

APPENDIX C

Groundwater Chemistry Analysis

Table C.1 - Groundwater Analytical Results - General Chemistry

Parameter	Units	MDL (µg/L)	MUN1 16-Sep-09	MUN2 16-Sep-09	MW3 17-Sep-09	MW5 16-Sep-09	3604741 17-Sep-09	SS1 30-Sep-09	sandstone 09-Oct-09
Date Sampled >									
Alkalinity, total	mg/L	5	312	368	202	294	356	285	316
Ammonia as N	mg/L	0.02	ND	0.03	0.07	0.04	ND	0.17	0.13
Chlorine, total	mg/L	0.01	0.07	0.01	ND	0.01	0.1	--	0.01
Phosphorus, total	mg/L	0.01	0.01	0.03	0.02	0.04	0.02	0.01	ND
Total Dissolved Solids	mg/L	10	626	510	266	540	597	489	1090
Total Suspended Solids	mg/L	2	ND	ND	4	2	ND	541	2
Total Kjeldahl Nitrogen	mg/L	0.1	0.14	0.2	0.2	0.3	0.14	0.6	0.2
Conductivity	µS/cm	5	963	906	427	805	918	787	978
pH (pH units)			7.85	7.32	7.88	7.56	7.94	7.1	7.5
Turbidity	NTU	0.1	0.6	1.3	1	1	5.4	--	0.3
Bromide	mg/L	0.1	ND	ND	ND	ND	ND	ND	ND
Chloride	mg/L	1	155	106	13	145	156	67	200
Fluoride	mg/L	0.1	0.3	0.5	0.6	ND	0.7	ND	ND
Nitrate as N	mg/L	0.1	2	0.4	0.2	ND	0.1	ND	ND
Nitrite as N	mg/L	0.05	ND	ND	ND	ND	ND	ND	ND
Phosphate as P	mg/L	1	ND	ND	ND	ND	ND	ND	ND
Sulphate	mg/L	1	70	67	25	50	44	68	54

Notes:

MDL = Method Detection Limit

ND = Not Detected above the MDL

-- = Parameter Not Analyzed

highlighted = Analysis performed after holding time was exceeded

Table C.2 - Groundwater Analytical Results - Metals

Parameter	MDL (µg/L)	MUN1 16-Sep-09	MUN2 16-Sep-09	MW3 17-Sep-09	MW5 16-Sep-09	3604741 17-Sep-09	SS1 30-Sep-09	SS1 duplicate 30-Sep-09	sandstone 9-Oct-09
Date Sampled >									
Aluminium	1	ND	ND	41	7	13	173	100	4
Antimony	0.5	ND	ND	1.5	0.8	ND	1.6	1.1	ND
Arsenic	1	ND	ND	ND	ND	ND	ND	ND	ND
Barium	5	153	129	98	138	ND	102	97	148
Beryllium	0.5	ND	ND	ND	ND	ND	ND	ND	ND
Boron	10	21.2	ND	16.5	ND	22.8	35.3	32.9	ND
Cadmium	0.1	ND	ND	ND	ND	ND	ND	ND	ND
Calcium	1	96700	88700	55900	96900	660	110000	106000	117000
Chromium	1	2	2	ND	ND	4	13	19	5
Cobalt	0.5	ND	ND	ND	ND	0.5	ND	ND	0.6
Copper	0.5	8.1	35.1	0.9	0.8	6.8	1.6	1.3	2
Iron	100	ND	ND	ND	ND	552	240	ND	ND
Lead	0.1	0.2	0.3	ND	ND	0.8	0.3	ND	ND
Magnesium	200	20200	31100	18400	28400	ND	20500	20000	32100
Manganese	5	ND	ND	5	28	44	58	6	26
Molybdenum	1	ND	ND	2	1	ND	1	2	ND
Nickel	1	2	2	1	3	ND	2	2	5
Potassium	100	3210	833	971	2370	123	3590	3550	2290
Selenium	1	1	ND	ND	ND	ND	ND	ND	ND
Silver	0.1	ND	ND	0.7	0.1	ND	ND	ND	ND
Sodium	200	53500	23700	7650	37100	191000	48800	49000	52100
Strontium	10	550	324	490	258	ND	1090	1100	294
Thallium	0.1	ND	ND	ND	ND	ND	ND	ND	ND
Tin	5	ND	ND	ND	ND	ND	ND	ND	ND
Titanium	5	ND	ND	ND	ND	ND	8	6	ND
Tungsten	10	ND	ND	ND	ND	ND	ND	ND	ND
Uranium	0.1	1.2	1.4	1.7	0.2	0.5	2	2.2	0.6
Vanadium	1	4	3	2	3	4	4	6	3
Zinc	10	ND	22	ND	ND	ND	ND	ND	11

Notes:

MDL = Method Detection Limit

ND = Not Detected above the MDL

Table C.3 - Groundwater Analytical Results - Isotope Data

Parameter	Units	MUN1	MUN2	MW3		MW5	3604741	SS1	sandstone
		16-Sep-09	16-Sep-09	17-Sep-09	duplicate 17-Sep-09	16-Sep-09	17-Sep-09	30-Sep-09	08-Oct-09
$\delta^2\text{H}_{\text{VSMOW}}$	per mil	-73.7	-68.4	-71.8	-71.0	-67.7	-71.4	-79.1	--
$\delta^{18}\text{O}_{\text{VSMOW}}$	per mil	-10.4	-9.7	-10.2	-10.1	-9.8	-10.3	-11.2	--
^3H	TU	17.7	11.8	12.4	--	14.5	7.0	19.6	13.5
DIC	ppmC	133.01	154.71	82.98	--	134.29	123.32	116.76	132.78
$\delta^{13}\text{C}_{\text{DIC}}$	‰	-14.02	-15.22	-15.71	--	-14.62	-13.48	-14.88	-15.20
DOC	ppmC	1.71	1.24	1.08	--	1.30	1.54	10.62	1.58
$\delta^{13}\text{C}_{\text{DOC}}$	‰	-27.26	-27.00	-26.91	--	-26.83	-26.77	-29.64	-27.11

Notes:

- MDL = Method Detection Limit
- ND = Not Detected above the MDL
- = Parameter Not Analyzed
- DIC = dissolved inorganic carbon
- DOC = dissolved organic carbon
- TU = tritium units (1 TU = 1 tritium atom in 10^{18})
- VSMOW = Vienna Standard Mean Ocean Water

Table C.4 - Groundwater Analytical Results - Microbiological Parameters

Parameter	Date Sampled >	Units	MDL	MW5	MW3
E. coli		CFU/100 mL	1	1	ND
Total Coliforms		CFU/100 mL	1	36	ND
Heterotrophic Plate Count		CFU/mL	10	30	790

Notes:

MDL = Method Detection Limit
 ND = Not Detected above the MDL
 -- = Parameter Not Analyzed

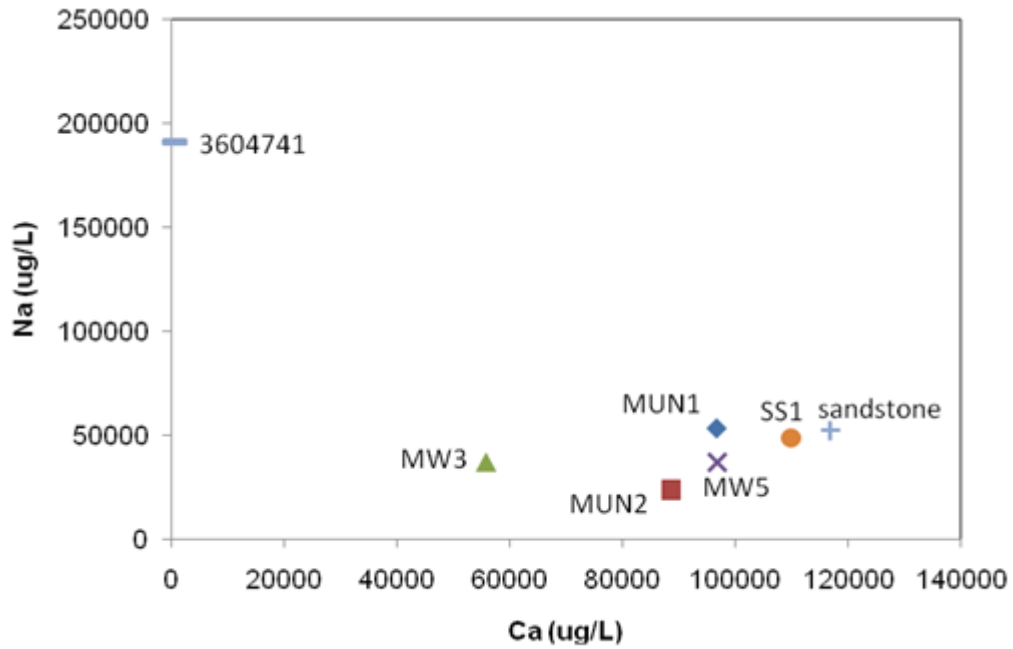


Figure C-1 – Sodium vs. Calcium concentrations for Select Monitoring Wells near Lansdowne, Ontario.

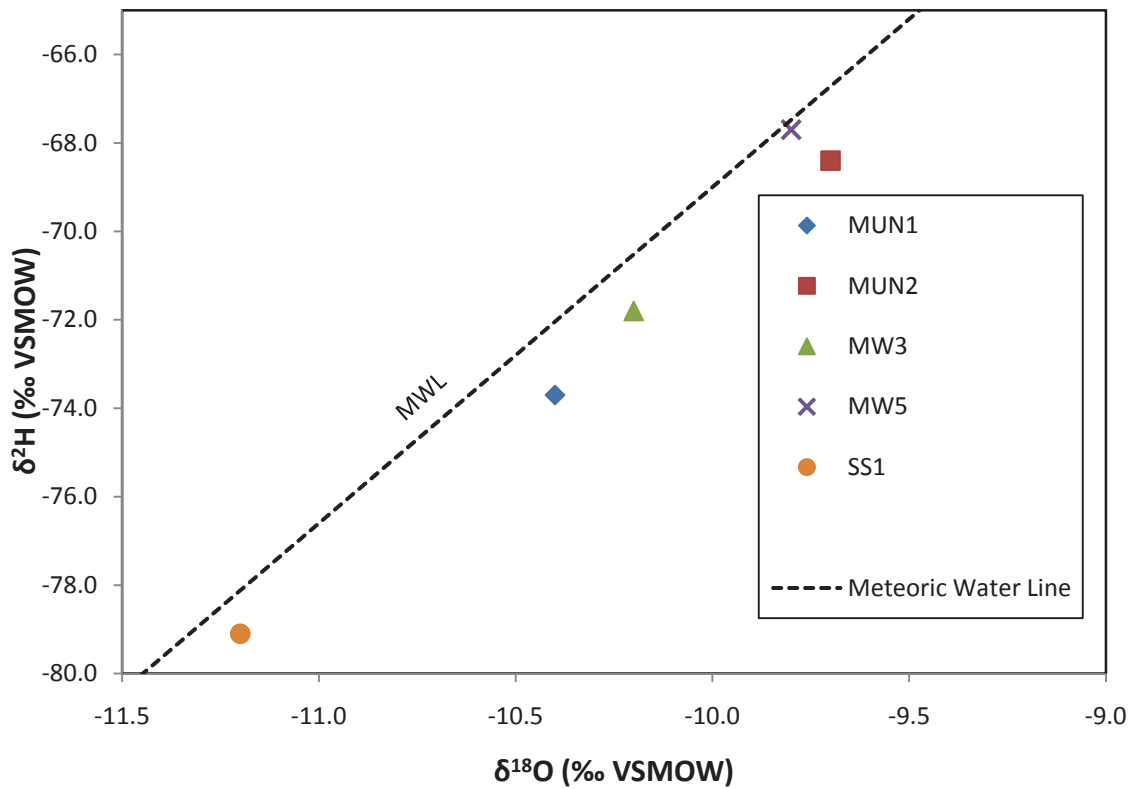


Figure C-2 – Stable isotope composition of Lansdowne water samples. MWL = meteoric water line for Ottawa, Ontario (Clark & Fritz, 1997).