Appendix V

Laboratory Analytical Results

Table 17J.1 Water Quality Laboratory Analytical Resutls for Routine Monitoring Stations from October 2011 and March 2012 Visits

Parameter	Units	RDL	CWQG Guideline	MMER Guideline	S1				S2				S3			S4			S5			L1			L2	Long Lake
					8-Oct-11	Lab. Dup.	2-Mar-12	Lab. Dup.	7-Oct-11	Lab. Dup.	2-Mar-12	Lab. Dup.	8-Oct-11	2-Mar-12	Lab. Dup.	7-Oct-11	2-Mar-12	Lab. Dup.	8-Oct-11	Lab. Dup.	2-Mar-12	7-Oct-11	2-Mar-12	Lab. Dup.	8-Oct-11	2-Mar-12
Anion Sum	me/L	N/A			0.67		1.06		1.21		1.75		0.55	0.960		0.61	0.690		1.79		2.32	0.68	0.710		1.83	0.81
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	1			33		49		56		78		27	42		28	32		86		110	34	33		88	37
Calculated TDS	mg/L	1			38		58.0		67		93.0		36	56.0		34	37.0		90		116	37	38.0		91	43
Carb. Alkalinity (calc. as CaCO3)	mg/L	1			<1		<1.0		<1		<1.0		<1	<1.0		<1	<1.0		<1		1.2	<1	<1.0		<1	<1.0
Cation Sum	me/L	N/A			0.76		0.970		1.23		1.57		0.65	0.890		0.65	0.630		1.84		2.22	0.76	0.670		1.85	0.76
Hardness (CaCO3)	mg/L	1			34		43		56		69		29	40		29	29		89		110	36	31		90	36
Ion Balance (% Difference)	%	N/A			6.29		4.43		0.82		5.42		8.33	3.78		3.17	4.55		1.38		2.20	5.56	2.90		0.54	3.18
Langelier Index (@ 20C)	N/A				-1.34		-1.07		-0.54		-0.421		-1.53	-1.10		-1.36	-1.37		-0.075		0.152	-1.11	-1.19		-0.087	-1.08
Langelier Index (@ 4C)	N/A				-1.59		-1.32		-0.792		-0.672		-1.78	-1.36		-1.61	-1.63		-0.326		-0.0990	-1.36	-1.45		-0.338	-1.33
Nitrate (N)	mg/L	0.05	13		<0.05		0.27		<0.05		0.053		<0.05	0.080		<0.05	<0.050		<0.05		0.11	<0.05	<0.050		<0.05	0.11
Saturation pH (@ 20C)	N/A				8.86		8.58		8.41		8.18		9.03	8.66		8.99	8.92		8.11		7.91	8.88	8.85		8.13	8.76
Saturation pH (@ 4C)	N/A				9.11		8.83		8.66		8.43		9.28	8.92		9.24	9.18		8.36		8.16	9.13	9.11		8.38	9.01
Acidity	mg/L	5			<5		5.6		<5		6.4		5	<5.0		<5	<5.0		<5	<5	<5.0	<5	<5.0		<5	<5.0
Total Alkalinity (Total as CaCO3)	mg/L	5			33		49		56		78		27	43		29	32	31	87		110	34	33	32	89	38
Dissolved Chloride (Cl)	mg/L	1			<1		<1.0		<1		2.2		<1	<1.0		<1	<1.0	<1.0	<1		<1.0	<1	<1.0	<1.0	<1	<1.0
Colour	TCU	5	Narrative		23		22		20		11		44	14		13	12	11	13		7.9	10	11	10	12	9.9
Strong Acid Dissoc. Cyanide (CN)	mg/L	0.002	0.005 (as free CN)	2	<0.002		<0.0020		<0.002		<0.0020		<0.002	<0.0020		<0.002	<0.0020		<0.002		<0.0020	<0.002	<0.0020		<0.002	<0.0020
Total Dissolved Solids	mg/L	10			47		64		64	54	82		46	48		31	32		81		110	34	27		100	30
Dissolved Fluoride (F-)	mg/L	0.1	0.120 (inorganic F)		<0.1	<0.1	<0.10	<0.10	<0.1		0.11		<0.1	<0.10		<0.1	<0.10		<0.1		<0.10	<0.1	<0.10		<0.1	<0.10
Nitrate + Nitrite	mg/L	0.05			<0.05		0.27		<0.05		0.053		<0.05	0.080		<0.05	<0.050	<0.050	<0.05		0.11	<0.05	<0.050	0.052	<0.05	0.11
Nitrite (N)	mg/L	0.01	0.06		<0.01		<0.010		<0.01		<0.010		<0.01	<0.010		<0.01	<0.010	<0.010	<0.01		<0.010	<0.01	<0.010	<0.010	<0.01	<0.010
Nitrogen (Ammonia Nitrogen)	mg/L	0.05	See Table		0.06		<0.050	<0.050	0.11		<0.050		0.08	<0.050		0.06	<0.050		0.16		<0.050	<0.05	<0.050	<0.050	<0.05	<0.050
Dissolved Organic Carbon (C)	mg/L	0.5			5.3	5.4	5.0	4.8	3.7		3.5		6.7	2.5		3.2	3.3		3.2		1.5	3.1	3.3		3	3.2
Total Organic Carbon (C)	mg/L	0.5			5		4.4	4.3	3.5		3.8		6.7	2.1		3.1	2.9		3		1.2	2.9	2.7		2.9	2.8
Orthophosphate (P)	mg/L	0.01			<0.01		<0.010		<0.01		<0.010		<0.01	<0.010		<0.01	<0.010	<0.010	<0.01		<0.010	<0.01	<0.010	<0.010	0.01	<0.010
pH	pH	N/A	6.5-9		7.52		7.51		7.87		7.76	7.78	7.5	7.56		7.63	7.55		8.03		8.06	7.77	7.66		8.04	7.68
Total Phosphorus	mg/L						0.016				0.005			0.012			0.012				0.004		0.003			0.018
Reactive Silica (SiO2)	mg/L	0.5			4.2		6.7		6.6		8.8		7.4	9.4		3.2	3.6	3.5	4.3		6.7	3.4	3.7	3.7	4.3	4
Total Suspended Solids	mg/L	1	Narrative	30	2		2.7		1		<2.0		<1	5.2		1	2.4		<1		<1.0	1	1.6		2	<1.0
Dissolved Sulphate (SO4)	mg/L	2			<2		2.7		4		5.4		<2	4.8		2	2.2	2.1	2		5.8	<2	2.2	2.3	2	2.3
Turbidity	NTU	0.1	Narrative		0.2		0.60		0.1		1.3		0.2	0.70	0.78	0.1	0.37		<0.1		0.40	0.2	0.18		<0.1	0.61
Conductivity	uS/cm	1			67		95		110		160	160	56	87		58	62		160		210	68	67		160	76
Dissolved Mercury (Hg)	µg/L	0.01	0.026		<0.01	<0.01	<0.013	<0.013	0.01		<0.013		<0.01	<0.013		<0.01	<0.013		<0.01		<0.013	<0.01	<0.013		<0.01	<0.013
Dissolved Aluminum (Al)	µg/L	5.0			14.3		12.9		10.3		7.8		79.8	22.1		17.9	11.5	12.1	<5		<5.0	16.1	<5.0		12.3	7.2
Total Aluminum (Al)	µg/L	5.0	5 if pH <6.5, 100 if pH > 6.5		13.1		19.9		14.4		14.7		72.8	41.9		20.1	73.6		<5		8.2	47.7	8.2		19.2	16.5
Total Antimony (Sb)	µg/L	1.0			<1		<1.0		<1		<1.0		<1	<1.0		<1	<1.0		<1		<1.0	<1	<1.0		<1	<1.0
Total Arsenic (As)	µg/L	1.0	5	1000	<1		<1.0		<1		<1.0		<1	<1.0		<1	<1.0		<1		<1.0	<1	<1.0		<1	<1.0
Total Barium (Ba)	µg/L	1.0			12.5		18.2		14.3		18.6		12.2	15.3		8.6	10.4		18.3		30.6	9.6	30.6		18.5	10.3
Total Beryllium (Be)	µg/L	1.0			<1		<1.0		<1		<1.0		<1	<1.0		<1	<1.0		<1		<1.0	<1	<1.0		<1	<1.0
Total Bismuth (Bi)	µg/L	2.0			<2		<2.0		<2		<2.0		<2	<2.0		<2	<2.0		<2		<2.0	<2	<2.0		<2	<2.0
Total Boron (B)	µg/L	50	1500		<50		<50		<50		<50		<50	<50		<50	<50		<50		<50	<50	<50		<50	<50
Total Cadmium (Cd)	µg/L	0.017	Cadmium concentration = $10^{0.86[\log10(hardness)]-3.2}$ µg/L		0.048		<0.017		<0.017		<0.017		<0.017	<0.017		<0.017	<0.017		<0.017		<0.017	<0.017	<0.017		<0.017	<0.017
Total Calcium (Ca)	µg/L	100			8490		11100		14500		18200		6860	10400		7110	7280		19500		25300	7690	25300		18700	9090
Total Chromium (Cr)	µg/L	1.0			<1		<1.0		<1		<1.0		<1	<1.0		<1	<1.0		<1		<1.0	<1	<1.0		<1	<1.0
Total Cobalt (Co)	µg/L	0.40			<0.4		<0.40		<0.4		<0.40		<0.4	<0.40		<0.4	<0.40		<0.4		<0.40	<0.4	<0.40		<0.4	<0.40
Total Copper (Cu)	µg/L	2.0	Copper concetration = $e^{0.8545[\ln(hardness)]-1.465} * 0.2$ µg/L	600	<2		<2.0		<2		<2.0		<2	<2.0		<2	<2.0		<2		<2.0	2.4	<2.0		<2	<2.0
Total Iron (Fe)	µg/L	50	300		77		297		112		493		123	123		<50	140		54		167	76	167		109	<50
Total Lead (Pb)	µg/L	0.50	Lead concetration = $e^{1.273[\ln(hardness)]-4.705}$ µg/L	400	<0.5		<0.50		<0.5		<0.50		<0.5	<0.50		<0.5	<0.50		<0.5		<0.50	<0.5	<0.50		<0.5	<0.50
Total Magnesium (Mg)	µg/L	100			3120		4030		5580		7080		2870	4250		2930	3040		9780		13000	3590	13000		9770	3840
Total Manganese (Mn)	µg/L	2.0			27.2		87.0		26.1		185		28.4	62.9		4	21.4		29.5		50.8	12.8	50.8		45	7.7
Total Molybdenum (Mo)	µg/L	2.0	73		<2		<2.0		<2		<2.0		<2	<2.0		<2	<2.0		<2		<2.0	<2	<2.0		<2	<2.0
Total Nickel (Ni)	µg/L	2.0	Nickel concentration = $e^{0.76[\ln(hardness)]+1.06}$ µg/L	1000	<2		<2.0		<2		<2.0		<2	<2.0		<2	<2.0		<2		<2.0	<2	<2.0		<2	<2.0
Total Phosphorus (P)	µg/L	100	ultra-oligotrophic <4,oligotrophic 4-10, mesotrophic 10-20, meso-eutrophic 20-35, eutrophic 35-100, hyper-eutrophic >100		<100		<100		<100		<100		<100	<100		<100	<100		<100		<100	<100	<100		<100	<100
Total Potassium (K)	µg/L	100			1330		1640		2060		2690		1040	1570		1060	1120		971		1410	849	1410		908	1050
Total Selenium (Se)	µg/L	1.0	1		<1		<1.0		<1		<1.0		<1	<1.0		<1	<1.0		<1		<1.0	<1	<1.0		<1	<1.0
Total Silicon (Si)	µg/L	500			2050		3460		3220		4800		3470	4940		1560	1940		2040		3590	1650	3590		2020	2090
Total Silver (Ag)	µg/L	0.10	0.1		<0.1		<0.10		<0.1		<0.10		<0.1	<0.10		<0.1	<0.10		<0.1		<0.10	<0.1	<0.10		<0.1	<0.10
Total Sodium (Na)	µg/L	100			940		1440		1200		3040		925	1300		706	808		599		946	538	946		597	762
Total Strontium (Sr)	µg/L	2.0			17.7		22.5		24.2		29.9		16.7	23.5		12.9	13.3		15.5		23.2	12.4	23.2		16	12.6
Total Sulphur (S)	µg/L	5000			<5000		<5000		<5000		<5000		<5000	<5000		<5000	<5000		<5000		<5000	<5000	<5000		<5000	<5000
Total Tellurium (Te)	µg/L	2.0			<2		<2.0		<2		<2.0		<2	<2.0		<2	<2.0		<2		<2.0	<2	<2.0		<2	<2.0
Total Thallium (Tl)	µg/L	0.10	0.8		<0.1		<0.10		<0.1		<0.10		<0.1	<0.10		<0.1	<0.10		<0.1		<0.10	<0.1	<0.10		<0.1	<0.10
Total Tin (Sn)	µg/L	2.0			<2		<2.0		<2		<2.0		<2	<2.0		<2	<2.0		<2		<2.0	<2	<2.0		<2	<2.0
Total Titanium (Ti)	µg/L	2.0			<2		<2.0		<2		<2.0		<2	<2.0		<2	4.1		<2		<2.0	2.5	<2.0		<2	2.2
Total Uranium (U)	µg/L	0.10	33 (short term), 15 (long term)		<0.1		<0.10		0.16		0.15		<0.1	<0.10		<0.1	0.16		0.39		0.96	<0.1	0.96		0.37	<0.10
Total Vanadium (V)	µg/L	2.0			<2		<2.0		<2		<2.0		<2	<2.0		<2	<2.0		<2		<2.0	<2	<2.0		<2	<2.0
Total Zinc (Zn)	µg/L	5.0	30	1000	<5		24.7		<5		<5.0		<5	5.2		<5	<5.0		<5		7.0	<5	7.0		<5	30.7
Radium 226	Bq/L			1.11	<0.005				0.02				<0.005			0.006			<0.005			0.008			<0.005	

Table 17J.2 Water Quality Laboratory Analytical Resutls for Additional Lake Samples from April 2012 Field Visit

Parameter	Units	RDL	CWQG Guideline	MMER Guideline	LL1-M		LL2-T		LL3-T		LL4-T	WDR-1	MI1-T	JLC-T	WALSH-T		PL1-T	MOL-1-C	
					16-Apr-12	Lab.Dup.	16-Apr-12	Lab.Dup.	17-Apr-12	Lab.Dup.	17-Apr-12	17-Apr-12	17-Apr-12	18-Apr-12	18-Apr-12	Lab.Dup.	18-Apr-12	18-Apr-12	Lab.Dup.
Anion Sum	me/L	N/A			0.930		1.13		0.940		1.62	1.54	0.840	0.910	0.660		1.37	0.620	
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	1			42		52		43		76	72	39	41	27		61	29	
Calculated TDS	mg/L	1			49.0		60.0		50.0		79.0	78.0	45.0	49.0	40.0		75.0	35.0	
Carb. Alkalinity (calc. as CaCO3)	mg/L	1			ND		ND		ND		ND	ND	ND	ND	ND		ND	ND	
Cation Sum	me/L	N/A			0.880		1.11		0.920		1.40	1.49	0.820	0.890	0.680		1.24	0.660	
Hardness (CaCO3)	mg/L	1			41		52		43		67	71	38	42	29		55	30	
Ion Balance (% Difference)	%	N/A			2.76		0.890		1.08		7.28	1.65	1.20	1.11	1.49		4.98	3.13	
Langelier Index (@ 20C)	N/A				-0.871		-0.880		-0.897		-0.542	-0.399	-1.10	-0.951	-1.46		-0.768	-3.28	
Langelier Index (@ 4C)	N/A				-1.12		-1.13		-1.15		-0.793	-0.650	-1.35	-1.20	-1.71		-1.02	-3.53	
Nitrate (N)	mg/L	0.05	13		0.083		0.094		ND		0.070	0.066	ND	0.11	0.11		ND	ND	
Saturation pH (@ 20C)	N/A				8.71		8.50		8.67		8.27	8.31	8.75	8.68	9.00		8.43	8.95	
Saturation pH (@ 4C)	N/A				8.96		8.75		8.92		8.52	8.56	9.00	8.93	9.25		8.68	9.20	
Acidity	mg/L	5			5.2		ND		ND		5.0	ND	ND	ND	ND	ND	5.2	12	
Total Alkalinity (Total as CaCO3)	mg/L	5			43		52		44		76	72	40	42	27		61	29	
Dissolved Chloride (Cl)	mg/L	1			ND		ND		ND		ND	ND	ND	ND	2.2		1.6	ND	
Colour	TCU	5	Narrative		10		9.8		11		9.9	8.3	11	12	22		15	9.6	
Strong Acid Dissoc. Cyanide (CN)	mg/L	0.002	0.005 (as free CN)	2	ND		ND		ND		ND	ND	ND	ND	ND		ND	ND	
Total Dissolved Solids	mg/L	10			52		48		49		90	74	36	46	41	41	69	29	
Dissolved Fluoride (F-)	mg/L	0.1	0.120 (inorganic F)		ND	ND	ND		ND		ND	ND	ND	ND	ND		ND	ND	
Nitrate + Nitrite	mg/L	0.05			0.083		0.094		ND		0.070	0.066	ND	0.11	0.11		ND	ND	
Nitrite (N)	mg/L	0.01	0.06		ND		ND		ND		ND	ND	ND	ND	ND		ND	ND	
Nitrogen (Ammonia Nitrogen)	mg/L	0.05	See Table		ND	ND	ND		ND		ND	ND	ND	ND	ND		ND	ND	
Dissolved Organic Carbon (C)	mg/L	0.5					7.3	7.4	3.9		6.2	3.8	4.3	3.7	4.7		4.7	20	
Total Organic Carbon (C)	mg/L	0.5			2.6	2.8	6.7		3.4		6.3	3.2	4.2	3.7	4.2		4.2	20	
Orthophosphate (P)	mg/L	0.01			ND		ND		ND		ND	ND	ND	ND	ND		ND	ND	
pH	pH	N/A	6.5-9		7.84	7.85	7.62		7.77		7.73	7.91	7.65	7.73	7.54		7.66	5.67	5.64
Total Phosphorus	mg/L				0.005		0.006		0.014		0.011	0.007	0.011	0.011	0.009		0.013	0.007	
Reactive Silica (SiO2)	mg/L	0.5			4.4		4.8		4.4		4.7	4.7	4.2	4.5	5.7		8.2	3.8	
Total Suspended Solids	mg/L	1	Narrative	30	ND		1.4		1.0		2.0	ND	1.0	ND	ND		1.6	1.0	
Dissolved Sulphate (SO4)	mg/L	2			3.4		3.7		3.1		4.4	4.4	2.4	3.1	2.2		5.3	2.3	
Turbidity	NTU	0.1	Narrative		0.33	0.36	0.43		0.40		0.53	0.60	0.31	0.20	0.45		0.96	0.17	
Conductivity	uS/cm	1			87	89	110		88		140	140	79	86	67		120	66	66
Dissolved Mercury (Hg)	µg/L	0.01	0.026		0.073	0.073	ND		ND		ND	ND	ND	ND	ND		ND	0.022	
Dissolved Aluminum (Al)	µg/L	5.0			7.2		5.9	5.9	7.7		ND	ND	9.4	ND	36.7		10.8	18	
Total Aluminum (Al)	µg/L	5.0	5 if pH <6.5, 100 if pH > 6.5		18.6		14		15.5	15.1	12.5	13.8	17.4	8.7	45.8		15.2	18.5	
Total Antimony (Sb)	µg/L	1.0			ND		ND		ND	ND	ND	ND	ND	ND	ND		ND	ND	
Total Arsenic (As)	µg/L	1.0	5	1000	ND		ND		ND	ND	ND	ND	ND	ND	ND		ND	ND	
Total Barium (Ba)	µg/L	1.0			10.9		14.4		11.7	11.8	17.2	17.9	10.1	12.2	12.5		15.2	8.6	
Total Beryllium (Be)	µg/L	1.0			ND		ND		ND	ND	ND	ND	ND	ND	ND		ND	ND	
Total Bismuth (Bi)	µg/L	2.0			ND		ND		ND	ND	ND	ND	ND	ND	ND		ND	ND	
Total Boron (B)	µg/L	50	1500		ND		ND		ND	ND	ND	ND	ND	ND	ND		ND	ND	
Total Cadmium (Cd)	µg/L	0.017	*Cadmium concentration =* $10^{0.86[\log10(hardness)]-3.2}$ *µg/L*		ND		0.056		0.045	0.039	0.022	0.035	ND	ND	ND		ND	ND	
Total Calcium (Ca)	µg/L	100			9410		12300		10000	9860	15300	14500	8870	10200	7280		12900	7550	
Total Chromium (Cr)	µg/L	1.0			ND		ND		ND	ND	ND	ND	ND	ND	ND		ND	ND	
Total Cobalt (Co)	µg/L	0.40			ND		ND		ND	ND	ND	ND	ND	ND	ND		ND	ND	
Total Copper (Cu)	µg/L	2.0	*Copper concetration =* $e^{0.8545[\ln(hardness)]-1.465} * 0.2$ *µg/L*	600	ND		ND		ND	ND	ND	ND	ND	ND	ND		ND	ND	
Total Iron (Fe)	µg/L	50	300		ND		52		ND	ND	128	136	ND	ND	180		160	ND	
Total Lead (Pb)	µg/L	0.50	*Lead concetration =* $e^{1.273[\ln(hardness)]-4.705}$ *µg/L*	400	0.60		0.84		ND	ND	ND	ND	ND	ND	ND		ND	ND	
Total Magnesium (Mg)	µg/L	100			4560		5890		4770	4740	7480	7790	4070	4490	2580		5220	3050	
Total Manganese (Mn)	µg/L	2.0			4.6		21.3		7.5	7.3	19.5	17.8	4.8	7.6	15.8		75.2	ND	
Total Molybdenum (Mo)	µg/L	2.0	73		ND		ND		ND	ND	ND	ND	ND	ND	ND		ND	ND	
Total Nickel (Ni)	µg/L	2.0	*Nickel concentration =* $e^{0.76[\ln(hardness)]+1.06}$ *µg/L*	1000	ND		ND		ND	ND	ND	ND	ND	ND	ND		ND	ND	
Total Phosphorus (P)	µg/L	100	ultra-oligotrophic <4,oligotrophic 4-10, mesotrophic 10-20, meso-eutrophic 20-35, eutrophic 35-100, hyper-eutrophic >100		ND		ND		ND	ND	ND	ND	ND	ND	ND		ND	ND	
Total Potassium (K)	µg/L	100			1000		1270		1080	1080	1300	1420	1010	954	1210		2100	1020	
Total Selenium (Se)	µg/L	1.0	1		ND		ND		ND	ND	ND	ND	ND	ND	ND		ND	ND	
Total Silicon (Si)	µg/L	500			1860		2150		1890	1880	1930	1890	1830	1970	2380		3410	1630	
Total Silver (Ag)	µg/L	0.10	0.1		ND		ND		ND	ND	ND	ND	ND	ND	ND		ND	ND	
Total Sodium (Na)	µg/L	100			651		814		770	752	658	771	748	654	1540		1990	893	
Total Strontium (Sr)	µg/L	2.0			14.0		17.6		14.8	13.9	19.3	20.5	13.4	15.6	18.4		22.5	13.7	
Total Sulphur (S)	µg/L	5000			ND		ND		ND	ND	ND	ND	ND	ND	ND		ND	ND	
Total Tellurium (Te)	µg/L	2.0			ND		ND		ND	ND	ND	ND	ND	ND	ND		ND	ND	
Total Thallium (Tl)	µg/L	0.10	0.8		ND		ND		ND	ND	ND	ND	ND	ND	ND		ND	ND	
Total Tin (Sn)	µg/L	2.0			ND		ND		ND	ND	ND	ND	ND	ND	ND		ND	ND	
Total Titanium (Ti)	µg/L	2.0			ND		ND		ND	ND	ND	ND	ND	ND	ND		ND	ND	
Total Uranium (U)	µg/L	0.10	33 (short term), 15 (long term)		0.13		0.22		0.15	0.14	0.39	0.4	ND	ND	ND		ND	ND	
Total Vanadium (V)	µg/L	2.0			ND		ND		ND	ND	ND	ND	ND	ND	ND		ND	ND	
Total Zinc (Zn)	µg/L	5.0	30	1000	6.9		ND		ND	ND	ND	ND	ND	ND	ND		22.3	ND	
Radium 226	Bq/L			1.11															

Table 17J.3 In-situ Water Quality Measurements Results for October and March Field Visit

Station	Date	Temperature (deg. C)	Specific Conductance (µS/cm)	Conductivity (µS/cm)	TDS (g/L)	Salinity	DO (%)	DO (mg/L)	pH	pH mV
October 2011 Field Visit										
S1	8-Oct-11	3.57	65	38	0.042	0.03	90.1	11.93	9.00	-85.0
S2	7-Oct-11	1.85	111	62	0.072	0.05	103.4	14.36	8.90	-81.7
S3	8-Oct-11	3.64	56	33	0.037	0.03	87.6	11.59	9.10	-90.0
S4	7-Oct-11	7.00	57	38	0.037	0.03	100.5	12.18	8.94	-83.2
S5	8-Oct-11	4.72	156	95	0.101	0.07	87.8	11.29	9.07	-88.8
L1	7-Oct-11	6.73	66	43	0.043	0.03	101.1	12.35	9.13	-93.0
L2	8-Oct-11	5	157	57	0.102	0.07	93.2	11.91	9.06	-88.4
March 2012 Field Visit										
S1	2-Mar-12	4.27	100	72	0.065	0.05	121.3	15.44	7.60	-82.0
S2	3-Mar-12	3.40	158	123	0.103	0.08	127	17.1	7.70	-92.1
S3	2-Mar-12	5.53	87	54	0.057	0.04	98.8	12.46	7.81	-100.9
S4	2-Mar-12	4	48	38	0.032	0.02	127.7	16.6	8.62	-128
S5	2-Mar-12	4.5	245	155	0.158	0.12	98.8	12.55	7.59	-89.3
L1	2-Mar-12	3.42	104	62	0.068	0.05	131	17.44	7.45	-84.2
L2	2-Mar-12	2.65	85	49	0.055	0.04	94.1	12.67	8.08	-111.1

Table 17J.4 In-situ Water Quality Measurements Results for April and May 2012 Field Visit

Station	Date	Water Temperature (deg. C)	Air Temperature (deg.C)	Water Depth (m)	Depth of Sample (m)	Thickness of Ice (m)	Conductivity (µS/cm)	DO (mg/L)	pH
April 2012 Field Visit									
LL1-M	16-Apr-12	2.18	0	7.7	4.00	0.82	181	10.91	6.30
LL2-T	17-Apr-12	0.06	-7	2.4	1.20	0.85	265	12.06	7.03
LL3-T	17-Apr-12	0.15	-8	2.4	1.20	0.82	221	12.92	7.22
LL4-T	17-Apr-12	0.01	-8	1.0	0.90	0.82	299	12.13	7.42
WDR-1	17-Apr-12	0.04	-6	1.3	0.60	0.4	351	12.09	7.60
MI1-T	17-Apr-12	0.01	-5	12.4	1.00	0.85	200	12.84	7.69
JLC-T	18-Apr-12	1.24	-4	0.2	0.15		219	12.24	7.28
WALSH-T	41017	0.07	-2	0.5	0.15	0.1	171	12.39	7.5
PL-1-T	18-Apr-12	0.11	0	1.2	0.50	0.8	308	11.29	7.49
MOL1-C	18-Apr-12	0.41	0	17.6	1.00	0.8	167	12.15	7.77
May 2012 Field Visit									
S1	29-May-12	6.35	3	0.75	0.30	0.47	72	10.21	7.96
S2	29-May-12	7.02	3	0.4	0.40	0.67	81	9.92	7.90
S3	28-May-12	1.65	2	0.8	0.10	0.4	34	11.09	8.02
S4	28-May-12	3.36	2	0.3	0.10	0.91	45	11.06	7.84
S5	28-May-12	4.1	4	0.7	0.30		125	12.02	8.06
L1	28-May-12	3.88	2	Lake	0.20	0.58	68	11.71	7.79
L2	28-May-12	5.52	4	0.8	0.10	0.55	81	11.46	7.88

Table 17J.5 Sediment Quality General Constituents Laboratory Analytical Resutls for Routine Monitoring Stations and Selected Lakes

Parameter	Units	RDL(Nov_11)	CCME Guidelines		S3			S4			S5			MS8125 (5-Mar-12)			L2			LV4062		LL1-S			PL 1-S			MOL-1-S	
			ISQG	PEL	5-Mar-12	Lab. Dup.		3-Mar-12	Lab. Dup.		2-Mar-12	Lab. Dup.		(Field Dup.5-Mar-12)	Field Dup. -Lab.Dup.		28-Nov-11	Lab. Dup.		28-Nov-11(DUP)		16-Apr-12	Lab. Dup.	RDL	18-Apr-12	Lab. Dup.	RDL	18-Apr-12	RDL
Inorganics																													
Chloride (Cl)	mg/kg	5.0			65			<5.0			29			6.5			7			7		8.9		5.0	29		5.0	36	5.0
Moisture	%	1			88			18			62			15			38	33		36		86		1	88		1	91	1
Organic Carbon (TOC)	g/kg	0.20			210			1.8			70			1.9			27			27		74		0.40	99		1	79	0.50
Total Kjeldahl Nitrogen	µg/g	10			6810			92			2870			122			1540			1310		5810		50	6710		50	6060	50
< -4 Phi (16 mm)	%	0.10			100			100			100			100			100			100		100		0.10	100		0.10	100	0.10
< -3 Phi (8 mm)	%	0.10			100			100			100			100			100			100		100		0.10	100		0.10	100	0.10
< -2 Phi (4 mm)	%	0.10			100			100			100			100			100			100		100		0.10	100		0.10	100	0.10
< -1 Phi (2 mm)	%	0.10			95 (2)			67			98 (1)			58			73 (1)			90 (2)		100		0.10	100		0.10	100	0.10
< 0 Phi (1 mm)	%	0.10			81 (3)			40			93			31			65			81		73		0.10	74		0.10	74	0.10
< +1 Phi (0.5 mm)	%	0.10			67 (4)			20			87			14			52			65		65		0.10	62		0.10	62	0.10
< +2 Phi (0.25 mm)	%	0.10			53			5.4			70			4.0			26			32		60		0.10	48		0.10	55	0.10
< +3 Phi (0.12 mm)	%	0.10			40			1.5			45			1.3			13			16		55		0.10	33		0.10	49	0.10
< +4 Phi (0.062 mm)	%	0.10			33			0.93			26			0.85			6.1			6.8		49		0.10	25		0.10	45	0.10
< +5 Phi (0.031 mm)	%	0.10			28			0.68			17			0.65			5.5			6.0		39		0.10	23		0.10	43	0.10
< +6 Phi (0.016 mm)	%	0.10			20			0.47			9.9			0.47			4.6			5.4		31		0.10	17		0.10	35	0.10
< +7 Phi (0.0078 mm)	%	0.10			11			0.28			3.6			0.38			3.4			4.3		18		0.10	11		0.10	20	0.10
< +8 Phi (0.0039 mm)	%	0.10			10			0.29			2.5			0.45			3.3			4.1		15		0.10	11		0.10	16	0.10
< +9 Phi (0.0020 mm)	%	0.10			11			0.3			1.8			0.29			3.2			3.9		14		0.10	9.4		0.10	14	0.10
Gravel	%	0.10			5.2			33			2.1			42			27			9.6		ND		0.10	ND		0.10	ND	0.10
Sand	%	0.10			61			66			72			57			67			84		51		0.10	75		0.10	55	0.10
Silt	%	0.10			23			0.63			23			0.40			2.8			2.7		34		0.10	14		0.10	29	0.10
Clay	%	0.10			10			0.29			2.5			0.45			3.3	4.1		4.1		15		0.10	11		0.10	16	0.10

Table 17J.6 Sediment Quality Metals Laboratory Analytical Resutls for Routine Monitoring Stations and Selected Lakes

Parameter	Units	RDL	CCME Guidelines		S3			S4			S5			MS8125 (5-Mar-12)			L2			LV4062		LL1-S			PL 1-S			MOL-1-S	
			ISQG	PEL	5-Mar-12	Lab. Dup.		3-Mar-12	Lab. Dup.		2-Mar-12	Lab. Dup.		(Field Dup.5-Mar-12)	Field Dup. -Lab.Dup.		28-Nov-11	Lab. Dup.		28-Nov-11(DUP)		16-Apr-12	Lab. Dup.	RDL	18-Apr-12	Lab. Dup.	RDL	18-Apr-12	RDL
Metals																													
Acid Extractable Aluminum (Al)	µg/g	50			13000			3500						3300	3300														
Available Aluminum (Al)	mg/kg	10			13000			2300			4500	4700		2300			1500			1500		16000		10	10000		10	23000	10
Available Antimony (Sb)	mg/kg	2.0			<2.0			<2.0			<2.0	<2.0		<2.0			ND			ND		ND		2.0	ND		2.0	ND	2.0
Available Arsenic (As)	mg/kg	2.0	5.9	17	<2.0			<2.0			2.3	2.6		<2.0			ND			ND		2.2		2.0	ND		2.0	ND	2.0
Acid Extractable Barium (Ba)	µg/g	0.5			150			43						39	38														
Available Barium (Ba)	mg/kg	5.0			120			23			290	240		17			46			47		350		5.0	140		5.0	860	5.0
Acid Extractable Beryllium (Be)	µg/g	0.5			<0.5			<0.5						<0.5	<0.5														
Available Beryllium (Be)	mg/kg	2.0			<2.0			<2.0			<2.0	<2.0		<2.0			ND			ND		ND		2.0	ND		2.0	ND	2.0
Acid Extractable Bismuth (Bi)	µg/g	5			<5			<5						<5	<5														
Available Bismuth (Bi)	mg/kg	2.0			<2.0			<2.0			<2.0	<2.0		<2.0			ND			ND		ND		2.0	ND		2.0	ND	2.0
Available Boron (B)	mg/kg	5.0			<5.0			<5.0			<5.0	<5.0		<5.0			ND			ND		ND		5.0	ND		5.0	ND	5.0
Acid Extractable Cadmium (Cd)	µg/g	0.3			0.6			<0.3						<0.3	<0.3														
Available Cadmium (Cd)	mg/kg	0.30	0.6	3.5	0.5			<0.30			0.32	0.35		<0.30			ND			ND		0.59		0.30	ND		0.30	0.65	0.30
Acid Extractable Calcium (Ca)	µg/g	50			7800			2100						1700	1600														
Acid Extractable Chromium (Cr)	µg/g	0.5			49			26						23	22														
Available Chromium (Cr)	mg/kg	2.0	37.3	90	48			15			22	23		11			11			9		65		2.0	31		2.0	71	2.0
Acid Extractable Cobalt (Co)	µg/g	0.5			9.1			3						2.5	3.2														
Available Cobalt (Co)	mg/kg	1.0			9.8			1.7			5.8	6.4		1.7			2			2		13		1.0	11		1.0	17	1.0
Acid Extractable Copper (Cu)	µg/g	0.5			36			3.9						2.7	19 (1)														
Available Copper (Cu)	mg/kg	2.0	35.7	197	14			<2.0			9.6	8.7		<2.0			2			2		25		2.0	16		2.0	37	2.0
Acid Extractable Iron (Fe)	µg/g	50			23000			11000						9400	9200														
Available Iron (Fe)	mg/kg	50			21000			5500			52000	54000		6400			31000			25000		71000		50	23000		50	44000	50
Acid Extractable Lead (Pb)	µg/g	1			5			3						2	2														
Available Lead (Pb)	mg/kg	0.50	35	91.3	5.3			1.7			2.1	2.2		1.5			1.1			1.1		16		0.50	2.3		0.50	7.8	0.50
Available Lithium (Li)	mg/kg	2.0			16			4.1			3.4	3.6		3.5			ND			ND		11		2.0	7.7		2.0	14	2.0
Acid Extractable Magnesium (Mg)	µg/g	50			4100			2600						2400	2400														
Acid Extractable Manganese (Mn)	µg/g	10			2800			390						290	310														
Available Manganese (Mn)	mg/kg	2.0			650			220			15000	16000		110			400			390		4100		2.0	1100		2.0	16000	2.0
Available Mercury (Hg)	mg/kg	0.10	0.17	0.486	0.17			<0.10			<0.10	<0.10		<0.10			ND			ND		0.11		0.10	ND		0.10	0.15	0.10
Acid Extractable Molybdenum (Mo)	µg/g	0.5			14			0.8						0.6	0.8														
Available Molybdenum (Mo)	mg/kg	2.0			14			<2.0			14	14		<2.0			ND			ND		4.1		2.0	5.9		2.0	14	2.0
Acid Extractable Nickel (Ni)	µg/g	0.5			19			7.9						7.1	7.9														
Available Nickel (Ni)	mg/kg	2.0			20			5.3			18	20		5.5			4			4		40		2.0	35		2.0	49	2.0
Acid Extractable Phosphorus (P)	µg/g	20			770			560			950			460	450		700	700		670		1100		20	570		20	3900	200
Acid Extractable Potassium (K)	µg/g	200			330			950						910	900														
Available Rubidium (Rb)	mg/kg	2.0			3.9			4.8			2.9	3.1		5.1			ND			ND		19		2.0	4.5		2.0	15	2.0
Available Selenium (Se)	mg/kg	2.0			<2.0			<2.0			<2.0	<2.0		<2.0			ND			ND		ND		2.0	ND		2.0	ND	2.0
Acid Extractable Silver (Ag)	µg/g	0.3			<0.3			<0.3						<0.3	<0.3														
Available Silver (Ag)	mg/kg	0.50			<0.50			<0.50			<0.50	<0.50		<0.50			ND			ND		ND		0.50	ND		0.50	ND	0.50
Acid Extractable Sodium (Na)	µg/g	100			<100			<100						<100	<100														
Available Strontium (Sr)	mg/kg	5.0			25			8.6			13	13		8.6			5			5		23		5.0	18		5.0	39	5.0
Acid Extractable Strontium (Sr)	µg/g	1			23			7						6	6														
Available Thallium (Tl)	mg/kg	0.10			0.24			<0.10			0.71	0.81		<0.10			ND			ND		0.41		0.10	0.48		0.10	0.44	0.10
Acid Extractable Sulphur (S)	µg/g	50			1800			87						100	180														
Available Tin (Sn)	mg/kg	2.0			<2.0			<2.0			<2.0	<2.0		<2.0			ND			ND		ND		2.0	ND		2.0	ND	2.0
Acid Extractable Tin (Sn)	µg/g	1			<1			<1						<1	2														
Available Uranium (U)	mg/kg	0.10			4.8			0.35			9.7	11		0.23			1.3			1.2		12		0.10	6		0.10	28	0.10
Acid Extractable Titanium (Ti)	µg/g	5			450			350						330	330														
Available Vanadium (V)	mg/kg	2.0			32			8.3			16	17		7.4			9			7		39		2.0	17		2.0	42	2.0
Available Zinc (Zn)	mg/kg	5.0	123	315	91			8.2			49	51		8.8			8			9		110		5.0	70		5.0	130	5.0
Acid Extractable Vanadium (V)	µg/g	0.5			40			15						14	13														
Acid Extractable Zinc (Zn)	µg/g	3			100			16						13	13														
Acid Extractable Zirconium (Zr)	µg/g	5			<5			<5						<5	<5														

Table 17J.7 Sediment Quality Hydrocarbons Laboratory Analytical Resutls for Routine Monitoring Stations and Selected Lakes

Parameter	Units	RDL	CCME Guidelines		S3			S4			S5			MS8125 (5-Mar-12)			L2			LV4062		LL1-S			PL 1-S			MOL-1-S	
			ISQG	PEL	5-Mar-12	Lab. Dup.		3-Mar-12	Lab. Dup.		2-Mar-12	Lab. Dup.		(Field Dup.5-Mar-12)	Field Dup. -Lab.Dup.		28-Nov-11	Lab. Dup.		28-Nov-11(DUP)		16-Apr-12	Lab. Dup.	RDL	18-Apr-12	Lab. Dup.	RDL	18-Apr-12	RDL
Polyaromatic Hydrocarbons																													
1-Methylnaphthalene	mg/kg	0.0050			<0.0050			<0.0050			<0.0050			<0.0050	<0.0050		ND			ND		ND	ND	0.0050	ND		0.0050	ND	0.0050
2-Methylnaphthalene	mg/kg	0.0050	0.0202	0.2010	<0.0050			<0.0050			<0.0050			<0.0050	<0.0050		ND			ND		ND	ND	0.0050	ND		0.0050	ND	0.0050
Acenaphthene	mg/kg	0.0050	0.0067	0.0889	<0.0050			<0.0050			<0.0050			<0.0050	<0.0050		ND			ND		ND	ND	0.0050	ND		0.0050	ND	0.0050
Acenaphthylene	mg/kg	0.0050	0.0059	0.1280	<0.0050			<0.0050			<0.0050			<0.0050	<0.0050		ND			ND		ND	ND	0.0050	ND		0.0050	ND	0.0050
Anthracene	mg/kg	0.0050	0.0469	0.2450	<0.0050			<0.0050			<0.0050			<0.0050	<0.0050		ND			ND		ND	ND	0.0050	ND		0.0050	ND	0.0050
Benzo(a)anthracene	mg/kg	0.0050	0.0317	0.3850	<0.0050			<0.0050			<0.0050			<0.0050	<0.0050		ND			ND		ND	ND	0.0050	ND		0.0050	ND	0.0050
Benzo(a)pyrene	mg/kg	0.0050	0.0319	0.7820	<0.0050			<0.0050			<0.0050			<0.0050	<0.0050		ND			ND		ND	ND	0.0050	ND		0.0050	ND	0.0050
Benzo(b)fluoranthene	mg/kg	0.0050			<0.0050			<0.0050			<0.0050			<0.0050	<0.0050		ND			ND		ND	ND	0.0050	ND		0.0050	ND	0.0050
Benzo(g,h,i)perylene	mg/kg	0.0050			<0.0050			<0.0050			<0.0050			<0.0050	<0.0050		ND			ND		ND	ND	0.0050	ND		0.0050	ND	0.0050
Benzo(j)fluoranthene	mg/kg	0.0050			<0.0050			<0.0050			<0.0050			<0.0050	<0.0050		ND			ND		ND	ND	0.0050	ND		0.0050	ND	0.0050
Benzo(k)fluoranthene	mg/kg	0.0050			<0.0050			<0.0050			<0.0050			<0.0050	<0.0050		ND			ND		ND	ND	0.0050	ND		0.0050	ND	0.0050
Chrysene	mg/kg	0.0050	0.0571	0.8620	<0.0050			<0.0050			<0.0050			<0.0050	<0.0050		ND			ND		ND	ND	0.0050	ND		0.0050	ND	0.0050
Dibenz(a,h)anthracene	mg/kg	0.0050	0.0062	0.1350	<0.0050			<0.0050			<0.0050			<0.0050	<0.0050		ND			ND		ND	ND	0.0050	ND		0.0050	ND	0.0050
Fluoranthene	mg/kg	0.0050	0.1110	2.3550	<0.0050			<0.0050			<0.0050			<0.0050	<0.0050		ND			ND		ND	ND	0.0050	ND		0.0050	ND	0.0050
Fluorene	mg/kg	0.0050	0.0212	0.1440	<0.0050			<0.0050			<0.0050			<0.0050	<0.0050		ND			ND		ND	ND	0.0050	ND		0.0050	ND	0.0050
Indeno(1,2,3-cd)pyrene	mg/kg	0.0050			<0.0050			<0.0050			<0.0050			<0.0050	<0.0050		ND			ND		ND	ND	0.0050	ND		0.0050	ND	0.0050
Naphthalene	mg/kg	0.0050	0.0346	0.3910	<0.0050			<0.0050			<0.0050			<0.0050	<0.0050		ND			ND		ND	ND	0.0050	ND		0.0050	ND	0.0050
Perylene	mg/kg	0.0050			<0.0050			<0.0050			1.3			<0.0050	<0.0050		0.19			0.16		1.4	1.5	0.0050	2.3		0.0050	1.6	0.0050
Phenanthrene	mg/kg	0.0050	0.0419	0.5150	<0.0050			<0.0050			<0.0050			<0.0050	<0.0050		ND			ND		ND	ND	0.0050	ND		0.0050	ND	0.0050
Pyrene	mg/kg	0.0050	0.0530	0.8750	<0.0050			<0.0050			<0.0050			<0.0050	<0.0050		ND			ND		ND	ND	0.0050	ND		0.0050	ND	0.0050
Surrogate Recovery (%)																													
D10-Anthracene	%				86			82			86			83	92		79			81		84	85		86			79	
D14-Terphenyl	%				92			94			130			91	97		121			109		96	99		100			95	
D8-Acenaphthylene	%				82			76			82			77	80		78			77		80	80		78			77	
BTEX & F1 Hydrocarbons																													
Benzene	µg/g	0.020			<0.20			<0.020			<0.060			<0.020			ND			ND		ND		0.14	ND		0.20	ND	0.20
Toluene	µg/g	0.020			<0.20			<0.020			<0.060			<0.020			ND			ND		ND		0.14	ND		0.20	ND	0.20
Ethylbenzene	µg/g	0.020			<0.20			<0.020			<0.060			<0.020			ND			ND		ND		0.14	ND		0.20	ND	0.20
o-Xylene	µg/g	0.020			<0.20			<0.020			<0.060			<0.020			ND			ND		ND		0.14	ND		0.20	ND	0.20
p+m-Xylene	µg/g	0.040			<0.40			<0.040			<0.12			<0.040			ND			ND		ND		0.28	ND		0.40	ND	0.40
Total Xylenes	µg/g	0.040			<0.40			<0.040			<0.12			<0.040			ND			ND		ND		0.28	ND		0.40	ND	0.40
F1 (C6-C10)	µg/g	10			<100			<10			<30			<10			ND			ND		ND		70	ND		100	ND	100
F1 (C6-C10) - BTEX	µg/g	10			<100			<10			<30			<10			ND			ND		ND		70	ND		100	ND	100
F2-F4 Hydrocarbons																													
F4G-sg (Grav. Heavy Hydrocarbons)																	1200			440	590								
F2 (C10-C16 Hydrocarbons)	µg/g	10			<100			<10			46			<10			ND			ND		ND		70	ND		100	500	100
F3 (C16-C34 Hydrocarbons)	µg/g	10			720			<10			140			<10			71			67		ND		70	ND		100	180	100
F4 (C34-C50 Hydrocarbons)	µg/g	10			240			<10			<30			<10			13			16		ND		70	ND		100	ND	100
Reached Baseline at C50	µg/g				Yes			Yes			Yes			Yes			Yes			Yes		Yes			Yes			Yes	
Surrogate Recovery (%)																													
1,4-Difluorobenzene	%				97			97			97			99			101			102		99			102			103	
4-Bromofluorobenzene	%				109			108			108			108			98			100		96			99			85	
D10-Ethylbenzene	%				98			99			98			98			87			92		97			105			110	
D4-1,2-Dichloroethane	%				93			92			92			93			96			98		95			95			98	
o-Terphenyl	%				90			84			86			88			127			116		113			113			115	