

Winnipeg
Water and Waste Department

Site: Brady
Location : SW25-WESTPOND

Dates:
1-May-12
25-Oct-12
25-Jul-13
28-Jul-14

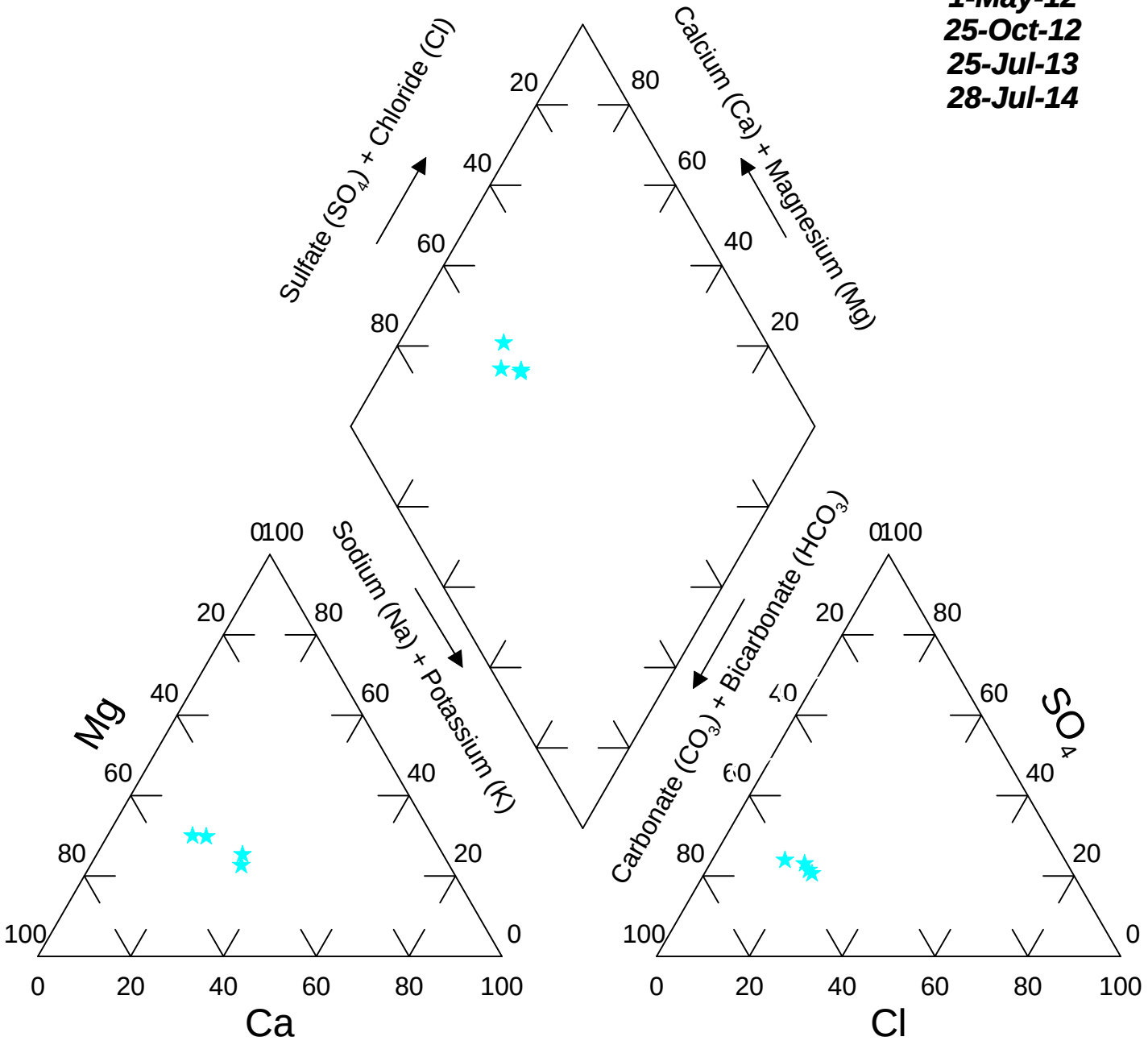


FIGURE: 31P

Winnipeg
Water and Waste Department

APPENDIX D

2014 LANDFILL GAS COLLECTION AND FLARING REPORT

2014 ANNUAL MONITORING REPORT
CITY OF WINNIPEG

BRADY ROAD RESOURCE MANAGEMENT FACILITY
LANDFILL GAS COLLECTION AND FLARING SYSTEM
2014

Prepared for

THE CITY OF WINNIPEG

Prepared by

INTEGRATED GAS RECOVERY SERVICES INC.

2014 ANNUAL MONITORING REPORT
CITY OF WINNIPEG

BRADY ROAD RESOURCE MANAGEMENT FACILITY
LANDFILL GAS COLLECTION AND FLARING SYSTEM

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1.0 INTRODUCTION

The City of Winnipeg (the City) operates the Landfill Gas Collection and Flaring System at the Brady Road Resource Management Facility in Winnipeg, Manitoba, which operates under Manitoba Conservation Licence 3081. After a short 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 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 during 2014.

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 Monitoring

The wellfield system monitoring consists of measuring vacuum/pressure in each well and lateral pipe, as well as 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 proper gas meter/analyzer such as a Landtec GEM-2000+, or equivalent. Vacuum fluctuations were noted, as it can be an indication of water within in 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 2014, elevated levels of Carbon Monoxide (CO) were found initially at GW5-42 and additionally in GW2-13. Elevated carbon monoxide within landfill gas is an indicator of a subsurface fire within the waste. Measurements of carbon monoxide and temperature further confirmed there was a fire. The gas wells in the areas of the fire were adjusted to reduce the

vacuum in order to reduce the potential for oxygen to be drawn in and further ignite the fire. Landfill Fire Control Inc. completed an investigation and made recommendations to help control and eliminate the fire. Landfill Fire Control Inc. has submitted a copy of the report and summary of the investigation separately to the City. By the end of 2014, the CO readings were within normal range and the wellfield readjusted, monitoring will continue for evidence of fire.

In May 2014, wellbore seals were placed around wells: H-1, 1-5, H-12, 2-14, 3-22, 4-35, 5-39 and 5-41. The seals are designed to improve balancing at the wellhead, reduce oxygen intrusion and reduce the potential for landfill fires. In some cases, wells that were fitted with wellbore seals showed some improvement in gas quality, gas flow, or both. Of the eight wells fitted with seals, some show reduced oxygen concentrations after May 2014 (H-1, 1-5, 2-14, 5-41). However, fluctuations of gas quality are typically observed throughout the year due to weather conditions and seasonal changes. Additional measurements and observations throughout 2015 will further confirm whether the borehole seals have improved wellfield collection and balancing.

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

Pump counter measurements were recorded on a monthly basis at all dual purpose gas/leachate collection wells. Table 3 presents the pump counter measurements recorded at both the pump drain traps and dual purpose wells in 2014. The following wells are fitted with pneumatic pumps for leachate removal: H-4, 1-9, 1-10, H-11, 2-18, 3-27, 3-29 and 3-30. Dual purpose well locations were chosen based on the incidence of elevated leachate levels in the surrounding area. Additional well locations were designed with compressed air and forcemain coming up to the well which allows for pumps to be relocated, as necessary.

Table 4 presents the water levels measured on a quarterly basis. The percent of open screen available for gas collection at each well is estimated based on water levels. During 2014, the average open screen at all wells was approximately 50%.

Based on pump counters and water levels recorded throughout 2014, dual purpose well pumps continue to remove leachate consistently. Most of the dual purpose wells have open screen percentages above 60%. The frequency of operation of pumps in H-4 and 3-30 various throughout 2014, and overall were relatively low. However, leachate levels indicate that the wells were partially flooded most of the year. It is suspected that the pump may not be functioning as designed, due to leachate and siltation residue making the pump inoperable. Consideration can be given to relocating the pumps in H-4 and 3-30 if pump cycle frequency remains low and little improvement is observed in leachate elevations at the two wells.

Table 2:
Wellfield Monitoring Data

		15-Jan-14	5-Feb-14	5-Mar-14	3-Apr-14	7-May-14	3-Jun-14	15-Jul-14	7-Aug-14	3-Sep-14	10-Oct-17	6-Nov-14	17-Dec-14
Weather Conditions		light snow	sunny	overcast	light snow	light rain	sunny	partly cloudy	cloudy	partly cloudy	partly cloudy	partly cloudy	clear
Ambient Temperature (d		-25	-21	-16	-2	10	26	20	27	20	11	4	-13
			anemometer										
Location			***issues***										
Control Pan	*Flow Rate*	925	900	900	750	850	1025	1175	1200	1100	1100	1092	909
	CH4	48.6	39.5	42.1	49.4	54.6	54.1	55.2	51.2	54.3	51.7	51.7	48.3
	O2	0.8	3.0	2.1	1.1	0.9	0.8	0.7	0.8	0.4	1.2	0.9	2.7
	Wellfield Vac	-12.1	-17.4	-15.7	-16.8	-10.0	-12.5	-15.0	-15.8	-14.4	-15.9	-22.6	-14.4
	Outlet Press.	4.0	4.0	3.2	2.8	3.2	3.3	3.9	3.9	4.6	3.8	5	3.9
H-1	*Well*	-7.86	-12.65	-11.06	-11.31	-2.18	-4.06	-5.2	-5.87	-5.8	-5.41	-7.07	-3.82
well bore se	*Lateral*	-10.59	-13.44	-11.82	-11.49	-7.46	-10.79	-13.12	-16.06	-14.28	-13.45	-19.39	-10.22
	CH4	34.2	30.1	26.8	30.1	56.9	60.6	53.4	41.7	48.1	51.8	46.6	54.2
	CO2	34.9	31.5	29.9	30	34.4	37.6	36.4	35	37.7	37.9	35.5	34.3
	O2	1.2	1.4	1.6	1.7	1.5	0.2	0.6	0.4	0.3	0.4	0.4	0.4
	BAL (N2)	24.688	31.236	35.184	31.308	7.2	1.3	9	22.7	13.7	9.9	17.4	11.1
	CO	10	13	9	0	10	14	30	16	10	12	22	3
	H2S	72	63	17	58	53	53	64	51	47	35	17	5
	Vel Max (m/s)	0.62	0.44	3.11	3.61	1.25	1.86	0.44	2.01	1.42	1.78	1.77	1.75
	Vel Min (m/s)	0.47	0	2.82	3.45	1.05	1.44	0	1.84	1.58	1.64	1.67	1.61
	Flow (cfm)	5.15	2.08	28.02	33.36	10.87	15.59	2.08	18.19	14.17	16.16	16.25	15.88
	Temp	-0.7	-7.5	4.7	13.8	12.4	26.5	25	22.2	19.9	18.1	10.4	11.1
	Comments	6T	6T	6T	6T	cracked	cracked	cracked	cracked	cracked	cracked	cracked	racked -> 1/4
H-2	*Well*	-8.01	-9.57	-8.12	-7.38	1.12	-0.54	-1.07	-1.16	-1.43	-0.69	-0.27	0.72
	Lateral	-8.89	-12.49	-9.08	-8.54	-7.13	-10.58	-13.31	-16.24	-14.31	-13.43	-19.2	-10.28
	CH4	48.2	42.4	37.7	31.1	58.7	58.2	58.5	57.2	56.1	53.8	40	60.2
	CO2	42.7	41.1	38.3	28.1	40.6	41.4	40.4	42.1	43.2	37.4	28.1	39.5
	O2	0.4	1.3	1.6	7.9	0.3	0.2	0.4	0.4	0.5	3	7.5	0.2
	BAL (N2)	6.696	9.812	15.884	2.696	0.1	0.1	0.2	0.2	0.2	5.8	24.4	0.1
	CO	13	27	41	0	5	14	32	15	10	11	20	0
	H2S	15	14	4	20	154	43	52	37	29	21	1	3
	Vel Max (m/s)	11.52	13.81	13.15	x	1.7	1.84	1.44	2.2	1.99	0.44	x	0.47
	Vel Min (m/s)	11.23	13.35	12.89	x	1.43	1.68	1.25	2.04	1.91	0	x	0
	Flow (cfm)	107.49	128.32	123.03	x	14.79	16.63	12.71	20.03	18.43	2.08	x	2.22
	Temp	18.8	17.6	28.8	x	10.6	28.5	25.4	22	23.9	18.1	x	8.4
	Comments	8T	8T	8T	closed	cracked	cracked	cracked	cracked	cracked	cracked	racked->close	closed -> 1/4T
H-3	*Well*	2.24	-5.72	-10.33	0.13	0.92	-2.7	-3.96	-4.72	-4.35	-4.2	-4.69	-1.95
	Lateral	2.04	-1.6	-11.45	-14.88	-6.57	-10.46	-13.28	-15.91	-14.12	-14.2	-18.82	-10.52
	CH4	47.7	44.3	41.5	55.6	55.1	55.1	50	50.4	52.7	55.4	53.2	49.3
	CO2	43.4	39.1	37.1	44.1	44.8	41	38.2	39.3	40.7	40.9	39.3	34.9
	O2	2.4	3.9	4.6	0	0	1.5	2.8	2.4	2.1	2.1	2.8	4.2
	BAL (N2)	-3.024	-2.464	-0.996	-0.2	0.1	2.2	9	7.9	4.3	1.6	4.2	11.6
	CO	96	40	23	179	8	27	42	25	20	21	33	12
	H2S	3	3	0	12	11	5	4	3	4	3	3	1
	Vel Max (m/s)	sub	sub	5.28	x	2.33	1.75	1.24	2.25	2.04	2	2.25	1.56
	Vel Min (m/s)	lateral	lateral	4.51	x	2.12	1.31	1.18	2.13	1.93	1.97	2.19	1.52
	Flow (cfm)	is	is	46.25	x	21.02	14.46	11.43	20.69	18.76	18.76	20.98	14.55
	Temp	frozen??	frozen	2.8	x	8.5	20	20	22.1	17	12	9.3	9.1
	Comments		2T	2T	closed	cracked	cracked	cracked	cracked	cracked	cracked	barely cracked	barely cracked
H-4 DP	*Well*	-3.14	0.69	0.65	1.09	-0.63	-0.73	-4.28	-6.97	-7.09	-6.89	-8.31	-2.65
	Lateral	-8.43	frozen	FROZEN	-15.41	-6.5	-10.37	-13.11	-15.88	-14.03	-14.16	-18.71	-10.31
	CH4	53.8	55.6	54.8	56.9	58	52	51.7	54.6	56	50.5	54.9	58.6
	CO2	43.9	45.5	45.6	43	40.9	37.1	37.9	40.3	40.2	37.7	41.4	40.9
	O2	0.8	0.4	0.6	0	1	2.6	2.4	1.2	1	2.7	0.8	0.4
	BAL (N2)	-2.008	-3.504	-3.756	-0.4	0.1	7.9	7.9	3.9	1.5	9.1	2.8	0.1
	CO	5	3	0	0	8	13	29	17	16	15	32	9
	H2S	7	35	36	215	11	10	10	8	13	12	9	4
	Max	6.63	sub	sub	x	2.33	2.36	0.98	2.09	1.8	1.86	2.02	1.6
	Min	6.52	lateral	lateral	x	2.12	2.27	0.56	2.06	1.77	1.79	1.91	1.52
	Flow (cfm)	62.13	is	is	x	21.02	21.88	7.28	19.61	16.87	17.25	18.57	14.74
	Temp	-2.8	frozen	frozen	x	8.5	20.4	23.6	21.2	20.5	18.4	10.3	10.4
	Comments	cracked	cracked	cracked	closed	1T	1T	1T	1T	1T	1T	1T	1T
1-5	*Well*	-7.69	-12.34	-10.54	-13.52	-5.96	-9.16	-2.33	-13.68	-12.39	-11.08	-1.49	-0.8
well bore	*Lateral*	-9.07	-13.88	-11.6	-14.62	-6.65	-10.27	-13.22	-15.52	-13.95	-13.36	-18.85	-10.59
seal	*CH4*	38.1	34.7	31.3	38.9	56.2	46.9	53	39.9	42.4	39.1	53	41.7
	CO2	35.2	33.7	32	35.3	39.9	37.7	37.5	35.6	36.8	34	39.1	28.8
	O2	1.1	2.2	2.8	0.8	0.2	0.4	1.2	0.4	0.6	1.4	1.3	6.4
	BAL (N2)	20.964	20.628	22.872	21.492	3.7	14.8	8	24.1	20	25.3	7.1	23.1
	CO	54	65	45	24	15	35	30	62	47	49	27	6
	H2S	18	11	8	20	19	17	202	14	12	10	14	5
	Max	8.18	6.7	7.95	9.1	5.5	6.11	1.71	7.95	7.95	1.26	1.5	1.63
	Min	7.99	2.13	7.65	8.04	5.33	5.93	1.55	7.77	7.78	1.23	1.42	1.57
	Flow (cfm)	76.40	41.72	73.71	80.98	51.17	56.89	15.40	74.27	74.32	11.76	13.80	15.12
	Temp	1.4	7.00	3.00	11.10	12.10	20.70	26.10	20.60	19.50	16.30	10.2	7.6
	Comments	2T	2T surging	2T surging	2T	2T	2T	2T	2T	1.5T	1.5T -> 1T	1T	1T

Table 2:
Wellfield Monitoring Data

		15-Jan-14	5-Feb-14	5-Mar-14	3-Apr-14	7-May-14	3-Jun-14	15-Jul-14	7-Aug-14	3-Sep-14	10-Oct-17	6-Nov-14	17-Dec-14
1-6 DP	*Well*	0.75	-0.34	-0.22	-0.52	0.69	-1.6	-2.33	-2.34	-2.25	-0.37	-0.05	0.19
	Lateral	-9.43	-14.17	-12.18	-15.19	-6.95	-10.52	-13.22	-16.03	-14.25	-13.59	-18.99	-10.64
	CH4	55.1	4.1	8	15.9	56.6	48.2	53	39.3	42.1	57.7	57.7	60.1
	CO2	43.5	3.3	7.1	12.9	42.9	35.3	37.5	31.9	33.6	39	41.5	39.5
	O2	0.5	21.2	17.4	15.2	0.2	1.5	1.2	2	2.3	1.3	0.5	0.3
	BAL (N2)	-1.48	-8.812	1.576	-1.652	0.1	15	8	26.8	22.3	2	0.1	0.1
	CO	5	0	5	0	2	18	30	15	7	8	21	1
	H2S	52	2	0	8	468	131	202	150	143	150	89	31
	Max	x	x	x	x	1.81	1.9	1.71	2.56	0.44	1.12	1.56	1.5
	Min	x	x	x	x	1.62	1.78	1.55	2.44	0	1.07	1.52	1.43
	Flow (cfm)	x	x	x	x	16.21	17.39	15.40	23.62	2.08	10.35	14.55	13.84
	Temp	x	x	x	x	11.4	27.4	26.1	25	25.1	21.1	13	10.7
	Comments	closed	closed	closed	closed	1/2 T	1/2 T	1/2 T	1/2 T	cracked	cracked	cracked	racked -> 1/2
1-7	*Well*	-0.25	0.01	0.18	-0.12	0.61	0.02	-0.2	-0.2	0	-0.22	-0.01	0.12
	Lateral	-10.88	-14.41	-14.55	-13.36	-7.71	-11.02	-13.09	-15.09	-13	-13.87	-18.97	-10.94
	CH4	0.6	1	50.1	0.5	53.2	49.8	53.1	29.6	43.7	39.6	39.6	53.2
	CO2	0.2	0.7	37.7	0.3	46	49.8	46.5	47.5	51.4	50.7	53.4	45.9
	O2	17.1	21.8	3.1	22.7	0.2	0.3	0.4	0.5	0.3	0.4	0.3	0.5
	BAL (N2)	17.304	-5.968	-3.056	-9.352	0.1	0.1	0.2	22.6	4.6	9.3	6.6	0.1
	CO	0	0	14	0	32	134	37	319	305	108	180	114
	H2S	0	0	0	8	22	38	28	0	4	4	0	0
	Max	x	x	x	x	0.42	1.96	1.94	2.37	2.11	1.8	1.69	0
	Min	x	x	x	x	0	1.77	1.86	2.1	2.02	1.74	1.39	0
	Flow (cfm)	x	x	x	x	1.98	17.62	17.95	21.12	19.51	16.73	14.55	0.00
	Temp	x	x	x	x	12.6	24.6	22.9	31.5	27.9	11.4	6.7	-6.3
	Comments	closed	closed	closed	closed	cracked	cracked	cracked	cracked	cracked	cracked	cracked->1/4T	1/4T
1-8	*Well*	-0.59	-0.41	-0.32	-0.61	0.54	-0.08	-0.28	-0.31	0.05	-0.19	-0.13	0.09
	Lateral	-10.94	-14.59	-14.81	-13.37	-7.55	-10.86	-13.24	-15.19	-13.12	-14.06	-19.08	-11.35
	CH4	0.3	0.8	0.7	0.4	56.3	47.2	50.4	22.2	41.5	0.6	3.4	49.8
	CO2	0.1	0.6	3.4	1.1	43.2	51.4	46.4	38.9	53.6	0.1	3.2	49
	O2	21.9	21.9	18.9	21.6	0.2	0.3	0.8	1	0.5	21.4	20.1	0.3
	BAL (N2)	-5.144	-6.144	5.436	-4.816	0.1	0.8	2.8	37.1	4.4	77.8	73.2	0.9
	CO	9	0	0	0	18	46	26	238	127	17	30	312
	H2S	23	0	0	8	68	58	67	14	21	0	1	37
	Max	x	x	x	x	0.71	0.78	0.85	x	x	x	x	x
	Min	x	x	x	x	0.67	0.65	0.72	x	x	x	x	x
	Flow (cfm)	x	x	x	x	6.52	6.76	7.42	x	x	x	x	x
	Temp	x	x	x	x	12.1	24.3	24.2	x	x	x	x	x
	Comments	closed	closed	closed	closed	cracked	cracked	cracked	closed	closed	closed	closed	closed
1-9 DP	*Well*	-10.18	-13.22	-11.32	-11.73	-6.4	-9.6	-11.76	-14.32	-12.74	-12.3	-17.23	-9.23
	Lateral	-10.84	-14.1	-11.95	-12.48	-6.91	-10.23	-12.7	-15.28	-13.79	12.85	-17.88	-9.73
	CH4	46.8	40	40.4	44.1	60.3	59.1	56.4	50.2	56.4	57	52.4	44
	CO2	38.4	35.7	35.7	36.4	39.3	40.4	39.8	40.6	41.9	41.4	40.9	31.1
	O2	0.2	1.5	1	0.7	0.3	0.4	0.8	0.4	0.5	0.5	0.4	4.2
	BAL (N2)	13.348	16.66	18.64	15.668	0.1	0.1	3.2	8.6	1.1	1.1	6.3	20.7
	CO	20	28	16	0	10	12	27	14	9	12	22	4
	H2S	30	32	5	54	33	30	34	31	32	21	14	5
	Max	9.15	9.54	10.33	12.36	8.7	9.75	9.08	13.26	11.84	12.04	14.86	9.34
	Min	9.07	9.06	9.5	11.27	8.31	9.45	8.53	12.95	11.57	11.77	14.41	9.02
	Flow (cfm)	86.08	87.88	93.69	111.65	80.37	90.71	83.20	123.83	110.61	112.50	138.29	86.75
	Temp	15.9	25.4	25.1	26.4	26.8	29.1	25.1	30	27.5	27.7	29.4	27.6
	Comments	7T	7T	7T	7T	7T	7T	7T	7T	7T	7T	7T->7.5T	7.5T -> 7T
1-10 DP	*Well*	-5.93	-0.3	0.01	-1.64	1.67	-2.52	-6.34	-8.55	-6.57	-7.82	-10.58	-6.12
	Lateral	-11.28	-14.89	-15.16	-12.87	-7.35	-10.9	-13.18	-16.01	-13.05	-14.1	-20.49	-11.45
	CH4	47.2	39.5	42.3	6.8	61.4	62.1	58.1	43	53.4	59.4	46.7	40.1
	CO2	32.8	23.3	26	4.2	37.5	37.2	37.2	35	37.9	39.6	35.9	25.8
	O2	4.6	6	8	19	0.2	0.6	0.5	0.7	0.4	0.6	0.6	5.1
	BAL (N2)	-2.396	8.14	-6.88	-1.94	0.2	0.1	4.1	21.2	8	0.4	16.8	28.9
	CO	20	6	12	0	14	16	33	13	24	30	21	0
	H2S	59	0	1	5	177	106	68	58	48	40	19	26
	Max	1.4	0.44	sub	x	1.14	1.54	0.97	1.75	0.44	2.03	2.07	0.94
	Min	1.2	0	lateral	x	1	1.2	0.7	1.57	0	1.96	1.99	0.6
	Flow (cfm)	12.28	2.08	is	x	10.11	12.95	7.89	15.69	2.08	18.85	19.18	7.28
	Temp	2.7	-7.8	frozen	x	13.8	24.6	24.8	23.2	24.6	15.3	13.7	6.8
	Comments	2T	2T	2T	closed	1T	1.5T	1.5T	1.5T	1.5T	1.5T	1.5T	1.5T -> 1.25T
H-11 DP	*Well*	-0.6	3.32	-10.35	0.73	-0.6	-0.05	-4.23	3.67	-0.49	-6.41	1.49	4.75
	Lateral	-8.54	frozen	-11.16	-14.62	-6.51	-10.47	-13.29	-15.62	-14.03	-14.03	-18.66	-10.5
	CH4	53.1	58.1	16.3	53.9	59	58.4	45.4	56.2	56.3	41.2	55.6	57.7
	CO2	38.3	47.3	15.1	45.7	40	41.1	36.1	43.2	43.2	31	44	41.8
	O2	1.2	0.1	12.4	0.2	0.8	0.4	3.1	0.5	0.4	5	0.2	0.4
	BAL (N2)	2.388	-6.376	9.076	-1.052	0.2	0.1	15.3	0.2	0.2	22.8	0.2	0.1
	CO	0	4	3	0	12	16	26	15	14	10	15	0
	H2S	49	42	0	74	31	52	161	221	153	21	26	9
	Max	0.44	sub	x	1.06	0.95	1.23	1.47	4.17	3.63	0.84	1.79	1.45
	Min	0	lateral	x	0.55	0.5	1.14	1.29	4.05	3.5	0.81	1.7	1.28
	Flow (cfm)	2.08	is	x	7.61	6.85	11.20	13.04	38.84	33.69	7.80	16.49	12.90
	Temp	-11.4	frozen	x	4	11.5	26.4	24.3	23.5	23.7	18.6	10.1	11.6
	Comments	cracked	cracked	closed	1/4T	1/4T	1/4T	cracked	1/2T	1/2T	/2T -> cracke	cracked	racked -> 1/2

Table 2:
Wellfield Monitoring Data

		15-Jan-14	5-Feb-14	5-Mar-14	3-Apr-14	7-May-14	3-Jun-14	15-Jul-14	7-Aug-14	3-Sep-14	10-Oct-17	6-Nov-14	17-Dec-14
H-12	*Well*	-0.5	5.14	-6.38	-1.57	-0.13	-2.48	2.94	-0.37	-0.26	-0.35	-0.97	frozen
well bore se	*Lateral*	-8.51	frozen	-11.38	-14.78	-6.46	-10.33	-13.04	-15.55	-14.29	-14.18	-18.42	-10.64
QED wellhe	*CH4*	56.9	56.2	20.5	51.1	58.7	47.7	57.3	54.9	51.9	58.1	59.1	59.7
	CO2	40.7	47.3	16.8	36.5	40.7	33.1	42.2	37.8	35.8	41.3	39.3	39.8
	O2	1.1	0.1	13.1	2.6	0.5	4	0.4	1.7	2.9	0.5	1.5	0.4
	BAL (N2)	-3.336	-4.476	-0.156	-0.476	0.1	15.4	0.1	5.3	9.4	0.1	0.1	0.1
	CO	3	6	4	0	12	13	31	17	15	13	13	2
	H2S	88	73	16	73	63	81	110	70	4	65	29	16
	Max	0.44	sub	8	1.67	2.16	x	1.42	1.2	1.5	1.92	0.95	1.3
	Min	0	lateral	7.89	1.51	2.11	x	1.2	1.08	1.3	1.74	0.88	1.26
	Flow (cfm)	2.08	is	75.08	15.02	20.17	x	12.38	10.77	13.23	17.29	8.65	12.10
	Temp	-3.2	frozen	-0.5	13.2	14.9	x	25.1	23.5	23.7	16.9	10.9	9.6
	Comments	0.75	0.75	closed	cracked	cracked	closed	cracked	cracked	cracked	20T -> 25T	20T->15T	15T
2-13	*Well*	-0.13	0.08	0.15	0.39	0.56	0.49	0.47	0.4	0.11	-1.53	-2.1	-1.38
	Lateral	-4.78	0.03	frozen	frozen	-8	-10.82	-12.96	-14.98	-13.31	-13.91	-18.05	-11.29
	CH4	27.7	kanaflex	54.1	56.9	52.6	54.1	54.6	49.9	49.4	51.8	47.7	49.4
	CO2	25.1	is	45.4	42.9	47.1	45.5	44.9	48.4	50.1	47.3	45.8	45.2
	O2	10	frozen	0.3	0.1	0.1	0.2	0.3	0.4	0.3	0.8	0.5	0.5
	BAL (N2)	-0.9	#VALUE!	-1.428	-0.776	0.1	0.1	0.2	1.2	0.2	0.1	6	5
	CO	108	no	515	183	129	155	87	1712	1048	369	421	455
	H2S	83	flow	296	421	183	177	93	over range	over range	3	over range	0
	Max	x	through	sub	x	x	x	x	1.55	1.31	3.09	3.27	2.55
	Min	x	well	lateral	x	x	x	x	1.39	1.24	3.04	3.16	2.36
	Flow (cfm)	x		is	x	x	x	x	13.89	12.05	28.96	30.38	23.20
	Temp	x		frozen	x	x	x	x	33.5	24.5	13.6	15.1	7.3
	Comments	closed			closed	closed	closed	closed	cracked	0.5 T	0.5T	0.5T->0.25T	1/4T -> 1/2T
2-14	*Well*	-0.22	-0.14	-0.03	0.15	-0.42	-0.65	-0.89	-1	-0.61	-0.72	-0.96	-0.2
well bore se	*Lateral*	-9.27	-13.13	-13.43	-12.27	-7.43	-9.86	-12.47	-13.94	-12.08	-12.72	-16.83	-10.72
	CH4	42.3	33.6	34.3	55.4	51.3	45.7	53.5	38.1	52.1	53	44.3	59.3
	CO2	38.8	31.4	29.2	44.4	41.5	40.2	41.7	35.1	42	41.4	38.4	39.8
	O2	1	5.7	7.2	0.1	0.5	0.4	0.5	0.6	0.4	0.4	0.5	0.5
	BAL (N2)	13.64	7.368	1.728	-0.776	6.7	13.5	4.1	26	5.2	5.2	16.8	0.3
	CO	7	11	<<	0	27	35	34	78	52	21	26	11
	H2S	8	<<	<<	8	13	13	18	11	14	10	9	4
	Max	3.53	5.24	4.6	x	5.61	6.33	7.2	7.89	7.41	7.44	6.77	4.83
	Min	3.39	5	4.43	x	5.39	6.18	7.06	7.68	7.17	7.25	6.42	4.62
	Flow (cfm)	32.70	48.38	42.66	x	51.97	59.11	67.37	73.56	68.89	69.41	62.32	62.32
	Temp	11.5	-4.9	5.6	x	16.9	22.3	21.8	31.7	24.1	16.6	19.2	17.6
	Comments	1.25	1.25	closed	closed	cracked	cracked	cracked	cracked	cracked	cracked	barely cracked	y cracked ->
2-15	*Well*	0.04	0.06	0.21	0.06	0.27	0.08	0.11	0.14	0.46	0.06	-0.15	0.03
	Lateral	-9.27	-14.03	-13.63	-12.45	-7.79	-9.98	-12.64	-14.61	-12.67	-13.43	-17.71	-10.13
	CH4	55.8	55.3	53.5	55.1	57.9	58.3	58.5	58.3	57.7	55.6	55.8	59.2
	CO2	42.7	47.4	46.1	44.5	41.7	41.4	40.9	41	41.8	43.8	39.7	39.8
	O2	1.2	1.2	0.2	0.2	0.2	0.2	0.4	0.6	0.3	0.4	2.1	0.7
	BAL (N2)	-4.712	-8.912	-1.052	-1.052	0.1	0.1	0.2	0.1	0.2	0.1	2.4	0.1
	CO	4	16	0	0	14	22	31	36	42	23	19	29
	H2S	15	14	1	14	27	33	115	47	31	24	14	12
	Max	x	x	x	x	x	x	x	x	0.44	1.59	1.39	1.42
	Min	x	x	x	x	x	x	x	x	0	1.54	1.3	1.31
	Flow (cfm)	x	x	x	x	x	x	x	x	2.08	14.79	12.71	12.90
	Temp	x	x	x	x	x	x	x	x	24.5	16	10.3	0.5
	Comments	closed	closed	closed	closed	closed	closed	closed	closed	cracked	cracked -> 1/4T	1/4T	1/4T
2-16	*Well*	-0.78	0.64	1.01	0.38	0.96	-0.64	-1.05	-1.18	-0.8	-1.09	-0.57	-0.12
	Lateral	-9.17	-15.24	-13.4	-12.04	-7.18	-10.21	-12.33	-14.28	-12.07	-13.01	-17.92	-9.79
	CH4	36.4	54.6	55.1	55.2	57	53.4	54.3	48.3	53	53.3	40	53
	CO2	30.4	46.1	44.8	44.8	42.7	40.1	39.5	38.3	40.7	39.6	30.2	35.6
	O2	7.4	0.9	0	0	0.2	1.3	1.4	1.4	1.2	1.8	6.5	3.1
	BAL (N2)	-2.524	-5.484	-0.4	-0.5	0.2	5.2	4.8	12.5	5	5.3	23.2	8.4
	CO	10	6	0	9	25	34	41	67	51	27	22	28
	H2S	17	47	49	82	59	42	40	27	27	22	9	9
	Max	x	x	0.44	2.08	6.75	6.47	7.33	8.7	7.94	8.06	8.23	4.69
	Min	x	x	0	1.89	6.53	6.23	7.22	8.4	7.79	7.92	8.13	4.56
	Flow (cfm)	x	x	2.08	18.76	62.74	60.00	68.74	80.79	74.32	75.50	77.30	43.70
	Temp	x	x	-9.5	2.6	15.4	21.6	22.4	26.1	24.1	15.9	16.2	14.4
	Comments	closed	closed	cracked	to 1/2 T	1.5T	1.5T	1.5T	1.5T	1.5T	1.5T	1.5T->cracked	d -> barely cr
2-17	*Well*	-1.49	0.46	-1.46	0.29	1.64	-0.44	-0.69	-0.88	-0.32	-0.84	-1.18	-0.05
	Lateral	-10.19	frozen	-13.69	-12.87	-6.81	-10.88	-12.39	-15.23	-12.17	-13.42	-17.84	-10.72
	CH4	53.2	54.8	41.3	56.6	58.4	58.4	59	58.6	58.2	57	58.5	46.9
	CO2	37.6	44.9	31.1	43.1	40.9	41.2	40.3	40.8	41.1	42.5	39.4	30.6
	O2	3.3	0.6	6.5	0.2	0.3	0.2	0.5	0.4	0.6	0.4	1.6	5.2
	BAL (N2)	-7.008	-3.056	-3.84	-1.152	0.1	0.1	0.1	0.1	0.1	0.2	0.5	16.9
	CO	9	3	5	0	14	13	26	12	17	22	9	3
	H2S	16	13	6	11	99	21	15	10	15	9	7	4
	Max	3.45	kanaflex	2.84	x	2.82	2.82	3	3.12	2.69	2.55	2.81	3.31
	Min	3.25	is	3	x	2.4	2.69	2.87	2.96	2.6	2.49	2.72	3.04
	Flow (cfm)	31.66	frozen	27.59	x	24.66	26.03	27.73	28.73	24.99	23.81	26.13	30.00
	Temp	2.6	X	7.9	x	12	23.7	20.7	22	24.9	15	14.6	7.8
	Comments	cracked	cracked	cracked	closed	1T	1T	1T	1T	1T	1T	1T	1T -> 3/4T

Table 2:
Wellfield Monitoring Data

		15-Jan-14	5-Feb-14	5-Mar-14	3-Apr-14	7-May-14	3-Jun-14	15-Jul-14	7-Aug-14	3-Sep-14	10-Oct-17	6-Nov-14	17-Dec-14
2-18	*Well*	-1.17	-0.81	-0.7	-0.95	0.06	-0.84	-1.18	-1.42	-0.92	-1.37	-2.24	-1.05
	Lateral	-10.34	-14.01	-13.56	-10.99	-6.97	-10.94	-12.38	-15.38	-12.32	-13.26	-17.66	-10.74
	CH4	38.6	46.3	34.9	37.3	58	55.9	54.4	40.1	52	52.2	44.5	52.6
	CO2	35.3	38	33.8	33.8	40.3	39.6	39.5	35.1	40	40.2	36.2	36.7
	O2	1	2.1	1.4	1.7	0.6	0.3	0.5	0.5	0.3	0.3	0.6	0.6
	BAL (N2)	20.84	5.204	24.136	20.308	0.1	4.1	5.5	24.2	7.7	7.2	18.5	10
	CO	60	20	18	0	18	18	31	17	19	26	20	5
	H2S	106	91	60	77	88	71	72	70	66	51	34	33
	Max	2.58	0.89	2.47	2.7	3.68	4.46	3.21	5.17	4.21	4.25	5.26	4.95
	Min	2.31	0.47	2.36	2.3	3.34	4.16	3.16	5.02	4.07	4.18	5.15	4.66
	Flow (cfm)	23.10	6.43	22.82	23.62	33.17	40.73	30.10	48.14	39.12	39.83	49.18	45.40
	Temp	11.6	-3.7	22.2	11.8	21.2	28.7	31	30.9	33.3	31.8	31	27.4
	Comments	0.5	0.5	0.5	0.5	1T	1T	1T	1T	1T	1T	1T	1T -> 1.25T
3-19	*Well*	-4.54	-7.34	3.29	-1.03	0.79	-5.51	-7.35	-8.47	-6.33	-6.4	3.69	2.6
	Lateral	-5.35	-8.62	frozen	-12.32	-4.63	-9.16	-11.56	-13.61	-12.04	-12.19	-18.63	-10.43
	CH4	39.5	33.4	53.2	55.5	56.8	54	54.5	49	55.8	46	56.8	58.5
	CO2	31.9	28.5	46.2	41.8	42.6	38.8	39.4	37	40.6	33.8	42.4	41
	O2	4	8.3	0.2	1.8	0.3	1.4	1.6	2.3	1.3	4.4	0.6	0.4
	BAL (N2)	9.06	-1.908	-0.852	-6.368	0.1	5.7	4.4	11.6	2.3	15.8	0.1	0.1
	CO	7	13	4	0	14	16	24	22	17	16	9	1
	H2S	2	5	15	19	10	11	16	7	14	7	7	4
	Max	10.05	1.1	sub	4.6	7.98	8.61	7.55	10.34	10.52	1.31	2.3	2.01
	Min	9.96	0.48	lateral	4.35	7.83	8.32	7.4	10.12	10.42	1.26	2.12	1.95
	Flow (cfm)	94.54	7.47	is	42.29	74.70	79.99	70.63	96.67	98.94	12.14	20.88	18.71
	Temp	9.8	-9	frozen	2.1	9.2	22	14.8	16.5	19.7	15.6	10.2	9.4
	Comments	full -1T	cracked	cracked	cracked	cracked	cracked	cracked	cracked	cracked	cracked	cracked->1/4T	1/4T
3-20	*Well*	-6.16	-4.32	-10.94	-10.19	-5.15	-8.79	-11.11	-13.33	-12.11	-12.26	-16.02	-9.22
	Lateral	-7.14	-10.61	-12.03	-11.53	-5.57	-9.44	-11.82	-14.1	-12.66	-13.05	-17.05	-9.78
	CH4	53.5	52	39	54.5	56.9	57.4	57.4	56.5	55.6	55.6	57.1	58.3
	CO2	45	37.2	33.1	44.3	42.7	41.9	41.9	43	43.8	43.9	42	41.1
	O2	0.9	2.8	5.5	0.6	0.3	0.5	0.6	0.3	0.5	0.4	0.7	0.4
	BAL (N2)	-3.284	-3.028	1.22	-2.156	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.1
	CO	12	43	15	28	18	22	35	24	26	25	22	16
	H2S	7	4	13	13	5	6	5	3	4	3	3	1
	Max	3.17	kanaflex	0.44	11.25	7.27	8.2	6.29	10.08	9.22	10.27	10.4	8.24
	Min	3.04	is	0	9.63	7.12	8.13	6.07	9.99	9.16	9.91	10.18	8.03
	Flow (cfm)	29.34	frozen	2.08	98.65	67.99	77.15	58.40	94.83	86.84	95.34	97.23	76.87
	Temp	-4.8	X	-7.3	6.9	9.1	23.5	19.7	17.2	13.8	10.1	9.1	9.9
	Comments	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T->4.25T	4.25T -> 4.75T
3-21	*Well*	-1.95	-14.15	-11.7	0.25	2.07	0.03	1.09	0.1	-1.7	-0.8	-1.92	-0.19
	Lateral	-4.27	-14.1	-11.6	-12.37	-6.24	-9.89	-12.97	-15.05	-13.66	-13.94	-18.38	-10.6
	CH4	54.8	39.1	34.4	56.1	58.3	55.5	58	57.1	56.5	56.8	52.1	59.1
	CO2	40.5	29	24.4	43.1	41.6	41.5	41.5	42.4	41.8	41.7	37.8	39.1
	O2	0.1	5.6	5.4	0.4	0	3.3	0.3	0.3	0.9	1.3	3.2	1.6
	BAL (N2)	3.724	4.744	14.996	-1.604	0.1	0.2	0.7	0.1	0.1	0.2	6.9	0.2
	CO	1	3	2	0	9	13	21	16	15	13	9	0
	H2S	76	55	50	8	47	21	74	24	22	19	12	2
	Max	0.44	X	0.44	X	0.95	X	0.44	3.38	2.98	2.88	3.01	1.87
	Min	0	X	0	X	0.89	X	0	3.35	2.86	2.82	2.92	1.82
	Flow (cfm)	2.08	X	2.08	X	8.69	X	2.08	31.80	27.59	26.93	28.02	17.43
	Temp	-11.1	X	-7.3	X	9.1	X	22.4	23.2	20.1	11.6	7.4	6.2
	Comments	5T	closed	5T	closed	cracked	closed	cracked	1/4 T	1/4 T	1/4T	1/4T	1/4T
3-22	*Well*	-3.96	-0.05	-4.29	1.31	-0.31	-0.8	-1.09	-1.23	-0.59	-0.49	-1.74	-0.65
well bore se	*Lateral*	-6.95	-9.88	-8.5	-10.42	-7.39	-10.61	-11.96	-13	-11.79	-13.69	-17.1	-9.81
	CH4	41.1	33	34.8	55.6	55.9	56.7	57.7	56	55.6	54.8	52.9	38.2
	CO2	41	37.6	37	44.3	43	42.9	41.8	42.2	43.8	44.7	40.9	26.6
	O2	0.8	1	0.2	0	0.5	0.2	0.3	0.4	0.4	0.4	1.2	7.8
	BAL (N2)	13.592	24.14	26.748		0.1	0.1	0.2	1.2	0.1	0.1	5.1	27.4
	CO	28	55	90	0	21	24	42	50	46	28	31	18
	H2S	146	122	100	over range	211	180	210	179	143	181	61	64
	Max	9.76	10.75	12.2	X	5.13	5.41	5.79	6.06	6.02	4.64	6.55	5.43
	Min	9.54	10	12.06	X	5.05	5.3	5.73	5.9	5.91	4.58	6.37	5.25
	Flow (cfm)	91.19	98.04	114.62	X	48.10	50.60	54.43	56.51	56.37	43.56	61.04	50.46
	Temp	10.3	12.3	6	X	17.3	23	23.5	28.5	23.5	20.1	18.8	14.8
	Comments	3T	3T	3T	closed	cracked	cracked	cracked	cracked	cracked	cracked -> 1/4T	1/4T	1/4T -> closed
3-23	*Well*	-5.95	-8.08	-6.46	0.94	0.18	-1.22	-1.93	-1.99	-1.31	-2.07	-2.86	-2.26
	Lateral	-6.29	-9.05	-6.78	-12.04	-8.16	-10.74	-11.51	-13.39	-12.48	-13.37	-18.11	-10.16
	CH4	47.2	40.8	32.6	55.4	57.6	57.8	57.5	55.7	56.1	56.1	57.3	53
	CO2	38.6	35.8	27.7	44.1	42.3	41.9	41.7	41.2	43.4	43.2	42	35.6
	O2	1.9	2.9	7.9	0.2	0.1	0.2	0.6	0.6	0.4	0.5	0.6	2.1
	BAL (N2)	4.656	9.096	1.596	-0.952	0.2	0.1	0.1	2.4	0.1	0.2	0.1	9.3
	CO	13	17	6	0	15	13	16	17	17	10	12	7
	H2S	157	142	99	452	281	182	257	186	162	148	74	63
	Max	8.07	0.44	x	2.18	3.13	3.7	2.74	3.89	4.37	3.56	4.39	3.57
	Min	7.91	0	x	1.95	3	3.52	2.39	3.77	4.25	3.4	4.15	3.47
	Flow (cfm)	75.50	2.08	x	19.51	28.96	34.11	24.24	36.19	40.73	32.88	40.35	33.26
	Temp	18.1	23.1	x	12	20.8	24.6	25.8	28.8	25	23.4	20.3	15.8
	Comments	8T	8T	closed	1/2T	1T	1T	1T	1T	1T	1T	1T->1.25T	1.25T

Table 2:
Wellfield Monitoring Data

		15-Jan-14	5-Feb-14	5-Mar-14	3-Apr-14	7-May-14	3-Jun-14	15-Jul-14	7-Aug-14	3-Sep-14	10-Oct-17	6-Nov-14	17-Dec-14
3-24	*Well*	-0.52	-0.11	0.37	-0.41	-0.11	-1.04	-1.32	-0.93	-0.2	-0.88	-1.46	-3.38
	Lateral	-7.78	-11.3	-10.76	-11.09	-8.33	-10.87	-11.75	-13.6	-12.74	-13.84	-18.01	-10.24
	CH4	54.7	51.6	55.9	54.9	56.5	56.4	56.8	57.5	55.6	55	55.9	50.8
	CO2	43.9	44.4	46.1	44.6	43.2	43.2	42.7	42	43.9	44.4	43.5	37.9
	O2	0.9	1.3	0.1	0.4	0.2	0.2	0.4	0.3	0.3	0.4	0.4	0.7
	BAL (N2)	-3.384	-2.688	-2.976	-1.904	0.1	0.2	0.1	0.2	0.1	0.1	0.2	10.4
	CO	20	43	10	187	23	24	26	63	39	26	37	32
	H2S	103	131	103	52	42	39	45	45	31	34	17	12
	Max	0	0.44	0.44	6.05	5.56	6.49	5.65	5.64	5.81	5.52	6.3	9.24
	Min	0	0	0	5.92	5.42	6.32	5.48	5.5	5.73	5.16	5.92	9.1
	Flow (cfm)	0.00	2.08	2.08	56.55	51.88	60.52	52.59	52.63	54.52	50.46	57.74	86.65
	Temp	-0.3	-9.5	-19.3	13	14.1	14	21.3	25	21.7	15.4	14.6	13.8
	Comments	cracked	frozen	cracked to 1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2T	1/2T->3/4T	3/4T -> 1.25T
3-25	*Well*	-7.53	-10.64	-3.35	1.22	0.52	0.37	-0.59	-0.65	-0.36	-0.53	-1.08	-0.95
	Lateral	-7.79	-11.6	-9.75	-10.65	-8.22	-10.83	-11.68	-13.77	-13.41	-13.83	-18.02	-10.33
	CH4	37.6	32.4	33.7	55.8	56.7	56.9	57	57.4	56.2	55.5	56.7	56.6
	CO2	35.2	32.1	30.5	42.7	43	42.8	42.4	41.7	43.3	43.8	42.8	38.8
	O2	2.2	3.3	5.3	1	0.1	0.1	0.3	0.5	0.3	0.4	0.3	0.4
	BAL (N2)	16.228	19.292	10.072	-3.76	0.1	0.1	0.1	0.3	0.2	0.2	0.1	4.6
	CO	0	1	2	0	17	15	26	25	6	9	11	5
	H2S	164	140	118	over range	over range	over range	45	381	423	295	128	121
	Max	7.97	0.44	x	0.44	2.14	1.41	5.65	2.4	1.38	2.2	2.09	2.35
	Min	7.74	0	x	0	1.91	1.32	5.48	2.31	1.34	2.16	2.05	2.2
	Flow (cfm)	74.23	2.08	x	2.08	19.14	12.90	52.59	22.25	12.85	20.60	19.56	21.50
	Temp	18.4	19	x	5.2	16.4	23.4	21.3	30.8	23.3	16	17.8	12.4
	Comments	6T	6T	closed	cracked	1T	1.25	1.25	1.25	1.25	1.25T	1.25T	1.25T
3-26	*Well*	-8.85	-12.94	-11.14	-9.94	-8.23	-10.64	-11.74	-13.48	-11.67	-13.31	-18.64	-10.75
	Lateral	-8.86	-12.69	-11.63	-10.63	-8.22	-11.08	-11.67	-13.48	-11.79	-13.41	-18.87	-10.87
	CH4	54.6	52.8	52.8	54.5	57.7	57	57.2	57.8	57	56.1	57	59.5
	CO2	45	44.5	44.2	44.3	41.1	42.6	42.3	40.9	41.2	43.4	42.4	39.6
	O2	0.5	1.4	0.8	0.5	1	0.1	0.3	0.6	0.9	0.4	0.4	0.7
	BAL (N2)	-2.48	-4.464	-1.308	-1.68	0.2	0.1	0.1	0.7	0.7	0.1	0.1	0.1
	CO	5	0	1	0	15	20	35	17	10	17	7	0
	H2S	345	301	253	295	191	200	228	226	171	145	114	89
	Max	2.59	0.5	3	2.07	3.69	3.48	1.32	3.1	2.94	3.21	3.23	3.46
	Min	2.27	0.45	2.64	1.93	3.22	2.99	1.22	2.85	2.75	2.89	2.56	2.75
	Flow (cfm)	22.96	4.49	26.65	18.90	32.65	30.57	12.00	28.11	26.88	28.82	27.36	29.34
	Temp	8.3	-5	7.4	13.1	19	23.3	21.7	29.6	25.5	21.7	20.9	14.7
	Comments	8T	8T	8T	8T	8T	8T	8T	8T	8T	8T	8T->8.5T	8.5T -> 8.75T
3-27 DP	*Well*	0.14	-1.39	-1.13	-0.74	0.17	-6.91	-5.34	-10.35	-7.59	-8.06	0.1	2.22
	Lateral	-7.65	-11.1	-11.23	-9.02	-7.61	-10.72	-12.07	-13.15	-12.36	-13.53	-18.13	-10.89
	CH4	52.5	40.6	39.9	50.3	55.3	54	55.8	50.9	51.2	48	55.1	58.2
	CO2	47	33.9	32.6	40.6	44.4	41	42.7	38.2	39.5	35.9	44.5	41.3
	O2	0.3	6.9	7	2.5	0.2	1	0.5	1.9	2.3	4.3	0.3	0.3
	BAL (N2)	-1.428	-7.844	-6.32	-3.3	0.1	3.8	0.8	8	6.8	11.9	0.1	0.2
	CO	6	3	3	0	20	15	23	16	8	11	13	11
	H2S	156	87	65	233	329	278	332	253	185	87	149	130
	Max	1.62	2.71	3.23	2.29	6.87	4.95	5.61	5.17	5.61	x	x	3.88
	Min	1.48	2.54	3	1.76	6.7	3.7	5.47	4.34	5.52	x	x	3.65
	Flow (cfm)	14.65	24.80	29.43	19.14	64.11	40.87	52.35	44.93	52.59	x	x	35.58
	Temp	9.5	9.4	18.7	13.1	22.2	41.4	37.9	41.2	36.7	x	x	37.3
	Comments	1T	1T	1T	1T	2T	2T	2T	2T	1.75T	closed	closed	closed -> 1T
3-28	*Well*	-7.78	-10.52	-7.37	-3.46	-2.79	-4.53	-5.62	-6.02	-2.12	1.72	-0.43	4.21
	Lateral	-8.05	-10.74	-8.11	-8.68	-7.35	-10.04	-12.13	-13.95	-11.11	-13.41	-17.82	-10.68
	CH4	54.8	51.7	37.7	56.6	58.2	58.7	58.1	51.3	40.6	56.7	47.2	59.7
	CO2	42.9	38.1	28.2	42.1	41	40.4	40	25.3	29.2	42.9	32.5	39.6
	O2	1.8	4.1	8.4	1.2	0.6	0.7	0.9	2.8	6.5	0.3	5.3	0.5
	BAL (N2)	-6.768	-9.816	-6.384	-4.912	0.2	0.1	0.6	10.1	23.6	0.1	15.1	0.2
	CO	<<	12	<<	41	0	12	13	32	15	18	14	23
	H2S	46	27	18	36	43	43	45	37	30	41	24	21
	Max	7.14	7.19	9.53	3.18	5.15	5	4.78	7.77	0.44	4.72	1.5	4.77
	Min	6.79	6.26	9.42	2.96	5.06	4.92	4.36	7.64	0	4.61	1.37	4.59
	Flow (cfm)	65.82	63.55	89.53	29.01	48.24	46.87	43.18	72.81	2.08	44.08	13.56	44.22
	Temp	12.4	9.8	8.1	10.1	16.7	21.1	20.8	24.8	25.3	16.9	13.8	12.9
	Comments	9T	9T	closed	0.5T	0.5T	0.5T	0.5T	0.5T	0.25T	1/4T -> 3/4T	3/4T->1/4T	1/4T -> 1T
3-29 DP	*Well*	-6.1	-4.15	-4.35	-4.71	-3.71	-6.15	-7.44	-4.02	5.27	-6.2	-10.41	-4.22
	Lateral	-6.92	-12.05	-10.61	-9.22	-7.84	-10.58	-11.44	-13.01	-11.49	-13.1	-18.41	-10.62
	CH4	27.9	30.9	44.5	55.5	57.3	57.8	58.2	34.6	57.4	56.7	57.9	30.7
	CO2	20.7	23.3	32.3	44.2	41.6	41.8	41.1	24.8	42	42.6	41.2	20.3
	O2	11.4	11	6.1	0	0.4	0.2	0.6	7.8	0.4	0.5	0.7	11.1
	BAL (N2)	-3.364	-7.06	-6.336	-0.2	0.1	0.1	0.2	32.8	0.1	0	0.2	37.9
	CO	4	0	1	0	13	10	31	14	12	14	7	0
	H2S	205	271	293	309	295	260	337	176	261	197	149	63
	Max	10.38	7.85	blocked	5.71	6.87	7.63	5.14	x	8.15	6.64	6.67	7.39
	Min	10.21	7.18	with	5.59	6.7	7.4	4.88	x	7.97	6.48	6.32	7.01
	Flow (cfm)	97.28	71.01	ice	53.39	64.11	71.01	47.34	x	76.16	61.99	61.37	68.04
	Temp	18.6	-8.5		30.1	22	30.4	28.8	x	34.2	25.1	31.8	15.1
	Comments	cracked	cracked	cracked	cracked	cracked	cracked	cracked	closed	1T	1T	1T->1.25T	1.25T -> 3/4T

Table 2:
Wellfield Monitoring Data

		15-Jan-14	5-Feb-14	5-Mar-14	3-Apr-14	7-May-14	3-Jun-14	15-Jul-14	7-Aug-14	3-Sep-14	10-Oct-17	6-Nov-14	17-Dec-14
3-30 DP	*Well*	0.03	-0.17	0.4	-0.4	0.3	-0.61	-0.92	-0.91	-0.55	-0.32	-0.66	-0.06
	Lateral	-7.77	-11.99	ice	-10.01	-7.98	-10.8	-11.73	-13.45	-12.43	-13.25	-18.51	-11.17
	CH4	54.4	29.9	55.1	57.1	57.2	53	52	46.9	57.1	56.3	54.4	48.9
	CO2	41.1	23.4	46.3	42.3	42.5	39.5	39.4	36.2	41.3	43.1	38.3	32.4
	O2	2.3	10.2	0.4	0.5	0.2	0.5	0.8	0.7	0.7	0.4	2.1	4.7
	BAL (N2)	-6.948	-2.352	-3.804	-2.28	0.2	6.8	8.5	16	0.2	0.1	5.2	14.1
	CO	6	3	1	0	14	18	30	19	12	15	9	0
	H2S	>>	340	>>	544	477	327	365	291	197	244	141	96
	Max	3.47	2.75	sublateral	2.91	4.91	4.79	5.1	5.76	5.22	5.62	6.87	5.5
	Min	3.4	2.25	is	2.84	4.74	4.59	5.02	5.65	5.16	5.42	6.63	5.32
	Flow (cfm)	32.46	23.62	frozen	27.17	45.59	44.32	47.81	53.91	49.04	52.16	63.78	51.12
	Temp	15.5	10.8		18.3	31.1	34.2	30.4	35.4	35.4	34.5	31.9	25.9
	Comments	0.5	0.5		0.5	1T	1T	1T	1T	1T	1T	1T	1T -> 3/4T
4-31	*Well*	-0.91	-1.87	-0.44	-0.88	-0.17	-2.29	-3.67	-4.21	4.83	-1.17	-1.25	-1.03
	Lateral	-6.9	-10.34	-6.66	-7.16	-4.86	-9.22	-11.69	-13.36	-12.78	-14.56	-17.87	-10.17
	CH4	53.7	47.1	55.1	55.8	56.9	53.2	50.5	46.9	56.8	56.5	56.1	58.5
	CO2	42.9	36.3	42.8	41.3	42.6	37.8	37.1	34.5	42.4	43.1	43.5	41
	O2	1.2	5.5	1.5	2	0.2	2.3	2.7	4.1	0.5	0.3	0.3	0.3
	BAL (N2)	-2.812	-10.08	-5.54	-7.12	0.1	6.7	9.6	14.5	0.1	0.1	0.1	0.2
	CO	3	7	7	0	12	13	23	17	17	15	11	0
	H2S	25	21	34	37	29	24	27	23	55	39	30	7
	Max	4.03	8.47	8.6	8.11	7.7	8.68	9.84	2.12	7.88	7.62	8.07	10.41
	Min	3.67	8.29	7.54	7.63	7.4	8.34	9.66	2.2	7.74	7.5	7.83	10.02
	Flow (cfm)	36.38	79.19	76.26	74.37	71.34	80.41	92.13	20.41	73.80	71.44	75.12	96.53
	Temp	4	2.1	7	4.1	12.2	18.2	21.3	23.4	20.3	15	15.2	13.5
	Comments	full open	full open	full open	full open	full open	full open	full open	full open	0.5T	1/2T	1/2T->3/4T	3/4T -> 1.25T
4-32	*Well*	1.62	-1.96	1.59	0.39	-5.76	-10.66	-12.97	0.07	0.08	0.08	-18.78	-9.94
	Lateral	-8.2	-11.62	-8.41	-8.28	-5.79	-10.77	-13.34	-16.29	-12.99	-15.38	-18.91	-11.15
	CH4	56.1	31.6	52.7	54.1	54.9	48.8	45.9	58.1	60.8	60.4	56.5	43.6
	CO2	41.5	25.6	46.4	45.4	41.2	35.9	34.7	41.3	37.4	39.1	42.4	30.9
	O2	1	10.4	0.1	0.3	0.8	2.1	3.8	0.4	0.1	0.4	1	6.5
	BAL (N2)	-2.86	-7.204	-0.076	-1.428	14.6	14.6	15.4	0.1	0.2	0.1	0.2	18.2
	CO	5	19	11	0	13	14	25	18	11	12	11	0
	H2S	27	34	81	160	106	131	173	62	196	50	55	11
	Max	1.85	X	0.44	1.7	0.45	0.58	X	X	X	0.44	0.5	0
	Min	1.74	X	0	1.1	0	0.5	X	X	X	0	0	0
	Flow (cfm)	16.96	X	2.08	13.23	2.13	5.10	X	X	X	2.08	2.36	0.00
	Temp	-14.2	X	-8.9	-0.2	10.5	29.1	X	X	X	14.8	5.2	7.5
	Comments	6T to 7t	closed	cracked	1/2 T	1/2 T	1/2 T	closed	closed	closed	osed -> cracke	cracked	cracked
4-33	*Well*	-0.14	-0.27	0.02	-0.1	-0.25	-0.72	-1.1	-1.31	-0.72	-0.26	1.6	1.5
	Lateral	-7.69	-10.82	-6.96	-8.6	-8.59	-10.71	-11.29	-13.29	-12.62	-12.49	-18.58	-11.07
	CH4	54.8	50.5	54.4	55.5	57.6	54.6	54.2	52.2	56.7	42.2	56.8	60
	CO2	44.2	39	40.1	43.7	41.2	40	40.5	39.2	42.2	30.5	42.7	39.5
	O2	0.7	3.9	2.8	0.6	0.9	1.2	1	1.5	0.9	6.9	0.3	0.3
	BAL (N2)	-2.832	-8.564	-8.328	-2.556	1	4.2	4.1	7.1	0.1	20.4	0.1	0.2
	CO	12	18	4	0	16	15	20	24	22	12	8	7
	H2S	306	235	232	224	153	127	132	90	97	79	113	113
	Max	4.38	0.44	6.1	5.05	5.02	5.29	6.45	6.5	6.15	x	0	0.99
	Min	4.25	0	5.32	4.56	4.79	5.02	6.21	6.27	5.3	x	0	0.8
	Flow (cfm)	40.77	2.08	53.96	45.40	46.35	48.71	59.81	60.33	54.10	x	0.00	8.46
	Temp	21.8	18.1	12.5	14.5	19.1	25	21.1	29.7	27.5	x	6.3	0.1
	Comments	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1T -> closed	losed->cracke	cracked
4-34	*Well*	0.07	0.34	-2.03	-2.81	0.1	-0.16	-0.42	-0.39	-0.19	-0.26	-0.63	-0.69
	Lateral	-7.93	-11.15	-6.88	-8.45	-8.57	-11.17	-12.02	-13.98	-13.04	-13.1	-19.36	-11.07
	CH4	52.2	52.9	33.1	40.9	56.2	56	56.6	53.2	54.1	53.8	54.6	51.8
	CO2	45.2	46.6	33.1	39.3	43.3	43.7	43	43.7	45.3	45.6	45	37.7
	O2	0.8	0.2	3.2	1.2	0.2	0.1	0.2	0.6	0.4	0.4	0.3	0.4
	BAL (N2)	-1.708	-0.952	18.068	13.588	0.2	0.2	0.2	2.5	0.1	0.1	0.1	10
	CO	11	15	28	0	23	21	24	21	22	14	15	16
	H2S	>>	521	71	88	153	221	253	211	196	260	141	105
	Max	x	kanaflex	7.13	6.72	5.02	2.87	3.03	4.21	4.01	4.23	4.63	5.01
	Min	x	is	1.92	6.02	4.79	2.65	2.72	4.07	3.96	4.03	4.32	4.92
	Flow (cfm)	x	frozen	42.76	60.19	46.35	26.08	27.17	39.12	37.66	39.03	42.29	46.92
	Temp	x	X	13.1	13.5	19.1	22.7	22.5	21.5	24.7	21.3	19.8	18.7
	Comments	closed	closed	5T	5T	5T	5T	5T	5T	5T	5T	5T->5.25T	5.25T -> 5.50T
4-35	*Well*	0.13	0.35	0.71	0.62	-0.4	-0.58	-0.75	-0.92	-0.65	-0.74	-1.39	-0.12
well bore se	*Lateral*	-7.93	-11.01	-7.59	-8.83	-8.71	-11.39	-12.2	-14.04	-13.12	-13.37	-19.31	-11.44
	CH4	56.5	53.7	54.6	53.7	54.2	50.1	52.1	49.1	56.1	56.8	54.2	55.3
	CO2	42.1	45.6	45.1	45.4	39.6	38.1	39.7	38.9	42.6	41.6	39.9	37.5
	O2	1.2	x	0.1	0.4	1.9	2.5	1.7	1.8	1.2	1.4	2.3	1.8
	BAL (N2)	-4.812	#VALUE!	-0.676	-1.504	4.4	9.2	6.4	10.4	0.1	0.1	3.6	5.4
	CO	86	0.3	74	46	28	19	26	23	20	18	22	83
	H2S	91	82	140	46	29	25	32	28	27	27	23	21
	Max	5.12	62	kanaflex	x	4.31	4.7	4.89	5.77	5.11	4.74	6.09	3.6
	Min	5.04	x	is	x	4.19	4.62	4.78	5.62	4.91	4.45	5.74	3.49
	Flow (cfm)	48.00	x	frozen	x	40.16	44.03	45.69	53.81	47.34	43.42	55.89	33.50
	Temp	2	x		x	12.5	15.6	17.9	21.9	17.4	13.8	11.9	9.2
	Comments	1/2 T	closed	cracked	closed	cracked	cracked	cracked	cracked	cracked	cracked	barely cracked	barely cracked

Table 2:
Wellfield Monitoring Data

		15-Jan-14	5-Feb-14	5-Mar-14	3-Apr-14	7-May-14	3-Jun-14	15-Jul-14	7-Aug-14	3-Sep-14	10-Oct-17	6-Nov-14	17-Dec-14
4-36	*Well*	0.02	0.13	0.23	-0.04	0.24	0.21	-2.41	0.27	0.28	0.08	-0.26	-0.17
	Lateral	-7.87	-11.14	0.18	-8.01	0.26	0.21	-10.65	-13.98	-13.09	-13.26	-18.97	-11.24
	CH4	52.6	51.1	55.1	52	54.2	54.8	30.8	56.2	54	53.7	47.3	45.8
	CO2	48.6	49.7	49.1	47.5	45.4	45	29.5	43.3	45.6	45.8	38.7	34.6
	O2	0	0.7	0.3	0.3	0.2	0.1	6.5	0.4	0.2	0.3	3.6	3.4
	BAL (N2)	-1.7	-4.632	-6.128	-1.428	0.1	0.1	33.2	0.2	0.2	0.2	0.3	16.1
	CO	20	34	18	146	22	20	28	36	12	18	30	59
	H2S	202	202	208	213	153	166	30	159	120	95	58	48
	Max	x	kanaflex	kanaflex	2.8			x	0.44	0.52	1.12	0.46	2.4
	Min	x	is	is	1.23			x	0	0	1.03	0	2.29
	Flow (cfm)	x	frozen	frozen	19.04	NO	NO	x	2.08	2.46	10.16	2.17	22.16
	Temp	x	x	x	0.6	VACUUM	VACUUM	x	36.1	20.8	11.6	7.7	10.6
	Comments	closed	closed	closed	cracked			closed	cracked	0.5T	1/2T -> 3/4T	3/4T->1/2T	1/4T -> 1/4T
4-37	*Well*	0.16	0.07	0.11	0.34	0.1	0.04	0.13	0.08	0.25	0.03	0.02	0.03
	Lateral	-8.1	-11.68	-7.78	-9.08	-8.75	-11.48	-13.12	-14.23	-13.43	-13.4	-19.04	-11.75
	CH4	57.1	55.6	56.1	55.6	57.3	57.4	56.9	56.5	56.2	55.6	56	59.2
	CO2	42.5	43.8	43.5	43.4	42.4	42.3	42.5	42.2	43.2	43.8	43.5	40.4
	O2	0.2	0.4	0.2	0.4	0.2	0.2	0.4	0.8	0.4	0.4	0.4	0.3
	BAL (N2)	-1.052	-1.804	-1.052	-1.404	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1
	CO	5	5	3	0	10	9	12	11	15	10	30	37
	H2S	over range	over range	over range	over range	over range	over range	over range	over range	over range	502	371	368
	Max	x	x	x	x	x	x	0.6	x	0.44	0.85	1.14	2.51
	Min	x	x	x	x	x	x	0.44	x	0	0.73	1.07	2.47
	Flow (cfm)	x	x	x	x	x	x	4.91	x	2.08	7.47	10.44	23.53
	Temp	x	x	x	x	x	x	19.4	x	26.2	12.1	8	11.6
	Comments	closed	closed - surgin	closed	closed	closed	closed	cracked	closed	cracked	cracked	cracked	racked -> 1/2
5-38	*Well*	0.11	0.07	0.12	0.22	0.17	0.22	2.83	6.49	-8.16	3.22	-18.82	0.13
	Lateral	-8.17	-11.45	-8.42	-8.26	-6.04	-10.58	-13.17	-16.35	-12.5	-14.96	-18.81	-10.82
	CH4	50.2	54.4	53.4	53.7	55.9	57.5	65.3	71.7	27.4	74.6	1.2	73.1
	CO2	46.5	41.6	46.5	46.8	43.3	42.2	31.6	23.7	8.8	24.8	0.3	26.4
	O2	1.1	0.6	0	0.3	0.2	0.2	0.9	0.9	13.1	0.4	21.6	0.4
	BAL (N2)	-2.436	0.644	-0.4	-2.428	0.1	0.1	2.1	2.7	52.8	0.2	76.9	0.1
	CO	5	5	8	0	17	17	19	14	10	10	5	0
	H2S	26	38	40	63	66	78	over range	over range	over range	over range	10	204
	Max	x	x	x	x	x	x	x	0.44	x	0.57	x	x
	Min	x	x	x	x	x	x	x	0	x	0.51	x	x
	Flow (cfm)	x	x	x	x	x	x	x	19.4	x	5.10	x	x
	Temp	x	x	x	x	x	x	x	0	x	15.6	x	x
	Comments	closed	closed	closed	closed	closed	closed	closed	cracked	closed	closed -> 1T	closed well	closed
5-39	*Well*	3.39	-7.05	-6.19	-5.28	1.45	-1.98	-1.86	-3.85	1.54	-3.78	-0.15	-0.47
well bore se	*Lateral*	-7.93	-10.46	frozen	-7.65	-5.41	-10.48	-12.6	-15.48	-11.57	-14.08	-17.42	-9.58
	CH4	54.4	46.2	0.3	47.6	56.7	51.9	52.7	50.1	56.5	56.4	56.9	59.3
	CO2	41.1	35.4	0.5	36.1	42.9	37.4	38.8	36.8	42.7	39.2	42.4	39.8
	O2	0.6	6	20.1	2.9	0.2	2.3	1.9	3	0.5	2.1	0.5	0.7
	BAL (N2)	1.144	-10.66	3.024	1.996	0.1	8	6.5	10	0.1	2.3	0.2	0.2
	CO	2	12	1	0	14	21	27	22	21	17	18	12
	H2S	16	14	2	24	20	19	18	18	49	13	13	7
	Max	kanaflex	6.85	kanaflex	1.75	2.59	3.13	3.23	3.66	5.06	4.41	6.69	7.34
	Min	frozen	5.23	frozen	1.37	2.47	3.04	3.07	3.59	4.89	4.3	6.3	6.93
	Flow (cfm)	n/a	57.07	n/a	14.74	23.91	29.15	29.77	34.25	47.01	41.15	61.37	67.42
	Temp	n/a	-5.6	n/a	1.2	9.4	26	19.3	21	22.2	13.9	11.6	10.7
	Comments	3T to 4T	n/a	n/a	4T to 2T	2.5T	2.5T	2.5T	2.5T	3T	3T	3T->3.25T	3.25T -> 3.5T
5-40	*Well*	-0.14	-0.31	-0.23	0.35	0.26	0.34	0.3	0.1	-0.17	-0.27	-0.48	-0.23
	Lateral	-7.46	-10.75	-6.92	0.34	0.25	-11.05	-12.06	-13.88	-12.48	-12.61	-18.61	-10.73
	CH4	52.7	51.7	53.9	53.8	57	57.4	57.4	57.7	55.9	56.4	53.6	57.6
	CO2	44	42.5	42.6	45.1	42.5	42.3	42.1	41.8	43.6	43	41.5	38.8
	O2	0.9	0.8	0.8	0.6	0.1	0.1	0.3	0.4	0.3	0.4	0.7	0.7
	BAL (N2)	-1.484	1.492	-0.808	-2.256	0.2	0.2	0.1	0.1	0.2	0.1	4.3	2.8
	CO	0	0	0	0	23	20	20	21	19	12	10	10
	H2S	190	159	204	over range	over range	over range	over range	373	177	162	93	114
	Max	3.67	0.44	0.44	NO	NO	3.13	2.12	2.34	3.64	3.69	3.91	2.79
	Min	3.51	0	0	VACUUM	VACUUM	3.04	1.9	2.21	3.5	3.57	3.58	2.61
	Flow (cfm)	33.92	2.08	2.08			29.15	18.99	21.50	33.73	34.30	35.39	25.51
	Temp	19	14	3.6			26	28	30.1	27.8	24.3	22.7	22.4
	Comments	1T	1T	1T			cracked	cracked	1/4 T	1/4 T	1/4T	1/4T	1/4T -> 1/2T
5-41	*Well*	-2.13	-2.33	-1.35	-2.18	-2.29	-3.35	-3.81	-4.71	-4.41	-4.8	-6.19	-2.52
well bore se	*Lateral*	-3.39	-4.41	-2.89	-3.67	-3.81	-5.2	-5.96	-6.74	-5.69	-6.63	-8.95	-4.35
	CH4	52.1	45.2	42.2	53	54.8	57.6	58.8	56.6	56.8	57.4	51.1	44.8
	CO2	38.7	35.1	32.1	39.3	38.4	40.5	40.3	40.1	42.4	41.5	35.8	29.7
	O2	3	5.4	7.11	2.8	2	0.8	0.7	0.7	0.6	1	3.7	5.5
	BAL (N2)	-5.58	-6.504	-8.6436	-6.128	4.8	1	0.2	2.6	0.1	0.1	9.4	20
	CO	<<	0	<<	0	22	7	12	29	17	10	8	0
	H2S	299	260	265	315	272	250	340	207	240	247	160	154
	Max	11.91	0.44	11.62	15.65	16.16	17.06	18.47	20.5	18	16.86	19.69	16.63
	Min	11.49	0	11.18	14.98	16.01	16.8	18.08	18.89	17.34	16.41	18.63	15.62
	Flow (cfm)	110.56	2.08	107.72	144.72	151.99	159.98	172.69	186.11	166.97	157.19	181.05	152.37
	Temp	12.1	11.2	10.1	15.4	19.1	20.6	22.8	25	23.1	21.1	20.1	18.8
	Comments	full open	full open	full open	full open	full open	full open	full open	full open	full open	full open	ull open->8.75	8.75T -> 6.75T

Table 2:
Wellfield Monitoring Data

		15-Jan-14	5-Feb-14	5-Mar-14	3-Apr-14	7-May-14	3-Jun-14	15-Jul-14	7-Aug-14	3-Sep-14	10-Oct-17	6-Nov-14	17-Dec-14
5-42	*Well*	0.11	0.06	0.07	0.09	0.08	0.08	0.07	0.06	-0.01	-0.49	-1.02	-0.32
QED wellhe	*Lateral*	-7.95	-11.44	-7.56	-8.94	-8.6	-11.48	-12.17	-13.97	-13.17	-13.24	-19.13	-11.37
	CH4	45.6	44.7	47.4	47.7	47.3	49.2	51.3	50.7	51	53.6	47.4	56.6
	CO2	53.6	54.5	52.5	52.2	54.4	50.5	48.1	48.8	48.5	45.7	36.6	41.6
	O2	0.3	0.4	0	0	0.2	0.1	0.4	0.3	0.3	0.5	4.6	0.8
	BAL (N2)	-1.128	-1.604	-0.4	-0.4	0.1	0.1	0.2	0.2	0.1	0.1	11	0.9
	CO	802	958	663	622	253	192	85	502	134	53	40	288
	H2S	69	73	119	105	92	97	113	81	68	94	38	59
	Max	x	x	x	x	x	x	0.6	1.41	1.51	2.12	1.49	1.94
	Min	x	x	x	x	x	x	0.5	1.21	1.3	2.06	1.45	1.87
	Flow (cfm)	x	x	x	x	x	x	5.20	12.38	13.28	19.75	13.89	18.00
	Temp	x	x	x	x	x	x	19.4	21	23.4	11.9	11.9	6.5
	Comments	closed	closed	closed	closed	closed	closed	cracked	cracked	cracked	cracked	20T->10T	10T -> 20T

Table 3: Pump Counters

	Dec. 12, 2013	Jan. 27, 2014			Feb. 27, 2014			Mar. 13, 2014			Apr. 22, 2014			May 23, 2014			June 24, 2014		
Location	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	428	434	6	16	434	0	0	435	1	3	593	158	411	641	48	125	716	75	195
PDT 2	2043	2714	671	1745	3323	609	1583	3664	341	887	4762	1098	2855	5518	756	1966	6199	681	1771
PDT 3	2977	2977	0	0	2977	0	0	2977	0	0	3022	45	117	3026	4	10	3082	56	146
PDT 4	2411	2513	102	265	2513	0	0	buried			chamber flooded			2523			2749	226	588
PDT 5	3555	3555	0	0	4198	643	1672	4219	21	55	4495	276	718	5330	835	2171	6072	742	1929
PDT 6	3528	6941	3413	8874	10527	3586	9324	11489	962	2501	14300	2811	7309	15694	1394	3624	17228	1534	3988
PDT 7	3482	3482	0	0	3482	0	0	3482	0	0	chamber flooded			chamber flooded			chamber flooded		
PDT 8	1139	1160	21	55	1169	9	23	1169	0	0	1169		0	1169	0	0	1170	1	3
PDT 9	6442	6467	25	65	6467	0	0	6467	0	0	7209	742	1929	8891	1682	4373	10199	1308	3401
H-4	74092	74092	0	0	74093	1	3	74093	0	0	83844	9751	25353	83881	37	96	83882	1	3
1-9	162509	172055	9546	24820	172055	0	0	172055	0	0	201385	29330	76258	222436	21051	54733	242862	20426	53108
1-10	77510	91387	13877	36080	91387	0	0	91387	0	0	135595	44208	114941	154368	18773	48810	172795	18427	47910
H-11	67449	67476	27	70	67487	11	29	67550	63	164	68374	824	2142	69465	1091	2837	123105	53640	139464
2-18	884	917	33	86	932	15	39	27606	26674	69352	294130	266524	692962	502648	208518	542147	602223	99575	258895
3-27	501	565	64	166	1049	484	1258	1092	43	112	101548	100456	261186	203380	101832	264763	227217	23837	61976
3-29	462333	485448	23115	60099	485448	0	0	485448	0	0	577186	91738	238519	638624	61438	159739	700229	61605	160173
3-30	158199	172995	14796	38470	172995	0	0	172995	0	0	172995	0	0	221645	48650	126490	256260	34615	89999

	July 24, 2014			Aug. 11, 2014			Sept 16, 2014			October 31, 2014			November 26, 2014			December 18, 2014			
Location	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	Total Cycles Per Year
PDT 1	728	12	31	752	24	62	761	9	23	922	161	419	976	54	140	1033	57	148	605
PDT 2	6820	621	1615	7228	408	1061	7966	738	1919	9139	1173	3050	9994	855	2223	10815	821	2135	8772
PDT 3	3361	279	725	3543	182	473	4022	479	1245	4371	349	907	4619	248	645	4636	17	44	1659
PDT 4	2969	220	572	3081	112	291	3518	437	1136	3816	298	775	3957	141	367	4016	59	153	1605
PDT 5	6741	669	1739	7116	375	975	7943	827	2150	8626	683	1776	8720	94	244	8841	121	315	5286
PDT 6	18323	1095	2847	18956	633	1646	19711	755	1963	20848	1137	2956	21755	907	2358	22761	1006	2616	19233
PDT 7	4438	na	na	4699	261	679	chamber flooded			5206	-	0	5297	91	237	5504	207	538	2022
PDT 8	1170	0	0	1170	0	0	1171	1	3	1173	2	5	1173	0	0	1173	0	0	34
PDT 9	10616	417	1084	10953	337	876	chamber flooded			12137	-	0	12157	20	0	12366	209	0	5924
H-4	83882	0	0	102046	18164	47226	102057	11	29	102162	105	273	102226	64	166	102229	3	8	28,137
1-9	260330	17468	45417	270198	9868	25657	287245	17047	44322	311283	24038	62499	320972	9689	25191	328137	7165	18629	165,628
1-10	188938	16143	41972	197653	8715	22659	216503	18850	49010	240664	24161	62819	250714	10050	26130	258671	7957	20688	181,161
H-11	215452	92347	240102	252709	37257	96868	310468	57759	150173	310468	0	0	332161	21693	56402	352577	20416	53082	285,128
2-18	602223	0	0	602682	459	1193	772035	169353	440318	781493	9458	24591	790520	9027	23470	863443	72923	189600	862,559
3-27	234148	6931	18021	235590	1442	3749	238272	2682	6973	238272	0	0	238272	0	0	238272	0	0	237,771
3-29	754420	54191	140897	783252	28832	74963	835033	51781	134631	920439	85406	222056	961402	40963	106504	981276	19874	51672	518,943
3-30	288336	32076	83398	305936	17600	45760	339884	33948	88265	385905	46021	119655	398302	12397	32232	407326	9024	23462	249,127

Table 4:
Leachate Levels

	Screen Length	Installed Depth	21-Mar-14				27-Jun-14				13-Aug-14				22-Dec-14				2014 Average
Location	meter	mbgs	D.T.W	D.T.B.	Temp	% Open Screen	D.T.W	D.T.B.	Temp	% Open Screen	D.T.W	D.T.B.	Temp	% Open Screen	D.T.W	D.T.B.	Temp	% Open Screen	% Open Screen
H-1	12	14.63	7.68	13.92	n/a	42.98	7.62	13.74	29.4	42.48	7.62	10.77	29.1	42.48	7.39	13.92	28.8	40.60	42.14
H-2	14	16.77	10.64	17.15	n/a	55.33	10.98	17.16	31.9	57.81	11.02	17.30	31.7	58.10	10.56	17.83	31.1	54.75	56.50
H-3	12	15.24	8.91	15.33	n/a	48.06	8.77	15.22	12.1	46.91	8.92	15.65	12.9	48.14	8.48	15.80	10.5	44.54	46.91
H-4	11	14.02	7.04	8.29	n/a	36.36	6.96	7.80	12.6	35.64	7.46	8.10	12.4	40.19	7.53	7.88	11.6	40.83	38.26
1-5	11	13.72	0.00	14.12	n/a	0.00	9.60	13.73	19.8	61.39	9.66	10.95	19.4	61.96	9.41	13.99	19.1	59.61	45.74
1-6	12	15.55	10.42	15.87	n/a	57.94	11.40	15.67	25.5	65.98	11.84	15.79	25.2	69.59	9.07	16.06	24.5	46.87	60.10
1-7	18	21.34	18.15	20.44	n/a	82.55	16.90	20.54	27.7	75.72	17.16	21.04	28.5	77.14	16.80	21.11	29.2	75.17	77.65
1-8	21	24.39	well	blocked	n/a	n/a	16.86	24.09	33.7	64.72	16.77	24.00	34.3	64.29	16.32	24.22	32.9	62.19	63.73
1-9	12	14.63	8.64	14.89	n/a	50.85	13.93	14.75	34.6	94.23	11.09	15.24	33.4	70.94	10.12	14.80	35.2	62.98	69.75
1-10	9	12.20	8.11	11.96	n/a	55.34	9.52	10.23	28.2	70.75	10.41	11.65	30.4	80.48	10.73	11.81	30.0	83.98	72.64
H-11	9	12.80	5.33	12.13	n/a	18.27	8.50	12.29	22.0	52.93	11.94	12.17	20.2	90.54	11.47	12.52	21.3	85.41	61.79
H-12	13	16.16	10.34	15.99	n/a	55.62	9.50	15.63	23.9	49.21	9.70	15.76	22.3	50.73	cnm	QED	wellhead	n/a	51.85
2-13	21	25.00	10.38	20.56	n/a	31.49	8.66	9.55	29.0	23.44	8.69	9.74	32.7	23.58	8.02	20.52	39.2	20.44	24.74
2-14	20	22.56	13.12	22.23	n/a	52.36	12.55	21.99	21.5	49.48	12.63	22.62	21.9	49.89	12.07	22.77	22.0	47.06	49.70
2-15	18	21.65	16.33	22.50	n/a	70.94	14.20	22.02	15.5	59.29	14.87	21.87	16.4	62.96	14.25	22.23	15.3	59.57	63.19
2-16	26	28.35	23.32	28.15	n/a	80.58	23.45	28.81	15.8	81.08	23.23	29.60	16.0	80.23	22.50	29.83	15.6	77.41	79.82
2-17	15	18.29	13.83	17.83	n/a	70.72	13.54	16.67	22.5	68.82	10.49	17.39	23.3	48.81	13.04	17.50	22.2	65.54	63.48
2-18	15	18.29	16.51	18.48	n/a	88.31	15.94	18.64	31.0	84.57	17.87	18.67	30.7	97.23	17.33	18.79	29.7	93.68	90.95
3-19	12	14.94	11.54	14.76	n/a	72.13	10.62	12.10	13.8	64.58	10.74	12.16	12.0	65.57	11.12	14.93	11.8	68.68	67.74
3-20	11	13.26	11.76	13.82	n/a	85.92	9.18	13.62	11.8	61.74	9.04	10.74	12.0	60.43	10.19	13.91	10.0	71.21	69.83
3-21	5	7.62	well	blocked	n/a	n/a	6.56	7.59	10.2	76.78	6.64	7.69	8.4	78.53	6.06	7.45	7.4	65.85	73.72
3-22	24	26.68	10.30	25.22	n/a	32.01	7.61	26.15	28.5	20.84	8.10	26.26	28.4	22.87	7.40	26.49	28.2	19.96	23.92
3-23	23	25.91	11.26	22.16	n/a	35.91	10.01	21.96	31.3	30.44	10.40	22.55	33.0	32.15	9.27	22.52	33.0	27.21	31.43
3-24	21	23.48	13.65	21.78	n/a	53.96	13.35	21.65	23.7	52.55	12.63	21.87	24.1	49.18	12.41	22.25	24.7	48.15	50.96
3-25	18	21.34	10.78	20.99	n/a	42.26	10.59	20.79	27.9	41.23	9.58	21.03	28.6	35.70	7.00	21.82	28.3	21.60	35.20
3-26	9	12.20	foam	12.40	n/a	n/a	foam	12.25	24.5	n/a	foam	12.36	26.2	n/a	2.00	12.36	28.0	0.00	0.00
3-27	21	24.09	3.45	10.03	n/a	3.31	foam	24.55	44.3	n/a	8.75	23.08	44.3	28.14	6.42	22.92	47.1	17.23	16.23
3-28	12	15.24	9.17	14.28	n/a	50.19	10.23	14.47	23.5	58.89	10.34	14.57	24.2	59.79	9.75	14.87	24.2	54.95	55.95
3-29	12	14.63	11.83	14.10	n/a	77.01	11.41	13.76	37.1	73.56	11.44	13.99	37.7	73.81	9.87	12.29	30.0	60.93	71.33
3-30	7	9.76	5.36	9.39	n/a	39.92	8.69	9.36	36.9	85.43	8.68	9.49	37.5	85.29	8.44	9.09	36.7	82.01	73.16
4-31	16	18.75	9.73	18.76	n/a	44.18	9.78	18.63	19.8	44.49	9.57	18.43	19.2	43.19	10.00	16.12	19.5	45.85	44.43
4-32	10	12.50	5.72	12.93	n/a	30.51	3.40	12.79	12.1	6.73	3.23	12.60	12.7	4.98	3.15	12.30	14.0	4.16	11.59
4-33	24	26.68	6.54	21.20	n/a	17.44	5.33	20.81	32.0	12.48	5.09	20.12	32.2	11.49	4.38	20.54	29.7	8.58	12.50
4-34	20	22.56	7.45	21.37	n/a	23.75	6.99	21.71	32.4	21.43	6.88	21.53	32.3	20.87	6.05	22.48	30.3	16.68	20.68
4-35	15	17.38	13.92	16.77	n/a	77.32	13.34	17.30	13.9	73.51	13.29	17.18	14.5	73.18	12.80	17.44	14.4	69.97	73.49
4-36	15	18.29	10.06	17.18	n/a	45.99	9.45	17.05	28.4	41.99	9.55	16.70	29.8	42.65	8.71	17.78	30.9	37.14	41.94
4-37	12	14.94	14.24	14.30	n/a	94.27	6.79	14.12	38.8	33.18	6.09	12.43	39.6	27.44	7.12	13.49	37.1	35.88	47.69
5-38	8	10.67	well	blocked	n/a	n/a	3.95	10.88	12.1	11.82	3.92	10.49	11.9	11.43	2.51	10.70	12.5	0.00	7.75
5-39	8	10.67	6.45	11.23	n/a	44.62	5.74	10.95	12.4	35.31	5.89	10.73	12.2	37.28	4.93	11.20	11.9	24.68	35.47
5-40	18	21.95	11.46	21.91	n/a	42.65	10.49	21.73	37.0	37.35	9.22	22.48	36.9	30.40	8.81	18.08	36.9	28.16	34.64
5-41	17	18.90	16.29	17.76	n/a	84.42	12.40	17.26	23.6	61.22	13.63	17.21	24.6	68.56	3.26	17.51	24.8	6.71	55.23
5-42	12	16.16	13.45	15.04	n/a	77.79	13.42	15.05	14.7	77.54	13.37	14.72	15.4	77.13	12.54	15.27	15.5	70.33	75.70
																		Average	49.75

Dual purpose

n/a - not available

2.2 Surface Emission Monitoring

As required by the City, surface emission monitoring was carried out quarterly, weather conditions permitting, by Comcor. This monitoring was performed using a portable flame ionization detector (FID). A Comcor technician walked the site in a grid pattern with the FID and a GPS, marking locations where concentrations of hydrocarbons were greater than 500 ppm. Several areas were noted where there were significant volumes of gas detected, including areas where cap was weak, uncovered manholes, and around some LFG wells.

2.3 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
- 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. No major repairs had to be made to the mechanical system during 2014.

Data for 2014 has been compiled, and is found in Appendix A.

2.3.1 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 2014 has been compiled, and is found in Table 2.

2.3.2 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 LGFCS to the flare. As a safety precaution, if either the oxygen concentration gets too high, or the methane concentration gets 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 2014, the system operated as intended with the analyzer data recorded at an interval of 5 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 insitu monitoring devices to ensure accuracy. These measurements were taken using a proper gas meter/analyzer such as a Landtec GEM-2000+, or equivalent.

2.3.3 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. 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 2014 isfound 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 comprises 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 21 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 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 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.

The condensate Collection System operated as intended during 2014.

5.0 SITE ACTIVITIES

A few minor upgrades were made in the wellfield in 2014 to improve landfill gas collection and overall operations.

In May 2014, wellbore seals were placed around a number of landfill gas collection wells to decrease oxygen intrusion into the gas collection system. Oxygen intrusion can increase the risk of subsurface landfill gas fires and result in poor quality landfill gas concentrations for combustion. Wellbore seals were placed on the following wells: H-1, 1-5, H-12, 2-14, 3-22, 4-35, 5-39 and 5-41.

QED Quick-Change Orifice Plate Wellheads were placed on wells H-12 and 5-42 in October 2014 as a trial to observe if the expense of the wellheads was worthwhile. The QED wellheads are designed to improve flow adjustments and overall operator control. In December 2014, one of the QED wellhead ports froze preventing monitoring of the vacuum on the well side. The benefits of the QED wellheads will continue to be assessed during the 2015 monitoring year.

No major maintenance or construction activities were required in 2014.

6.0 CONCLUSIONS AND RECOMMENDATIONS

1. During operation in 2014, the Brady Road Resource Management Facility Gas Collection and Flaring System operated as was intended.

2. During surface emission monitoring, some areas were noted where gas was escaping. These areas included open manholes and areas of weak surface cap. In order to get maximum efficiency from the LFGCS, these issues should be looked at in the future.

3. 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

Shannan McGarr, B.Sc.
Wellfield Operations Manager

APPENDIX A

PLANT AND FLARE DATA

	CO2 Equivalents			Landfill Gas Flow						Methane	Oxygen	Flare	Flare	Temp			Blower 1		Blower 2	
Date	Yearly	Monthly	Daily	Yearly	Monthly	Daily	Daily	Avg	Total	Avg	Avg	Run	Starts	Min.	Avg.	Max.	Daily	Cumu.	Daily	Cumu.
	Tonnes CO2	Tonnes CO2	Tonnes CO2	scf	scf	meter3	scf	scfm	MMBTU	(%)	(%)	Hours		°C	°C	°C	Hours	Hours	Hours	Hours
Jan 1 2014	7	7	7	26587	26587	753	26587	926	16	60.4	4.2	00:27	0	892	900	910	0	1709	1.3	1649.5
Jan 2 2014	199	199	192	834309	834309	22881	807722	924	425	51.9	1.5	14:36	2	78	891	969	0	1709	12.7	1662.2
Jan 3 2014	478	478	279	2023947	2023947	33700	1189638	924	616	51.2	1.7	21:27	1	-11	895	964	0	1709	21.5	1683.7
Jan 4 2014	758	758	280	3355663	3355663	37725	1331716	925	617	45.8	2.5	23:59	0	889	900	917	0	1709	24	1707.7
Jan 5 2014	965	965	207	4377548	4377548	28948	1021885	925	456	44.1	2.6	18:18	0	887	900	915	0	1709	20.2	1727.9
Jan 6 2014	1052	1052	87	4747000	4747000	10466	369452	924	192	51.3	1.4	06:41	1	10	886	964	0	1709	4.8	1732.7
Jan 7 2014	1339	1339	287	6078683	6078683	37724	1331683	925	633	47	2.1	23:59	0	887	900	918	0	1709	24	1756.7
Jan 8 2014	1614	1614	275	7411125	7411125	37745	1332442	925	606	44.9	2.4	23:59	0	883	900	917	0	1709	24	1780.7
Jan 9 2014	1895	1895	281	8743271	8743271	37737	1332146	926	619	46	2.1	23:59	0	884	900	915	0	1709	24	1804.7
Jan 10 2014	2171	2171	276	10073176	10073176	37674	1329905	924	609	45.2	2.2	23:59	0	883	900	919	0	1709	24	1828.7
Jan 11 2014	2442	2442	271	11405953	11405953	37755	1332777	926	597	44.3	2.3	23:59	0	883	900	918	0	1709	24	1852.7
Jan 12 2014	2720	2720	278	12737812	12737812	37729	1331859	926	613	45.5	2	23:59	0	882	900	922	0	1709	24	1876.7
Jan 13 2014	3000	3000	280	14070748	14070748	37759	1332936	926	618	45.9	2	23:59	0	886	900	916	0	1709	24	1900.7
Jan 14 2014	3274	3274	274	15401223	15401223	37690	1330475	925	605	44.9	2.1	23:59	0	889	900	913	0	1709	23.9	1924.6
Jan 15 2014	3574	3574	300	16784476	16784476	39185	1383253	961	662	47.3	1.2	23:59	0	873	900	927	0	1709	25.7	1950.3
Jan 16 2014	3860	3860	286	18206852	18206852	40293	1422376	1000	632	43.9	2.1	23:42	1	238	897	960	11.7	1720.7	12	1962.3
Jan 17 2014	4158	4158	298	19646877	19646877	40793	1440025	1000	658	45.2	1.7	23:59	0	876	900	917	24	1744.7	0	1962.3
Jan 18 2014	4453	4453	295	21085142	21085142	40743	1438265	1000	650	44.7	1.9	23:59	0	888	900	916	24	1768.7	0	1962.3
Jan 19 2014	4743	4743	290	22524078	22524078	40762	1438936	1000	640	44	2.2	23:59	0	888	900	915	24	1792.7	0	1962.3
Jan 20 2014	5020	5020	277	23962840	23962840	40757	1438762	1000	610	41.9	2.6	23:59	0	883	900	918	24	1816.7	0	1962.3
Jan 21 2014	5307	5307	287	25402927	25402927	40795	1440087	1000	634	43.5	2.1	23:59	0	883	900	917	23	1839.7	0	1962.3
Jan 22 2014	5578	5578	271	26841278	26841278	40746	1438351	1000	599	41.1	2.6	23:59	0	885	900	918	24	1863.7	0	1962.3
Jan 23 2014	5856	5856	278	28280844	28280844	40780	1439566	1001	614	42.1	2.2	23:59	0	884	900	918	24	1887.7	0	1962.3
Jan 24 2014	6139	6139	283	29719450	29719450	40753	1438606	1000	624	42.8	2.3	23:59	0	887	900	917	24	1911.7	0	1962.3
Jan 25 2014	6417	6417	278	31157145	31157145	40727	1437695	1000	614	42.2	2.4	23:59	0	888	900	914	24	1935.7	0	1962.3
Jan 26 2014	6689	6689	272	32595749	32595749	40753	1438604	1000	599	41.2	2.7	23:59	0	881	900	922	24	1959.7	0	1962.3
Jan 27 2014	6953	6953	264	34033876	34033876	40739	1438127	1000	582	40	2.9	23:59	0	884	900	916	23.9	1983.6	0	1962.3
Jan 28 2014	7215	7215	262	35472823	35472823	40762	1438947	1000	577	39.6	3.1	23:59	0	869	900	918	24	2007.6	0	1962.3
Jan 29 2014	7473	7473	258	36912890	36912890	40794	1440067	1001	569	39.1	3.7	23:59	0	883	900	920	24	2031.6	0	1962.3
Jan 30 2014	7711	7711	238	38250287	38250287	37886	1337397	956	526	38.9	3.6	23:17	1	64	896	937	12.7	2044.3	12.1	1974.4
Jan 31 2014	7942	7942	231	39498359	39498359	35355	1248072	898	510	40.4	3.2	23:08	3	59	890	941	0	2044.3	22.8	1997.2
Feb 1 2014	8177	235	235	40791981	1293622	36646	1293622	899	518	39.6	3.4	23:59	0	878	900	919	0	2044.3	24	2021.2
Feb 2 2014	8415	473	238	42087088	2588729	36688	1295107	900	526	40.1	3.3	23:59	0	879	900	918	0	2044.3	24	2045.2
Feb 3 2014	8656	714	241	43423004	3924645	37844	1335916	941	531	39.3	3.6	23:43	1	130	896	945	0	2044.3	23.8	2069
Feb 4 2014	8902	960	246	44815773	5317414	39454	1392769	968	542	38.5	3.6	23:59	0	875	900	916	0	2044.3	24	2093
Feb 5 2014	9132	1190	230	46084491	6586132	35940	1268718	900	508	39.5	3	23:31	2	99	894	921	0	2044.3	23.5	2116.5
Feb 6 2014	9364	1422	232	47332670	7834311	35358	1248179	899	511	40.5	2.9	23:09	1	26	896	953	0	2044.3	22.2	2138.7
Feb 7 2014	9597	1655	233	48608440	9110081	36140	1275770	899	513	39.8	3.1	23:39	1	84	895	938	12.2	2056.5	11.5	2150.3
Feb 8 2014	9828	1886	231	49904402	10406043	36712	1295962	900	510	38.9	3.2	23:59	0	882	900	916	24	2080.5	0	2150.3
Feb 9 2014	10056	2114	228	51198578	11700219	36661	1294176	900	504	38.5	3.3	23:59	0	885	900	918	24	2104.5	0	2150.3
Feb 10 2014	10279	2337	223	52452669	12954310	35526	1254091	900	491	38.7	3.3	23:14	3	79	891	923	25.3	2129.8	0	2150.3
Feb 11 2014	10515	2573	236	53746856	14248497	36662	1294187	899	521	39.8	3	23:59	0	886	900	915	22.4	2152.3	0	2150.3
Feb 12 2014	10745	2803	230	55043152	15544793	36721	1296296	900	508	38.8	3.3	23:59	0	881	900	915	24	2176.3	0	2150.3
Feb 13 2014	10973	3031	228	56336874	16838515	36649	1293722	899	504	38.5	3.4	23:59	0	887	900	910	23.9	2200.2	0	2150.3
Feb 14 2014	11177	3235	204	57494078	17995719	32781	1157204	899	451	38.5	3.4	21:27	1	-15	894	948	12	2212.2	10.3	2160.6
Feb 15 2014	11400	3458	223	58788586	19290227	36671	1294508	899	492	37.6	3.7	23:59	0	883	900	914	0	2212.2	24	2184.6
Feb 16 2014	11624	3682	224	60083224	20584865	36675	1294638	900	495	37.8	3.6	23:59	0	887	900	916	0	2212.2	23	2207.6
Feb 17 2014	11855	3913	231	61378021	21879662	36679	1294797	900	510	38.9	3.5	23:59	0	887	900	912	0	2212.2	24	2231.6
Feb 18 2014	12092	4150	237	62673084	23174725	36687	1295063	900	523	39.9	3.6	23:59	0	873	900	927	0	2212.2	24.1	2255.8
Feb 19 2014	12318	4376	226	63879926	24381567	34187	1206842	900	499	40.9	3.2	22:21	1	110	896	939	0	2212.2	22.5	2278.3

	CO2 Equivalents			Landfill Gas Flow						Methane	Oxygen	Flare	Flare	Temp			Blower 1		Blower 2	
Date	Yearly	Monthly	Daily	Yearly	Monthly	Daily	Daily	Avg	Total	Avg	Avg	Run	Starts	Min.	Avg.	Max.	Daily	Cumu.	Daily	Cumu.
	Tonnes CO2	Tonnes CO2	Tonnes CO2	scf	scf	meter3	scf	scfm	MMBTU	(%)	(%)	Hours		°C	°C	°C	Hours	Hours	Hours	Hours
Feb 20 2014	12553	4611	235	65153870	25655511	36088	1273944	899	519	40.3	3.3	23:37	1	89	896	941	12.2	2224.4	11.4	2289.7
Feb 21 2014	12790	4848	237	66448240	26949881	36667	1294370	900	524	40	3.4	23:59	0	882	900	916	24	2248.4	0	2289.7
Feb 22 2014	13022	5080	232	67743696	28245337	36698	1295456	900	511	39	3.7	23:59	0	877	900	917	24	2272.5	0	2289.7
Feb 23 2014	13249	5307	227	69037668	29539309	36656	1293972	900	500	38.2	3.8	23:59	0	880	900	916	24	2296.5	0	2289.7
Feb 24 2014	13476	5534	227	70332075	30833716	36668	1294407	900	501	38.3	3.7	23:59	0	878	900	916	24	2320.5	0	2289.7
Feb 25 2014	13702	5760	226	71625678	32127319	36645	1293603	899	499	38.1	3.7	23:59	0	876	900	918	24	2344.5	0	2289.7
Feb 26 2014	13931	5989	229	72919854	33421495	36661	1294176	899	505	38.6	3.6	23:59	0	871	900	926	24	2368.6	0	2289.7
Feb 27 2014	14139	6197	208	74111914	34613555	33769	1192060	899	459	38.1	3.6	22:07	1	-12	895	956	22.1	2390.7	0	2289.7
Feb 28 2014	14356	6414	217	75371747	35873388	35689	1259833	899	478	37.5	3.9	23:21	1	5	895	926	13.3	2404	10.1	2299.8
Mar 1 2014	14572	216	216	76667594	1295847	36709	1295847	900	477	36.4	4.1	23:59	0	890	900	912	0	2404	24	2323.8
Mar 2 2014	14787	431	215	77961309	2589562	36648	1293715	900	475	36.3	4.2	23:59	0	881	900	920	0	2404	24	2347.8
Mar 3 2014	15004	648	217	79242796	3871049	36302	1281487	899	480	37	4.1	23:45	1	154	896	941	0	2404	23.8	2371.7
Mar 4 2014	15209	853	205	80428340	5056593	33584	1185544	881	453	37.8	4	22:25	1	57	896	933	0	2404	22.4	2394.1
Mar 5 2014	15427	1071	218	81649133	6277386	34583	1220793	848	482	39.1	3.4	23:59	0	875	900	916	0	2404	24	2418.1
Mar 6 2014	15640	1284	213	82800000	7428253	32602	1150867	800	469	40.3	2.9	23:59	0	844	900	925	0	2404	24	2442.1
Mar 7 2014	15842	1486	202	83926713	8554966	31918	1126713	783	446	39.2	3.4	23:59	0	876	900	911	0	2404	24	2466.2
Mar 8 2014	16044	1688	202	85005607	9633860	30563	1078894	749	445	40.8	2.8	23:59	0	884	900	916	0	2404	24	2490.2
Mar 9 2014	16168	1812	124	85653417	10281670	18351	647810	750	273	41.6	2.7	14:22	0	878	900	922	0	2404	14.5	2504.7
Mar 10 2014	16299	1943	131	86281431	10909684	17790	628014	749	288	45.4	2.7	13:59	1	23	892	940	0	2404	12.9	2517.6
Mar 11 2014	16512	2156	213	87359768	11988021	30547	1078337	750	471	43.1	3.2	23:59	0	885	900	913	0	2404	24	2541.6
Mar 12 2014	16723	2367	211	88376505	13004758	28802	1016737	750	465	45.2	2.5	22:35	1	-5	895	943	0	2404	22.5	2564.2
Mar 13 2014	16946	2590	223	89443503	14071756	30226	1066998	750	493	45.6	2.4	23:43	1	247	897	938	8.3	2412.3	16	2580.2
Mar 14 2014	17164	2808	218	90521665	15149918	30542	1078162	750	481	44.1	3.1	23:59	0	880	900	916	24	2436.3	0	2580.2
Mar 15 2014	17379	3023	215	91601985	16230238	30603	1080320	751	475	43.4	3.3	23:59	0	886	900	915	24	2460.4	0	2580.2
Mar 16 2014	17606	3250	227	92680095	17308348	30541	1078110	750	500	45.8	2.5	23:59	0	881	900	920	24	2484.4	0	2580.2
Mar 17 2014	17830	3474	224	93760080	18388333	30594	1079985	750	495	45.3	2.9	23:59	0	878	900	918	24	2508.4	0	2580.2
Mar 18 2014	18049	3693	219	94830050	19458303	30310	1069970	749	482	44.5	3.2	23:46	1	163	895	931	23.8	2532.2	0	2580.2
Mar 19 2014	18274	3918	225	95909980	20538233	30592	1079930	750	496	45.4	3	23:59	0	875	900	921	23.9	2556.1	0	2580.2
Mar 20 2014	18499	4143	225	96982307	21610560	30377	1072327	749	496	45.7	3	23:51	1	278	896	927	23.9	2580.1	0	2580.2
Mar 21 2014	18719	4363	220	98018339	22646592	29349	1036032	750	486	46.4	2.7	23:00	2	0	890	922	11.4	2591.5	11.6	2591.8
Mar 22 2014	18947	4591	228	99098204	23726457	30590	1079865	751	502	45.9	2.8	23:59	0	889	900	909	0	2591.5	24	2615.8
Mar 23 2014	19177	4821	230	1E+08	24806331	30591	1079874	750	508	46.5	2.6	23:59	0	886	900	913	0	2591.5	24	2639.8
Mar 24 2014	19395	5039	218	1.01E+08	25843305	29375	1036974	750	481	45.9	2.8	23:04	1	23	895	925	11	2602.5	12.1	2651.9
Mar 25 2014	19603	5247	208	1.02E+08	26850380	28528	1007075	750	460	45.1	3.1	22:23	1	105	897	921	22.4	2624.9	0	2651.9
Mar 26 2014	19818	5462	215	1.03E+08	27868849	28851	1018469	750	475	46.1	2.9	22:37	1	155	897	936	15.4	2640.3	7.2	2659.1
Mar 27 2014	20043	5687	225	1.04E+08	28948105	30573	1079256	750	495	45.4	3.2	23:59	0	888	900	913	0	2640.3	24	2683.2
Mar 28 2014	20264	5908	221	1.05E+08	30027457	30576	1079352	750	488	44.6	3.2	23:59	0	888	900	913	0	2640.3	23	2706.2
Mar 29 2014	20489	6133	225	1.06E+08	31108804	30632	1081347	752	496	45.4	3	23:59	0	874	900	920	0	2640.3	24	2730.2
Mar 30 2014	20708	6352	219	1.08E+08	32189366	30610	1080562	751	484	44.2	3.3	23:59	0	886	900	912	0	2640.3	24	2754.2
Mar 31 2014	20926	6570	218	1.09E+08	33268513	30570	1079147	750	481	44	3.3	23:59	0	886	900	915	0	2640.3	24	2778.3
Apr 1 2014	21147	221	221	1.1E+08	1080122	30598	1080122	751	488	44.6	3	23:59	0	889	900	914	0	2640.3	24	2802.3
Apr 2 2014	21379	453	232	1.11E+08	2161443	30632	1081321	752	513	46.9	2.1	23:59	0	884	900	921	0	2640.3	24	2826.3
Apr 3 2014	21620	694	241	1.12E+08	3231893	30324	1070450	749	531	49.1	1.2	23:49	1	225	896	944	7	2647.3	16.8	2843.1
Apr 4 2014	21864	938	244	1.13E+08	4310176	30546	1078283	749	538	49.3	1.1	23:59	0	886	900	912	24	2671.4	0	2843.1
Apr 5 2014	22110	1184	246	1.14E+08	5387994	30532	1077818	749	543	49.8	0.9	23:59	0	884	900	917	24	2695.4	0	2843.1
Apr 6 2014	22358	1432	248	1.15E+08	6463891	30478	1075897	748	547	50.3	0.8	23:59	0	883	900	919	25	2720.4	0	2843.1
Apr 7 2014	22607	1681	249	1.16E+08	7543080	30571	1079189	750	549	50.3	0.9	23:59	0	885	900	918	24	2744.4	0	2843.1
Apr 8 2014	22859	1933	252	1.17E+08	8622823	30587	1079743	751	556	50.9	0.8	23:59	0	878	900	916	24	2768.5	0	2843.1
Apr 9 2014	23107	2181	248	1.18E+08	9661816	29433	1038993	750	547	52.1	0.7	23:05	1	118	896	958	23.6	2792.1	0	2843.1
Apr 10 2014	23361	2435	254	1.19E+08	10740964	30570	1079148	750	561	51.3	0.9	23:59	0	886	900	912	24	2816.1	0	2843.1

	CO2 Equivalents			Landfill Gas Flow						Methane	Oxygen	Flare	Flare	Temp			Blower 1		Blower 2	
Date	Yearly	Monthly	Daily	Yearly	Monthly	Daily	Daily	Avg	Total	Avg	Avg	Run	Starts	Min.	Avg.	Max.	Daily	Cumu.	Daily	Cumu.
	Tonnes CO2	Tonnes CO2	Tonnes CO2	scf	scf	meter3	scf	scfm	MMBTU	(%)	(%)	Hours		°C	°C	°C	Hours	Hours	Hours	Hours
Apr 11 2014	23614	2688	253	1.2E+08	11821086	30598	1080122	750	558	51.1	1	23:59	0	869	900	936	23.9	2840	0	2843.1
Apr 12 2014	23870	2944	256	1.22E+08	12899876	30560	1078790	750	564	51.7	0.8	23:59	0	889	900	912	24	2864	0	2843.1
Apr 13 2014	24123	3197	253	1.23E+08	13978827	30565	1078951	750	558	51.1	1	23:59	0	881	900	922	24	2888.1	0	2843.1
Apr 14 2014	24378	3452	255	1.24E+08	15055932	30512	1077105	749	562	51.5	0.9	23:59	0	889	900	914	24	2912.1	0	2843.1
Apr 15 2014	24634	3708	256	1.25E+08	16135586	30584	1079654	750	564	51.7	1	23:59	0	852	900	934	24	2936.1	0	2843.1
Apr 16 2014	24885	3959	251	1.26E+08	17215104	30581	1079518	750	555	50.8	1.4	23:59	0	849	900	927	24	2960.1	0	2843.1
Apr 17 2014	25142	4216	257	1.27E+08	18284085	30282	1068981	749	566	52.3	1.2	23:47	1	175	896	940	10.8	2971	13	2856.1
Apr 18 2014	25408	4482	266	1.28E+08	19364271	30600	1080186	751	587	53.7	1	23:59	0	874	900	923	0	2971	23	2879.2
Apr 19 2014	25676	4750	268	1.29E+08	20444478	30600	1080207	750	591	54	0.9	23:59	0	874	900	916	0	2971	24	2903.2
Apr 20 2014	25942	5016	266	1.3E+08	21524152	30585	1079674	750	586	53.7	1	23:59	0	888	900	919	0	2971	24	2927.2
Apr 21 2014	26205	5279	263	1.31E+08	22603030	30562	1078878	750	580	53.1	1.2	23:59	0	887	900	913	0	2971	24	2951.2
Apr 22 2014	26471	5545	266	1.32E+08	23683531	30608	1080501	750	587	53.7	1	23:59	0	885	900	913	0	2971	24	2975.3
Apr 23 2014	26740	5814	269	1.33E+08	24763391	30590	1079860	750	593	54.3	0.9	23:59	0	889	900	914	0	2971	24	2999.3
Apr 24 2014	27011	6085	271	1.34E+08	25843279	30591	1079888	750	597	54.6	0.8	23:59	0	892	900	912	0	2971	24	3023.3
Apr 25 2014	27281	6355	270	1.36E+08	26913012	30303	1069733	750	597	55.1	0.7	23:47	1	209	896	942	13	2984	10.7	3034
Apr 26 2014	27556	6630	275	1.37E+08	27992518	30580	1079506	750	607	55.6	0.6	23:59	0	890	900	917	24	3008	0	3034
Apr 27 2014	27832	6906	276	1.38E+08	29073446	30621	1080928	751	609	55.6	0.6	23:59	0	883	900	924	24	3032	0	3034
Apr 28 2014	28107	7181	275	1.39E+08	30153024	30582	1079578	750	607	55.6	0.6	23:59	0	876	900	920	24	3056	0	3034
Apr 29 2014	28385	7459	278	1.4E+08	31232968	30593	1079944	751	612	56	0.6	23:59	0	891	900	912	24	3080.1	0	3034
Apr 30 2014	28664	7738	279	1.41E+08	32313323	30604	1080355	751	614	56.2	0.5	23:59	0	890	900	909	24	3104.1	0	3034
May 1 2014	28937	273	273	1.42E+08	1051679	29792	1051679	751	601	56.5	0.5	23:21	1	221	897	956	12	3116.1	11.5	3045.5
May 2 2014	29215	551	278	1.43E+08	2132711	30623	1081032	751	614	56.1	0.6	23:59	0	882	900	922	0	3116.1	24.9	3070.4
May 3 2014	29488	824	273	1.44E+08	3212739	30595	1080028	750	603	55.2	0.8	23:59	0	887	900	916	0	3116.1	24	3094.5
May 4 2014	29760	1096	272	1.45E+08	4291775	30567	1079036	750	599	54.9	0.9	23:59	0	881	900	919	0	3116.1	24	3118.5
May 5 2014	30034	1370	274	1.46E+08	5371208	30578	1079433	750	604	55.3	0.7	23:59	0	888	900	926	0	3116.1	24	3142.5
May 6 2014	30310	1646	276	1.47E+08	6449850	30556	1078642	750	608	55.7	0.6	23:59	0	884	900	914	0	3116.1	24	3166.5
May 7 2014	30604	1940	294	1.49E+08	7600975	32609	1151125	800	649	55.8	0.6	23:59	0	888	900	934	0	3116.1	24	3190.6
May 8 2014	30913	2249	309	1.5E+08	8823530	34633	1222555	850	681	55	0.8	23:59	0	890	900	914	0	3116.1	24	3214.6
May 9 2014	31221	2557	308	1.51E+08	10031528	34220	1207998	849	679	55.5	0.7	23:43	1	109	897	969	12.3	3128.4	11.4	3226
May 10 2014	31530	2866	309	1.52E+08	11256159	34691	1224631	851	682	55	0.8	23:59	0	883	900	921	24	3152.4	0	3226
May 11 2014	31836	3172	306	1.53E+08	12480031	34670	1223872	850	675	54.5	0.9	23:59	0	888	900	912	24	3176.5	0	3226
May 12 2014	32141	3477	305	1.55E+08	13704255	34680	1224224	850	674	54.4	0.9	23:59	0	889	900	909	24	3200.5	0	3226
May 13 2014	32454	3790	313	1.56E+08	14962392	35641	1258137	874	691	54.3	0.9	23:59	0	884	900	933	24	3224.5	0	3226
May 14 2014	32769	4105	315	1.57E+08	16257078	36676	1294686	900	695	53	1.2	23:59	0	888	900	913	24	3248.5	0	3226
May 15 2014	33089	4425	320	1.59E+08	17553345	36721	1296267	900	706	53.9	0.9	23:59	0	888	900	920	24	3272.5	0	3226
May 16 2014	33408	4744	319	1.6E+08	18838996	36420	1285651	900	704	54.1	0.9	23:49	1	348	898	977	11.8	3284.4	12.1	3238.1
May 17 2014	33728	5064	320	1.61E+08	20133492	36670	1294496	900	707	54	1	23:59	0	884	900	918	0	3284.4	24	3262.1
May 18 2014	34046	5382	318	1.62E+08	21428220	36677	1294728	900	701	53.5	1.1	23:58	0	890	900	915	0	3284.4	25.5	3287.7
May 19 2014	34367	5703	321	1.64E+08	22722617	36668	1294397	899	709	54.1	0.9	23:59	0	0	899	917	0	3284.4	23.1	3310.8
May 20 2014	34698	6034	331	1.65E+08	24038372	37273	1315755	914	731	54.9	0.6	23:59	0	881	900	920	0	3284.4	23.3	3334.1
May 21 2014	34874	6210	176	1.66E+08	24718158	19257	679786	924	389	56.8	0.4	11:07	1	212	894	978	8.8	3293.2	2.1	3336.2
May 22 2014	35205	6541	331	1.67E+08	26001609	36358	1283451	938	730	56.2	0.5	22:49	2	51	894	981	11.5	3304.7	11.3	3347.5
May 23 2014	35555	6891	350	1.68E+08	27368724	38728	1367115	950	772	55.8	0.5	23:59	0	872	900	929	0	3304.7	24	3371.5
May 24 2014	35775	7111	220	1.69E+08	28228620	24359	859896	951	485	55.7	0.5	15:02	0	873	900	931	0	3304.7	15.6	3387.2
May 25 2014	35775	7111	0	1.69E+08	28228620	0	0	0	0	0	0	00:00	0	0	0	0	0	3304.7	0	3387.2
May 26 2014	36000	7336	225	1.7E+08	29083698	24223	855078	999	496	57.3	0.5	14:19	1	218	896	973	0	3304.7	13.7	3400.9
May 27 2014	36246	7582	246	1.71E+08	30042824	27170	959126	999	542	55.8	0.7	15:58	0	877	900	918	0	3304.7	16.7	3417.6
May 28 2014	36474	7810	228	1.72E+08	30917684	24783	874860	1054	504	56.9	0.6	13:53	2	19	885	941	13.2	3317.9	0	3417.6
May 29 2014	36769	8105	295	1.73E+08	32061556	32404	1143872	1048	650	56.2	0.7	18:11	1	34	895	949	17.2	3335.1	0	3417.6
May 30 2014	37142	8478	373	1.74E+08	33534343	41721	1472787	1032	823	55.2	0.9	23:47	1	232	898	964	23.8	3358.9	0	3417.6

	CO2 Equivalents			Landfill Gas Flow						Methane	Oxygen	Flare	Flare	Temp			Blower 1		Blower 2	
Date	Yearly	Monthly	Daily	Yearly	Monthly	Daily	Daily	Avg	Total	Avg	Avg	Run	Starts	Min.	Avg.	Max.	Daily	Cumu.	Daily	Cumu.
	Tonnes CO2	Tonnes CO2	Tonnes CO2	scf	scf	meter3	scf	scfm	MMBTU	(%)	(%)	Hours		°C	°C	°C	Hours	Hours	Hours	Hours
May 31 2014	37514	8850	372	1.76E+08	35009788	41796	1475445	1025	820	54.9	0.8	23:59	0	881	900	920	23	3382	0	3417.6
Jun 1 2014	37885	371	371	1.77E+08	1474783	41778	1474783	1025	818	54.8	0.8	23:59	0	871	900	928	24	3406	0	3417.6
Jun 2 2014	38250	736	365	1.79E+08	2949773	41784	1474990	1026	806	54	0.9	23:59	0	883	900	916	27.3	3433.3	0	3417.6
Jun 3 2014	38614	1100	364	1.8E+08	4423974	41761	1474201	1025	804	53.9	0.9	23:59	0	878	900	916	20.7	3454	0	3417.6
Jun 4 2014	38979	1465	365	1.82E+08	5900292	41821	1476318	1025	804	53.8	0.8	23:59	0	870	900	935	24	3478	0	3417.6
Jun 5 2014	39345	1831	366	1.83E+08	7376259	41811	1475967	1026	807	54	0.8	23:59	0	877	900	936	24	3502.1	0	3417.6
Jun 6 2014	39701	2187	356	1.85E+08	8850834	41772	1474575	1025	785	52.6	1	23:59	0	884	900	915	24	3526.1	0	3417.6
Jun 7 2014	40058	2544	357	1.86E+08	10325153	41765	1474319	1025	787	52.8	0.9	23:59	0	882	900	916	24	3550.1	0	3417.6
Jun 8 2014	40417	2903	359	1.88E+08	11801517	41822	1476364	1026	792	53	0.9	23:59	0	868	900	928	23.9	3574	0	3417.6
Jun 9 2014	40776	3262	359	1.89E+08	13276719	41790	1475202	1025	791	53	0.9	23:59	0	885	900	921	26.4	3600.5	0	3417.6
Jun 10 2014	41140	3626	364	1.91E+08	14767519	42231	1490800	1036	804	53.3	0.8	23:59	0	849	900	941	24	3624.5	0	3417.6
Jun 11 2014	41502	3988	362	1.92E+08	16276683	42752	1509164	1049	799	52.3	1	23:59	0	877	900	919	24	3648.5	0	3417.6
Jun 12 2014	41858	4344	356	1.94E+08	17768384	42257	1491701	1049	784	52	1	23:41	1	255	898	954	9.9	3658.4	13.8	3431.4
Jun 13 2014	42217	4703	359	1.95E+08	19279271	42800	1510887	1050	793	51.9	1	23:59	0	877	900	921	0	3658.4	24	3455.4
Jun 14 2014	42578	5064	361	1.97E+08	20789132	42771	1509861	1050	796	52.1	1	23:59	0	871	900	928	0	3658.4	24	3479.4
Jun 15 2014	42949	5435	371	1.98E+08	22301182	42833	1512050	1050	819	53.5	0.5	23:59	0	888	900	920	0	3658.4	24	3503.5
Jun 16 2014	43323	5809	374	2E+08	23832640	43383	1531458	1065	825	53.3	0.6	23:59	0	881	900	917	0	3658.4	24	3527.5
Jun 17 2014	43665	6151	342	2.01E+08	25253369	40246	1420729	1086	755	52.5	0.8	21:46	0	688	900	920	0	3658.4	22.1	3549.6
Jun 18 2014	43912	6398	247	2.02E+08	26228300	27618	974931	1098	545	55.3	0.6	14:50	1	45	895	943	0	3658.4	14.5	3564.1
Jun 19 2014	44299	6785	387	2.04E+08	27811731	44855	1583431	1101	855	53.3	0.9	23:59	0	882	900	934	0	3658.4	24	3588.2
Jun 20 2014	44673	7159	374	2.05E+08	29323521	42826	1511790	1100	825	53.9	0.7	22:55	1	201	898	937	0	3658.4	22.9	3611.1
Jun 21 2014	45061	7547	388	2.07E+08	30905534	44815	1582013	1100	855	53.4	0.8	23:59	0	876	900	924	0	3658.4	24	3635.1
Jun 22 2014	45442	7928	381	2.08E+08	32488888	44853	1583354	1100	839	52.4	1.1	23:59	0	881	900	925	0	3658.4	24	3659.1
Jun 23 2014	45818	8304	376	2.1E+08	34072675	44866	1583787	1100	830	51.8	1.2	23:59	0	883	900	919	0	3658.4	24	3683.1
Jun 24 2014	46189	8675	371	2.12E+08	35656244	44859	1583569	1100	818	51	1.3	23:59	0	884	900	916	0	3658.4	24	3707.2
Jun 25 2014	46555	9041	366	2.13E+08	37203908	43842	1547664	1099	808	51.6	1.2	23:29	1	163	897	965	12.4	3670.8	11.1	3718.3
Jun 26 2014	46935	9421	380	2.15E+08	38788055	44876	1584147	1100	838	52.3	1.1	23:59	0	882	900	925	22.9	3693.8	0	3718.3
Jun 27 2014	47320	9806	385	2.16E+08	40371131	44845	1583076	1100	848	53	0.9	23:59	0	864	900	932	24	3717.8	0	3718.3
Jun 28 2014	47709	10195	389	2.18E+08	41953302	44820	1582171	1100	857	53.6	0.7	23:59	0	866	900	937	24	3741.8	0	3718.3
Jun 29 2014	47967	10453	258	2.19E+08	42996923	29564	1043621	1101	569	53.9	0.6	15:46	0	616	900	928	17	3758.8	0	3718.3
Jun 30 2014	47967	10453	0	2.19E+08	42996923	0	0	0	0	0	0	00:00	0	0	0	0	0.2	3759	0	3718.3
Jul 1 2014	47967	0	0	2.19E+08	0	0	0	0	0	0	0	00:00	0	0	0	0	0	3759	0	3718.3
Jul 2 2014	48235	268	268	2.2E+08	1039009	29433	1039009	1174	592	56.3	0.7	14:46	1	50	894	932	13.3	3772.3	0	3718.3
Jul 3 2014	48649	682	414	2.22E+08	2693325	46863	1654316	1150	914	54.6	0.9	23:59	0	884	900	920	24	3796.4	0	3718.3
Jul 4 2014	49057	1090	408	2.23E+08	4329567	46351	1636242	1150	899	54.3	0.9	23:44	1	141	897	946	12.1	3808.5	11.7	3730
Jul 5 2014	49467	1500	410	2.25E+08	5984121	46870	1654554	1150	905	54.1	0.9	23:59	0	884	900	928	0	3808.5	23	3753
Jul 6 2014	49871	1904	404	2.27E+08	7638986	46879	1654865	1150	891	53.2	1	23:59	0	878	900	917	0	3808.5	24	3777
Jul 7 2014	50273	2306	402	2.28E+08	9293960	46882	1654974	1150	886	52.9	1	23:59	0	880	900	943	0	3808.5	24	3801.1
Jul 8 2014	50668	2701	395	2.3E+08	10948766	46877	1654806	1150	871	52	1.1	23:59	0	878	900	921	0	3808.5	24	3825.1
Jul 9 2014	51061	3094	393	2.32E+08	12603836	46885	1655070	1150	867	51.8	1.1	23:59	0	882	900	918	0	3808.5	23.9	3849
Jul 10 2014	51455	3488	394	2.33E+08	14237677	46283	1633841	1149	868	52.5	0.9	23:41	1	135	897	943	9.4	3817.9	14.4	3863.4
Jul 11 2014	51853	3886	398	2.35E+08	15905811	47255	1668134	1159	878	52	1	23:59	0	883	900	917	24	3841.9	0	3863.4
Jul 12 2014	52113	4146	260	2.36E+08	17004707	31130	1098896	1175	573	51.5	1.1	15:33	0	876	900	927	19.1	3861	0	3863.4
Jul 13 2014	52113	4146	0	2.36E+08	17004707	0	0	0	0	0	0	00:00	0	0	0	0	0	3861	0	3863.4
Jul 14 2014	52322	4355	209	2.37E+08	17817439	23023	812732	1174	461	56	0.8	11:33	1	46	892	940	11.4	3872.4	0	3863.4
Jul 15 2014	52746	4779	424	2.38E+08	19507337	47871	1689898	1175	936	54.7	0.9	23:59	0	870	900	926	21.8	3894.3	0	3863.4
Jul 16 2014	53169	5202	423	2.4E+08	21199129	47925	1691792	1175	933	54.5	0	23:59	0	886	900	919	24	3918.3	0	3863.4
Jul 17 2014	53579	5612	410	2.42E+08	22840611	46500	1641482	1185	903	54.4	0.7	23:04	1	208	897	958	24.3	3942.6	0	3863.4
Jul 18 2014	54003	6036	424	2.44E+08	24553232	48515	1712621	1199	935	54	0.7	23:49	1	217	898	929	12	3954.6	11.8	3875.2
Jul 19 2014	54420	6453	417	2.45E+08	26281161	48949	1727929	1200	920	52.6	0.9	23:59	0	884	900	924	0	3954.6	23	3898.3

	CO2 Equivalents			Landfill Gas Flow						Methane	Oxygen	Flare	Flare	Temp			Blower 1		Blower 2	
Date	Yearly	Monthly	Daily	Yearly	Monthly	Daily	Daily	Avg	Total	Avg	Avg	Run	Starts	Min.	Avg.	Max.	Daily	Cumu.	Daily	Cumu.
	Tonnes CO2	Tonnes CO2	Tonnes CO2	scf	scf	meter3	scf	scfm	MMBTU	(%)	(%)	Hours		°C	°C	°C	Hours	Hours	Hours	Hours
Jul 20 2014	54779	6812	359	2.47E+08	27756768	41801	1475607	1200	792	53.1	0.8	20:27	0	865	900	930	0	3954.6	21.6	3919.9
Jul 21 2014	55064	7097	285	2.48E+08	28887301	32026	1130533	1199	629	54.9	0.7	15:44	1	566	900	945	0	3954.6	14.6	3934.5
Jul 22 2014	55477	7510	413	2.5E+08	30614155	48918	1726854	1200	911	52.1	1	23:59	0	859	900	946	0	3954.6	24	3958.5
Jul 23 2014	55886	7919	409	2.51E+08	32340752	48911	1726597	1200	902	51.6	1	23:59	0	848	900	958	0	3954.6	24	3982.5
Jul 24 2014	56301	8334	415	2.53E+08	34068281	48937	1727529	1200	915	52.4	0.9	23:59	0	846	900	942	0	3954.6	24	4006.6
Jul 25 2014	56715	8748	414	2.55E+08	35796678	48962	1728397	1200	913	52.2	0.9	23:59	0	850	900	975	0	3954.6	24	4030.6
Jul 26 2014	57123	9156	408	2.56E+08	37523741	48924	1727063	1200	900	51.5	1	23:59	0	864	900	941	0	3954.6	24	4054.6
Jul 27 2014	57518	9551	395	2.58E+08	39250465	48915	1726724	1200	872	49.9	1.3	23:59	0	857	900	941	0	3954.6	24	4078.6
Jul 28 2014	57915	9948	397	2.6E+08	40976352	48891	1725887	1200	876	50.2	1.2	23:59	0	863	900	944	0	3954.6	24	4102.7
Jul 29 2014	58315	10348	400	2.62E+08	42703350	48922	1726998	1200	882	50.5	1.1	23:59	0	867	900	946	0	3954.6	24.8	4127.5
Jul 30 2014	58715	10748	400	2.63E+08	44431700	48961	1728350	1200	882	50.4	1.2	23:59	0	867	900	947	0	3954.6	23.2	4150.7
Jul 31 2014	59082	11115	367	2.65E+08	46005699	44588	1573999	1200	810	50.8	1.1	21:53	1	475	898	956	0	3954.6	21.9	4172.6
Aug 1 2014	59480	398	398	2.67E+08	1726514	48909	1726514	1199	878	50.3	1.2	23:59	0	879	900	914	0	3954.6	24	4196.6
Aug 2 2014	59872	790	392	2.68E+08	3452590	48896	1726076	1200	864	49.5	1.3	23:59	0	878	900	921	0	3954.6	24	4220.7
Aug 3 2014	60260	1178	388	2.7E+08	5178391	48888	1725801	1200	856	49	1.4	23:59	0	883	900	929	0	3954.6	24	4244.7
Aug 4 2014	60648	1566	388	2.72E+08	6906160	48944	1727769	1200	856	49	1.4	23:59	0	884	900	923	0	3954.6	24	4268.7
Aug 5 2014	61033	1951	385	2.74E+08	8631874	48886	1725714	1199	850	48.7	1.5	23:59	0	872	900	958	0	3954.6	24	4292.7
Aug 6 2014	61409	2327	376	2.75E+08	10287713	46907	1655839	1168	829	49.5	1.3	23:37	1	134	897	967	11.7	3966.3	11.8	4304.6
Aug 7 2014	61783	2701	374	2.77E+08	11888233	45340	1600520	1112	825	51	0.9	23:59	0	871	900	922	23	3989.3	0	4304.6
Aug 8 2014	61985	2903	202	2.78E+08	12704710	23129	816477	1097	446	54	0.7	12:23	2	104	889	978	12.9	4002.3	0	4304.6
Aug 9 2014	61985	2903	0	2.78E+08	12704710	0	0	0	0	0	0	00:00	0	0	0	0	1.7	4004	0	4304.6
Aug 10 2014	61985	2903	0	2.78E+08	12704710	0	0	0	0	0	0	00:00	0	0	0	0	0	4004	0	4304.6
Aug 11 2014	62188	3106	203	2.78E+08	13506113	22702	801403	1098	449	55.3	0.9	12:12	2	184	891	965	10	4014	0	4304.6
Aug 12 2014	62572	3490	384	2.8E+08	15065971	44188	1559858	1100	848	53.7	1	23:39	1	125	897	946	24.4	4038.4	0	4304.6
Aug 13 2014	62948	3866	376	2.82E+08	16618225	43972	1552254	1100	829	52.8	1.2	23:29	1	352	899	921	25	4063.4	0	4304.6
Aug 14 2014	63185	4103	237	2.83E+08	17565972	26848	947747	1100	522	54.4	0.9	14:22	1	364	897	983	13	4076.4	0	4304.6
Aug 15 2014	63570	4488	385	2.84E+08	19149786	44866	1583814	1100	849	53	1.2	23:59	0	882	900	924	24	4100.5	0	4304.6
Aug 16 2014	63947	4865	377	2.86E+08	20732338	44831	1582552	1100	831	51.9	1.3	23:58	0	870	900	921	24	4124.5	0	4304.6
Aug 17 2014	64321	5239	374	2.87E+08	22313502	44791	1581164	1100	826	51.6	1.3	23:55	0	687	900	918	24	4148.5	0	4304.6
Aug 18 2014	64321	5239	0	2.87E+08	22313502	0	0	0	0	0	0	00:00	0	0	0	0	1.3	4149.8	0	4304.6
Aug 19 2014	64563	5481	242	2.88E+08	23271564	27140	958062	1097	534	55.1	0.9	14:33	3	47	882	970	14.5	4164.3	0	4304.6
Aug 20 2014	64949	5867	386	2.9E+08	24853799	44822	1582235	1100	852	53.2	1.2	23:59	0	877	900	920	21.6	4185.9	0	4304.6
Aug 21 2014	65330	6248	381	2.91E+08	26437158	44853	1583359	1100	841	52.5	1.2	23:59	0	868	900	923	24	4210	0	4304.6
Aug 22 2014	65718	6636	388	2.93E+08	28020582	44855	1583424	1100	855	53.4	0.8	23:59	0	886	900	911	24	4234	0	4304.6
Aug 23 2014	66108	7026	390	2.95E+08	29603703	44847	1583121	1100	860	53.7	0.7	23:59	0	887	900	911	24	4258	0	4304.6
Aug 24 2014	66506	7424	398	2.96E+08	31185660	44814	1581957	1100	877	54.8	0.5	23:59	0	874	900	938	24	4282	0	4304.6
Aug 25 2014	66896	7814	390	2.98E+08	32767838	44820	1582178	1100	860	53.7	0.7	23:59	0	888	900	922	24	4306.1	0	4304.6
Aug 26 2014	67281	8199	385	2.99E+08	34350316	44828	1582478	1100	850	53.1	0.8	23:59	0	888	900	916	24	4330.1	0	4304.6
Aug 27 2014	67669	8587	388	3.01E+08	35934313	44871	1583997	1100	856	53.4	0.7	23:59	0	878	900	920	24	4354.1	0	4304.6
Aug 28 2014	68061	8979	392	3.02E+08	37517305	44843	1582992	1100	864	53.9	0.7	23:59	0	871	900	925	24	4378.1	0	4304.6
Aug 29 2014	68442	9360	381	3.04E+08	39072773	44063	1555468	1100	840	53.4	0.8	23:34	1	181	898	969	11.3	4389.4	12.4	4317
Aug 30 2014	68827	9745	385	3.06E+08	40656544	44865	1583771	1100	849	53	0.8	23:59	0	880	900	922	0	4389.4	24	4341
Aug 31 2014	69216	10134	389	3.07E+08	42240071	44858	1583527	1100	858	53.6	0.7	23:59	0	881	900	914	0	4389.4	24	4365
Sep 1 2014	69603	387	387	3.09E+08	1581753	44808	1581753	1100	853	53.3	0.7	23:59	0	882	900	916	0	4389.4	24	4389
Sep 2 2014	69992	776	389	3.1E+08	3165016	44851	1583263	1100	858	53.6	0.6	23:59	0	879	900	920	0	4389.4	24	4413.1
Sep 3 2014	70384	1168	392	3.12E+08	4748760	44864	1583744	1100	866	54	0.4	23:59	0	881	900	916	0	4389.4	24	4437.1
Sep 4 2014	70773	1557	389	3.14E+08	6310046	44228	1561286	1099	858	54.3	0.4	23:41	1	130	896	981	9.2	4398.6	14.5	4451.6
Sep 5 2014	71162	1946	389	3.15E+08	7891759	44807	1581713	1100	858	53.6	0.5	23:59	0	872	900	925	24	4422.7	0	4451.6
Sep 6 2014	71555	2339	393	3.17E+08	9474737	44843	1582978	1100	866	54.1	0.4	23:59	0	879	900	926	24	4446.7	0	4451.6
Sep 7 2014	71951	2735	396	3.18E+08	11057581	44839	1582844	1100	873	54.5	0.4	23:59	0	877	900	926	24	4470.7	0	4451.6

	CO2 Equivalents			Landfill Gas Flow						Methane	Oxygen	Flare	Flare	Temp			Blower 1		Blower 2	
Date	Yearly	Monthly	Daily	Yearly	Monthly	Daily	Daily	Avg	Total	Avg	Avg	Run	Starts	Min.	Avg.	Max.	Daily	Cumu.	Daily	Cumu.
	Tonnes CO2	Tonnes CO2	Tonnes CO2	scf	scf	meter3	scf	scfm	MMBTU	(%)	(%)	Hours		°C	°C	°C	Hours	Hours	Hours	Hours
Sep 8 2014	72346	3130	395	3.2E+08	12641885	44880	1584304	1100	872	54.4	0.5	23:59	0	854	900	959	24	4494.7	0	4451.6
Sep 9 2014	72732	3516	386	3.21E+08	14224957	44845	1583072	1100	851	53.1	0.6	23:59	0	835	900	982	24	4518.8	0	4451.6
Sep 10 2014	73118	3902	386	3.23E+08	15807234	44823	1582277	1100	851	53.2	0.6	23:59	0	884	900	913	24	4542.8	0	4451.6
Sep 11 2014	73497	4281	379	3.25E+08	17361731	44036	1554497	1099	836	53.1	0.6	23:35	1	126	897	988	15.1	4557.9	8.4	4460
Sep 12 2014	73883	4667	386	3.26E+08	18944278	44830	1582547	1101	853	53.2	0.6	23:59	0	875	900	930	0	4557.9	24	4484
Sep 13 2014	74274	5058	391	3.28E+08	20528411	44875	1584133	1101	862	53.7	0.6	23:59	0	879	900	924	0	4557.9	24	4508.1
Sep 14 2014	74658	5442	384	3.29E+08	22110820	44826	1582409	1100	846	52.9	0.8	23:59	0	882	900	916	0	4557.9	23	4531.1
Sep 15 2014	75042	5826	384	3.31E+08	23693442	44833	1582622	1100	848	53	0.7	23:59	0	875	900	925	0	4557.9	24	4555.1
Sep 16 2014	75429	6213	387	3.32E+08	25274901	44800	1581459	1100	855	53.4	0.7	23:59	0	884	900	919	0	4557.9	24	4579.1
Sep 17 2014	75811	6595	382	3.34E+08	26857393	44829	1582492	1100	842	52.6	0.9	23:59	0	882	900	915	0	4557.9	23	4602.1
Sep 18 2014	76193	6977	382	3.36E+08	28405817	43864	1548424	1099	842	53.7	0.6	23:29	1	68	897	994	10.1	4568	13.4	4615.6
Sep 19 2014	76583	7367	390	3.37E+08	29989710	44869	1583893	1100	861	53.7	0.7	23:59	0	878	900	918	24	4592	0	4615.6
Sep 20 2014	76951	7735	368	3.39E+08	31512645	43142	1522935	1100	812	52.7	0.9	23:03	0	527	899	918	24	4616.1	0	4615.6
Sep 21 2014	76951	7735	0	3.39E+08	31512645	0	0	0	0	0	0	00:00	0	0	0	0	2.4	4618.5	0	4615.6
Sep 22 2014	77044	7828	93	3.39E+08	31866164	10015	353519	1096	205	57.3	0.5	05:24	1	230	891	974	2.1	4620.6	0	4615.6
Sep 23 2014	77446	8230	402	3.41E+08	33448437	44823	1582273	1100	886	55.3	0.7	23:59	0	876	900	920	24	4644.6	0	4615.6
Sep 24 2014	77842	8626	396	3.42E+08	35031771	44853	1583334	1101	873	54.5	0.8	23:59	0	885	900	919	24	4668.6	0	4615.6
Sep 25 2014	78230	9014	388	3.44E+08	36588110	44088	1556339	1099	855	54.3	0.8	23:35	1	94	897	950	17.5	4686.1	6.2	4621.8
Sep 26 2014	78623	9407	393	3.45E+08	38171442	44853	1583332	1100	868	54.2	0.8	23:59	0	876	900	923	0	4686.1	25.5	4647.3
Sep 27 2014	79012	9796	389	3.47E+08	39754626	44848	1583184	1100	859	53.6	0.9	23:59	0	880	900	915	0	4686.1	23	4670.3
Sep 28 2014	79394	10178	382	3.49E+08	41335851	44793	1581225	1099	842	52.6	1	23:59	0	881	900	915	0	4686.1	25	4695.3
Sep 29 2014	79701	10485	307	3.5E+08	42600954	35838	1265103	1100	678	52.9	0.8	19:09	0	724	900	917	0	4686.1	21	4716.4
Sep 30 2014	79953	10737	252	3.51E+08	43584347	27858	983393	1102	555	55.8	0.4	14:53	1	5	894	927	0	4686.1	13	4729.4
Oct 1 2014	80346	393	393	3.52E+08	1581986	44815	1581986	1099	868	54.2	0.8	23:59	0	880	900	921	0	4686.1	23.1	4752.5
Oct 2 2014	80681	728	335	3.54E+08	2944036	38584	1362050	1100	739	53.7	0.8	20:39	1	60	897	950	0	4686.1	20.7	4773.2
Oct 3 2014	81041	1088	360	3.55E+08	4411777	41578	1467741	1099	794	53.5	0.8	22:15	1	21	896	951	4.9	4691	17.3	4790.5
Oct 4 2014	81429	1476	388	3.57E+08	5992369	44775	1580592	1099	855	53.4	0.8	23:59	0	882	900	915	24	4715.1	0	4790.5
Oct 5 2014	81817	1864	388	3.58E+08	7574954	44831	1582585	1099	856	53.5	0.8	23:59	0	886	900	918	24	4739.1	0	4790.5
Oct 6 2014	82203	2250	386	3.6E+08	9158386	44855	1583432	1100	852	53.2	0.9	23:59	0	888	900	911	24	4763.1	0	4790.5
Oct 7 2014	82578	2625	375	3.62E+08	10726968	44435	1568582	1099	828	52.1	1.1	23:47	1	291	898	955	23.9	4787	0	4790.5
Oct 8 2014	82925	2972	347	3.63E+08	12185390	41314	1458422	1098	766	51.9	1.1	22:10	2	16	894	978	22.1	4809.1	0	4790.5
Oct 9 2014	83299	3346	374	3.65E+08	13766803	44798	1581413	1100	826	51.6	1.2	23:58	0	890	900	912	27.6	4836.8	0	4790.5
Oct 10 2014	83677	3724	378	3.66E+08	15327741	44218	1560938	1099	833	52.7	0.9	23:39	1	145	897	974	14.9	4851.7	7.7	4798.2
Oct 11 2014	84071	4118	394	3.68E+08	16911429	44863	1583688	1100	868	54.2	0.5	23:59	0	875	900	924	0	4851.7	23.9	4822.2
Oct 12 2014	84459	4506	388	3.69E+08	18493354	44813	1581925	1099	856	53.5	0.7	23:59	0	884	900	916	0	4851.7	24	4846.2
Oct 13 2014	84839	4886	380	3.71E+08	20075974	44832	1582620	1100	838	52.3	0.8	23:59	0	883	900	918	0	4851.7	24	4870.2
Oct 14 2014	85219	5266	380	3.72E+08	21659170	44849	1583196	1100	837	52.3	0.7	23:58	0	878	900	919	0	4851.7	24	4894.2
Oct 15 2014	85603	5650	384	3.74E+08	23241923	44836	1582753	1100	848	53	0.7	23:59	0	883	900	913	0	4851.7	24	4918.3
Oct 16 2014	85987	6034	384	3.76E+08	24824170	44822	1582247	1100	848	52.9	0.7	23:59	0	880	900	922	0	4851.7	24	4942.3
Oct 17 2014	86357	6404	370	3.77E+08	26407785	44861	1583615	1100	815	50.9	1	23:59	0	879	900	922	0	4851.7	24	4966.3
Oct 18 2014	86733	6780	376	3.79E+08	27991327	44859	1583542	1100	829	51.7	0.7	23:59	0	884	900	916	0	4851.7	24	4990.3
Oct 19 2014	87112	7159	379	3.8E+08	29574733	44855	1583406	1100	836	52.1	0.7	23:59	0	884	900	917	0	4851.7	24	5014.3
Oct 20 2014	87481	7528	369	3.82E+08	31157080	44825	1582347	1100	815	50.9	0.9	23:59	0	885	900	915	0	4851.7	24	5038.4
Oct 21 2014	87856	7903	375	3.84E+08	32739429	44825	1582349	1100	828	51.7	0.8	23:59	0	882	900	917	0	4851.7	24	5062.4
Oct 22 2014	88233	8280	377	3.85E+08	34323239	44866	1583810	1100	832	51.9	0.8	23:59	0	883	900	917	0	4851.7	24	5086.4
Oct 23 2014	88608	8655	375	3.87E+08	35906401	44848	1583162	1100	828	51.7	0.9	23:59	0	879	900	919	0	4851.7	24	5110.4
Oct 24 2014	88958	9005	350	3.88E+08	37365368	41330	1458967	1098	772	52.3	0.8	22:09	1	51	896	944	0	4851.7	22.1	5132.6
Oct 25 2014	89329	9376	371	3.9E+08	38946988	44804	1581620	1100	817	51.1	1	23:59	0	888	900	914	0	4851.7	24	5156.6
Oct 26 2014	89706	9753	377	3.91E+08	40529414	44827	1582426	1099	832	52	0.8	23:59	0	883	900	917	0	4851.7	23	5179.6
Oct 27 2014	90080	10127	374	3.93E+08	42112581	44848	1583167	1100	826	51.6	1	23:59	0	882	900	920	0	4851.7	24	5203.6

	CO2 Equivalents			Landfill Gas Flow						Methane	Oxygen	Flare	Flare	Temp			Blower 1		Blower 2	
Date	Yearly	Monthly	Daily	Yearly	Monthly	Daily	Daily	Avg	Total	Avg	Avg	Run	Starts	Min.	Avg.	Max.	Daily	Cumu.	Daily	Cumu.
	Tonnes CO2	Tonnes CO2	Tonnes CO2	scf	scf	meter3	scf	scfm	MMBTU	(%)	(%)	Hours		°C	°C	°C	Hours	Hours	Hours	Hours
Oct 28 2014	90447	10494	367	3.94E+08	43694553	44814	1581972	1100	810	50.6	1.1	23:59	0	887	900	919	0	4851.7	24	5227.7
Oct 29 2014	90814	10861	367	3.96E+08	45277980	44855	1583427	1100	811	50.6	1.1	23:59	0	888	900	915	0	4851.7	24	5251.7
Oct 30 2014	91173	11220	359	3.98E+08	46859668	44806	1581688	1099	792	49.5	1.4	23:59	0	883	900	918	0	4851.7	24	5275.7
Oct 31 2014	91537	11584	364	3.99E+08	48441747	44817	1582079	1100	804	50.2	1.1	23:59	0	883	900	918	0	4851.7	24	5299.7
Nov 1 2014	91912	375	375	4.01E+08	1582045	44816	1582045	1100	827	51.7	0.9	23:59	0	881	900	920	0	4851.7	24	5323.7
Nov 2 2014	92285	748	373	4.02E+08	3165091	44845	1583046	1099	824	51.4	1.1	23:59	0	880	900	918	0	4851.7	25.4	5349.2
Nov 3 2014	92655	1118	370	4.04E+08	4748111	44844	1583020	1100	817	51	1.2	23:59	0	884	900	916	0	4851.7	24	5373.2
Nov 4 2014	92894	1357	239	4.05E+08	5746316	28277	998205	1099	528	52.2	1.2	15:07	1	1	894	940	0	4851.7	15.1	5388.3
Nov 5 2014	93260	1723	366	4.07E+08	7329510	44849	1583194	1100	807	50.4	1.5	23:59	0	881	900	919	0	4851.7	24	5412.3
Nov 6 2014	93626	2089	366	4.08E+08	8911717	44821	1582207	1099	807	50.4	1.4	23:59	0	886	900	914	0	4851.7	24	5436.4
Nov 7 2014	94004	2467	378	4.1E+08	10493852	44819	1582135	1100	835	52.1	0.9	23:59	0	876	900	919	0	4851.7	24.4	5460.8
Nov 8 2014	94375	2838	371	4.11E+08	12078187	44881	1584335	1100	819	51.1	1.1	23:59	0	886	900	911	0	4851.7	24	5484.8
Nov 9 2014	94744	3207	369	4.13E+08	13662132	44870	1583945	1100	814	50.8	1.1	23:59	0	886	900	914	0	4851.7	24	5508.8
Nov 10 2014	95105	3568	361	4.14E+08	15245358	44850	1583226	1100	796	49.7	1.3	23:59	0	888	900	913	0	4851.7	23.9	5532.8
Nov 11 2014	95462	3925	357	4.16E+08	16829369	44872	1584011	1100	788	49.1	1.4	23:59	0	889	900	913	0	4851.7	24	5556.8
Nov 12 2014	95811	4274	349	4.18E+08	18371901	43697	1542532	1099	770	49.3	1.4	23:23	1	17	895	979	0	4851.7	23.4	5580.2
Nov 13 2014	96102	4565	291	4.19E+08	19633681	35744	1261780	1097	641	50.2	1.3	19:11	2	-6	891	971	0	4851.7	19.2	5599.4
Nov 14 2014	96463	4926	361	4.2E+08	21216121	44827	1582440	1100	796	49.7	1.4	23:59	0	878	900	919	0	4851.7	24	5623.4
Nov 15 2014	96823	5286	360	4.22E+08	22799881	44865	1583760	1100	794	49.5	1.4	23:59	0	888	900	919	0	4851.7	24	5647.5
Nov 16 2014	97183	5646	360	4.24E+08	24382733	44839	1582852	1100	794	49.6	1.5	23:59	0	886	900	914	0	4851.7	24	5671.5
Nov 17 2014	97534	5997	351	4.25E+08	25966732	44872	1583999	1100	775	48.3	1.7	23:59	0	891	900	908	0	4851.7	24	5695.5
Nov 18 2014	97889	6352	355	4.27E+08	27550281	44859	1583549	1100	782	48.8	1.6	23:59	0	884	900	916	0	4851.7	24	5719.5
Nov 19 2014	98235	6698	346	4.28E+08	29133640	44853	1583359	1100	763	47.6	2	23:59	0	887	900	912	0	4851.7	24	5743.6
Nov 20 2014	98575	7038	340	4.3E+08	30718042	44883	1584402	1101	751	46.8	2	23:59	0	891	900	912	0	4851.7	24	5767.6
Nov 21 2014	98927	7390	352	4.32E+08	32300791	44836	1582749	1100	778	48.5	1.8	23:59	0	883	900	920	0	4851.7	23.9	5791.5
Nov 22 2014	99280	7743	353	4.33E+08	33884510	44864	1583719	1100	779	48.6	1.8	23:59	0	890	900	917	0	4851.7	24	5815.5
Nov 23 2014	99627	8090	347	4.35E+08	35468164	44862	1583654	1100	766	47.8	2.1	23:59	0	882	900	919	0	4851.7	24	5839.6
Nov 24 2014	99963	8426	336	4.36E+08	37050877	44835	1582713	1100	740	46.2	2.5	23:59	0	886	900	912	0	4851.7	24	5863.6
Nov 25 2014	100296	8759	333	4.38E+08	38633080	44821	1582203	1100	734	45.8	2.5	23:59	0	888	900	915	0	4851.7	23	5886.6
Nov 26 2014	100619	9082	323	4.39E+08	40214531	44799	1581451	1098	712	44.5	2.8	23:59	0	846	900	951	0	4851.7	24	5910.6
Nov 27 2014	100905	9368	286	4.41E+08	41580923	38707	1366392	1044	632	45.7	2.4	21:49	3	29	888	972	0	4851.7	21.8	5932.4
Nov 28 2014	101214	9677	309	4.42E+08	43020298	40775	1439375	1000	683	46.9	2.3	23:59	0	879	900	915	0	4851.7	24	5956.5
Nov 29 2014	101525	9988	311	4.44E+08	44459269	40763	1438971	1000	687	47.2	2.6	23:59	0	884	900	920	0	4851.7	24	5980.5
Nov 30 2014	101821	10284	296	4.45E+08	45899532	40800	1440263	1000	653	44.8	3.2	23:59	0	885	900	921	0	4851.7	24	6004.5
Dec 1 2014	102120	299	299	4.47E+08	1439155	40768	1439155	1000	659	45.2	3	23:59	0	870	900	918	0	4851.7	24	6028.5
Dec 2 2014	102422	601	302	4.48E+08	2877514	40746	1438359	999	667	45.8	3	23:59	0	886	900	917	0	4851.7	26.1	6054.7
Dec 3 2014	102709	888	287	4.49E+08	4280425	39742	1402911	975	633	44.6	3.4	23:59	0	872	900	917	0	4851.7	23.2	6077.9
Dec 4 2014	102986	1165	277	4.51E+08	5575046	36674	1294621	900	612	46.7	2.8	23:59	0	885	900	920	0	4851.7	24	6101.9
Dec 5 2014	103254	1433	268	4.52E+08	6868959	36654	1293913	900	592	45.2	3.4	23:59	0	839	900	937	0	4851.7	24	6125.9
Dec 6 2014	103522	1701	268	4.53E+08	8164156	36690	1295197	900	592	45.1	3.3	23:59	0	884	900	915	0	4851.7	24	6150
Dec 7 2014	103803	1982	281	4.55E+08	9457913	36650	1293757	900	619	47.3	2.7	23:59	0	883	900	911	0	4851.7	24	6174
Dec 8 2014	104075	2254	272	4.56E+08	10752892	36684	1294979	900	600	45.8	3.3	23:59	0	884	900	913	0	4851.7	24	6198
Dec 9 2014	104355	2534	280	4.57E+08	12048248	36695	1295356	900	618	47.1	2.8	23:59	0	843	900	946	0	4851.7	24	6222
Dec 10 2014	104646	2825	291	4.58E+08	13343654	36696	1295406	900	642	49	2.4	23:59	0	864	900	913	0	4851.7	24	6246
Dec 11 2014	104938	3117	292	4.6E+08	14637769	36660	1294115	900	643	49.1	2.4	23:59	0	883	900	913	0	4851.7	24	6270.1
Dec 12 2014	105235	3414	297	4.61E+08	15931446	36647	1293677	899	655	50	2.2	23:59	0	889	900	917	0	4851.7	24	6294.1
Dec 13 2014	105533	3712	298	4.62E+08	17226452	36685	1295006	900	657	50.1	2.2	23:59	0	886	900	913	0	4851.7	24	6318.1
Dec 14 2014	105830	4009	297	4.64E+08	18521418	36684	1294966	900	654	49.9	2.3	23:59	0	892	900	910	0	4851.7	24	6342.1
Dec 15 2014	106117	4296	287	4.65E+08	19816322	36682	1294904	900	634	48.4	2.8	23:59	0	890	900	911	0	4851.7	24	6366.2
Dec 16 2014	106404	4583	287	4.66E+08	21111403	36687	1295081	900	632	48.2	2.7	23:59	0	889	900	911	0	4851.7	23.9	6390.1

	CO2 Equivalents			Landfill Gas Flow						Methane	Oxygen	Flare	Flare	Temp			Blower 1		Blower 2	
Date	Yearly	Monthly	Daily	Yearly	Monthly	Daily	Daily	Avg	Total	Avg	Avg	Run	Starts	Min.	Avg.	Max.	Daily	Cumu.	Daily	Cumu.
	Tonnes CO2	Tonnes CO2	Tonnes CO2	scf	scf	meter3	scf	scfm	MMBTU	(%)	(%)	Hours		°C	°C	°C	Hours	Hours	Hours	Hours
Dec 17 2014	106695	4874	291	4.68E+08	22405476	36659	1294073	899	643	49.1	2.4	23:59	0	883	900	914	0	4851.7	24	6414.1
Dec 18 2014	106993	5172	298	4.69E+08	23687180	36308	1281704	900	657	50.7	1.7	23:45	1	162	896	967	5.5	4857.2	18.3	6432.4
Dec 19 2014	107249	5428	256	4.7E+08	24762511	30462	1075331	899	564	51.8	1.5	19:57	1	-7	895	970	19.9	4877.1	0	6432.4
Dec 20 2014	107553	5732	304	4.71E+08	26056095	36645	1293584	899	670	51.2	1.6	23:59	0	885	900	916	24	4901.1	0	6432.4
Dec 21 2014	107860	6039	307	4.72E+08	27350764	36675	1294669	899	677	51.7	1.4	23:59	0	887	900	915	24	4925.2	0	6432.4
Dec 22 2014	108164	6343	304	4.74E+08	28645326	36672	1294562	900	671	51.2	1.6	23:59	0	879	900	918	24.2	4949.4	0	6432.4
Dec 23 2014	108465	6644	301	4.75E+08	29939870	36672	1294544	900	664	50.7	1.7	23:59	0	883	900	922	24	4973.4	0	6432.4
Dec 24 2014	108762	6941	297	4.76E+08	31175545	35004	1235675	900	654	52.3	1.2	22:52	0	875	900	924	23.4	4996.8	0	6432.4
Dec 25 2014	108762	6941	0	4.76E+08	31175545	0	0	0	0	0	0	00:00	0	0	0	0	0	4996.8	0	6432.4
Dec 26 2014	108762	6941	0	4.76E+08	31175545	0	0	0	0	0	0	00:00	0	0	0	0	0	4996.8	0	6432.4
Dec 27 2014	108762	6941	0	4.76E+08	31175545	0	0	0	0	0	0	00:00	0	0	0	0	0	4996.8	0	6432.4
Dec 28 2014	108876	7055	114	4.77E+08	31637730	13093	462185	896	252	53.9	1.5	08:38	1	14	891	952	8.1	5004.9	0	6432.4
Dec 29 2014	109174	7353	298	4.78E+08	32916462	36224	1278732	899	658	50.9	2	23:41	1	109	897	948	23.7	5028.7	0	6432.4
Dec 30 2014	109470	7649	296	4.79E+08	34210811	36666	1294349	899	652	49.8	2	23:59	0	878	900	917	24	5052.7	0	6432.4
Dec 31 2014	0	0	302	0	0	36692	1295238	900	667	50.9	1.8	23:59	0	881	900	917	24	5076.7	0	6432.4