



STAR-ORION SOUTH DIAMOND PROJECT
ENVIRONMENTAL IMPACT STATEMENT

APPENDIX 5.2.8-A

Tables

Table 1 Sampling dates for surface water quality in the Project LSA and RSA, 2005 to 2009.

Parameters	Waterbody	Station	Sampling Dates															
			2005				2006											
Field	Caution Creek	CCS-CN																
		CCS-01																
		CCS-02																
	101 Ravine	101-CN																
	West Perimeter Ravine	WPR-CN																
	West Ravine	WRS-CN																
		WRS-01				11-May-06	13-Jun-06	11-Aug-06	28-Oct-06	11-Nov-06	14-Dec-06							
		WRS-02				11-May-06	16-May-06	13-Jun-06	11-Aug-06	28-Oct-06	11-Nov-06	24-Dec-06						
		WRS-03				11-May-06	13-Jun-06	11-Aug-06	28-Oct-06	11-Nov-06	14-Dec-06							
	East Ravine	ERS-CN																
		ERS-01				11-May-06	16-Jun-06	11-Aug-06	30-Oct-06									
		ERS-02				11-May-06	13-Jun-06	12-Jul-06	31-Oct-06	12-Nov-06	1-Dec-06							
		ERS-03				11-May-06	15-Jun-06	11-Aug-06	31-Oct-06	25-Nov-06	1-Dec-06							
	Duke Ravine	DRS-CN				16-May-06	15-Jun-06	9-Aug-06	29-Oct-06	25-Nov-06	13-Dec-06							
		DSS-01																
	FALC Ravine	FRS-CN																
	Wapiti Ravine	WapRS-CN																
	English Creek	EC-CN																
		ECS-01																
	Saskatchewan River	SKR1																
		NSRS-01																
		NSRS-02																
		SKR2/NSRS-03																
		Gronlid Ferry Crossing																
	Cecil Ferry Crossing					24-May-06	26-Jun-06	26-Jul-06	22-Aug-06	19-Sep-06	17-Oct-06							
		Muskoday IR																
	Lab	Caution Creek	SA1				9-May-06											
SA4						2-May-06												
CCS-CN						1-Sep-06												
CCS-01																		
CCS-02																		
101 Ravine		SB1				2-May-06	31-Aug-06											
		101-CN																
West Perimeter Ravine		SE1				10-May-06	31-Aug-06											
		WPR-CN																
West Ravine		WRS-CN																
	WRS-01				13-Mar-06	15-Apr-06	11-May-06	13-Jun-06	12-Jul-06	11-Aug-06	3-Sep-06	28-Oct-06	19-Nov-06	14-Dec-06				
	WRS-02	16-Nov-05	25-Nov-05	5-Jan-06	3-Mar-06	15-Apr-06	16-May-06	13-Jun-06	12-Jul-06	11-Aug-06	3-Sep-06	28-Oct-06	19-Nov-06	24-Dec-06	21-Jan-07	18-Feb-07		
WRS-03				3-Mar-06	15-Apr-06	11-May-06	13-Jun-06	12-Jul-06	11-Aug-06	3-Sep-06	28-Oct-06	19-Nov-06	14-Dec-06					

Table 1 Sampling dates for surface water quality in the Project LSA and RSA, 2005 to 2009.

Parameters	Waterbody	Station	Sampling Dates														
			2007												2008		
Field	Caution Creek	CCS-CN	5-May-07	13-Aug-07	30-Oct-07											18-May-08	19-Aug-08
		CCS-01	27-Feb-07	16-Mar-07												5-Apr-08	9-May-08
		CCS-02														15-Apr-08	20-May-08
	101 Ravine	101-CN	6-May-07	11-Aug-07	28-Oct-07											18-May-08	19-Aug-08
	West Perimeter Ravine	WPR-CN	6-May-07	28-Oct-07												18-May-08	19-Aug-08
	West Ravine	WRS-CN	6-May-07	9-Aug-07	28-Oct-07											18-May-08	19-Aug-08
		WRS-01	21-Jan-07	18-Feb-07	11-Mar-07	9-Apr-07	7-May-07	7-Jun-07	2-Jul-07	20-Aug-07	9-Sep-07	20-Oct-07	10-Nov-07	21-Dec-07			
		WRS-02	21-Jan-07	18-Feb-07	11-Mar-07	19-Apr-07	7-May-07	7-Jun-07	2-Jul-07	20-Aug-07	9-Sep-07	20-Oct-07	20-Nov-07	21-Dec-07	4-Apr-08	2-May-08	
		WRS-03	21-Jan-07	18-Feb-07	18-Mar-07	8-Apr-07	7-May-07	7-Jun-07	2-Jul-07	27-Aug-07	7-Sep-07	20-Oct-07	12-Nov-07	21-Dec-07	6-Apr-08	3-May-08	
		WRS-04	31-Jan-07	28-Feb-07	17-Mar-07	30-Mar-07	12-Jun-07			16-Aug-07	23-Sep-07		17-Nov-07	28-Dec-07	6-Apr-08	3-May-08	
	East Ravine	ERS-CN	6-May-07	11-Aug-07	28-Oct-07											18-May-08	20-Aug-08
		ERS-01	21-Jan-07	28-Feb-07	18-Mar-07	9-Apr-07	7-May-07	11-Jun-07	2-Jul-07	9-Sep-07	20-Oct-07	12-Nov-07	26-Dec-07		4-Apr-08	2-May-08	
		ERS-02	21-Jan-07	28-Feb-07	30-Mar-07	9-Apr-07	7-May-07	8-Jun-07	2-Jul-07	9-Sep-07	20-Oct-07	12-Nov-07	26-Dec-07		4-Apr-08	3-May-08	
		ERS-03	31-Jan-07	28-Feb-07	17-Mar-07	8-Apr-07	6-May-07	12-Jun-07	2-Jul-07	15-Aug-07	9-Sep-07	20-Oct-07	11-Nov-07	28-Dec-07	6-Apr-08	3-May-08	
		ERS-04	31-Jan-07	28-Feb-07	17-Mar-07	30-Mar-07	12-Jun-07	16-Aug-07	23-Sep-07	17-Nov-07	28-Dec-07				6-Apr-08	3-May-08	
	Duke Ravine	DRS-CN														17-May-08	20-Aug-08
		DSS-01														30-Apr-08	22-May-08
	FALC Ravine	FRS-CN														17-May-08	20-Aug-08
	Wapiti Ravine	WapRS-CN														17-May-08	20-Aug-08
	English Creek	EC-CN	6-May-07	14-Aug-07	28-Oct-07											17-May-08	20-Aug-08
		ECS-01	28-Feb-07	16-Mar-07												6-Apr-08	21-May-08
	Saskatchewan River	SKR1	5-May-07	13-Aug-07	30-Oct-07											18-May-08	20-Aug-08
		NSRS-01														27-Aug-08	5-Nov-08
		NSRS-02														27-Aug-08	6-Nov-08
		SKR2/NSRS-03	6-May-07	14-Aug-07	28-Oct-07											18-May-08	19-Aug-08
		Gronlid Ferry Crossing	3-Jul-07	30-Jul-07	23-Aug-07	26-Sep-07	22-Oct-07	29-Nov-07								17-Jan-08	14-Feb-08
		Cecil Ferry Crossing	30-May-07	26-Jun-07	23-Aug-07	17-Sep-07	23-Oct-07									14-Jan-08	14-Feb-08
		Muskoday IR	30-Jul-07	27-Aug-07	24-Sep-07	25-Oct-07	29-Nov-07									17-Jan-08	14-Feb-08
Lab	Caution Creek	SA1															
		SA4															
		CCS-CN	5-May-07	13-Aug-07	30-Oct-07											18-May-08	20-Aug-08
		CCS-01	27-Feb-07	16-Mar-07	28-Apr-07	10-May-07	7-Jun-07	2-Jul-07	15-Aug-07	24-Sep-07	20-Oct-07	11-Nov-07	21-Dec-07		14-Jan-08	16-Feb-08	
		CCS-02														15-Apr-08	20-May-08
	101 Ravine	SB1															
		101-CN	6-May-07	11-Aug-07	28-Oct-07											18-May-08	20-Aug-08

Table 2 Surface water quality parameters (laboratory) for sampling stations SA1, SA4, and CCS-CN (Caution Creek), May 2006 to November 2008.

Parameters	Units	Summary Statistics											Sample ⁵									
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	SA1	SA4	CCS-CN	CCS-CN	CCS-CN	CCS-CN	CCS-CN	CCS-CN	CCS-CN	
								90 th	95 th	99 th			9-May-06	2-May-06	1-Sep-06	5-May-07	13-Aug-07	30-Oct-07	18-May-08	20-Aug-08	5-Nov-08	
Inorganic Ions																						
Bicarbonate	mg/L	9	9	-	246	221	370	306.8	338.4	363.7	260.1	45.88	233	291	370	221	260	246	233	249	238	
Calcium	mg/L	9	9	-	59	57	90	82.8	86.4	89.3	65.2	11.92	58	81	90	57	64	59	58	62	58	
Carbonate	mg/L	9	5	-	2.5	0.5	12	6.4	9.2	11.4	4.0	3.45	<5	<5	<5	12	5	<1	5	5	1	
Chloride	mg/L	9	7	-	1	0.5	2	2.0	2.0	2.0	1.1	0.55	1	<1	2	1	1	2	1	1	<1	
Fluoride	mg/L	6	6	-	0.15	0.12	0.17	0.2	0.2	0.2	0.1	0.02	-	-	-	0.14	0.17	0.16	0.16	0.13	0.12	
Hydroxide	mg/L	9	0	-	0.5	0.5	2.5	2.5	2.5	2.5	1.2	1.00	<5	<5	<5	<1	<1	<1	<1	<1	<1	
Ion Balance	%	3	3	-	111	106	116	115	115.5	115.9	111	5	106	116	111	-	-	-	-	-	-	
Magnesium	mg/L	9	9	-	13	12	24	16.8	20.4	23.3	14.0	3.87	12	15	24	12	13	13	12	13	12	
Potassium	mg/L	9	9	-	1.5	0.8	3	2.2	2.6	2.9	1.6	0.71	2	3	2	1.9	0.9	1.1	1.5	0.8	1.1	
Sodium	mg/L	9	9	-	3.5	3	7	4.6	5.8	6.8	3.9	1.21	3	4	7	3.4	3.5	3.5	3.3	3.4	3.7	
Sulfate	mg/L	9	6	-	3.8	3	5.4	4.7	5.0	5.3	3.8	0.82	<6	<6	<6	3.8	3.8	4.5	4.3	3.4	5.4	
Total Metals																						
Aluminum	mg/L	9	8	2	0.036	0.01	1.29	0.4	0.8	1.2	0.2	0.41	1.29	0.03	<0.02	0.14	0.055	0.026	0.1	0.035	0.036	
Antimony	mg/L	9	0	-	0.0001	0.0001	0.0005	0.0005	0.0005	0.0005	0.0002	0.00020	<0.001	<0.001	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Arsenic	ug/L	9	9	0	3.2	0.0007	4.9	4.3	4.6	4.8	2.4	1.95	0.0046	0.0007	0.0008	3.7	4.9	3.2	3.5	4.2	2.5	
Barium	mg/L	9	9	-	0.3	0.27	0.364	0.4	0.4	0.4	0.3	0.04	0.314	0.296	0.364	0.28	0.35	0.28	0.3	0.36	0.27	
Beryllium	mg/L	9	8	-	0.0001	0.00005	0.0005	0.0005	0.0005	0.0005	0.0002	0.00022	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	
Bismuth	mg/L	3	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	<0.0002	-	-	-	-	-	-	
Boron	mg/L	9	9	-	0.02	0.01	0.04	0.0	0.0	0.0	0.0	0.01	0.03	0.04	0.04	0.02	0.02	0.02	0.01	0.02	0.01	
Cadmium	mg/L	9	0	0	0.00005	0.00005	0.0001	0.00010	0.00010	0.00010	0.00007	0.000025	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Cesium	mg/L	3	0	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0	<0.0001	<0.0001	<0.0001	-	-	-	-	-	-	
Chromium	mg/L	9	2	2	0.00025	0.00025	0.0058	0.00276	0.00428	0.00550	0.00112	0.001845	0.002	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	0.0058	<0.0005	
Cobalt	mg/L	9	8	-	0.0002	0.0001	0.0007	0.0005	0.0006	0.0007	0.0003	0.00020	0.0007	<0.0002	0.0004	0.0003	0.0002	0.0001	0.0003	0.0001	0.0001	
Copper	mg/L	9	9	0	0.0007	0.0003	0.002	0.0016	0.0018	0.0020	0.0009	0.00056	0.001	0.002	0.001	0.0007	0.0004	0.0005	0.0006	0.0015	0.0003	
Iron	mg/L	9	9	8	0.84	0.1	2.56	1.5	2.1	2.5	1.0	0.67	2.56	0.1	0.83	1.29	0.92	0.84	1.11	0.76	0.71	
Lead	mg/L	9	8	0	0.0003	0.0001	0.0007	0.0006	0.0007	0.0007	0.0004	0.00023	0.0007	0.0006	<0.0005	0.0004	0.0002	0.0001	0.0003	0.0006	0.0001	
Manganese	mg/L	9	9	-	0.099	0.0066	0.539	0.2	0.4	0.5	0.1	0.16	0.162	0.0066	0.539	0.13	0.086	0.099	0.1	0.067	0.063	
Mercury	mg/L	3	1	1	0.0002	0.0002	0.0017	0.0014	0.00155	0.00167	0.0007	0.000866	<0.0004	<0.0004	0.0017	-	-	-	-	-	-	
Molybdenum	mg/L	9	9	0	0.0012	0.0006	0.0042	0.00	0.00	0.00	0.00	0.001	0.0012	0.0017	0.0042	0.0008	0.0014	0.0008	0.0006	0.0019	0.0007	
Nickel	mg/L	9	9	0	0.0009	0.0003	0.008	0.0056	0.0068	0.0078	0.0022	0.00264	0.008	0.005	0.002	0.0009	0.0006	0.0003	0.0007	0.0016	0.0003	
Rubidium	mg/L	3	3	-	0.0026	0.0025	0.0033	0.00316	0.00323	0.00329	0.00280	0.000436	0.0026	0.0033	0.0025	-	-	-	-	-	-	
Selenium	mg/L	9	6	2	0.0002	0.00005	0.002	0.0020	0.0020	0.0020	0.0006	0.00081	0.002	<0.001	0.002	0.0002	<0.0001	0.0002	<0.0001	0.0001	0.0002	
Silver	mg/L	9	0	0	0.00005	0.00005	0.0005	0.0005	0.0005	0.0005	0.0002	0.00023	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Strontium	mg/L	9	9	-	0.16	0.13	0.287	0.2	0.3	0.3	0.2	0.05	0.136	0.217	0.287	0.16	0.17	0.15	0.15	0.16	0.13	
Tellurium	mg/L	3	0	-	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0	<0.001	<0.001	<0.001	-	-	-	-	-	-	
Thallium	mg/L	9	0	0	0.0001	0.00005	0.0001	0.0001	0.0001	0.0001	0.0001	0.00003	<0.0001	<0.0001	<0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Tin	mg/L	9	7	-	0.00005	0.00005	0.0068	0.0023	0.0046	0.0064	0.0010	0.00221	<0.0006	<0.0006	0.0068	<0.0001	<0.0001	<0.0001	<0.0001	0.0012	<0.0001	
Titanium	mg/L	9	7	-	0.002	0.00045	0.0313	0.0101	0.0207	0.0292	0.0055	0.00980	0.0313	<0.0009	<0.0009	0.0048	0.0029	0.0015	0.0042	0.0017	0.002	
Tungsten	mg/L	3	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	<0.0002	-	-	-	-	-	-	
Uranium	ug/L	9	7	0	0.2	0.00005	0.4	0.40	0.40	0.40	0.20	0.173	0.0005	<0.0001	<0.0001	0.4	0.2	0.2	0.4	0.4	0.2	
Vanadium	mg/L	9	7	-	0.0005	0.0002	0.004	0.0019	0.0030	0.0038	0.0010	0.00118	0.004	<0.001	<0.001	0.0008	0.0004	0.0004	0.0007	0.0014	0.0002	
Zinc	mg/L	9	7	0	0.005	0.003	0.03	0.016	0.023	0.029	0.009	0.0086	<0.01	<0.01	0.01	0.0033	0.03	0.003	0.0065	0.013	0.0045	
Zirconium	mg/L	3	1	-	0.0002	0.0002	0.001	0.0008	0.0009	0.0010	0.0005	0.00046	0.001	<0.0004	<0.0004	-	-	-	-	-	-	

Table 2 Surface water quality parameters (laboratory) for sampling stations SA1, SA4, and CCS-CN (Caution Creek), May 2006 to November 2008.

Parameters	Units	Summary Statistics											Sample ⁵									
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	SA1	SA4	CCS-CN	CCS-CN	CCS-CN	CCS-CN	CCS-CN	CCS-CN	CCS-CN	
								90 th	95 th	99 th			9-May-06	2-May-06	1-Sep-06	5-May-07	13-Aug-07	30-Oct-07	18-May-08	20-Aug-08	5-Nov-08	
Nutrients																						
Ammonia as nitrogen	mg/L	8	4	-	0.025	0.005	0.12	0.099	0.110	0.118	0.046	0.0402	<0.05	<0.05	<0.05	0.06	0.09	0.12	-	0.02	<0.01	
Dissolved organic carbon	mg/L	9	9	-	8.4	4.4	28	24.0	26.0	27.6	11.2	8.37	9	23	28	8.4	9.2	5.3	7.7	5.8	4.4	
Dissolved phosphorus	mg/L	3	1	-	0.01	0.01	0.2	0.16	0.18	0.20	0.07	0.110	<0.02	<0.02	0.2	-	-	-	-	-	-	
Nitrate	mg/L	9	4	0	0.05	0.02	0.13	0.098	0.114	0.127	0.066	0.0368	<0.1	<0.1	<0.1	<0.04	<0.04	0.09	0.09	0.09	0.13	
Nitrite	mg/L	3	0	0	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0	<0.05	<0.05	<0.05	-	-	-	-	-	-	
Nitrite+Nitrate, nitrogen	mg/L	6	3	-	0.04	0.02	0.05	0.050	0.050	0.050	0.037	0.0151	<0.1	<0.1	<0.1	-	-	-	0.02	0.02	0.03	
Total Kjeldahl nitrogen	mg/L	8	8	-	0.48	0.21	1	0.9	1.0	1.0	0.6	0.31	0.8	0.9	1	0.59	0.31	0.25	-	0.37	0.21	
Total nitrogen	mg/L	3	3	-	0.31	0.27	0.59	0.534	0.562	0.584	0.390	0.1744	-	-	-	0.59	0.31	0.27	-	-	-	
Total organic carbon	mg/L	9	9	-	8.4	4.9	27	23.0	25.0	26.6	11.3	7.79	10	22	27	8.4	9.1	5.5	8	6.4	4.9	
Total phosphorus	mg/L	9	5	-	0.06	0.005	0.2	0.12	0.16	0.19	0.07	0.062	<0.2	<0.2	0.2	0.07	0.03	0.02	<0.01	0.06	<0.01	
Physical Properties																						
Chemical Oxygen Demand	mg/L	3	3	-	26	14	34	32.4	33.2	33.8	24.7	10.07	-	-	-	34	26	14	-	-	-	
pH	pH units	9	9	0	8.32	7.7	8.55	8.41	8.48	8.54	8.24	0.250	8.3	8	7.7	8.55	8.38	8.22	8.36	8.35	8.32	
Specific conductivity	µS/cm	9	9	-	357	212	550	454.0	502.0	540.4	373.7	88.62	350	430	550	357	396	349	353	212	366	
Sum of Ions	mg/L	6	6	-	324	312	351	344.0	347.5	350.3	327.7	14.47	-	-	-	312	351	329	318	337	319	
Total alkalinity	mg/L	9	9	-	202	191	303	251.0	277.0	297.8	217.8	35.02	191	238	303	201	221	202	199	208	197	
Total dissolved solids	mg/L	9	9	-	225	200	310	286.0	298.0	307.6	240.9	34.40	200	280	310	240	249	225	218	225	221	
Total hardness	mg/L	9	9	-	201	19	324	276.0	300.0	319.2	202.8	81.48	194	264	324	191	213	201	194	225	19	
Total suspended solids	mg/L	5	3	-	5	5	30	20.8	25.4	29.1	10.4	10.99	30	<10	<10	-	-	-	-	5	7	
Turbidity	NTU	9	9	-	7.3	0.15	15	12.6	13.8	14.8	8.1	4.55	12	0.15	4.5	12	7.3	9.3	15	5.3	7	
Dissolved Metals																						
Aluminum	mg/L	3	3	0 ⁶	0.04	0.02	0.05	0.048	0.049	0.050	0.037	0.0153	0.05	0.04	0.02	-	-	-	-	-	-	
Antimony	mg/L	3	0	-	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0	<0.001	<0.001	<0.001	-	-	-	-	-	-	
Arsenic	ug/L	3	3	0 ⁶	0.0006	0.0006	0.0013	0.0	0.0	0.0	0.0	0.00	0.0006	0.0006	0.0013	-	-	-	-	-	-	
Barium	mg/L	3	3	-	0.275	0.081	0.345	0.3	0.3	0.3	0.2	0.14	0.081	0.275	0.345	-	-	-	-	-	-	
Beryllium	mg/L	3	0	-	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0	<0.001	<0.001	<0.001	-	-	-	-	-	-	
Bismuth	mg/L	3	0	-	0.00015	0.00015	0.00015	0.0	0.0	0.0	0.0	0.00	<0.0003	<0.0003	<0.0003	-	-	-	-	-	-	
Boron	mg/L	3	3	-	0.04	0.04	0.05	0.048	0.049	0.050	0.043	0.0058	0.05	0.04	0.04	-	-	-	-	-	-	
Cadmium	mg/L	3	0	0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	<0.0002	-	-	-	-	-	-	
Cesium	mg/L	3	0	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00	<0.0001	<0.0001	<0.0001	-	-	-	-	-	-	
Chromium	mg/L	3	2	2 ⁶	0.005	0.0005	0.008	0.0074	0.0077	0.0079	0.0045	0.00377	0.005	0.008	<0.001	-	-	-	-	-	-	
Cobalt	mg/L	3	1	-	0.0001	0.0001	0.0004	0.0003	0.0004	0.0004	0.0002	0.00017	<0.0002	<0.0002	0.0004	-	-	-	-	-	-	
Copper	mg/L	3	3	0 ⁶	0.0007	0.0006	0.0017	0.0015	0.0016	0.0017	0.0010	0.00061	0.0017	0.0007	0.0006	-	-	-	-	-	-	
Iron	mg/L	3	3	0 ⁶	0.02	0.01	0.1	0.08	0.09	0.10	0.04	0.049	0.01	0.02	0.1	-	-	-	-	-	-	
Lead	mg/L	3	1	0 ⁶	0.00005	0.00005	0.0005	0.0004	0.0005	0.0005	0.0002	0.00026	<0.0001	<0.0001	0.0005	-	-	-	-	-	-	
Manganese	mg/L	3	3	-	0.0022	0.002	0.546	0.4372	0.4916	0.5351	0.1834	0.31402	0.0022	0.002	0.546	-	-	-	-	-	-	
Mercury	mg/L	3	0	0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	<0.0002	-	-	-	-	-	-	
Molybdenum	mg/L	3	3	0 ⁶	0.0012	0.0001	0.0016	0.00152	0.00156	0.00159	0.00097	0.000777	0.0001	0.0012	0.0016	-	-	-	-	-	-	
Nickel	mg/L	3	3	0 ⁶	0.0019	0.0018	0.0028	0.00262	0.00271	0.00278	0.00217	0.000551	0.0028	0.0019	0.0018	-	-	-	-	-	-	
Rubidium	mg/L	3	3	-	0.0025	0.0012	0.003	0.0029	0.0030	0.0030	0.0022	0.00093	0.0012	0.003	0.0025	-	-	-	-	-	-	
Selenium	mg/L	3	0	0	0.0005	0.0005	0.0005	0.00050	0.00050	0.00050	0.00050	0	<0.001	<0.001	<0.001	-	-	-	-	-	-	
Silver	mg/L	3	0	0	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0	<0.0005	<0.0005	<0.0005	-	-	-	-	-	-	
Strontium	mg/L	3	3	-	0.281	0.196	0.339	0.3274	0.3332	0.3378	0.2720	0.07192	0.339	0.196	0.281	-	-	-	-	-	-	

Table 2 Surface water quality parameters (laboratory) for sampling stations SA1, SA4, and CCS-CN (Caution Creek), May 2006 to November 2008.

Parameters	Units	Summary Statistics											Sample ⁵									
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	SA1	SA4	CCS-CN	CCS-CN	CCS-CN	CCS-CN	CCS-CN	CCS-CN	CCS-CN	
								90 th	95 th	99 th			9-May-06	2-May-06	1-Sep-06	5-May-07	13-Aug-07	30-Oct-07	18-May-08	20-Aug-08	5-Nov-08	
Tellurium	mg/L	3	0	-	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0	<0.0005	<0.0005	<0.0005	-	-	-	-	-	-	
Thallium	mg/L	3	0	0	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0	<0.0001	<0.0001	<0.0001	-	-	-	-	-	-	
Tin	mg/L	3	2	-	0.0003	0.00015	0.0003	0.00030	0.00030	0.00030	0.00025	0.000087	0.0003	<0.0003	0.0003	-	-	-	-	-	-	
Titanium	mg/L	3	1	-	0.00025	0.00025	0.0008	0.00069	0.00075	0.00079	0.00043	0.000318	0.0008	<0.0005	<0.0005	-	-	-	-	-	-	
Tungsten	mg/L	3	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	<0.0002	-	-	-	-	-	-	
Uranium	ug/L	3	1	0 ⁶	0.00005	0.00005	0.0011	0.00089	0.00100	0.00108	0.00040	0.000606	0.0011	<0.0001	<0.0001	-	-	-	-	-	-	
Vanadium	mg/L	3	3	-	0.003	0.003	0.004	0.0038	0.0039	0.0040	0.0033	0.00058	0.003	0.004	0.003	-	-	-	-	-	-	
Zinc	mg/L	3	1	0 ⁶	0.0025	0.0025	0.005	0.0045	0.0048	0.0050	0.0033	0.00144	0.005	<0.005	<0.005	-	-	-	-	-	-	
Zirconium	mg/L	3	0	-	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0	<0.0004	<0.0004	<0.0004	-	-	-	-	-	-	
Dissolved Silicon	mg/L	3	3	-	4.8	0.6	11.7	10.32	11.01	11.56	5.70	5.604	0.6	4.8	11.7	-	-	-	-	-	-	
TDS (Calculated)	mg/L	3	3	-	246	191	307	294.8	300.9	305.8	248.0	58.03	191	246	307	-	-	-	-	-	-	

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Boded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

6Dissolved metal guideline is not available, thus total metal guideline was used.

Table 3 Surface water quality parameters (laboratory) for sampling station CCS-01 (Caution Creek), February 2007 to January 2009.

Parameters	Units	Summary Statistics										
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴
								90 th	95 th	99 th		
Manganese	mg/L	10	10	-	0.158	0.0091	4.68	1.719	3.200	4.384	0.725	1.4492
Mercury	mg/L	2	0	0 ⁶	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0
Molybdenum	mg/L	10	10	0 ⁶	0.0009	0.0004	0.0018	0.00180	0.00180	0.00180	0.00102	0.000539
Nickel	mg/L	10	10	0 ⁶	0.0008	0.0005	0.0037	0.0022	0.00294	0.00355	0.00119	0.000983
Rubidium	mg/L	0	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	10	5	0 ⁶	0.000075	0.00005	0.0002	0.00011	0.00016	0.00019	0.00009	0.000047
Silver	mg/L	10	0	0 ⁶	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0
Strontium	mg/L	10	10	-	0.165	0.087	0.22	0.211	0.216	0.219	0.152	0.0468
Tellurium	mg/L	0	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	10	0	0 ⁶	0.0001	0.0001	0.0001	0.00010	0.00010	0.00010	0.00010	0
Tin	mg/L	10	2	-	0.00005	0.00005	0.0002	0.00011	0.00016	0.00019	0.00007	0.000048
Titanium	mg/L	10	7	-	0.0002	0.0001	0.001	0.0005	0.0007	0.0009	0.0003	0.00027
Tungsten	mg/L	0	-	-	-	-	-	-	-	-	-	-
Uranium	ug/L	10	2	0 ⁶	0.00025	0.0001	0.05	0.050	0.050	0.050	0.010	0.0210
Vanadium	mg/L	10	8	-	0.05	0.0001	0.2	0.06	0.13	0.19	0.05	0.058
Zinc	mg/L	10	10	0 ⁶	0.0001	0.00005	0.012	0.0120	0.0120	0.0120	0.0025	0.00501
Zirconium	mg/L	0	-	-	-	-	-	-	-	-	-	-
Dissolved Silicon	mg/L	0	-	-	-	-	-	-	-	-	-	-
TDS (Calculated)	mg/L	0	-	-	-	-	-	-	-	-	-	-

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Boded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

6Dissolved metal guideline is not available, thus total metal guideline was used.

Table 3 Surface water quality parameters (laboratory) for sampling station CCS-01 (Caution Creek), February 2007 to January 2009.

Parameters	Units	Sample ⁵										
		#07061	#07082	#07124	#07151	#07155	#07186	#07225	#07277	#07292	#07325	#07343
		27-Feb-07	16-Mar-07	28-Apr-07	10-May-07	07-Jun-07	02-Jul-07	15-Aug-07	24-Sep-07	20-Oct-07	11-Nov-07	21-Dec-07
Inorganic Ions												
Bicarbonate	mg/L	356	360	222	270	301	279	333	312	314	332	373
Calcium	mg/L	80	81	54	64	67	63	77	69	71	74	83
Carbonate	mg/L	<1	<1	<1	1	2	8	<1	<1	<1	<1	<1
Chloride	mg/L	5	1	<1	2	<1	<1	1	2	1	<1	<1
Fluoride	mg/L	0.16	0.1	0.09	0.16	0.18	0.18	0.16	0.15	0.13	0.14	0.15
Hydroxide	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ion balance	%	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	19	19	11	13	15	15	17	16	16	16	19
Potassium	mg/L	2.1	1.6	2.2	2.3	1.6	0.9	1.1	1.5	1.7	1.4	1.6
Sodium	mg/L	6.4	5.4	2.8	4	4	3.9	4.8	4.8	4.7	4.7	5.6
Sulfate	mg/L	1	0.5	1.4	0.8	0.5	0.4	0.5	0.4	0.5	0.9	1.2
Total Metals												
Aluminum	mg/L	0.071	0.32	0.0041	0.033	0.0033	0.0076	0.0037	0.0019	0.0008	0.035	0.043
Antimony	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-	<0.0002
Arsenic	ug/L	0.4	0.8	4	5.4	6	7.6	12	4.9	4.7	7.1	6.9
Barium	mg/L	0.3	0.31	0.36	0.45	0.51	0.52	0.65	0.47	0.45	0.46	0.51
Beryllium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	0.02	<0.01	0.02	0.02	0.03	0.03	0.03	0.02	0.02	0.02	0.02
Cadmium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cesium	mg/L	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cobalt	mg/L	0.0004	0.0007	<0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	<0.0001	0.0001	0.0002
Copper	mg/L	0.0011	0.00005	0.0002	0.0004	<0.0002	0.0002	<0.0002	0.0004	<0.0002	<0.0002	0.0022
Iron	mg/L	1.14	0.91	0.47	0.48	0.47	0.42	0.89	0.51	0.63	1.27	1.1
Lead	mg/L	0.0003	0.0003	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.0002
Manganese	mg/L	1.07	1.78	0.058	0.062	0.058	0.023	0.3	0.041	0.065	0.21	0.36
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	0.001	<0.0001	0.0014	0.0018	0.0016	0.0015	0.0014	0.0012	0.0013	<0.0001	0.0019
Nickel	mg/L	0.0007	0.0009	0.0002	0.0004	0.0003	0.0003	0.0003	0.0002	<0.0001	0.0003	0.0009
Rubidium	mg/L	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001
Silver	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Strontium	mg/L	0.18	0.2	0.16	0.19	0.21	0.21	0.26	0.21	0.21	0.21	0.24
Tellurium	mg/L	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Tin	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001
Titanium	mg/L	0.0021	0.0048	<0.0002	0.001	0.0002	0.0002	0.0002	0.0011	<0.0002	0.0013	0.0024

Table 4 Surface water quality parameters (laboratory) for sampling station CCS-02 (Caution Creek), April 2008 to December 2009.

Parameters	Units	Summary Statistics										
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴
								90 th	95 th	99 th		
Inorganic Ions												
Bicarbonate	mg/L	16	16	-	289	124	415	365.5	394.8	411.0	287.1	71.78
Calcium	mg/L	16	16	-	69.5	28	102	90.5	97.5	101.1	68.3	18.66
Carbonate	mg/L	16	3	-	0.5	0.5	12	4.5	6.8	11.0	1.7	3.07
Chloride	mg/L	16	13	-	1	0.5	3	2.0	2.3	2.9	1.4	0.72
Fluoride	mg/L	16	16	-	0.16	0.1	0.2	0.2	0.2	0.2	0.2	0.03
Hydroxide	mg/L	16	0	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0
Ion Balance	%	0	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	16	16	-	15	6.3	19	18.0	18.3	18.9	14.3	3.58
Potassium	mg/L	16	16	-	1.5	0.3	4.2	2.7	3.2	4.0	1.6	1.01
Sodium	mg/L	16	16	-	4.65	2	6.7	6.3	6.5	6.7	4.6	1.20
Sulfate	mg/L	16	16	-	0.85	0.4	2	1.3	1.6	1.9	0.9	0.37
Metals												
Aluminum	mg/L	16	13	0	0.0063	0.00025	0.093	0.0	0.1	0.1	0.0	0.03
Antimony	mg/L	16	0	-	0.0001	0.00005	0.0001	0.0001	0.0001	0.0001	0.0001	0.00001
Arsenic	ug/L	16	16	0	0.85	0.4	4.7	3.2	4.3	4.6	1.4	1.29
Barium	mg/L	16	16	-	0.22	0.097	0.39	0.3	0.4	0.4	0.2	0.08
Beryllium	mg/L	16	0	-	0.0001	0.00005	0.0001	0.0001	0.0001	0.0001	0.0001	0.00001
Bismuth	mg/L	0	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	16	13	-	0.02	0.005	0.04	0.025	0.033	0.039	0.017	0.0095
Cadmium	mg/L	16	1	1	0.00005	0.000005	0.0001	0.00008	0.00010	0.00010	0.00005	0.000025
Cesium	mg/L	0	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	16	5	5	0.00025	0.00025	0.024	0.0062	0.0111	0.0214	0.0029	0.00605
Cobalt	mg/L	16	13	-	0.0001	0.00005	0.0017	0.00095	0.00148	0.00166	0.00032	0.000496
Copper	mg/L	16	9	0	0.0003	0.0001	0.0019	0.0013	0.0015	0.0018	0.0005	0.00054
Iron	mg/L	16	16	8	0.275	0.019	11.1	5.66	10.05	10.89	1.65	3.451
Lead	mg/L	16	8	0	0.000075	0.00005	0.0007	0.00055	0.00063	0.00069	0.00018	0.000217
Manganese	mg/L	16	16	-	0.1125	0.0042	1.92	1.370	1.860	1.908	0.366	0.6297
Mercury	mg/L	3	0	0	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0
Molybdenum	mg/L	16	16	0	0.0011	0.0004	0.0024	0.00160	0.00180	0.00228	0.00107	0.000563
Nickel	mg/L	16	16	0	0.0004	0.0001	0.0036	0.00210	0.00270	0.00342	0.00081	0.000974
Rubidium	mg/L	0	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	16	8	0	0.000075	0.00005	0.0002	0.0002	0.0002	0.0002	0.0001	0.00006
Silver	mg/L	16	0	0	0.00005	0.000005	0.00005	0.00005	0.00005	0.00005	0.000044	0.0000154
Strontium	mg/L	16	16	-	0.185	0.075	0.27	0.245	0.255	0.267	0.184	0.0522
Tellurium	mg/L	0	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	16	0	0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0
Tin	mg/L	16	5	-	0.00005	0.00005	0.0009	0.0007	0.0008	0.0009	0.0002	0.00028
Titanium	mg/L	16	11	-	0.00025	0.0001	0.0029	0.0015	0.0022	0.0028	0.0006	0.00078
Tungsten	mg/L	0	-	-	-	-	-	-	-	-	-	-
Uranium	ug/L	16	2	0	0.05	0.05	0.2	0.05	0.09	0.18	0.06	0.038
Vanadium	mg/L	16	12	-	0.0001	0.00005	0.0011	0.00085	0.00103	0.00109	0.00028	0.000344
Zinc	mg/L	16	15	1	0.00475	0.00025	0.056	0.0190	0.0358	0.0520	0.0090	0.01416
Zirconium	mg/L	0	-	-	-	-	-	-	-	-	-	-
Nutrients												
Ammonia as nitrogen	mg/L	16	16	-	0.09	0.02	0.66	0.335	0.420	0.612	0.141	0.1672
Dissolved organic carbon	mg/L	10	10	-	17.5	12	32	28.4	30.2	31.6	19.9	6.45
Dissolved phosphorus	mg/L	11	7	-	0.01	0.005	0.05	0.050	0.050	0.050	0.021	0.0210
Nitrate	mg/L	15	11	0	0.09	0.02	0.35	0.238	0.322	0.344	0.107	0.1009
Nitrite	mg/L	0	-	-	-	-	-	-	-	-	-	-
Nitrite+Nitrate, nitrogen	mg/L	16	11	-	0.02	0.005	0.08	0.060	0.073	0.079	0.026	0.0232

Table 4 Surface water quality parameters (laboratory) for sampling station CCS-02 (Caution Creek), April 2008 to December 2009.

Parameters	Units	Sample ⁵															
		#08049 15-Apr-08	#08081 20-May-08	#08116 5-Jun-08	#08133 9-Jul-08	#08181 16-Aug-08	#08239 12-Sep-08	#08260 18-Oct-08	#08320 19-Nov-08	#08323 15-Dec-08	#08354 15-Jan-08	#09026 9-Feb-08	#9046 12-Apr-09	#9054 17-Jun-09	#9075 30-Aug-09	#9088 11-Oct-09	#9105 2-Dec-09
Nitrite+Nitrate, nitrogen	mg/L	0.02	<0.01	<0.01	<0.01	<0.01	0.07	0.02	<0.01	0.01	0.02	0.03	0.03	0.05	0.03	0.03	0.08
Total Kjeldahl nitrogen	mg/L	0.72	208	0.43	0.65	1.4	1.6	0.69	0.48	0.53	1.2	1.2	0.85	0.4	0.96	0.84	0.52
Total nitrogen	mg/L	-	0.72	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon	mg/L	19	17	18	21	23	23	16	13	16	26	31	16	12	22	20	12
Total phosphorus	mg/L	0.03	0.01	<0.01	0.05	0.05	0.2	0.03	0.05	0.005	0.07	0.05	0.06	<0.01	0.05	<0.01	0.01
Physical Properties																	
Chemical Oxygen Demand	mg/L	51	48	52	52	73	65	42	38	39	65	76	40	38	53	46	26
pH	pH units	7.83	8.41	8.26	8.1	8.01	8.12	8.36	7.79	7.54	7.75	7.41	7.75	8.12	8.16	8.52	7.19
Specific conductivity	µS/cm	205	373	387	413	457	511	455	405	478	574	620	316	332	467	455	342
Sum of Ions	mg/L	168	342	356	383	424	483	406	370	427	514	550	265	289	430	395	302
Total alkalinity	mg/L	102	215	224	241	265	281	258	233	264	318	340	163	182	270	253	191
Total dissolved solids	mg/L	152	<1	283	289	332	370	293	245	278	352	405	204	226	320	321	212
Total hardness	mg/L	96	256	213	231	258	286	239	218	260	313	332	157	163	262	251	179
Total suspended solids	mg/L	2	9	1	1	47	17	3	-	11	56	32	-	-	-	-	-
Turbidity	NTU	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																	
Aluminum	mg/L	0.014	0.0037	0.0021	0.0022	0.0032	0.0064	0.006	0.0051	0.0013	0.012	0.0028	-	-	-	-	-
Antimony	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	-	-
Arsenic	ug/L	0.7	0.8	0.9	1.2	1.8	1.3	0.8	0.6	1.4	3	3.9	-	-	-	-	-
Barium	mg/L	0.13	0.19	0.22	0.23	0.24	0.27	0.22	0.2	0.25	0.35	0.4	-	-	-	-	-
Beryllium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-
Bismuth	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	0.01	0.02	0.02	0.02	0.04	0.02	0.02	<0.01	0.02	0.03	0.01	-	-	-	-	-
Cadmium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	-	-	-	-	-
Cesium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	0.0005	0.0017	0.27	0.092	0.016	0.025	0.097	0.011	0.059	0.14	0.066	-	-	-	-	-
Cobalt	mg/L	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0005	0.0014	0.0014	-	-	-	-	-
Copper	mg/L	0.0021	0.001	0.0003	0.0015	0.0014	0.0011	0.0033	0.0004	0.0003	0.0037	0.0002	-	-	-	-	-
Iron	mg/L	0.23	0.04	0.035	0.051	0.047	0.033	0.045	0.12	0.25	4.12	9.5	-	-	-	-	-
Lead	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0008	<0.0001	-	-	-	-	-
Manganese	mg/L	0.11	0.017	0.0048	0.015	0.041	0.019	0.045	0.052	1	1.87	1.91	-	-	-	-	-
Mercury	mg/L	-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	-	-	-	-	-
Molybdenum	mg/L	0.0013	0.0013	0.0013	0.0006	0.0009	0.0005	0.0011	0.0005	0.0005	0.0008	0.0003	-	-	-	-	-
Nickel	mg/L	0.0049	0.0009	0.0008	0.0007	0.0009	0.0012	0.0014	0.0009	0.0007	0.0015	0.0009	-	-	-	-	-
Rubidium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	<0.0001	<0.0001	<0.0001	0.0001	0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	-	-	-	-	-
Silver	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-
Strontium	mg/L	0.078	0.18	0.19	0.21	0.19	0.24	0.21	0.15	0.2	0.24	0.27	-	-	-	-	-
Tellurium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	-	-
Tin	mg/L	0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.0001	<0.0001	0.0002	0.0002	0.0001	-	-	-	-	-
Titanium	mg/L	0.0008	0.0002	<0.0002	0.0002	0.0003	0.0004	0.0003	0.0004	<0.0002	0.0007	0.0002	-	-	-	-	-
Tungsten	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	ug/L	<0.1	0.00002	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.05	<0.1	<0.1	-	-	-	-	-
Vanadium	mg/L	0.0002	<1	0.0001	0.0001	0.0001	0.0002	0.0001	0.0001	0.0001	0.0002	0.0002	-	-	-	-	-
Zinc	mg/L	0.0061	0.004	0.0096	0.0061	0.0068	0.0081	0.016	0.0057	0.0092	0.014	0.0085	-	-	-	-	-
Zirconium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Silicon	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDS (Calculated)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

Table 4 Surface water quality parameters (laboratory) for sampling station CCS-02 (Caution Creek), April 2008 to December 2009.

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

6Dissolved metal guideline is not available, thus total metal guideline was used.

Table 5 Surface water quality parameters (laboratory) for sampling stations SB1 and 101-CN (101 Ravine), May 2006 to November 2008.

Parameters	Units	Summary Statistics											Sample ⁵								
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	SB1	SB1	101-CN	101-CN	101-CN	101-CN	101-CN	101-CN	
								90 th	95 th	99 th			2-May-06	31-Aug-06	6-May-07	11-Aug-07	28-Oct-07	18-May-08	20-Aug-08	5-Nov-08	
Inorganic Ions																					
Bicarbonate	mg/L	8	8	-	305.5	243	353	348.1	350.6	352.5	304.6	39.59	255	329	243	300	346	301	353	310	
Calcium	mg/L	8	8	-	74	64	89	83.4	86.2	88.4	74.5	8.52	64	81	64	71	79	75	89	73	
Carbonate	mg/L	8	7	-	8.5	2.5	17	12.8	14.9	16.6	8.4	4.53	<5	9	17	8	4	10	11	6	
Chloride	mg/L	8	7	-	1	0.5	2	1.3	1.7	1.9	1.1	0.42	<1	1	1	2	1	1	1	1	
Fluoride	mg/L	6	6	-	0.17	0.14	0.21	0.205	0.208	0.210	0.172	0.0299	-	-	0.14	0.21	0.2	0.18	0.16	0.14	
Hydroxide	mg/L	8	0	-	0.5	0.5	2.5	2.50	2.50	2.50	1.00	0.926	<5	<5	<1	<1	<1	<1	<1	<1	
Ion Balance	%	2	2	-	105	104	106	105.8	105.9	105.98	105.0	1.41	106	104	-	-	-	-	-	-	
Magnesium	mg/L	8	8	-	20.5	16	26	24.6	25.3	25.9	20.5	3.55	16	24	16	20	22	19	26	21	
Potassium	mg/L	8	8	-	2.15	1.6	2.4	2.33	2.37	2.39	2.11	0.253	2	2	2.1	1.6	2.3	2.2	2.3	2.4	
Sodium	mg/L	8	8	-	5.45	3	9.1	8.3	8.7	9.0	5.9	1.95	3	8	4.4	5.3	5.5	6.7	9.1	5.4	
Sulfate	mg/L	8	8	-	14	8.3	31	26.8	28.9	30.6	17.3	8.04	11	23	13	15	12	25	31	8.3	
Total Metals																					
Aluminum	mg/L	8	8	4	0.1005	0.038	0.87	0.408	0.639	0.824	0.198	0.2768	0.87	0.21	0.13	0.11	0.038	0.088	0.046	0.091	
Antimony	mg/L	8	0	-	0.0001	0.0001	0.0005	0.0005	0.0005	0.0005	0.00020	0.000185	<0.001	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Arsenic	ug/L	8	7	0	1.75	0.00025	3.7	2.72	3.21	3.60	1.60	1.216	0.0017	<0.0005	1.6	3.7	1.9	1.3	2.3	2	
Barium	mg/L	8	8	-	0.164	0.14	0.19	0.184	0.187	0.189	0.165	0.0181	0.1580	0.1820	0.15	0.18	0.15	0.17	0.19	0.14	
Beryllium	mg/L	8	0	-	0.0001	0.00005	0.0005	0.0005	0.0005	0.0005	0.0002	0.00021	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Bismuth	mg/L	2	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	-	-	-	-	-	-	
Boron	mg/L	8	8	-	0.035	0.02	0.06	0.053	0.057	0.059	0.038	0.0128	0.04	0.05	0.03	0.04	0.03	0.03	0.06	0.02	
Cadmium	mg/L	8	1	1	0.00005	0.00005	0.0001	0.00010	0.00010	0.00010	0.00007	0.000026	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	
Cesium	mg/L	2	0	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0	<0.0001	<0.0001	-	-	-	-	-	-	
Chromium	mg/L	8	2	2	0.00025	0.00025	0.002	0.0020	0.0020	0.0020	0.0007	0.00081	0.002	0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Cobalt	mg/L	8	8	-	0.0002	0.0001	0.0004	0.0004	0.0004	0.0004	0.0002	0.00012	0.0004	0.0004	0.0002	0.0003	0.0001	0.0002	0.0001	0.0002	
Copper	mg/L	8	7	0	0.0008	0.0004	0.002	0.0012	0.0016	0.0019	0.0009	0.00049	0.002	<0.001	0.0009	0.0009	0.0004	0.0008	0.0007	0.0008	
Iron	mg/L	8	8	7	0.625	0.27	0.96	0.848	0.904	0.949	0.616	0.2255	0.96	0.80	0.52	0.73	0.47	0.45	0.27	0.73	
Lead	mg/L	8	5	0	0.000225	0.00005	0.0005	0.0004	0.0005	0.0005	0.0002	0.00015	<0.0005	<0.0005	0.0004	0.0002	<0.0001	0.0002	0.0001	0.0005	
Manganese	mg/L	8	8	-	0.0607	0.057	0.13	0.100	0.115	0.127	0.073	0.0252	0.0614	0.0700	0.059	0.087	0.058	0.06	0.057	0.13	
Mercury	mg/L	2	0	0	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0	<0.0004	<0.0004	-	-	-	-	-	-	
Molybdenum	mg/L	8	8	0	0.0008	0.0005	0.0015	0.00136	0.00143	0.00149	0.00089	0.000360	0.0010	0.0013	0.0006	0.0009	0.0007	0.0006	0.0015	0.0005	
Nickel	mg/L	8	8	0	0.00125	0.0008	0.008	0.0038	0.0059	0.0076	0.0021	0.00240	0.002	0.008	0.0012	0.0016	0.0008	0.001	0.0013	0.0011	
Rubidium	mg/L	2	2	-	0.00145	0.0011	0.0018	0.00173	0.001765	0.001793	0.00145	0.000494975	0.0018	0.0011	-	-	-	-	-	-	
Selenium	mg/L	8	6	0	0.0002	0.00005	0.001	0.0007	0.0008	0.0010	0.0003	0.00031	<0.001	0.001	0.0002	0.0001	0.0002	<0.0001	0.0002	0.0003	
Silver	mg/L	8	0	0	0.00005	0.00005	0.0005	0.0005	0.0005	0.0005	0.00016	0.000208	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Strontium	mg/L	8	8	-	0.27	0.198	0.31	0.303	0.307	0.309	0.264	0.0394	0.198	0.300	0.22	0.28	0.29	0.25	0.31	0.26	
Tellurium	mg/L	2	0	-	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0	<0.001	<0.001	-	-	-	-	-	-	
Thallium	mg/L	8	0	0	0.0001	0.00005	0.0001	0.0001	0.0001	0.0001	0.0001	0.00002	<0.0001	<0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Tin	mg/L	8	0	-	0.00005	0.00005	0.0003	0.0003	0.0003	0.0003	0.0001	0.00012	<0.0006	<0.0006	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Titanium	mg/L	8	8	-	0.0043	0.0021	0.0251	0.0117	0.0184	0.0238	0.0066	0.00758	0.0251	0.0045	0.0046	0.0059	0.0021	0.0041	0.0023	0.0041	
Tungsten	mg/L	2	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	-	-	-	-	-	-	
Uranium	ug/L	8	8	0	0.85	0.0008	1.5	1.3	1.4	1.5	0.8	0.54	0.0012	0.0008	1.2	0.9	0.8	1.5	1.1	0.7	
Vanadium	mg/L	8	8	-	0.0009	0.0003	0.003	0.0023	0.0027	0.0029	0.0012	0.00089	0.003	0.002	0.0009	0.0009	0.0003	0.0007	0.0006	0.0009	
Zinc	mg/L	8	6	0	0.005	0.002	0.021	0.0147	0.0179	0.0204	0.0069	0.00649	<0.01	<0.01	0.012	0.0051	0.0029	0.0025	0.002	0.021	
Zirconium	mg/L	2	2	-	0.00075	0.0004	0.0011	0.00103	0.001065	0.001093	0.00075	0.000494975	0.0011	0.0004	-	-	-	-	-	-	
Nutrients																					

Table 5 Surface water quality parameters (laboratory) for sampling stations SB1 and 101-CN (101 Ravine), May 2006 to November 2008.

Parameters	Units	Summary Statistics											Sample ⁵								
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	SB1	SB1	101-CN	101-CN	101-CN	101-CN	101-CN	101-CN	
								90 th	95 th	99 th			2-May-06	31-Aug-06	6-May-07	11-Aug-07	28-Oct-07	18-May-08	20-Aug-08	5-Nov-08	
Ammonia as nitrogen	mg/L	8	5	-	0.04	0.005	0.21	0.189	0.200	0.208	0.081	0.0789	<0.05	<0.05	0.05	0.21	0.12	0.18	0.03	<0.01	
Dissolved organic carbon	mg/L	8	8	-	10	6.7	15	15.0	15.0	15.0	10.5	3.08	11	15	6.7	15	10	7.8	10	8.7	
Dissolved phosphorus	mg/L	2	1	-	0.075	0.01	0.14	0.127	0.134	0.139	0.075	0.0919	<0.02	0.14	-	-	-	-	-	-	
Nitrate	mg/L	8	4	0	0.07	0.02	0.4	0.3	0.4	0.4	0.1	0.14	<0.1	<0.1	<0.04	<0.04	0.13	0.4	0.31	0.09	
Nitrite	mg/L	2	0	0	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0	<0.05	<0.05	-	-	-	-	-	-	
Nitrite+Nitrate, nitrogen	mg/L	5	3	-	0.05	0.02	0.09	0.082	0.086	0.089	0.056	0.0261	<0.1	<0.1	-	-	-	0.09	0.07	0.02	
Total Kjeldahl nitrogen	mg/L	7	7	-	0.5	0.37	0.87	0.708	0.789	0.854	0.536	0.1731	0.6	0.5	0.58	0.87	0.37	-	0.46	0.37	
Total nitrogen	mg/L	3	3	-	0.58	0.4	0.87	0.812	0.841	0.864	0.617	0.2371	-	-	0.58	0.87	0.4	-	-	-	
Total organic carbon	mg/L	8	8	-	11	7.8	15	15.0	15.0	15.0	11.1	2.78	12	15	8.9	15	11	7.8	11	8.4	
Total phosphorus	mg/L	8	6	-	0.035	0.005	0.4	0.2	0.3	0.4	0.1	0.13	<0.2	0.40	0.04	0.04	<0.01	0.02	0.02	0.03	
Physical Properties																					
Chemical Oxygen Demand	mg/L	3	3	-	24	24	40	36.8	38.4	39.7	29.3	9.24	-	-	24	40	24	-	-	-	
pH	pH units	8	8	0	8.4	8.2	8.61	8.498	8.554	8.599	8.375	0.1355	8.2	8.2	8.61	8.41	8.32	8.45	8.42	8.39	
Specific conductivity	µS/cm	8	8	-	487.5	400	569	541.7	555.4	566.3	482.4	55.08	400	530	415	486	491	489	569	479	
Sum of Ions	mg/L	6	6	-	434	361	523	497.5	510.3	520.5	441.2	54.05	-	-	361	423	472	441	523	427	
Total alkalinity	mg/L	8	8	-	263.5	209	307	295.1	301.1	305.8	263.0	32.36	209	284	227	260	290	263	307	264	
Total dissolved solids	mg/L	8	8	-	318.5	240	360	343.9	352.0	358.4	307.3	40.07	240	330	262	318	337	319	360	292	
Total hardness	mg/L	8	8	-	266.5	225	329	309.4	319.2	327.0	270.0	35.54	226	301	225	259	287	265	329	268	
Total suspended solids	mg/L	5	1	-	5	2	20	16.4	18.2	19.6	8.4	7.30	20	<10	-	-	-	11	4	2	
Turbidity	NTU	8	8	-	6.35	2.6	16	15.3	15.7	15.9	8.0	5.17	16.00	2.60	15	7.2	5.5	10	3.7	4.1	
Dissolved Metals																					
Aluminum	mg/L	2	2	0 ⁶	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0	0.07	0.07	-	-	-	-	-	-	
Antimony	mg/L	2	0	-	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0	<0.001	<0.001	-	-	-	-	-	-	
Arsenic	ug/L	2	2	0 ⁶	0.00165	0.0011	0.0022	0.00209	0.00215	0.00219	0.00165	0.000778	0.0011	0.0022	-	-	-	-	-	-	
Barium	mg/L	2	2	-	0.156	0.141	0.171	0.1680	0.1695	0.1707	0.1560	0.02121	0.141	0.171	-	-	-	-	-	-	
Beryllium	mg/L	2	0	-	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0	<0.001	<0.001	-	-	-	-	-	-	
Bismuth	mg/L	2	0	-	0.00015	0.00015	0.00015	0.00015	0.00015	0.00015	0.00015	0	<0.0003	<0.0003	-	-	-	-	-	-	
Boron	mg/L	2	2	-	0.055	0.05	0.06	0.059	0.060	0.060	0.055	0.0071	0.05	0.06	-	-	-	-	-	-	
Cadmium	mg/L	2	0	0	0.0001	0.0001	0.0001	0.00010	0.00010	0.00010	0.00010	0	<0.0002	<0.0002	-	-	-	-	-	-	
Cesium	mg/L	2	0	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0	<0.0001	<0.0001	-	-	-	-	-	-	
Chromium	mg/L	2	1	1 ⁶	0.00425	0.0005	0.008	0.0073	0.0076	0.0079	0.0043	0.00530	0.008	<0.001	-	-	-	-	-	-	
Cobalt	mg/L	2	1	-	0.0002	0.0001	0.0003	0.0003	0.0003	0.0003	0.0002	0.00014	<0.0002	0.0003	-	-	-	-	-	-	
Copper	mg/L	2	2	0 ⁶	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0	0.0013	0.0013	-	-	-	-	-	-	
Iron	mg/L	2	2	1 ⁶	0.215	0.03	0.4	0.36	0.38	0.40	0.22	0.262	0.03	0.40	-	-	-	-	-	-	
Lead	mg/L	2	2	0 ⁶	0.0003	0.0002	0.0004	0.0004	0.0004	0.0004	0.0003	0.00014	0.0004	0.0002	-	-	-	-	-	-	
Manganese	mg/L	2	2	-	0.04715	0.025	0.0693	0.0649	0.0671	0.0689	0.0472	0.03132	0.0250	0.0693	-	-	-	-	-	-	
Mercury	mg/L	2	0	0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	-	-	-	-	-	-	
Molybdenum	mg/L	2	2	0 ⁶	0.0026	0.001	0.0042	0.0039	0.0040	0.0042	0.0026	0.00226	0.0042	0.0010	-	-	-	-	-	-	
Nickel	mg/L	2	2	0 ⁶	0.0032	0.0031	0.0033	0.00328	0.00329	0.00330	0.00320	0.000141	0.0033	0.0031	-	-	-	-	-	-	
Rubidium	mg/L	2	2	-	0.0009	0.0008	0.001	0.0010	0.0010	0.0010	0.0009	0.00014	0.0008	0.0010	-	-	-	-	-	-	
Selenium	mg/L	2	0	0 ⁶	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0	<0.001	<0.001	-	-	-	-	-	-	
Silver	mg/L	2	0	0	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0	<0.0005	<0.0005	-	-	-	-	-	-	
Strontium	mg/L	2	2	-	0.237	0.182	0.292	0.2810	0.2865	0.2909	0.2370	0.07778	0.182	0.292	-	-	-	-	-	-	
Tellurium	mg/L	2	0	-	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0	<0.0005	<0.0005	-	-	-	-	-	-	
Thallium	mg/L	2	0	0 ⁶	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0	<0.0001	<0.0001	-	-	-	-	-	-	

Table 5 Surface water quality parameters (laboratory) for sampling stations SB1 and 101-CN (101 Ravine), May 2006 to November 2008.

Parameters	Units	Summary Statistics											Sample ⁵							
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	SB1	SB1	101-CN	101-CN	101-CN	101-CN	101-CN	101-CN
								90 th	95 th	99 th			2-May-06	31-Aug-06	6-May-07	11-Aug-07	28-Oct-07	18-May-08	20-Aug-08	5-Nov-08
Tin	mg/L	2	0	-	0.00015	0.00015	0.00015	0.00015	0.00015	0.00015	0.00015	0	<0.0003	<0.0003	-	-	-	-	-	-
Titanium	mg/L	2	2	-	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0	0.0024	0.0024	-	-	-	-	-	-
Tungsten	mg/L	2	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	-	-	-	-	-	-
Uranium	ug/L	2	2	0 ⁶	0.001	0.0008	0.0012	0.00116	0.00118	0.00120	0.00100	0.000283	0.0012	0.0008	-	-	-	-	-	-
Vanadium	mg/L	2	2	-	0.003	0.002	0.004	0.0038	0.0039	0.0040	0.0030	0.00141	0.004	0.002	-	-	-	-	-	-
Zinc	mg/L	2	1	0 ⁶	0.00525	0.0025	0.008	0.0075	0.0077	0.0079	0.0053	0.00389	0.008	<0.005	-	-	-	-	-	-
Zirconium	mg/L	2	0	-	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0	<0.0004	<0.0004	-	-	-	-	-	-
Dissolved Silicon	mg/L	2	2	-	6	3.8	8.2	7.76	7.98	8.156	6.00	3.111	3.8	8.2	-	-	-	-	-	-
TDS (calculated)	mg/L	2	2	-	265	221	309	300.2	304.6	308.1	265.0	62.23	221	309	-	-	-	-	-	-

Notes: 1N = number of samples.
 2Number of samples greater than or equal to detection limit (DL).
 3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.
 4For calculation of descriptives statistics, values < DL were set to half the value of DL.
 5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).
 6Dissolved metal guideline is not available, thus total metal guideline was used.

Table 6 Surface water quality parameters (laboratory) for sampling stations SE1 and WPR-CN (West Perimeter Ravine), May 2006 to November 2008.

Parameters	Units	Summary Statistics											Sample ⁵		SE1	SE1	WPR-CN	WPR-CN	WPR-CN	WPR-CN	WPR-CN
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	SE1	SE1							
								90 th	95 th	99 th			10-May-06	31-Aug-06							
Inorganic Ions																					
Bicarbonate	mg/L	7	7	-	264	226	284	282.2	283.1	283.8	262.4	19.42	253	261	226	281	268	264	284		
Calcium	mg/L	7	7	-	63	57	66	66.0	66.0	66.0	62.1	3.53	60	64	57	63	66	59	66		
Carbonate	mg/L	7	6	-	7	2.5	12	9.6	10.8	11.8	6.9	2.83	<10	7	12	6	7	8	6		
Chloride	mg/L	7	4	-	1	0.5	1	1.0	1.0	1.0	0.8	0.27	<1	1	1	1	<1	1	<1		
Fluoride	mg/L	5	5	-	0.13	0.11	0.16	0.156	0.158	0.160	0.134	0.0207	-	-	0.11	0.15	0.16	0.13	0.12		
Hydroxide	mg/L	7	0	-	0.5	0.5	2.5	2.5	2.5	2.5	1.07	0.976	<10	<10	<1	<1	<1	<1	<1		
Ion Balance	%	2	2	-	105.5	101	110	109.1	109.6	109.9	105.5	6.36	101	110	-	-	-	-	-		
Magnesium	mg/L	7	7	-	17	14	18	18	18	18	16.4	1.81	14	18	14	16	17	18	18		
Potassium	mg/L	7	7	-	2.2	2	2.6	2.5	2.5	2.6	2.2	0.23	2	2	2.4	2	2.6	2.2	2.2		
Sodium	mg/L	7	7	-	6	4	7	6.8	6.9	7.0	5.7	1.15	4	6	4.3	5.9	6.6	7	6.4		
Sulfate	mg/L	7	6	-	6.8	3	17	12.2	14.6	16.5	7.9	4.43	9	<6	7.7	5.8	17	6.8	5.9		
Total Metals																					
Aluminum	mg/L	7	7	3	0.08	0.022	0.61	0.490	0.550	0.598	0.200	0.2302	0.03	0.08	0.61	0.026	0.22	0.41	0.022		
Antimony	mg/L	7	0	-	0.0001	0.0001	0.0005	0.0005	0.0005	0.0005	0.0002	0.00020	<0.001	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Arsenic	ug/L	7	7	0	1.4	0.0008	3.4	2.8	3.1	3.3	1.5	1.22	0.0010	0.0008	2.4	1.7	1.3	3.4	1.4		
Barium	mg/L	7	7	-	0.139	0.12	0.17	0.164	0.167	0.169	0.141	0.0195	0.1390	0.1200	0.16	0.13	0.15	0.17	0.12		
Beryllium	mg/L	7	1	-	0.0001	0.00005	0.0005	0.0005	0.0005	0.0005	0.0002	0.00022	<0.001	<0.001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Bismuth	mg/L	2	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	-	-	-	-	-		
Boron	mg/L	7	7	-	0.05	0.04	0.07	0.07	0.07	0.07	0.054	0.0127	0.06	0.07	0.05	0.04	0.05	0.07	0.04		
Cadmium	mg/L	7	1	1	0.00005	0.00005	0.0001	0.00010	0.00010	0.00010	0.00007	0.000027	<0.0002	<0.0002	0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Cesium	mg/L	2	0	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0	<0.0001	<0.0001	-	-	-	-	-		
Chromium	mg/L	7	4	2	0.0007	0.00025	0.0092	0.00446	0.00683	0.00873	0.00189	0.003248	0.001	<0.001	0.0013	<0.0005	<0.0005	0.0092	0.0007		
Cobalt	mg/L	7	5	-	0.0001	0.0001	0.0011	0.0010	0.0011	0.0011	0.0004	0.00045	<0.0002	<0.0002	0.001	0.0001	0.0005	0.0011	0.0001		
Copper	mg/L	7	7	1	0.0013	0.0005	0.006	0.0048	0.0054	0.0059	0.0023	0.00208	0.006	0.001	0.0028	0.0005	0.0013	0.004	0.0005		
Iron	mg/L	7	6	4	0.35	0.025	2.36	2.042	2.201	2.328	0.789	0.9173	<0.05	0.20	1.83	0.35	0.52	2.36	0.24		
Lead	mg/L	7	6	1	0.0005	0.0001	0.0197	0.0094	0.0146	0.0187	0.0035	0.00720	0.0197	<0.0005	0.0012	0.0001	0.0005	0.0026	0.0001		
Manganese	mg/L	7	7	-	0.042	0.0062	0.21	0.150	0.180	0.204	0.067	0.0716	0.0062	0.0214	0.21	0.055	0.042	0.11	0.023		
Mercury	mg/L	2	1	1	0.0008	0.0002	0.0014	0.00128	0.00134	0.00139	0.00080	0.000849	<0.0004	0.0014	-	-	-	-	-		
Molybdenum	mg/L	7	7	0	0.0012	0.0006	0.049	0.0205	0.0348	0.0462	0.0080	0.01809	0.0011	0.0015	0.0006	0.0013	0.0012	0.049	0.0011		
Nickel	mg/L	7	6	0	0.0016	0.0007	0.0041	0.00332	0.00371	0.00402	0.001843	0.00125	<0.002	0.002	0.0028	0.0007	0.0016	0.0041	0.0007		
Rubidium	mg/L	2	2	-	0.00075	0.0006	0.0009	0.00087	0.00089	0.00090	0.000750	0.00021	0.0006	0.0009	-	-	-	-	-		
Selenium	mg/L	7	5	0	0.0001	0.00005	0.001	0.0007	0.0009	0.0010	0.0003	0.00034	<0.001	0.001	0.0001	<0.0001	0.0001	0.0003	0.0001		
Silver	mg/L	7	0	0	0.00005	0.00005	0.0005	0.00050	0.00050	0.00050	0.000179	0.00022	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Strontium	mg/L	7	7	-	0.228	0.197	0.24	0.24	0.24	0.24	0.224	0.0158	0.197	0.228	0.21	0.24	0.23	0.24	0.22		
Tellurium	mg/L	2	0	-	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0	<0.001	<0.001	-	-	-	-	-		
Thallium	mg/L	7	1	0	0.0001	0.00005	0.0003	0.00018	0.00024	0.00029	0.000121	0.00008	<0.0001	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Tin	mg/L	7	2	-	0.00005	0.00005	0.0038	0.00170	0.00275	0.00359	0.000629	0.00140	<0.0006	0.0038	<0.0001	0.0001	<0.0001	<0.0001	<0.0001		
Titanium	mg/L	7	6	-	0.0029	0.00045	0.02	0.018	0.019	0.020	0.007	0.0080	<0.0009	0.0029	0.017	0.002	0.0085	0.02	0.0012		
Tungsten	mg/L	2	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	-	-	-	-	-		
Uranium	ug/L	7	7	0	0.3	0.0002	0.9	0.78	0.84	0.89	0.37	0.345	0.0004	0.0002	0.7	0.2	0.9	0.5	0.3		
Vanadium	mg/L	7	5	-	0.0005	0.0002	0.0065	0.00440	0.00545	0.00629	0.001771	0.00230	<0.001	<0.001	0.003	0.0003	0.0014	0.0065	0.0002		
Zinc	mg/L	7	7	0	0.01	0.0007	0.03	0.024	0.027	0.029	0.012	0.0101	0.02	0.03	0.007	0.0007	0.0038	0.013	0.01		
Zirconium	mg/L	2	0	-	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0	<0.0004	<0.0004	-	-	-	-	-		
Nutrients																					
Ammonia as nitrogen	mg/L	7	3	-	0.025	0.005	0.11	0.098	0.104	0.109	0.050	0.0449	<0.05	<0.05	0.09	0.09	0.11	<0.01	<0.01		
Dissolved organic carbon	mg/L	7	7	-	7.1	5.6	11	11	11	11	8.0	2.27	11	11	7.1	5.6	6.2	8.7	6.4		
Dissolved phosphorus	mg/L	2	1	-	0.105	0.01	0.2	0.181	0.1905	0.1981	0.11	0.134	<0.02	0.20	-	-	-	-	-		
Nitrate	mg/L	7	5	0	0.13	0.05	0.58	0.388	0.484	0.561	0.197	0.1872	<0.1	<0.1	0.13	0.22	0.58	0.26	0.09		
Nitrite	mg/L	2	0	0	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0	<0.05	<0.05	-	-	-	-	-		
Nitrite+Nitrate, nitrogen	mg/L	5	3	-	0.05	0.02	0.13	0.102	0.116	0.127	0.062	0.0409	<0.1	<0.1	-	-	0.13	0.06	0.02		

Table 6 Surface water quality parameters (laboratory) for sampling stations SE1 and WPR-CN (West Perimeter Ravine), May 2006 to November 2008.

Parameters	Units	Summary Statistics											Sample ⁵		SE1	SE1	WPR-CN	WPR-CN	WPR-CN	WPR-CN	WPR-CN
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	SE1	SE1							
								90 th	95 th	99 th			10-May-06	31-Aug-06							
Total Kjeldahl nitrogen	mg/L	6	6	-	0.31	0.16	0.73	0.615	0.673	0.719	0.385	0.2008	0.5	0.3	0.73	0.16	-	0.32	0.3		
Total nitrogen	mg/L	2	2	-	0.485	0.21	0.76	0.705	0.733	0.755	0.485	0.3889	-	-	0.76	0.21	-	-	-		
Total organic carbon	mg/L	7	7	-	7.4	5.9	11	10.4	10.7	10.9	8.0	2.08	10	11	7.4	5.9	6.3	9.1	6		
Total phosphorus	mg/L	7	6	-	0.1	0.01	0.4	0.3	0.3	0.4	0.1	0.13	<0.2	0.40	0.15	0.01	0.04	0.13	0.04		
Physical Properties																					
Chemical Oxygen Demand	mg/L	2	2	-	21.5	15	28	26.7	27.4	27.9	21.5	9.19	-	-	28	15	-	-	-		
pH	pH units	7	7	0	8.41	8.3	8.58	8.50	8.54	8.57	8.39	0.102	8.3	8.3	8.58	8.31	8.42	8.44	8.41		
Specific conductivity	µS/cm	7	7	-	413	4	445	435.4	440.2	444.0	352.4	155.66	380	420	376	413	429	4	445		
Sum of Ions	mg/L	5	5	-	381	325	389	387.4	388.2	388.8	369.2	26.20	-	-	325	381	385	366	389		
Total alkalinity	mg/L	7	7	-	230	205	243	241.2	242.1	242.8	226.1	14.74	208	225	205	240	232	230	243		
Total dissolved solids	mg/L	7	7	-	258	170	270	265.8	267.9	269.6	241.0	34.55	230	170	236	270	263	260	258		
Total hardness	mg/L	7	7	-	223	200	239	236.0	237.5	238.7	222.6	14.64	207	234	200	223	234	221	239		
Total suspended solids	mg/L	5	3	-	5	1	147	112.2	129.6	143.5	43.6	62.76	<10	<10	-	-	147	60	1		
Turbidity	NTU	7	7	-	4.1	1.5	143	95.0	119.0	138.2	32.0	53.74	2.60	1.50	143	4.1	63	8.1	2		
Dissolved Metals																					
Aluminum	mg/L	2	2	0 ⁶	0.03	0.02	0.04	0.038	0.039	0.040	0.030	0.0141	0.04	0.02	-	-	-	-	-		
Antimony	mg/L	2	0	-	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0	<0.001	<0.001	-	-	-	-	-		
Arsenic	ug/L	2	2	0 ⁶	0.00205	0.0011	0.003	0.0028	0.0029	0.0030	0.0021	0.00134	0.0011	0.0030	-	-	-	-	-		
Barium	mg/L	2	2	-	0.1255	0.12	0.131	0.130	0.130	0.131	0.126	0.0078	0.131	0.120	-	-	-	-	-		
Beryllium	mg/L	2	0	-	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0	<0.001	<0.001	-	-	-	-	-		
Bismuth	mg/L	2	0	-	0.00015	0.00015	0.00015	0.00015	0.00015	0.00015	0.00015	0	<0.0003	<0.0003	-	-	-	-	-		
Boron	mg/L	2	2	-	0.07	0.06	0.08	0.078	0.079	0.080	0.070	0.0141	0.06	0.08	-	-	-	-	-		
Cadmium	mg/L	2	0	0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	-	-	-	-	-		
Cesium	mg/L	2	0	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0	<0.0001	<0.0001	-	-	-	-	-		
Chromium	mg/L	2	1	1 ⁶	0.00375	0.0005	0.007	0.0064	0.0067	0.0069	0.0038	0.00460	0.007	<0.001	-	-	-	-	-		
Cobalt	mg/L	2	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	-	-	-	-	-		
Copper	mg/L	2	2	1 ⁶	0.00315	0.0007	0.0056	0.00511	0.00536	0.00555	0.003150	0.00346	0.0056	0.0007	-	-	-	-	-		
Iron	mg/L	2	2	0 ⁶	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0	0.02	0.02	-	-	-	-	-		
Lead	mg/L	2	2	1 ⁶	0.0099	0.0002	0.0196	0.01766	0.01863	0.01941	0.009900	0.01372	0.0196	0.0002	-	-	-	-	-		
Manganese	mg/L	2	2	-	0.00535	0.0053	0.0054	0.00539	0.00540	0.00540	0.005350	0.00007	0.0054	0.0053	-	-	-	-	-		
Mercury	mg/L	2	0	0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	-	-	-	-	-		
Molybdenum	mg/L	2	2	0 ⁶	0.00125	0.001	0.0015	0.0015	0.0015	0.0015	0.0013	0.00035	0.0010	0.0015	-	-	-	-	-		
Nickel	mg/L	2	2	0 ⁶	0.00215	0.0019	0.0024	0.00235	0.00238	0.00240	0.002150	0.00035	0.0024	0.0019	-	-	-	-	-		
Rubidium	mg/L	2	2	-	0.0007	0.0006	0.0008	0.00078	0.00079	0.00080	0.000700	0.00014	0.0006	0.0008	-	-	-	-	-		
Selenium	mg/L	2	0	0	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0	<0.001	<0.001	-	-	-	-	-		
Silver	mg/L	2	0	0	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0	<0.0005	<0.0005	-	-	-	-	-		
Strontium	mg/L	2	2	-	0.2075	0.181	0.234	0.2287	0.2314	0.2335	0.2075	0.03748	0.181	0.234	-	-	-	-	-		
Tellurium	mg/L	2	0	-	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0	<0.0005	<0.0005	-	-	-	-	-		
Thallium	mg/L	2	1	0 ⁶	0.000175	0.00005	0.0003	0.00028	0.00029	0.00030	0.000175	0.00018	<0.0001	0.0003	-	-	-	-	-		
Tin	mg/L	2	1	-	0.000225	0.00015	0.0003	0.00029	0.00029	0.00030	0.000225	0.00011	<0.0003	0.0003	-	-	-	-	-		
Titanium	mg/L	2	0	-	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0	<0.0005	<0.0005	-	-	-	-	-		
Tungsten	mg/L	2	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	-	-	-	-	-		
Uranium	ug/L	2	2	0 ⁶	0.0003	0.0002	0.0004	0.00038	0.00039	0.00040	0.000300	0.00014	0.0004	0.0002	-	-	-	-	-		
Vanadium	mg/L	2	2	-	0.0035	0.003	0.004	0.0039	0.0040	0.0040	0.0035	0.00071	0.004	0.003	-	-	-	-	-		
Zinc	mg/L	2	0	0	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0	<0.005	<0.005	-	-	-	-	-		
Zirconium	mg/L	2	0	-	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0	<0.0004	<0.0004	-	-	-	-	-		
Dissolved Silicon	mg/L	2	2	-	6.8	5.2	8.4	8.08	8.24	8.368	6.80	2.263	5.2	8.4	-	-	-	-	-		
TDS (calculated)	mg/L	2	2	-	220	214	226	224.8	225.4	225.9	220.0	8.49	214	226	-	-	-	-	-		

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

Table 6 Surface water quality parameters (laboratory) for sampling stations SE1 and WPR-CN (West Perimeter Ravine), May 2006 to November 2008.

⁵Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).
⁶Dissolved metal guideline is not available, thus total metal guideline was used.

Table 7 Surface water quality parameters (laboratory) for sampling station WRS-CN (West Ravine), May 2007 to November 2008.

Parameters	Units	Summary Statistics											Sample ⁵					
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	6-May-07	9-Aug-07	28-Oct-07	18-May-08	20-Aug-08	6-Nov-08
								90 th	95 th	99 th								
Inorganic Ions																		
Bicarbonate	mg/L	6	6	-	306.5	248	326	318.0	322.0	325.2	295.8	28.13	248	310	304	278	326	309
Calcium	mg/L	6	6	-	88	75	101	98.5	99.8	100.8	87.8	10.15	92	101	96	75	79	84
Carbonate	mg/L	6	6	-	8.5	4	24	17.5	20.8	23.4	10.2	7.31	24	11	4	7	10	5
Chloride	mg/L	6	6	-	350.5	190	504	449.0	476.5	498.5	348.2	107.09	393	504	394	190	300	308
Fluoride	mg/L	6	6	-	0.145	0.12	0.18	0.170	0.175	0.179	0.147	0.0216	0.13	0.15	0.16	0.18	0.14	0.12
Hydroxide	mg/L	6	0	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0	<1	<1	<1	<1	<1	<1
Ion Balance	%	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	6	6	-	20	17	23	22.5	22.8	23.0	20.2	2.23	19	23	22	17	19	21
Potassium	mg/L	6	6	-	2.5	2.2	3.3	3.15	3.23	3.29	2.63	0.432	3	3.3	2.6	2.3	2.4	2.2
Sodium	mg/L	6	6	-	222.5	126	301	274.5	287.8	298.4	220.7	58.29	248	301	239	126	206	204
Sulfate	mg/L	6	6	-	59.5	26	76	73.5	74.8	75.8	56.0	18.41	76	60	71	44	26	59
Total Metals																		
Aluminum	mg/L	6	6	0	0.0225	0.013	0.061	0.0445	0.0528	0.0594	0.0275	0.01717	0.022	0.028	0.023	0.061	0.018	0.013
Antimony	mg/L	6	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	ug/L	6	6	0	1.75	1.3	3.1	2.95	3.03	3.09	2.02	0.752	1.8	3.1	1.7	1.3	2.8	1.4
Barium	mg/L	6	6	-	0.24	0.22	0.3	0.28	0.29	0.30	0.25	0.029	0.24	0.3	0.25	0.22	0.24	0.22
Beryllium	mg/L	6	0	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	6	6	-	0.38	0.29	0.46	0.455	0.458	0.460	0.378	0.0700	0.46	0.39	0.37	0.29	0.45	0.31
Cadmium	mg/L	6	1	1	0.00005	0.00005	0.0001	0.00008	0.00009	0.00010	0.00006	0.000020	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cesium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	6	0	0	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cobalt	mg/L	6	6	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Copper	mg/L	6	6	0	0.0003	0.0002	0.0005	0.00040	0.00045	0.00049	0.00030	0.000110	0.0003	0.0003	0.0002	0.0005	0.0003	0.0002
Iron	mg/L	6	6	1	0.195	0.091	0.32	0.305	0.313	0.319	0.198	0.0947	0.091	0.2	0.29	0.32	0.098	0.19
Lead	mg/L	6	3	0	0.000075	0.00005	0.0002	0.00015	0.00018	0.00020	0.00009	0.000058	<0.0001	0.0001	<0.0001	0.0002	0.0001	<0.0001
Manganese	mg/L	6	6	-	0.0625	0.02	0.13	0.109	0.119	0.128	0.065	0.0415	0.02	0.078	0.13	0.087	0.028	0.047
Mercury	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	6	6	0	0.00085	0.0007	0.0013	0.00125	0.00128	0.00130	0.00095	0.000243	0.0008	0.0013	0.0008	0.0009	0.0012	0.0007
Nickel	mg/L	6	6	0	0.0007	0.0006	0.0009	0.00085	0.00088	0.00090	0.00072	0.000117	0.0006	0.0009	0.0007	0.0007	0.0008	0.0006
Rubidium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	6	6	0	0.0001	0.0001	0.0003	0.00020	0.00025	0.00029	0.00013	0.000082	0.0001	0.0001	0.0001	0.0001	0.0003	0.0001
Silver	mg/L	6	0	0	0.00005	0.00005	0.00005	0.00	0.00	0.00	0.00	0.000	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Strontium	mg/L	6	6	-	0.195	0.16	0.25	0.230	0.240	0.248	0.198	0.0306	0.2	0.25	0.21	0.16	0.19	0.18
Tellurium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	6	0	0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Tin	mg/L	6	3	-	0.000075	0.00005	0.0003	0.00020	0.00025	0.00029	0.00011	0.000097	<0.0001	0.0001	0.0003	0.0001	<0.0001	<0.0001
Titanium	mg/L	6	6	-	0.0017	0.0007	0.0026	0.0026	0.0026	0.0026	0.0017	0.00083	0.001	0.0025	0.0022	0.0026	0.0012	0.0007
Tungsten	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	ug/L	6	6	0	0.25	0.2	0.4	0.4	0.4	0.4	0.28	0.098	0.4	0.2	0.3	0.4	0.2	0.2
Vanadium	mg/L	6	6	-	0.00035	0.0001	0.001	0.0010	0.0010	0.0010	0.0005	0.00039	0.0001	0.0009	0.001	0.0004	0.0003	0.0001
Zinc	mg/L	6	4	0	0.0023	0.00025	0.0054	0.00425	0.00483	0.00529	0.00227	0.001935	<0.0005	0.0021	<0.0005	0.0031	0.0025	0.0054
Zirconium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients																		

Table 7 Surface water quality parameters (laboratory) for sampling station WRS-CN (West Ravine), May 2007 to November 2008.

Parameters	Units	Summary Statistics											Sample ⁵					
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	6-May-07	9-Aug-07	28-Oct-07	18-May-08	20-Aug-08	6-Nov-08
								90 th	95 th	99 th								
Ammonia as nitrogen	mg/L	6	5	-	0.08	0.005	0.11	0.100	0.105	0.109	0.064	0.0422	0.07	0.09	0.09	0.11	0.02	<0.01
Dissolved organic carbon	mg/L	6	6	-	6.75	2.9	9	8.9	8.9	9.0	6.8	2.18	6.9	9	2.9	6.4	8.7	6.6
Dissolved phosphorus	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate	mg/L	6	5	0	0.285	0.02	0.62	0.485	0.553	0.607	0.297	0.1956	<0.04	0.62	0.26	0.22	0.35	0.31
Nitrite	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite+Nitrate, nitrogen	mg/L	3	3	-	0.07	0.05	0.08	0.078	0.079	0.080	0.067	0.0153	-	-	-	0.05	0.08	0.07
Total Kjeldahl nitrogen	mg/L	5	5	-	0.27	0.15	1	0.7	0.9	1.0	0.4	0.34	0.15	1	0.27	-	0.34	0.26
Total nitrogen	mg/L	3	3	-	0.33	0.15	1.1	0.95	1.02	1.08	0.53	0.505	0.15	1.1	0.33	-	-	-
Total organic carbon	mg/L	6	6	-	6.8	5.6	10	9.5	9.7	9.9	7.4	1.68	7	10	5.6	6.6	8.9	6.4
Total phosphorus	mg/L	6	3	-	0.0125	0.005	0.05	0.05	0.05	0.05	0.023	0.0221	<0.01	0.05	<0.01	0.05	0.02	<0.01
Physical Properties																		
Chemical Oxygen Demand	mg/L	3	3	-	20	16	29	27.2	28.1	28.8	21.7	6.66	20	29	16	-	-	-
pH	pH units	6	6	0	8.415	8.31	8.63	8.545	8.588	8.622	8.435	0.1078	8.63	8.46	8.31	8.41	8.42	8.38
Specific conductivity	µS/cm	6	6	-	1610	1060	2160	1985.0	2072.5	2142.5	1616.7	368.82	1810	2160	1680	1060	1450	1540
Sum of Ions	mg/L	6	6	-	1046.5	740	1310	1220.0	1265.0	1301.0	1040.3	190.71	1100	1310	1130	740	969	993
Total alkalinity	mg/L	6	6	-	258	240	283	277.5	280.3	282.5	259.0	16.63	243	272	255	240	283	261
Total dissolved solids	mg/L	6	6	-	914.5	601	1190	1095.0	1142.5	1180.5	904.5	200.91	1000	1190	983	601	807	846
Total hardness	mg/L	6	6	-	302	257	346	338.0	342.0	345.2	302.0	33.30	308	346	330	257	275	296
Total suspended solids	mg/L	3	3	-	14	5	66	55.6	60.8	65.0	28.3	32.93	-	-	-	66	14	5
Turbidity	NTU	6	6	-	3.5	2	12	8.0	10.0	11.6	4.6	3.73	2.4	3.1	4	12	3.9	2

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 8 Surface water quality parameters (laboratory) for sampling station WRS-01 (West Ravine), March 2006 to December 2009.

Parameters	Units	Summary Statistics										
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴
								90 th	95 th	99 th		
Inorganic Ions												
Bicarbonate	mg/L	37	37	-	346	163	526	450.4	473.0	524.2	351.4	78.78
Calcium	mg/L	37	37	-	83	38	124	102.0	109.4	123.6	83.2	18.53
Carbonate	mg/L	37	3	-	0.5	0.5	8	0.5	2.0	7.3	0.9	1.51
Chloride	mg/L	37	36	-	7	0.5	38	28.4	34.2	36.9	10.6	10.82
Fluoride	mg/L	37	37	-	0.13	0.05	0.28	0.164	0.188	0.258	0.132	0.0397
Hydroxide	mg/L	37	2	-	0.5	0.5	1	0.5	0.6	1.0	0.5	0.11
Ion balance	%	0	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	37	37	-	17	8.2	27	22.4	23.4	26.3	17.1	3.64
Potassium	mg/L	37	37	-	1.3	0.6	8	3.9	4.6	7.7	2.0	1.62
Sodium	mg/L	37	37	-	7.5	0.0042	33	21.0	23.6	30.5	9.8	7.60
Sulfate	mg/L	37	37	-	3.4	1.4	31	7.6	18.2	26.7	5.1	5.80
Total Metals												
Aluminum	mg/L	37	37	10	0.038	0.0022	2	0.4	0.9	1.8	0.2	0.40
Antimony	mg/L	36	3	-	0.0001	0.0001	0.0002	0.00010	0.00013	0.00020	0.00011	0.000023
Arsenic	ug/L	37	37	10	2.6	0.0006	280	14.1	89.2	262.0	18.0	58.47
Barium	mg/L	37	37	-	0.54	0.12	7.7	0.89	2.84	7.59	0.94	1.623
Beryllium	mg/L	37	30	-	0.0001	0.00005	0.0007	0.00010	0.00028	0.00066	0.00009	0.000139
Bismuth	mg/L	0	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	37	36	-	0.03	0.005	20	0.1	0.1	12.8	0.6	3.28
Cadmium	mg/L	37	12	12	0.00005	0.00005	0.25	0.0004	0.002	0.161	0.007	0.0411
Cesium	mg/L	0	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	37	14	10	0.00025	0.00025	0.081	0.0	0.0	0.1	0.0	0.01
Cobalt	mg/L	37	37	-	0.0005	0.0002	0.035	0.0023	0.0076	0.0307	0.0022	0.00668
Copper	mg/L	37	33	5	0.0007	0.0001	0.053	0.0051	0.0096	0.0426	0.0034	0.00931
Iron	mg/L	37	37	36	3.56	0.11	325	20.1	87.2	299.8	21.7	66.08
Lead	mg/L	36	27	2	0.0002	0.00005	0.042	0.0028	0.0090	0.0343	0.0023	0.00761
Manganese	mg/L	37	37	-	0.82	0.03	9.4	1.63	4.00	8.90	1.28	1.886
Mercury	mg/L	0	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	37	37	0	0.0015	0.0006	0.018	0.0041	0.0072	0.0176	0.0027	0.00374
Nickel	mg/L	37	37	0	0.0012	0.0004	0.144	0.0124	0.0296	0.1253	0.0088	0.02741
Rubidium	mg/L	0	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	37	21	2	0.0001	0.00005	0.0048	0.00040	0.00100	0.00415	0.00034	0.000898
Silver	mg/L	37	7	1	0.00005	0.000005	0.0005	0.00010	0.00010	0.00036	0.00007	0.000076
Strontium	mg/L	37	37	-	0.15	0.069	0.68	0.194	0.286	0.604	0.174	0.1056
Tellurium	mg/L	0	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	37	2	0	0.0001	0.0001	0.0002	0.00010	0.00012	0.00020	0.00011	0.000023
Tin	mg/L	37	19	-	0.0001	0.00005	0.01	0.001	0.001	0.007	0.001	0.0017
Titanium	mg/L	37	37	-	0.0021	0.0002	0.0083	0.00618	0.00744	0.00819	0.00282	0.002266
Tungsten	mg/L	0	-	-	-	-	-	-	-	-	-	-
Uranium	ug/L	36	36	0	0.55	0.0001	15	1.3	5.0	15.0	1.3	3.40
Vanadium	mg/L	37	37	-	0.0004	0.0001	0.132	0.0052	0.0107	0.0902	0.0052	0.02165
Zinc	mg/L	37	37	6	0.0062	0.0005	0.24	0.053	0.090	0.236	0.025	0.0534
Zirconium	mg/L	0	-	-	-	-	-	-	-	-	-	-
Nutrients												
Ammonia as nitrogen	mg/L	36	35	-	0.12	0.005	1.3	0.46	0.52	1.05	0.21	0.237
Dissolved organic carbon	mg/L	31	31	-	7.3	2.8	42	16.0	21.0	35.7	9.3	7.64
Dissolved phosphorus	mg/L	0	-	-	-	-	-	-	-	-	-	-
Nitrate	mg/L	36	20	0	0.04	0.02	2.2	0.24	0.30	1.57	0.14	0.365
Nitrite	mg/L	0	-	-	-	-	-	-	-	-	-	-
Nitrite+Nitrate, nitrogen	mg/L	24	14	-	0.01	0.005	0.09	0.050	0.059	0.083	0.022	0.0227
Total Kjeldahl nitrogen	mg/L	36	36	-	0.995	0.27	77	3.6	21.5	64.4	4.8	14.22

Table 8 Surface water quality parameters (laboratory) for sampling station WRS-01 (West Ravine), March 2006 to December 2009.

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of $N \geq DL$.

4For calculation of descriptives statistics, values $< DL$ were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

6Dissolved metal guideline is not available, thus total metal guideline was used.

Table 8 Surface water quality parameters (laboratory) for sampling station WRS-01 (West Ravine), March 2006 to December 2009.

Parameters	Units	Sample ⁵														
		13-Mar-06	#06001 15-Apr-06	#06009 11-May-06	#06032 13-Jun-06	#06042 12-Jul-06	#06067 11-Aug-06	#06084 03-Sep-06	#06102 28-Oct-06	#06124 19-Nov-06	#06142 14-Dec-06	#07005 21-Jan-07	#07053 18-Feb-07	#07072 09-Mar-07	#07097 09-Apr-07	#07139 07-May-07
Inorganic Ions																
Bicarbonate	mg/L	305	200	461	454	526	429	422	310	349	390	414	303	264	163	398
Calcium	mg/L	72	47	105	106	124	98	98	75	81	95	100	73	62	38	95
Carbonate	mg/L	<1	<1	<1	<1	<1	<1	<1	6	<1	<1	1	<1	<1	<1	<1
Chloride	mg/L	2	2	14	3	34	28	19	7	9	22	26	2	5	4	8
Fluoride	mg/L	0.12	0.05	0.13	0.1	0.15	0.13	0.09	0.09	0.14	0.17	0.14	0.12	0.11	0.07	0.11
Hydroxide	mg/L	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	1	<1	<1	<1	<1
Ion balance	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	15	11	23	23	27	19	20	16	17	19	20	15	14	8.2	19
Potassium	mg/L	1.2	2.9	2.2	1.8	4	4	3.9	1	1.5	1	1.3	1.2	1.5	2.4	1.3
Sodium	mg/L	0.0042	2.1	14	7.3	33	26	19	7.7	9.3	18	21	4.2	5.3	5	9.7
Sulfate	mg/L	5.1	1.9	2.1	1.5	1.9	1.8	4.1	4.8	3.8	3.8	3.4	4.3	6.6	3.2	1.8
Total Metals																
Aluminum	mg/L	0.25	0.027	0.045	0.0052	0.042	0.11	0.019	0.0027	0.0096	0.084	0.049	0.18	0.031	0.081	0.0022
Antimony	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	ug/L	3.5	0.0006	0.0016	0.009	0.0026	0.0038	0.0031	0.0034	0.0052	0.014	0.007	0.0056	0.0034	0.0031	1.3
Barium	mg/L	0.66	0.12	0.41	0.29	0.59	0.61	0.52	0.4	0.58	0.77	0.62	0.51	0.43	0.25	0.3
Beryllium	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	20	<0.01	0.05	0.03	0.04	0.09	0.06	0.01	0.05	0.03	0.04	0.02	0.05	0.02	0.03
Cadmium	mg/L	<0.5	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cesium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	0.0005	0.0041	<0.0005	<0.0005	<0.0005
Cobalt	mg/L	0.0011	0.0004	0.001	0.0007	0.0013	0.0005	0.0005	0.0002	0.0005	0.0007	0.0004	0.0005	0.0003	0.0003	0.0002
Copper	mg/L	0.0003	0.0004	<0.0002	<0.0002	0.0004	0.001	0.0002	0.0002	0.0002	0.0029	0.0014	0.0022	0.0037	0.0011	<0.0002
Iron	mg/L	7.2	0.52	2.3	2.1	2.7	5.6	5.5	1.4	12.1	14	9.4	3.56	1.54	1.4	1.16
Lead	mg/L	0.0011	<0.0001	<0.0001	<0.0001	0.0001	0.0014	<0.0001	0.0001		0.0005	0.0002	0.0006	0.0004	0.0002	<0.0001
Manganese	mg/L	1.1	0.13	1.6	0.44	1.67	1.3	1.4	0.98	0.82	1.1	0.94	0.82	0.59	0.35	0.26
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	0.0007	0.0007	0.0015	0.001	0.0011	0.0046	0.0038	0.0024	0.0014	0.0008	0.0006	0.0025	0.0006	0.0025	0.0013
Nickel	mg/L	0.0018	0.0005	0.0016	0.0006	0.001	0.0014	0.0007	0.0004	0.0005	0.0018	0.001	0.0019	0.0011	0.0009	0.001
Rubidium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	0.0003	0.0002	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	0.0004	0.0002	0.0004	<0.0001	<0.0001
Silver	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Strontium	mg/L	0.15	0.071	0.19	0.18	0.24	0.18	0.15	0.11	0.13	0.16	0.14	0.13	0.13	0.069	0.14
Tellurium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Tin	mg/L	0.0002	0.0003	<0.0001	<0.0001	<0.0001	0.0003	<0.0001	0.0002	0.0003	0.0001	0.0001	0.0001	0.0001	<0.0001	<0.0001
Titanium	mg/L	0.0051	0.0017	0.0034	0.0028	0.0032	0.0045	0.0031	0.0006	0.0019	0.0037	0.003	0.0063	0.001	0.0016	0.0002
Tungsten	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	ug/L	1.6	0.0001	0.0007	0.0002	0.0005	0.0038	0.0039	0.0044	0.0006	0.0012	0.001	0.0011	0.0011	0.003	0.6
Vanadium	mg/L	0.0014	0.0001	0.0003	0.0001	0.0003	0.0005	0.0003	0.0001	0.0002	0.0011	0.001	0.0033	0.0001	0.0005	0.0001
Zinc	mg/L	0.009	0.0012	0.001	0.0005	0.0044	0.0021	0.0024	0.0005	0.0007	0.009	0.0026	0.01	0.021	0.0084	0.0007
Zirconium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients																
Ammonia as nitrogen	mg/L	-	0.01	0.11	0.07	0.17	0.15	0.06	0.1	0.17	0.34	0.3	0.2	0.18	0.1	0.02
Dissolved organic carbon	mg/L	7.5	42	21	-	8.03	13	8.8	4.9	5.4	7.4	7.2	3.1	4.5	5.6	14
Dissolved phosphorus	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate	mg/L	<0.04	<0.04	0.22	<0.04	0.22	<0.04	<0.04	0.04	<0.04	<0.04	0.04	<0.04	0.4	<0.04	<0.04

Table 8 Surface water quality parameters (laboratory) for sampling station WRS-01 (West Ravine), March 2006 to December 2009.

Parameters	Units	Sample ⁵																
		#07344 21-Dec-07	#07375 22-Jan-08	#07396 11-Feb-08	#08020 08-Mar-08	#08029 04-Apr-08	#08056 02-May-08	#08092 01-Jun-08	#08135 09-Jul-08	#08196 19-Aug-08	#08212 06-Sep-08	#08265 19-Oct-08	#08307 13-Nov-08	#9044 12-Apr-09	#9055 20-Jun-09	#9079 30-Aug-09	#9089 11-Oct-09	Stream is dry 3-Dec-09
Inorganic Ions																		
Bicarbonate	mg/L	371	351	368	293	305	332	346	353	340	327	328	345	181	345	327	376	-
Calcium	mg/L	87	68	91	72	73	79	84	83	80	80	77	87	42	83	80	95	-
Carbonate	mg/L	<1	<1	<1	8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-
Chloride	mg/L	10	35	14	4	1	8	4	3	2	<1	2	2	29	8	4	38	-
Fluoride	mg/L	0.12	0.28	0.22	0.14	0.12	0.13	0.14	0.12	0.12	0.11	0.11	0.13	0.09	0.12	0.12	0.16	-
Hydroxide	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-
Ion balance	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	17	13	18	15	16	16	16	16	16	17	17	16	13	16	17	18	-
Potassium	mg/L	1.1	8	1.6	1.3	1.1	2	1.1	1.2	1	1.2	1	1.5	7.2	1.1	0.9	0.6	-
Sodium	mg/L	11	16	12	6.2	3	8.3	5.8	4.9	3.6	3.4	3.3	3.6	21	7.5	4.8	23	-
Sulfate	mg/L	2.7	19	1.8	3.9	4.2	4.6	31	3.1	2.1	2.4	6.6	3.2	18	3.9	3.1	9.2	-
Total Metals																		
Aluminum	mg/L	0.026	1.4	0.78	0.36	0.22	0.013	0.015	0.024	0.044	0.35	0.13	2	0.026	0.022	0.0046	0.022	-
Antimony	mg/L		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-
Arsenic	ug/L	5.3	230	54	7.1	9.5	2.6	1.8	3.3	7.3	21	5.6	280	0.5	3.8	3	2.4	-
Barium	mg/L	0.52	7.7	1.7	0.62	0.67	0.48	0.54	0.61	0.69	1.08	0.67	7.4	0.15	0.64	0.6	0.52	-
Beryllium	mg/L	<0.0001	0.0007	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0006	<0.0001	<0.0001	<0.0001	<0.0001	-
Bismuth	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	0.03	0.08	0.03	0.02	0.02	0.02	0.02	0.05	0.03	0.03	0.02	0.07	0.06	0.05	0.03	0.08	-
Cadmium	mg/L	<0.0001	0.0019	0.0002	<0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0008	<0.0001	<0.0001	0.0001	0.002	-
Cesium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	<0.0005	0.081	0.0051	0.017	0.0006	0.0092	<0.0005	0.0014	0.0063	0.018	0.0005	0.0032	<0.0005	<0.0005	<0.0005	0.025	-
Cobalt	mg/L	0.0007	0.035	0.0038	0.0015	0.001	0.0002	0.0002	0.0003	0.0004	0.0034	0.0007	0.023	0.0002	0.0003	0.0002	0.0003	-
Copper	mg/L	0.0004	0.053	0.0056	0.006	0.0013	0.0005	0.0004	0.0007	0.0018	0.0034	0.001	0.024	0.0015	0.0028	0.002	0.0048	-
Iron	mg/L	13	325	45.3	9.8	7.93	1.73	1.8	3.1	4.63	29.2	6.5	255	0.11	3.12	1.86	8.4	-
Lead	mg/L	0.0001	0.02	0.0053	0.0007	0.0005	<0.0001	<0.0001	0.0001	0.0011	0.0024	0.0004	0.042	<0.0001	0.0031	0.0004	0.0009	-
Manganese	mg/L	1.1	8	3	0.78	0.59	0.41	0.44	0.5	1.01	1.31	0.74	9.4	0.03	0.52	0.29	0.59	-
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	0.0011	0.018	0.0047	0.0023	0.0016	0.0013	0.0012	0.0017	0.0035	0.0031	0.0013	0.017	0.0022	0.0012	0.0013	0.0008	-
Nickel	mg/L	0.0009	0.144	0.013	0.012	0.0044	0.0007	0.0007	0.001	0.011	0.014	0.0024	0.092	0.0022	0.0008	0.0016	0.0021	-
Rubidium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	0.0001	0.0048	0.0005	<0.0001	0.0001	0.0001	<0.0001	0.0002	0.0001	0.0004	0.0001	0.003	0.0001	<0.0001	0.0002	<0.0001	-
Silver	mg/L	0.0005	<0.0001	0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0001	0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-
Strontium	mg/L	0.14	0.68	0.2	0.16	0.16	0.15	0.16	0.16	0.17	0.19	0.16	0.47	0.079	0.15	0.15	0.14	-
Tellurium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-
Tin	mg/L	0.0001	0.0012	0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0009	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0004	0.0013	-
Titanium	mg/L	0.0012	0.008	0.0061	0.0083	0.0056	0.0005	0.001	0.0011	0.0015	0.0073	0.0033	0.0045	0.001	0.001	0.0002	0.001	-
Tungsten	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	ug/L	0.4	15	-	0.9	0.9	0.8	0.6	0.6	0.8	1.2	0.8	15	0.2	0.5	0.3	0.3	-
Vanadium	mg/L	0.001	0.132	0.0056	0.0024	0.0025	0.0001	0.0001	0.0004	0.0012	0.0094	0.0009	0.016	0.0001	0.0004	0.0001	0.0017	-
Zinc	mg/L	0.055	0.24	0.027	0.05	0.016	0.0062	0.0054	0.025	0.019	0.054	0.0099	0.23	0.0052	0.053	0.0043	0.019	-
Zirconium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients																		
Ammonia as nitrogen	mg/L	0.5	0.58	0.44	0.36	0.12	0.08	0.1	0.19	0.08	0.1	0.3	1.3	0.06	0.09	0.04	0.1	-
Dissolved organic carbon	mg/L	6.3	6.2	9.4	4.1	2.8	8.5	7.4	7.3	5.4	-	4	12	-	-	-	-	-
Dissolved phosphorus	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate	mg/L	0.09	0.26	0.18	0.09	0.26	0.07	0.09	2.2	<0.04	<0.04	<0.04	0.22	0.09	-	0.09	0.13	-

Table 8 Surface water quality parameters (laboratory) for sampling station WRS-01 (West Ravine), March 2006 to December 2009.

Parameters	Units	Sample ⁵																Stream is dry
		#07344	#07375	#07396	#08020	#08029	#08056	#08092	#08135	#08196	#08212	#08265	#08307	#9044	#9055	#9079	#9089	
		21-Dec-07	22-Jan-08	11-Feb-08	08-Mar-08	04-Apr-08	02-May-08	01-Jun-08	09-Jul-08	19-Aug-08	06-Sep-08	19-Oct-08	13-Nov-08	12-Apr-09	20-Jun-09	30-Aug-09	11-Oct-09	
Nitrite	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite+Nitrate, nitrogen	mg/L	-	-	-	-	0.06	0.02	0.02	0.05	<0.01	0.01	<0.01	0.05	0.02	0.03	0.02	0.03	-
Total Kjeldahl nitrogen	mg/L	0.76	41	15	0.8	0.46	0.57	0.46	1.6	0.78	1.2	0.57	77	1.6	0.38	0.92	0.55	-
Total nitrogen	mg/L	0.78	41	15	0.82	-	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon	mg/L	9.5	47	21	9.1	6	8.8	8.8	10	7.1	8.1	5.1	12	21	6.2	6.8	11	-
Total phosphorus	mg/L	0.12	7.3	1.4	0.09	0.25	0.05	0.01	0.09	0.17	0.51	0.17	6.4	0.1	0.05	0.1	0.1	-
Physical Properties																		
Chemical Oxygen Demand	mg/L	34	1240	790	319	92	63	28	55	35	55	14	4085	63	28	9	18	-
pH	pH units	7.94	7.75	7.85	8.41	7.92	8.01	8.13	8.09	8.07	8.26	8.28	7.49	7.85	7.76	7.86	7.5	-
Specific conductivity	µS/cm	561	625	563	487	452	504	497	507	486	483	490	526	407	525	484	669	-
Sum of Ions	mg/L	501	511	507	403	404	450	460	467	445	431	435	460	311	465	437	560	-
Total alkalinity	mg/L	304	288	302	254	250	272	284	289	279	268	269	283	148	283	268	308	-
Total dissolved solids	mg/L	324	305	320	261	268	308	315	282	267	282	278	307	262	325	293	411	-
Total hardness	mg/L	287	223	301	241	248	263	275	273	265	269	262	283	158	273	269	311	-
Total suspended solids	mg/L	52	5830	2300	150	392	29	6	73	49	67	28	2090	-	-	-	-	-
Turbidity	NTU	109	1600	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																		
Aluminum	mg/L	-	-	-	-	0.002	0.0052	0.0027	0.0038	0.0039	0.0056	0.001	<0.0005	-	-	-	-	-
Antimony	mg/L	-	-	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	-	-
Arsenic	ug/L	-	-	-	-	1.8	1.2	1.1	1.8	2.6	1.1	0.7	3	-	-	-	-	-
Barium	mg/L	-	-	-	-	0.47	0.37	0.5	0.56	0.59	0.53	0.45	0.65	-	-	-	-	-
Beryllium	mg/L	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-
Bismuth	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	-	-	-	-	0.01	0.05	0.03	0.04	0.03	0.03	0.02	0.02	-	-	-	-	-
Cadmium	mg/L	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-
Cesium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	-	-	-	-	<0.0005	0.0032	0.0011	0.029	0.021	0.0032	0.0005	0.0097	-	-	-	-	-
Cobalt	mg/L	-	-	-	-	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0004	-	-	-	-	-
Copper	mg/L	-	-	-	-	0.0003	0.0012	0.0007	0.0019	0.0027	0.0003	0.0004	0.001	-	-	-	-	-
Iron	mg/L	-	-	-	-	0.46	0.14	0.015	0.045	0.12	0.03	0.012	1.54	-	-	-	-	-
Lead	mg/L	-	-	-	-	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	-	-	-	-	-
Manganese	mg/L	-	-	-	-	0.51	0.29	0.34	0.43	0.89	0.57	0.47	1.26	-	-	-	-	-
Mercury	mg/L	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	0.0014	0.0014	0.0014	0.0014	0.0024	0.0012	0.0011	0.0016	-	-	-	-	-
Nickel	mg/L	-	-	-	-	0.0011	0.0013	0.0008	0.0008	0.0013	0.0012	0.0005	0.0015	-	-	-	-	-
Rubidium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	-	-	-	-	<0.0001	0.0003	<0.0001	0.0001	0.0002	0.0001	0.0001	<0.0001	-	-	-	-	-
Silver	mg/L	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-
Strontium	mg/L	-	-	-	-	0.15	0.15	0.15	0.16	0.16	0.14	0.14	0.14	-	-	-	-	-

Table 9 Surface water quality parameters (laboratory) for sampling station WRS-02 (West Ravine), November 2005 to January 2009.

Parameters	Units	Summary Statistics										
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴
								90 th	95 th	99 th		
Inorganic Ions												
Bicarbonate	mg/L	35	35	-	370	215	2280	442.8	465.1	1667.0	419.4	328.58
Calcium	mg/L	35	35	-	103	56	151	135.2	140.8	149.0	103.0	25.47
Carbonate	mg/L	35	3	-	0.5	0.5	14	0.5	2.8	11.6	1.1	2.50
Chloride	mg/L	33	33	-	318	5	2480	817.6	1126.0	2073.6	424.4	482.78
Fluoride	mg/L	33	33	-	0.18	0.08	1.6	0.24	0.29	1.18	0.21	0.255
Hydroxide	mg/L	35	2	-	0.5	0.5	1	0.5	0.6	1.0	0.5	0.12
Ion Balance	%	0	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	35	35	-	21	12	96	28.0	29.0	73.2	23.4	13.45
Potassium	mg/L	35	35	-	3.8	1.7	108	8.4	10.8	76.0	7.4	17.69
Sodium	mg/L	35	35	-	255	20	2460	694.2	793.0	1895.6	347.9	433.41
Sulfate	mg/L	35	35	-	78	4.1	980	210.0	228.0	738.6	109.5	167.30
Metals												
Aluminum	mg/L	36	36	8	0.0215	0.0019	0.91	0.305	0.430	0.816	0.099	0.1919
Antimony	mg/L	35	22	-	0.0001	0.0001	0.001	0.0001	0.0002	0.0007	0.0001	0.00015
Arsenic	ug/L	36	36	0	0.6	0.0003	4.1	2.15	3.05	3.79	0.81	1.033
Barium	mg/L	36	36	-	0.405	0.2	0.91	0.575	0.683	0.886	0.421	0.1575
Beryllium	mg/L	36	2	-	0.0001	0.000005	0.0005	0.00010	0.00011	0.00038	0.00007	0.000077
Bismuth	mg/L	0	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	36	36	-	0.355	0.04	2.4	0.80	0.95	2.02	0.43	0.439
Cadmium	mg/L	36	3	3	0.00005	0.00005	0.001	0.0003	0.0003	0.0007	0.0001	0.00017
Cesium	mg/L	0	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	36	13	9	0.00025	0.00025	2.5	0.01	0.04	1.65	0.07	0.416
Cobalt	mg/L	36	36	-	0.00035	0.0001	0.005	0.0026	0.0034	0.0044	0.0008	0.00113
Copper	mg/L	36	25	2	0.0002	0.0001	0.0094	0.00175	0.00293	0.00810	0.00081	0.001784
Iron	mg/L	36	36	33	1.72	0.064	13.1	7.07	8.50	11.81	2.60	2.953
Lead	mg/L	35	15	0	0.0001	0.00005	0.002	0.0009	0.0011	0.0018	0.0003	0.00046
Manganese	mg/L	36	36	-	0.95	0.014	3.39	2.445	2.680	3.289	1.156	0.9142
Mercury	mg/L	14	11	11	0.0013	0.00005	0.025	0.0184	0.0250	0.0250	0.0047	0.00863
Molybdenum	mg/L	36	35	0	0.00155	0.00005	0.051	0.0070	0.0101	0.0391	0.0039	0.00867
Nickel	mg/L	36	36	0	0.0018	0.0008	0.018	0.0070	0.0079	0.0145	0.0031	0.00324
Rubidium	mg/L	0	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	36	23	1	0.0001	0.00005	0.0021	0.0003	0.0005	0.0016	0.0002	0.00035
Silver	mg/L	36	3	0	0.00005	0.00005	0.0005	0.00008	0.00010	0.00036	0.00007	0.000076
Strontium	mg/L	36	36	-	0.23	0.11	0.61	0.325	0.353	0.523	0.238	0.0929
Tellurium	mg/L	0	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	36	4	0	0.0001	0.0001	0.001	0.0001	0.0002	0.0007	0.0001	0.00015
Tin	mg/L	36	14	-	0.00005	0.00005	0.003	0.0002	0.0019	0.0026	0.0003	0.00064
Titanium	mg/L	36	35	-	0.0021	0.0001	293	0.009	51.0	261.9	13.8	58.70
Tungsten	mg/L	0	-	-	-	-	-	-	-	-	-	-
Uranium	ug/L	36	29	0	0.05	0.0002	6	0.5	1.1	4.5	0.3	1.03
Vanadium	mg/L	36	30	-	0.0002	0.00005	0.0022	0.00180	0.00193	0.00213	0.00058	0.000679
Zinc	mg/L	36	27	0	0.0025	0.00025	0.014	0.0091	0.0108	0.0137	0.0035	0.00360
Zirconium	mg/L	0	-	-	-	-	-	-	-	-	-	-
Nutrients												
Ammonia as nitrogen	mg/L	32	31	-	0.09	0.005	2	0.4	0.5	1.6	0.2	0.36
Dissolved organic carbon	mg/L	32	32	-	8.065	3.2	66	15.8	21.4	54.2	11.1	10.99
Dissolved phosphorus	mg/L	11	5	-	0.005	0.005	5.6	0.26	2.93	5.07	0.54	1.679
Nitrate	mg/L	34	19	1	0.04	0.02	21	1.1	1.7	14.8	0.8	3.59
Nitrite	mg/L	0	-	-	-	-	-	-	-	-	-	-
Nitrite+Nitrate, nitrogen	mg/L	22	13	-	0.01	0.005	4.7	0.07	0.45	3.81	0.25	0.999
Total Kjeldahl nitrogen	mg/L	32	32	-	0.595	0.1	2.2	1.79	1.98	2.20	0.78	0.566

Table 9 Surface water quality parameters (laboratory) for sampling station WRS-02 (West Ravine), November 2005 to January 2009.

Notes: ¹N = number of samples.

²Number of samples greater than or equal to detection limit (DL).

³Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of $N \geq DL$.

⁴For calculation of descriptive statistics, values < DL were set to half the value of DL.

⁵Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

⁶Dissolved metal guideline is not available, thus total metal guideline was used.

Table 9 Surface water quality parameters (laboratory) for sampling station WRS-02 (West Ravine), November 2005 to January 2009.

Parameters	Units	Sample ⁵																		
		- 16-Nov- 05	- 25-Nov- 05	- 5-Jan- 06	- 3-Mar- 06	#06002 15-Apr- 06	#06016 16-May- 06	#06033 13-Jun- 06	#06043 12-Jul- 06	#06072 11-Aug- 06	#06082 3-Sep- 06	#06103 28-Oct- 06	#06123 19-Nov- 06	#06153 24-Dec- 06	#07006 21-Jan- 07	#07050 18-Feb- 07	#07073 9-Mar- 07	#07106 19-Apr- 07	#07140 7-May- 07	#07158 8-Jun- 07
Inorganic Ions																				
Bicarbonate	mg/L	373	-	367	370	249	357	400	399	400	397	307	353	325	322	331	321	215	329	393
Calcium	mg/L	134	-	125	136	66	107	96	130	129	151	99	118	70	74	72	70	56	95	110
Carbonate	mg/L	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	7	<1	<1	1	<1	<1	<1	<1	<1
Chloride	mg/L	-	-	-	12.1	215	595	121	820	764	1210	495	1070	48	34	27	24	142	461	355
Fluoride	mg/L	-	-	-	0.24	0.08	0.16	0.12	0.18	0.18	0.18	0.12	0.3	0.14	0.12	0.11	0.08	0.08	0.16	0.22
Hydroxide	mg/L	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	1	<1	<1	<1	<1	<1
Ion Balance	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	27	-	28	28	14	21	20	26	24	29	21	25	17	17	17	16	12	19	22
Potassium	mg/L	5.7	-	5.5	14	4.1	5.9	2.3	7	7.5	9.4	3.8	7.3	3.7	2.7	2.6	2.4	3	4.6	3.4
Sodium	mg/L	594	-	490	800	148	417	96	590	506	790	324	761	38	32	25	23	104	304	227
Sulfate	mg/L	200	-	160	270	43	120	23	170	130	210	95	210	4.1	4.8	4.9	5.8	31	84	66
Metals																				
Aluminum	mg/L	0.021	0.0047	0.12	0.02	0.015	0.009	0.0019	0.14	0.0025	0.0081	0.056	0.013	0.16	0.35	0.36	0.64	0.91	0.012	0.013
Antimony	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	ug/L	0.0004	0.0003	0.0013	0.7	0.0005	0.0004	0.0003	0.0009	0.0005	0.0008	0.0004	0.0005	0.0038	0.0037	0.0043	0.0032	0.8	1.5	0.6
Barium	mg/L	0.42	0.41	0.38	0.45	0.27	0.35	0.31	0.58	0.53	0.57	0.26	0.4	0.29	0.28	0.27	0.25	0.2	0.3	0.39
Beryllium	mg/L	<0.00001	<0.0002	<0.0003	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	0.69	0.44	0.54	0.12	0.16	0.41	0.14	0.76	0.83	0.83	0.29	1.3	0.06	0.05	0.04	0.06	0.23	0.55	0.34
Cadmium	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cesium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	<0.005	<0.005	<0.005	<5	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	0.0005	<0.0005	0.0006	0.0011	0.0025	0.0016	<0.0005	<0.0005	<0.0005
Cobalt	mg/L	0.0006	0.0009	0.0005	0.0005	0.0007	0.0003	0.0002	0.0007	0.0003	0.0005	0.0002	0.0003	0.0034	0.0034	0.0027	0.0024	0.0001	0.0002	0.0002
Copper	mg/L	0.0002	0.0007	0.0002	0.0057	<0.0002	0.0002	<0.0002	0.0006	0.0003	<0.0002	0.0002	0.0004	0.001	0.0008	0.002	0.0015	0.0003	<0.0002	<0.0002
Iron	mg/L	1.35	0.29	4.9	1.7	0.55	0.65	0.064	0.88	0.38	0.97	0.9	1.9	9.4	8.2	7.29	6.85	0.1	0.26	0.48
Lead	mg/L	<0.0001	<0.0001	0.0003	0.0001	<0.0001	<0.0001	<0.0001	0.0002	0.0002	<0.0001	0.0002	-	0.0004	0.0008	0.0009	0.0014	<0.0001	<0.0001	<0.0001
Manganese	mg/L	0.85	0.18	0.96	1.3	0.94	0.16	0.014	0.47	0.61	0.88	0.12	0.38	3.1	2.46	2.43	2.2	0.015	0.17	0.43
Mercury	mg/L	-	-	-	-	0.0014	0.0011	0.0012	0.0027	0.003	0.0029	0.0006	0.0015	0.0008	0.0005	0.0006	<0.0001	-	-	-
Molybdenum	mg/L	0.0015	0.0009	0.0013	0.0026	0.0036	0.0015	0.0011	0.0033	0.0017	0.0017	0.0017	0.0011	0.0054	0.0078	0.0071	0.0068	0.0043	0.0011	0.0007
Nickel	mg/L	0.0015	0.0008	0.0038	0.0027	0.0036	0.0015	0.0011	0.0033	0.0017	0.0017	0.0017	0.0011	0.0054	0.0078	0.0071	0.0068	0.0029	0.0016	0.0018
Rubidium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	<0.0001	<0.0001	0.0001	0.0002	0.0001	0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	0.0021	0.0003	0.0006	0.0001	0.0001	<0.0001
Silver	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Strontium	mg/L	0.28	0.28	0.29	0.32	0.15	0.26	0.2	0.36	0.33	0.35	0.16	0.29	0.16	0.14	0.14	0.14	0.11	0.2	0.23
Tellurium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	0.0001	0.0001	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Tin	mg/L	<0.0001	<0.0001	0.0001	0.0001	0.0019	0.0019	<0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0001	0.0001	<0.0001	0.0001	<0.0001	<0.0001
Titanium	mg/L	0.0002	0.0017	0.0058	0.002	204	293	0.0024	0.0072	0.0012	0.0022	0.0024	0.0015	0.0073	0.0087	0.0081	0.0098	0.0025	0.0007	0.0009
Tungsten	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	ug/L	0.0008	0.0004	0.0009	1.8	0.0004	0.0004	0.0003	0.0005	0.0002	0.0002	0.0002	0.0008	0.0004	0.0005	0.0005	0.0006	0.3	0.3	0.3
Vanadium	mg/L	<0.0001	0.0001	0.0006	0.0001	0.0001	<0.0001	<0.0001	0.0005	<0.0001	0.0002	0.0007	0.0001	0.0022	0.0019	0.0018	0.0018	0.0002	<0.0001	0.0005
Zinc	mg/L	<0.005	<0.005	<0.005	<0.005	0.0005	<0.0005	<0.0005	0.0059	<0.001	0.0009	0.0005	0.0015	0.0023	0.003	0.0067	0.0081	<0.0005	0.0015	<0.0005
Zirconium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients																				
Ammonia as nitrogen	mg/L	-	-	-	-	0.03	0.04	0.04	0.09	0.11	0.05	0.11	0.09	0.42	0.35	0.44	0.32	0.05	<0.01	0.06
Dissolved organic carbon	mg/L	5.9	-	-	4.4	28	9.2	-	8.03	9.9	3.2	7.2	8.1	14	9.4	13	7	8.5	7.7	11

Table 9 Surface water quality parameters (laboratory) for sampling station WRS-02 (West Ravine), November 2005 to January 2009.

Parameters	Units	Sample ⁵																
		#07179 2-Jul-07	#07234 20-Aug-07	#07254 9-Sep-07	#07287 20-Oct-07	#07320 10-Nov-07	#07345 21-Dec-07	#08021 8-Mar-08	#08030 4-Apr-08	#08057 2-May-08	#08093 1-Jun-08	#08136 9-Jul-08	#08213 14-Aug-08	#08198 6-Sep-08	#08251 9-Oct-08	#08308 13-Nov-08	#08333 11-Dec-08	#09017 18-Jan-09
Inorganic Ions																		
Bicarbonate	mg/L	426	432	418	343	315	309	383	368	304	329	407	460	477	399	371	2280	450
Calcium	mg/L	103	128	120	110	67	67	111	91	79	97	113	98	113	93	94	145	139
Carbonate	mg/L	<1	<1	<1	<1	<1	<1	14	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloride	mg/L	183	549	494	490	8	5	227	81	125	318	462	346	473	265	297	2480	808
Fluoride	mg/L	0.23	0.22	0.2	0.17	0.14	0.13	0.14	0.11	0.14	0.18	0.18	0.23	0.2	0.18	0.18	1.6	0.29
Hydroxide	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ion Balance	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	21	25	24	22	15	15	29	24	16	19	22	19	22	19	19	96	28
Potassium	mg/L	2.1	4.3	4.1	4	2.2	1.7	5	3.3	2.6	2.3	3.2	2.5	4.3	2.7	2.5	108	9
Sodium	mg/L	129	338	317	313	22	20	127	48	81	182	294	255	347	189	222	2460	563
Sulfate	mg/L	31	83	80	98	14	13	39	17	28	59	87	54	86	45	78	980	210
Metals																		
Aluminum	mg/L	0.024	0.029	0.021	0.0034	0.058	0.022	0.26	0.021	0.0065	0.0029	0.023	0.029	0.017	0.024	0.063	0.08	0.021
Antimony	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	ug/L	0.7	1.5	1.1	0.6	3.2	2.8	0.9	0.8	0.4	0.6	1.2	1.5	1.3	1	0.9	3	4.1
Barium	mg/L	0.4	0.63	0.54	0.45	0.24	0.23	0.45	0.37	0.32	0.43	0.5	0.5	0.55	0.44	0.44	0.91	0.84
Beryllium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.0001
Bismuth	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	0.3	0.42	0.42	0.42	0.06	0.05	0.17	0.06	0.17	0.33	0.54	0.63	0.43	0.37	0.29	2.4	0.58
Cadmium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.001	<0.0001
Cesium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.032	<0.0005	<0.0005	0.0011	0.0027	<0.0005	<0.0005	0.06	0.0011	0.026	0.0006
Cobalt	mg/L	0.0002	0.0003	0.005	0.0001	0.0005	0.0004	0.0015	0.0004	0.0001	0.0001	0.0002	0.0003	0.0003	0.0003	0.0003	0.001	0.0006
Copper	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	0.0094	0.0005	<0.0002	0.0002	0.0002	0.0004	0.0004	0.0003	0.0002	0.002	0.0002
Iron	mg/L	0.5	2.3	1.75	1.22	3.3	3.4	2	1.74	0.49	0.78	1.57	2.07	2.77	2.73	3.35	3.4	13.1
Lead	mg/L	<0.0001	0.0001	0.0009	<0.0001	0.0001	<0.0001	0.0009	0.0001	<0.0001	<0.0001	0.0001	0.0001	0.0002	<0.0001	0.0009	0.002	0.0001
Manganese	mg/L	0.34	3.39	2	1.07	1.3	1.15	1.9	1.57	0.25	0.31	0.82	1.16	2.54	1.44	0.8	2.2	1.71
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
Molybdenum	mg/L	0.0021	0.0025	0.0016	0.0007	0.0003	<0.0001	0.0024	0.0008	0.0008	0.0006	0.0009	0.0018	0.0013	0.0006	0.0004	0.017	0.051
Nickel	mg/L	0.0018	0.0022	0.0016	0.0009	0.0015	0.001	0.018	0.0044	0.0012	0.0011	0.0019	0.0022	0.002	0.0018	0.0026	0.008	0.0012
Rubidium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	0.0001	0.0001	<0.0001	0.0001	0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	0.0003	0.0001	0.0001	0.0001	<0.001	0.0003
Silver	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.0001
Strontium	mg/L	0.21	0.3	0.26	0.24	0.14	0.13	0.25	0.2	0.16	0.21	0.26	0.22	0.24	0.2	0.23	0.61	0.32
Tellurium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.002	<0.0002
Tin	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0002	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.003	<0.0001
Titanium	mg/L	0.0009	0.0015	0.0029	0.0008	0.0028	0.0013	0.01	0.0009	0.0004	<0.0002	0.0024	0.001	0.0009	0.0011	0.0033	0.003	0.0012
Tungsten	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	ug/L	0.2	0.1	<0.1	<0.1	0.5	0.5	0.2	0.2	0.2	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	6	0.9
Vanadium	mg/L	0.0002	0.0004	0.0001	0.0014	0.0005	0.0007	0.0009	0.0001	0.0001	<0.0001	0.0016	0.0001	0.0001	0.0001	0.0003	0.002	0.0012
Zinc	mg/L	0.0012	0.0022	0.0011	0.0011	0.0035	0.0007	0.014	0.01	0.0028	0.0032	0.0067	0.0035	0.0054	0.0043	0.013	0.01	0.0026
Zirconium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients																		
Ammonia as nitrogen	mg/L	0.09	2	0.08	0.05	0.34	0.33	0.29	0.08	0.07	0.08	0.14	0.11	0.03	0.04	0.02	0.23	0.57
Dissolved organic carbon	mg/L	16	12	10	6.5	5.4	6.5	7.8	8	7.8	6.5	8.3	9.7		6.8	6.8	66	16
Dissolved	mg/L	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.01	0.26	0.07

Table 10 Surface water quality parameters (laboratory) for sampling station WRS-03 (West Ravine), March 2006 to December 2009.

Parameters	Units	Summary Statistics										
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴
								90 th	95 th	99 th		
Inorganic Ions												
Bicarbonate	mg/L	37	37	-	327	238	373	351.0	361.2	369.0	321.9	28.84
Calcium	mg/L	37	37	-	109	64	156	138.6	143.6	155.3	112.4	20.56
Carbonate	mg/L	37	9	-	0.5	0.5	13	7.0	8.6	12.3	1.8	3.12
Chloride	mg/L	37	37	-	528	71	975	865.8	943.8	967.8	558.5	218.57
Fluoride	mg/L	37	37	-	0.15	0.06	0.22	0.2	0.2	0.2	0.1	0.03
Hydroxide	mg/L	36	2	-	0.5	0.5	1	0.5	0.6	1.0	0.5	0.12
Ion Balance	%	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	37	37	-	22	0.25	32	27.4	28.2	30.9	22.3	5.29
Potassium	mg/L	37	37	-	3.4	0.0002	6.3	4.5	5.1	5.9	3.4	1.08
Sodium	mg/L	37	37	-	353	174	2440	592.2	613.6	1783.4	423.9	362.97
Sulfate	mg/L	37	37	-	110	59	1810	190.0	190.0	1226.8	162.9	281.08
Metals												
Aluminum	mg/L	37	37	6	0.031	0.0014	0.55	0.2	0.3	0.5	0.1	0.12
Antimony	mg/L	35	2	-	0.0001	0.0001	0.001	0.0	0.0	0.0	0.0	0.00
Arsenic	ug/L	37	37	3	0.9	0.0006	55	2.8	10.0	45.6	3.1	9.96
Barium	mg/L	37	37	-	0.33	0.22	2	0.5	0.7	1.9	0.4	0.36
Beryllium	mg/L	37	2	-	0.00005	0.00005	0.0005	0.0	0.0	0.0	0.0	0.00
Bismuth	mg/L	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	37	37	-	0.56	0.11	1	0.8	0.8	1.0	0.6	0.18
Cadmium	mg/L	37	4	4	0.00005	0.000005	0.0005	0.0	0.0	0.0	0.0	0.00
Cesium	mg/L	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	37	10	7	0.00025	0.00025	0.13	0.0	0.0	0.1	0.0	0.02
Cobalt	mg/L	37	35	-	0.0003	0.00005	0.0091	0.0	0.0	0.0	0.0	0.00
Copper	mg/L	37	32	3	0.0005	0.0001	0.007	0.0	0.0	0.0	0.0	0.00
Iron	mg/L	36	36	34	0.905	0.0022	86.9	6.1	44.5	74.7	6.3	17.51
Lead	mg/L	35	19	0	0.0001	0.00005	0.0041	0.0	0.0	0.0	0.0	0.00
Manganese	mg/L	36	36	-	0.37	0.0005	34	1.3	4.8	27.5	1.8	6.05
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	36	34	0	0.0012	0.00005	0.0041	0.0	0.0	0.0	0.0	0.00
Nickel	mg/L	36	36	0	0.00135	0.0005	0.047	0.0	0.0	0.0	0.0	0.01
Rubidium	mg/L	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	36	13	0	0.0001	0.00005	0.001	0.0	0.0	0.0	0.0	0.00
Silver	mg/L	36	4	1	0.00005	0.000005	0.0002	0.0	0.0	0.0	0.0	0.00
Strontium	mg/L	36	36	-	0.24	0.14	0.35	0.3	0.3	0.3	0.2	0.05
Tellurium	mg/L	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	36	2	0	0.0001	0.00005	0.001	0.0	0.0	0.0	0.0	0.00
Tin	mg/L	36	17	-	0.000075	0.00005	0.0025	0.0	0.0	0.0	0.0	0.00
Titanium	mg/L	36	36	-	0.0019	0.0002	0.011	0.0	0.0	0.0	0.0	0.00
Tungsten	mg/L	-	-	-	-	-	-	-	-	-	-	-
Uranium	ug/L	37	36	0	0.4	0.0005	0.7	0.6	0.6	0.7	0.3	0.25
Vanadium	mg/L	37	35	-	0.0003	0.00005	0.015	0.0	0.0	0.0	0.0	0.00
Zinc	mg/L	37	34	5	0.0024	0.00025	16	0.0	0.0	10.3	0.4	2.63
Zirconium	mg/L	-	-	-	-	-	-	-	-	-	-	-
Nutrients												
Ammonia as nitrogen	mg/L	36	35	-	0.075	0.005	0.99	0.2	0.4	0.8	0.1	0.18
Dissolved organic carbon	mg/L	19	19	-	6.1	2.5	8.6	7.8	8.1	8.5	6.1	1.43
Dissolved phosphorus	mg/L	9	7	-	0.01	0.005	5.6	1.1	3.4	5.2	0.6	1.86
Nitrate	mg/L	36	29	0	0.22	0.02	1.8	0.8	1.0	1.5	0.4	0.39
Nitrite	mg/L	-	-	-	-	-	-	-	-	-	-	-
Nitrite+Nitrate, nitrogen	mg/L	25	22	-	0.06	0.005	3.5	0.2	0.4	2.8	0.2	0.69

Table 10 Surface water quality parameters (laboratory) for sampling station WRS-03 (West Ravine), March 2006 to December 2009.

Parameters	Units	Summary Statistics										
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴
								90 th	95 th	99 th		
TDS (calculated)	mg/L	0	-	-	-	-	-	-	-	-	-	-

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

6Dissolved metal guideline is not available, thus total metal guideline was used.

Table 10 Surface water quality parameters (laboratory) for sampling station WRS-03 (West Ravine), March 2006 to December 2009.

Parameters	Units	Sample ⁵																		
		3-Mar-06	#06003 15-Apr-06	#06014 11-May-06	#06034 13-Jun-06	#06044 12-Jul-06	#06070 11-Aug-06	#06083 3-Sep-06	#06104 28-Oct-06	#06122 19-Nov-06	#06143 14-Dec-06	#07007 21-Jan-07	#07051 18-Feb-07	#07089 18-Mar-07	#07098 8-Apr-07	#07141 7-May-07	#07159 8-Jun-07	#07180 2-Jul-07	#07237 27-Aug-07	#07255 9-Sep-07
Inorganic Ions																				
Bicarbonate	mg/L	327	257	327	361	351	311	337	282	317	311	315	316	287	293	295	321	343	338	346
Calcium	mg/L	154	89	113	101	141	134	156	117	126	132	137	141	137	131	118	120	107	121	120
Carbonate	mg/L	<1	<1	<1	<1	<1	<1	<1	13	<1	<1	1	<1	<1	<1	<1	2	7	<1	<1
Chloride	mg/L	71	332	461	322	721	759	975	717	802	803	823	930	955	941	679	626	469	675	652
Fluoride	mg/L	0.12	0.06	0.1	0.11	0.18	0.13	0.11	0.12	0.15	0.14	0.15	0.14	0.09	0.13	0.14	0.18	0.17	0.16	0.16
Hydroxide	mg/L	<1	<1	-	<1	<1	<1	<1	1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1
Ion Balance	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	0.25	19	24	22	29	27	32	25	27	27	28	27	26	23	25	22	22	24	25
Potassium	mg/L	0.0002	4	3.4	2.8	3.9	5	5.3	4	3.9	3.9	4.2	4.4	4.5	6.3	4.5	3.4	2.4	3.4	3.5
Sodium	mg/L	2440	210	289	192	448	456	616	464	531	508	534	587	600	613	424	368	274	414	402
Sulfate	mg/L	1810	82	110	72	150	160	190	150	170	170	180	190	190	190	130	120	81	120	120
Metals																				
Aluminum	mg/L	0.0015	0.013	0.038	0.042	0.0056	0.053	0.013	0.17	0.0048	0.0076	0.0027	0.058	0.2	0.02	0.0096	0.056	0.033	0.028	0.053
Antimony	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	ug/L	0.0007	0.0006	0.0008	0.0007	0.001	0.0019	0.0011	0.0009	0.0006	0.0018	0.0006	0.0013	0.0031	0.0024	2.1	0.9	1	1.3	1.3
Barium	mg/L	0.35	0.23	0.28	0.25	0.45	0.47	0.48	0.26	0.34	0.33	0.31	0.32	0.3	0.29	0.3	0.34	0.34	0.39	0.38
Beryllium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	0.47	0.23	0.29	0.29	0.55	0.72	0.69	0.45	0.75	0.78	0.75	0.72	0.91	1	0.7	0.52	0.56	0.58	0.59
Cadmium	mg/L	<0.0005	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0005	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cesium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	0.02	0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cobalt	mg/L	0.0003	0.0004	0.0005	0.0003	0.0004	0.0005	0.0005	0.0005	0.0003	0.004	0.0001	0.0003	0.0004	0.0001	0.0001	0.0002	0.0002	0.0002	0.0004
Copper	mg/L	0.0009	0.0002	0.0002	<0.0002	<0.0002	0.0008	0.0006	0.002	0.0007	0.0042	0.0008	0.0007	0.0015	<0.0002	0.0003	0.0004	0.0002	0.0003	0.0003
Iron	mg/L	-	0.53	0.65	0.29	0.53	2.2	0.87	1.3	0.57	42	0.59	1.48	1.64	0.44	0.33	0.72	0.65	1.4	1.45
Lead	mg/L	-	<0.0001	<0.0001	<0.0001	<0.0001	0.0008	<0.0001	0.0005	-	0.0041	0.0001	0.0002	0.0004	<0.0001	<0.0001	0.0001	0.0001	<0.0001	0.0002
Manganese	mg/L	-	0.2	0.22	0.068	0.24	0.58	0.43	0.33	0.3	0.51	0.26	0.39	0.34	0.21	0.15	0.2	0.29	0.92	0.78
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	0.0011	0.0008	0.0012	0.0017	0.0015	0.0023	0.0007	0.0011	0.0013	0.0009	0.0011	<0.0001	0.0013	0.0011	0.0005	0.0018	0.002	0.0019
Nickel	mg/L	-	0.0017	0.0013	0.0011	0.0009	0.0014	0.0012	0.003	0.0007	0.013	0.0007	0.0013	0.0017	0.0007	0.0009	0.0016	0.0018	0.0014	0.0012
Rubidium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	-	0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0004	0.0004	0.0002	0.0003	<0.0001	<0.0001	0.0001	0.0001	<0.0001	<0.0001
Silver	mg/L	-	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002
Strontium	mg/L	-	0.2	0.26	0.23	0.34	0.33	0.35	0.19	0.28	0.24	0.25	0.27	0.28	0.27	0.24	0.25	0.23	0.27	0.25
Tellurium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	-	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Tin	mg/L	-	0.0002	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	0.0025	<0.0001	0.0003	0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	<0.0001
Titanium	mg/L	-	0.002	0.0025	0.0033	0.0018	0.0032	0.0025	0.0051	0.0012	0.0013	0.001	0.0024	0.0057	0.0011	0.0005	0.0026	0.0023	0.0015	0.0034
Tungsten	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	ug/L	0.0008	0.0006	0.0006	0.0007	0.0006	0.0006	0.0007	0.0005	0.0007	0.0006	0.0006	0.0006	0.0006	0.0007	0.5	0.5	0.4	0.4	0.2
Vanadium	mg/L	0.0001	0.0001	0.0002	0.0003	0.0001	0.0003	0.0002	0.0016	0.0001	0.0051	0.0016	0.0004	0.0006	<0.0001	<0.0001	0.001	0.0005	0.0006	0.0002
Zinc	mg/L	<0.0005	0.0009	0.0024	<0.0005	0.0012	0.013	0.0012	0.0026	0.0007	16	0.0006	0.0024	0.005	<0.0005	0.0021	0.0007	0.0006	0.0021	0.0012
Zirconium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients																				
Ammonia as nitrogen	mg/L	-	0.04	0.09	0.05	0.08	0.99	<0.01	0.08	0.08	0.09	0.06	0.1	0.06	0.06	0.01	0.04	0.07	0.08	0.08
Dissolved organic	mg/L	-	7.7	6.8		8.03	6.7	5.3	6.9	5.2	5	5.5	2.5	5.1	5.2	-	-	-	-	-

Table 10 Surface water quality parameters (laboratory) for sampling station WRS-03 (West Ravine), March 2006 to December 2009.

Parameters	Units	#07288	#07329	#07341	#07386	#07397	#08043	#08058	#08094	#08162	#08187	#08214	#08250	#08309	#9045	#9056	#9080	#9093	#9104
		20-Oct-07	12-Nov-07	21-Dec-07	26-Jan-08	11-Feb-08	6-Apr-08	3-May-08	1-Jun-08	28-Jul-08	17-Aug-08	6-Sep-08	9-Oct-08	13-Nov-08	12-Apr-09	20-Jun-09	30-Aug-09	11-Oct-09	18-Dec-09
Inorganic Ions		327	305	315	317	327	311	283	311	348	349	362	351	334	238	345	373	344	337
Bicarbonate	mg/L	115	110	105	109	108	101	83	94	93	100	106	103	98	64	90	90	85	109
Calcium	mg/L	<1	7	<1	<1	<1	<1	<1	<1	8	11	2	<1	<1	<1	<1	1	<1	<1
Carbonate	mg/L	628	541	453	554	504	491	288	396	450	534	528	491	430	258	360	360	337	348
Chloride	mg/L	0.16	0.15	0.14	0.16	0.15	0.13	0.14	0.18	0.22	0.18	0.15	0.17	0.16	0.13	0.21	0.2	0.22	0.14
Fluoride	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Hydroxide	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ion Balance	%	24	22	21	22	22	22	17	19	18	21	21	22	20	15	17	20	18	22
Magnesium	mg/L	3.8	2.8	2.7	2.8	2.9	2.5	2.5	2.7	3.3	2.8	4.3	3.1	2.8	4.6	3	2.1	3	2.9
Potassium	mg/L	397	372	339	344	342	317	187	258	304	353	355	314	300	174	253	259	232	214
Sodium	mg/L	120	110	110	100	110	93	59	82	84	90	96	92	100	61	85	84	77	90
Sulfate	mg/L																		
Metals		0.19	0.005	0.0014	0.39	0.088	0.013	0.053	0.0082	0.0018	0.24	0.073	0.0062	0.051	0.038	0.0063	0.0088	0.031	0.55
Aluminum	mg/L	<0.0002	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Antimony	mg/L	3	0.9	0.7	55	5.3	0.8	1.3	0.8	0.9	2.3	1.5	0.9	2.6	1.4	0.8	1.1	1.1	29
Arsenic	ug/L	0.41	0.33	0.28	1.75	0.42	0.3	0.36	0.32	0.29	0.43	0.37	0.31	0.37	0.22	0.27	0.25	0.23	2
Barium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0005
Beryllium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	mg/L	0.62	0.55	0.5	0.65	0.46	0.48	0.37	0.56	0.11	0.79	0.65	0.57	0.48	0.4	0.71	0.66	0.51	0.4
Boron	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium	mg/L	0.0015	<0.0005	<0.0005	0.019	0.001	<0.0005	<0.0005	<0.0005	<0.0005	0.0083	0.13	0.0032	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Chromium	mg/L	0.0007	0.0001	0.0001	0.0091	0.0006	<0.0001	0.0003	0.0001	<0.0001	0.0009	0.0003	0.0001	0.0003	0.0002	0.0001	0.0001	0.0001	0.009
Cobalt	mg/L	0.0018	<0.0002	<0.0002	0.0041	0.0009	0.0003	0.0004	0.0002	0.0012	0.0038	0.001	0.0005	0.0003	0.0007	0.0003	0.0003	0.0024	0.007
Copper	mg/L	3	1.4	0.75	86.9	8.1	0.7	2.05	0.64	0.0022	3.13	1.65	0.81	4.04	1.29	0.6	0.78	0.94	52
Iron	mg/L	0.0007	<0.0001	<0.0001	0.0038	0.0002	0.0001	0.0001	<0.0001	<0.0001	0.0015	0.0003	<0.0001	0.0002	0.0001	<0.0001	<0.0001	<0.0001	0.003
Lead	mg/L	1.3	0.41	0.45	34	1.3	0.35	1.33	0.33	0.0005	0.8	0.83	0.48	1.12	0.5	0.24	0.21	0.32	15.3
Manganese	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	0.001	0.001	0.0007	0.0034	0.0011	0.0011	0.0007	0.0012	0.0041	0.0033	0.0019	0.0015	0.0013	0.0017	0.0017	0.0022	0.0012	<0.001
Molybdenum	mg/L	0.0035	0.0009	0.0005	0.035	0.0034	0.0006	0.0017	0.0009	0.0018	0.04	0.0016	0.0009	0.0015	0.0018	0.0012	0.0012	0.0011	0.047
Nickel	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	0.0001	0.0001	0.0001	0.0004	0.0001	<0.0001	0.0001	<0.0001	0.0001	0.0004	0.0001	<0.0001	0.0001	<0.0001	0.0003	<0.0001	0.0001	0.001
Selenium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Silver	mg/L	0.24	0.23	0.2	0.29	0.24	0.22	0.18	0.21	0.2	0.25	0.24	0.22	0.24	0.14	0.19	0.19	0.19	0.29
Strontium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Thallium	mg/L	0.0025	0.0001	0.0001	0.0006	0.0007	0.0001	<0.0001	0.0001	<0.0001	0.001	<0.0001	<0.0001	0.0007	<0.0001	<0.0001	<0.0001	<0.0001	0.0005
Tin	mg/L	0.007	0.0018	0.0012	0.011	0.0036	0.0006	0.0018	0.0004	0.0002	0.0051	0.0028	0.0002	0.002	0.0018	0.0004	0.0006	0.0012	0.006
Titanium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten	mg/L	0.4	0.4	0.4	0.7	0.7	0.5	0.5	0.5	0.6	0.5	0.4	0.4	0.4	0.6	0.6	0.4	0.4	<1
Uranium	ug/L	0.0056	0.0025	0.0024	0.015	0.0005	0.0001	0.0003	0.0001	0.0005	0.0051	0.0003	0.0001	0.0007	0.0002	0.0002	0.0001	0.0005	0.004
Vanadium	mg/L	0.034	0.0015	0.0022	0.045	0.007	0.0043	0.005	0.0038	0.0017	0.028	0.011	0.0083	0.07	0.004	0.0036	0.0051	0.0013	0.031
Zinc	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium	mg/L																		
Nutrients		0.07	0.02	0.19	0.38	0.16	0.02	0.06	0.08	0.04	0.14	0.05	0.12	0.01	0.21	0.1	0.04	0.04	0.57
Ammonia as nitrogen	mg/L	-	-	-	-	-	4.6	6.2	6.1	8.6	7.8	-	6.2	6	-	-	-	-	-
Dissolved organic carbon	mg/L	-	-	-	-	-	<0.01	0.02	<0.01	0.02	0.03	0.01	0.01	0.01	-	-	-	-	-

Table 11 Surface water quality parameters (laboratory) for sampling station WRS-04 (West Ravine), June 2006 to December 2009.

Parameters	Units	Summary Statistics											Sample ⁵														
		N ¹	N≥D L ²	N>< GL ³	Med ⁴	Min ⁴	Max ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	#06028	#06045	#06066	#06109	#06128	#06140	#07041	#07066	#07086	#07119	#07170	#07217	#07232		
								3-Jun-06	12-Jul-06	9-Aug-06			29-Oct-06	26-Nov-06	13-Dec-06	21-Jan-07	28-Feb-07	17-Mar-07	8-Apr-07	12-Jun-07	28-Jul-07	16-Aug-07					
Inorganic Ions																											
Bicarbonate	mg/L	33	33	-	309	222	353	332.8	336.6	349.5	301.5	32.46	318	322	309	267	332	310	309	310	288	250	293	321	303		
Calcium	mg/L	33	33	-	84	50	129	119.8	122.8	127.4	89.3	21.24	83	119	118	110	117	120	129	124	122	84	94	102	99		
Carbonate	mg/L	33	23	-	7	0.5	19	13.6	14.8	18.0	6.5	5.24	6	10	10	19	<1	<1	<1	<1	<1	7	14	14	8		
Chloride	mg/L	33	32	-	326	0.5	668	582.2	617.4	661.6	308.2	214.93	202	455	558	539	587	563	597	648	668	362	326	421	496		
Fluoride	mg/L	33	33	-	0.14	0.05	0.2	0.18	0.18	0.20	0.15	0.027	0.14	0.11	0.16	0.13	0.15	0.16	0.14	0.13	0.05	0.13	0.19	0.16	0.16		
Hydroxide	mg/L	33	0	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Ion Balance	%	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Magnesium	mg/L	33	33	-	20	13	26	25.8	26.0	26.0	20.5	3.55	19	26	26	24	26	24	26	25	25	17	20	23	23		
Potassium	mg/L	33	33	-	2.7	1.8	13	3.2	3.5	10.0	3.0	1.85	2.7	3.5	3.5	3.1	2.9	3	3	3	3.2	3.2	2.7	2.8	3		
Sodium	mg/L	33	33	-	214	5.4	404	383.6	399.4	403.7	197.7	131.83	135	291	311	348	389	362	403	397	404	223	202	275	292		
Sulfate	mg/L	33	33	-	53	7.6	160	128.0	130.0	150.4	59.1	41.46	45	83	88	110	130	120	160	130	130	69	57	51	62		
Metals																											
Aluminum	mg/L	33	33	9	0.053	0.0046	0.71	0.182	0.224	0.566	0.090	0.1261	0.021	0.13	0.044	0.01	0.039	0.027	0.04	0.035	0.059	0.11	0.037	0.075	0.035		
Antimony	mg/L	32	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Arsenic	ug/L	33	33	0	1.6	0.9	3.6	2.46	2.92	3.44	1.78	0.630	1.1	2.2	2.3	1	1	1.2	1.1	1.3	2.3	2.2	1.5	3.1	2.8		
Barium	mg/L	33	33	-	0.24	0.1	0.37	0.32	0.36	0.37	0.24	0.069	0.2	0.37	0.35	0.24	0.32	0.3	0.32	0.31	0.3	0.23	0.26	0.31	0.28		
Beryllium	mg/L	33	1	-	0.0001	0.00005	0.0001	0.00005	0.00005	0.00008	0.00005	0.000009	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Bismuth	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Boron	mg/L	33	33	-	0.33	0.01	0.57	0.490	0.508	0.554	0.286	0.1709	0.23	0.33	0.42	0.29	0.5	0.5	0.52	0.45	0.57	0.44	0.36	0.4	0.36		
Cadmium	mg/L	33	3	3	0.00005	0.000005	0.0003	0.00005	0.00010	0.00024	0.00006	0.000046	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Cesium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Chromium	mg/L	33	8	5	0.00025	0.00005	0.039	0.0021	0.0041	0.0279	0.0018	0.00675	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		
Cobalt	mg/L	33	32	-	0.0002	0.00005	0.0014	0.00056	0.00110	0.00130	0.00029	0.000315	0.0002	0.0006	0.0003	0.0001	0.0003	0.0002	0.0002	0.0001	0.0001	0.0002	0.0001	0.0002	0.0001		
Copper	mg/L	33	32	0	0.0004	0.0001	0.0036	0.00122	0.00180	0.00322	0.00068	0.000686	<0.0002	0.0004	0.0009	0.0002	0.0004	0.0004	0.0009	0.0004	0.0006	0.0007	0.0004	0.0004	0.0002		
Iron	mg/L	33	33	22	0.36	0.088	3.32	0.728	2.150	3.099	0.573	0.6956	0.12	0.48	0.25	0.17	0.37	0.36	0.34	0.37	0.44	0.48	0.14	0.29	0.21		
Lead	mg/L	33	29	0	0.0001	0.00005	0.0028	0.00086	0.00118	0.00232	0.00031	0.000539	<0.0001	0.0003	0.0001	0.0001	0.0028	0.0001	0.0001	0.0001	0.0001	0.0002	0.0001	0.0001	0.0001		
Manganese	mg/L	33	33	-	0.096	0.017	0.25	0.176	0.184	0.231	0.097	0.0572	0.017	0.074	0.076	0.067	0.1	0.1	0.12	0.18	0.16	0.11	0.033	0.099	0.075		
Mercury	mg/L	2	0	0	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0	-	-	-	-	-	-	-	-	-	-	-	-	-		
Molybdenum	mg/L	33	32	0	0.0008	0.00005	0.0017	0.00130	0.00134	0.00160	0.00082	0.000366	0.0009	0.00014	0.0013	0.0007	0.0008	0.0008	0.0008	0.0009	<0.0001	0.0013	0.0003	0.0014	0.0011		
Nickel	mg/L	33	33	0	0.0009	0.0005	0.0037	0.00238	0.00348	0.00367	0.00122	0.000864	0.0007	0.0015	0.0009	0.0006	0.0007	0.0008	0.0009	0.0008	0.0007	0.0012	0.0009	0.0005	0.0009		
Rubidium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Selenium	mg/L	33	19	0	0.0001	0.00005	0.0006	0.00030	0.00044	0.00057	0.00015	0.000138	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0002	<0.0001	0.0002	0.0003	0.0001	<0.0001	<0.0001	0.0001		
Silver	mg/L	33	2	0	0.00005	0.000005	0.0001	0.00005	0.00007	0.00010	0.00005	0.000015	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Strontium	mg/L	33	33	-	0.22	0.12	0.41	0.270	0.310	0.378	0.221	0.0561	0.19	0.31	0.31	0.19	0.26	0.24	0.24	0.23	0.25	0.18	0.21	0.25	0.23		
Tellurium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Thallium	mg/L	33	0	0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Tin	mg/L	33	8	-	0.00005	0.00005	0.0011	0.00010	0.00022	0.00088	0.00010	0.000190	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001		
Titanium	mg/L	33	33	-	0.0028	0.0002	0.025	0.0077	0.0118	0.0212	0.0044	0.00467	0.0027	0.0071	0.0038	0.0009	0.0024	0.002	0.0022	0.002	0.0039	0.0036	0.0018	0.0032	0.0022		
Tungsten	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Uranium	ug/L	33	33	0	0.3	0.1	1.6	0.58	0.94	1.50	0.40	0.304	0.5	0.4	0.3	0.3	0.5	0.4	0.4	0.4	0.4	0.5	0.4	0.2	0.2		
Vanadium	mg/L	33	33	-	0.0008	0.0002	0.034	0.00588	0.00914	0.02616	0.00300	0.00613	0.0003	0.0008	0.0004	0.0006	0.0002	0.0058	0.0027	0.0003	0.0002	0.0005	0.0007	0.0009	0.0007		
Zinc	mg/L	25	22	1	0.0018	0.00025	0.039	0.0090	0.0116	0.0325	0.0042	0.00786	<0.0005	0.0018	-	0.0005	0.0006	0.0008	0.0033	0.0007	0.0009	0.0012	<0.0005	0.0013	0.0023		
Zirconium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Nutrients																											
Ammonia as	mg/L	33	33	-	0.09	0.01	0.4	0.16	0.19	0.34	0.10	0.074	0.01	0.17	0.4	0.04	0.1	0.21	0.13	0.09	0.04	0.01	0.04	0.08	0.04		

Table 11 Surface water quality parameters (laboratory) for sampling station WRS-04 (West Ravine), June 2006 to December 2009.

Parameters	Units	Sample ⁵																		
		#07331	#07354	#07379	#07411	#08012	#08044	#08059	#08098	#08157	#08206	#08217	#08263	#08326	#09006	#9041	# 9062	#9081	#9098	Stream is Dry
		17-Nov-07	28-Dec-07	24-Jan-08	24-Feb-08	7-Mar-08	6-Apr-08	3-May-08	2-Jun-08	28-Jul-08	30-Aug-08	7-Sep-08	19-Oct-08	1-Dec-08	3-Jan-09	26-Apr-09	30-Jun-09	30-Aug-09	23-Oct-09	18-Dec-09
Inorganic Ions		299	306	329	342	329	333	222	270	300	306	314	310	353	228	223	320	333	295	-
Bicarbonate	mg/L	96	71	74	75	76	78	50	66	75	78	79	85	96	58	60	77	72	71	-
Calcium	mg/L	10	5	<1	<1	16	5	1	10	8	10	8	12	<1	<1	<1	7	5	11	-
Carbonate	mg/L	407	<1	2	2	2	1	2	1	288	333	320	344	323	10	167	241	256	248	-
Chloride	mg/L	0.16	0.14	0.14	0.14	0.14	0.13	0.13	0.17	0.18	0.14	0.14	0.14	0.15	0.15	0.12	0.18	0.17	0.2	-
Fluoride	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-
Hydroxide	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ion Balance	%	21	17	18	19	19	20	13	16	16	19	19	21	23	20	15	17	18	18	-
Magnesium	mg/L	2.3	1.8	1.9	2.1	2.2	2.2	2.5	2.3	2.9	13	2.6	2.6	2.7	2.9	2.5	2.6	2	2.9	-
Potassium	mg/L	241	6.3	6.4	7	7.1	7.3	5.4	6	189	211	214	227	224	23	116	165	176	167	-
Sodium	mg/L	71	8	7.6	8.2	8.3	9	14	11	35	30	33	53	66	72	42	39	30	45	-
Sulfate	mg/L																			
Metals		0.024	0.068	0.09	0.19	0.065	0.11	0.71	0.2	0.0046	0.26	0.059	0.033	0.035	0.053	0.15	0.068	0.019	0.027	-
Aluminum	mg/L	<0.0002		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-
Antimony	mg/L	1.4	1.3	1.5	1.6	1.6	1.4	1.8	1.7	2.3	3.6	2.2	1.5	1.4	0.9	2.5	1.7	1.9	1.5	-
Arsenic	ug/L	0.24	0.14	0.16	0.17	0.17	0.18	0.15	0.17	0.22	0.3	0.23	0.23	0.28	0.1	0.25	0.24	0.21	0.19	-
Barium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	-
Beryllium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	mg/L	0.31	0.03	0.04	0.03	0.04	0.03	0.04	0.07	0.4	0.41	0.34	0.31	0.24	0.01	0.25	0.38	0.4	0.34	-
Boron	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0003	<0.0001	0.0001	<0.0001	<0.0001	-
Cadmium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0018	0.0006	<0.0005	0.0022	<0.0005	<0.0005	0.004	0.039	0.0042	0.0005	<0.0005	<0.0005	-
Chromium	mg/L	0.0001	0.0002	0.0002	0.0003	0.0002	0.0002	0.0014	0.0003	0.0002	0.0011	0.0002	0.0001	0.0001	0.0002	0.0011	0.0002	0.0001	<0.0001	-
Cobalt	mg/L	0.0003	0.0004	0.0005	0.0007	0.0008	0.0006	0.0036	0.0013	0.0003	0.0024	0.0006	0.0003	0.0003	0.0014	0.0006	0.0007	0.0003	0.0003	-
Copper	mg/L	0.31	0.56	0.68	0.74	0.55	0.64	1.83	0.67	0.26	2.63	0.32	0.18	0.33	0.35	3.32	0.48	0.088	0.16	-
Iron	mg/L	0.0001	0.0001	0.0001	0.0002	0.0002	0.0001	0.0013	0.0003	<0.0001	0.0011	0.0002	0.0001	0.0003	0.0003	0.001	0.0002	<0.0001	<0.0001	-
Lead	mg/L	0.098	0.096	0.16	0.19	0.15	0.13	0.15	0.067	0.036	0.25	0.06	0.036	0.096	0.049	0.18	0.034	0.021	0.023	-
Manganese	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	0.0004	0.0004	0.0007	0.0005	0.0006	0.0006	0.001	0.0013	0.0012	0.0006	0.0007	0.0008	0.0007	0.0017	0.0011	0.0011	0.001	0.0007	-
Molybdenum	mg/L	0.0006	0.0008	0.0009	0.0011	0.0009	0.001	0.0037	0.0015	0.0025	0.0036	0.001	0.0007	0.0006	0.0019	0.0034	0.0018	0.0009	0.0008	-
Nickel	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	0.0001	0.0002	0.0004	0.0002	<0.0001	0.0003	0.0006	0.0005	0.0002	0.0001	0.0001	-
Selenium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-
Silver	mg/L	0.19	0.23	0.24	0.27	0.27	0.27	0.18	0.23	0.16	0.19	0.18	0.19	0.22	0.41	0.12	0.18	0.16	0.17	-
Strontium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-
Thallium	mg/L	<0.0001	0.0004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0011	<0.0001	0.0001	<0.0001	<0.0001	-
Tin	mg/L	0.0023	0.0054	0.0078	0.013	0.0036	0.0071	0.025	0.011	0.0002	0.0055	0.0028	0.0015	0.0013	0.0019	0.0054	0.0033	0.0009	0.0013	-
Titanium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten	mg/L	0.3	0.3	0.3	0.3	0.3	0.3	1.6	0.6	0.2	0.3	0.2	0.2	0.2	1.3	0.7	0.4	0.2	0.2	-
Uranium	ug/L	0.0013	0.0004	0.0005	0.0009	0.0004	0.004	0.0095	0.0056	0.0021	0.034	0.0057	0.0059	0.0002	0.0015	0.0089	0.0015	0.0004	0.0003	-
Vanadium	mg/L	0.0026	0.0024	0.0029	0.0053	0.0074	-	-	-	-	-	-	-	0.01	0.039	0.0044	0.003	0.0005	<0.0005	-
Zinc	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium	mg/L																			
Nutrients		0.08	0.07	0.16	0.13	0.12	0.1	0.12	0.1	0.04	0.07	0.06	0.16	0.11	0.12	0.12	0.14	0.02	0.02	-
Ammonia as nitrogen	mg/L	5.4	5.1	4.9	5.2	5.2	4.9	6.1	6.5	8.9	7.8		6	6.5	3.8	-	-	-	-	-
Dissolved organic carbon	mg/L	-	-	-	-	-	<0.01	<0.01	<0.01	0.01	0.02	<0.01	0.03	0.03	0.01	-	-	-	-	-
Dissolved phosphorus	mg/L	0.44	0.35	0.42	0.33	0.35	0.44	0.61	0.22	0.31	0.09	0.13	0.09	27	30	0.4	0.13	0.26	0.18	-

Table 11 Surface water quality parameters (laboratory) for sampling station WRS-04 (West Ravine), June 2006 to December 2009.

Parameters	Units	Sample ⁵																		
		#07331	#07354	#07379	#07411	#08012	#08044	#08059	#08098	#08157	#08206	#08217	#08263	#08326	#09006	#9041	# 9062	#9081	#9098	Stream is Dry
		17-Nov-07	28-Dec-07	24-Jan-08	24-Feb-08	7-Mar-08	6-Apr-08	3-May-08	2-Jun-08	28-Jul-08	30-Aug-08	7-Sep-08	19-Oct-08	1-Dec-08	3-Jan-09	26-Apr-09	30-Jun-09	30-Aug-09	23-Oct-09	18-Dec-09
Nitrate	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite	mg/L	-	-	-	-	-	0.1	0.14	0.05	0.07	0.01	0.03	0.02	6	6.8	0.09	0.03	0.06	0.04	-
Nitrite+Nitrate, nitrogen	mg/L	0.25	0.36	0.34	0.55	0.71	0.47	0.74	0.23	0.56	0.63	0.34	0.3	0.44	0.61	2	0.23	0.41	0.18	-
Total Kjeldahl nitrogen	mg/L	0.35	0.44	0.43	0.62	0.79	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg/L	5.2	5.9	5	5.1	5.9	5.2	5.9	6.7	9	8	7.1	7	6.2	4.3	8	7.1	8.7	7.6	-
Total organic carbon	mg/L	0.03	0.03	0.07	0.03	0.03	0.02	0.16	0.03	0.09	0.12	0.02	<0.01	0.04	0.02	0.14	0.02	0.04	<0.01	-
Total phosphorus	mg/L																			
Physical Properties		16	17	12	20	20	15	21	18	19	59	24	18	21	15	47	24	22	10	-
Chemical Oxygen Demand	mg/L	8.3	8.33	8.24	8.2	8.5	8.3	8.3	8.47	8.52	8.46	8.42	8.51	8.21	8.18	8.14	8.45	8.37	8.47	-
pH	pH units	1780	465	479	497	530	508	350	419	1430	1540	1510	1700	1670	521	953	1280	1300	1270	-
Specific conductivity	µS/cm	1150	416	440	456	460	456	311	383	914	1000	990	1050	1110	444	626	869	892	858	-
Sum of Ions	mg/L	261	259	270	280	296	281	184	237	260	267	271	274	289	187	183	274	281	260	-
Total alkalinity	mg/L	986	289	291	288	338	270	227	263	284	882	856	923	880	296	534	740	739	725	-
Total dissolved solids	mg/L	326	247	259	265	268	277	178	230	253	273	275	298	334	227	211	262	254	251	-
Total hardness	mg/L	7	16	16	57	46	21	341	25	8	120	11	3	-	-	-	-	-	-	-
Total suspended solids	mg/L	2.1	7.7	8.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU																			
Dissolved Metals		-	-	-	-	-	0.0019	0.016	0.0033	0.0021	0.0073	0.0018	0.0015	0.0008	0.0025	-	-	-	-	-
Aluminum	mg/L	-	-	-	-	-	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	-	-	-	-	-
Antimony	mg/L	-	-	-	-	-	0.9	1	1.2	2	2.3	2	1.3	0.9	0.6	-	-	-	-	-
Arsenic	ug/L	-	-	-	-	-	0.19	0.12	0.16	0.22	0.24	0.23	0.23	0.27	0.11	-	-	-	-	-
Barium	mg/L	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-
Beryllium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	mg/L	-	-	-	-	-	0.07	0.04	0.06	0.36	0.4	0.33	0.32	0.24	0.01	-	-	-	-	-
Boron	mg/L	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	-	-	-	-	-
Cadmium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium	mg/L	-	-	-	-	-	<0.0005	0.002	<0.0005	0.14	0.051	0.0059	<0.0005	0.0038	0.033	-	-	-	-	-
Chromium	mg/L	-	-	-	-	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	<0.0001	<0.0001	0.0001	-	-	-	-	-
Cobalt	mg/L	-	-	-	-	-	0.0008	0.0007	0.001	0.0006	0.0018	0.0002	0.0002	0.0002	0.0022	-	-	-	-	-
Copper	mg/L	-	-	-	-	-	0.028	0.026	0.015	0.031	0.034	0.022	0.014	0.014	0.01	-	-	-	-	-
Iron	mg/L	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.0001	<0.0001	<0.0001	0.0029	-	-	-	-	-
Lead	mg/L	-	-	-	-	-	0.12	0.028	0.0081	0.014	0.03	0.021	0.02	0.048	0.024	-	-	-	-	-
Manganese	mg/L	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	-	-	-
Mercury	mg/L	-	-	-	-	-	0.0007	0.0019	0.0015	0.0011	0.0009	0.0008	0.0008	0.0007	0.0017	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.0012	0.0008	0.0011	0.0008	0.0013	0.0008	0.0006	0.0006	0.0018	-	-	-	-	-
Nickel	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	-	-	-	-	-	<0.0001	<0.0001	0.0002	0.0002	0.0001	0.0001	<0.0001	0.0002	0.0004	-	-	-	-	-
Selenium	mg/L	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-
Silver	mg/L	-	-	-	-	-	0.27	0.19	0.24	0.16	0.18	0.18	0.19	0.22	0.36	-	-	-	-	-
Strontium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium	mg/L	-	-	-	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	-	-
Thallium	mg/L	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.0001	-	-	-	-	-
Tin	mg/L	-	-	-	-	-	<0.0002	0.0011	0.0002	<0.0002	0.0008	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	-	-
Titanium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten	mg/L	-	-	-	-	-	0.3	1.4	0.5	0.2	0.2	0.2	0.2	0.2	1.2	-	-	-	-	-
Uranium	ug/L	-	-	-	-	-	0.0001	0.0007	0.0004	0.0003	0.0004	0.0002	0.0001	0.0001	0.0003	-	-	-	-	-
Vanadium	mg/L	-	-	-	-	-	0.0055	0.0032	0.0026	0.0048	0.0076	0.0043	0.0051	0.0042	0.0058	-	-	-	-	-

Table 11 Surface water quality parameters (laboratory) for sampling station WRS-04 (West Ravine), June 2006 to December 2009.

Parameters	Units	Sample ⁵																		
		#07331	#07354	#07379	#07411	#08012	#08044	#08059	#08098	#08157	#08206	#08217	#08263	#08326	#09006	#9041	# 9062	#9081	#9098	Stream is Dry
		17-Nov-07	28-Dec-07	24-Jan-08	24-Feb-08	7-Mar-08	6-Apr-08	3-May-08	2-Jun-08	28-Jul-08	30-Aug-08	7-Sep-08	19-Oct-08	1-Dec-08	3-Jan-09	26-Apr-09	30-Jun-09	30-Aug-09	23-Oct-09	18-Dec-09
Zinc	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved silicon	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDS (calculated)	mg/L																			

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

6Dissolved metal guideline is not available, thus total metal guideline was used.

Table 12 Surface water quality parameters (laboratory) for sampling stations SC1 and ERS-CN (East Ravine), May 2006 to November 2008.

Parameters	Units	Summary Statistics											Sample ⁵								
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	SC1	SC1	ERS-CN	ERS-CN	ERS-CN	ERS-CN	ERS-CN	ERS-CN	
								90 th	95 th	99 th			11-May-06	31-Aug-06	6-May-07	10-Aug-07	28-Oct-07	17-May-08	21-Aug-08	6-Nov-08	
Inorganic Ions																					
Bicarbonate	mg/L	8	8	-	255	240	271	266.1	268.6	270.5	254.5	10.28	246	256	246	254	271	240	264	259	
Calcium	mg/L	8	8	-	67	65	71	69.6	70.3	70.9	67.5	1.85	71	67	67	68	69	65	67	66	
Carbonate	mg/L	8	5	-	5.5	0.5	10	7.9	9.0	9.8	5.1	3.09	<5	<5	6	7	<1	10	7	5	
Chloride	mg/L	8	8	-	57.5	40	78	76.6	77.3	77.9	58.4	13.80	57	76	58	78	52	43	63	40	
Fluoride	mg/L	6	6	-	0.12	0.1	0.16	0.15	0.16	0.16	0.13	0.023	-	-	0.11	0.14	0.16	0.13	0.11	0.1	
Hydroxide	mg/L	8	0	-	0.5	0.5	2.5	2.50	2.50	2.50	1.00	0.926	<5	<5	<1	<1	<1	<1	<1	<1	
Ion Balance	%	2	2	-	100.5	98	103	102.5	102.8	103.0	100.5	3.54	103	98	-	-	-	-	-	-	
Magnesium	mg/L	8	8	-	15.5	14	16	16.0	16.0	16.0	15.3	0.89	16	16	14	16	15	14	16	15	
Potassium	mg/L	8	8	-	1.25	1	1.5	1.5	1.5	1.5	1.2	0.20	1	1	1.5	1.2	1.3	1.5	1.1	1.3	
Sodium	mg/L	8	8	-	33.5	27	46	43.2	44.6	45.7	35.0	6.95	30	42	34	46	33	28	40	27	
Sulfate	mg/L	8	8	-	15.5	13	18	18.0	18.0	18.0	15.6	1.77	18	16	16	18	15	15	14	13	
Metals																					
Aluminum	mg/L	8	8	2	0.077	0.036	3.05	1.055	2.053	2.851	0.454	1.0504	3.05	0.20	0.057	0.069	0.038	0.093	0.085	0.036	
Antimony	mg/L	8	1	-	0.0001	0.0001	0.002	0.0010	0.0015	0.0019	0.0004	0.00067	<0.001	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Arsenic	ug/L	8	8	1	2.3	0.0021	5.1	4.96	5.03	5.09	2.38	1.902	0.0047	0.0021	2.2	4.9	2.5	2.4	5.1	1.9	
Barium	mg/L	8	8	-	0.425	0.35	0.489	0.479	0.484	0.488	0.424	0.0506	0.4890	0.4750	0.38	0.45	0.39	0.4	0.46	0.35	
Beryllium	mg/L	8	1	-	0.0001	0.00005	0.001	0.0007	0.0008	0.0010	0.0002	0.00035	<0.001	0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Bismuth	mg/L	2	1	-	0.0008	0.0001	0.0015	0.00136	0.00143	0.00149	0.00080	0.00099	<0.0002	0.0015	-	-	-	-	-	-	
Boron	mg/L	8	8	-	0.075	0.06	0.11	0.110	0.110	0.110	0.083	0.0191	0.07	0.11	0.08	0.09	0.07	0.07	0.11	0.06	
Cadmium	mg/L	8	1	1	0.00005	0.00005	0.0014	0.00049	0.00094	0.00131	0.00023	0.000475	<0.0002	0.0014	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Cesium	mg/L	2	2	-	0.0009	0.0003	0.0015	0.00138	0.00144	0.00149	0.00090	0.00085	0.0003	0.0015	-	-	-	-	-	-	
Chromium	mg/L	8	2	2	0.00025	0.00025	0.005	0.0029	0.0040	0.0048	0.0011	0.00170	0.005	0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Cobalt	mg/L	8	8	-	0.0001	0.0001	0.0019	0.00176	0.00183	0.00189	0.00053	0.000789	0.0019	0.0017	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
Copper	mg/L	8	8	0	0.00055	0.0003	0.004	0.0033	0.0037	0.0039	0.0013	0.00141	0.004	0.003	0.0004	0.0004	0.0003	0.0006	0.0005	0.0014	
Iron	mg/L	8	8	7	0.425	0.3	4.08	1.62	2.85	3.83	0.88	1.296	4.08	0.57	0.32	0.51	0.41	0.41	0.44	0.3	
Lead	mg/L	8	8	0	0.00015	0.0001	0.0022	0.00206	0.00213	0.00219	0.00063	0.000913	0.0022	0.0020	0.0001	0.0002	0.0001	0.0002	0.0001	0.0001	
Manganese	mg/L	8	8	-	0.067	0.035	0.327	0.1583	0.2427	0.3101	0.0933	0.09603	0.327	0.0712	0.036	0.086	0.057	0.064	0.07	0.035	
Mercury	mg/L	2	1	1	0.0014	0.0002	0.0026	0.00236	0.00248	0.00258	0.00140	0.001697	<0.0004	0.0026	-	-	-	-	-	-	
Molybdenum	mg/L	8	8	0	0.0009	0.0009	0.003	0.0020	0.0025	0.0029	0.0013	0.00074	0.0009	0.0030	0.0009	0.0015	0.0009	0.0009	0.0016	0.0009	
Nickel	mg/L	8	8	0	0.00065	0.0004	0.006	0.0039	0.0050	0.0058	0.0016	0.00199	0.006	0.003	0.0005	0.0008	0.0004	0.0006	0.0007	0.0004	
Rubidium	mg/L	2	2	-	0.004	0.0029	0.0051	0.00488	0.00499	0.00508	0.00400	0.001556	0.0051	0.0029	-	-	-	-	-	-	
Selenium	mg/L	8	5	1	0.00015	0.00005	0.003	0.0013	0.0021	0.0028	0.0005	0.00101	<0.001	0.003	0.0002	<0.0001	0.0001	<0.0001	0.0002	0.0001	
Silver	mg/L	8	0	0	0.00005	0.00005	0.0005	0.00050	0.00050	0.00050	0.00016	0.000208	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Strontium	mg/L	8	8	-	0.1535	0.14	0.17	0.170	0.170	0.170	0.157	0.0113	0.157	0.168	0.15	0.17	0.15	0.15	0.17	0.14	
Tellurium	mg/L	2	1	-	0.00075	0.0005	0.001	0.0010	0.0010	0.0010	0.0008	0.00035	<0.001	0.001	-	-	-	-	-	-	
Thallium	mg/L	8	2	1	0.0001	0.0001	0.003	0.0011	0.0021	0.0028	0.0005	0.00102	0.0003	0.0030	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Tin	mg/L	8	1	-	0.00005	0.00005	0.0047	0.00162	0.00316	0.00439	0.00066	0.001634	<0.0006	0.0047	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Titanium	mg/L	8	8	-	0.00425	0.0021	0.0907	0.03302	0.06186	0.08493	0.01503	0.030637	0.0907	0.0083	0.0032	0.0048	0.0026	0.0046	0.0039	0.0021	
Tungsten	mg/L	2	1	-	0.00085	0.0001	0.0016	0.00145	0.00153	0.00159	0.00085	0.001061	<0.0002	0.0016	-	-	-	-	-	-	
Uranium	ug/L	8	8	0	0.3	0.0008	0.6	0.53	0.57	0.59	0.30	0.213	0.0008	0.0018	0.5	0.3	0.3	0.6	0.4	0.3	
Vanadium	mg/L	8	8	-	0.0006	0.0003	0.009	0.0041	0.0066	0.0085	0.0018	0.00298	0.009	0.002	0.0004	0.0006	0.0004	0.0006	0.0007	0.0003	
Zinc	mg/L	8	7	0	0.00335	0.0006	0.02	0.010	0.015	0.019	0.005	0.0063	<0.01	0.02	0.0007	0.0023	0.0006	0.0036	0.0031	0.0039	
Zirconium	mg/L	2	2	-	0.002	0.0017	0.0023	0.00224	0.00227	0.00229	0.00200	0.000424	0.0023	0.0017	-	-	-	-	-	-	
Nutrients																					

Table 12 Surface water quality parameters (laboratory) for sampling stations SC1 and ERS-CN (East Ravine), May 2006 to November 2008.

Parameters	Units	Summary Statistics											Sample ⁵							
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	SC1	SC1	ERS-CN	ERS-CN	ERS-CN	ERS-CN	ERS-CN	ERS-CN
								90 th	95 th	99 th			11-May-06	31-Aug-06	6-May-07	10-Aug-07	28-Oct-07	17-May-08	21-Aug-08	6-Nov-08
Ammonia as nitrogen	mg/L	8	5	-	0.025	0.005	0.1	0.07	0.08	0.10	0.03	0.029	<0.05	<0.05	0.03	0.02	0.05	0.1	0.02	<0.01
Dissolved organic carbon	mg/L	8	8	-	4.5	3.1	6	6.0	6.0	6.0	4.5	1.15	6	6	4.1	5.1	3.2	3.8	4.9	3.1
Dissolved phosphorus	mg/L	2	1	-	0.08	0.01	0.15	0.136	0.143	0.149	0.080	0.0990	<0.02	0.15	-	-	-	-	-	-
Nitrate	mg/L	8	6	0	0.09	0.05	0.22	0.192	0.206	0.217	0.113	0.0607	<0.1	<0.1	0.09	0.13	0.22	0.18	0.09	0.09
Nitrite	mg/L	2	0	0	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0	<0.05	<0.05	-	-	-	-	-	-
Nitrite+Nitrate, nitrogen	mg/L	5	3	-	0.04	0.02	0.05	0.050	0.050	0.050	0.036	0.0152	<0.1	<0.1	-	-	-	0.04	0.02	0.02
Total Kjeldahl nitrogen	mg/L	7	6	-	0.27	0.1	0.5	0.47	0.49	0.50	0.31	0.141	0.5	<0.2	0.27	0.27	0.45	-	0.37	0.2
Total nitrogen	mg/L	3	3	-	0.3	0.29	0.5	0.46	0.48	0.50	0.36	0.118	-	-	0.29	0.3	0.5	-	-	-
Total organic carbon	mg/L	8	8	-	4.65	3.2	7	6.3	6.7	6.9	4.8	1.27	6	7	4.2	5.2	3.8	3.9	5.1	3.2
Total phosphorus	mg/L	8	4	-	0.03	0.005	0.2	0.13	0.17	0.19	0.05	0.068	<0.2	0.20	<0.01	0.05	<0.01	0.02	<0.01	0.04
Physical Properties																				
Chemical Oxygen Demand	mg/L	3	3	-	12	11	18	16.8	17.4	17.9	13.7	3.79	-	-	12	18	11	-	-	-
pH	pH units	8	8	0	8.39	8.2	8.59	8.53	8.56	8.58	8.39	0.124	8.2	8.3	8.59	8.41	8.3	8.51	8.41	8.37
Specific conductivity	µS/cm	8	8	-	579.5	526	673	656.9	665.0	671.4	589.3	51.68	570	650	589	673	558	526	607	541
Sum of Ions	mg/L	6	6	-	450	417	488	480.0	484.0	487.2	450.5	27.16	-	-	443	488	457	417	472	426
Total alkalinity	mg/L	8	8	-	216.5	202	228	223.8	225.9	227.6	215.9	8.18	202	210	212	220	222	213	228	220
Total dissolved solids	mg/L	8	8	-	338.5	258	382	365.2	373.6	380.3	329.8	37.53	340	310	337	382	358	309	344	258
Total hardness	mg/L	8	8	-	233	220	243	237.4	240.2	242.4	231.1	7.16	243	233	225	235	234	220	233	226
Total suspended solids	mg/L	4	3	-	8.5	5	160	115.0	137.5	155.5	45.5	76.36	160	<10	-	-	-	-	10	7
Turbidity	NTU	8	8	-	6.4	4.3	39	17.9	28.4	36.9	10.3	11.73	39.00	6.10	6.7	4.3	4.7	8.8	7.9	4.5
Dissolved Metals																				
Aluminum	mg/L	2	2	0 ⁶	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0	0.03	0.03	-	-	-	-	-	-
Antimony	mg/L	2	1	-	0.00075	0.0005	0.001	0.0010	0.0010	0.0010	0.0008	0.00035	<0.001	0.001	-	-	-	-	-	-
Arsenic	ug/L	2	2	0 ⁶	0.00225	0.0015	0.003	0.0029	0.0029	0.0030	0.0023	0.00106	0.0015	0.0030	-	-	-	-	-	-
Barium	mg/L	2	2	-	0.416	0.378	0.454	0.4464	0.4502	0.4532	0.4160	0.05374	0.378	0.454	-	-	-	-	-	-
Beryllium	mg/L	2	0	-	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0	<0.001	<0.001	-	-	-	-	-	-
Bismuth	mg/L	2	0	-	0.00015	0.00015	0.00015	0.00015	0.00015	0.00015	0.00015	0	<0.0003	<0.0003	-	-	-	-	-	-
Boron	mg/L	2	2	-	0.09	0.07	0.11	0.106	0.108	0.110	0.090	0.0283	0.07	0.11	-	-	-	-	-	-
Cadmium	mg/L	2	0	0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	-	-	-	-	-	-
Cesium	mg/L	2	0	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0	<0.0001	<0.0001	-	-	-	-	-	-
Chromium	mg/L	2	1	1 ⁶	0.00375	0.0005	0.007	0.0064	0.0067	0.0069	0.0038	0.00460	0.007	<0.001	-	-	-	-	-	-
Cobalt	mg/L	2	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	-	-	-	-	-	-
Copper	mg/L	2	2	0 ⁶	0.00095	0.0009	0.001	0.0010	0.0010	0.0010	0.0010	0.00007	0.0010	0.0009	-	-	-	-	-	-
Iron	mg/L	2	2	0 ⁶	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0	0.02	0.02	-	-	-	-	-	-
Lead	mg/L	2	1	0 ⁶	0.000225	0.00005	0.0004	0.00037	0.00038	0.00040	0.00023	0.000247	<0.0001	0.0004	-	-	-	-	-	-
Manganese	mg/L	2	2	-	0.0413	0.0242	0.0584	0.05498	0.05669	0.05806	0.04130	0.024183	0.0584	0.0242	-	-	-	-	-	-
Mercury	mg/L	2	0	0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	-	-	-	-	-	-
Molybdenum	mg/L	2	2	0 ⁶	0.00125	0.0012	0.0013	0.00129	0.00130	0.00130	0.00125	0.000071	0.0012	0.0013	-	-	-	-	-	-
Nickel	mg/L	2	2	0 ⁶	0.00235	0.0019	0.0028	0.00271	0.00276	0.00279	0.00235	0.000636	0.0019	0.0028	-	-	-	-	-	-
Rubidium	mg/L	2	2	-	0.00085	0.0006	0.0011	0.00105	0.00108	0.00110	0.00085	0.000354	0.0006	0.0011	-	-	-	-	-	-
Selenium	mg/L	2	0	0	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0	<0.001	<0.001	-	-	-	-	-	-
Silver	mg/L	2	0	0	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0	<0.0005	<0.0005	-	-	-	-	-	-
Strontium	mg/L	2	2	-	0.1515	0.135	0.168	0.1647	0.1664	0.1677	0.1515	0.02333	0.135	0.168	-	-	-	-	-	-
Tellurium	mg/L	2	0	-	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0	<0.0005	<0.0005	-	-	-	-	-	-
Thallium	mg/L	2	2	0 ⁶	0.0004	0.0002	0.0006	0.00056	0.00058	0.00060	0.00040	0.000283	0.0002	0.0006	-	-	-	-	-	-

Table 12 Surface water quality parameters (laboratory) for sampling stations SC1 and ERS-CN (East Ravine), May 2006 to November 2008.

Parameters	Units	Summary Statistics											Sample ⁵							
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	SC1	SC1	ERS-CN	ERS-CN	ERS-CN	ERS-CN	ERS-CN	ERS-CN
								90 th	95 th	99 th			11-May-06	31-Aug-06	6-May-07	10-Aug-07	28-Oct-07	17-May-08	21-Aug-08	6-Nov-08
Tin	mg/L	2	1	-	0.000725	0.00015	0.0013	0.00119	0.00124	0.00129	0.00073	0.000813	<0.0003	0.0013	-	-	-	-	-	-
Titanium	mg/L	2	0	-	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0	<0.0005	<0.0005	-	-	-	-	-	-
Tungsten	mg/L	2	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	-	-	-	-	-	-
Uranium	ug/L	2	2	0 ⁶	0.0005	0.0004	0.0006	0.00058	0.00059	0.00060	0.00050	0.000141	0.0006	0.0004	-	-	-	-	-	-
Vanadium	mg/L	2	2	-	0.003	0.002	0.004	0.0038	0.0039	0.0040	0.0030	0.00141	0.004	0.002	-	-	-	-	-	-
Zinc	mg/L	2	1	0 ⁶	0.00825	0.0025	0.014	0.0129	0.0134	0.0139	0.0083	0.00813	<0.005	0.014	-	-	-	-	-	-
Zirconium	mg/L	2	0	-	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0	<0.0004	<0.0004	-	-	-	-	-	-
Dissolved Silicon	mg/L	2	2	-	6.1	5.1	7.1	6.90	7.00	7.08	6.10	1.414	5.1	7.1	-	-	-	-	-	-
TDS (calculated)	mg/L	2	2	-	329	314	344	341.0	342.5	343.7	329.0	21.21	314	344	-	-	-	-	-	-

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

6Dissolved metal guideline is not available, thus total metal guideline was used.

Table 13 Surface water quality parameters (laboratory) for sampling station ERS-01 (East Ravine), May 2006 to December 2009.

Parameters	Units	Summary Statistics											Sample ⁵														
		N ¹	N≥D L ²	N>< GL ³	Med ⁴	Min	Max ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	#06011	#06038	#06048	#06070	#06079	#06116	#06136	#06144	#07038	#07065	#07090	#07094	#07144		
								11-May-06	16-Jun-06	14-Jul-06			11-Aug-06	4-Sep-06	31-Oct-06	30-Nov-06	15-Dec-06	21-Jan-07	28-Feb-07	18-Mar-07	9-Apr-07	7-May-07					
Inorganic Ions																											
Bicarbonate	mg/L	38	38	-	265.5	203	481	291.8	333.5	429.6	270.6	43.26	246	245	261	257	265	266	271	256	264	265	267	265	240		
Calcium	mg/L	38	38	-	63	48	97	69.3	78.2	90.3	63.4	8.47	61	57	61	59	57	68	62	62	63	64	64	63	56		
Carbonate	mg/L	38	33	-	0.5	0.5	25	5.0	7.0	18.3	1.8	4.24	<1	<1	<1	<1	<1	7	<1	<1	<1	<1	<1	<1	<1		
Chloride	mg/L	38	25	-	1	0.5	6	3.0	3.3	5.6	1.5	1.25	1	<1	5	2	2	2	2	2	<1	3	<1	1	1		
Fluoride	mg/L	38	38	-	0.12	0.06	0.21	0.143	0.153	0.195	0.120	0.0276	0.09	0.1	0.09	0.14	0.08	0.08	0.12	0.13	0.13	0.11	0.07	0.11	0.11		
Hydroxide	mg/L	38	2	-	0.5	0.5	1	1.0	1.0	1.0	0.6	0.17	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1		
Ion Balance	%	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Magnesium	mg/L	38	38	-	14	10	35	15.3	17.2	28.7	14.2	3.78	12	12	14	13	14	15	14	13	13	13	13	13	12		
Potassium	mg/L	38	37	-	1.1	0.6	31	1.9	2.1	20.3	2.0	4.85	1	0.6	0.9	1.3	1.1	1.2	2	0.9	0.8	0.8	1	1.1	1.5		
Sodium	mg/L	38	38	-	3.55	2.6	14	4.5	5.4	11.5	3.9	1.87	2.9	3.3	4.1	3.4	3.6	3.5	4.2	3.2	3.2	2.9	3.7	3.2	3.5		
Sulfate	mg/L	38	38	-	4.05	1.5	23	6.2	10.0	18.2	4.7	3.52	4.6	3.4	3.1	7	2.5	10	4.6	4.4	4.4	4.2	4.5	4.3	4		
Metals																											
Aluminum	mg/L	38	38	10	0.0305	0.0053	0.75	0.308	0.575	0.717	0.117	0.1870	0.036	0.013	0.072	0.071	0.02	0.56	0.098	0.49	0.0066	0.021	0.013	0.01	0.02		
Antimony	mg/L	37	3	-	0.0001	0.0001	0.0006	0.00010	0.00020	0.00046	0.00012	0.000084	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Arsenic	ug/L	38	38	8	3.2	1.8	41	6.0	8.4	29.9	4.7	6.35	2.9	3.3	5.8	5.6	4.7	3.7	2.7	41	2.5	3.2	2	2	3.2		
Barium	mg/L	38	38	-	0.42	0.26	1.1	0.48	0.50	0.89	0.43	0.124	0.41	0.39	0.49	0.48	0.45	0.4	0.45	1.1	0.42	0.41	0.41	0.41	0.4		
Beryllium	mg/L	38	2	-	0.0001	0.00005	0.0002	0.00005	0.00006	0.00016	0.00006	0.000025	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Bismuth	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Boron	mg/L	38	38	-	0.03	0.01	0.07	0.040	0.052	0.066	0.028	0.0121	0.04	0.03	0.04	0.03	0.03	0.01	0.03	0.03	0.02	0.02	0.03	0.02	0.03		
Cadmium	mg/L	38	9	8	0.00005	0.000005	0.0002	0.00010	0.00010	0.00016	0.00006	0.000033	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Cesium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Chromium	mg/L	38	11	9	0.00025	0.00025	0.043	0.0117	0.0279	0.0393	0.0039	0.01002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0012	0.0007	0.0017	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		
Cobalt	mg/L	38	35	-	0.00015	0.00005	0.0048	0.00090	0.00262	0.00425	0.00050	0.000977	0.0003	0.0002	0.0003	0.0003	0.0002	0.0025	0.0004	0.0033	0.0001	0.0001	0.0001	<0.0001	0.0001		
Copper	mg/L	38	35	5	0.0005	0.0001	0.037	0.0046	0.0081	0.0269	0.0024	0.00616	<0.0002	<0.0002	0.0014	0.0005	0.0014	0.0042	0.0056	0.0036	0.0004	0.0002	0.0003	<0.0002	0.0002		
Iron	mg/L	38	38	32	0.45	0.22	16	2.3	4.7	12.0	1.3	2.69	0.38	0.32	0.56	0.74	0.32	1.8	0.66	16	0.43	0.6	0.36	0.34	0.32		
Lead	mg/L	38	22	0	0.0001	0.00005	0.0028	0.00173	0.00229	0.00280	0.00051	0.000796	<0.0001	<0.0001	0.0001	0.0017	<0.0001	0.0028	0.0009	0.0018	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Manganese	mg/L	38	38	-	0.105	0.016	7.7	0.38	0.46	5.02	0.34	1.232	0.077	0.06	0.22	0.096	0.016	0.36	0.27	7.7	0.18	0.18	0.15	0.12	0.064		
Mercury	mg/L	2	0	0	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0	-	-	-	-	-	-	-	-	-	-	-	-	-		
Molybdenum	mg/L	38	37	0	0.001	0.00005	0.0059	0.00140	0.00158	0.00446	0.00106	0.000895	0.001	0.0008	0.0012	0.0012	0.0013	0.0003	0.0007	0.0004	0.0014	0.0009	<0.0001	0.0009	0.001		
Nickel	mg/L	38	38	0	0.0006	0.0002	0.069	0.0037	0.0060	0.0459	0.0030	0.01110	0.0009	0.0003	0.0012	0.0008	0.0006	0.0059	0.0019	0.0053	0.0003	0.0003	0.0003	0.0002	0.0003		
Rubidium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Selenium	mg/L	38	21	0	0.0001	0.00005	0.0004	0.00020	0.00022	0.00036	0.00011	0.000080	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0002	0.0001	0.0002	0.0001	<0.0001	<0.0001		
Silver	mg/L	38	2	1	0.00005	0.000005	0.0005	0.00005	0.00006	0.00035	0.00006	0.000074	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Strontium	mg/L	38	38	-	0.15	0.1	0.5	0.19	0.24	0.46	0.17	0.072	0.15	0.15	0.17	0.17	0.16	0.1	0.14	0.14	0.13	0.12	0.14	0.14	0.13		
Tellurium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Thallium	mg/L	38	1	0	0.0001	0.0001	0.0002	0.00010	0.00010	0.00016	0.00010	0.000016	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Tin	mg/L	38	7	-	0.00005	0.00005	0.001	0.0001	0.0003	0.0010	0.0001	0.00020	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.0001	0.0009	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Titanium	mg/L	38	38	-	0.0021	0.0003	0.012	0.0096	0.0112	0.0120	0.0036	0.00346	0.0035	0.0021	0.0054	0.0043	0.002	0.0055	0.0043	0.012	0.011	0.0009	0.0009	0.0007	0.0013		
Tungsten	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Uranium	ug/L	37	36	0	0.3	0.05	1.6	0.50	0.52	1.24	0.38	0.231	0.5	0.4	0.4	0.3	0.3	0.5	0.3	0.4	0.3	0.3	0.3	0.3	0.4		
Vanadium	mg/L	38	36	-	0.0003	0.00005	0.0046	0.00314	0.00383	0.00438	0.00095	0.001311	0.0003	0.0001	0.0006	0.0005	0.0003	0.0037	0.0004	0.0038	0.0001	0.0001	0.0001	0.0001	0.0001		
Zinc	mg/L	38	35	4	0.0031	0.00025	0.15	0.035	0.094	0.135	0.016	0.0324	0.0008	<0.0005	0.0036	0.0013	0.0035	0.01	0.028	0.015	0.0009	0.0009	<0.0005	<0.0005	0.0006		
Zirconium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Nutrients																											
Ammonia as nitrogen	mg/L	38	38	-	0.06	0.01	0.49	0.175	0.300	0.420	0.095	0.0937	0.04	0.05	0.07	0.06	0.05	0.09	0.21	0.3	0.09	0.04	0.04	0.09	0.04		
Dissolved organic carbon	mg/L	30	30	-	3.75	2.2	20	5.4	8.8	17.4	4.6	3.37	3.6	-	-	5	3.9	4.4	3.4	2.5	2.6	2.6	2.2	2.8	4		
Dissolved phosphorus	mg/L	10	6	-	0.01	0.005	0.05	0.023	0.037	0.047	0.014	0.0139	-	-	-	-	-	-	-	-	-	-	-	-	-		
Nitrate	mg/L	38	25	0	0.125	0.02	1	0.4	0.5	0.8	0.2	0.20	<0.04														

Table 13 Surface water quality parameters (laboratory) for sampling station ERS-01 (East Ravine), May 2006 to December 2009.

Parameters	Units	Sample ⁵																						
		#07238	#07256	#07289	#07327	#07348	#07376	#07394	#08018	#08027	#08055	#08099	#08153	#08177	#08219	#08271	#08304	#08353	#09014	#9039	#9065	#9077	#9099	#9106
		27-Aug-07	9-Sep-07	20-Oct-07	12-Nov-07	26-Dec-07	23-Jan-08	6-Feb-08	8-Mar-08	4-Apr-08	2-May-08	2-Jun-08	28-Jul-08	12-Aug-08	7-Sep-08	20-Oct-08	13-Nov-08	23-Dec-08	17-Jan-09	26-Apr-09	30-Jun-09	30-Aug-09	25-Oct-09	2-Dec-09
Nutrients		0.13	0.04	0.06	0.16	0.07	0.12	0.3	0.49	0.1	0.06	0.12	0.02	0.08	0.04	0.07	0.01	0.04	0.06	0.14	0.14	0.05	0.02	0.05
Ammonia as nitrogen	mg/L	5.3	5	4.3	3.4	2.6	3.2	4.8	20	2.5	3.6	5.2	11	6.1	-	4.8	3.2	2.8	2.5	-	-	-	-	-
Dissolved organic carbon	mg/L	-	-	-	-	-	-	-	-	<0.01	0.02	<0.01	0.01	0.02	<0.01	0.01	0.05	<0.01	0.01	-	-	-	-	-
Dissolved phosphorus	mg/L	0.04	<0.04	0.04	0.13	0.18	0.49	0.58	1	0.26	0.12	0.09	0.35	<0.04	<0.04	<0.04	0.22	0.18	0.26	<0.04	<0.04	0.18	0.13	0.35
Nitrate	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite	mg/L	-	-	-	-	-	-	-	-	0.06	0.02	0.02	0.08	<0.01	<0.01	<0.01	0.05	0.04	0.06	<0.01	<0.01	0.04	0.03	0.08
Nitrite+Nitrate, nitrogen	mg/L	0.48	0.6	0.88	0.16	0.36	0.79	1.9	3.9	0.51	0.57	0.3	0.58	0.64	0.28	0.44	0.29	0.29	0.22	0.58	0.18	0.46	0.15	0.23
Total Kjeldahl nitrogen	mg/L	0.49	0.6	0.89	0.19	0.9	2	4.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg/L	6	9.7	4	3.2	3.2	4.9	8.2	28	2.8	4	5.4	14	5.8	4.6	4.6	3.2	2.7	2.3	6.2	3.6	8.3	3.1	3
Total organic carbon	mg/L	0.04	0.08	0.03	0.01	0.03	<0.01	0.1	0.17	0.01	0.02	<0.01	0.22	0.05	<0.01	0.05	0.14	<0.01	0.02	0.07	0.04	0.03	0.02	<0.01
Total phosphorus	mg/L																							
Physical Properties		28	23	14	13	14	20	28	101	11	17	16	34	19	14	13	16	5	6	22	4	7	<4	9
Chemical Oxygen Demand	mg/L	8.12	8.2	8.13	8.52	8.14	8.04	8.12	8.52	8.1	8.15	8.23	8.25	8.1	8.1	8.41	8.12	8.09	8.06	8.17	8.17	7.69	7.55	8.2
pH	pH units	398	400	385	407	397	441	510	820	400	330	378	340	363	386	439	414	431	427	323	374	492	370	419
Specific conductivity	µS/cm	2.6	2.6	3.5	4	4	5.8	10	23	356	289	353	306	348	350	388	369	384	398	270	331	439	338	363
Sum of Ions	mg/L	228	229	219	223	220	243	280	436	221	176	217	191	218	218	244	227	238	228	166	206	272	211	223
Total alkalinity	mg/L	243	240	249	245	260	265	330	258	240	194	228	219	211	230	254	242	227	236	184	225	304	242	246
Total dissolved solids	mg/L	222	215	217	217	213	234	267	286	215	177	211	177	205	216	238	225	236	230	163	203	269	201	225
Total hardness	mg/L	8	3	4		89	17	824	70	15	6	<1	95	2	<1	12	14	-	14	-	-	-	-	-
Total suspended solids	mg/L	2.6	1	3	2	42	7.9	1.2	-	-	-	-	-	-	-	-	-	-	0.3	-	-	-	-	-
Turbidity	NTU																							
Dissolved Metals		-	-	-	-	-	-	-	-	0.0008	0.0032	0.0041	0.079	0.0017	0.0043	0.0021	0.0025	0.003	0.0014	-	-	-	-	-
Aluminum	mg/L	-	-	-	-	-	-	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	-	-
Antimony	mg/L	-	-	-	-	-	-	-	-	1.5	1.4	2.9	5.3	3	1.4	1.1	1.3	1.1	1.2	-	-	-	-	-
Arsenic	ug/L	-	-	-	-	-	-	-	-	0.42	0.33	0.43	0.21	0.48	0.42	0.4	0.39	0.44	0.44	-	-	-	-	-
Barium	mg/L	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-
Beryllium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	mg/L	-	-	-	-	-	-	-	-	0.01	0.02	0.03	0.09	0.03	0.02	0.02	0.02	0.01	0.02	-	-	-	-	-
Boron	mg/L	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-
Cadmium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium	mg/L	-	-	-	-	-	-	-	-	<0.0005	0.062	0.012	0.11	0.0009	0.0013	0.0038	0.012	0.0074	0.44	-	-	-	-	-
Chromium	mg/L	-	-	-	-	-	-	-	-	0.0001	0.0001	0.0001	0.0004	0.0001	0.0001	0.0001	0.00005	0.0001	0.0001	-	-	-	-	-
Cobalt	mg/L	-	-	-	-	-	-	-	-	0.0002	0.001	0.0018	0.003	0.0009	0.0005	0.0004	0.0006	0.0007	<0.0002	-	-	-	-	-
Copper	mg/L	-	-	-	-	-	-	-	-	0.012	0.012	0.033	0.13	0.028	0.016	0.013	0.016	0.046	0.014	-	-	-	-	-
Iron	mg/L	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	-	-	-	-	-
Lead	mg/L	-	-	-	-	-	-	-	-	0.23	0.022	0.022	0.24	0.022	0.028	0.022	0.021	0.13	0.19	-	-	-	-	-
Manganese	mg/L	-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	-	-	-
Mercury	mg/L	-	-	-	-	-	-	-	-	0.0008	0.0011	0.0014	0.002	0.0011	0.0012	0.001	0.0009	0.0008	0.0008	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	-	-	-	0.0005	0.0012	0.0011	0.0072	0.0008	0.0007	0.0006	0.0005	0.0004	0.0007	-	-	-	-	-

Table 13 Surface water quality parameters (laboratory) for sampling station ERS-01 (East Ravine), May 2006 to December 2009.

Parameters	Units	Sample ⁵																						
		#07238	#07256	#07289	#07327	#07348	#07376	#07394	#08018	#08027	#08055	#08099	#08153	#08177	#08219	#08271	#08304	#08353	#09014	#9039	#9065	#9077	#9099	#9106
		27-Aug-07	9-Sep-07	20-Oct-07	12-Nov-07	26-Dec-07	23-Jan-08	6-Feb-08	8-Mar-08	4-Apr-08	2-May-08	2-Jun-08	28-Jul-08	12-Aug-08	7-Sep-08	20-Oct-08	13-Nov-08	23-Dec-08	17-Jan-09	26-Apr-09	30-Jun-09	30-Aug-09	25-Oct-09	2-Dec-09
Nickel	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	0.0001	0.0001	0.0001	0.0001	<0.0001	<0.0001	0.0004	-	-	-	-	-	
Selenium	mg/L	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-	
Silver	mg/L	-	-	-	-	-	-	-	0.14	0.14	0.19	0.15	0.16	0.16	0.16	0.14	0.15	0.14	-	-	-	-	-	
Strontium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Tellurium	mg/L	-	-	-	-	-	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	-	-	
Thallium	mg/L	-	-	-	-	-	-	-	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	-	-	-	-	-	
Tin	mg/L	-	-	-	-	-	-	-	<0.0002	<0.0002	0.0003	0.0032	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	-	-	
Titanium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Tungsten	mg/L	-	-	-	-	-	-	-	0.3	0.5	0.5	0.2	0.2	0.3	0.3	0.3	0.3	0.0002	-	-	-	-	-	
Uranium	ug/L	-	-	-	-	-	-	-	<0.0001	0.0001	0.0002	0.0006	0.0001	0.0002	0.0001	0.0001	<0.0001	<1	-	-	-	-	-	
Vanadium	mg/L	-	-	-	-	-	-	-	0.0043	0.0032	0.0084	0.0088	0.0053	0.0048	0.0076	0.0045	0.0063	0.012	-	-	-	-	-	
Zinc	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Zirconium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Dissolved Silicon	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
TDS (calculated)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

- Notes:** 1N = number of samples.
 2Number of samples greater than or equal to detection limit (DL).
 3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.
 4For calculation of descriptives statistics, values < DL were set to half the value of DL.
 5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).
 6Dissolved metal guideline is not available, thus total metal guideline was used.

Table 14 Surface water quality parameters (laboratory) for sampling station ERS-02 (East Ravine), March 2006 to January 2009.

Parameters	Units	#07184	#07239	#07257	#07301	#07328	#07349	#07384	#07398	#08019	#08028	#08060	#08095	#08154	#08185	#08215	#08266	#08305	#08349	#09015
		2-Jul-07	27-Aug-07	9-Sep-07	20-Oct-07	12-Nov-07	26-Dec-07	26-Jan-08	11-Feb-08	8-Mar-08	4-Apr-08	3-May-08	1-Jun-08	28-Jul-08	17-Aug-08	6-Sep-08	18-Oct-08	13-Nov-08	21-Dec-08	17-Jan-09
Nitrite	mg/L	-	-	-	-	-	-	-	-	-	0.07	0.02	0.02	<0.01	<0.01	0.01	<0.01	0.09	0.08	0.07
Nitrite+Nitrate, nitrogen	mg/L	0.32	0.38	0.19	0.22	0.14	0.33	0.32	0.7	0.3	0.32	0.48	0.28	0.22	0.64	0.28	0.62	0.18	0.28	0.24
Total Kjeldahl nitrogen	mg/L	0.32	0.39	0.19	0.24	0.17	0.39	0.42	0.79	0.38	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg/L	5.8	4.6	4.7	3.5	3.8	2.8	2.6	3	2.2	2.3	3.4	4.1	6.1	5.2	6.5	4	3.4	3.3	2.8
Total organic carbon	mg/L	<0.01	0.02	0.04	0.01	0.01	0.02	<0.01	0.14	0.12	<0.01	0.01	<0.01	<0.01	0.05	<0.01	0.04	0.05	0.03	<0.01
Total phosphorus	mg/L																			
Physical Properties		11	10	11	17	11	14	12	30	12	8	11	12	9	21	18	12	13	19	11
Chemical Oxygen Demand	mg/L	8.36	8.2	8.3	8.21	8.43	8.2	7.93	8.17	8.52	8.18	8.23	8.3	8.35	8.12	8.19	8.39	8.19	8.09	8.08
pH	pH units	360	387	383	405	419	405	414	418	424	410	337	369	383	408	408	427	432	451	450
Specific conductivity	µS/cm	325	352	347	381	359	357	394	370	342	360	295	342	327	367	361	365	375	395	413
Sum of Ions	mg/L	196	212	217	231	224	219	246	223	216	219	179	208	203	224	218	226	224	240	231
Total alkalinity	mg/L	257	228	221	250	253	246	240	227	284	247	208	230	233	221	240	244	258	238	255
Total dissolved solids	mg/L	191	215	207	226	217	211	217	222	211	217	172	206	203	219	219	217	227	234	239
Total hardness	mg/L	8	4	4	6		59	5	241	7	4	17	8	21	17	5	2	16	-	24
Total suspended solids	mg/L	5.7	3.1	2.6	2.4	2.4	22	3.8	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU																			
Dissolved Metals		-	-	-	-	-	-	-	-	-	0.03	0.0025	0.0024	0.0013	0.0019	0.014	0.0026	<0.0005	0.0039	0.0073
Aluminum	mg/L	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Antimony	mg/L	-	-	-	-	-	-	-	-	-	1.5	1.5	2.4	2.7	3.7	2.4	1.4	1.3	1.1	0.9
Arsenic	ug/L	-	-	-	-	-	-	-	-	-	0.42	0.34	0.45	0.42	0.47	0.43	0.38	0.4	0.43	0.45
Barium	mg/L	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Beryllium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	mg/L	-	-	-	-	-	-	-	-	-	0.01	0.02	0.03	0.03	0.04	0.05	0.02	0.02	0.01	0.03
Boron	mg/L	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium	mg/L	-	-	-	-	-	-	-	-	-	0.0005	0.0043	0.093	0.081	0.1	0.0041	0.0056	0.038	0.011	0.044
Chromium	mg/L	-	-	-	-	-	-	-	-	-	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	<0.0001	<0.0001	0.0001	0.0001
Cobalt	mg/L	-	-	-	-	-	-	-	-	-	0.0003	0.0013	0.001	0.0003	0.0008	0.0005	0.0008	0.0004	0.0007	0.002
Copper	mg/L	-	-	-	-	-	-	-	-	-	0.25	0.027	0.0067	0.026	0.061	0.077	0.013	0.012	0.056	0.04
Iron	mg/L	-	-	-	-	-	-	-	-	-	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.0002
Lead	mg/L	-	-	-	-	-	-	-	-	-	0.14	0.063	0.067	0.036	0.18	0.02	0.022	0.03	0.063	0.081
Manganese	mg/L	-	-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Mercury	mg/L	-	-	-	-	-	-	-	-	-	0.0008	0.0011	0.0014	0.0013	0.0016	0.0013	0.001	0.0009	0.0008	0.0009
Molybdenum	mg/L	-	-	-	-	-	-	-	-	-	0.002	0.0008	0.0007	0.0006	0.0007	0.0008	0.0004	0.0003	0.0004	0.0008
Nickel	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.0001	0.0003	<0.0001
Selenium	mg/L	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Silver	mg/L	-	-	-	-	-	-	-	-	-	0.14	0.12	0.15	0.14	0.17	0.16	0.15	0.15	0.15	0.15
Strontium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium	mg/L	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Thallium	mg/L	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0005	0.0003
Tin	mg/L	-	-	-	-	-	-	-	-	-	0.0018	0.0003	<0.0002	<0.0002	<0.0002	0.0009	<0.0002	<0.0002	0.0002	0.0005
Titanium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten	mg/L	-	-	-	-	-	-	-	-	-	0.4	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Uranium	ug/L	-	-	-	-	-	-	-	-	-	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001
Vanadium	mg/L	-	-	-	-	-	-	-	-	-	0.0049	0.0043	0.0033	0.0058	0.01	0.006	0.013	0.013	0.0072	0.53
Zinc	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Silicon	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDS (calculated)	mg/L																			

Notes: 1N = number of samples.

Table 14 Surface water quality parameters (laboratory) for sampling station ERS-02 (East Ravine), March 2006 to January 2009.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of $N \geq DL$.

4For calculation of descriptives statistics, values $< DL$ were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

6Dissolved metal guideline is not available, thus total metal guideline was used.

Table 15 Surface water quality parameters (laboratory) for sampling station ERS-03 (East Ravine), March 2006 to January 2009.

Parameters	Units	Sample ⁵																
		#07258	#07290	#07323	#07355	#07385	#07399	#08013	#08041	#08061	#08096	#08163	#08186	#08216	#08249	#08306	#08350	#09016
		9-Sep-07	20-Oct-07	11-Nov-07	28-Dec-07	26-Jan-08	11-Feb-08	7-Mar-08	6-Apr-08	3-May-08	2-Jun-08	28-Jul-08	17-Aug-08	6-Sep-08	9-Oct-08	13-Nov-08	21-Dec-08	17-Jan-09
Inorganic Ions		264	273	273	271	267	281	276	276	222	255	243	272	275	277	282	296	287
Bicarbonate	mg/L	68	70	68	67	69	69	68	70	59	67	62	64	66	68	71	75	73
Calcium	mg/L	5	<1	<1	<1	5	<1	11	<1	<1	4	7	<1	<1	<1	<1	<1	<1
Carbonate	mg/L	10	56	46	42	48	48	49	45	48	57	43	53	53	44	46	43	39
Chloride	mg/L	0.14	0.11	0.14	0.12	0.12	0.13	0.11	0.12	0.12	0.14	0.15	0.14	0.12	0.13	0.12	0.1	0.05
Fluoride	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Hydroxide	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ion Balance	%	15	15	14	14	14	15	14	15	12	14	14	15	15	15	15	16	15
Magnesium	mg/L	1.3	1.5	1.1	1.1	1	1.1	1.1	1.5	1.4	1.5	1.1	1.1	1.3	1.7	1.3	1.1	1.5
Potassium	mg/L	36	34	31	29	30	30	29	27	30	35	28	34	34	28	28	27	25
Sodium	mg/L	14	15	14	14	13	14	14	13	14	16	11	11	12	12	13	13	12
Sulfate	mg/L																	
Metals		0.051	0.054	0.029	0.03	0.037	0.049	0.059	0.13	0.16	0.11	0.1	0.082	0.12	0.048	0.036	0.0066	0.067
Aluminum	mg/L	<0.0002	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Antimony	mg/L	3	2.3	1.8	-	1.6	1.5	1.6	2.4	2.4	3	4	5.2	3.5	2.3	1.7	1.3	2.2
Arsenic	ug/L	0.41	0.39	0.37	-	0.41	0.42	0.42	0.41	0.37	0.46	0.4	0.45	0.42	0.39	0.38	0.42	0.45
Barium	mg/L	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	0.0004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Beryllium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	mg/L	0.07	0.06	0.06	0.06	0.07	0.05	0.06	0.05	0.07	0.09	0.08	0.1	0.08	0.07	0.06	0.05	0.05
Boron	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cadmium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0098	<0.0005	<0.0005	0.0007	0.0069	0.0027	<0.0005	<0.0005	<0.0005	0.0008
Chromium	mg/L	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	0.0001	0.0001	<0.0001	0.0002
Cobalt	mg/L	0.0003	0.0003	0.0002	0.0002	0.0003	0.0003	0.001	0.0054	0.001	0.001	0.0009	0.0018	0.0006	0.0005	0.00015	0.0002	0.0005
Copper	mg/L	0.36	0.38	0.32	0.32	0.35	0.31	0.4	1.19	0.8	0.52	0.74	0.7	0.58	0.3	0.31	0.035	0.61
Iron	mg/L	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0009	0.0004	0.0002	0.0002	0.0008	0.0002	0.0001	0.0001	<0.0001	0.0002
Lead	mg/L	0.05	0.054	0.048	0.07	0.096	0.089	0.11	0.14	0.099	0.084	0.092	0.077	0.078	0.04	0.043	0.0028	0.087
Manganese	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
Mercury	mg/L	0.0012	0.001	0.0006	0.0005	0.0008	0.0007	0.0007	0.002	0.0008	0.0013	0.0012	0.0025	0.0012	0.0011	0.0008	0.0017	0.001
Molybdenum	mg/L	0.0003	0.0006	0.0004	0.0003	0.0007	0.0004	0.0006	0.00022	0.001	0.0009	0.001	0.0018	0.0009	0.0005	0.0004	0.0003	0.0023
Nickel	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	<0.0001	0.0001	0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0002	<0.0001	0.0001	0.0001	0.0002	<0.0001	<0.0001	0.0001	<0.0001	0.0002
Selenium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Silver	mg/L	0.15	0.15	0.14	0.14	0.14	0.16	0.15	0.14	0.13	0.16	0.14	0.17	0.16	0.15	0.14	0.16	0.15
Strontium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Thallium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0024	0.0001	0.0001	<0.0001	0.0009	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Tin	mg/L	0.0041	0.0032	0.0019	0.0022	0.0028	0.0027	0.0034	0.0062	0.0059	0.006	0.0054	0.0042	0.0062	0.0024	0.0006	0.0003	0.0073
Titanium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten	mg/L	<0.1	0.3	0.3	0.3	0.4	0.4	0.4	1.6	0.6	0.6	0.5	0.4	0.4	0.4	0.4	0.2	0.4
Uranium	ug/L	0.0004	0.0006	0.0002	0.0001	0.0004	0.0002	0.0003	0.0023	0.0009	0.0008	0.0017	0.0021	0.0008	0.0004	0.0002	0.0001	0.001
Vanadium	mg/L	0.0014	0.0008	0.0032	0.0015	0.0054	0.0028	0.0068	0.028	0.0023	0.0045	0.0073	0.015	0.0064	0.0041	0.0048	0.0015	0.058
Zinc	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium	mg/L																	
Nutrients		<0.04	0.02	0.1	0.05	0.07	0.07	0.05	0.1	0.12	0.11	0.44	0.11	0.02	0.14	<0.01	0.01	0.02
Ammonia as nitrogen	mg/L	4.4	3.4	3	2.7	2.4	2.5	2.4	2.9	3.4	4	6	5.1	-	4.6	3.1	2.9	2.5
Dissolved organic carbon	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01	0.05
Dissolved phosphorus	mg/L	0.03	0.18	0.31	0.44	0.62	0.53	0.4	0.58	0.3	0.13	<0.01	0.04	<0.02	22	0.26	0.44	0.4

Table 15 Surface water quality parameters (laboratory) for sampling station ERS-03 (East Ravine), March 2006 to January 2009.

Parameters	Units	Sample ⁵																
		#07258 9-Sep-07	#07290 20-Oct-07	#07323 11-Nov-07	#07355 28-Dec-07	#07385 26-Jan-08	#07399 11-Feb-08	#08013 7-Mar-08	#08041 6-Apr-08	#08061 3-May-08	#08096 2-Jun-08	#08163 28-Jul-08	#08186 17-Aug-08	#08216 6-Sep-08	#08249 9-Oct-08	#08306 13-Nov-08	#08350 21-Dec-08	#09016 17-Jan-09
TDS (calculated)	mg/L																	

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

6Dissolved metal guideline is not available, thus total metal guideline was used.

Table 16 Surface water quality parameters (laboratory) for sampling station ERS-04 (East Ravine), May 2006 to December 2009.

Parameters	Units	Summary Statistics											Sample ⁵												
		N ¹	N≥D L ²	N><G L ³	Med ⁴	Min ⁴	Max ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	#06017 16-May-06	#06037 15-Jun-06	#06047 12-Jul-06	#06065 9-Aug-06	#06107 31-Oct-06	#06125 25-Nov-06	#06141 14-Dec-06	#07040 30-Jan-07	#07063 28-Feb-07	#07087 7-Mar-07	#07169 12-Jun-07	#07218 28-Jul-07	#07230 16-Aug-07
								90 th	95 th	99 th															
Inorganic Ions																									
Bicarbonate	mg/L	35	35	-	261	217	345	281.0	286.8	329.0	262.0	23.10	264	246	254	253	242	277	261	275	268	270	243	235	250
Calcium	mg/L	35	35	-	69	57	93	72.6	74.3	86.9	68.7	6.05	72	67	71	73	71	72	71	72	71	71	65	60	69
Carbonate	mg/L	35	19	-	5	0.5	14	10.6	12.0	13.3	4.4	4.22	<1	6	7	8	14	<1	<1	<1	<1	<1	10	6	6
Chloride	mg/L	35	35	-	51	25	88	64.8	76.4	86.0	52.6	12.96	60	53	66	88	61	63	61	59	59	58	58	58	82
Fluoride	mg/L	35	35	-	0.12	0.08	0.16	0.140	0.140	0.153	0.118	0.0171	0.1	0.09	0.1	0.12	0.1	0.12	0.12	0.12	0.11	0.1	0.14	0.13	0.09
Hydroxide	mg/L	35	24	-	0.5	0.5	1	0.5	0.5	0.8	0.5	0.08	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	
Ion Balance	%	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	35	35	-	15	0.068	21	16.0	16.0	19.3	14.6	2.89	15	14	16	0.068	16	16	15	15	15	15	15	16	16
Potassium	mg/L	35	35	-	1.2	0.8	2.5	1.66	1.93	2.33	1.31	0.326	1.7	1	0.8	1.3	1.1	1.2	1.1	1	1.1	1.1	1.2	1.6	1.2
Sodium	mg/L	35	35	-	31	22	48	37.2	40.8	47.0	31.7	5.75	30	27	38	45	36	36	36	35	34	35	33	39	48
Sulfate	mg/L	35	35	-	14	9.9	29	18.6	19.3	25.9	15.0	3.55	18	15	17	19	18	18	18	20	16	16	15	29	19
Metals																									
Aluminum	mg/L	35	35	12	0.078	0.022	1.76	0.198	0.316	1.274	0.146	0.2904	0.17	0.17	0.31	0.071	0.025	0.03	0.022	0.027	0.043	0.047	0.33	0.18	0.087
Antimony	mg/L	34	2	-	0.0001	0.0001	0.0014	0.00010	0.00013	0.00100	0.00014	0.000223	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	ug/L	35	35	1	2.1	1.3	8.1	4.26	4.45	6.98	2.74	1.410	3.9	2.8	4.8	4.2	1.7	1.3	1.5	1.7	1.9	1.7	3.2	4.3	4.3
Barium	mg/L	35	35	-	0.41	0.27	0.63	0.474	0.515	0.603	0.414	0.0640	0.45	0.39	0.5	0.49	0.31	0.39	0.39	0.4	0.38	0.38	0.43	0.35	0.44
Beryllium	mg/L	35	3	-	0.0001	0.00005	0.0004	0.00005	0.00010	0.00030	0.00006	0.000060	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001
Bismuth	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	35	35	-	0.06	0.02	0.34	0.096	0.100	0.258	0.073	0.0499	0.02	0.05	0.06	0.1	0.03	0.06	0.07	0.06	0.06	0.06	0.08	0.1	0.08
Cadmium	mg/L	35	5	4	0.00005	0.000005	0.0002	0.00008	0.00013	0.00020	0.00006	0.000039	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cesium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	35	14	7	0.00025	0.00025	0.01	0.002	0.004	0.008	0.001	0.0019	<0.0005	<0.0005	0.0008	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	
Cobalt	mg/L	35	35	-	0.0002	0.00001	0.0053	0.00056	0.00063	0.00374	0.00037	0.000874	0.0006	0.0005	0.0007	0.0003	0.0001	0.0002	0.0001	0.0001	0.0001	0.00001	0.0005	0.0003	0.0001
Copper	mg/L	35	35	2	0.0005	0.0002	0.0091	0.00136	0.00345	0.00873	0.00107	0.001906	0.0008	0.0005	0.008	0.0005	0.0002	0.0002	0.0003	0.0013	0.0004	0.0002	0.0014	0.001	0.0005
Iron	mg/L	35	35	33	0.46	0.24	10.1	1.09	1.19	7.14	0.84	1.634	1.4	0.71	1.1	0.46	0.32	0.24	0.3	0.32	0.35	0.32	1.09	0.58	0.51
Lead	mg/L	35	33	0	0.0001	0.00005	0.0052	0.00046	0.00059	0.00370	0.00035	0.000859	0.0002	<0.0001	0.0005	0.0001	0.0001	0.0002	0.0001	0.0001	0.0001	0.0001	0.0005	0.0003	0.0001
Manganese	mg/L	35	35	-	0.079	0.026	16	0.2	0.4	10.8	0.6	2.69	0.12	0.088	0.14	16	0.036	0.038	0.051	0.066	0.08	0.075	0.11	0.077	0.072
Mercury	mg/L	3	0	0	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	35	34	0	0.0008	0.00005	0.0015	0.00130	0.00130	0.00143	0.00090	0.000308	0.0009	0.0007	0.001	0.0012	0.0007	0.0008	0.0008	0.001	0.0009	<0.0001	0.0008	0.0012	0.0013
Nickel	mg/L	35	35	0	0.0008	0.0003	0.012	0.0017	0.0023	0.0087	0.0012	0.00194	0.0011	0.001	0.0017	0.0007	0.0005	0.0003	0.0006	0.0008	0.0005	0.0004	0.0016	0.0008	0.0008
Rubidium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	35	23	0	0.0001	0.00005	0.0009	0.00020	0.00023	0.00070	0.00013	0.000147	0.0001	<0.0001	<0.0001	0.0001	0.0001	<0.0001	0.0001	0.0001	0.0002	0.0001	0.0001	0.0001	<0.0001
Silver	mg/L	35	3	0	0.00005	0.000005	0.0001	0.00005	0.00010	0.00010	0.00005	0.000018	0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Strontium	mg/L	35	35	-	0.15	0.12	0.24	0.190	0.196	0.230	0.159	0.0234	0.18	0.16	0.19	0.19	0.12	0.15	0.15	0.14	0.13	0.14	0.15	0.24	0.17
Tellurium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	35	1	0	0.0001	0.0001	0.0002	0.00010	0.00010	0.00017	0.00010	0.000017	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Tin	mg/L	35	4	-	0.00005	0.00005	0.0001	0.00008	0.00010	0.00010	0.00006	0.000016	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001
Titanium	mg/L	35	35	-	0.0039	0.0017	0.016	0.0084	0.0114	0.0157	0.0050	0.00341	0.0085	0.0082	0.015	0.0043	0.0017	0.0024	0.0021	0.0017	0.0021	0.003	0.0099	0.0052	0.0046
Tungsten	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	ug/L	35	34	0	0.4	0.05	1.3	0.60	0.63	1.10	0.44	0.185	0.7	0.6	0.5	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4
Vanadium	mg/L	35	35	-	0.0006	0.0001	0.018	0.0017	0.0021	0.0128	0.0012	0.00297	0.0011	0.001	0.0017	0.0007	0.0001	0.0002	0.0013	0.0005	0.0003	0.0002	0.0013	0.0013	0.0008
Zinc	mg/L	35	33	4	0.0041	0.00025	0.12	0.030	0.040	0.096	0.011	0.0220	0.0014	0.0014	0.0029	<0.0005	0.0005	<0.0005	0.0028	0.0034	0.0007	0.0006	0.0035	0.003	0.0012
Zirconium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients																									
Ammonia as nitrogen	mg/L	35	32	-	0.07	0.005	0.59	0.162	0.179	0.457	0.089	0.1017	0.04	0.04	0.59	0.11	0.05	0.02	0.06	0.08	0.09	0.03	0.12	0.08	0.17
Dissolved organic carbon	mg/L	27	27	-	3.2	2.2	5.8	4.78	5.39	5.75	3.43	1.013	4	-	-	4.7	3.6	2.9	2.7	2.9	2.6	2.2	4.6	5.8	3.3
Dissolved phosphorus	mg/L	10	1	-	0.005	0.005	0.02	0.006	0.013	0.019	0.007	0.0047	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate	mg/L	35	25	3	0.13	0.02	32	0.6	26.3	30.3	2.6	8.02	<0.04	<0.04	0.09	<0.04	0.13	0.31	0.35	0.49	0.58	0.53	<0.04	0.04	0.09

Table 16 Surface water quality parameters (laboratory) for sampling station ERS-04 (East Ravine), May 2006 to December 2009.

Parameters	Units	Summary Statistics											Sample ⁵												
		N ¹	N≥D L ²	N><G L ³	Med ⁴	Min ⁴	Max ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	#06017	#06037	#06047	#06065	#06107	#06125	#06141	#07040	#07063	#07087	#07169	#07218	#07230
								16- May-06	15-Jun- 06	12-Jul- 06			9-Aug- 06	31-Oct- 06	25-Nov- 06	14-Dec- 06	30-Jan- 07	28-Feb- 07	7-Mar- 07	12-Jun- 07	28-Jul- 07	16-Aug- 07			
Nitrite	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite+Nitrate, nitrogen	mg/L	24	16	-	0.045	0.005	7.2	4.18	6.07	6.95	0.84	2.156	<0.01	<0.01	-	<0.01	0.03	0.07	0.08	0.11	0.13	0.12	-	-	-
Total Kjeldahl nitrogen	mg/L	35	35	-	0.32	0.12	3.5	0.90	1.06	2.72	0.49	0.583	0.3	3.5	1.2	0.56	0.34	0.24	0.29	0.49	0.27	0.15	0.84	0.37	1
Total nitrogen	mg/L	19	19	-	0.38	0	1	0.9	1.0	1.0	0.5	0.26	0.3	-	0	0.56	0.37	0.31	0.37	0.6	0.4	0.27	0.84	0.38	1
Total organic carbon	mg/L	35	35	-	3.8	2.3	31	5.3	5.9	22.6	4.6	4.73	4.2	5.1	31	5	4.2	3.1	2.8	2.6	2.3	2.5	5.2	6.2	4.2
Total phosphorus	mg/L	33	28	-	0.02	0.005	0.42	0.068	0.098	0.321	0.042	0.0727	-	-	0.09	0.02	0.01	<0.01	<0.01	0.05	0.05	<0.01	0.06	0.05	0.03
Physical Properties																									
Chemical Oxygen Demand	mg/L	33	32	-	11	2	47	20.0	27.8	43.2	13.3	8.59	10	-	-	35	14	7	7	11	13	8	11	20	15
pH	pH units	35	35	0	8.34	7.74	8.7	8.50	8.51	8.64	8.32	0.176	8.39	8.36	8.45	8.49	8.7	8.23	8.29	8.16	8.21	8.26	8.48	8.45	8.38
Specific conductivity	µS/cm	35	35	-	579	484	694	619.6	637.4	681.4	578.1	44.32	590	559	629	694	612	613	596	604	599	610	575	596	657
Sum of Ions	mg/L	34	34	-	453	380	553	490.8	499.8	536.5	453.1	34.32	-	429	471	503	459	484	464	478	465	467	440	445	492
Total alkalinity	mg/L	35	35	-	222	178	283	230.6	239.1	269.7	221.6	16.26	216	212	220	221	222	227	214	225	220	221	215	203	215
Total dissolved solids	mg/L	35	35	-	334	282	420	371.2	386.1	410.1	335.5	28.87	336	314	391	420	364	358	340	344	351	346	344	384	376
Total hardness	mg/L	35	35	-	234	191	318	246.8	249.3	294.9	233.3	20.21	241	225	243	248	243	245	239	241	239	239	224	215	238
Total suspended solids	mg/L	23	23	-	13	4	40	30.8	36.4	39.3	17.3	10.95	-	-	-	-	-	6	6	5	11	8	12	25	13
Turbidity	NTU	18	18	-	5.6	3.1	12	11.0	11.2	11.8	6.4	2.73	8	12	11	3.1	6.3	3.2	3.7	4.3	5.4	4.6	5.1	11	7.7

Table 16 Surface water quality parameters (laboratory) for sampling station ERS-04 (East Ravine), May 2006 to December 2009.

Parameters	Units	Sample ⁵																			
		#07330 17-Nov-07	#07356 28-Dec-07	#07378 24-Jan-08	#07410 24-Feb-08	#08011 7-Mar-08	#08042 6-Apr-08	#08062 3-May-08	#08097 2-Jun-08	#08158 28-Jul-08	#08205 30-Aug-08	#08218 7-Sep-08	#08262 19-Oct-08	#08325 1-Dec-08	#09005 3-Jan-09	#09027 5-Feb-09	#9040 26-Apr-09	#9059 30-Jun-09	#9078 30-Aug-09	#9096 23-Oct-09	#9100 18-Dec-09
Inorganic Ions		277	270	282	281	265	256	222	249	229	255	261	261	298	278	281	217	255	261	243	345
Bicarbonate	mg/L	69	68	70	70	69	69	59	66	60	65	67	68	74	75	72	57	64	65	63	93
Calcium	mg/L	<1	<1	<1	<1	12	11	4	7	12	10	6	6	<1	<1	<1	<1	5	5	7	<1
Carbonate	mg/L	48	40	50	47	48	45	42	35	74	56	51	45	40	45	39	51	35	49	40	25
Chloride	mg/L	0.13	0.12	0.11	0.13	0.11	0.11	0.12	0.14	0.14	0.14	0.11	0.12	0.12	0.11	0.08	0.11	0.14	0.13	0.16	0.13
Fluoride	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Hydroxide	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ion Balance	%	15	14	15	15	15	15	12	14	14	15	15	15	16	15	15	12	14	15	14	21
Magnesium	mg/L	1.2	1.1	1.1	1.2	1.2	1.2	1.4	1.5	1.1	1.2	1.2	1.5	1.3	2.5	1.2	1.6	1.2	1.1	1.4	2
Potassium	mg/L	31	29	31	29	29	27	26	22	25	36	32	28	29	30	26	33	23	32	26	24
Sodium	mg/L	14	14	14	14	14	13	13	12	11	13	12	12	14	15	13	16	9.9	11	12	11
Sulfate	mg/L																				
Metals		0.048	0.037	0.051	0.07	0.068	0.1	0.078	0.17	0.022	0.11	0.11	0.048	0.071	0.063	0.084	1.76	0.12	0.1	0.09	0.21
Aluminum	mg/L	<0.0002		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Antimony	mg/L	1.9	1.5	1.6	1.6	1.7	2	2.2	3.3	3.8	4.1	3.4	2.1	1.7	1.5	1.8	8.1	4	3.7	2.3	2.1
Arsenic	ug/L	0.37	0.37	0.41	0.43	0.41	0.42	0.35	0.44	0.4	0.44	0.41	0.37	0.45	0.44	0.44	0.63	0.42	0.44	0.37	0.55
Barium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0004	<0.0001	<0.0001	<0.0001	<0.0001
Beryllium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	mg/L	0.06	0.06	0.07	0.05	0.06	0.05	0.06	0.06	0.09	0.1	0.08	0.07	0.05	0.05	0.05	0.08	0.07	0.09	0.08	0.05
Boron	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	0.0002	0.0001	<0.0001	<0.00001	0.00001
Cadmium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0049	0.001	0.004	0.0005	<0.0005	0.0025	0.002	0.0006	0.0016	0.01	0.0014	<0.0005	<0.0005	<0.0005
Chromium	mg/L	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0003	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0003	0.0053	0.0004	0.0001	0.0001	0.0003
Cobalt	mg/L	0.0003	0.0002	0.0003	0.0004	0.0004	0.0005	0.0008	0.0012	0.001	0.0011	0.0006	0.0004	0.0004	0.0004	0.0015	0.0091	0.0008	0.0005	0.0005	0.0008
Copper	mg/L	0.39	0.36	0.41	0.4	0.46	0.64	0.56	0.78	0.68	0.87	0.54	0.34	0.41	0.37	0.73	10.1	1.09	0.43	0.43	0.76
Iron	mg/L	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0003	0.0003	<0.0001	0.0002	0.0002	0.0001	0.0002	0.0001	0.0003	0.0052	0.0003	0.0001	0.0001	0.0003
Lead	mg/L	0.048	0.07	0.095	0.11	0.1	0.12	0.065	0.12	0.058	0.074	0.071	0.038	0.079	0.093	0.085	0.59	0.086	0.061	0.048	0.35
Manganese	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	0.0006	0.0005	0.0008	0.0006	0.0007	0.0007	0.001	0.0012	0.0015	0.0013	0.0012	0.001	0.0007	0.0007	0.0012	0.0008	0.0013	0.0013	0.0008	0.0003
Molybdenum	mg/L	0.0005	0.0005	0.0006	0.0004	0.0012	0.0007	0.0007	0.0012	0.0024	0.0013	0.0008	0.0005	0.0005	0.0005	0.0011	0.012	0.0023	0.0008	0.0006	0.0012
Nickel	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	0.0001	0.0002	0.0001	<0.0001	0.0002	<0.0001	0.0003	0.0009	0.0002	0.0001	0.0001	0.0001
Selenium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00001	<0.00001
Silver	mg/L	0.15	0.14	0.14	0.16	0.15	0.15	0.13	0.16	0.14	0.16	0.16	0.15	0.17	0.15	0.15	0.16	0.16	0.16	0.15	0.19
Strontium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Thallium	mg/L	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Tin	mg/L	0.0029	0.0036	0.0039	0.0034	0.0041	0.0058	0.0028	0.0076	0.0018	0.0051	0.0058	0.0022	0.0025	0.0029	0.0031	0.016	0.0064	0.0062	0.0038	0.0072
Titanium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten	mg/L	0.4	0.3	0.4	0.4	0.4	0.4	0.5	0.6	0.3	0.4	0.4	0.4	0.3	0.4	0.4	1.3	0.6	0.4	0.4	0.5
Uranium	ug/L	0.0002	0.0004	0.0003	0.0003	0.0003	0.0005	0.0006	0.001	0.00016	0.0019	0.0007	0.0003	0.0003	0.0003	0.0016	0.018	0.0026	0.0008	0.0005	0.0008
Vanadium	mg/L	0.0074	0.0013	0.0046	0.0034	0.0048	0.0079	0.0049	0.0063	0.032	0.036	0.0092	0.0042	0.0094	0.0047	0.12	0.028	0.049	0.0027	0.0041	0.0031
Zinc	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium	mg/L																				
Nutrients		0.04	0.1	0.15	0.07	0.06	0.08	0.11	0.11	<0.01	0.02	<0.01	0.17	<0.01	0.15	0.05	0.12	0.2	0.01	0.03	0.08
Ammonia as nitrogen	mg/L	3.2	2.7	2.4	2.7	2.4	2.5	3.4	3.9	5.6	4.6	<0.01	3.3	2.8	2.9	2.4	-	-	-	-	-
Dissolved organic carbon	mg/L	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	-	-	-	-	-

Table 16 Surface water quality parameters (laboratory) for sampling station ERS-04 (East Ravine), May 2006 to December 2009.

Parameters	Units	Sample ⁵																		
		#07330 17-Nov-07	#07356 28-Dec-07	#07378 24-Jan-08	#07410 24-Feb-08	#08011 7-Mar-08	#08042 6-Apr-08	#08062 3-May-08	#08097 2-Jun-08	#08158 28-Jul-08	#08205 30-Aug-08	#08218 7-Sep-08	#08262 19-Oct-08	#08325 1-Dec-08	#09005 3-Jan-09	#09027 5-Feb-09	#9040 26-Apr-09	#9059 30-Jun-09	#9078 30-Aug-09	#9096 23-Oct-09
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

6Dissolved metal guideline is not available, thus total metal guideline was used.

Table 17 Surface water quality parameters (laboratory) for sampling station DRS-CN (Duke Ravine), May 2008 to November 2008.

Parameters	Units	Summary Statistics											Sample ⁵		
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	18-May-08	21-Aug-08	6-Nov-08
								90 th	95 th	99 th					
Inorganic Ions															
Bicarbonate	mg/L	3	3	-	257	232	260	259.4	259.7	259.9	249.7	15.37	232	260	257
Calcium	mg/L	3	3	-	58	57	61	60.4	60.7	60.9	58.7	2.08	58	57	61
Carbonate	mg/L	3	3	-	5	4	7	6.6	6.8	7.0	5.3	1.53	7	5	4
Chloride	mg/L	3	0	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0	<1	<1	<1
Fluoride	mg/L	3	2	-	0.14	0.11	0.5	0.43	0.46	0.49	0.25	0.217	0.14	0.11	<1
Hydroxide	mg/L	3	0	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0	<1	<1	<1
Ion Balance	%	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	3	3	-	15	14	16	15.8	15.9	16.0	15.0	1.00	14	16	15
Potassium	mg/L	3	3	-	1.4	1.3	1.7	1.64	1.67	1.69	1.47	0.208	1.7	1.3	1.4
Sodium	mg/L	3	3	-	4.3	4.2	4.5	4.46	4.48	4.50	4.33	0.153	4.2	4.5	4.3
Sulfate	mg/L	3	3	-	7.6	4	13	11.9	12.5	12.9	8.2	4.53	13	4	7.6
Metals															
Aluminum	mg/L	3	3	1	0.03	0.028	0.61	0.494	0.552	0.598	0.223	0.3354	0.61	0.028	0.03
Antimony	mg/L	3	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	<0.0002
Arsenic	ug/L	3	3	0	2.4	2.2	3.8	3.52	3.66	3.77	2.80	0.872	2.4	3.8	2.2
Barium	mg/L	3	3	-	0.2	0.18	0.21	0.208	0.209	0.210	0.197	0.0153	0.21	0.2	0.18
Beryllium	mg/L	3	0	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	3	3	-	0.03	0.02	0.04	0.038	0.039	0.040	0.030	0.0100	0.03	0.04	0.02
Cadmium	mg/L	3	0	0	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0	<0.0001	<0.0001	<0.0001
Cesium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	3	1	1	0.00025	0.00025	0.0017	0.0	0.0	0.0	0.0	0.00	0.0017	<0.0005	<0.0005
Cobalt	mg/L	3	3	-	0.0001	0.0001	0.0008	0.0007	0.0007	0.0008	0.0003	0.00040	0.0008	0.0001	0.0001
Copper	mg/L	3	3	0	0.0004	0.0003	0.0023	0.0019	0.0021	0.0023	0.0010	0.00113	0.0023	0.0004	0.0003
Iron	mg/L	3	3	1	0.27	0.22	1.42	1.190	1.305	1.397	0.637	0.6788	1.42	0.22	0.27
Lead	mg/L	3	3	0	0.0001	0.0001	0.0009	0.0007	0.0008	0.0009	0.0004	0.00046	0.0009	0.0001	0.0001
Manganese	mg/L	3	3	-	0.017	0.0083	0.019	0.0	0.0	0.0	0.0	0.01	0.0083	0.019	0.017
Mercury	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	3	3	0	0.0009	0.0007	0.0011	0.00	0.00	0.00	0.00	0.000	0.0009	0.0011	0.0007
Nickel	mg/L	3	3	0	0.0008	0.0005	0.0027	0.0	0.0	0.0	0.0	0.00	0.0027	0.0008	0.0005
Rubidium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	3	2	0	0.0001	0.00005	0.0003	0.0003	0.0003	0.0003	0.0002	0.00013	0.0001	<0.0001	0.0003
Silver	mg/L	3	0	0	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0	<0.0001	<0.0001	<0.0001
Strontium	mg/L	3	3	-	0.15	0.15	0.16	0.158	0.159	0.160	0.153	0.0058	0.15	0.16	0.15
Tellurium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	3	0	0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	<0.0002
Tin	mg/L	3	0	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0	<0.0001	<0.0001	<0.0001
Titanium	mg/L	3	3	-	0.002	0.0013	0.025	0.0204	0.0227	0.0245	0.0094	0.01349	0.025	0.0013	0.002
Tungsten	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	ug/L	3	3	0	0.5	0.4	1.3	1.14	1.22	1.28	0.73	0.493	1.3	0.4	0.5
Vanadium	mg/L	3	3	-	0.0004	0.0002	0.0029	0.0024	0.0027	0.0029	0.0012	0.00150	0.0029	0.0004	0.0002
Zinc	mg/L	3	3	0	0.0039	0.0036	0.0069	0.0063	0.0066	0.0068	0.0048	0.00182	0.0069	0.0036	0.0039
Zirconium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients															

Table 17 Surface water quality parameters (laboratory) for sampling station DRS-CN (Duke Ravine), May 2008 to November 2008.

Parameters	Units	Summary Statistics											Sample ⁵		
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	18-May-08	21-Aug-08	6-Nov-08
								90 th	95 th	99 th					
Ammonia as nitrogen	mg/L	3	1	-	0.005	0.005	0.05	0.041	0.046	0.049	0.020	0.0260	0.05	<0.01	<0.01
Dissolved organic carbon	mg/L	3	3	-	5.1	4.5	6.3	6.06	6.18	6.28	5.30	0.917	5.1	6.3	4.5
Dissolved phosphorus	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate	mg/L	3	3	0	0.18	0.09	0.22	0.212	0.216	0.219	0.163	0.0666	0.22	0.09	0.18
Nitrite	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite+Nitrate, nitrogen	mg/L	3	3	-	0.02	0.001	0.04	0.036	0.038	0.040	0.020	0.0195	0.001	0.02	0.04
Total Kjeldahl nitrogen	mg/L	2	2	-	0.32	0.22	0.42	0.400	0.410	0.418	0.320	0.1414	-	0.42	0.22
Total nitrogen	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon	mg/L	3	3	-	5.2	4.4	6.9	6.56	6.73	6.87	5.50	1.277	5.2	6.9	4.4
Total phosphorus	mg/L	3	2	-	0.02	0.005	0.04	0.036	0.038	0.040	0.022	0.0176	0.04	0.02	<0.01
Physical Properties															
Chemical Oxygen Demand	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	pH units	3	3	0	8.37	8.37	8.44	8.426	8.433	8.439	8.393	0.0404	8.44	8.37	8.37
Specific conductivity	µS/cm	3	3	-	381	370	399	395.4	397.2	398.6	383.3	14.64	370	381	399
Sum of Ions	mg/L	3	3	-	348	330	350	349.6	349.8	350.0	342.7	11.02	330	348	350
Total alkalinity	mg/L	3	3	-	217	202	221	220.2	220.6	220.9	213.3	10.02	202	221	217
Total dissolved solids	mg/L	3	3	-	230	223	232	231.6	231.8	232.0	228.3	4.73	223	230	232
Total hardness	mg/L	3	3	-	208	202	214	212.8	213.4	213.9	208.0	6.00	202	208	214
Total suspended solids	mg/L	3	3	-	9	6	183	148.2	165.6	179.5	66.0	101.34	183	6	9
Turbidity	NTU	3	3	-	3.9	1.7	53	43.2	48.1	52.0	19.5	29.00	53	1.7	3.9

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolted values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 18 Surface water quality parameters (laboratory) for sampling station DSS-01 (Duke Ravine), April 2008 to February 2009.

Parameters	Units	Summary Statistics											Sample ⁵										
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	#08053	#08086	#08118	#08167	#08184	#08234	#08254	#08323	#08354	#09026	
								90 th	95 th	99 th			30-Apr-08	22-May-08	5-Jun-08	30-Jul-08	15-Aug-08	11-Sep-08	12-Oct-08	1-Dec-08	28-Dec-08	4-Feb-09	
Inorganic Ions																							
Bicarbonate	mg/L	10	10	-	240.5	206	318	298.2	308.1	316.0	253.2	37.93	206	231	209	238	243	237	261	296	318	293	
Calcium	mg/L	10	10	-	59	50	76	71.5	73.8	75.6	61.6	8.24	50	58	60	56	56	59	59	71	76	71	
Carbonate	mg/L	10	6	-	3	0.5	10	10.0	10.0	10.0	4.0	3.84	<1	10	4	6	6	10	2	<1	<1	<1	
Chloride	mg/L	10	8	-	1	0.5	14	3.2	8.6	12.9	2.4	4.13	0.5	1	14	<1	1	2	<1	2	1	1	
Fluoride	mg/L	10	10	-	0.12	0.09	0.15	0.141	0.146	0.149	0.123	0.0177	0.15	0.14	0.14	0.11	0.12	0.12	0.13	0.12	0.11	0.09	
Hydroxide	mg/L	10	0	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Ion Balance	%	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Magnesium	mg/L	10	10	-	15	11	18	17.1	17.6	17.9	14.9	1.91	11	14	14	14	15	15	15	17	18	16	
Potassium	mg/L	10	10	-	1.5	1.1	3.3	2.22	2.76	3.19	1.66	0.645	1.6	1.5	1.2	1.1	1.2	1.5	1.7	3.3	2.1	1.4	
Sodium	mg/L	10	10	-	4.5	3.4	5.1	4.92	5.01	5.08	4.45	0.467	3.4	4.1	4.3	4.4	4.5	4.7	4.5	4.9	5.1	4.6	
Sulfate	mg/L	10	10	-	8	4.2	12	10.2	11.1	11.8	7.9	2.53	10	12	10	6.3	4.2	5	5.7	8.2	9.5	7.8	
Metals																							
Aluminum	mg/L	10	10	2	0.054	0.024	1.41	0.465	0.937	1.316	0.213	0.4325	1.41	0.36	0.024	0.07	0.031	0.033	0.031	0.052	0.056	0.06	
Antimony	mg/L	10	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Arsenic	ug/L	10	10	0	2.6	1.3	5	4.1	4.6	4.9	2.8	1.19	4	3.1	2.1	5	4	2.8	2.4	2	1.6	1.3	
Barium	mg/L	10	10	-	0.205	0.17	0.26	0.224	0.242	0.256	0.205	0.0242	0.26	0.22	0.2	0.19	0.19	0.19	0.17	0.21	0.21	0.21	
Beryllium	mg/L	10	1	-	0.00005	0.00005	0.0001	0.00006	0.00008	0.00010	0.00006	0.000016	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Bismuth	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Boron	mg/L	10	10	-	0.03	0.02	0.04	0.040	0.040	0.040	0.029	0.0074	0.04	0.03	0.03	0.04	0.03	0.03	0.02	0.02	0.02	0.03	
Cadmium	mg/L	10	1	1	0.00005	0.00005	0.0001	0.00006	0.00008	0.00010	0.00006	0.000016	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Cesium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chromium	mg/L	10	5	3	0.000375	0.00025	0.0089	0.00386	0.00638	0.00840	0.00167	0.002737	0.0089	0.0033	0.0007	<0.0005	<0.0005	<0.0005	0.0005	0.002	<0.0005	<0.0005	
Cobalt	mg/L	10	9	-	0.0001	0.00005	0.0022	0.00094	0.00157	0.00207	0.00039	0.000675	0.0022	0.0008	<0.0001	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
Copper	mg/L	10	10	1	0.0005	0.0002	0.0071	0.00242	0.00476	0.00663	0.00129	0.002097	0.0071	0.0019	0.0002	0.0006	0.0004	0.0003	0.0005	0.0009	0.0005	0.0005	
Iron	mg/L	10	10	5	0.3	0.07	6.2	2.87	4.54	5.87	1.08	1.933	6.2	2.5	0.07	0.45	0.23	0.23	0.21	0.31	0.32	0.29	
Lead	mg/L	10	7	0	0.0001	0.00005	0.0035	0.00107	0.00229	0.00326	0.00051	0.001076	0.0035	0.0008	<0.0001	0.0001	0.0001	<0.0001	<0.0001	0.0002	0.0001	0.0001	
Manganese	mg/L	10	10	-	0.034	0.0018	0.15	0.103	0.127	0.145	0.047	0.0459	0.15	0.098	0.0018	0.032	0.016	0.015	0.011	0.036	0.053	0.053	
Mercury	mg/L	3	0	0	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	
Molybdenum	mg/L	10	10	0	0.00095	0.0005	0.024	0.0037	0.0138	0.0220	0.0032	0.00730	0.024	0.0009	0.0014	0.0012	0.0011	0.001	0.0008	0.0008	0.0006	0.0005	
Nickel	mg/L	10	10	0	0.0007	0.0005	0.0071	0.00269	0.00489	0.00666	0.00148	0.002036	0.0071	0.0022	0.0007	0.001	0.0008	0.0007	0.0005	0.0006	0.0006	0.0006	
Rubidium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Selenium	mg/L	10	8	0	0.0002	0.00005	0.0003	0.00030	0.00030	0.00030	0.00019	0.000097	0.0003	0.0002	0.0002	0.0002	0.0003	<0.0001	<0.0001	0.0001	0.0003	0.0002	
Silver	mg/L	10	0	0	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Strontium	mg/L	10	10	-	0.16	0.12	0.18	0.171	0.176	0.179	0.159	0.0166	0.12	0.15	0.17	0.16	0.16	0.16	0.15	0.17	0.18	0.17	
Tellurium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Thallium	mg/L	10	0	0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Tin	mg/L	10	7	-	0.00005	0.00005	0.143	0.0147	0.0788	0.1302	0.0144	0.04519	0.143	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0004	<0.0001	<0.0001	
Titanium	mg/L	10	10	-	0.0024	0.001	0.043	0.0133	0.0282	0.0400	0.0070	0.01292	0.043	0.01	0.001	0.0031	0.0016	0.0017	0.0016	0.0021	0.0027	0.0029	
Tungsten	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Uranium	ug/L	10	10	0	0.55	0.4	1.1	1.01	1.06	1.09	0.63	0.250	1	1.1	0.4	0.5	0.4	0.4	0.5	0.6	0.7	0.7	
Vanadium	mg/L	10	10	-	0.0003	0.0003	0.014	0.0019	0.0080	0.0128	0.0017	0.00431	0.014	0.0005	0.0003	0.0006	0.0004	0.0003	0.0003	0.0003	0.0003	0.0003	
Zinc	mg/L	10	9	1	0.004	0.00025	0.032	0.0158	0.0239	0.0304	0.0073	0.00937	0.014	0.032	<0.0005	0.0031	0.0046	0.003	0.0037	0.0036	0.0047	0.0043	
Zirconium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nutrients																							
Ammonia as nitrogen	mg/L	10	5	-	0.0125	0.005	0.1	0.06	0.08	0.10	0.03	0.031	0.1	0.05	<0.01	0.05	<0.01	0.02	0.02	<0.01	<0.01	<0.01	
Dissolved organic carbon	mg/L	9	9	-	4.9	2.8	7.4	6.76	7.08	7.34	4.93	1.400	4.5	5.1	5.2	7.4	6.6		4.9	4.1	3.8	2.8	
Dissolved phosphorus	mg/L	10	4	-	0.005	0.005	0.44	0.179	0.310	0.414	0.068	0.1382	0.44	<0.01	<0.01	0.15	<0.01	<0.01	<0.01	<0.01	0.02	0.04	
Nitrate	mg/L	10	9	1	0.09	0.02	28	3.1	15.6	25.5	2.9	8.81	0.22	0.09	0.09	0.09	0.09	<0.04	0.09	28	0.26	0.35	
Nitrite	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nitrite+Nitrate, nitrogen	mg/L	10	8	-	0.02	0.005	6.3	0.70	3.50	5.74	0.66	1.983	0.05	0.02	0.02	0.02	<0.01	<0.01	0.02	6.3	0.06	0.08	

Table 18 Surface water quality parameters (laboratory) for sampling station DSS-01 (Duke Ravine), April 2008 to February 2009.

Parameters	Units	Summary Statistics											Sample ⁵									
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	#08053	#08086	#08118	#08167	#08184	#08234	#08254	#08323	#08354	#09026
								90 th	95 th	99 th			30-Apr-08	22-May-08	5-Jun-08	30-Jul-08	15-Aug-08	11-Sep-08	12-Oct-08	1-Dec-08	28-Dec-08	4-Feb-09
Total Kjeldahl nitrogen	mg/L	10	10	-	0.36	0.12	202	20.7	111.3	183.9	20.5	63.78	0.53	202	0.34	0.4	0.38	0.12	0.21	0.46	0.33	0.16
Total nitrogen	mg/L	1	1	-	-	11	11	-	-	-	-	-	-	11	-	-	-	-	-	-	-	-
Total organic carbon	mg/L	10	10	-	5.05	3.3	7.3	6.49	6.90	7.22	5.15	1.281	4.6	5	6.2	7.3	6.4	5.8	5.1	3.6	4.2	3.3
Total phosphorus	mg/L	10	8	-	0.03	0.005	0.14	0.077	0.109	0.134	0.038	0.0415	0.14	<0.01	0.05	0.07	0.03	<0.01	0.01	0.01	0.03	0.03
Physical Properties																						
Chemical Oxygen Demand	mg/L	10	10	-	18	6	23	21.2	22.1	22.8	16.4	5.74	23	21	21	11	20	17	6	18	18	9
pH	pH units	10	10	0	8.32	8.08	8.49	8.409	8.450	8.482	8.279	0.1329	8.26	8.49	8.31	8.33	8.4	8.33	8.34	8.16	8.09	8.08
Specific conductivity	µS/cm	10	10	-	387	326	482	459.5	470.8	479.8	403.5	49.56	326	374	434	367	372	374	400	457	482	449
Sum of Ions	mg/L	10	10	-	333	283	430	430.0	430.0	430.0	352.7	49.27	283	332	317	326	331	334	349	430	430	395
Total alkalinity	mg/L	10	10	-	209.5	169	261	244.8	252.9	259.4	213.7	28.55	169	205	177	205	209	210	218	243	261	240
Total dissolved solids	mg/L	10	9	-	238.5	0.5	267	264.3	265.7	266.7	217.9	78.90	202	<1	258	226	230	237	240	254	264	267
Total hardness	mg/L	10	10	-	209	170	264	248.7	256.4	262.5	218.2	28.26	170	235	207	197	201	209	209	247	264	243
Total suspended solids	mg/L	8	8	-	11.5	6	186	102.0	144.0	177.6	39.9	62.34	186	66	24		7	7	6	-	12	11
Turbidity	NTU	2	2	-	26.65	1.3	52	46.9	49.5	51.5	26.7	35.85	-	1.3	-	52	-	-	-	-	-	-
Dissolved Metals																						
Aluminum	mg/L	10	10	1 ⁶	0.0031	0.0007	0.72	0.126	0.423	0.661	0.083	0.2245	0.72	0.015	0.025	0.0017	0.0021	0.0033	0.0029	0.0007	0.0012	0.06
Antimony	mg/L	10	1	-	0.0001	0.0001	0.0003	0.00012	0.00021	0.00028	0.00012	0.000063	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	ug/L	10	10	1 ⁶	1.85	1	5.9	4.10	5.00	5.72	2.38	1.530	5.9	1.5	1.9	3.9	3.1	2.2	1.8	1.2	1	1.3
Barium	mg/L	10	10	-	0.195	0.17	0.24	0.213	0.227	0.237	0.199	0.0197	0.24	0.19	0.19	0.19	0.21	0.18	0.17	0.2	0.21	0.21
Beryllium	mg/L	10	0	-	0.00005	0.00005	0.0001	0.00006	0.00008	0.00010	0.00006	0.000016	0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Bismuth	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	10	10	-	0.03	0.02	0.04	0.040	0.040	0.040	0.028	0.0079	0.04	0.03	0.03	0.04	0.03	0.03	0.02	0.02	0.02	0.02
Cadmium	mg/L	10	1	1 ⁶	0.00005	0.00005	0.002	0.00024	0.00112	0.00182	0.00025	0.000617	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Cesium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	10	9	8 ⁶	0.0195	0.00025	0.094	0.0652	0.0796	0.0911	0.0276	0.03016	0.062	0.0084	0.094	0.026	0.001	0.019	0.0056	0.04	0.02	<0.0005
Cobalt	mg/L	10	8	-	0.0001	0.00005	0.0081	0.00090	0.00450	0.00738	0.00089	0.002533	0.0081	0.0001	0.0001	0.0001	0.0001	0.0001	<0.0001	<0.0001	0.0001	0.0001
Copper	mg/L	10	10	1 ⁶	0.0007	0.0003	0.021	0.0034	0.0122	0.0192	0.0028	0.00642	0.021	0.0014	0.0004	0.0006	0.0008	0.0005	0.001	0.0003	0.0012	0.0004
Iron	mg/L	10	10	1 ⁶	0.031	0.0091	5.1	0.78	2.94	4.67	0.57	1.595	5.1	0.024	0.071	0.066	0.027	0.026	0.035	0.0091	0.019	0.3
Lead	mg/L	10	5	0 ⁶	0.000075	0.00005	0.0044	0.00053	0.00247	0.00401	0.00051	0.001369	0.0044	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	0.0001
Manganese	mg/L	10	10	-	0.015	0.0074	0.43	0.090	0.260	0.396	0.062	0.1302	0.43	0.017	0.0097	0.013	0.0074	0.0089	0.012	0.033	0.036	0.052
Mercury	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05
Molybdenum	mg/L	10	10	0 ⁶	0.00095	0.0005	0.0014	0.00140	0.00140	0.00140	0.00099	0.000307	0.0008	0.0014	0.0014	0.0013	0.0011	0.001	0.0009	0.0008	0.0007	0.0005
Nickel	mg/L	10	10	0 ⁶	0.0009	0.0004	0.116	0.0130	0.0645	0.1057	0.0124	0.03642	0.116	0.0012	0.0015	0.0009	0.001	0.0009	0.0006	0.0004	0.0005	0.0006
Rubidium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	10	7	0 ⁶	0.0001	0.00005	0.0002	0.00020	0.00020	0.00020	0.00012	0.000063	0.0002	<0.0001	<0.0001	0.0001	0.0001	0.0001	<0.0001	0.0002	0.0002	0.0001
Silver	mg/L	10	0	0	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Strontium	mg/L	10	10	-	0.16	0.15	0.18	0.171	0.176	0.179	0.163	0.0095	0.16	0.15	0.16	0.17	0.16	0.16	0.15	0.17	0.18	0.17
Tellurium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	10	0	0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Tin	mg/L	10	2	-	0.00005	0.00005	0.0006	0.00015	0.00037	0.00056	0.00011	0.000173	0.0006	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001
Titanium	mg/L	10	8	-	0.0002	0.0001	0.02	0.005	0.012	0.018	0.003	0.0062	0.02	0.0007	0.0016	0.0002	0.0002	0.0002	0.0002	<0.0002	<0.0002	0.003
Tungsten	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	ug/L	10	10	0 ⁶	0.55	0.0065	1.1	0.74	0.92	1.06	0.56	0.282	1.1	0.0065	0.7	0.5	0.4	0.4	0.5	0.6	0.7	0.7
Vanadium	mg/L	10	9	-	0.0003	0.0001	0.5	0.06	0.28	0.46	0.05	0.158	0.0069	<1	0.0004	0.0004	0.0003	0.0002	0.0002	0.0001	0.0001	0.0003
Zinc	mg/L	10	10	1 ⁶	0.00575	0.0023	0.09	0.019	0.054	0.083	0.015	0.0267	0.09	0.0049	0.0069	0.0061	0.0036	0.0048	0.01	0.0054	0.011	0.0023
Zirconium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Silicon	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDS (calculated)	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

Table 18 Surface water quality parameters (laboratory) for sampling station DSS-01 (Duke Ravine), April 2008 to February 2009.

⁴For calculation of descriptives statistics, values < DL were set to half the value of DL.

⁵**Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).**

⁶Dissolved metal guideline is not available, thus total metal guideline was used.

Table 19 Surface water quality parameters (laboratory) for sampling station FRS-CN (FALC Ravine), May 2008 to November 2008.

Parameters	Units	Summary Statistics											Sample ⁵		
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	18-May-08	21-Aug-08	6-Nov-08
								90 th	95 th	99 th					
Inorganic Ions															
Bicarbonate	mg/L	3	3	-	267	257	268	267.8	267.9	268.0	264.0	6.08	267	268	257
Calcium	mg/L	3	3	-	67	66	69	68.6	68.8	69.0	67.3	1.53	69	67	66
Carbonate	mg/L	3	3	-	7	5	7	7.0	7.0	7.0	6.3	1.15	7	7	5
Chloride	mg/L	3	1	-	0.5	0.5	1	0.9	1.0	1.0	0.7	0.29	<1	1	<1
Fluoride	mg/L	3	3	-	0.09	0.08	0.12	0.1	0.1	0.1	0.1	0.02	0.12	0.09	0.08
Hydroxide	mg/L	3	0	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0	<1	<1	<1
Ion Balance	%	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	3	3	-	15	14	15	15.0	15.0	15.0	14.7	0.58	15	14	15
Potassium	mg/L	3	3	-	1.2	1.2	1.6	1.52	1.56	1.59	1.33	0.231	1.6	1.2	1.2
Sodium	mg/L	3	3	-	3.9	3.6	4.2	4.14	4.17	4.19	3.90	0.300	4.2	3.6	3.9
Sulfate	mg/L	3	3	-	12	8	20	18.4	19.2	19.8	13.3	6.11	20	8	12
Metals															
Aluminum	mg/L	3	3	2	0.14	0.044	0.19	0.180	0.185	0.189	0.125	0.0742	0.14	0.19	0.044
Antimony	mg/L	3	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	<0.0002
Arsenic	ug/L	3	3	0	0.9	0.6	0.9	0.90	0.90	0.90	0.80	0.173	0.9	0.9	0.6
Barium	mg/L	3	3	-	0.2	0.16	0.22	0.216	0.218	0.220	0.193	0.0306	0.2	0.22	0.16
Beryllium	mg/L	3	0	-	0.0001	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	3	3	-	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0	0.02	0.02	0.02
Cadmium	mg/L	3	1	1	0.00005	0.00005	0.0001	0.00009	0.00010	0.00010	0.00007	0.000029	<0.0001	<0.0001	0.0001
Cesium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	3	2	1	0.0005	0.00025	0.0074	0.00602	0.00671	0.00726	0.00272	0.004058	0.0005	0.0074	<0.0005
Cobalt	mg/L	3	3	-	0.0004	0.0001	0.0004	0.00040	0.00040	0.00040	0.00030	0.000173	0.0004	0.0004	0.0001
Copper	mg/L	3	3	0	0.0009	0.0006	0.0029	0.00250	0.00270	0.00286	0.00147	0.001250	0.0009	0.0029	0.0006
Iron	mg/L	3	3	2	0.45	0.1	0.89	0.802	0.846	0.881	0.480	0.3959	0.45	0.89	0.1
Lead	mg/L	3	3	0	0.0004	0.0002	0.0012	0.00104	0.00112	0.00118	0.00060	0.000529	0.0004	0.0012	0.0002
Manganese	mg/L	3	3	-	0.036	0.01	15	12.0	13.5	14.7	5.0	8.65	15	0.036	0.01
Mercury	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	3	3	0	0.0004	0.0004	0.0014	0.00120	0.00130	0.00138	0.00073	0.000577	0.0004	0.0014	0.0004
Nickel	mg/L	3	3	0	0.001	0.0006	0.0034	0.00292	0.00316	0.00335	0.00167	0.001514	0.001	0.0034	0.0006
Rubidium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	3	2	0	0.0001	0.00005	0.0001	0.00010	0.00010	0.00010	0.00008	0.000029	<0.0001	0.0001	0.0001
Silver	mg/L	3	1	1	0.00005	0.00005	0.0002	0.00017	0.00019	0.00020	0.00010	0.000087	<0.0001	0.0002	<0.0001
Strontium	mg/L	3	3	-	0.15	0.13	0.16	0.158	0.159	0.160	0.147	0.0153	0.16	0.15	0.13
Tellurium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	3	1	0	0.0001	0.0001	0.0003	0.00026	0.00028	0.00030	0.00017	0.000115	<0.0002	0.0003	<0.0002
Tin	mg/L	3	1	-	0.00005	0.00005	0.0012	0.00097	0.00109	0.00118	0.00043	0.000664	<0.0001	0.0012	<0.0001
Titanium	mg/L	3	3	-	0.0044	0.0021	0.0099	0.00880	0.00935	0.00979	0.00547	0.004008	0.0044	0.0099	0.0021
Tungsten	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	ug/L	3	3	0	0.3	0.3	0.5	0.46	0.48	0.50	0.37	0.115	0.5	0.3	0.3
Vanadium	mg/L	3	3	-	0.0008	0.0002	0.004	0.0034	0.0037	0.0039	0.0017	0.00204	0.0008	0.004	0.0002
Zinc	mg/L	3	3	0	0.0054	0.0043	0.018	0.0155	0.0167	0.0177	0.0092	0.00761	0.0043	0.018	0.0054
Zirconium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients															

Table 19 Surface water quality parameters (laboratory) for sampling station FRS-CN (FALC Ravine), May 2008 to November 2008.

Parameters	Units	Summary Statistics											Sample ⁵		
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	18-May-08	21-Aug-08	6-Nov-08
								90 th	95 th	99 th					
Ammonia as nitrogen	mg/L	3	2	-	0.01	0.005	0.03	0.026	0.028	0.030	0.015	0.0132	0.01	0.03	<0.01
Dissolved organic carbon	mg/L	3	3	-	5.1	4.9	5.4	5.34	5.37	5.39	5.13	0.252	5.4	5.1	4.9
Dissolved phosphorus	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate	mg/L	3	2	0	0.04	0.02	0.13	0.112	0.121	0.128	0.063	0.0586	0.04	<0.04	0.13
Nitrite	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite+Nitrate, nitrogen	mg/L	3	2	-	0.01	0.005	0.13	0.106	0.118	0.128	0.048	0.0708	0.01	<0.01	0.13
Total Kjeldahl nitrogen	mg/L	2	2	-	0.34	0.3	0.38	0.37	0.38	0.38	0.34	0.057	-	0.38	0.3
Total nitrogen	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon	mg/L	3	3	-	5.5	4.8	5.7	5.66	5.68	5.70	5.33	0.473	5.7	5.5	4.8
Total phosphorus	mg/L	3	1	-	0.005	0.005	0.05	0.041	0.046	0.049	0.020	0.0260	<0.01	0.05	<0.01
Physical Properties															
Chemical Oxygen Demand	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	pH units	3	3	0	8.42	8.41	8.43	8.428	8.429	8.430	8.420	0.0100	8.43	8.42	8.41
Specific conductivity	µS/cm	3	3	-	413	409	432	428.2	430.1	431.6	418.0	12.29	432	409	413
Sum of Ions	mg/L	3	3	-	370	361	384	381.2	382.6	383.7	371.7	11.59	384	370	361
Total alkalinity	mg/L	3	3	-	231	219	232	231.8	231.9	232.0	227.3	7.23	231	232	219
Total dissolved solids	mg/L	3	3	-	261	254	324	311.4	317.7	322.7	279.7	38.55	261	324	254
Total hardness	mg/L	3	3	-	226	225	234	232.4	233.2	233.8	228.3	4.93	234	225	226
Total suspended solids	mg/L	3	3	-	79	20	91	88.6	89.8	90.8	63.3	38.00	91	79	20
Turbidity	NTU	3	3	-	9.7	3.3	26	22.7	24.4	25.7	13.0	11.70	26	9.7	3.3

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 20 Surface water quality parameters (laboratory) for sampling station WapRS-CN (Wapiti Ravine), May 2008 to November 2008.

Parameters	Units	Summary Statistics											Sample ⁵		
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	17-May-08	20-Aug-08	6-Nov-08
								90 th	95 th	99 th					
Inorganic Ions															
Bicarbonate	mg/L	3	3	-	327	279	338	335.8	336.9	337.8	314.7	31.37	279	338	327
Calcium	mg/L	3	3	-	80	73	82	81.6	81.8	82.0	78.3	4.73	73	82	80
Carbonate	mg/L	3	3	-	6	2	8	7.6	7.8	8.0	5.3	3.06	8	2	6
Chloride	mg/L	3	3	-	1	1	2	1.8	1.9	2.0	1.3	0.58	1	1	2
Fluoride	mg/L	3	3	-	0.15	0.13	0.15	0.150	0.150	0.150	0.143	0.0115	0.15	0.15	0.13
Hydroxide	mg/L	3	0	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0	<1	<1	<1
Ion Balance	%	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	3	3	-	20	16	21	20.8	20.9	21.0	19.0	2.65	16	21	20
Potassium	mg/L	3	3	-	2.1	2	2.1	2.10	2.10	2.10	2.07	0.058	2.1	2	2.1
Sodium	mg/L	3	3	-	5.1	3.7	5.2	5.18	5.19	5.20	4.67	0.839	3.7	5.1	5.2
Sulfate	mg/L	3	3	-	17	14	17	17.0	17.0	17.0	16.0	1.73	14	17	17
Metals															
Aluminum	mg/L	3	3	1	0.1	0.011	0.18	0.164	0.172	0.178	0.097	0.0845	0.18	0.1	0.011
Antimony	mg/L	3	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	<0.0002
Arsenic	ug/L	3	3	0	2.3	1.3	3.6	3.34	3.47	3.57	2.40	1.153	3.6	2.3	1.3
Barium	mg/L	3	3	-	0.21	0.14	0.27	0.258	0.264	0.269	0.207	0.0651	0.27	0.21	0.14
Beryllium	mg/L	3	1	-	0.0001	0.00005	0.0002	0.00017	0.00019	0.00020	0.00010	0.000087	0.0002	<0.0001	<0.0001
Bismuth	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	3	3	-	0.02	0.02	0.03	0.028	0.029	0.030	0.023	0.0058	0.02	0.03	0.02
Cadmium	mg/L	3	1	1	0.00005	0.00005	0.0001	0.00009	0.00010	0.00010	0.00007	0.000029	0.0001	<0.0001	<0.0001
Cesium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	3	2	2	0.0023	0.00025	0.0081	0.00694	0.00752	0.00798	0.00355	0.004072	0.0023	0.0081	<0.0005
Cobalt	mg/L	3	3	-	0.0003	0.0001	0.0025	0.00206	0.00228	0.00246	0.00097	0.001332	0.0025	0.0003	0.0001
Copper	mg/L	3	3	1	0.0029	0.0005	0.008	0.0070	0.0075	0.0079	0.0038	0.00383	0.008	0.0029	0.0005
Iron	mg/L	3	3	2	1.1	0.092	4.04	3.452	3.746	3.981	1.744	2.0513	4.04	1.1	0.092
Lead	mg/L	3	2	0	0.001	0.00005	0.0029	0.00252	0.00271	0.00286	0.00132	0.001451	0.0029	0.001	<0.0001
Manganese	mg/L	3	3	-	0.1	0.0058	0.55	0.460	0.505	0.541	0.219	0.2908	0.55	0.1	0.0058
Mercury	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	3	3	0	0.0009	0.0005	0.0026	0.00226	0.00243	0.00257	0.00133	0.001115	0.0005	0.0026	0.0009
Nickel	mg/L	3	3	0	0.0029	0.0007	0.0058	0.00522	0.00551	0.00574	0.00313	0.002558	0.0058	0.0029	0.0007
Rubidium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	3	3	0	0.0004	0.0003	0.0007	0.00064	0.00067	0.00069	0.00047	0.000208	0.0007	0.0004	0.0003
Silver	mg/L	3	1	0	0.00005	0.00005	0.0001	0.00009	0.00010	0.00010	0.00007	0.000029	<0.0001	0.0001	<0.0001
Strontium	mg/L	3	3	-	0.2	0.18	0.22	0.216	0.218	0.220	0.200	0.0200	0.18	0.22	0.2
Tellurium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	3	0	0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	<0.0002
Tin	mg/L	3	1	-	0.00005	0.00005	0.0014	0.00113	0.00127	0.00137	0.00050	0.000779	<0.0001	0.0014	<0.0001
Titanium	mg/L	3	3	-	0.0024	0.0007	0.0054	0.00480	0.00510	0.00534	0.00283	0.002380	0.0024	0.0054	0.0007
Tungsten	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	ug/L	3	3	0	1.4	1	1.8	1.7	1.8	1.8	1.4	0.40	1.8	1.4	1
Vanadium	mg/L	3	3	-	0.003	0.0002	0.0067	0.00596	0.00633	0.00663	0.00330	0.003260	0.0067	0.003	0.0002
Zinc	mg/L	3	3	0	0.016	0.0065	0.018	0.0176	0.0178	0.0180	0.0135	0.00614	0.016	0.018	0.0065
Zirconium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients															

Table 20 Surface water quality parameters (laboratory) for sampling station WapRS-CN (Wapiti Ravine), May 2008 to November 2008.

Parameters	Units	Summary Statistics											Sample ⁵		
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	17-May-08	20-Aug-08	6-Nov-08
								90 th	95 th	99 th					
Ammonia as nitrogen	mg/L	3	2	-	0.02	0.005	0.11	0.092	0.101	0.108	0.045	0.0568	0.11	<0.01	0.02
Dissolved organic carbon	mg/L	3	3	-	9.1	9	9.7	9.6	9.6	9.7	9.3	0.38	9.1	9.7	9
Dissolved phosphorus	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate	mg/L	3	3	0	0.49	0.13	0.58	0.562	0.571	0.578	0.400	0.2381	0.58	0.49	0.13
Nitrite	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite+Nitrate, nitrogen	mg/L	3	3	-	0.13	0.11	0.13	0.130	0.130	0.130	0.123	0.0115	0.13	0.11	0.13
Total Kjeldahl nitrogen	mg/L	2	2	-	0.43	0.28	0.58	0.550	0.565	0.577	0.430	0.2121	-	0.58	0.28
Total nitrogen	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon	mg/L	3	3	-	9.6	8.4	11	10.7	10.9	11.0	9.7	1.30	9.6	11	8.4
Total phosphorus	mg/L	3	2	-	0.05	0.005	0.35	0.290	0.320	0.344	0.135	0.1875	0.35	0.05	<0.01
Physical Properties															
Chemical Oxygen Demand	mg/L												-	-	-
pH	pH units	3	3	0	8.4	8.32	8.42	8.416	8.418	8.420	8.380	0.0529	8.42	8.32	8.4
Specific conductivity	µS/cm	3	3	-	509	440	518	516.2	517.1	517.8	489.0	42.67	440	509	518
Sum of Ions	mg/L	3	3	-	460	398	469	467.2	468.1	468.8	442.3	38.66	398	469	460
Total alkalinity	mg/L	3	3	-	278	243	281	280.4	280.7	280.9	267.3	21.13	243	281	278
Total dissolved solids	mg/L	3	3	-	322	276	595	540.4	567.7	589.5	397.7	172.44	276	595	322
Total hardness	mg/L	3	3	-	282	248	291	289.2	290.1	290.8	273.7	22.68	248	291	282
Total suspended solids	mg/L	3	3	-	27	3	691	558.2	624.6	677.7	240.3	390.47	691	27	3
Turbidity	NTU	3	3	-	2	1	306	245.2	275.6	299.9	103.0	175.80	306	2	1

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolted values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 21 Surface water quality parameters (laboratory) for sampling stations SD1, SD2, and EC-CN (English Creek), April/May 2006 to November 2008.

Parameters	Units	Summary Statistics											Sample ⁵									
		N ¹	N≥DL ²	N><G ³	Med ⁴	Min ⁴	Max ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	SD1	SD1	SD2	SD2	EC-CN	EC-CN	EC-CN	EC-CN	EC-CN	EC-CN
								90 th	95 th	99 th			25-Apr-06 to 12-May-06	31-Aug-06 to 1-Sep-06	25-Apr-06 to 12-May-06	31-Aug-06 to 1-Sep-06	6-May-07	14-Aug-07	28-Oct-07	10-May-08	21-Aug-08	6-Nov-08
Inorganic Ions																						
Bicarbonate	mg/L	10	10	-	300.5	234	338	333.5	335.8	337.6	293.7	37.54	263	333	259	333	234	307	317	259	338	294
Calcium	mg/L	10	10	-	70	61	85	81.4	83.2	84.6	70.4	8.85	62	85	62	81	61	71	72	62	79	69
Carbonate	mg/L	10	6	-	4.5	0.5	14	12.2	13.1	13.8	5.6	4.36	<5	12	<5	<5	14	6	<1	5	7	4
Chloride	mg/L	10	6	-	1	0.5	3	1.2	2.1	2.8	1.0	0.75	<1	1	<1	<1	1	3	1	1	1	<1
Fluoride	mg/L	6	6	-	0.15	0.12	0.18	0.180	0.180	0.180	0.152	0.0256	-	-	-	-	0.13	0.16	0.18	0.18	0.14	0.12
Hydroxide	mg/L	10	0	-	0.5	0.5	2.5	2.50	2.50	2.50	1.30	1.033	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1
Ion Balance	%	4	4	-	105.5	102	110	109.4	109.7	109.9	105.8	3.86	103	110	102	108	-	-	-	-	-	-
Magnesium	mg/L	10	10	-	17	13	24	20.4	22.2	23.6	16.9	3.54	14	24	13	19	13	17	18	14	20	17
Potassium	mg/L	10	10	-	1.95	1.1	2	2.0	2.0	2.0	1.8	0.31	2	2	2	2	1.9	1.1	1.7	2	1.4	1.8
Sodium	mg/L	10	10	-	3.95	3	5	4.7	4.9	5.0	4.0	0.69	3	4	3	5	3.3	3.9	4.4	3.9	4.4	4.7
Sulfate	mg/L	10	6	-	3	2.3	5	3.8	4.4	4.9	3.3	0.72	<6	<6	<6	<6	3.6	2.3	3	5	2.9	3.7
Metals																						
Aluminum	mg/L	10	10	5	0.085	0.014	2.43	0.423	1.427	2.229	0.326	0.7423	2.43	0.19	0.06	0.05	0.11	0.2	0.02	0.15	0.039	0.014
Antimony	mg/L	10	0	-	0.0001	0.0001	0.0005	0.00050	0.00050	0.00050	0.00026	0.000207	<0.001	<0.001	<0.001	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	ug/L	10	10	1	2.95	0.0022	8	4.7	6.3	7.7	2.5	2.60	0.0046	0.0022	0.0044	0.0090	3.2	8	3.4	3.5	4.3	2.7
Barium	mg/L	10	10	-	0.3665	0.28	0.697	0.475	0.586	0.675	0.392	0.1175	0.3610	0.3720	0.4500	0.6970	0.32	0.38	0.31	0.35	0.4	0.28
Beryllium	mg/L	10	0	-	0.0001	0.00005	0.0005	0.00050	0.00050	0.00050	0.00023	0.000232	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	4	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	-	-	-
Boron	mg/L	10	10	-	0.035	0.02	0.05	0.041	0.046	0.049	0.034	0.0097	0.04	0.04	0.04	0.05	0.03	0.03	0.02	0.03	0.04	0.02
Cadmium	mg/L	10	2	2	0.00005	0.00005	0.0003	0.00021	0.00026	0.00029	0.00010	0.000085	<0.0002	0.0003	<0.0002	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cesium	mg/L	4	1	-	0.00005	0.00005	0.0002	0.00016	0.00018	0.00020	0.00009	0.000075	0.0002	<0.0001	<0.0001	<0.0001	-	-	-	-	-	-
Chromium	mg/L	10	4	2	0.00037 5	0.00025	0.004	0.0023	0.0031	0.0038	0.0010	0.00121	0.004	0.001	0.001	<0.001	<0.0005	0.0021	<0.0005	<0.0005	<0.0005	<0.0005
Cobalt	mg/L	10	8	-	0.00015	0.0001	0.0007	0.00043	0.00057	0.00067	0.00025	0.000201	0.0007	0.0004	<0.0002	<0.0002	0.0002	0.0004	0.0001	0.0003	0.0001	0.0001
Copper	mg/L	10	9	0	0.001	0.0002	0.003	0.0021	0.0026	0.0029	0.0011	0.00085	0.002	<0.001	0.001	0.003	0.0012	0.0012	0.0002	0.0008	0.0004	0.0003
Iron	mg/L	10	10	10	0.775	0.35	2.66	1.805	2.233	2.575	1.010	0.7023	2.66	1.21	0.60	0.91	0.66	1.71	0.66	0.89	0.35	0.45
Lead	mg/L	10	6	0	0.00025	0.00005	0.0011	0.00083	0.00097	0.00107	0.00036	0.000332	0.0008	<0.0005	<0.0005	<0.0005	0.0002	0.0011	<0.0001	0.0004	0.0002	0.0001
Manganese	mg/L	10	10	-	0.1495	0.0435	14	1.6	7.8	12.8	1.5	4.38	0.2270	0.1790	0.0435	0.2080	0.088	0.24	0.12	14	0.059	0.064
Mercury	mg/L	4	0	-	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0	<0.0004	<0.0004	<0.0004	<0.0004	-	-	-	-	-	-
Molybdenum	mg/L	10	10	0	0.0013	0.0008	0.0018	0.00162	0.00171	0.00178	0.00125	0.000310	0.0014	0.0013	0.0013	0.0018	0.0011	0.0013	0.001	0.0009	0.0016	0.0008
Nickel	mg/L	10	10	0	0.00145	0.0005	0.005	0.0050	0.0050	0.0050	0.0021	0.00178	0.003	0.005	0.005	0.002	0.0008	0.003	0.0005	0.0009	0.0007	0.0005
Rubidium	mg/L	4	0	-	0.00145	0.0012	0.0044	0.00353	0.00397	0.00431	0.00213	0.001522	0.0044	0.0015	0.0012	0.0014	-	-	-	-	-	-
Selenium	mg/L	10	4	1	0.0002	0.00005	0.002	0.0007	0.0013	0.0019	0.0004	0.00059	<0.001	0.002	<0.001	<0.001	0.0002	<0.0001	0.0001	<0.0001	0.0002	<0.0001
Silver	mg/L	10	0	-	0.00005	0.00005	0.0005	0.00050	0.00050	0.00050	0.00023	0.000232	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Strontium	mg/L	10	10	-	0.2	0.167	0.272	0.2576	0.2648	0.2706	0.2104	0.03984	0.169	0.272	0.167	0.256	0.18	0.23	0.22	0.18	0.25	0.18
Tellurium	mg/L	4	0	-	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-
Thallium	mg/L	10	0	0	0.0001	0.00005	0.0001	0.00010	0.00010	0.00010	0.00008	0.000026	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Tin	mg/L	10	2	-	0.00005	0.00005	0.0032	0.00095	0.00208	0.00298	0.00048	0.000979	<0.0006	0.0032	<0.0006	0.0007	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium	mg/L	10	9	-	0.0028	0.00045	0.0645	0.01221	0.03835	0.05927	0.00908	0.019594	0.0645	0.0038	<0.0009	0.0012	0.004	0.0064	0.0013	0.0063	0.0018	0.001
Tungsten	mg/L	4	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	-	-	-
Uranium	ug/L	10	8	0	0.3	0.00005	0.6	0.51	0.56	0.59	0.25	0.237	0.0007	0.0005	<0.0001	<0.0001	0.5	0.3	0.3	0.6	0.5	0.3
Vanadium	mg/L	10	8	-	0.0006	0.0002	0.007	0.0050	0.0060	0.0068	0.0016	0.00232	0.007	0.001	<0.001	<0.001	0.0007	0.0048	0.0003	0.001	0.0004	0.0002

Table 21 Surface water quality parameters (laboratory) for sampling stations SD1, SD2, and EC-CN (English Creek), April/May 2006 to November 2008.

Parameters	Units	Summary Statistics											Sample ⁵									
		N ¹	N≥DL ²	N><G ³	Med ⁴	Min ⁴	Max ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	SD1	SD1	SD2	SD2	EC-CN	EC-CN	EC-CN	EC-CN	EC-CN	EC-CN
								90 th	95 th	99 th			25-Apr-06 to 12-May-06	31-Aug-06 to 1-Sep-06	25-Apr-06 to 12-May-06	31-Aug-06 to 1-Sep-06	6-May-07	14-Aug-07	28-Oct-07	10-May-08	21-Aug-08	6-Nov-08
Zinc	mg/L	10	8	0	0.00515	0.0028	0.02	0.020	0.020	0.020	0.009	0.0067	<0.01	0.02	<0.01	0.02	0.0081	0.014	0.0028	0.0034	0.0053	0.0046
Zirconium	mg/L	4	2	-	0.00035	0.0002	0.0019	0.00148	0.00169	0.00186	0.00070	0.000812	0.0019	0.0005	<0.0004	<0.0004	-	-	-	-	-	-
Nutrients																						
Ammonia as nitrogen	mg/L	10	6	-	0.0425	0.005	0.37	0.145	0.258	0.348	0.081	0.1086	0.0600	<0.05	<0.05	<0.05	0.07	0.37	0.12	0.1	0.01	<0.01
Dissolved organic carbon	mg/L	10	10	-	8.1	4.8	12	10.2	11.1	11.8	8.0	2.33	10	12	9	9	4.8	10	5.9	6.3	7.2	5.8
Dissolved phosphorus	mg/L	4	2	-	0.135	0.01	0.83	0.659	0.745	0.813	0.278	0.3867	<0.02	0.83	<0.02	0.26	-	-	-	-	-	-
Nitrate	mg/L	10	6	0	0.05	0.02	0.35	0.341	0.346	0.349	0.130	0.1275	<0.1	<0.1	<0.1	<0.1	<0.04	0.04	0.13	0.34	0.22	0.35
Nitrite	mg/L	4	0	0	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0	<0.05	<0.05	<0.05	<0.05	-	-	-	-	-	-
Nitrite+Nitrate, nitrogen	mg/L	7	3	-	0.05	0.05	0.08	0.080	0.080	0.080	0.059	0.0146	<0.1	<0.1	<0.1	<0.1	-	-	-	0.08	0.05	0.08
Total Kjeldahl nitrogen	mg/L	9	9	-	0.4	0.24	1	1.0	1.0	1.0	0.6	0.28	1.0	0.4	0.4	0.4	0.97	0.79	0.57	-	0.35	0.24
Total nitrogen	mg/L	3	3	-	0.75	0.6	0.97	0.926	0.948	0.966	0.773	0.1861	-	-	-	-	0.97	0.75	0.6	-	-	-
Total organic carbon	mg/L	10	10	-	8.5	4.9	12	10.2	11.1	11.8	8.4	2.18	10	12	10	9	4.9	10	7.8	6.6	8	6
Total phosphorus	mg/L	10	6	-	0.055	0.005	0.3	0.21	0.26	0.29	0.09	0.097	<0.2	0.30	<0.2	0.20	0.06	0.05	<0.01	0.01	0.02	<0.01
Physical properties																						
Chemical oxygen demand	mg/L	3	3	-	17	13	33	29.8	31.4	32.7	21.0	10.58	-	-	-	-	17	33	13	-	-	-
pH	pH units	10	10	0	8.28	7.7	8.6	8.40	8.50	8.58	8.20	0.279	8.1	8.1	7.8	7.7	8.6	8.36	8.21	8.38	8.37	8.35
Specific conductivity	µS/cm	10	10	-	445	385	530	503.0	516.5	527.3	443.2	53.89	390	530	390	500	385	465	444	387	495	446
Total alkalinity	mg/L	10	10	-	253.5	213	293	289.4	291.2	292.6	248.8	31.25	215	293	213	273	216	262	260	220	289	247
Sum of Ions	mg/L	6	6	-	404	332	454	435.5	444.8	452.2	393.8	44.94	-	-	-	-	332	413	417	352	454	395
Total dissolved solids	mg/L	10	10	-	265	220	311	302.9	307.0	310.2	264.8	30.96	240	270	220	260	239	289	282	235	302	311
Total hardness	mg/L	10	10	-	244.5	206	311	283.1	297.1	308.2	245.1	36.36	212	311	208	280	206	247	254	212	279	242
Total suspended solids	mg/L	7	4	-	5	5	60	45.0	52.5	58.5	17.7	21.64	60	<10	<10	<10	-	-	-	35	9	5
Turbidity	NTU	10	10	-	6.2	2	27	18.0	22.5	26.1	9.8	7.96	27.00	3.60	2.00	5.30	11	16	7.1	17	5.1	4
Dissolved Metals																						
Aluminum	mg/L	4	4	0 ⁶	0.035	0.02	0.05	0.047	0.049	0.050	0.035	0.0129	0.04	0.05	0.03	0.02	-	-	-	-	-	-
Antimony	mg/L	4	1	-	0.0005	0.0005	0.001	0.0009	0.0009	0.0010	0.0006	0.00025	<0.001	<0.001	<0.001	0.001	-	-	-	-	-	-
Arsenic	ug/L	4	4	0 ⁶	0.0035	0.0022	0.007	0.0063	0.0066	0.0069	0.0041	0.00225	0.0022	0.0046	0.0024	0.0070	-	-	-	-	-	-
Barium	mg/L	4	4	-	0.393	0.297	0.673	0.6004	0.6367	0.6657	0.4390	0.16537	0.297	0.355	0.431	0.673	-	-	-	-	-	-
Beryllium	mg/L	4	0	-	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-
Bismuth	mg/L	4	0	-	0.00015	0.00015	0.00015	0.00015	0.00015	0.00015	0.00015	0	<0.0003	<0.0003	<0.0003	<0.0003	-	-	-	-	-	-
Boron	mg/L	4	4	-	0.045	0.04	0.05	0.050	0.050	0.050	0.045	0.0058	0.04	0.05	0.04	0.05	-	-	-	-	-	-
Cadmium	mg/L	4	0	0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	-	-	-
Cesium	mg/L	4	1	-	0.00005	0.00005	0.0001	0.00009	0.00009	0.00010	0.00006	0.000025	<0.0001	<0.0001	0.0001	<0.0001	-	-	-	-	-	-
Chromium	mg/L	4	2	2 ⁶	0.00325	0.0005	0.007	0.0067	0.0069	0.0070	0.0035	0.00349	0.007	<0.001	0.006	<0.001	-	-	-	-	-	-
Cobalt	mg/L	4	1	-	0.0001	0.0001	0.0003	0.00024	0.00027	0.00029	0.00015	0.000100	<0.0002	0.0003	<0.0002	<0.0002	-	-	-	-	-	-

Table 21 Surface water quality parameters (laboratory) for sampling stations SD1, SD2, and EC-CN (English Creek), April/May 2006 to November 2008.

Parameters	Units	Summary Statistics											Sample ⁵									
		N ¹	N≥DL ²	N><G ³ L ³	Med ⁴	Min ⁴	Max ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	SD1	SD1	SD2	SD2	EC-CN	EC-CN	EC-CN	EC-CN	EC-CN	EC-CN
								90 th	95 th	99 th			25-Apr-06 to 12-May-06	31-Aug-06 to 1-Sep-06	25-Apr-06 to 12-May-06	31-Aug-06 to 1-Sep-06	6-May-07	14-Aug-07	28-Oct-07	10-May-08	21-Aug-08	6-Nov-08
Copper	mg/L	4	4	0 ⁶	0.00075	0.0005	0.0011	0.00101	0.00106	0.00109	0.00078	0.000250	0.0008	0.0011	0.0007	0.0005	-	-	-	-	-	-
Iron	mg/L	4	4	1 ⁶	0.055	0.02	0.8	0.58	0.69	0.78	0.23	0.379	0.05	0.80	0.02	0.06	-	-	-	-	-	-
Lead	mg/L	4	4	0 ⁶	0.0003	0.0002	0.0003	0.00030	0.00030	0.00030	0.00028	0.000050	0.0003	0.0003	0.0003	0.0002	-	-	-	-	-	-
Manganese	mg/L	4	4	-	0.1525	0.0245	0.202	0.1927	0.1974	0.2011	0.1329	0.07741	0.1340	0.1710	0.0245	0.2020	-	-	-	-	-	-
Mercury	mg/L	4	1	1 ⁶	0.0001	0.0001	0.0002	0.00017	0.00019	0.00020	0.00013	0.000050	<0.0002	0.0002	<0.0002	<0.0002	-	-	-	-	-	-
Molybdenum	mg/L	4	4	0 ⁶	0.0014	0.0013	0.0017	0.00164	0.00167	0.00169	0.00145	0.000191	0.0015	0.0013	0.0013	0.0017	-	-	-	-	-	-
Nickel	mg/L	4	4	0 ⁶	0.0022	0.0016	0.0027	0.00261	0.00266	0.00269	0.00218	0.000479	0.0020	0.0024	0.0027	0.0016	-	-	-	-	-	-
Rubidium	mg/L	4	4	-	0.00115	0.0006	0.0014	0.00134	0.00137	0.00139	0.00108	0.000340	0.0006	0.0012	0.0011	0.0014	-	-	-	-	-	-
Selenium	mg/L	4	0	0	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-
Silver	mg/L	4	0	0	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0	<0.0005	<0.0005	<0.0005	<0.0005	-	-	-	-	-	-
Strontium	mg/L	4	4	-	0.2085	0.155	0.266	0.2639	0.2650	0.2658	0.2095	0.06128	0.155	0.266	0.158	0.259	-	-	-	-	-	-
Tellurium	mg/L	4	0	-	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0	<0.0005	<0.0005	<0.0005	<0.0005	-	-	-	-	-	-
Thallium	mg/L	4	0	0	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-	-
Tin	mg/L	4	0	-	0.00015	0.00015	0.00015	0.00015	0.00015	0.00015	0.00015	0	<0.0003	<0.0003	<0.0003	<0.0003	-	-	-	-	-	-
Titanium	mg/L	4	2	-	0.000375	0.00025	0.0009	0.00078	0.00084	0.00089	0.00048	0.000307	0.0005	0.0009	<0.0005	<0.0005	-	-	-	-	-	-
Tungsten	mg/L	4	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	-	-	-
Uranium	ug/L	4	3	0 ⁶	0.0003	0.00005	0.0006	0.00057	0.00059	0.00060	0.00031	0.000278	0.0006	0.0005	0.0001	<0.0001	-	-	-	-	-	-
Vanadium	mg/L	4	4	-	0.003	0.003	0.004	0.0037	0.0039	0.0040	0.0033	0.00050	0.004	0.003	0.003	0.003	-	-	-	-	-	-
Zinc	mg/L	4	1	0 ⁶	0.0025	0.0025	0.013	0.0099	0.0114	0.0127	0.0051	0.00525	<0.005	<0.005	0.013	<0.005	-	-	-	-	-	-
Zirconium	mg/L	4	0	-	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0	<0.0004	<0.0004	<0.0004	<0.0004	-	-	-	-	-	-
Dissolved Silicon	mg/L	4	4	-	6.6	4	9.8	9.6	9.7	9.8	6.8	3.08	4.2	9.8	4.0	9.0	-	-	-	-	-	-
TDS (calculated)	mg/L	4	4	-	240.5	208	292	285.7	288.9	291.4	245.3	42.73	210	292	208	271	-	-	-	-	-	-

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Boded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

6Dissolved metal guideline is not available, thus total metal guideline was used.

Table 22 Surface water quality parameters (laboratory) for sampling station ECS-01 (English Creek), February 2007 to December 2009.

Parameters	Units	Summary Statistics										
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴
								90 th	95 th	99 th		
Inorganic Ions												
Bicarbonate	mg/L	17	17	-	300	223	404	369.6	383.2	399.8	312.1	49.90
Calcium	mg/L	17	17	-	66	52	91	86.6	89.4	90.7	71.7	11.82
Carbonate	mg/L	17	3	-	0.5	0.5	12	6.2	8.8	11.4	1.9	3.32
Chloride	mg/L	17	11	-	1	0.5	3	3.0	3.0	3.0	1.2	0.90
Fluoride	mg/L	17	17	-	0.13	0.1	0.18	0.158	0.172	0.178	0.135	0.0194
Hydroxide	mg/L	17	0	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0
Ion Balance	%	0	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	17	17	-	16	11	21	19.4	20.2	20.8	16.3	2.54
Potassium	mg/L	17	17	-	1.5	0.7	4.1	2.24	2.90	3.86	1.65	0.787
Sodium	mg/L	17	17	-	5.1	3.4	7.6	6.40	6.88	7.46	5.14	1.004
Sulfate	mg/L	17	16	-	0.9	0.1	1.8	1.62	1.80	1.80	0.88	0.511
Metals												
Aluminum	mg/L	17	17	0	0.009	0.0011	0.069	0.0250	0.0338	0.0620	0.0129	0.01629
Antimony	mg/L	17	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0
Arsenic	ug/L	17	17	12	6.1	3.2	12	9.9	11.2	11.8	6.5	2.40
Barium	mg/L	17	17	-	0.5	0.32	0.64	0.560	0.576	0.627	0.493	0.0723
Beryllium	mg/L	17	0	-	0.0001	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0
Bismuth	mg/L	0	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	17	16	-	0.03	0.005	0.05	0.044	0.050	0.050	0.027	0.0125
Cadmium	mg/L	17	1	1	0.00005	0.000005	0.00037	0.000050	0.000114	0.000319	0.000066	0.0000790
Cesium	mg/L	0	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	17	6	5	0.00025	0.00025	0.05	0.022	0.038	0.048	0.007	0.0142
Cobalt	mg/L	17	12	-	0.0001	0.00005	0.0002	0.00014	0.00020	0.00020	0.00010	0.000045
Copper	mg/L	17	16	0	0.0005	0.0001	0.0017	0.00148	0.00162	0.00168	0.00068	0.000515
Iron	mg/L	17	17	16	0.6	0.0091	2.01	1.124	1.330	1.874	0.714	0.4359
Lead	mg/L	17	6	0	0.00005	0.00005	0.0009	0.00014	0.00034	0.00079	0.00012	0.000205
Manganese	mg/L	17	17	-	0.14	0.03	0.95	0.388	0.510	0.862	0.194	0.2320
Mercury	mg/L	2	0	0	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0
Molybdenum	mg/L	17	16	0	0.001	0.00005	0.0016	0.00140	0.00144	0.00157	0.00094	0.000442
Nickel	mg/L	17	17	0	0.0003	0.0002	0.0015	0.00074	0.00094	0.00139	0.00042	0.000329
Rubidium	mg/L	0	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	17	6	0	0.00005	0.00005	0.0002	0.00010	0.00012	0.00018	0.00007	0.000040
Silver	mg/L	17	0	0	0.00005	0.000005	0.00005	0.000050	0.000050	0.000050	0.000045	0.0000149
Strontium	mg/L	17	17	-	0.21	0.15	0.25	0.234	0.242	0.248	0.210	0.0245
Tellurium	mg/L	0	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	17	0	0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0
Tin	mg/L	17	5	-	0.00005	0.00005	0.0007	0.00024	0.00038	0.00064	0.00012	0.000165
Titanium	mg/L	17	15	-	0.0004	0.0001	0.0016	0.00104	0.00120	0.00152	0.00049	0.000409
Tungsten	mg/L	0	-	-	-	-	-	-	-	-	-	-
Uranium	ug/L	16	13	0	0.05	0.05	0.2	0.08	0.13	0.19	0.06	0.039
Vanadium	mg/L	17	7	-	0.00005	0.00005	0.0013	0.00018	0.00050	0.00114	0.00015	0.000302
Zinc	mg/L	17	17	1	0.0034	0.0008	0.064	0.0118	0.0248	0.0562	0.0085	0.01477
Zirconium	mg/L	0	-	-	-	-	-	-	-	-	-	-
Nutrients												
Ammonia as nitrogen	mg/L	17	16	-	0.1	0.005	0.48	0.376	0.416	0.467	0.160	0.1479
Dissolved organic carbon	mg/L	11	11	-	6	5.2	9.4	9.10	9.25	9.37	6.87	1.482
Dissolved phosphorus	mg/L	10	4	-	0.005	0.005	0.07	0.052	0.061	0.068	0.023	0.0246
Nitrate	mg/L	16	13	1	0.09	0.02	30	0.2	7.6	25.5	2.0	7.48
Nitrite	mg/L	2	1	-	0.0225	0.005	0.04	0.037	0.038	0.040	0.023	0.0247
Nitrite+Nitrate, nitrogen	mg/L	15	12	-	0.02	0.005	6.9	0.03	2.09	5.94	0.48	1.777

Table 22 Surface water quality parameters (laboratory) for sampling station ECS-01 (English Creek), February 2007 to December 2009.

Parameters	Units	Summary Statistics										
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴
								90 th	95 th	99 th		
Total Kjeldahl nitrogen	mg/L	17	17	-	0.54	0.18	212	0.7	43.0	178.2	12.9	51.30
Total nitrogen	mg/L	3	3	-	0.69	0.66	0.76	0.746	0.753	0.759	0.703	0.0513
Total organic carbon	mg/L	16	16	-	6.8	5.3	8.6	8.20	8.60	8.60	6.83	1.012
Total phosphorus	mg/L	17	11	-	0.02	0.005	0.06	0.054	0.060	0.060	0.022	0.0186
Physical Properties												
Chemical Oxygen Demand	mg/L	17	17	-	18	4	26	25.4	26.0	26.0	18.3	5.72
pH	pH units	17	17	0	8.11	7.73	8.46	8.368	8.396	8.447	8.118	0.1921
Specific conductivity	µS/cm	17	17	-	425	349	590	554.8	584.4	588.9	461.2	73.84
Sum of Ions	mg/L	17	17	-	389	294	528	499.2	506.4	523.7	412.3	66.44
Total alkalinity	mg/L	17	17	-	246	183	331	302.8	314.2	327.6	258.3	38.56
Total dissolved solids	mg/L	17	15	-	264	0.5	321	315.2	317.8	320.4	239.1	96.27
Total hardness	mg/L	17	17	-	233	175	313	295.6	305.8	311.6	247.4	38.62
Total suspended solids	mg/L	10	10	-	3.5	1	10	5.5	7.7	9.6	3.9	2.42
Turbidity	NTU	3	2	-	3.9	0.05	6	5.6	5.8	6.0	3.3	3.02
Dissolved Metals												
Aluminum	mg/L	10	10	0 ⁶	0.0017	0.0008	0.075	0.0246	0.0498	0.0700	0.0108	0.02321
Antimony	mg/L	10	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0
Arsenic	ug/L	10	10	2 ⁶	3.45	0.5	7	5.9	6.5	6.9	3.5	1.92
Barium	mg/L	10	10	-	0.475	0.2	0.64	0.613	0.627	0.637	0.474	0.1208
Beryllium	mg/L	10	0	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0
Bismuth	mg/L	0	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	10	9	-	0.03	0.005	0.05	0.041	0.046	0.049	0.030	0.0126
Cadmium	mg/L	10	1	1 ⁶	0.00005	0.00005	0.0001	0.00006	0.00008	0.00010	0.00006	0.000016
Cesium	mg/L	0	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	10	9	8 ⁶	0.00715	0.00025	0.55	0.172	0.361	0.512	0.080	0.1706
Cobalt	mg/L	10	9	-	0.0001	0.00005	0.0002	0.00020	0.00020	0.00020	0.00012	0.000047
Copper	mg/L	10	9	1 ⁶	0.0011	0.0001	0.0083	0.00326	0.00578	0.00780	0.00179	0.002408
Iron	mg/L	10	10	1 ⁶	0.015	0.0068	0.31	0.283	0.297	0.307	0.075	0.1177
Lead	mg/L	10	4	0 ⁶	0.00005	0.00005	0.0008	0.00017	0.00048	0.00074	0.00014	0.000233
Manganese	mg/L	10	10	-	0.1075	0.028	0.91	0.505	0.708	0.870	0.234	0.2820
Mercury	mg/L	2	0	0	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0
Molybdenum	mg/L	10	10	0 ⁶	0.0009	0.0006	0.0015	0.00150	0.00150	0.00150	0.00095	0.000314
Nickel	mg/L	10	10	0 ⁶	0.0006	0.0003	0.0087	0.00177	0.00523	0.00801	0.00140	0.002576
Rubidium	mg/L	0	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	10	3	0 ⁶	0.00005	0.00005	0.0002	0.00011	0.00016	0.00019	0.00008	0.000049
Silver	mg/L	10	0	0	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0
Strontium	mg/L	10	10	-	0.215	0.18	0.24	0.240	0.240	0.240	0.211	0.0228
Tellurium	mg/L	0	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	10	0	0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0
Tin	mg/L	10	1	-	0.00005	0.00005	0.0003	0.00007	0.00019	0.00028	0.00008	0.000079
Titanium	mg/L	10	2	-	0.0001	0.0001	0.0012	0.00066	0.00093	0.00115	0.00026	0.000366
Tungsten	mg/L	0	-	-	-	-	-	-	-	-	-	-
Uranium	ug/L	10	1	0 ⁶	0.05	0.0001	0.05	0.050	0.050	0.050	0.045	0.0158
Vanadium	mg/L	10	3	-	0.00005	0.00005	0.5	0.05	0.28	0.46	0.05	0.158
Zinc	mg/L	10	10	2 ⁶	0.0066	0.0041	0.065	0.0416	0.0533	0.0627	0.0152	0.02035
Zirconium	mg/L	0	-	-	-	-	-	-	-	-	-	-
Dissolved Silicon	mg/L	0	-	-	-	-	-	-	-	-	-	-
TDS (calculated)	mg/L	0	-	-	-	-	-	-	-	-	-	-

Notes: 1Number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

Table 22 Surface water quality parameters (laboratory) for sampling station ECS-01 (English Creek), February 2007 to December 2009.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

6Dissolved metal guideline is not available, thus total metal guideline was used.

Table 22 Surface water quality parameters (laboratory) for sampling station ECS-01 (English Creek), February 2007 to December 2009.

Parameters	Units	Sample ⁵																
		#07062 28-Feb-07	#07085 16-Mar-07	#08040 6-Apr-08	#08082 21-May-08	#08117 5-Jun-08	#08129 9-Jul-08	#08183 16-Aug-08	#08222 7-Sep-08	#08256 13-Oct-08	#08318 19-Nov-08	#08336 15-Dec-08	#09001 1-Jan-09	#09036 26-Apr-09	#09053 17-Jun-09	#09076 30-Aug-09	#09107 11-Nov-09	#09115 2-Dec-09
Inorganic Ions																		
Bicarbonate	mg/L	364	339	364	261	254	296	300	301	288	340	378	404	223	271	287	281	355
Calcium	mg/L	84	82	81	62	63	64	66	67	64	80	91	89	52	60	64	65	85
Carbonate	mg/L	<1	<1	<1	8	12	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	5	<1
Chloride	mg/L	1	1	3	1	<1	3	1	<1	<1	<1	1	3	1	1	<1	1	<1
Fluoride	mg/L	0.13	0.12	0.12	0.14	0.15	0.15	0.14	0.12	0.13	0.12	0.18	0.13	0.1	0.13	0.14	0.17	0.13
Hydroxide	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ion Balance	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	18	17	18	14	15	15	16	16	15	18	21	20	11	13	15	16	19
Potassium	mg/L	1.8	1.9	2.6	1.9	1.3	0.7	0.9	1	1.6	1.5	1.3	4.1	2	1.3	1	1.7	1.5
Sodium	mg/L	5.2	5.3	6.7	4.1	4.7	4.5	4.6	5.2	4.7	5.5	7.6	6.2	3.4	4.4	4.5	5.1	5.6
Sulfate	mg/L	1.2	1.5	1.8	1.1	0.6	<0.2	0.4	0.3	0.5	1	1.1	0.9	1.8	0.9	0.3	0.5	1
Metals																		
Aluminum	mg/L	0.009	0.016	0.0014	0.025	0.025	0.015	0.069	0.003	0.0053	0.011	0.0013	0.008	0.0059	0.0011	0.0017	0.0091	0.012
Antimony	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	ug/L	6	5.7	4.9	5.8	6.1	7.8	12	6.4	3.9	4.4	6.4	11	9.1	6.8	6.6	3.9	3.2
Barium	mg/L	0.49	0.46	0.51	0.45	0.49	0.56	0.64	0.51	0.42	0.46	0.5	0.56	0.32	0.56	0.53	0.41	0.51
Beryllium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	0.02	0.02	<0.01	0.02	0.03	0.05	0.04	0.03	0.02	0.01	0.02	0.03	0.03	0.05	0.04	0.03	0.02
Cadmium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00037
Cesium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001	0.0068	<0.0005	0.0033	0.05	0.035	0.014	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cobalt	mg/L	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	<0.0001	<0.0001	0.0001	0.0001	0.0002	0.0001	0.0001	<0.0001	<0.0001	<0.0001
Copper	mg/L	0.0008	0.0008	0.0013	0.0003	0.0014	0.0003	0.0017	0.0002	0.0004	0.0006	0.0002	0.0004	<0.0002	0.0005	0.0003	0.0006	0.0016
Iron	mg/L	0.73	0.76	0.0091	0.6	0.53	0.65	1.16	0.46	0.55	0.78	1.1	2.01	0.99	0.54	0.44	0.36	0.47
Lead	mg/L	0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.0002	0.0009	<0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Manganese	mg/L	0.32	0.28	0.4	0.075	0.046	0.049	0.16	0.035	0.033	0.15	0.38	0.95	0.16	0.049	0.033	0.03	0.14
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05	-	-	-	-	-
Molybdenum	mg/L	0.0001	<0.0001	0.0008	0.0014	0.0014	0.0011	0.0016	0.0009	0.001	0.0007	0.0005	0.0009	0.0013	0.0014	0.0012	0.001	0.0007
Nickel	mg/L	0.0005	0.0005	0.0007	0.0003	0.0003	0.0003	0.0015	0.0002	0.0002	0.0003	0.0002	0.0003	0.0002	0.0004	0.0002	0.0003	0.0008
Rubidium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	<0.0001	<0.0001	<0.0001	0.0001	0.0001	0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001
Silver	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Strontium	mg/L	0.22	0.23	0.24	0.18	0.21	0.22	0.23	0.22	0.19	0.19	0.21	0.25	0.15	0.2	0.2	0.2	0.23
Tellurium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Tin	mg/L	0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	0.0007	<0.0001	<0.0001	<0.0001	0.0001	0.0003	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium	mg/L	0.0004	0.0006	<0.0002	0.001	0.0011	0.0006	0.0016	0.0002	0.0002	0.0004	<0.0002	0.0003	0.0004	0.0002	0.0001	0.0004	0.0006
Tungsten	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.1	<0.1	<0.1	<0.1
Vanadium	mg/L	0.0001	<0.0001	<0.0001	0.0001	0.0001	0.0003	0.0013	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Zinc	mg/L	0.015	0.0072	0.0096	0.0021	0.0008	0.0017	0.0094	0.0027	0.0029	0.0074	0.0033	0.064	0.0015	0.0034	0.0038	0.0032	0.0073
Zirconium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients																		
Ammonia as nitrogen	mg/L	0.36	0.36	0.4	0.07	0.08	0.1	<0.01	0.1	0.08	0.15	0.22	0.48	0.1	0.08	0.02	0.02	0.09
Dissolved organic carbon	mg/L	5.6	5.2	6	7.2	7.4	9.1	8.2	-	5.8	9.4	6	5.7	-	-	-	-	-

Table 22 Surface water quality parameters (laboratory) for sampling station ECS-01 (English Creek), February 2007 to December 2009.

Parameters	Units	Sample ⁵																
		#07062 28-Feb-07	#07085 16-Mar-07	#08040 6-Apr-08	#08082 21-May-08	#08117 5-Jun-08	#08129 9-Jul-08	#08183 16-Aug-08	#08222 7-Sep-08	#08256 13-Oct-08	#08318 19-Nov-08	#08336 15-Dec-08	#09001 1-Jan-09	#09036 26-Apr-09	#09053 17-Jun-09	#09076 30-Aug-09	#09107 11-Nov-09	#09115 2-Dec-09
Dissolved phosphorus	mg/L	-	-	<0.01	<0.01	<0.01	0.07	<0.01	<0.01	<0.01	0.05	0.04	0.04	-	-	-	-	-
Nitrate	mg/L	<0.04	0.18	0.13	0.04	<0.04	0.04	0.04	<0.04	0.09	0.09	0.13	0.09	0.09	0.09	0.09	0.13	30
Nitrite	mg/L	<0.01	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite+Nitrate, nitrogen	mg/L	-	-	0.03	0.01	<0.01	0.01	<0.01	<0.01	0.01	0.02	0.03	0.02	0.02	0.01	0.02	0.03	6.9
Total Kjeldahl nitrogen	mg/L	0.69	0.72	0.56	212	0.4	0.5	0.66	0.3	0.18	0.2	0.54	0.74	0.37	0.54	0.74	0.28	0.49
Total nitrogen	mg/L	0.69	0.76	-	0.66	-	-	-	-	-	-	-	-	-	-	-	-	-
Total organic carbon	mg/L	5.5	5.7	6.6	7.2	7.8	8.6	8.6	7.1	6.2	7	6.2	6.1	7.3	7.7	6.4	5.3	
Total phosphorus	mg/L	0.02	0.02	<0.01	0.02	0.02	<0.01	0.05	<0.01	<0.01	0.02	0.03	0.06	0.02	0.03	0.06	<0.01	<0.01
Physical Properties																		
Chemical Oxygen Demand	mg/L	19	18	18	19	26	23	25	16	12	24	16	16	20	26	17	4	12
pH	pH units	7.81	8.1	8.11	8.46	8.36	8.12	8.09	8.26	8.13	7.98	7.91	7.73	8.08	8.24	8.14	8.38	8.1
Specific conductivity	µS/cm	528	515	530	389	387	419	425	423	424	500	583	590	349	394	415	434	536
Sum of Ions	mg/L	476	448	478	353	351	383	389	391	374	446	501	528	294	352	372	375	498
Total alkalinity	mg/L	298	278	298	228	228	243	246	247	236	279	310	331	183	222	235	238	291
Total dissolved solids	mg/L	317	300	292	<1	244	264	208	269	252	274	309	321	200	250	247	<5	314
Total hardness	mg/L	283	274	276	241	219	221	230	233	221	274	313	304	175	203	221	228	290
Total suspended solids	mg/L	4	3	10	4	1	5	4	3	2	-	3	-	-	-	-	-	-
Turbidity	NTU	3.9	6	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																		
Aluminum	mg/L	-	-	0.0008	0.004	0.0017	0.019	0.0026	0.075	0.0011	0.0017	0.0011	0.0011	-	-	-	-	-
Antimony	mg/L	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	-	-
Arsenic	ug/L	-	-	0.5	2.9	3.4	4.1	5.8	3.5	1.8	1.8	3.8	7	-	-	-	-	-
Barium	mg/L	-	-	0.2	0.44	0.49	0.54	0.61	0.64	0.41	0.47	0.46	0.48	-	-	-	-	-
Beryllium	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-
Bismuth	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	-	-	<0.01	0.03	0.03	0.04	0.05	0.03	0.02	0.02	0.03	0.04	-	-	-	-	-
Cadmium	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-
Cesium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	-	-	<0.0005	0.074	0.55	0.0026	0.024	0.0021	0.13	0.0067	0.0076	0.0007	-	-	-	-	-
Cobalt	mg/L	-	-	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	<0.0001	0.0001	0.0001	0.0002	-	-	-	-	-
Copper	mg/L	-	-	0.0012	0.0014	<0.0002	0.0017	0.0027	0.0083	0.001	0.0005	0.0005	0.0005	-	-	-	-	-
Iron	mg/L	-	-	0.0083	0.014	0.0068	0.07	0.016	0.28	0.0096	0.023	0.011	0.31	-	-	-	-	-
Lead	mg/L	-	-	<0.0001	<0.0001	<0.0001	0.0001	0.0001	0.0008	<0.0001	<0.0001	0.0001	<0.0001	-	-	-	-	-
Manganese	mg/L	-	-	0.39	0.066	0.028	0.047	0.075	0.2	0.028	0.14	0.46	0.91	-	-	-	-	-
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05	-	-	-	-	-
Molybdenum	mg/L	-	-	0.0009	0.0015	0.0015	0.0007	0.0009	0.0007	0.001	0.0008	0.0006	0.0009	-	-	-	-	-
Nickel	mg/L	-	-	0.0009	0.0006	0.0003	0.0007	0.001	0.0087	0.0003	0.0004	0.0005	0.0006	-	-	-	-	-
Rubidium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	-	-	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.0002	-	-	-	-	-

Table 23 Surface water quality parameters (laboratory) for sampling station SKR1 (Saskatchewan River upstream of Caution Creek), Spring 2006 to November 2008.

Parameters	Units	Summary Statistics											Sample ⁵						
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	Spring 2006	5-May-07	13-Aug-07	30-Oct-07	17-May-08	21-Aug-08	5-Nov-08
								90 th	95 th	99 th									
Inorganic Ions																			
Bicarbonate	mg/L	7	7	-	182	171	199	199.0	199.0	199.0	186.7	11.73	199	177	181	199	198	171	182
Calcium	mg/L	7	7	-	49	44	50	50.0	50.0	50.0	47.9	2.48	50	44	46	50	50	46	49
Carbonate	mg/L	7	4	-	2.5	0.5	6	5.4	5.7	5.9	3.1	2.26	<5	6	5	<1	5	<1	2
Chloride	mg/L	7	7	-	7	4	10	9.4	9.7	9.9	7.0	2.16	7	9	8	6	10	4	5
Fluoride	mg/L	6	7	-	0.135	0.11	0.17	0.160	0.165	0.169	0.135	0.0251	-	0.11	0.17	0.15	0.15	0.11	0.12
Hydroxide	mg/L	7	0	-	0.5	0.5	2.5	1.30	1.90	2.38	0.79	0.756	<5	<1	<1	<1	<1	<1	<1
Ion Balance	%	1	1	-	-	103	103	-	-	-	-	-	103	-	-	-	-	-	-
Magnesium	mg/L	7	7	-	17	15	20	19.4	19.7	19.9	17.0	1.91	19	15	17	17	20	15	16
Potassium	mg/L	7	7	-	2.7	1.6	5.8	5.32	5.56	5.75	3.27	1.743	5	5.8	2.7	1.9	4.3	1.6	1.6
Sodium	mg/L	7	7	-	18	11	26	25.4	25.7	25.9	18.6	5.53	25	20	18	16	26	11	14
Sulfate	mg/L	7	7	-	64	52	91	83.8	87.4	90.3	66.9	13.75	79	52	66	64	91	55	61
Metals																			
Aluminum	mg/L	7	7	5	0.17	0.069	1.75	1.288	1.519	1.704	0.488	0.6408	1.75	0.98	0.17	0.08	0.22	0.15	0.069
Antimony	mg/L	7	1	-	0.0001	0.0001	0.0005	0.00032	0.00041	0.00048	0.00017	0.000150	<0.001	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	ug/L	7	7	0	0.8	0.0011	2.1	1.38	1.74	2.03	0.81	0.649	0.0011	2.1	0.8	0.5	0.9	0.9	0.5
Barium	mg/L	7	7	-	0.09	0.074	0.15	0.121	0.135	0.147	0.096	0.0260	0.1010	0.15	0.082	0.076	0.09	0.096	0.074
Beryllium	mg/L	7	1	-	0.0001	0.00005	0.0005	0.00032	0.00041	0.00048	0.00014	0.000170	<0.001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	1	0	-	-	0.0001	0.0001	-	-	-	-	-	<0.0002	-	-	-	-	-	-
Boron	mg/L	7	7	-	0.03	0.02	0.05	0.044	0.047	0.049	0.033	0.0111	0.05	0.04	0.03	0.03	0.04	0.02	0.02
Cadmium	mg/L	7	2	2	0.00005	0.00005	0.0001	0.00010	0.00010	0.00010	0.00007	0.000027	0.0001	0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cesium	mg/L	1	1	-	-	0.0002	0.0002	-	-	-	-	-	0.0002	-	-	-	-	-	-
Chromium	mg/L	7	3	3	0.00025	0.00025	0.0069	0.00396	0.00543	0.00661	0.00159	0.002439	0.002	0.0012	<0.0005	<0.0005	<0.0005	0.0069	<0.0005
Cobalt	mg/L	7	7	-	0.0004	0.0001	0.0023	0.00134	0.00182	0.00220	0.00064	0.000757	0.0007	0.0023	0.0003	0.0002	0.0005	0.0004	0.0001
Copper	mg/L	7	7	1	0.002	0.0009	0.0072	0.00528	0.00624	0.00701	0.00276	0.002227	0.004	0.0072	0.0016	0.001	0.002	0.0026	0.0009
Iron	mg/L	7	7	5	0.71	0.16	2.77	1.810	2.290	2.674	0.880	0.9041	1.17	2.77	0.71	0.17	0.47	0.71	0.16
Lead	mg/L	7	7	0	0.0006	0.0002	0.0036	0.00198	0.00279	0.00344	0.00093	0.001204	0.0006	0.0036	0.0004	0.0002	0.0006	0.0009	0.0002
Manganese	mg/L	7	7	-	0.057	0.01	15	6.1	10.6	14.1	2.2	5.65	0.0570	0.21	0.032	0.016	0.059	15	0.01
Mercury	mg/L	1	0	0	-	0.0002	0.0002	-	-	-	-	-	<0.0004	-	-	-	-	-	-
Molybdenum	mg/L	7	7	0	0.0011	0.0003	0.0022	0.00160	0.00190	0.00214	0.00116	0.000556	0.0012	0.0003	0.0012	0.0011	0.0011	0.0022	0.001
Nickel	mg/L	7	7	0	0.0024	0.001	0.007	0.0052	0.0061	0.0068	0.0029	0.00206	0.004	0.007	0.0024	0.0013	0.002	0.0025	0.001
Rubidium	mg/L	1	1	-	-	0.0035	0.0035	-	-	-	-	-	0.0035	-	-	-	-	-	-
Selenium	mg/L	7	7	-	0.0004	0.0002	0.001	0.0008	0.0009	0.0010	0.0004	0.00029	0.001	0.0006	0.0004	0.0002	0.0002	0.0004	0.0002
Silver	mg/L	7	1	1	0.00005	0.00005	0.0005	0.00032	0.00041	0.00048	0.00014	0.000170	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001
Strontium	mg/L	7	7	-	0.38	0.32	0.44	0.434	0.437	0.439	0.382	0.0414	0.357	0.32	0.37	0.44	0.43	0.38	0.38
Tellurium	mg/L	1	0	-	-	0.0005	0.0005	-	-	-	-	-	<0.001	-	-	-	-	-	-
Thallium	mg/L	7	0	0	0.0001	0.00005	0.0001	0.00010	0.00010	0.00010	0.00009	0.000019	<0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Tin	mg/L	7	2	-	0.00005	0.00005	0.0011	0.00062	0.00086	0.00105	0.00024	0.000389	<0.0006	<0.0001	<0.0001	0.0001	<0.0001	0.0011	<0.0001
Titanium	mg/L	7	7	-	0.0041	0.0025	0.0462	0.02238	0.03429	0.04382	0.00996	0.016036	0.0462	0.0065	0.0043	0.0029	0.0041	0.0032	0.0025
Tungsten	mg/L	1	0	-	-	0.0001	0.0001	-	-	-	-	-	<0.0002	-	-	-	-	-	-
Uranium	ug/L	7	7	0	0.7	0.001	1.2	1.14	1.17	1.19	0.76	0.391	0.0010	1.2	0.9	0.7	1.1	0.7	0.7
Vanadium	mg/L	7	7	-	0.0011	0.0005	0.0043	0.00412	0.00421	0.00428	0.00217	0.001707	0.004	0.0043	0.0011	0.0006	0.0011	0.0036	0.0005
Zinc	mg/L	7	7	0	0.0072	0.004	0.016	0.0154	0.0157	0.0159	0.0088	0.00504	0.01	0.016	0.0047	0.0045	0.004	0.015	0.0072
Zirconium	mg/L	1	1	-	-	0.0015	0.0015	-	-	-	-	-	0.0015	-	-	-	-	-	-
Nutrients																			
Ammonia as nitrogen	mg/L	7	5	-	0.08	0.005	0.18	0.150	0.165	0.177	0.080	0.0621	<0.05	0.13	0.18	0.08	0.1	0.04	<0.01
Dissolved organic carbon	mg/L	7	7	-	3.4	2.2	11	10.4	10.7	10.9	5.4	3.72	11	10	3.4	2.9	6.1	2.3	2.2
Dissolved phosphorus	mg/L	1	0	-	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-	<0.02	-	-	-	-	-	-
Nitrate	mg/L	7	5	0	0.26	0.02	1.5	1.10	1.30	1.46	0.43	0.551	<0.1	1.5	0.26	0.31	0.04	<0.04	0.84
Nitrite	mg/L	1	0	0	-	0.025	0.025	-	-	-	-	-	<0.05	-	-	-	-	-	-
Nitrite+Nitrate, nitrogen	mg/L	4	2	-	0.03	0.005	0.19	0.148	0.169	0.186	0.064	0.0865	<0.1	-	-	-	0.01	<0.01	0.19

Table 23 Surface water quality parameters (laboratory) for sampling station SKR1 (Saskatchewan River upstream of Caution Creek), Spring 2006 to November 2008.

Parameters	Units	Summary Statistics											Sample ⁵						
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	Spring 2006	5-May-07	13-Aug-07	30-Oct-07	17-May-08	21-Aug-08	5-Nov-08
								90 th	95 th	99 th									
Total Kjeldahl nitrogen	mg/L	6	6	-	0.5	0.19	0.74	0.720	0.730	0.738	0.490	0.2174	0.7	0.74	0.44	0.56	-	0.31	0.19
Total nitrogen	mg/L	3	3	-	0.63	0.5	1.1	1.01	1.05	1.09	0.74	0.316	-	1.1	0.5	0.63	-	-	-
Total organic carbon	mg/L	7	7	-	3.8	2.3	11	11.0	11.0	11.0	5.7	3.88	11	11	3.8	3	6.6	2.3	2.4
Total phosphorus	mg/L	7	4	-	0.04	0.005	0.29	0.176	0.233	0.279	0.073	0.1012	<0.2	0.29	0.05	<0.01	0.02	0.04	<0.01
Physical Properties																			
Chemical Oxygen Demand	mg/L	3	3	-	16	11	45	39.2	42.1	44.4	24.0	18.36	-	45	16	11	-	-	-
pH	pH units	7	7	0	8.35	8.29	8.46	8.448	8.454	8.459	8.363	0.0709	8.3	8.46	8.44	8.3	8.4	8.29	8.35
Specific conductivity	µS/cm	7	7	-	422	362	502	494.8	498.4	501.3	436.7	47.73	490	418	445	422	502	362	418
Sum of Ions	mg/L	6	6	-	337.5	304	404	379.0	391.5	401.5	344.5	33.66	-	330	344	354	404	304	331
Total alkalinity	mg/L	7	7	-	156	140	170	165.8	167.9	169.6	157.1	9.58	163	155	156	163	170	140	153
Total dissolved solids	mg/L	7	7	-	274	213	320	313.4	316.7	319.3	270.4	36.98	320	274	262	274	309	213	241
Total hardness	mg/L	7	7	-	188	171	207	205.2	206.1	206.8	189.4	13.50	204	171	185	195	207	176	188
Total suspended solids	mg/L	4	1	-	43.5	2	66	64.2	65.1	65.8	38.8	29.90	60	-	-	-	66	27	2
Turbidity	NTU	7	7	-	13	5.5	192	94.8	143.4	182.3	39.8	67.60	13.00	192	13	7.8	30	17	5.5
Dissolved Metals																			
Aluminum	mg/L	1	1	0 ⁶	-	0.05	0.05	-	-	-	-	-	0.05	-	-	-	-	-	-
Antimony	mg/L	1	0	-	-	0.0005	0.0005	-	-	-	-	-	<0.001	-	-	-	-	-	-
Arsenic	ug/L	1	1	0 ⁶	-	0.0016	0.0016	-	-	-	-	-	0.0016	-	-	-	-	-	-
Barium	mg/L	1	1	-	-	0.257	0.257	-	-	-	-	-	0.257	-	-	-	-	-	-
Beryllium	mg/L	1	0	-	-	0.0005	0.0005	-	-	-	-	-	<0.001	-	-	-	-	-	-
Bismuth	mg/L	1	0	-	-	0.00015	0.00015	-	-	-	-	-	<0.0003	-	-	-	-	-	-
Boron	mg/L	1	1	-	-	0.04	0.04	-	-	-	-	-	0.04	-	-	-	-	-	-
Cadmium	mg/L	1	0	0	-	0.0001	0.0001	-	-	-	-	-	<0.0002	-	-	-	-	-	-
Cesium	mg/L	1	0	-	-	0.00005	0.00005	-	-	-	-	-	<0.0001	-	-	-	-	-	-
Chromium	mg/L	1	1	1 ⁶	-	0.006	0.006	-	-	-	-	-	0.006	-	-	-	-	-	-
Cobalt	mg/L	1	0	-	-	0.0001	0.0001	-	-	-	-	-	<0.0002	-	-	-	-	-	-
Copper	mg/L	1	1	0 ⁶	-	0.0005	0.0005	-	-	-	-	-	0.0005	-	-	-	-	-	-
Iron	mg/L	1	1	0 ⁶	-	0.01	0.01	-	-	-	-	-	0.01	-	-	-	-	-	-
Lead	mg/L	1	0	0	-	0.00005	0.00005	-	-	-	-	-	<0.0001	-	-	-	-	-	-
Manganese	mg/L	1	1	-	-	0.0338	0.0338	-	-	-	-	-	0.0338	-	-	-	-	-	-
Mercury	mg/L	1	0	0	-	0.0001	0.0001	-	-	-	-	-	<0.0002	-	-	-	-	-	-
Molybdenum	mg/L	1	1	0 ⁶	-	0.0013	0.0013	-	-	-	-	-	0.0013	-	-	-	-	-	-
Nickel	mg/L	1	1	0 ⁶	-	0.0012	0.0012	-	-	-	-	-	0.0012	-	-	-	-	-	-
Rubidium	mg/L	1	1	-	-	0.0008	0.0008	-	-	-	-	-	0.0008	-	-	-	-	-	-
Selenium	mg/L	1	0	0	-	0.0005	0.0005	-	-	-	-	-	<0.001	-	-	-	-	-	-
Silver	mg/L	1	0	0	-	0.00025	0.00025	-	-	-	-	-	<0.0005	-	-	-	-	-	-
Strontium	mg/L	1	1	-	-	0.13	0.13	-	-	-	-	-	0.130	-	-	-	-	-	-
Tellurium	mg/L	1	0	-	-	0.00025	0.00025	-	-	-	-	-	<0.0005	-	-	-	-	-	-
Thallium	mg/L	1	0	0	-	0.00005	0.00005	-	-	-	-	-	<0.0001	-	-	-	-	-	-
Tin	mg/L	1	0	-	-	0.00015	0.00015	-	-	-	-	-	<0.0003	-	-	-	-	-	-
Titanium	mg/L	1	0	-	-	0.00025	0.00025	-	-	-	-	-	<0.0005	-	-	-	-	-	-
Tungsten	mg/L	1	0	-	-	0.0001	0.0001	-	-	-	-	-	<0.0002	-	-	-	-	-	-
Uranium	ug/L	1	1	0 ⁶	-	0.0005	0.0005	-	-	-	-	-	0.0005	-	-	-	-	-	-
Vanadium	mg/L	1	1	-	-	0.003	0.003	-	-	-	-	-	0.003	-	-	-	-	-	-
Zinc	mg/L	1	0	0 ⁶	-	0.0025	0.0025	-	-	-	-	-	<0.005	-	-	-	-	-	-
Zirconium	mg/L	1	0	-	-	0.0002	0.0002	-	-	-	-	-	<0.0004	-	-	-	-	-	-
Dissolved Silicon	mg/L	1	1	-	-	4.5	4.5	-	-	-	-	-	4.5	-	-	-	-	-	-
TDS (calculated)	mg/L	1	1	-	-	283	283	-	-	-	-	-	283	-	-	-	-	-	-

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

Table 23 Surface water quality parameters (laboratory) for sampling station SKR1 (Saskatchewan River upstream of Caution Creek), Spring 2006 to November 2008.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

6Dissolved metal guideline is not available, thus total metal guideline was used.

Table 24 Surface water quality parameters (laboratory) for sampling station NSRS-01 (Saskatchewan River upstream of West Ravine), May 2007 to October 2009.

Parameters	Units	Summary Statistics											Sample ⁵						
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	#07149	#07224	#07303	#08191	#08288	# 9061	#9095
								90 th	95 th	99 th			6-May-07	18-Jul-07	21-Oct-07	27-Aug-08	5-Nov-08	30-Jun-09	23-Oct-09
Inorganic Ions																			
Bicarbonate	mg/L	7	7	-	187	168	190	189.4	189.7	189.9	181.6	9.18	188	187	190	171	189	178	168
Calcium	mg/L	7	7	-	47	44	53	51.8	52.4	52.9	48.0	3.06	44	47	53	46	51	48	47
Carbonate	mg/L	7	7	-	5	1	8	6.8	7.4	7.9	4.3	2.63	1	8	6	6	2	2	5
Chloride	mg/L	7	7	-	7	6	10	8.8	9.4	9.9	7.3	1.38	10	8	6	7	7	6	7
Fluoride	mg/L	7	7	-	0.15	0.12	0.19	0.184	0.187	0.189	0.150	0.0283	0.13	0.15	0.18	0.12	0.12	0.16	0.19
Hydroxide	mg/L	7		-	0.5	0.5	1	0.7	0.9	1.0	0.6	0.19	<1	<1	<1	1	<1	<1	<1
Ion Balance	%	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	7	7	-	17	16	19	18.4	18.7	18.9	17.3	1.11	17	18	19	16	18	17	16
Potassium	mg/L	7	7	-	2.5	1.9	5.8	4.18	4.99	5.64	2.94	1.314	5.8	3.1	2.3	2.5	2.7	2.3	1.9
Sodium	mg/L	7	7	-	18	15	25	22.6	23.8	24.8	18.9	3.44	25	21	17	18	20	16	15
Sulfate	mg/L	7	7	-	68	63	69	69.0	69.0	69.0	67.0	2.38	69	69	66	65	68	69	63
Metals																			
Aluminum	mg/L	6	6	0	0.0585	0.0063	0.15	0.123	0.137	0.147	0.070	0.0487	0.0063	0.049	-	0.096	0.061	0.15	0.056
Antimony	mg/L	7	5	-	0.0002	0.0001	0.0002	0.00020	0.00020	0.00020	0.00017	0.000049	0.0002	0.0002	<0.0002	0.0002	0.0002	0.0002	<0.0002
Arsenic	ug/L	7	7	0	0.9	0.4	2	1.5	1.8	2.0	0.9	0.55	2	1.2	0.5	0.9	0.6	0.9	0.4
Barium	mg/L	7	7	-	0.081	0.069	0.13	0.110	0.120	0.128	0.088	0.0203	0.13	0.081	0.069	0.081	0.082	0.096	0.076
Beryllium	mg/L	7	2	-	0.0001	0.00005	0.0001	0.00010	0.00010	0.00010	0.00006	0.000024	0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	7	7	-	0.03	0.02	0.06	0.048	0.054	0.059	0.034	0.0140	0.04	0.04	0.02	0.03	0.02	0.03	0.06
Cadmium	mg/L	7	5	3	0.00010	0.00001	0.0001	0.00010	0.00010	0.00010	0.00007	0.000036	0.0001	<0.0001	<0.0001	0.0001	0.0001	0.0001	0.00001
Cesium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	7	3	2	0.00025	0.00025	0.0067	0.00352	0.00511	0.00638	0.00141	0.002371	0.0008	<0.0005	<0.0005	0.0067	<0.0005	0.0014	<0.0005
Cobalt	mg/L	7	7	-	0.0001	0.0001	0.0016	0.00094	0.00127	0.00153	0.00039	0.000555	0.0016	0.0001	0.0001	0.0002	0.0001	0.0005	0.0001
Copper	mg/L	7	7	1	0.0011	0.0007	0.0056	0.00392	0.00476	0.00543	0.00210	0.001763	0.0056	0.0011	0.0008	0.0028	0.0011	0.0026	0.0007
Iron	mg/L	7	7	3	0.23	0.0036	1.75	1.264	1.507	1.701	0.515	0.6280	1.75	0.0036	0.13	0.44	0.23	0.94	0.11
Lead	mg/L	7	6	0	0.0004	0.00005	0.0027	0.00162	0.00216	0.00259	0.00068	0.000941	0.0027	<0.0001	0.0001	0.0009	0.0004	0.0005	0.0001
Manganese	mg/L	7	7	-	0.012	0.0009	0.16	0.096	0.128	0.154	0.038	0.0563	0.16	0.0009	0.012	0.018	0.011	0.054	0.012
Mercury	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	7	7	0	0.0012	0.0007	0.0027	0.00258	0.00264	0.00269	0.00149	0.000782	0.0007	0.0025	0.001	0.0027	0.0012	0.0011	0.0012
Nickel	mg/L	7	7	0	0.0015	0.0006	0.0053	0.00368	0.00449	0.00514	0.00214	0.001583	0.0053	0.0006	0.0014	0.0026	0.0015	0.0026	0.001
Rubidium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	7	7	0	0.0004	0.0002	0.0006	0.00054	0.00057	0.00059	0.00039	0.000157	0.0005	0.0006	0.0003	0.0005	0.0004	0.0002	0.0002
Silver	mg/L	7	1	0	0.00005	0.000005	0.0001	0.00007	0.00009	0.00010	0.00005	0.000027	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.00001
Strontium	mg/L	7	7	-	0.36	0.31	0.42	0.408	0.414	0.419	0.361	0.0398	0.31	0.37	0.36	0.32	0.35	0.42	0.4
Tellurium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	7	1	0	0.0001	0.0001	0.0002	0.00014	0.00017	0.00019	0.00011	0.000038	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002
Tin	mg/L	7	1	-	0.00005	0.00005	0.0011	0.00047	0.00078	0.00104	0.00020	0.000397	<0.0001	<0.0001	<0.0001	0.0011	<0.0001	<0.0001	<0.0001
Titanium	mg/L	7	7	-	0.002	0.0009	0.0067	0.00502	0.00586	0.00653	0.00280	0.001956	0.0067	0.0009	0.0016	0.0026	0.0019	0.0039	0.002
Tungsten	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	ug/L	7	7	0	0.9	0.7	1.3	1.18	1.24	1.29	0.94	0.230	1.3	0.9	0.7	1.1	1.1	0.8	0.7
Vanadium	mg/L	7	7	-	0.0007	0.0004	0.0032	0.00302	0.00311	0.00318	0.00156	0.001246	0.0032	0.0007	0.0005	0.0025	0.0007	0.0029	0.0004
Zinc	mg/L	7	5	0	0.01	0.00025	0.012	0.0120	0.0120	0.0120	0.0066	0.00582	0.01	<0.0005	<0.0005	0.011	0.012	0.012	0.0008
Zirconium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients																			
Ammonia as nitrogen	mg/L	7	6	-	0.01	0.005	0.15	0.114	0.132	0.146	0.048	0.0555	0.01	0.06	0.01	0.01	<0.01	0.15	0.09
Dissolved organic carbon	mg/L	5	5	-	3.4	2.9	8.2	7.20	7.70	8.10	4.66	2.277	8.2	5.7	3.4	2.9	3.1	-	-
Dissolved phosphorus	mg/L	2	1	-	0.0075	0.005	0.01	0.010	0.010	0.010	0.008	0.0035	-	-	-	0.01	<0.01	-	-
Nitrate	mg/L	7	5	0	0.31	0.02	1.4	1.28	1.34	1.39	0.62	0.595	1.1	<0.04	0.26	0.31	1.2	<0.04	1.4
Nitrite	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite+Nitrate, nitrogen	mg/L	4	3	-	0.165	0.005	0.31	0.295	0.303	0.309	0.161	0.1468	-	-	-	0.07	0.26	<0.01	0.31

Table 24 Surface water quality parameters (laboratory) for sampling station NSRS-01 (Saskatchewan River upstream of West Ravine), May 2007 to October 2009.

Parameters	Units	Summary Statistics											Sample ⁵						
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	#07149	#07224	#07303	#08191	#08288	# 9061	#9095
								90 th	95 th	99 th			6-May-07	18-Jul-07	21-Oct-07	27-Aug-08	5-Nov-08	30-Jun-09	23-Oct-09
Total Kjeldahl nitrogen	mg/L	7	7	-	0.28	0.2	1.5	0.92	1.21	1.44	0.48	0.464	1.5	0.54	0.26	0.28	0.28	0.2	0.28
Total nitrogen	mg/L	3	3	-	0.54	0.32	1.4	1.23	1.31	1.38	0.75	0.571	1.4	0.54	0.32	-	-	-	-
Total organic carbon	mg/L	7	7	-	3.5	2.8	8.2	6.82	7.51	8.06	4.34	1.999	8.2	5.9	3.9	2.9	3.2	3.5	2.8
Total phosphorus	mg/L	7	5	-	0.03	0.005	0.25	0.124	0.187	0.237	0.053	0.0880	0.25	0.03	<0.01	0.03	<0.01	0.04	0.01
Physical Properties																			
Chemical Oxygen Demand	mg/L	6	5	-	12.5	2	39	28.0	33.5	37.9	15.5	12.57	39	14	11	-	10	17	<4
pH	pH units	7	7	0	8.43	8.31	8.47	8.464	8.467	8.469	8.413	0.0562	8.31	8.46	8.41	8.47	8.37	8.43	8.44
Specific conductivity	µS/cm	7	7	-	437	409	463	455.8	459.4	462.3	435.6	20.07	463	451	437	409	447	430	412
Sum of Ions	mg/L	7	7	-	359	324	361	361.0	361.0	361.0	347.9	15.99	361	361	360	332	359	338	324
Total alkalinity	mg/L	7	7	-	156	146	167	166.4	166.7	166.9	156.3	8.18	156	167	166	150	159	150	146
Total dissolved solids	mg/L	7	7	-	270	228	296	290.0	293.0	295.4	267.0	24.34	286	296	269	241	279	270	228
Total hardness	mg/L	7	7	-	190	180	210	204.6	207.3	209.5	190.9	11.16	180	191	210	181	201	190	183
Total suspended solids	mg/L	5	5	-	21	13	358	231.6	294.8	345.4	90.2	150.12	358	42	17	21	13	-	-
Turbidity	NTU	4	4	-	14.05	6	154	114.4	134.2	150.0	47.0	71.71	154	22	6	6.1	-	-	-
Dissolved Metals																			
Aluminum	mg/L	3	3	0 ⁶	0.0053	0.0024	0.0064	0.00618	0.00629	0.00638	0.00470	0.002066	-	-	0.0064	0.0053	0.0024	-	-
Antimony	mg/L	3	2	-	0.0002	0.0001	0.0002	0.00020	0.00020	0.00020	0.00017	0.000058	-	-	<0.0002	0.0002	0.0002	-	-
Arsenic	ug/L	3	3	0 ⁶	0.5	0.5	0.6	0.58	0.59	0.60	0.53	0.058	-	-	0.5	0.6	0.5	-	-
Barium	mg/L	3	3	-	0.08	0.079	0.081	0.0808	0.0809	0.0810	0.0800	0.00100	-	-	0.079	0.08	0.081	-	-
Beryllium	mg/L	3	1	-	0.00005	0.00005	0.0001	0.00009	0.00010	0.00010	0.00007	0.000029	-	-	<0.0001	0.0001	<0.0001	-	-
Bismuth	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	3	3	-	0.03	0.02	0.03	0.030	0.030	0.030	0.027	0.0058	-	-	0.03	0.03	0.02	-	-
Cadmium	mg/L	3	1	1 ⁶	0.00005	0.00005	0.0001	0.00009	0.00010	0.00010	0.00007	0.000029	-	-	<0.0001	0.0001	<0.0001	-	-
Cesium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	3	2	2 ⁶	0.014	0.00025	0.024	0.0220	0.0230	0.0238	0.0128	0.01192	-	-	<0.0005	0.024	0.014	-	-
Cobalt	mg/L	3	3	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	-	-	0.0001	0.0001	0.0001	-	-
Copper	mg/L	3	3	0 ⁶	0.0012	0.0011	0.0014	0.00136	0.00138	0.00140	0.00123	0.000153	-	-	0.0014	0.0012	0.0011	-	-
Iron	mg/L	3	3	0 ⁶	0.0086	0.0042	0.01	0.010	0.010	0.010	0.008	0.0030	-	-	0.01	0.0086	0.0042	-	-
Lead	mg/L	3	1	0 ⁶	0.00005	0.00005	0.0001	0.00009	0.00010	0.00010	0.00007	0.000029	-	-	<0.0001	0.0001	<0.0001	-	-
Manganese	mg/L	3	3	-	0.011	0.0025	0.018	0.0166	0.0173	0.0179	0.0105	0.00776	-	-	0.0025	0.018	0.011	-	-
Mercury	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	3	3	0 ⁶	0.0013	0.0012	0.0014	0.00138	0.00139	0.00140	0.00130	0.000100	-	-	0.0012	0.0014	0.0013	-	-
Nickel	mg/L	3	3	0 ⁶	0.0014	0.0011	0.0015	0.00148	0.00149	0.00150	0.00133	0.000208	-	-	0.0015	0.0011	0.0014	-	-
Rubidium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	3	3	0 ⁶	0.0002	0.00003	0.0004	0.00036	0.00038	0.00040	0.00021	0.000185	-	-	0.0002	0.0004	0.00003	-	-
Silver	mg/L	3	1	0 ⁶	0.00005	0.00005	0.0001	0.00009	0.00010	0.00010	0.00007	0.000029	-	-	<0.0001	0.0001	<0.0001	-	-
Strontium	mg/L	3	3	-	0.32	0.31	0.39	0.376	0.383	0.389	0.340	0.0436	-	-	0.39	0.31	0.32	-	-
Tellurium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	3	1	0 ⁶	0.0001	0.0001	0.0002	0.00018	0.00019	0.00020	0.00013	0.000058	-	-	<0.0002	0.0002	<0.0002	-	-
Tin	mg/L	3	1	-	0.00005	0.00005	0.0001	0.00009	0.00010	0.00010	0.00007	0.000029	-	-	<0.0001	0.0001	<0.0001	-	-
Titanium	mg/L	3	2	-	0.0002	0.0001	0.0009	0.00076	0.00083	0.00089	0.00040	0.000436	-	-	0.0009	0.0002	<0.0002	-	-
Tungsten	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	ug/L	3	3	0 ⁶	1	0.8	1.1	1.08	1.09	1.10	0.97	0.153	-	-	0.8	1	1.1	-	-
Vanadium	mg/L	3	3	-	0.0003	0.0003	0.0004	0.00038	0.00039	0.00040	0.00033	0.000058	-	-	0.0003	0.0004	0.0003	-	-
Zinc	mg/L	3	3	0 ⁶	0.0031	0.00047	0.0048	0.00446	0.00463	0.00477	0.00279	0.002182	-	-	0.0031	0.0048	0.00047	-	-
Zirconium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Silicon	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDS (calculated)	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

Table 24 Surface water quality parameters (laboratory) for sampling station NSRS-01 (Saskatchewan River upstream of West Ravine), May 2007 to October 2009.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

6Dissolved metal guideline is not available, thus total metal guideline was used.

Table 25 Surface water quality parameters (laboratory) for sampling station NSRS-02 (Saskatchewan River downstream of East Ravine), May 2007 to December 2009.

Parameters	Units	Summary Statistics											Sample ⁵							
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	#07150	#07223	#07304	#08192	#08302	# 9060	#9084	#9097
								90 th	95 th	99 th			6-May-07	18-Jul-07	21-Oct-07	27-Aug-08	6-Nov-08	30-Jun-09	30-Aug-09	23-Oct-09
Inorganic Ions																				
Bicarbonate	mg/L	8	8	-	190	170	264	257.0	260.5	263.3	210.5	36.53	189	190	190	170	185	264	254	242
Calcium	mg/L	8	8	-	50.5	44	64	64.0	64.0	64.0	53.5	8.77	44	47	52	45	49	64	64	63
Carbonate	mg/L	8	7	-	5.5	0.5	8	7.3	7.7	7.9	4.9	2.51	<1	5	6	6	2	5	7	8
Chloride	mg/L	8	8	-	11	6	49	42.7	45.9	48.4	20.6	17.68	12	10	6	6	7	35	49	40
Fluoride	mg/L	8	8	-	0.135	0.12	0.17	0.163	0.167	0.169	0.140	0.0185	0.13	0.15	0.17	0.12	0.12	0.14	0.13	0.16
Hydroxide	mg/L	8	1	-	0.5	0.5	1	0.7	0.8	1.0	0.6	0.18	<1	<1	<1	1	<1	<1	<1	<1
Ion Balance	%	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	8	8	-	16.5	14	18	18.0	18.0	18.0	16.1	1.64	17	18	18	16	17	14	15	14
Potassium	mg/L	8	8	-	2.4	1.1	5.7	3.88	4.79	5.52	2.50	1.490	5.7	3.1	2.3	2.5	2.7	1.2	1.1	1.4
Sodium	mg/L	8	8	-	22	17	33	28.1	30.6	32.5	22.8	5.26	25	21	18	17	19	23	33	26
Sulfate	mg/L	8	8	-	62.5	9.5	69	69.0	69.0	69.0	45.1	28.49	69	69	65	60	65	9.5	11	12
Metals																				
Aluminum	mg/L	8	8	3	0.08	0.011	0.64	0.290	0.465	0.605	0.149	0.2026	0.64	0.011	0.057	0.12	0.06	0.14	0.093	0.067
Antimony	mg/L	8	3	-	0.0001	0.0001	0.0002	0.00020	0.00020	0.00020	0.00014	0.000052	0.0002	0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	ug/L	8	8	0	1.45	0.5	4.1	3.75	3.93	4.07	1.85	1.361	1.9	1	0.5	0.9	0.7	4.1	3.6	2.1
Barium	mg/L	8	8	-	0.115	0.076	0.45	0.429	0.440	0.448	0.213	0.1679	0.13	0.078	0.076	0.1	0.083	0.45	0.42	0.37
Beryllium	mg/L	8	2	-	0.0001	0.00005	0.0001	0.00010	0.00010	0.00010	0.00006	0.000023	0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	8	5	-	0.025	0.000005	0.04	0.033	0.037	0.039	0.019	0.0164	0.04	0.03	0.03	0.03	0.02	<0.0001	<0.0001	<0.00001
Cadmium	mg/L	5	3	3	0.00010	0.00005	0.0001	0.00010	0.00010	0.00010	0.00008	0.000027	0.0001	<0.0001	<0.0001	0.0001	0.0001	-	-	-
Cesium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	8	4	3	0.000475	0.00025	0.0074	0.00684	0.00712	0.00734	0.00215	0.003032	0.0007	<0.0005	<0.0005	0.0074	0.0066	0.0015	<0.0005	<0.0005
Cobalt	mg/L	8	7	-	0.0001	0.00005	0.0016	0.00083	0.00122	0.00152	0.00034	0.000527	0.0016	0.0001	0.0001	0.0002	0.0001	0.0005	0.0001	<0.0001
Copper	mg/L	8	8	2	0.00115	0.0003	0.0055	0.00431	0.00491	0.00538	0.00189	0.001792	0.0055	0.0013	0.0011	0.0038	0.0011	0.0012	0.0008	0.0003
Iron	mg/L	8	8	5	0.35	0.0071	1.7	1.46	1.58	1.68	0.59	0.608	1.7	0.0071	0.14	0.6	0.24	1.35	0.37	0.33
Lead	mg/L	8	6	0	0.0003	0.00005	0.0026	0.00134	0.00197	0.00247	0.00060	0.000858	0.0026	<0.0001	0.0001	0.0008	0.0006	0.0005	0.0001	<0.0001
Manganese	mg/L	8	8	-	0.03	0.0017	0.16	0.132	0.146	0.157	0.053	0.0572	0.16	0.0017	0.015	0.024	0.011	0.12	0.058	0.036
Mercury	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	8	8	0	0.00115	0.0007	0.0013	0.00130	0.00130	0.00130	0.00109	0.000223	0.0007	0.0013	0.0012	0.0012	0.0011	0.0011	0.0013	0.0008
Nickel	mg/L	8	8	0	0.0015	0.0005	0.0075	0.00596	0.00673	0.00735	0.00254	0.002557	0.0053	0.0005	0.0016	0.0075	0.0014	0.0027	0.0008	0.0005
Rubidium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	8	8	0	0.00035	0.0001	0.0009	0.00083	0.00087	0.00089	0.00040	0.000302	0.0004	0.0008	0.0003	0.0004	0.0009	0.0001	0.0001	0.0002
Silver	mg/L	8	1	0	0.00005	0.000005	0.0001	0.00007	0.00008	0.00010	0.00005	0.000025	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.00001
Strontium	mg/L	8	8	-	0.32	0.15	0.4	0.38	0.39	0.40	0.28	0.104	0.31	0.36	0.4	0.33	0.37	0.17	0.16	0.15
Tellurium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	8	1	0	0.0001	0.0001	0.0002	0.00013	0.00017	0.00019	0.00011	0.000035	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Tin	mg/L	8	1	-	0.00005	0.00005	0.002	0.0006	0.0013	0.0019	0.0003	0.00069	<0.0001	<0.0001	<0.0001	0.002	<0.0001	<0.0001	<0.0001	<0.0001
Titanium	mg/L	8	8	-	0.00325	0.0006	0.0074	0.00530	0.00635	0.00719	0.00339	0.002004	0.0074	0.0006	0.0025	0.0032	0.0019	0.0044	0.0038	0.0033
Tungsten	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	ug/L	8	8	0	0.85	0.4	1.4	1.12	1.26	1.37	0.81	0.340	1.4	0.9	0.8	1	1	0.6	0.4	0.4
Vanadium	mg/L	8	8	-	0.00095	0.0004	0.0034	0.00326	0.00333	0.00339	0.00165	0.001334	0.0032	0.0007	0.0005	0.0031	0.0012	0.0034	0.0007	0.0004
Zinc	mg/L	8	8	0	0.00485	0.0019	0.019	0.0183	0.0187	0.0189	0.0082	0.00683	0.01	0.0019	0.003	0.018	0.019	0.0059	0.0038	0.0038
Zirconium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients																				
Ammonia as nitrogen	mg/L	8	7	-	0.035	0.005	0.18	0.110	0.145	0.173	0.052	0.0571	0.04	0.05	0.08	0.01	<0.01	0.18	0.02	0.03
Dissolved organic carbon	mg/L	5	5	-	3.6	2.9	8.7	7.26	7.98	8.56	4.68	2.407	8.7	5.1	3.6	2.9	3.1	-	-	-
Dissolved phosphorus	mg/L	2	1	-	0.0075	0.005	0.01	0.010	0.010	0.010	0.008	0.0035	-	-	-	0.01	<0.01	-	-	-
Nitrate	mg/L	8	6	0	0.175	0.02	1.2	0.95	1.07	1.17	0.36	0.430	1.2	<0.04	0.31	0.22	0.84	<0.04	0.13	0.13
Nitrite	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite+Nitrate, nitrogen	mg/L	5	5	-	0.03	0.005	0.19	0.134	0.162	0.184	0.061	0.0739	-	-	-	0.05	0.19	<0.01	0.03	0.03

Table 25 Surface water quality parameters (laboratory) for sampling station NSRS-02 (Saskatchewan River downstream of East Ravine), May 2007 to December 2009.

Parameters	Units	Summary Statistics											Sample ⁵							
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	#07150	#07223	#07304	#08192	#08302	# 9060	#9084	#9097
								90 th	95 th	99 th			6-May-07	18-Jul-07	21-Oct-07	27-Aug-08	6-Nov-08	30-Jun-09	30-Aug-09	23-Oct-09
Total Kjeldahl nitrogen	mg/L	8	8	-	0.34	0.17	0.92	0.577	0.749	0.886	0.391	0.2299	0.92	0.43	0.35	0.32	0.22	0.33	0.39	0.17
Total nitrogen	mg/L	3	3	-	0.43	0.42	1.2	1.05	1.12	1.18	0.68	0.447	1.2	0.43	0.42	-	-	-	-	-
Total organic carbon	mg/L	8	8	-	3.6	2.1	8.2	5.82	7.01	7.96	4.15	1.878	8.2	4.8	3.9	2.9	3.2	2.1	4.8	3.3
Total phosphorus	mg/L	8	6	-	0.02	0.005	0.26	0.106	0.183	0.245	0.049	0.0862	0.26	0.02	0.02	0.04	<0.01	0.01	0.03	<0.01
Physical Properties																				
Chemical Oxygen Demand	mg/L	7	6	-	11	2	43	32.2	37.6	41.9	17.1	13.56	43	19	11	-	10	25	10	<4
pH	pH units	8	8	0	8.455	8.3	8.5	8.49	8.49	8.50	8.43	0.072	8.3	8.47	8.44	8.5	8.36	8.38	8.48	8.48
Specific conductivity	µS/cm	8	8	-	457.5	400	546	530.6	538.3	544.5	471.4	50.53	462	453	437	400	437	512	546	524
Sum of Ions	mg/L	8	8	-	363	323	434	421.4	427.7	432.7	376.4	38.24	363	363	358	323	347	416	434	407
Total alkalinity	mg/L	8	8	-	165	149	224	221.2	222.6	223.7	180.8	32.00	155	164	166	149	156	224	220	212
Total dissolved solids	mg/L	8	8	-	281.5	239	333	323.2	328.1	332.0	287.5	32.87	277	286	265	239	263	319	333	318
Total hardness	mg/L	8	8	-	198	178	221	218.2	219.6	220.7	199.8	16.90	180	191	204	178	192	217	221	215
Total suspended solids	mg/L	5	5	-	25	13	280	184.0	232.0	270.4	74.4	115.45	280	40	14	25	13	-	-	-
Turbidity	NTU	4	4	-	14.25	6.9	154	113.8	133.9	150.0	47.4	71.34	154	20	6.9	8.5	-	-	-	-
Dissolved Metals																				
Aluminum	mg/L	3	3	0 ⁶	0.0042	0.0033	0.0083	0.00748	0.00789	0.00822	0.00527	0.002665	-	-	0.0042	0.0083	0.0033	-	-	-
Antimony	mg/L	3	1	-	0.0001	0.0001	0.0002	0.00018	0.00019	0.00020	0.00013	0.000058	-	-	<0.0002	0.0002	<0.0002	-	-	-
Arsenic	ug/L	3	3	0 ⁶	0.5	0.5	0.6	0.58	0.59	0.60	0.53	0.058	-	-	0.5	0.6	0.5	-	-	-
Barium	mg/L	3	3	-	0.077	0.075	0.08	0.079	0.080	0.080	0.077	0.0025	-	-	0.075	0.077	0.08	-	-	-
Beryllium	mg/L	3	1	-	0.00005	0.00005	0.0001	0.00009	0.00010	0.00010	0.00007	0.000029	-	-	<0.0001	0.0001	<0.0001	-	-	-
Bismuth	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	3	3	-	0.02	0.02	0.03	0.028	0.029	0.030	0.023	0.0058	-	-	0.03	0.02	0.02	-	-	-
Cadmium	mg/L	3	1	1 ⁶	0.00005	0.00005	0.0001	0.00009	0.00010	0.00010	0.00007	0.000029	-	-	<0.0001	0.0001	<0.0001	-	-	-
Cesium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	3	2	2 ⁶	0.0025	0.00025	0.0044	0.00402	0.00421	0.00436	0.00238	0.002077	-	-	<0.0005	0.0025	0.0044	-	-	-
Cobalt	mg/L	3	3	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	-	-	0.0001	0.0001	0.0001	-	-	-
Copper	mg/L	3	3	0 ⁶	0.0011	0.001	0.0011	0.0011	0.0011	0.0011	0.0011	0.00006	-	-	0.0011	0.001	0.0011	-	-	-
Iron	mg/L	3	3	0 ⁶	0.009	0.006	0.013	0.0122	0.0126	0.0129	0.0093	0.00351	-	-	0.006	0.013	0.009	-	-	-
Lead	mg/L	3	1	0 ⁶	0.00005	0.00005	0.0001	0.00009	0.00010	0.00010	0.00007	0.000029	-	-	<0.0001	0.0001	<0.0001	-	-	-
Manganese	mg/L	3	3	-	0.0012	0.0012	0.0048	0.00408	0.00444	0.00473	0.00240	0.002078	-	-	0.0012	0.0048	0.0012	-	-	-
Mercury	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	3	3	0 ⁶	0.0012	0.0012	0.0014	0.00136	0.00138	0.00140	0.00127	0.000115	-	-	0.0012	0.0014	0.0012	-	-	-
Nickel	mg/L	3	3	0 ⁶	0.0013	0.001	0.0014	0.0014	0.0014	0.0014	0.0012	0.00021	-	-	0.0013	0.001	0.0014	-	-	-
Rubidium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	3	3	0 ⁶	0.0004	0.0003	0.0005	0.00048	0.00049	0.00050	0.00040	0.000100	-	-	0.0003	0.0005	0.0004	-	-	-
Silver	mg/L	3	1	0 ⁶	0.00005	0.00005	0.0001	0.00009	0.00010	0.00010	0.00007	0.000029	-	-	<0.0001	0.0001	<0.0001	-	-	-
Strontium	mg/L	3	3	-	0.34	0.33	0.4	0.39	0.39	0.40	0.36	0.038	-	-	0.4	0.34	0.33	-	-	-
Tellurium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	3	1	0 ⁶	0.0001	0.0001	0.0002	0.00018	0.00019	0.00020	0.00013	0.000058	-	-	<0.0002	0.0002	<0.0002	-	-	-
Tin	mg/L	3	1	-	0.00005	0.00005	0.0001	0.00009	0.00010	0.00010	0.00007	0.000029	-	-	<0.0001	0.0001	<0.0001	-	-	-
Titanium	mg/L	3	3	-	0.0002	0.0002	0.0005	0.00044	0.00047	0.00049	0.00030	0.000173	-	-	0.0005	0.0002	0.0002	-	-	-
Tungsten	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	ug/L	3	3	0 ⁶	0.9	0.8	1	1.0	1.0	1.0	0.9	0.10	-	-	0.8	0.9	1	-	-	-
Vanadium	mg/L	3	3	-	0.0003	0.0003	0.0005	0.00046	0.00048	0.00050	0.00037	0.000115	-	-	0.0003	0.0005	0.0003	-	-	-
Zinc	mg/L	3	3	0 ⁶	0.0044	0.0031	0.0048	0.00472	0.00476	0.00479	0.00410	0.000889	-	-	0.0031	0.0048	0.0044	-	-	-
Zirconium	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Silicon	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDS (calculated)	mg/L	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

Table 25 Surface water quality parameters (laboratory) for sampling station NSRS-02 (Saskatchewan River downstream of East Ravine), May 2007 to December 2009.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

6Dissolved metal guideline is not available, thus total metal guideline was used.

Table 26 Surface water quality parameters (laboratory) for sampling stations SKR2 and NSRS-03 (Saskatchewan River downstream of English Creek), Spring 2006 to November 2008.

Parameters	Units	Summary Statistics											Sample ⁵							
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	Spring 2006	Fall 2006	6-May-07	10-Aug-07	28-Oct-07	18-May-08	27-Aug-08	6-Nov-08
								90 th	95 th	99 th										
Inorganic Ions																				
Bicarbonate	mg/L	8	8	-	186	166	214	201.4	207.7	212.7	186.8	14.75	214	174	187	179	196	193	166	185
Calcium	mg/L	8	8	-	46.5	43	54	51.9	53.0	53.8	47.5	3.82	54	43	44	46	50	51	45	47
Carbonate	mg/L	8	5	-	4.25	0.5	7	6.3	6.7	6.9	4.1	2.44	<5	<5	6	6	2	7	6	<1
Chloride	mg/L	8	8	-	7	5	10	9.3	9.7	9.9	7.4	1.60	7	6	9	7	8	10	5	7
Fluoride	mg/L	6	6	-	0.135	0.11	0.16	0.2	0.2	0.2	0.1	0.02	-	-	0.11	0.16	0.16	0.15	0.11	0.12
Hydroxide	mg/L	8	0	-	0.5	0.5	2.5	2.50	2.50	2.50	1.00	0.926	<5	<5	<1	<1	<1	<1	<1	<1
Ion Balance	%	2	2	-	101	99	103	102.6	102.8	103.0	101.0	2.83	103	99	-	-	-	-	-	-
Magnesium	mg/L	8	8	-	16.5	15	20	18.6	19.3	19.9	17.0	1.60	18	16	16	17	18	20	15	16
Potassium	mg/L	8	8	-	2.7	2	6	6.0	6.0	6.0	3.5	1.71	6	2	6	2.9	2.5	4.2	2	2.2
Sodium	mg/L	8	8	-	20	14	26	24.6	25.3	25.9	19.8	4.10	21	15	24	20	20	26	14	18
Sulfate	mg/L	8	8	-	65.5	57	92	75.9	84.0	90.4	66.9	11.12	66	57	65	68	69	92	58	60
Metals																				
Aluminum	mg/L	8	8	5	0.12	0.059	1.7	1.08	1.39	1.64	0.43	0.577	1.70	0.48	0.81	0.12	0.059	0.1	0.12	0.071
Antimony	mg/L	8	3	-	0.0002	0.0001	0.001	0.0007	0.0008	0.0010	0.0004	0.00031	<0.001	<0.001	0.0002	0.0002	<0.0002	<0.002	0.0002	<0.0002
Arsenic	ug/L	8	7	0	0.65	0.00025	1.9	1.13	1.52	1.82	0.68	0.592	0.0016	<0.0005	1.9	0.8	0.6	0.7	0.8	0.6
Barium	mg/L	8	8	-	0.0815	0.077	0.14	0.134	0.137	0.139	0.095	0.0257	0.1320	0.0875	0.14	0.082	0.08	0.081	0.079	0.077
Beryllium	mg/L	8	1	-	0.0001	0.00005	0.0005	0.00050	0.00050	0.00050	0.00018	0.000203	<0.001	<0.001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	2	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	-	-	-	-	-	-
Boron	mg/L	8	8	-	0.035	0.02	0.05	0.043	0.047	0.049	0.034	0.0106	0.05	0.04	0.04	0.03	0.03	0.04	0.02	0.02
Cadmium	mg/L	8	3	3	0.00010	0.00005	0.0001	0.00010	0.00010	0.00010	0.00008	0.000026	<0.0002	<0.0002	0.0001	0.0001	0.0001	<0.0001	<0.0001	<0.0001
Cesium	mg/L	2	1	-	0.000125	0.00005	0.0002	0.00019	0.00019	0.00020	0.00013	0.000106	0.0002	<0.0001	-	-	-	-	-	-
Chromium	mg/L	8	4	3	0.00075	0.00025	0.0073	0.00359	0.00545	0.00693	0.00161	0.002384	0.002	<0.001	0.001	<0.0005	<0.0005	<0.0005	0.0073	0.0013
Cobalt	mg/L	8	8	-	0.00025	0.0002	0.0017	0.00100	0.00135	0.00163	0.00048	0.000523	0.0007	0.0003	0.0017	0.0002	0.0002	0.0003	0.0002	0.0002
Copper	mg/L	8	8	1	0.002	0.0011	0.0058	0.0038	0.0048	0.0056	0.0024	0.00151	0.003	0.002	0.0058	0.0021	0.0013	0.0015	0.002	0.0011
Iron	mg/L	8	8	4	0.33	0.14	2.22	1.569	1.895	2.155	0.648	0.7422	1.29	0.40	2.22	0.26	0.14	0.14	0.57	0.16
Lead	mg/L	8	7	0	0.000275	0.0002	0.0028	0.00126	0.00203	0.00265	0.00064	0.000888	0.0006	<0.0005	0.0028	0.0002	0.0002	0.0003	0.0006	0.0002
Manganese	mg/L	8	8	-	0.0247	0.012	0.17	0.103	0.136	0.163	0.047	0.0534	0.0740	0.0264	0.17	0.023	0.014	0.035	0.022	0.012
Mercury	mg/L	2	0	0	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0	<0.0004	<0.0004	-	-	-	-	-	-
Molybdenum	mg/L	8	8	0	0.00125	0.0005	0.0021	0.00161	0.00186	0.00205	0.00128	0.000440	0.0014	0.0014	0.0005	0.0012	0.0013	0.0012	0.0021	0.0011
Nickel	mg/L	8	8	0	0.0017	0.0013	0.0059	0.00387	0.00489	0.00570	0.00244	0.001560	0.003	0.003	0.0059	0.0015	0.0014	0.0015	0.0019	0.0013
Rubidium	mg/L	2	2	-	0.0026	0.0017	0.0035	0.00332	0.00341	0.00348	0.00260	0.001273	0.0035	0.0017	-	-	-	-	-	-
Selenium	mg/L	8	6	0	0.00045	0.0002	0.0005	0.00050	0.00050	0.00050	0.00040	0.000120	<0.001	<0.001	0.0005	0.0004	0.0003	0.0002	0.0005	0.0003
Silver	mg/L	8	0	0	0.00005	0.00005	0.0005	0.00050	0.00050	0.00050	0.00016	0.000208	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Strontium	mg/L	8	8	-	0.36	0.32	0.41	0.403	0.407	0.409	0.359	0.0347	0.321	0.370	0.32	0.37	0.4	0.41	0.35	0.33
Tellurium	mg/L	2	0	-	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0	<0.001	<0.001	-	-	-	-	-	-
Thallium	mg/L	8	0	0	0.0001	0.00005	0.0001	0.00010	0.00010	0.00010	0.00009	0.000023	<0.0001	<0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Tin	mg/L	8	2	-	0.000125	0.00005	0.0008	0.00045	0.00063	0.00077	0.00023	0.000258	<0.0006	<0.0006	<0.0001	<0.0001	0.0002	<0.0001	0.0008	<0.0001
Titanium	mg/L	8	8	-	0.0036	0.0022	0.034	0.0185	0.0262	0.0324	0.0083	0.01083	0.0340	0.0118	0.0057	0.0037	0.0035	0.0024	0.0032	0.0022
Tungsten	mg/L	2	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	-	-	-	-	-	-
Uranium	ug/L	8	8	0	0.95	0.001	1.3	1.16	1.23	1.29	0.76	0.492	0.0010	0.0010	1.3	0.9	1	1.1	0.8	1
Vanadium	mg/L	8	8	-	0.00145	0.0005	0.005	0.0040	0.0045	0.0049	0.0020	0.00170	0.005	0.002	0.0036	0.0009	0.0005	0.0006	0.003	0.0005
Zinc	mg/L	8	8	0	0.00795	0.0032	0.02	0.020	0.020	0.020	0.010	0.0064	0.02	0.02	0.012	0.0075	0.0076	0.0032	0.0083	0.0051
Zirconium	mg/L	2	2	-	0.00095	0.0005	0.0014	0.00131	0.00136	0.00139	0.00095	0.000636	0.0014	0.0005	-	-	-	-	-	-
Nutrients																				
Ammonia as nitrogen	mg/L	8	4	-	0.0375	0.005	0.1	0.09	0.10	0.10	0.05	0.037	<0.05	<0.05	0.09	0.05	0.07	0.1	<0.01	<0.01
Dissolved organic carbon	mg/L	8	8	-	3.2	2.6	9.5	8.45	8.98	9.40	4.78	2.693	8	3	9.5	3.3	3.1	5.9	2.6	2.8
Dissolved phosphorus	mg/L	2	1	-	0.06	0.01	0.11	0.100	0.105	0.109	0.060	0.0707	<0.02	0.11	-	-	-	-	-	-
Nitrate	mg/L	8	4	0	0.05	0.02	35	11.3	23.2	32.6	4.6	12.28	<0.1	<0.1	1.2	0.04	0.53	<0.04	<0.04	35
Nitrite	mg/L	2	0	0	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0	<0.05	<0.05	-	-	-	-	-	-
Nitrite+Nitrate, nitrogen	mg/L	5	1	-	0.05	0.005	8	4.8	6.4	7.7	1.6	3.57	<0.1	<0.1	-	-	-	<0.01	<0.01	8

Table 26 Surface water quality parameters (laboratory) for sampling stations SKR2 and NSRS-03 (Saskatchewan River downstream of English Creek), Spring 2006 to November 2008.

Parameters	Units	Summary Statistics											Sample ⁵							
		N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	Spring 2006	Fall 2006	6-May-07	10-Aug-07	28-Oct-07	18-May-08	27-Aug-08	6-Nov-08
								90 th	95 th	99 th										
Total Kjeldahl nitrogen	mg/L	7	6	-	0.4	0.1	1.2	0.96	1.08	1.18	0.50	0.376	0.8	<0.2	1.2	0.4	0.47	-	0.28	0.28
Total nitrogen	mg/L	3	3	-	0.6	0.41	1.5	1.32	1.41	1.48	0.84	0.582	-	-	1.5	0.41	0.6	-	-	-
Total organic carbon	mg/L	8	8	-	3.9	2.8	8.9	7.57	8.24	8.77	4.86	2.321	7	3	8.9	4.5	3.3	6.5	2.8	2.9
Total phosphorus	mg/L	8	6	-	0.035	0.005	0.7	0.39	0.55	0.67	0.15	0.239	<0.2	0.70	0.26	0.04	<0.01	0.03	0.02	0.01
Physical Properties																				
Chemical Oxygen Demand	mg/L	3	3	-	12	10	42	36.0	39.0	41.4	21.3	17.93	-	-	42	12	10	-	-	-
pH	pH units	8	8	0	8.425	8.34	8.49	8.483	8.487	8.489	8.423	0.0585	8.4	8.4	8.47	8.45	8.34	8.48	8.49	8.35
Specific conductivity	µS/cm	8	8	-	441	381	509	485.2	497.1	506.6	443.3	41.50	470	400	475	446	436	509	381	429
Sum of Ions	mg/L	6	6	-	362	311	403	387.0	395.0	401.4	359.2	30.34	-	-	358	346	366	403	311	371
Total alkalinity	mg/L	8	8	-	160	143	175	171.5	173.3	174.7	158.9	11.38	175	143	163	157	165	170	146	152
Total dissolved solids	mg/L	8	8	-	270.5	200	306	297.6	301.8	305.2	261.8	35.94	280	200	294	261	281	306	226	246
Total hardness	mg/L	8	8	-	183.5	173	209	209.0	209.0	209.0	188.4	15.17	209	173	176	185	199	209	174	182
Total suspended solids	mg/L	5	4	-	12	5	25	23.4	24.2	24.8	14.6	8.20	10	<10	-	-	-	25	21	12
Turbidity	NTU	8	8	-	9.5	4.3	180	63.8	121.9	168.4	30.2	60.62	11.00	7.10	180	12	4.3	14	8	5.3
Dissolved Metals																				
Aluminum	mg/L	2	2	0 ⁶	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0	0.03	0.03	-	-	-	-	-	-
Antimony	mg/L	2	0	-	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0	<0.001	<0.001	-	-	-	-	-	-
Arsenic	ug/L	2	1	0 ⁶	0.000525	0.00025	0.0008	0.00075	0.00077	0.00079	0.00053	0.000389	0.0008	<0.0005	-	-	-	-	-	-
Barium	mg/L	2	2	-	0.09	0.081	0.099	0.0972	0.0981	0.0988	0.0900	0.01273	0.099	0.081	-	-	-	-	-	-
Beryllium	mg/L	2	0	-	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0	<0.001	<0.001	-	-	-	-	-	-
Bismuth	mg/L	2	0	-	0.00015	0.00015	0.00015	0.00015	0.00015	0.00015	0.00015	0	<0.0003	<0.0003	-	-	-	-	-	-
Boron	mg/L	2	2	-	0.05	0.04	0.06	0.058	0.059	0.060	0.050	0.0141	0.06	0.04	-	-	-	-	-	-
Cadmium	mg/L	2	0	0	0.0001	0.0001	0.0001	0.00010	0.00010	0.00010	0.00010	0	<0.0002	<0.0002	-	-	-	-	-	-
Cesium	mg/L	2	0	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0	<0.0001	<0.0001	-	-	-	-	-	-
Chromium	mg/L	2	2	2 ⁶	0.0035	0.002	0.005	0.0047	0.0049	0.0050	0.0035	0.00212	0.005	0.002	-	-	-	-	-	-
Cobalt	mg/L	2	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	-	-	-	-	-	-
Copper	mg/L	2	2	0 ⁶	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0	0.0019	0.0019	-	-	-	-	-	-
Iron	mg/L	2	2	0 ⁶	0.025	0.02	0.03	0.029	0.030	0.030	0.025	0.0071	0.03	0.02	-	-	-	-	-	-
Lead	mg/L	2	2	0 ⁶	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	0.0001	0.0001	-	-	-	-	-	-
Manganese	mg/L	2	2	-	0.011	0.0072	0.0148	0.0	0.0	0.0	0.0	0.01	0.0148	0.0072	-	-	-	-	-	-
Mercury	mg/L	2	0	0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	-	-	-	-	-	-
Molybdenum	mg/L	2	2	0 ⁶	0.00135	0.0013	0.0014	0.00139	0.00140	0.00140	0.00135	0.000071	0.0014	0.0013	-	-	-	-	-	-
Nickel	mg/L	2	2	0 ⁶	0.002	0.0018	0.0022	0.00216	0.00218	0.00220	0.00200	0.000283	0.0022	0.0018	-	-	-	-	-	-
Rubidium	mg/L	2	2	-	0.001	0.0008	0.0012	0.00116	0.00118	0.00120	0.00100	0.000283	0.0012	0.0008	-	-	-	-	-	-
Selenium	mg/L	2	0	0	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0	<0.001	<0.001	-	-	-	-	-	-
Silver	mg/L	2	0	0	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0	<0.0005	<0.0005	-	-	-	-	-	-
Strontium	mg/L	2	2	-	0.344	0.324	0.364	0.3600	0.3620	0.3636	0.3440	0.02828	0.324	0.364	-	-	-	-	-	-
Tellurium	mg/L	2	0	-	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0	<0.0005	<0.0005	-	-	-	-	-	-
Thallium	mg/L	2	0	0	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0	<0.0001	<0.0001	-	-	-	-	-	-
Tin	mg/L	2	1	-	0.000275	0.00015	0.0004	0.00038	0.00039	0.00040	0.00028	0.000177	0.0004	<0.0003	-	-	-	-	-	-
Titanium	mg/L	2	1	-	0.000975	0.00025	0.0017	0.00156	0.00163	0.00169	0.00098	0.001025	0.0017	<0.0005	-	-	-	-	-	-
Tungsten	mg/L	2	0	-	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	<0.0002	<0.0002	-	-	-	-	-	-
Uranium	ug/L	2	2	0 ⁶	0.00105	0.0009	0.0012	0.00	0.00	0.00	0.00	0.000	0.0012	0.0009	-	-	-	-	-	-
Vanadium	mg/L	2	2	-	0.0025	0.002	0.003	0.0029	0.0030	0.0030	0.0025	0.00071	0.003	0.002	-	-	-	-	-	-
Zinc	mg/L	2	0	0 ⁶	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0	<0.005	<0.005	-	-	-	-	-	-
Zirconium	mg/L	2	0	-	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0	<0.0004	<0.0004	-	-	-	-	-	-
Dissolved Silicon	mg/L	2	2	-	1.2	0.8	1.6	1.52	1.56	1.59	1.20	0.566	0.8	1.6	-	-	-	-	-	-
TDS (calculated)	mg/L	2	2	-	251	225	277	271.8	274.4	276.5	251.0	36.77	277	225	-	-	-	-	-	-

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

Table 26 Surface water quality parameters (laboratory) for sampling stations SKR2 and NSRS-03 (Saskatchewan River downstream of English Creek), Spring 2006 to November 2008.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

6Dissolved metal guideline is not available, thus total metal guideline was used.

Table 27 Surface water quality parameters (laboratory) for the Gronlid Ferry Crossing sampling station (Saskatchewan River downstream of the Project LSA), July 2007 to October 2009.1

Parameters	Units	Summary Statistics										
		N ²	N≥DL ³	N><GL ⁴	Median ⁵	Minimum ⁵	Maximum ⁵	Percentiles ⁵			Mean ⁵	SD ⁵
								90 th	95 th	99 th		
Inorganic Ions												
Bicarbonate	mg/L	20	20	-	181	156	234	201.7	217.9	230.8	183.6	18.41
Calcium, dissolved	mg/L	20	20	-	48	44	57	52.1	53.2	56.2	48.9	3.14
Calcium, total	mg/L	6	6	-	47	45	50	49.5	49.8	50.0	47.3	1.97
Carbonate	mg/L	20	20	-	5.5	0	10	8.1	9.1	9.8	4.5	3.47
Chloride, dissolved	mg/L	20	20	-	7.05	5.4	15.4	10.35	11.03	14.53	7.74	2.228
Flouride, dissolved	mg/L	20	20	-	0.15	0.12	0.33	0.171	0.188	0.302	0.156	0.0441
Hydroxide	mg/L	20	20	-	0	0	0	0	0	0	0	0
Magnesium, dissolved	mg/L	20	20	-	18	16	21	19.2	21.0	21.0	17.8	1.40
Magnesium, total	mg/L	6	6	-	17	17	19	18.5	18.8	19.0	17.5	0.84
Potassium, dissolved	mg/L	20	20	-	2	2	4	3.1	4.0	4.0	2.6	0.69
Potassium, total	mg/L	6	6	-	2.6	2	3	3.0	3.0	3.0	2.6	0.37
Sodium, dissolved	mg/L	20	20	-	20	17	28	22.4	26.1	27.6	20.5	2.65
Sodium, total	mg/L	6	6	-	19.5	17	22	21.0	21.5	21.9	19.3	1.75
Sulphate, dissolved	mg/L	20	20	-	68.4	58	123.7	82.43	89.88	116.94	72.48	14.614
Total metals												
Aluminum	mg/L	11	11	4	0.07	0.011	1.6	0.23	0.92	1.46	0.23	0.462
Antimony	mg/L	3	2	-	0.0002	0.0001	0.0002	0.0002	0.0002	0.0002	0.00017	0.000058
Arsenic	ug/L	9	9	-	0.7	0.5	1.6	0.96	1.28	1.54	0.78	0.331
Barium	mg/L	11	11	-	0.083	0.077	0.12	0.110	0.115	0.119	0.088	0.0138
Beryllium	mg/L	11	1	-	0.0005	0.00005	0.0005	0.0005	0.0005	0.0005	0.00038	0.000203
Boron	mg/L	11	11	-	0.026	0.015	0.03	0.0300	0.0300	0.0300	0.0243	0.00450
Cadmium	mg/L	11	1	1	0.0005	0.000005	0.0008	0.0005	0.00065	0.00077	0.00044	0.000224
Chromium	mg/L	11	5	2	0.0005	0.00025	0.0021	0.0020	0.0021	0.0021	0.0009	0.00064
Cobalt	mg/L	11	3	-	0.0005	0.0001	0.0007	0.0005	0.0006	0.0007	0.0005	0.00016
Copper	mg/L	11	10	1	0.001	0.0005	0.0081	0.0030	0.0056	0.0076	0.0019	0.00218
Iron	mg/L	11	11	4	0.13	0.069	1.69	1.15	1.42	1.64	0.41	0.533
Lead	mg/L	11	3	0	0.001	0.0001	0.0012	0.0010	0.0011	0.0012	0.0009	0.00036
Manganese	mg/L	11	11	-	0.026	0.006	0.046	0.042	0.044	0.046	0.025	0.0137
Mercury	ug/L	17	2	0	0.01	0.01	0.02	0.014	0.020	0.020	0.011	0.0033
Molybdenum	mg/L	11	6	0	0.001	0.0005	0.007	0.002	0.004	0.006	0.001	0.0019
Nickel	mg/L	11	8	0	0.0012	0.0005	0.003	0.0027	0.0029	0.0030	0.0014	0.00088
Selenium	mg/L	9	9	0	0.0004	0.0003	0.0006	0.00052	0.00056	0.000592	0.00042	0.000109
Silver	mg/L	11	1	0	0.0005	0.00005	0.0005	0.0005	0.0005	0.0005	0.00038	0.000203
Strontium	mg/L	11	11	-	0.35	0.32	0.41	0.380	0.395	0.407	0.355	0.0262
Thallium	mg/L	3	0	0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0
Tin	mg/L	3	2	-	0.0001	0.00005	0.0003	0.00026	0.00028	0.000296	0.00015	0.000132
Titanium	mg/L	11	11	-	0.003	0.001	0.027	0.006	0.016	0.025	0.005	0.0075
Uranium	ug/L	3	3	0	0.8	0.8	1.7	1.52	1.61	1.68	1.10	0.520
Vanadium	mg/L	11	5	-	0.0005	0.0004	0.0056	0.0050	0.0053	0.0055	0.0015	0.00193
Zinc	mg/L	11	3	1	0.0025	0.0005	0.032	0.0025	0.0173	0.0291	0.0049	0.00902
Zirconium	mg/L	8	1	-	0.0005	0.0005	0.003	0.0013	0.0021	0.0028	0.0008	0.00088
Nutrients												
Dissolved nitrate	mg/L	20	15	0 ⁷	0.1	0.02	0.75	0.351	0.380	0.676	0.174	0.1818
Dissolved organic carbon	mg/L	20	20	-	5.1	3.3	13.9	8.19	9.25	12.97	5.66	2.446
Total Kjeldahl nitrogen	mg/L	20	19	-	0.285	0.01	0.85	0.515	0.660	0.812	0.320	0.1792
Total nitrogen	mg/L	20	20	-	0.4	0.2	1.6	0.82	1.03	1.49	0.50	0.329
Total phosphorus	mg/L	21	16	-	0.04	0.01	0.19	0.140	0.180	0.188	0.052	0.0537
Properties												
Chemical oxygen demand	mg/L	19	12	-	16.2	5.5	65.4	49.28	51.90	62.70	20.20	17.486
pH	pH units	19	19	0	8.4	8.2	8.6	8.50	8.51	8.58	8.40	0.133
Specific conductance	uS/cm	20	20	-	437.5	398	891	519.0	554.7	823.7	467.7	105.74

Table 27 Surface water quality parameters (laboratory) for the Gronlid Ferry Crossing sampling station (Saskatchewan River downstream of the Project LSA), July 2007 to October 2009.1

Parameters	Units	Summary Statistics										
		N ²	N≥DL ³	N><GL ⁴	Median ⁵	Minimum ⁵	Maximum ⁵	Percentiles ⁵			Mean ⁵	SD ⁵
								90 th	95 th	99 th		
Total alkalinity	mg/L	20	20	-	155.5	144	192	165.4	178.7	189.3	158.1	11.12
Total hardness	mg/L	20	20	-	192.5	176	229	211.5	216.7	226.5	195.4	12.73
Turbidity	NTU	20	20	-	8.45	2.9	160	31.8	53.3	138.7	19.3	34.99

Notes: 1Source: Ministry of Saskatchewan Environment

2N = number of samples.

3Number of samples greater than or equal to detection limit (DL).

4Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

5For calculation of descriptives statistics, values < DL were set to half the value of DL.

6Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

7No dissolved nitrate guideline is available; total nitrate guideline was used for comparison.

Table 27 Surface water quality parameters (laboratory) for the Gronlid Ferry Crossing sampling station (Saskatchewan River downstream of the Project LSA), July 2007 to October 2009.1

Parameters	Units	Sample ⁶																				
		3-Jul-07	30-Jul-07	23-Aug-07	26-Sep-07	22-Oct-07	29-Nov-07	17-Jan-08	14-Feb-08	6-May-08	9-Jun-08	15-Jul-08	5-Aug-08	10-Sep-08	7-Oct-08	27-Oct-08	14-Jan-09	2-Mar-09	8-Jun-09	9-Jun-09	20-Jul-09	5-Oct-09
Inorganic ions																						
Bicarbonate	mg/L	187	181	159	181	183	234	217	200	156	187	173	175	167	174	183	199	190	181	-	176	169
Calcium, dissolved	mg/L	47	52	46	48	50	57	53	51	46	44	48	48	46	47	48	51	50	52	-	49	45
Calcium, total	mg/L	-	-	45	-	49	-	-	-	-	-	46	-	-	-	48	-	-	-	50	-	46
Carbonate	mg/L	5	7	9	6	7	0	0	0	10	0	8	5	8	6	2	0	0	7	-	6	4
Chloride, dissolved	mg/L	6.5	6.7	6.8	7.4	7.3	10.8	10.3	7.9	6.9	6.2	5.4	6.1	6.5	6.7	7.2	8.5	15.4	7.9	-	6.7	7.6
Flouride, dissolved	mg/L	0.17	0.16	0.12	0.15	0.15	0.18	0.15	0.14	0.12	0.15	0.14	0.13	0.13	0.15	0.14	0.15	0.33	0.15	-	0.17	0.13
Hydroxide	mg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Magnesium, dissolved	mg/L	18	21	18	18	18	21	19	18	18	16	17	17	17	16	17	17	17	18	-	19	16
Magnesium, total	mg/L	-	-	17	-	18	-	-	-	-	-	17	-	-	-	17	-	-	-	19	-	17
Potassium, dissolved	mg/L	3	3	3	3	2	4	4	3	3	2	2	2	2	2	2	3	2	2	-	2	2
Potassium, total	mg/L	-	-	2.9	-	3	-	-	-	-	-	2.5	-	-	-	2.4	-	-	-	2.7	-	2
Sodium, dissolved	mg/L	21	22	20	20	20	28	26	22	19	20	18	19	18	18	19	22	20	20	-	20	17
Sodium, total	mg/L	-	-	20	-	22	-	-	-	-	-	18	-	-	-	19	-	-	-	20	-	17
Sulphate, dissolved	mg/L	74.3	71.5	67.5	68	68.8	88.1	78.5	69.7	80.9	60.8	58	60.7	61.5	62.3	64.4	66.3	123.7	78.8	-	81.8	63.9
Total metals																						
Aluminum	mg/L	1.6	-	0.07	-	0.014	0.23	-	0.032	0.18	-	0.19	-	-	-	0.011	-	-	-	0.035	0.078	0.055
Antimony	mg/L	-	-	-	-	-	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002	0.0002
Arsenic	ug/L	-	-	-	-	0.6	1.6	-	0.7	0.8	-	0.8	-	-	-	0.5	-	-	-	0.7	0.8	0.5
Barium	mg/L	0.11	-	0.078	-	0.08	0.12	-	0.083	0.083	-	0.09	-	-	-	0.08	-	-	-	0.086	0.086	0.077
Beryllium	mg/L	<0.001	-	<0.001	-	<0.001	0.0001	-	<0.001	<0.001	-	<0.001	-	-	-	<0.001	-	-	-	<0.001	<0.0001	<0.0001
Boron	mg/L	0.027	-	0.026	-	0.024	0.03	-	0.026	0.015	-	0.021	-	-	-	0.022	-	-	-	0.026	0.03	0.02
Cadmium	mg/L	<0.001	-	<0.001	-	<0.001	0.0008	-	<0.001	<0.001	-	<0.001	-	-	-	<0.001	-	-	-	<0.001	<0.0001	<0.00001
Chromium	mg/L	0.002	-	<0.001	-	<0.001	0.0021	-	0.001	0.001	-	0.001	-	-	-	<0.001	-	-	-	<0.001	<0.0005	<0.0005
Cobalt	mg/L	<0.001	-	<0.001	-	<0.001	0.0007	-	<0.001	<0.001	-	<0.001	-	-	-	<0.001	-	-	-	<0.001	0.0002	0.0001
Copper	mg/L	0.003	-	0.001	-	0.001	0.0081	-	0.001	0.001	-	0.002	-	-	-	0.001	-	-	-	<0.001	0.0012	0.0007
Iron	mg/L	1.69	-	0.17	-	0.099	1.15	-	0.074	0.5	-	0.46	-	-	-	0.092	-	-	-	0.13	0.13	0.069
Lead	mg/L	<0.002	-	<0.002	-	<0.002	0.0012	-	<0.002	<0.002	-	<0.002	-	-	-	<0.002	-	-	-	<0.002	0.0002	0.0001
Manganese	mg/L	0.042	-	0.022	-	0.012	0.046	-	0.006	0.033	-	0.033	-	-	-	0.008	-	-	-	0.026	0.031	0.012
Mercury	ug/L	-	<0.02	-	<0.02	0.02	<0.02	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02	<0.02
Molybdenum	mg/L	0.007	-	<0.001	-	0.001	0.0016	-	0.001	<0.001	-	<0.001	-	-	-	<0.001	-	-	-	<0.001	0.0013	0.0014
Nickel	mg/L	0.003	-	<0.001	-	0.002	0.0027	-	0.002	<0.001	-	0.001	-	-	-	0.001	-	-	-	<0.001	0.0014	0.0012
Selenium	mg/L	-	-	-	-	0.0003	0.0005	-	0.0006	0.0003	-	0.0004	-	-	-	0.0004	-	-	-	0.0005	0.0005	0.0003
Silver	mg/L	<0.001	-	<0.001	-	<0.001	0.0001	-	<0.001	<0.001	-	<0.001	-	-	-	<0.001	-	-	-	<0.001	0.00005	0.00005
Strontium	mg/L	0.34	-	0.33	-	0.36	0.38	-	0.35	0.34	-	0.32	-	-	-	0.34	-	-	-	0.41	0.38	0.35
Thallium	mg/L	-	-	-	-	-	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002
Tin	mg/L	-	-	-	-	-	0.0003	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	0.0001
Titanium	mg/L	0.027	-	0.003	-	0.001	0.0059	-	0.002	0.004	-	0.004	-	-	-	0.001	-	-	-	0.002	0.003	0.0016
Uranium	ug/L	-	-	-	-	-	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8	0.8
Vanadium	mg/L	0.005	-	<0.001	-	<0.001	0.0056	-	<0.001	<0.001	-	0.002	-	-	-	<0.001	-	-	-	<0.001	0.0007	0.0004

Table 27 Surface water quality parameters (laboratory) for the Gronlid Ferry Crossing sampling station (Saskatchewan River downstream of the Project LSA), July 2007 to October 2009.1

Parameters	Units	Sample ⁶																				
		3-Jul-07	30-Jul-07	23-Aug-07	26-Sep-07	22-Oct-07	29-Nov-07	17-Jan-08	14-Feb-08	6-May-08	9-Jun-08	15-Jul-08	5-Aug-08	10-Sep-08	7-Oct-08	27-Oct-08	14-Jan-09	2-Mar-09	8-Jun-09	9-Jun-09	20-Jul-09	5-Oct-09
Zinc	mg/L	<0.005	-	<0.005	-	<0.005	0.032	-	<0.005	<0.005	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	0.0013	0.0005
Zirconium	mg/L	0.003	-	<0.001	-	<0.001	-	-	<0.001	<0.001	-	<0.001	-	-	-	<0.001	-	-	-	<0.001	-	-
Nutrients																						
Dissolved nitrate	mg/L	0.2	<0.04	0.1	<0.04	0.1	0.3	0.35	0.36	<0.04	0.25	0.07	0.07	0.1	0.1	0.22	0.35	0.75	<0.04	-	<0.04	0.06
Dissolved organic carbon	mg/L	13.9	5.3	3.9	4.3	4.5	6.3	6.1	5.4	6.8	8.1	5.5	4.5	3.3	3.8	3.9	4.6	9	4.9	-	5.6	3.4
Total Kjeldahl nitrogen	mg/L	0.4	0.29	0.3	0.28	0.3	0.5	0.65	0.24	0.38	0.25	0.23	0.23	0.2	0.2	<0.02	0.35	0.85	0.2	-	0.3	0.24
Total nitrogen	mg/L	0.6	0.3	0.4	0.3	0.4	0.8	1	0.6	0.4	0.5	0.3	0.3	0.3	0.3	0.4	0.7	1.6	0.2	-	0.3	0.3
Total phosphorus	mg/L	0.18	0.06	0.05	0.04	0.03	0.08	0.03	<0.02	0.14	0.19	0.06	0.04	<0.02	<0.02	<0.02	0.02	0.03	0.04	0.01	0.05	<0.02
Properties																						
Chemical oxygen demand	mg/L	17.1	20.7	17.4	<11	12.6	50.4	65.4	-	35.2	20.3	16.2	<11	<11	49	<11	<11	<30	<11	-	20.2	11.3
pH	pH units	8.4	8.5	8.6	8.4	8.5	8.2	8.2	8.2	8.5	8.2	8.5	8.4	8.5	8.5	8.4	8.2	-	8.5	-	8.5	8.4
Specific conductance	uS/cm	443	438	408	435	450	537	517	476	437	398	415	413	418	425	429	470	891	471	-	461	422
Total alkalinity	mg/L	161	160	145	159	162	192	178	164	144	153	155	152	151	152	154	163	156	160	-	154	146
Total hardness	mg/L	191	216	189	194	199	229	211	201	189	176	190	190	185	183	190	197	195	204	-	201	178
Turbidity	NTU	47.7	18.7	13	8.4	4.4	30	3.7	2.9	23	160	19	9.8	3.6	4	3.9	2.9	8.5	5.4	-	13	5

Table 28 Surface water quality parameters (laboratory) for the Cecil Ferry Crossing sampling station (North Saskatchewan River upstream of the Project LSA), May 2006 to October 2009.1

Parameters	Units	Summary Statistics											Sample ⁶						
		N ²	N≥DL ³	N><GL ⁴	Median ⁵	Minimum ⁵	Maximum ⁵	Percentiles ⁵			Mean ⁵	SD ⁵	24-May-06	26-Jun-06	26-Jul-06	22-Aug-06	19-Sep-06	17-Oct-06	30-May-07
								90 th	95 th	99 th									
Inorganic ions																			
Bicarbonate	mg/L	25	27	-	182	155	622	222.4	336.0	560.1	208.9	95.14	217	205	178	173	173	195	220
Calcium, dissolved	mg/L	25	27	-	49	42	177	56.6	95.4	159.7	56.7	27.65	56	52	48	46	42	49	52
Calcium, total	mg/L	9	9	-	50	42	60	58.4	59.2	59.8	50.6	5.73	-	58	-	-	46	-	-
Carbonate	mg/L	22	24	-	4	0	14	7.9	9.0	13.0	4.2	3.62	7.2	-	7.2	7.2	-	-	2
Chloride, dissolved	mg/L	25	27	-	4.9	2.8	37.3	7.48	7.84	30.24	6.37	6.579	7.3	5.3	5.2	4.7	4.6	4	7.6
Fluoride, dissolved	mg/L	25	27	-	0.14	0.12	0.29	0.166	0.170	0.261	0.150	0.0324	0.15	0.14	0.16	0.15	0.14	0.15	0.17
Hydroxide	mg/L	19	21	-	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0
Magnesium, dissolved	mg/L	25	27	-	18	15	54	22.0	22.0	46.3	19.2	7.58	22	19	18	17	15	18	22
Magnesium, total	mg/L	9	9	-	17	16	21	20.2	20.6	20.9	17.8	1.86	-	21	-	-	17	-	-
Potassium, dissolved	mg/L	25	26	-	2	0.5	5	3.6	4.0	4.8	2.1	1.10	4	3	2	2	1	2	5
Potassium, total	mg/L	9	9	-	1.9	1.3	3.9	2.86	3.38	3.80	2.11	0.774	-	3.9	-	-	1.8	-	-
Sodium, total	mg/L	9	9	-	14	11	17	17.0	17.0	17.0	14.0	2.40	-	14	-	-	12	-	-
Sulphate, dissolved	mg/L	25	27	-	62.5	47.5	199.1	87.56	109.68	178.87	71.34	30.280	85.1	61.5	62.5	59.4	59.8	56.1	80.8
Total Metals																			
Aluminum	mg/L	12	12	6	0.184	0.015	8.8	6.01	7.59	8.56	1.45	2.965	-	8.8	-	-	0.73	-	-
Antimony	mg/L	2	1	-	0.00015	0.0001	0.0002	0.00019	0.000195	0.000199	0.00015	0.000071	-	-	-	-	-	-	-
Arsenic	ug/L	10	10	0	0.6	0.3	1.9	1.45	1.68	1.86	0.84	0.550	-	1.3	-	-	-	-	-
Barium	mg/L	12	10	-	0.079	0.071	0.19	0.181	0.190	0.190	0.099	0.0434	-	0.19	-	-	0.074	-	-
Beryllium	mg/L	12	0	-	0.0005	0.00005	0.0005	0.0005	0.0005	0.0005	0.00043	0.000175	-	<0.001	-	-	<0.001	-	-
Boron	mg/L	12	12	-	0.024	0.018	0.031	0.0309	0.0310	0.0310	0.0244	0.00470	-	0.031	-	-	0.022	-	-
Cadmium	mg/L	12	0	0	0.0005	0.000005	0.0005	0.0005	0.0005	0.0005	0.00042	0.000184	-	<0.001	-	-	<0.001	-	-
Chromium	mg/L	12	3	2	0.0005	0.00025	0.011	0.0091	0.0105	0.0109	0.0022	0.00390	-	0.011	-	-	<0.001	-	-
Cobalt	mg/L	12	5	-	0.0005	0.0001	0.003	0.0020	0.0025	0.0029	0.0009	0.00088	-	0.002	-	-	<0.001	-	-
Copper	mg/L	12	9	2	0.0015	0.0005	0.009	0.0058	0.0074	0.0087	0.0025	0.00265	-	0.009	-	-	0.001	-	-
Iron	mg/L	12	12	7	0.52	0.1	7.76	6.67	7.38	7.68	1.79	2.754	-	7.06	-	-	0.86	-	-
Lead	mg/L	12	4	0	0.001	0.0001	0.004	0.0019	0.0029	0.0038	0.0013	0.00096	-	0.002	-	-	<0.002	-	-
Manganese	mg/L	12	12	-	0.033	0.014	0.21	0.197	0.210	0.210	0.064	0.0714	-	0.21	-	-	0.037	-	-
Mercury	ug/L	19	3	1	0.01	0.01	0.03	0.021	0.026	0.029	0.013	0.0061	-	0.02	-	<0.02	-	<0.05	-
Molybdenum	mg/L	12	8	0	0.001	0.0005	0.05	0.003	0.024	0.045	0.005	0.0141	-	0.001	-	-	<0.001	-	-
Nickel	mg/L	12	10	0	0.0015	0.0005	0.011	0.0085	0.0099	0.0108	0.0030	0.00345	-	0.009	-	-	0.001	-	-
Selenium	mg/L	10	10	0	0.0004	0.0001	0.0005	0.0005	0.0005	0.0005	0.00034	0.000135	-	0.0001	-	-	-	-	-
Silver	mg/L	12	0	-	0.0005	0.00005	0.0005	0.0005	0.0005	0.0005	0.00043	0.000175	-	<0.001	-	-	<0.001	-	-
Strontium	mg/L	12	12	-	0.41	0.35	0.52	0.470	0.493	0.515	0.416	0.0512	-	0.4	-	-	0.38	-	-
Thallium	mg/L	2	0	0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0	-	-	-	-	-	-	-
Tin	mg/L	2	0	-	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0	-	-	-	-	-	-	-
Titanium	mg/L	12	11	-	0.005	0.0005	0.17	0.079	0.124	0.161	0.025	0.0514	-	0.17	-	-	0.014	-	-
Uranium	ug/L	2	2	0	0.65	0.5	0.8	0.77	0.79	0.80	0.65	0.212	-	-	-	-	-	-	-
Vanadium	mg/L	12	8	-	0.00145	0.0004	0.022	0.0161	0.0193	0.0215	0.0048	0.00727	-	0.022	-	-	0.002	-	-
Zinc	mg/L	12	7	0	0.00315	0.0007	0.026	0.0204	0.0233	0.0255	0.0078	0.00835	-	0.021	-	-	<0.005	-	-
Zirconium	mg/L	10	3	-	0.0005	0.0005	0.008	0.0053	0.0067	0.0077	0.0021	0.00268	-	0.008	-	-	0.005	-	-
Nutrients																			
Ammonia as nitrogen	mg/L	6	0	-	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-
Dissolved nitrate	mg/L	25	10	0 ⁷	0.02	0.02	1.88	0.462	0.514	1.554	0.191	0.3868	<0.04	0.36	<0.04	<0.04	<0.04	0.17	<0.04
Dissolved organic carbon	mg/L	24	24	-	4.7	2.8	35.3	9.45	11.35	29.85	6.80	6.481	7.7	7.2	4.7	4.7	3.8	7.2	11.6
Total Kjeldahl nitrogen	mg/L	25	21	-	0.27	0.1	1.4	0.48	0.50	1.18	0.33	0.247	0.5	1.4	0.5	<0.3	0.3	0.4	0.46
Total nitrogen	mg/L	19	15	-	0.3	0.1	1.7	0.86	1.52	1.66	0.46	0.442	-	-	-	-	-	-	0.5
Total phosphorus	mg/L	25	25	-	0.06	0.03	1.23	0.292	0.536	1.076	0.160	0.2558	0.08	1.23	0.07	0.06	0.1	0.06	0.19
Properties																			
Chemical oxygen demand	mg/L	25	24	-	1	1	3	1.6	2.1	2.8	1.2	0.48	24.9	31.9	17.3	<11	14.7	20.8	37.7
pH	pH units	24	24	0	8.4	7.8	8.7	8.47	8.50	8.65	8.31	0.203	8.4	8.2	8.4	8.4	8.3	8.3	8.3

Table 28 Surface water quality parameters (laboratory) for the Cecil Ferry Crossing sampling station (North Saskatchewan River upstream of the Project LSA), May 2006 to October 2009.1

Parameters	Units	Summary Statistics										Sample ⁶							
		N ²	N≥DL ³	N><GL ⁴	Median ⁵	Minimum ⁵	Maximum ⁵	Percentiles ⁵			Mean ⁵	SD ⁵	24-May-06	26-Jun-06	26-Jul-06	22-Aug-06	19-Sep-06	17-Oct-06	30-May-07
								90 th	95 th	99 th									
Specific conductance	uS/cm	19	19	-	428	364	1475	570.0	912.5	1362.5	499.7	259.07	-	-	-	-	-	-	499
Total alkalinity	mg/L	25	25	-	158	142	510	187.6	276.4	459.1	177.4	75.99	190	168	158	154	142	160	184
Total dissolved solids	mg/L	6	6	-	334.5	306	421	390.0	405.5	417.9	346.2	40.58	421	359	334	322	306	335	-
Total hardness	mg/L	25	25	-	196	167	665	229.6	361.2	600.0	223.4	101.47	230	208	194	185	167	196	220
Turbidity	NTU	24	24	-	15.3	4.6	176	105.1	164.0	174.6	33.6	49.93	16	130	17	11	17	18	-

Table 28 Surface water quality parameters (laboratory) for the Cecil Ferry Crossing sampling station (North Saskatchewan River upstream of the Project LSA), May 2006 to October 2009.1

Parameters	Units	17-Sep-07	23-Oct-07	14-Jan-08	14-Feb-08	7-May-08	11-Jun-08	16-Jul-08	7-Aug-08	2-Sep-08	1-Oct-08	4-Nov-08	8-Jan-09	3-Mar-09	9-Jun-09	20-Jul-09	5-Oct-09
		182	196	224	201	174	177	155	169	165	165	182	622	364	183	172	164
Inorganic ions		49	52	57	56	50	44	48	47	46	47	51	177	105	53	48	47
Bicarbonate	mg/L	-	52	-	-	-	-	48	-	-	-	50	60	-	52	-	47
Calcium, dissolved	mg/L	5	4	0	0	9	0	14	4	4	4	0	0	0	4	5	5
Calcium, total	mg/L	5	4.9	5.7	5.5	7.9	3.7	3.2	2.8	3.9	3.9	4.3	37.3	6.2	6.2	6.8	4.5
Carbonate	mg/L	0.15	0.14	0.15	0.13	0.13	0.16	0.14	0.12	0.13	0.16	0.12	0.14	0.29	0.14	0.17	0.13
Chloride, dissolved	mg/L	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fluoride, dissolved	mg/L	18	19	21	19	22	16	15	15	15	15	16	54	16	18	18	16
Hydroxide	mg/L	-	19	-	-	-	-	16	-	-	-	17	20	-	18	-	16
Magnesium, dissolved	mg/L	2	2	2	2	4	2	1	1	1	<1	1	3	1	2	2	1
Magnesium, total	mg/L	-	2.1	-	-	-	-	1.7	-	-	-	1.3	1.9	-	2.2	-	1.5
Potassium, dissolved	mg/L	-	15	-	-	-	-	11	-	-	-	13	17	-	16	-	11
Potassium, total	mg/L	59.1	63.5	72.3	65.6	89.2	59.5	47.5	50.1	52	52.8	58.2	199.1	114.8	70.3	71.5	57.8
Sodium, total	mg/L																
Sulphate, dissolved	mg/L	-	0.049	-	0.062	0.32	-	0.3	-	-	-	0.053	0.015	-	0.068	0.32	0.056
Total Metals		-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0002	<0.0002
Aluminum	mg/L	-	0.5	-	0.3	1.1	-	1.9	-	-	-	0.4	0.4	-	0.7	1.4	0.4
Antimony	mg/L	-	0.074	-	0.077	0.1	-	0.08	-	-	-	0.073	0.094	-	0.078	0.088	0.071
Arsenic	ug/L	-	<0.001	-	<0.001	<0.001	-	<0.001	-	-	-	<0.001	<0.001	-	<0.001	<0.0001	<0.0001
Barium	mg/L	-	0.025	-	0.027	0.031	-	0.018	-	-	-	0.018	0.023	-	0.022	0.03	0.02
Beryllium	mg/L	-	<0.001	-	<0.001	<0.001	-	<0.001	-	-	-	<0.001	<0.001	-	<0.001	<0.0001	<0.00001
Boron	mg/L	-	<0.001	-	<0.001	<0.001	-	0.001	-	-	-	<0.001	<0.001	-	<0.001	<0.0005	<0.0005
Cadmium	mg/L	-	<0.001	-	<0.001	<0.001	-	0.002	-	-	-	<0.001	<0.001	-	<0.001	0.0007	0.0001
Chromium	mg/L	-	<0.001	-	<0.001	0.004	-	0.002	-	-	-	0.002	<0.001	-	0.001	0.0024	0.0007
Cobalt	mg/L	-	0.21	-	0.15	3.11	-	0.84	-	-	-	0.21	0.15	-	0.35	0.69	0.1
Copper	mg/L	-	<0.002	-	<0.002	<0.002	-	<0.002	-	-	-	<0.002	<0.002	-	<0.002	0.0009	0.0001
Iron	mg/L	-	0.019	-	0.019	0.067	-	0.055	-	-	-	0.017	0.014	-	0.029	0.076	0.014
Lead	mg/L	0.03	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Manganese	mg/L	-	0.002	-	0.001	0.001	-	<0.001	-	-	-	<0.001	<0.001	-	0.003	0.0013	0.0011
Mercury	ug/L	-	<0.001	-	0.001	0.004	-	0.002	-	-	-	0.001	<0.001	-	0.003	0.0023	0.001
Molybdenum	mg/L	-	0.0002	-	0.0004	0.0005	-	0.0004	-	-	-	0.0004	0.0003	-	0.0004	0.0005	0.0002
Nickel	mg/L	-	<0.001	-	<0.001	<0.001	-	<0.001	-	-	-	<0.001	<0.001	-	<0.001	<0.0001	<0.0001
Selenium	mg/L	-	0.42	-	0.47	0.36	-	0.35	-	-	-	0.44	0.52	-	0.47	0.38	0.42
Silver	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002
Strontium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001
Thallium	mg/L	-	0.002	-	0.005	0.006	-	0.005	-	-	-	0.002	<0.001	-	0.002	0.0089	0.0015
Tin	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8	0.5
Titanium	mg/L	-	<0.001	-	<0.001	0.008	-	0.003	-	-	-	<0.001	<0.001	-	0.001	0.0019	0.0004
Uranium	ug/L	-	<0.005	-	<0.005	0.015	-	0.006	-	-	-	0.008	<0.005	-	<0.005	0.0038	0.0007
Vanadium	mg/L	-	<0.001	-	<0.001	<0.001	-	<0.001	-	-	-	<0.001	<0.001	-	<0.001	-	-
Zinc	mg/L																
Zirconium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients		<0.04	0.06	0.42	0.49	<0.04	0.24	<0.04	<0.04	<0.04	<0.04	0.19	1.88	0.52	<0.04	<0.04	<0.04
Ammonia as nitrogen	mg/L	4.4	4.6	35.3	4	6.9	8.4	5.7	3.2	3.5	2.9	3.1	9.9	6.1	4.7	6.5	2.8
Dissolved nitrate	mg/L	0.3	0.24	0.28	0.21	0.4	0.26	0.2	0.2	0.2	0.2	<0.2	<0.63	<0.48	0.2	0.3	0.2
Dissolved organic carbon	mg/L	0.3	0.3	0.7	0.7	0.4	0.5	0.2	<0.2	<0.2	<0.2	0.3	1.7	1.5	0.2	0.3	<0.2
Total Kjeldahl nitrogen	mg/L	0.05	0.04	0.04	0.03	0.32	0.25	0.22	0.09	0.06	0.03	0.04	0.04	0.04	0.05	0.17	0.03
Total nitrogen	mg/L																
Total phosphorus	mg/L	<11	<11	11.1	-	27.3	25.8	24.9	15.5	<11	<11	<11	<11	22.6	13.1	26.5	13.9
Properties		8.4	8.4	7.9	7.9	8.5	8.2	8.7	8.4	8.4	8.4	8.2	-	7.8	8.4	8.4	8.4

Table 28 Surface water quality parameters (laboratory) for the Cecil Ferry Crossing sampling station (North Saskatchewan River upstream of the Project LSA), May 2006 to October 2009.1

Parameters	Units	17-Sep-07	23-Oct-07	14-Jan-08	14-Feb-08	7-May-08	11-Jun-08	16-Jul-08	7-Aug-08	2-Sep-08	1-Oct-08	4-Nov-08	8-Jan-09	3-Mar-09	9-Jun-09	20-Jul-09	5-Oct-09
Chemical oxygen demand	mg/L	419	440	500	463	467	375	368	364	386	373	398	1475	850	447	441	395
pH	pH units	158	167	184	165	158	145	150	145	142	142	149	510	298	157	149	142
Specific conductance	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total alkalinity	mg/L	196	208	229	218	215	176	182	179	177	179	193	665	394	206	194	183
Total dissolved solids	mg/L	13	7.2	5.1	4.6	40	170	18	25	11	7.2	7.2	14.6	10.1	9.1	47	5.9
Total hardness	mg/L																
Turbidity	NTU																

Notes: 1Source: Ministry of Saskatchewan Environment

2N = number of samples.

3Number of samples greater than or equal to detection limit (DL).

4Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

5For calculation of descriptives statistics, values < DL were set to half the value of DL.

6Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

7No dissolved nitrate guideline is available; total nitrate guideline was used for comparison.

Table 29 Surface water quality parameters (laboratory) for the Muskoday IR sampling station (South Saskatchewan River upstream of the Project LSA), July 2007 to October 2008.1

Parameters	Units	Summary Statistics										
		N ²	N≥DL ³	N><GL ⁴	Median ⁵	Minimum ⁵	Maximum ⁵	Percentiles ⁵			Mean ⁵	SD ⁵
								90 th	95 th	99 th		
Inorganic ions												
Bicarbonate	mg/L	11	11	-	190	179	238	209.0	223.5	235.1	194.8	17.58
Calcium, dissolved	mg/L	11	11	-	50	46	62	58.0	60.0	61.6	51.1	4.91
Calcium, total	mg/L	3	3	-	48	47	48	48.0	48.0	48.0	47.7	0.58
Carbonate	mg/L	11	11	-	4	0	15	8.0	11.5	14.3	4.8	4.60
Chloride, dissolved	mg/L	11	11	-	9.6	8.4	89.2	12.40	50.80	81.52	17.15	23.923
Fluoride, dissolved	mg/L	11	11	-	0.16	0.15	0.28	0.220	0.250	0.274	0.179	0.0383
Hydroxide	mg/L	11	11	-	0	0	0	0	0	0	0	0
Magnesium, dissolved	mg/L	11	11	-	19	17	40	22.0	31.0	38.2	21.2	6.40
Magnesium, total	mg/L	3	3	-	18	18	19	18.8	18.9	19.0	18.3	0.58
Potassium, dissolved	mg/L	11	11	-	4	3	13	4.0	8.5	12.1	4.5	2.88
Potassium, total	mg/L	3	3	-	4.2	3	4.2	4.2	4.2	4.2	3.8	0.69
Sodium, dissolved	mg/L	11	11	-	27	24	136	32.0	84.0	125.6	37.0	32.91
Sodium, total	mg/L	3	3	-	31	22	31	31.0	31.0	31.0	28.0	5.20
Sulphate, dissolved	mg/L	11	11	-	79.1	67.5	291	92.0	191.5	271.1	97.6	64.53
Total metals												
Aluminum	mg/L	5	5	0	0.061	0.036	0.087	0.0806	0.0838	0.0864	0.0610	0.01951
Antimony	mg/L	1	1	-	-	0.0002	0.0002	-	-	-	-	-
Arsenic	ug/L	4	4	0	0.9	0.8	1.2	1.14	1.17	1.19	0.95	0.191
Barium	mg/L	5	5	-	0.09	0.088	0.11	0.102	0.106	0.109	0.094	0.0092
Beryllium	mg/L	5	0	-	0.0005	0.00005	0.0005	0.0005	0.0005	0.0005	0.00041	0.000201
Boron	mg/L	5	5	-	0.028	0.022	0.033	0.0318	0.0324	0.0329	0.0272	0.00466
Cadmium	mg/L	5	1	1	0.0005	0.0001	0.0005	0.0005	0.0005	0.0005	0.00042	0.000179
Chromium	mg/L	5	1	0	0.0005	0.0005	0.0009	0.00074	0.00082	0.000884	0.00058	0.000179
Cobalt	mg/L	5	1	-	0.0005	0.0004	0.0005	0.0005	0.0005	0.0005	0.00048	0.000045
Copper	mg/L	5	5	1	0.002	0.0005	0.0085	0.0059	0.0072	0.00824	0.00300	0.003142
Iron	mg/L	5	5	1	0.22	0.1	0.44	0.36	0.40	0.43	0.23	0.132
Lead	mg/L	5	1	0	0.001	0.0004	0.001	0.0010	0.0010	0.0010	0.0009	0.00027
Manganese	mg/L	5	5	-	0.017	0.015	0.022	0.0208	0.0214	0.0219	0.0178	0.00277
Mercury	ug/L	8	0	0	0.01	0.01	0.02	0.013	0.017	0.019	0.011	0.0035
Molybdenum	mg/L	5	2	0	0.0005	0.0005	0.002	0.0019	0.0019	0.0020	0.0010	0.00075
Nickel	mg/L	5	4	0	0.002	0.0005	0.0024	0.00224	0.00232	0.002384	0.00158	0.000795
Selenium	mg/L	4	4	0	0.00055	0.0004	0.0006	0.0006	0.0006	0.0006	0.00053	0.000096
Silver	mg/L	5	0	0	0.0005	0.00005	0.0005	0.0005	0.0005	0.0005	0.00041	0.000201
Strontium	mg/L	5	5	-	0.3	0.29	0.35	0.334	0.342	0.348	0.308	0.0249
Thallium	mg/L	1	0	0	-	0.0001	0.0001	-	-	-	-	-
Tin	mg/L	1	1	-	-	0.0002	0.0002	-	-	-	-	-
Titanium	mg/L	5	5	-	0.0027	0.002	0.003	0.003	0.003	0.003	0.0025	0.00051
Uranium	ug/L	1	1	0	-	1.6	1.6	-	-	-	-	-
Vanadium	mg/L	5	1	-	0.0005	0.0005	0.005	0.0032	0.0041	0.0048	0.0014	0.00201
Zinc	mg/L	5	1	1	0.0025	0.0025	0.13	0.079	0.105	0.125	0.028	0.0570
Zirconium	mg/L	4	0	-	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0
Nutrients												
Dissolved organic carbon	mg/L	11	11	-	5.3	4.7	12.9	11.50	12.20	12.76	6.47	2.889
Dissolved nitrate	mg/L	11	11	0 ⁷	0.23	0.16	0.31	0.300	0.305	0.309	0.231	0.0561
Total nitrogen	mg/L	11	10	-	0.5	0.4	3	0.8	1.9	2.8	0.7	0.76
Total Kjeldahl nitrogen	mg/L	11	11	-	0.25	0.1	2.84	0.49	1.67	2.61	0.51	0.781
Total phosphorus	mg/L	11	10	-	0.05	0.015	0.3	0.19	0.25	0.29	0.08	0.089
Properties												
Total alkalinity	mg/L	11	11	-	166	159	195	174.00	184.50	192.90	168.00	10.227
pH	mg/L	11	11	0	8.4	8.2	8.7	8.50	8.60	8.68	8.42	0.147

Table 29 Surface water quality parameters (laboratory) for the Muskoday IR sampling station (South Saskatchewan River upstream of the Project LSA), July 2007 to October 2008.1

Parameters	Units	Summary Statistics										
		N ²	N≥DL ³	N><GL ⁴	Median ⁵	Minimum ⁵	Maximum ⁵	Percentiles ⁵			Mean ⁵	SD ⁵
								90 th	95 th	99 th		
Chemical oxygen demand	mg/L	10	8	-	13.8	5.5	56.4	54.7	55.5	56.2	21.1	18.62
Specific conductance	uS/cm	11	11	-	480	447	1133	559.0	846.0	1075.6	542.2	198.27
Total hardness	pH units	11	11	-	203	185	320	235.0	277.5	311.5	214.8	37.38
Turbidity	NTU	11	11	-	10.8	4	61.6	43.0	52.3	59.7	17.3	18.10

Notes: 1Source: Ministry of Saskatchewan Environment

2N = number of samples.

3Number of samples greater than or equal to detection limit (DL).

4Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

5For calculation of descriptives statistics, values < DL were set to half the value of DL.

6Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

7No dissolved nitrate guideline is available; total nitrate guideline was used for comparison.

Table 29 Surface water quality parameters (laboratory) for the Muskoday IR sampling station (South Saskatchewan River upstream of the Project LSA), July 2007 to October 2008.1

Parameters	Units	Sample ⁶										
		4-Jul-07	30-Jul-07	27-Aug-07	24-Sep-07	25-Oct-07	29-Nov-07	17-Jan-08	14-Feb-08	5-Aug-08	1-Oct-08	27-Oct-08
Inorganic ions												
Bicarbonate	mg/L	190	179	181	181	191	238	204	209	200	180	190
Calcium, dissolved	mg/L	47	52	48	62	50	58	48	51	52	46	48
Calcium, total	mg/L	-	-	48	-	47	-	-	-	-	-	48
Carbonate	mg/L	6	8	8	15	4	0	0	0	3	7	2
Chloride, dissolved	mg/L	9.5	9.6	10.2	89.2	10	11.7	9.6	9.3	12.4	8.4	8.8
Fluoride, dissolved	mg/L	0.17	0.16	0.16	0.28	0.16	0.18	0.15	0.16	0.22	0.16	0.17
Hydroxide	mg/L	0	0	0	0	0	0	0	0	0	0	0
Magnesium, dissolved	mg/L	19	21	20	40	19	22	18	19	20	17	18
Magnesium, total	mg/L	-	-	19	-	18	-	-	-	-	-	18
Potassium, dissolved	mg/L	4	4	4	13	4	4	3	4	3	3	3
Potassium, total	mg/L	-	-	4.2	-	4.2	-	-	-	-	-	3
Sodium, dissolved	mg/L	25	29	28	136	27	32	27	28	26	25	24
Sodium, total	mg/L	-	-	31	-	31	-	-	-	-	-	22
Sulphate, dissolved	mg/L	86.4	79.4	82.6	291	75.6	92	75.4	75.3	79.1	67.5	69.3
Total metals												
Aluminum	mg/L	-	-	0.05	-	0.061	0.071	-	0.036	-	-	0.087
Antimony	mg/L	-	-	-	-	-	0.0002	-	-	-	-	-
Arsenic	ug/L	-	-	-	-	0.8	1.2	-	1	-	-	0.8
Barium	mg/L	-	-	0.088	-	0.09	0.11	-	0.091	-	-	0.089
Beryllium	mg/L	-	-	<0.001	-	<0.001	<0.0001	-	<0.001	-	-	<0.001
Boron	mg/L	-	-	0.028	-	0.022	0.03	-	0.033	-	-	0.023
Cadmium	mg/L	-	-	<0.001	-	<0.001	0.0001	-	<0.001	-	-	<0.001
Chromium	mg/L	-	-	<0.001	-	<0.001	0.0009	-	<0.001	-	-	<0.001
Cobalt	mg/L	-	-	<0.001	-	<0.001	0.0004	-	<0.001	-	-	<0.001
Copper	mg/L	-	-	0.002	-	0.002	0.0085	-	0.002	-	-	<0.001
Iron	mg/L	-	-	0.14	-	0.22	0.44	-	0.1	-	-	0.25
Lead	mg/L	-	-	<0.002	-	<0.002	0.0004	-	<0.002	-	-	<0.002
Manganese	mg/L	-	-	0.019	-	0.017	0.022	-	0.015	-	-	0.016
Mercury	ug/L	-	0.02	-	<0.02	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.02
Molybdenum	mg/L	-	-	<0.001	-	<0.001	0.0017	-	0.002	-	-	<0.001
Nickel	mg/L	-	-	0.002	-	0.001	0.0024	-	0.002	-	-	<0.001
Selenium	mg/L	-	-	-	-	0.0004	0.0005	-	0.0006	-	-	0.0006
Silver	mg/L	-	-	<0.001	-	<0.001	<0.0001	-	<0.001	-	-	<0.001
Strontium	mg/L	-	-	0.3	-	0.29	0.35	-	0.31	-	-	0.29
Thallium	mg/L	-	-	-	-	-	<0.0002	-	-	-	-	-
Tin	mg/L	-	-	-	-	-	0.0002	-	-	-	-	-
Titanium	mg/L	-	-	0.003	-	0.003	0.0027	-	0.002	-	-	0.002
Uranium	ug/L	-	-	-	-	-	1.6	-	-	-	-	-
Vanadium	mg/L	-	-	<0.001	-	<0.001	0.005	-	<0.001	-	-	<0.001
Zinc	mg/L	-	-	<0.005	-	<0.005	0.13	-	<0.005	-	-	<0.005
Zirconium	mg/L	-	-	<0.001	-	<0.001	-	-	<0.001	-	-	<0.001
Nutrients												
Dissolved	mg/L	12.9	4.7	4.7	11.5	5.5	5.9	4.9	6.1	5.3	5	4.7

Table 29 Surface water quality parameters (laboratory) for the Muskoday IR sampling station (South Saskatchewan River upstream of the Project LSA), July 2007 to October 2008.1

Parameters	Units	Sample ⁶										
		4-Jul-07	30-Jul-07	27-Aug-07	24-Sep-07	25-Oct-07	29-Nov-07	17-Jan-08	14-Feb-08	5-Aug-08	1-Oct-08	27-Oct-08
organic carbon												
Dissolved nitrate	mg/L	0.16	0.16	0.25	0.16	0.23	0.31	0.28	0.3	0.2	0.22	0.27
Total nitrogen	mg/L	0.4	0.4	0.5	3	0.5	0.8	0.7	0.6	0.4	0.4	0.5
Total Kjeldahl nitrogen	mg/L	0.24	0.24	0.25	2.84	0.27	0.49	0.42	0.3	0.2	<0.2	0.23
Total phosphorus	mg/L	0.3	0.05	0.06	0.19	0.02	0.04	0.02	<0.03	0.1	0.02	0.06
Properties												
Total alkalinity	mg/L	166	161	162	174	164	195	167	171	170	159	159
pH	mg/L	8.5	8.5	8.5	8.7	8.4	8.3	8.2	8.2	8.4	8.5	8.4
Chemical oxygen demand	mg/L	18.7	12.8	17.4	54.5	14	56.4	<11	-	12.4	<11	13.6
Specific conductance	uS/cm	480	456	480	1133	477	559	485	505	487	447	455
Total hardness	pH units	196	216	202	320	203	235	194	206	212	185	194
Turbidity	NTU	61.6	11.9	15	14	8.4	10.8	5.4	4	43	7	9.5

Table 30 Surface water quality parameters (field) for sampling station CCS-CN (Caution Creek), May 2007 to November 2008.

Parameters	Summary Statistics										Sample ⁵						
	N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	5-May-07	13-Aug-07	30-Oct-07	18-May-08	19-Aug-08	5-Nov-08
							90 th	95 th	99 th								
Temperature (°C)	6	-	-	9.64	2.38	16.72	16.06	16.39	16.65	9.360	6.1782	8.50	15.40	2.38	10.78	16.72	2.38
Dissolved oxygen (mg/L)	6	-	0	10.9	9.6	16.85	15.08	15.96	16.67	11.888	2.7845	11.41	9.60	13.30	10.39	9.78	16.85
pH	6	-	0	8.1	7.7	8.8	8.63	8.69	8.74	8.16	0.427	7.65	8.50	7.89	8.32	7.86	8.75
Conductivity (uS/cm)	6	-	-	354.5	326	423.5	400.3	411.9	421.2	361.25	37.408	336.0	423.5	332	326.0	373.0	377
Total dissolved solids (mg/L)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 31 Surface water quality parameters (field) for sampling station CCS-01 (Caution Creek), February 2007 to January 2009.

Parameters	Summary Statistics										
	N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴
							90 th	95 th	99 th		
Temperature (°C)	12	-	-	5.05	0.1	18	17.2	17.6	17.9	7.35	7.050
Dissolved oxygen (mg/L)	0	-	-	-	-	-	-	-	-	-	-
pH	11	-	5	6.5	5.2	7.7	7.61	7.67	7.72	6.50	0.744
Conductivity (uS/cm)	12	-	-	498.5	275	1117	763	924	1078	549.9	245.03
Total dissolved solids (mg/L)	11	-	-	260	140	553	383	468	536	274.5	124.74

Parameters	Sample ⁵											
	27-Feb-07	16-Mar-07	5-Apr-08	9-May-08	5-Jun-08	9-Jul-08	16-Aug-08	7-Sep-08	13-Oct-08	19-Nov-08	15-Dec-08	1-Jan-09
Temperature (°C)	0.1	0.2	0.1	7.0	16.8	17.2	18.0	13.0	7.0	3.0	3.1	2.7
Dissolved oxygen (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-
pH	6.17	-	5.80	6.42	7.73	7.61	5.17	6.85	6.57	6.50	6	6.7
Conductivity (uS/cm)	475	477	1117	291	766	692	740	275	399	308	539	520
Total dissolved solids (mg/L)	-	232	553	140	383	339	348	146	199	155	264	260

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptive statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 32 Surface water quality parameters (field) for sampling station CCS-02 (Caution Creek), April 2008 to December 2009.

Parameters	Summary Statistics										
	N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴
							90 th	95 th	99 th		
Temperature (°C)	15	-	-	11.7	0.9	25.5	23.6	24.7	25.3	13.02	9.130
Dissolved oxygen (mg/L)	0	-	-	-	-	-	-	-	-	-	-
pH	15	-	4	7.0	5.7	8.0	7.83	7.87	7.95	7.03	0.711
Conductivity (uS/cm)	15	-	-	514	274	748	694	719	742	509.1	156.05
Total dissolved solids (mg/L)	15	-	-	260	137	375	346	358	372	254.7	78.16

Parameters	Sample ¹														
	15-Apr-08	20-May-08	5-Jun-08	9-Jul-08	16-Aug-08	12-Sep-08	19-Nov-08	15-Dec-08	15-Jan-09	9-Feb-09	12-Apr-09	17-Jun-09	30-Aug-09	11-Oct-09	2-Dec-09
Temperature (°C)	0.9	11.7	22.5	19.3	21.9	18.7	4.3	4	4.1	2.9	3.2	20.4	25.5	24.4	11.5
Dissolved oxygen (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	6.42	6.90	7.46	7.39	5.69	7.26	5.72	7	6.41	6.94	7.03	7.82	7.83	7.97	7.55
Conductivity (uS/cm)	538	276	677	706	748	505	402	514	656	570	274	288	426	447	609
Total dissolved solids (mg/L)	268	138	339	351	375	252	202	260	329	285	137	144	212	222	306

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 33 Surface water quality parameters (field) for sampling station 101-CN (101 Ravine), May 2006 to November 2008.

Parameters	Summary Statistics											Sample ¹					
	N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	6-May-07	11-Aug-07	28-Oct-07	18-May-08	19-Aug-08	5-Nov-08
							90 th	95 th	99 th								
Temperature (°C)	6	-	-	10.785	1.73	17.43	16.72	17.07	17.36	9.75	6.823	12.30	16.00	1.77	9.27	17.43	1.73
Dissolved oxygen (mg/L)	6	-	1	10.62	9.31	15.13	14.330	14.730	15.050	11.452	2.3509	10.57	9.50	13.53	10.67	9.31	15.13
pH	6	-	0	8.3	7.7	8.9	8.69	8.79	8.86	8.23	0.464	7.70	8.50	8.16	8.42	7.72	8.88
Conductivity (uS/cm)	6	-	-	479	394	571	539	555	568	479.7	59.91	394	507	463	448	571	495
Total dissolved solids (mg/L)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 34 Surface water quality parameters (field) for sampling station WPR-CN (West Perimeter Ravine), May 2007 to November 2008.

Parameters	Summary Statistics											Sample ¹				
	N ¹	N \geq DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	6-May-07	28-Oct-07	18-May-08	19-Aug-08	5-Nov-08
							90 th	95 th	99 th							
Temperature (°C)	5	-	-	9.68	2.04	18.15	15.43	16.79	17.88	8.72	6.740	11.35	2.37	9.68	18.15	2.04
Dissolved oxygen (mg/L)	5	-	1	10.73	9.44	15.3	14.52	14.91	15.22	11.88	2.391	10.73	13.35	10.56	9.44	15.3
pH	5	-	0	8.1	7.6	8.9	8.70	8.79	8.86	8.15	0.518	7.60	8.07	8.43	7.76	8.88
Conductivity (uS/cm)	5	-	-	389	356	449	433	441	447	394.4	36.28	356	370	389	408	449
Total dissolved solids (mg/L)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N \geq DL.

4For calculation of descriptive statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 35 Surface water quality parameters (field) for sampling station WRS-CN (West Ravine), May 2007 to November 2008.

Parameters	Summary Statistics											Sample ¹					
	N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	6-May-07	9-Aug-07	28-Oct-07	18-May-08	19-Aug-08	6-Nov-08
							90 th	95 th	99 th								
Temperature (°C)	6	-	-	9.975	0.88	18.93	17.62	18.27	18.80	9.76	7.216	10.9	16.3	2.5	9.1	18.9	0.9
Dissolved oxygen (mg/L)	6	-	2	10.82	8.73	15.02	14.17	14.60	14.94	11.36	2.387	10.91	9.43	13.32	10.73	8.73	15.02
pH	6	-	0	8.5	7.3	8.9	8.92	8.92	8.92	8.29	0.674	7.7	8.5	8.92	8.43	7.25	8.91
Conductivity (uS/cm)	6	-	-	1612	981	2230	1966	2098	2204	1597.5	403.51	1702	2230	1600	981	1448	1624
Total dissolved solids (mg/L)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 36 Surface water quality parameters (field) for sampling station WRS-01 (West Ravine), May 2006 to December 2009.

Parameters	Summary Statistics										
	N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴
							90 th	95 th	99 th		
Temperature (°C)	29	-	-	9.3	0	24.50	20.9	22.5	24.2	10.4	7.90
Dissolved oxygen (mg/L)	0	-	-	-	-	-	-	-	-	-	-
pH	27	-	7	6.9	5.3	8.3	7.83	7.99	8.20	6.95	0.778
Conductivity (uS/cm)	29	-	-	540	232	1749	1209.6	1411.0	1684.0	641.5	363.31
Total dissolved solids (mg/L)	30	-	-	275.5	110	876	601.3	698.1	840.3	321.8	178.31

Table 36 Surface water quality parameters (field) for sampling station WRS-01 (West Ravine), May 2006 to December 2009.

Parameters	N ¹	Sample ¹															
		11-May-06	13-Jun-06	11-Aug-06	28-Oct-06	11-Nov-06	14-Dec-06	21-Jan-07	18-Feb-07	11-Mar-07	9-Apr-07	7-May-07	7-Jun-07	2-Jul-07	20-Aug-07	9-Sep-07	20-Oct-07
		17.0	16.6	21.0	5.0	3.4	0.7	0.7	0.0	3.9	6.6	9.3	14.6		15.3	16.3	5.3
Temperature (°C)	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved oxygen (mg/L)	0	7.55	7.76	7.75	6.27	6.75	7.84	8.25	6.93	-	-	6.99	7.55	8.06	6.46	6.04	6.13
pH	27	600	610	636	397	372	670	550	405	423	232	1517	834	1749	540	780	
Conductivity (uS/cm)	29	318	329	308	184	228	290	276	203	203	110	753	417	876	275	330	417
Total dissolved solids (mg/L)	30																

Parameters	Sample ¹													
	10-Nov-07	21-Dec-07	4-Apr-08	2-May-08	1-Jun-08	9-Jul-08	19-Aug-08	6-Sep-08	19-Oct-08	13-Nov-08	12-Apr-09	20-Jun-09	30-Aug-09	11-Oct-09
	3.6	0.1	1.1	4.9	16.1	24.5	17.8	20.0	7.7	2.5	9.5	20.9	23.5	14.8
Temperature (°C)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved oxygen (mg/L)	6.76	5.30	5.47	6.13	6.50	7.15	6.67	7.35	6.60	6.49	7.46	7.49	7.82	-
pH	479	467	1252	1199	362	850	680	346	398	512	346	437	401	559
Conductivity (uS/cm)	240	238	631	598	182	411	340	173	200	253	174	217	201	280
Total dissolved solids (mg/L)														

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 37 Surface water quality parameters (field) for sampling station WRS-02 (West Ravine), May 2006 to January 2009.

Parameters	Summary Statistics										
	N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴
							90 th	95 th	99 th		
Temperature (°C)	28	-	-	5.55	0.2	24.4	17.2	20.2	23.5	8.3	7.05
Dissolved oxygen (mg/L)	0	-	-	-	-	-	-	-	-	-	-
pH	26	-	5	7.0	4.5	8.3	7.78	7.95	8.24	6.87	0.962
Conductivity (uS/cm)	29	-	-	1300	326	7620	3268.0	5622.0	7382.0	1870.0	1746.71
Total dissolved solids (mg/L)	29	-	-	981	184	2910	2043.2	2550.0	2870.8	1025.7	742.47

Table 37 Surface water quality parameters (field) for sampling station WRS-02 (West Ravine), May 2006 to January 2009.

Parameters	Sample ¹																						
	11-May-06	16-May-06	13-Jun-06	11-Aug-06	28-Oct-06	11-Nov-06	24-Dec-06	21-Jan-07	18-Feb-07	11-Mar-07	19-Apr-07	7-May-07	7-Jun-07	2-Jul-07	20-Aug-07	9-Sep-07	20-Oct-07	20-Nov-07	21-Dec-07	4-Apr-08	2-May-08	1-Jun-08	
Temperature (°C)	5.1	7.9	14.0	16.7	1.7	2.3	2.6	1.2	0.2	1.3	4.3	10.4	15.1		15.5	13.1	6.0	3.6	2.4	0.3	9.2	16.3	
Dissolved oxygen (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	-	7.47	7.76	7.80	6.68	6.51	8.32	-	6.91	-	6.83	6.95	7.63	7.68	6.86	6.08	4.60	6.96	4.50	4.98	6.70	6.99	
Conductivity (uS/cm)	1300	2140	860	3900	1950	1121	603	380	559	515	840	555	1920	326	2700	2590	7620	516	498	2200	2270	1118	
Total dissolved solids (mg/L)	745	1230	500	1999	981	553	296	184	270	250	391	2770	990	1600	1300	1280	2220	259	247	1200	1370	558	

Parameters	Sample ¹															
	9-Jul-08	14-Aug-08	6-Sep-08	9-Oct-08	13-Nov-08	11-Dec-08	18-Jan-09	2-May-08	1-Jun-08	9-Jul-08	14-Aug-08	6-Sep-08	9-Oct-08	13-Nov-08	11-Dec-08	18-Jan-09
Temperature (°C)	21.1	24.4	18.5	11.0	2.6	4.0	2.4	9.2	16.3	21.1	24.4	18.5	11.0	2.6	4.0	2.4
Dissolved oxygen (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	7.62	7.18	7.43	7.04	6.31	8.00	6.8	6.70	6.99	7.62	7.18	7.43	7.04	6.31	8.00	6.8
Conductivity (uS/cm)	6770	2280	3110	1107	1831	600	2050	2270	1118	6770	2280	3110	1107	1831	600	2050
Total dissolved solids (mg/L)	2910	1140	1580	642	935	304	1040	1370	558	2910	1140	1580	642	935	304	1040

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 38 Surface water quality parameters (field) for sampling station WRS-03 (West Ravine), May 2006 to December 2009.

Parameters	Summary Statistics										
	N ¹	N \geq DL ²	N $>$ <GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴
							90 th	95 th	99 th		
Temperature (°C)	32	-	-	7.65	0	24.5	17.5	22.6	24.2	8.8	7.83
Dissolved oxygen (mg/L)	0	-	-	-	-	-	-	-	-	-	-
pH	30	-	5	7.4	4.3	9.3	8.20	8.44	9.08	7.29	0.966
Conductivity (uS/cm)	33	-	-	1497	319	7340	3498.0	4468.0	6876.0	2093.2	1511.80
Total dissolved solids (mg/L)	33	-	-	800	314	3660	1840.6	2780.0	3426.4	1179.6	774.85

Table 38 Surface water quality parameters (field) for sampling station WRS-03 (West Ravine), May 2006 to December 2009.

Parameters	N ¹	Sample ¹																
		11-May-06	13-Jun-06	11-Aug-06	28-Oct-06	11-Nov-06	14-Dec-06	21-Jan-07	18-Feb-07	18-Mar-07	8-Apr-07	7-May-07	7-Jun-07	2-Jul-07	27-Aug-07	7-Sep-07	20-Oct-07	12-Nov-07
Temperature (°C)	32	2.7	17.0	14.1	1.8	1.1	0.1	0.0	0.5	0.1	0.7	8.4	14.9	-	15.2	16.0	6.9	3.0
Dissolved oxygen (mg/L)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	30	7.40	8.46	7.30	8.10	7.40	9.34	-	7.08	-	-	7.13	7.59	8.18	7.97	6.86	6.15	4.29
Conductivity (uS/cm)	33	1785	1334	2830	3450	3020	970	3190	3520	3510	1777	7340	2670	549	735	319	375	1610
Total dissolved solids (mg/L)	33	980	790	1448	1240	1535	330	1638	1811	1848	1674	3660	1330	2680	362	1600	1350	800

Parameters	N ¹	Sample ¹																
		21-Dec-07	6-Apr-08	3-May-08	1-Jun-08	28-Jul-08	17-Aug-08	6-Sep-08	9-Oct-08	13-Nov-08	11-Dec-08	18-Jan-09	12-Apr-09	20-Jun-09	30-Aug-09	11-Oct-09	18-Dec-09	
Temperature (°C)	32	0.2	0.3	11.7	15.6	22.0	24.5	17.3	10.9	3.0	4.0	2.7	3.5	17.5	23.4	12.9	9.9	
Dissolved oxygen (mg/L)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
pH	30	5.23	7.42	6.50	7.40	6.75	6.33	7.55	7.42	7.08	7.00	7.55	7.84	7.77	8.41	8.14	7.18	
Conductivity (uS/cm)	33	3030	5890	1386	1285	2560	3010	1497	1570	1130	1174	1430	1015	1340	1304	1342	1130	
Total dissolved solids (mg/L)	33	314	2930	690	642	1280	1510	748	784	570	588	720	507	671	651	676	570	

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 39 Surface water quality parameters (field) for sampling station WRS-04 (West Ravine), June 2006 to December 2009.

Parameters	Summary Statistics										
	N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴
							90 th	95 th	99 th		
Temperature (°C)	24	-	-	8.4	0	24.8	19.2	22.7	24.4	8.9	8.07
Dissolved oxygen (mg/L)	0	-	-	-	-	-	-	-	-	-	-
pH	23	-	1	8.2	5.8	9.0	8.83	8.90	8.97	7.91	0.814
Conductivity (uS/cm)	26	-	-	1621.5	347	4720	2595.0	3830.0	4600.0	1724.2	1001.28
Total dissolved solids (mg/L)	25	-	-	809	166.7	2460	1318.4	1960.0	2378.4	866.9	523.37

Table 39 Surface water quality parameters (field) for sampling station WRS-04 (West Ravine), June 2006 to December 2009.

Parameters	N ¹	Sample ¹													
		3-Jun-06	9-Aug-06	29-Oct-06	25-Nov-06	13-Dec-06	31-Jan-07	28-Feb-07	17-Mar-07	30-Mar-07	12-Jun-07	16-Aug-07	23-Sep-07	17-Nov-07	28-Dec-07
Temperature (°C)	24	15.0	17.0	0.8	0.0	-	-	0.0	0.0	8.5	16.7	13.9	8.3	0.8	0.0
Dissolved oxygen (mg/L)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	23	8.90	8.20	8.41	8.99	-	8.35	-	-	8.90	8.09	8.16	7.47	5.76	7.21
Conductivity (uS/cm)	26	1054	2140	2130	1935	2190	1345	2590	2600	1585	1650	1719	4240	4720	560
Total dissolved solids (mg/L)	25	-	1080	1071	664	1100	603	1316	1320	792	810	860	2120	2460	295

Parameters	N ¹	Sample ¹												
		6-Apr-08	3-May-08	2-Jun-08	28-Jul-08	30-Aug-08	7-Sep-08	19-Oct-08	1-Dec-08	26-Apr-09	30-Jun-09	30-Aug-09	23-Oct-09	
Temperature (°C)	24	0.0	3.4	11.5	15.6	20.1	11.2	5.2	2.3	2.7	23.2	24.8	13.1	
Dissolved oxygen (mg/L)	0	-	-	-	-	-	-	-	-	-	-	-	-	
pH	23	7.57	6.50	8.51	6.76	8.28	8.33	7.77	7.16	7.65	7.89	8.53	8.52	
Conductivity (uS/cm)	26	1322	347	847	1920	1620	1017	1623	1704	705	1005	1025	1236	
Total dissolved solids (mg/L)	25	662	166.7	412	970	809	508	811	857	351	503	512	620	

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 40 Surface water quality parameters (field) for sampling station ERS-CN (East Ravine), May 2007 to November 2008.

Parameters	Summary Statistics											Sample ¹					
	N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	6-May-07	11-Aug-07	28-Oct-07	18-May-08	20-Aug-08	6-Nov-08
							90 th	95 th	99 th								
Temperature (°C)	6	-	-	13.085	1.12	21.96	18.63	20.30	21.63	11.24	7.889	13.7	15.3	2.9	12.5	22.0	1.1
Dissolved oxygen (mg/L)	6	-	1	10.01	8.59	15.55	14.40	14.98	15.44	11.19	2.644	10.20	9.75	13.25	9.82	8.59	15.55
pH	6	-	0	8.2	7.7	8.9	8.69	8.78	8.85	8.24	0.426	7.7	8.5	7.98	8.39	7.99	8.87
Conductivity (uS/cm)	6	-	-	558	303	671	639.0	655.0	667.8	531.0	126.98	554	671	303	489	607	562
Total dissolved solids (mg/L)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 41 Surface water quality parameters (field) for sampling station ERS-01 (East Ravine), May 2006 to December 2009.

Parameters	Summary Statistics										
	N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴
							90 th	95 th	99 th		
Temperature (°C)	29	-	-	8.5	0	25.4	20.4	23.0	25.2	9.8	8.39
Dissolved oxygen (mg/L)	0	-	-	-	-	-	-	-	-	-	-
pH	27	-	6	7.3	4.7	8.3	7.87	7.96	8.18	7.09	0.833
Conductivity (uS/cm)	30	-	-	451	262	1129	865.5	958.7	1081.4	508.9	216.69
Total dissolved solids (mg/L)	29	-	-	224	131	564	438.2	475.6	539.4	253.2	110.16

Table 41 Surface water quality parameters (field) for sampling station ERS-01 (East Ravine), May 2006 to December 2009.

Parameters	N ¹	Sample ¹															
		11-May-06	16-Jun-06	11-Aug-06	30-Oct-06	21-Jan-07	28-Feb-07	18-Mar-07	9-Apr-07	7-May-07	11-Jun-07	2-Jul-07	9-Sep-07	20-Oct-07	12-Nov-07	26-Dec-07	4-Apr-08
Temperature (°C)	29	14.0	18.0	19.5	2.0	0.3	0.2	0.3	0.2	12.4	14.0		16.9	8.3	1.4	0.6	0.0
Dissolved oxygen (mg/L)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	27	7.49	7.43	6.90	7.11	6.30	-	-	-	7.60	7.41	8.26	7.08	7.81	5.79	4.65	5.79
Conductivity (uS/cm)	30	310	330	354	386	387	367	369	362	951	518	965	530	741	418	531	1129
Total dissolved solids (mg/L)	29	166.7	180	170.3	185.1	-	206	178	174.6	476	259	475	240	376	210	253	564

Parameters	N ¹	Sample ¹													
		2-May-08	2-Jun-08	28-Jul-08	12-Aug-08	7-Sep-08	20-Oct-08	13-Nov-08	23-Dec-08	17-Jan-09	26-Apr-09	30-Jun-09	30-Aug-09	25-Oct-09	2-Dec-09
Temperature (°C)	29	8.5	20.4	19.6	20.4	13.5	5.9	2.7	3	2.8	3.1	25.4	24.8	14.7	11.6
Dissolved oxygen (mg/L)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	27	6.83	7.82	6.06	7.20	7.64	6.12	7.34	6.68	7.24	7.95	7.49	7.76	7.96	7.59
Conductivity (uS/cm)	30	856	285	505	608	269	453	449	484	502	262	529	412	564	441
Total dissolved solids (mg/L)	29	429	143	265	305	135	225	224	241	254	131	164	206	285	221

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 42 Surface water quality parameters (field) for sampling station ERS-02 (East Ravine), May 2006 to January 2009.

Parameters	Summary Statistics										
	N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴
							90 th	95 th	99 th		
Temperature (°C)	24	-	-	5.25	0	24.1	19.6	21.6	23.6	8.3	8.36
Dissolved oxygen (mg/L)	0	-	-	-	-	-	-	-	-	-	-
pH	21	-	5	7.5	5.2	8.5	8.43	8.46	8.51	7.21	1.057
Conductivity (uS/cm)	24	-	-	422	274	3300	1005.1	1135.3	2806.9	623.6	620.79
Total dissolved solids (mg/L)	23	-	-	207	137	578	466.0	521.5	566.3	255.0	124.86

Parameter	Sample ¹											
	11-May-06	13-Jun-06	31-Oct-06	12-Nov-06	21-Jan-07	28-Feb-07	30-Mar-07	9-Apr-07	7-May-07	8-Jun-07	2-Jul-07	9-Sep-07
Temperature (°C)	11.0	18.0	1.1	0.0	0.0	0.1	0.3	0.4	15.3	16.5	na	20.3
Dissolved oxygen (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-
pH	8.05	8.46	8.40	8.52	-	-	-	-	7.80	7.78	8.43	7.83
Conductivity (uS/cm)	3300	300	372	299	-	382	343	379	1018	516	975	480
Total dissolved solids (mg/L)	na	194	179	181.2	-	184.5	165	182.9	525	257	490	240

Parameter	Sample ¹												
	20-Oct-07	12-Nov-07	26-Dec-07	4-Apr-08	3-May-08	1-Jun-08	28-Jul-08	17-Aug-08	6-Sep-08	18-Oct-08	13-Nov-08	21-Dec-08	17-Jan-09
Temperature (°C)	7.0	0.8	0.2	0.0	11.8	17.9	21.8	24.1	15.4	8.7	2.8	2.8	3.5
Dissolved oxygen (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	5.49	7.91	5.15	5.45	6.50	7.45	6.24	6.59	7.74	6.12	6.79	7.24	7.48
Conductivity (uS/cm)	788	430	340	1156	341	274	641	673	308	414	448	336	454
Total dissolved solids (mg/L)	370	215	170	578	164	137	319	337	154	207	221	168	227

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 43 Surface water quality parameters (field) for sampling station ERS-03 (East Ravine), May 2006 to January 2009.

Parameters	Summary Statistics										
	N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴
							90 th	95 th	99 th		
Temperature (°C)	25	-	-	4.9	0	24.1	19.4	22.9	24.0	8.4	8.33
Dissolved oxygen (mg/L)	0	-	-	-	-	-	-	-	-	-	-
pH	25	-	0	7.6	6.5	8.5	8.24	8.25	8.42	7.48	0.603
Conductivity (uS/cm)	27	-	-	577	371	1900	1519.6	1561.3	1812.6	757.8	418.95
Total dissolved solids (mg/L)	26	-	-	288.5	178	935	764.5	785.0	897.8	385.2	210.06

Parameters	Sample ¹												
	11-May-06	15-Jun-06	11-Aug-06	31-Oct-06	25-Nov-06	31-Jan-07	28-Feb-07	17-Mar-07	8-Apr-07	6-May-07	12-Jun-07	2-Jul-07	15-Aug-07
Temperature (°C)	9.2	18.4	-	0.1	0.0	0.0	0.3	0.0	0.4	13.9	20.1	-	16.5
Dissolved oxygen (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	8.24	7.95	7.45	6.75	8.25	7.82	7.84	-	-	7.59	7.58	8.47	6.93
Conductivity (uS/cm)	494	505	656	387	582	582	555	566	563	1496	752	1555	545
Total dissolved solids (mg/L)	-	294	319	272	282	282	270	275	275	747	337	786	273

Parameters	Sample ¹													
	9-Sep-07	20-Oct-07	11-Nov-07	28-Dec-07	6-Apr-08	3-May-08	2-Jun-08	28-Jul-08	17-Aug-08	6-Sep-08	9-Oct-08	13-Nov-08	21-Dec-08	17-Jan-09
Temperature (°C)	14.0	4.9	0.9	0.1	0.0	8.4	17.3	23.6	24.1	15.5	10.4	2.8	3.8	4.2
Dissolved oxygen (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	7.66	7.02	7.06	8.24	6.54	6.50	8.21	6.89	7.26	7.63	8.04	6.55	6.97	7.55
Conductivity (uS/cm)	1900	1100	593	371	1564	511	1103	776	914	385	409	577	443	576
Total dissolved solids (mg/L)	935	572	297	178	782	248	551	389	457	192	205	288	221	289

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 44 Surface water quality parameters (field) for sampling station ERS-04 (East Ravine), May 2006 to December 2009.

Parameters	Summary Statistics										
	N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴
							90 th	95 th	99 th		
Temperature (°C)	29	-	-	7.4	0	24.9	20.5	22.8	24.5	9.2	8.55
Dissolved oxygen (mg/L)	0	-	-	-	-	-	-	-	-	-	-
pH	25	-	1	8.0	6.3	9.5	8.43	8.83	9.36	7.81	0.798
Conductivity (uS/cm)	29	-	-	564	328	1488	870.8	1226.0	1466.2	651.0	271.85
Total dissolved solids (mg/L)	29	-	-	278	156	720	412.6	455.2	651.1	307.6	112.82

Table 44 Surface water quality parameters (field) for sampling station ERS-04 (East Ravine), May 2006 to December 2009.

Parameters	Sample ¹													
	16-May-06	15-Jun-06	9-Aug-06	29-Oct-06	25-Nov-06	13-Dec-06	31-Jan-07	28-Feb-07	17-Mar-07	30-Mar-07	12-Jun-07	16-Aug-07	23-Sep-07	17-Nov-07
Temperature (°C)	16.7	18.0	18.9	1.3	0.0	0.0	0.0	0.1	0.1	11.1	19.2	16.1	8.3	0.3
Dissolved oxygen (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	8.43	8.26	-	8.25	8.93	-	7.86	-	-	9.50	8.16	7.81	7.53	6.29
Conductivity (uS/cm)	516	500	636	544	348	328	573	568	566	538	767	564	818	851
Total dissolved solids (mg/L)	277	280	303	266	172	156	279	276	275	261	384	281	409	427

Parameters	Sample ¹														
	28-Dec-07	6-Apr-08	3-May-08	2-Jun-08	28-Jul-08	30-Aug-08	7-Sep-08	19-Oct-08	1-Dec-08	5-Feb-09	26-Apr-09	30-Jun-09	30-Aug-09	23-Oct-09	18-Dec-09
Temperature (°C)	0.1	0.0	6.0	14.8	21.9	20.1	13.1	5.0	2.5	2.7	3.3	23.4	24.9	12.8	7.4
Dissolved oxygen (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	7.55	7.48	6.50	8.38	6.74	8.34	8.18	7.82	6.90	6.64	7.96	8.25	8.35	8.43	6.81
Conductivity (uS/cm)	815	1410	1488	950	820	648	373	545	534	555	410	436	453	558	767
Total dissolved solids (mg/L)	407	720	236	474	404	324	185	270	269	278	204	209	225	281	387

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 46 Surface water quality parameters (field) for sampling station DSS-01 (Duke Ravine), April 2008 to February 2009.

Parameters	Summary Statistics											Sample ¹									
	N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	30-Apr-08	22-May-08	5-Jun-08	30-Jul-08	15-Aug-07	11-Sep-08	12-Oct-08	1-Dec-08	28-Dec-08	4-Feb-09
							90 th	95 th	99 th												
Temperature (°C)	10	-	-	11.7	2.7	20.5	20.3	20.4	20.5	11.4	6.52	9.0	14.4	14.4	20.3	20.5	15.5	7.0	2.7	3.9	6
Dissolved oxygen (mg/L)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	10	-	2	7.6	6.0	8.5	8.17	8.33	8.45	7.34	0.866	7.58	8.14	8.48	7.20	6.21	7.93	7.90	6.38	6	7.62
Conductivity (uS/cm)	10	-	-	573	383	765	728.1	746.6	761.3	571.8	134.51	765	709	724	553	609	383	392	467	593	523
Total dissolved solids (mg/L)	10	-	-	288.5	191	382	364.0	373.0	380.2	286.5	67.23	382	354	362	276	305	191	196	233	301	265

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 46 Surface water quality parameters (field) for sampling station DSS-01 (Duke Ravine), April 2008 to February 2009.

Parameters	Summary Statistics											Sample ¹									
	N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	30-Apr-08	22-May-08	5-Jun-08	30-Jul-08	15-Aug-07	11-Sep-08	12-Oct-08	1-Dec-08	28-Dec-08	4-Feb-09
							90 th	95 th	99 th												
Temperature (°C)	10	-	-	11.7	2.7	20.5	20.3	20.4	20.5	11.4	6.52	9.0	14.4	14.4	20.3	20.5	15.5	7.0	2.7	3.9	6
Dissolved oxygen (mg/L)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	10	-	2	7.6	6.0	8.5	8.17	8.33	8.45	7.34	0.866	7.58	8.14	8.48	7.20	6.21	7.93	7.90	6.38	6	7.62
Conductivity (uS/cm)	10	-	-	573	383	765	728.1	746.6	761.3	571.8	134.51	765	709	724	553	609	383	392	467	593	523
Total dissolved solids (mg/L)	10	-	-	288.5	191	382	364.0	373.0	380.2	286.5	67.23	382	354	362	276	305	191	196	233	301	265

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptive statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 47 Surface water quality parameters (field) for sampling station FRS-CN (FALC Ravine), May 2008 to November 2008.

Parameters	Summary Statistics										Sample ¹			
	N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	17-May-08	20-Aug-08	6-Nov-08
							90 th	95 th	99 th					
Temperature (°C)	3	-	-	8.71	1.54	14.65	13.46	14.06	14.53	8.30	6.565	8.71	14.65	1.54
Dissolved oxygen (mg/L)	3	-	0	11.85	10.2	15.35	14.65	15.00	15.28	12.47	2.630	11.85	10.20	15.35
pH	3	-	0	8.4	7.6	8.9	8.80	8.86	8.90	8.28	0.679	8.36	7.56	8.91
Conductivity (uS/cm)	3	-	-	406	395	428	423.6	425.8	427.6	409.7	16.80	395	406	428
Total dissolved solids (mg/L)	0	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptive statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 48 Surface water quality parameters (field) for sampling station WapRS-CN (Wapiti Ravine), May 2008 to November 2008.

Parameters	Summary Statistics											Sample ¹		
	N ¹	N \geq DL ²	N $>$ <GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	17-May-08	20-Aug-08	6-Nov-08
							90 th	95 th	99 th					
Temperature (°C)	3	-	-	14.2	0.84	19.7	18.60	19.15	19.59	11.58	9.699	14.2	19.70	0.84
Dissolved oxygen (mg/L)	3	-	1	9.87	5.64	15.49	14.37	14.93	15.38	10.33	4.941	9.87	5.64	15.49
pH	3	-	0	8.5	7.3	8.8	8.76	8.80	8.83	8.20	0.789	8.45	7.32	8.84
Conductivity (uS/cm)	3	-	-	524	405	539	536.0	537.5	538.7	489.3	73.42	405	524	539
Total dissolved solids (mg/L)	0	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N \geq DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 49 Surface water quality parameters (field) for sampling station EC-CN (English Creek), May 2007 to November 2008.

Parameters	Summary Statistics											Sample ¹					
	N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	6-May-07	14-Aug-07	28-Oct-07	17-May-08	20-Aug-08	6-Nov-08
							90 th	95 th	99 th								
Temperature (°C)	6	-	-	14.72	1.67	18.12	17.41	17.77	18.05	11.42	7.330	13.9	16.7	2.6	15.6	18.1	1.7
Dissolved oxygen (mg/L)	6	-	2	9.965	9.18	15.56	14.39	14.98	15.44	11.20	2.605	10.19	9.30	13.22	9.74	9.18	15.56
pH	6	-	0	8.2	7.8	8.7	8.61	8.66	8.70	8.17	0.443	7.8	8.5	7.76	8.5	7.76	8.71
Conductivity (uS/cm)	6	-	-	437	360	500	497.5	498.8	499.8	432.2	62.77	364	500	412	360	495	462
Total dissolved solids (mg/L)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptive statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 50 Surface water quality parameters (field) for sampling station ECS-01 (English Creek), February 2007 to December 2009.

Parameters	Summary Statistics										
	N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴
							90 th	95 th	99 th		
Temperature (°C)	17	-	-	10.6	0.1	24.5	23.5	24.3	24.5	11.7	8.87
Dissolved oxygen (mg/L)	0	-	-	-	-	-	-	-	-	-	-
pH	16	-	1	7.4	6.0	8.0	7.84	7.90	7.96	7.22	0.602
Conductivity (uS/cm)	17	-	-	477	168	1365	697.8	837.0	1259.4	520.7	266.99
Total dissolved solids (mg/L)	17	-	-	231	134	683	363.2	450.2	636.4	264.9	132.27

Parameters	Sample ¹																
	28-Feb-07	16-Mar-07	6-Apr-08	21-May-08	5-Jun-08	9-Jul-08	16-Aug-08	7-Sep-08	13-Oct-08	19-Nov-08	15-Dec-08	1-Jan-09	26-Apr-09	17-Jun-09	30-Aug-09	11-Oct-09	2-Dec-09
Temperature (°C)	0.5	0.1	6.5	15.6	23.0	18.9	22.0	16.4	9.1	2.7	4.3	2.5	2.4	24.3	24.5	14.9	10.6
Dissolved oxygen (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	6.00	-	6.50	6.82	7.80	7.67	6.88	7.73	7.39	6.78	6.5	6.79	7.46	7.57	7.97	7.87	7.73
Conductivity (uS/cm)	473	477	1365	285	687	705	693	288	422	480	561	646	168	359	364	387	492
Total dissolved solids (mg/L)	229	231	683	143	344	392	343	143	210	245	284	324	134	179	182	191	247

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Boded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 51 Surface water quality parameters (field) for sampling station SKR1 (Saskatchewan River upstream of Caution Creek), May 2007 to November 2008.

Parameters	Summary Statistics											Sample ⁵					
	N ¹	N \geq DL ²	N $>$ GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	5-May-07	13-Aug-07	30-Oct-07	18-May-08	20-Aug-08	5-Nov-08
							90 th	95 th	99 th								
Temperature (°C)	6	-	-	15.665	3.31	23.91	21.46	22.68	23.66	13.54	8.568	12.55	19.00	3.71	18.78	23.91	3.31
Dissolved oxygen (mg/L)	6	-	3	9.89	8.66	15.98	14.45	15.22	15.83	11.06	2.857	10.40	9.38	12.92	9.03	8.66	15.98
pH	6	-	1	8.6	7.7	10.0	9.42	9.69	9.90	8.66	0.752	7.70	8.50	9.95	8.65	8.26	8.89
Conductivity (uS/cm)	6	-	-	415	366	469	465.0	467.0	468.6	419.7	40.30	403	469	392	461	366	427
Total dissolved solids (mg/L)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N \geq DL.

4For calculation of descriptive statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 52 Surface water quality parameters (field) for sampling station NSRS-01 (Saskatchewan River upstream of West Ravine), November 2008 to October 2009.

Parameters	Summary Statistics											Sample ⁵		
	N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	5-Nov-08	30-Jun-09	23-Oct-09
							90 th	95 th	99 th					
Temperature (°C)	3	-	-	13.3	10.5	23.8	21.7	22.8	23.6	15.9	7.01	10.5	23.8	13.3
Dissolved oxygen (mg/L)	0	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	3	-	0	8.1	8.0	8.8	8.61	8.68	8.74	8.25	0.434	8.06	7.95	8.75
Conductivity (uS/cm)	3	-	-	454	358	464	462.0	463.0	463.8	425.3	58.53	464	358	454
Total dissolved solids (mg/L)	3	-	-	226	180	230	229.2	229.6	229.9	212.0	27.78	230	180	226

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 53 Surface water quality parameters (field) for sampling station NSRS-02 (Saskatchewan River downstream of East Ravine), November 2008 to December 2009.

Parameters	Summary Statistics											Sample ⁵					Unsafe to sample
	N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	6-Nov-08	30-Jun-09	30-Aug-09	23-Oct-09	18-Dec-09	
							90 th	95 th	99 th								
Temperature (°C)	4	-	-	18.75	9.9	24.8	24.3	24.5	24.7	18.1	7.05	9.9	23	24.8	14.5	-	
Dissolved oxygen (mg/L)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
pH	4	-	0	8.4	8.1	8.8	8.66	8.71	8.74	8.43	0.266	8.41	8.1	8.75	8.46	-	
Conductivity (uS/cm)	4	-	-	491	405	564	560.7	562.4	563.7	487.8	82.40	405	429	564	553	-	
Total dissolved solids (mg/L)	4	-	-	245.5	203	282	280.5	281.3	281.9	244.0	41.29	203	214	282	277	-	

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 54 Surface water quality parameters (field) for sampling stations SKR2 and NSRS-03 (Saskatchewan River downstream of English Creek), May 2007 to November 2008.

Parameters	Summary Statistics											Sample ⁵					
	N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	6-May-07	14-Aug-07	28-Oct-07	18-May-08	19-Aug-08	6-Nov-08
							90 th	95 th	99 th								
Temperature (°C)	6	-	-	14.415	1.68	24.75	21.78	23.26	24.45	12.85	8.985	13.65	18.80	3.06	15.18	24.75	1.68
Dissolved oxygen (mg/L)	6	-	2	9.89	7.44	15.29	14.30	14.80	15.19	10.88	2.870	10.02	9.46	13.31	7.44	9.76	15.29
pH	6	-	0	8.3	7.6	8.8	8.76	8.77	8.79	8.29	0.460	7.60	8.50	8.05	8.72	8.08	8.79
Conductivity (uS/cm)	6	-	-	440.05	237	467	464.5	465.8	466.8	405.4	87.78	426	454.1	237	467	386	462
Total dissolved solids (mg/L)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 55 Surface water quality parameters (field) for the Gronlid Ferry Crossing sampling station (Saskatchewan River downstream of the Project LSA), July 2007 to October 2009.1

Parameters	Summary Statistics										
	N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴
							90 th	95 th	99 th		
Temperature (°C)	20	-	-	12.6	0.07	26.4	21.21	22.41	25.60	11.63	8.413
Dissolved oxygen (mg/L)	20	-	10	9.5	6.16	13.5	11.37	12.08	13.22	9.57	1.738
pH	18	-	0	8.4	7.2	8.7	8.58	8.65	8.68	8.28	0.362
Conductivity (uS/cm)	0	-	-	-	-	-	-	-	-	-	-
Total dissolved solids (mg/L)	0	-	-	-	-	-	-	-	-	-	-

Parameters	Sample ⁶																			
	3-Jul-07	30-Jul-07	23-Aug-07	26-Sep-07	22-Oct-07	29-Nov-07	17-Jan-08	14-Feb-08	6-May-08	9-Jun-08	15-Jul-08	5-Aug-08	10-Sep-08	7-Oct-08	27-Oct-08	14-Jan-09	2-Mar-09	8-Jun-09	20-Jul-09	5-Oct-09
Temperature (°C)	22.2	26.4	17.3	12	6.7	0.07	1.1	1.4	10.8	17.4	20.1	20.3	14.9	13.2	3.8	0.5	0.5	14.3	21.1	8.6
Dissolved oxygen (mg/L)	8.2	7.8	9.4	10.5	11.3	13.5	7.78	6.16	9.2	8.1	8.5	8.6	10.1	9.6	12	11.3	11.1	9.68	8.25	10.34
pH	8.2	8.27	8.56	8.45	8.47	8.3	7.93	7.75	-	8.1	8.5	8.56	-	8.48	8.49	8.23	7.22	8.69	8.64	8.2
Conductivity (uS/cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved solids (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: 1Source: Ministry of Saskatchewan Environment

2N = number of samples.

3Number of samples greater than or equal to detection limit (DL).

4Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

5For calculation of descriptives statistics, values < DL were set to half the value of DL.

6Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 56 Surface water quality parameters (field) for the Cecil Ferry Crossing sampling station (North Saskatchewan River upstream of the Project LSA), May 2006 to October 2009.1

Parameters	Sample ⁵																								
	24-May-06	26-Jun-06	26-Jul-06	22-Aug-06	19-Sep-06	17-Oct-06	30-May-07	26-Jun-07	23-Aug-07	17-Sep-07	23-Oct-07	14-Jan-08	14-Feb-08	7-May-08	11-Jun-08	16-Jul-08	7-Aug-08	2-Sep-08	1-Oct-08	4-Nov-08	8-Jan-09	3-Mar-09	9-Jun-09	20-Jul-09	5-Oct-09
Temperature (°C)	17.88	20.9	24.75	19.97	8.1	2.25	13	18	16.1	12.5	6.1	0.5	0.5	10.1	16.8	20.4	22.5	15.9	12.5	3.6	0.5	0.5	11.9	19.5	8.2
Dissolved oxygen (mg/L)	8.6	8.24	9.31	10.46	14.08	16.04	-	8.3	9.6	9.6	12.1	-	5.25	9.25	8.8	9.5	8.3	9.3	10.3	12.2	9.1	8.8	9.77	8.44	10.9
pH	7.94	8.34	9.33	10.01	-	-	8.35	8.36	8.48	8.41	8.47	7.88	8.25	8.64	8.23	8.74	8.42	8.51	8.56	8.39	7.94	6.95	8.61	9.72	8.29
Conductivity (uS/cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved solids (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: 1N = number of samples.

2Number of samples greater than or equal to detection limit (DL).

3Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

4For calculation of descriptives statistics, values < DL were set to half the value of DL.

5Boded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 57 Surface water quality parameters (field) for the Muskoday IR sampling station (South Saskatchewan River upstream of the Project LSA), July 2007 to October 2008.1

Parameters	Summary Statistics											Sample ⁶									
	N ¹	N≥DL ²	N><GL ³	Median ⁴	Minimum ⁴	Maximum ⁴	Percentiles ⁴			Mean ⁴	SD ⁴	30-Jul-07	27-Aug-07	24-Sep-07	25-Oct-07	29-Nov-07	17-Jan-08	14-Feb-08	5-Aug-08	1-Oct-08	27-Oct-08
							90 th	95 th	99 th												
Temperature (°C)	10	-	-	9.75	0.5	25.3	21.97	23.64	24.97	10.01	9.118	25.3	15.9	11.7	7.8	0.5	0.5	0.5	21.6	13.6	2.7
Dissolved oxygen (mg/L)	10	-	4	9.95	6.98	12.9	12.54	12.72	12.86	9.69	2.124	7.6	9.8	10.1	11.2	12.9	6.98	7.07	8.6	10.1	12.5
pH	9	-	1	8.3	5.6	8.6	8.54	8.57	8.59	8.06	0.937	8.42	8.49	5.6	-	8.24	8.29	8.31	8.06	8.6	8.53
Conductivity (uS/cm)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved solids (mg/L)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: 1Source: Ministry of Saskatchewan Environment

2N = number of samples.

3Number of samples greater than or equal to detection limit (DL).

4Number of samples greater than (or less than in the case of dissolved oxygen and pH) SSWQO (SE 2006) or CWQG (CCME 2007) guidelines, out of N≥DL.

5For calculation of descriptives statistics, values < DL were set to half the value of DL.

6Bolded values are greater than SSWQO (SE 2006) and/or CWQG (CCME 2007).

Table 58 Sediment chemistry parameters for all tributaries in the Project LSA, 2007 and 2008.

Tributary	Station	Inorganic Ions (ug/g)					Nutrients	
		Calcium	Magnesium	Potassium	Sodium	Sulfate, acid soluble	Organic carbon (%)	Phosphorus (ug/g)
ISQG								
PEL								
LEL								
Caution Creek	1	2160	1100	400	130	130	0.01	190
	2	3280	1700	560	90	210	0.06	210
	3	3240	1500	570	25	150	0.01	200
	4	3520	1600	470	130	210	0.01	240
	5	5110	2300	570	150	340	0.33	370
	N ¹	5	5	5	5	5	5	5
	N<DL ²	0	0	0	1	0	0	0
	N>guidelines ³	-	-	-	-	-	-	-
	Mean ⁴	3462	1640	514	105	208	0.08	242
	SD ⁴	1060.3	433.6	76.4	49.7	82.0	0.139	74.0
Median ⁴	3280	1600	560	130	210	0.01	210	
Minimum	2160	1100	400	<50	130	0.01	190	
Maximum	5110	2300	570	150	340	0.33	370	
101 Ravine	1	11000	5300	500	150	180	0.06	140
	2	18900	5100	860	250	320	0.01	170
	3	9440	2600	480	200	170	0.01	140
	4	13100	3200	660	170	330	0.07	270
	5	5640	2300	600	180	170	0.06	120
	N ¹	5	5	5	5	5	5	5
	N<DL ²	0	0	0	0	0	0	0
	N>guidelines ³	-	-	-	-	-	-	-
	Mean ⁴	11616	3700	620	190	234	0.04	168
	SD ⁴	4901.2	1408.9	153.0	38.1	83.2	0.029	59.7
Median ⁴	11000	3200	600	180	180	0.06	140	
Minimum	5640	2300	480	150	170	0.01	120	
Maximum	18900	5300	860	250	330	0.07	270	
West Perimeter Ravine	1	8680	2400	1000	190	160	0.07	160
	2	8290	2400	920	120	90	0.01	180
	3	12300	2900	1000	140	110	0.03	140
	4	9550	2300	710	170	150	0.16	180
	5	9000	2300	1200	100	330	0.35	240
	N ¹	5	5	5	5	5	5	5
	N<DL ²	0	0	0	0	0	0	0
	N>guidelines ³	-	-	-	-	-	-	-
	Mean ⁴	9564	2460	966	144	168	0.12	180
	SD ⁴	1597.5	251.0	176.6	36.5	95.0	0.139	37.4
Median ⁴	9000	2400	1000	140	150	0.07	180	
Minimum	8290	2300	710	100	90	0.01	140	
Maximum	12300	2900	1200	190	330	0.35	240	
West Ravine	1	20000	10400	1200	390	180	0.6	200

Table 58 Sediment chemistry parameters for all tributaries in the Project LSA, 2007 and 2008.

Tributary	Station	Inorganic Ions (ug/g)					Nutrients	
		Calcium	Magnesium	Potassium	Sodium	Sulfate, acid soluble	Organic carbon (%)	Phosphorus (ug/g)
	2	6940	2200	980	460	300	1.32	200
	3	7690	2800	1200	380	310	0.62	260
	4	4150	1500	810	320	180	0.2	130
	5	4950	1900	900	270	130	0.05	250
	N ¹	5	5	5	5	5	5	5
	N<DL ²	0	0	0	0	0	0	0
	N>guidelines ³	-	-	-	-	-	-	-
	Mean ⁴	8746	3760	1018	364	220	0.6	208
	SD ⁴	6452.9	3742.1	176.7	72.3	80.3	0.49	51.7
	Median ⁴	6940	2200	980	380	180	0.60	200
	Minimum	4150	1500	810	270	130	0.05	130
	Maximum	20000	10400	1200	460	310	1.32	260
East Ravine	1	6540	2400	540	240	70	0.02	140
	2	5970	2100	650	150	210	0.25	180
	3	5360	2000	540	170	100	0.01	160
	4	10000	3700	900	170	250	0.3	340
	5	8710	3000	630	290	80	0.01	160
	N ¹	5	5	5	5	5	5	5
	N<DL ²	0	0	0	0	0	0	0
	N>guidelines ³	-	-	-	-	-	-	-
	Mean ⁴	7316	2640	652	204	142	0.1	196
	SD ⁴	1961.3	709.2	147.5	59.0	82.3	0.14	81.7
	Median ⁴	6540	2400	630	170	100	0.02	160
	Minimum	5360	2000	540	150	70	0.01	140
	Maximum	10000	3700	900	290	250	0.3	340
Duke Ravine	1	22300	4830	1480	85	210	0.9	240
	2	8300	3060	1030	57	210	0.3	190
	3	11600	4680	1650	100	220	1.8	300
	4	10300	4310	1470	96	200	0.7	290
	5	21100	8150	2310	150	380	0.8	410
	N ¹	5	5	5	5	5	5	5
	N<DL ²	0	0	0	0	0	0	0
	N>guidelines ³	-	-	-	-	-	-	-
	Mean ⁴	14720	5006	1588	98	244	0.9	286
	SD ⁴	6493.2	1890.3	464.2	33.8	76.4	0.55	82.0
	Median ⁴	11600	4680	1480	96	210	0.80	290
	Minimum	8300	3060	1030	57	200	0.3	190
	Maximum	22300	8150	2310	150	380	1.8	410
FALC Ravine	1	3470	1990	1490	81	90	0.4	190
	2	10200	5300	3800	200	250	1.9	360
	3	5450	2930	2040	110	150	0.7	230
	4	5230	2400	1820	150	80	0.4	190
	5	2810	1720	1390	82	100	0.7	170

Table 58 Sediment chemistry parameters for all tributaries in the Project LSA, 2007 and 2008.

Tributary	Station	Inorganic Ions (ug/g)					Nutrients	
		Calcium	Magnesium	Potassium	Sodium	Sulfate, acid soluble	Organic carbon (%)	Phosphorus (ug/g)
	N ¹	5	5	5	5	5	5	5
	N<DL ²	0	0	0	0	0	0	0
	N>guidelines ³	-	-	-	-	-	-	-
	Mean ⁴	5432	2868	2108	125	134	0.8	228
	SD ⁴	2893.9	1434.1	980.8	50.6	70.2	0.62	76.9
	Median ⁴	5230	2400	1820	110	100	0.70	190
	Minimum	2810	1720	1390	81	80	0.4	170
	Maximum	10200	5300	3800	200	250	1.9	360
English Creek	1	9770	3200	560	120	180	0.04	240
	2	21400	5200	900	140	880	2.92	490
	3	24000	6400	990	140	980	2.91	560
	4	23900	5600	950	150	650	1.09	460
	5	23100	5900	880	170	360	0.65	390
	N ¹	5	5	5	5	5	5	5
	N<DL ²	0	0	0	0	0	0	0
	N>guidelines ³	-	-	-	-	-	-	-
	Mean ⁴	20434	5260	856	144	610	1.52	428
	SD ⁴	6051.7	1232.1	171.0	18.2	338.7	1.325	121.5
	Median ⁴	23100	5600	900	140	650	1.09	460
	Minimum	9770	3200	560	120	180	0.04	240
	Maximum	24000	6400	990	170	980	2.92	560

Table 58 Sediment chemistry parameters for all tributaries in the Project LSA, 2007 and 2008.

Tributary	Station	Metals (ug/g)												
		Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	
ISQG				5.9				0.6	37.3		35.7		35	
PEL				17				3.5	90.0		197.0		91.3	
LEL				9.8					47.6					
Caution Creek	1	3900	<0.2	7.9	100	<0.1	<1	<0.1	6.8	2.2	1.4	7600	1.6	
	2	6300	<0.2	9.9	170	0.2	<1	<0.1	11	3.3	2.4	11000	3.8	
	3	4900	<0.2	12	140	0.2	<1	<0.1	8.3	2.7	1.9	9700	2	
	4	5300	<0.2	9.3	150	0.2	<1	<0.1	9.9	3	1.9	10000	2.1	
	5	8300	<0.2	17	260	0.3	<1	<0.1	12	4.2	3.8	15500	3.1	
	N ¹	5	5	5	5	5	5	5	5	5	5	5	5	5
	N<DL ²	0	5	0	0	1	5	5	0	0	0	0	0	0
	N>guidelines ³	-	-	5	-	-	-	-	0	0	-	0	-	0
	Mean ⁴	5740	0.1	11	164	0.2	0.5	0.05	10	3	2.3	10760	3	
	SD ⁴	1669.7	0	3.6	59.4	0.1	0	0	2.1	0.7	0.92	2924.6	0.9	
Median ⁴	5300	0.1	9.9	150	0.2	0.5	0.05	10	3	1.9	10000	2		
Minimum	3900	<0.2	7.9	100	<0.1	<1	<0.1	6.8	2.2	1.4	7600	1.6		
Maximum	8300	<0.2	17	260	0.3	<1	<0.1	12	4.2	3.8	15500	3.8		
101 Ravine	1	3000	<0.2	3.3	57	<0.1	<1	<0.1	5.3	2.1	1.8	5900	1.6	
	2	4300	<0.2	3.8	83	0.2	<1	<0.1	7.6	2.7	2.5	7300	2	
	3	2500	<0.2	2.6	51	<0.1	<1	<0.1	3.5	1.8	1.1	4700	1.3	
	4	4900	<0.2	4.6	91	0.2	<1	<0.1	7.9	2.7	2.5	7800	2.1	
	5	3800	<0.2	3.1	61	<0.1	<1	<0.1	5.8	2.2	1.9	6000	1.7	
	N ¹	5	5	5	5	5	5	5	5	5	5	5	5	
	N<DL ²	0	5	0	0	3	5	5	0	0	0	0	0	
	N>guidelines ³	-	-	0	-	-	-	-	0	-	0	-	0	
	Mean ⁴	3700	0.1	3.5	69	0.1	0.5	0.05	6.0	2.3	2.0	6340	2	
	SD ⁴	967.0	0	0.76	17.4	0.1	0	0	1.80	0.39	0.58	1230.0	0.3	
Median ⁴	3800	0.1	3.3	61	0.1	0.5	0.05	6	2	1.9	6000	2		
Minimum	2500	<0.2	2.6	51	<0.1	<1	<0.1	3.5	1.8	1.1	4700	1.3		
Maximum	4900	<0.2	4.6	91	0.2	<1	<0.1	7.9	2.7	2.5	7800	2.1		
West Perimeter Ravine	1	4600	<0.2	5.4	96	0.1	<1	<0.1	6.6	2.5	2.1	8600	2.3	
	2	4200	<0.2	4.4	72	<0.1	12	<0.1	5.1	2.2	1.4	7100	1.9	
	3	4400	<0.2	5.6	81	<0.1	<1	<0.1	6.4	2.3	2.5	8300	2	
	4	4900	<0.2	6.4	100	<0.1	<1	<0.1	6.2	2.5	1.9	8300	2.2	
	5	6000	<0.2	7.6	130	0.2	<1	<0.1	8.4	2.9	2.6	9700	2.6	
	N ¹	5	5	5	5	5	5	5	5	5	5	5	5	
	N<DL ²	0	5	0	0	3	4	5	0	0	0	0	0	
	N>guidelines ³	-	-	2	-	-	-	-	0	-	0	-	0	
	Mean ⁴	4820	0.1	5.9	96	0.1	3	0.05	6.5	2.5	2.1	8400	2	
	SD ⁴	708.5	0	1.20	22.2	0.07	5.14	0	1.19	0.27	0.48	927.4	0.3	
Median ⁴	4600	0.1	5.6	96	0.1	0.5	0.05	6	3	2.1	8300	2		
Minimum	4200	<0.2	4.4	72	<0.1	<1	<0.1	5.1	2.2	1.4	7100	1.9		
Maximum	6000	<0.2	7.6	130	0.2	12	<0.1	8.4	2.9	2.6	9700	2.6		

Table 58 Sediment chemistry parameters for all tributaries in the Project LSA, 2007 and 2008.

Tributary	Station	Metals (ug/g)												
		Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	
West Ravine	1	4000	<0.2	5.3	110	<0.1	<1	<0.1	6.7	2.4	1.9	8800	2	
	2	4700	<0.2	6.5	160	<0.1	<1	<0.1	6.5	2.8	2.3	10200	2.2	
	3	6100	<0.2	6.4	160	0.2	<1	<0.1	10	3.4	3.1	11400	2.9	
	4	3800	<0.2	5.5	100	<0.1	<1	<0.1	5.9	2.2	1.6	7800	1.9	
	5	4800	<0.2	7.1	170	<0.1	<1	<0.1	7.4	2.8	1.7	10200	2.2	
	N ¹	5	5	5	5	5	5	5	5	5	5	5	5	5
	N<DL ²	0	5	0	0	4	5	5	0	0	0	0	0	0
	N>guidelines ³	-	-	3	-	-	-	0	0	-	0	-	0	0
	Mean ⁴	4680	0.1	6.2	140	0.1	0.5	0.05	7	2.7	2.1	9680	2	
	SD ⁴	903.9	0.0	0.7	32.4	0.1	0	0	1.6	0.46	0.61	1397.1	0.4	
	Median ⁴	4700	0.1	6.4	160	0.1	0.5	0.05	7	3	1.9	10200	2	
Minimum	3800	<0.2	5.3	100	<0.1	<1	<0.1	5.9	2.2	1.6	7800	1.9		
Maximum	6100	<0.2	7.1	170	0.2	<1	<0.1	10	3.4	3.1	11400	2.9		
East Ravine	1	2600	<0.2	5	93	<0.1	<1	<0.1	5.1	2.1	2.0	5800	1.6	
	2	5200	<0.2	8.2	160	0.2	<1	<0.1	6.4	3	2.9	8300	2.5	
	3	3600	<0.2	6.1	100	<0.1	<1	<0.1	6.1	2.3	1.9	7300	2.1	
	4	11700	<0.2	11	240	0.4	<1	<0.1	15	4.4	5.2	13800	3.8	
	5	3400	<0.2	6.3	100	<0.1	<1	<0.1	6.2	2.3	3.2	6800	1.5	
	N ¹	5	5	5	5	5	5	5	5	5	5	5	5	
	N<DL ²	0	5	0	0	3	5	5	0	0	0	0	0	
	N>guidelines ³	-	-	4	-	-	-	0	0	-	0	-	0	
	Mean ⁴	5300	0.1	7	139	0.2	0.5	0.05	8	3	3.0	8400	2.3	
	SD ⁴	3700.0	0	2.4	62.8	0	0	0	4.1	0.9	1.33	3150.4	0.93	
	Median ⁴	3600	0.1	6.3	100	0.1	0.5	0.05	6	2	2.9	7300	2	
Minimum	2600	<0.2	5	93	<0.1	<1	<0.1	5.1	2.1	1.9	5800	1.5		
Maximum	11700	<0.2	11	240	0.4	<1	<0.1	15	4.4	5.2	13800	3.8		
Duke Ravine	1	7600	<0.2	7.2	130	0.2	<1	<0.1	10	3.6	3.4	8490	3.3	
	2	5300	<0.2	6.5	100	0.2	<1	<0.1	6.4	3.2	2.7	6840	2.7	
	3	8800	<0.2	7.5	140	0.3	<1	<0.1	7.1	3.8	3.1	8800	3.5	
	4	7500	<0.2	6.8	120	0.2	<1	<0.1	8.9	3.6	2.7	7900	3.3	
	5	11900	<0.2	11	200	0.3	<1	<0.1	16	5.3	6.5	12100	4.8	
	N ¹	5	5	5	5	5	5	5	5	5	5	5	5	
	N<DL ²	0	5	0	0	0	5	5	0	0	0	0	0	
	N>guidelines ³	-	-	5	-	-	-	0	0	-	0	-	0	
	Mean ⁴	8220	0.1	8	138	0.2	0.5	0.05	10	3.9	3.7	8826	3.5	
	SD ⁴	2413.9	0	1.8	37.7	0.05	0	0	3.8	0.81	1.60	1977.0	0.78	
	Median ⁴	7600	0.1	7.2	130	0.2	0.5	0.05	9	4	3.1	8490	3	
Minimum	5300	<0.2	6.5	100	0.2	<1	<0.1	6.4	3.2	2.7	6840	2.7		
Maximum	11900	<0.2	11	200	0.3	<1	<0.1	16	5.3	6.5	12100	4.8		
FALC Ravine	1	7600	<0.2	3.2	100	0.2	<1	<0.1	9	3.5	3.0	7500	3.2	
	2	19500	<0.2	6.2	230	0.5	<1	0.2	12	7.4	9.3	15500	6.5	
	3	10900	<0.2	4.5	140	0.3	<1	<0.1	11	4.6	4.9	10100	4.3	
	4	9500	<0.2	3.8	110	0.2	<1	<0.1	11	3.8	3.8	9700	4.1	

Table 58 Sediment chemistry parameters for all tributaries in the Project LSA, 2007 and 2008.

Tributary	Station	Metals (ug/g)											
		Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Iron	Lead
	5	7300	<0.2	3.3	91	0.2	<1	<0.1	7.1	3.1	2.6	7200	2.8
	N ¹	5	5	5	5	5	5	5	5	5	5	5	5
	N<DL ²	0	5	0	0	0	5	4	0	0	0	0	0
	N>guidelines ³	-	-	1	-	-	-	0	0	-	0	-	0
	Mean ⁴	10960	0.1	4.2	134	0.3	0.5	0.1	10	4.5	4.7	10000	4.2
	SD ⁴	4993.8	0	1.23	56.6	0.13	0	0	2.0	1.72	2.71	3333.2	1.44
	Median ⁴	9500	0.1	3.8	110	0.2	0.5	0.05	11	4	3.8	9700	4
	Minimum	7300	<0.2	3.2	91	0.2	<1	<0.1	7.1	3.1	2.6	7200	2.8
	Maximum	19500	<0.2	6.2	230	0.5	<1	0.2	12	7.4	9.3	15500	6.5
English Creek	1	4400	<0.2	6.9	120	0.2	<1	<0.1	7.5	2.5	1.8	6900	1.9
	2	14600	<0.2	25	450	0.5	<1	<0.1	18	6	9.4	19300	5.2
	3	16700	<0.2	27	480	0.5	<1	<0.1	22	6.4	10	21400	5.7
	4	14300	<0.2	19	380	0.4	<1	<0.1	18	5.5	7.7	17200	4.9
	5	12100	<0.2	9.8	220	0.4	<1	<0.1	14	5	6.4	13700	4.4
	N ¹	5	5	5	5	5	5	5	5	5	5	5	5
	N<DL ²	0	5	0	0	0	5	5	0	0	0	0	0
	N>guidelines ³	-	-	5	-	-	-	0	0	-	0	-	0
	Mean ⁴	12420	0.1	18	330	0.4	0.5	0.05	16	5	7	15700	4.4
	SD ⁴	4770.4	0	8.9	154.6	0.12	0	0	5.5	1.5	3.3	5682.0	1.49
	Median ⁴	14300	0.1	19	380	0.4	0.5	0.05	18	6	7.7	17200	5
	Minimum	4400	<0.2	6.9	120	0.2	<1	<0.1	7.5	2.5	1.8	6900	1.9
	Maximum	16700	<0.2	27	480	0.5	<1	<0.1	22	6.4	10	21400	5.7

Notes: 1N = number of samples.

2Number of samples less than the detection limit (DL).

3Number of samples greater than ISQG, PEL, or LEL guidelines.

4For calculation of mean, standard deviation (SD), and median, values < DL were set to half the value of DL.

Table 58 Sediment chemistry parameters for all tributaries in the Project LSA, 2007 and 2008.

Tributary	Station	Metals (ug/g)											
		Manganese	Molybdenum	Nickel	Selenium	Silver	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc
ISQG													123
PEL													315
LEL			13.8	23.4		1.9					104.4	35.2	
Caution Creek	1	350	0.2	4.6	<0.1	<0.1	11	<0.2	<0.1	160	0.3	13	37
	2	480	0.05	7.3	<0.1	<0.1	17	<0.2	<0.1	240	0.4	21	12
	3	550	0.2	5.5	<0.1	<0.1	13	<0.2	<0.1	200	0.3	16	41
	4	400	0.05	6.3	<0.1	<0.1	19	<0.2	<0.1	200	0.4	17	26
	5	800	0.05	9.1	<0.1	<0.1	30	<0.2	<0.1	320	0.5	25	17
	N ¹	5	5	5	5	5	5	5	5	5	5	5	5
	N<DL ²	0	3	0	5	5	0	5	5	0	0	0	0
	N>guidelines ³	-	0	0	-	0	-	-	-	-	0	0	0
	Mean ⁴	516	0.1	6.6	0.05	0.05	18	0.1	0.05	224	0.4	18	27
	SD ⁴	176.2	0.1	1.73	0	0	7.4	0	0	60.7	0.08	4.7	12.5
	Median ⁴	480	0.1	6.3	0.05	0.05	17	0.1	0.05	200	0.4	17	26
	Minimum	350	<0.1	4.6	<0.1	<0.1	11	<0.2	<0.1	160	0.3	13	12
	Maximum	800	0.2	9.1	<0.1	<0.1	30	<0.2	<0.1	320	0.5	25	41
101 Ravine	1	200	0.05	4.1	<0.1	<0.1	15	<0.2	<0.1	130	0.3	9.4	12
	2	290	0.05	5	<0.1	<0.1	24	<0.2	<0.1	230	0.5	14	24
	3	190	0.05	3.5	<0.1	<0.1	14	<0.2	<0.1	130	0.2	7.8	6.6
	4	370	0.05	5.8	<0.1	<0.1	25	<0.2	<0.1	160	0.4	15	6
	5	230	0.05	4.4	<0.1	<0.1	15	<0.2	<0.1	140	0.3	10	55
	N ¹	5	5	5	5	5	5	5	5	5	5	5	5
	N<DL ²	0	5	0	5	5	0	5	5	0	0	0	0
	N>guidelines ³	-	0	0	-	0	-	-	-	-	0	0	0
	Mean ⁴	256	0.05	5	0.05	0.05	19	0.1	0.05	158	0.3	11	21
	SD ⁴	74.7	0	0.9	0	0	5.4	0	0	42.1	0.11	3.1	20.5
	Median ⁴	230	0.1	4.4	0.05	0.05	15	0.1	0.05	140	0.3	10	12
	Minimum	190	<0.1	3.5	<0.1	<0.1	14	<0.2	<0.1	130	0.2	7.8	6
	Maximum	370	<0.1	5.8	<0.1	<0.1	25	<0.2	<0.1	230	0.5	15	55
West Perimeter Ravine	1	520	<0.1	5.1	<0.1	<0.1	21	<0.2	<0.1	170	0.4	12	8.4
	2	370	<0.1	4.1	<0.1	<0.1	18	<0.2	<0.1	180	0.3	11	7.7
	3	490	<0.1	4.4	<0.1	<0.1	19	<0.2	<0.1	180	0.4	12	8.8
	4	630	<0.1	4.7	<0.1	<0.1	22	<0.2	<0.1	160	0.3	12	9.4
	5	1080	0.2	6.1	<0.1	<0.1	26	<0.2	<0.1	160	0.3	16	12
	N ¹	5	5	5	5	5	5	5	5	5	5	5	5
	N<DL ²	0	4	0	5	5	0	5	5	0	0	0	0
	N>guidelines ³	-	0	0	-	0	-	-	-	-	0	0	0
	Mean ⁴	618	0.1	4.9	0.05	0.05	21	0.1	0.05	170	0.3	13	9
	SD ⁴	274.4	0.07	0.78	0	0	3.1	0	0	10.0	0.05	1.9	1.7
	Median ⁴	520	0.1	4.7	0.05	0.05	21	0.1	0.05	170	0.3	12	9
	Minimum	370	<0.1	4.1	<0.1	<0.1	18	<0.2	<0.1	160	0.3	11	7.7
	Maximum	1080	0.2	6.1	<0.1	<0.1	26	<0.2	<0.1	180	0.4	16	12

Table 58 Sediment chemistry parameters for all tributaries in the Project LSA, 2007 and 2008.

Tributary	Station	Metals (ug/g)											
		Manganese	Molybdenum	Nickel	Selenium	Silver	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc
West Ravine	1	630	<0.1	4.7	<0.1	<0.1	19	<0.2	<0.1	200	0.4	13	7.8
	2	1010	<0.1	5.4	<0.1	<0.1	18	<0.2	<0.1	190	0.3	13	10
	3	940	<0.1	6.7	<0.1	<0.1	19	<0.2	<0.1	230	0.4	17	18
	4	540	<0.1	4.1	<0.1	<0.1	14	<0.2	<0.1	160	0.3	11	8.5
	5	1400	<0.1	5.4	<0.1	<0.1	17	<0.2	<0.1	200	0.3	14	17
	N ¹	5	5	5	5	5	5	5	5	5	5	5	5
	N<DL ²	0	5	0	5	5	0	5	5	0	0	0	0
	N>guidelines ³	-	0	0	-	0	-	-	-	-	0	0	0
	Mean ⁴	904	0.05	5.3	0.05	0.05	17	0.1	0.05	196	0.3	14	12
	SD ⁴	341.4	0	0.97	0	0	2.1	0	0	25.1	0.05	2.2	4.9
	Median ⁴	940	0.1	5.4	0.05	0.05	18	0.1	0.05	200	0.3	13	10
Minimum	540	<0.1	4.1	<0.1	<0.1	14	<0.2	<0.1	160	0.3	11	7.8	
Maximum	1400	<0.1	6.7	<0.1	<0.1	19	<0.2	<0.1	230	0.4	17	18	
East Ravine	1	440	<0.1	4.3	<0.1	<0.1	12	<0.2	<0.1	150	0.3	8.9	14
	2	580	<0.1	6.8	<0.1	<0.1	16	<0.2	<0.1	220	0.4	16	18
	3	320	<0.1	5.1	<0.1	<0.1	12	<0.2	<0.1	150	0.3	12	13
	4	780	<0.1	11	<0.1	<0.1	26	<0.2	<0.1	460	0.7	32	37
	5	500	<0.1	4.7	<0.1	<0.1	14	<0.2	<0.1	220	0.4	9.7	15
	N ¹	5	5	5	5	5	5	5	5	5	5	5	5
	N<DL ²	0	5	0	5	5	0	5	5	0	0	0	0
	N>guidelines ³	-	0	0	-	0	-	-	-	-	0	0	0
	Mean ⁴	524	0.05	6.4	0.05	0.05	16	0.1	0.05	240	0.4	16	19
	SD ⁴	171.7	0	2.75	0	0	5.8	0	0	127.9	0.16	9.5	10.0
	Median ⁴	500	0.1	5.1	0.05	0.05	14	0.1	0.05	220	0.4	12	15
Minimum	320	<0.1	4.3	<0.1	<0.1	12	<0.2	<0.1	150	0.3	8.9	13	
Maximum	780	<0.1	11	<0.1	<0.1	26	<0.2	<0.1	460	0.7	32	37	
Duke Ravine	1	480	<0.1	7.3	0.2	<0.1	28	<0.2	0.1	410	0.6	23	21
	2	310	<0.1	6.3	0.1	<0.1	20	<0.2	0.1	260	0.5	17	16
	3	350	<0.1	8.2	0.2	<0.1	27	<0.2	<0.1	410	0.7	25	24
	4	300	<0.1	7.5	0.1	<0.1	25	<0.2	0.1	380	0.6	22	22
	5	540	<0.1	13	0.4	<0.1	41	<0.2	0.1	510	0.9	34	34
	N ¹	5	5	5	5	5	5	5	5	5	5	5	5
	N<DL ²	0	5	0	0	5	0	5	1	0	0	0	0
	N>guidelines ³	-	0	0	-	0	-	-	-	-	0	0	0
	Mean ⁴	396	0.05	8.5	0.2	0.05	28	0.1	0.1	394	0.7	24	23
	SD ⁴	107.8	0	2.63	0.12	0	7.8	0	0	89.6	0.15	6.2	6.6
	Median ⁴	350	0.1	7.5	0.20	0.05	27	0.1	0.10	410	0.6	23	22
Minimum	300	<0.1	6.3	0.1	<0.1	20	<0.2	<0.1	260	0.5	17	16	
Maximum	540	<0.1	13	0.4	<0.1	41	<0.2	0.1	510	0.9	34	34	
FALC Ravine	1	190	<0.1	6.9	0.1	<0.1	18	0.1	1.4	360	0.4	21	18
	2	500	<0.1	16	0.5	<0.1	40	0.2	0.8	640	0.8	46	43
	3	290	<0.1	9.9	0.2	<0.1	25	0.1	0.2	380	0.5	28	25
	4	200	<0.1	8.0	0.1	<0.1	20	0.1	1.1	450	0.6	26	26

Table 58 Sediment chemistry parameters for all tributaries in the Project LSA, 2007 and 2008.

Tributary	Station	Metals (ug/g)											
		Manganese	Molybdenum	Nickel	Selenium	Silver	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc
	5	180	<0.1	6.2	0.1	<0.1	17	0.1	0.1	290	0.4	19	19
	N ¹	5	5	5.0	5	5	5	5	5	5	5	5	5
	N<DL ²	0	5	0	0	5	0	4	0	0	0	0	0
	N>guidelines ³	-	0	0	-	0	-	-	-	-	0	1	0
	Mean ⁴	272	0.05	9.4	0.2	0.05	24	0.1	0.7	424	0.5	28	26
	SD ⁴	134.8	0	3.95	0.17	0	9.5	0	0.56	133.5	0.17	10.7	10.0
	Median ⁴	200	0.1	8.0	0.10	0.05	20	0.1	0.80	380	0.5	26	25
	Minimum	180	<0.1	6.2	0.1	<0.1	17	<0.2	0.1	290	0.4	19	18
	Maximum	500	<0.1	16	0.5	<0.1	40	0.2	1.4	640	0.8	46	43
English Creek	1	440	<0.1	5.6	<0.1	<0.1	17	<0.2	<0.1	170	0.3	15	22
	2	2370	0.3	16	0.5	<0.1	55	<0.2	<0.1	540	0.8	44	32
	3	2800	0.1	17	0.5	<0.1	60	<0.2	<0.1	510	0.8	46	32
	4	1580	<0.1	15	0.3	<0.1	53	<0.2	<0.1	480	0.7	42	27
	5	510	<0.1	13	<0.1	<0.1	46	<0.2	<0.1	440	0.8	36	28
	N ¹	5	5	5	5	5	5	5	5	5	5	5	5
	N<DL ²	0	3	0	2	5	0	5	5	0	0	0	0
	N>guidelines ³	-	0	0	-	0	-	-	-	-	0	4	0
	Mean ⁴	1540	0.1	13.3	0.3	0.05	46	0.1	0.05	428	0.7	37	28
	SD ⁴	1066.4	0	4.56	0	0	17.1	0	0	148.9	0.22	12.6	4.1
	Median ⁴	1580	0.1	15.0	0.30	0.05	53	0.1	0.05	480	0.8	42	28
	Minimum	440	<0.1	5.6	<0.1	<0.1	17	<0.2	<0.1	170	0.3	15	22
	Maximum	2800	0.3	17	0.5	<0.1	60	<0.2	<0.1	540	0.8	46	32

Table 59 Sediment chemistry parameters for all Saskatchewan River sampling areas in the Project LSA, 2007 and 2008.

Location	Station	Inorganic Ions (ug/g)					Nutrients	
		Calcium	Magnesium	Potassium	Sodium	Sulfate, acid soluble	Organic carbon (%)	Phosphorus (ug/g)
ISQG								
PEL								
LEL								
Upstream of Caution Creek	1	37600	8500	1300	260	1000	0.91	490
	2	43000	11000	1600	240	560	0.95	490
	3	43500	13900	1500	200	390	0.36	540
	4	39700	10100	1000	170	220	0.11	440
	5	43400	13600	1700	250	570	0.63	560
	N ¹	5	5	5	5	5	5	5
	N<DL ²	0	0	0	0	0	0	0
	N>guidelines ³	-	-	-	-	-	-	-
	Mean ⁴	41440	11420	1420	224	548	0.59	504
	SD ⁴	2659.5	2310.2	277.5	37.8	290.5	0.359	47.2
Median ⁴	43000	11000	1500	240	560	0.63	490	
Minimum	37600	8500	1000	170	220	0.11	440	
Maximum	43500	13900	1700	260	1000	0.95	560	
Downstream of Caution Creek	1	25900	6000	1000	170	300	0.01	370
	2	25200	5000	550	160	90	0.06	300
	3	34000	7300	840	160	150	0.07	380
	4	29000	6200	1000	170	490	0.66	390
	5	39900	9300	1300	200	600	0.98	480
	N ¹	5	5	5	5	5	5	5
	N<DL ²	0	0	0	0	0	0	0
	N>guidelines ³	-	-	-	-	-	-	-
	Mean ⁴	30800	6760	938	172	326	0.36	384
	SD ⁴	6157.5	1638.0	273.3	16.4	217.6	0.439	64.3
Median ⁴	29000	6200	1000	170	300	0.07	380	
Minimum	25200	5000	550	160	90	0.01	300	
Maximum	39900	9300	1300	200	600	0.98	480	
Downstream of 101 Ravine	1	20900	4400	750	270	120	0.09	300
	2	22400	4800	750	220	140	0.02	300
	3	25800	5600	750	160	140	0.15	320
	4	27900	6000	970	270	180	0.01	330
	5	36300	8700	1000	220	180	0.27	410
	N ¹	5	5	5	5	5	5	5
	N<DL ²	0	0	0	0	0	0	0
	N>guidelines ³	-	-	-	-	-	-	-
	Mean ⁴	26660	5900	844	228	152	0.11	332
	SD ⁴	6052.5	1688.2	129.2	45.5	26.8	0.107	45.5
Median ⁴	25800	5600	750	220	140	0.09	320	
Minimum	20900	4400	750	160	120	0.01	300	
Maximum	36300	8700	1000	270	180	0.27	410	
Downstream of West Perimeter Ravine	1	44100	13900	2500	320	470	0.50	560

Table 59 Sediment chemistry parameters for all Saskatchewan River sampling areas in the Project LSA, 2007 and 2008.

Location	Station	Inorganic Ions (ug/g)					Nutrients	
		Calcium	Magnesium	Potassium	Sodium	Sulfate, acid soluble	Organic carbon (%)	Phosphorus (ug/g)
	2	49300	15700	5100	430	920	1.16	710
	3	47600	13900	4200	380	1200	1.69	670
	4	45500	11900	3300	350	1500	2.39	650
	5	38600	10000	1700	250	620	0.78	470
	6	48600	15100	4200	410	890	1.39	670
	N ¹	6	6	6	6	6	6	6
	N<DL ²	0	0	0	0	0	0	0
	N>guidelines ³	-	-	-	-	-	-	-
	Mean ⁴	45920	13320	3700	364	1026	1.48	634
	SD ⁴	4335.6	2356.3	1286.5	70.6	335.2	0.607	94.2
	Median ⁴	46550	13900	3750	365	905	1.28	660
	Minimum	38600	10000	1700	250	620	0.78	470
	Maximum	49300	15700	5100	430	1500	2.39	710
Downstream of West Ravine	1	34000	9200	1700	390	190	0.01	410
	2	30100	7600	1200	340	120	0.16	410
	3	42400	12700	1900	320	280	0.11	550
	4	38200	10700	3000	400	560	0.23	530
	5	42900	11900	2000	320	370	0.4	540
	N ¹	5	5	5	5	5	5	5
	N<DL ²	0	0	0	0	0	0	0
	N>guidelines ³	-	-	-	-	-	-	-
	Mean ⁴	37520	10420	1960	354	304	0.18	488
	SD ⁴	5492.4	2056.0	658.0	38.5	171.3	0.146	71.6
	Median ⁴	38200	10700	1900	340	280	0.16	530
	Minimum	30100	7600	1200	320	120	0.01	410
	Maximum	42900	12700	3000	400	560	0.4	550
Downstream of East Ravine	1	26400	5700	770	200	170	0.10	300
	2	6560	2000	550	260	90	0.01	150
	3	17600	4300	630	190	90	0.04	240
	4	30100	6900	640	180	100	0.01	350
	5	30700	7000	730	180	90	0.02	340
	6	32100	7300	780	180	120	0.01	360
	N ¹	6	6	6	6	6	6	6
	N<DL ²	0	0	0	0	0	0	0
	N>guidelines ³	-	-	-	-	-	-	-
	Mean ⁴	23910	5533	683	198	110	0.03	290
	SD ⁴	9985.3	2057.8	91.1	31.3	31.6	0.0	81.5
	Median ⁴	28250	6300	685	185	95	0.02	320
	Minimum	6560	2000	550	180	90	0.01	150
	Maximum	32100	7300	780	260	170	0.1	360
Downstream of Duke Ravine	1	30200	8840	2860	180	510	0.7	400
	2	48100	12200	5480	270	1100	2.0	580
	3	31500	9000	2240	170	230	0.4	390

Table 59 Sediment chemistry parameters for all Saskatchewan River sampling areas in the Project LSA, 2007 and 2008.

Location	Station	Inorganic Ions (ug/g)					Nutrients	
		Calcium	Magnesium	Potassium	Sodium	Sulfate, acid soluble	Organic carbon (%)	Phosphorus (ug/g)
	4	37300	11200	3230	220	330	0.7	460
	5	39100	12900	3270	230	270	0.4	450
	N ¹	5	5	5	5	5	5	5
	N<DL ²	0	0	0	0	0	0	0
	N>guidelines ³	-	-	-	-	-	-	-
	Mean ⁴	37240	10828	3416	214	488	0.8	456
	SD ⁴	7139.9	1844.4	1225.6	40.4	358.5	0.67	75.7
	Median ⁴	37300	11200	3230	220	330	0.70	450
	Minimum	30200	8840	2240	170	230	0.4	390
	Maximum	48100	12900	5480	270	1100	2	580
Downstream of FALC Ravine	1	40800	12100	4690	300	560	1.1	480
	2	50200	14100	6640	370	1100	2.2	630
	3	53900	15000	7440	410	1500	2.7	670
	4	45700	13200	4900	310	860	1.8	540
	5	44700	14000	5020	310	590	1.1	560
	N ¹	5	5	5	5	5	5	5
	N<DL ²	0	0	0	0	0	0	0
	N>guidelines ³	-	-	-	-	-	-	-
	Mean ⁴	47060	13680	5738	340	922	1.8	576
	SD ⁴	5080.6	1089.5	1227.4	48.0	390.8	0.70	75.0
	Median ⁴	45700	14000	5020	310	860	1.80	560
	Minimum	40800	12100	4690	300	560	1.1	480
	Maximum	53900	15000	7440	410	1500	2.7	670
Downstream of Wapiti Ravine	1	41700	12900	4630	290	570	1.5	510
	2	47400	15000	6730	380	1100	2.3	620
	3	49900	15800	6990	400	1200	2.2	640
	4	49000	15600	6180	320	910	2.1	640
	5	41600	12900	4390	260	480	2.3	510
	N ¹	5	5	5	5	5	5	5
	N<DL ²	0	0	0	0	0	0	0
	N>guidelines ³	-	-	-	-	-	-	-
	Mean ⁴	45920	14440	5784	330	852	2.1	584
	SD ⁴	3999.6	1436.3	1202.2	59.2	317.8	0.33	68.0
	Median ⁴	47400	15000	6180	320	910	2.2	620.0
	Minimum	41600	12900	4390	260	480	1.5	510
	Maximum	49900	15800	6990	400	1200	2.3	640
Downstream of English Creek	1	37500	9100	1200	190	690	1.69	500
	2	47100	14700	4500	470	870	1.49	740
	3	48600	14500	4100	420	680	0.92	720
	4	50600	15600	3300	290	690	0.75	670
	5	46100	15300	3400	310	500	0.86	630
	N ¹	5	5	5	5	5	5	5
	N<DL ²	0	0	0	0	0	0	0

Table 59 Sediment chemistry parameters for all Saskatchewan River sampling areas in the Project LSA, 2007 and 2008.

Location	Station	Inorganic Ions (ug/g)					Nutrients	
		Calcium	Magnesium	Potassium	Sodium	Sulfate, acid soluble	Organic carbon (%)	Phosphorus (ug/g)
	N>guidelines ³	-	-	-	-	-	-	-
	Mean ⁴	45980	13840	3300	336	686	1.14	652
	SD ⁴	5034.6	2686.6	1274.8	110.8	130.9	0.419	95.2
	Median ⁴	47100	14700	3400	310	690	0.9	670.0
	Minimum	37500	9100	1200	190	500	0.75	500
	Maximum	50600	15600	4500	470	870	1.69	740

Notes: 1N = number of samples.

2Number of samples less than the detection limit (DL).

3Number of samples greater than ISQG, PEL, or LEL guidelines.

4For calculation of mean, standard deviation (SD), and median, values < DL were set to half the value of DL.

Table 59 Sediment chemistry parameters for all Saskatchewan River sampling areas in the Project LSA, 2007 and 2008.

Location	Station	Metals (ug/g)												
		Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	
ISQG				5.9				0.6	37.3		35.7		35	
PEL				17				3.5	90.0		197.0		91.3	
LEL				9.8					47.6					
Upstream of Caution Creek	1	15600	<0.2	7.3	230	0.6	<1	0.2	15	7.1	12	16500	7.7	
	2	16700	<0.2	6.0	190	0.6	<1	0.2	24	7.5	13	18000	7.3	
	3	17500	<0.2	6.1	200	0.6	<1	<0.1	21	7.3	12	18100	7.2	
	4	12100	<0.2	4.7	160	0.5	<1	0.2	21	6.0	6.1	13300	5.6	
	5	18600	<0.2	6.9	220	0.6	<1	0.2	24	7.5	13	20400	7.6	
	N ¹	5	5	5	5	5	5	5	5	5	5	5	5	5
	N<DL ²	0	5	0	0	0	5	1	0	0	0	0	0	0
	N>guidelines ³	-	-	4	-	-	-	0	0	-	0	-	-	0
	Mean ⁴	16100	0.1	6.2	200	0.6	0.5	0.2	21	7.1	11	17260	7.1	
	SD ⁴	2491.0	0.0	1.00	27.4	0.04	0.0	0.1	3.7	0.63	2.9	2615.9	0.85	
Median ⁴	16700	0.1	6.1	200	0.6	0.5	0.2	21	7.3	12	18000	7.3		
Minimum	12100	<0.2	4.7	160	0.5	<1	<0.1	15	6	6.1	13300	5.6		
Maximum	18600	<0.2	7.3	230	0.6	<1	0.2	24	7.5	13	20400	7.7		
Downstream of Caution Creek	1	8700	<0.2	5.7	130	0.3	<1	0.2	16	6.0	5.4	12000	5.7	
	2	4500	<0.2	4.4	69	0.2	<1	<0.1	9.5	4.8	1.7	8500	4.2	
	3	8200	<0.2	4.7	120	0.3	<1	<0.1	15	5.6	3.5	11200	5.1	
	4	12200	<0.2	6.6	150	0.4	<1	<0.1	15	6.8	8.7	15000	6.8	
	5	18300	<0.2	7.3	210	0.6	<1	0.2	26	7.9	12	18600	8.1	
	N ¹	5	5	5	5	5	5	5	5	5	5	5	5	
	N<DL ²	0	5	0	0	0	5	3	0	0	0	0	0	
	N>guidelines ³	-	-	2	-	-	-	0	0	-	0	-	-	0
	Mean ⁴	10380	0.1	5.7	136	0.4	0.5	0.1	16	6.2	6.3	13060	6.0	
	SD ⁴	5200.7	0.0	1.23	51.1	0.15	0.0	0.1	6.0	1.18	4.12	3867.6	1.52	
Median ⁴	8700	0.1	5.7	130	0.3	0.5	0.1	15	6.0	5	12000	5.7		
Minimum	4500	<0.2	4.4	69	0.2	<1	<0.1	9.5	4.8	1.7	8500	4.2		
Maximum	18300	<0.2	7.3	210	0.6	<1	0.2	26	7.9	12	18600	8.1		
Downstream of 101 Ravine	1	4900	<0.2	4.8	100	0.2	<1	<0.1	7.8	4.7	2.0	8000	4.2	
	2	5800	<0.2	5	110	0.2	<1	<0.1	9.0	5.2	2.5	9000	4.7	
	3	7000	<0.2	4.8	100	0.3	<1	<0.1	7.8	5.0	2.7	10000	4.9	
	4	7200	<0.2	4.8	110	0.3	<1	<0.1	9.8	5.6	3.1	10200	5.2	
	5	9400	<0.2	6	150	0.4	<1	<0.1	13	6.4	4.4	12900	6.3	
	N ¹	5	5	5	5	5	5	5	5	5	5	5	5	
	N<DL ²	0	5	0	0	0	5	5	0	0	0	0	0	
	N>guidelines ³	-	-	1	-	-	-	0	0	-	0	-	-	0
	Mean ⁴	6860	0.1	5	114	0.3	0.5	0.05	9.5	5.4	2.9	10020	5.1	
	SD ⁴	1699.4	0	0.5	20.7	0.08	0	0	2.14	0.66	0.91	1833.6	0.78	
Median ⁴	7000	0.1	4.8	110	0.3	0.5	0.1	9	5.2	3	10000	4.9		
Minimum	4900	<0.2	4.8	100	0.2	<1	<0.1	7.8	4.7	2	8000	4.2		
Maximum	9400	<0.2	6	150	0.4	<1	<0.1	13	6.4	4.4	12900	6.3		

Table 59 Sediment chemistry parameters for all Saskatchewan River sampling areas in the Project LSA, 2007 and 2008.

Location	Station	Metals (ug/g)												
		Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	
Downstream of West Perimeter Ravine	1	15600	<0.2	5.0	190	0.5	<1	0.2	21	6.9	11	16400	6.8	
	2	25200	<0.2	6.1	250	0.7	<1	0.3	23	7.5	16	20400	8.4	
	3	24900	<0.2	6.7	250	0.8	<1	0.3	29	8.4	19	22500	9.0	
	4	20600	<0.2	6.5	230	0.7	<1	0.3	17	7.9	17	20500	8.7	
	5	10600	<0.2	5.4	140	0.4	<1	<0.1	9.7	6.0	7.4	12800	6.2	
	6	20800	<0.2	6.1	220	0.7	<1	0.2	19	7.4	15	18500	8.1	
	N ¹	6	6	6	6	6	6	6	6	6	6	6	6	6
	N<DL ²	0	6	0	0	0	6	1	0	0	0	0	0	0
	N>guidelines ³	-	-	4	-	-	-	0	0	-	0	-	0	0
	Mean ⁴	20420	0.1	6.2	218	0.7	0.5	0.2	20	7.4	15	18940	8.1	
	SD ⁴	5906.1	0.0	0.50	45.5	0.15	0.0	0.1	7.2	0.90	4.4	3712.5	1.10	
Median ⁴	20700	0.1	6.1	225	0.7	0.5	0.3	20	7.5	16	19450	8.3		
Minimum	10600	<0.2	5.4	140	0.4	<1	<0.1	9.7	6	7.4	12800	6.2		
Maximum	25200	<0.2	6.7	250	0.8	<1	0.3	29	8.4	19	22500	9		
Downstream of West Ravine	1	10100	<0.2	4.6	130	0.3	<1	<0.1	10	5.3	4.3	11200	5.1	
	2	7800	<0.2	4.3	130	0.2	<1	<0.1	9.9	5	3.1	10800	4.7	
	3	12500	<0.2	4.0	170	0.4	<1	<0.1	18	5.7	6.0	13300	5.5	
	4	18100	<0.2	5.9	200	0.5	<1	<0.1	15	6.5	9.9	16700	6.8	
	5	15500	<0.2	5.2	170	0.5	<1	<0.1	21	6.7	8.3	15500	6.5	
	N ¹	5	5	5	5	5	5	5	5	5	5	5	5	
	N<DL ²	0	5	0	0	0	5	5	0	0	0	0	0	
	N>guidelines ³	-	-	0	-	-	-	0	0	-	0	-	0	
	Mean ⁴	12800	0.1	4.8	160	0.4	0.5	0.05	15	5.8	6.3	13500	5.7	
	SD ⁴	4115.8	0.0	0.76	30.0	0.13	0.0	0.0	4.9	0.74	2.80	2591.3	0.90	
	Median ⁴	12500	0.1	4.6	170	0.4	0.5	0.1	15	5.7	6	13300	5.5	
Minimum	7800	<0.2	4	130	0.2	<1	<0.1	9.9	5	3.1	10800	4.7		
Maximum	18100	<0.2	5.9	200	0.5	<1	<0.1	21	6.7	9.9	16700	6.8		
Downstream of East Ravine	1	7700	<0.2	5.7	120	0.2	<1	<0.1	9.9	4.7	3.0	11400	4.4	
	2	2800	<0.2	4.2	78	0.1	<1	<0.1	4	2.3	1.3	5300	2.2	
	3	3200	<0.2	3.5	59	0.1	<1	<0.1	5.1	2.7	1.1	5600	2.6	
	4	7000	<0.2	4.4	120	0.2	<1	<0.1	13	4.5	2.0	8800	4.2	
	5	7200	<0.2	4.4	110	0.3	<1	<0.1	9.2	4.9	2.0	9600	4.6	
	6	8700	<0.2	4.7	130	0.3	<1	<0.1	15	5.3	3.2	10300	5.1	
	N ¹	6	6	6	6	6	6	6	6	6	6	6	6	
	N<DL ²	0	6	0	0	0	6	6	0	0	0	0	0	
	N>guidelines ³	-	-	0	-	-	-	0	0	-	0	-	0	
	Mean ⁴	6100	0.1	4	103	0.2	0.5	0.05	9	4	2	8500	4	
	SD ⁴	2475.5	0	0.7	28.0	0.1	0	0	4.3	1.2	0.9	2514.0	1.2	
Median ⁴	7100	0.1	4.4	115	0.2	0.5	0.1	10	4.6	2	9200	4.3		
Minimum	2800	<0.2	3.5	59	0.1	<1	<0.1	4	2.3	1.1	5300	2.2		
Maximum	8700	<0.2	5.7	130	0.3	<1	<0.1	15	5.3	3.2	11400	5.1		
Downstream of Duke Ravine	1	14600	<0.2	8.7	190	0.5	<1	0.1	11	5.6	7	12800	5.7	
	2	27000	<0.2	8.3	300	0.8	<1	0.3	15	8.8	16	19600	10.0	

Table 59 Sediment chemistry parameters for all Saskatchewan River sampling areas in the Project LSA, 2007 and 2008.

Location	Station	Metals (ug/g)											
		Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Iron	Lead
	N<DL ²	0	5	0	0	0	5	0	0	0	0	0	0
	N>guidelines ³	-	-	5	-	-	-	0	0	-	0	-	0
	Mean ⁴	20300	0.1	7.4	262	0.7	0.5	0.2	21	7.2	13	19740	7
	SD ⁴	1760.7	0	1.45	19.2	0.05	0	0	4.2	0.24	0.7	1293.4	0.4
	Median ⁴	20500	0.1	7	260.0	1	1	0.2	19.0	7.1	13.0	20500	7.0
	Minimum	17400	<0.2	6	240	0.6	<1	0.2	18	6.9	12	17700	6.6
	Maximum	21800	<0.2	9.1	290	0.7	<1	0.2	28	7.5	14	20700	7.6

Table 59 Sediment chemistry parameters for all Saskatchewan River sampling areas in the Project LSA, 2007 and 2008.

Location	Station	Metals (ug/g)												
		Manganese	Molybdenum	Nickel	Selenium	Silver	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc	
	ISQG												123	
	PEL												315	
	LEL		13.8	23.4		1.9					104.4	35.2		
Upstream of Caution Creek	1	350	0.3	19	0.3	<0.1	83	<0.2	<0.1	440	0.9	43	45	
	2	360	0.2	23	0.2	<0.1	91	<0.2	<0.1	310	0.8	44	48	
	3	380	0.2	23	<0.1	<0.1	89	<0.2	<0.1	340	0.9	46	48	
	4	300	0.2	18	<0.1	<0.1	72	<0.2	<0.1	320	0.7	38	48	
	5	500	0.2	23	0.2	<0.1	96	<0.2	<0.1	300	0.9	48	53	
	N ¹	5	5	5	5	5	5	5	5	5	5	5	5	5
	N<DL ²	0	0	0	2	5	0	5	5	0	0	0	0	0
	N>guidelines ³	-	0	0	-	0	-	-	-	-	-	0	5	0
	Mean ⁴	378	0.2	21	0.2	0.05	86	0.1	0.05	342	0.8	44	48	
	SD ⁴	74.3	0.04	2.5	0.1	0.0	9.2	0.0	0.0	56.7	0.09	3.8	2.9	
Median ⁴	360	0.2	23	0.2	0.05	89	0.1	0.05	320	0.9	44	48		
Minimum	300	0.2	18	<0.1	<0.1	72	<0.2	<0.1	300	0.7	38	45		
Maximum	500	0.3	23	0.3	<0.1	96	<0.2	<0.1	440	0.9	48	53		
Downstream of Caution Creek	1	300	<0.1	16	<0.1	<0.1	53	<0.2	<0.1	210	0.5	26	25	
	2	220	<0.1	11	<0.1	<0.1	39	<0.2	<0.1	160	0.4	15	19	
	3	270	0.2	15	<0.1	<0.1	57	<0.2	<0.1	260	0.5	28	27	
	4	370	0.2	19	<0.1	<0.1	65	<0.2	<0.1	240	0.6	34	35	
	5	440	0.3	24	0.2	<0.1	94	<0.2	<0.1	470	0.8	52	98	
	N ¹	5	5	5	5	5	5	5	5	5	5	5	5	
	N<DL ²	0	2	0	4	5	0	5	5	0	0	0	0	
	N>guidelines ³	-	0	1	-	0	-	-	-	-	0	1	0	
	Mean ⁴	320	0.2	17	0.1	0.05	62	0.1	0.05	268	0.6	31	41	
	SD ⁴	86.3	0.1	4.8	0.1	0.0	20.4	0.0	0.0	119.0	0.15	13.6	32.5	
Median ⁴	300	0.2	16	0.1	0.05	57	0.1	0.05	240	0.5	28	27		
Minimum	220	<0.1	11	<0.1	<0.1	39	<0.2	<0.1	160	0.4	15	19		
Maximum	440	0.3	24	0.2	<0.1	94	<0.2	<0.1	470	0.8	52	98		
Downstream of 101 Ravine	1	180	<0.1	11	<0.1	<0.1	39	<0.2	<0.1	170	0.4	17	23	
	2	210	<0.1	12	<0.1	<0.1	43	<0.2	<0.1	170	0.4	19	20	
	3	210	<0.1	13	<0.1	<0.1	46	<0.2	<0.1	210	0.5	22	32	
	4	230	<0.1	14	<0.1	<0.1	49	<0.2	<0.1	200	0.5	23	32	
	5	280	0.2	17	<0.1	<0.1	63	<0.2	<0.1	320	0.7	31	38	
	N ¹	5	5	5	5	5	5	5	5	5	5	5	5	
	N<DL ²	0	4	0	5	5	0	5	5	0	0	0	0	
	N>guidelines ³	-	0	0	-	0	-	-	-	-	0	0	0	
	Mean ⁴	222	0.1	13	0.05	0.05	48	0.1	0.05	214	0.5	22	29	
	SD ⁴	37.0	0.07	2.3	0	0	9.2	0	0	61.9	0.12	5.4	7.3	
Median ⁴	210	0.1	13	0.1	0.05	46	0.1	0.05	200	0.5	22	32		
Minimum	180	<0.1	11	<0.1	<0.1	39	<0.2	<0.1	170	0.4	17	20		
Maximum	280	0.2	17	<0.1	<0.1	63	<0.2	<0.1	320	0.7	31	38		

Table 59 Sediment chemistry parameters for all Saskatchewan River sampling areas in the Project LSA, 2007 and 2008.

Location	Station	Metals (ug/g)												
		Manganese	Molybdenum	Nickel	Selenium	Silver	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc	
Downstream of West Perimeter Ravine	1	340	0.1	20	<0.1	0.1	82	<0.2	<0.1	230	0.9	38	45	
	2	390	0.3	23	0.2	0.1	100	0.2	0.1	400	1.0	55	58	
	3	440	0.3	26	0.3	0.1	110	<0.2	0.05	330	1.0	55	66	
	4	440	0.2	24	0.3	<0.1	100	<0.2	<0.1	250	0.9	42	58	
	5	310	<0.1	16	<0.1	<0.1	67	<0.2	<0.1	130	0.6	24	36	
	6	380	0.1	22	0.2	<0.1	97	<0.2	<0.1	280	0.9	45	54	
	N ¹	6	6	6	6	6	6	6	6	6	6	6	6	6
	N<DL ²	0	1	0	2	3	0	5	5	0	0	0	0	0
	N>guidelines ³	-	0	2	-	0	-	-	-	-	0	5	0	0
	Mean ⁴	392	0.2	22	0.2	0.1	95	0.1	0.1	278	0.9	44	54	
SD ⁴	53.6	0.1	3.8	0.1	0.0	16.3	0.0	0.0	100.3	0.16	12.7	11.2		
Median ⁴	385	0.2	22.5	0.2	0.075	99	0.1	0.05	265	0.9	43.5	56		
Minimum	310	<0.1	16	<0.1	<0.1	67	<0.2	<0.1	130	0.6	24	36		
Maximum	440	0.3	26	0.3	0.1	110	0.2	0.1	400	1	55	66		
Downstream of West Ravine	1	240	<0.1	14	<0.1	<0.1	55	<0.2	<0.1	250	0.6	26	31	
	2	230	<0.1	12	<0.1	<0.1	48	<0.2	<0.1	250	0.6	22	35	
	3	310	<0.1	16	<0.1	<0.1	72	<0.2	<0.1	310	0.7	34	43	
	4	370	0.1	19	<0.1	<0.1	79	<0.2	<0.1	450	0.8	43	56	
	5	370	<0.1	19	<0.1	<0.1	84	<0.2	<0.1	300	0.8	40	54	
	N ¹	5	5	5	5	5	5	5	5	5	5	5	5	
	N<DL ²	0	4	0	5	5	0	5	5	0	0	0	0	
	N>guidelines ³	-	0	0	-	0	-	-	-	-	0	2	0	
	Mean ⁴	304	0.1	16	0.05	0.05	68	0.1	0.05	312	0.7	33	44	
	SD ⁴	67.7	0.0	3.1	0.0	0.0	15.5	0.0	0.0	82.0	0.10	8.9	11.1	
Median ⁴	310	0.1	16	0.1	0.05	72	0.1	0.05	300	0.7	34	43		
Minimum	230	<0.1	12	<0.1	<0.1	48	<0.2	<0.1	250	0.6	22	31		
Maximum	370	0.1	19	<0.1	<0.1	84	<0.2	<0.1	450	0.8	43	56		
Downstream of East Ravine	1	240	<0.1	12	<0.1	<0.1	47	<0.2	<0.1	260	0.5	24	35	
	2	220	<0.1	4.6	<0.1	<0.1	20	<0.2	<0.1	100	0.3	8.5	2.3	
	3	190	<0.1	6.3	<0.1	<0.1	23	<0.2	<0.1	110	0.2	11	23	
	4	220	<0.1	12	<0.1	<0.1	48	<0.2	<0.1	280	0.5	24	26	
	5	200	<0.1	12	<0.1	<0.1	48	<0.2	<0.1	230	0.5	23	27	
	6	240	0.2	14	<0.1	<0.1	54	<0.2	<0.1	280	0.6	29	32	
	N ¹	6	6	6	6	6	6	6	6	6	6	6	6	
	N<DL ²	0	5	0	6	6	0	6	6	0	0	0	0	
	N>guidelines ³	-	0	0	-	0	-	-	-	-	0	0	0	
	Mean ⁴	218	0.08	10	0.05	0.05	40	0.1	0.05	210	0.4	20	24	
SD ⁴	20.4	0.1	3.8	0	0	14.6	0	0	83.4	0.2	8.2	11.6		
Median ⁴	220	0.1	12	0.1	0.05	48	0.1	0.05	245	0.5	24	27		
Minimum	190	<0.1	4.6	<0.1	<0.1	20	<0.2	<0.1	100	0.2	8.5	2.3		
Maximum	240	0.2	14	<0.1	<0.1	54	<0.2	<0.1	280	0.6	29	35		
Downstream of Duke Ravine	1	360	<0.1	14	0.3	<0.1	62	<0.2	0.2	500	0.8	37	39	
	2	450	0.2	23	0.6	<0.1	120	0.3	0.4	740	1.2	63	71	

Table 59 Sediment chemistry parameters for all Saskatchewan River sampling areas in the Project LSA, 2007 and 2008.

Location	Station	Metals (ug/g)											
		Manganese	Molybdenum	Nickel	Selenium	Silver	Strontium	Thallium	Tin	Titanium	Uranium	Vanadium	Zinc
	N<DL ²	0	0	0	2	5	0	5	5	0	0	0	0
	N>guidelines ³	-	0	0	-	0	-	-	-	-	0	5	0
	Mean ⁴	520	0.2	21	0.2	0.05	94	0.1	0.05	416	1.2	49	52
	SD ⁴	92.5	0.05	0.4	0.11	0.00	6.8	0.00	0.00	49.3	0.36	3.1	6.7
	Median ⁴	490	0.2	21	0	0.1	96	0.10	0	430.0	1.00	48	53.0
	Minimum	400	0.2	20	<0.1	<0.1	84	<0.2	<0.1	340	0.9	44	41
	Maximum	640	0.3	21	0.3	<0.1	100	<0.2	<0.1	470	1.8	52	58