

Appendix A
Background Water Quality Monitoring Results

Doris Outflow Water Quality

Parameter	Unit	CWQG	19-Jun-04	24-Jun-04	2-Jul-04	7-Jul-04	16-Jul-04	22-Jul-04	4-Aug-04	14-Aug-04	15-Aug-04	12-Sep-04
Total Metals												
Aluminum (Al)	ug/L	100	33.2	23.1	59.7	10.3	47.5	55.0	62.9	80.7	63.0	72.1
Antimony (Sb)	ug/L		0.360	0.3	0.238	0.199	0.827	0.461	0.419	0.236	2.845	0.150
Arsenic (As)	ug/L	5	0.471	0.33	0.398	0.341	0.340	0.271	0.357	0.253	0.364	0.363
Barium (Ba)	ug/L		2.85	2.24	3.15	2.15	2.86	2.76	2.87	2.68	3.00	3.09
Beryllium (Be)	ug/L		0.0057	<0.2	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Bismuth (Bi), Total	ug/L		<0.1	<0.03	<0.1	<0.1	<0.1	0.25	<0.1			
Boron (B)	ug/L		34.4	17	22.5	19.6	20.3	18.2		19.9	23.2	22.3
Cadmium (Cd)	ug/L	0.017	<0.002	<0.05	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	<0.002
Calcium (Ca)	mg/L		8.47	6.07	7.54	6.37	7.81	7.39	7.38	5.59	7.60	7.31
Chromium (Cr)	ug/L	1	0.219	0.64	0.252	0.244	<0.03	<0.03	0.455	<0.03	0.281	0.248
Cobalt (Co)	ug/L		0.0462	<0.1	0.0452	0.0171	0.135	0.0543	0.129	0.0392	0.8875	0.0535
Copper (Cu)	ug/L	2	1.06	1.2	1.53	1.45	1.20	1.18	1.25	1.14	1.26	1.50
Iron (Fe)	ug/L	300	42.6	51	80.8	19.5	125	107.0	67.8	65.7	84.7	90.4
Lead (Pb)	ug/L	1	0.0175	<0.05	<0.001	<0.001	0.0306	0.0608	0.0313	0.0300	0.0368	0.0356
Magnesium (Mg)	mg/L		7.30	5.04	6.56	5.38	5.00	6.36	4.53	6.62	6.48	
Manganese (Mn)	ug/L		5.29	6.6	8.45	6.58	20.8	20.8	11.0	6.07	13.3	10.1
Mercury (Hg)	ng/L	26	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Molybdenum (Mo)	ug/L	73	0.157	0.12	0.153	0.127	0.144	0.143	0.140	0.182	0.159	0.160
Nickel (Ni)	ug/L	25	0.404	0.32	0.421	0.373	0.458	0.568	0.335	0.461	0.456	0.433
Potassium (K)	mg/L		2.82	1.91	2.38	2.03	2.42	2.15	2.24	1.84	2.41	2.34
Selenium (Se)	ug/L	1	0.898	0.5	0.571	0.542	0.439	0.236	0.618	0.175	0.571	0.545
Silver (Ag)	ug/L	0.1	0.0008	<0.1	<0.0005	<0.0005	0.0005	0.0010	<0.0005	0.0007	0.0006	0.0005
Sodium (Na)	mg/L		39	25	32	28	33	29	32	27	34	32
Strontium (Sr)	ug/L		40.6	32	42.0	34.3	38.9	38.7	31.8	35.8	34.8	40.0
Thallium (Tl)	µg/L	0.8	<0.1	<0.03	<0.1	<0.1	0.3	<0.1	<0.1			
Tin (Sn)	ug/L		<0.4	<0.1	<0.4	<0.4	<0.4	<0.4	<0.4			
Uranium (U)	ug/L		0.0248	<0.05	0.0297	0.0189	0.0243	0.0260	0.0255	0.0378	0.0265	0.0312
Vanadium (V)	ug/L		0.0311	0.55	0.0442	<0.005	<0.005	<0.005	0.162	<0.005	0.234	0.138
Zinc (Zn)	ug/L	30	0.850	0.9	3.16	2.13	1.70	1.56	0.868	2.84	1.465	1.695
Dissolved Metals												
Aluminum (Al)	ug/L		2.94	4.52	12.90						3.58	
Antimony (Sb)	ug/L		0.359	1.03	0.378						1.80	
Arsenic (As)	ug/L		0.326	0.282	0.315						0.346	
Barium (Ba)	ug/L		2.40	2.18	2.40						2.52	
Beryllium (Be)	ug/L		<0.003	<0.003	<0.003						<0.003	
Boron (B)	ug/L		22.1	20.6	21.7						23.7	
Cadmium (Cd)	ug/L		<0.002	<0.002	<0.002						<0.002	
Calcium (Ca)	mg/L		7.88	6.98	7.23						7.67	
Chromium (Cr)	ug/L		0.155	0.143	0.152						0.145	
Cobalt (Co)	ug/L		0.0371	0.0770	0.0249						0.264	
Copper (Cu)	ug/L		1.33	1.20	1.27						1.35	
Iron (Fe)	ug/L		8.68	13.8	27.6						13.9	
Lead (Pb)	ug/L		0.0144	0.0100	0.0431						0.0111	
Magnesium (Mg)	mg/L		6.11	5.16	5.59						6.47	
Manganese (Mn)	ug/L		4.02	5.79	5.35						7.12	
Molybdenum (Mo)	ug/L		0.150	0.137	0.141						0.157	
Nickel (Ni)	ug/L		0.209	0.244	0.266						0.217	
Potassium (K)	ug/L		2.37	2.19	2.31						2.31	
Selenium (Se)	ug/L		0.481	0.433	0.420						0.669	
Silver (Ag)	ug/L		<0.0005	<0.0005	<0.0005						<0.0005	
Sodium (Na)	ug/L		31	29	31						32	
Strontium (Sr)	ug/L		42.9	37.7	38.8						42.8	
Uranium (U)	ug/L		0.0281	0.0251	0.0252						0.0304	
Vanadium (V)	ug/L		<0.005	0.0368	0.0061						0.0374	
Zinc (Zn)	ug/L		0.791	0.578	0.849						0.322	
Nutrients												
Phosphorus, Total	mg/L		0.017	0.016	0.019	0.014	0.020	0.019	0.019		0.029	0.015
Ammonia-N	mg/L	1.27	<0.005	<0.005	0.008	<0.005	<0.005	0.008	0.014		<0.005	0.013
Color, True	T.C.U.		15	15	20	15	15	20	10		20	20
Dissolved Organic Carbon	mg/L		6	5	6	5	5	5	8		7	5
Fluoride (F)	mg/L		0.06	0.07	0.07	0.06	0.07	0.07	0.05		0.07	0.07
Sulphide	mg/L		<0.003	<0.003	0.012	0.015	0.005	<0.003	<0.003		0.004	0.003
Total Dissolved Solids	mg/L		160	120	90	50	170	175	120		130	120
Total Kjeldahl Nitrogen	mg/L		0.47	0.47	0.46	0.35	0.26	0.36	0.41		0.32	0.54
Total Organic Carbon	mg/L		7	5	6	5	5	5	7		7	5
Total Suspended Solids	mg/L		4	4	6	5	8	5	6		<3	7
Carbon Part	mg/L											
Routine Water Analysis - low level												
Chloride (Cl)	mg/L		64	57	65	54	61	62	59		58	62
Nitrate+Nitrite-N	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006		<0.006	<0.006
Nitrate-N	mg/L	2.94	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006		<0.006	<0.006
Nitrite-N	mg/L	0.018	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002
Sulphate (SO4)	mg/L		2.98	2.63	2.87	2.42	2.79	2.77	2.8		2.89	3.01
pH, Conductivity and Total Alkalinity												
pH	pH	6.5-9.0	7.2	7.5	7.6	7.6	7.6	7.6	7.6		7.6	7.6
Conductivity (EC)	uS/cm		268	243	255	217	250	251	236		263	261
Bicarbonate (HCO3)	mg/L		35	32	33	28	31	33	33		33	33
Carbonate (CO3)	mg/L		<5	<5	<5	<5	<5	<5	<5		<5	<5
Hydroxide (OH)	mg/L		<5	<5	<5	<5	<5	<5	<5		<5	<5
Alkalinity, Total (as CaCO3)	mg/L		29	26	27	23	25	27	27		27	27
P- Alkalinity												
Ion Balance Calculation												
Ion Balance	%		95	95.4	96.7	96.8	96.5	94.3	96.2		94.6	96.2
Anions	meq/L											
Cations	meq/L											
TDS (Calculated)	mg/L		131	118	132	110	124	126	122		120	127
Hardness (as CaCO3)	mg/L		48	43	47	39	42	43	43		42	45
ICP metals for routine water												
Calcium (Ca)	mg/L		8.1	7.1	7.7	6.4	7.1	7.2	7.2		7.1	7.6
Potassium (K)	mg/L		2.3	2.2	2.4	1.9	2.1	2.2	2.1		2	2.3
Magnesium (Mg)	mg/L		6.7	6.1	6.8	5.7	6.0	6.2	6.1		6	6.3
Sodium (Na)	mg/L		30	27	31	26	30	30	29		28	30
Other												
Cyanide, Total	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002
Radium 226	Bq/L		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005

Doris Outflow Water Quality

Parameter	Unit	CWQG	22-Sep-04	27-Jun-05	18-Jul-05	5-Aug-05	20-Aug-05	1-Sep-05	15-Sep-05	18-Jun-06	24-Jun-06	30-Jun-06
Total Metals												
Aluminum (Al)	ug/L	100	63.8	145	61.7	53.6	774	48.2	31.2	106.0	78.2	75.1
Antimony (Sb)	ug/L		0.458	0.0110	0.0119	0.0145	0.0128	0.0170	0.0137	0.0120	0.0117	0.0126
Arsenic (As)	ug/L	5	0.342	0.336	0.405	0.328	0.473	0.420	0.283	0.376	0.370	0.420
Barium (Ba)	ug/L		2.87	4.30	3.46	3.18	11.1	3.03	2.84	3.46	3.10	3.47
Beryllium (Be)	ug/L		<0.003	0.0045	0.0036	<0.003	0.0199	<0.003	0.0049	0.0003	0.0007	<0.003
Bismuth (Bi), Total	ug/L			<0.001	0.0111	0.0029	0.0064	0.0014	0.0016	<0.001	0.0003	0.0002
Boron (B)	ug/L		22.3	18.6	22.7	22.6	21.7	22.4	18.9	19.50	18.80	21.00
Cadmium (Cd)	ug/L	0.017	<0.002	<0.002	<0.002	0.0023	0.0051	<0.002	<0.002	0.0002	0.0003	<0.002
Calcium (Ca)	mg/L		7.23	5.73	7.28	7.02	7.49	7.35	7.18	6.350	6.290	6.970
Chromium (Cr)	ug/L	1	0.178	0.344	0.152	0.198	1.41	1.26	0.173	0.775	0.278	0.270
Cobalt (Co)	ug/L		0.0748	0.0568	0.0325	0.0406	0.352	0.0449	0.0345	0.054	0.047	0.044
Copper (Cu)	ug/L	2	1.44	1.22	1.10	1.35	2.06	1.40	1.39	1.30	1.26	1.30
Iron (Fe)	ug/L	300	48.9	202	163	75.0	888	69.9	57.7	125	101	145
Lead (Pb)	ug/L	1	0.0189	0.183	0.202	0.124	0.268	0.0231	0.0214	0.035	0.086	0.043
Magnesium (Mg)	mg/L		6.37	4.44	6.47	6.25	6.87	5.97	5.21	5.840	5.290	5.220
Manganese (Mn)	ug/L		7.91	13.1	20.0	9.82	39.5	9.53	8.88	13.00	9.86	18.00
Mercury (Hg)	ng/L	26	<0.6	0.9	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Molybdenum (Mo)	ug/L	73	0.155	0.115	0.244	0.192	0.140	0.128	0.129	0.116	0.105	0.115
Nickel (Ni)	ug/L	25	0.396	0.568	0.597	0.567	0.969	0.448	0.487	0.850	0.437	0.383
Potassium (K)	mg/L		2.34	2.07	2.35	2.24	2.57	2.29	2.15	2.20	2.03	2.10
Selenium (Se)	ug/L	1	0.556	0.546	0.952	0.458	0.838	1.12	0.484	0.8	0.8	1.0
Silver (Ag)	ug/L	0.1	0.0007	<0.0005	<0.0005	0.0024	0.0031	<0.0005	0.0016	0.0001	0.0002	0.0001
Sodium (Na)	mg/L		32	23	32	31	34	29	28	26.40	26.30	27.90
Strontium (Sr)	ug/L		39.3	33.2	38.9	39.1	41.5	40.2	38.8	39.000	33.500	36.600
Thallium (Tl)	µg/L	0.8		0.124	<0.0003	0.0005	0.0105	0.0010	0.0027	0.0005	0.0005	0.0005
Tin (Sn)	ug/L			<0.03	0.0312	<0.03	0.0739	<0.03	0.0615	<0.03	<0.03	<0.03
Uranium (U)	ug/L		0.0311	0.0378	0.0325	0.0325	0.0625	0.0354	0.0305	0.026	0.028	0.030
Vanadium (V)	ug/L		0.121	0.703	0.794	0.528	1.56	0.494	0.093	0.279	0.627	0.794
Zinc (Zn)	ug/L	30	0.716	0.929	0.609	10.9	4.12	2.10	1.93	1.87	5.83	10.10
Dissolved Metals												
Aluminum (Al)	ug/L		22.2	5.37	4.37	7.94	2.02	1.75	15.000	9.470	5.480	
Antimony (Sb)	ug/L		0.0106	0.0115	0.0114	0.0124	0.0114	0.0132	0.012	0.012	0.012	0.012
Arsenic (As)	ug/L		0.273	0.369	0.287	0.389	0.370	0.237	0.337	0.300	0.334	
Barium (Ba)	ug/L		2.44	2.53	2.41	2.66	2.24	2.10	2.240	2.070	2.260	
Beryllium (Be)	ug/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0005	<0.003	
Boron (B)	ug/L		16.1	22.2	21.0	20.9	19.5	17.0	17.80	17.20	19.50	
Cadmium (Cd)	ug/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Calcium (Ca)	mg/L		5.39	7.08	6.78	7.31	6.57	6.48	5.810	5.840	6.210	
Chromium (Cr)	ug/L		0.151	0.146	0.152	0.352	1.07	0.112	0.62	0.23	0.11	
Cobalt (Co)	ug/L		0.0149	0.0086	0.0159	0.0139	0.0103	0.0105	0.012	0.015	0.011	
Copper (Cu)	ug/L		1.19	1.10	1.32	1.54	1.14	1.06	1.12	1.05	1.04	
Iron (Fe)	ug/L		44.3	34.6	11.5	7.82	<2	<2	31	15	16	
Lead (Pb)	ug/L		0.118	0.193	0.124	0.0180	0.0040	0.0052	0.010	0.012	0.007	
Magnesium (Mg)	mg/L		3.97	6.20	5.88	6.75	5.46	4.83	5.38	4.94	4.86	
Manganese (Mn)	ug/L		0.457	0.268	0.278	0.169	0.053	0.035	4.000	1.410	0.595	
Molybdenum (Mo)	ug/L		0.102	0.123	0.120	0.119	0.114	0.112	0.107	0.099	0.104	
Nickel (Ni)	ug/L		0.567	0.191	0.305	0.224	0.164	0.168	0.276	0.252	0.190	
Potassium (K)	ug/L		1.85	2.25	2.12	2.22	2.00	1.91	1.98	1.86	1.89	
Selenium (Se)	ug/L		0.545	0.736	0.458	0.835	0.924	0.313	0.8	0.6	0.7	
Silver (Ag)	ug/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Sodium (Na)	ug/L		20.1	31.2	29.5	33.6	26.6	25.5	24.6	24.2	26.2	
Strontium (Sr)	ug/L		30.8	37.4	38.9	38.7	39.8	34.9	36.3	30.5	33.8	
Uranium (U)	ug/L		0.0253	0.0221	0.0215	0.0192	0.0167	0.0223	0.0167	0.0147	0.0171	
Vanadium (V)	ug/L		0.443	0.373	0.095	0.088	0.349	0.066	0.152	0.396	0.451	
Zinc (Zn)	ug/L		0.925	0.608	6.38	3.46	2.10	0.674	1.87	2.36	1.19	
Nutrients												
Phosphorus, Total	mg/L		0.024	0.019	0.021	0.022	0.044	0.022	0.027	0.019	0.020	0.022
Ammonia-N	mg/L	1.27	<0.005	0.010	0.019	0.018	0.009	0.008	0.007	0.008	0.008	0.014
Color, True	T.C.U.		15	25	13	5	15	12	15	13	15	12
Dissolved Organic Carbon	mg/L		5	4.7	6.0	4.8	4.7	5.4	5.9	5.3	4.6	5.0
Fluoride (F)	mg/L		0.08	0.05	0.06	0.05	0.06	0.05	0.05	0.05	0.06	0.05
Sulphide	mg/L		<0.003	0.001	<0.001	<0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001
Total Dissolved Solids	mg/L		170									
Total Kjeldahl Nitrogen	mg/L		0.46	0.41	0.44	0.42	0.55	0.48	0.55	0.42	0.42	0.47
Total Organic Carbon	mg/L		6	5.37	6.59	5.32	5.72	6.47	7.60	6.2	5.5	6.0
Total Suspended Solids	mg/L		<3	3.0	2.3	2.0	25	4.0	3.0	2	2	3
Carbon Part	mg/L			0.67	0.59	0.55	1.02	1.07	1.70	0.94	0.90	1.00
Routine Water Analysis - low level												
Chloride (Cl)	mg/L		63	50.4	61.8	61.4	61.9	61.2	62.5	55.9	54.6	60.6
Nitrate+Nitrite-N	mg/L		<0.006	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nitrate-N	mg/L	2.94	<0.006	0.0055	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nitrite-N	mg/L	0.018	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Sulphate (SO4)	mg/L		2.96	4.0	<3	4.8	<3	3.0	4.0	5	7	<3
pH, Conductivity and Total Alkalinity												
pH	pH	6.5-9.0	7.6	6.93	7.04	7.00	7.57	7.59	7.52	7.08	7.11	7.14
Conductivity (EC)	uS/cm		258	213	264	250	262	264	263	223	235	250
Bicarbonate (HCO3)	mg/L		32	27	33	33	33	34	34	31	29	33
Carbonate (CO3)	mg/L		<5									
Hydroxide (OH)	mg/L		<5									
Alkalinity, Total (as CaCO3)	mg/L		26	21.9	26.8	26.7	27.3	28.0	27.8	26	24	27
P- Alkalinity				<1	<1	<1	<1	<1	<1	<1	<1	<1
Ion Balance Calculation												
Ion Balance	%		94.2	95.00	94.00	96.00	97.00	92.00	93.00	91	90	93
Anions	meq/L			1.95	2.32	2.37	2.34	2.35	2.40	2.19	2.15	2.29
Cations	meq/L			1.84	2.19	2.26	2.25	2.18	2.24	1.98	1.94	2.12
TDS (Calculated)	mg/L		127	106	125	129	126	126	130	117	116	123
Hardness (as CaCO3)	mg/L		43	35.3	40.3	42.7	44.2	40.9	38.1	36.4	36.2	38.5
ICP metals for routine water												
Calcium (Ca)	mg/L		7.3	5.95	6.80	7.01	7.49	7.07	6.76	5.990	6.290	6.960
Potassium (K)	mg/L		2.1	2.0	2.2	2.2	2.3	2.2	2.3	2.1	2.1	2.2
Magnesium (Mg)	mg/L		6.1	4.97	5.67	6.13	6.19	5.64	5.15	5.20	4.97	5.13
Sodium (Na)	mg/L		30	25.0	30.6	31.1	30.2	30.0	32.6	27.6	26.9	29.8
Other												
Cyanide, Total	mg/L		<0.002	<0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Radium 226	Bq/L			<0.005	0.006	0.007	N/A	<0.005	<0.005			

Doris Outflow Water Quality													
Parameter	Unit	CWQG	7-Jul-06	13-Jul-06	20-Jul-06	28-Jul-06	4-Aug-06	11-Aug-06	18-Aug-06	26-Aug-06	1-Sep-06	9-Sep-06	9-Sep-06
Total Metals													
Aluminum (Al)	ug/L	100	87.4	73.6	64.8	59.9	32.8	41.9	58.6	39.5	146.0	35.2	35.6
Antimony (Sb)	ug/L		0.0149	0.0103	0.0123	0.0124	0.0140	0.0143	0.0158	0.0164	0.0126	0.0122	0.0140
Arsenic (As)	ug/L	5	0.507	0.443	0.398	0.427	0.488	0.513	0.628	0.668	0.727	0.596	0.574
Barium (Ba)	ug/L		3.80	3.36	3.13	3.32	2.88	2.89	3.01	2.97	4.80	2.98	2.89
Beryllium (Be)	ug/L		0.007	<0.003	<0.003	0.004	<0.003	<0.003	<0.003	0.003	0.007	0.004	<0.003
Bismuth (Bi), Total	ug/L		0.003	0.002	0.001	0.002	0.005	0.003	0.002	<0.001	<0.001	0.011	0.003
Boron (B)	ug/L		20.80	21.30	23.00	24.40	24.10	23.60	23.60	22.40	22.40	23.00	22.40
Cadmium (Cd)	ug/L	0.017	0.003	0.011	0.002	<0.002	0.003	<0.002	<0.002	<0.002	<0.002	0.003	<0.002
Calcium (Ca)	mg/L		6.930	6.880	6.700	7.330	7.110	7.350	8.030	8.130	8.390	8.200	7.660
Chromium (Cr)	ug/L	1	0.344	0.271	0.248	0.229	0.303	0.305	0.312	0.347	0.485	0.191	0.173
Cobalt (Co)	ug/L		0.051	0.046	0.040	0.051	0.037	0.050	0.062	0.053	0.136	0.060	0.054
Copper (Cu)	ug/L	2	1.53	0.98	1.43	1.46	1.44	1.42	1.52	1.50	1.48	1.31	1.35
Iron (Fe)	ug/L	300	141	113	100	117	78	105	116	106	356	130	107
Lead (Pb)	ug/L	1	0.055	0.056	0.053	0.144	0.134	0.130	0.117	0.052	0.096	0.039	0.035
Magnesium (Mg)	mg/L		5.500	5.900	6.150	6.270	6.290	6.470	6.770	6.050	6.120	7.020	6.780
Manganese (Mn)	ug/L		15.10	10.80	12.30	18.90	16.10	18.10	18.10	19.30	64.20	24.10	24.30
Mercury (Hg)	ng/L	26	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	1.200
Molybdenum (Mo)	ug/L	73	0.121	0.119	0.148	0.127	0.129	0.133	0.150	0.148	0.154	0.139	0.137
Nickel (Ni)	ug/L	25	0.531	0.643	0.331	0.586	0.345	0.316	0.449	0.502	0.547	0.388	0.697
Potassium (K)	mg/L		2.28	2.25	2.20	2.35	2.25	2.23	2.37	2.42	2.47	2.43	2.37
Selenium (Se)	ug/L	1	1.4	1.2	0.8	0.9	1.3	1.1	1.6	1.7	1.6	1.4	1.6
Silver (Ag)	ug/L	0.1	0.001	0.002	0.002	0.005	0.001	0.001	0.002	<0.0005	<0.0005	0.002	0.001
Sodium (Na)	mg/L		29.50	28.10	31.60	30.50	31.80	32.60	33.10	33.00	33.00	34.10	33.80
Strontium (Sr)	ug/L		38.200	38.800	37.000	39.100	39.100	40.800	44.300	42.600	44.600	44.800	42.600
Thallium (Tl)	µg/L	0.8	0.008	0.013	0.012	0.022	0.012	0.013	0.003	<0.003	<0.003	0.016	0.013
Tin (Sn)	ug/L		<0.03	0.111	0.124	<0.03	0.035	0.037	0.061	0.032	<0.03	0.036	0.034
Uranium (U)	ug/L		0.032	0.034	0.033	0.032	0.035	0.037	0.038	0.036	0.041	0.032	0.033
Vanadium (V)	ug/L		0.129	0.147	0.152	0.139	0.116	0.067	0.140	0.093	0.336	0.045	0.010
Zinc (Zn)	ug/L	30	12.20	1.06	0.99	1.24	1.77	3.57	8.44	1.35	3.10	0.81	1.47
Dissolved Metals													
Aluminum (Al)	ug/L		5.050	5.590	4.160	3.690	1.470	1.640	2.530	0.907	0.760	0.982	1.080
Antimony (Sb)	ug/L		0.015	0.010	0.011	0.012	0.014	0.014	0.016	0.016	0.012	0.012	0.014
Arsenic (As)	ug/L		0.392	0.403	0.304	0.340	0.442	0.421	0.515	0.402	0.470	0.456	0.504
Barium (Ba)	ug/L		2.180	2.220	2.220	2.120	2.150	2.060	2.120	2.180	2.400	2.300	2.270
Beryllium (Be)	ug/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003
Boron (B)	ug/L		16.70	19.10	20.30	23.60	20.50	20.70	22.20	21.40	21.00	20.00	21.10
Cadmium (Cd)	ug/L		<0.002	0.007	0.002	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium (Ca)	mg/L		5.890	6.250	6.390	6.530	6.680	6.680	7.250	7.710	7.970	7.620	7.320
Chromium (Cr)	ug/L		0.19	0.27	0.24	0.11	0.30	0.26	0.25	0.35	0.31	0.18	0.17
Cobalt (Co)	ug/L		0.011	0.019	0.011	0.016	0.012	0.013	0.014	0.018	0.017	0.008	0.008
Copper (Cu)	ug/L		1.04	0.73	1.17	1.25	1.11	1.10	1.15	1.15	1.20	1.14	1.12
Iron (Fe)	ug/L		13	17	7	13	5	4	7	8	5	5	4
Lead (Pb)	ug/L		0.021	0.039	0.034	0.132	0.115	0.123	0.112	0.041	0.037	0.028	0.026
Magnesium (Mg)	mg/L		4.68	5.32	5.75	5.66	5.85	5.84	6.14	5.83	5.83	6.45	6.38
Manganese (Mn)	ug/L		0.424	0.332	0.237	0.552	0.162	0.202	0.214	0.305	0.317	0.117	0.119
Molybdenum (Mo)	ug/L		0.106	0.111	0.141	0.122	0.118	0.122	0.131	0.136	0.138	0.130	0.135
Nickel (Ni)	ug/L		0.186	0.466	0.159	0.195	0.162	0.174	0.150	0.131	0.146	0.144	0.105
Potassium (K)	ug/L		1.88	2.02	2.06	2.07	2.06	2.06	2.11	2.27	2.30	2.21	2.24
Selenium (Se)	ug/L		0.9	0.9	0.6	0.5	0.8	0.8	0.8	0.9	1.1	0.8	0.7
Silver (Ag)	ug/L		<0.0005	0.0012	<0.0005	0.0045	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Sodium (Na)	ug/L		26.8	25.8	29.9	29.0	29.8	29.8	30.4	32.5	32.3	31.3	31.6
Strontium (Sr)	ug/L		31.0	34.8	34.8	34.3	36.4	36.9	40.0	39.7	41.4	41.2	40.4
Uranium (U)	ug/L		0.0135	0.0162	0.0168	0.0221	0.0176	0.0205	0.0178	0.0187	0.0161	0.0156	0.0136
Vanadium (V)	ug/L		0.019	0.016	0.092	0.034	0.075	0.023	0.046	0.014	0.030	<0.01	<0.01
Zinc (Zn)	ug/L		3.09	1.05	0.87	1.16	0.84	2.52	1.54	1.26	1.45	0.57	0.41
Nutrients													
Phosphorus, Total	mg/L		0.022	0.026	0.024	0.050	0.045	0.030	0.035	0.036	0.039	0.040	0.048
Ammonia-N	mg/L	1.27	0.015	0.015	0.027	0.026	0.013	0.012	0.011	0.019	0.009	0.008	0.007
Color, True	T.C.U.		12	12	15	8	18	12	16	13	13	<1	<1
Dissolved Organic Carbon	mg/L		4.7	5.5	5.0	5.2	5.1	5.0	5.2	4.9	3.6	5.0	5.0
Fluoride (F)	mg/L		0.06	0.05	0.06	0.05	0.03	0.03	0.04	0.04	0.04	0.06	0.06
Sulphide	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001
Total Dissolved Solids	mg/L												
Total Kjeldahl Nitrogen	mg/L		0.51	0.46	0.47	0.63	0.53	0.47	0.49	0.51	0.52	0.50	0.55
Total Organic Carbon	mg/L		5.9	6.2	5.8	6.4	6.0	6.0	6.2	6.1	5.1	6.5	6.8
Total Suspended Solids	mg/L		3	3	3	4	2	2	3	4	3	3	2
Carbon Part	mg/L		1.22	0.69	0.78	1.17	0.85	0.96	1.03	1.22	1.46	1.52	1.75
Routine Water Analysis - low level													
Chloride (Cl)	mg/L		61.1	59.8	76.8	62.1	62.4	63.6	65.8	63.8	65.3	66.4	65.9
Nitrate+Nitrite-N	mg/L		<0.005	<0.005	<0.005	0.009	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005
Nitrate-N	mg/L	2.94	<0.005	<0.005	<0.005	0.009	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005
Nitrite-N	mg/L	0.018	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.001
Sulphate (SO4)	mg/L		<3	<3	<3	5	<3	<3	<3	<3	<3	5	<3
pH, Conductivity and Total Alkalinity													
pH	pH	6.5-9.0	7.10	6.92	7.41	7.18	7.56	7.60	7.56	7.46	7.49	7.53	6.97
Conductivity (EC)	µS/cm		265	249	276	265	267	271	276	279	284	287	279
Bicarbonate (HCO3)	mg/L		33	30	45	33	33	34	34	34	35	35	34
Carbonate (CO3)	mg/L												
Hydroxide (OH)	mg/L												
Alkalinity, Total (as CaCO3)	mg/L		27	25	37	27	27	28	28	28	29	29	28
P- Alkalinity	mg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ion Balance Calculation													
Ion Balance	%		96	98	87	97	97	97	98	99	99	95	95
Anions	meq/L		2.3	2.22	2.95	2.4	2.35	2.41	2.46	2.4	2.46	2.55	2.45
Cations	meq/L		2.22	2.19	2.57	2.34	2.28	2.34	2.42	2.37	2.42	2.44	2.34
TDS (Calculated)	mg/L		126	122	156	131	128	131	134	132	134	138	132
Hardness (as CaCO3)	mg/L		38.8	41.3	37.2	44.2	43.2	44.7	47.5	44.6	45.9	48.2	46.0
ICP metals for routine water													
Calcium (Ca)	mg/L		6.870	6.780	6.460	7.420	7.170	7.540	8.060	7.840	8.17.		

Tail Outflow Water Quality										
Parameter	Unit	CWQG	19-Jun-04	2-Jul-04	16-Jul-04	4-Aug-04	15-Aug-04	10-Sep-04	22-Sep-04	26-Jun-05
Total Metals										
Aluminum (Al)	ug/L	100	16.5	11.6	9.3	9.39	45.7	10.9	22.1	10.7
Antimony (Sb)	ug/L		0.13	0.13	0.26	0.580	0.166	0.159	0.661	0.0147
Arsenic (As)	ug/L	5	0.2	0.28	0.22	0.224	0.241	0.200	0.201	0.291
Barium (Ba)	ug/L		1.66	1.93	1.87	2.25	2.73	2.31	2.27	2.68
Beryllium (Be)	ug/L		<0.2	<0.2	<0.2	<0.003	<0.003	<0.003	<0.003	<0.003
Bismuth (Bi)	ug/L		<0.03	<0.03	<0.03					<0.001
Boron (B)	ug/L		12	15	13	15.8	13.9	13.7	12.2	22.3
Cadmium (Cd)	ug/L	0.017	<0.05	<0.05	<0.05	<0.002	0.0034	<0.002	<0.002	<0.002
Calcium (Ca)	mg/L		5.18	6.89	5.82	6.82	7.17	6.59	6.48	8.53
Chromium (Cr)	ug/L	1	0.37	0.11	0.74	0.855	0.254	0.109	0.0895	0.248
Cobalt (Co)	ug/L		<0.1	<0.1	<0.1	0.0695	0.0823	0.0306	0.087	0.0151
Copper (Cu)	ug/L	2	0.9	1	0.8	0.668	0.726	0.714	0.660	0.920
Iron (Fe)	ug/L	300	42	31	34	71.4	78.6	64.0	64.1	39.5
Lead (Pb)	ug/L	1	<0.05	<0.05	<0.05	0.0181	0.0717	0.0102	0.0066	0.107
Magnesium (Mg)	mg/L		4.08	5.47	4.62	4.65	5.37	4.45	4.49	6.92
Manganese (Mn)	ug/L		0.8	0.6	0.7	1.44	2.30	1.95	2.76	0.901
Mercury (Hg)	ng/L	26	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	0.7
Molybdenum (Mo)	ug/L	73	0.1	0.11	0.08	0.0691	0.0567	0.0781	0.0709	0.110
Nickel (Ni)	ug/L	25	0.52	0.54	0.49	0.457	0.445	0.397	0.365	0.588
Potassium (K)	mg/L		1.58	1.73	1.35	1.25	1.46	1.81	1.87	2.26
Selenium (Se)	ug/L	1	0.4	0.4	<0.1	0.308	0.335	0.264	0.318	0.517
Silver (Ag)	ug/L	0.1	<0.1	<0.1	<0.1	<0.0005	<0.0005	<0.0005	0.00413	<0.0005
Sodium (Na)	mg/L		15.7	18.8	15.2	16.7	18.1	18.2	18	23.8
Strontium (Sr)	ug/L		21.8	26.9	23.3	23.5	24.7	29.2	28.0	37.1
Thallium (Tl)	ug/L	0.8	<0.03	<0.03	<0.03					0.127
Tin (Sn)	ug/L		<0.1	<0.1	0.3					<0.03
Uranium (U)	ug/L		<0.05	<0.05	<0.05	0.0064	0.0060	0.0054	0.0059	0.0144
Vanadium (V)	ug/L		0.48	0.47	0.19	0.180	0.140	0.0152	<0.005	0.437
Zinc (Zn)	ug/L	30	<0.8	<0.8	<0.8	2.24	1.39	8.24	0.693	3.90
Dissolved Metals										
Aluminum (Al)	ug/L		10.9	6.70			5.39			4.31
Antimony (Sb)	ug/L		0.589	0.303			0.286			0.0152
Arsenic (As)	ug/L		0.204	0.236			0.335			0.262
Barium (Ba)	ug/L		1.80	2.08			2.43			2.34
Beryllium (Be)	ug/L		<0.003	<0.003			<0.003			<0.003
Boron (B)	ug/L		13.6	17.1			14.6			19.5
Cadmium (Cd)	ug/L		<0.002	<0.002			<0.002			<0.002
Calcium (Ca)	mg/L		6.06	7.49			7.17			7.70
Chromium (Cr)	ug/L		0.183	0.197			0.123			0.143
Cobalt (Co)	ug/L		0.0408	0.0231			0.0335			0.0151
Copper (Cu)	ug/L		1.29	1.31			0.610			0.870
Iron (Fe)	ug/L		30.0	15.9			43.3			13.2
Lead (Pb)	ug/L		0.0838	0.0547			0.0046			0.103
Magnesium (Mg)	ug/L		4.15	5.33			4.66			6.01
Manganese (Mn)	ug/L		0.462	0.769			2.21			0.284
Molybdenum (Mo)	ug/L		0.0996	0.1000			0.0612			0.102
Nickel (Ni)	ug/L		0.581	0.572			0.516			0.582
Potassium (K)	mg/L		1.71	1.91			1.52			2.05
Selenium (Se)	ug/L		0.258	0.383			0.409			0.414
Silver (Ag)	ug/L		<0.0005	<0.0005			<0.0005			<0.0005
Sodium (Na)	mg/L		15.1	19.9			17.8			20.9
Strontium (Sr)	ug/L		24.0	30.1			31.8			33.9
Uranium (U)	ug/L		0.0139	0.0107			0.0064			0.0119
Vanadium (V)	ug/L		0.0273	0.0139			0.0163			0.388
Zinc (Zn)	ug/L		1.20	1.60			0.828			3.87
Nutrients										
Phosphorus, Total	mg/L		0.009	0.005	0.005	0.003	0.005	0.002	0.003	0.006
Ammonia-N	mg/L	1.27	<0.005	<0.005	<0.005	<0.005	<0.005	0.028	<0.005	0.006
Color, True	T.C.U.		15	10	10	15	10	10	20	25
Dissolved Organic Carbon	mg/L		6	7	4	5	6	4	5	6.1
Fluoride (F)	mg/L		0.06	0.08	0.07	0.06	0.06	0.08	0.07	0.07
Sulphide	mg/L		0.004	0.004	0.01	<0.003	0.004	<0.003	0.004	0.001
Total Dissolved Solids	mg/L		110	40	120	80	100	90	120	
Total Kjeldahl Nitrogen	mg/L		0.33	0.36	0.32	0.29	0.16	0.29	0.21	0.33
Total Organic Carbon	mg/L		6		5	6	7	4	5	6.24
Total Suspended Solids	mg/L		3	3	<3	<3	<3	<3	<3	<1
Carbon Part	mg/L									0.11
Routine Water Analysis - low level										
Chloride (Cl)	mg/L		29	40	30	30	34	37	37	43.5
Nitrate+Nitrite-N	mg/L		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.005
Nitrate-N	mg/L	2.94	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.005
Nitrite-N	mg/L	0.018	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001
Sulphate (SO4)	mg/L		1.97	2.54	1.89	1.67	2.05	2.91	2.62	6.0
pH, Conductivity and Total Alkalinity										
pH	pH	6.5-9.0	7.4	7.6	7.4	7.3	7.3	7.3	7.3	7.06
Conductivity (EC)	uS/cm		147	186	149	155	179	177	175	219
Bicarbonate (HCO3)	mg/L		30	38	32	33	33	30	31	44
Carbonate (CO3)	mg/L		<5	<5	<5	<5	<5	<5	<5	
Hydroxide (OH)	mg/L		<5	<5	<5	<5	<5	<5	<5	
Alkalinity, Total (as CaCO3)	mg/L		25	31	26	27	27	24	25	35.9
P- Alkalinity	mg/L									<1
Ion Balance Calculation										
Ion Balance	%		97	96.2	91.2	99.4	95.1	96.6	94.9	95.00
Anions	meq/L									2.06
Cations	meq/L									1.97
TDS (Calculated)	mg/L		72	95	73	75	81	85	85	109
Hardness (as CaCO3)	mg/L		33	43	32	37	37	38	37	48.8
ICP metals for routine water										
Calcium (Ca)	mg/L		5.8	7.5	5.8	6.6	6.7	6.7	6.6	8.32
Potassium (K)	mg/L		1.6	1.9	1.3	1.1	1.3	1.8	1.7	2.0
Magnesium (Mg)	mg/L		4.5	5.9	4.3	4.9	4.9	5.1	5	6.80
Sodium (Na)	mg/L		14	19	14	15	16	17	17	21.6
Other										
Cyanide, Total	mg/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001
Radium 226	Bq/L		<0.005	<0.005	0.006		0.03	<0.005		<0.005

Tail Outflow Water Quality

Parameter	Unit	CWQG	18-Jul-05	5-Aug-05	21-Aug-05	1-Sep-05	15-Sep-05	18-Jun-06	24-Jun-06	30-Jun-06	7-Jul-06
Total Metals											
Aluminum (Al)	ug/L	100	9.47	9.60	44.6	12.1	10.0	27.6	14.4	21.8	15.1
Antimony (Sb)	ug/L		0.0061	0.0087	0.0091	0.0088	0.0081	0.0106	0.0090	0.0080	0.0099
Arsenic (As)	ug/L	5	0.216	0.261	0.250	0.256	0.135	0.243	0.223	0.238	0.258
Barium (Ba)	ug/L		1.91	2.28	2.82	2.13	2.04	2.06	1.93	2.19	2.01
Beryllium (Be)	ug/L		<0.003	<0.003	<0.003	<0.003	0.0048	0.004	0.005	0.007	0.005
Bismuth (Bi)	ug/L		0.0073	0.0011	0.0014	0.0011	0.0010	<0.001	0.001	<0.001	0.006
Boron (B)	ug/L		15.7	13.6	14.7	13.1	11.5	13.40	14.20	14.00	11.80
Cadmium (Cd)	ug/L	0.017	<0.002	<0.002	0.0025	<0.002	<0.002	0.002	0.006	0.002	0.010
Calcium (Ca)	mg/L		6.11	6.50	6.69	6.44	6.27	6.390	6.090	6.070	5.710
Chromium (Cr)	ug/L	1	0.123	<0.03	0.236	0.744	0.336	0.649	0.167	0.188	0.220
Cobalt (Co)	ug/L		0.0070	0.0171	0.0695	0.0198	0.0231	0.016	0.017	0.025	0.040
Copper (Cu)	ug/L	2	0.505	0.770	0.798	0.756	0.792	1.13	0.85	0.84	0.98
Iron (Fe)	ug/L	300	68.2	73.2	73.2	51.9	72.3	40	62	85	89
Lead (Pb)	ug/L	1	0.0699	0.0089	0.0333	0.0074	0.0129	0.025	0.017	0.006	0.034
Magnesium (Mg)	mg/L		4.41	4.35	5.32	4.69	4.20	5.450	4.630	4.240	4.120
Manganese (Mn)	ug/L		1.01	1.12	6.28	1.34	1.96	1.24	1.53	2.22	2.02
Mercury (Hg)	ng/L	26	1.1	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Molybdenum (Mo)	ug/L	73	0.0673	0.0810	0.0906	0.117	0.0810	0.101	0.071	0.073	0.073
Nickel (Ni)	ug/L	25	0.384	0.452	0.465	0.432	0.434	0.530	0.459	0.446	0.681
Potassium (K)	mg/L		1.4	1.43	1.49	1.44	1.54	1.70	1.43	1.30	1.28
Selenium (Se)	ug/L	1	0.272	0.529	0.369	0.610	0.231	0.4	0.4	0.4	0.5
Silver (Ag)	ug/L	0.1	0.00055	0.0006	0.0021	<0.0005	0.0010	0.001	0.001	0.001	0.001
Sodium (Na)	mg/L		16	15.1	17.7	15.3	14.8	16.30	15.00	14.40	14.30
Strontium (Sr)	ug/L		25.2	28.0	29.3	28.2	26.5	28.900	24.700	24.500	23.600
Thallium (Tl)	µg/L	0.8	<0.0003	0.0008	0.0011	<0.0003	0.0017	0.004	0.004	0.006	0.008
Tin (Sn)	µg/L		<0.03	<0.03	0.0984	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Uranium (U)	ug/L		0.0098	0.0096	0.0146	0.0098	0.0106	0.011	0.010	0.010	0.010
Vanadium (V)	ug/L		0.104	<0.01	0.156	0.248	0.047	0.157	0.300	0.401	0.042
Zinc (Zn)	ug/L	30	3.62	0.779	5.77	1.34	5.21	5.50	5.35	7.28	16.00
Dissolved Metals											
Aluminum (Al)	ug/L		3.96	2.81	4.32	4.59	5.13	5.080	4.250	4.200	3.840
Antimony (Sb)	ug/L		0.0054	0.0087	0.0090	0.0087	0.0080	0.010	0.009	0.008	0.010
Arsenic (As)	ug/L		0.213	0.229	0.223	0.235	0.130	0.222	0.215	0.218	0.238
Barium (Ba)	ug/L		1.84	2.06	2.16	1.92	1.85	1.820	1.650	1.710	1.620
Beryllium (Be)	ug/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.005	<0.003	0.005
Boron (B)	ug/L		14.6	13.6	13.3	11.9	9.95	12.60	12.70	11.90	10.90
Cadmium (Cd)	ug/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium (Ca)	mg/L		5.97	6.45	6.68	6.04	5.94	5.870	5.610	5.200	5.220
Chromium (Cr)	ug/L		0.117	<0.03	0.234	0.738	0.170	0.64	0.15	0.14	0.14
Cobalt (Co)	ug/L		0.0059	0.0103	0.0220	0.0142	0.0179	0.012	0.013	0.012	0.016
Copper (Cu)	ug/L		0.492	0.757	0.791	0.753	0.792	0.98	0.79	0.70	0.67
Iron (Fe)	ug/L		27.0	2.90	33.4	14.5	21.9	13	18	17	19
Lead (Pb)	ug/L		0.0621	0.0088	0.0263	0.0051	0.0123	0.002	0.008	0.006	0.012
Magnesium (Mg)	ug/L		4.18	4.31	5.32	4.51	4.07	4.86	4.41	3.69	3.77
Manganese (Mn)	ug/L		0.460	0.140	1.25	0.597	1.57	0.807	0.789	0.503	1.010
Molybdenum (Mo)	ug/L		0.0671	0.0771	0.0720	0.0686	0.0670	0.089	0.065	0.064	0.058
Nickel (Ni)	ug/L		0.296	0.397	0.407	0.402	0.432	0.458	0.402	0.346	0.387
Potassium (K)	mg/L		1.38	1.41	1.46	1.37	1.48	1.56	1.35	1.15	1.19
Selenium (Se)	ug/L		0.277	0.527	0.369	0.603	0.142	0.4	0.4	0.4	0.5
Silver (Ag)	ug/L		<0.0005	0.0006	0.0011	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	<0.0005
Sodium (Na)	mg/L		15.8	15.1	17.7	14.9	14.5	15.2	13.9	12.5	13.4
Strontium (Sr)	ug/L		25.3	28.0	28.5	27.9	26.2	28.9	22.8	21.5	21.2
Uranium (U)	ug/L		0.0082	0.0065	0.0076	0.0079	0.0083	0.0078	0.0076	0.0065	0.0071
Vanadium (V)	ug/L		0.104	<0.01	0.092	0.240	0.047	0.149	0.268	0.332	0.026
Zinc (Zn)	ug/L		3.57	1.97	5.70	1.26	2.18	5.43	3.53	3.31	2.99
Nutrients											
Phosphorus, Total	mg/L		0.006	0.005	0.004	0.005	0.003	0.008	0.008	0.008	0.006
Ammonia-N	mg/L	1.27	0.008	0.004	0.007	0.008	0.009	0.104	0.012	0.008	0.006
Color, True	T.C.U.		13	8	21	12	15	13	15	12	12
Dissolved Organic Carbon	mg/L		4.7	5.0	4.6	5.0	5.8	5.9	5.2	5.4	5.3
Fluoride (F)	mg/L		0.06	0.06	0.07	0.05	0.05	0.06	0.07	0.05	0.06
Sulphide	mg/L		0.001	<0.001	0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001
Total Dissolved Solids	mg/L										
Total Kjeldahl Nitrogen	mg/L		0.25	0.23	0.24	0.24	0.23	0.30	0.30	0.30	0.32
Total Organic Carbon	mg/L		4.89	5.30	4.70	5.14	5.84	6.0	5.3	5.7	5.5
Total Suspended Solids	mg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbon Part	mg/L		0.19	0.30	0.10	0.14	0.05	0.10	0.10	0.30	0.23
Routine Water Analysis - low level											
Chloride (Cl)	mg/L		28.3	31.8	34.0	35.2	35.2	34.7	30.1	27.4	28.8
Nitrate+Nitrite-N	mg/L		0.010	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nitrate-N	mg/L	2.94	0.0095	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nitrite-N	mg/L	0.018	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Sulphate (SO4)	mg/L		<3	3.4	<3	<3	3.5	<3	6	<3	<3
pH, Conductivity and Total Alkalinity											
pH	pH	6.5-9.0	6.88	6.72	7.22	7.27	7.11	6.99	7.01	6.98	6.95
Conductivity (EC)	uS/cm		151	154	164	171	170	170	159	147	151
Bicarbonate (HCO3)	mg/L		31	32	33	31	31	36	33	34	31
Carbonate (CO3)	mg/L										
Hydroxide (OH)	mg/L										
Alkalinity, Total (as CaCO3)	mg/L		25.8	26.6	27.4	25.4	25.2	29	27	28	26
P- Alkalinity	mg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1
Ion Balance Calculation											
Ion Balance	%		99.00	90.00	94.00	92.00	92.00	93.00	89.00	93.00	92.00
Anions	meq/L		1.36	1.50	1.55	1.54	1.57	1.61	1.52	1.37	1.37
Cations	meq/L		1.34	1.35	1.46	1.43	1.44	1.5	1.35	1.28	1.26
TDS (Calculated)	mg/L		72.4	78.1	81.2	80.8	83.0	84	79	72	71
Hardness (as CaCO3)	mg/L		33.4	32.7	37.0	35.1	33.0	35.0	32.4	31.7	30.3
ICP metals for routine water											
Calcium (Ca)	mg/L		6.1	6.4	6.7	6.4	6.3	6.1	6.0	6.1	5.7
Potassium (K)	mg/L		1.4	1.4	1.5	1.4	1.6	1.7	1.5	1.3	1.3
Magnesium (Mg)	mg/L		4.43	4.06	4.93	4.65	4.21	4.80	4.25	4.02	3.89
Sodium (Na)	mg/L		14.7	15.1	15.6	15.8	17.0	17.3	15.3	14.1	14.4
Other											
Cyanide, Total	mg/L		<0.001	N/A	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Radium 226	Bq/L		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Tail Outflow Water Quality											
Parameter	Unit	CWQG	13-Jul-06	20-Jul-06	28-Jul-06	4-Aug-06	11-Aug-06	18-Aug-06	26-Aug-06	1-Sep-06	9-Sep-06
Total Metals											
Aluminum (Al)	ug/L	100	16.2	28.8	12.1	16.8	16.9	16.1	15.0	20.0	65.2
Antimony (Sb)	ug/L		0.0063	0.0084	0.0072	0.0094	0.0100	0.0102	0.0087	0.0073	0.0070
Arsenic (As)	ug/L	5	0.272	0.286	0.261	0.402	0.483	0.655	0.741	0.761	0.644
Barium (Ba)	ug/L		2.35	2.70	2.42	3.28	4.50	5.82	6.79	7.94	6.61
Beryllium (Be)	ug/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.005	0.007
Bismuth (Bi)	ug/L		<0.001	<0.001	0.001	0.006	0.004	0.001	<0.001	<0.001	0.002
Boron (B)	ug/L		17.10	16.00	13.50	14.60	14.80	13.90	16.70	13.70	13.30
Cadmium (Cd)	ug/L	0.017	<0.002	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium (Ca)	mg/L		6.140	6.360	6.960	7.990	11.200	13.700	15.700	18.000	13.800
Chromium (Cr)	ug/L	1	0.158	0.203	0.105	0.267	0.246	0.188	0.282	0.284	0.159
Cobalt (Co)	ug/L		0.047	0.058	0.045	0.073	0.123	0.133	0.160	0.226	0.181
Copper (Cu)	ug/L	2	0.52	0.88	0.62	0.79	0.57	0.58	0.68	0.63	0.71
Iron (Fe)	ug/L	300	175	358	170	301	507	634	853	1150	1070
Lead (Pb)	ug/L	1	0.032	0.037	0.094	0.124	0.132	0.113	0.053	0.048	0.055
Magnesium (Mg)	mg/L		4.640	4.980	5.400	5.810	7.930	9.380	11.000	12.500	9.680
Manganese (Mn)	ug/L		4.22	6.07	5.02	9.21	17.10	21.40	28.10	43.40	29.80
Mercury (Hg)	ng/L	26	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Molybdenum (Mo)	ug/L	73	0.073	0.096	0.069	0.071	0.080	0.055	0.044	0.039	0.056
Nickel (Ni)	ug/L	25	0.709	0.513	0.513	0.581	0.660	0.563	0.548	0.550	0.445
Potassium (K)	mg/L		1.29	1.37	1.30	1.33	1.83	1.95	2.10	2.22	2.26
Selenium (Se)	ug/L	1	0.5	0.4	0.4	0.7	1.2	1.5	2.0	2.2	1.9
Silver (Ag)	ug/L	0.1	0.002	0.002	0.004	0.001	0.001	0.001	<0.0005	<0.0005	0.002
Sodium (Na)	mg/L		14.10	16.30	17.90	19.00	25.20	31.80	36.50	44.80	36.50
Strontium (Sr)	ug/L		27.200	28.500	30.800	38.300	54.700	67.600	78.100	91.800	69.100
Thallium (Tl)	µg/L	0.8	0.014	0.013	0.022	0.015	0.011	0.001	<0.003	<0.003	0.012
Tin (Sn)	µg/L		0.037	0.045	<0.03	<0.03	<0.03	0.051	0.052	<0.03	0.047
Uranium (U)	ug/L		0.011	0.013	0.008	0.011	0.010	0.009	0.010	0.018	0.035
Vanadium (V)	ug/L		0.054	0.095	0.022	0.065	0.051	0.042	0.098	<0.01	<0.01
Zinc (Zn)	ug/L	30	0.88	2.07	4.95	2.64	2.62	11.10	2.96	3.34	1.39
Dissolved Metals											
Aluminum (Al)	ug/L		4.550	6.030	4.740	5.640	5.940	4.400	3.730	3.750	4.420
Antimony (Sb)	ug/L		0.006	0.008	0.007	0.009	0.010	0.010	0.009	0.007	0.007
Arsenic (As)	ug/L		0.248	0.244	0.240	0.366	0.391	0.550	0.400	0.454	0.584
Barium (Ba)	ug/L		1.930	2.110	2.080	2.760	3.830	4.960	6.050	7.180	5.420
Beryllium (Be)	ug/L		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Boron (B)	ug/L		13.90	14.20	13.10	12.70	13.40	13.30	15.70	12.80	12.80
Cadmium (Cd)	ug/L		<0.002	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Calcium (Ca)	mg/L		5.490	5.720	6.480	7.400	10.300	12.600	14.900	17.200	12.900
Chromium (Cr)	ug/L		0.16	0.20	0.08	0.26	0.24	0.19	0.28	0.28	0.16
Cobalt (Co)	ug/L		0.020	0.019	0.030	0.017	0.023	0.022	0.017	0.095	0.040
Copper (Cu)	ug/L		0.31	0.70	0.58	0.79	0.52	0.41	0.57	0.54	0.50
Iron (Fe)	ug/L		41	56	58	69	118	114	89	123	123
Lead (Pb)	ug/L		0.032	0.036	0.086	0.121	0.126	0.105	0.053	0.040	0.026
Magnesium (Mg)	mg/L		4.23	4.52	4.96	5.40	7.36	8.96	10.50	11.90	9.37
Manganese (Mn)	ug/L		0.939	0.631	3.400	0.550	2.930	5.880	1.890	28.900	16.500
Molybdenum (Mo)	ug/L		0.065	0.087	0.069	0.069	0.066	0.045	0.039	0.035	0.043
Nickel (Ni)	ug/L		0.682	0.429	0.468	0.545	0.594	0.469	0.499	0.498	0.402
Potassium (K)	mg/L		1.17	1.24	1.21	1.24	1.65	1.81	2.01	2.10	2.13
Selenium (Se)	ug/L		0.5	0.4	0.3	0.4	0.6	0.8	0.9	1.0	0.9
Silver (Ag)	ug/L		0.0014	0.0007	0.0020	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Sodium (Na)	mg/L		12.7	15.1	16.9	17.7	23.5	30.3	36.8	42.8	36.0
Strontium (Sr)	ug/L		24.3	25.6	28.7	35.1	49.6	62.6	73.6	86.1	65.0
Uranium (U)	ug/L		0.0078	0.0085	0.0077	0.0069	0.0070	0.0047	0.0068	0.0082	0.0126
Vanadium (V)	ug/L		0.052	0.073	0.010	0.039	0.021	0.021	0.012	0.010	<0.01
Zinc (Zn)	ug/L		0.88	0.93	2.42	2.57	2.39	3.33	2.84	3.07	1.36
Nutrients											
Phosphorus, Total	mg/L		0.011	0.013	0.014	0.021	0.026	0.019	0.006	0.021	0.019
Ammonia-N	mg/L	1.27	0.008	0.039	0.011	0.007	0.009	0.013	0.014	0.010	0.005
Color, True	T.C.U.		19	15	8	17	11	16	13	13	4
Dissolved Organic Carbon	mg/L		5.8	5.7	4.8	5.8	5.7	4.9	4.4	4.9	3.9
Fluoride (F)	mg/L		0.06	0.07	0.06	0.03	0.05	0.04	0.04	0.04	0.05
Sulphide	mg/L		<0.001	<0.001	0.002	0.002	0.004	0.005	0.006	0.007	0.004
Total Dissolved Solids	mg/L										
Total Kjeldahl Nitrogen	mg/L		0.31	0.35	0.30	0.31	0.34	0.25	0.23	0.21	0.19
Total Organic Carbon	mg/L		6.1	5.9	5.0	6.1	6.0	5.1	4.7	5.3	4.1
Total Suspended Solids	mg/L		2	<1	<1	<1	5	2	<1	3	<1
Carbon Part	mg/L		0.30	0.22	0.17	0.25	0.32	0.16	0.33	0.38	0.18
Routine Water Analysis - low level											
Chloride (Cl)	mg/L		29.0	32.7	37.8	39.9	56.9	77.1	88.3	107.0	89.2
Nitrate+Nitrite-N	mg/L		<0.005	0.007	0.007	<0.005	<0.005	<0.005	<0.005	0.029	0.015
Nitrate-N	mg/L	2.94	<0.005	0.005	0.007	<0.005	<0.005	<0.005	<0.005	0.026	0.013
Nitrite-N	mg/L	0.018	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	0.002
Sulphate (SO4)	mg/L		<3	<3	4	<3	<3	6	4	7	6
pH, Conductivity and Total Alkalinity											
pH	pH	6.5-9.0	8.47	7.07	6.91	7.22	7.17	7.16	7.18	7.09	7.50
Conductivity (EC)	uS/cm		151	164	183	198	268	334	388	449	377
Bicarbonate (HCO3)	mg/L		37	35	46	39	45	41	41	39	34
Carbonate (CO3)	mg/L		1								
Hydroxide (OH)	mg/L										
Alkalinity, Total (as CaCO3)	mg/L		33	29	38	32	37	34	33	32	28
P- Alkalinity	mg/L		1	<1	<1	<1	<1	<1	<1	<1	<1
Ion Balance Calculation											
Ion Balance	%		89.00	98.00	85.00	96.00	97.00	98.00	102.00	102.00	99.00
Anions	meq/L		1.52	1.54	1.9	1.81	2.41	2.98	3.24	3.79	3.19
Cations	meq/L		1.35	1.51	1.62	1.73	2.33	2.93	3.3	3.86	3.15
TDS (Calculated)	mg/L		77	82	97	95	128	161	178	209	174
Hardness (as CaCO3)	mg/L		34.1	35.2	39.6	44.0	59.2	73.3	79.7	92.2	74.6
ICP metals for routine water											
Calcium (Ca)	mg/L		6.1	6.4	7.6	8.2	11.1	13.8	15.1	17.3	13.6
Potassium (K)	mg/L		1.3	1.4	1.4	1.4	1.9	2.0	2.1	2.2	2.3
Magnesium (Mg)	mg/L		4.57	4.70	5.04	5.74	7.65	9.43	10.20	11.90	9.87
Sodium (Na)	mg/L		14.5	17.7	18.3	18.7	25.2	32.6	37.9	45.1	36.8
Other											
Cyanide, Total	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.002	0.001
Radium 226	Bq/L										

Little Roberts Lake Water Quality, 2004.

Parameter	Unit	CWQG	20-Jun-04	16-Jul-04	14-Aug-04	19-Aug-04	12-Sep-04	22-Sep-04	28-Jun-05	17-Jul-05
Total Metals										
Aluminum (Al)	ug/L	100	243	114.0	95	191	140	151	498	96.3
Antimony (Sb)	ug/L		0.416	1.710	0.334	1.160	0.176	0.61	0.0156	0.0111
Arsenic (As)	ug/L	5	0.415	0.318	0.267	0.512	0.409	0.37	0.435	0.384
Barium (Ba)	ug/L		5.08	3.40	3.11	4.41	4.15	4.09	8.19	3.50
Beryllium (Be)	ug/L		0.00647	<0.003	<0.003	0.0043	0.00385	<0.003	0.0107	0.0042
Bismuth (Bi)	ug/L		<0.1	<0.1					<0.001	0.0066
Boron (B)	ug/L		29.2	20.0	18.4	28.1	26.2	23.4	23.7	24.0
Cadmium (Cd)	ug/L	0.017	0.00243	0.0040	<0.002	0.0145	<0.002	<0.002	<0.002	<0.002
Calcium (Ca)	mg/L		7.71	6.61	6.67	6.69	7.45	6.87	5.28	6.25
Chromium (Cr)	ug/L	1	0.491	<0.03	<0.03	0.559	0.383	0.318	0.815	0.163
Cobalt (Co)	ug/L		0.149	0.3000	0.072	0.357	0.0825	0.113	0.140	0.0313
Copper (Cu)	ug/L	2	1.15	1.30	1.15	1.60	1.84	1.54	1.52	1.20
Iron (Fe)	ug/L	300	278	137	99	178	155	136	410	130
Lead (Pb)	ug/L	1	0.0661	0.0469	0.039	0.089	0.251	0.0491	0.234	0.210
Magnesium (Mg)	mg/L		6.96	5.00	4.78	5.18	7.09	6.63	5.49	6.19
Manganese (Mn)	ug/L		23.7	8.45	12.4	8.10	7.74	5.76	10.3	9.07
Mercury (Hg)	ng/L	26	<0.6	<0.6		<0.6	<0.6	<0.6	<0.6	<0.6
Molybdenum (Mo)	ug/L	73	0.18	0.164	0.235	0.179	0.196	0.178	0.183	0.152
Nickel (Ni)	ug/L	25	0.639	0.492	0.501	0.635	0.568	0.501	0.762	0.326
Potassium (K)	mg/L		2.69	2.17	1.99	2.16	2.46	2.31	2.23	2.17
Selenium (Se)	ug/L	1	0.64	0.365	0.230	0.821	0.592	0.548	0.767	0.767
Silver (Ag)	ug/L	0.1	0.00321	<0.0005	0.0029	<0.0005	<0.0005	0.00125	<0.0005	<0.0005
Sodium (Na)	mg/L		37.4	31.0	28.0	33.5	36.0	33.4	28.6	31.5
Strontium (Sr)	ug/L		44.1	36.9	39.0	33.6	45.2	41.2	37.1	37.5
Thallium (Tl)	ug/L	0.8	<1	0.3					0.120	<0.0003
Tin (Sn)	ug/L		<0.4	<0.4					<0.03	<0.03
Uranium (U)	ug/L		0.0351	0.0312	0.0337	0.0317	0.0421	0.0361	0.0613	0.0419
Vanadium (V)	ug/L		0.423	0.092	<0.005	0.447	0.284	0.251	1.34	0.471
Zinc (Zn)	ug/L	30	3.46	1.66	0.62	1.53	5.1	0.683	10.3	2.42
Dissolved Metals										
Aluminum (Al)	ug/L		11		13.30				42.2	9.87
Antimony (Sb)	ug/L		0.568		0.306				0.0141	0.0103
Arsenic (As)	ug/L		0.327		0.314				0.325	0.348
Barium (Ba)	ug/L		2.93		2.57				2.55	2.37
Beryllium (Be)	ug/L		<0.003		<0.003				<0.003	<0.003
Boron (B)	ug/L		21.1		22.8				21.9	22.4
Cadmium (Cd)	ug/L		<0.002		<0.002				<0.002	<0.002
Calcium (Ca)	mg/L		7.22		6.57				4.75	5.96
Chromium (Cr)	ug/L		0.16		0.234				0.349	0.158
Cobalt (Co)	ug/L		0.176		0.0362				0.0179	0.0060
Copper (Cu)	ug/L		1.35		1.32				1.52	1.14
Iron (Fe)	ug/L		83.6		31.7				51.5	29.9
Lead (Pb)	ug/L		0.0144		0.0114				0.120	0.200
Magnesium (Mg)	mg/L		5.21		6.32				5.04	5.86
Manganese (Mn)	ug/L		22.9		6.59				1.39	0.272
Molybdenum (Mo)	ug/L		0.154		0.172				0.163	0.142
Nickel (Ni)	ug/L		0.396		0.308				0.761	0.282
Potassium (K)	mg/L		2.2		2.20				1.89	2.04
Selenium (Se)	ug/L		0.425		0.522				0.588	0.762
Silver (Ag)	ug/L		<0.0005		<0.0005				<0.0005	<0.0005
Sodium (Na)	mg/L		29.2		32.0				26.9	30.1
Strontium (Sr)	ug/L		47.9		39.2				32.5	37.2
Uranium (U)	ug/L		0.0355		0.0318				0.0341	0.0261
Vanadium (V)	ug/L		0.0646		0.068				0.589	0.261
Zinc (Zn)	ug/L		5.01		0.342				10.3	1.18
Nutrients										
Phosphorus, Total	mg/L		0.024	0.016	0.007		0.015	0.019	0.019	0.016
Ammonia-N	mg/L	1.27	<0.005	<0.005	<0.005		0.007	<0.005	0.005	0.009
Color, True	T.C.U.		20	13	15		15	25	25	13
Dissolved Organic Carbon	mg/L		6	4	7		5	5	5.3	4.0
Fluoride (F)	mg/L		0.06	0.06	0.06		0.07	0.07	0.04	0.05
Sulphide	mg/L		0.003	0.005	0.004		<0.003	<0.003	0.001	0.001
Total Dissolved Solids	mg/L		150	150	140		150	160		
Total Kjeldahl Nitrogen	mg/L		0.42	0.19	0.18		0.42	0.3	0.35	0.33
Total Organic Carbon	mg/L		6	4	7		5	5	5.72	4.38
Total Suspended Solids	mg/L		7	8	4		5	3	4.3	2.3
Carbon Part	mg/L								0.40	0.38
Routine Water Analysis - low level										
Chloride (Cl)	mg/L		61	58	57		63	65	51.0	58.8
Nitrate+Nitrite-N	mg/L		<0.006	<0.006	<0.006		<0.006	<0.006	<0.005	<0.005
Nitrate-N	mg/L	2.94	<0.006	<0.006	<0.006		<0.006	<0.006	<0.005	<0.005
Nitrite-N	mg/L	0.018	<0.002	<0.002	<0.002		<0.002	<0.002	<0.001	<0.001
Sulphate (SO4)	mg/L		3.77	3.68	4.66		4.44	4.25	6.3	3.5
pH, Conductivity and Total Alkalinity										
pH	pH	6.5-9.0	7.1	7.6	7.6		7.6	7.5	6.98	7.16
Conductivity (EC)	uS/cm		247	236	266		266	261	218	245
Bicarbonate (HCO3)	mg/L		29	28	29		29	30	25	28
Carbonate (CO3)	mg/L		<5	<5	<5		<5	<5		
Hydroxide (OH)	mg/L		<5	<5	<5		<5	<5		
Alkalinity, Total	pCaCO3/L		23	23	24		24	25	20.1	22.6
P- Alkalinity	mg/L								<1	<1
Ion Balance Calculation										
Ion Balance	%		91.5	93.7	95.1		102	91.7	95.00	95.00
Anions	meq/L								1.98	2.19
Cations	meq/L								1.88	2.08
TDS (Calculated)	mg/L		121	117	118		131	129	108	119
Hardness (as CaCO3)	mg/L		43	38	40		44	43	36.2	37.3
ICP metals for routine water										
Calcium (Ca)	mg/L		7.2	6	6.4		7.1	6.9	5.38	5.93
Potassium (K)	mg/L		2.1	1.9	2		2.3	2.1	1.8	2.0
Magnesium (Mg)	mg/L		6	5.7	5.9		6.5	6.2	5.52	5.47
Sodium (Na)	mg/L		27	28	28		33	30	25.6	29.4
Other										
Cyanide, Total	mg/L		<0.002	<0.002	<0.002		<0.002	<0.002	0.001	0.001
Radium 226	Bq/L		<0.005	<0.005	<0.005		<0.005	<0.005	<0.005	<0.005

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Parameter	Unit	CWQG	5-Aug-05	19-Aug-05	31-Aug-05	14-Sep-05	18-Jun-06	13-Jul-06	10-Aug-06	9-Sep-06
Total Metals										
Aluminum (Al)	ug/L	100	97.6	60.1	156	60.1	379.0	98.2	49.1	53.6
Antimony (Sb)	ug/L		0.0153	0.0106	0.0155	0.0149	0.0130	0.0105	0.0134	0.0127
Arsenic (As)	ug/L	5	0.376	0.460	0.446	0.503	0.380	0.466	0.633	0.659
Barium (Ba)	ug/L		3.63	2.87	4.41	3.33	6.32	3.51	2.69	3.15
Beryllium (Be)	ug/L		<0.003	<0.003	0.0076	0.0076	0.013	0.004	<0.003	<0.003
Bismuth (Bi)	ug/L		0.0031	<0.001	0.0024	<0.001	0.002	<0.001	0.002	0.002
Boron (B)	ug/L		30.9	23.7	23.5	29.4	17.20	22.90	25.70	26.60
Cadmium (Cd)	ug/L	0.017	<0.002	<0.002	<0.002	<0.002	0.002	0.003	<0.002	0.002
Calcium (Ca)	mg/L		6.59	6.38	7.11	6.44	4.910	6.220	6.780	7.860
Chromium (Cr)	ug/L	1	0.288	0.316	1.39	0.336	1.050	0.272	0.354	0.287
Cobalt (Co)	ug/L		0.0508	0.0404	0.0853	0.0501	0.124	0.057	0.049	0.044
Copper (Cu)	ug/L	2	1.59	1.47	1.61	1.63	1.52	1.09	1.51	1.45
Iron (Fe)	ug/L	300	100	102	176	117	318	151	140	155
Lead (Pb)	ug/L	1	0.127	0.0230	0.0680	0.0328	0.110	0.067	0.142	0.046
Magnesium (Mg)	mg/L		6.65	6.46	6.10	4.95	5.110	5.890	6.570	7.180
Manganese (Mn)	ug/L		8.31	6.82	9.92	6.88	11.80	8.46	12.40	9.24
Mercury (Hg)	ng/L	26	<0.6	N/A	<0.6	<0.6	<0.6	<0.6	<0.6	8.500
Molybdenum (Mo)	ug/L	73	0.187	0.153	0.171	0.245	0.139	0.153	0.177	0.168
Nickel (Ni)	ug/L	25	0.516	0.558	0.533	0.604	0.734	0.649	0.398	0.431
Potassium (K)	mg/L		2.25	2.16	2.18	1.99	1.96	2.14	2.17	2.34
Selenium (Se)	ug/L	1	0.783	1.34	0.993	1.35	0.6	1.0	1.3	1.9
Silver (Ag)	ug/L	0.1	0.0023	0.0006	0.0017	0.0006	0.002	0.002	<0.0005	0.002
Sodium (Na)	mg/L		33.6	32.2	29.2	26.9	23.20	27.70	33.90	36.70
Strontium (Sr)	ug/L		41.7	38.9	43.6	42.0	34.900	38.700	41.000	48.500
Thallium (Tl)	ug/L	0.8	0.0006	0.0003	0.0028	0.0039	0.008	0.013	0.009	0.014
Tin (Sn)	ug/L		<0.03	0.0535	<0.03	0.0510	<0.03	0.041	0.075	0.030
Uranium (U)	ug/L		0.0408	0.0430	0.0476	0.0451	0.043	0.041	0.044	0.041
Vanadium (V)	ug/L		0.176	0.0565	0.673	0.075	0.699	0.173	0.137	0.062
Zinc (Zn)	ug/L	30	6.13	2.72	2.56	2.15	6.54	1.57	2.58	1.21
Dissolved Metals										
Aluminum (Al)	ug/L		15.9	10.0	15.9	6.54	37.600	5.270	3.600	4.160
Antimony (Sb)	ug/L		0.0151	0.0108	0.0131	0.0146	0.012	0.011	0.013	0.013
Arsenic (As)	ug/L		0.347	0.458	0.425	0.503	0.313	0.376	0.523	0.584
Barium (Ba)	ug/L		2.50	2.21	2.69	2.14	2.320	2.130	1.920	2.320
Beryllium (Be)	ug/L		<0.003	<0.003	<0.003	0.0075	<0.003	<0.003	<0.003	<0.003
Boron (B)	ug/L		30.7	21.4	22.0	29.0	16.40	20.60	23.40	23.90
Cadmium (Cd)	ug/L		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002
Calcium (Ca)	mg/L		6.32	6.33	7.11	5.68	4.550	5.750	6.170	7.520
Chromium (Cr)	ug/L		0.282	0.314	1.29	0.333	0.70	0.15	0.28	0.28
Cobalt (Co)	ug/L		0.0127	0.0134	0.0117	0.0155	0.017	0.015	0.013	0.012
Copper (Cu)	ug/L		1.59	1.40	1.39	1.25	1.29	0.76	1.14	1.24
Iron (Fe)	ug/L		22.4	28.5	17.7	20.1	47	16	6	19
Lead (Pb)	ug/L		0.114	0.0195	0.0148	0.0071	0.025	0.040	0.118	0.032
Magnesium (Mg)	mg/L		6.34	5.40	6.06	4.18	4.78	5.38	6.03	6.89
Manganese (Mn)	ug/L		0.407	0.135	0.093	0.103	3.390	0.347	0.179	0.182
Molybdenum (Mo)	ug/L		0.169	0.153	0.169	0.170	0.121	0.139	0.162	0.165
Nickel (Ni)	ug/L		0.401	0.376	0.339	0.403	0.368	0.484	0.259	0.278
Potassium (K)	mg/L		2.13	2.06	2.11	#REF!	1.72	1.96	1.96	2.16
Selenium (Se)	ug/L		0.679	1.34	0.984	1.35	0.5	1.0	0.9	1.1
Silver (Ag)	ug/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.0005
Sodium (Na)	mg/L		32.8	28.6	29.1	#REF!	21.5	25.9	31.1	35.1
Strontium (Sr)	ug/L		40.2	38.5	43.6	36.1	31.7	35.6	37.6	47.7
Uranium (U)	ug/L		0.0242	0.0256	0.0317	0.0279	0.0219	0.0217	0.0214	0.0215
Vanadium (V)	ug/L		0.173	0.027	0.409	<0.01	0.225	0.025	0.025	0.033
Zinc (Zn)	ug/L		4.33	2.43	1.78	1.06	5.29	1.51	1.16	1.17
Nutrients										
Phosphorus, Total	mg/L		0.014	0.018	0.018	0.017	0.018	0.019	0.029	0.035
Ammonia-N	mg/L	1.27	0.004	0.004	0.011	0.004	0.003	0.004	0.008	0.008
Color, True	T.C.U.		8	16	12	15	16	12	12	7
Dissolved Organic Carbon	mg/L		5.3	4.4	5.4	5.7	4.9	4.9	4.8	4.8
Fluoride (F)	mg/L		0.05	0.06	0.06	0.06	0.04	0.05	0.04	0.06
Sulphide	mg/L		<0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001
Total Dissolved Solids	mg/L									
Total Kjeldahl Nitrogen	mg/L		0.31	0.36	0.41	0.39	0.35	0.34	0.40	0.38
Total Organic Carbon	mg/L		5.77	4.79	5.92	6.61	5.6	5.3	5.4	5.6
Total Suspended Solids	mg/L		<1	2.3	4.3	2.2	5	3	<1	2
Carbon Part	mg/L		0.52	0.39	0.54	0.92	0.66	0.35	0.57	0.78
Routine Water Analysis - low level										
Chloride (Cl)	mg/L		59.6	59.9	62.8	70.2	48.4	59.2	63.2	72.7
Nitrate+Nitrite-N	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nitrate-N	mg/L	2.94	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nitrite-N	mg/L	0.018	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Sulphate (SO4)	mg/L		5.0	4.4	6.9	5.5	8	<3	<3	7
pH, Conductivity and Total Alkalinity										
pH	pH	6.5-9.0	7.05	7.53	7.41	7.48	7.07	7.92	7.46	7.65
Conductivity (EC)	uS/cm		241	247	271	301	194	246	270	310
Bicarbonate (HCO3)	mg/L		29	30	32	30	24	27	32	32
Carbonate (CO3)	mg/L									
Hydroxide (OH)	mg/L									
Alkalinity, Total	pCaCO3/L		23.8	24.7	26.1	24.9	20	22	26	27
P- Alkalinity	mg/L		<1	<1	<1	<1	<1	<1	<1	<1
Ion Balance Calculation										
Ion Balance	%		95.00	94.00	91.00	95.00	89.00	99.00	99.00	95.00
Anions	meq/L		2.26	2.28	2.44	2.59	1.92	2.15	2.38	2.72
Cations	meq/L		2.14	2.13	2.23	2.47	1.72	2.13	2.34	2.6
TDS (Calculated)	mg/L		123	123	131	143	103	118	130	148
Hardness (as CaCO3)	mg/L		40.1	40.2	41.8	34.9	30.9	38.9	42.9	49.2
ICP metals for routine water										
Calcium (Ca)	mg/L		6.51	6.38	7.04	6.05	4.780	6.190	6.870	7.860
Potassium (K)	mg/L		2.0	2.1	2.2	2.5	1.6	2.1	2.3	2.3
Magnesium (Mg)	mg/L		5.80	5.89	5.88	4.81	4.61	5.69	6.26	7.18
Sodium (Na)	mg/L		29.6	29.3	30.7	39.3	24.3	29.8	32.8	35.7
Other										
Cyanide, Total	mg/L		0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Radium 226	Bq/L		<0.005	<0.005	0.006					

Appendix B
Background Water Quality Summary Tables

Doris Lake Outflow		CWQG	June						July					
Parameter	Units		N(total)	N < DL	N> CWQG	Mean	Median	Maximum	N(total)	N < DL	N>CWQG	Mean	Median	Maximum
Total Metals														
Aluminum (Al)	ug/L	100	6		2	76.8	76.7	145.0	9			57.8	59.9	87.4
Antimony (Sb)	ug/L		6			0.118	0.012	0.360	9			0.198	0.015	0.827
Arsenic (As)	ug/L	5	6			0.384	0.373	0.471	9			0.392	0.398	0.507
Barium (Ba)	ug/L		6			3.2	3.3	4.3	9			3.1	3.2	3.8
Beryllium (Be)	ug/L		6	2		0.037	0.005	0.200	9	6		0.0	0.0	0.0
Bismuth (Bi), Total	ug/L		6	4		0.023	0.002	0.100	9	3		0.1	0.0	0.3
Boron (B)	ug/L		6			21.6	19.2	34.4	9			21.4	21.3	24.4
Cadmium (Cd)	ug/L	0.017	6	4		0.002	0.002	0.003	9	5		0.003	0.002	0.011
Calcium (Ca)	mg/L		6			6.647	6.320	8.470	9			7.137	7.280	7.810
Chromium (Cr)	ug/L	1	6			0.421	0.311	0.775	9	2		0.200	0.244	0.344
Cobalt (Co)	ug/L		6	1		0.1	0.1	0.1	9			0.1	0.0	0.1
Copper (Cu)	ug/L	2	6			1.22	1.24	1.30	9			1.32	1.43	1.53
Iron (Fe)	ug/L	300	6			111	113	202	9			107	113	163
Lead (Pb)	ug/L	1	6	1		0.069	0.046	0.183	9	2		0.067	0.055	0.202
Magnesium (Mg)	mg/L		6			5.5	5.3	7.3	9			5.9	5.9	6.6
Manganese (Mn)	ug/L		6			11.0	11.4	18.0	9			14.9	15.1	20.8
Mercury (Hg)	ng/L	26	6	5		0.650	0.600	0.900	9	9		0.600	0.600	0.600
Molybdenum (Mo)	ug/L	73	6			0.121	0.116	0.157	9			0.147	0.143	0.244
Nickel (Ni)	ug/L	25	6			0.494	0.421	0.850	9			0.501	0.531	0.643
Potassium (K)	mg/L		6			2.188	2.085	2.820	9			2.268	2.280	2.420
Selenium (Se)	ug/L	1	6			0.741	0.773	0.954	9		2	0.782	0.823	1.390
Silver (Ag)	ug/L	0.1	6	2		0.018	0.001	0.100	9	3		0.001	0.001	0.005
Sodium (Na)	mg/L		6			27.900	26.350	39.300	9			30.433	30.500	33.100
Strontium (Sr)	ug/L		6			35.817	35.050	40.600	9			38.428	38.800	42.000
Thallium (Tl)	µg/L	0.8	6	2		0.045	0.017	0.124	9	4		0.073	0.022	0.300
Tin (Sn)	ug/L		6	6		0.1	0.0	0.4	9	6		0.2	0.1	0.4
Uranium (U)	ug/L		6	1		0.0	0.0	0.1	9			0.0	0.0	0.0
Vanadium (V)	ug/L		6			0.5	0.6	0.8	9	3		0.2	0.1	0.8
Zinc (Zn)	ug/L	30	6			3.41	1.40	10.10	9			2.74	1.56	12.20
Dissolved Metals														
Aluminum (Al)	ug/L		6			9.94	7.48	22.20	6			6.13	5.21	12.90
Antimony (Sb)	ug/L		6			0.239	0.012	1.030	6			0.073	0.012	0.378
Arsenic (As)	ug/L		6			0.309	0.313	0.337	6			0.354	0.355	0.403
Barium (Ba)	ug/L		6			2.27	2.25	2.44	6			2.28	2.22	2.53
Beryllium (Be)	ug/L		6	5		0.003	0.003	0.005	6	6		0.003	0.003	0.003
Boron (B)	ug/L		6			18.9	18.7	22.1	6			20.6	21.0	23.6
Cadmium (Cd)	ug/L		6	6		0.002	0.002	0.002	6	3		0.003	0.002	0.007
Calcium (Ca)	mg/L		6			6.35	6.03	7.88	6			6.56	6.46	7.23
Chromium (Cr)	ug/L		6			0.234	0.153	0.618	6			0.184	0.172	0.268
Cobalt (Co)	ug/L		6			0.028	0.015	0.077	6			0.015	0.013	0.025
Copper (Cu)	ug/L		6			1.16	1.16	1.33	6			1.09	1.14	1.27
Iron (Fe)	ug/L		6			21.3	15.3	44.3	6			18.7	15.0	34.6
Lead (Pb)	ug/L		6			0.029	0.011	0.118	6			0.077	0.041	0.193
Magnesium (Mg)	mg/L		6			5.07	5.05	6.11	6			5.53	5.63	6.20
Manganese (Mn)	ug/L		6			2.71	2.71	5.79	6			1.19	0.38	5.35
Molybdenum (Mo)	ug/L		6			0.117	0.106	0.150	6			0.124	0.123	0.141
Nickel (Ni)	ug/L		6			0.290	0.248	0.567	6			0.244	0.193	0.466
Potassium (K)	ug/L		6			2.02	1.94	2.37	6			2.10	2.07	2.31
Selenium (Se)	ug/L		6			0.589	0.568	0.754	6			0.682	0.646	0.928
Silver (Ag)	ug/L		6	6		0.0005	0.0005	0.0005	6	4		0.0013	0.0005	0.0045
Sodium (Na)	ug/L		6			25.8	25.4	30.9	6			28.9	29.5	31.2
Strontium (Sr)	ug/L		6			35.3	35.1	42.9	6			35.2	34.8	38.8
Uranium (U)	ug/L		6			0.021	0.021	0.028	6			0.019	0.019	0.025
Vanadium (V)	ug/L		6	1		0.247	0.274	0.451	6			0.090	0.026	0.373
Zinc (Zn)	ug/L		6			1.29	1.06	2.36	6			1.27	0.96	3.09
Nutrients														
Phosphorus, Total	mg/L	1.27	6			0.019	0.019	0.022	9			0.024	0.021	0.050
Ammonia-N	mg/L		6	2		0.008	0.008	0.014	9	2		0.014	0.015	0.027
Color, True	T.C.U.		6			15.8	15.0	25.0	9			14.4	15.0	20.0
Dissolved Organic Carbc	mg/L		6			5.10	5.00	6.00	9			5.21	5.00	6.00
Fluoride (F)	mg/L		6			0.057	0.055	0.070	9			0.061	0.060	0.070
Sulphide	mg/L		6	5		0.002	0.001	0.003	9	6		0.004	0.001	0.015
Total Dissolved Solids	mg/L		2			140	140	160	4			121	130	175
Total Kjeldahl Nitrogen	mg/L		6			0.443	0.445	0.470	9			0.437	0.460	0.630
Total Organic Carbon	mg/L		6			5.85	5.75	7.00	9			5.76	5.92	6.59
Total Suspended Solids	mg/L		6			3.0	3.0	4.0	9			4.3	4.0	8.0
Carbon Part	mg/L		4			0.878	0.920	1.000	5			0.890	0.780	1.220
Routine Water Analysis - low level														
Chloride (Cl)	mg/L		6			57.1	56.5	64.0	9			62.6	61.8	76.8
Nitrate+Nitrite-N	mg/L		6	5		0.005	0.005	0.006	9	8		0.006	0.006	0.009
Nitrate-N	mg/L	2.94	6	5		0.005	0.005	0.006	9	8		0.006	0.006	0.009
Nitrite-N	mg/L	0.018	6	6		0.001	0.001	0.002	9	8		0.002	0.002	0.002
Sulphate (SO4)	mg/L		6	1		4.1	3.5	7.0	9	4		3.1	3.0	5.0
pH, Conductivity and Total Alkalinity														
pH	pH	6.5-9.0	6			7.16	7.13	7.50	9			7.34	7.41	7.60
Conductivity (EC)	uS/cm		6			239	239	268	9			255	255	276
Bicarbonate (HCO3)	mg/L		6			31.2	31.5	35.0	9			33.2	33.0	45.0
Carbonate (CO3)	mg/L		2	2		5.00	5.00	5.00	4	4		5.00	5.00	5.00
Hydroxide (OH)	mg/L		2	2		5.00	5.00	5.00	4	4		5.00	5.00	5.00
Alkalinity, Total	1gCaCO3/L		6			25.5	25.8	29.0	9			27.1	26.8	36.9
P- Alkalinity			4	4		1.00	1.00	1.00	5	5		1.00	1.00	1.00
Ion Balance Calculation														
Ion Balance	%		6			0.93	0.94	0.95	9			0.95	0.97	0.98
Anions	meq/L		4			2.15	2.17	2.29	5			2.44	2.32	2.95
Cations	meq/L		4			1.97	1.96	2.12	5			2.30	2.22	2.57
TDS (Calculated)	mg/L		6			119	118	131	9			128	126	156
Hardness (as CaCO3)	mg/L		6			39.6	37.5	48.0	9			41.4	41.3	47.0
ICP metals for routine water														
Calcium (Ca)	mg/L		6			6.73	6.63	8.10	9			6.97	6.87	7.70
Potassium (K)	mg/L		6			2.15	2.15	2.30	9			2.26	2.20	2.70
Magnesium (Mg)	mg/L		6			5.51	5.17	6.70	9			5.87	5.93	6.80
Sodium (Na)	mg/L		6			27.7	27.3	30.0	9			31.3	30.6	40.4
Other														
Cyanide, Total	mg/L		6	6		0.001	0.001	0.002	9	8		0.001	0.001	0.002
Radium 226	Bq/L		3	3		0.005	0.005	0.005	5	4		0.005	0.005	0.006

Doris Lake Outflow		CWQG	August						September					
Parameter	Units		N(total)	N < DL	N>CWQG	Mean	Median	Maximum	N(total)	N < DL	N>CWQG	Mean	Median	Maximum
Total Metals														
Aluminum (Al)	ug/L	100	9		1	134.1	58.6	774.0	7		1	61.7	48.2	146.0
Antimony (Sb)	ug/L		9			0.399	0.016	2.845	7			0.097	0.014	0.458
Arsenic (As)	ug/L	5	9			0.452	0.473	0.668	7			0.472	0.420	0.727
Barium (Ba)	ug/L		9			3.8	3.0	11.1	7			3.2	3.0	4.8
Beryllium (Be)	ug/L		9	7		0.0	0.0	0.0	7	4		0.0	0.0	0.0
Bismuth (Bi), Total	ug/L		7	2		0.0	0.0	0.1	5	1		0.0	0.0	0.0
Boron (B)	ug/L		9			22.7	22.8	24.1	7			22.0	22.4	23.0
Cadmium (Cd)	ug/L	0.017	9	6		0.003	0.002	0.005	7	6		0.002	0.002	0.003
Calcium (Ca)	mg/L		9			7.300	7.380	8.130	7			7.618	7.350	8.390
Chromium (Cr)	ug/L	1	9	1	1	0.405	0.305	1.410	7	1	0.387	0.191	1.260	
Cobalt (Co)	ug/L		9			0.2	0.1	0.9	7		0.1	0.1	0.1	
Copper (Cu)	ug/L	2	9		1	1.44	1.42	2.06	7		1.41	1.40	1.50	
Iron (Fe)	ug/L	300	9		1	176	85	888	7	1	123	90	356	
Lead (Pb)	ug/L		1	9			0.103	0.117	0.268		7	0.038	0.035	0.096
Magnesium (Mg)	mg/L		9			6.2	6.4	6.9	7		6.3	6.4	7.0	
Manganese (Mn)	ug/L		9			16.8	16.1	39.5	7		21.3	10.1	64.2	
Mercury (Hg)	ng/L	26	8	8		0.600	0.600	0.600	7	6		0.686	0.600	1.200
Molybdenum (Mo)	ug/L	73	9			0.153	0.148	0.192	7			0.143	0.139	0.160
Nickel (Ni)	ug/L	25	9			0.489	0.456	0.969	7			0.485	0.448	0.697
Potassium (K)	mg/L		9			2.285	2.250	2.570	7			2.341	2.340	2.470
Selenium (Se)	ug/L	1	9		4	0.928	0.838	1.690	7		4	1.045	1.120	1.630
Silver (Ag)	ug/L	0.1	9	2		0.001	0.001	0.003	7	2		0.001	0.001	0.002
Sodium (Na)	mg/L		9			32.178	32.600	34.400	7			31.638	32.133	34.100
Strontium (Sr)	ug/L		9			38.867	39.100	44.300	7			41.467	40.200	44.800
Thallium (Tl)	µg/L	0.8	7	2		0.020	0.011	0.100	5	1		0.007	0.003	0.016
Tin (Sn)	ug/L		7	2		0.1	0.0	0.4	5	2		0.0	0.0	0.1
Uranium (U)	ug/L		9			0.0	0.0	0.1	7			0.0	0.0	0.0
Vanadium (V)	ug/L		9	1		0.3	0.1	1.6	7			0.2	0.1	0.5
Zinc (Zn)	ug/L	30	9			3.92	2.84	10.90	7			1.69	1.70	3.10
Dissolved Metals														
Aluminum (Al)	ug/L		7			3.21	2.53	7.94	5			1.32	1.08	2.02
Antimony (Sb)	ug/L		7			0.269	0.014	1.800	5			0.013	0.012	0.014
Arsenic (As)	ug/L		7			0.400	0.402	0.515	5			0.407	0.456	0.504
Barium (Ba)	ug/L		7			2.30	2.18	2.66	5			2.26	2.27	2.40
Beryllium (Be)	ug/L		7	7		0.003	0.003	0.003	5	4		0.003	0.003	0.003
Boron (B)	ug/L		7			21.5	21.0	23.7	5			19.7	20.0	21.1
Cadmium (Cd)	ug/L		7	7		0.002	0.002	0.002	5	5		0.002	0.002	0.002
Calcium (Ca)	mg/L		7			7.15	7.25	7.71	5			7.19	7.32	7.97
Chromium (Cr)	ug/L		7			0.258	0.261	0.352	5			0.369	0.184	1.070
Cobalt (Co)	ug/L		7			0.050	0.014	0.264	5			0.011	0.010	0.017
Copper (Cu)	ug/L		7			1.25	1.15	1.54	5			1.13	1.14	1.20
Iron (Fe)	ug/L		7			8.2	7.8	13.9	5	2		3.6	4.2	5.3
Lead (Pb)	ug/L		7			0.078	0.112	0.124	5			0.020	0.026	0.037
Magnesium (Mg)	mg/L		7			6.11	5.88	6.75	5			5.79	5.83	6.45
Manganese (Mn)	ug/L		7			1.21	0.21	7.12	5			0.13	0.12	0.32
Molybdenum (Mo)	ug/L		7			0.129	0.122	0.157	5			0.126	0.130	0.138
Nickel (Ni)	ug/L		7			0.195	0.174	0.305	5			0.145	0.146	0.168
Potassium (K)	ug/L		7			2.16	2.12	2.31	5			2.13	2.21	2.30
Selenium (Se)	ug/L		7			0.757	0.826	0.870	5			0.781	0.791	1.130
Silver (Ag)	ug/L		7	7		0.0005	0.0005	0.0005	5	5		0.0005	0.0005	0.0005
Sodium (Na)	ug/L		7			31.1	30.4	33.6	5			29.5	31.3	32.3
Strontium (Sr)	ug/L		7			39.1	38.9	42.8	5			39.5	40.4	41.4
Uranium (U)	ug/L		7			0.021	0.019	0.030	5			0.017	0.016	0.022
Vanadium (V)	ug/L		7			0.054	0.046	0.095	5	2		0.093	0.030	0.349
Zinc (Zn)	ug/L		7			2.33	1.54	6.38	5			1.04	0.67	2.10
Nutrients														
Phosphorus, Total	mg/L	1.27	8			0.033	0.033	0.045	7			0.031	0.027	0.048
Ammonia-N	mg/L		8	1		0.013	0.013	0.019	7	1		0.008	0.008	0.013
Color, True	T.C.U.		8			13.7	14.2	20.0	7	2		11.1	13.0	20.0
Dissolved Organic Carbon	mg/L		8			5.58	5.05	8.00	7			4.99	5.00	5.90
Fluoride (F)	mg/L		8			0.046	0.045	0.070	7			0.059	0.060	0.080
Sulphide	mg/L		8	7		0.002	0.001	0.004	7	3		0.002	0.001	0.003
Total Dissolved Solids	mg/L		2			125	125	130	2			145	145	170
Total Kjeldahl Nitrogen	mg/L		8			0.462	0.480	0.550	7			0.514	0.520	0.550
Total Organic Carbon	mg/L		8			6.16	6.04	7.00	7			6.20	6.47	7.60
Total Suspended Solids	mg/L		8	1		5.9	3.0	25.0	7	1		3.6	3.0	7.0
Carbon Part	mg/L		6			0.938	0.990	1.220	5			1.500	1.520	1.750
Routine Water Analysis - low level														
Chloride (Cl)	mg/L	2.94 0.018	8			62.0	62.2	65.8	7			63.8	63.0	66.4
Nitrate+Nitrite-N	mg/L		8	7		0.005	0.005	0.006	7	7		0.005	0.005	0.006
Nitrate-N	mg/L		8	7		0.005	0.005	0.006	7	7		0.005	0.005	0.006
Nitrite-N	mg/L		8	8		0.001	0.001	0.002	7	6		0.002	0.001	0.003
Sulphate (SO4)	mg/L		8	5		3.2	3.0	4.8	7	2		3.4	3.0	5.0
pH, Conductivity and Total Alkalinity														
pH	pH	6.5-9.0	8			7.49	7.57	7.60	7			7.47	7.53	7.60
Conductivity (EC)	uS/cm		8			263	265	279	7			271	264	287
Bicarbonate (HCO3)	mg/L		8			33.4	33.0	34.0	7			33.9	34.0	35.0
Carbonate (CO3)	mg/L		2	2		5.00	5.00	5.00	2	2		5.00	5.00	5.00
Hydroxide (OH)	mg/L		2	2		5.00	5.00	5.00	2	2		5.00	5.00	5.00
Alkalinity, Total	mgCaCO3/L		8			27.3	27.2	28.0	7			27.7	27.8	28.8
P- Alkalinity			6	6		1.00	1.00	1.00	5	5		1.00	1.00	1.00
Ion Balance Calculation														
Ion Balance	%		8			0.97	0.97	0.99	7			0.95	0.95	0.99
Anions	meq/L		6			2.39	2.39	2.46	5			2.44	2.45	2.55
Cations	meq/L		6			2.32	2.31	2.42	5			2.32	2.34	2.44
TDS (Calculated)	mg/L		8			128	129	134	7			131	130	138
Hardness (as CaCO3)	mg/L		8			44.0	43.7	47.5	7			43.9	45.0	48.2
ICP metals for routine water														
Calcium (Ca)	mg/L		8			7.43	7.35	8.06	7			7.51	7.58	8.17
Potassium (K)	mg/L		8			2.24	2.30	2.40	7			2.25	2.25	2.40
Magnesium (Mg)	mg/L		8			6.19	6.14	6.64	7			6.11	6.19	6.80
Sodium (Na)	mg/L		8			30.8	31.2	32.7	7			31.4	31.3	33.3
Other														
Cyanide, Total	mg/L		8	7		0.001	0.001	0.002	7	5		0.001	0.001	0.002
Radium 226	Bq/L		2	1		0.006	0.006	0.007	3	3		0.005	0.005	0.005

Tail Lake Outflow		CWQG	June						July						
Parameter	Units		N(total)	N < DL	N> CWQG	Mean	Median	Maximum	N(total)	N < DL	N> CWQG	Mean	Median	Maximum	
Total Metals															
Aluminum (Al)	ug/L	100	5			18.2	16.5	27.6	7			14.7	12.1	28.8	
Antimony (Sb)	ug/L		5			0.034	0.011	0.130	7			0.061	0.008	0.260	
Arsenic (As)	ug/L		5			0.239	0.238	0.291	7			0.256	0.261	0.286	
Barium (Ba)	ug/L	5	5			2.1	2.1	2.7	7			2.2	2.0	2.7	
Beryllium (Be)	ug/L		5	2		0.0	0.0	0.2	7	6		0.1	0.0	0.2	
Bismuth (Bi)	ug/L		5	4		0.0	0.0	0.0	7	4		0.0	0.0	0.0	
Boron (B)	ug/L	0.017	5			15.2	14.0	22.3	7			14.6	15.0	17.1	
Cadmium (Cd)	ug/L		5	2		0.012	0.002	0.050	7	5		0.017	0.003	0.050	
Calcium (Ca)	mg/L		5			6.452	6.090	8.530	6			6.183	6.125	6.960	
Chromium (Cr)	ug/L	1	5			0.324	0.248	0.649	7			0.237	0.158	0.740	
Cobalt (Co)	ug/L		5	1		0.0	0.0	0.1	7	2		0.1	0.0	0.1	
Copper (Cu)	ug/L		2	5		0.93	0.90	1.13	7			0.76	0.80	1.00	
Iron (Fe)	ug/L	300	5			54	42	85	7		1	132	89	358	
Lead (Pb)	ug/L	1	5	1		0.041	0.025	0.107	7	2		0.052	0.050	0.094	
Magnesium (Mg)	mg/L		5			5.1	4.6	6.9	6			4.7	4.6	5.4	
Manganese (Mn)	ug/L		5			1.3	1.2	2.2	7			2.8	2.0	6.1	
Mercury (Hg)	ng/L	26	5	4		0.620	0.600	0.700	7	6		0.671	0.600	1.100	
Molybdenum (Mo)	ug/L	73	5			0.091	0.100	0.110	7			0.081	0.073	0.110	
Nickel (Ni)	ug/L	25	5			0.509	0.520	0.588	7			0.547	0.513	0.709	
Potassium (K)	mg/L	1	5			1.654	1.580	2.260	7			1.389	1.350	1.730	
Selenium (Se)	ug/L		5			0.419	0.400	0.517	7	1		0.380	0.421	0.520	
Silver (Ag)	ug/L		0.1	5	2		0.021	0.001	0.100	7	2		0.030	0.002	0.100
Sodium (Na)	mg/L	5	5			17.040	15.700	23.800	7			16.086	16.000	18.800	
Strontium (Sr)	ug/L		5			27.400	24.700	37.100	7			26.500	26.900	30.800	
Thallium (Tl)	µg/L		0.8	5	1		0.034	0.006	0.127	7	3		0.017	0.014	0.030
Tin (Sn)	µg/L	5		5		0.0	0.0	0.1	7	4		0.1	0.0	0.3	
Uranium (U)	ug/L	5		1		0.0	0.0	0.1	7	2		0.0	0.0	0.1	
Vanadium (V)	ug/L	30	5			0.4	0.4	0.5	7			0.1	0.1	0.5	
Zinc (Zn)	ug/L		5	1		4.57	5.35	7.28	7	2		4.16	2.07	16.00	
Dissolved Metals															
Aluminum (Al)	ug/L		5			5.75	4.31	10.90	6			4.97	4.65	6.70	
Antimony (Sb)	ug/L		5			0.126	0.010	0.589	6			0.057	0.008	0.303	
Arsenic (As)	ug/L		5			0.224	0.218	0.262	6			0.237	0.239	0.248	
Barium (Ba)	ug/L	5	5			1.86	1.80	2.34	6			1.94	2.01	2.11	
Beryllium (Be)	ug/L		5	4		0.003	0.003	0.005	6	5		0.003	0.003	0.005	
Boron (B)	ug/L		5			14.1	12.7	19.5	6			14.0	14.1	17.1	
Cadmium (Cd)	ug/L	5	5	5		0.002	0.002	0.002	6	5		0.002	0.002	0.003	
Calcium (Ca)	mg/L		5			6.09	5.87	7.70	6			6.06	5.85	7.49	
Chromium (Cr)	ug/L		5			0.250	0.147	0.641	6			0.148	0.148	0.203	
Cobalt (Co)	ug/L	5	5			0.019	0.013	0.041	6			0.019	0.019	0.030	
Copper (Cu)	ug/L		5			0.93	0.87	1.29	6			0.68	0.63	1.31	
Iron (Fe)	ug/L		5			18.3	16.7	30.0	6			36.2	34.2	58.1	
Lead (Pb)	ug/L	5	5			0.040	0.008	0.103	6			0.047	0.045	0.086	
Magnesium (Mg)	mg/L		5			4.62	4.41	6.01	6			4.50	4.38	5.33	
Manganese (Mn)	ug/L		5			0.57	0.50	0.81	6			1.20	0.85	3.40	
Molybdenum (Mo)	ug/L	5	5			0.084	0.089	0.102	6			0.074	0.068	0.100	
Nickel (Ni)	ug/L		5			0.474	0.458	0.582	6			0.472	0.449	0.682	
Potassium (K)	mg/L		5			1.56	1.56	2.05	6			1.35	1.23	1.91	
Selenium (Se)	ug/L	5	5			0.367	0.390	0.418	6			0.395	0.398	0.502	
Silver (Ag)	ug/L		5	4		0.0005	0.0005	0.0006	6	3		0.0009	0.0006	0.0020	
Sodium (Na)	mg/L		5			15.5	15.1	20.9	6			15.6	15.5	19.9	
Strontium (Sr)	ug/L	5	5			26.2	24.0	33.9	6			25.9	25.5	30.1	
Uranium (U)	ug/L		5			0.010	0.008	0.014	6			0.008	0.008	0.011	
Vanadium (V)	ug/L		5			0.233	0.268	0.388	6			0.047	0.039	0.104	
Zinc (Zn)	ug/L		5			3.47	3.53	5.43	6			2.06	2.01	3.57	
Nutrients															
Phosphorus, Total	mg/L		1.27	5			0.008	0.008	0.009	7			0.009	0.006	0.014
Ammonia-N	mg/L	5		1		0.027	0.008	0.104	7	2		0.012	0.008	0.039	
Color, True	T.C.U.	5				16.0	15.0	25.0	7			12.4	12.0	19.0	
Dissolved Organic Carbon	mg/L	5				5.73	5.90	6.13	7			5.33	5.30	7.00	
Fluoride (F)	mg/L	5				0.063	0.060	0.073	7			0.066	0.060	0.080	
Sulphide	mg/L	5		5	3		0.002	0.001	0.004	7	3		0.003	0.001	0.010
Total Dissolved Solids	mg/L			1			110	110	110	2			80	80	120
Total Kjeldahl Nitrogen	mg/L			5			0.312	0.300	0.330	7			0.316	0.320	0.360
Total Organic Carbon	mg/L	5				5.85	6.00	6.24	6			5.40	5.27	6.10	
Total Suspended Solids	mg/L	5		5	4		1.4	1.0	3.0	7	5		1.7	1.0	3.0
Carbon Part	mg/L			4			0.152	0.105	0.300	5			0.222	0.220	0.300
Routine Water Analysis - low level															
Chloride (Cl)	mg/L	2.94	5			32.9	30.1	43.5	7			32.4	30.0	40.0	
Nitrate+Nitrite-N	mg/L		5	5		0.005	0.005	0.006	7	4		0.007	0.006	0.010	
Nitrate-N	mg/L		5	5		0.005	0.005	0.006	7	4		0.006	0.006	0.010	
Nitrite-N	mg/L		5	5		0.001	0.001	0.002	7	6		0.001	0.001	0.002	
Sulphate (SO4)	mg/L		5	2		4.0	3.0	6.0	7	4		2.9	3.0	4.0	
pH, Conductivity and Total Alkalinity															
pH	pH	6.5-9.0	5			7.09	7.01	7.40	7			7.33	7.07	8.47	
Conductivity (EC)	uS/cm		5			168	159	219	7			162	151	186	
Bicarbonate (HCO3)	mg/L		5			35.4	34.0	44.0	7			35.7	35.0	46.0	
Carbonate (CO3)	mg/L		1	1		5.00	5.00	5.00	3	2		3.67	5.00	5.00	
Hydroxide (OH)	mg/L		1	1		5.00	5.00	5.00	2	2		5.00	5.00	5.00	
Alkalinity, Total	1gCaCO3/L		5			29.0	27.6	35.9	7			29.6	28.5	37.8	
P- Alkalinity	mg/L		4	4		1.00	1.00	1.00	5	4		1.02	1.00	1.10	
Ion Balance Calculation															
Ion Balance	%		5			20.14	0.93	97.00	7			27.43	0.98	96.20	
Anions	meq/L		4			1.64	1.57	2.06	5			1.54	1.52	1.90	
Cations	meq/L		4			1.53	1.43	1.97	5			1.42	1.35	1.62	
TDS (Calculated)	mg/L		5			83	79	109	7			81	77	97	
Hardness (as CaCO3)	mg/L		5			36.2	33.0	48.8	7			35.4	34.1	43.0	
ICP metals for routine water															
Calcium (Ca)	mg/L		5			6.45	6.06	8.32	7			6.44	6.11	7.55	
Potassium (K)	mg/L		5			1.63	1.60	2.03	7			1.42	1.36	1.90	
Magnesium (Mg)	mg/L		5			4.87	4.50	6.80	7			4.69	4.57	5.90	
Sodium (Na)	mg/L		5			16.5	15.3	21.6	7			16.1	14.7	19.0	
Other															
Cyanide, Total	mg/L		5	5		0.001	0.001	0.002	7	7		0.001	0.001	0.002	
Radium 226	Bq/L		2	2		0.005	0.005	0.005	3	2		0.005	0.005	0.006	

Tail Lake Outflow															
Parameter		Units	CWQG	August						September					
				N(total)	N < DL	N > CWQG	Mean	Median	Maximum	N(total)	N < DL	N > CWQG	Mean	Median	Maximum
Total Metals															
Aluminum (Al)		ug/L	100	8			21.8	16.5	45.7	6			23.4	16.1	65.2
Antimony (Sb)		ug/L		8			0.100	0.010	0.580	6			0.142	0.008	0.661
Arsenic (As)		ug/L	5	8			0.407	0.332	0.741	6			0.366	0.229	0.761
Barium (Ba)		ug/L		8			3.8	3.1	6.8	6			3.9	2.3	7.9
Beryllium (Be)		ug/L		8	8		0.0	0.0	0.0	6	3		0.0	0.0	0.0
Bismuth (Bi)		ug/L		6	1		0.0	0.0	0.0	4	1		0.0	0.0	0.0
Boron (B)		ug/L		8			14.8	14.7	16.7	6			12.9	13.2	13.7
Cadmium (Cd)		ug/L	0.017	8	6		0.002	0.002	0.003	6	6		0.002	0.002	0.002
Calcium (Ca)		mg/L		8			9.471	7.580	15.700	6			9.597	6.535	18.000
Chromium (Cr)		ug/L	1	8	1		0.295	0.250	0.855	6			0.287	0.222	0.744
Cobalt (Co)		ug/L		8			0.1	0.1	0.2	6			0.1	0.1	0.2
Copper (Cu)		ug/L	2	8			0.70	0.70	0.80	6			0.71	0.71	0.79
Iron (Fe)		ug/L	300	8		5	406	404	853	6		2	412	68	1150
Lead (Pb)		ug/L	1	8			0.069	0.062	0.132	6			0.023	0.012	0.055
Magnesium (Mg)		mg/L		8			6.7	5.6	11.0	6			6.7	4.6	12.5
Manganese (Mn)		ug/L		8			10.9	7.7	28.1	6			13.5	2.4	43.4
Mercury (Hg)															
Molybdenum (Mo)		ug/L	73	8			0.068	0.070	0.091	6			0.074	0.075	0.117
Nickel (Ni)		ug/L	25	8			0.521	0.507	0.660	6			0.437	0.433	0.550
Potassium (K)		mg/L		8			1.605	1.475	2.100	6			1.857	1.840	2.260
Selenium (Se)		ug/L	1	8		3	0.858	0.615	1.960	6		2	0.922	0.464	2.230
Silver (Ag)		ug/L	0.1	8	3		0.001	0.001	0.002	6	3		0.001	0.001	0.004
Sodium (Na)		mg/L		8			22.775	18.550	38.600	6			24.600	18.100	44.800
Strontium (Sr)		ug/L		8			43.025	33.800	78.100	6			45.467	28.700	91.800
Thallium (Tl)		µg/L	0.8	6	1		0.005	0.002	0.015	4	2		0.004	0.002	0.012
Tin (Sn)		µg/L		6	3		0.0	0.0	0.1	4	3		0.0	0.0	0.0
Uranium (U)		ug/L		8			0.0	0.0	0.0	6			0.0	0.0	0.0
Vanadium (V)		ug/L		8	1		0.1	0.1	0.2	6	3		0.1	0.0	0.2
Zinc (Zn)		ug/L	30	8			3.69	2.63	11.10	6			3.37	2.37	8.24
Dissolved Metals															
Aluminum (Al)		ug/L		7			4.60	4.40	5.94	4			4.47	4.51	5.13
Antimony (Sb)		ug/L		7			0.049	0.009	0.286	4			0.008	0.008	0.009
Arsenic (As)		ug/L		7			0.356	0.366	0.550	4			0.351	0.345	0.584
Barium (Ba)		ug/L		7			3.46	2.76	6.05	4			4.09	3.67	7.18
Beryllium (Be)		ug/L		7	7		0.003	0.003	0.003	4	4		0.003	0.003	0.003
Boron (B)		ug/L		7			13.8	13.4	15.7	4			11.9	12.4	12.8
Cadmium (Cd)		ug/L		7	7		0.002	0.002	0.002	4	4		0.002	0.002	0.002
Calcium (Ca)		mg/L		7			9.36	7.40	14.90	4			10.52	9.47	17.20
Chromium (Cr)		ug/L		7	1		0.192	0.234	0.275	4			0.337	0.226	0.738
Cobalt (Co)		ug/L		7			0.021	0.022	0.034	4			0.042	0.029	0.095
Copper (Cu)		ug/L		7			0.63	0.61	0.79	4			0.65	0.65	0.79
Iron (Fe)		ug/L		7			67.0	68.6	118.0	4			70.6	72.5	123.0
Lead (Pb)		ug/L		7			0.063	0.053	0.126	4			0.021	0.019	0.040
Magnesium (Mg)		mg/L		7			6.64	5.40	10.50	4			7.46	6.94	11.90
Manganese (Mn)		ug/L		7			2.12	1.89	5.88	4			11.89	9.04	28.90
Molybdenum (Mo)		ug/L		7			0.061	0.066	0.077	4			0.053	0.055	0.069
Nickel (Ni)		ug/L		7			0.490	0.499	0.594	4			0.434	0.417	0.498
Potassium (K)		mg/L		7			1.59	1.52	2.01	4			1.77	1.79	2.13
Selenium (Se)		ug/L		7			0.575	0.527	0.921	4			0.668	0.760	1.010
Silver (Ag)		ug/L		7	5		0.0006	0.0005	0.0011	4	4		0.0005	0.0005	0.0005
Sodium (Na)		mg/L		7			22.7	17.8	36.8	4			27.1	25.5	42.8
Strontium (Sr)		ug/L		7			44.2	35.1	73.6	4			51.3	46.5	86.1
Uranium (U)		ug/L		7			0.007	0.007	0.008	4			0.009	0.008	0.013
Vanadium (V)		ug/L		7	1		0.030	0.021	0.092	4	1		0.077	0.028	0.240
Zinc (Zn)		ug/L		7			2.80	2.57	5.70	4			1.97	1.77	3.07
Nutrients															
Phosphorus, Total		mg/L	1.27	8			0.011	0.006	0.026	6			0.009	0.004	0.021
Ammonia-N		mg/L		8	2		0.008	0.007	0.014	6	1		0.011	0.008	0.028
Color, True		T.C.U.		8			13.9	14.0	21.0	6			12.5	12.7	20.0
Dissolved Organic Carbon		mg/L		8			5.18	5.00	6.00	6			4.77	4.95	5.79
Fluoride (F)		mg/L		8			0.051	0.055	0.070	6			0.057	0.050	0.080
Sulphide		mg/L		8	2		0.003	0.004	0.006	6	1		0.003	0.004	0.007
Total Dissolved Solids		mg/L		2			90	90	100	2			105	105	120
Total Kjeldahl Nitrogen		mg/L		8			0.256	0.245	0.340	6			0.228	0.220	0.290
Total Organic Carbon		mg/L		8			5.61	5.65	7.00	6			4.89	5.07	5.84
Total Suspended Solids		mg/L		8	6		2.1	1.5	5.0	6	5		2.0	2.0	3.0
Carbon Part		mg/L		6			0.243	0.275	0.330	4			0.188	0.160	0.380
Routine Water Analysis - low level															
Chloride (Cl)		mg/L		8			49.0	37.0	88.3	6			56.8	37.0	107.0
Nitrate+Nitrite-N		mg/L		8	8		0.005	0.005	0.006	6	4		0.011	0.006	0.029
Nitrate-N		mg/L		8	8		0.005	0.005	0.006	6	4		0.010	0.006	0.026
Nitrite-N		mg/L		8	8		0.001	0.001	0.002	6	4		0.002	0.002	0.003
Sulphate (SO4)		mg/L		8	3		3.3	3.0	6.0	6	1		4.2	3.3	7.0
pH, Conductivity and Total Alkalinity															
pH		pH	6.5-9.0	8			7.16	7.20	7.30	6			7.26	7.29	7.50
Conductivity (EC)		uS/cm		8			230	189	388	6			253	176	449
Bicarbonate (HCO3)		mg/L		8			37.1	36.0	45.0	6			32.7	31.0	39.0
Carbonate (CO3)		mg/L		2	2		5.00	5.00	5.00	2	2		5.00	5.00	5.00
Hydroxide (OH)		mg/L		2	2		5.00	5.00	5.00	2	2		5.00	5.00	5.00
Alkalinity, Total		mgCaCO3/L		8			30.5	29.7	37.0	6			26.6	25.3	31.7
P- Alkalinity		mg/L		6	6		1.00	1.00	1.00	4	4		1.00	1.00	1.00
Ion Balance Calculation															
Ion Balance		%		8			25.03	0.98	99.40	6			32.56	1.01	96.60
Anions		meq/L		6			2.25	2.11	3.24	4			2.52	2.38	3.79
Cations		meq/L		6			2.18	2.03	3.30	4			2.47	2.30	3.86
TDS (Calculated)		mg/L		8			110	88	178	6			119	85	209
Hardness (as CaCO3)		mg/L		8			50.0	40.5	79.7	6			51.7	37.5	92.2
ICP metals for routine water															
Calcium (Ca)		mg/L		8			9.32	7.43	15.10	6			9.48	6.65	17.30
Potassium (K)		mg/L		8			1.59	1.45	2.10	6			1.84	1.75	2.30
Magnesium (Mg)		mg/L		8			6.48	5.34	10.20	6			6.79	5.05	11.90
Sodium (Na)		mg/L		8			22.0	17.4	37.9	6			24.8	17.0	45.1
Other															
Cyanide, Total		mg/L		7	6		0.001	0.001	0.002	6	4		0.002	0.002	0.002
Radium 226		Bq/L		3	2		0.013	0.005	0.030	3	3		0.005	0.005	0.005

Little Roberts Lake Outflow															
Parameter		Units	CWQG	June					July						
				N(total)	N < DL	N> CWQG	Mean	Median	Maximum	N(total)	N < DL	N> CWQG	Mean	Median	Maximum
Total Metals															
Aluminum (Al)	ug/L	100	3		3		373.3	379.0	498.0	3		1	102.8	98.2	114.0
Antimony (Sb)	ug/L		3				0.148	0.016	0.416	3			0.577	0.011	1.710
Arsenic (As)	ug/L	5	3				0.410	0.415	0.435	3			0.389	0.384	0.466
Barium (Ba)	ug/L		3				6.5	6.3	8.2	3			3.5	3.5	3.5
Beryllium (Be)	ug/L		3				0.0	0.0	0.0	3	1		0.0	0.0	0.0
Bismuth (Bi)	ug/L		3	2			0.0	0.0	0.1	3	2		0.0	0.0	0.1
Boron (B)	ug/L		3				23.4	23.7	29.2	3			22.3	22.9	24.0
Cadmium (Cd)	ug/L	0.017	3	1			0.002	0.002	0.002	3	1		0.003	0.003	0.004
Calcium (Ca)	mg/L		3				5.967	5.280	7.710	3			6.360	6.250	6.610
Chromium (Cr)	ug/L	1	3		1		0.785	0.815	1.050	3	1		0.155	0.163	0.272
Cobalt (Co)	ug/L		3				0.1	0.1	0.1	3			0.1	0.1	0.3
Copper (Cu)	ug/L	2	3				1.40	1.52	1.52	3			1.20	1.20	1.30
Iron (Fe)	ug/L	300	3		2		335	318	410	3			139	137	151
Lead (Pb)	ug/L	1	3				0.137	0.110	0.234	3			0.108	0.067	0.210
Magnesium (Mg)	mg/L		3				5.9	5.5	7.0	3			5.7	5.9	6.2
Manganese (Mn)	ug/L		3				15.3	11.8	23.7	3			8.7	8.5	9.1
Mercury (Hg)	ng/L	26	3	3			0.600	0.600	0.600	3	3		0.600	0.600	0.600
Molybdenum (Mo)	ug/L	73	3				0.167	0.180	0.183	3			0.156	0.153	0.164
Nickel (Ni)	ug/L	25	3				0.712	0.734	0.762	3			0.489	0.492	0.649
Potassium (K)	mg/L		3				2.293	2.230	2.690	3			2.160	2.170	2.170
Selenium (Se)	ug/L	1	3				0.682	0.640	0.767	3			0.701	0.767	0.971
Silver (Ag)	ug/L	0.1	3	1			0.002	0.002	0.003	3	2		0.001	0.001	0.002
Sodium (Na)	mg/L		3				29.733	28.600	37.400	3			30.067	31.000	31.500
Strontium (Sr)	ug/L		3				38.700	37.100	44.100	3			37.700	37.500	38.700
Thallium (Tl)	ug/L	0.8	3	1			0.076	0.100	0.120	3	1		0.104	0.013	0.300
Tin (Sn)	ug/L		3	3			0.2	0.0	0.4	3	2		0.2	0.0	0.4
Uranium (U)	ug/L		3				0.0	0.0	0.1	3			0.0	0.0	0.0
Vanadium (V)	ug/L		3				0.8	0.7	1.3	3			0.2	0.2	0.5
Zinc (Zn)	ug/L	30	3				6.77	6.54	10.30	3			1.88	1.66	2.42
Dissolved Metals															
Aluminum (Al)	ug/L		3				30.27	37.60	42.20	2			7.57	7.57	9.87
Antimony (Sb)	ug/L		3				0.198	0.014	0.568	2			0.010	0.010	0.011
Arsenic (As)	ug/L		3				0.322	0.325	0.327	2			0.362	0.362	0.376
Barium (Ba)	ug/L		3				2.60	2.55	2.93	2			2.25	2.25	2.37
Beryllium (Be)	ug/L		3	3			0.003	0.003	0.003	2	2		0.003	0.003	0.003
Boron (B)	ug/L		3				19.8	21.1	21.9	2			21.5	21.5	22.4
Cadmium (Cd)	ug/L		3	3			0.002	0.002	0.002	2	2		0.002	0.002	0.002
Calcium (Ca)	mg/L		3				5.51	4.75	7.22	2			5.86	5.86	5.96
Chromium (Cr)	ug/L		3				0.404	0.349	0.704	2			0.152	0.152	0.158
Cobalt (Co)	ug/L		3				0.070	0.018	0.176	2			0.011	0.011	0.015
Copper (Cu)	ug/L		3				1.39	1.35	1.52	2			0.95	0.95	1.14
Iron (Fe)	ug/L		3				60.6	51.5	83.6	2			22.8	22.8	29.9
Lead (Pb)	ug/L		3				0.053	0.025	0.120	2			0.120	0.120	0.200
Magnesium (Mg)	mg/L		3				5.01	5.04	5.21	2			5.62	5.62	5.86
Manganese (Mn)	ug/L		3				9.23	3.39	22.90	2			0.31	0.31	0.35
Molybdenum (Mo)	ug/L		3				0.146	0.154	0.163	2			0.141	0.141	0.142
Nickel (Ni)	ug/L		3				0.508	0.396	0.761	2			0.383	0.383	0.484
Potassium (K)	mg/L		3				1.94	1.89	2.20	2			2.00	2.00	2.04
Selenium (Se)	ug/L		3				0.518	0.541	0.588	2			0.859	0.859	0.956
Silver (Ag)	ug/L		3	3			0.0005	0.0005	0.0005	2	1		0.0006	0.0006	0.0006
Sodium (Na)	mg/L		3				25.9	26.9	29.2	2			28.0	28.0	30.1
Strontium (Sr)	ug/L		3				37.4	32.5	47.9	2			36.4	36.4	37.2
Uranium (U)	ug/L		3				0.031	0.034	0.036	2			0.024	0.024	0.026
Vanadium (V)	ug/L		3				0.293	0.225	0.589	2			0.143	0.143	0.261
Zinc (Zn)	ug/L		3				6.87	5.29	10.30	2			1.35	1.35	1.51
Nutrients															
Phosphorus, Total	mg/L	1.27	3				0.020	0.019	0.024	3			0.017	0.016	0.019
Ammonia-N	mg/L		3	1			0.004	0.005	0.005	3	1		0.006	0.005	0.009
Color, True	T.C.U.		3				20.3	20.0	25.0	3			12.7	13.0	13.0
Dissolved Organic Carbon	mg/L		3				5.41	5.32	6.00	3			4.30	4.00	4.90
Fluoride (F)	mg/L		3				0.048	0.043	0.060	3			0.053	0.050	0.060
Sulphide	mg/L		3	1			0.002	0.001	0.003	3	1		0.002	0.001	0.005
Total Dissolved Solids	mg/L		1				150	150	150	1			150	150	150
Total Kjeldahl Nitrogen	mg/L		3				0.373	0.350	0.420	3			0.287	0.330	0.340
Total Organic Carbon	mg/L		3				5.76	5.72	6.00	3			4.54	4.38	5.25
Total Suspended Solids	mg/L		3				5.4	5.0	7.0	3			4.4	3.0	8.0
Carbon Part	mg/L		2				0.531	0.531	0.660	2			0.365	0.365	0.380
Routine Water Analysis - low level															
Chloride (Cl)	mg/L		3				53.5	51.0	61.0	3			58.7	58.8	59.2
Nitrate+Nitrite-N	mg/L	2.94	3	3			0.005	0.005	0.006	3	3		0.005	0.005	0.006
Nitrate-N	mg/L		3	3			0.005	0.005	0.006	3	3		0.005	0.005	0.006
Nitrite-N	mg/L	0.018	3	3			0.001	0.001	0.002	3	3		0.001	0.001	0.002
Sulphate (SO4)	mg/L		3				6.0	6.3	8.0	3	1		3.4	3.5	3.7
pH, Conductivity and Total Alkalinity															
pH	pH	6.5-9.0	3				7.05	7.07	7.10	3			7.56	7.60	7.92
Conductivity (EC)	uS/cm		3				220	218	247	3			242	245	246
Bicarbonate (HCO3)	mg/L		3				26.0	25.0	29.0	3			27.7	28.0	28.0
Carbonate (CO3)	mg/L		1	1			5.00	5.00	5.00	1	1		5.00	5.00	5.00
Hydroxide (OH)	mg/L		1	1			5.00	5.00	5.00	1	1		5.00	5.00	5.00
Alkalinity, Total	1gCaCO3/L		3				21.0	20.1	23.0	3			22.5	22.6	23.0
P- Alkalinity	mg/L		2	2			1.00	1.00	1.00	2	2		1.00	1.00	1.00
Ion Balance Calculation															
Ion Balance	%		3				31.11	0.95	91.50	3			31.88	0.99	93.70
Anions	meq/L		2				1.95	1.95	1.98	2			2.17	2.17	2.19
Cations	meq/L		2				1.80	1.80	1.88	2			2.11	2.11	2.13
TDS (Calculated)	mg/L		3				111	108	121	3			118	118	119
Hardness (as CaCO3)	mg/L		3				36.7	36.2	43.0	3			38.1	38.0	38.9
ICP metals for routine water															
Calcium (Ca)	mg/L		3				5.79	5.38	7.20	3			6.04	6.00	6.19
Potassium (K)	mg/L		3				1.85	1.84	2.10	3			2.00	2.00	2.10
Magnesium (Mg)	mg/L		3				5.38	5.52	6.00	3			5.62	5.69	5.70
Sodium (Na)	mg/L		3				25.6	25.6	27.0	3			29.1	29.4	29.8
Other															
Cyanide, Total	mg/L		3	2			0.001	0.001	0.002	3	2		0.001	0.001	0.002
Radium 226	Bq/L		2	2			0.005	0.005	0.005	2	2		0.005	0.005	0.005

Little Roberts Lake Outflow															
Parameter		Units	CWQG	August						September					
				N(total)	N < DL	N > CWQG	Mean	Median	Maximum	N(total)	N < DL	N > CWQG	Mean	Median	Maximum
Total Metals															
Aluminum (Al)	ug/L	100	6		2	108.2	96.4	191.0	4		2	84.6	60.1	140.0	
Antimony (Sb)	ug/L		6			0.258	0.015	1.160	4			0.068	0.015	0.176	
Arsenic (As)	ug/L	5	6			0.449	0.453	0.633	4			0.524	0.503	0.659	
Barium (Ba)	ug/L		6			3.5	3.4	4.4	4			3.5	3.3	4.2	
Beryllium (Be)	ug/L		6	4		0.0	0.0	0.0	4	2		0.0	0.0	0.0	
Bismuth (Bi)	ug/L		4	1		0.0	0.0	0.0	2	1		0.0	0.0	0.0	
Boron (B)	ug/L		6			25.1	24.7	30.9	4			27.4	26.6	29.4	
Cadmium (Cd)	ug/L	0.017	6	5		0.004	0.002	0.015	4	3		0.002	0.002	0.002	
Calcium (Ca)	mg/L		6			6.703	6.680	7.110	4			7.250	7.450	7.860	
Chromium (Cr)	ug/L	1	6	1	1	0.490	0.335	1.390	4			0.335	0.336	0.383	
Cobalt (Co)	ug/L		6			0.1	0.1	0.4	4			0.1	0.1	0.1	
Copper (Cu)	ug/L	2	6			1.49	1.55	1.61	4			1.64	1.63	1.84	
Iron (Fe)	ug/L	300	6			132	121	178	4			142	155	155	
Lead (Pb)	ug/L	1	6			0.081	0.079	0.142	4			0.110	0.046	0.251	
Magnesium (Mg)	mg/L		6			6.0	6.3	6.7	4			6.4	7.1	7.2	
Manganese (Mn)	ug/L		6			9.7	9.1	12.4	4			8.0	7.7	9.2	
Mercury (Hg)	ng/L	26	4	4		0.600	0.600	0.600	4	3		3.233	0.600	8.500	
Molybdenum (Mo)	ug/L	73	6			0.184	0.178	0.235	4			0.203	0.196	0.245	
Nickel (Ni)	ug/L	25	6			0.524	0.525	0.635	4			0.534	0.568	0.604	
Potassium (K)	mg/L		6			2.152	2.165	2.250	4			2.263	2.340	2.460	
Selenium (Se)	ug/L	1	6		2	0.906	0.907	1.340	4		2	1.277	1.350	1.890	
Silver (Ag)	ug/L	0.1	6	2		0.001	0.001	0.003	4	1		0.001	0.001	0.002	
Sodium (Na)	mg/L		6			31.733	32.850	33.900	4			33.200	36.000	36.700	
Strontium (Sr)	ug/L		6			39.633	40.000	43.600	4			45.233	45.200	48.500	
Thallium (Tl)	ug/L	0.8	4			0.003	0.002	0.009	2			0.009	0.009	0.014	
Tin (Sn)	ug/L		4	2		0.0	0.0	0.1	2			0.0	0.0	0.1	
Uranium (U)	ug/L		6			0.0	0.0	0.0	4			0.0	0.0	0.0	
Vanadium (V)	ug/L		6	1		0.2	0.2	0.7	4			0.1	0.1	0.3	
Zinc (Zn)	ug/L	30	6			2.69	2.57	6.13	4			2.82	2.15	5.10	
Dissolved Metals															
Aluminum (Al)	ug/L		5			11.74	13.30	15.90	2			5.35	5.35	6.54	
Antimony (Sb)	ug/L		5			0.072	0.013	0.306	2			0.014	0.014	0.015	
Arsenic (As)	ug/L		5			0.413	0.425	0.523	2			0.544	0.544	0.584	
Barium (Ba)	ug/L		5			2.38	2.50	2.69	2			2.23	2.23	2.32	
Beryllium (Be)	ug/L		5	5		0.003	0.003	0.003	2	1		0.005	0.005	0.008	
Boron (B)	ug/L		5			24.1	22.8	30.7	2			26.5	26.5	29.0	
Cadmium (Cd)	ug/L		5	5		0.002	0.002	0.002	2	1		0.002	0.002	0.002	
Calcium (Ca)	mg/L		5			6.50	6.33	7.11	2			6.60	6.60	7.52	
Chromium (Cr)	ug/L		5			0.480	0.282	1.290	2			0.307	0.307	0.333	
Cobalt (Co)	ug/L		5			0.017	0.013	0.036	2			0.014	0.014	0.016	
Copper (Cu)	ug/L		5			1.37	1.39	1.59	2			1.25	1.25	1.25	
Iron (Fe)	ug/L		5			21.2	22.4	31.7	2			19.8	19.8	20.1	
Lead (Pb)	ug/L		5			0.056	0.020	0.118	2			0.019	0.019	0.032	
Magnesium (Mg)	mg/L		5			6.03	6.06	6.34	2			5.54	5.54	6.89	
Manganese (Mn)	ug/L		5			1.48	0.18	6.59	2			0.14	0.14	0.18	
Molybdenum (Mo)	ug/L		5			0.165	0.169	0.172	2			0.168	0.168	0.170	
Nickel (Ni)	ug/L		5			0.337	0.339	0.401	2			0.341	0.341	0.403	
Potassium (K)	mg/L		5			2.09	2.11	2.20	2			1.08	1.08	2.16	
Selenium (Se)	ug/L		5			0.879	0.871	1.340	2			1.200	1.200	1.350	
Silver (Ag)	ug/L		5	5		0.0005	0.0005	0.0005	2	2		0.0005	0.0005	0.0005	
Sodium (Na)	mg/L		5			30.7	31.1	32.8	2			17.6	17.6	35.1	
Strontium (Sr)	ug/L		5			39.8	39.2	43.6	2			41.9	41.9	47.7	
Uranium (U)	ug/L		5			0.027	0.026	0.032	2			0.025	0.025	0.028	
Vanadium (V)	ug/L		5			0.140	0.068	0.409	2	1		0.021	0.021	0.033	
Zinc (Zn)	ug/L		5			2.01	1.78	4.33	2			1.12	1.12	1.17	
Nutrients															
Phosphorus, Total	mg/L	1.27	5			0.017	0.018	0.029	4			0.022	0.017	0.035	
Ammonia-N	mg/L		5	1		0.006	0.005	0.011	4	1		0.006	0.007	0.008	
Color, True	T.C.U.		5			12.8	12.4	16.5	4			12.5	15.0	15.5	
Dissolved Organic Carbon	mg/L		5			5.37	5.25	7.00	4			5.16	5.00	5.69	
Fluoride (F)	mg/L		5			0.054	0.055	0.060	4			0.063	0.060	0.070	
Sulphide	mg/L		5	3		0.002	0.001	0.004	4	3		0.002	0.001	0.003	
Total Dissolved Solids	mg/L		1			140	140	140	2			150	150	150	
Total Kjeldahl Nitrogen	mg/L		5			0.332	0.360	0.410	4			0.397	0.390	0.420	
Total Organic Carbon	mg/L		5			5.77	5.77	7.00	4			5.73	5.58	6.61	
Total Suspended Solids	mg/L		5	2		2.5	2.3	4.3	4			3.1	2.2	5.0	
Carbon Part	mg/L		4			0.506	0.531	0.570	2			0.851	0.851	0.923	
Routine Water Analysis - low level															
Chloride (Cl)	mg/L	2.94 0.018	5			60.5	59.9	63.2	4			68.6	70.2	72.7	
Nitrate+Nitrite-N	mg/L		5	5		0.005	0.005	0.006	4	4		0.005	0.005	0.006	
Nitrate-N	mg/L		5	5		0.005	0.005	0.006	4	4		0.005	0.005	0.006	
Nitrite-N	mg/L		5	5		0.001	0.001	0.002	4	4		0.001	0.001	0.002	
Sulphate (SO4)	mg/L		5	1		4.8	4.7	6.9	4			5.6	5.5	7.0	
pH, Conductivity and Total Alkalinity															
pH	pH	6.5-9.0	5			7.41	7.46	7.60	4			7.58	7.60	7.65	
Conductivity (EC)	uS/cm		5			259	266	271	4			292	301	310	
Bicarbonate (HCO3)	mg/L		5			30.4	30.0	32.0	4			30.3	30.0	32.0	
Carbonate (CO3)	mg/L		1	1		5.00	5.00	5.00	2	2		5.00	5.00	5.00	
Hydroxide (OH)	mg/L		1	1		5.00	5.00	5.00	2	2		5.00	5.00	5.00	
Alkalinity, Total	mgCaCO3/L		5			24.9	24.7	26.1	4			25.1	24.9	26.5	
P- Alkalinity	mg/L		4	4		1.00	1.00	1.00	2	2		1.00	1.00	1.00	
Ion Balance Calculation															
Ion Balance	%		5			19.78	0.95	95.10	4			34.63	0.95	102.00	
Anions	meq/L		4			2.34	2.33	2.44	2			2.66	2.66	2.72	
Cations	meq/L		4			2.21	2.19	2.34	2			2.54	2.54	2.60	
TDS (Calculated)	mg/L		5			125	123	131	4			141	143	148	
Hardness (as CaCO3)	mg/L		5			41.0	40.2	42.9	4			42.7	44.0	49.2	
ICP metals for routine water															
Calcium (Ca)	mg/L		5			6.64	6.51	7.04	4			7.00	7.10	7.86	
Potassium (K)	mg/L		5			2.12	2.10	2.30	4			2.35	2.30	2.45	
Magnesium (Mg)	mg/L		5			5.95	5.89	6.26	4			6.16	6.50	7.18	
Sodium (Na)	mg/L		5			30.1	29.6	32.8	4			36.0	35.7	39.3	
Other															
Cyanide, Total	mg/L		5	2		0.001	0.001	0.002	4	4		0.001	0.001	0.002	
Radium 226	Bq/L		4	3		0.005	0.005	0.006	1	1		0.005	0.005	0.005	

Appendix C
Nutrient Release from Fish Habitat

Technical Memorandum

To:	Brian Labadie, MHBL	Date:	12 September 2005
cc:	Gary Ash, Golder	From:	John Chapman
Subject:	Doris North Project - Jetty and Fish Habitat Construction Nutrient Release from Blast Residues	Project #:	1CM014.006

1 Introduction

Construction rock will be used to construct the Doris North Project jetty and to establish or enhance fish habitat in Doris Lake and around the jetty area. This technical memorandum presents estimates of blast residue that may be released from the construction rock as it is placed in the bay and in Doris Lake.

2 Calculation Method

The potential blast residue release from the construction rock was calculated following the methods described in Ferguson and Leask (1988). Mine production rates and estimated explosives usage rates provided by MHBL indicated a powder factor of about 1.14 kg per tonne of rock mined. The same powder factor was adopted for the quarrying of construction rock. Conservatively, blast residue content equal to 10% of the powder factor was adopted. Since the construction rock will be fully immersed in water, it was further assumed that all of the blast residue will be released. Therefore, the steps to calculate the release of ammonia and nitrate from the mined rock are as follows:

1. An estimate of the amount of ANFO used in the blasting of each of the waste rock and ore materials was calculated by multiplying the amount of each material by the powder factor.
2. The residual mass of ANFO was then estimated by multiplying the total mass of ANFO used to produce the rock and ore with the overall residue factor (i.e. 10%).
3. The amount of nitrogen in the ANFO was calculated assuming that the ANFO comprises 94% NH_4NO_3 , and 6% fuel oil. The mass weight equivalent of the N in ammonium nitrate is 35%, therefore the total N content of the ANFO is 33%.
4. The amount of nitrogen released from the waste rock in storage was calculated assuming that all of the residual nitrogen will be flushed from the construction fill.
5. The speciation of the nitrogen in the blast residues was assumed to be 28% ammonia, 70% nitrate, and 2% nitrite. In contrast to the recommendations in Ferguson and Leask (1988), this conservatively assumes a higher portion of the nitrogen will be present as ammonia.

3 Results

3.1 Roberts Bay

3.1.1 Jetty Construction

Based on the current design, the jetty will be constructed using approximately 5,600 cubic meters of rock (11,600 dry tonnes). The current proposal for the jetty compensation is to create eight spurs along the jetty each measuring 5 m x 15 m and about 0.5 m in height, for a rock volume of 300 m³ (about 500 tonnes). The total mass of rock that will be placed will therefore be about 12,100 dry tonnes.

It is anticipated that the jetty will be constructed over a 10 day period. During construction, a silt curtain will be maintained around the rock deposition zone.

By assuming that all of the rock will be wetted and thoroughly 'rinsed' during deposition, it is expected that all of the blast residue will be released to Roberts Bay over the period of construction. This is conservative since a proportion of the rock will remain above the water level. The estimated nutrient loadings that may be released from the placement of construction rock are summarized in Table 3.1.

The silt curtain may limit the rate of dispersion of the blast residues during construction. However, wave action and local currents are expected to displace the majority of the water from within the silt curtain area on a daily basis. Assuming that: i) the average water depth along the extent of the jetty is about 2.5 m, ii) the silt curtain is placed at a distance of about 15 meters from the centre-line on both sides of the jetty, and, iii) the silt curtain extends about 15 meters beyond the end of the jetty, daily maximum concentrations that may occur within the silt curtain area, assuming complete release of the blast residues were calculated and are included in Table 3.1.

Table 3.1 Summary of Estimated Nutrient Release to Roberts Bay from Jetty Construction

Parameter	Overall Release (kg)	Daily Release (kg/day)	Average Local* Daily Concentration (mg/L)
NH ₃ -N	50	5.0	0.57
NO ₃ -N	396	40.0	4.50
NO ₂ -N	9.1	0.91	0.10

Note: * Locally within silt curtain.

3.1.2 Additional Fish Habitat Compensation

As well, six additional rock spurs measuring 5 m x 20 m x 0.5 m high, for a rock volume of 300 m³ (about 500 tonnes), will be constructed out from shore somewhere along the bay. All of these are to be underwater, to provide additional rock habitat for fish and invertebrates, so that all of the blast residues will be released from the rock. The estimated nutrient loadings to Roberts Bay from these additional spurs will be as shown Table 3.2 below.

Table 3.2 Estimated Nutrient Loadings from Spurs Constructed for Fish Habitat Enhancement

Parameter	Total Loading (kg)
NH ₃ -N	2.1
NO ₃ -N	16.4
NO ₂ -N	0.4

3.2 Doris Lake Fish Habitat

The proposed fish rearing habitats in Doris Lake would comprise five areas each measuring about 25 m x 25 m and one area measuring about 30 m x 30 m. In each area rock would be placed to a height of between 1.0 m and 1.5 m, depending on the bathymetry of the area. Assuming a height of 1.5 m, the total volume of rock would be about 12,500 tonnes.

These areas will be constructed by simply placing construction rock on the ice at the desired locations during winter. As ice-melt occurs in the spring, the rock will settle to the bottom of the lake to create the rearing habitats.

As the rock-mass settles through the water column the nutrients contained in the blast residues will be released to Doris Lake. The estimated total nutrient loadings to Doris Lake are summarized in Table 3.3. Locally, nutrient concentrations may increase with the lake water column for a short period of time. However, since Doris Lake contains about 26.3 million m³ of water, it is apparent that the net nutrient concentration increase in Doris Lake will be small, as shown in Table 3.3.

Table 3.3 Estimated Nutrient Loadings and Concentrations in Doris Lake Caused by Habitat Construction

Parameter	Total Nutrient release (kg)	Incremental Concentration (mg/L)
NH ₃ -N	52	0.0020
NO ₃ -N	409	0.0160
NO ₂ -N	9.4	0.0004

4 References

Ferguson, K.D. and Leask, S.M., 1988. *The export of Nutrients from Surface Coal Mines*. Environment Canada, Conservation and Protection, Pacific and Yukon Region. Regional Program Report 87-12.

Appendix D
Tailings Water Quality Results

TABLE D-1. DORIS NORTH PROJECT CYANIDE LEACH AND TAILINGS WATER ANALYSES

Source: AMMTEC - Supplied by AMEC

(Data In ppm (mg/l) Unless Stated Otherwise)

ANALYSIS		Float Tails Soln [HS9312]	Cyanide Leach Soln [HS9467]	Cyanide Detoxified Soln [MH3051]	Blended Effluent	Blended Effluent [1 month]
		Dissolved	Dissolved	Dissolved	Dissolved	Dissolved
CN(free)		<5	120	<5	<5	<5
CN(wad)		<0.01	180	0.25	0.04	0.01
CN(total)		0.01	210	2.5	0.29	0.20
CNO		<5	360	400	32	9.1
SCN		0.2	37	0.2	<0.1	0.3
Nitrate (NO ₃) as N		2	ND	8	2	0.8
Ammonia (NH ₃) as N		<1	3	17	1	4.4
NO ₃ ⁻ & NO ₂ ⁻ as N		NA	8	NA	NA	NA
Nitrite (NO ₂) as N		<1	ND	23	1	0.9
pH		7.88	10.63	7.86	8.18	7.95
Free acid, g/l		0	0	0	0	0
Sulphate (SO ₄), g/l		<0.05	0.26	4.05	0.18	0.44
Hardness, mg/l CaCO ₃		290	12.9	1470	409	363
Conductivity, mS/cm		955 µS/cm	4.44	9.38	1.94	1.89
Alkalinity, mg/l CaCO ₃		115	640	435	170	150
Acidity		NA	NA	NA	NA	NA
Total Metals	Al	0.057	0.33	0.11	0.10	0.073
	As	0.006	1.00	0.010	0.008	0.002
	B	0.05	0.06	0.10	0.05	0.34
	Ba	<0.02	<0.02	0.37	0.04	0.04
	Ca	60.4	8.2	411	106	68.5
	Cd	<0.005	<0.005	<0.005	<0.005	<0.005
	Co	<0.005	0.64	0.30	0.040	0.032
	Cr	0.002	0.034	0.24	0.026	0.020
	Cu	0.008	42	0.14	0.039	0.024
	Fe	0.034	5.9	0.17	0.120	0.220
	Hg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	K	11.2	105	1890	182	168
	Mg	14.0	1.5	77.1	22.8	28.2
	Mn	0.058	0.016	0.023	0.12	0.10
	Mo	0.03	0.16	0.08	0.04	0.04
	Na	99.8	863	750	160	162
	Ni	0.01	0.33	0.62	0.03	0.01
	Pb	<0.05	<0.05	<0.05	<0.05	<0.05
	SO ₄	70.2	482	3860	428	433
	V	<0.005	0.042	0.023	0.005	<0.005
	Zn	0.025	1.7	0.37	0.090	0.092
Dissolved Metals	Al	0.010	0.36	<0.005	0.006	0.023
	As	0.007	1.00	0.010	0.008	0.002
	B	0.06	0.08	0.06	0.03	0.09
	Ba	0.009	0.007	0.38	0.04	0.034
	Ca	62.9	7.6	442	104	71.4
	Cd	<0.005	<0.005	<0.005	<0.005	<0.005
	Co	<0.005	0.64	0.49	0.048	0.044
	Cr	<0.002	0.029	0.23	0.023	0.005
	Cu	0.007	46	0.18	0.022	0.009
	Fe	<0.005	6.3	0.12	0.025	0.033
	Hg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	K	10.9	116	2010	175	174
	Mg	14.5	1.5	82.4	23.9	28.9
	Mn	0.059	0.009	0.021	0.13	0.096
	Mo	0.03	0.18	0.08	0.04	0.05
	Na	99.8	888	769	158	167
	Ni	<0.01	0.38	0.77	0.03	<0.01
	Pb	<0.05	<0.05	<0.05	<0.05	<0.02
	SO ₄	73.4	505	4220	439	440
	V	<0.005	0.050	0.024	<0.005	<0.005
	Zn	<0.005	1.8	0.30	0.006	<0.005

TABLE D-2. DORIS NORTH PROJECT CYANIDE LEACH AND TAILINGS WATER ANALYSES

Source : Supplied by AMEC



BC Research Inc., BC Research and Innovation Complex, 3650 Westbrook Mall, Vancouver, BC, Canada V6S 2L2
 Telephone: (604) 224-4331 • Facsimile: (604) 224-0540 • Email: info@bcresearch.com • Website: bcresearch.com

Miramar Doris North Water Samples (Received August 6/03 from Ammtec)

Parameter	Units	Sample 1	Sample 2	Sample 3	Sample 4
pH		10.17	7.70	7.49	7.63
Free CN	mg/L	to come	to come	to come	to come
Total CN	mg/L	220	1.82	0.0109	0.242
WAD CN	mg/L	153	0.181	<0.0005	0.0363
CNO	mg/L	312	282	<1	33
SCN	mg/L	38	0.82	0.45	0.45
Sulphate	mg/L	328	4010	41	355
Total Ammonia	mg/L	2.16	22	0.186	1.14
Nitrate	mg/L	1.32	2.54	1.14	0.735
Nitrite	mg/L	0.052	0.386	0.021	0.116
Alkalinity	mg/L	724	441	116	189
Conductivity	uS/cm	5040	9800	960	1920
Hardness CaCO3	mg/L	10	1320	197	340
Total Metals Analysis					
Aluminum Al	mg/L	0.15	0.005	0.013	0.01
Antimony Sb	mg/L	0.054	0.022	< 0.001	0.003
Arsenic As	mg/L	0.93	0.012	0.006	0.01
Barium Ba	mg/L	0.004	0.35	0.009	0.041
Beryllium Be	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Bismuth Bi	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Boron B	mg/L	0.08	0.07	< 0.05	0.06
Cadmium Cd	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Calcium Ca	mg/L	3.37	346	53.6	93.5
Chromium Cr	mg/L	0.025	0.2	< 0.001	0.021
Cobalt Co	mg/L	0.38	0.5	< 0.001	0.044
Copper Cu	mg/L	40.4	0.2	0.013	0.039
Iron Fe	mg/L	3.61	0.18	< 0.05	< 0.05
Lead Pb	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Lithium Li	mg/L	< 0.001	0.016	0.009	0.011
Magnesium Mg	mg/L	0.43	80.3	15.3	26.2
Manganese Mn	mg/L	0.003	0.02	0.049	0.11
Mercury Hg	ug/L	0.19	0.03	< 0.02	< 0.02
Molybdenum Mo	mg/L	0.15	0.068	0.021	0.031
Nickel Ni	mg/L	0.38	0.68	0.009	0.031
Phosphorus PO4	mg/L	1.03	1.64	0.14	0.28
Potassium K	mg/L	113	1700	10.9	182
Selenium Se	mg/L	0.008	0.01	< 0.001	< 0.001
Silicon SiO2	mg/L	15.1	18	16.9	14.9
Silver Ag	mg/L	0.0045	< 0.0001	< 0.0001	< 0.0001
Sodium Na	mg/L	918	730	101	173
Strontium Sr	mg/L	0.018	1.41	0.14	0.33
Tellurium Te	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Thallium Tl	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Thorium Th	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Tin Sn	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Titanium Ti	mg/L	0.001	0.004	0.001	0.001
Uranium U	mg/L	< 0.0005	0.0057	< 0.0005	< 0.0005
Vanadium V	mg/L	0.044	< 0.001	< 0.001	< 0.001
Zinc Zn	mg/L	1.53	0.25	< 0.005	0.009
Zirconium Zr	mg/L	< 0.01	< 0.01	< 0.01	< 0.01

Table D-3 Aged Samples Analysed at B.C. Research



BC Research Inc., BC Research and Innovation Complex, 3650 Westbrook Mall, Vancouver, BC, Canada V6S 2L2
 Telephone: (604) 224-4331 • Facsimile: (604) 224-0540 • Email: info@bcresearch.com • Website: bcresearch.com

Miramar Doris North Aged Water Samples (Received Sept 12/03 from Ammtec)

Sample ID		Sample 4 (A8693)
Parameter	Units	Aged 1 month
pH		7.87
Free CN	mg/L	0.01
Total CN	mg/L	0.147
WAD CN	mg/L	0.0139
CNO	mg/L	8.3
SCN	mg/L	<0.2
Sulphate	mg/L	446
Total Ammonia	mg/L	5.31
Nitrate	mg/L	0.331
Nitrite	mg/L	<0.002
Alkalinity	mg/L	161
Conductivity	uS/cm	1518
Hardness CaCO ₃	mg/L	282
Parameter		Total Metals Analysis
Aluminum Al	mg/L	0.015
Antimony Sb	mg/L	0.003
Arsenic As	mg/L	0.007
Barium Ba	mg/L	0.032
Beryllium Be	mg/L	< 0.001
Bismuth Bi	mg/L	< 0.001
Boron B	mg/L	0.08
Cadmium Cd	mg/L	< 0.0002
Calcium Ca	mg/L	65.3
Chromium Cr	mg/L	0.004
Cobalt Co	mg/L	0.04
Copper Cu	mg/L	0.02
Iron Fe	mg/L	< 0.05
Lead Pb	mg/L	< 0.001
Lithium Li	mg/L	0.009
Magnesium Mg	mg/L	28.8
Manganese Mn	mg/L	0.084
Mercury Hg	ug/L	0.07
Molybdenum Mo	mg/L	0.036
Nickel Ni	mg/L	0.007
Phosphorus PO ₄	mg/L	0.13
Potassium K	mg/L	175
Selenium Se	mg/L	< 0.001
Silicon SiO ₂	mg/L	8.27
Silver Ag	mg/L	0.001
Sodium Na	mg/L	165
Strontium Sr	mg/L	0.28
Tellurium Te	mg/L	< 0.001
Thallium Tl	mg/L	< 0.0001
Thorium Th	mg/L	< 0.0005
Tin Sn	mg/L	< 0.001
Titanium Ti	mg/L	< 0.001
Uranium U	mg/L	0.0006
Vanadium V	mg/L	< 0.001
Zinc Zn	mg/L	0.007
Zirconium Zr	mg/L	< 0.01

Dissolved Metals Analysis
0.005
0.003
0.007
0.033
< 0.001
< 0.001
0.08
< 0.0002
61.4
0.005
0.041
0.015
< 0.05
< 0.001
0.009
27.9
0.087
< 0.02
0.037
0.005
0.05
159
< 0.001
8.27
0.0011
153
0.29
< 0.001
< 0.0001
< 0.0005
< 0.001
< 0.001
0.0006
< 0.001
0.006
< 0.01

Appendix E
Shoreline Erosion Calculations

Potential Shoreline Erosion Processes at Tail Lake, Doris North Project, Hope Bay Nunavut, Canada

Prepared for

Miramar Hope Bay Limited

Prepared by



October 2005

Potential Shoreline Erosion Processes at Tail Lake, Doris North Project, Hope Bay Nunavut, Canada

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SRK Project Number 1CM014.006

October 2005

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Attachment 1: SRK Technical Memorandum re. "Inspection of areas of permafrost degradation near Doris North Project site", dated December 23, 2004.	

1 Introduction

1.1 Background

SRK Consulting (Canada) Inc. (SRK) has been working with Miramar Hope Bay Limited (MHBL) since October 2001, on various aspects of the Hope Bay Doris North Project (from here on referred to as the Doris North Project), including completion of a Preliminary Assessment in February 2002 (SRK 2002a), Conceptual Infrastructure and Tailings Impoundment Designs in December 2002 (SRK 200b, c), and a Feasibility Study in February 2003 (SRK 2003a).

MHBL is planning to develop a new underground gold mine at the Doris North Site. The ore will be processed on site and tailings will be deposited sub-aqueously in Tail Lake. The tailings will be contained in Tail Lake with two water retaining frozen core embankments, the South Dam and the North Dam. The water management plan requires that excess water be retained in Tail Lake until it is suitable for discharge to Doris Creek without any adverse environmental effects. As a result, the water level in the lake will first be increased above its natural level, and then decreased to its original elevation to reinstate Tail Lake as a natural flow-through system by breaching the North Dam.

The rising and subsequent lowering of the water level in Tail Lake may result in shoreline erosion and an increased sediment load into Tail Lake. Shoreline erosion could be triggered by thawing of the ice-rich permafrost clays and silts as the water level rises. When the water level lowers, these thawed soils may be especially susceptible to physical erosion by geotechnical failure of steeper slopes and by surface runoff.

This report quantifies the potential shoreline erosion that may occur around Tail Lake, and proposes mitigation measures to ensure that, should it occur, shoreline erosion will not result in adverse environmental effects.

1.2 Methodology

Since there are no standard procedures to quantify the potential for shoreline erosion around lakes located in permafrost environments that are subject to artificially fluctuating water levels, SRK conducted an extensive literature review of case studies where this phenomenon has been observed. From factual data obtained from these case studies a hypothesis has been developed to describe how shoreline erosion does occur under these conditions, and it was subsequently used to quantify the likely potential for erosion at Tail Lake.

Based on this quantification of the likely potential for erosion, a mitigation plan was developed that should prove to be protective of the environment, be proactive, and is not unnecessarily conservative and financially burdening to MHBL.

1.3 Report Structure

Following this general introduction, Section 2 documents a literature review of case studies of shoreline erosion in permafrost environments. These case studies include Russian sites and six Canadian sites. Section 3 describes four site specific permafrost erosion features (both natural and man-made) that are present in the Doris North Project Area. The potential shoreline erosion hypothesis is presented in Section 4, complete with the assumptions and resultant expected shoreline erosion rates predicted for Tail Lake. Section 5 concludes the report with details of an adaptive management plan to prevent and/or mitigate potential shoreline erosion processes.

2 Historic Research

2.1 Russian Experience

Shoreline erosion, resulting from rising and falling of water levels in natural impoundments has been known to occur for a long time. However, it was not until the late sixties, when Russian researchers started documenting specific case studies (Newbury *et al.* 1978), that an understanding of the processes of shoreline erosion was conceived.

The Russians initiated this research because they were concerned about the loss of storage capacity in natural impoundments caused by sedimentation from shoreline erosion in non-permafrost embankment soils (Newbury *et al.* 1978). Their investigations of the shoreline erosion processes led to a broader recognition of the factors that affect shoreline morphology, including the role of the overburden materials and the wave energy impacting the shoreline. These factors were first recognised for reservoirs in Poland in 1973.

It was observed that unconsolidated shoreline materials exposed to wind generated waves would erode the shoreline, and that through this process of erosion and deposition of the shoreline material, in the back- and near-shore zones, a new stable shoreline ultimately developed. Furthermore, it has been observed that if the shoreline materials consisted predominantly of fine grained material (silt and clay); the erosion during this period of stabilization can be intense. The energy of the waves undercuts the shoreline, which then slumps and retreats. The coarser materials settle out as offshore shoals, whilst the fines are held in suspension and circulated throughout the water body.

This research culminated in Kondratjev (1966) (*as per* Newbury *et al.* 1978) developing a “*generalized terminal form*” (model) for shoreline erosion in the USSR. This model states that an eroded backshore platform develops with a stable foreshore depositional shoal that dissipates incoming erosional wave energy.

Around the same time, another researcher, Kachugin (1966) (*as per* Newbury *et al.* 1978) evaluated the impact of wave energy on shoreline morphology, and developed a “*wash-out*” coefficient, which has units of cubic meters of eroded soil per ton-meter of wave energy (Newbury *et al.* 1978).

Insofar as tools for understanding and predicting shoreline erosion processes resulting from the rising and falling of water levels associated with natural impoundments in non-permafrost soils, these two models are the current state-of-the art; but are not particularly useful in their current form.

2.2 Canadian Experience

Limited information exists for older Canadian reservoir shorelines in unfrozen erodable material. However, a cursory review by Newbury *et al.* (1978) suggested that the Kondratjev model does apply.

A large number of Canadian reservoirs are located in the sub-arctic climatic zone of Canada, where widespread discontinuous permafrost is present. Newbury *et al.* (1978) document that little research has been done on shoreline erosion processes under these conditions. From the limited anecdotal information that is available, it would appear that the process of shoreline formation in flooded impoundments, where permafrost is present, is a combination of erosive and thermal phenomena.

Newbury and McCullough (1984) document the first and only scientific case study of shoreline erosion in permafrost soils at the Southern Indian Lake Reservoir in northern Manitoba, Canada. They stipulate that the rate of shoreline erosion in open water bodies is dependent on the onshore wave energy, the resistance of the shoreline materials to the drag forces exerted by the waves and return flows, and the configuration of the shoreline and offshore zone (i.e. shoreline morphology).

Furthermore, they stipulate that the time required establishing the long-term stable form of the shoreline depends on the erosion rate and the characteristics of the eroding material.

Although Newbury and McCullough (1984) present scientific data to support their findings at the Southern Indian Lake, they do not present a transferable model that can be used to predict shoreline erosion at other impoundments.

2.3 Case Studies

A review of the current state-of-the art with respect to finding an appropriate scientific method to predict shoreline erosion, failed to identify such a tool (see preceding sections). SRK therefore opted to find additional Canadian case studies which could be evaluated critically with the hope of developing a hypothesis for shoreline erosion. This hypothesis could then be used to predict shoreline erosion at Tail Lake.

The following sections of this report contain summary discussions of a few relevant case studies. Where appropriate, these case studies are discussed in sufficient detail to allow a comparison of the conditions leading to shoreline erosion with the conditions at Tail Lake.

2.3.1 Case Study #1: Southern Indian Lake Reservoir, Manitoba

Site Description

Newbury and McCullough (1984) present the results of the first and only documented case study of shoreline erosion in permafrost soils associated with a rising water level. The Southern Indian Lake water level in northern Manitoba, near the town of Thompson, was raised 3 m in 1976 (i.e. total water level increase occurred in one season). Prior to raising the water level, the lake had a surface area of 1,930 km², and the natural water level fluctuation was approximately 1.5 m. Post flooding, the lake covered 2,530 km² and exposed 2,900 km of shoreline.

Monitoring Plan

Prior to raising the water level, 38 cross-sections of the backshore, beach and foreshore zones were surveyed, and the material properties sampled and analysed for grain size distribution and ice content. After the water level was raised, annual surveys of these sections were conducted as well as soundings in the lake at each section up to a water depth of 4 m.

Site specific wind data were recorded and on-shore wave energies were determined at each section, such that the net volume of eroded soils at each section could be divided into the incident wave energy to obtain a gross erosion index for each site. Subsequently, a dry mineral soil erosion index was determined by subtracting the peat, water, and ice content from the volume eroded between surveys. This data collection was continued for a period of four years.

Shoreline Soil Properties

Newbury and McCullough (1984) present data for only 20 of the 38 surveyed sections, and of those 20 sites, only 14 sections were located in fine-grained material. The fine grained material ranged from 0 to 9% sand, 15 to 49% silt and 51 to 85% clay, with the ice content varying from 43 to 92% (six samples only). No plasticity results were reported.

The depth to permafrost at the end of the summer season ranged from 50 cm to 140 cm, depending on the surface cover. Permafrost temperature was not measured; however, based on the Mean Annual Ambient Air Temperature (MAAT) for Thompson, Manitoba of -3.3°C (http://www.climate.weatheroffice.ec.gc.ca/climate_normals), it would be reasonable to assume that under the good thermal protection of an organic layer, warm permafrost temperatures around -1°C would have been likely.

Erosion Process

It is reported that the erosion of frozen fine-grained materials on the shorelines of the larger basins of the lake (average fetch of 6.4 km) was observed to proceed in a repeated sequence of cutting, slumping and removal. As the ice pockets and lenses melted, the bank material became oversaturated and formed a slurry. The partially thawed materials flowed out and formed silty-clay beaches strewn with scattered frozen blocks. These materials were completely removed during storms in areas of high wave energy.

Peat covered backshore sections were observed to melt below and slightly above the water level. Often caverns or melt niches developed under the frozen backshore material, which ultimately collapsed onto the foreshore. The collapsed material was subsequently removed by wave action.

If bedrock was encountered at the eroding face, erosion of the water level ceased.

Newbury and McCullough (1984) concluded that the dominant erosion and sediment release process at Southern Indian Lake was essentially mechanical erosion due to wave action, and that thermal

erosion probably played an insignificant role, and in fact, may even have improved the conditions, due to the frost adding strength to exposed slopes.

Erosion Rate

Coring of the flooded foreshore materials as well as sediment budgets, confirmed that most of the eroded materials was deposited within 300 m of the shoreline, and only a few percent of the eroded materials were carried into the main water mass in suspension.

Newbury and McCullough (1984) calculated a mean erosion index for the frozen fine-grained soils, which was half of that reported by Kachugin (1966) (*as per Newbury et al. 1978*) thus suggesting that permafrost soils may retard erosion.

The average rate of shoreline erosion reported by Newbury and McCullough (1984) was 4.6 m³/m of shoreline, and after correcting for ice content at 58% by weight, organic content (values not recorded) and an assumed dry bulk density of 2,600 kg/m³, they report the total dry mineral soil erosion loss as 1.08 m³/m of shoreline for the fine grained soils.

A limitation of the work reported by Newbury and McCullough (1984) is the fact that they do not present the geometry of each surveyed section as a function of the erosion loss. The only section that they illustrate is for a high wave energy site, which experienced the most significant erosion loss (4.6 m³/m of shoreline dry mineral soil). This cross-section showed that the original foreshore slope was 9.5° (1V:6H) and the backshore slope was 14.4° (1V:3.9H), and rose more than 5 m above the original lake water level. The new foreshore was again stabilizing at a 9.5° slope, after the water level rose, whilst the backshore was actively being eroded.

Although not reported, it is conceivable, based on the available data, that shoreline erosion is significantly impacted by geometry, and that the greater the slope variance between the foreshore and backshore slopes, and the height of the embankment, the greater the potential for erosion. The reason for this would be the greater vertical resistance that the shoreline presents to the incoming waves, i.e. if the backshore slope was flat, the wave energy would be dissipated over a larger surface area.

Shoreline Stabilization

Newbury and McCullough (1984) finally conclude that shoreline stabilization will only happen once pre-flooding shoreline conditions are established. Prior to flooding of the Southern Indian Lake, the shoreline was 76% bedrock controlled, and at post flooding, this was reduced to 14%. Based on this observation, the researchers concluded that shoreline stabilization would take approximately 35 years, or until the year 2011.

No follow-up research has been done; however, interest groups continued to report on progressive erosion in 2003 (<http://www.justenergy.org/images/indianlake>). All the erosion examples at this time however, coincide only with the steep banks impacted by the high wave energy cross-section as

presented by Newbury and McCullough (1984), and it is possible that other zones may have stabilized.

2.3.2 Case Study #2: Discovery Mine Borrow Pit, Northwest Territory

Site Characterization

A silty clay borrow pit was developed in permafrost soils at the Discovery Mine, 85 km north of Yellowknife, Northwest Territories, Canada, during the winter seasons of 1999 and 2000.

Prior to the development, the borrow source was characterized with ten drill holes. Based on borehole logs and air photo interpretation, the material has been classified as a glaciolacustrine soil unit. Visible ice in the upper 2 m was typically reported in the range of 20 to 40% and occasionally in the range 50 to 60%. Below 2 m depth, the ice content was typically 2 to 10%. Occasionally near the base of the drill holes, ice content increased to 20 or 30% (BGC 2004a, b).

The average moisture content was determined to be 35%, which was 16% higher than the average plastic limit. The average gradation was 2/3 silt and 1/3 clay (i.e. substantially less clay than the Southern Indian Lake shoreline soils). Based on the Atterberg Limits, the material was reported to behave as clay, since most of the samples plotted as a low plastic clay or silt, or as intermediate plastic clay (BGC 2004a, b).

SRK is not aware of permafrost temperatures being recorded; however, based on the assumption that the MAAT at Yellowknife is -4.6°C (http://www.climate.weatheroffice.ec.gc.ca/climate_normals), and at the Colomac Mine, approximately 100 km northwest of Discovery, the MAAT is estimated at -7.6°C (Noël 2004), the permafrost temperatures under good thermal insulation is likely to be in the -1°C to -3°C range at Discovery Mine.

Erosion Processes

The pit was developed by stripping the organic peat cover, and excavating into the silt and clay. No pit rehabilitation was done and thermal erosion started during the first summer that the pit was exposed. Snowmelt and summer rain filled the pit, which had no outlet. This introduced an additional heat source to the exposed ice-rich permafrost in the pit. Thaw settlement subsequently occurred, which resulted in tension cracks around the pit perimeter. Surface water could enter these cracks, which in turn added heat, and subsequently, erosion gulleys transporting silt was developed leading into the pit.

In addition, wave action resulted in shoreline erosion which undercut the 50 cm high settlement banks, and subsequently collapsed into the pit releasing more sediment. It was also concluded that as permafrost beneath the pit thawed, additional silt and clay were released into the pit. As the pit continued to fill with water, it eventually reached an overflow level and turbid water was released into an adjoining lake (Cassie 2004).

In contrast to the Southern Indian Lake case study, BGC concluded that the dominant erosion and sediment yield process at Discovery Mine was associated with thermal erosion which led to thaw-settlement. Mechanical erosion due to wave action was not considered to be significant, although it contributed to lake turbidity.

Erosion Rate

Progressive erosion since 1999 has regressed the borrow pit and bedrock is likely to be intercepted around approximately 70% of the pit perimeter (Cassie 2004). The remaining 30% of the perimeter does not have shallow bedrock and continued progressive erosion is expected in the ice-rich soil until the natural pit slope reaches a stable angle (BGC 2004c), which is likely to be approximately 11° for a thawing slope (13° for a thawed and saturated slope).

It was estimated that without any reclamation, erosion in the ice-rich material would continue at a rate of 0.01 to 0.04 m/m, and that by re-vegetating the slopes, the sediment yield will be reduced by 90 to 95% (BGC 2004c).

SRK converted the predicted erosion rate to units consistent with that reported by Newbury and McCullough (1984) for the Southern Indian Lake. This was done by assuming that the slope length per meter of shoreline impacted by erosion would be approximately 8 m. Correcting that soil mass for a organic layer 30 cm thick, ice content of 48%, and a dry mineral soil bulk density of $2,700 \text{ kg/m}^3$ (dry bulk density of clay soil according to Andersland and Ladanyi (2004)), the total dry mineral soil erosion loss at Discovery Mine computes to 0.04 to $0.15 \text{ m}^3/\text{m}$ of exposed shoreline.

This means that the predicted erosion rate at the Discovery Mine borrow pit would be only 14% of that observed for the Southern Indian Lake, suggesting that the reduced wave action, lower clay content, slightly colder permafrost conditions, and the different physical morphology significantly impact the erosion rate.

Shoreline Stabilization

Three reclamation options were proposed in 2003. The first entailed re-vegetating the slopes, and while such vegetation is allowed to establish, active water management will be done through pumping and treating. It was estimated that this option would require a site presence of up to ten years.

The second reclamation alternative entailed draining the lake and lining all pit slopes with geotextile and rip-rap. The final reclamation alternative entailed construction of a rock fill dyke across the pit, dividing the pool in two, such that wave action in the pond can be limited (BGC 2004c).

Based on trial re-vegetation success in 2003, the final reclamation plan that has been put in place for the borrow pit, to stabilize the slopes and stop the thermal erosion, entails re-establishing natural vegetation, supplemented by selective re-grading of excessively eroded gulleys and placement of rip-rap.

It is estimated that stabilization will take three to five years, during which time maintenance may be required, and active water management through pumping and treating will continue. At that time additional silt loads should not enter the borrow pit and water would be allowed to naturally discharge.

2.3.3 Case Study #3: Garrow Lake, Polaris Mine, Nunavut Territory

Site Characterization

Deep tailings disposal (sub-aqueous) was done in Garrow Lake, at the Polaris Mine on the southern tip of Little Cornwallis Island, Nunavut, Canada. Tailings deposition started in 1981, and by 1985 water quality concerns in the lake resulted in the decision to impound the lake. A 195 m long, 8 m high frozen core dam was subsequently constructed across Garrow Creek, approximately 600 m downstream of the original outlet to Garrow Lake in the winter of 1990/91.

After completion of the dam, the water level in Garrow Lake steadily rose from 1005.6 m (lake level prior to impoundment) to 1008.8 m (approximately 1.4 m below the dam FSL of 1010.2 m). This constitutes a water level rise of approximately 3.2 m over a period of five years. Between 1995 and 2002, when the mine was closed, the water level in Garrow Lake was kept relatively constant at 1008.8 m through annual discharge (EBA 2001).

From 2001 to 2004, the water level in Garrow Lake was steadily lowered to its original level, and the dam was breached in 2004.

Shoreline erosion and associated increased turbidity was never an issue of concern at Garrow Lake (Donald 2004). It can be speculated that the reason for this could be;

- The lake surface remains frozen for eleven months of the year, which means that there is limited wave action (potentially the lake would have an average fetch of 1.6 km).
- The shoreline materials appears to consist of a very thin layer of organics overlying weathered ice-saturated shale (20 to 30% ice content) over more competent shale bedrock (EBA 2001). Thaw settlement potential is therefore low, and not much is available for transport by wave action.

Erosion Rate

SRK has not been able to confirm exactly what the shoreline foundation conditions are at Garrow Lake, so comparisons with the other case studies are difficult. It is however known that the MAAT at Garrow Lake is -14.2°C (EBA 2001) and thermistor data confirms that cold permafrost of -13°C exists. This may have contributed towards slowing down the thaw rate, such that thaw settlement would be reduced.

2.3.4 Case Study #4: Aishihik Lake, Yukon Energy Corporation, Yukon Territory

Aishihik Lake is one of three lakes that have been dammed as part of the Aishihik hydroelectric facility, located about 110 km north of Whitehorse, Yukon Territory. This facility was constructed in 1975 by the Northern Power Commission (NPC), and taken over and managed by Yukon Energy Corporation (YEC) since 1987 (YEC 2005). A water storage control structure has been constructed at the outlet of Aishihik Lake and the water level fluctuates between 0.8 and 1.8 m every year. The lake surface area is about 146 km², and has a shoreline length of about 153 km (World Lakes Database 2005).

The geology of the area is typical of glaciated terrain with glacio-fluvial and morainal material present in valleys and along mountain flanks. Rock type generally includes granodiorite, quartz diorite and granite (Yukon Geological Survey 1994). Aishihik Lake lies in an area of discontinuous but widespread permafrost. The permafrost is non-saline and warm (-0.3°C to -0.4°C) (Personal communication with Mr. Cord Hamilton, P.Eng., YEC). Permafrost with up to 40% volume of ice is common in well-sorted silt and clays along the north shore of Aishihik Lake (YGS 1994). Along the lake shoreline permafrost related mass movements such as detached slides, creep and solifluction are possible, particularly on north facing slopes at high elevations. There are examples of ice-rich deposits undercut by stream or wave erosion, which are actively slumping.

There are numerous press releases and other reports that state that the artificial raising of the lake has resulted in significant erosion of these permafrost soils, and that has led to significant siltation in the northern end of the lake. The World Lakes Database (2005) states that significant shoreline erosion took place during early stages of the reservoirs life, but data do not exist to state if such conditions have continued, although reports suggest that slopes are stabilizing.

Prior to constructing the reservoir, the NPC did acknowledge that shoreline erosion may occur, and a geomorphological study was initiated to characterize the lake shoreline, such that erosion prone areas could be identified. This study, which was done through air photo interpretation, concluded that sections of the shoreline consisting of bedrock or till would not be subject to shoreline erosion, but that sections covered in glaciolacustrine clays, or steep slopes with ice-rich permafrost would be subject to erosion. At the time, the study did not attempt to characterize the extent of potential erosion, nor was any mitigative measures proposed. There was some studies on wave action and maximum wave heights; however, those were used to calculate dam freeboard heights, and not used to evaluate shoreline erosion potential (Personal communication with Mr. Cord Hamilton, P.Eng., YEC).

There are many conflicting statements regarding the magnitude of shoreline erosion at Aishihik Lake as a result of artificially raising the water level. However, since there have been no factual studies or research conducted to specifically evaluate the extent, magnitude, mechanisms or processes involved in shoreline erosion, the case study is not of particular use, as a comparison to Tail Lake. There does however appear to be consensus that after the lake water level was raised, lake water turbidity (and total suspended solids) increased along the northern portion of Aishihik Lake, and the reason appears

to be shoreline erosion of ice-rich permafrost soils. What is not clear is exactly how this erosion has been propagated over time, at what rate, and whether it has naturally stabilized.

2.3.5 Case Study #5: Bigspruce Reservoir, Northwest Territory

The Bigspruce reservoir represents the main storage system of the four hydroelectric generating stations on the Snare River, about 140 km north of Yellowknife, NT. Bigspruce reservoir (formerly Bigspruce Lake) is the northernmost water storage facility, and the dam in the Snare River, near the Snare Rapids (Snare Rapids Hydroelectric Station) causes an artificial fluctuation of the water level. Bigspruce reservoir is about 130 km² in size (NTPC 2005; Rescan 2000).

Most of the Snare River descends through the rugged and lake-filled Precambrian Shield and lies just to the south of the continuous permafrost line. The majority of the lake is bounded by bedrock, and therefore the potential for shoreline erosion is limited. There are conflicting reports that the artificial water level fluctuations has resulted in shoreline erosion which has in turn resulted in increased turbidity and total dissolved solids concentrations in the reservoir. The only factual information that exist about this is a biological characterization study of the Snare River System (Rescan 2001) which states that the water quality in Bigspruce reservoir is good, suggesting that shoreline erosion is perhaps not of concern.

Representatives of Northwest Territories Power Corporation (NTPC) are not aware of any problems of shoreline erosion in Bigspruce reservoir. They state that if there were significant problems they would surely have been aware of it since the reservoir is frequented by canoeists during the summer (Personal communication with Mr. Holger Hartmaier, P.Eng., BGC). Bigspruce reservoir forms part of an official 350 km long canoe trail stretching from Fort Enterprise on Winter Lake to the community of Fort Rae, and SRK is not aware of reports of shoreline erosion or water quality impacts being reported (NT 2005).

Based on the lack of factual information available with regard to potential shoreline erosion at Bigspruce reservoir, there is not enough information to make this case study useful.

2.3.6 Case Study #6: Cross (Pimicikamak) Lake, Manitoba

Manitoba Hydro operates the Churchill-Nelson Hydroelectric Project in Manitoba. This project covers both the Churchill and Nelson River catchments, and amongst many lakes include the Southern Indian Lake (on the Churchill River), and Cross Lake (on the Nelson River). The flow control structure at Jenpeg (at the northern end of Lake Winnipeg) causes the water level in Cross Lake to fluctuate such that the lake area varies between 115 km² and 230 km². The fluctuation of about 3.7 m is however as a result of lowering the water level in Cross Lake, i.e. about half of the original lake is not flooded for a portion of every year, exposing the lake bed sediments (McCullough Research, undated).

According to many sources, significant shoreline erosion has taken place in Cross Lake as a result of this artificial lowering and rising of the water level (The United Church Observer 2000; The

Manitoba 2002; University of Wisconsin Eau Claire 2005; Saturday Free Press 1999a, b; The Drum 1999; Grass Roots News 1999). Most reports state the cause of poor water quality and loss of aquatic life in the lake as shoreline erosion caused by melting permafrost. Some press releases even suggest that as the shorelines continue to erode, the surrounding boreal forest is being destroyed, and with the loss of trees, shoreline erosion continues to expand aerially. Whilst it is undeniable that shoreline erosion exist in the Nelson and Churchill River Systems (Environment Canada 2000), there are no factual studies regarding the erosion processes that are of any use in developing an understanding of how shoreline erosion is occurring (other than the Southern Indian Lake work reported earlier on in this report). Furthermore, SRK is of the opinion, that as far as Cross Lake is concerned, shoreline erosion as a result of melting permafrost is likely not the reason for water quality concerns in Cross Lake. The water level does not fluctuate above the historic high water level in the lake, and therefore new shoreline is not subject to thermal erosion. However, since the lake level is lowered to below its original elevation, the exposed lake bed sediments will be subject to overland surface runoff, which could result in erosion gulley developing, which in turn may affect the water quality in the lake. Alternatively, the lake sediments that have been deposited below the depth of wave action will have become susceptible to re-suspension when the water level was lowered. It could in fact be the sediment released from the lake bed that could be the primary source for suspended solids.

Considering the quality of information available for Cross Lake shoreline erosion, it is not an appropriate case study to use in developing an understanding of shoreline erosion processes at Tail Lake.

2.4 Other Relevant Research

There has been extensive research into overland and shoreline erosion associated with freeze-thaw effects (recent examples include; Gatto 1995; Gatto and Ferrick 2003). This research does however not apply directly to the shoreline erosion phenomena associated with a rising or lowering water level, as it pertains more to the physical desiccation phenomena of soils subject to freeze-thaw cycles, as opposed to thawing soils only.

It is however worthy to note that a failing slope, whether it is due to wave induced energy or due to freeze-thaw processes does share some similarities, especially when considering final slope stabilization and remediation techniques.

Generally, slope failures result in a deposit of material at the toe slope, which if not removed, does become a toe buttress, which ultimately protects the slope from further progressive failure. As illustrated in the Southern Indian Lake case study, the natural buttress is removed continuously by wind induced waves, which results in the progressive nature of shoreline erosion (Newbury *et al.* 1978).

The most logical slope reclamation technique is thus to protect this bank of slumped material at the slope toe, whether this material is subject to freeze-thaw or other geotechnical processes that threaten

to move the material. Low-cost and biotechnical toe protection approaches using native vegetation that is tolerant to shoreline conditions are therefore the preferred remediation technique (Gatto 1995).

Burn (undated) state that the most active landform related to permafrost is thaw slump. Thaw slumps result from disturbance of permafrost generally caused by shoreline erosion. Wave action erodes the shoreline and exposes permafrost, which melts due to the heat introduced by water. The ice-rich soil turn almost liquid, flows away as mud, and the soil above and around it slumps. When the waves wash away the mud and expose more permafrost, the slumping continues. Burn (undated) states that the long-term retreat of the Yukon coastline, at between two and ten meters a year, is due to this process. In other areas, where erosion is less constant, the build-up of mud or surface material will often cover the permafrost and eventually the slumping process.

3 Natural Permafrost Erosion in the Doris North Project Area

3.1 Permafrost Features

3.1.1 Site Location

In an attempt to glean site specific data, which may be used to characterize the conditions at Tail Lake, SRK investigated four permafrost erosion features in the Doris North Project area. These areas were first identified in the regional air photo interpretation (SRK 2005a), and consisted of three man made erosion features associated with the old Roberts Mining Company (RMC) silver mine, north of the Roberts Lake outflow, and one natural erosion feature (Figure 1, Attachment 1).

A detailed field memorandum documenting the field observations complete with maps, photos and laboratory characterization data for four samples collected during the field study is included as Attachment 1; however, the primary conclusions are re-iterated here, together with some additional interpretations.

3.1.2 Soil Conditions

Four representative samples of the eroding ice-rich fine grained soils were collected and tested, confirming that the ice content ranged between 34 and 61%, sand content ranged between 2 and 28%, silt content ranged between 46 and 67%, clay content ranged between 11 and 31% and the plasticity index ranged between 4 and 14%. These soils therefore act as low to medium plasticity clays and silts.

3.1.3 Erosion Processes

Mining activities was carried out at the RMC silver mine during the seventies, and the remnants of activity are still present in the form of buildings and markings on the permafrost associated with vehicular traffic. Three erosion features in the vicinity of the RMC silver mine appear to have been instigated by human activities associated with damage to the protective tundra heath vegetation layer over the permafrost in areas where vehicles travelled.

On-site evidence suggest that prior to human activity, the erosion features were not present, and that catchment runoff flowed down the valley in a diffuse sheet flow pattern, such as observed at Tail Lake. However, as the protective vegetation was damaged, summer permafrost degradation occurred, which led to thaw-settlement of the underlying ice-rich silt and clay. This initial thaw-settlement exposed more ice-rich soil and subsequently thermal erosion continued to expand creating the 3 to 5 m deep gulleys visible today.

The lack of sediment in the gully base, and the presence of a shallow delta at the toe of two of the gulleys confirm that sediment transport takes place, probably as a result of flow concentration during the peak freshet period. There is however no depositional delta visible in Roberts Lake, which is approximately 100 m downstream of the terminus of one of the erosion gulleys, which suggest all sediment probably settle out prior to reaching the lake.

Widespread active natural permafrost degradation is present along the deeply incised shoreline slopes of the Lower Windy Creek (Area 3 on Figure 1, Attachment 1). The mechanisms of erosion appear to be freeze-thaw related. These slopes appear to be sufficiently active to resist natural re-vegetation and stabilization of the 15 to 25° eroding slopes. Flow in the creek is fast, and any sediment is rapidly transported downstream. No sediment plume has ever been documented at the stream outlet in Roberts Bay, and air photography, confirm that there is only a small localized outwash delta, suggesting that all sediment settle out rapidly.

Essentially, observation of the existing permafrost features in similar soils to those observed around Tail Lake; confirm that if the ice-rich fine grained soils are allowed to thaw, and thaw-settlement occurs, then successive erosion is likely to continue, with sediment transport through flow concentration. The evidence however also suggests that sediment will settle out rapidly, and therefore suspended sediment loads are expected to be small.

3.1.4 Erosion Rate

SRK used the air photographs and our own field observations to estimate the volume of erosion loss that had occurred in the three areas around the RMC silver mine (Areas 1 to 3 on Figure 1, Attachment 1). These erosion loss estimates assume that the surface was 100% undisturbed prior to the start of RMC silver mine operations in the late seventies.

Correcting this volume of soil for ice (48%) and peat content (30 cm thick peat layer), the equivalent amount of annual dry mineral soil erosion loss at these sites equates to 0.14 m³/m of shoreline, or in this case exposed gully slope. This amount is consistent with the upper range estimated for the Discovery Lake borrow pit.

3.2 Roberts Bay Analogy

Roberts Bay, located approximately 5 km north of Tail Lake is a shallow bay on the Arctic Coastline. Detailed shoreline characterization confirms that the bay sediments and shoreline materials consist of similar materials to those observed around Tail Lake (Golder 2005; SRK 2005b). It is therefore worthwhile to investigate if there can be some analogy drawn from the Bay shoreline, as to what may happen as Tail Lake is flooded.

Wind and wave action in Roberts Bay is substantially different than at Tail Lake. The maximum fetch in Roberts Bay is 17 km, which is about five times the maximum fetch in Tail Lake. This result in significantly larger wave heights occurring in Roberts Bay, and therefore the potential energy impacted on the shoreline is much greater than in Tail Lake.

There is no physical evidence of any active shoreline erosion taking place in Roberts Bay (Golder 2005). Background water quality sampling has recorded a maximum total suspended solids concentration in the Bay of 17 mg/L; however, this was a single high value recorded in the Bay and was attributed to local bed sediment re-suspension as opposed to shoreline erosion. This bed re-suspension is likely to occur in the Bay, since the entire southern section of the Bay has a shallow (less than 2 m deep) shelf of marine sediments extending up to 100 m out into the Bay.

Roberts Bay is therefore not a good natural analogy to use in developing an understanding of the potential shoreline erosion processes at Tail Lake.

4 Potential Tail Lake Shoreline Erosion and Sediment Yield

4.1 Approach

It is clear that there are no readily available tools with which to determine the rate and magnitude of shoreline erosion and sediment yield associated with rising and lowering the natural lake level in permafrost terrain. Furthermore, the conditions at case studies where this phenomena has been investigated, differ from those found at Tail Lake, both in terms of slope morphology and wave energy, and as such the case study observations may not be readily applicable.

The following sections describe the conditions at Tail Lake, as compared to those in the documented case studies and the natural permafrost features in the Doris North Project area. This information is used to develop a hypothesis with which to predict shoreline erosion rate and magnitude at Tail Lake.

4.2 Shoreline Characterization

It is conceivable that shoreline erosion, and associated sediment release into Tail Lake may occur, as the water level in Tail Lake is elevated up to 5.2 m over a period of five years or more (SRK 2005b, c).

Air photo interpretation and geotechnical drilling (SRK 2005b) confirmed that the soils surrounding Tail Lake are predominantly ice-rich marine silt and clay. Depth to bedrock is up to 10 m, and the ice-rich silt and clay ranges in thickness between 2 and 9 m. Sand deposits are often found sandwiched between the surface silt/clay layer and bedrock.

Eight fine grained samples were characterized and showed sand contents ranging between 3 and 16%, silt contents between 58 and 79%, clay contents between 12 and 37%, and ice contents of between 22 and 76%. Atterberg Limits confirm an average plasticity index of 12.3 (range of 6 to 16). This confirms that the soil will act as inorganic clay and silt with low to medium plasticity.

In addition, clay mineralogy was performed on two samples of the clay fraction (SRK 2005b), confirming that 24% of the clay sized fraction consist of clay minerals, of which 12% is an illite-smectite mixed layer clay (with the smectite layers comprising 10% of that), 58% consist of illite and mica and the remaining 30% is chlorite.

Three thermistor strings were installed in six shoreline drill holes (SRK 2005b), and data confirms the presence of cold permafrost (-8°C) in these soils, which is consistent with the ground temperature measured throughout the site (SRK 2005b).

The current Tail Lake shoreline is approximately 8.2 km long, and approximately 19% is bedrock controlled. The remaining shoreline consists of the marine silt and clays. On the existing shoreline, approximately 45% of the silt and clay slopes are less than 6° (1H:9.5V). Once Tail Lake reaches the Full Supply Level (FSL) of 33.5 m, the exposed shoreline will increase to 8.8 km, of which 41% will be bedrock controlled (including the two dams), and 34% of the shoreline will be on slopes flatter than 6°. The total surface area that will be flooded is approximately 50 ha (10 ha of which is exposed bedrock), of which 76% will consist of slopes flatter than 6°.

Air photo interpretation clearly shows that most of the Tail Lake catchment has been subjected to solifluction. Solifluction is considered to be a form of flow landslide (McRoberts and Morgenstern 1974) which is described by various different nomenclatures. Irrespective of these varying nomenclatures, solifluction in the context of geotechnical engineering is a type of mass movement common to cold regions.

A common feature of solifluction is instability at low angle slopes, and a case study in England illustrated that solifluction failures can occur in slope angles as low as 3 to 7° (McRoberts and Morgenstern 1974). Andersland and Ladanyi (2004) also report that solifluction could occur in slopes as flat as 4°.

4.3 Predicted Erosion Rate

4.3.1 Corrections for Wave Energy

The work by Newbury and McCullough (1984) showed that there is a linear relationship between wave energy and erosion rate. The potential wave energy at the three sites (South Indian Lake, Discovery Mine and Tail Lake) is distinctly different. The wave energy at Southern Indian Lake was driven by an average fetch of 6.4 km. At Tail Lake, the maximum fetch would be the distance between the North and South Dams, which is 3.2 km. The average fetch in Tail Lake is, however, less than 500 m. The maximum fetch distance at the Discovery Mine borrow pit is 400 m, and the average fetch is probably less than 200 m.

Actual wind induced wave energies have not been measured for Tail Lake or Discovery Mine; however, empirical relationships exist between fetch length, wind velocity and wave heights (U.S. Department of the Interior 1987). Based on these empirical relationships, the average wave height at Tail Lake, using a fetch of 1,000 m (increased by a factor of 2, as a factor of safety) would be smaller than at Southern Indian Lake for sustained wind speeds from 80 to 160 km/hr. Similarly, the smaller fetch distance at Discovery Mine would yield wave heights smaller than at Tail Lake. Table 1 summarizes these results.

Table 1: Summary of wave energy correction applied to shoreline erosion

Site	Fetch (km)	Wave height (ft)			Average Fraction of South Indian Lake
		@ 80 km/hr	@ 120 km/hr	@ 160 km/hr	
Discovery Mine	0.2	0.70	0.70	0.80	0.60
Tail Lake	1	0.77	0.84	0.91	0.69
South Indian Lake	6.4	1.07	1.23	1.37	1.00

Based on the measured average soil erosion rate of dry mineral soil at Southern Indian Lake of $1.08 \text{ m}^3/\text{m}$ of shoreline, a wave energy induced corrected erosion rate at Tail Lake can be calculated as $0.75 \text{ m}^3/\text{m}$ of shoreline, and at Discovery Mine the corrected erosion rate would be $0.65 \text{ m}^3/\text{m}$ of shoreline (*i.e.* $1.08 \text{ m}^3/\text{m} \times 0.69 = 0.75 \text{ m}^3/\text{m}$ and $1.08 \text{ m}^3/\text{m} \times 0.60 = 0.65 \text{ m}^3/\text{m}$).

4.3.2 Correction for Slope Morphology

A second factor that should be taken into account is the slope morphology. Both Southern Indian Lake and Discovery Mine have exposed slopes which are more than 15° , as opposed to Tail Lake slopes which are predominantly less than 6° . Stable slopes at Discovery Mine have been estimated to be 11° , and at Southern Indian Lake, the cross-section provided by Newbury and McCullough (1984) suggest that the stable slope is 10° . Therefore it is reasonable to conclude that, based on morphology, the chances of slope failures at Tail Lake due to over-steepened slopes exposed to wave action are limited, and may in fact not occur at all.

It is however acknowledged that mass flow movements can occur for slopes at less than 6° (McRoberts and Morgenstern 1974), and the solifluction at Tail Lake is evidence that such movement has occurred. It is however not possible to determine if this mass movement would be aggravated or enhanced by wave action as the lake level rises.

A third important consideration in estimating the shoreline erosion rate involves a comparison of the soil and ice conditions between the three sites under consideration. Clay contents at Southern Indian Lake are almost twice as high as at the other locations, and the ice content is also approximately 10% higher at Southern Indian Lake.

With all these factors combined, it is reasonable to assume that the biggest risk of sediment release at Tail Lake due to rising lake water level would be associated with the thawing of the newly submerged ground. As this ground thaws, thaw-settlement would occur, which may expose small scarps which would be subject to wave erosion. This process appears to be the primary cause of erosion in the gulleys at the RMC silver mine area and, as indicated previously, the annual total erosion loss has been estimated at approximately $0.14 \text{ m}^3/\text{m}$ of exposed gully slope.

This is about 7.5 times lower than the calculated erosion loss at Southern Indian Lake, where wave energy was attributed to be the major erosion mechanism. Applying an arbitrary factor of safety of 2.3 to this number and applying that to the wave energy corrected erosion loss for Tail Lake of 0.75

m^3/m of shoreline gives a total predicted soil loss of $0.23 \text{ m}^3/\text{m}$ of shoreline for Tail Lake (i.e. $1.08 \text{ m}^3/\text{m} \div 0.14 \text{ m}^3/\text{m} = 7.54$; $2.3 \div 7.54 = 0.30$; $0.30 \times 0.75 \text{ m}^3/\text{m} = 0.23 \text{ m}^3/\text{m}$).

Applying a similar correction to the wave energy corrected erosion rate of $0.65 \text{ m}^3/\text{m}$ of shoreline for Discovery Mine yields a total predicted soil loss of $0.20 \text{ m}^3/\text{m}$ of shoreline (i.e. $1.08 \text{ m}^3/\text{m} \div 0.14 \text{ m}^3/\text{m} = 7.54$; $2.3 \div 7.54 = 0.30$; $0.30 \times 0.65 \text{ m}^3/\text{m} = 0.20 \text{ m}^3/\text{m}$). This value is significantly greater than the maximum measured rate of $0.14 \text{ m}^3/\text{m}$ of shoreline, suggesting that these corrections are conservative.

4.3.3 Total Erosion Rate

Based on the erosion corrections described in the previous sections, the total potential erosion rate at Tail Lake can be summarized by Figure 1. Depending on the shoreline erosion correction factor that is used, the total annual potential shoreline can range from about 1 million kg of shoreline material, assuming an erosion rate similar to that observed at the RMC silver mine of $0.14 \text{ m}^3/\text{m}$, to just under 10 million kg, using an erosion rate similar to that observed at the Southern Indian Lake (i.e. $1.08 \text{ m}^3/\text{m}$).

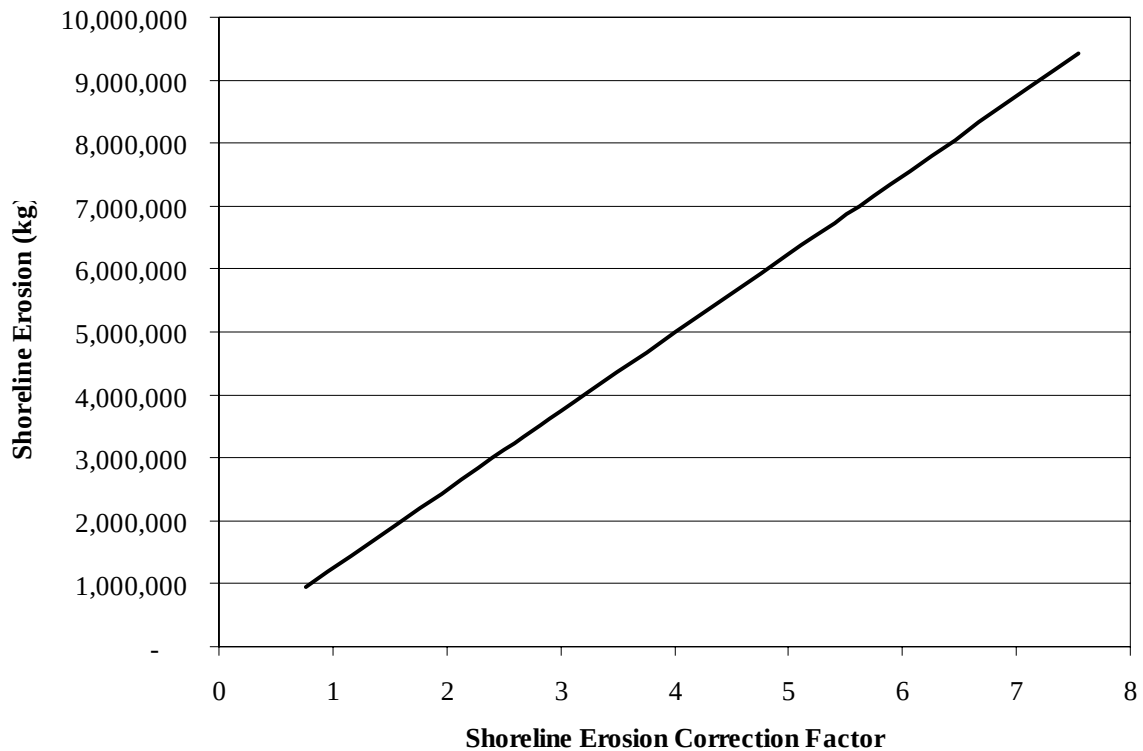


Figure 1: Range of potential shoreline erosion at Tail Lake

The total erosion at Tail Lake is calculated, assuming a water level at 28.3 m (i.e. the water level at long-term steady state). At this water level the total shoreline length is 8,200 m, and about 41% is bedrock controlled, such that 59% or about 4,900 m could potentially undergo shoreline erosion. Multiplying this value with the corrected shoreline erosion rate of $0.23 \text{ m}^3/\text{m}$ for a correction factor of 2.3, and assuming a sediment dry density of $2,600 \text{ kg}/\text{m}^3$, gives a total erosion mass of about 2,847,000 kg (i.e. $8,200 \text{ m} \times 59\% = 4,856 \text{ m}$ impacted shoreline; $4,856 \text{ m} \times 0.23 \text{ m}^3/\text{m} = 1,095 \text{ m}^3$ sediment release; $1,095 \text{ m}^3 \times 2,600 \text{ kg}/\text{m}^3 = 2,846,891 \text{ kg}$ sediment release).

Table 2 list the likely base case, lower and upper estimate of shoreline erosion that could be used in water quality predictions.

Table 2: Summary of base case and lower an upper estimates of shoreline erosion for Tail Lake

Scenario	Total Shoreline Erosion (kg)
Base case	2,846,891
Lower limit	948,964
Upper limit	7,354,467

4.4 Predicted Suspended Sediment Concentration

SRK (2005) provides a detailed discussion of the total suspended solids concentration in Tail Lake as a result of shoreline erosion amongst other processes. That analysis includes corrections for sedimentation rates of the particles based on representative samples from the shores of Tail Lake and the effects of residence time in the lake. It is however, worthwhile to provide a first order estimate of the expected total sediment loads in Tail Lake using only the information gleaned in this study. Such an estimate provides a ‘reality check’ on the hypothesis presented.

Newbury and McCullough (1984) estimated that the amount of sediments that remain in suspension is about 2%. The 2 % will be a function of the soil particle size distribution and soil physical properties including density, shape and surface properties. Nonetheless, using this value, and the volume of water in Tail Lake at an elevation of 28.3 m, after correcting for the volume occupied by the tailings, suggest that for an erosion rate of $0.23 \text{ m}^3/\text{m}$, the total suspended sediment concentration in Tail Lake would be $31.7 \text{ mg}/\text{L}$ (i.e. Free volume in Tail Lake @ 28.3 m = $1,798,704 \text{ m}^3$; $2,846,891 \text{ kg} \div 1,798,704 \text{ m}^3 \times 2\% = 31.7 \text{ mg}/\text{L}$).

It should be noted that clay mineralogy is known to impact turbidity (or suspended solids concentration) (Glassmann 2000; Bates *et al.* 1998), and smectite clay is generally considered to be one of the biggest contributors towards sustained turbidity problems (Bates *et al.* 1998).

Smectite is only present as an illite-smectite mixed clay layer in the Tail Lake shoreline soils (SRK 2005b), which comprise only 12% of the total clay content of the soil. Of this, only 10% is actually smectite layers, or 1.2% of the total clay content. The remaining clay minerals consist of illite and mica (58%) and chlorite (30%), both clay minerals which are known to settle out rapidly and not contribute much to turbidity.

Considering that only 24% of the clay sized fraction consists of clay minerals (43% quartz, 6% potassium feldspar, 24% plagioclase, 1% calcite and 2% pyrite), and based on the laboratory results for samples from Tail Lake, the average clay content is 23% by weight (SRK 2005b). With this information it is possible to estimate the potential sediment concentration in a different manner as well, as a check for the validity of the hypothesis described in the preceding sections.

If the annual dry mineral soil sediment load is $0.23 \text{ m}^3/\text{m}$ of shoreline, the sediment concentration associated with 100% of the clay sized fraction at the Tail Lake FSL would be 364 mg/L. Using only the clay mineral fraction, the sediment concentration is reduced to 87 mg/L, and if we consider that only the smectite fraction could contribute to suspended sediment, then the total suspended solids concentration is estimated to be about 1.05 mg/L.

5 Appropriate Shoreline Erosion Mitigation Measures

5.1 General

It is evident that thawing of the permafrost in the submerged shoreline zones of Tail Lake as the water level rises will occur. These areas are likely to undergo thaw-settlement which could expose a scarp of fine grained soil which may be subject to wave induced shoreline erosion. As documented in the preceding section of this report, it is reasonable to expect this shoreline erosion will result in an increase in suspended sediment concentration and turbidity in Tail Lake.

The hypothesis presented in this report has been used to estimate a probable reasonable upper bound (i.e. base case) for the rate of shoreline erosion and associated increased suspended sediment concentration. With the values quantified, a number of mitigation alternatives have been evaluated.

5.2 Mitigation Alternatives

5.2.1 Rip-Rap & Geotextile Erosion Protection

One mitigation strategy to minimize sediment yield into Tail Lake would be to cover the entire surface area surrounding Tail Lake that could be submerged at FSL with a layer of geotextile and to place a protective rip-rap layer approximately 50 cm thick over it. This will not prevent thaw-settlement from happening but will fulfill two important functions:

- fine sediment will be retained, minimizing the risk of suspended solids in Tail Lake, and
- the rip-rap will protect the shoreline from being physically eroded through wave action. Furthermore, this will ensure that erosion does not progress beyond the FSL, and after the lake level is lowered, erosion from surface runoff will be prevented.

This strategy is technically feasible; however, it would be an extremely conservative and costly alternative. Assuming the worst case scenario, i.e. Tail Lake is flooded to FSL, the exposed surface area that is not bedrock controlled is about 30 ha, which means that a total volume of cover rock of 150,000 m³ would be required for this mitigation alternative. Based on conceptual level cost estimates, this alternative would cost approximately \$5.4 million and would place an excessive burden on the local quarries.

Considering the fact that the proposed water management strategy for Tail Lake will result in a maximum water level of 29.4 m, with a total flooded footprint of about 13 ha (not discounting for bedrock control), the conceptual level cost estimate for full mitigation reduces to \$1.4 million, and only about 38,000 m³ of quarried rock is required. This is therefore a more reasonable and realistic mitigation strategy. It is however still conceivable that the entire flooded zone may not be subject to

shoreline erosion, and therefore SRK recommends that MHBL adopt the following mitigative strategy:

- Prior to depositing tailings into Tail Lake, pro-actively mitigate 20% of the perimeter of Tail Lake between the elevations of 28.3 m and 29.4 m. This means a total area of about 1.5 ha must be covered, requiring a total volume of rip-rap of about 7,600 m³, and about 15,300 m² of geotextile. Areas to be pro-actively mitigated would be areas where the slopes are greater than 6°, and where fetch lengths are the greatest.
- During operation, and prior to final closure, MHBL should be prepared to cover another 20% of the shoreline, i.e. placing another 7,600 m³ of rip-rap, and 15,300 m² of geotextile. Areas to be mitigated would be those areas where erosion has been seen to occur.
- At closure, i.e. as soon as the water level is lowered to 28.3 m, MHBL should be prepared to cover the remaining 60% of the shoreline, which is not bedrock controlled, should shoreline erosion remain a problem. This would require placement of an additional 22,800 m³ of rip-rap, and 45,700 m² of geotextile. Areas to be mitigated would be areas where visible erosion is seen to occur, and it is feasible that the entire zone may not need to be covered.
- Finally, the ultimate contingency strategy would be to cover the entire exposed shoreline, as if flooding extended to the FSL elevation of 33.5 m. For this contingency, placement of an additional 108,300 m³ of rip-rap would be required and 216,500 m² of geotextile.

This proposed mitigation strategy is based on the fact that between the elevations 28.3 m and 33.5 m, 41% of the shoreline is bedrock, and at least 76% of the total area is on slopes of less than 6°. Considering the fact, that all the perimeter soils, if not bedrock, is similar ice-rich marine silt and clay, it is therefore reasonable to suggest that the steeper slopes would have greater potential to erode, and therefore the proposed mitigation strategy would entail pro-actively mitigating about 85% of the steep slopes, in areas close to the dams where the fetch would be the greatest.

It should be noted that the surface areas used in these calculations are based on the stage curve for Tail Lake, which includes portions of Tail Lake up to the two dams. For this stage curve the Tail Lake surface area at 28.3 m is 80.8 ha, and the surface area at FSL is 130.4 ha. This differs from the actual surface area of the body of water in Tail Lake as reported in the NNLP of 76.6 ha (Golder 2005b).

5.2.2 Relocation of Tail Lake Access Road

A tailings access road is planned along the eastern catchment of Tail Lake (SRK 2005a). This access road could be re-routed to follow along the eastern FSL shoreline of Tail Lake. This would serve to function as a final erosion break against any physical erosion along this portion of the lake, ensuring that no progressive erosion would occur beyond the FSL.

This is not a complete mitigation strategy, but could be easily and cost effectively be implemented in combination with any other mitigation strategy with limited cost implication.

5.2.3 Silt Curtain

Based on the estimated suspended sediment concentration that could be deposited annually into Tail Lake, it would be feasible to install a series of silt curtains in Tail Lake, during the open water season that would retain the suspended sediments. This would provide an added factor of safety against any unforeseen suspended sediment or turbidity issues.

Silt curtains are a proven technology, and are designed and used specifically for this type of application. These fences do however require maintenance and supervision. This mitigation strategy is therefore not a long-term sustainable solution, but could be effectively used as part of a mitigation strategy during operation and throughout the time leading towards final closure.

Assuming annual redeployment of silt curtains, with no re-use of material, the cost of this strategy has been estimated at approximately \$75,000 per year.

5.2.4 Re-establish Vegetation

The preferred long-term mitigation approach adopted for the Discovery Mine borrow pit is re-vegetation of the exposed slopes. This approach appears to be having the desired effect by both slowing down erosion, as well as resulting in a reduced sediment load in the borrow pit (Cassie 2004). It is expected that a stable self-sustaining vegetation mat would be developed in a five year period, during which time the vegetation will be assisted by artificial means through addition of nutrients etc., as required. The reason this approach has the potential to work efficiently, is that the re-establishment of vegetation would re-create the organic cover layer that was stripped and which initiated the thermal erosion at the borrow pit. Furthermore, the vegetation will reduce water inflow velocities from snowmelt and runoff, which will reduce the overland erosion potential.

At Tail Lake, once the North Dam is breached, it is expected that permafrost will re-establish in the slopes surrounding Tail Lake; however, without a vegetative cover, the exposed beach may continue to be subject to overland erosion due to runoff and snowmelt. This will continue until all fines have been washed out leaving behind the sand and gravel particles that form the current beaches. Therefore, one reasonable mitigation approach would be to re-vegetate the exposed slopes immediately after the water level is dropped.

Although, in concept, this mitigation strategy has merit, the harsh climate at the Doris North Project site makes it extremely difficult to establish sustainable growth within relatively short period of time. Any mitigation strategy that relies on sustained vegetation would likely require continued inspection and possibly maintenance for at least a decade after final closure.

5.3 Recommended Mitigation: Adaptive Management Plan

Considering the state-of-the-art in science associated with arctic shoreline stability, specifically associated with rising and lowering of lake water levels, and weighing the potential adverse environmental effects with potential mitigation costs, SRK is of the opinion that an adaptive management plan would be the environmentally and technologically responsible approach.

As described in the preceding sections, SRK has proposed a hypothesis for the potential erosion mechanisms, as well as the potential suspended sediment concentration to be released annually from the Tail Lake shoreline. SRK proposes that MHBL implement an adaptive management plan that would use this hypothesis as the basis upon which to trigger mitigation measures, much like a conventional water quality model would be used. These mitigative measures would be implemented in addition to the proposed mitigation strategy proposed in Section 5.2.1, i.e. it covers the portions of Tail Lake shoreline beyond the 20% proactively covered zone. The details of the proposed adaptive management plan are as follows:

Monitoring

MHBL completed six holes around Tail Lake in 2004 and 2005, and installed thermistor strings (SRK 2005c). At the same time MHBL conducted a detailed strip survey, 50 m wide extending from the Tail Lake shoreline to the potential new Tail Lake FSL.

MHBL should monitor the thermistors monthly (during operation; after operation ceases this should be done seasonally until five years after the lake reaches FSL) to determine how the active layer changes as the water level rises.

The strip surveys should be redone annually, including a bathymetry survey of the underwater section of the strip down to the original lake water level of 28.3 m (this should continue for five years after the FSL is reached or till there is no discernable profile difference in two consecutive years). This will provide information of the slope morphology as time progresses, as well as allow for calculation of a sediment balance.

Annually, a qualified Geotechnical Engineer, registered to practice in Nunavut Territory, should conduct a physical investigation of the shoreline conditions to identify areas where mitigation may be required. This could be done in conjunction with an annual dam safety inspection, and will likely cease five years after the North Dam has been breached.

Finally, water quality samples should be collected throughout the open water season to measure the total suspended solids (TSS) content and turbidity in Tail Lake. Water quality sampling will also be done through the ice, immediately prior break-up to determine whether complete settlement of the any residual suspended solids has occurred.

Reporting

The monitoring results should be documented annually in a formal report. Since significant portions of the monitoring data could only be gathered during the summer season, it is expected that this report would be submitted no later than December every year, such that mitigation works, if required, can be initiated for the following winter and summer periods without delay. The details of such reporting will have to be confirmed at the appropriate regulatory permitting stages.

Mitigation Triggers

If at any point during the life of Tail Lake as a tailings impoundment, the suspended sediment concentration in Tail Lake exceeds the MMER value of 15 mg/L at the point of discharge, a silt curtain will be installed across the entire width of the lake in a location upstream of the discharge uptake. At such time, water quality monitoring will be done both upstream and downstream of the silt curtain to ensure the success and integrity of the curtain.

If the TSS concentration downstream of the silt curtain (if required) exceeds the MMER value before Tail Lake reaches FSL, or would not meet CCME Guideline values at the designated monitoring point downstream of the waterfall in Doris Creek during discharge, no water will be discharged. The Dam will enable Tail Lake to store all incoming natural and process water for a period of at least five years, using conservative water balance assumptions.

Areas where active erosion loss is taking place will be covered in geotextile and a 50 cm thick layer of 150 mm nominal size rip-rap will be placed over the geotextile. This protection will cover an area at least 1 m beyond the extremities of the visible erosion feature.

This report, **1CM014.006 – Potential Shoreline Erosion Processes at Tail Lake, Doris North Project, Hope Bay, Nunavut, Canada**, was prepared by SRK Consulting (Canada) Inc.

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Attachment 1
SRK Technical Memorandum
Re. "Inspection of areas of permafrost degradation near
Doris North Project site", dated December 23, 2004

Technical Memorandum

To:	Doris North Project File	Date:	December 23, 2004
cc:		From:	Dylan MacGregor Maritz Rykaart
Subject:	Inspection of areas of permafrost degradation near Doris North Project site	Project #:	1CM014.004.0500

1 Introduction

Several areas of permafrost degradation were identified during surficial mapping in the region of the Doris North project. Selected areas were investigated during the period of August 24-26, 2004 to record the characteristics of the failing material and to collect samples for laboratory testing of material properties.

The investigation focussed on two main areas of permafrost degradation. The first area investigated was in the vicinity of the former Roberts Mining Company (RMC) silver mine, located north of the Roberts Lake outflow. Three sites in this area appear to have experienced disturbance-induced permafrost degradation and gully formation related to historic mining activities which occurred during the 1970s. The second area investigated was southwest of Roberts Bay, where natural degradation of permafrost is actively occurring along the flanks of the Windy Creek valley. A number of digital photos were taken during the investigation; these are filed on a CD which is on record at SRK's office in Vancouver.

At each site, the length of active degradation was investigated. The gullies were walked, and observations about drainage, soil type and structure, vegetation, slope and degree of activity were recorded. The gullies were photographed, and a representative soil sample was collected from each site and submitted for laboratory characterization.

2 Permafrost Degradation in Disturbed Areas

2.1 North of former mine

Area 1 in Figure 1 consists of a north-south oriented valley to the northwest of the RMC site. Markings from vehicular traffic in this area are concentrated along two routes, one from the site west towards Roberts Bay, and another from the mine site north along the eastern flank of the valley. The vertical aerial photograph in Figure 2 shows these tracks and the two areas where gullies have developed due to ongoing degradation of permafrost. Markings on the tundra from vehicular traffic are very difficult to distinguish from the ground, and are generally obvious only on aerial photographs.

The southern gully system in Area 1 is developed on a relatively steep section of slope. There is no indication upstream or downstream of pre-existing surface drainage channels. The main channel of this system is approximately 500 m in length. Gully depth reaches a maximum of five meters in the vicinity of the 'Y' shown in Figure 2, and is typically 3 m across the extent of the system. A representative sample (SRKPD02) of frozen ice-rich soil was collected from a hand excavation from an active failure surface on the wall of the left fork immediately upstream of the bifurcation. The active failure surfaces were observed to be seepage faces; faces were wet only, with no flow to isolated drips observed.

Upstream origin of gully system is series of shallow (<0.3 m) irregular linear depressions, which look like caribou paths. Ponded water is observed in 25% of these depressions; the remainder are wet at the surface, and support darker green vegetation than the adjacent tundra, but no surface water was present.

Sediment produced during gully erosion has been deposited in a broad splay on valley bottom at foot of gully; sediment up to coarse sand size was carried for approximately 50 m beyond mouth of gully. Within the confines of the gully, in-channel boulders were common. This suggests that high-energy flows occur in the channel during a portion of the year, and that finer sediment is removed. Rare gravel lag deposits were noted and very little sand and fine sediment was observed within the gully system. At the time of investigation, a very low but persistent flow of water was present on surface over approximately 80% of the gully system. Areas where surface water was absent had the former channel bottom covered by recently collapsed material from adjacent banks. Water appeared to be flowing under the recently collapsed material and reappearing downstream, and can be considered to be a continuous flow. Flow volumes at the time of the investigation were visually estimated to be 1-2 litres/ minute.

North of the southern area of permafrost degradation is a relatively flat section where no surface erosion is evident. This area is shown in Figure 2, and is clearly marked by the patterned ground which typically develops in ice-rich fine-grained sediments. Surface drainage in this flat section appears to be diffuse and likely follows the margins of the ice-wedge polygons seen in the aerial photograph. The shallow pond located north of the region of patterned ground attests to the poorly drained condition of this flat section.

North of the shallow pond, bedrock outcrops on the west side of the valley and forms small cliffs and steep rocky slopes. On the east side of the valley, bedrock is absent and the valley floor again becomes steeper. Another area of permafrost degradation and gully development is found here. As with the southern gully system, there is no evidence of a pre-existing surface drainage channel. These gullies are approximately 350 m in length, reach a maximum of 4 m depth, and typically are 2 to 2.5 m deep. A representative sample of frozen ice-rich soil (SRKPD01) was collected midway along the main gully as shown in Figure 2. Water was present in isolated pools within channel; no continuous flowing water was observed.

2.2 Adjacent to Roberts Lake, south of former mine

Linear permafrost degradation is present in Area 3, shown on Figure 1. Recent aerial photographs show tracks from vehicular traffic that remain visible at present. Tracks lead from former mine site towards Roberts Lake down a 100 m wide broad valley flanked by steep bedrock ridges (Figure 3). Thick overburden is present in the valley bottom. Vehicular tracks terminate at the northern end of the current gully system, as shown in Figure 3. The valley bottom upslope of the gully has a gentle uniform slope and a uniform cover of tundra grasses.

No evidence of a pre-existing drainage channel was observed either upstream or downstream of the gully in Area 3. Between the southern terminus of the gully and the shore of Roberts Lake, an alluvial fan deposit has formed from the deposition of eroded sediment over a distance of approximately 50 m. Upstream (north) of the fan, the channel disappears for approximately 50 m and the flowpath is marked by lush green grass, in contrast to the adjacent brown and reddish brown tundra grasses and willows.

The gully terminus is approximately 100 m from Roberts Lake. The lower 350 m of gully is generally inactive, 1-2 m deep, with grass-covered banks and rare patches of mineral soil. Abundant rounded granitic boulders are concentrated in channel, and are visible on plain adjacent to channel as well. No surface flow is noted in this lower inactive portion of the gully system.

Total gully length is 500 m, and maximum depth is 3 m, approximately 100 m from the upslope gully terminus. Average gully depth was 2 m. Gully walls were generally active for 150 m below upper terminus, and inactive for remaining 350 m. A sample was collected from an active gully wall approximately 100 m below the upper terminus. The sample (SRKPD03) was collected by hand excavating the sidewall of the gully until frozen material was encountered. There was a discontinuous flow at the bottom of the active

portion of the gully at the time of inspection; maximum flow was visually estimated to be approximately 2 litres/minute.

3 Permafrost Degradation in Undisturbed Areas

3.1 Lower Windy Creek

Widespread active natural permafrost degradation is present in Area 3 (Figure 1) on the slopes adjacent to lower Windy Creek, along the 3 km reach that runs from Roberts Bay to the unnamed lake upstream. These slopes form a 20 to 50 m wide valley that is greatly oversized for Windy Creek. Large scale patterned ground was not observed either from the air or during ground traverses. Frost boils and small (metre scale) ice wedge polygons were observed on the flat bench adjacent to the valley.

The vertical aerial photograph in Figure 4 shows Windy Creek and the outline of the area where permafrost degradation is occurring. As seen in Figure 4, the Windy Creek valley is incised into a uniform geomorphic unit that blankets the bottom of a larger valley, that is bounded by rock ridges to the east and west, and that slopes gently towards Roberts Bay. Bedrock is exposed within the creek channel at one point and is common along the western side of the valley from the upstream lake to approximately 1.5 km downstream, as shown in Figure 4.

There was no evidence of recent seasonal flows that would have the capacity to form the observed incised valley. It appears that larger flows occurred in the geologic past, and that channel formation was accomplished by these larger flows. Within this larger valley, a defined channel has formed that is appropriately sized to the observed flow; there is evidence of seasonal overtopping of this channel and a small floodplain has developed adjacent to the current channel in most areas.

There are isolated examples of the current creek undercutting the larger channel banks and causing erosion. The large cut banks produced by undercutting have slopes approaching 1H:1V, and are much steeper than the slopes of active banks where toe stability exists. However, it appears that the prevalent process acting on the walls of the large incised channel is the melting of ice-rich permafrost and the subsequent erosion of fine-grained sediment. Evidence of this is found in the seepage fronts observed on many of the active banks, and the development of immature dendritic drainage patterns in gullies where no surface waters sources were identified and where seasonal concentration of meltwater is unlikely. Lateral gully formation away from the centreline of Windy Creek is variably developed, but includes instances where incision has progressed upslope approximately 50 m.

Commonly, rounded active slopes were observed where erosion appears to occur as incremental creep. Slopes undergoing creep appear to be sufficiently active to prevent the establishment of vegetation. The driving force behind the widespread creep observed is a combination of the voids created and the water produced during the melting of ice-rich permafrost.

If slopes where vegetation has been established are considered to be approximately in equilibrium, then very few of the slopes along lower Windy Creek meet these criteria. Those that do have slope angles that were visually estimated to range from 15 to 25 degrees. There are many slopes with slope angles within this range that are currently active, and that are not developing any vegetative cover at all.

Mechanisms of erosion appear to be a combination of slow and rapid mass movement. Two rapid flow deposits were observed, where it appears that a skin-type of failure has occurred and soil has flowed downslope. The deposits formed by this type of failure tend to form low lobes with an elevated leading edge. One such flow was observed to have displaced Windy Creek and forced the channel to relocate against the opposite wall of the larger channel. Both flow deposits were observed to be 20 to 30 m across and 2 to 3 m deep at the thickest point.

Physical instability of the banks was also noted to be caused by animals. Animal burrows were common, and in one location it appeared that a bear had excavated a 2 m x 2 m area in a highly burrowed bank. These processes do not result in a large volume of material movement, but may be responsible for ongoing instability in some banks.

A representative sample of frozen ice-rich soil was collected from one of the active cut banks, at the position indicated in Figure 4. Ice constituted approximately 50% of the formation at the sample location.

4 Material Characterization

Understanding the engineering characteristics of permafrost soils near the project area that are currently undergoing degradation will aid in predicting the effects of disturbance on permafrost soils within the Doris North Project area. Table 1 summarizes a list of samples that were collected at the areas of natural and disturbance-induced permafrost degradation. Laboratory testing to determine the physical properties of these samples were conducted by EBA Engineering Ltd. in Yellowknife. The results are summarized in Table 2, and the complete laboratory data sheets are included as Appendix A.

Table 1 Summary of Samples Collected

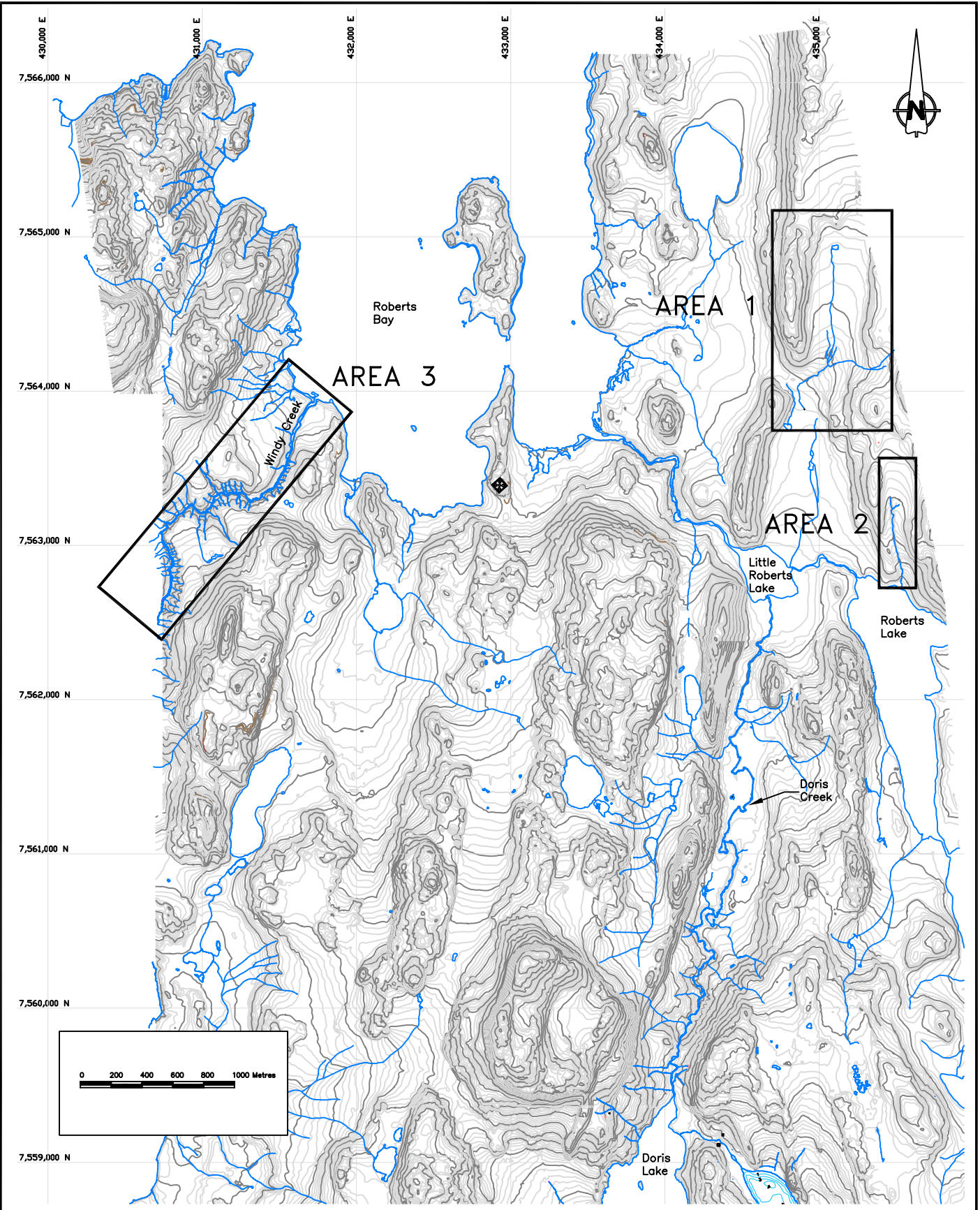
Sample ID	Sample Location	Field Classification	Laboratory Testing
SRKPD-01	Area 1	SM	Particle Size Distribution, Atterberg Limits, Moisture Content
SRKPD-02	Area 1	ML	Particle Size Distribution, Atterberg Limits, Moisture Content
SRKPD-03	Area 2	ML	Particle Size Distribution, Atterberg Limits, Moisture Content
SRKPD-04	Area 3	ML	Particle Size Distribution, Atterberg Limits, Moisture Content

Table 2 Summary of Laboratory Results

Sample	Moisture Content (%)	Atterberg Limits				Particle Size Distribution				
		Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	UCSC Classification	Gravel Content (%)	Sand Content (%)	Fines Content (%)	Silt Content (%)	Clay Content (%)
SRKPD-01	33.6	20	16	4	CL	0	30	70	58	12
SRKPD-02	61.0	28	23	4	CL	2	24	74	56	18
SRKPD-03	55	37	23	41	CL	0	2	98	67	31
SRKPD-04	41.4	28	16	12	CL	0	28	72	45	27

Figures

Dwg Ref: Site-Plan-2004 (Area Plan).dwg

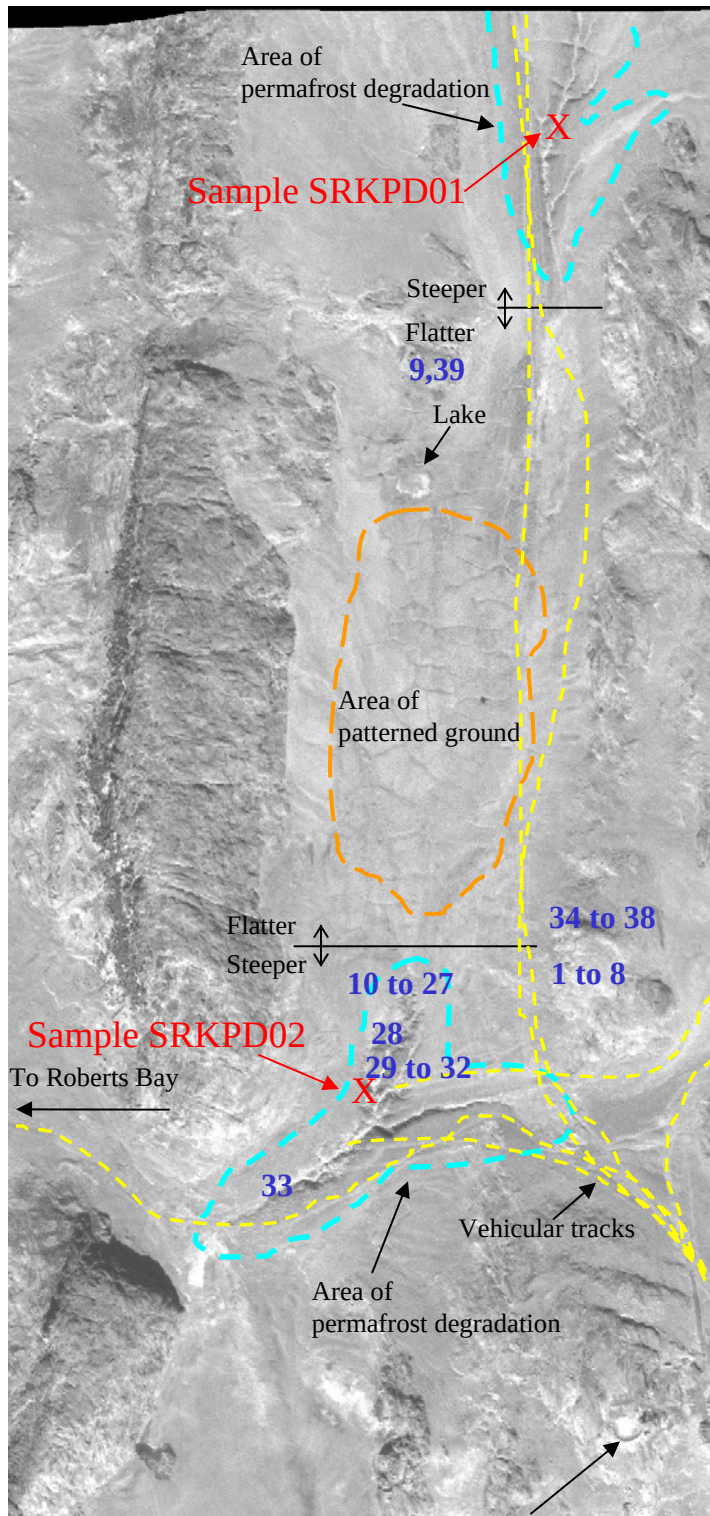


MIRAMAR HOPE BAY LIMITED

DORIS NORTH PROJECT

Permafrost Degradation Investigation Areas

PROJECT NO.	DATE	APPROVED	FIGURE
1CM014.004.0050	Oct. 2004		1



Former RMC mine

1 = Location and # of photo

500 m



Miramar Hope Bay Limited

Doris North Project
Investigation of Permafrost Degradation

**Area 1: Permafrost Degradation
North of Former Mine**

PROJECT:
1CM014.004.0050

DATE:
October 2004

APPROVED:

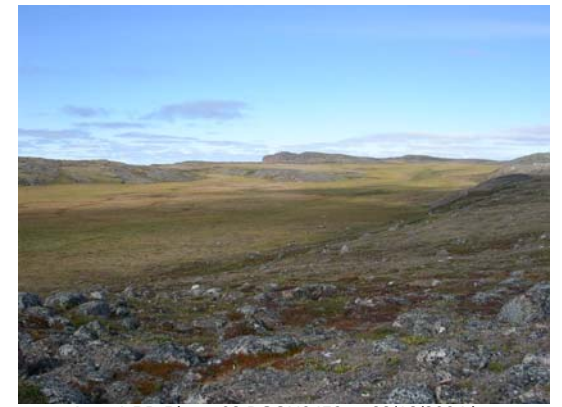
FIGURE:
2



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Area.1.PD.Photo-05.DSCN0461: - 23/12/2004 by



Area.1.PD.Photo-06.DSCN0462: - 23/12/2004 by



Area.1.PD.Photo-07.DSCN0463: - 23/12/2004 by



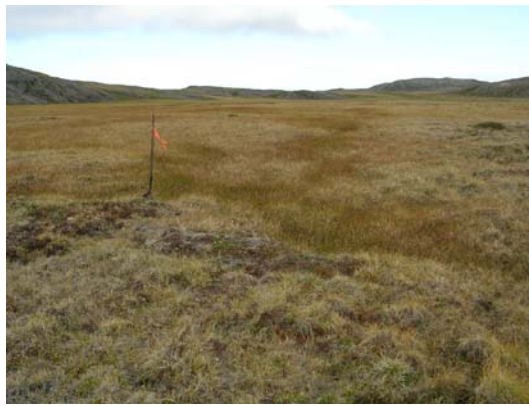
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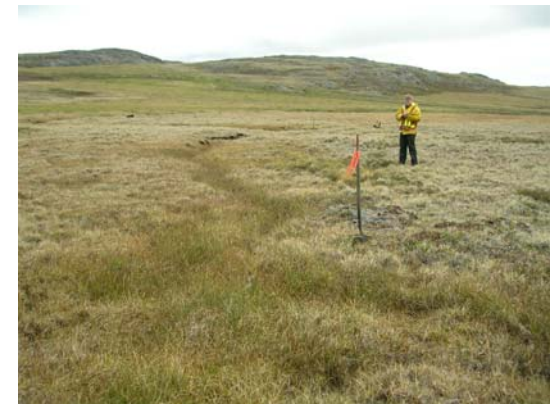
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Area.1.PD.Photo-15.DSCN0487: - 23/12/2004 by



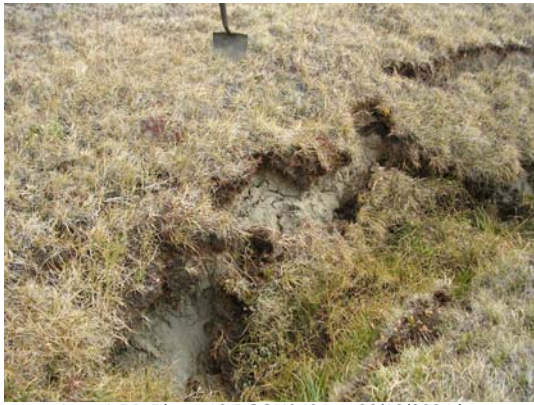
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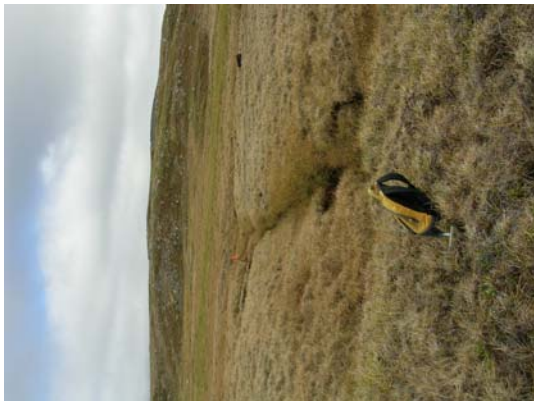
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Area.1.PD.Photo-22.DSCN0494: - 23/12/2004 by



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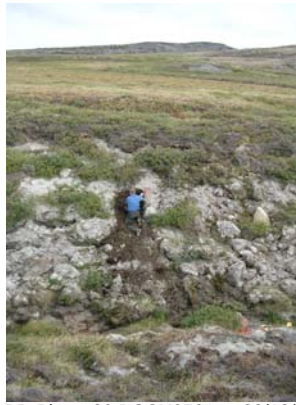
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Area.1.PD.Photo-29.DSCN0501: - 23/12/2004 by



Area.1.PD.Photo-30.DSCN0502: - 23/12/2004 by



Area.1.PD.Photo-31.DSCN0503: - 23/12/2004 by



Area.1.PD.Photo-32.DSCN0504: - 23/12/2004 by



Area.1.PD.Photo-33.DSCN0505: - 23/12/2004 by



Area.1.PD.Photo-34.PD_Valley_1_North: - 23/12/2004 by



Area.1.PD.Photo-35.PD_Valley_2: - 23/12/2004 by



Area.1.PD.Photo-36.PD_Valley_3: - 23/12/2004 by



Area.1.PD.Photo-37.PD_Valley_4: - 23/12/2004 by

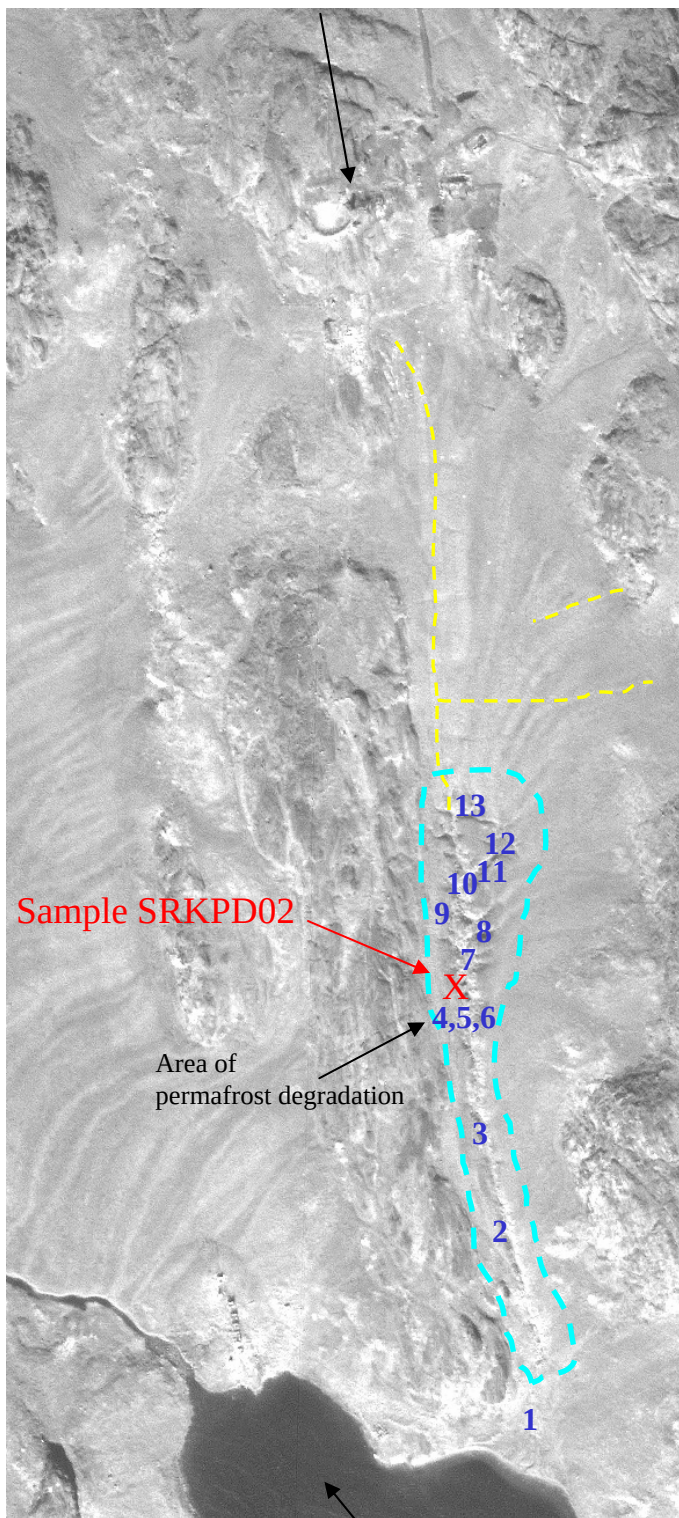


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Area.1.PD.Photo-39.PD_Valley_N_end_look_South: - 23/12/2004 by

Former RMC mine



Sample SRKPD02

Area of
permafrost degradation

Roberts Lake

1 = Location and # of photo

500 m



Miramar Hope Bay Limited

Doris North Project
Investigation of Permafrost Degradation

**Area 2: Permafrost Degradation
South of Former Mine**

PROJECT:
1CM014.004.0050

DATE:
October 2004

APPROVED:

FIGURE:

3



Area.2.PD.Photo-01.DSCN0515: - 23/12/2004 by



Area.2.PD.Photo-02.DSCN0516: - 23/12/2004 by



Area.2.PD.Photo-03.DSCN0517: - 23/12/2004 by



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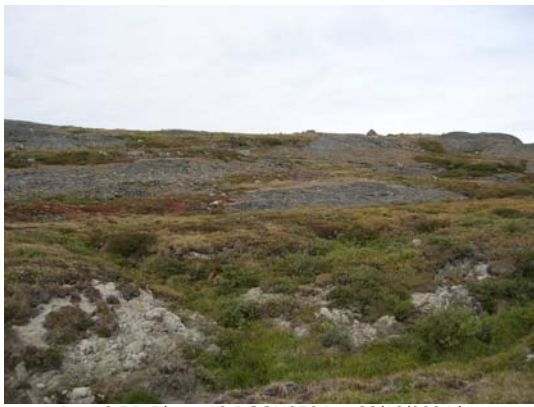
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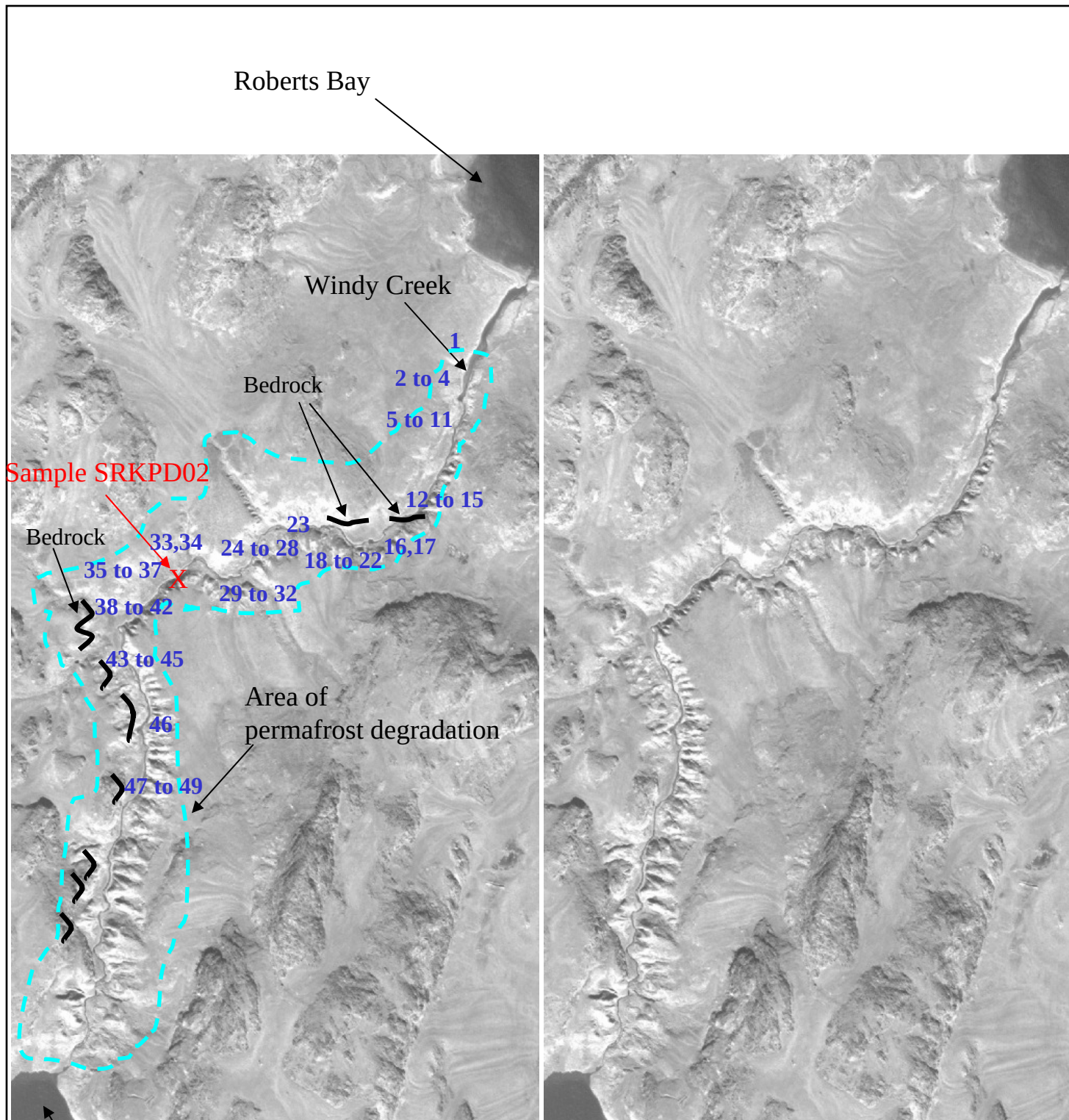
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Area.2.PD.Photo-13.DSCN0527: - 23/12/2004 by



1 = Location and # of photo
 50 to 56 are miscellaneous photos

 SRK Consulting <i>Engineers and Scientists</i>	Doris North Project Investigation of Permafrost Degradation			
	Area 3: Permafrost Degradation Along Lower Windy Creek			
Miramar Hope Bay Limited	PROJECT:	DATE:	APPROVED:	FIGURE:
	1CM014.004.0050	October 2004		4



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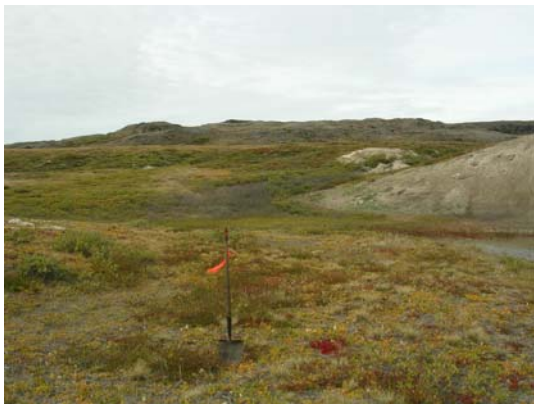
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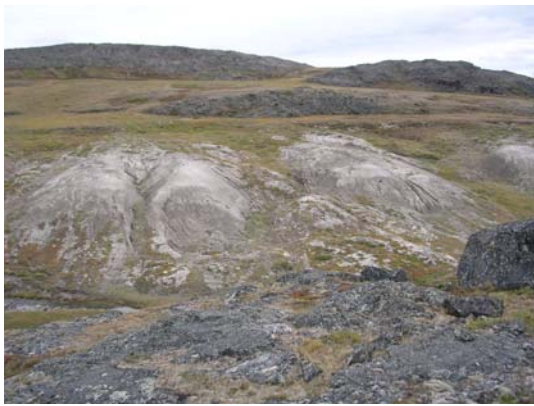
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Area.3.PD.Photo-6.DSCN0535: - 23/12/2004 by



Area.3.PD.Photo-7.DSCN0536: - 23/12/2004 by



Area.3.PD.Photo-8.DSCN0537: - 23/12/2004 by



Area.3.PD.Photo-9.DSCN0543: - 23/12/2004 by



Ice_lenses: - 23/12/2004 by

Appendix A
Laboratory Data Sheets

EBA Engineering Consultants Ltd.

MOISTURE CONTENT TEST RESULTS

Project: SRK 2004 Testing Services BH No: n/a
Hope Bay, Doris North Project SRK Job #: 1CM014.004.0050
Project No.: 1780108 Date Tested: October 20 - October 21, 2004
Location: Hope Bay, NU By: VG
Client: SRK Consulting

Test No.	Sample Number	Depth (m)	Wet+Tare	Dry+Tare	Tare	% Moisture Content
3763A-1	PD-01	n/a	3305.8	2728	1009.1	33.6
3763A-2	PD-02	n/a	4499.7	3160	964.3	61.0
3763A-3	PD-03	n/a	5554.7	4028	1254.6	55.0
3763A-4	PD-04	n/a	5596.1	4329	1266.1	41.4

EBA Engineering Consultants Ltd.

GRAIN SIZE DISTRIBUTION

Project: SRK 2004 Testing Services Hope Bay, Doris North Project

Project Number: 1780108

Client: SRK Consulting

Attention: Mr. Dylan MacGregor, Project Manager

Date Tested: October 25 - November 1, 2004

SRK Job Number ICM014.004.0050

Depth: n/a

Sample Number: PD-01

Lab Number: 3763A-1

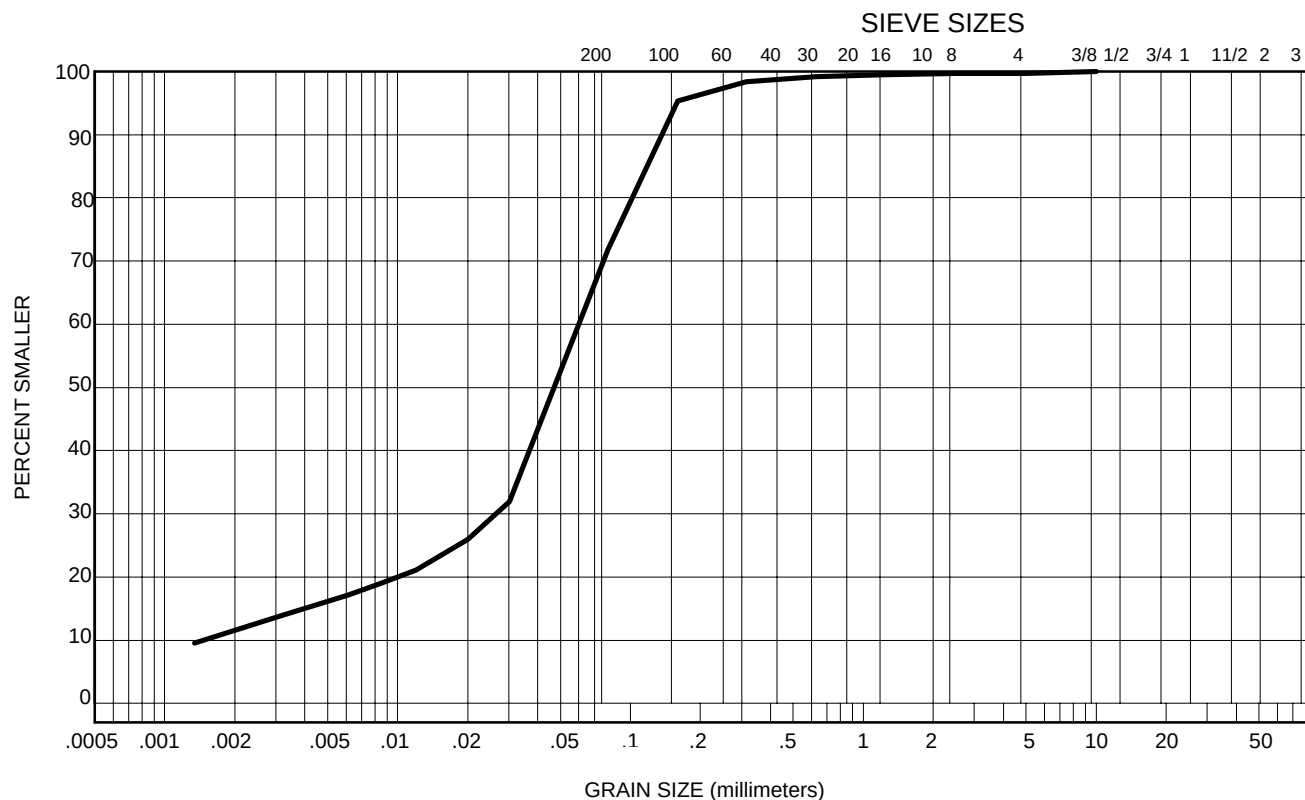
Soil Description: SILT, sandy, some clay, CL

Natural Moisture Content: 33.6%

Remarks: LL=20%, PL=16%, PI=4%

SIEVE	PERCENTAGE PASSING
40	
25	
20	
16	
12.5	
10	
5	
2.5	
1.25	100
0.63	99
0.315	98
0.16	95
0.08	71.8

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Reviewed By: _____ P.Eng.

Data presented hereon is for the sole use of the stipulated client. EBA is not responsible, nor can be held liable, for use made of this report by any other party, with or without the knowledge of EBA

The testing services reported herein have been performed by an EBA technician to recognized industry standards, unless otherwise noted. No other warranty is made. These data do not include or represent any interpretation or opinion of specification compliance or material suitability. Should engineering interoperation be required, EBA will provide it upon written request.



EBA Engineering Consultants Ltd.

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Project: SRK 2004 Testing Services Hope Bay, Doris North Project.

Project Number: 1780108

Client: SRK Consulting

Attention: Mr. Dylan MacGregor, Project Manager

Date Tested: October 25 - November 1, 2004

SRK Job Number ICM014.004.0050

Depth: n/a

Sample Number: PD-02

Lab Number: 3763A-2

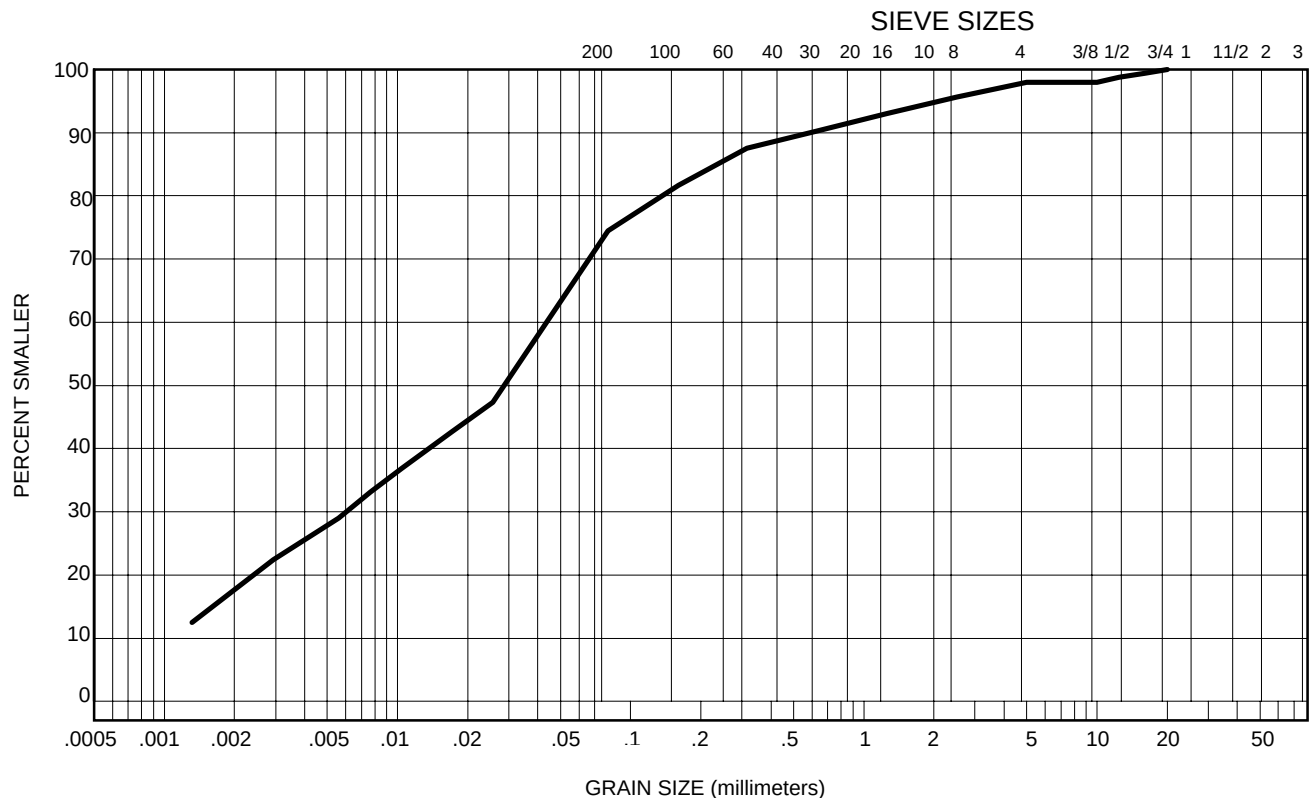
Soil Description: SILT, sandy, some clay, trace gravel, CL

Natural Moisture Content: 61.0%

Remarks: LL=28%, PL=23%, PI=5%

SIEVE	PERCENTAGE PASSING
40	
25	
20	100
16	99
12.5	99
10	98
5	98
2.5	96
1.25	93
0.63	90
0.315	88
0.16	82
0.08	74.4

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Reviewed By: _____ P.Eng.

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EBA Engineering Consultants Ltd.

GRAIN SIZE DISTRIBUTION

Project: SRK 2004 Testing Services Hope Bay, Doris North Project.

Project Number: 1780108

Client: SRK Consulting

Attention: Mr. Dylan MacGregor, Project Manager

Date Tested: October 25 - November 2, 2004

Borehole Number: 1CM014.004.0050

Depth: n/a

Sample Number: PD-03

Lab Number: 3763A-3

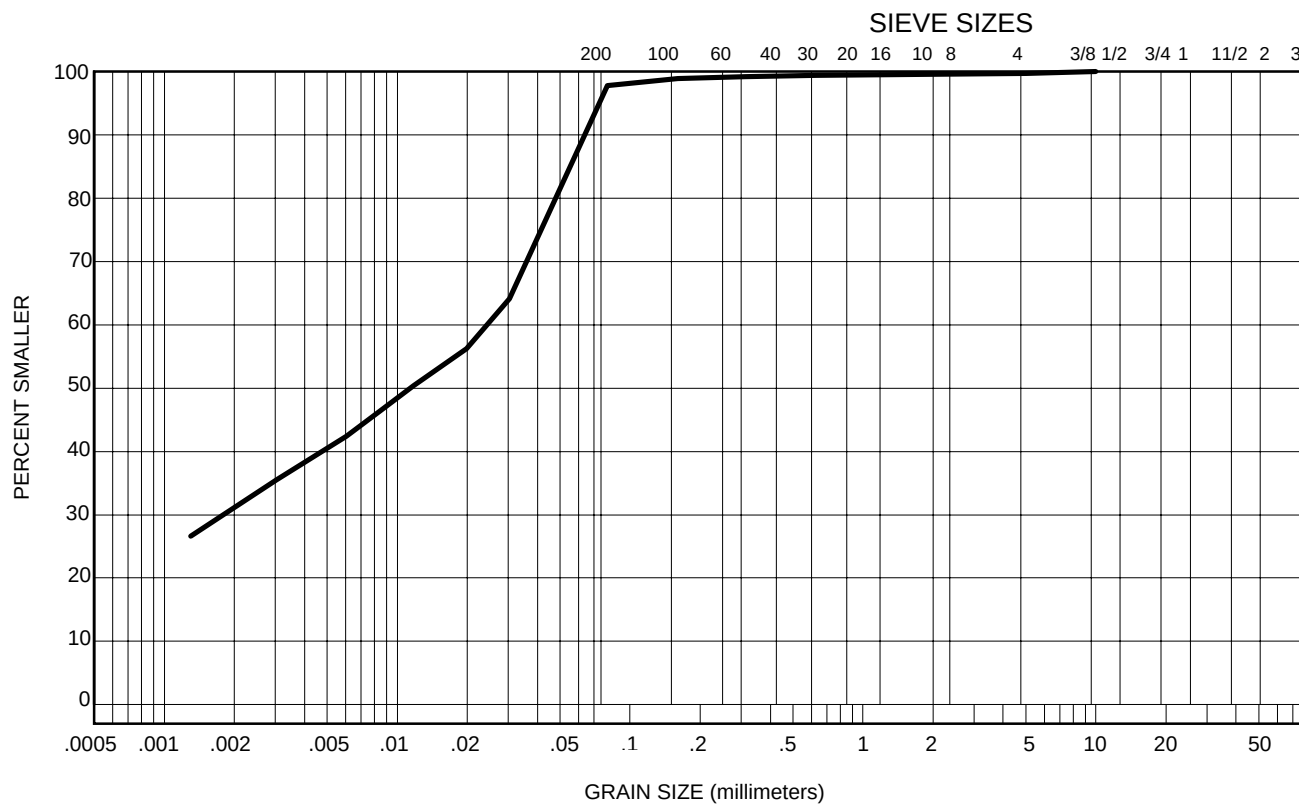
Soil Description: SILT, Clayey, trace sand, CL

Natural Moisture Content: 55.0%

Remarks: LL=37%, PL=23%, PI=14%

SIEVE	PERCENTAGE PASSING
40	
25	
20	
16	
12.5	
10	
5	
2.5	
1.25	100
0.63	99
0.315	99
0.16	99
0.08	97.8

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Reviewed By: _____ P.Eng.

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EBA Engineering Consultants Ltd.

GRAIN SIZE DISTRIBUTION

Project: SRK 2004 Testing Services Hope Bay, Doris North Project

Project Number: 1780108

Client: SRK Consulting

Attention: Mr. Dylan MacGregor, Project Manager

Date Tested: October 25 - November 2, 2004

SRK Job Number: 1CM014.004.0050

Depth: n/a

Sample Number: PD-04

Lab Number: 3763A-4

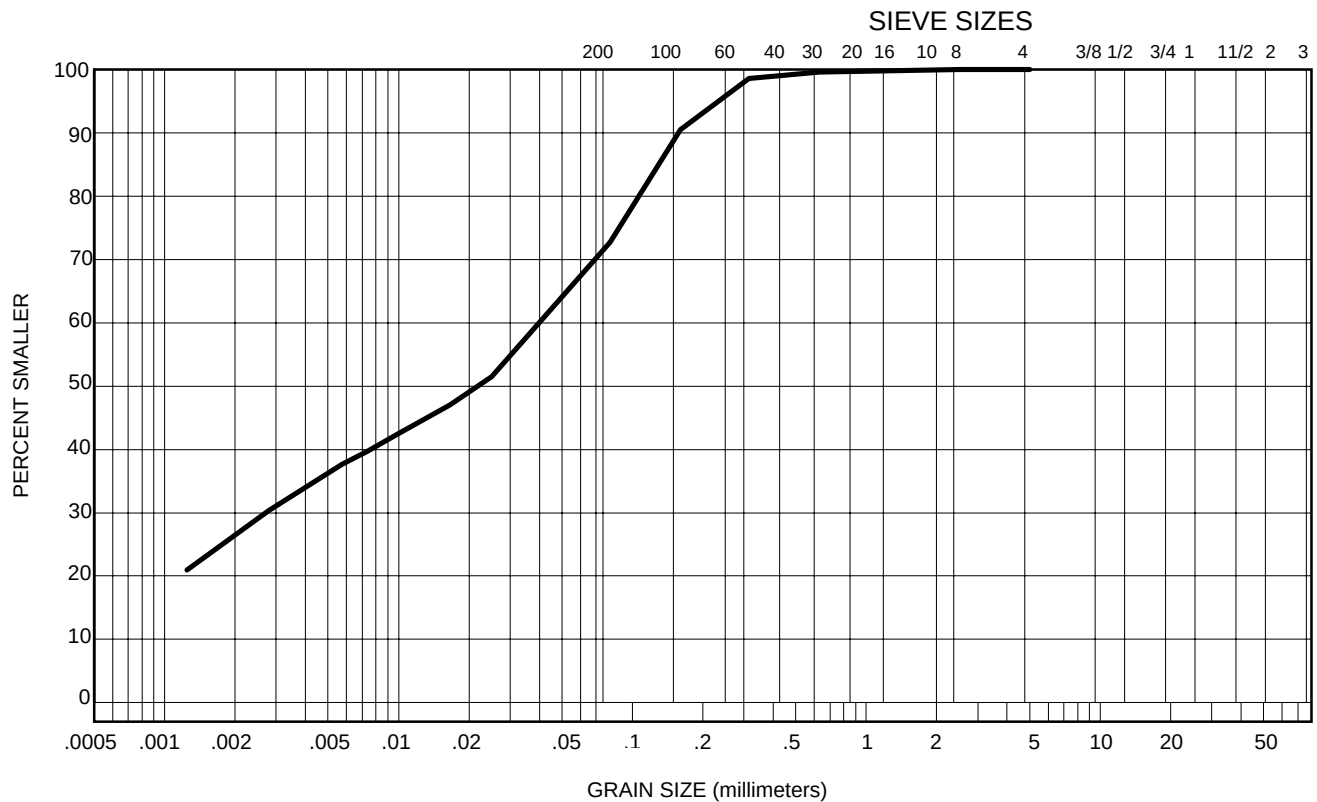
Soil Description: SILT, clayey, sandy, CL

Natural Moisture Content: 41.4%

Remarks: LL=28%, PL=16%, PI=12%

SIEVE	PERCENTAGE PASSING
40	
25	
20	
16	
12.5	
10	
5	
2.5	
1.25	
0.63	100
0.315	99
0.16	91
0.08	72.7

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Reviewed By: _____ P.Eng.

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Atterberg Limits

Date Received: **Job Number:** 1780108
Sample #: 3763A-1 (PD 01) **Source:** SRK Job Number 1CM014.004.0050
ASTM D-2487, Unified Soils Classification System

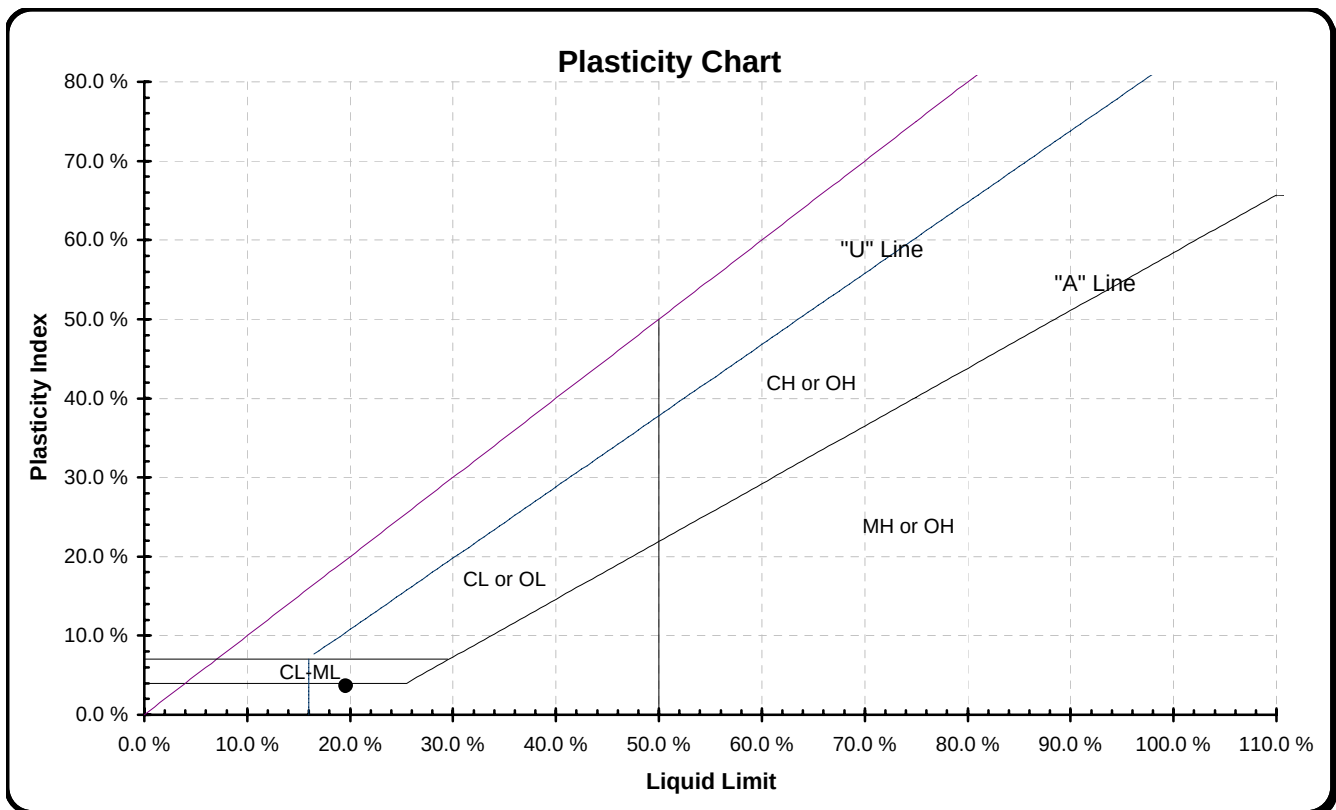
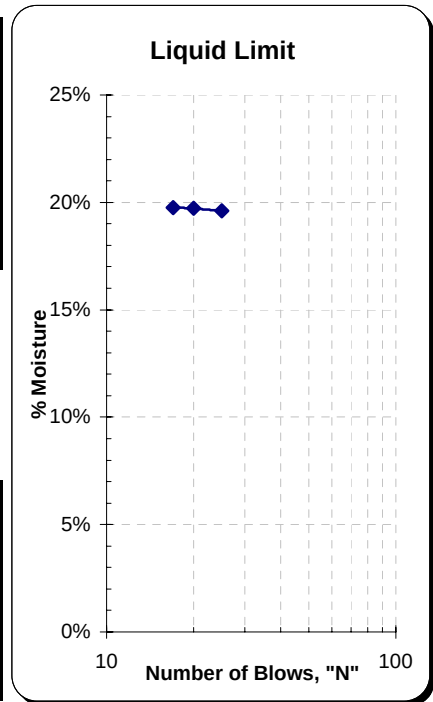
Liquid Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	33.80	30.00	24.70			
Weight of Dry Soils + Pan:	28.90	25.70	21.30			
Weight of Pan:	3.90	3.90	4.10			
Weight of Dry Soils:	25.00	21.80	17.20			
Weight of Moisture:	4.90	4.30	3.40			
% Moisture:	19.6 %	19.7 %	19.8 %			
N:	25	20	17			

Liquid Limit @ 25 Blows: 19.6 %
Plastic Limit: 16.0 %
Plasticity Index, I_p: 3.6 %

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	13.40	14.50				
Weight of Dry Soils + Pan:	12.10	13.00				
Weight of Pan:	3.80	3.80				
Weight of Dry Soils:	8.30	9.20				
Weight of Moisture:	1.30	1.50				
% Moisture:	15.7 %	16.3 %				



Atterberg Limits

Date Received:

Job Number: 1780108

Sample #: 3763A-2 (PD 02)

Source: SRK Job Number 1CM014.004.0050

ASTM D-2487, Unified Soils Classification System

Liquid Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	38.40	35.60	35.00			
Weight of Dry Soils + Pan:	31.10	28.80	28.10			
Weight of Pan:	4.30	4.30	4.00			
Weight of Dry Soils:	26.80	24.50	24.10			
Weight of Moisture:	7.30	6.80	6.90			
% Moisture:	27.2 %	27.8 %	28.6 %			
N:	30	22	16			

Liquid Limit @ 25 Blows: 27.6 %

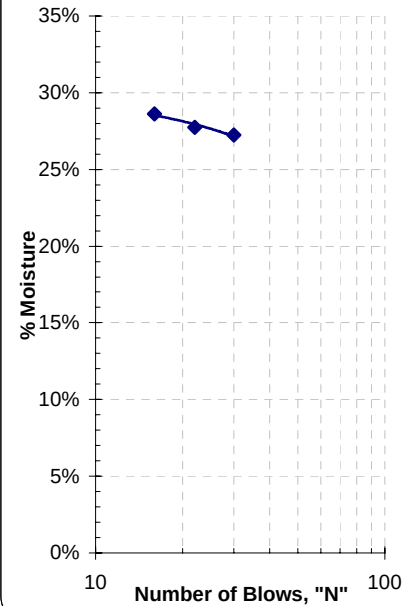
Plastic Limit: 23.1 %

Plasticity Index, I_p : 4.5 %

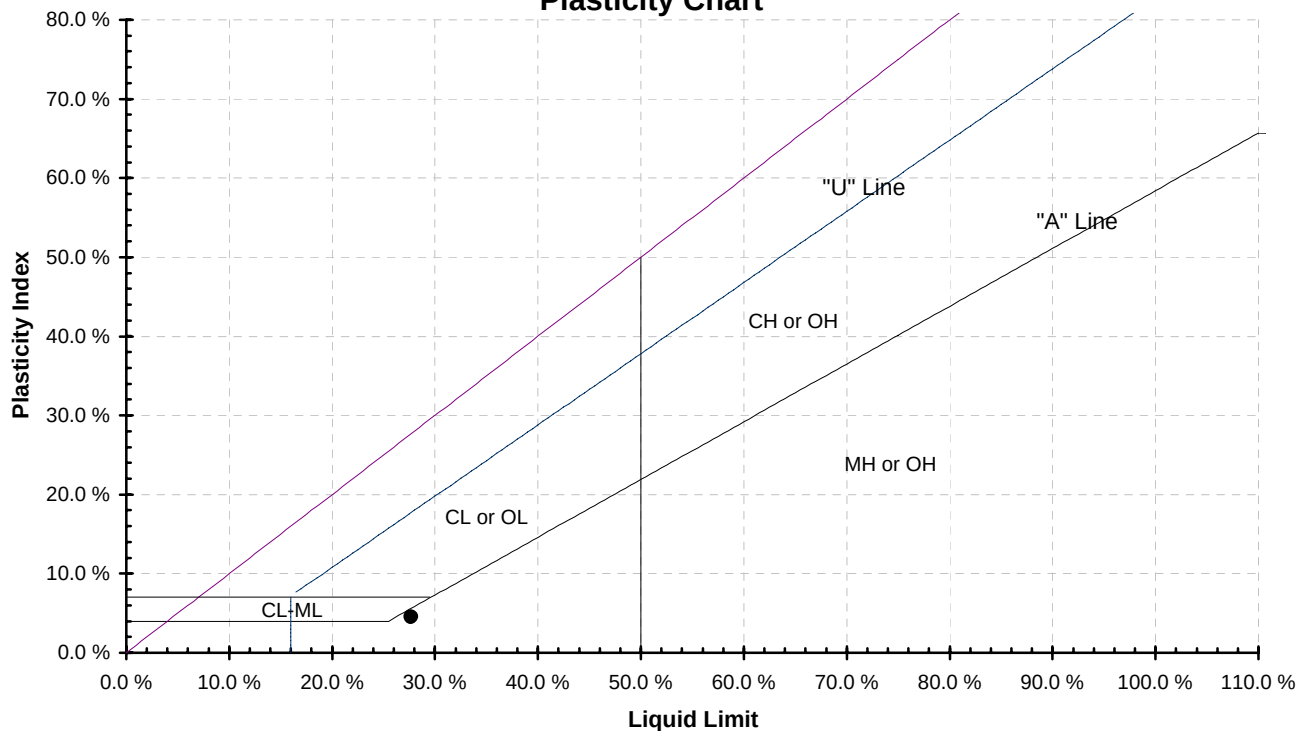
Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	15.40	16.80				
Weight of Dry Soils + Pan:	13.20	14.40				
Weight of Pan:	3.80	3.90				
Weight of Dry Soils:	9.40	10.50				
Weight of Moisture:	2.20	2.40				
% Moisture:	23.4 %	22.9 %				

Liquid Limit



Plasticity Chart



Atterberg Limits

Date Received: **Job Number:** 1780108
Sample #: 3763A-3 (PD 03) **Source:** SRK Job Number 1CM014.004.0050
ASTM D-2487, Unified Soils Classification System

Liquid Limit Determination

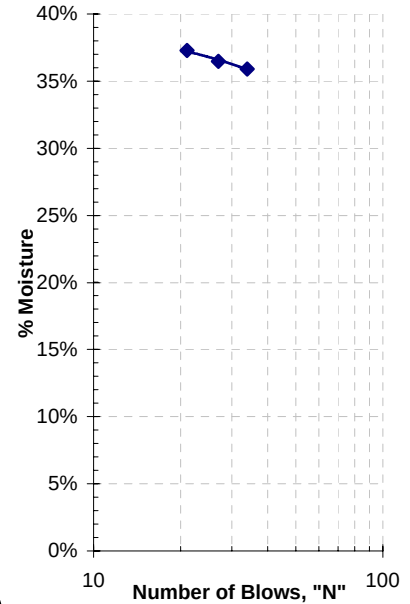
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	32.20	32.00	27.30			
Weight of Dry Soils + Pan:	24.80	24.60	21.00			
Weight of Pan:	4.20	4.30	4.10			
Weight of Dry Soils:	20.60	20.30	16.90			
Weight of Moisture:	7.40	7.40	6.30			
% Moisture:	35.9 %	36.5 %	37.3 %			
N:	34	27	21			

Liquid Limit @ 25 Blows: 36.8 %
Plastic Limit: 22.7 %
Plasticity Index, I_p: 14.1 %

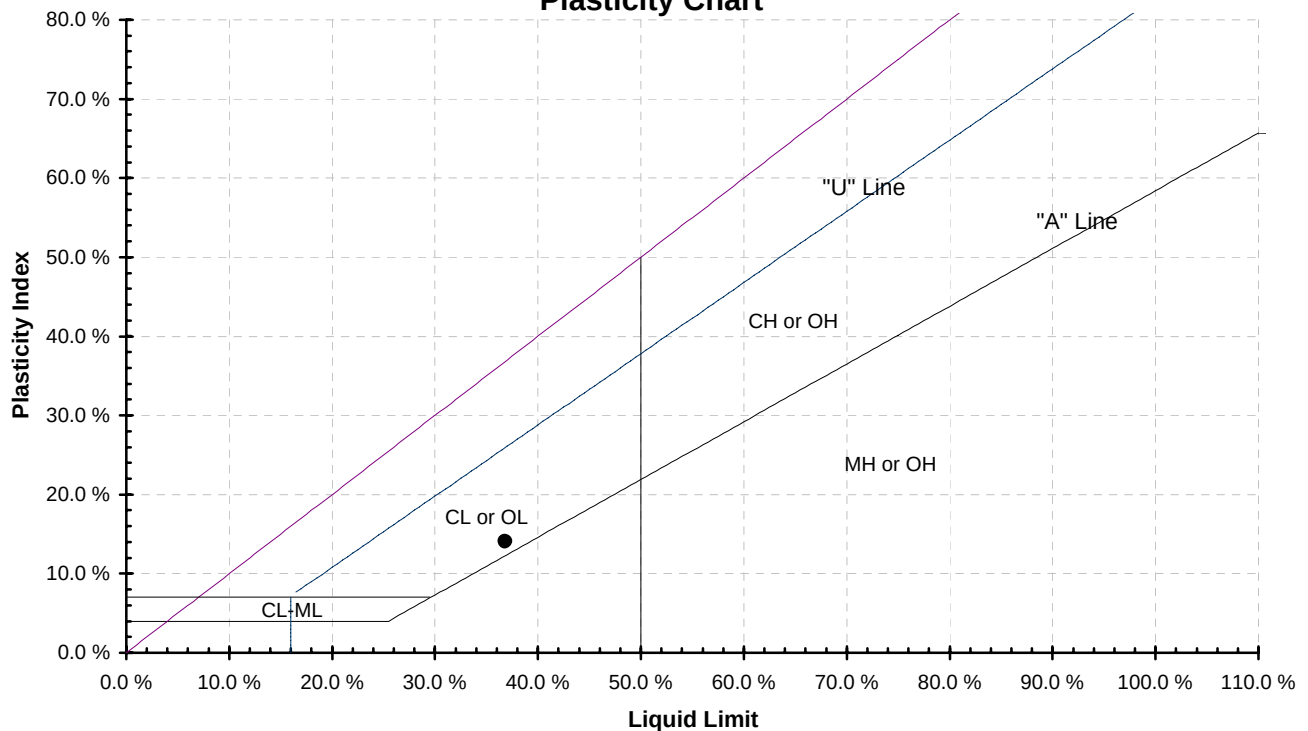
Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	19.30	16.90				
Weight of Dry Soils + Pan:	16.40	14.50				
Weight of Pan:	3.80	3.80				
Weight of Dry Soils:	12.60	10.70				
Weight of Moisture:	2.90	2.40				
% Moisture:	23.0 %	22.4 %				

Liquid Limit



Plasticity Chart



Atterberg Limits

Date Received: **Job Number:** 1780108
Sample #: 3763A-4 (PD 04) **Source:** SRK Job Number 1CM014.004.0050
ASTM D-2487, Unified Soils Classification System

Liquid Limit Determination

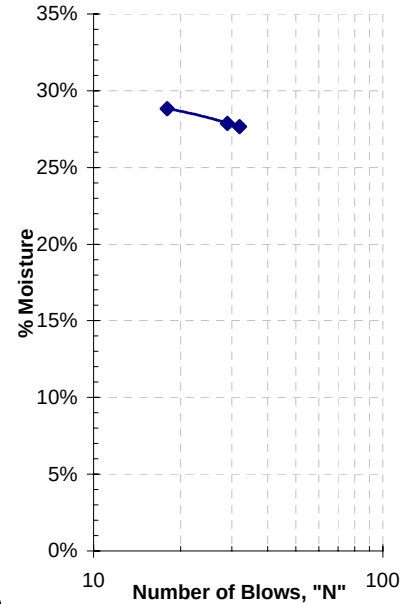
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	28.10	29.90	31.70			
Weight of Dry Soils + Pan:	22.90	24.30	25.50			
Weight of Pan:	4.10	4.20	4.00			
Weight of Dry Soils:	18.80	20.10	21.50			
Weight of Moisture:	5.20	5.60	6.20			
% Moisture:	27.7 %	27.9 %	28.8 %			
N:	32	29	18			

Liquid Limit @ 25 Blows: 28.2 %
Plastic Limit: 16.2 %
Plasticity Index, I_p: 12.1 %

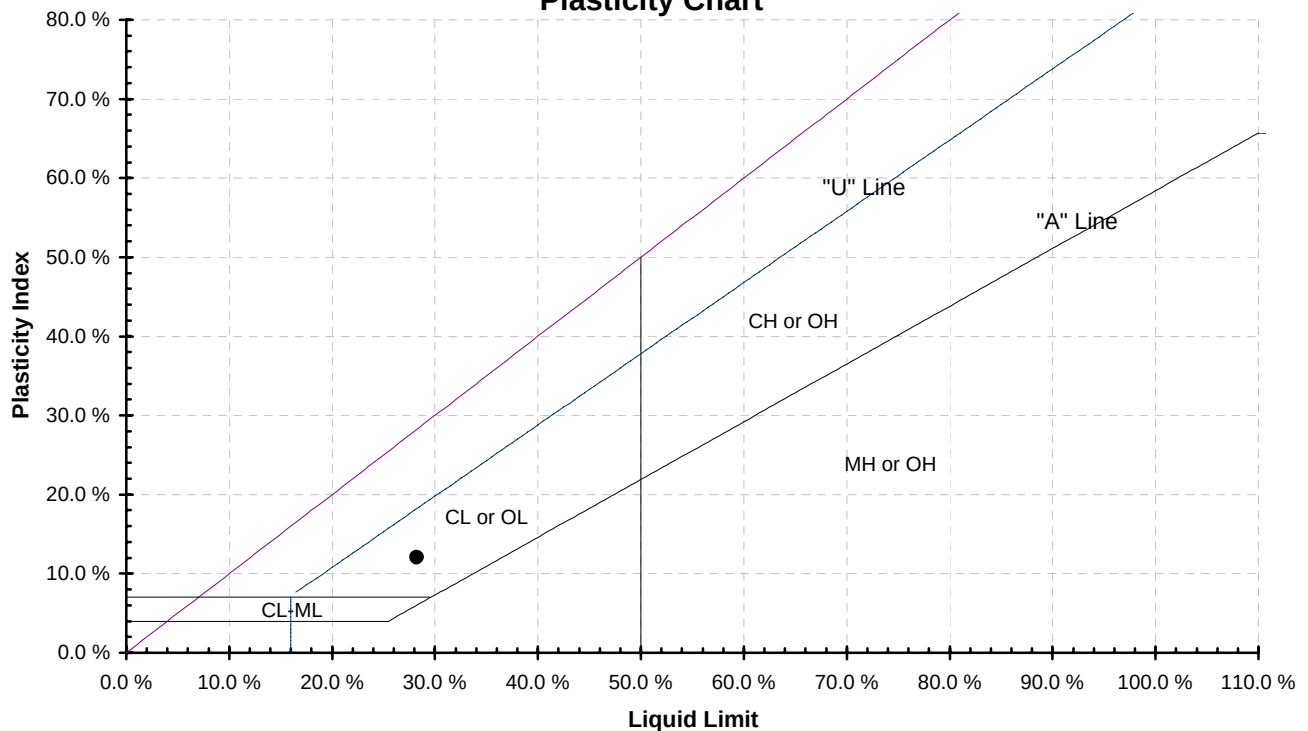
Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	13.70	15.50				
Weight of Dry Soils + Pan:	12.30	13.90				
Weight of Pan:	3.80	3.80				
Weight of Dry Soils:	8.50	10.10				
Weight of Moisture:	1.40	1.60				
% Moisture:	16.5 %	15.8 %				

Liquid Limit



Plasticity Chart



Appendix F
Sediment Re-suspension Calculations

Technical Memorandum

To:	Brian Labadie	Date:	September 16, 2005
cc:	Project File	From:	Maritz Rykaart, Ben Wickland
Subject:	Re-Suspension of Shoreline Eroded Material in Tail Lake	Project #:	1CM014.006

1 Introduction

Re-suspension occurs in water bodies when the resistance of the bed material is overcome by action of the overlying water. The resistance of the bed is dependent on particle size, density, and cohesion. The action of the overlying water-wave action is dependent on the:

- fetch distance (distance of water over which waves may be generated), and
- wind speed, direction and duration.

Re-suspension affects the overall water quality due to increased total suspended solids (TSS) and potential total concentrations in the body of water.

As part of the Doris North Project, tailings will be deposited sub-aqueously into Tail Lake. The tailings will be contained in Tail Lake through the construction of two dams. The volume of water contained in Tail Lake will be managed by annually decanting water from Tail Lake until the lake can be returned to a flow-through system that will require no further management. This will result in a slow increase of the water level in the Tail Lake basin initially. As decanting progresses the water quality will improve and the water level will decrease to the original water elevation in Tail Lake. At that time the North Dam will be breached and the lake will return to a flow-through system.

During and after tailings deposition there are three sources for potential particle re-suspension in Tail Lake;

- *Existing lake bed sediments.* Based on background water quality data there is little evidence of re-suspension occurring in Tail Lake and this source can be disregarded. (Note: The water and load balance includes current background loadings of suspended solids irrespective of additional sources and this potential source is therefore already included in the water and load balance calculations.)
- *Deposited tailings.* The tailings will be deposited in the deepest areas of Tail Lake, and at any given time will be covered by at least 4 m of water. The minimum depth of the water cover required to prevent tailings re-suspension has been calculated as 2.42 m (SRK 2005a). Re-suspension of the tailings in Tail Lake is not likely to be significant.

- *Shoreline erosion sediments.* As the water level in Tail Lake rises, the submerged permafrost shoreline soils will thaw and some of these sediments may be eroded by wave action. Once the water level is lowered and the thaw zones are exposed, shoreline erosion will continue through overland runoff and wave action. A detailed description of these processes is given in SRK (2005b), together with an estimate of how much material may be eroded. These eroded sediments will be deposited in Tail Lake and will settle out over the entire lake bed, including the shallow fringes close to the shoreline.

The total load of sediments that may be mobilized by the above mechanisms were calculated to develop predictions of the potential effects on water quality in Tail Lake. This memorandum presents the calculations and results for total sediment loads to Tail Lake from re-suspension of sediments in Tail Lake.

2 Shoreline Erosion Material Re-suspension

2.1 Methodology

Samad and Yanful (2005) published a procedure to calculate shear stress on sediment beds from shallow wave action. This procedure was used to predict shear stresses and to estimate the amount of erosion and re-suspension of sediments due to wind and counter current flow action. This procedure is however in its infancy, and has only been verified for tailings bed material. Verification of the theory is limited to laboratory scale work and three short term and small scale field studies on actual tailings facilities. Nonetheless, this method offers the only realistic method for predicting sediment re-suspension in Tail Lake from sediments deposited by shoreline erosion.

SRK developed a spreadsheet model using the procedure described by Samad and Yanful (2005) and Yanful (2005) to calculate the likely range in sediment loads in Tail Lake through the process of bed erosion from shoreline erosion sediments.

The first step in the procedure is to calculate the maximum shear stress induced on the sediment bed by wave action. The shear stress exerted on the sediment bed results from different water velocities in the profile. The sum total of these two bed shear stresses is then used in the final step to calculate the total amount of bed erosion that can occur, which is equivalent to the re-suspension load.

2.2 Assumptions and Inputs

The primary input parameters used in the calculation are listed in Table 1.

Table 1. List of primary input values to re-suspension calculation

Parameter	Possible Range	Source
Water Depth	0.5 – 4.0 m	Topographical maps of Tail Lake
Fetch Distance	500 to 3,000 m	Topographical maps of Tail Lake
Wind Speed	6.11 to 11.11 m/sec	Cambridge Bay hourly wind speed data
Critical Shear Stress	0.058 to 0.120 Pa	Yanful (2005); Tables 2 & 3

The calculated bed erosion due to wave action and counter current flow is a function of the critical shear stress of the bed material. The critical shear stress is a site specific value that must be determined in the laboratory, using a flume test. Yanful (2005) report results of three such flume tests, all from tailings, as listed in Table 2. There does not appear to be a direct correlation between particle size and critical shear stress, which complicates application of this data to other materials such as the shoreline sediments at Tail Lake. Table 3 lists the typical Tail Lake shoreline material particle sizes as measured from samples collected during two drilling programs in 2004 and 2005 (SRK 2005c; SRK 2005d). The tailings particle size distribution is also listed in Table 3 for

completeness (SRK 2005e). Clearly the shoreline materials are on the fine side, and the average particle size is close to the Heath Steele tailings. Therefore, the average critical shear stress listed in Table 2 was adopted as the base case for Tail Lake bed erosion calculations. However, a sensitivity analysis was carried out to evaluate the effect of this assumption.

Table 2. Critical shear stress for tailings (Yanful 2005)

Site	d ₅₀ (mm)	Shear Stress (Pa)
Falconbridge Tailings	0.110	0.090
Heath Steel Upper Tailings	0.010	0.120
Heath Steel Lower Tailings	0.010	0.058
Average		0.089

Table 3. Tail Lake shoreline material particle size range

Site	d ₅₀ (mm)	d ₉₀ (mm)
SRK54(0.46-0.61)	0.0280	1.000
SRK54(3.18-3.34)	0.0043	0.060
SRK54(5.33-5.49)	0.0012	0.065
SRK55(0.1-0.2)	0.028	1.000
SRK55(0.35-0.45)	0.022	1.500
SRK56(0.14-0.20)	0.025	0.075
SRK56(0.3-0.4)	0.032	0.070
SRK56(0.5-0.6)	0.023	0.075
SRK53-2G(2.10-2.85)	0.008	0.075
SRK58-3E(4.10-4.40)	0.009	0.100
SRK58-2F(2.10-3.40)	0.004	0.058
SRK57-3C(4.28-4.68)	0.210	0.300
SRK54(8.26-8.41)	1.200	0.600
Doris North Project Tailings	0.067	0.150
Tail Lake Shoreline Soils - Minimum	0.001	0.058
Tail Lake Shoreline Soils - Average	0.017	0.371

Site specific wind data for the Doris North site is limited, and therefore wind speed data for Cambridge Bay has been used in the re-suspension calculations (SRK 2005g). The prevailing wind direction at Tail Lake is the north wind and the frequency of these winds, at different hourly average wind speeds are summarized in Table 4. These are the values that were used to calculate wind specific event based re-suspension loads. Since, the amount of re-suspension is a function of the wind speed, the total sum of re-suspension has been calculated by taking the sum of all the wind specific events, pro-rated according to the wind frequency distribution listed in Table 4.

The total open water period in Tail Lake, during which discharge will take place, and when re-suspension will occur is approximately 120 days. For the total annual sediment load calculation, we have assumed that an event can occur every seven days, i.e. the total annual load is equal to the sum total of 17 single events.

Table 4. Wind speed data used for re-suspension calculations

Wind Frequency (% Exceedance)	Wind Speed (km/h)	Wind Speed (m/sec)
50	22	6.1
40	26	7.2
30	29	8.1
20	34	9.4
10	40	11.1

2.3 Results

Results of the re-suspension calculations are illustrated in Figures 1 through 5, and presented in Tables 5 through 9. Each figure and table presents the potential total annual erosion load for any given fetch distance and wind speed, expressed as a bed erosion value in kg. This load is the sum total of material re-suspended down to a 4 m water depth, estimated from the Tail Lake stage curve (SRK 2005f). The erosion calculations were done in 50 cm slices, effectively representing a simplified 3-dimensional model, to maximize the accuracy within the model framework.

Figures 1 through 3 (and Tables 5 through 7) illustrate the effect that the increased water level in Tail Lake has on bed erosion. At the Full Supply Level (FSL) of 33.5 m, the minimum and maximum annual erosion associated with the minimum wind speed and fetch (as listed in Table 3 and 4) and the maximum wind speed and fetch, respectively are about 44,000 kg and 294,000 kg. At the proposed maximum operating water level in Tail Lake of 29.4 m, the surface area under 4 m is slightly greater than when the water is at 33.5 m, and therefore the minimum and maximum annual erosion loads increases to about 59,000 kg and 417,000 kg. At the flow-through elevation of Tail Lake, i.e. the current elevation where Tail Lake will be returned to when the dam is breached (28.3 m), the surface area under 4 m is even greater, and the erosion loads range between about 69,000 kg and 485,000 kg.

The effect of increasing wind speed and fetch is also clear from Figures 1 through 5. As the wind speed and fetch increases, the erosion load increases by factors of between 1.6 and 3.5.

Figures 4 and 5 (Tables 8 and 9) present the effect that the critical shear stress has on the erosion load calculation. Reducing the critical shear stress to the minimum recorded value of 0.058 Pa, results in a two-fold increase in the erosion load, whilst increasing the critical shear stress to 1.120 Pa, has the reverse effect of almost halving the erosion load.

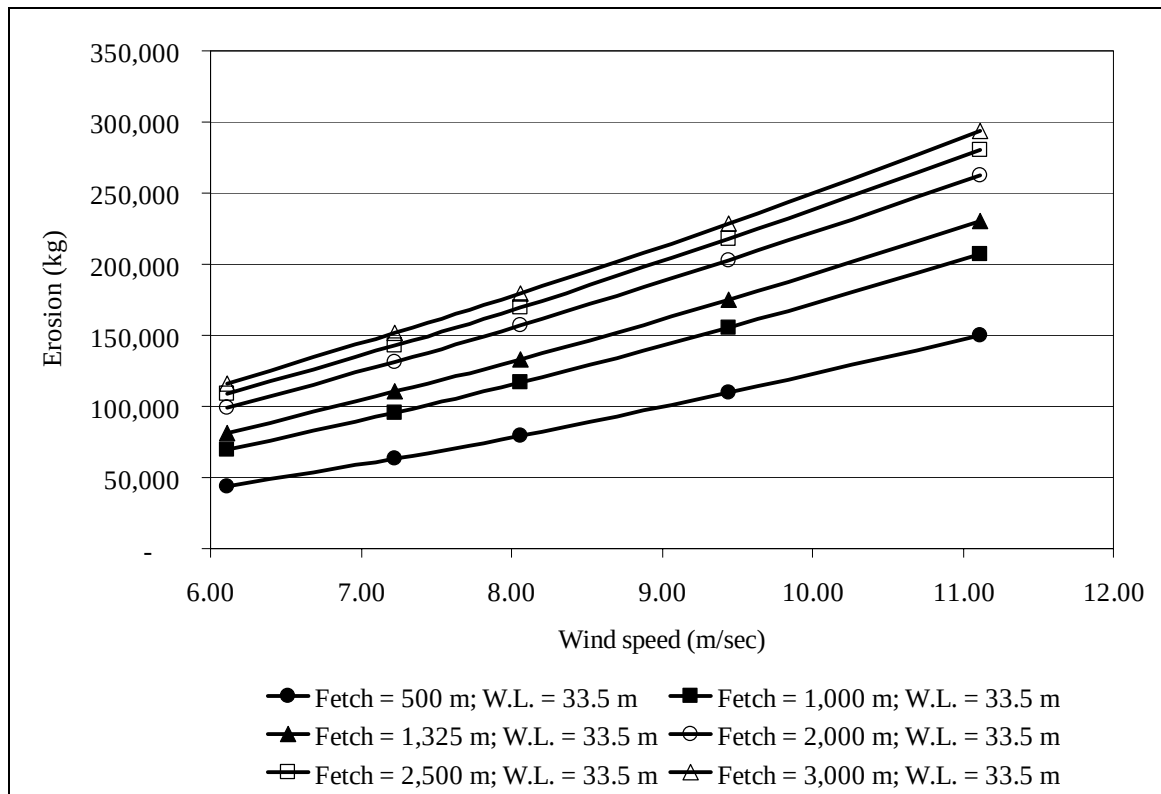


Figure 1. Re-suspension loads at the full supply level (FSL) of 33.5 m, using the average critical shear stress of 0.089 Pa.

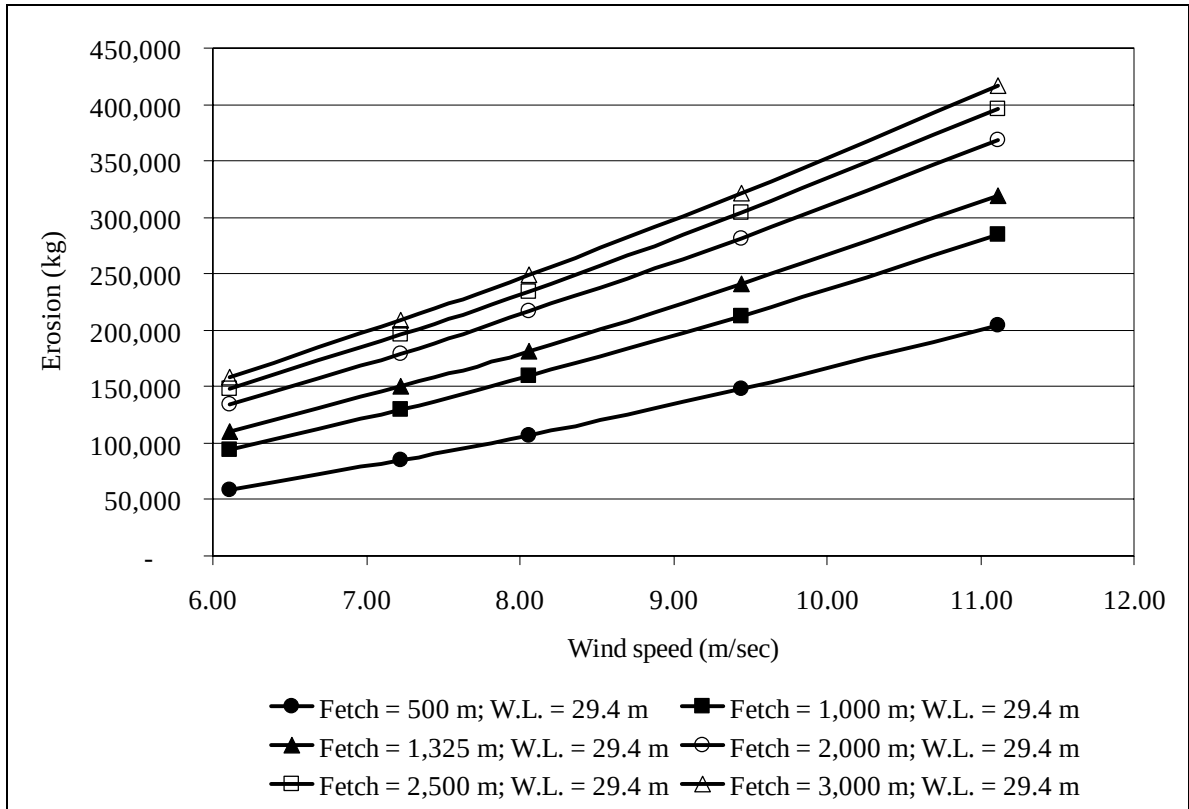


Figure 2. Re-suspension loads at the proposed maximum water level of 29.4 m, using the average critical shear stress of 0.089 Pa.

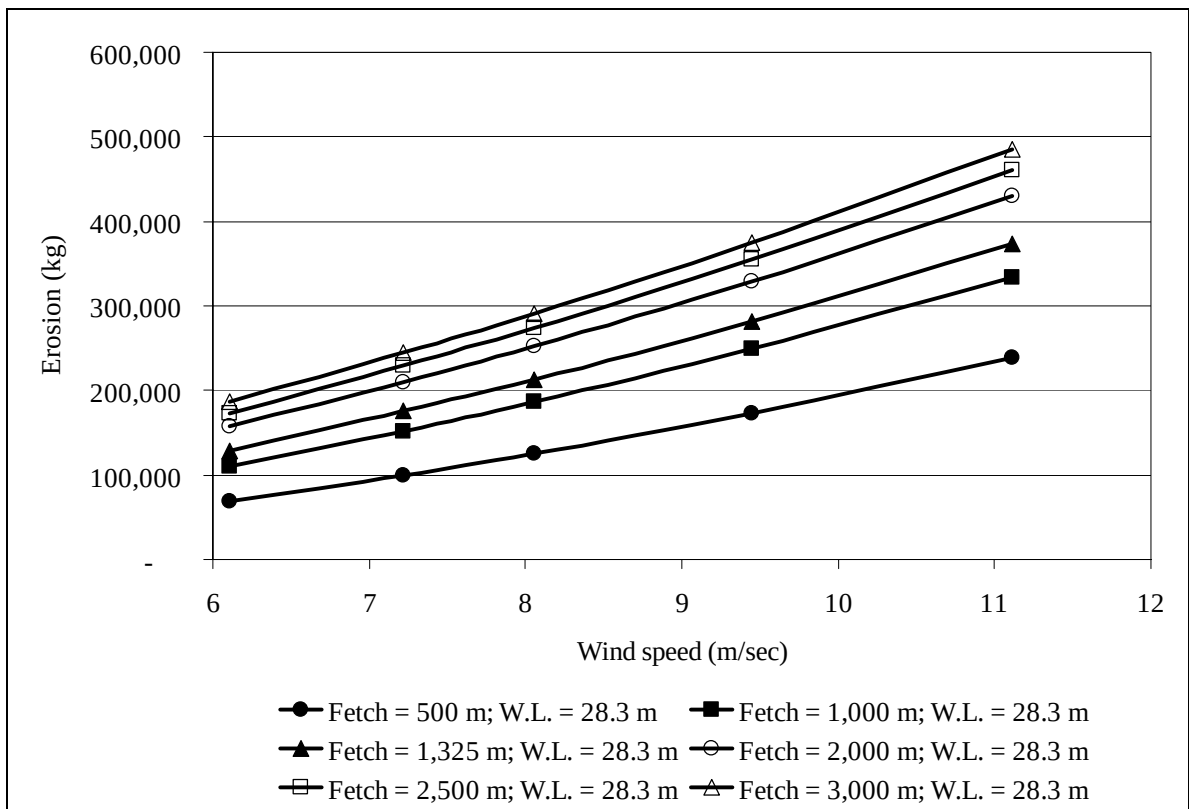


Figure 3. Re-suspension loads at the flow-through water level of 28.3 m, using the average critical shear stress of 0.089 Pa.

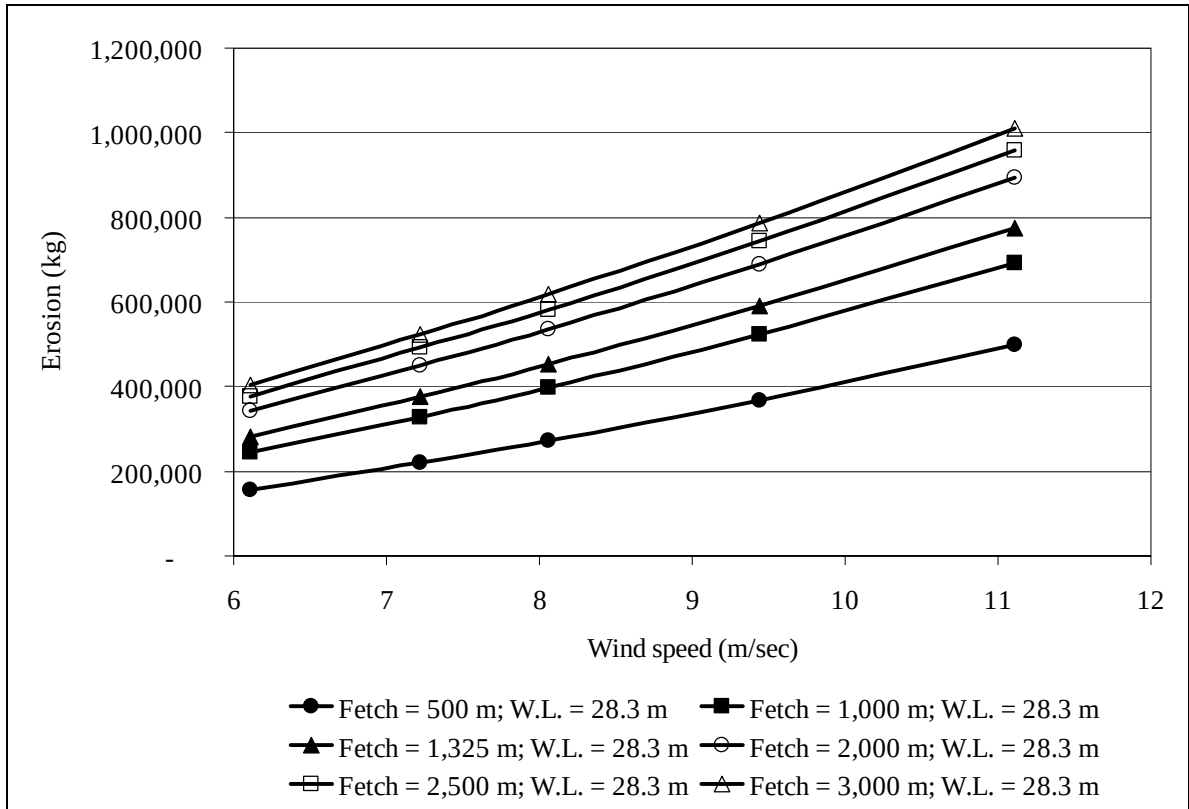


Figure 4. Re-suspension loads at the flow-through water level of 28.3 m, using the minimum shear stress of 0.058 Pa.

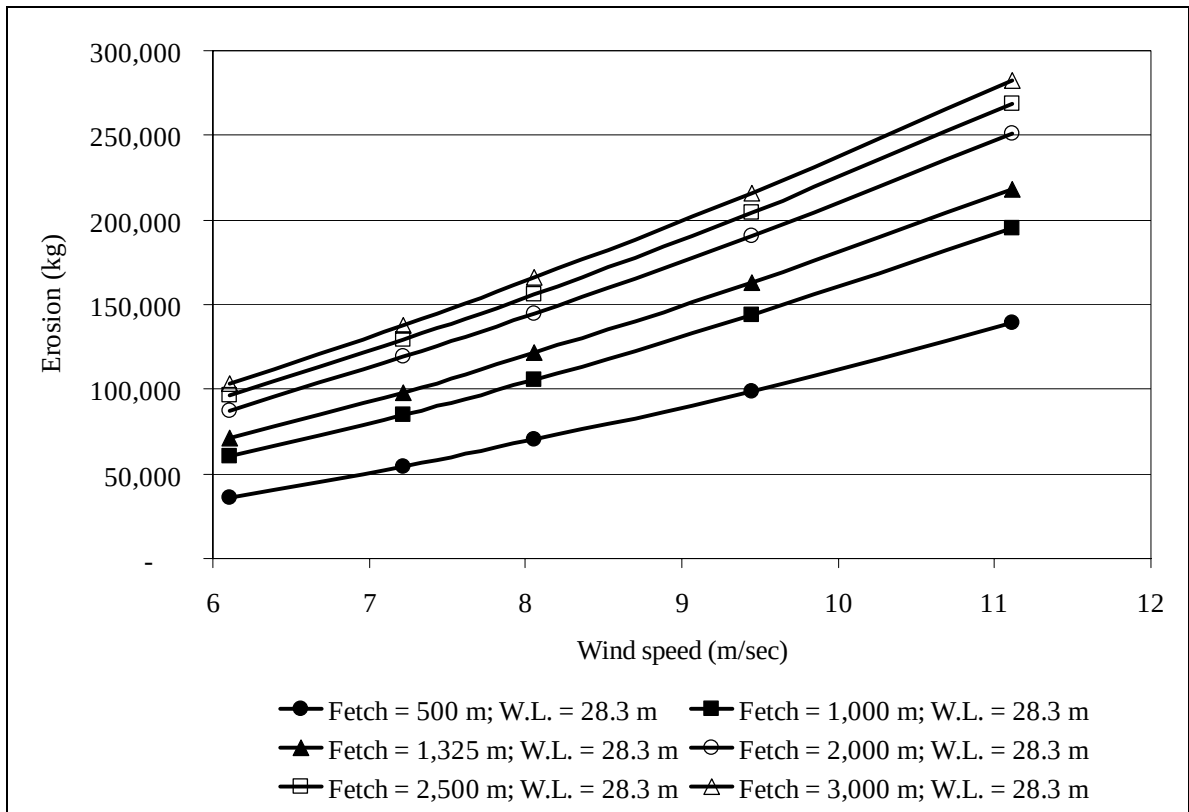


Figure 5. Re-suspension loads at the flow-through water level of 28.3 m, using the maximum shear stress of 1.120 Pa.

Table 5. Re-suspension loads (kg) at the full supply level (FSL) of 33.5 m, using the average critical shear stress of 0.089 Pa

Fetch (m)	Wind Speed (m/s)				
	6.11	7.22	8.06	9.44	11.11
500	44061	63612	79427	109443	150140
1,000	69652	95881	117343	155586	206824
1,325	81260	110353	133260	175194	230068
2,000	99211	131207	157186	202833	262901
2,500	108547	142567	169507	217475	280221
3,000	115979	151499	179184	228797	293710

Table 6. Re-suspension loads (kg) at the proposed maximum water level of 29.4 m, using the average critical shear stress of 0.089 Pa

Fetch (m)	Wind Speed (m/s)				
	6.11	7.22	8.06	9.44	11.11
500	58796	85262	106721	147882	204176
1,000	93637	129652	159367	212695	285163
1,325	109667	149943	181818	240974	319355
2,000	134865	179590	216393	281666	368935
2,500	148120	196130	234546	303819	395846
3,000	158792	209297	249020	321220	417169

Table 7. Re-suspension loads (kg) at the flow-through water level of 28.3 m, using the average critical shear stress of 0.089 Pa

Fetch (m)	Wind Speed (m/s)				
	6.11	7.22	8.06	9.44	11.11
500	69035	100079	125246	173457	239326
1,000	109886	152066	186833	249162	333652
1,325	128653	175778	213051	282057	373254
2,000	158096	210361	253265	329218	430347
2,500	173566	229578	274315	354732	461062
3,000	186001	244847	291049	374706	485273

Table 8. Re-suspension loads (kg) at the flow-through water level of 28.3 m, using the minimum shear stress of 0.058 Pa

Fetch (m)	Wind Speed (m/s)				
	6.11	7.22	8.06	9.44	11.11
500	157639	219927	272219	367803	499551
1,000	243571	327924	397739	522926	691259
1,325	282784	377251	453070	590440	773090
2,000	344159	450678	536751	689931	893078
2,500	377838	491331	581581	743527	957647
3,000	404930	524127	618431	787021	1010018

Table 9. Re-suspension loads (kg) at the flow-through water level of 28.3 m, using the maximum shear stress of 1.120 Pa

Fetch (m)	Wind Speed (m/s)				
	6.11	7.22	8.06	9.44	11.11
500	35667	54266	70071	98811	138962
1,000	60176	85118	105453	144048	194900
1,325	71134	98310	121525	162777	218484
2,000	87000	119048	144329	190349	251250
2,500	96185	129664	156081	204688	268794
3,000	103536	137771	165846	215587	282336

Table 10 provides a summary of the results and Table 11 list the recommended total annual re-suspension loads for use in water quality modeling.

Table 10. Total annual re-suspension loads (kg)

Water Level (m)	Scenario				
	33.5	29.4	28.3	28.3	28.3
Shear Stress (Pa)	0.089	0.089	0.089	0.058	1.120
Fetch = 500 m	77306	104220	122261	264724	67941
Fetch = 1,000 m	113072	154022	180479	384896	102530
Fetch = 1,325 m	128524	175978	206066	438086	117525
Fetch = 2,000 m	151308	208984	244402	518431	139123
Fetch = 2,500 m	163272	226679	264858	562092	150895
Fetch = 3,000 m	172680	240784	281115	597426	160156

Table 11. Recommended total annual re-suspension loads for use in water quality modeling

Scenario	Water Level (m)	28.3
	Shear Stress (Pa)	0.089
Lower Limit	Fetch = 500 m	122261
Base Case	Fetch = 1,325 m	206066
Upper Limit	Fetch = 3,000 m	281115

3 Conclusion

The calculations documented in this technical memorandum demonstrate the potential range of bed erosion that may occur at Tail Lake. For water quality predictions it is recommended that the conditions listed in Table 11. This represents bed erosion at the long-term, steady state flow-through elevation of 28.3 m, using an average critical shear stress value.

4 References

Samad, M.A., and Yanful, E.K. 2005. *A design approach for selecting the optimum water cover depth for sub aqueous disposal of sulfide mine tailings*. Canadian Geotechnical Journal. 42: pp. 207-228.

SRK Consulting (Canada) Inc. 2005a. *Water Cover Design for Tail Lake*. Technical Memorandum submitted to Miramar Hope Bay Limited, September 16.

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Appendix G
Shoreline Soil Settling Test Results

Technical Memorandum

To:	Brian Labadie	Date:	October 12, 2005
cc:	Project File	From:	John Chapman
Subject:	Doris North Project, Hope Bay - Tail Lake Perimeter Soil Settling Tests	Project #:	1CM014.006

1 Introduction

1.1 Terms of Reference

Permafrost soils around the perimeter of Tail Lake may thaw as result of the expected rise in water level in the lake due to tailings deposition. The thawed soils may become susceptible to re-suspension due to wave action while submerged. Subsequent to operations, the water level in Tail Lake will be lowered to its original elevation. At that time, the soils above the waterline that have been thawed will be subject to physical erosion caused by overland runoff and wave action impacting on the shoreline. This erosion may lead to sloughing and slumping of thawed soils at steep gradients which may further exacerbate particulate transport to Tail Lake.

The combined effects of physical erosion and re-suspension by wave action may increase the suspended solids concentration in Tail Lake. This memorandum presents results for testing conducted to assess suspended solids release to Tail Lake from soils sampled along the shoreline of Tail Lake, and examines the potential effects on water quality in Tail Lake.

1.2 Background

Calculations have been completed that estimated sediment re-suspension and erosion loadings from three possible mechanisms as follows:

- *Re-suspension of tailings by wave action.* The calculations considered the depth of the water cover; the tailings solids size distribution and the prevailing wind fetch and speed (SRK 2005a).
- *Physical shoreline erosion from overland runoff and wave action.* Calculations completed to estimate the potential sediment transport due to shoreline erosion processes considered only the mass transport that occurs as a result of the physical process of erosion (SRK 2005b).
- *Shoreline material re-suspension by wave action.* These calculations address soil that had been eroded from the shoreline and has accumulated on the bed of Tail Lake and the shallow fringes near the lake shore (SRK 2005c).

Due to the depth of the water cover that will exist over the tailings, the effect of wave action on re-suspension of tailings will be negligible (SRK 2005a).

The estimated total solids loadings to Tail Lake generated from shoreline erosion and through re-suspension, before any correction for settling, derived from these calculations are summarized below in Table 1.1.

Table 1.1 Summary of Estimated Solids Loadings to Tail Lake at 28.3 m

Case	Loading by Physical Shoreline Erosion (kg/year)	Loading Resulting from Re-Suspension of Eroded Material (kg/year)	Estimated Total Annual Loading (kg/year)
Base Case	2,846,891	206,066	3,052,957
Upper Limit	7,354,467	281,115	7,635,582
Lower Limit	948,964	122,261	1,071,225

Under the proposed management strategy, water will be discharged from Tail Lake when tailings deposition commences so that the water level in Tail Lake will rise slowly. Thawing of the permafrost will commence only after inundation, and thawing will likely be limited to the soils directly inundated by rising water. Therefore, during the short operational period of two years, while the water level in Tail Lake is still rising, it is anticipated that shoreline erosion will be limited because thawing has to occur before soils will become erodable. As the soils that have become inundated with the increased water elevation thaws, erosion will accelerate to the levels indicated in the above table. Consequently, the most significant solids release will occur only when the water level recedes, leading to sloughing of the steeper slopes, and to physical shoreline erosion of the more gentle slopes through overland runoff and wave action. The effects of these loadings will be observed only after the water level in Tail Lake has been lowered to its current outflow elevation, resulting in exposing the thawed soils.

Furthermore, it is important to note that the calculations for solids re-suspension by wave action assume that the sediments are exposed and readily available for mobilization. In reality, as the water level increases, the shoreline will be inundated with the existing vegetation remaining intact. The vegetation will initially provide some protection against solids mobilization and suspension, and the calculations are likely to overestimate the actual loadings from this source during the operational period.

Initially, once erosion commences, the volume of water contained in Tail Lake will provide substantial dilution of the solids entering the lake. In time, the suspended solids in the lake may build-up and concentrations may increase gradually. Therefore, in order to estimate the maximum total solids concentrations that may result in Tail Lake, it is necessary to evaluate the mass balance for Tail Lake at steady state flow-through conditions.

At steady state, the total loading to Tail Lake from physical shoreline erosion and wave re-suspension will equal the sum of the suspended solids loads removed from Tail Lake due to settling from the water column and that transported (flushed) from Tail Lake in the outflow. The maximum total solids concentrations that could result can be estimated by assuming the estimated shoreline erosion rates are sustained indefinitely, i.e. the loadings of solids to Tail Lake do not change with time, and steady state conditions will develop at some time in the future. This is conservative since the loadings from erosion are likely to increase rapidly initially to the peak values given in Table 1.1, and will then decrease over time until a new stable shoreline is established.

For steady state conditions it can be shown that the 'available dilution' for the annual load of solids into Tail Lake is equal to the volume of annual water inflow to Tail Lake. Table 1.2 provides estimates of the inflow to Tail Lake and the equivalent total solids concentrations that may result in Tail Lake under steady state conditions for each of the loading scenarios given in Table 1.1. The estimated concentrations equal the total annual loading divided by the annual flow and represent the concentrations **without** any correction for solids settling from the water column.

Table 1.2 Estimated Steady State Total Solids Loading Concentration in Tail Lake

Description	Units	Range	
Runoff yield	mm/year	111	180
Flow into Tail Lake	m ³ /year	500,000	812,000
TSS Concentration*			
Base Case	g/L	6.1	3.8
Upper Limit	g/L	2.1	1.3
Lower Limit	g/L	15.3	9.4

Note: * Total loading not corrected for settling

As shown, for the base case conditions, the maximum solids concentration before correction for settling is estimated to be about 6.1 g/L for the low-yield conditions (111 mm/year), and about 3.8 g/L for the high-yield estimate. The estimated upper limit of the total solids loading is about 15.3 g/L, at the low-yield conditions of 111 mm/year. As noted before, these estimates assume that the rate of shoreline erosion remains constant indefinitely. It is however important to note that:

- First, the maximum solids loadings will result only after the water level in Tail Lake has been lowered from the maximum elevation to the natural outflow elevation.
- Second, the estimated total solids concentrations shown in Table 1.2 will result only if the shoreline erosion rate is maintained at a constant rate until steady state conditions are reached. Initially, the water in Tail Lake will provide considerable dilution so that, steady state conditions would be attained only after several years. It is unlikely that shoreline erosion rates will be sustained in the longer term. It is more likely that, once the water level has been lowered, permafrost conditions will be re-establish in the affected areas, and sediment loadings will gradually decrease over time.
- Third, these concentrations need to be corrected for the effects of settling and solids retention within Tail Lake.

The effects of settling on the total suspended solids were determined by completing a series of settling tests on soil samples collected from perimeter soils representing a range of clay and fines contents. In the following sections, the test procedures are first presented and the test results discussed. The results are then used to estimate the effect of settling rates on suspended solids and water quality in Tail Lake.

2 Test Methods and Sample Selection

2.1 Sample Selection

Three drill core samples were selected from the summer 2004 and winter 2005 field programs at Tail Lake (SRK 2005d; SRK 2005e). The selected samples represent soils along the perimeter of Tail Lake that could be subject to shoreline erosion and wave re-suspension. Samples were specifically selected to cover the range of clay size particles found along the Tail lake shoreline. The sample numbers and size distributions are summarized in Table 2.1. Samples were tested as described in the next section.

Table 2.1 Sample Selection and Size Distribution

Sample	Percent passing 74 µm (silt)	Percent passing 2 µm (clay)
SRK-51 3L 2E (2.12 t 2.6)	95 %	15 %
SRK-58 3L (4.1 to 4.4)	85 %	32 %
SRK-58 4L	94 %	40 %

2.2 Methods

2.2.1 Settling Test Procedure

The settling tests were carried out as follows:

- Two sub-samples of 40 g (wet weight) were split from each of the moist soil samples, and labeled as -A and -B samples respectively.
- Each sub-sample was suspended in about 100 ml of distilled water to ensure that any clots or agglomerates were broken up prior to testing. Water was then added, while mixing well, to bring the total slurry volume to 2.0 L in a 2.0 L graduated cylinder.
- The solids – water interface was recorded at regular time intervals (1, 2, 4, 8, 24 etc. hrs) to determine the settling rate of the solids. Digital photographs were obtained at each measurement as appropriate. Measurements were continued for each test until the all tests were terminated.
- Water samples were removed from the top of the water column from each of the first tests (A-samples) after a period of 24 hours. Only water above the solids – clear supernatant interface was sampled.
- Water samples were obtained from the -B tests after 72 hours.

The water samples collected at 24 hours and at 72 hours were submitted for analysis as described below.

2.2.2 Analytical Procedures

Solids Analyses

Each of the solids samples were submitted for elemental analysis by Inductively Coupled Plasma (ICP) analysis, and for total sulphur, sulphate sulphur and neutralization potential.

Sub-samples were also submitted for X-Ray Diffraction (XRD) analysis to identify clays and other crystalline phases present.

Supernatant Samples

All water (supernatant) samples were submitted for dissolved metals, total metals, and total suspended solids. Dissolved and total metals were analyzed by ICP MS method, to 'Ultra Trace Level'.

3 Results and Discussion

3.1 Settling Test Conditions

The settling tests were completed on wet samples. The equivalent initial solids concentrations, on a dry weight basis, were calculated from the initial moisture content and are summarized in Table 3.1. As shown in the last column of the table, the tests were completed within the range of the upper total solids concentration estimated for the upper limit of solids loading to Tail Lake (see Table 1.2) at steady state, low yield conditions.

Table 3.1 Sample Selection and Size Distribution

Sample	Sample Wet Wt. (g)	Moisture (%)	Dry Weight (g)	Total Solids Concentration (g/L)
SRK-51 3L 2E (2.12 t 2.6)	40	24.8	30.1	15.0
SRK-58 3L (4.1 to 4.4)	40	23.7	30.5	15.3
SRK-58 4L	40	34.1	26.4	13.2

3.2 Solids Composition

The acid base account test results for the samples are summarized in Table 3.2. The results indicate that the soil samples have a very low sulphide mineral content resulting in a low acid generation potential (AP). Overall, the excess neutralization potential (NP) of the soils indicate that they are not expected to be net acid generating.

Table 3.2 Acid Base Account Test Results

Sample	pH	Total (Wt.%)	SO ₄ -S (Wt.%)	Sulphide-S (Wt.%)	Max. AP*	NP*	NNP*
SRK-51 3L	7.5	0.06	0.05	0.01	0.3	13.2	12.9
SRK-58 3L	7.7	0.08	0.04	0.04	1.1	10.2	9.1
SRK-58 4L	7.6	0.12	0.10	0.02	0.8	11.2	10.4

Note: * in units of kg CaCO₃ eq/tonne

The complete elemental analyses are provided in Attachment 1, and are summarized in Table 3.3. The soils generally have low base metal contents, and mercury was found to be at or below a detection limit of 0.01 ppm.

The XRD results (also provided in Attachment 1) are summarized in Table 3.4 and indicate that the clay minerals consist predominantly of illite and mica. The results suggested the presence of pyrite; however, as noted above, the actual sulphide mineral content of the soils is very low. XRD-analysis is a semi-quantitative method generally used to identify crystalline mineral phases and cannot be used to quantify trace minerals.

Table 3.3 Summary of Elemental Analyses

Element	Units	SRK-51 3L	SRK-58 3L	SRK-58 4L
Al	%	2.19	1.84	2.12
As	ppm	2	1.4	1.9
Ca	%	0.66	0.72	0.74
Cd	ppm	0.1	0.1	0.1
Co	ppm	16.1	13.2	15.2
Cr	ppm	85.8	62.6	78.6
Cu	ppm	36.8	31.5	36.5
Fe	%	3.24	2.76	3.17
Hg	ppm	<0.01	<0.01	0.01
K	%	0.72	0.57	0.67
Mg	%	1.74	1.44	1.7
Mn	ppm	438	399	442
Mo	ppm	1.5	1.1	1.3
Na	%	0.828	0.731	0.862
Ni	ppm	37.5	29.5	36.4
Pb	ppm	9.9	10.9	9.3
Zn	ppm	80	76	80

Table 3.4 Mineralogical Composition of the Soils Estimated by XRD

Sample ID	SRK-51L 3L	SRK-58 3L	SRK-58 4L
Whole Rock Composition by Weight %			
Quartz	41	46	46
K-Feldspar	9	8	8
Plagioclase	30	28	29
Amphibole	1	1	1
Calcite	0	0	0
Ankerite	0	0	0
Dolomite	0	0	0
Gypsum	0	0	0
Halite	0	0	0
Siderite	0	0	0
Pyrite	3	3	3
Hematite	0	0	0
Total Clay	16	14	13
Total	100	100	100
Relative Clay Content by Wt. %			
Smectite	4	2	4
Illite / Smectite *	0	0	0
Illite & Mica	66	62	60
Kaolinite	7	9	7
Chlorite	23	27	29
Total	100	100	100

3.3 Settling Rate and Density

The settling test observations are provided in Attachment 2. Images of the water columns at various time intervals are provided in Photos 1 to 7, contained in Attachment 2. As shown, the supernatant cleared within 24 hours for all tests, and was very clear at 72 hours. The estimated slurry density of the settled fraction, expressed as a percent solids content within the settled fraction, for each time stage is summarized in Table 3.5. The 72 hour settled densities ranged from 23 percent to 62 percent solids (by wt.), and varied inversely with the initial clay particle size content (i.e. the higher the clay content the lower the settled solids content). The results indicate that the solids settled to a small net volume, and do not remain suspended. Furthermore, any suspended solids are likely to accumulate at depth on top of the tailings to form a thin layer over the tailings.

Table 3.5 Estimated Solids Content in Settled Solids Zone (Below Settled Interface)

Sample	Settled Density (Solids Content % (wt))							
	0 hr	1 hr	2 hr	4 hr	8 hr	24 hr	48 hr	72 hr
SRK-51 3L 2E (2.12 t 2.6)	1.5	43	47	51	56	62	62	62
SRK-58 3L (4.1 to 4.4)	1.5	1.5	28	22	25	28	30	34
SRK-58 4L	1.3	12	13	14	15	19	22	22

3.4 Totals Suspended Solids and Water Quality

Summaries of the supernatant water quality parameters are provided in Table 3.6 below. Complete results are provided in Attachment 3.

The total suspended solids (TSS) were at or below detection the detection limit of 1 mg/L for all tests after 24 hours. The method utilized a 1 µm glass fibre filter medium.

The differences between the total and dissolved analyses were also used to calculate the TSS concentration. Since samples for total metals are not filtered, and samples for dissolved metals are

filtered to a filter size of 0.45 µm, the calculated suspended solids estimate represents all particles greater than 0.45 µm in size. The results are included in Table 3.6.

The calculated TSS for sample SRK-51 3L suggests that the suspended solids had increased from 24 hours to 72 hours. However, these tests were completed in two separate vessels and the 24 hour water sample was not obtained from the same water column as the 72 hour sample. In fact, the photographs clearly illustrate that the one test had reached a clear supernatant before the other. The turbidity measurements supported this observation. For the remaining two tests, the calculated TSS decreased from above 10 mg/L at 24 hours to less than 5 mg/L at 72 hours.

Overall, the settling tests indicate that the TSS decreased to 5 mg/L or less within a 72 hour period, with the residual particles within the size range of 0.45 µm to 1 µm.

The water quality results indicate that the soils may result in increased metal concentrations for some elements, including copper and aluminium. In general, the total concentrations for these metals represent predominantly particulate matter. Concentrations of other metals, including mercury, arsenic, cadmium and zinc, are not likely to be affected significantly. The implications of the observed copper and aluminium concentrations are discussed further in Section 4.

The composition of the suspended solids was also estimated from the total and dissolved metals analyses. The results are shown in Table 3.7 and indicate that suspended solids consist predominantly of aluminosilicates. The sodium content may however be overestimated, since the porewater contained high concentrations of dissolved sodium. Even a small error in the sodium analysis may lead to a significant error in estimating the overall solids composition when compared to the other constituents. Nonetheless, the results are consistent with clay mineralization. The suspended solids also contain some iron. At the particulate matter size distribution, the iron is likely present in a colloidal form, possibly as an oxy-hydroxide. As such, it is possible that some of the suspended metals, including copper, are present in the suspended solids as sorbed species.

Table 3.6 Supernatant Water Quality Results

Sample	Time	TSS		Turbidity	Al	As	Ca	Cd	Cu	Fe	Hg	Zn
		Assay ($< 1\mu\text{m}$) (mg/L)	Calc. ($> 0.45\ \mu\text{m}$)* (mg/L)									
	hr			NTU	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
SRK-51 3L												
Dissolved	24	-	-	-	49	<0.5	2193	<0.05	0.5	18	0.1	<0.5
Total	24	<1	2.9	17	562	0.6	2213	<0.05	1	622	<0.1	1.2
Dissolved	72	-	-	-	65	<0.5	2107	<0.05	0.8	24	<0.1	2.1
Total	72	<1	5.4	17	521	0.5	2165	<0.05	1.6	550	<0.1	5.6
SRK-58 3L												
Dissolved	24	-	-	-	200	1.4	6921	<0.05	0.8	88	<0.1	0.5
Total	24	<1	13	120	2888	1.4	7330	<0.05	5.8	3143	<0.1	8.3
Dissolved	72	-	-	-	152	1.4	6659	<0.05	10.8	44	<0.1	6.4
Total	72	<1	4.5	29	852	1.4	6966	<0.05	2.2	802	<0.1	2.4
SRK-58 4L												
Dissolved	24	-	-	-	182	0.8	6460	<0.05	0.7	107	<0.1	2.4
Total	24	<1	11	75	2037	0.9	6858	<0.05	4.1	2207	<0.1	6.3
Dissolved	72	-	-	-	81	1.1	8070	<0.05	1	27	<0.1	<0.5
Total	72	1	4.1	16	495	1.2	8588	<0.05	2.1	464	<0.1	2.2

Note: * calculated from the difference between total and dissolved solids concentrations, corrected for oxide content.

Table 3.7 Estimated Composition of Suspended Solids

Description	SRK-51 3L		SRK-58 3L		SRK-58 4L	
	24 hr	72 hr	24hr	72 hr	24 hr	72 hr
Al ₂ O ₃	19.8	10.7	22.6	18.5	20.0	12.3
CaO	0.6	1.0	2.6	6.0	3.2	11.4
CuO	0.013	0.012	0.028	0.031	0.024	0.022
Fe ₂ O ₃	17.6	9.4	19.5	15.1	17.1	9.8
K ₂ O	8.8	4.9	5.7	7.1	5.3	13.4
MgO	23.1	9.1	11.7	9.9	15.9	27.7
Mn ₂ O ₃	0.2	0.1	0.3	0.2	0.2	0.1
Na ₂ O	-	49.4	9.4	19.1	11.0	7.0
SiO ₂	29.4	15.2	28.1	24.0	27.0	17.7
TOTAL (%)	99.4	99.8	99.9	100.0	99.7	99.6

Note: Compositions calculated from difference between total and dissolved concentrations

4 Potential Effects on Tail Lake Water Quality

Tail Lake, after operations, i.e. after tailings deposition ceases and when the lake elevation is lowered to the current outflow elevation, will contain about 2.2 million m³ of water. The average retention time in Tail Lake will range from about 4.4 years (low yield flow) to about 2.7 years (high yield flow). Compared to a settling time of 72 hours of the settling tests, it is apparent that ample time will be available from the time that the solids are released at the shoreline until the flow reaches Tail Lake outflow, to allow settling to occur to at least the levels observed in the 72 hour settling tests.

The results presented in Table 3.6 reflect the upper limit of the solids loadings to Tail Lake at a low runoff yield. It should also be noted that not all of the solids that may be released will contain the same fractions of clay minerals contained in the test samples.

Considering these conservatisms, metal and TSS concentrations that may develop in Tail Lake were estimated from the average concentrations observed in the three tests. The average concentrations were then corrected for the estimated solids loadings projected for the three different cases under consideration. The calculation was as follows:

$$C(i)_{case} = C(i)_{tests} * (SL_{case}/SL_{tests})$$

Where: $C(i)_{case}$ is the concentration of solute (i) for the case under consideration

$C(i)_{tests}$ is the average concentration for solute (i) measured in the three tests (Column 4 in Table 4.1)

SL_{case} is the total sediment loading for the case under consideration (see table 4.1)

SL_{tests} is the average sediment loading in the tests (see Table 4.1)

Where concentrations were below detection, a concentration of 50 % of the detection limit was adopted in the calculations. The resultant base case, lower limit and upper limit steady state total concentrations are shown in Table 4.1. These concentrations reflect the water quality that may develop in Tail Lake after the water level in Tail Lake is lowered to the current overflow elevation under conditions of sustained rates of erosion.

The results for the base case assessment indicate that, with the exception of aluminium, the water quality in Tail Lake is likely to meet CCME guidelines for freshwater aquatic life in the interim period when maximum solids loadings occur. In the longer term, the concentrations are expected to decrease as the shoreline stabilizes and annual solids long-term.

The lower limit estimates indicate that all parameters including aluminium are likely to meet CCME guidelines for the protection of freshwater aquatic life.

The upper limit estimates suggest that concentrations of aluminium, iron and selenium, and for low flow conditions possibly chromium, may exceed CCME guidelines in Tail Lake. However, as noted before, these concentrations could occur only if solid loadings reach the estimated maximum loading rates, and persist at those rates indefinitely. Effects such as natural revegetation and re-establishment of permafrost are not considered. Without any intervention, in time these natural occurrences are likely to reduce overall sediment loadings.

Table 4.1 Estimated Steady Erosion Generated Concentrations in Tail Lake without Erosion Control

Description	Units	CCME	Test Average	Low Yield (111 mm/year)			High Yield (180 mm/year)		
Flow	m ³ /year		-	500,000			812,000		
Case			-	Lower Limit	Base case	Upper Limit	Lower Limit	Base case	Upper Limit
Total Sediment Load	g/L		14.5	2.14	6.11	15.27	1.32	3.76	9.40
TSS (measured)	mg/L		1.0	0.1	0.4	1.1	0.1	0.3	0.6
TSS (calc.)	mg/L		7.2	1.1	3.0	7.6	0.7	1.9	4.7
Chloride	mg/L		195	29	82	205	18	50	126
Total Metals									
Aluminium Al	ug/L	100	623	92	262	656	57	162	404
Antimony Sb	ug/L		0.17	0.025	0.070	0.176	0.015	0.043	0.108
Arsenic As	ug/L	5	1.0	0.15	0.44	1.1	0.09	0.27	0.67
Bismuth Bi	ug/L		0.025	0.004	0.011	0.026	0.002	0.006	0.016
Boron B	ug/L		78	11	33	82	7	20	50
Cadmium Cd	ug/L	0.038	0.025	0.004	0.011	0.026	0.002	0.006	0.016
Calcium Ca	ug/L		5,906	8,73	2,488	6,223	538	1,532	3,832
Chromium Cr	ug/L	1	1.2	0.18	0.52	1.29	0.11	0.32	0.80
Cobalt Co	ug/L		0.31	0.046	0.13	0.33	0.028	0.080	0.20
Copper Cu	ug/L	2	1.97	0.29	0.83	2.0	0.18	0.51	1.3
Iron Fe	ug/L	300	605	89	255	638	55	157	393
Lead Pb	ug/L	2	0.12	0.017	0.049	0.12	0.011	0.030	0.076
Lithium Li	ug/L		5.7	0.85	2.4	6.0	0.52	1.5	3.7
Magnesium Mg	ug/L		8,264	1,222	3,481	8,707	752	2,144	5,361
Manganese Mn	ug/L		14	2.1	6.1	15	1.3	3.7	9.4
Mercury Hg	ug/L	0.1	0.050	0.007	0.021	0.053	0.005	0.013	0.032
Molybdenum Mo	ug/L	73	0.80	0.12	0.34	0.84	0.073	0.21	0.52
Nickel Ni	ug/L	25	0.63	0.094	0.27	0.67	0.058	0.16	0.41
Phosphorus P	ug/L		47	7	20	49	4	12	30
Potassium K	ug/L		6,485	959	2,732	6,833	590	1,682	4,208
Selenium Se	ug/L	1	2.5	0.37	1.0	2.6	0.23	0.66	1.6
Silicon Si	ug/L		1,518	224	640	1,600	138	394	985
Silver Ag	ug/L		0.025	0.004	0.011	0.026	0.002	0.006	0.016
Sodium Na	ug/L		115,565	17,083	48,685	121,764	10,519	29,979	74,978
Strontium Sr	ug/L		41	6	17	43	4	11	26
Thallium Tl	ug/L	0.8	0.005	0.001	0.002	0.005	0.0001	0.001	0.003
Tin Sn	ug/L		0.095	0.014	0.040	0.100	0.009	0.025	0.062
Titanium Ti	ug/L		35	5.2	15	37	3.2	9.2	22
Vanadium V	ug/L		5.20	0.77	2.2	5.5	0.47	1.4	3.4
Zinc Zn	ug/L	30	3.40	0.50	1.4	3.6	0.31	0.88	2.2

*TSS Calc – total suspended solids concentration calculated from total and dissolved parameter concentrations

5 References

SRK Consulting (Canada) Inc. 2005a. *Water Cover Design for Tail Lake*. Technical Memorandum submitted to Miramar Hope Bay Limited, September 16.

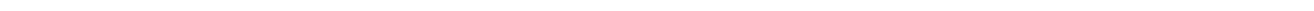
SRK Consulting (Canada) Inc. 2005d. *Potential Shoreline Erosion Processes at Tail Lake, Doris North Project, Hope Bay, Nunavut, Canada*. Technical Report No. 1CM014.006 submitted to Miramar Hope bay Limited, September.

SRK Consulting (Canada) Inc. 2005c. *Re-Suspension of Shoreline Eroded Material in Tail Lake*. Technical Memorandum submitted to Miramar Hope Bay Limited, September 16.

SRK Consulting (Canada) Inc. 2005d. *Summer 2004 Geotechnical Field Investigation at Tail Lake, Doris North Project, Nunavut, Canada*. Technical Report No. 1CM014.04-050 submitted to Miramar Hope bay Limited, April.

SRK Consulting (Canada) Inc. 2005f. *Winter 2005 Geotechnical Field Investigation at Tail Lake, Doris North Project, Nunavut, Canada*. Technical Report No. 1CM014.04-0110 submitted to Miramar Hope bay Limited, October.

Attachment 1
Soil Sample Characteristics



Hope Bay - Doris North Samples

Received September 2, 2005

QA/QC for Metals

ELEMENT	SAMPLES	SRK-51 3L	SRK-58 3L	SRK-58 4L		STANDARD DS6	STANDARD DS6 true value	% deviation from true value
Mo	ppm	1.5	1.1	1.3		11.4	11.72	2.73
Cu	ppm	36.8	31.5	36.5		121.9	122	0.08
Pb	ppm	9.9	10.9	9.3		30.6	28.95	-5.70
Zn	ppm	80	76	80		142	141	-0.71
Ag	ppm	0.1	0.1	0.1		0.3	0.271	-10.70
Ni	ppm	37.5	29.5	36.4		24.5	24.8	1.21
Co	ppm	16.1	13.2	15.2		10.6	10.8	1.85
Mn	ppm	438	399	442		703	704	0.14
Fe	%	3.24	2.76	3.17		2.81	2.80	-0.50
As	ppm	2	1.4	1.9		21.1	21.5	1.86
U	ppm	1.8	1.4	1.7		6.9	6.48	-6.48
Au	ppb	5.4	2.1	2.8		46	46.3	0.65
Th	ppm	15.1	13	14		3.1	3	-3.33
Sr	ppm	48	41	43		40	39.6	-1.01
Cd	ppm	0.1	0.1	0.1		6	5.98	-0.33
Sb	ppm	<.1	<.1	0.1		3.5	3.42	-2.34
Bi	ppm	0.2	0.2	0.2		5.2	5.02	-3.59
V	ppm	79	62	76		55	56	1.79
Ca	%	0.66	0.72	0.74		0.85	0.85	-0.24
P	%	0.066	0.061	0.064		0.078	0.079	1.27
La	ppm	46	40	42		14	14.2	1.41
Cr	ppm	85.8	62.6	78.6		185.5	190.9	2.83
Mq	%	1.74	1.44	1.7		0.57	0.57	0.00
Ba	ppm	152	122	132		164	167	1.91
Ti	%	0.193	0.166	0.182		0.081	0.081	0.00
B	ppm	24	20	27		18	16.1	-11.80
Al	%	2.19	1.84	2.12		1.89	1.89	0.00
Na	%	0.828	0.731	0.862		0.071	0.071	0.00
K	%	0.72	0.57	0.67		0.14	0.15	6.04
W	ppm	0.2	0.2	0.2		3.4	3.33	-2.10
Hg	ppm	<.01	<.01	0.01		0.23	0.231	0.43
Sc	ppm	7.1	5.6	6.6		3.3	3.3	0.00
Tl	ppm	0.3	0.2	0.2		1.7	1.69	-0.59
Ga	ppm	10	8	9		6	6.2	3.23
Se	ppm	<.5	<.5	<.5		4.2	4.3	2.33



ABA Results for Hope Bay- Doris North Samples Received September 2, 2005

Sample	Paste pH	Total Sulphur (Wt.%)	Sulphate Sulphur (Wt.%)	Sulphide Sulphur* (Wt.%)	Maximum Potential Acidity** (Kg CaCO3/Tonne)	Neutralization Potential (Kg CaCO3/Tonne)	Net Neutralization Potential (Kg CaCO3/Tonne)	Fizz
SRK-51 3L	7.5	0.06	0.05	0.01	0.3	13.2	12.9	none
SRK-58 3L	7.7	0.08	0.04	0.04	1.1	10.2	9.1	none
SRK-58 4L	7.6	0.12	0.10	0.02	0.8	11.2	10.4	none
<i>Detection Limits</i>	<i>0.1</i>	<i>0.02</i>	<i>0.01</i>					
Vizon Method Number	7160	7400	7410	Calculation	Calculation	7150	Calculation	7150

*Based on difference between total sulphur and sulphate-sulphur

**Based on sulphide-sulphur

NP method used: Mod. ABA method (1989)

**X-Ray Diffraction Analysis
(Combined Whole Rock and Clay)**



Company: Vizon SciTec Inc.
Location: SRK-Hope Bay 2-21-900
File No: 52135-05-3361

Sample No Sample ID	1 SRK-51L 3L-S2E	2 SRK-58 3L-S3E	3 SRK-58 4L		
	Whole Rock Weight %				
Quartz	41	46	46		
K-Feldspar	9	8	8		
Plagioclase	30	28	29		
Amphibole	1	1	1		
Calcite	0	0	0		
Ankerite	0	0	0		
Dolomite	0	0	0		
Gypsum	0	0	0		
Halite	0	0	0		
Siderite	0	0	0		
Pyrite	3	3	3		
Hematite	0	0	0		
Total Clay	16	14	13		
Total	100	100	100		
	Relative Clay %				
Smectite	4	2	4		
Illite / Smectite *	0	0	0		
Illite & Mica	66	62	60		
Kaolinite	7	9	7		
Chlorite	23	27	29		
Total	100	100	100		

* Illite / Smectite Mixed-Layer Clay

Attachment 2
Settling Test Results

Hope Bay - Doris North Settling Tests

Sample id	% Moisture	weight used g	total volume mL	1hr settling mL	2hr settling mL	4hr settling mL	8hr settling mL	24hr settling mL	48hr settling mL	72hr settling mL
SRK-51 3L S2E (2.12 t 2.6)	24.8	40	2000	40-50	40-50	40	30-40	30-40	30-40	30-40
SRK-51 3L S3E(2.12 t 2.6)		40	2000	40-50	40-50	40	30-40	30-40	30-40	30-40
Clarity above interface				heavy in suspended solids	heavy in suspended solids	some clarity	some clarity	some clarity	very clear	very clear
SRK-58 3L (4.1 to 4.4)	23.7	40	2000	no interface	80-90	90-100	80-90	70-80	70-80	70-80
SRK-58 3L (4.1 to 4.4)		40	2000	no interface	80-90	110-120	90-100	80-90	80-90	80-90
Clarity above interface				heavy in suspended solids	heavy in suspended solids	heavy in suspended solids	heavy in suspended solids	some clarity	very clear	very clear
SRK-58 4L	34.1	40	2000	200	180	150-160	140-150	110-120	90-100	90-100
SRK-58 4L		40	2000	120	120	110-120	90-100	80-90	70-80	70-80
Clarity above interface				heavy in suspended solids	heavy in suspended solids	heavy in suspended solids	some clarity	some clarity	very clear	very clear

ELEMENT SAMPLES	TSS (1um) mg/L	Turbidity NTU
SRK-51 3L T Sep 7 05 @ 24hr	<1	17
SRK-51 3L T Sep 9 05 @ 72hr	<1	17
SRK-58 3L T Sep 7 05 @ 24hr	<1	120
SRK-58 3L T Sep 9 05 @ 72hr	<1	29
SRK-58 4L T Sep 7 05 @ 24hr	<1	75
SRK-58 4L T Sep 9 05 @ 72hr	1	16



Photo 1. Settling Tests at Time = 0 hr

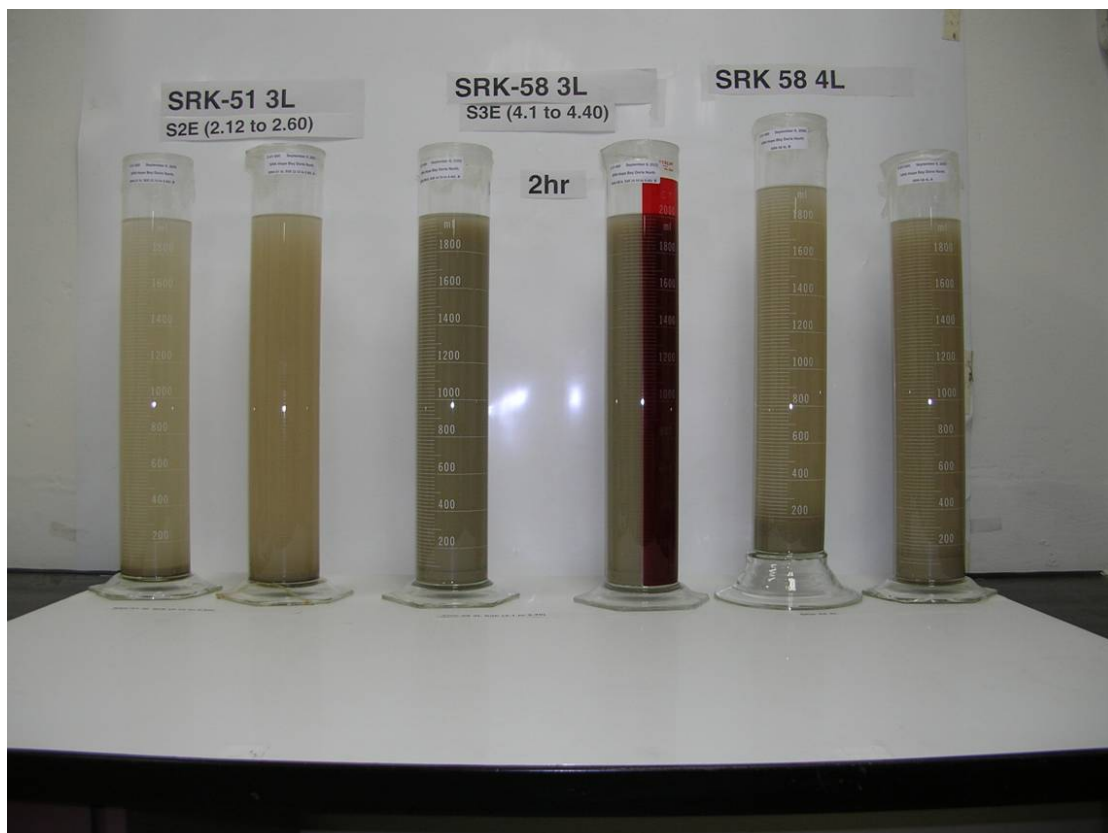


Photo 2 Settling Tests at Time = 2hr

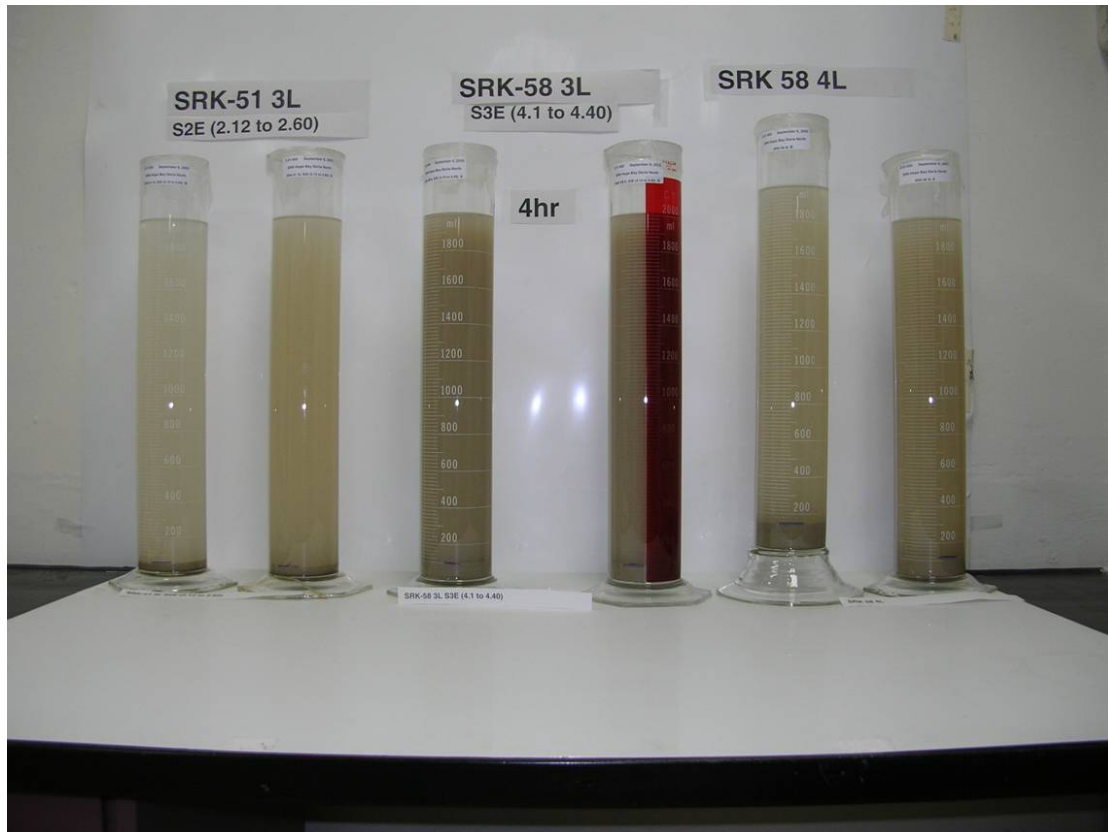


Photo 3 Settling Tests at Time = 4hr

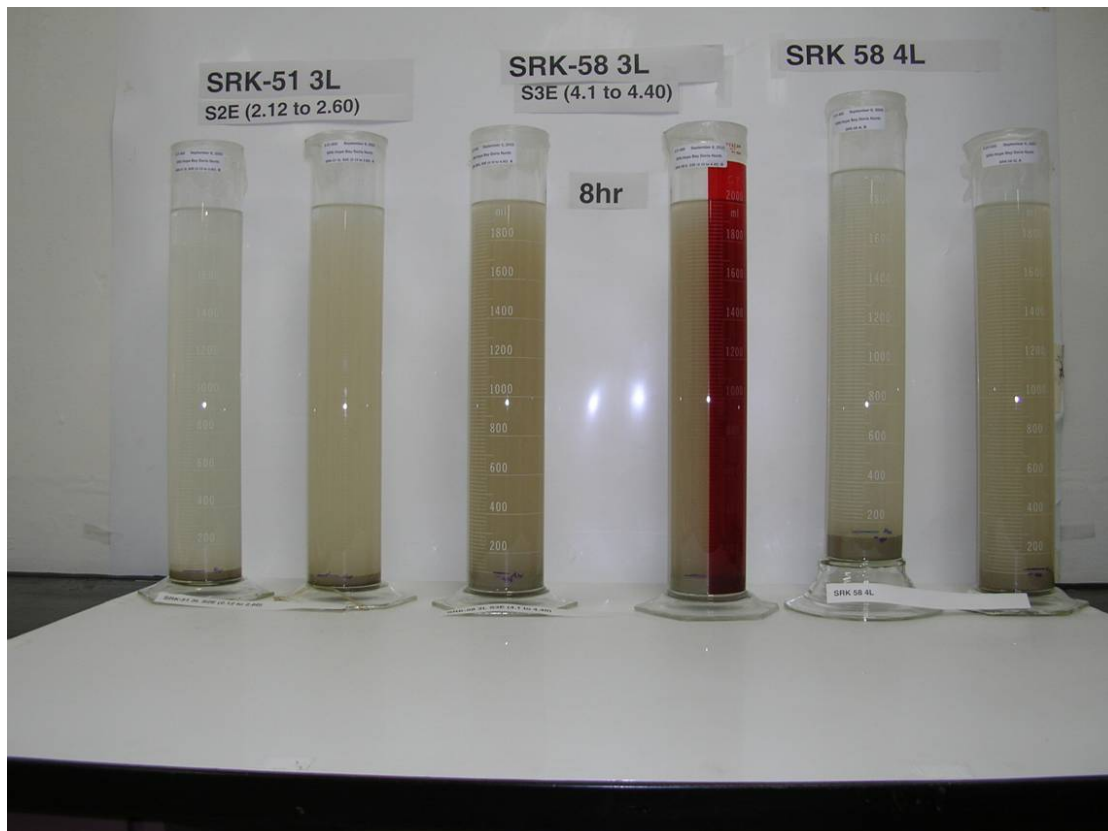


Photo 4 Settling Tests at Time = 8hr

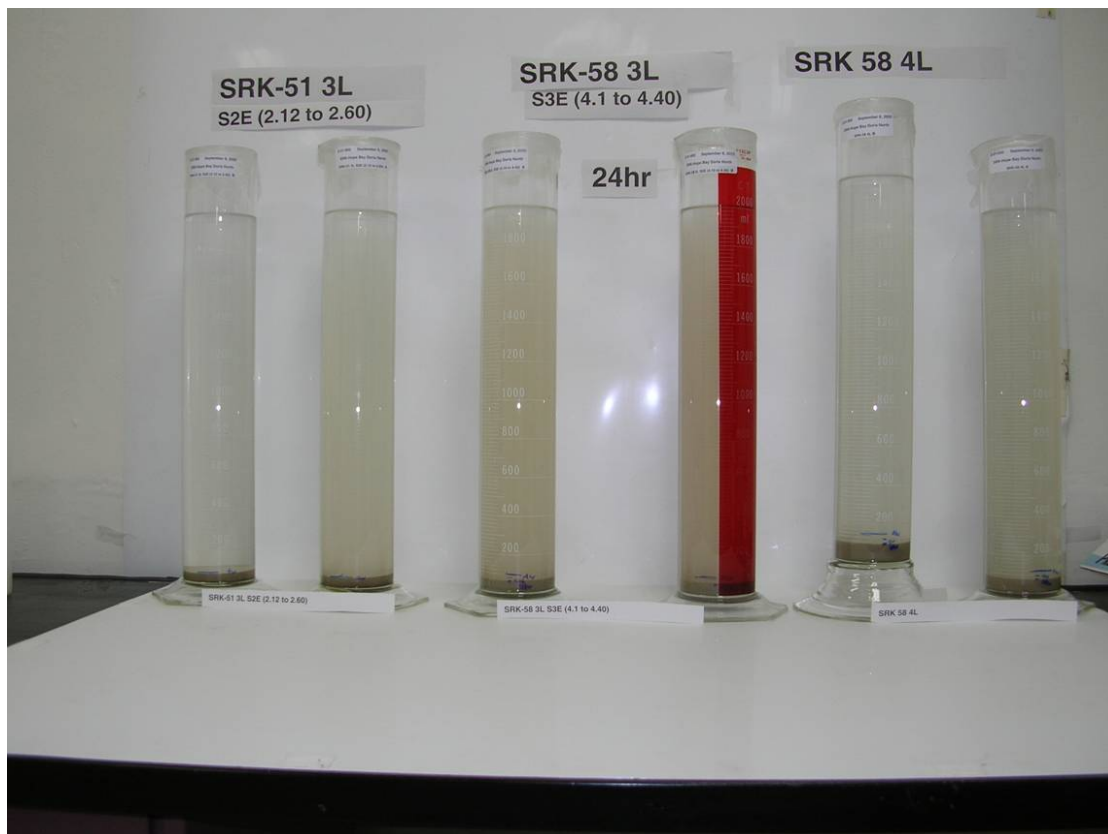


Photo 5 Settling Tests at Time = 24hr

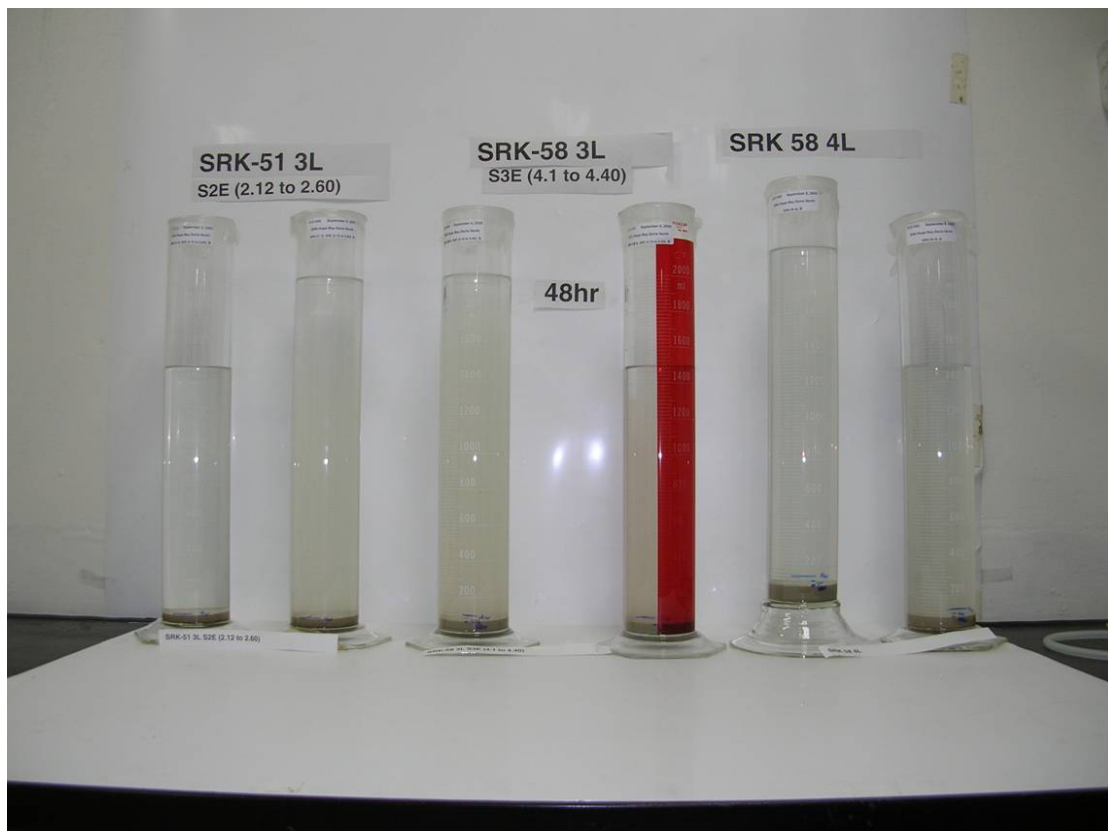


Photo 6 Settling Tests at Time = 48hr



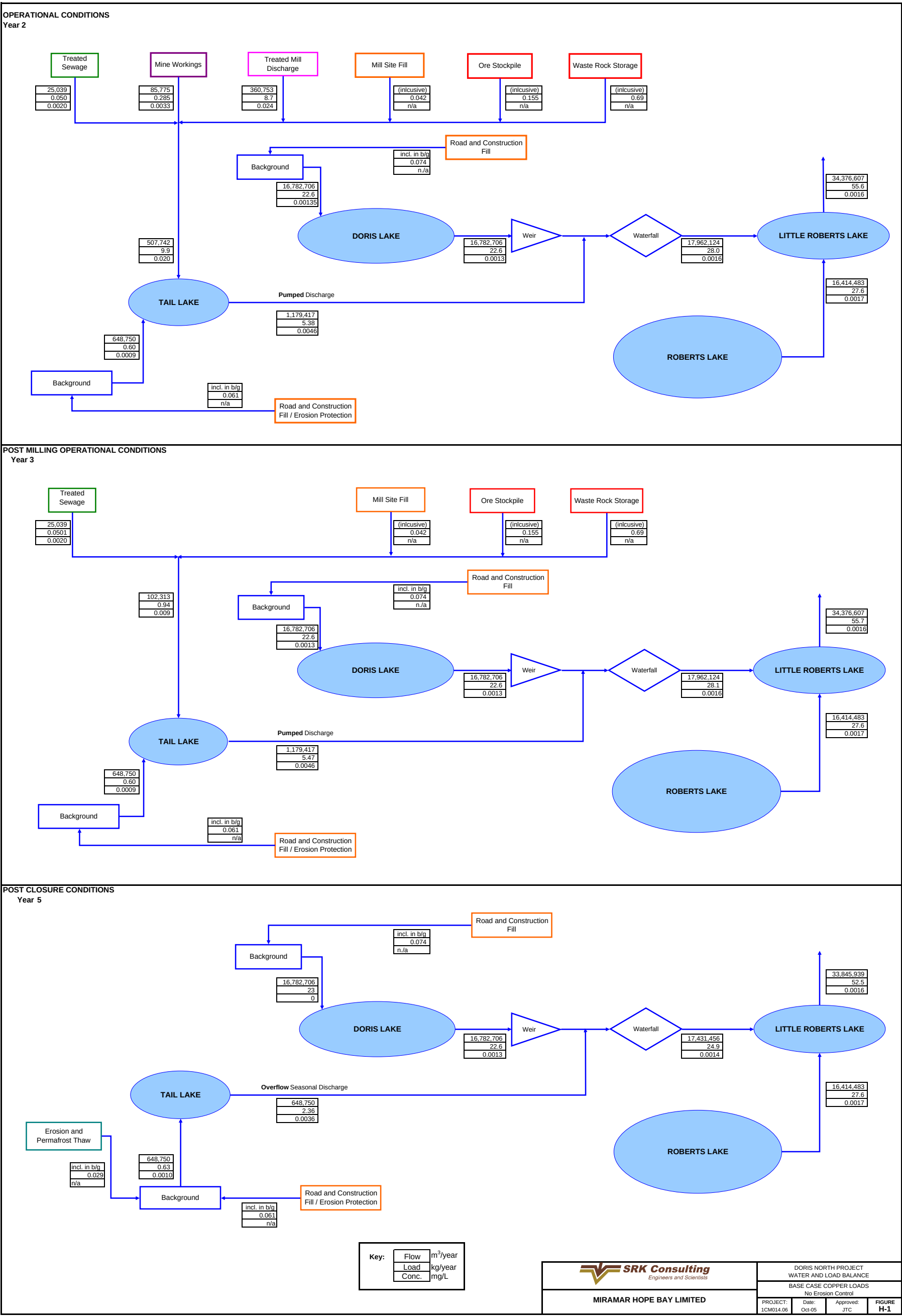
Photo 7 Settling Tests at Time = 72hr

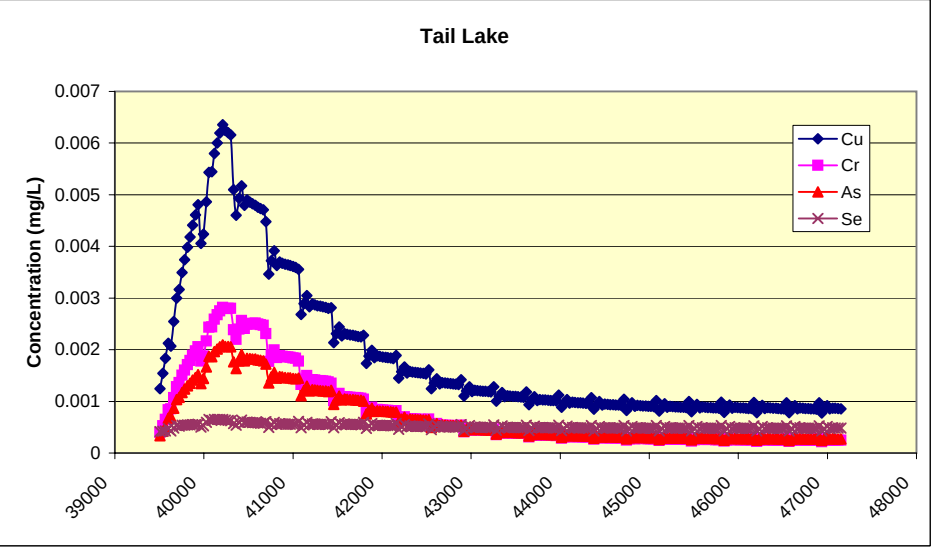
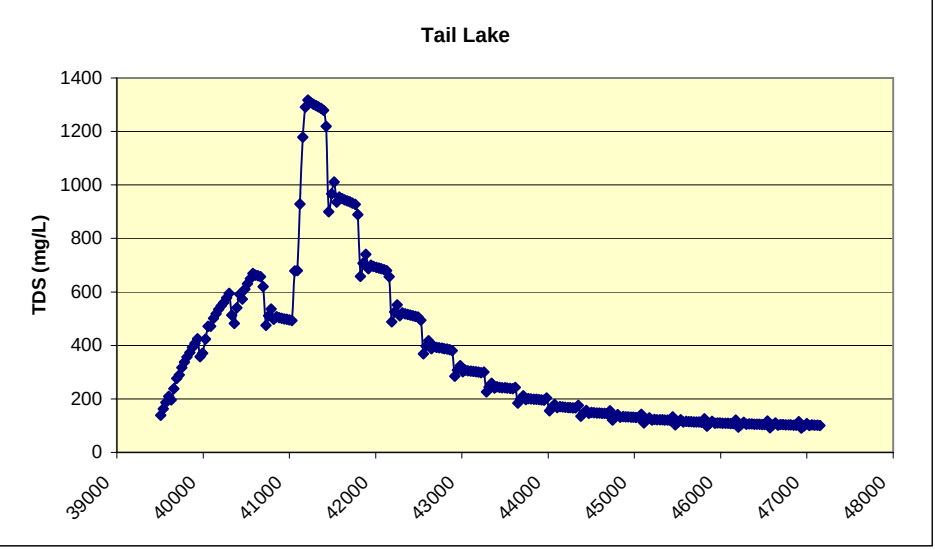
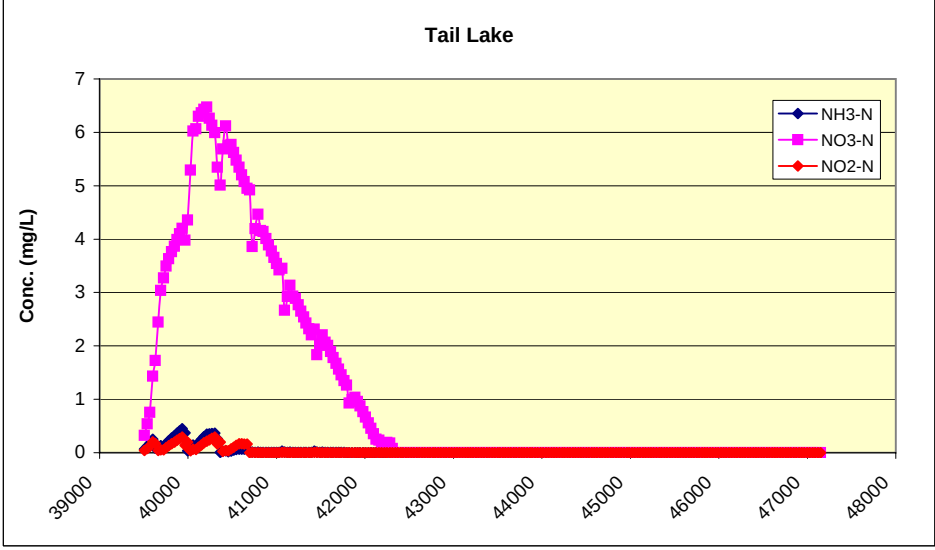
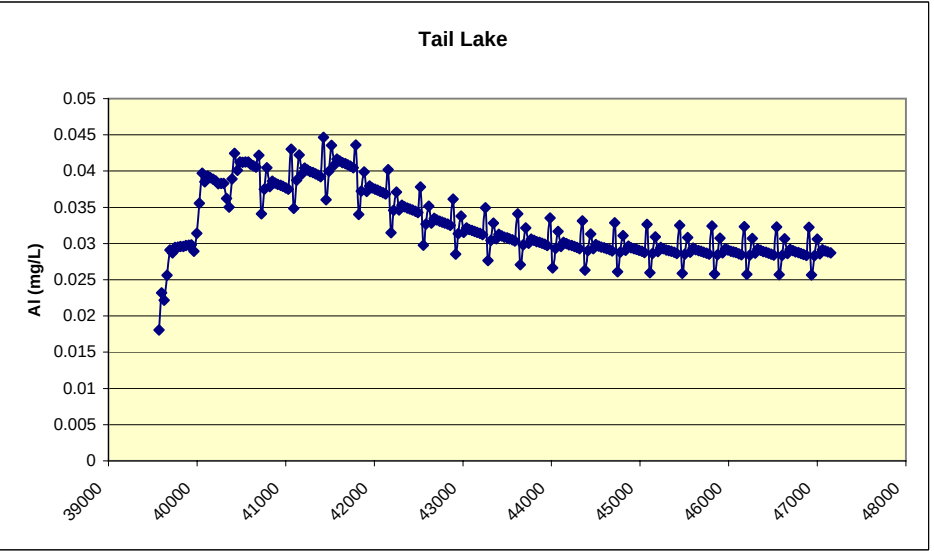
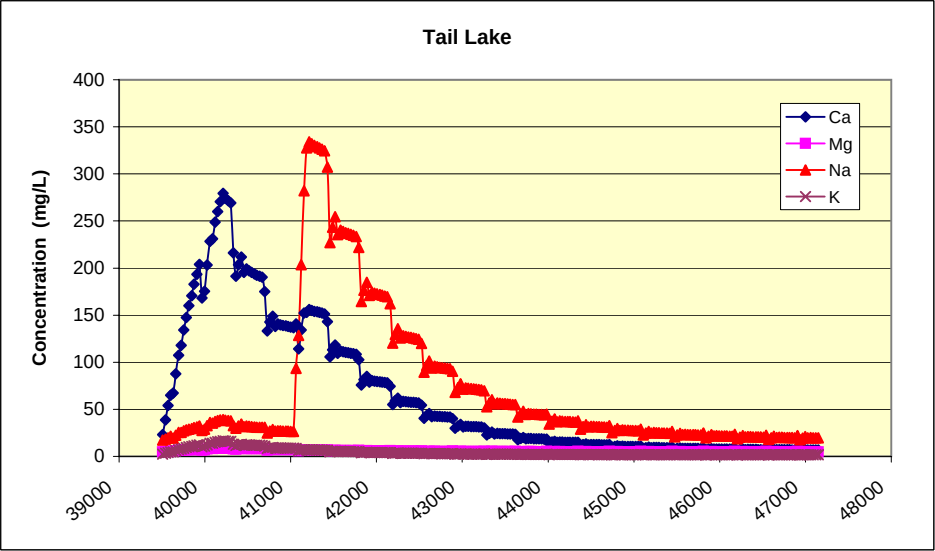
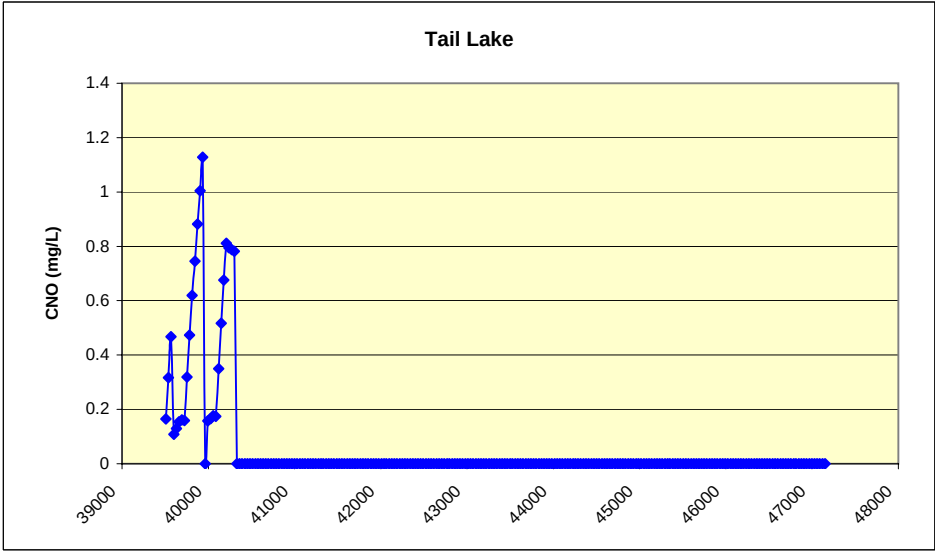
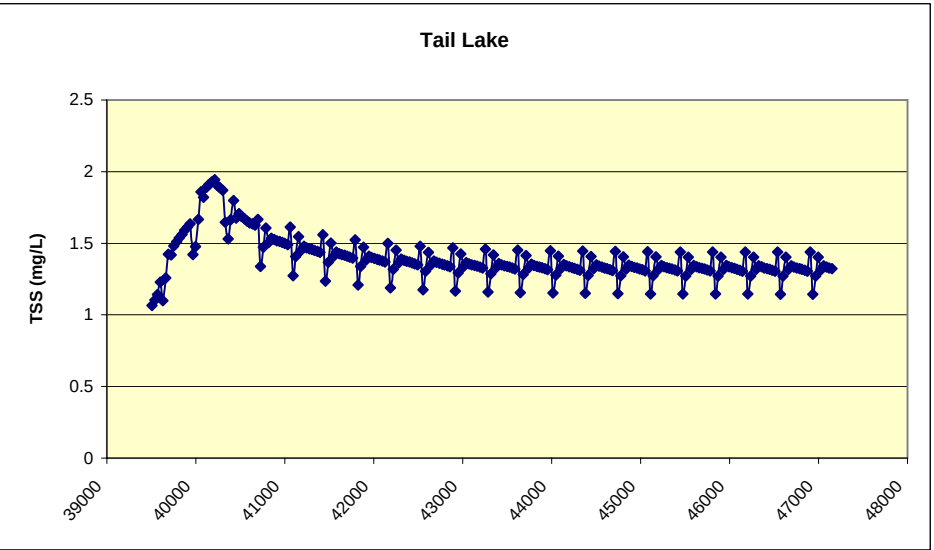
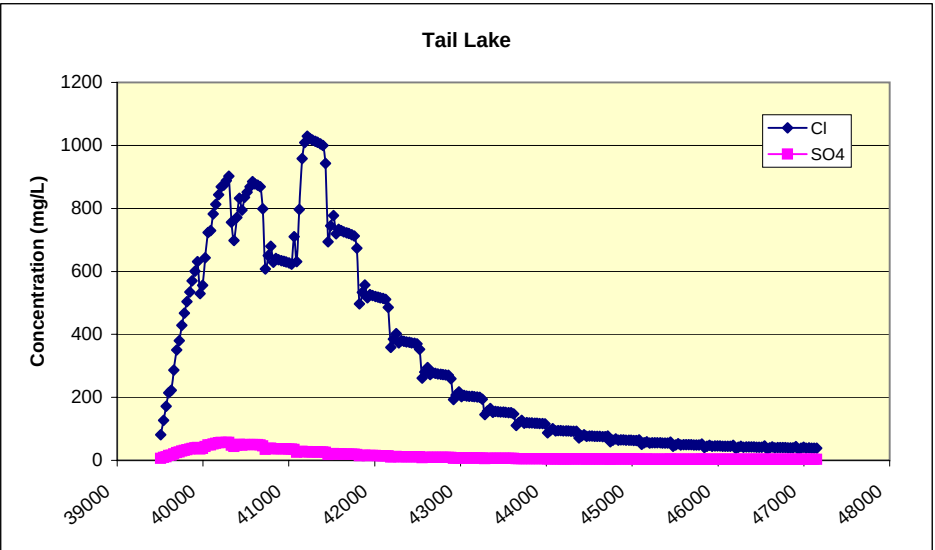
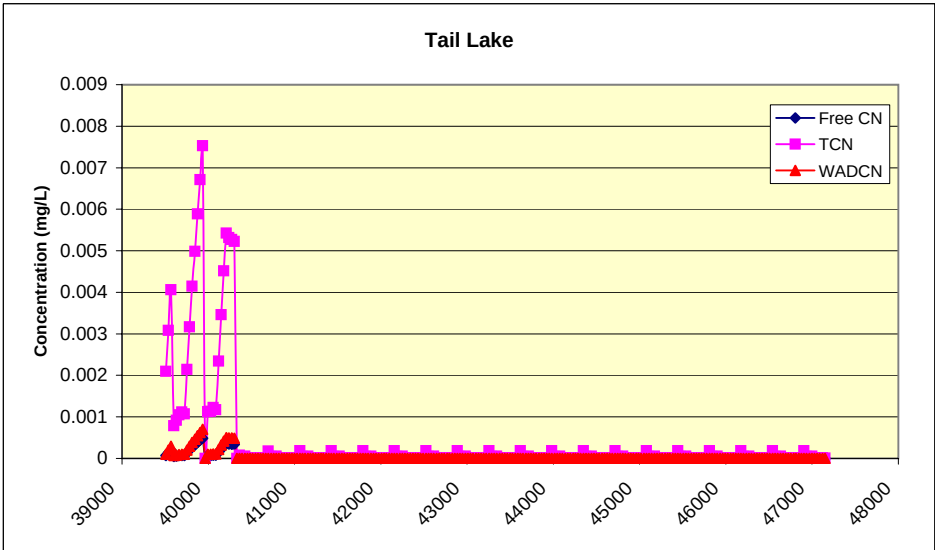
Attachment 3
Supernatant Analytical Results

Metals and Total Suspended Results for Hope Bay- Doris North Settling Study Samples Received September 2, 2005

ELEMENT	Units	SRK-51 3L D Sep 7 05 @ 24hr	SRK-51 3L T Sep 7 05 @ 24hr	SRK-58 3L D Sep 7 05 @ 24hr	SRK-58 3L T Sep 7 05 @ 24hr	SRK-58 4L D Sep 7 05 @ 24hr	SRK-58 4L T Sep 7 05 @ 24hr	SRK-51 3L D Sep 9 05 @ 72hr	SRK-51 3L T Sep 9 05 @ 72hr	SRK-58 3L D Sep 9 05 @ 72hr	SRK-58 3L T Sep 9 05 @ 72hr	SRK-58 4L D Sep 9 05 @ 72hr	SRK-58 4L T Sep 9 05 @ 72hr
TSS	mg/L	n/a	<1	n/a	<1	n/a	<1	n/a	<1	n/a	<1	n/a	1
Ag	ppb	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05
Al	ppb	49	562	200	2888	182	2037	65	521	152	852	81	495
As	ppb	<.5	0.6	1.4	1.4	0.8	0.9	<.5	0.5	1.4	1.4	1.1	1.2
Au	ppb	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05
B	ppb	49	58	60	64	61	76	61	66	68	69	90	98
Ba	ppb	1.73	4.97	2.08	20.1	2.11	14.1	1.29	4.97	2.72	6.95	1.84	4.26
Be	ppb	0.13	<.05	<.05	0.17	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05
Bi	ppb	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05
Br	ppb	402	414	378	383	451	452	422	430	371	375	574	612
Ca	ppb	2193	2213	6921	7330	6460	6858	2107	2165	6659	6966	8070	8588
Cd	ppb	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05
Ce	ppb	0.10	1.70	0.54	9.63	0.37	5.64	0.09	1.60	0.25	2.52	0.09	1.19
Cl	ppm	166	174	145	150	167	171	176	178	148	153	234	253
Co	ppb	0.02	0.30	0.04	1.63	0.06	1.08	0.04	0.31	0.02	0.38	0.03	0.24
Cr	ppb	<.5	1.3	<.5	5.3	0.5	3.8	<.5	1.2	<.5	1.5	<.5	1
Cs	ppb	0.01	0.04	0.02	0.18	0.02	0.12	0.01	0.03	0.01	0.05	0.01	0.03
Cu	ppb	0.5	1.0	0.8	5.8	0.7	4.1	0.8	1.6	10.8	2.2	1.0	2.1
Dy	ppb	<.01	0.04	0.01	0.21	<.01	0.13	<.01	0.03	<.01	0.06	<.01	0.03
Er	ppb	<.01	0.02	0.01	0.09	<.01	0.05	<.01	0.01	<.01	0.02	<.01	0.01
Eu	ppb	<.01	0.01	0.01	0.08	<.01	0.05	<.01	0.01	<.01	0.02	<.01	0.01
Fe	ppb	18	622	88	3143	107	2207	24	550	44	802	27	464
Ga	ppb	0.06	0.23	0.31	1.19	0.26	0.87	0.06	0.2	0.26	0.52	0.26	0.41
Gd	ppb	<.01	0.05	0.03	0.33	0.02	0.21	<.01	0.06	0.01	0.09	<.01	0.04
Ge	ppb	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05
Hf	ppb	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02
Hg	ppb	0.1	<.1	0.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
Ho	ppb	<.01	0.01	<.01	0.03	<.01	0.02	<.01	<.01	<.01	0.01	<.01	<.01
In	ppb	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
Ir	ppb	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05
K	ppb	5300	5658	4985	6051	5673	6452	5640	5966	4995	5416	7365	8074
La	ppb	0.05	0.89	0.27	4.77	0.18	2.89	0.04	0.79	0.17	1.28	0.04	0.59
Li	ppb	5.0	7.0	3.1	7.3	3.9	7.5	6.5	7.2	3.7	4.3	5.3	5.7
Lu	ppb	<.01	<.01	<.01	0.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
Mg	ppb	5458	6141	6379	7965	8158	9844	5404	5845	6405	6833	11053	12113
Mn	ppb	8.82	15.82	6.62	53.33	7.88	35.63	6.4	12.52	4.58	16.06	9.94	14.76
Mo	ppb	0.5	0.5	0.6	0.3	1.0	0.8	0.5	0.4	0.6	0.5	1.5	1.5
Na	ppb	108483	107304	90732	92305	106726	108163	109934	112879	90758	91772	141713	142045
Nb	ppb	<.01	0.03	0.02	0.02	0.01	0.03	<.01	0.03	<.01	0.02	<.01	0.01
Nd	ppb	0.04	0.74	0.22	3.95	0.15	2.3	0.04	0.63	0.10	1.07	0.03	0.49
Ni	ppb	<.2	0.6	<.2	3.3	<.2	2.0	0.2	0.8	<.2	0.6	<.2	0.5
Os	ppb	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05
P	ppb	<20	51	38	137	22	82	<20	31	44	71	25	38
Pb	ppb	<.1	5.3	<.1	1.2	<.1	0.7	<.1	<.1	2.5	0.2	<.1	0.1
Pd	ppb	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2
Pr	ppb	0.01	0.2	0.06	1.05	0.04	0.62	0.01	0.17	0.03	0.28	0.01	0.12
Pt	ppb	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
Rb	ppb	0.96	2.40	1.80	9.27	2.04	7.00	1.01	2.32	1.85	3.54	2.32	3.47
Re	ppb	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
Rh	ppb	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
Ru	ppb	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05
Sb	ppb	<.05	<.05	<.05	<.05	<.05	<.05	0.14	0.25	0.06	0.16	0.08	0.09
Sc	ppb	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
Se	ppb	2.3	2.3	2.1	2.2	2.4	2.4	2.3	2.2	2.2	2.0	3.2	3.4
Si	ppb	443	1119	1078	4040	874	3097	590	1164	1088	1895	967	1496
Sm	ppb	<.02	0.1	0.03	0.58	0.02	0.33	<.02	0.09	<.02	0.15	<.02	0.07
Sn	ppb	<.05	<.05	<.05	<.05	<.05	<.05	<.05	0.14	0.2	0.12	<.05	<.05
Sr	ppb	31.97	32.49	36.35	42.87	37.02	40.81	29.94	30.99	35.2	38.42	47.85	52.91
Ta	ppb	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02
Tb	ppb	<.01	0.01	<.01	0.04	<.01	0.02	<.01	<.01	<.01	0.01	<.01	<.01
Te	ppb	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05
Th	ppb	<.05	0.18	<.05	0.91	<.05	0.62	<.05	0.24	<.05	0.22	<.05	0.08
Ti	ppb	<10	39	<10	168	<10	122	<10	33	<10	46	<10	27
Tl	ppb	<.01	<.01	<.01	0.04	<.01	0.02	<.01	<.01	<.01	<.01	<.01	<.01
Tm	ppb	<.01	<.01	<.01	0.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
U	ppb	0.03	0.08	0.14	0.34	0.06	0.19	0.03	0.08	0.12	0.16	0.08	0.11
V	ppb	0.9	2.4	6.2	12.1	3.6	7.4	1.4	2.4	6.3	7.7	4.2	5.5
W	ppb	0.08	0.06	0.05	<.02	0.04	0.02	0.24	0.17	0.06	0.04	0.09	0.08
Y	ppb	0.01	0.19	0.05	0.95	0.04	0.55	0.01	0.14	0.02	0.24	0.01	0.12
Yb	ppb	<.01	0.01	<.01	0.08	<.01	0.05	<.01	0.01	<.01	0.02	<.01	0.01
Zn	ppb	<.5	1.2	0.5	8.3	2.4	6.3	2.1	5.6	6.4	2.4	<.5	2.2
Zr	ppb	0.02	0.20	0.07	0.19	0.07	0.23	0.04	0.23	0.03	0.17	0.02	0.15

Appendix H
Water Quality Modelling Results – Base Case Conditions





Tail Lake Water Quality Summary

OUTPUT SUMMARY					
Max Annual Discharge rate		1,179,417 m ³ /year in		Year 2	
Degradation Field(age)		Tail Lk Cu < CME Year		8	
				Maximum in	
Maximum Concentration		MMER	CCME	Tail Lake Background	Tail Lake Year 2
pH			6 to 9	7.29	7 to 8
TDS	mg/L			110	1317
TSS	mg/L	15		2.0	1.9
Free CN	mg/L		0.005		0.0005
Total CN	mg/L	1.0		0.002	0.008
WAD CN	mg/L				0.0007
CNO	mg/L				1.1
SCN	mg/L				0.074
Sulphate	mg/L			3	57
Chloride	mg/L			37	1029
Total Ammonia-N	mg/L		1.27	0.008	0.45
Nitrate-N	mg/L		2.9	0.006	6.5
Nitrite-N	mg/L		0.018	0.0020	0.30
Alkalinity	mg/L			30	49
OrthoPhosphate-P	mg/L			0.0020	0.2192
Phosphate-P	mg/L			0.0080	0.2233
Org. Carbon	mg/L			5.9	6.1
Hardness CaCO3	mg/L			41	88
Total Metals					
Aluminum Al	mg/L		0.1	0.017	0.045
Antimony Sb	mg/L			0.0000	0.0193
Arsenic As	mg/L	0.5	0.005	0.0003	0.0021
Barium Ba	mg/L			0.0031	0.0068
Beryllium Be	mg/L			0.00000	0.00068
Bismuth Bi	mg/L			0.00001	0.01919
Boron B	mg/L			0.015	0.032
Cadmium Cd	mg/L		0.000017	0.000003	0.000059
Calcium Ca	mg/L			7.6	279
Chromium Cr	mg/L		0.001	0.0003	0.0028
Cobalt Co	mg/L			0.0001	0.0038
Copper Cu	mg/L	0.3	0.002	0.001	0.006
Iron Fe	mg/L		0.3	0.40	0.11
Lead Pb	mg/L	0.2	0.001	0.00006	0.00043
Lithium Li	mg/L			-	0.0028
Magnesium Mg	mg/L			5.6	8.7
Manganese Mn	mg/L			0.008	0.015
Mercury Hg	ug/L		0.026	0.0006	0.0050
Molybdenum Mo	mg/L		0.073	0.0001	0.0062
Nickel Ni	mg/L	0.5	0.025	0.001	0.008
Phosphorus P	mg/L			0.008	0.288
Potassium K	mg/L			1.8	17
Selenium Se	mg/L		0.001	0.00062	0.00065
Silicon SiO2	mg/L			-	4.0
Silver Ag	mg/L		0.0001	0.00000	0.00007
Sodium Na	mg/L			19	334
Strontium Sr	mg/L			0.034	0.064
Tellurium Te	mg/L			-	0.00027
Thallium Tl	mg/L		0.0008	0.000014	0.000032
Thorium Th	mg/L			-	0.00014
Tin Sn	mg/L			0.00004	0.00308
Titanium Ti	mg/L			-	0.0012
Uranium U	mg/L			0.000011	0.000183
Vanadium V	mg/L			0.0004	0.0034
Zinc Zn	mg/L	0.5	0.03	0.005	0.011
Zirconium Zr	mg/L			0.0050	0.0067

Water Quality in TAIL LAKE													
Date	Units	Year 1 Mar-08	Year 1 Apr-08	Year 1 May-08	Year 1 Jun-08	Year 1 Jul-08	Year 1 Aug-08	Year 1 Sep-08	Year 1 Oct-08	Year 1 Nov-08	Year 1 Dec-08	Year 1 Jan-09	Year 1 Feb-09
Parameter													
TDS	mg/L	139	163	187	209	197	238	277	289	317	337	357	373
TSS	mg/L	1.1	1.1	1.1	1.2	1.1	1.3	1.4	1.4	1.5	1.5	1.5	1.6
Free CN	mg/L	0.00007	0.00014	0.00020	0.00005	0.00006	0.00007	0.00007	0.00007	0.00014	0.00021	0.00027	0.00032
Total CN	mg/L	0.002	0.003	0.004	0.001	0.001	0.001	0.001	0.001	0.002	0.003	0.004	0.005
WAD CN	mg/L	0.0001	0.0002	0.0003	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0003	0.0004	0.0005
CNO	mg/L	0.17	0.32	0.47	0.11	0.13	0.15	0.16	0.16	0.32	0.47	0.62	0.75
SCN	mg/L	0.005	0.009	0.013	0.016	0.017	0.022	0.027	0.030	0.034	0.038	0.041	0.044
Sulphate	mg/L	6.1	8.8	11.6	15.1	15.8	20.2	24.5	26.2	29.2	31.4	33.6	35.4
Chloride	mg/L	81	127	172	214	222	287	350	380	429	467	504	535
Total Ammonia-N	mg/L	0.067	0.121	0.174	0.253	0.083	0.117	0.132	0.114	0.171	0.225	0.276	0.319
Nitrate-N	mg/L	0.33	0.54	0.76	1.44	1.73	2.44	3.04	3.27	3.49	3.63	3.76	3.86
Nitrite-N	mg/L	0.042	0.081	0.118	0.202	0.172	0.042	0.057	0.054	0.094	0.132	0.169	0.200
Alkalinity	mg/L	29	30	31	33	30	34	37	37	38	39	40	40
OrthoPhosphate-P	mg/L	0.0117	0.0205	0.0293	0.0351	0.0364	0.0478	0.0588	0.0647	0.0740	0.0815	0.0887	0.0948
Phosphate-P	mg/L	0.0176	0.0264	0.0350	0.0410	0.0414	0.0531	0.0643	0.0699	0.0791	0.0865	0.0936	0.0996
Org. Carbon	mg/L	5.9	5.7	5.6	5.8	5.0	5.3	5.6	5.3	5.3	5.2	5.0	4.9
Hardness CaCO3	mg/L	37	40	42	46	42	49	55	56	60	62	64	66
Total Metals													
Aluminum Al	mg/L	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Antimony Sb	mg/L	0.0006	0.0011	0.0016	0.0034	0.0040	0.0052	0.0064	0.0068	0.0073	0.0077	0.0080	0.0083
Arsenic As	mg/L	0.0003	0.0004	0.0005	0.0007	0.0007	0.0009	0.0010	0.0011	0.0012	0.0012	0.0013	0.0014
Barium Ba	mg/L	0.0024	0.0026	0.0028	0.0032	0.0030	0.0035	0.0040	0.0041	0.0044	0.0046	0.0047	0.0049
Beryllium Be	mg/L	0.00003	0.00006	0.00008	0.00015	0.00017	0.00022	0.00027	0.00029	0.00032	0.00033	0.00035	0.00037
Bismuth Bi	mg/L	0.00057	0.00109	0.00160	0.00336	0.00399	0.00513	0.00636	0.00669	0.00722	0.00758	0.00793	0.00822
Boron B	mg/L	0.015	0.015	0.016	0.019	0.017	0.020	0.023	0.022	0.023	0.024	0.024	0.024
Cadmium Cd	mg/L	0.0000049	0.0000075	0.0000100	0.0000154	0.0000169	0.0000216	0.0000264	0.0000280	0.0000307	0.0000327	0.0000346	0.0000362
Calcium Ca	mg/L	23	39	54	65	67	88	107	118	134	147	160	171
Chromium Cr	mg/L	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002
Cobalt Co	mg/L	0.0002	0.0004	0.0006	0.0008	0.0009	0.0012	0.0015	0.0016	0.0018	0.0020	0.0022	0.0023
Copper Cu	mg/L	0.0012	0.0015	0.0018	0.0021	0.0021	0.0025	0.0030	0.0032	0.0035	0.0037	0.0040	0.0042
Iron Fe	mg/L	0.04	0.04	0.04	0.05	0.04	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Lead Pb	mg/L	0.00004	0.00006	0.00008	0.00012	0.00013	0.00017	0.00020	0.00021	0.00023	0.00024	0.00026	0.00027
Lithium Li	mg/L	0.0002	0.0003	0.0004	0.0006	0.0007	0.0009	0.0011	0.0012	0.0013	0.0015	0.0016	0.0017
Magnesium Mg	mg/L	4.9	5.0	5.2	5.7	5.2	5.9	6.6	6.5	6.7	6.8	6.9	7.0
Manganese Mn	mg/L	0.002	0.003	0.003	0.004	0.004	0.006	0.007	0.007	0.008	0.008	0.009	0.009
Mercury Hg	ug/L	0.0008809	0.0011265	0.0013692	0.0015637	0.0015264	0.0018956	0.0022478	0.0023920	0.0026622	0.0028687	0.0030664	0.0032344
Molybdenum Mo	mg/L	0.00048	0.00083	0.00118	0.00142	0.00148	0.00193	0.00237	0.00261	0.00297	0.00327	0.00355	0.00379
Nickel Ni	mg/L	0.0010	0.0014	0.0018	0.0023	0.0024	0.0030	0.0036	0.0039	0.0043	0.0047	0.0050	0.0053
Phosphorus P	mg/L	0.021	0.033	0.045	0.057	0.060	0.077	0.094	0.101	0.114	0.124	0.133	0.141
Potassium K	mg/L	2.5	3.4	4.2	4.9	4.8	6.0	7.2	7.7	8.7	9.4	10.0	10.6
Selenium Se	mg/L	0.00042	0.00042	0.00043	0.00047	0.00043	0.00048	0.00053	0.00052	0.00054	0.00054	0.00055	0.00055
Silicon SiO2	mg/L	0.24	0.46	0.68	0.87	0.93	1.22	1.51	1.66	1.89	2.08	2.25	2.40
Silver Ag	mg/L	0.0000032	0.0000055	0.0000077	0.0000168	0.0000201	0.0000256	0.0000316	0.0000330	0.0000354	0.0000369	0.0000383	0.0000395
Sodium Na	mg/L	17	18	20	21	19	23	25	26	27	28	29	30
Strontium Sr	mg/L	0.027	0.029	0.031	0.034	0.031	0.036	0.041	0.041	0.044	0.045	0.047	0.048
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000007	0.000008	0.000010	0.000012	0.000013	0.000015	0.000017	0.000018	0.000019	0.000020	0.000021	0.000022
Thorium Th	mg/L	0.000007	0.000013	0.000020	0.000031	0.000035	0.000045	0.000056	0.000061	0.000067	0.000072	0.000077	0.000081
Tin Sn	mg/L	0.00013	0.00021	0.00030	0.00059	0.00068	0.00087	0.00108	0.00113	0.00123	0.00129	0.00135	0.00140
Titanium Ti	mg/L	0.0000	0.0001	0.0001	0.0002	0.0003	0.0003	0.0004	0.0005	0.0005	0.0005	0.0006	0.0006
Uranium U	mg/L	0.000021	0.000029	0.000037	0.000051	0.000053	0.000068	0.000082	0.000087	0.000096	0.000103	0.000109	0.000115
Vanadium V	mg/L	0.0005	0.0006	0.0007	0.0010	0.0010	0.0012	0.0015	0.0015	0.0016	0.0016	0.0017	0.0017
Zinc Zn	mg/L	0.0058	0.0060	0.0063	0.0071	0.0063	0.0072	0.0080	0.0080	0.0084	0.0086	0.0088	0.0090
Zirconium Zr	mg/L	0.0051	0.0051	0.0051	0.0056	0.0049	0.0055	0.0060	0.0058	0.0059	0.0059	0.0059	0.0058

Water Quality in TAIL LAKE														
Date	Units	Year 2 Mar-09	Year 2 Apr-09	Year 2 May-09	Year 2 Jun-09	Year 2 Jul-09	Year 2 Aug-09	Year 2 Sep-09	Year 2 Oct-09	Year 2 Nov-09	Year 2 Dec-09	Year 2 Jan-10	Year 2 Feb-10	
Parameter														
TDS	mg/L	392	408	425	358	370	424	472	472	502	519	535	548	
TSS	mg/L	1.6	1.6	1.6	1.4	1.5	1.7	1.9	1.8	1.9	1.9	1.9	1.9	
Free CN	mg/L	0.00038	0.00044	0.00049		0.00007	0.00007	0.00008	0.00008	0.00015	0.00022	0.00029	0.00035	
Total CN	mg/L	0.006	0.007	0.008		0.001	0.001	0.001	0.001	0.002	0.003	0.005	0.005	
WAD CN	mg/L	0.0005	0.0006	0.0007		0.0001	0.0001	0.0001	0.0001	0.0002	0.0003	0.0004	0.0005	
CNO	mg/L	0.88	1.00	1.13		0.16	0.17	0.18	0.17	0.35	0.52	0.68	0.81	
SCN	mg/L	0.048	0.051	0.053	0.044	0.046	0.053	0.060	0.061	0.065	0.068	0.071	0.074	
Sulphate	mg/L	37.5	39.3	41.1	35.3	37.4	43.2	48.6	48.8	52.0	53.8	55.5	56.9	
Chloride	mg/L	570	601	631	529	555	643	723	730	782	813	844	869	
Total Ammonia-N	mg/L	0.367	0.409	0.452	0.374	0.035	0.138	0.144	0.125	0.187	0.245	0.300	0.347	
Nitrate-N	mg/L	3.99	4.10	4.20	3.98	4.36	5.29	6.02	6.06	6.30	6.37	6.43	6.47	
Nitrite-N	mg/L	0.234	0.264	0.295	0.140	0.197	0.038	0.063	0.058	0.102	0.144	0.184	0.217	
Alkalinity	mg/L	41	42	42	37	38	43	47	46	48	48	49	49	
OrthoPhosphate-P	mg/L	0.1017	0.1077	0.1137	0.0935	0.0974	0.1129	0.1270	0.1286	0.1386	0.1449	0.1510	0.1560	
Phosphate-P	mg/L	0.1063	0.1122	0.1181	0.0977	0.1016	0.1174	0.1317	0.1330	0.1430	0.1492	0.1551	0.1600	
Org. Carbon	mg/L	4.8	4.7	4.6	4.2	4.4	4.7	5.0	4.7	4.7	4.6	4.4	4.3	
Hardness CaCO3	mg/L	68	70	72	61	64	73	80	79	83	85	87	88	
Total Metals														
Aluminum Al	mg/L	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	
Antimony Sb	mg/L	0.0087	0.0090	0.0092	0.0087	0.0097	0.0112	0.0128	0.0127	0.0133	0.0135	0.0137	0.0139	
Arsenic As	mg/L	0.0014	0.0015	0.0015	0.0013	0.0014	0.0017	0.0019	0.0019	0.0020	0.0020	0.0021	0.0021	
Barium Ba	mg/L	0.0051	0.0052	0.0054	0.0046	0.0049	0.0055	0.0062	0.0061	0.0064	0.0065	0.0067	0.0068	
Beryllium Be	mg/L	0.00038	0.00040	0.00041	0.00038	0.00042	0.00048	0.00055	0.00055	0.00057	0.00059	0.00060	0.00061	
Bismuth Bi	mg/L	0.00856	0.00884	0.00913	0.00864	0.00957	0.01110	0.01263	0.01255	0.01312	0.01334	0.01355	0.01372	
Boron B	mg/L	0.025	0.025	0.025	0.023	0.024	0.028	0.031	0.030	0.031	0.031	0.031	0.031	
Cadmium Cd	mg/L	0.0000380	0.0000395	0.0000411	0.0000368	0.0000398	0.0000460	0.0000521	0.0000520	0.0000549	0.0000563	0.0000577	0.0000588	
Calcium Ca	mg/L	183	193	204	168	175	203	228	231	249	260	270	279	
Chromium Cr	mg/L	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.003	
Cobalt Co	mg/L	0.0024	0.0026	0.0027	0.0023	0.0024	0.0028	0.0032	0.0032	0.0034	0.0036	0.0037	0.0038	
Copper Cu	mg/L	0.0044	0.0046	0.0048	0.0041	0.0042	0.0049	0.0054	0.0054	0.0058	0.0060	0.0062	0.0064	
Iron Fe	mg/L	0.06	0.05	0.05	0.05	0.05	0.07	0.07	0.07	0.07	0.07	0.07	0.07	
Lead Pb	mg/L	0.00028	0.00029	0.00030	0.00027	0.00029	0.00034	0.00038	0.00038	0.00040	0.00041	0.00042	0.00043	
Lithium Li	mg/L	0.0018	0.0019	0.0020	0.0017	0.0018	0.0021	0.0023	0.0024	0.0025	0.0026	0.0027	0.0028	
Magnesium Mg	mg/L	7.1	7.2	7.3	6.5	6.8	7.7	8.4	8.2	8.5	8.6	8.6	8.7	
Manganese Mn	mg/L	0.010	0.010	0.011	0.009	0.010	0.011	0.013	0.013	0.014	0.014	0.014	0.015	
Mercury Hg	ug/L	0.0034242	0.0035894	0.0037553	0.0031317	0.0032622	0.0037511	0.0041941	0.0042142	0.0045055	0.0046767	0.0048410	0.0049779	
Molybdenum Mo	mg/L	0.00406	0.00430	0.00453	0.00374	0.00390	0.00452	0.00509	0.00515	0.00554	0.00579	0.00603	0.00623	
Nickel Ni	mg/L	0.0056	0.0059	0.0062	0.0052	0.0055	0.0064	0.0071	0.0072	0.0077	0.0080	0.0082	0.0084	
Phosphorus P	mg/L	0.150	0.158	0.166	0.140	0.148	0.171	0.192	0.194	0.207	0.215	0.223	0.229	
Potassium K	mg/L	11.3	11.8	12.4	10.3	10.8	12.4	13.9	14.0	15.0	15.6	16.1	16.6	
Selenium Se	mg/L	0.00055	0.00055	0.00056	0.00050	0.00053	0.00059	0.00065	0.00063	0.00065	0.00065	0.00065	0.00065	
Silicon SiO2	mg/L	2.57	2.72	2.87	2.39	2.51	2.91	3.28	3.32	3.57	3.72	3.87	3.99	
Silver Ag	mg/L	0.0000410	0.0000421	0.0000434	0.0000417	0.0000466	0.0000540	0.0000614	0.0000609	0.0000634	0.0000642	0.0000650	0.0000656	
Sodium Na	mg/L	31	31	32	28	29	33	36	35	37	38	39	39	
Strontium Sr	mg/L	0.049	0.050	0.052	0.045	0.047	0.053	0.059	0.058	0.061	0.062	0.063	0.064	
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Thallium Tl	mg/L	0.000022	0.000023	0.000024	0.000021	0.000023	0.000026	0.000029	0.000029	0.000030	0.000031	0.000032	0.000032	
Thorium Th	mg/L	0.000086	0.000090	0.000094	0.000083	0.000089	0.000103	0.000117	0.000117	0.000125	0.000128	0.000132	0.000135	
Tin Sn	mg/L	0.00145	0.00150	0.00155	0.00146	0.00161	0.00187	0.00212	0.00211	0.00220	0.00224	0.00228	0.00231	
Titanium Ti	mg/L	0.0006	0.0006	0.0007	0.0006	0.0007	0.0008	0.0009	0.0009	0.0009	0.0009	0.0009	0.0010	
Uranium U	mg/L	0.000121	0.000126	0.000132	0.000115	0.000122	0.000141	0.000159	0.000159	0.000169	0.000174	0.000179	0.000183	
Vanadium V	mg/L	0.0018	0.0018	0.0019	0.0018	0.0019	0.0022	0.0025	0.0025	0.0026	0.0026	0.0026	0.0027	
Zinc Zn	mg/L	0.0092	0.0093	0.0095	0.0085	0.0088	0.0099	0.0108	0.0106	0.0111	0.0112	0.0113	0.0115	
Zirconium Zr	mg/L	0.0058	0.0058	0.0058	0.0053	0.0056	0.0062	0.0067	0.0065	0.0066	0.0066	0.0065	0.0065	

Water Quality in TAIL LAKE													
Date	Units	Year 3 Mar-10	Year 3 Apr-10	Year 3 May-10	Year 3 Jun-10	Year 3 Jul-10	Year 3 Aug-10	Year 3 Sep-10	Year 3 Oct-10	Year 3 Nov-10	Year 3 Dec-10	Year 3 Jan-11	Year 3 Feb-11
Parameter													
TDS	mg/L	560	578	595	513	482	541	592	573	610	630	650	669
TSS	mg/L	1.9	1.9	1.9	1.6	1.5	1.7	1.8	1.7	1.7	1.7	1.7	1.7
Free CN	mg/L	0.00034	0.00034	0.00034									
Total CN	mg/L	0.005	0.005	0.005		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WAD CN	mg/L	0.0005	0.0005	0.0005									
CNO	mg/L	0.80	0.79	0.78									
SCN	mg/L	0.072	0.072	0.071	0.057	0.050	0.053	0.055	0.051	0.052	0.051	0.050	0.050
Sulphate	mg/L	56.4	56.4	56.5	47.7	44.0	47.9	51.2	48.1	49.7	49.8	50.0	50.2
Chloride	mg/L	874	888	902	756	699	772	832	795	835	852	869	885
Total Ammonia-N	mg/L	0.351	0.359	0.367	0.258	0.007	0.030	0.036	0.019	0.032	0.045	0.057	0.069
Nitrate-N	mg/L	6.26	6.13	6.00	5.34	5.01	5.69	6.12	5.75	5.77	5.62	5.48	5.35
Nitrite-N	mg/L	0.242	0.269	0.295	0.161	0.195	0.026	0.041	0.037	0.071	0.105	0.137	0.167
Alkalinity	mg/L	48	48	47	42	39	42	45	42	42	42	41	41
OrthoPhosphate-P	mg/L	0.1627	0.1706	0.1787	0.1518	0.1439	0.1640	0.1813	0.1784	0.1928	0.2019	0.2110	0.2192
Phosphate-P	mg/L	0.1666	0.1745	0.1825	0.1558	0.1478	0.1681	0.1857	0.1825	0.1969	0.2060	0.2151	0.2233
Org. Carbon	mg/L	4.2	4.2	4.2	4.2	4.1	4.5	4.9	4.5	4.6	4.6	4.5	4.5
Hardness CaCO3	mg/L	86	85	85	73	67	72	76	70	72	71	70	70
Total Metals													
Aluminum Al	mg/L	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Antimony Sb	mg/L	0.0142	0.0146	0.0150	0.0139	0.0138	0.0158	0.0176	0.0171	0.0180	0.0184	0.0189	0.0193
Arsenic As	mg/L	0.0021	0.0021	0.0021	0.0018	0.0016	0.0018	0.0019	0.0018	0.0018	0.0018	0.0018	0.0018
Barium Ba	mg/L	0.0067	0.0067	0.0066	0.0057	0.0053	0.0057	0.0061	0.0057	0.0058	0.0058	0.0058	0.0057
Beryllium Be	mg/L	0.00061	0.00062	0.00063	0.00056	0.00054	0.00060	0.00066	0.00063	0.00066	0.00066	0.00067	0.00068
Bismuth Bi	mg/L	0.01400	0.01441	0.01483	0.01382	0.01371	0.01564	0.01747	0.01695	0.01789	0.01833	0.01878	0.01919
Boron B	mg/L	0.031	0.031	0.031	0.028	0.027	0.030	0.032	0.030	0.031	0.031	0.031	0.031
Cadmium Cd	mg/L	0.0000577	0.0000573	0.0000568	0.0000479	0.0000439	0.0000474	0.0000502	0.0000467	0.0000476	0.0000472	0.0000467	0.0000464
Calcium Ca	mg/L	274	272	269	216	191	204	212	196	199	197	195	194
Chromium Cr	mg/L	0.003	0.003	0.003	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.003	0.003
Cobalt Co	mg/L	0.0037	0.0037	0.0037	0.0031	0.0028	0.0030	0.0032	0.0030	0.0031	0.0031	0.0031	0.0031
Copper Cu	mg/L	0.0062	0.0062	0.0062	0.0051	0.0046	0.0049	0.0052	0.0048	0.0049	0.0049	0.0048	0.0048
Iron Fe	mg/L	0.06	0.06	0.06	0.06	0.06	0.07	0.08	0.07	0.08	0.07	0.07	0.07
Lead Pb	mg/L	0.00042	0.00043	0.00043	0.00037	0.00035	0.00039	0.00042	0.00040	0.00041	0.00041	0.00042	0.00042
Lithium Li	mg/L	0.0027	0.0027	0.0028	0.0023	0.0021	0.0023	0.0024	0.0023	0.0024	0.0024	0.0024	0.0024
Magnesium Mg	mg/L	8.5	8.5	8.5	7.7	7.3	8.0	8.6	8.1	8.3	8.3	8.2	8.2
Manganese Mn	mg/L	0.015	0.015	0.014	0.012	0.011	0.012	0.013	0.012	0.012	0.012	0.012	0.012
Mercury Hg	ug/L	0.0048783	0.0048359	0.0047928	0.0039126	0.0034970	0.0037297	0.0038890	0.0035912	0.0036577	0.0036165	0.0035801	0.0035499
Molybdenum Mo	mg/L	0.00611	0.00606	0.00601	0.00482	0.00428	0.00455	0.00474	0.00438	0.00446	0.00442	0.00438	0.00435
Nickel Ni	mg/L	0.0083	0.0083	0.0083	0.0069	0.0063	0.0068	0.0072	0.0067	0.0069	0.0069	0.0069	0.0069
Phosphorus P	mg/L	0.235	0.243	0.251	0.215	0.203	0.229	0.251	0.244	0.261	0.270	0.279	0.288
Potassium K	mg/L	16.3	16.1	16.0	13.0	11.6	12.4	13.0	12.0	12.2	12.1	12.0	11.9
Selenium Se	mg/L	0.00064	0.00063	0.00063	0.00057	0.00054	0.00059	0.00064	0.00059	0.00060	0.00060	0.00059	0.00059
Silicon SiO2	mg/L	3.92	3.89	3.86	3.11	2.77	2.95	3.08	2.85	2.91	2.88	2.86	2.84
Silver Ag	mg/L	0.0000654	0.0000659	0.0000664	0.0000600	0.0000580	0.0000647	0.0000708	0.0000673	0.0000699	0.0000703	0.0000709	0.0000714
Sodium Na	mg/L	38	38	38	33	30	32	34	32	32	32	32	31
Strontium Sr	mg/L	0.062	0.062	0.062	0.054	0.050	0.054	0.057	0.053	0.055	0.054	0.054	0.053
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000032	0.000031	0.000031	0.000027	0.000025	0.000027	0.000028	0.000026	0.000027	0.000027	0.000026	0.000026
Thorium Th	mg/L	0.000132	0.000131	0.000130	0.000108	0.000098	0.000106	0.000111	0.000103	0.000105	0.000104	0.000103	0.000102
Tin Sn	mg/L	0.00235	0.00241	0.00247	0.00228	0.00225	0.00255	0.00284	0.00274	0.00289	0.00295	0.00302	0.00308
Titanium Ti	mg/L	0.0010	0.0010	0.0010	0.0009	0.0009	0.0010	0.0011	0.0011	0.0011	0.0011	0.0011	0.0012
Uranium U	mg/L	0.000180	0.000178	0.000177	0.000147	0.000134	0.000144	0.000152	0.000141	0.000144	0.000142	0.000141	0.000140
Vanadium V	mg/L	0.0027	0.0027	0.0028	0.0026	0.0025	0.0029	0.0032	0.0031	0.0032	0.0033	0.0033	0.0034
Zinc Zn	mg/L	0.0113	0.0113	0.0113	0.0102	0.0095	0.0103	0.0110	0.0104	0.0107	0.0106	0.0107	0.0107
Zirconium Zr	mg/L	0.0063	0.0063	0.0062	0.0058	0.0056	0.0061	0.0065	0.0061	0.0062	0.0061	0.0061	0.0060

Water Quality in TAIL LAKE													
Date	Units	Year 4 Mar-11	Year 4 Apr-11	Year 4 May-11	Year 4 Jun-11	Year 4 Jul-11	Year 4 Aug-11	Year 4 Sep-11	Year 4 Oct-11	Year 4 Nov-11	Year 4 Dec-11	Year 4 Jan-12	Year 4 Feb-12
Parameter													
TDS	mg/L	663	660	657	620	475	511	536	497	507	504	501	499
TSS	mg/L	1.6	1.6	1.6	1.7	1.3	1.5	1.6	1.5	1.5	1.5	1.5	1.5
Free CN	mg/L												
Total CN	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L	0.050	0.049	0.049	0.045	0.034	0.036	0.038	0.035	0.036	0.036	0.035	0.035
Sulphate	mg/L	49.8	49.5	49.3	45.6	34.8	37.3	39.1	36.2	36.9	36.7	36.5	36.3
Chloride	mg/L	877	873	869	799	607	651	680	629	642	637	634	632
Total Ammonia-N	mg/L	0.068	0.068	0.067	0.026	0.014	0.008	0.011	0.003	0.003	0.003	0.003	0.003
Nitrate-N	mg/L	5.20	5.08	4.95	4.92	3.86	4.20	4.46	4.16	4.14	4.01	3.89	3.77
Nitrite-N	mg/L	0.165	0.164	0.164		0.006	0.003	0.003	0.002	0.002	0.002	0.002	0.002
Alkalinity	mg/L	41	41	40	42	34	37	39	37	37	37	37	37
OrthoPhosphate-P	mg/L	0.2175	0.2164	0.2153	0.1970	0.1493	0.1598	0.1667	0.1542	0.1573	0.1563	0.1555	0.1549
Phosphate-P	mg/L	0.2215	0.2204	0.2193	0.2017	0.1532	0.1641	0.1711	0.1584	0.1615	0.1605	0.1597	0.1591
Org. Carbon	mg/L	4.5	4.4	4.4	5.1	4.3	4.7	5.1	4.7	4.8	4.8	4.8	4.8
Hardness CaCO3	mg/L	69	69	68	68	54	59	63	59	60	60	59	59
Total Metals													
Aluminum Al	mg/L	0.04	0.04	0.04	0.04	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Antimony Sb	mg/L	0.0191	0.0191	0.0190	0.0173	0.0131	0.0140	0.0146	0.0135	0.0138	0.0137	0.0137	0.0136
Arsenic As	mg/L	0.0018	0.0018	0.0018	0.0017	0.0014	0.0015	0.0016	0.0015	0.0015	0.0015	0.0015	0.0015
Barium Ba	mg/L	0.0057	0.0057	0.0056	0.0055	0.0043	0.0047	0.0050	0.0047	0.0048	0.0047	0.0047	0.0047
Beryllium Be	mg/L	0.00068	0.00067	0.00067	0.00062	0.00048	0.00051	0.00054	0.00050	0.00051	0.00051	0.00050	0.00050
Bismuth Bi	mg/L	0.01904	0.01895	0.01885	0.01723	0.01305	0.01396	0.01456	0.01347	0.01374	0.01365	0.01358	0.01353
Boron B	mg/L	0.031	0.031	0.031	0.031	0.025	0.027	0.029	0.027	0.028	0.027	0.027	0.027
Cadmium Cd	mg/L	0.0000460	0.0000458	0.0000456	0.0000445	0.0000354	0.0000386	0.0000412	0.0000384	0.0000392	0.0000389	0.0000387	0.0000386
Calcium Ca	mg/L	192	191	190	175	133	143	149	138	141	140	139	138
Chromium Cr	mg/L	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Cobalt Co	mg/L	0.0031	0.0031	0.0030	0.0028	0.0021	0.0023	0.0024	0.0022	0.0022	0.0022	0.0022	0.0022
Copper Cu	mg/L	0.0048	0.0047	0.0047	0.0045	0.0035	0.0037	0.0039	0.0036	0.0037	0.0037	0.0037	0.0036
Iron Fe	mg/L	0.07	0.07	0.07	0.07	0.06	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Lead Pb	mg/L	0.00042	0.00041	0.00041	0.00039	0.00031	0.00033	0.00035	0.00032	0.00033	0.00033	0.00033	0.00033
Lithium Li	mg/L	0.0024	0.0024	0.0024	0.0022	0.0016	0.0018	0.0018	0.0017	0.0017	0.0017	0.0017	0.0017
Magnesium Mg	mg/L	8.2	8.1	8.1	8.2	6.6	7.2	7.7	7.2	7.3	7.2	7.2	7.2
Manganese Mn	mg/L	0.012	0.012	0.012	0.011	0.008	0.009	0.010	0.009	0.009	0.009	0.009	0.009
Mercury Hg	ug/L	0.0035211	0.0035044	0.0034862	0.0032929	0.0025393	0.0027335	0.0028706	0.0026612	0.0027145	0.0026969	0.0026829	0.0026733
Molybdenum Mo	mg/L	0.00432	0.00429	0.00427	0.00392	0.00297	0.00318	0.00332	0.00307	0.00313	0.00311	0.00310	0.00309
Nickel Ni	mg/L	0.0068	0.0068	0.0068	0.0063	0.0048	0.0052	0.0054	0.0050	0.0051	0.0051	0.0050	0.0050
Phosphorus P	mg/L	0.286	0.284	0.283	0.261	0.199	0.214	0.223	0.207	0.211	0.210	0.208	0.208
Potassium K	mg/L	11.8	11.8	11.7	11.0	8.4	9.0	9.5	8.8	9.0	8.9	8.9	8.8
Selenium Se	mg/L	0.00058	0.00058	0.00058	0.00061	0.00050	0.00055	0.00060	0.00056	0.00057	0.00056	0.00056	0.00056
Silicon SiO2	mg/L	2.82	2.80	2.79	2.57	1.96	2.10	2.20	2.04	2.08	2.07	2.06	2.05
Silver Ag	mg/L	0.0000709	0.0000705	0.0000702	0.0000676	0.0000533	0.0000579	0.0000616	0.0000574	0.0000585	0.0000582	0.0000579	0.0000577
Sodium Na	mg/L	31	31	31	31	25	27	29	27	27	27	27	27
Strontium Sr	mg/L	0.053	0.053	0.052	0.052	0.042	0.046	0.049	0.045	0.046	0.046	0.046	0.046
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000026	0.000026	0.000026	0.000025	0.000021	0.000023	0.000024	0.000022	0.000023	0.000023	0.000023	0.000023
Thorium Th	mg/L	0.000101	0.000101	0.000100	0.000097	0.000076	0.000083	0.000088	0.000082	0.000084	0.000083	0.000083	0.000082
Tin Sn	mg/L	0.00305	0.00304	0.00302	0.00278	0.00211	0.00226	0.00236	0.00219	0.00223	0.00222	0.00220	0.00220
Titanium Ti	mg/L	0.0012	0.0012	0.0011	0.0011	0.0008	0.0009	0.0009	0.0008	0.0009	0.0008	0.0008	0.0008
Uranium U	mg/L	0.000139	0.000138	0.000138	0.000133	0.000104	0.000113	0.000120	0.000112	0.000114	0.000113	0.000113	0.000112
Vanadium V	mg/L	0.0034	0.0033	0.0033	0.0031	0.0024	0.0026	0.0027	0.0025	0.0025	0.0025	0.0025	0.0025
Zinc Zn	mg/L	0.0106	0.0105	0.0105	0.0106	0.0082	0.0089	0.0093	0.0087	0.0088	0.0088	0.0087	0.0087
Zirconium Zr	mg/L	0.0060	0.0059	0.0059	0.0064	0.0053	0.0058	0.0063	0.0059	0.0060	0.0059	0.0059	0.0059

Water Quality in TAIL LAKE													
Date	Units	Year 5 Mar-12	Year 5 Apr-12	Year 5 May-12	Year 5 Jun-12	Year 5 Jul-12	Year 5 Aug-12	Year 5 Sep-12	Year 5 Oct-12	Year 5 Nov-12	Year 5 Dec-12	Year 5 Jan-13	Year 5 Feb-13
Parameter													
TDS	mg/L	498	495	493	679	680	928	1178	1292	1317	1309	1302	1297
TSS	mg/L	1.5	1.5	1.5	1.6	1.3	1.4	1.5	1.4	1.5	1.5	1.5	1.5
Free CN	mg/L												
Total CN	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L	0.035	0.035	0.035	0.033	0.024	0.026	0.027	0.025	0.025	0.025	0.025	0.025
Sulphate	mg/L	36.2	36.0	35.8	34.2	25.4	27.3	28.6	26.5	27.0	26.8	26.7	26.6
Chloride	mg/L	630	626	623	710	631	797	958	1009	1029	1023	1017	1014
Total Ammonia-N	mg/L	0.003	0.003	0.003	0.032	0.013	0.008	0.011	0.003	0.003	0.003	0.003	0.003
Nitrate-N	mg/L	3.66	3.54	3.42	3.45	2.67	2.92	3.14	2.93	2.89	2.77	2.65	2.54
Nitrite-N	mg/L	0.002	0.002	0.002	0.006	0.005	0.003	0.003	0.002	0.002	0.002	0.002	0.002
Alkalinity	mg/L	37	37	36	39	31	34	36	34	35	34	34	34
OrthoPhosphate-P	mg/L	0.1543	0.1536	0.1528	0.1435	0.1054	0.1129	0.1177	0.1089	0.1111	0.1104	0.1098	0.1094
Phosphate-P	mg/L	0.1585	0.1577	0.1569	0.1486	0.1096	0.1175	0.1226	0.1135	0.1158	0.1150	0.1144	0.1140
Org. Carbon	mg/L	4.7	4.7	4.7	5.5	4.4	4.9	5.3	4.9	5.0	5.0	5.0	4.9
Hardness CaCO3	mg/L	59	58	58	61	47	52	55	51	52	52	52	51
Total Metals													
Aluminum Al	mg/L	0.04	0.04	0.04	0.04	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Antimony Sb	mg/L	0.0136	0.0135	0.0134	0.0126	0.0092	0.0099	0.0103	0.0095	0.0097	0.0097	0.0096	0.0096
Arsenic As	mg/L	0.0015	0.0014	0.0014	0.0014	0.0011	0.0012	0.0013	0.0012	0.0012	0.0012	0.0012	0.0012
Barium Ba	mg/L	0.0047	0.0046	0.0046	0.0047	0.0036	0.0040	0.0042	0.0039	0.0040	0.0040	0.0039	0.0039
Beryllium Be	mg/L	0.00050	0.00050	0.00049	0.00047	0.00035	0.00038	0.00040	0.00037	0.00038	0.00038	0.00038	0.00037
Bismuth Bi	mg/L	0.01348	0.01341	0.01334	0.01251	0.00918	0.00983	0.01025	0.00949	0.00968	0.00961	0.00956	0.00953
Boron B	mg/L	0.027	0.027	0.027	0.028	0.022	0.025	0.026	0.025	0.025	0.025	0.025	0.025
Cadmium Cd	mg/L	0.0000384	0.0000383	0.0000381	0.0000387	0.0000301	0.0000330	0.0000354	0.0000330	0.0000337	0.0000335	0.0000333	0.0000332
Calcium Ca	mg/L	138	137	137	141	114	134	152	153	156	155	154	154
Chromium Cr	mg/L	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt Co	mg/L	0.0022	0.0022	0.0022	0.0021	0.0015	0.0016	0.0017	0.0016	0.0016	0.0016	0.0016	0.0016
Copper Cu	mg/L	0.0036	0.0036	0.0036	0.0036	0.0027	0.0029	0.0030	0.0028	0.0029	0.0029	0.0029	0.0028
Iron Fe	mg/L	0.08	0.08	0.08	0.08	0.07	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Lead Pb	mg/L	0.00032	0.00032	0.00032	0.00032	0.00024	0.00026	0.00028	0.00026	0.00026	0.00026	0.00026	0.00026
Lithium Li	mg/L	0.0017	0.0017	0.0017	0.0016	0.0012	0.0013	0.0014	0.0013	0.0013	0.0013	0.0013	0.0013
Magnesium Mg	mg/L	7.2	7.1	7.1	7.5	5.9	6.5	6.9	6.5	6.6	6.6	6.5	6.5
Manganese Mn	mg/L	0.009	0.009	0.009	0.009	0.007	0.007	0.008	0.007	0.007	0.007	0.007	0.007
Mercury Hg	ug/L	0.0026633	0.0026504	0.0026364	0.0025812	0.0019400	0.0020934	0.0022034	0.0020440	0.0020849	0.0020714	0.0020607	0.0020533
Molybdenum Mo	mg/L	0.00308	0.00306	0.00304	0.00287	0.00212	0.00227	0.00237	0.00219	0.00223	0.00222	0.00221	0.00220
Nickel Ni	mg/L	0.0050	0.0050	0.0050	0.0047	0.0035	0.0038	0.0040	0.0037	0.0038	0.0037	0.0037	0.0037
Phosphorus P	mg/L	0.207	0.206	0.205	0.195	0.144	0.155	0.162	0.150	0.153	0.152	0.152	0.151
Potassium K	mg/L	8.8	8.8	8.7	8.5	6.3	6.8	7.2	6.7	6.8	6.8	6.7	6.7
Selenium Se	mg/L	0.00056	0.00055	0.00055	0.00061	0.00049	0.00055	0.00059	0.00055	0.00057	0.00056	0.00056	0.00056
Silicon SiO2	mg/L	2.04	2.03	2.02	1.92	1.43	1.54	1.61	1.49	1.52	1.51	1.50	1.50
Silver Ag	mg/L	0.0000574	0.0000572	0.0000569	0.0000570	0.0000439	0.0000479	0.0000512	0.0000478	0.0000488	0.0000485	0.0000482	0.0000480
Sodium Na	mg/L	27	27	26	94	128	204	282	328	334	332	330	329
Strontium Sr	mg/L	0.045	0.045	0.045	0.047	0.037	0.040	0.043	0.040	0.041	0.041	0.040	0.040
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000022	0.000022	0.000022	0.000023	0.000018	0.000020	0.000021	0.000020	0.000020	0.000020	0.000020	0.000020
Thorium Th	mg/L	0.000082	0.000082	0.000081	0.000082	0.000063	0.000069	0.000074	0.000069	0.000071	0.000070	0.000070	0.000070
Tin Sn	mg/L	0.00219	0.00218	0.00217	0.00204	0.00151	0.00162	0.00169	0.00157	0.00160	0.00159	0.00158	0.00157
Titanium Ti	mg/L	0.0008	0.0008	0.0008	0.0009	0.0008	0.0008	0.0009	0.0008	0.0009	0.0009	0.0008	0.0008
Uranium U	mg/L	0.000112	0.000111	0.000111	0.000112	0.000086	0.000094	0.000100	0.000093	0.000095	0.000094	0.000094	0.000093
Vanadium V	mg/L	0.0025	0.0025	0.0025	0.0024	0.0018	0.0019	0.0020	0.0019	0.0019	0.0019	0.0019	0.0019
Zinc Zn	mg/L	0.0087	0.0086	0.0086	0.0091	0.0069	0.0074	0.0079	0.0073	0.0074	0.0074	0.0074	0.0073
Zirconium Zr	mg/L	0.0059	0.0058	0.0058	0.0065	0.0052	0.0057	0.0062	0.0058	0.0059	0.0059	0.0058	0.0058

Water Quality in TAIL LAKE													
Date	Units	Year 6 Mar-13	Year 6 Apr-13	Year 6 May-13	Year 6 Jun-13	Year 6 Jul-13	Year 6 Aug-13	Year 6 Sep-13	Year 6 Oct-13	Year 6 Nov-13	Year 6 Dec-13	Year 6 Jan-14	Year 6 Feb-14
Parameter													
TDS	mg/L	1293	1286	1280	1219	900	966	1011	936	955	949	944	940
TSS	mg/L	1.5	1.4	1.4	1.6	1.2	1.4	1.5	1.4	1.4	1.4	1.4	1.4
Free CN	mg/L												
Total CN	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L	0.025	0.025	0.024	0.023	0.017	0.018	0.019	0.017	0.018	0.018	0.017	0.017
Sulphate	mg/L	26.5	26.3	26.2	25.2	18.7	20.2	21.2	19.6	20.0	19.9	19.8	19.7
Chloride	mg/L	1010	1005	1000	943	694	744	777	719	734	729	725	723
Total Ammonia-N	mg/L	0.003	0.003	0.003	0.032	0.013	0.008	0.011	0.003	0.003	0.003	0.003	0.003
Nitrate-N	mg/L	2.43	2.32	2.20	2.31	1.83	2.03	2.20	2.07	2.01	1.89	1.78	1.67
Nitrite-N	mg/L	0.002	0.002	0.002	0.006	0.005	0.003	0.003	0.002	0.002	0.002	0.002	0.002
Alkalinity	mg/L	34	34	34	37	29	32	34	32	32	32	32	32
OrthoPhosphate-P	mg/L	0.1090	0.1085	0.1079	0.1015	0.0746	0.0799	0.0833	0.0771	0.0787	0.0782	0.0778	0.0775
Phosphate-P	mg/L	0.1136	0.1130	0.1124	0.1070	0.0790	0.0848	0.0886	0.0820	0.0836	0.0831	0.0827	0.0824
Org. Carbon	mg/L	4.9	4.9	4.9	5.7	4.6	5.0	5.4	5.0	5.2	5.1	5.1	5.1
Hardness CaCO3	mg/L	51	51	51	54	42	46	49	46	47	47	46	46
Total Metals													
Aluminum Al	mg/L	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Antimony Sb	mg/L	0.0096	0.0095	0.0095	0.0089	0.0065	0.0070	0.0073	0.0067	0.0069	0.0068	0.0068	0.0068
Arsenic As	mg/L	0.0012	0.0012	0.0012	0.0012	0.0009	0.0010	0.0011	0.0010	0.0010	0.0010	0.0010	0.0010
Barium Ba	mg/L	0.0039	0.0039	0.0039	0.0040	0.0031	0.0034	0.0036	0.0034	0.0035	0.0034	0.0034	0.0034
Beryllium Be	mg/L	0.00037	0.00037	0.00037	0.00036	0.00027	0.00029	0.00031	0.00028	0.00029	0.00029	0.00029	0.00029
Bismuth Bi	mg/L	0.00949	0.00945	0.00940	0.00881	0.00647	0.00693	0.00723	0.00669	0.00682	0.00678	0.00674	0.00672
Boron B	mg/L	0.025	0.025	0.024	0.026	0.021	0.023	0.025	0.023	0.023	0.023	0.023	0.023
Cadmium Cd	mg/L	0.0000331	0.0000329	0.0000327	0.0000337	0.0000264	0.0000291	0.0000313	0.0000293	0.0000299	0.0000297	0.0000295	0.0000294
Calcium Ca	mg/L	153	152	151	143	106	113	118	110	112	111	110	110
Chromium Cr	mg/L	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt Co	mg/L	0.0016	0.0016	0.0016	0.0015	0.0011	0.0012	0.0012	0.0011	0.0012	0.0012	0.0012	0.0011
Copper Cu	mg/L	0.0028	0.0028	0.0028	0.0028	0.0021	0.0023	0.0024	0.0023	0.0023	0.0023	0.0023	0.0023
Iron Fe	mg/L	0.09	0.09	0.09	0.09	0.08	0.09	0.10	0.09	0.09	0.09	0.09	0.09
Lead Pb	mg/L	0.00026	0.00026	0.00026	0.00026	0.00020	0.00022	0.00023	0.00021	0.00022	0.00022	0.00021	0.00021
Lithium Li	mg/L	0.0013	0.0012	0.0012	0.0012	0.0009	0.0010	0.0010	0.0009	0.0010	0.0010	0.0009	0.0009
Magnesium Mg	mg/L	6.5	6.4	6.4	6.9	5.4	6.0	6.4	6.0	6.1	6.1	6.0	6.0
Manganese Mn	mg/L	0.007	0.007	0.007	0.007	0.005	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Mercury Hg	ug/L	0.0020456	0.0020357	0.0020250	0.0020084	0.0015198	0.0016435	0.0017346	0.0016103	0.0016425	0.0016319	0.0016234	0.0016176
Molybdenum Mo	mg/L	0.00219	0.00218	0.00217	0.00205	0.00151	0.00162	0.00169	0.00157	0.00160	0.00159	0.00158	0.00158
Nickel Ni	mg/L	0.0037	0.0037	0.0036	0.0035	0.0026	0.0028	0.0030	0.0028	0.0028	0.0028	0.0028	0.0028
Phosphorus P	mg/L	0.150	0.150	0.149	0.143	0.106	0.114	0.119	0.111	0.113	0.112	0.112	0.111
Potassium K	mg/L	6.7	6.7	6.6	6.5	4.9	5.3	5.6	5.2	5.3	5.3	5.2	5.2
Selenium Se	mg/L	0.00055	0.00055	0.00055	0.00061	0.00049	0.00055	0.00059	0.00055	0.00056	0.00056	0.00056	0.00056
Silicon SiO2	mg/L	1.49	1.49	1.48	1.42	1.06	1.14	1.20	1.11	1.13	1.12	1.12	1.11
Silver Ag	mg/L	0.0000479	0.0000476	0.0000474	0.0000481	0.0000374	0.0000410	0.0000440	0.0000411	0.0000419	0.0000416	0.0000414	0.0000413
Sodium Na	mg/L	328	326	324	307	227	243	255	236	240	239	238	237
Strontium Sr	mg/L	0.040	0.040	0.040	0.042	0.033	0.036	0.039	0.036	0.037	0.037	0.037	0.036
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000020	0.000020	0.000020	0.000021	0.000017	0.000018	0.000020	0.000018	0.000019	0.000018	0.000018	0.000018
Thorium Th	mg/L	0.000069	0.000069	0.000069	0.000070	0.000055	0.000060	0.000065	0.000061	0.000062	0.000061	0.000061	0.000061
Tin Sn	mg/L	0.00157	0.00156	0.00155	0.00147	0.00109	0.00117	0.00122	0.00113	0.00115	0.00115	0.00114	0.00114
Titanium Ti	mg/L	0.0008	0.0008	0.0008	0.0009	0.0008	0.0008	0.0009	0.0008	0.0009	0.0009	0.0009	0.0008
Uranium U	mg/L	0.000093	0.000093	0.000092	0.000094	0.000073	0.000080	0.000085	0.000080	0.000081	0.000081	0.000080	0.000080
Vanadium V	mg/L	0.0019	0.0019	0.0019	0.0019	0.0014	0.0015	0.0016	0.0015	0.0015	0.0015	0.0015	0.0015
Zinc Zn	mg/L	0.0073	0.0073	0.0072	0.0078	0.0059	0.0064	0.0068	0.0063	0.0065	0.0064	0.0064	0.0064
Zirconium Zr	mg/L	0.0058	0.0058	0.0057	0.0064	0.0051	0.0057	0.0061	0.0057	0.0058	0.0058	0.0058	0.0057

Water Quality in TAIL LAKE													
Date	Units	Year 7 Mar-14	Year 7 Apr-14	Year 7 May-14	Year 7 Jun-14	Year 7 Jul-14	Year 7 Aug-14	Year 7 Sep-14	Year 7 Oct-14	Year 7 Nov-14	Year 7 Dec-14	Year 7 Jan-15	Year 7 Feb-15
Parameter													
TDS	mg/L	937	932	928	889	658	707	741	687	700	696	692	690
TSS	mg/L	1.4	1.4	1.4	1.5	1.2	1.3	1.5	1.4	1.4	1.4	1.4	1.4
Free CN	mg/L												
Total CN	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L	0.017	0.017	0.017	0.016	0.012	0.013	0.013	0.012	0.012	0.012	0.012	0.012
Sulphate	mg/L	19.6	19.5	19.4	18.8	14.0	15.1	15.8	14.7	15.0	14.9	14.8	14.7
Chloride	mg/L	720	717	713	674	497	533	557	516	526	523	520	518
Total Ammonia-N	mg/L	0.003	0.003	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Nitrate-N	mg/L	1.57	1.46	1.35	1.27	0.93	1.00	1.04	0.96	0.88	0.77	0.66	0.56
Nitrite-N	mg/L	0.002	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Alkalinity	mg/L	32	32	31	35	28	30	33	30	31	31	31	30
OrthoPhosphate-P	mg/L	0.0772	0.0768	0.0764	0.0719	0.0529	0.0567	0.0592	0.0548	0.0559	0.0555	0.0552	0.0550
Phosphate-P	mg/L	0.0820	0.0816	0.0812	0.0778	0.0576	0.0618	0.0646	0.0598	0.0610	0.0606	0.0603	0.0601
Org. Carbon	mg/L	5.1	5.0	5.0	5.8	4.6	5.1	5.5	5.1	5.2	5.2	5.2	5.2
Hardness CaCO3	mg/L	46	46	46	49	38	42	45	42	43	43	43	43
Total Metals													
Aluminum Al	mg/L	0.04	0.04	0.04	0.04	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Antimony Sb	mg/L	0.0067	0.0067	0.0067	0.0062	0.0046	0.0049	0.0051	0.0047	0.0048	0.0048	0.0048	0.0048
Arsenic As	mg/L	0.0010	0.0010	0.0010	0.0010	0.0008	0.0008	0.0009	0.0008	0.0008	0.0008	0.0008	0.0008
Barium Ba	mg/L	0.0034	0.0034	0.0034	0.0035	0.0027	0.0030	0.0032	0.0030	0.0031	0.0030	0.0030	0.0030
Beryllium Be	mg/L	0.00028	0.00028	0.00028	0.00026	0.00019	0.00021	0.00022	0.00020	0.00020	0.00020	0.00020	0.00020
Bismuth Bi	mg/L	0.00669	0.00666	0.00663	0.00621	0.00455	0.00487	0.00508	0.00470	0.00479	0.00476	0.00474	0.00472
Boron B	mg/L	0.023	0.023	0.023	0.024	0.019	0.021	0.022	0.021	0.021	0.021	0.021	0.021
Cadmium Cd	mg/L	0.0000293	0.0000292	0.0000290	0.0000277	0.0000206	0.0000221	0.0000231	0.0000214	0.0000218	0.0000217	0.0000216	0.0000215
Calcium Ca	mg/L	110	109	108	103	76	81	85	79	80	80	79	79
Chromium Cr	mg/L	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt Co	mg/L	0.0011	0.0011	0.0011	0.0011	0.0008	0.0008	0.0009	0.0008	0.0008	0.0008	0.0008	0.0008
Copper Cu	mg/L	0.0023	0.0023	0.0022	0.0023	0.0017	0.0019	0.0020	0.0018	0.0019	0.0019	0.0019	0.0019
Iron Fe	mg/L	0.09	0.09	0.09	0.10	0.08	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Lead Pb	mg/L	0.00021	0.00021	0.00021	0.00020	0.00015	0.00017	0.00017	0.00016	0.00016	0.00016	0.00016	0.00016
Lithium Li	mg/L	0.0009	0.0009	0.0009	0.0009	0.0007	0.0007	0.0008	0.0007	0.0007	0.0007	0.0007	0.0007
Magnesium Mg	mg/L	6.0	6.0	5.9	6.4	5.1	5.6	6.0	5.6	5.7	5.7	5.7	5.6
Manganese Mn	mg/L	0.006	0.006	0.006	0.006	0.004	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Mercury Hg	ug/L	0.0016115	0.0016038	0.0015953	0.0016057	0.0012243	0.0013271	0.0014047	0.0013051	0.0013312	0.0013226	0.0013157	0.0013110
Molybdenum Mo	mg/L	0.00157	0.00156	0.00155	0.00148	0.00109	0.00117	0.00122	0.00113	0.00116	0.00115	0.00114	0.00114
Nickel Ni	mg/L	0.0028	0.0027	0.0027	0.0027	0.0020	0.0021	0.0023	0.0021	0.0021	0.0021	0.0021	0.0021
Phosphorus P	mg/L	0.111	0.110	0.110	0.104	0.077	0.082	0.086	0.080	0.081	0.081	0.080	0.080
Potassium K	mg/L	5.2	5.2	5.1	5.1	3.9	4.2	4.5	4.1	4.2	4.2	4.2	4.2
Selenium Se	mg/L	0.00055	0.00055	0.00055	0.00060	0.00048	0.00053	0.00057	0.00053	0.00054	0.00054	0.00053	0.00053
Silicon SiO2	mg/L	1.11	1.10	1.10	1.04	0.76	0.82	0.85	0.79	0.81	0.80	0.80	0.79
Silver Ag	mg/L	0.0000411	0.0000409	0.0000407	0.0000384	0.0000284	0.0000304	0.0000317	0.0000294	0.0000300	0.0000298	0.0000296	0.0000295
Sodium Na	mg/L	236	235	233	222	164	177	185	171	175	173	172	172
Strontium Sr	mg/L	0.036	0.036	0.036	0.038	0.030	0.033	0.036	0.033	0.034	0.034	0.034	0.034
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000018	0.000018	0.000018	0.000018	0.000014	0.000015	0.000016	0.000015	0.000015	0.000015	0.000015	0.000015
Thorium Th	mg/L	0.000061	0.000060	0.000060	0.000057	0.000042	0.000045	0.000047	0.000044	0.000045	0.000044	0.000044	0.000044
Tin Sn	mg/L	0.00113	0.00113	0.00112	0.00106	0.00078	0.00083	0.00087	0.00081	0.00082	0.00082	0.00081	0.00081
Titanium Ti	mg/L	0.0008	0.0008	0.0008	0.0009	0.0007	0.0008	0.0009	0.0008	0.0008	0.0008	0.0008	0.0008
Uranium U	mg/L	0.000080	0.000080	0.000079	0.000077	0.000057	0.000062	0.000065	0.000060	0.000061	0.000061	0.000060	0.000060
Vanadium V	mg/L	0.0015	0.0015	0.0015	0.0015	0.0011	0.0012	0.0012	0.0011	0.0012	0.0011	0.0011	0.0011
Zinc Zn	mg/L	0.0063	0.0063	0.0063	0.0069	0.0052	0.0057	0.0060	0.0056	0.0057	0.0056	0.0056	0.0056
Zirconium Zr	mg/L	0.0057	0.0057	0.0057	0.0062	0.0050	0.0054	0.0059	0.0055	0.0056	0.0055	0.0055	0.0055

Water Quality in TAIL LAKE													
Date	Units	Year 8 Mar-15	Year 8 Apr-15	Year 8 May-15	Year 8 Jun-15	Year 8 Jul-15	Year 8 Aug-15	Year 8 Sep-15	Year 8 Oct-15	Year 8 Nov-15	Year 8 Dec-15	Year 8 Jan-16	Year 8 Feb-16
Parameter													
TDS	mg/L	687	684	680	657	488	525	551	511	521	518	515	513
TSS	mg/L	1.4	1.4	1.4	1.5	1.2	1.3	1.5	1.4	1.4	1.4	1.4	1.4
Free CN	mg/L												
Total CN	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L	0.012	0.012	0.012	0.011	0.008	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Sulphate	mg/L	14.7	14.6	14.5	14.2	10.6	11.5	12.1	11.2	11.4	11.3	11.3	11.2
Chloride	mg/L	516	514	511	485	359	385	403	373	380	378	376	375
Total Ammonia-N	mg/L	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Nitrate-N	mg/L	0.46	0.35	0.25	0.24	0.17	0.19	0.19	0.18	0.08			
Nitrite-N	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Alkalinity	mg/L	30	30	30	33	27	29	31	29	30	30	30	29
OrthoPhosphate-P	mg/L	0.0548	0.0546	0.0543	0.0512	0.0377	0.0404	0.0422	0.0391	0.0398	0.0396	0.0394	0.0392
Phosphate-P	mg/L	0.0599	0.0596	0.0593	0.0572	0.0425	0.0457	0.0478	0.0443	0.0452	0.0449	0.0446	0.0445
Org. Carbon	mg/L	5.1	5.1	5.1	5.9	4.7	5.2	5.6	5.2	5.3	5.3	5.2	5.2
Hardness CaCO3	mg/L	42	42	42	45	36	40	43	40	41	40	40	40
Total Metals													
Aluminum Al	mg/L	0.04	0.04	0.04	0.04	0.03	0.03	0.04	0.03	0.04	0.04	0.03	0.03
Antimony Sb	mg/L	0.0047	0.0047	0.0047	0.0044	0.0032	0.0035	0.0036	0.0033	0.0034	0.0034	0.0034	0.0033
Arsenic As	mg/L	0.0008	0.0008	0.0008	0.0008	0.0006	0.0007	0.0007	0.0006	0.0007	0.0007	0.0006	0.0006
Barium Ba	mg/L	0.0030	0.0030	0.0030	0.0032	0.0025	0.0027	0.0029	0.0027	0.0028	0.0028	0.0028	0.0028
Beryllium Be	mg/L	0.00020	0.00020	0.00020	0.00019	0.00014	0.00015	0.00015	0.00014	0.00015	0.00014	0.00014	0.00014
Bismuth Bi	mg/L	0.00470	0.00468	0.00466	0.00436	0.00320	0.00343	0.00357	0.00330	0.00337	0.00335	0.00333	0.00332
Boron B	mg/L	0.021	0.021	0.021	0.022	0.018	0.019	0.021	0.019	0.020	0.019	0.019	0.019
Cadmium Cd	mg/L	0.0000214	0.0000213	0.0000212	0.0000204	0.0000152	0.0000164	0.0000171	0.0000159	0.0000162	0.0000161	0.0000160	0.0000159
Calcium Ca	mg/L	79	78	78	74	55	59	62	57	58	58	58	57
Chromium Cr	mg/L	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt Co	mg/L	0.0008	0.0008	0.0008	0.0008	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006
Copper Cu	mg/L	0.0018	0.0018	0.0018	0.0019	0.0014	0.0016	0.0017	0.0015	0.0016	0.0016	0.0016	0.0016
Iron Fe	mg/L	0.10	0.10	0.09	0.10	0.08	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Lead Pb	mg/L	0.00016	0.00016	0.00016	0.00015	0.00012	0.00013	0.00013	0.00012	0.00013	0.00012	0.00012	0.00012
Lithium Li	mg/L	0.0007	0.0007	0.0007	0.0007	0.0005	0.0005	0.0006	0.0005	0.0005	0.0005	0.0005	0.0005
Magnesium Mg	mg/L	5.6	5.6	5.6	6.1	4.9	5.4	5.8	5.4	5.5	5.4	5.4	5.4
Manganese Mn	mg/L	0.005	0.005	0.005	0.005	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
Mercury Hg	ug/L	0.0013061	0.0012998	0.0012929	0.0013225	0.0010166	0.0011047	0.0011729	0.0010906	0.0011125	0.0011053	0.0010995	0.0010956
Molybdenum Mo	mg/L	0.00113	0.00113	0.00112	0.00107	0.00079	0.00085	0.00089	0.00083	0.00084	0.00084	0.00083	0.00083
Nickel Ni	mg/L	0.0021	0.0021	0.0021	0.0020	0.0015	0.0017	0.0017	0.0016	0.0017	0.0016	0.0016	0.0016
Phosphorus P	mg/L	0.080	0.079	0.079	0.075	0.056	0.060	0.063	0.058	0.059	0.059	0.058	0.058
Potassium K	mg/L	4.1	4.1	4.1	4.2	3.2	3.4	3.6	3.4	3.5	3.4	3.4	3.4
Selenium Se	mg/L	0.00053	0.00053	0.00053	0.00058	0.00046	0.00051	0.00055	0.00051	0.00053	0.00052	0.00052	0.00052
Silicon SiO2	mg/L	0.79	0.79	0.78	0.74	0.54	0.58	0.61	0.56	0.58	0.57	0.57	0.57
Silver Ag	mg/L	0.0000294	0.0000292	0.0000291	0.0000275	0.0000204	0.0000218	0.0000228	0.0000211	0.0000215	0.0000214	0.0000213	0.0000212
Sodium Na	mg/L	171	170	169	162	120	129	136	126	128	127	127	126
Strontium Sr	mg/L	0.033	0.033	0.033	0.036	0.028	0.031	0.034	0.031	0.032	0.032	0.032	0.032
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000015	0.000015	0.000015	0.000015	0.000012	0.000013	0.000014	0.000013	0.000013	0.000013	0.000013	0.000013
Thorium Th	mg/L	0.000044	0.000044	0.000043	0.000041	0.000031	0.000033	0.000034	0.000032	0.000033	0.000032	0.000032	0.000032
Tin Sn	mg/L	0.00081	0.00080	0.00080	0.00075	0.00056	0.00060	0.00062	0.00058	0.00059	0.00058	0.00058	0.00058
Titanium Ti	mg/L	0.0008	0.0008	0.0008	0.0009	0.0007	0.0008	0.0009	0.0008	0.0008	0.0008	0.0008	0.0008
Uranium U	mg/L	0.000060	0.000060	0.000059	0.000058	0.000044	0.000047	0.000050	0.000046	0.000047	0.000047	0.000046	0.000046
Vanadium V	mg/L	0.0011	0.0011	0.0011	0.0011	0.0009	0.0009	0.0010	0.0009	0.0009	0.0009	0.0009	0.0009
Zinc Zn	mg/L	0.0056	0.0055	0.0055	0.0062	0.0047	0.0051	0.0054	0.0050	0.0051	0.0051	0.0051	0.0050
Zirconium Zr	mg/L	0.0055	0.0054	0.0054	0.0060	0.0048	0.0053	0.0057	0.0053	0.0054	0.0054	0.0053	0.0053

Water Quality in TAIL LAKE													
Date	Units	Year 9 Mar-16	Year 9 Apr-16	Year 9 May-16	Year 9 Jun-16	Year 9 Jul-16	Year 9 Aug-16	Year 9 Sep-16	Year 9 Oct-16	Year 9 Nov-16	Year 9 Dec-16	Year 9 Jan-17	Year 9 Feb-17
Parameter													
TDS	mg/L	511	509	506	495	369	398	418	388	396	393	391	390
TSS	mg/L	1.4	1.4	1.3	1.5	1.2	1.3	1.4	1.3	1.4	1.4	1.4	1.4
Free CN	mg/L												
Total CN	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L	0.009	0.009	0.008	0.008	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Sulphate	mg/L	11.2	11.1	11.1	10.9	8.3	8.9	9.4	8.7	8.9	8.9	8.8	8.8
Chloride	mg/L	373	372	370	353	261	281	294	273	278	276	275	274
Total Ammonia-N	mg/L	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Nitrate-N	mg/L				0.00	0.00	0.00	0.00	0.00				
Nitrite-N	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Alkalinity	mg/L	29	29	29	32	26	29	31	29	29	29	29	29
OrthoPhosphate-P	mg/L	0.0391	0.0389	0.0387	0.0366	0.0270	0.0290	0.0303	0.0280	0.0286	0.0284	0.0283	0.0282
Phosphate-P	mg/L	0.0443	0.0441	0.0439	0.0428	0.0319	0.0343	0.0360	0.0333	0.0340	0.0338	0.0336	0.0335
Org. Carbon	mg/L	5.2	5.2	5.2	5.9	4.8	5.2	5.6	5.2	5.4	5.3	5.3	5.3
Hardness CaCO3	mg/L	40	40	39	43	34	38	41	38	39	38	38	38
Total Metals													
Aluminum Al	mg/L	0.03	0.03	0.03	0.04	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.03
Antimony Sb	mg/L	0.0033	0.0033	0.0033	0.0031	0.0023	0.0024	0.0025	0.0023	0.0024	0.0024	0.0024	0.0024
Arsenic As	mg/L	0.0006	0.0006	0.0006	0.0006	0.0005	0.0005	0.0006	0.0005	0.0005	0.0005	0.0005	0.0005
Barium Ba	mg/L	0.0027	0.0027	0.0027	0.0029	0.0023	0.0025	0.0027	0.0026	0.0026	0.0026	0.0026	0.0026
Beryllium Be	mg/L	0.00014	0.00014	0.00014	0.00013	0.00010	0.00010	0.00011	0.00010	0.00010	0.00010	0.00010	0.00010
Bismuth Bi	mg/L	0.00331	0.00329	0.00327	0.00307	0.00225	0.00241	0.00251	0.00232	0.00237	0.00235	0.00234	0.00233
Boron B	mg/L	0.019	0.019	0.019	0.021	0.017	0.018	0.019	0.018	0.018	0.018	0.018	0.018
Cadmium Cd	mg/L	0.0000159	0.0000158	0.0000157	0.0000152	0.0000114	0.0000123	0.0000129	0.0000120	0.0000122	0.0000121	0.0000121	0.0000120
Calcium Ca	mg/L	57	57	57	54	40	43	45	42	43	43	42	42
Chromium Cr	mg/L	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt Co	mg/L	0.0006	0.0006	0.0006	0.0005	0.0004	0.0004	0.0005	0.0004	0.0004	0.0004	0.0004	0.0004
Copper Cu	mg/L	0.0015	0.0015	0.0015	0.0016	0.0012	0.0014	0.0014	0.0013	0.0014	0.0014	0.0013	0.0013
Iron Fe	mg/L	0.10	0.10	0.10	0.10	0.08	0.10	0.11	0.10	0.10	0.10	0.10	0.10
Lead Pb	mg/L	0.00012	0.00012	0.00012	0.00012	0.00009	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010
Lithium Li	mg/L	0.0005	0.0005	0.0005	0.0005	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004
Magnesium Mg	mg/L	5.4	5.3	5.3	5.9	4.7	5.2	5.6	5.2	5.3	5.3	5.2	5.2
Manganese Mn	mg/L	0.004	0.004	0.004	0.004	0.003	0.004	0.004	0.004	0.004	0.004	0.004	0.004
Mercury Hg	ug/L	0.0010915	0.0010862	0.0010805	0.0011235	0.0008706	0.0009484	0.0010100	0.0009399	0.0009587	0.0009525	0.0009476	0.0009442
Molybdenum Mo	mg/L	0.00083	0.00082	0.00082	0.00079	0.00059	0.00063	0.00066	0.00061	0.00062	0.00062	0.00062	0.00061
Nickel Ni	mg/L	0.0016	0.0016	0.0016	0.0016	0.0012	0.0013	0.0014	0.0013	0.0013	0.0013	0.0013	0.0013
Phosphorus P	mg/L	0.058	0.058	0.057	0.055	0.041	0.044	0.046	0.043	0.043	0.043	0.043	0.043
Potassium K	mg/L	3.4	3.4	3.4	3.5	2.7	2.9	3.1	2.9	2.9	2.9	2.9	2.9
Selenium Se	mg/L	0.00052	0.00051	0.00051	0.00056	0.00045	0.00050	0.00054	0.00050	0.00051	0.00051	0.00051	0.00051
Silicon SiO2	mg/L	0.57	0.56	0.56	0.53	0.39	0.42	0.44	0.41	0.41	0.41	0.41	0.41
Silver Ag	mg/L	0.0000211	0.0000210	0.0000209	0.0000198	0.0000148	0.0000158	0.0000166	0.0000153	0.0000156	0.0000155	0.0000155	0.0000154
Sodium Na	mg/L	126	125	125	120	90	96	101	94	96	95	95	94
Strontium Sr	mg/L	0.031	0.031	0.031	0.034	0.027	0.030	0.032	0.030	0.031	0.031	0.030	0.030
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000013	0.000013	0.000012	0.000013	0.000010	0.000011	0.000012	0.000011	0.000011	0.000011	0.000011	0.000011
Thorium Th	mg/L	0.000032	0.000032	0.000032	0.000030	0.000023	0.000024	0.000025	0.000024	0.000024	0.000024	0.000024	0.000024
Tin Sn	mg/L	0.00058	0.00057	0.00057	0.00054	0.00040	0.00043	0.00045	0.00041	0.00042	0.00042	0.00042	0.00042
Titanium Ti	mg/L	0.0008	0.0008	0.0008	0.0009	0.0007	0.0008	0.0009	0.0008	0.0008	0.0008	0.0008	0.0008
Uranium U	mg/L	0.000046	0.000046	0.000046	0.000045	0.000034	0.000037	0.000039	0.000036	0.000037	0.000037	0.000037	0.000036
Vanadium V	mg/L	0.0009	0.0009	0.0009	0.0009	0.0007	0.0008	0.0008	0.0007	0.0007	0.0007	0.0007	0.0007
Zinc Zn	mg/L	0.0050	0.0050	0.0050	0.0057	0.0043	0.0047	0.0050	0.0046	0.0047	0.0047	0.0047	0.0047
Zirconium Zr	mg/L	0.0053	0.0053	0.0052	0.0058	0.0047	0.0051	0.0055	0.0052	0.0053	0.0052	0.0052	0.0052

Water Quality in TAIL LAKE												
Date	Units	Year 10 Mar-17	Year 10 Apr-17	Year 10 May-17	Year 10 Jun-17	Year 10 Jul-17	Year 10 Aug-17	Year 10 Sep-17	Year 10 Oct-17	Year 10 Nov-17	Year 10 Dec-17	Year 10 Jan-18
Parameter												
TDS	mg/L	388	386	384	380	285	308	324	301	307	305	304
TSS	mg/L	1.3	1.3	1.3	1.5	1.2	1.3	1.4	1.3	1.4	1.4	1.4
Free CN	mg/L											
Total CN	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WAD CN	mg/L											
CNO	mg/L											
SCN	mg/L	0.006	0.006	0.006	0.006	0.004	0.004	0.005	0.004	0.004	0.004	0.004
Sulphate	mg/L	8.7	8.7	8.7	8.7	6.6	7.1	7.5	7.0	7.2	7.1	7.1
Chloride	mg/L	273	271	270	259	193	208	218	202	206	205	204
Total Ammonia-N	mg/L	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Nitrate-N	mg/L				0.00	0.00	0.00	0.00	0.00			
Nitrite-N	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Alkalinity	mg/L	29	28	28	32	25	28	30	28	29	28	28
OrthoPhosphate-P	mg/L	0.0281	0.0279	0.0278	0.0264	0.0195	0.0209	0.0219	0.0203	0.0207	0.0205	0.0204
Phosphate-P	mg/L	0.0334	0.0332	0.0330	0.0326	0.0245	0.0264	0.0277	0.0256	0.0262	0.0260	0.0258
Org. Carbon	mg/L	5.3	5.2	5.2	6.0	4.8	5.3	5.7	5.3	5.4	5.3	5.3
Hardness CaCO3	mg/L	38	38	38	41	33	36	39	37	37	37	37
Total Metals												
Aluminum Al	mg/L	0.03	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Antimony Sb	mg/L	0.0023	0.0023	0.0023	0.0022	0.0016	0.0017	0.0018	0.0017	0.0017	0.0017	0.0017
Arsenic As	mg/L	0.0005	0.0005	0.0005	0.0005	0.0004	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
Barium Ba	mg/L	0.0026	0.0025	0.0025	0.0028	0.0022	0.0024	0.0026	0.0024	0.0025	0.0025	0.0024
Beryllium Be	mg/L	0.00010	0.00010	0.00010	0.00009	0.00007	0.00007	0.00008	0.00007	0.00007	0.00007	0.00007
Bismuth Bi	mg/L	0.00232	0.00231	0.00230	0.00216	0.00158	0.00169	0.00176	0.00163	0.00167	0.00165	0.00165
Boron B	mg/L	0.018	0.018	0.018	0.020	0.016	0.017	0.019	0.017	0.018	0.018	0.017
Cadmium Cd	mg/L	0.0000120	0.0000119	0.0000119	0.0000116	0.0000088	0.0000095	0.0000100	0.0000093	0.0000094	0.0000094	0.0000093
Calcium Ca	mg/L	42	42	42	40	30	32	34	31	32	32	32
Chromium Cr	mg/L	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Cobalt Co	mg/L	0.0004	0.0004	0.0004	0.0004	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
Copper Cu	mg/L	0.0013	0.0013	0.0013	0.0014	0.0011	0.0012	0.0013	0.0012	0.0012	0.0012	0.0012
Iron Fe	mg/L	0.10	0.10	0.10	0.10	0.08	0.10	0.11	0.10	0.10	0.10	0.10
Lead Pb	mg/L	0.00010	0.00010	0.00010	0.00010	0.00007	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008
Lithium Li	mg/L	0.0004	0.0004	0.0004	0.0004	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
Magnesium Mg	mg/L	5.2	5.2	5.1	5.7	4.6	5.0	5.4	5.1	5.2	5.1	5.1
Manganese Mn	mg/L	0.004	0.004	0.004	0.004	0.003	0.003	0.004	0.003	0.003	0.003	0.003
Mercury Hg	ug/L	0.0009406	0.0009361	0.0009312	0.0009837	0.0007680	0.0008386	0.0008956	0.0008340	0.0008507	0.0008452	0.0008408
Molybdenum Mo	mg/L	0.00061	0.00061	0.00060	0.00059	0.00044	0.00047	0.00050	0.00046	0.00047	0.00047	0.00046
Nickel Ni	mg/L	0.0013	0.0013	0.0013	0.0013	0.0010	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011
Phosphorus P	mg/L	0.043	0.042	0.042	0.041	0.030	0.033	0.034	0.032	0.032	0.032	0.032
Potassium K	mg/L	2.9	2.9	2.8	3.0	2.3	2.5	2.7	2.5	2.6	2.5	2.5
Selenium Se	mg/L	0.00050	0.00050	0.00050	0.00055	0.00044	0.00049	0.00053	0.00050	0.00051	0.00050	0.00050
Silicon SiO2	mg/L	0.41	0.41	0.40	0.38	0.28	0.31	0.32	0.30	0.30	0.30	0.30
Silver Ag	mg/L	0.0000153	0.0000153	0.0000152	0.0000145	0.0000108	0.0000116	0.0000122	0.0000113	0.0000115	0.0000114	0.0000114
Sodium Na	mg/L	94	93	93	90	68	73	77	71	73	72	72
Strontium Sr	mg/L	0.030	0.030	0.030	0.033	0.026	0.029	0.031	0.029	0.030	0.030	0.029
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000011	0.000011	0.000011	0.000011	0.000009	0.000010	0.000011	0.000010	0.000010	0.000010	0.000010
Thorium Th	mg/L	0.000024	0.000024	0.000023	0.000023	0.000017	0.000018	0.000019	0.000018	0.000018	0.000018	0.000018
Tin Sn	mg/L	0.00042	0.00041	0.00041	0.00039	0.00029	0.00031	0.00033	0.00030	0.00031	0.00031	0.00030
Titanium Ti	mg/L	0.0008	0.0008	0.0008	0.0009	0.0007	0.0008	0.0009	0.0008	0.0008	0.0008	0.0008
Uranium U	mg/L	0.000036	0.000036	0.000036	0.000036	0.000028	0.000030	0.000032	0.000029	0.000030	0.000030	0.000030
Vanadium V	mg/L	0.0007	0.0007	0.0007	0.0008	0.0006	0.0006	0.0007	0.0006	0.0006	0.0006	0.0006
Zinc Zn	mg/L	0.0046	0.0046	0.0046	0.0053	0.0041	0.0044	0.0047	0.0044	0.0045	0.0044	0.0044
Zirconium Zr	mg/L	0.0052	0.0051	0.0051	0.0057	0.0046	0.0050	0.0054	0.0051	0.0052	0.0051	0.0051

Loadings to Tail Lake (kg/month)												
Date	Year 1 Mar-08	Year 1 Apr-08	Year 1 May-08	Year 1 Jun-08	Year 1 Jul-08	Year 1 Aug-08	Year 1 Sep-08	Year 1 Oct-08	Year 1 Nov-08	Year 1 Dec-08	Year 1 Jan-09	Year 1 Feb-09
Parameter												
TDS	64532	62450	64532	101399	77789	69223	69323	66338	62450	64532	64532	58287
TSS	153	148	153	502	319	231	279	188	148	153	153	138
Free CN	0.16	0.15	0.16	0.15	0.16	0.16	0.15	0.16	0.15	0.16	0.16	0.14
Total CN	2	2	2	3	3	2	2	2	2	2	2	2
WAD CN	0.23	0.22	0.23	0.22	0.23	0.23	0.22	0.23	0.22	0.23	0.23	0.20
CNO	363	351	363	351	363	363	351	363	351	363	363	328
SCN	10	10	10	10	10	10	10	10	10	10	10	9
Sulphate	6786	6567	6786	11414	9630	7931	8046	7283	6567	6786	6786	6129
Chloride	111587	107988	111587	143221	131801	119935	118630	115092	107988	111587	111587	100788
Total Ammonia-N	130	125	130	267	217	166	172	146	125	130	130	117
Nitrate-N	716	693	716	1794	1399	1003	1061	844	693	716	716	646
Nitrite-N	91	88	91	114	107	98	97	94	88	91	91	82
Alkalinity	3854	3729	3854	13502	8577	5399	5385	4289	3729	3854	3854	3481
OrthoPhosphate-P	21	21	21	21	22	21	21	21	21	21	21	19
Phosphate-P	21	21	21	23	22	22	21	21	21	21	21	19
Org. Carbon				2089.09	878.29	260.60	324.02	85.14				
Hardness CaCO3	8585	8308	8585	19993	14236	10696	10763	9230	8308	8585	8585	7754
Total Metals												
Aluminum Al	1.90	1.84	1.90	16.82	9.58	5.15	5.95	3.24	1.84	1.90	1.90	1.72
Antimony Sb	1.26	1.22	1.26	4.57	3.34	2.14	2.34	1.65	1.22	1.26	1.26	1.14
Arsenic As	0.22	0.21	0.22	0.53	0.41	0.30	0.30	0.25	0.21	0.22	0.22	0.20
Barium Ba	0.68	0.66	0.68	1.57	1.13	0.89	0.87	0.74	0.66	0.68	0.68	0.61
Beryllium Be	0.06	0.06	0.06	0.18	0.13	0.09	0.10	0.07	0.06	0.06	0.06	0.05
Bismuth Bi	1.24	1.20	1.24	4.55	3.32	2.11	2.32	1.63	1.20	1.24	1.24	1.12
Boron B	2.17	2.10	2.17	10.40	6.73	3.81	4.08	2.79	2.10	2.17	2.17	1.96
Cadmium Cd	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Calcium Ca	37571	36359	37571	39661	39297	38266	37170	37817	36359	37571	37571	33935
Chromium Cr	0.33	0.31	0.33	0.60	0.47	0.39	0.40	0.35	0.31	0.33	0.33	0.29
Cobalt Co	0.48	0.47	0.48	0.67	0.61	0.54	0.54	0.50	0.47	0.48	0.48	0.43
Copper Cu	0.76	0.74	0.76	1.17	0.97	0.83	0.82	0.79	0.74	0.76	0.76	0.69
Iron Fe	1.65	1.60	1.65	18.65	17.69	23.28	6.79	3.08	1.60	1.65	1.65	1.49
Lead Pb	0.04	0.04	0.04	0.12	0.09	0.06	0.06	0.05	0.04	0.04	0.04	0.04
Lithium Li	0.34	0.33	0.34	0.53	0.47	0.40	0.40	0.37	0.33	0.34	0.34	0.31
Magnesium Mg	633	612	633	2627	1633	1022	1038	756	612	633	633	572
Manganese Mn	1.77	1.71	1.77	2.63	2.40	2.30	2.02	1.86	1.71	1.77	1.77	1.60
Mercury Hg	0.62	0.60	0.62	0.82	0.72	0.65	0.64	0.63	0.60	0.62	0.62	0.56
Molybdenum Mo	0.84	0.81	0.84	0.88	0.87	0.85	0.83	0.85	0.81	0.84	0.84	0.76
Nickel Ni	1.04	1.00	1.04	1.56	1.35	1.16	1.16	1.09	1.00	1.04	1.04	0.94
Phosphorus P	29	28	29	41	36	32	32	30	28	29	29	26
Potassium K	2106	2038	2106	2677	2379	2203	2185	2147	2038	2106	2106	1902
Selenium Se	0.04	0.04	0.04	0.21	0.13	0.08	0.08	0.05	0.04	0.04	0.04	0.04
Silicon SiO2	529	512	529	618	595	557	547	541	512	529	529	477
Silver Ag	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.00
Sodium Na	3713	3593	3713	9196	6391	4691	4792	4029	3593	3713	3713	3353
Strontium Sr	6	6	6	16	11	8	8	6	6	6	6	5
Tellurium Te	0.03	0.03	0.03	0.06	0.05	0.04	0.04	0.03	0.03	0.03	0.03	0.03
Thallium Tl	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thorium Th	0.02	0.01	0.02	0.03	0.03	0.02	0.02	0.02	0.01	0.02	0.02	0.01
Tin Sn	0.21	0.21	0.21	0.75	0.55	0.35	0.38	0.27	0.21	0.21	0.21	0.19
Titanium Ti	0.09	0.09	0.09	0.29	0.22	0.15	0.16	0.12	0.09	0.09	0.09	0.08
Uranium U	0.02	0.02	0.02	0.04	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02
Vanadium V	0.22	0.22	0.22	0.92	0.59	0.37	0.41	0.29	0.22	0.22	0.22	0.20
Zinc Zn	1.0	0.9	1.0	3.6	1.8	1.3	1.3	1.1	0.9	1.0	1.0	0.9
Zirconium Zr	0.31	0.30	0.31	2.40	1.34	0.65	0.74	0.43	0.30	0.31	0.31	0.28

Loadings to Tail Lake (kg/month)												
Date	Year 2 Mar-09	Year 2 Apr-09	Year 2 May-09	Year 2 Jun-09	Year 2 Jul-09	Year 2 Aug-09	Year 2 Sep-09	Year 2 Oct-09	Year 2 Nov-09	Year 2 Dec-09	Year 2 Jan-10	Year 2 Feb-10
Parameter												
TDS	64532	62450	64532	100753	77793	69222	69323	66338	62450	64532	64532	58287
TSS	153	148	153	496	319	231	279	188	148	153	153	138
Free CN	0.16	0.15	0.16	0.15	0.16	0.16	0.15	0.16	0.15	0.16	0.16	0.14
Total CN	2	2	2	3	3	2	2	2	2	2	2	2
WAD CN	0.23	0.22	0.23	0.22	0.23	0.23	0.22	0.23	0.22	0.23	0.23	0.20
CNO	363	351	363	351	363	363	351	363	351	363	363	328
SCN	10	10	10	10	10	10	10	10	10	10	10	9
Sulphate	6786	6567	6786	11396	9631	7931	8046	7283	6567	6786	6786	6129
Chloride	111587	107988	111587	143044	131802	119935	118630	115092	107988	111587	111587	100788
Total Ammonia-N	130	125	130	267	217	166	172	146	125	130	130	117
Nitrate-N	716	693	716	1794	1399	1003	1061	844	693	716	716	646
Nitrite-N	91	88	91	114	107	98	97	94	88	91	91	82
Alkalinity	3854	3729	3854	13340	8578	5399	5385	4289	3729	3854	3854	3481
OrthoPhosphate-P	21	21	21	21	22	21	21	21	21	21	21	19
Phosphate-P	21	21	21	23	22	22	21	21	21	21	21	19
Org. Carbon				2054.41	878.57	260.60	324.02	85.14				
Hardness CaCO3	8585	8308	8585	19799	14238	10696	10763	9230	8308	8585	8585	7754
Total Metals												
Aluminum Al	1.90	1.84	1.90	16.73	9.58	5.15	5.95	3.24	1.84	1.90	1.90	1.72
Antimony Sb	1.26	1.22	1.26	4.57	3.34	2.14	2.34	1.65	1.22	1.26	1.26	1.14
Arsenic As	0.22	0.21	0.22	0.53	0.41	0.30	0.30	0.25	0.21	0.22	0.22	0.20
Barium Ba	0.68	0.66	0.68	1.56	1.13	0.89	0.87	0.74	0.66	0.68	0.68	0.61
Beryllium Be	0.06	0.06	0.06	0.18	0.13	0.09	0.10	0.07	0.06	0.06	0.06	0.05
Bismuth Bi	1.24	1.20	1.24	4.55	3.32	2.11	2.32	1.63	1.20	1.24	1.24	1.12
Boron B	2.17	2.10	2.17	10.32	6.73	3.81	4.08	2.79	2.10	2.17	2.17	1.96
Cadmium Cd	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Calcium Ca	37571	36359	37571	39626	39297	38266	37170	37817	36359	37571	37571	33935
Chromium Cr	0.33	0.31	0.33	0.60	0.47	0.39	0.40	0.35	0.31	0.33	0.33	0.29
Cobalt Co	0.48	0.47	0.48	0.67	0.61	0.54	0.54	0.50	0.47	0.48	0.48	0.43
Copper Cu	0.76	0.74	0.76	1.16	0.97	0.83	0.82	0.79	0.74	0.76	0.76	0.69
Iron Fe	1.65	1.60	1.65	18.41	17.69	23.28	6.79	3.08	1.60	1.65	1.65	1.49
Lead Pb	0.04	0.04	0.04	0.12	0.09	0.06	0.06	0.05	0.04	0.04	0.04	0.04
Lithium Li	0.34	0.33	0.34	0.53	0.47	0.40	0.40	0.37	0.33	0.34	0.34	0.31
Magnesium Mg	633	612	633	2600	1633	1022	1038	756	612	633	633	572
Manganese Mn	1.77	1.71	1.77	2.62	2.40	2.30	2.02	1.86	1.71	1.77	1.77	1.60
Mercury Hg	0.62	0.60	0.62	0.81	0.72	0.65	0.64	0.63	0.60	0.62	0.62	0.56
Molybdenum Mo	0.84	0.81	0.84	0.88	0.87	0.85	0.83	0.85	0.81	0.84	0.84	0.76
Nickel Ni	1.04	1.00	1.04	1.55	1.35	1.16	1.16	1.09	1.00	1.04	1.04	0.94
Phosphorus P	29	28	29	41	36	32	32	30	28	29	29	26
Potassium K	2106	2038	2106	2668	2379	2203	2185	2147	2038	2106	2106	1902
Selenium Se	0.04	0.04	0.04	0.21	0.13	0.08	0.08	0.05	0.04	0.04	0.04	0.04
Silicon SiO2	529	512	529	618	595	557	547	541	512	529	529	477
Silver Ag	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.00
Sodium Na	3713	3593	3713	9103	6392	4691	4792	4029	3593	3713	3713	3353
Strontium Sr	6	6	6	15	11	8	8	6	6	6	6	5
Tellurium Te	0.03	0.03	0.03	0.06	0.05	0.04	0.04	0.03	0.03	0.03	0.03	0.03
Thallium Tl	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thorium Th	0.02	0.01	0.02	0.03	0.03	0.02	0.02	0.02	0.01	0.02	0.02	0.01
Tin Sn	0.21	0.21	0.21	0.75	0.55	0.35	0.38	0.27	0.21	0.21	0.21	0.19
Titanium Ti	0.09	0.09	0.09	0.29	0.22	0.15	0.16	0.12	0.09	0.09	0.09	0.08
Uranium U	0.02	0.02	0.02	0.04	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02
Vanadium V	0.22	0.22	0.22	0.92	0.59	0.37	0.41	0.29	0.22	0.22	0.22	0.20
Zinc Zn	1.0	0.9	1.0	3.5	1.8	1.3	1.3	1.1	0.9	1.0	1.0	0.9
Zirconium Zr	0.31	0.30	0.31	2.37	1.34	0.65	0.74	0.43	0.30	0.31	0.31	0.28

Loadings to Tail Lake (kg/month)												
Date	Year 3 Mar-10	Year 3 Apr-10	Year 3 May-10	Year 3 Jun-10	Year 3 Jul-10	Year 3 Aug-10	Year 3 Sep-10	Year 3 Oct-10	Year 3 Nov-10	Year 3 Dec-10	Year 3 Jan-11	Year 3 Feb-11
Parameter												
TDS	50662	49028	50662	87557	63931	55356	55907	52469	49028	50662	50662	45759
TSS				350	166	78	131	34				
Free CN												
Total CN				0	0	0	0	0				
WAD CN												
CNO												
SCN												
Sulphate	1289	1247	1289	5982	4072	2408	2693	1775	1247	1289	1289	1164
Chloride	49110	47526	49110	82645	69328	57460	58170	52615	47526	49110	49110	44357
Total Ammonia-N	25	24	25	152	104	58	66	39	24	25	25	22
Nitrate-N	28	28	28	1019	643	287	359	144	28	28	28	26
Nitrite-N	64	62	64	85	79	70	70	67	62	64	64	58
Alkalinity				9667	4727	1547	1658	435				
OrthoPhosphate-P	21	21	21	21	22	21	21	21	21	21	21	19
Phosphate-P	21	21	21	23	22	22	21	21	21	21	21	19
Org. Carbon				2066.58	879.11	260.81	324.30	85.21				
Hardness CaCO3				11559	5656	2113	2457	645				
Total Metals												
Aluminum Al	0.81	0.78	0.81	12.75	6.66	3.28	3.90	1.81	0.78	0.81	0.81	0.73
Antimony Sb	1.21	1.17	1.21	4.51	3.28	2.08	2.29	1.60	1.17	1.21	1.21	1.09
Arsenic As	0.03	0.03	0.03	0.28	0.18	0.09	0.10	0.05	0.03	0.03	0.03	0.02
Barium Ba	0.06	0.06	0.06	0.96	0.50	0.27	0.27	0.12	0.06	0.06	0.06	0.05
Beryllium Be	0.03	0.03	0.03	0.13	0.09	0.06	0.06	0.04	0.03	0.03	0.03	0.03
Bismuth Bi	1.21	1.17	1.21	4.51	3.28	2.08	2.29	1.60	1.17	1.21	1.21	1.09
Boron B	0.60	0.58	0.60	8.15	4.74	2.06	2.34	1.14	0.58	0.60	0.60	0.55
Cadmium Cd	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Calcium Ca	263	254	263	3360	1882	912	1008	489	254	263	263	237
Chromium Cr	0.07	0.06	0.07	0.34	0.21	0.13	0.14	0.09	0.06	0.07	0.07	0.06
Cobalt Co	0.06	0.06	0.06	0.25	0.18	0.11	0.12	0.08	0.06	0.06	0.06	0.05
Copper Cu	0.03	0.03	0.03	0.44	0.22	0.09	0.11	0.05	0.03	0.03	0.03	0.03
Iron Fe	0.23	0.23	0.23	16.44	15.86	21.70	5.20	1.58	0.23	0.23	0.23	0.21
Lead Pb	0.01	0.01	0.01	0.07	0.05	0.03	0.03	0.02	0.01	0.01	0.01	0.01
Lithium Li	0.06	0.06	0.06	0.24	0.18	0.11	0.12	0.08	0.06	0.06	0.06	0.05
Magnesium Mg	121	117	121	2098	1112	507	538	242	117	121	121	110
Manganese Mn	0.16	0.15	0.16	1.05	0.78	0.68	0.46	0.25	0.15	0.16	0.16	0.14
Mercury Hg	0.00	0.00	0.00	0.21	0.10	0.03	0.04	0.01	0.00	0.00	0.00	0.00
Molybdenum Mo	0.01	0.01	0.01	0.08	0.04	0.02	0.03	0.02	0.01	0.01	0.01	0.01
Nickel Ni	0.12	0.12	0.12	0.65	0.43	0.24	0.26	0.17	0.12	0.12	0.12	0.11
Phosphorus P	23	22	23	33	29	25	25	24	22	23	23	21
Potassium K	25	24	25	653	296	122	170	66	24	25	25	23
Selenium Se	0.00	0.00	0.00	0.16	0.08	0.04	0.04	0.01	0.00	0.00	0.00	0.00
Silicon SiO2	10	9	10	84	56	29	34	18	9	10	10	9
Silver Ag	0.00	0.00	0.00	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00
Sodium Na	12	12	12	5550	2690	990	1211	328	12	12	12	11
Strontium Sr	0	0	0	10	5	2	3	1	0	0	0	0
Tellurium Te				0.02	0.01	0.01	0.01	0.00				
Thallium Tl	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thorium Th				0.01	0.01	0.00	0.00	0.00				
Tin Sn	0.18	0.18	0.18	0.70	0.51	0.32	0.35	0.24	0.18	0.18	0.18	0.16
Titanium Ti	0.06	0.06	0.06	0.24	0.18	0.11	0.12	0.08	0.06	0.06	0.06	0.05
Uranium U	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vanadium V	0.18	0.18	0.18	0.85	0.53	0.33	0.36	0.24	0.18	0.18	0.18	0.16
Zinc Zn	0.2	0.2	0.2	2.7	1.0	0.5	0.6	0.3	0.2	0.2	0.2	0.2
Zirconium Zr				1.95	0.95	0.31	0.39	0.11				

Loadings to Tail Lake (kg/month)												
Date	Year 4 Mar-11	Year 4 Apr-11	Year 4 May-11	Year 4 Jun-11	Year 4 Jul-11	Year 4 Aug-11	Year 4 Sep-11	Year 4 Oct-11	Year 4 Nov-11	Year 4 Dec-11	Year 4 Jan-12	Year 4 Feb-12
Parameter												
TDS				39033	13272	4697	6883	1808				
TSS				355	166	78	131	34				
Free CN												
Total CN				0	0	0	0	0				
WAD CN												
CNO												
SCN												
Sulphate				1211	589	195	262	73				
Chloride				10681	4977	1928	2425	637				
Total Ammonia-N				62	38	16	20	7				
Nitrate-N				469	291	122	157	55				
Nitrite-N				11	7	3	4	1				
Alkalinity				9794	4728	1547	1658	436				
OrthoPhosphate-P				1	0	0	0	0				
Phosphate-P				3	1	0	0	0				
Org. Carbon				2093.56	879.26	260.94	324.47	85.25				
Hardness CaCO3				11710	5657	2114	2458	646				
Total Metals												
Aluminum Al				10.14	4.67	1.98	2.49	0.78				
Antimony Sb				0.02	0.01	0.01	0.01	0.00				
Arsenic As				0.18	0.10	0.04	0.05	0.02				
Barium Ba				0.74	0.34	0.16	0.15	0.04				
Beryllium Be				0.02	0.01	0.01	0.01	0.00				
Bismuth Bi				0.02	0.01	0.01	0.01	0.00				
Boron B				5.97	3.11	1.03	1.20	0.34				
Cadmium Cd				0.01	0.00	0.00	0.00	0.00				
Calcium Ca				2412	1172	461	512	142				
Chromium Cr				0.11	0.04	0.02	0.02	0.01				
Cobalt Co				0.03	0.02	0.01	0.01	0.00				
Copper Cu				0.35	0.15	0.04	0.06	0.02				
Iron Fe				15.90	15.32	21.35	4.80	1.29				
Lead Pb				0.03	0.02	0.01	0.01	0.00				
Lithium Li				0.02	0.01	0.01	0.01	0.00				
Magnesium Mg				1668	784	298	309	82				
Manganese Mn				0.46	0.35	0.41	0.16	0.04				
Mercury Hg				0.21	0.10	0.03	0.04	0.01				
Molybdenum Mo				0.04	0.01	0.00	0.00	0.00				
Nickel Ni				0.21	0.10	0.03	0.04	0.01				
Phosphorus P				6	3	1	1	0				
Potassium K				567	228	79	123	32				
Selenium Se				0.16	0.08	0.04	0.04	0.01				
Silicon SiO2				47	29	12	16	6				
Silver Ag				0.01	0.00	0.00	0.00	0.00				
Sodium Na				5577	2658	970	1189	312				
Strontium Sr				9	5	2	2	1				
Tellurium Te				0.02	0.01	0.01	0.01	0.00				
Thallium Tl				0.00	0.00	0.00	0.00	0.00				
Thorium Th				0.01	0.01	0.00	0.00	0.00				
Tin Sn				0.03	0.02	0.01	0.01	0.00				
Titanium Ti				0.02	0.01	0.01	0.01	0.00				
Uranium U				0.01	0.01	0.00	0.00	0.00				
Vanadium V				0.18	0.04	0.01	0.01	0.00				
Zinc Zn				2.0	0.4	0.2	0.2	0.1				
Zirconium Zr				1.97	0.95	0.31	0.39	0.11				

Loadings to Tail Lake (kg/month)												
Date	Year 5 Mar-12	Year 5 Apr-12	Year 5 May-12	Year 5 Jun-12	Year 5 Jul-12	Year 5 Aug-12	Year 5 Sep-12	Year 5 Oct-12	Year 5 Nov-12	Year 5 Dec-12	Year 5 Jan-13	Year 5 Feb-13
Parameter												
TDS				417343	391484	382909	385095	380021				
TSS				414	193	87	142	37				
Free CN												
Total CN				0	0	0	0	0				
WAD CN												
CNO												
SCN												
Sulphate				1214	589	195	262	73				
Chloride				242676	236104	232552	233108	231106				
Total Ammonia-N				62	38	16	20	7				
Nitrate-N				469	291	122	157	55				
Nitrite-N				11	7	3	4	1				
Alkalinity				9818	4728	1547	1658	436				
OrthoPhosphate-P				1	0	0	0	0				
Phosphate-P				3	1	0	0	0				
Org. Carbon				2098.80	879.22	260.94	324.47	85.25				
Hardness CaCO3				11739	5657	2114	2458	646				
Total Metals												
Aluminum Al				15.20	7.02	2.72	3.41	1.02				
Antimony Sb				0.02	0.01	0.01	0.01	0.00				
Arsenic As				0.19	0.11	0.04	0.05	0.02				
Barium Ba				0.75	0.34	0.16	0.15	0.04				
Beryllium Be				0.02	0.01	0.01	0.01	0.00				
Bismuth Bi				0.02	0.01	0.01	0.01	0.00				
Boron B				6.61	3.40	1.12	1.32	0.37				
Cadmium Cd				0.01	0.00	0.00	0.00	0.00				
Calcium Ca				24741	23469	22743	22796	22419				
Chromium Cr				0.12	0.04	0.02	0.02	0.01				
Cobalt Co				0.03	0.02	0.01	0.01	0.00				
Copper Cu				0.36	0.16	0.05	0.06	0.02				
Iron Fe				20.84	17.60	22.06	5.71	1.53				
Lead Pb				0.03	0.02	0.01	0.01	0.00				
Lithium Li				0.07	0.03	0.01	0.02	0.00				
Magnesium Mg				1739	815	308	322	85				
Manganese Mn				0.58	0.40	0.43	0.18	0.05				
Mercury Hg				0.21	0.10	0.03	0.04	0.01				
Molybdenum Mo				0.04	0.02	0.00	0.01	0.00				
Nickel Ni				0.21	0.10	0.03	0.04	0.01				
Phosphorus P				6	3	1	1	0				
Potassium K				621	252	86	132	35				
Selenium Se				0.18	0.09	0.04	0.04	0.01				
Silicon SiO2				60	35	14	18	6				
Silver Ag				0.01	0.00	0.00	0.00	0.00				
Sodium Na				132072	128639	126652	126906	125903				
Strontium Sr				9	5	2	2	1				
Tellurium Te				0.02	0.01	0.01	0.01	0.00				
Thallium Tl				0.00	0.00	0.00	0.00	0.00				
Thorium Th				0.01	0.01	0.00	0.00	0.00				
Tin Sn				0.03	0.02	0.01	0.01	0.00				
Titanium Ti				0.31	0.15	0.05	0.06	0.02				
Uranium U				0.01	0.01	0.00	0.00	0.00				
Vanadium V				0.22	0.06	0.02	0.02	0.01				
Zinc Zn				2.0	0.4	0.2	0.2	0.1				
Zirconium Zr				1.98	0.95	0.31	0.39	0.11				

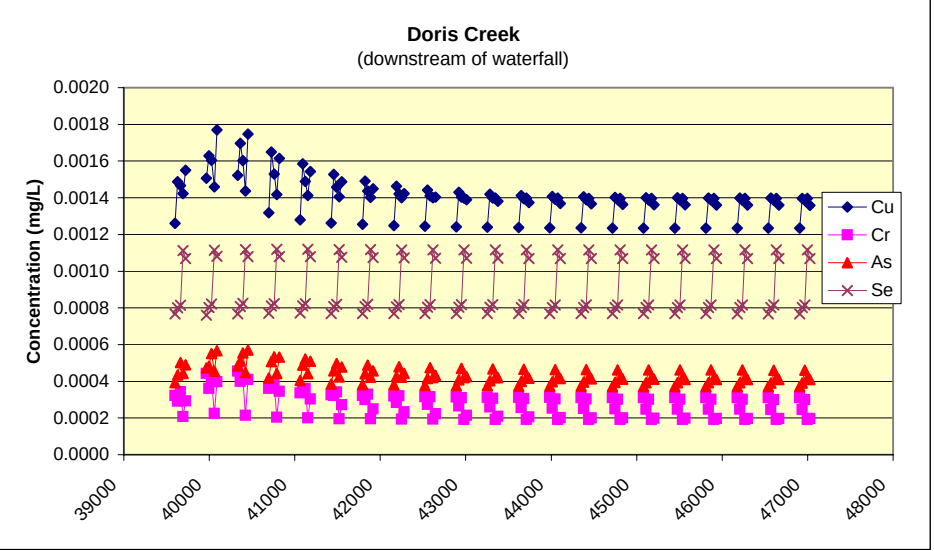
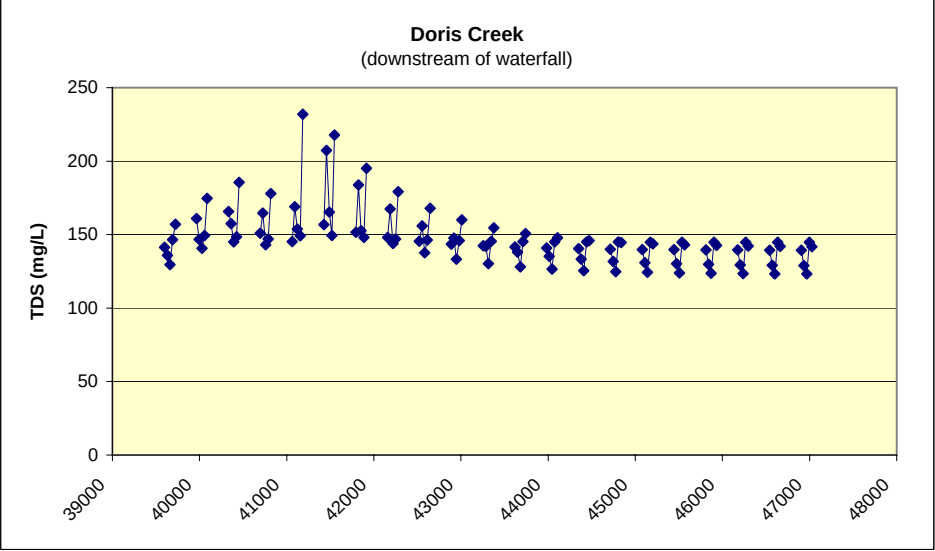
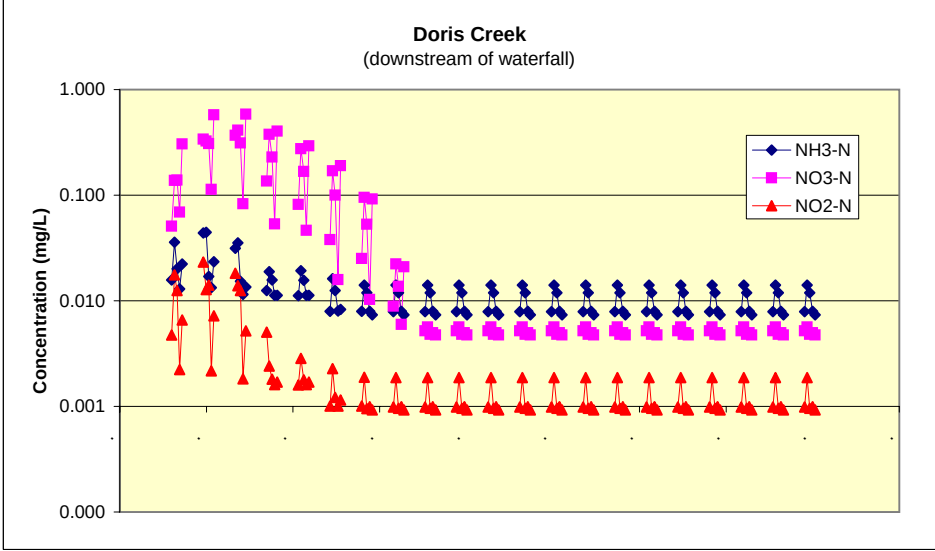
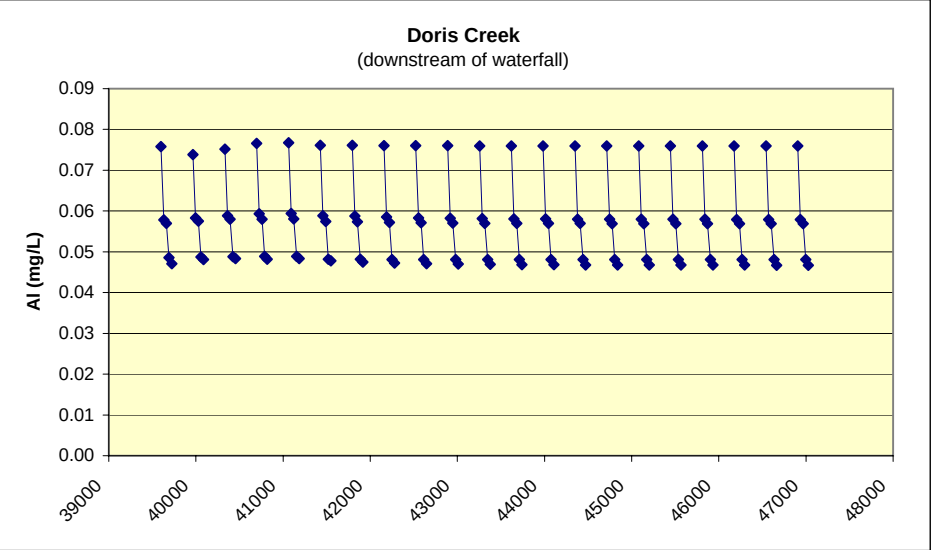
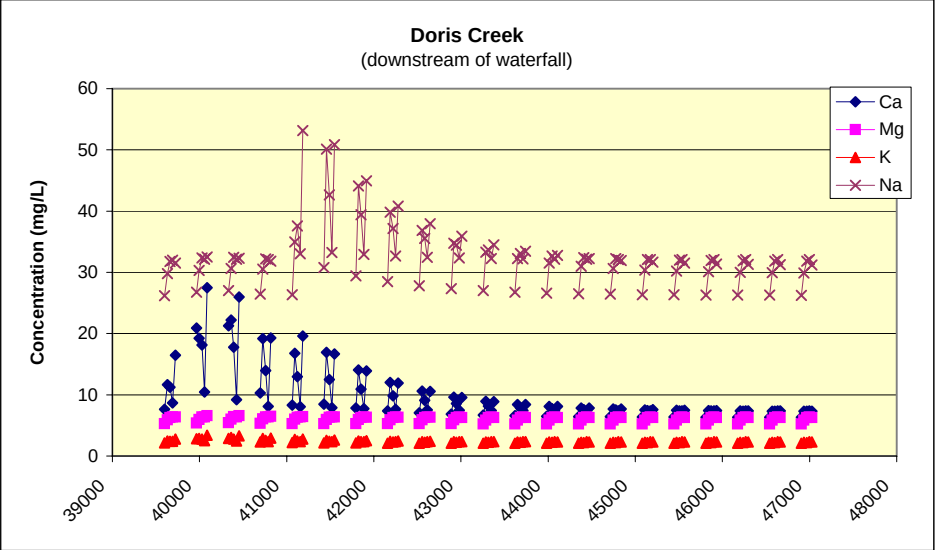
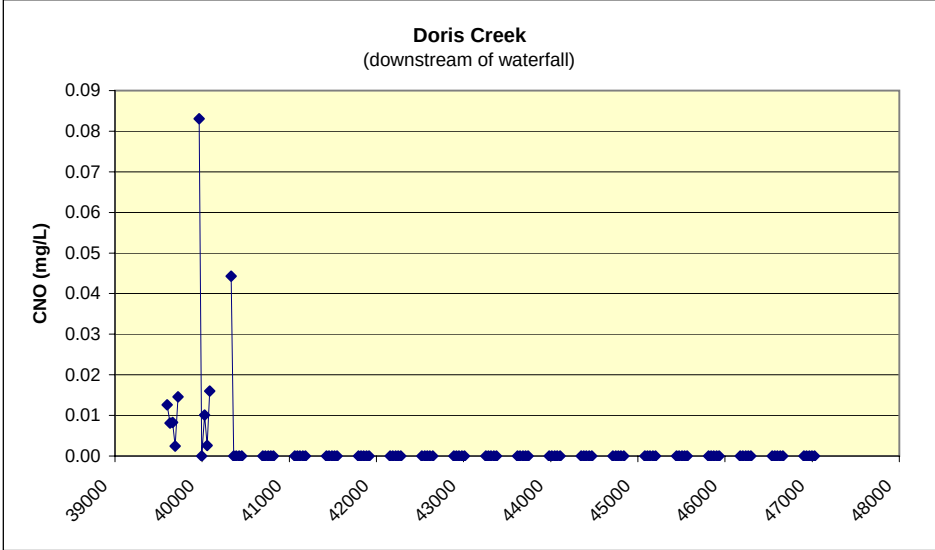
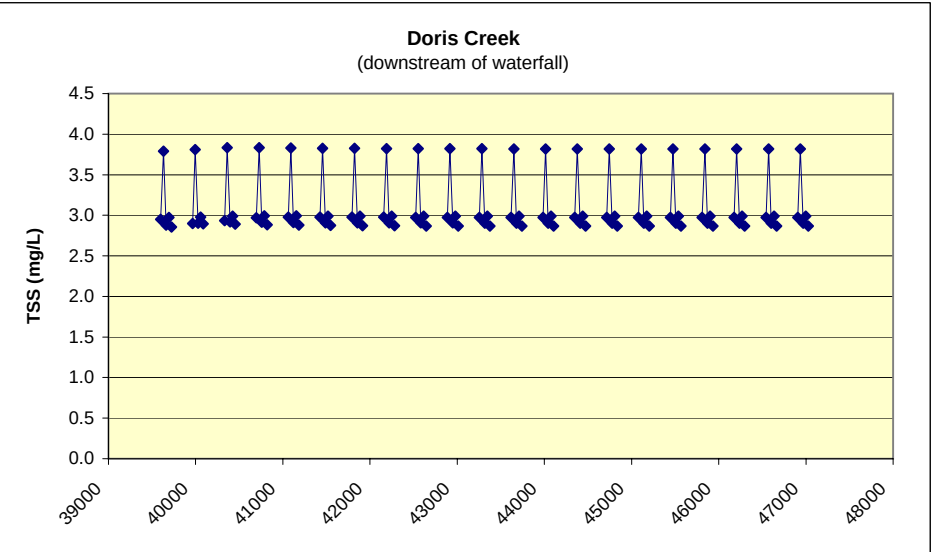
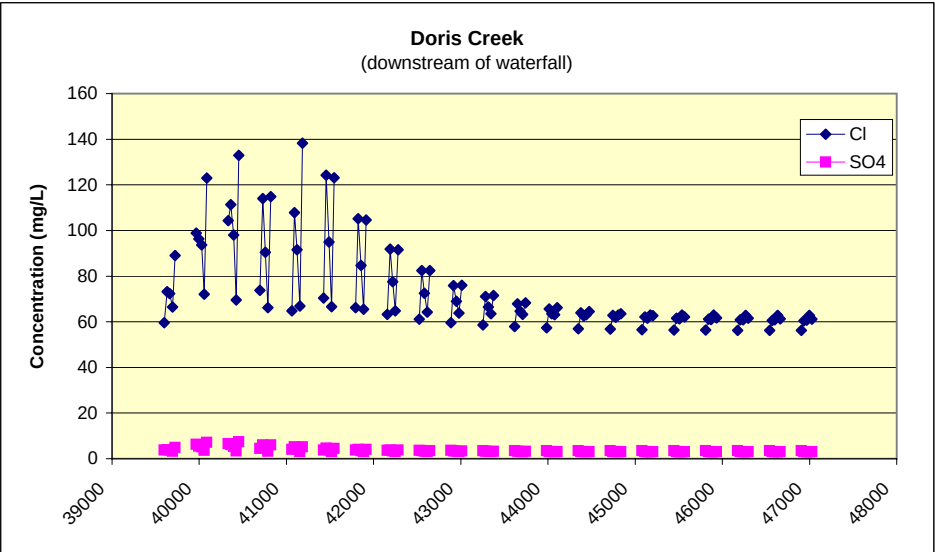
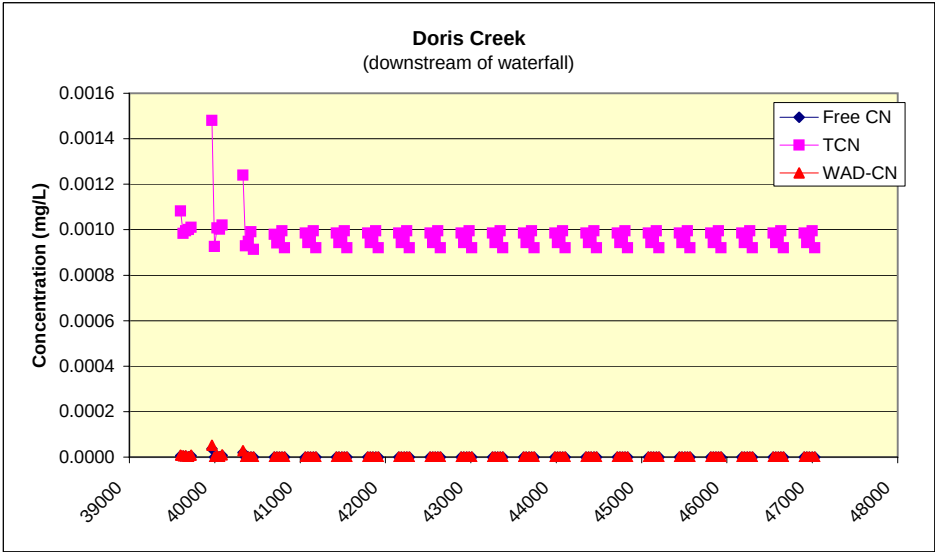
Loadings to Tail Lake (kg/month)												
Date	Year 6 Mar-13	Year 6 Apr-13	Year 6 May-13	Year 6 Jun-13	Year 6 Jul-13	Year 6 Aug-13	Year 6 Sep-13	Year 6 Oct-13	Year 6 Nov-13	Year 6 Dec-13	Year 6 Jan-14	Year 6 Feb-14
Parameter												
TDS				39130	13271	4697	6883	1808				
TSS				414	193	87	142	37				
Free CN												
Total CN				0	0	0	0	0				
WAD CN												
CNO												
SCN												
Sulphate				1214	589	195	262	73				
Chloride				12283	5712	2160	2716	713				
Total Ammonia-N				62	38	16	20	7				
Nitrate-N				469	291	122	157	55				
Nitrite-N				11	7	3	4	1				
Alkalinity				9818	4728	1547	1658	436				
OrthoPhosphate-P				1	0	0	0	0				
Phosphate-P				3	1	0	0	0				
Org. Carbon				2098.80	879.22	260.94	324.47	85.25				
Hardness CaCO3				11739	5657	2114	2458	646				
Total Metals												
Aluminum Al				15.20	7.02	2.72	3.41	1.02				
Antimony Sb				0.02	0.01	0.01	0.01	0.00				
Arsenic As				0.19	0.11	0.04	0.05	0.02				
Barium Ba				0.75	0.34	0.16	0.15	0.04				
Beryllium Be				0.02	0.01	0.01	0.01	0.00				
Bismuth Bi				0.02	0.01	0.01	0.01	0.00				
Boron B				6.61	3.40	1.12	1.32	0.37				
Cadmium Cd				0.01	0.00	0.00	0.00	0.00				
Calcium Ca				2466	1194	468	521	144				
Chromium Cr				0.12	0.04	0.02	0.02	0.01				
Cobalt Co				0.03	0.02	0.01	0.01	0.00				
Copper Cu				0.36	0.16	0.05	0.06	0.02				
Iron Fe				20.84	17.60	22.06	5.71	1.53				
Lead Pb				0.03	0.02	0.01	0.01	0.00				
Lithium Li				0.07	0.03	0.01	0.02	0.00				
Magnesium Mg				1739	815	308	322	85				
Manganese Mn				0.58	0.40	0.43	0.18	0.05				
Mercury Hg				0.21	0.10	0.03	0.04	0.01				
Molybdenum Mo				0.04	0.02	0.00	0.01	0.00				
Nickel Ni				0.21	0.10	0.03	0.04	0.01				
Phosphorus P				6	3	1	1	0				
Potassium K				621	252	86	132	35				
Selenium Se				0.18	0.09	0.04	0.04	0.01				
Silicon SiO2				60	35	14	18	6				
Silver Ag				0.01	0.00	0.00	0.00	0.00				
Sodium Na				6527	3094	1107	1361	358				
Strontium Sr				9	5	2	2	1				
Tellurium Te				0.02	0.01	0.01	0.01	0.00				
Thallium Tl				0.00	0.00	0.00	0.00	0.00				
Thorium Th				0.01	0.01	0.00	0.00	0.00				
Tin Sn				0.03	0.02	0.01	0.01	0.00				
Titanium Ti				0.31	0.15	0.05	0.06	0.02				
Uranium U				0.01	0.01	0.00	0.00	0.00				
Vanadium V				0.22	0.06	0.02	0.02	0.01				
Zinc Zn				2.0	0.4	0.2	0.2	0.1				
Zirconium Zr				1.98	0.95	0.31	0.39	0.11				

Loadings to Tail Lake (kg/month)												
Date	Year 7 Mar-14	Year 7 Apr-14	Year 7 May-14	Year 7 Jun-14	Year 7 Jul-14	Year 7 Aug-14	Year 7 Sep-14	Year 7 Oct-14	Year 7 Nov-14	Year 7 Dec-14	Year 7 Jan-15	Year 7 Feb-15
Parameter												
TDS				39130	13271	4697	6883	1808				
TSS				414	193	87	142	37				
Free CN												
Total CN				0	0	0	0	0				
WAD CN												
CNO												
SCN												
Sulphate				1067	498	157	213	56				
Chloride				12283	5712	2160	2716	713				
Total Ammonia-N				3	1	0	1	0				
Nitrate-N				2	1	0	0	0				
Nitrite-N				0	0	0	0	0				
Alkalinity				9818	4728	1547	1658	436				
OrthoPhosphate-P				1	0	0	0	0				
Phosphate-P				3	1	0	0	0				
Org. Carbon				2098.80	879.22	260.94	324.47	85.25				
Hardness CaCO3				11739	5657	2114	2458	646				
Total Metals												
Aluminum Al				10.91	4.36	1.60	1.98	0.52				
Antimony Sb				0.01	0.00	0.00	0.00	0.00				
Arsenic As				0.09	0.05	0.02	0.02	0.00				
Barium Ba				0.73	0.33	0.16	0.15	0.04				
Beryllium Be				0.00	0.00	0.00	0.00	0.00				
Bismuth Bi				0.00	0.00	0.00	0.00	0.00				
Boron B				5.61	2.78	0.86	0.98	0.26				
Cadmium Cd				0.00	0.00	0.00	0.00	0.00				
Calcium Ca				2214	1038	403	437	115				
Chromium Cr				0.10	0.03	0.01	0.02	0.00				
Cobalt Co				0.01	0.01	0.00	0.00	0.00				
Copper Cu				0.34	0.14	0.04	0.05	0.01				
Iron Fe				19.84	16.98	21.80	5.37	1.41				
Lead Pb				0.01	0.01	0.00	0.00	0.00				
Lithium Li				0.05	0.02	0.01	0.01	0.00				
Magnesium Mg				1714	799	302	313	82				
Manganese Mn				0.56	0.39	0.42	0.18	0.05				
Mercury Hg				0.21	0.10	0.03	0.04	0.01				
Molybdenum Mo				0.04	0.02	0.00	0.01	0.00				
Nickel Ni				0.19	0.09	0.03	0.03	0.01				
Phosphorus P				3	1	0	0	0				
Potassium K				615	248	85	130	34				
Selenium Se				0.16	0.08	0.04	0.03	0.01				
Silicon SiO2				12	6	2	2	1				
Silver Ag				0.00	0.00	0.00	0.00	0.00				
Sodium Na				6520	3090	1105	1359	357				
Strontium Sr				9	5	2	2	1				
Tellurium Te				0.00	0.00	0.00	0.00	0.00				
Thallium Tl				0.00	0.00	0.00	0.00	0.00				
Thorium Th				0.00	0.00	0.00	0.00	0.00				
Tin Sn				0.01	0.01	0.00	0.00	0.00				
Titanium Ti				0.29	0.13	0.04	0.05	0.01				
Uranium U				0.00	0.00	0.00	0.00	0.00				
Vanadium V				0.18	0.04	0.01	0.01	0.00				
Zinc Zn				1.9	0.4	0.1	0.2	0.0				
Zirconium Zr				1.78	0.83	0.26	0.33	0.09				

Loadings to Tail Lake (kg/month)												
Date	Year 8 Mar-15	Year 8 Apr-15	Year 8 May-15	Year 8 Jun-15	Year 8 Jul-15	Year 8 Aug-15	Year 8 Sep-15	Year 8 Oct-15	Year 8 Nov-15	Year 8 Dec-15	Year 8 Jan-16	Year 8 Feb-16
Parameter												
TDS				39130	13271	4697	6883	1808				
TSS				414	193	87	142	37				
Free CN												
Total CN				0	0	0	0	0				
WAD CN												
CNO												
SCN												
Sulphate				1067	498	157	213	56				
Chloride				12283	5712	2160	2716	713				
Total Ammonia-N				3	1	0	1	0				
Nitrate-N				2	1	0	0	0				
Nitrite-N				0	0	0	0	0				
Alkalinity				9818	4728	1547	1658	436				
OrthoPhosphate-P				1	0	0	0	0				
Phosphate-P				3	1	0	0	0				
Org. Carbon				2098.80	879.22	260.94	324.47	85.25				
Hardness CaCO3				11739	5657	2114	2458	646				
Total Metals												
Aluminum Al				10.91	4.36	1.60	1.98	0.52				
Antimony Sb				0.01	0.00	0.00	0.00	0.00				
Arsenic As				0.09	0.05	0.02	0.02	0.00				
Barium Ba				0.73	0.33	0.16	0.15	0.04				
Beryllium Be				0.00	0.00	0.00	0.00	0.00				
Bismuth Bi				0.00	0.00	0.00	0.00	0.00				
Boron B				5.61	2.78	0.86	0.98	0.26				
Cadmium Cd				0.00	0.00	0.00	0.00	0.00				
Calcium Ca				2214	1038	403	437	115				
Chromium Cr				0.10	0.03	0.01	0.02	0.00				
Cobalt Co				0.01	0.01	0.00	0.00	0.00				
Copper Cu				0.34	0.14	0.04	0.05	0.01				
Iron Fe				19.84	16.98	21.80	5.37	1.41				
Lead Pb				0.01	0.01	0.00	0.00	0.00				
Lithium Li				0.05	0.02	0.01	0.01	0.00				
Magnesium Mg				1714	799	302	313	82				
Manganese Mn				0.56	0.39	0.42	0.18	0.05				
Mercury Hg				0.21	0.10	0.03	0.04	0.01				
Molybdenum Mo				0.04	0.02	0.00	0.01	0.00				
Nickel Ni				0.19	0.09	0.03	0.03	0.01				
Phosphorus P				3	1	0	0	0				
Potassium K				615	248	85	130	34				
Selenium Se				0.16	0.08	0.04	0.03	0.01				
Silicon SiO2				12	6	2	2	1				
Silver Ag				0.00	0.00	0.00	0.00	0.00				
Sodium Na				6520	3090	1105	1359	357				
Strontium Sr				9	5	2	2	1				
Tellurium Te				0.00	0.00	0.00	0.00	0.00				
Thallium Tl				0.00	0.00	0.00	0.00	0.00				
Thorium Th				0.00	0.00	0.00	0.00	0.00				
Tin Sn				0.01	0.01	0.00	0.00	0.00				
Titanium Ti				0.29	0.13	0.04	0.05	0.01				
Uranium U				0.00	0.00	0.00	0.00	0.00				
Vanadium V				0.18	0.04	0.01	0.01	0.00				
Zinc Zn				1.9	0.4	0.1	0.2	0.0				
Zirconium Zr				1.78	0.83	0.26	0.33	0.09				

Loadings to Tail Lake (kg/month)												
Date	Year 9 Mar-16	Year 9 Apr-16	Year 9 May-16	Year 9 Jun-16	Year 9 Jul-16	Year 9 Aug-16	Year 9 Sep-16	Year 9 Oct-16	Year 9 Nov-16	Year 9 Dec-16	Year 9 Jan-17	Year 9 Feb-17
Parameter												
TDS				39130	13271	4697	6883	1808				
TSS				414	193	87	142	37				
Free CN												
Total CN				0	0	0	0	0				
WAD CN												
CNO												
SCN												
Sulphate				1067	498	157	213	56				
Chloride				12283	5712	2160	2716	713				
Total Ammonia-N				3	1	0	1	0				
Nitrate-N				2	1	0	0	0				
Nitrite-N				0	0	0	0	0				
Alkalinity				9818	4728	1547	1658	436				
OrthoPhosphate-P				1	0	0	0	0				
Phosphate-P				3	1	0	0	0				
Org. Carbon				2098.80	879.22	260.94	324.47	85.25				
Hardness CaCO3				11739	5657	2114	2458	646				
Total Metals												
Aluminum Al				10.91	4.36	1.60	1.98	0.52				
Antimony Sb				0.01	0.00	0.00	0.00	0.00				
Arsenic As				0.09	0.05	0.02	0.02	0.00				
Barium Ba				0.73	0.33	0.16	0.15	0.04				
Beryllium Be				0.00	0.00	0.00	0.00	0.00				
Bismuth Bi				0.00	0.00	0.00	0.00	0.00				
Boron B				5.61	2.78	0.86	0.98	0.26				
Cadmium Cd				0.00	0.00	0.00	0.00	0.00				
Calcium Ca				2214	1038	403	437	115				
Chromium Cr				0.10	0.03	0.01	0.02	0.00				
Cobalt Co				0.01	0.01	0.00	0.00	0.00				
Copper Cu				0.34	0.14	0.04	0.05	0.01				
Iron Fe				19.84	16.98	21.80	5.37	1.41				
Lead Pb				0.01	0.01	0.00	0.00	0.00				
Lithium Li				0.05	0.02	0.01	0.01	0.00				
Magnesium Mg				1714	799	302	313	82				
Manganese Mn				0.56	0.39	0.42	0.18	0.05				
Mercury Hg				0.21	0.10	0.03	0.04	0.01				
Molybdenum Mo				0.04	0.02	0.00	0.01	0.00				
Nickel Ni				0.19	0.09	0.03	0.03	0.01				
Phosphorus P				3	1	0	0	0				
Potassium K				615	248	85	130	34				
Selenium Se				0.16	0.08	0.04	0.03	0.01				
Silicon SiO2				12	6	2	2	1				
Silver Ag				0.00	0.00	0.00	0.00	0.00				
Sodium Na				6520	3090	1105	1359	357				
Strontium Sr				9	5	2	2	1				
Tellurium Te				0.00	0.00	0.00	0.00	0.00				
Thallium Tl				0.00	0.00	0.00	0.00	0.00				
Thorium Th				0.00	0.00	0.00	0.00	0.00				
Tin Sn				0.01	0.01	0.00	0.00	0.00				
Titanium Ti				0.29	0.13	0.04	0.05	0.01				
Uranium U				0.00	0.00	0.00	0.00	0.00				
Vanadium V				0.18	0.04	0.01	0.01	0.00				
Zinc Zn				1.9	0.4	0.1	0.2	0.0				
Zirconium Zr				1.78	0.83	0.26	0.33	0.09				

Loadings to Tail Lake (kg/month)											
Date	Year 10 Mar-17	Year 10 Apr-17	Year 10 May-17	Year 10 Jun-17	Year 10 Jul-17	Year 10 Aug-17	Year 10 Sep-17	Year 10 Oct-17	Year 10 Nov-17	Year 10 Dec-17	Year 10 Jan-18 Feb-18
Parameter											
TDS				39130	13271	4697	6883	1808			
TSS				414	193	87	142	37			
Free CN											
Total CN				0	0	0	0	0			
WAD CN											
CNO											
SCN											
Sulphate				1067	498	157	213	56			
Chloride				12283	5712	2160	2716	713			
Total Ammonia-N				3	1	0	1	0			
Nitrate-N				2	1	0	0	0			
Nitrite-N				0	0	0	0	0			
Alkalinity				9818	4728	1547	1658	436			
OrthoPhosphate-P				1	0	0	0	0			
Phosphate-P				3	1	0	0	0			
Org. Carbon				2098.80	879.22	260.94	324.47	85.25			
Hardness CaCO3				11739	5657	2114	2458	646			
Total Metals											
Aluminum Al				10.91	4.36	1.60	1.98	0.52			
Antimony Sb				0.01	0.00	0.00	0.00	0.00			
Arsenic As				0.09	0.05	0.02	0.02	0.00			
Barium Ba				0.73	0.33	0.16	0.15	0.04			
Beryllium Be				0.00	0.00	0.00	0.00	0.00			
Bismuth Bi				0.00	0.00	0.00	0.00	0.00			
Boron B				5.61	2.78	0.86	0.98	0.26			
Cadmium Cd				0.00	0.00	0.00	0.00	0.00			
Calcium Ca				2214	1038	403	437	115			
Chromium Cr				0.10	0.03	0.01	0.02	0.00			
Cobalt Co				0.01	0.01	0.00	0.00	0.00			
Copper Cu				0.34	0.14	0.04	0.05	0.01			
Iron Fe				19.84	16.98	21.80	5.37	1.41			
Lead Pb				0.01	0.01	0.00	0.00	0.00			
Lithium Li				0.05	0.02	0.01	0.01	0.00			
Magnesium Mg				1714	799	302	313	82			
Manganese Mn				0.56	0.39	0.42	0.18	0.05			
Mercury Hg				0.21	0.10	0.03	0.04	0.01			
Molybdenum Mo				0.04	0.02	0.00	0.01	0.00			
Nickel Ni				0.19	0.09	0.03	0.03	0.01			
Phosphorus P				3	1	0	0	0			
Potassium K				615	248	85	130	34			
Selenium Se				0.16	0.08	0.04	0.03	0.01			
Silicon SiO2				12	6	2	2	1			
Silver Ag				0.00	0.00	0.00	0.00	0.00			
Sodium Na				6520	3090	1105	1359	357			
Strontium Sr				9	5	2	2	1			
Tellurium Te				0.00	0.00	0.00	0.00	0.00			
Thallium Tl				0.00	0.00	0.00	0.00	0.00			
Thorium Th				0.00	0.00	0.00	0.00	0.00			
Tin Sn				0.01	0.01	0.00	0.00	0.00			
Titanium Ti				0.29	0.13	0.04	0.05	0.01			
Uranium U				0.00	0.00	0.00	0.00	0.00			
Vanadium V				0.18	0.04	0.01	0.01	0.00			
Zinc Zn				1.9	0.4	0.1	0.2	0.0			
Zirconium Zr				1.78	0.83	0.26	0.33	0.09			



Doris Creek Summary Table

Doris Creek Summary Table							Increase in Above Background %	Fraction of CCME in Doris Creek (%)
OUTPUT SUMMARY								
Max Annual Discharge rate		1,179,417 m ³ /year in	Year 2					
Degradation Field(age)		Tail Lk Cu < CME Year	8	Maximum in Doris Creek				
		MMER	CCME	Tail Lake Year 2	Upstream Downstream Year 2			
Maximum Concentration								
pH			6 to 9	7 to 8	7.6	7 to 8		
TDS	mg/L			1317	145	232		
TSS	mg/L	15		1.9	4.0	3.8	60%	
Free CN	mg/L		0.005	0.0005		0.00004	1%	
Total CN	mg/L	1.0		0.008	0.001	0.001		
WAD CN	mg/L			0.0007		0.0001		
CNO	mg/L			1.1		0.08		
SCN	mg/L			0.074		0.005		
Sulphate	mg/L			57	4	7.4		
Chloride	mg/L			1029	63	138		
Total Ammonia-N	mg/L		1.27	0.45	0.02	0.045	197%	
Nitrate-N	mg/L		2.9	6.5	0.006	0.58	9641%	
Nitrite-N	mg/L		0.018	0.30	0.0020	0.023	1060%	
Alkalinity	mg/L			49	28	30		
OrthoPhosphate-P	mg/L			0.2192	0.0008	0.0172		
Phosphate-P	mg/L			0.2233	0.0325	0.0414		
Org. Carbon	mg/L			6.1	5.1	5.1		
Hardness CaCO3	mg/L			88	45	48		
Total Metals								
Aluminum Al	mg/L		0.1	0.045	0.08	0.0768	0%	
Antimony Sb	mg/L			0.0193	0.0000	0.0016		
Arsenic As	mg/L	0.5	0.005	0.0021	0.00047	0.0006	11%	
Barium Ba	mg/L			0.0068	0.0033	0.0035		
Beryllium Be	mg/L			0.00068	0.00001	0.00007		
Bismuth Bi	mg/L			0.01919	0.00001	0.00159		
Boron B	mg/L			0.032	0.023	0.023		
Cadmium Cd	mg/L		0.000017	0.00006	0.000002	0.000007	240%	
Calcium Ca	mg/L			279	7	27	43%	
Chromium Cr	mg/L		0.001	0.0028	0.0003	0.000	46%	
Cobalt Co	mg/L			0.0038	0.0001	0.0003		
Copper Cu	mg/L	0.3	0.002	0.006	0.0014	0.0018	24%	
Iron Fe	mg/L		0.3	0.11	0.11	0.11	0%	
Lead Pb	mg/L	0.2	0.001	0.00043	0.00012	0.00013	13%	
Lithium Li	mg/L			0.0028		0.0002		
Magnesium Mg	mg/L			8.7	6.4	6.6		
Manganese Mn	mg/L			0.015	0.016	0.016		
Mercury Hg	ug/L		0.026	0.0049779	0.0006	0.0009268	4%	
Molybdenum Mo	mg/L		0.073	0.0062	0.0001	0.00059	1%	
Nickel Ni	mg/L	0.5	0.025	0.008	0.001	0.0011	4%	
Phosphorus P	mg/L			0.288		0.023		
Potassium K	mg/L			17	2	3.4		
Selenium Se	mg/L		0.001	0.00065	0.0011	0.0011	0%	
Silicon SiO2	mg/L			4.0		0.31		
Silver Ag	mg/L		0.0001	0.00007	0.00000	0.0000080	474%	
Sodium Na	mg/L			334	33	53	8%	
Strontium Sr	mg/L			0.064	0.040	0.042		
Tellurium Te	mg/L			0.000		0.000		
Thallium Tl	mg/L		0.0008	0.000032	0.000022	0.000022	3%	
Thorium Th	mg/L			0.000135		0.0000122		
Tin Sn	mg/L			0.00308	0.00012	0.00031		
Titanium Ti	mg/L			0.0012		0.0001		
Uranium U	mg/L			0.000183	0.000036	0.000045		
Vanadium V	mg/L			0.0034	0.0006	0.0007		
Zinc Zn	mg/L	0.5	0.03	0.011	0.003	0.0032	14%	
Zirconium Zr	mg/L			0.0067	0.0050	0.0052	11%	

Water Quality in DORIS CREEK (d/s of the waterfall)													
Date	Year 1 Mar-08	Year 1 Apr-08	Year 1 May-08	Year 1 Jun-08	Year 1 Jul-08	Year 1 Aug-08	Year 1 Sep-08	Year 1 Oct-08	Year 1 Nov-08	Year 1 Dec-08	Year 1 Jan-09	Year 1 Feb-09	
Parameter													
TDS mg/L				141	136	130	146	157					
TSS mg/L				2.9	3.8	2.9	3.0	2.9					
Free CN mg/L				0.00001	0.00000	0.00000	0.00000	0.00001					
Total CN mg/L				0.001	0.001	0.001	0.001	0.001					
WAD CN mg/L				0.0000	0.0000	0.0000	0.0000	0.0000					
CNO mg/L				0.01	0.01	0.01	0.00	0.01					
SCN mg/L				0.000	0.001	0.001	0.000	0.002					
Sulphate mg/L				3.7	3.9	3.8	3.3	5.0					
Chloride mg/L				60	73	72	67	89					
Total Ammonia-N mg/L				0.016	0.036	0.020	0.013	0.022					
Nitrate-N mg/L				0.05	0.14	0.14	0.07	0.30					
Nitrite-N mg/L				0.005	0.018	0.012	0.002	0.007					
Alkalinity mg/L				26	27	27	28	29					
OrthoPhosphate-P mg/L				0.0015	0.0033	0.0030	0.0015	0.0060					
Phosphate-P mg/L				0.0194	0.0225	0.0331	0.0274	0.0304					
Org. Carbon mg/L				5.0	5.1	5.0	5.0	5.1					
Hardness CaCO3 mg/L				38	42	44	45	46					
Total Metals													
Aluminum Al mg/L				0.08	0.06	0.06	0.05	0.05					
Antimony Sb mg/L				0.0001	0.0003	0.0003	0.0001	0.0006					
Arsenic As mg/L				0.0004	0.0004	0.0005	0.0004	0.0005					
Barium Ba mg/L				0.0033	0.0032	0.0030	0.0030	0.0031					
Beryllium Be mg/L				0.00001	0.00002	0.00002	0.00001	0.00003					
Bismuth Bi mg/L				0.00005	0.00027	0.00026	0.00009	0.00058					
Boron B mg/L				0.019	0.021	0.023	0.023	0.023					
Cadmium Cd mg/L				0.0000032	0.0000038	0.0000037	0.0000031	0.0000050					
Calcium Ca mg/L				8	12	11	9	16					
Chromium Cr mg/L				0.000	0.000	0.000	0.000	0.000					
Cobalt Co mg/L				0.0001	0.0001	0.0001	0.0001	0.0002					
Copper Cu mg/L				0.0013	0.0015	0.0015	0.0014	0.0015					
Iron Fe mg/L				0.11	0.11	0.08	0.09	0.09					
Lead Pb mg/L				0.00005	0.00006	0.00012	0.00004	0.00005					
Lithium Li mg/L				0.0000	0.0000	0.0000	0.0000	0.0001					
Magnesium Mg mg/L				5.3	5.9	6.3	6.4	6.4					
Manganese Mn mg/L				0.011	0.014	0.015	0.010	0.010					
Mercury Hg ug/L				0.0006208	0.0006727	0.0006592	0.0006204	0.0007499					
Molybdenum Mo mg/L				0.00014	0.00024	0.00023	0.00017	0.00034					
Nickel Ni mg/L				0.0005	0.0007	0.0006	0.0005	0.0007					
Phosphorus P mg/L				0.002	0.005	0.004	0.002	0.009					
Potassium K mg/L				2.1	2.5	2.4	2.4	2.8					
Selenium Se mg/L				0.00077	0.00080	0.00081	0.00111	0.00107					
Silicon SiO2 mg/L				0.03	0.07	0.07	0.03	0.14					
Silver Ag mg/L				0.0000027	0.0000032	0.0000030	0.0000021	0.0000045					
Sodium Na mg/L				26	30	32	32	32					
Strontium Sr mg/L				0.035	0.038	0.039	0.040	0.040					
Tellurium Te mg/L				0.000	0.000	0.000	0.000	0.000					
Thallium Tl mg/L				0.000018	0.000021	0.000011	0.000004	0.000005					
Thorium Th mg/L				0.000002	0.000004	0.000004	0.000002	0.000007					
Tin Sn mg/L				0.00004	0.00016	0.00008	0.00005	0.00013					
Titanium Ti mg/L				0.0000	0.0000	0.0000	0.0000	0.0000					
Uranium U mg/L				0.000031	0.000035	0.000039	0.000034	0.000038					
Vanadium V mg/L				0.0006	0.0002	0.0002	0.0001	0.0002					
Zinc Zn mg/L				0.0015	0.0020	0.0031	0.0018	0.0023					
Zirconium Zr mg/L				0.0050	0.0051	0.0050	0.0050	0.0051					

Water Quality in DORIS CREEK (d/s of the waterfall)													
Date		Year 2 Mar-09	Year 2 Apr-09	Year 2 May-09	Year 2 Jun-09	Year 2 Jul-09	Year 2 Aug-09	Year 2 Sep-09	Year 2 Oct-09	Year 2 Nov-09	Year 2 Dec-09	Year 2 Jan-10	Year 2 Feb-10
Parameter													
TDS	mg/L				161	147	141	149	175				
TSS	mg/L				2.9	3.8	2.9	3.0	2.9				
Free CN	mg/L				0.00004		0.00000	0.00000	0.00001				
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L				0.0001		0.0000	0.0000	0.0000				
CNO	mg/L				0.08		0.01	0.00	0.02				
SCN	mg/L				0.004	0.003	0.003	0.001	0.005				
Sulphate	mg/L				6.3	5.4	5.2	3.7	7.2				
Chloride	mg/L				99	96	94	72	123				
Total Ammonia-N	mg/L				0.044	0.045	0.017	0.013	0.023				
Nitrate-N	mg/L				0.34	0.32	0.31	0.11	0.58				
Nitrite-N	mg/L				0.023	0.013	0.014	0.002	0.007				
Alkalinity	mg/L				27	28	28	28	30				
OrthoPhosphate-P	mg/L				0.0091	0.0076	0.0069	0.0025	0.0122				
Phosphate-P	mg/L				0.0263	0.0267	0.0369	0.0284	0.0365				
Org. Carbon	mg/L				5.0	4.9	5.0	5.0	5.0				
Hardness CaCO3	mg/L				40	43	45	45	48				
Total Metals													
Aluminum Al	mg/L				0.07	0.06	0.06	0.05	0.05				
Antimony Sb	mg/L				0.0007	0.0007	0.0006	0.0002	0.0012				
Arsenic As	mg/L				0.0005	0.0005	0.0006	0.0005	0.0006				
Barium Ba	mg/L				0.0034	0.0033	0.0031	0.0030	0.0033				
Beryllium Be	mg/L				0.00004	0.00003	0.00003	0.00001	0.00006				
Bismuth Bi	mg/L				0.00068	0.00065	0.00062	0.00018	0.00115				
Boron B	mg/L				0.020	0.022	0.023	0.023	0.023				
Cadmium Cd	mg/L				0.0000058	0.0000053	0.0000052	0.0000035	0.0000073				
Calcium Ca	mg/L				21	19	18	10	27				
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0002	0.0002	0.0002	0.0001	0.0003				
Copper Cu	mg/L				0.0015	0.0016	0.0016	0.0015	0.0018				
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09				
Lead Pb	mg/L				0.00007	0.00007	0.00013	0.00004	0.00007				
Lithium Li	mg/L				0.0001	0.0001	0.0001	0.0000	0.0002				
Magnesium Mg	mg/L				5.4	5.9	6.4	6.4	6.6				
Manganese Mn	mg/L				0.011	0.015	0.016	0.010	0.010				
Mercury Hg	ug/L				0.0008325	0.0007875	0.0007701	0.0006496	0.0009268				
Molybdenum Mo	mg/L				0.00044	0.00041	0.00039	0.00021	0.00059				
Nickel Ni	mg/L				0.0008	0.0009	0.0008	0.0005	0.0011				
Phosphorus P	mg/L				0.013	0.011	0.010	0.003	0.018				
Potassium K	mg/L				2.8	2.9	2.8	2.5	3.4				
Selenium Se	mg/L				0.00076	0.00080	0.00082	0.00111	0.00108				
Silicon SiO2	mg/L				0.22	0.18	0.17	0.05	0.31				
Silver Ag	mg/L				0.0000055	0.0000050	0.0000047	0.0000026	0.0000072				
Sodium Na	mg/L				27	30	32	32	32				
Strontium Sr	mg/L				0.036	0.039	0.040	0.040	0.042				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000018	0.000022	0.000012	0.000004	0.000006				
Thorium Th	mg/L				0.000008	0.000008	0.000007	0.000003	0.000012				
Tin Sn	mg/L				0.00015	0.00023	0.00014	0.00007	0.00023				
Titanium Ti	mg/L				0.0001	0.0000	0.0000	0.0000	0.0001				
Uranium U	mg/L				0.000038	0.000039	0.000043	0.000035	0.000045				
Vanadium V	mg/L				0.0007	0.0003	0.0003	0.0002	0.0003				
Zinc Zn	mg/L				0.0020	0.0021	0.0032	0.0018	0.0025				
Zirconium Zr	mg/L				0.0051	0.0051	0.0051	0.0051	0.0052				

Water Quality in DORIS CREEK (d/s of the waterfall)													
Date		Year 3 Mar-10	Year 3 Apr-10	Year 3 May-10	Year 3 Jun-10	Year 3 Jul-10	Year 3 Aug-10	Year 3 Sep-10	Year 3 Oct-10	Year 3 Nov-10	Year 3 Dec-10	Year 3 Jan-11	Year 3 Feb-11
Parameter													
TDS	mg/L				166	157	145	149	186				
TSS	mg/L				2.9	3.8	2.9	3.0	2.9				
Free CN	mg/L				0.00002								
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L				0.0000								
CNO	mg/L				0.04								
SCN	mg/L				0.004	0.004	0.003	0.000	0.005				
Sulphate	mg/L				6.5	6.2	5.3	3.4	7.4				
Chloride	mg/L				104	111	98	69	133				
Total Ammonia-N	mg/L				0.031	0.035	0.015	0.011	0.014				
Nitrate-N	mg/L				0.37	0.41	0.31	0.08	0.58				
Nitrite-N	mg/L				0.018	0.014	0.012	0.002	0.005				
Alkalinity	mg/L				27	28	28	28	29				
OrthoPhosphate-P	mg/L				0.0108	0.0115	0.0088	0.0022	0.0172				
Phosphate-P	mg/L				0.0283	0.0306	0.0390	0.0283	0.0414				
Org. Carbon	mg/L				5.0	4.9	5.0	5.0	5.0				
Hardness CaCO3	mg/L				40	44	45	45	48				
Total Metals													
Aluminum Al	mg/L				0.08	0.06	0.06	0.05	0.05				
Antimony Sb	mg/L				0.0009	0.0010	0.0008	0.0002	0.0016				
Arsenic As	mg/L				0.0005	0.0005	0.0006	0.0004	0.0006				
Barium Ba	mg/L				0.0035	0.0033	0.0031	0.0030	0.0033				
Beryllium Be	mg/L				0.00004	0.00005	0.00004	0.00001	0.00007				
Bismuth Bi	mg/L				0.00085	0.00100	0.00078	0.00015	0.00159				
Boron B	mg/L				0.020	0.022	0.023	0.023	0.023				
Cadmium Cd	mg/L				0.0000060	0.0000060	0.0000051	0.0000032	0.0000071				
Calcium Ca	mg/L				21	22	18	9	26				
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0003	0.0003	0.0002	0.0001	0.0003				
Copper Cu	mg/L				0.0015	0.0017	0.0016	0.0014	0.0017				
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09				
Lead Pb	mg/L				0.00007	0.00008	0.00013	0.00004	0.00007				
Lithium Li	mg/L				0.0002	0.0002	0.0001	0.0000	0.0002				
Magnesium Mg	mg/L				5.4	6.0	6.4	6.4	6.6				
Manganese Mn	mg/L				0.012	0.015	0.016	0.010	0.010				
Mercury Hg	ug/L				0.0008377	0.0008367	0.0007632	0.0006287	0.0008991				
Molybdenum Mo	mg/L				0.00045	0.00048	0.00038	0.00018	0.00056				
Nickel Ni	mg/L				0.0009	0.0010	0.0008	0.0005	0.0011				
Phosphorus P	mg/L				0.015	0.016	0.012	0.003	0.023				
Potassium K	mg/L				2.9	3.1	2.8	2.4	3.3				
Selenium Se	mg/L				0.00077	0.00081	0.00082	0.00112	0.00108				
Silicon SiO2	mg/L				0.23	0.23	0.16	0.03	0.29				
Silver Ag	mg/L				0.0000061	0.0000062	0.0000050	0.0000023	0.0000080				
Sodium Na	mg/L				27	31	32	32	32				
Strontium Sr	mg/L				0.037	0.040	0.040	0.040	0.042				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000019	0.000022	0.000012	0.000004	0.000006				
Thorium Th	mg/L				0.000009	0.000009	0.000007	0.000003	0.000012				
Tin Sn	mg/L				0.00017	0.00028	0.00016	0.00006	0.00029				
Titanium Ti	mg/L				0.0001	0.0001	0.0001	0.0000	0.0001				
Uranium U	mg/L				0.000039	0.000041	0.000043	0.000034	0.000044				
Vanadium V	mg/L				0.0007	0.0003	0.0003	0.0002	0.0004				
Zinc Zn	mg/L				0.0020	0.0022	0.0032	0.0018	0.0026				
Zirconium Zr	mg/L				0.0051	0.0051	0.0051	0.0050	0.0052				

Water Quality in DORIS CREEK (d/s of the waterfall)													
Date		Year 4 Mar-11	Year 4 Apr-11	Year 4 May-11	Year 4 Jun-11	Year 4 Jul-11	Year 4 Aug-11	Year 4 Sep-11	Year 4 Oct-11	Year 4 Nov-11	Year 4 Dec-11	Year 4 Jan-12	Year 4 Feb-12
Parameter													
TDS	mg/L				151	165	143	147	178				
TSS	mg/L				3.0	3.8	2.9	3.0	2.9				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.001	0.003	0.002	0.000	0.003				
Sulphate	mg/L				4.5	6.0	4.7	3.2	6.1				
Chloride	mg/L				74	114	90	66	115				
Total Ammonia-N	mg/L				0.012	0.019	0.016	0.011	0.011				
Nitrate-N	mg/L				0.14	0.38	0.23	0.05	0.40				
Nitrite-N	mg/L				0.005	0.002	0.002	0.002	0.002				
Alkalinity	mg/L				26	28	28	28	29				
OrthoPhosphate-P	mg/L				0.0053	0.0146	0.0085	0.0016	0.0147				
Phosphate-P	mg/L				0.0233	0.0338	0.0388	0.0277	0.0391				
Org. Carbon	mg/L				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3	mg/L				38	43	44	45	47				
Total Metals													
Aluminum Al	mg/L				0.08	0.06	0.06	0.05	0.05				
Antimony Sb	mg/L				0.0004	0.0012	0.0007	0.0001	0.0012				
Arsenic As	mg/L				0.0004	0.0005	0.0005	0.0004	0.0005				
Barium Ba	mg/L				0.0033	0.0033	0.0030	0.0030	0.0032				
Beryllium Be	mg/L				0.00002	0.00005	0.00003	0.00001	0.00005				
Bismuth Bi	mg/L				0.00041	0.00123	0.00068	0.00008	0.00123				
Boron B	mg/L				0.020	0.022	0.023	0.023	0.023				
Cadmium Cd	mg/L				0.0000039	0.0000058	0.0000045	0.0000030	0.0000061				
Calcium Ca	mg/L				10	19	14	8	19				
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0001	0.0002	0.0002	0.0001	0.0003				
Copper Cu	mg/L				0.0013	0.0016	0.0015	0.0014	0.0016				
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09				
Lead Pb	mg/L				0.00006	0.00008	0.00013	0.00004	0.00006				
Lithium Li	mg/L				0.0001	0.0002	0.0001	0.0000	0.0002				
Magnesium Mg	mg/L				5.3	6.1	6.4	6.4	6.5				
Manganese Mn	mg/L				0.011	0.015	0.016	0.010	0.010				
Mercury Hg	ug/L				0.0006616	0.0007905	0.0007006	0.0006115	0.0007910				
Molybdenum Mo	mg/L				0.00020	0.00041	0.00029	0.00016	0.00041				
Nickel Ni	mg/L				0.0006	0.0009	0.0007	0.0005	0.0009				
Phosphorus P	mg/L				0.007	0.019	0.011	0.002	0.019				
Potassium K	mg/L				2.3	2.9	2.6	2.4	2.9				
Selenium Se	mg/L				0.00077	0.00081	0.00082	0.00112	0.00108				
Silicon SiO2	mg/L				0.07	0.19	0.11	0.02	0.19				
Silver Ag	mg/L				0.0000040	0.0000067	0.0000045	0.0000021	0.0000068				
Sodium Na	mg/L				26	31	32	32	32				
Strontium Sr	mg/L				0.035	0.040	0.039	0.040	0.041				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000018	0.000022	0.000011	0.000003	0.000005				
Thorium Th	mg/L				0.000004	0.000008	0.000006	0.000002	0.000009				
Tin Sn	mg/L				0.00010	0.00031	0.00015	0.00005	0.00023				
Titanium Ti	mg/L				0.0000	0.0001	0.0000	0.0000	0.0001				
Uranium U	mg/L				0.000033	0.000040	0.000041	0.000034	0.000041				
Vanadium V	mg/L				0.0007	0.0003	0.0003	0.0001	0.0003				
Zinc Zn	mg/L				0.0016	0.0022	0.0031	0.0017	0.0024				
Zirconium Zr	mg/L				0.0051	0.0051	0.0050	0.0050	0.0051				

Water Quality in DORIS CREEK (d/s of the waterfall)													
Date		Year 5 Mar-12	Year 5 Apr-12	Year 5 May-12	Year 5 Jun-12	Year 5 Jul-12	Year 5 Aug-12	Year 5 Sep-12	Year 5 Oct-12	Year 5 Nov-12	Year 5 Dec-12	Year 5 Jan-13	Year 5 Feb-13
Parameter													
TDS	mg/L				145	169	154	149	232				
TSS	mg/L				3.0	3.8	2.9	3.0	2.9				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.001	0.002	0.001	0.000	0.002				
Sulphate	mg/L				4.0	5.2	4.2	3.2	5.2				
Chloride	mg/L				65	108	92	67	138				
Total Ammonia-N	mg/L				0.011	0.019	0.016	0.011	0.011				
Nitrate-N	mg/L				0.08	0.27	0.17	0.05	0.29				
Nitrite-N	mg/L				0.002	0.003	0.002	0.002	0.002				
Alkalinity	mg/L				26	28	27	28	29				
OrthoPhosphate-P	mg/L				0.0030	0.0109	0.0062	0.0013	0.0106				
Phosphate-P	mg/L				0.0210	0.0301	0.0365	0.0275	0.0350				
Org. Carbon	mg/L				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3	mg/L				38	43	44	45	46				
Total Metals													
Aluminum Al	mg/L				0.08	0.06	0.06	0.05	0.05				
Antimony Sb	mg/L				0.0002	0.0009	0.0005	0.0001	0.0009				
Arsenic As	mg/L				0.0004	0.0005	0.0005	0.0004	0.0005				
Barium Ba	mg/L				0.0033	0.0033	0.0030	0.0030	0.0031				
Beryllium Be	mg/L				0.00002	0.00004	0.00002	0.00001	0.00004				
Bismuth Bi	mg/L				0.00020	0.00090	0.00048	0.00006	0.00087				
Boron B	mg/L				0.019	0.022	0.023	0.023	0.023				
Cadmium Cd	mg/L				0.0000035	0.0000054	0.0000042	0.0000030	0.0000056				
Calcium Ca	mg/L				8	17	13	8	20				
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0001	0.0002	0.0001	0.0001	0.0002				
Copper Cu	mg/L				0.0013	0.0016	0.0015	0.0014	0.0015				
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09				
Lead Pb	mg/L				0.00005	0.00008	0.00013	0.00004	0.00006				
Lithium Li	mg/L				0.0000	0.0001	0.0001	0.0000	0.0001				
Magnesium Mg	mg/L				5.3	6.0	6.3	6.4	6.4				
Manganese Mn	mg/L				0.011	0.015	0.016	0.010	0.010				
Mercury Hg	ug/L				0.0006302	0.0007406	0.0006695	0.0006080	0.0007349				
Molybdenum Mo	mg/L				0.00016	0.00034	0.00025	0.00015	0.00033				
Nickel Ni	mg/L				0.0005	0.0008	0.0006	0.0005	0.0007				
Phosphorus P	mg/L				0.004	0.014	0.008	0.001	0.014				
Potassium K	mg/L				2.2	2.7	2.5	2.4	2.7				
Selenium Se	mg/L				0.00077	0.00081	0.00082	0.00112	0.00108				
Silicon SiO2	mg/L				0.04	0.14	0.08	0.02	0.14				
Silver Ag	mg/L				0.0000033	0.0000060	0.0000040	0.0000020	0.0000059				
Sodium Na	mg/L				26	35	38	33	53				
Strontium Sr	mg/L				0.035	0.039	0.039	0.040	0.040				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000018	0.000022	0.000011	0.000003	0.000005				
Thorium Th	mg/L				0.000003	0.000007	0.000005	0.000002	0.000008				
Tin Sn	mg/L				0.00006	0.00026	0.00012	0.00005	0.00018				
Titanium Ti	mg/L				0.0000	0.0001	0.0000	0.0000	0.0001				
Uranium U	mg/L				0.000032	0.000039	0.000040	0.000034	0.000039				
Vanadium V	mg/L				0.0006	0.0003	0.0002	0.0001	0.0003				
Zinc Zn	mg/L				0.0015	0.0021	0.0031	0.0017	0.0022				
Zirconium Zr	mg/L				0.0050	0.0051	0.0050	0.0050	0.0051				

Water Quality in DORIS CREEK (d/s of the waterfall)													
Date		Year 6 Mar-13	Year 6 Apr-13	Year 6 May-13	Year 6 Jun-13	Year 6 Jul-13	Year 6 Aug-13	Year 6 Sep-13	Year 6 Oct-13	Year 6 Nov-13	Year 6 Dec-13	Year 6 Jan-14	Year 6 Feb-14
Parameter													
TDS	mg/L				157	207	165	149	218				
TSS	mg/L				3.0	3.8	2.9	3.0	2.9				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.000	0.002	0.001	0.000	0.002				
Sulphate	mg/L				3.8	4.6	3.8	3.1	4.5				
Chloride	mg/L				70	124	95	67	123				
Total Ammonia-N	mg/L				0.008	0.016	0.013	0.008	0.008				
Nitrate-N	mg/L				0.04	0.17	0.10	0.02	0.19				
Nitrite-N	mg/L				0.001	0.002	0.001	0.001	0.001				
Alkalinity	mg/L				26	27	27	28	28				
OrthoPhosphate-P	mg/L				0.0023	0.0079	0.0046	0.0012	0.0077				
Phosphate-P	mg/L				0.0204	0.0271	0.0349	0.0273	0.0322				
Org. Carbon	mg/L				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3	mg/L				38	42	44	45	45				
Total Metals													
Aluminum Al	mg/L				0.08	0.06	0.06	0.05	0.05				
Antimony Sb	mg/L				0.0002	0.0006	0.0004	0.0001	0.0006				
Arsenic As	mg/L				0.0004	0.0005	0.0005	0.0004	0.0005				
Barium Ba	mg/L				0.0033	0.0032	0.0030	0.0030	0.0030				
Beryllium Be	mg/L				0.00001	0.00003	0.00002	0.00000	0.00003				
Bismuth Bi	mg/L				0.00014	0.00064	0.00034	0.00004	0.00061				
Boron B	mg/L				0.019	0.022	0.023	0.022	0.023				
Cadmium Cd	mg/L				0.0000026	0.0000043	0.0000033	0.0000021	0.0000045				
Calcium Ca	mg/L				8	17	12	8	17				
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0001	0.0001	0.0001	0.0001	0.0002				
Copper Cu	mg/L				0.0013	0.0015	0.0015	0.0014	0.0015				
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09				
Lead Pb	mg/L				0.00005	0.00007	0.00012	0.00004	0.00005				
Lithium Li	mg/L				0.0000	0.0001	0.0000	0.0000	0.0001				
Magnesium Mg	mg/L				5.3	6.0	6.3	6.4	6.4				
Manganese Mn	mg/L				0.011	0.015	0.016	0.010	0.010				
Mercury Hg	ug/L				0.0006211	0.0006999	0.0006477	0.0006056	0.0006954				
Molybdenum Mo	mg/L				0.00015	0.00028	0.00022	0.00015	0.00027				
Nickel Ni	mg/L				0.0005	0.0007	0.0006	0.0005	0.0007				
Phosphorus P	mg/L				0.002	0.010	0.005	0.001	0.010				
Potassium K	mg/L				2.2	2.6	2.4	2.4	2.6				
Selenium Se	mg/L				0.00077	0.00081	0.00082	0.00112	0.00108				
Silicon SiO2	mg/L				0.02	0.10	0.05	0.01	0.10				
Silver Ag	mg/L				0.0000021	0.0000043	0.0000026	0.0000009	0.0000043				
Sodium Na	mg/L				31	50	43	33	51				
Strontium Sr	mg/L				0.035	0.039	0.039	0.040	0.040				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000017	0.000022	0.000011	0.000003	0.000004				
Thorium Th	mg/L				0.000001	0.000005	0.000003	0.000000	0.000005				
Tin Sn	mg/L				0.00005	0.00022	0.00009	0.00004	0.00013				
Titanium Ti	mg/L				0.0000	0.0001	0.0000	0.0000	0.0001				
Uranium U	mg/L				0.000030	0.000036	0.000038	0.000032	0.000036				
Vanadium V	mg/L				0.0006	0.0003	0.0002	0.0001	0.0002				
Zinc Zn	mg/L				0.0015	0.0020	0.0030	0.0017	0.0021				
Zirconium Zr	mg/L				0.0050	0.0051	0.0050	0.0050	0.0051				

Water Quality in DORIS CREEK (d/s of the waterfall)													
Date		Year 7 Mar-14	Year 7 Apr-14	Year 7 May-14	Year 7 Jun-14	Year 7 Jul-14	Year 7 Aug-14	Year 7 Sep-14	Year 7 Oct-14	Year 7 Nov-14	Year 7 Dec-14	Year 7 Jan-15	Year 7 Feb-15
Parameter													
TDS	mg/L				152	184	153	148	195				
TSS	mg/L				3.0	3.8	2.9	3.0	2.9				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.000	0.001	0.001	0.000	0.001				
Sulphate	mg/L				3.7	4.1	3.6	3.1	4.1				
Chloride	mg/L				66	105	85	66	105				
Total Ammonia-N	mg/L				0.008	0.014	0.012	0.008	0.007				
Nitrate-N	mg/L				0.03	0.10	0.05	0.01	0.09				
Nitrite-N	mg/L				0.001	0.002	0.001	0.001	0.001				
Alkalinity	mg/L				26	27	27	28	28				
OrthoPhosphate-P	mg/L				0.0019	0.0058	0.0035	0.0010	0.0057				
Phosphate-P	mg/L				0.0199	0.0250	0.0338	0.0272	0.0302				
Org. Carbon	mg/L				5.0	5.1	5.0	5.0	5.0				
Hardness CaCO3	mg/L				38	42	43	45	45				
Total Metals													
Aluminum Al	mg/L				0.08	0.06	0.06	0.05	0.05				
Antimony Sb	mg/L				0.0001	0.0005	0.0003	0.0000	0.0004				
Arsenic As	mg/L				0.0004	0.0004	0.0005	0.0004	0.0005				
Barium Ba	mg/L				0.0033	0.0032	0.0030	0.0030	0.0030				
Beryllium Be	mg/L				0.00001	0.00002	0.00001	0.00000	0.00002				
Bismuth Bi	mg/L				0.00010	0.00045	0.00024	0.00003	0.00043				
Boron B	mg/L				0.019	0.022	0.023	0.022	0.022				
Cadmium Cd	mg/L				0.0000025	0.0000038	0.0000030	0.0000021	0.0000038				
Calcium Ca	mg/L				8	14	11	8	14				
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0001	0.0001	0.0001	0.0001	0.0001				
Copper Cu	mg/L				0.0013	0.0015	0.0014	0.0014	0.0014				
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09				
Lead Pb	mg/L				0.00005	0.00007	0.00012	0.00004	0.00005				
Lithium Li	mg/L				0.0000	0.0001	0.0000	0.0000	0.0001				
Magnesium Mg	mg/L				5.3	5.9	6.3	6.4	6.3				
Manganese Mn	mg/L				0.011	0.014	0.015	0.010	0.010				
Mercury Hg	ug/L				0.0006147	0.0006713	0.0006324	0.0006039	0.0006677				
Molybdenum Mo	mg/L				0.00014	0.00024	0.00020	0.00014	0.00023				
Nickel Ni	mg/L				0.0005	0.0007	0.0005	0.0005	0.0006				
Phosphorus P	mg/L				0.002	0.007	0.004	0.000	0.007				
Potassium K	mg/L				2.1	2.5	2.3	2.3	2.5				
Selenium Se	mg/L				0.00077	0.00081	0.00082	0.00112	0.00107				
Silicon SiO2	mg/L				0.02	0.07	0.04	0.00	0.07				
Silver Ag	mg/L				0.0000020	0.0000036	0.0000021	0.0000008	0.0000033				
Sodium Na	mg/L				29	44	39	33	45				
Strontium Sr	mg/L				0.035	0.039	0.039	0.040	0.040				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000017	0.000021	0.000011	0.000003	0.000004				
Thorium Th	mg/L				0.000001	0.000004	0.000002	0.000000	0.000004				
Tin Sn	mg/L				0.00005	0.00019	0.00007	0.00004	0.00010				
Titanium Ti	mg/L				0.0000	0.0001	0.0000	0.0000	0.0001				
Uranium U	mg/L				0.000029	0.000035	0.000037	0.000032	0.000034				
Vanadium V	mg/L				0.0006	0.0002	0.0002	0.0001	0.0002				
Zinc Zn	mg/L				0.0015	0.0019	0.0030	0.0017	0.0021				
Zirconium Zr	mg/L				0.0050	0.0051	0.0050	0.0050	0.0051				

Water Quality in DORIS CREEK (d/s of the waterfall)													
Date		Year 8 Mar-15	Year 8 Apr-15	Year 8 May-15	Year 8 Jun-15	Year 8 Jul-15	Year 8 Aug-15	Year 8 Sep-15	Year 8 Oct-15	Year 8 Nov-15	Year 8 Dec-15	Year 8 Jan-16	Year 8 Feb-16
Parameter													
TDS	mg/L				148	167	144	147	179				
TSS	mg/L				3.0	3.8	2.9	3.0	2.9				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.000	0.001	0.000	0.000	0.001				
Sulphate	mg/L				3.7	3.8	3.4	3.0	3.8				
Chloride	mg/L				63	92	78	65	92				
Total Ammonia-N	mg/L				0.008	0.014	0.012	0.008	0.007				
Nitrate-N	mg/L				0.01	0.02	0.01	0.01	0.02				
Nitrite-N	mg/L				0.001	0.002	0.001	0.001	0.001				
Alkalinity	mg/L				26	27	27	28	28				
OrthoPhosphate-P	mg/L				0.0015	0.0043	0.0027	0.0010	0.0042				
Phosphate-P	mg/L				0.0196	0.0236	0.0330	0.0271	0.0287				
Org. Carbon	mg/L				5.0	5.1	5.0	5.0	5.0				
Hardness CaCO3	mg/L				38	42	43	45	45				
Total Metals													
Aluminum Al	mg/L				0.08	0.06	0.06	0.05	0.05				
Antimony Sb	mg/L				0.0001	0.0003	0.0002	0.0000	0.0003				
Arsenic As	mg/L				0.0004	0.0004	0.0005	0.0004	0.0004				
Barium Ba	mg/L				0.0033	0.0032	0.0029	0.0030	0.0030				
Beryllium Be	mg/L				0.00001	0.00002	0.00001	0.00000	0.00002				
Bismuth Bi	mg/L				0.00007	0.00032	0.00017	0.00002	0.00030				
Boron B	mg/L				0.019	0.021	0.023	0.022	0.022				
Cadmium Cd	mg/L				0.0000024	0.0000033	0.0000027	0.0000021	0.0000033				
Calcium Ca	mg/L				7	12	10	8	12				
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0001	0.0001	0.0001	0.0001	0.0001				
Copper Cu	mg/L				0.0012	0.0015	0.0014	0.0014	0.0014				
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09				
Lead Pb	mg/L				0.00005	0.00006	0.00012	0.00004	0.00004				
Lithium Li	mg/L				0.0000	0.0000	0.0000	0.0000	0.0000				
Magnesium Mg	mg/L				5.3	5.9	6.3	6.4	6.3				
Manganese Mn	mg/L				0.011	0.014	0.015	0.010	0.010				
Mercury Hg	ug/L				0.0006103	0.0006512	0.0006216	0.0006027	0.0006482				
Molybdenum Mo	mg/L				0.00013	0.00021	0.00018	0.00014	0.00020				
Nickel Ni	mg/L				0.0004	0.0006	0.0005	0.0005	0.0006				
Phosphorus P	mg/L				0.001	0.005	0.003	0.000	0.005				
Potassium K	mg/L				2.1	2.4	2.3	2.3	2.5				
Selenium Se	mg/L				0.00077	0.00081	0.00082	0.00112	0.00107				
Silicon SiO2	mg/L				0.01	0.05	0.03	0.00	0.05				
Silver Ag	mg/L				0.0000018	0.0000029	0.0000017	0.0000008	0.0000025				
Sodium Na	mg/L				28	40	37	33	41				
Strontium Sr	mg/L				0.035	0.039	0.039	0.040	0.040				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000017	0.000021	0.000011	0.000003	0.000004				
Thorium Th	mg/L				0.000001	0.000003	0.000002	0.000000	0.000003				
Tin Sn	mg/L				0.00004	0.00017	0.00006	0.00004	0.00008				
Titanium Ti	mg/L				0.0000	0.0001	0.0000	0.0000	0.0001				
Uranium U	mg/L				0.000029	0.000033	0.000037	0.000032	0.000033				
Vanadium V	mg/L				0.0006	0.0002	0.0002	0.0001	0.0002				
Zinc Zn	mg/L				0.0015	0.0019	0.0029	0.0017	0.0020				
Zirconium Zr	mg/L				0.0050	0.0051	0.0050	0.0050	0.0051				

Water Quality in DORIS CREEK (d/s of the waterfall)													
Date		Year 9 Mar-16	Year 9 Apr-16	Year 9 May-16	Year 9 Jun-16	Year 9 Jul-16	Year 9 Aug-16	Year 9 Sep-16	Year 9 Oct-16	Year 9 Nov-16	Year 9 Dec-16	Year 9 Jan-17	Year 9 Feb-17
Parameter													
TDS	mg/L				145	156	138	146	168				
TSS	mg/L				3.0	3.8	2.9	3.0	2.9				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.000	0.001	0.000	0.000	0.001				
Sulphate	mg/L				3.6	3.6	3.3	3.0	3.5				
Chloride	mg/L				61	82	72	64	82				
Total Ammonia-N	mg/L				0.008	0.014	0.012	0.008	0.007				
Nitrate-N	mg/L				0.01	0.01	0.00	0.00	0.00				
Nitrite-N	mg/L				0.001	0.002	0.001	0.001	0.001				
Alkalinity	mg/L				26	27	27	28	28				
OrthoPhosphate-P	mg/L				0.0013	0.0033	0.0021	0.0009	0.0032				
Phosphate-P	mg/L				0.0194	0.0225	0.0325	0.0270	0.0278				
Org. Carbon	mg/L				5.0	5.1	5.0	5.0	5.1				
Hardness CaCO3	mg/L				37	41	43	45	45				
Total Metals													
Aluminum Al	mg/L				0.08	0.06	0.06	0.05	0.05				
Antimony Sb	mg/L				0.0001	0.0002	0.0001	0.0000	0.0002				
Arsenic As	mg/L				0.0004	0.0004	0.0005	0.0004	0.0004				
Barium Ba	mg/L				0.0033	0.0031	0.0029	0.0030	0.0030				
Beryllium Be	mg/L				0.00001	0.00001	0.00001	0.00000	0.00001				
Bismuth Bi	mg/L				0.00005	0.00023	0.00012	0.00001	0.00021				
Boron B	mg/L				0.019	0.021	0.022	0.022	0.022				
Cadmium Cd	mg/L				0.0000024	0.0000029	0.0000025	0.0000021	0.0000029				
Calcium Ca	mg/L				7	11	9	8	11				
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0001	0.0001	0.0001	0.0001	0.0001				
Copper Cu	mg/L				0.0012	0.0014	0.0014	0.0014	0.0014				
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09				
Lead Pb	mg/L				0.00005	0.00006	0.00012	0.00004	0.00004				
Lithium Li	mg/L				0.0000	0.0000	0.0000	0.0000	0.0000				
Magnesium Mg	mg/L				5.3	5.9	6.3	6.4	6.3				
Manganese Mn	mg/L				0.011	0.014	0.015	0.010	0.010				
Mercury Hg	ug/L				0.0006071	0.0006371	0.0006140	0.0006019	0.0006345				
Molybdenum Mo	mg/L				0.00013	0.00019	0.00017	0.00014	0.00018				
Nickel Ni	mg/L				0.0004	0.0006	0.0005	0.0005	0.0005				
Phosphorus P	mg/L				0.001	0.004	0.002	0.000	0.004				
Potassium K	mg/L				2.1	2.4	2.3	2.3	2.4				
Selenium Se	mg/L				0.00077	0.00080	0.00082	0.00112	0.00107				
Silicon SiO2	mg/L				0.01	0.04	0.02	0.00	0.04				
Silver Ag	mg/L				0.0000017	0.0000023	0.0000014	0.0000007	0.0000020				
Sodium Na	mg/L				28	37	36	32	38				
Strontium Sr	mg/L				0.035	0.038	0.038	0.040	0.040				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000017	0.000021	0.000010	0.000003	0.000004				
Thorium Th	mg/L				0.000000	0.000002	0.000001	0.000000	0.000002				
Tin Sn	mg/L				0.00004	0.00015	0.00006	0.00004	0.00007				
Titanium Ti	mg/L				0.0000	0.0001	0.0000	0.0000	0.0001				
Uranium U	mg/L				0.000029	0.000033	0.000036	0.000032	0.000032				
Vanadium V	mg/L				0.0006	0.0002	0.0002	0.0001	0.0002				
Zinc Zn	mg/L				0.0015	0.0018	0.0029	0.0017	0.0020				
Zirconium Zr	mg/L				0.0050	0.0051	0.0050	0.0050	0.0050				

Water Quality in DORIS CREEK (d/s of the waterfall)												
Date		Year 10 Mar-17	Year 10 Apr-17	Year 10 May-17	Year 10 Jun-17	Year 10 Jul-17	Year 10 Aug-17	Year 10 Sep-17	Year 10 Oct-17	Year 10 Nov-17	Year 10 Dec-17	Year 10 Jan-18
Parameter												
TDS	mg/L				144	148	133	146	160			
TSS	mg/L				3.0	3.8	2.9	3.0	2.9			
Free CN	mg/L											
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001			
WAD CN	mg/L											
CNO	mg/L											
SCN	mg/L				0.000	0.000	0.000	0.000	0.000			
Sulphate	mg/L				3.6	3.4	3.2	3.0	3.4			
Chloride	mg/L				60	76	69	64	76			
Total Ammonia-N	mg/L				0.008	0.014	0.012	0.008	0.007			
Nitrate-N	mg/L				0.01	0.01	0.00	0.00	0.00			
Nitrite-N	mg/L				0.001	0.002	0.001	0.001	0.001			
Alkalinity	mg/L				26	27	27	28	28			
OrthoPhosphate-P	mg/L				0.0012	0.0026	0.0017	0.0009	0.0025			
Phosphate-P	mg/L				0.0192	0.0218	0.0321	0.0270	0.0271			
Org. Carbon	mg/L				5.0	5.1	5.0	5.0	5.1			
Hardness CaCO3	mg/L				37	41	43	45	45			
Total Metals												
Aluminum Al	mg/L				0.08	0.06	0.06	0.05	0.05			
Antimony Sb	mg/L				0.0000	0.0002	0.0001	0.0000	0.0002			
Arsenic As	mg/L				0.0004	0.0004	0.0005	0.0004	0.0004			
Barium Ba	mg/L				0.0033	0.0031	0.0029	0.0030	0.0029			
Beryllium Be	mg/L				0.00001	0.00001	0.00001	0.00000	0.00001			
Bismuth Bi	mg/L				0.00004	0.00016	0.00008	0.00001	0.00015			
Boron B	mg/L				0.019	0.021	0.022	0.022	0.022			
Cadmium Cd	mg/L				0.0000023	0.0000027	0.0000024	0.0000020	0.0000027			
Calcium Ca	mg/L				7	10	9	7	10			
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000			
Cobalt Co	mg/L				0.0001	0.0001	0.0001	0.0001	0.0001			
Copper Cu	mg/L				0.0012	0.0014	0.0014	0.0014	0.0014			
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09			
Lead Pb	mg/L				0.00005	0.00006	0.00011	0.00004	0.00004			
Lithium Li	mg/L				0.0000	0.0000	0.0000	0.0000	0.0000			
Magnesium Mg	mg/L				5.3	5.9	6.3	6.4	6.3			
Manganese Mn	mg/L				0.011	0.014	0.015	0.010	0.010			
Mercury Hg	ug/L				0.0006049	0.0006272	0.0006087	0.0006013	0.0006249			
Molybdenum Mo	mg/L				0.00012	0.00017	0.00016	0.00014	0.00017			
Nickel Ni	mg/L				0.0004	0.0006	0.0005	0.0005	0.0005			
Phosphorus P	mg/L				0.001	0.003	0.002	0.000	0.003			
Potassium K	mg/L				2.1	2.3	2.3	2.3	2.4			
Selenium Se	mg/L				0.00077	0.00080	0.00082	0.00112	0.00107			
Silicon SiO2	mg/L				0.01	0.03	0.01	0.00	0.03			
Silver Ag	mg/L				0.0000016	0.0000019	0.0000012	0.0000007	0.0000016			
Sodium Na	mg/L				27	35	34	32	36			
Strontium Sr	mg/L				0.035	0.038	0.038	0.040	0.039			
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000			
Thallium Tl	mg/L				0.000017	0.000021	0.000010	0.000003	0.000004			
Thorium Th	mg/L				0.000000	0.000002	0.000001	0.000000	0.000002			
Tin Sn	mg/L				0.00004	0.00014	0.00005	0.00004	0.00006			
Titanium Ti	mg/L				0.0000	0.0001	0.0000	0.0000	0.0001			
Uranium U	mg/L				0.000029	0.000032	0.000036	0.000032	0.000032			
Vanadium V	mg/L				0.0006	0.0002	0.0002	0.0001	0.0002			
Zinc Zn	mg/L				0.0014	0.0018	0.0029	0.0017	0.0019			
Zirconium Zr	mg/L				0.0050	0.0051	0.0050	0.0050	0.0050			

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)												
Date	Year 1 Mar-08	Year 1 Apr-08	Year 1 May-08	Year 1 Jun-08	Year 1 Jul-08	Year 1 Aug-08	Year 1 Sep-08	Year 1 Oct-08	Year 1 Nov-08	Year 1 Dec-08	Year 1 Jan-09	Year 1 Feb-09
Parameter												
TDS				1044560	656205	260227	358069	144994				
TSS				21811	18295	5781	7268	2639				
Free CN				0.04	0.02	0.01	0.00	0.01				
Total CN				8	5	2	2	1				
WAD CN				0.06	0.02	0.01	0.00	0.01				
CNO				93	39	17	6	13				
SCN				3	6	2	1	2				
Sulphate				27668	19004	7716	8054	4597				
Chloride				440497	353565	145304	162626	82312				
Total Ammonia				116	174	40	32	21				
Nitrate				376	665	280	169	281				
Nitrite				35	85	25	5	6				
Alkalinity				191453	131703	54957	68244	26483				
OrthoPhosphate-P				11	16	6	4	6				
Phosphate-P				144	109	66	67	28				
Org. Carbon				37085	24435	10132	12238	4672				
Hardness CaCO3				277863	201025	87557	110175	42443				
Total Metals												
Aluminum Al				560	279	114	119	44				
Antimony Sb				0.4	1.3	0.6	0.2	0.6				
Arsenic As				2.9	2.1	1.0	1.1	0.5				
Barium Ba				24	15	6	7	3				
Beryllium Be				0.08	0.08	0.03	0.02	0.03				
Bismuth Bi				0.36	1.29	0.52	0.21	0.54				
Boron B				142	103	45	55	21				
Cadmium Cd				0.02	0.02	0.01	0.01	0.00				
Calcium Ca				56582	56309	22561	21155	15229				
Chromium Cr				2	1	1	1	0				
Cobalt Co				0.52	0.53	0.22	0.18	0.17				
Copper Cu				9	7	3	3	1				
Iron Fe				823	521	165	220	81				
Lead Pb				0.37	0.30	0.24	0.10	0.05				
Lithium Li				0	0	0	0	0				
Magnesium Mg				38873	28429	12630	15566	5903				
Manganese Mn				83	69	31	25	9				
Mercury Hg				4.59	3.25	1.32	1.52	0.69				
Molybdenum Mo				1.07	1.16	0.47	0.41	0.32				
Nickel Ni				3.42	3.22	1.17	1.20	0.68				
Phosphorus P				13	23	9	4	8				
Potassium K				15847	11951	4849	5866	2573				
Selenium Se				5.67	3.86	1.64	2.72	0.99				
Silicon SiO2				193	351	133	66	133				
Silver Ag				0.02	0.02	0.01	0.01	0.00				
Sodium Na				193496	143858	63784	78196	29117				
Strontium Sr				258	186	78	98	37				
Tellurium Te				0	0	0	0	0				
Thallium Tl				0.13	0.10	0.02	0.01	0.00				
Thorium Th				0.02	0.02	0.01	0.01	0.01				
Tin Sn				0.30	0.78	0.16	0.12	0.12				
Titanium Ti				0	0	0	0	0				
Uranium U				0.23	0.17	0.08	0.08	0.03				
Vanadium V				4.41	0.96	0.41	0.36	0.23				
Zinc Zn				11.45	9.60	6.18	4.40	2.11				
Zirconium Zr				37	24	10	12	5				

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)												
Date	Year 2 Mar-09	Year 2 Apr-09	Year 2 May-09	Year 2 Jun-09	Year 2 Jul-09	Year 2 Aug-09	Year 2 Sep-09	Year 2 Oct-09	Year 2 Nov-09	Year 2 Dec-09	Year 2 Jan-10	Year 2 Feb-10
Parameter												
TDS				1250096	707612	282524	365206	161393				
TSS				22519	18355	5830	7283	2675				
Free CN				0.28		0.01	0.00	0.01				
Total CN				12	4	2	2	1				
WAD CN				0.40		0.01	0.00	0.01				
CNO				645		20	6	15				
SCN				31	16	6	2	5				
Sulphate				48858	26070	10480	8937	6623				
Chloride				767340	464486	188088	176299	113636				
Total Ammonia				340	215	34	33	22				
Nitrate				2630	1563	617	278	532				
Nitrite				180	62	28	5	7				
Alkalinity				209320	132694	56055	68598	27311				
OrthoPhosphate-P				70	37	14	6	11				
Phosphate-P				204	129	74	69	34				
Org. Carbon				38582	23818	10054	12214	4621				
Hardness CaCO3				310385	206185	90368	111078	44530				
Total Metals												
Aluminum Al				574	281	116	119	44				
Antimony Sb				5.4	3.2	1.3	0.5	1.1				
Arsenic As				3.7	2.3	1.1	1.1	0.5				
Barium Ba				27	16	6	7	3				
Beryllium Be				0.30	0.16	0.07	0.03	0.05				
Bismuth Bi				5.27	3.14	1.24	0.44	1.06				
Boron B				153	104	46	55	22				
Cadmium Cd				0.04	0.03	0.01	0.01	0.01				
Calcium Ca				162369	92668	36456	25595	25393				
Chromium Cr				3	2	1	1	0				
Cobalt Co				1.94	1.04	0.42	0.25	0.31				
Copper Cu				12	8	3	4	2				
Iron Fe				845	522	166	220	82				
Lead Pb				0.53	0.36	0.26	0.11	0.06				
Lithium Li				1	1	0	0	0				
Magnesium Mg				42007	28658	12839	15634	6061				
Manganese Mn				88	71	32	25	10				
Mercury Hg				6.47	3.79	1.55	1.59	0.86				
Molybdenum Mo				3.43	1.97	0.78	0.51	0.54				
Nickel Ni				6.58	4.25	1.57	1.33	0.98				
Phosphorus P				98	52	20	8	17				
Potassium K				22102	13865	5613	6110	3133				
Selenium Se				5.90	3.87	1.65	2.73	1.00				
Silicon SiO2				1699	889	337	131	282				
Silver Ag				0.04	0.02	0.01	0.01	0.01				
Sodium Na				207952	145954	64986	78582	30011				
Strontium Sr				282	189	80	99	39				
Tellurium Te				0	0	0	0	0				
Thallium Tl				0.14	0.11	0.02	0.01	0.01				
Thorium Th				0.07	0.04	0.01	0.01	0.01				
Tin Sn				1.13	1.09	0.28	0.16	0.21				
Titanium Ti				0	0	0	0	0				
Uranium U				0.29	0.19	0.09	0.09	0.04				
Vanadium V				5.36	1.24	0.52	0.39	0.32				
Zinc Zn				15.63	10.05	6.50	4.50	2.35				
Zirconium Zr				40	24	10	12	5				

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)												
Date	Year 3 Mar-10	Year 3 Apr-10	Year 3 May-10	Year 3 Jun-10	Year 3 Jul-10	Year 3 Aug-10	Year 3 Sep-10	Year 3 Oct-10	Year 3 Nov-10	Year 3 Dec-10	Year 3 Jan-11	Year 3 Feb-11
Parameter												
TDS				1264529	756279	289113	360964	171440				
TSS				22392	18413	5812	7256	2670				
Free CN				0.15								
Total CN				9	4	2	2	1				
WAD CN				0.21								
CNO				338								
SCN				31	19	6	1	5				
Sulphate				49787	29869	10616	8344	6837				
Chloride				796044	535123	195193	168757	122764				
Total Ammonia				240	170	30	28	12				
Nitrate				2817	1977	620	201	540				
Nitrite				139	67	25	4	5				
Alkalinity				205605	133938	55521	67888	27122				
OrthoPhosphate-P				83	55	18	5	16				
Phosphate-P				216	147	78	69	38				
Org. Carbon				37767	23762	9958	12133	4608				
Hardness CaCO3				306033	209211	89637	109890	44163				
Total Metals												
Aluminum Al				573	283	115	119	45				
Antimony Sb				6.6	4.9	1.6	0.4	1.5				
Arsenic As				3.7	2.5	1.1	1.1	0.5				
Barium Ba				26	16	6	7	3				
Beryllium Be				0.33	0.22	0.07	0.03	0.06				
Bismuth Bi				6.45	4.81	1.55	0.36	1.47				
Boron B				152	105	46	55	22				
Cadmium Cd				0.05	0.03	0.01	0.01	0.01				
Calcium Ca				162150	106824	35419	22316	23991				
Chromium Cr				3	2	1	1	0				
Cobalt Co				2.00	1.28	0.42	0.21	0.32				
Copper Cu				12	8	3	3	2				
Iron Fe				842	525	166	219	83				
Lead Pb				0.54	0.39	0.27	0.10	0.07				
Lithium Li				1	1	0	0	0				
Magnesium Mg				41510	28990	12785	15518	6077				
Manganese Mn				89	72	32	25	10				
Mercury Hg				6.39	4.02	1.52	1.53	0.83				
Molybdenum Mo				3.43	2.29	0.76	0.44	0.51				
Nickel Ni				6.64	4.75	1.57	1.24	0.98				
Phosphorus P				112	76	24	6	22				
Potassium K				21928	14657	5538	5910	3056				
Selenium Se				5.85	3.88	1.64	2.72	1.00				
Silicon SiO2				1724	1103	325	85	266				
Silver Ag				0.05	0.03	0.01	0.01	0.01				
Sodium Na				205889	147265	64650	78049	29854				
Strontium Sr				279	192	79	98	39				
Tellurium Te				0	0	0	0	0				
Thallium Tl				0.14	0.11	0.02	0.01	0.01				
Thorium Th				0.07	0.04	0.01	0.01	0.01				
Tin Sn				1.31	1.35	0.33	0.15	0.27				
Titanium Ti				0	0	0	0	0				
Uranium U				0.29	0.20	0.09	0.08	0.04				
Vanadium V				5.49	1.50	0.56	0.37	0.37				
Zinc Zn				15.08	10.53	6.43	4.35	2.36				
Zirconium Zr				39	24	10	12	5				

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)												
Date	Year 4 Mar-11	Year 4 Apr-11	Year 4 May-11	Year 4 Jun-11	Year 4 Jul-11	Year 4 Aug-11	Year 4 Sep-11	Year 4 Oct-11	Year 4 Nov-11	Year 4 Dec-11	Year 4 Jan-12	Year 4 Feb-12
Parameter												
TDS				1110187	790487	283878	355542	163121				
TSS				21838	18414	5778	7238	2643				
Free CN												
Total CN				7	5	2	2	1				
WAD CN												
CNO												
SCN				8	15	3	0	3				
Sulphate				33082	28984	9265	7761	5552				
Chloride				542362	547084	179280	160015	105299				
Total Ammonia				92	91	31	27	10				
Nitrate				1002	1813	455	129	370				
Nitrite				37	12	4	4	2				
Alkalinity				191573	133770	54616	67426	26406				
OrthoPhosphate-P				39	70	17	4	13				
Phosphate-P				171	162	77	67	36				
Org. Carbon				36663	24038	9933	12093	4590				
Hardness CaCO3				280133	207475	87746	109057	42654				
Total Metals												
Aluminum Al				563	285	115	118	44				
Antimony Sb				3.1	6.0	1.4	0.2	1.1				
Arsenic As				3.1	2.4	1.1	1.1	0.5				
Barium Ba				24	16	6	7	3				
Beryllium Be				0.17	0.24	0.06	0.02	0.05				
Bismuth Bi				3.00	5.91	1.35	0.19	1.13				
Boron B				144	106	46	55	21				
Cadmium Cd				0.03	0.03	0.01	0.01	0.01				
Calcium Ca				75615	92121	27637	19632	17691				
Chromium Cr				3	2	1	0	0				
Cobalt Co				0.87	1.17	0.32	0.17	0.23				
Copper Cu				10	8	3	3	1				
Iron Fe				825	530	166	219	83				
Lead Pb				0.42	0.39	0.26	0.10	0.06				
Lithium Li				0	1	0	0	0				
Magnesium Mg				39104	29138	12643	15433	5945				
Manganese Mn				84	71	31	24	9				
Mercury Hg				4.86	3.80	1.39	1.48	0.73				
Molybdenum Mo				1.50	1.97	0.58	0.38	0.37				
Nickel Ni				4.11	4.52	1.36	1.15	0.80				
Phosphorus P				48	91	21	4	18				
Potassium K				16843	13905	5097	5751	2698				
Selenium Se				5.67	3.89	1.63	2.71	0.99				
Silicon SiO2				494	908	216	46	176				
Silver Ag				0.03	0.03	0.01	0.00	0.01				
Sodium Na				194405	146604	63828	77678	29197				
Strontium Sr				261	191	78	97	38				
Tellurium Te				0	0	0	0	0				
Thallium Tl				0.13	0.11	0.02	0.01	0.00				
Thorium Th				0.03	0.04	0.01	0.01	0.01				
Tin Sn				0.71	1.51	0.29	0.12	0.21				
Titanium Ti				0	0	0	0	0				
Uranium U				0.24	0.19	0.08	0.08	0.04				
Vanadium V				4.80	1.67	0.52	0.34	0.31				
Zinc Zn				11.83	10.61	6.21	4.23	2.16				
Zirconium Zr				37	25	10	12	5				

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)												
Date	Year 5 Mar-12	Year 5 Apr-12	Year 5 May-12	Year 5 Jun-12	Year 5 Jul-12	Year 5 Aug-12	Year 5 Sep-12	Year 5 Oct-12	Year 5 Nov-12	Year 5 Dec-12	Year 5 Jan-13	Year 5 Feb-13
Parameter												
TDS				1060491	811307	304911	360931	212627				
TSS				21744	18397	5771	7238	2638				
Free CN												
Total CN				7	5	2	2	1				
WAD CN												
CNO												
SCN				4	11	2	0	2				
Sulphate				29234	25147	8294	7631	4741				
Chloride				473528	517661	181685	161903	126788				
Total Ammonia				82	93	31	27	10				
Nitrate				595	1318	333	113	268				
Nitrite				12	14	4	4	2				
Alkalinity				189194	132943	54322	67387	26162				
OrthoPhosphate-P				22	52	12	3	10				
Phosphate-P				154	144	72	66	32				
Org. Carbon				36480	24180	9950	12096	4605				
Hardness CaCO3				275722	204925	87000	108957	42033				
Total Metals												
Aluminum Al				561	285	115	118	44				
Antimony Sb				1.6	4.4	1.0	0.2	0.8				
Arsenic As				3.0	2.3	1.0	1.1	0.5				
Barium Ba				24	16	6	7	3				
Beryllium Be				0.11	0.19	0.05	0.02	0.04				
Bismuth Bi				1.48	4.33	0.96	0.14	0.79				
Boron B				142	105	45	55	21				
Cadmium Cd				0.03	0.03	0.01	0.01	0.01				
Calcium Ca				60545	80643	25696	19522	17953				
Chromium Cr				2	2	1	0	0				
Cobalt Co				0.62	0.92	0.26	0.16	0.18				
Copper Cu				9	8	3	3	1				
Iron Fe				823	534	167	219	83				
Lead Pb				0.39	0.37	0.25	0.10	0.05				
Lithium Li				0	1	0	0	0				
Magnesium Mg				38603	28914	12573	15423	5888				
Manganese Mn				83	70	31	24	9				
Mercury Hg				4.60	3.56	1.33	1.47	0.67				
Molybdenum Mo				1.16	1.62	0.50	0.36	0.30				
Nickel Ni				3.59	4.00	1.23	1.14	0.69				
Phosphorus P				26	69	16	3	13				
Potassium K				15951	13070	4885	5722	2521				
Selenium Se				5.64	3.90	1.63	2.71	0.99				
Silicon SiO2				276	691	162	39	131				
Silver Ag				0.02	0.03	0.01	0.00	0.01				
Sodium Na				192441	167982	74498	79963	48722				
Strontium Sr				257	189	77	97	37				
Tellurium Te				0	0	0	0	0				
Thallium Tl				0.13	0.11	0.02	0.01	0.00				
Thorium Th				0.02	0.04	0.01	0.00	0.01				
Tin Sn				0.47	1.26	0.23	0.11	0.16				
Titanium Ti				0	0	0	0	0				
Uranium U				0.23	0.19	0.08	0.08	0.04				
Vanadium V				4.55	1.43	0.46	0.33	0.26				
Zinc Zn				11.12	10.11	6.08	4.22	2.04				
Zirconium Zr				37	25	10	12	5				

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)											
Date	Year 6 Mar-13	Year 6 Apr-13	Year 6 May-13	Year 6 Jun-13	Year 6 Jul-13	Year 6 Aug-13	Year 6 Sep-13	Year 6 Oct-13	Year 6 Nov-13	Year 6 Dec-13	Year 6 Jan-14 Feb-14
Parameter											
TDS				1145616	995264	327565	361425	199710			
TSS				21738	18380	5767	7237	2635			
Free CN											
Total CN				7	5	2	2	1			
WAD CN											
CNO											
SCN				3	8	2	0	1			
Sulphate				28015	21964	7567	7480	4151			
Chloride				514241	596857	188209	161225	112831			
Total Ammonia				58	78	25	19	8			
Nitrate				276	814	198	38	174			
Nitrite				7	11	2	2	1			
Alkalinity				188880	132016	54116	67360	25990			
OrthoPhosphate-P				17	38	9	3	7			
Phosphate-P				149	130	69	66	30			
Org. Carbon				36499	24238	9963	12097	4616			
Hardness CaCO3				274923	202569	86478	108887	41596			
Total Metals											
Aluminum Al				556	282	114	117	44			
Antimony Sb				1.1	3.1	0.7	0.1	0.6			
Arsenic As				2.8	2.2	1.0	1.0	0.4			
Barium Ba				24	15	6	7	3			
Beryllium Be				0.08	0.14	0.03	0.01	0.03			
Bismuth Bi				1.03	3.05	0.67	0.09	0.56			
Boron B				140	104	45	54	21			
Cadmium Cd				0.02	0.02	0.01	0.01	0.00			
Calcium Ca				61843	81223	24723	19150	15292			
Chromium Cr				2	2	1	0	0			
Cobalt Co				0.53	0.71	0.21	0.15	0.14			
Copper Cu				9	7	3	3	1			
Iron Fe				822	535	167	219	84			
Lead Pb				0.36	0.33	0.24	0.09	0.05			
Lithium Li				0	0	0	0	0			
Magnesium Mg				38499	28679	12517	15407	5844			
Manganese Mn				83	70	31	24	9			
Mercury Hg				4.54	3.36	1.28	1.47	0.64			
Molybdenum Mo				1.07	1.34	0.43	0.36	0.25			
Nickel Ni				3.42	3.57	1.13	1.11	0.61			
Phosphorus P				16	49	11	1	9			
Potassium K				15716	12395	4734	5700	2396			
Selenium Se				5.62	3.88	1.63	2.70	0.99			
Silicon SiO2				160	482	108	15	92			
Silver Ag				0.02	0.02	0.01	0.00	0.00			
Sodium Na				224668	240775	84614	80474	46607			
Strontium Sr				256	187	77	97	37			
Tellurium Te				0	0	0	0	0			
Thallium Tl				0.13	0.10	0.02	0.01	0.00			
Thorium Th				0.01	0.02	0.01	0.00	0.00			
Tin Sn				0.38	1.05	0.18	0.10	0.12			
Titanium Ti				0	0	0	0	0			
Uranium U				0.22	0.17	0.08	0.08	0.03			
Vanadium V				4.44	1.21	0.41	0.31	0.22			
Zinc Zn				10.85	9.61	5.95	4.16	1.95			
Zirconium Zr				37	24	10	12	5			

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)												
Date	Year 7 Mar-14	Year 7 Apr-14	Year 7 May-14	Year 7 Jun-14	Year 7 Jul-14	Year 7 Aug-14	Year 7 Sep-14	Year 7 Oct-14	Year 7 Nov-14	Year 7 Dec-14	Year 7 Jan-15	Year 7 Feb-15
Parameter												
TDS				1107537	882940	302697	358079	178899				
TSS				21734	18367	5764	7237	2633				
Free CN												
Total CN				7	5	2	2	1				
WAD CN												
CNO												
SCN				2	5	1	0	1				
Sulphate				27283	19778	7079	7414	3739				
Chloride				483216	505340	167948	158499	95875				
Total Ammonia				58	67	24	19	7				
Nitrate				184	458	105	25	84				
Nitrite				7	9	2	2	1				
Alkalinity				188659	131365	53972	67340	25869				
OrthoPhosphate-P				14	28	7	3	5				
Phosphate-P				145	120	67	66	28				
Org. Carbon				36513	24279	9972	12098	4623				
Hardness CaCO3				274361	200913	86111	108838	41290				
Total Metals												
Aluminum Al				556	282	114	116	44				
Antimony Sb				0.8	2.2	0.5	0.1	0.4				
Arsenic As				2.8	2.1	1.0	1.0	0.4				
Barium Ba				24	15	6	7	3				
Beryllium Be				0.07	0.10	0.03	0.01	0.02				
Bismuth Bi				0.73	2.16	0.47	0.07	0.39				
Boron B				140	103	45	54	21				
Cadmium Cd				0.02	0.02	0.01	0.01	0.00				
Calcium Ca				57203	67490	21675	18740	12735				
Chromium Cr				2	1	1	0	0				
Cobalt Co				0.49	0.57	0.18	0.14	0.11				
Copper Cu				9	7	3	3	1				
Iron Fe				823	537	167	219	84				
Lead Pb				0.36	0.31	0.24	0.09	0.04				
Lithium Li				0	0	0	0	0				
Magnesium Mg				38448	28522	12482	15402	5814				
Manganese Mn				83	69	31	24	9				
Mercury Hg				4.49	3.22	1.25	1.46	0.61				
Molybdenum Mo				1.00	1.14	0.39	0.35	0.21				
Nickel Ni				3.32	3.28	1.06	1.11	0.55				
Phosphorus P				12	35	8	1	7				
Potassium K				15556	11923	4629	5685	2308				
Selenium Se				5.62	3.88	1.62	2.70	0.98				
Silicon SiO2				119	353	78	11	66				
Silver Ag				0.01	0.02	0.00	0.00	0.00				
Sodium Na				214823	211734	78184	79609	41226				
Strontium Sr				256	186	77	97	37				
Tellurium Te				0	0	0	0	0				
Thallium Tl				0.13	0.10	0.02	0.01	0.00				
Thorium Th				0.01	0.02	0.00	0.00	0.00				
Tin Sn				0.34	0.91	0.15	0.09	0.10				
Titanium Ti				0	0	0	0	0				
Uranium U				0.21	0.17	0.07	0.08	0.03				
Vanadium V				4.39	1.07	0.37	0.31	0.20				
Zinc Zn				10.75	9.29	5.88	4.15	1.89				
Zirconium Zr				37	24	10	12	5				

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)											
Date	Year 8 Mar-15	Year 8 Apr-15	Year 8 May-15	Year 8 Jun-15	Year 8 Jul-15	Year 8 Aug-15	Year 8 Sep-15	Year 8 Oct-15	Year 8 Nov-15	Year 8 Dec-15	Year 8 Jan-16 Feb-16
Parameter											
TDS				1080779	804010	285223	355728	164276			
TSS				21731	18358	5762	7236	2631			
Free CN											
Total CN				7	5	2	2	1			
WAD CN											
CNO											
SCN				1	4	1	0	1			
Sulphate				26752	18211	6732	7367	3449			
Chloride				461415	441031	153710	156583	83960			
Total Ammonia				58	67	24	19	7			
Nitrate				65	107	27	14	19			
Nitrite				7	9	2	2	1			
Alkalinity				188504	130907	53871	67327	25785			
OrthoPhosphate-P				11	21	5	2	4			
Phosphate-P				143	113	65	66	26			
Org. Carbon				36523	24307	9979	12099	4629			
Hardness CaCO3				273967	199750	85854	108803	41074			
Total Metals											
Aluminum Al				555	281	113	116	43			
Antimony Sb				0.6	1.6	0.4	0.1	0.3			
Arsenic As				2.8	2.0	1.0	1.0	0.4			
Barium Ba				24	15	6	7	3			
Beryllium Be				0.06	0.08	0.02	0.01	0.01			
Bismuth Bi				0.52	1.54	0.33	0.05	0.28			
Boron B				140	103	45	54	20			
Cadmium Cd				0.02	0.02	0.01	0.01	0.00			
Calcium Ca				53913	57787	19526	18451	10937			
Chromium Cr				2	1	1	0	0			
Cobalt Co				0.45	0.46	0.16	0.14	0.09			
Copper Cu				9	7	3	3	1			
Iron Fe				823	538	168	219	84			
Lead Pb				0.35	0.30	0.23	0.09	0.04			
Lithium Li				0	0	0	0	0			
Magnesium Mg				38409	28407	12456	15398	5793			
Manganese Mn				83	69	31	24	9			
Mercury Hg				4.46	3.13	1.23	1.46	0.59			
Molybdenum Mo				0.95	1.00	0.36	0.35	0.19			
Nickel Ni				3.25	3.06	1.02	1.10	0.51			
Phosphorus P				9	26	6	1	5			
Potassium K				15443	11590	4556	5676	2246			
Selenium Se				5.61	3.87	1.62	2.70	0.98			
Silicon SiO2				85	252	56	8	47			
Silver Ag				0.01	0.01	0.00	0.00	0.00			
Sodium Na				207905	191326	73666	79001	37445			
Strontium Sr				256	185	76	97	36			
Tellurium Te				0	0	0	0	0			
Thallium Tl				0.13	0.10	0.02	0.01	0.00			
Thorium Th				0.00	0.01	0.00	0.00	0.00			
Tin Sn				0.30	0.81	0.13	0.09	0.08			
Titanium Ti				0	0	0	0	0			
Uranium U				0.21	0.16	0.07	0.08	0.03			
Vanadium V				4.36	0.97	0.35	0.30	0.18			
Zinc Zn				10.66	9.04	5.82	4.14	1.84			
Zirconium Zr				37	24	10	12	5			

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)												
Date	Year 9 Mar-16	Year 9 Apr-16	Year 9 May-16	Year 9 Jun-16	Year 9 Jul-16	Year 9 Aug-16	Year 9 Sep-16	Year 9 Oct-16	Year 9 Nov-16	Year 9 Dec-16	Year 9 Jan-17	Year 9 Feb-17
Parameter												
TDS				1061976	748546	272943	354076	154000				
TSS				21729	18352	5761	7236	2630				
Free CN												
Total CN				7	5	2	2	1				
WAD CN												
CNO												
SCN				1	3	1	0	1				
Sulphate				26379	17110	6488	7335	3245				
Chloride				446094	395840	143705	155237	75588				
Total Ammonia				58	67	24	19	7				
Nitrate				38	27	10	12	4				
Nitrite				7	9	2	2	1				
Alkalinity				188395	130586	53800	67317	25725				
OrthoPhosphate-P				10	16	4	2	3				
Phosphate-P				141	108	64	65	25				
Org. Carbon				36529	24327	9983	12100	4632				
Hardness CaCO3				273690	198932	85673	108779	40923				
Total Metals												
Aluminum Al				555	280	113	116	43				
Antimony Sb				0.4	1.1	0.3	0.1	0.2				
Arsenic As				2.8	2.0	0.9	1.0	0.4				
Barium Ba				24	15	6	7	3				
Beryllium Be				0.05	0.06	0.02	0.01	0.01				
Bismuth Bi				0.37	1.09	0.24	0.04	0.19				
Boron B				140	102	45	54	20				
Cadmium Cd				0.02	0.01	0.00	0.00	0.00				
Calcium Ca				51602	50968	18017	18248	9674				
Chromium Cr				2	1	1	0	0				
Cobalt Co				0.43	0.39	0.14	0.14	0.08				
Copper Cu				9	7	3	3	1				
Iron Fe				823	539	168	219	84				
Lead Pb				0.35	0.29	0.23	0.09	0.04				
Lithium Li				0	0	0	0	0				
Magnesium Mg				38381	28326	12438	15396	5778				
Manganese Mn				83	69	31	24	9				
Mercury Hg				4.43	3.06	1.22	1.46	0.58				
Molybdenum Mo				0.92	0.91	0.34	0.34	0.17				
Nickel Ni				3.20	2.91	0.98	1.10	0.48				
Phosphorus P				6	19	4	1	4				
Potassium K				15364	11355	4504	5669	2203				
Selenium Se				5.61	3.86	1.62	2.70	0.98				
Silicon SiO2				61	181	40	5	34				
Silver Ag				0.01	0.01	0.00	0.00	0.00				
Sodium Na				203043	176985	70491	78574	34788				
Strontium Sr				256	185	76	97	36				
Tellurium Te				0	0	0	0	0				
Thallium Tl				0.13	0.10	0.02	0.01	0.00				
Thorium Th				0.00	0.01	0.00	0.00	0.00				
Tin Sn				0.28	0.74	0.11	0.09	0.06				
Titanium Ti				0	0	0	0	0				
Uranium U				0.21	0.16	0.07	0.08	0.03				
Vanadium V				4.33	0.89	0.33	0.30	0.16				
Zinc Zn				10.61	8.87	5.78	4.14	1.81				
Zirconium Zr				37	24	10	12	5				

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)												
Date	Year 10 Mar-17	Year 10 Apr-17	Year 10 May-17	Year 10 Jun-17	Year 10 Jul-17	Year 10 Aug-17	Year 10 Sep-17	Year 10 Oct-17	Year 10 Nov-17	Year 10 Dec-17	Year 10 Jan-18	Year 10 Feb-18
Parameter												
TDS				1048763	709571	264314	352915	146779				
TSS				21728	18348	5760	7236	2629				
Free CN												
Total CN				7	5	2	2	1				
WAD CN												
CNO												
SCN				1	2	0	0	0				
Sulphate				26116	16336	6317	7312	3101				
Chloride				435329	364085	136675	154291	69704				
Total Ammonia				58	67	24	19	7				
Nitrate				38	27	10	12	4				
Nitrite				7	9	2	2	1				
Alkalinity				188318	130360	53750	67310	25683				
OrthoPhosphate-P				8	12	3	2	2				
Phosphate-P				140	105	64	65	25				
Org. Carbon				36534	24341	9986	12100	4635				
Hardness CaCO3				273495	198357	85545	108762	40816				
Total Metals												
Aluminum Al				555	280	113	116	43				
Antimony Sb				0.3	0.8	0.2	0.1	0.1				
Arsenic As				2.7	2.0	0.9	1.0	0.4				
Barium Ba				24	15	6	7	3				
Beryllium Be				0.05	0.05	0.01	0.01	0.01				
Bismuth Bi				0.27	0.78	0.17	0.03	0.14				
Boron B				140	102	44	54	20				
Cadmium Cd				0.02	0.01	0.00	0.00	0.00				
Calcium Ca				49977	46177	16956	18105	8786				
Chromium Cr				2	1	1	0	0				
Cobalt Co				0.41	0.34	0.13	0.13	0.07				
Copper Cu				9	7	3	3	1				
Iron Fe				824	539	168	219	84				
Lead Pb				0.34	0.28	0.23	0.09	0.04				
Lithium Li				0	0	0	0	0				
Magnesium Mg				38362	28269	12426	15394	5767				
Manganese Mn				83	69	31	24	9				
Mercury Hg				4.42	3.01	1.21	1.45	0.57				
Molybdenum Mo				0.90	0.84	0.32	0.34	0.15				
Nickel Ni				3.16	2.81	0.96	1.09	0.46				
Phosphorus P				5	14	3	0	3				
Potassium K				15308	11191	4467	5664	2173				
Selenium Se				5.61	3.86	1.62	2.70	0.98				
Silicon SiO2				44	131	29	4	25				
Silver Ag				0.01	0.01	0.00	0.00	0.00				
Sodium Na				199626	166908	68260	78274	32921				
Strontium Sr				255	184	76	97	36				
Tellurium Te				0	0	0	0	0				
Thallium Tl				0.13	0.10	0.02	0.01	0.00				
Thorium Th				0.00	0.01	0.00	0.00	0.00				
Tin Sn				0.26	0.69	0.10	0.09	0.05				
Titanium Ti				0	0	0	0	0				
Uranium U				0.21	0.15	0.07	0.08	0.03				
Vanadium V				4.31	0.84	0.32	0.30	0.15				
Zinc Zn				10.57	8.75	5.76	4.14	1.79				
Zirconium Zr				37	24	10	12	5				

Little Roberts Lake Outflow Summary Table

OUTPUT SUMMARY								Fraction of CCME in LRL Creek (%)
Max Annual Discharge rate		1,179,417 m³/year in Degradation Field(age)		Year 2		Doris Creek	Max L'Roberts L Outflow	
		Tail Lk Cu < CME Year		8				
MMER		CCME	Tail Lake Year 2	Downstream Year 2	Baseline	Operational Year 2		
Maximum Concentration								
pH			6 to 9	7 to 8	7 to 8	7.6	7 to 8	
TDS	mg/L			1317	232	580	625	
TSS	mg/L	15		1.9	3.8	4.6	4.7	
Free CN	mg/L		0.005	0.0005	0.00004		0.00002	0%
Total CN	mg/L	1.0		0.008	0.001	0.001	0.001	
WAD CN	mg/L			0.0007	0.0001		0.0000	
CNO	mg/L			1.1	0.08		0.04	
SCN	mg/L			0.074	0.005		0.003	
Sulphate	mg/L			57	7.4	7.1	8.8	
Chloride	mg/L			1029	138	70	113	
Total Ammonia-N	mg/L		1.27	0.45	0.045	0.005	0.023	2%
Nitrate-N	mg/L		2.9	6.5	0.58	0.01	0.32	11%
Nitrite-N	mg/L		0.018	0.30	0.023	0.001	0.013	70%
Alkalinity	mg/L			49	30	25	27	
OrthoPhosphate-P	mg/L			0.2192	0.0172	0.0010	0.0099	
Phosphate-P	mg/L			0.2233	0.0414	0.0185	0.0261	
Org. Carbon	mg/L			6.1	5.1	5.3	5.4	
Hardness CaCO3	mg/L			88	48	45	49	
Total Metals								
Aluminum Al	mg/L		0.1	0.04	0.08	0.44	0.44	440%
Antimony Sb	mg/L			0.0193	0.0016	0.00002	0.0009	
Arsenic As	mg/L	0.5	0.005	0.00	0.0006	0.0005	0.0006	12%
Barium Ba	mg/L			0.0068	0.0035	0.0073	0.0075	
Beryllium Be	mg/L			0.00068	0.00007	0.000012	0.000037	
Bismuth Bi	mg/L			0.01919	0.0016	0.000007	0.0009	
Boron B	mg/L			0.032	0.023	0.027	0.028	
Cadmium Cd	mg/L		0.000017	0.000059	0.0000073	0.0000021	0.0000049	29%
Calcium Ca	mg/L			279	27	6.7	18	
Chromium Cr	mg/L		0.001	0.0028	0.0005	0.0009	0.0010	102%
Cobalt Co	mg/L			0.0038	0.0003	0.0001	0.0002	
Copper Cu	mg/L	0.3	0.002	0.006	0.0018	0.0016	0.0019	94%
Iron Fe	mg/L		0.3	0.11	0.11	0.36	0.3662	122%
Lead Pb	mg/L	0.2	0.001	0.00043	0.00013	0.00017	0.00019	19%
Lithium Li	mg/L			0.0028	0.0002		0.0001	
Magnesium Mg	mg/L			8.7	6.6	6.5	6.9	
Manganese Mn	mg/L			0.015	0.016	0.011	0.011	
Mercury Hg	ug/L		0.026	0.0050	0.0009	0.0006	0.0008	3%
Molybdenum Mo	mg/L		0.073	0.0062	0.00059	0.00018	0.00043	1%
Nickel Ni	mg/L	0.5	0.025	0.008	0.0011	0.0007	0.0010	4%
Phosphorus P	mg/L			0.288	0.023		0.013	
Potassium K	mg/L			17	3.4	2.3	2.9	
Selenium Se	mg/L		0.001	0.00065	0.00112	0.0014	0.0014	138%
Silicon SiO2	mg/L			4.0	0.31		0.16	
Silver Ag	mg/L		0.0001	0.00007	0.0000080	0.0000015	0.0000046	5%
Sodium Na	mg/L			334	53	33	46	
Strontium Sr	mg/L			0.064	0.042	0.042	0.045	
Tellurium Te	mg/L			0.000	0.000		0.000	
Thallium Tl	mg/L		0.0008	0.000032	0.000022	0.000064	0.000065	8%
Thorium Th	mg/L			0.000135	0.0000122		0.0000065	
Tin Sn	mg/L			0.00308	0.00031	0.00004	0.00018	
Titanium Ti	mg/L			0.0012	0.0001		0.0001	
Uranium U	mg/L			0.000183	0.000045	0.000052	0.000058	
Vanadium V	mg/L			0.0034	0.0007	0.0010	0.0011	
Zinc Zn	mg/L	0.5	0.03	0.011	0.0032	0.0084	0.0088	29%
Zirconium Zr	mg/L			0.0067	0.0052	0.0050	0.0053	

Water Quality in Little Roberts Lake Outflow													
Date		Year 1 Mar-08	Year 1 Apr-08	Year 1 May-08	Year 1 Jun-08	Year 1 Jul-08	Year 1 Aug-08	Year 1 Sep-08	Year 1 Oct-08	Year 1 Nov-08	Year 1 Dec-08	Year 1 Jan-09	Year 1 Feb-09
Parameter													
TDS	mg/L				108	588	147	152	164				
TSS	mg/L				4.7	3.0	2.3	2.2	2.3				
Free CN	mg/L				0.00000	0.00000	0.00000	0.00000	0.00000				
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L				0.0000	0.0000	0.0000	0.0000	0.0000				
CNO	mg/L				0.01	0.00	0.00	0.00	0.01				
SCN	mg/L				0.000	0.001	0.001	0.000	0.001				
Sulphate	mg/L				7.3	4.1	4.9	5.7	6.7				
Chloride	mg/L				52	67	67	72	87				
Total Ammonia-N	mg/L				0.008	0.017	0.009	0.008	0.013				
Nitrate-N	mg/L				0.03	0.07	0.08	0.04	0.17				
Nitrite-N	mg/L				0.003	0.009	0.007	0.002	0.004				
Alkalinity	mg/L				20	24	26	25	27				
OrthoPhosphate-P	mg/L				0.0014	0.0024	0.0022	0.0014	0.0039				
Phosphate-P	mg/L				0.0190	0.0176	0.0194	0.0174	0.0201				
Org. Carbon	mg/L				5.2	4.2	5.4	4.8	5.1				
Hardness CaCO3	mg/L				34	41	42	45	48				
Total Metals													
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06				
Antimony Sb	mg/L				0.0000	0.0001	0.0002	0.0001	0.0003				
Arsenic As	mg/L				0.0004	0.0004	0.0005	0.0005	0.0006				
Barium Ba	mg/L				0.0073	0.0036	0.0041	0.0034	0.0035				
Beryllium Be	mg/L				0.00001	0.00001	0.00001	0.00001	0.00002				
Bismuth Bi	mg/L				0.00002	0.00014	0.00014	0.00004	0.00031				
Boron B	mg/L				0.021	0.024	0.025	0.027	0.028				
Cadmium Cd	mg/L				0.0000026	0.0000031	0.0000030	0.0000026	0.0000037				
Calcium Ca	mg/L				6	9	9	7	12				
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0001	0.0001	0.0001	0.0001	0.0001				
Copper Cu	mg/L				0.0015	0.0013	0.0016	0.0016	0.0018				
Iron Fe	mg/L				0.36	0.13	0.16	0.13	0.14				
Lead Pb	mg/L				0.00017	0.00007	0.00013	0.00005	0.00006				
Lithium Li	mg/L				0.0000	0.0000	0.0000	0.0000	0.0001				
Magnesium Mg	mg/L				5.4	6.1	6.5	6.5	6.8				
Manganese Mn	mg/L				0.011	0.009	0.010	0.007	0.007				
Mercury Hg	ug/L				0.0006186	0.0006622	0.0006508	0.0006148	0.0007098				
Molybdenum Mo	mg/L				0.00018	0.00021	0.00023	0.00020	0.00030				
Nickel Ni	mg/L				0.0008	0.0006	0.0006	0.0006	0.0007				
Phosphorus P	mg/L				0.001	0.003	0.002	0.001	0.005				
Potassium K	mg/L				2.2	2.4	2.3	2.3	2.6				
Selenium Se	mg/L				0.00071	0.00079	0.00090	0.00136	0.00138				
Silicon SiO2	mg/L				0.01	0.04	0.03	0.01	0.08				
Silver Ag	mg/L				0.0000017	0.0000027	0.0000024	0.0000014	0.0000027				
Sodium Na	mg/L				26	32	33	33	34				
Strontium Sr	mg/L				0.036	0.039	0.042	0.042	0.044				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000064	0.000013	0.000002	0.000009	0.000010				
Thorium Th	mg/L				0.000001	0.000002	0.000002	0.000001	0.000004				
Tin Sn	mg/L				0.00004	0.00007	0.00007	0.00005	0.00009				
Titanium Ti	mg/L				0.0000	0.0000	0.0000	0.0000	0.0000				
Uranium U	mg/L				0.000054	0.000044	0.000046	0.000042	0.000046				
Vanadium V	mg/L				0.0010	0.0002	0.0005	0.0001	0.0001				
Zinc Zn	mg/L				0.0085	0.0027	0.0028	0.0013	0.0016				
Zirconium Zr	mg/L				0.0051	0.0052	0.0052	0.0051	0.0053				

Water Quality in Little Roberst Lake Outflow													
Date		Year 2 Mar-09	Year 2 Apr-09	Year 2 May-09	Year 2 Jun-09	Year 2 Jul-09	Year 2 Aug-09	Year 2 Sep-09	Year 2 Oct-09	Year 2 Nov-09	Year 2 Dec-09	Year 2 Jan-10	Year 2 Feb-10
Parameter													
TDS	mg/L				122	594	152	153	173				
TSS	mg/L				4.7	3.1	2.3	2.2	2.3				
Free CN	mg/L				0.00002		0.00000	0.00000	0.00000				
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L				0.0000		0.0000	0.0000	0.0000				
CNO	mg/L				0.04		0.01	0.00	0.01				
SCN	mg/L				0.002	0.002	0.002	0.000	0.003				
Sulphate	mg/L				8.8	4.9	5.7	5.8	7.9				
Chloride	mg/L				74	79	78	75	106				
Total Ammonia-N	mg/L				0.023	0.021	0.008	0.008	0.014				
Nitrate-N	mg/L				0.18	0.17	0.16	0.06	0.31				
Nitrite-N	mg/L				0.013	0.007	0.008	0.002	0.004				
Alkalinity	mg/L				22	24	26	25	27				
OrthoPhosphate-P	mg/L				0.0054	0.0046	0.0042	0.0019	0.0072				
Phosphate-P	mg/L				0.0231	0.0198	0.0214	0.0179	0.0234				
Org. Carbon	mg/L				5.3	4.2	5.4	4.8	5.0				
Hardness CaCO3	mg/L				36	41	42	46	49				
Total Metals													
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06				
Antimony Sb	mg/L				0.0004	0.0004	0.0003	0.0001	0.0006				
Arsenic As	mg/L				0.0005	0.0004	0.0005	0.0005	0.0006				
Barium Ba	mg/L				0.0075	0.0037	0.0042	0.0034	0.0036				
Beryllium Be	mg/L				0.00003	0.00002	0.00002	0.00001	0.00003				
Bismuth Bi	mg/L				0.00036	0.00035	0.00032	0.00009	0.00062				
Boron B	mg/L				0.022	0.024	0.026	0.027	0.028				
Cadmium Cd	mg/L				0.0000041	0.0000039	0.0000037	0.0000028	0.0000049				
Calcium Ca	mg/L				13	13	13	8	18				
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0002	0.0001	0.0002	0.0001	0.0002				
Copper Cu	mg/L				0.0017	0.0014	0.0017	0.0017	0.0019				
Iron Fe	mg/L				0.37	0.13	0.16	0.13	0.14				
Lead Pb	mg/L				0.00019	0.00008	0.00013	0.00005	0.00007				
Lithium Li	mg/L				0.0001	0.0001	0.0001	0.0000	0.0001				
Magnesium Mg	mg/L				5.6	6.1	6.5	6.6	6.9				
Manganese Mn	mg/L				0.011	0.009	0.010	0.007	0.008				
Mercury Hg	ug/L				0.0007458	0.0007223	0.0007087	0.0006293	0.0008048				
Molybdenum Mo	mg/L				0.00034	0.00030	0.00031	0.00022	0.00043				
Nickel Ni	mg/L				0.0010	0.0007	0.0007	0.0006	0.0009				
Phosphorus P	mg/L				0.007	0.006	0.005	0.002	0.010				
Potassium K	mg/L				2.6	2.6	2.5	2.3	2.9				
Selenium Se	mg/L				0.00073	0.00079	0.00091	0.00136	0.00138				
Silicon SiO2	mg/L				0.12	0.10	0.09	0.03	0.16				
Silver Ag	mg/L				0.0000033	0.0000037	0.0000032	0.0000016	0.0000042				
Sodium Na	mg/L				27	32	33	33	35				
Strontium Sr	mg/L				0.038	0.040	0.043	0.042	0.045				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000065	0.000014	0.000003	0.000009	0.000010				
Thorium Th	mg/L				0.000004	0.000004	0.000004	0.000002	0.000007				
Tin Sn	mg/L				0.00009	0.00010	0.00010	0.00006	0.00015				
Titanium Ti	mg/L				0.0000	0.0000	0.0000	0.0000	0.0000				
Uranium U	mg/L				0.000058	0.000046	0.000048	0.000043	0.000050				
Vanadium V	mg/L				0.0011	0.0002	0.0005	0.0001	0.0002				
Zinc Zn	mg/L				0.0088	0.0028	0.0029	0.0013	0.0017				
Zirconium Zr	mg/L				0.0052	0.0052	0.0052	0.0051	0.0053				

Water Quality in Little Roberst Lake Outflow													
Date		Year 3 Mar-10	Year 3 Apr-10	Year 3 May-10	Year 3 Jun-10	Year 3 Jul-10	Year 3 Aug-10	Year 3 Sep-10	Year 3 Oct-10	Year 3 Nov-10	Year 3 Dec-10	Year 3 Jan-11	Year 3 Feb-11
Parameter													
TDS	mg/L				123	599	154	152	179				
TSS	mg/L				4.7	3.1	2.3	2.2	2.3				
Free CN	mg/L				0.00001								
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L				0.0000								
CNO	mg/L				0.02								
SCN	mg/L				0.002	0.002	0.001	0.000	0.003				
Sulphate	mg/L				8.8	5.3	5.7	5.7	8.0				
Chloride	mg/L				76	87	80	74	111				
Total Ammonia-N	mg/L				0.016	0.016	0.007	0.007	0.008				
Nitrate-N	mg/L				0.19	0.22	0.16	0.04	0.32				
Nitrite-N	mg/L				0.010	0.007	0.007	0.001	0.003				
Alkalinity	mg/L				21	24	26	25	27				
OrthoPhosphate-P	mg/L				0.0062	0.0067	0.0052	0.0017	0.0099				
Phosphate-P	mg/L				0.0239	0.0219	0.0223	0.0178	0.0261				
Org. Carbon	mg/L				5.2	4.2	5.4	4.8	5.0				
Hardness CaCO3	mg/L				36	42	42	45	49				
Total Metals													
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06				
Antimony Sb	mg/L				0.0005	0.0005	0.0004	0.0001	0.0009				
Arsenic As	mg/L				0.0005	0.0005	0.0005	0.0005	0.0006				
Barium Ba	mg/L				0.0075	0.0037	0.0042	0.0034	0.0036				
Beryllium Be	mg/L				0.00003	0.00003	0.00002	0.00001	0.00004				
Bismuth Bi	mg/L				0.00044	0.00053	0.00040	0.00007	0.00086				
Boron B	mg/L				0.021	0.024	0.026	0.027	0.028				
Cadmium Cd	mg/L				0.0000041	0.0000043	0.0000037	0.0000026	0.0000049				
Calcium Ca	mg/L				13	14	12	7	17				
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0002	0.0002	0.0002	0.0001	0.0002				
Copper Cu	mg/L				0.0017	0.0014	0.0017	0.0016	0.0019				
Iron Fe	mg/L				0.37	0.13	0.16	0.13	0.14				
Lead Pb	mg/L				0.00019	0.00008	0.00013	0.00005	0.00007				
Lithium Li	mg/L				0.0001	0.0001	0.0001	0.0000	0.0001				
Magnesium Mg	mg/L				5.6	6.2	6.5	6.5	6.9				
Manganese Mn	mg/L				0.011	0.010	0.010	0.007	0.008				
Mercury Hg	ug/L				0.0007406	0.0007470	0.0007019	0.0006168	0.0007899				
Molybdenum Mo	mg/L				0.00034	0.00033	0.00030	0.00020	0.00041				
Nickel Ni	mg/L				0.0010	0.0007	0.0007	0.0006	0.0009				
Phosphorus P	mg/L				0.008	0.008	0.006	0.001	0.013				
Potassium K	mg/L				2.6	2.7	2.5	2.3	2.9				
Selenium Se	mg/L				0.00072	0.00079	0.00091	0.00135	0.00138				
Silicon SiO2	mg/L				0.12	0.12	0.08	0.02	0.15				
Silver Ag	mg/L				0.0000036	0.0000043	0.0000034	0.0000015	0.0000046				
Sodium Na	mg/L				27	32	33	33	35				
Strontium Sr	mg/L				0.038	0.040	0.043	0.042	0.045				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000065	0.000014	0.000003	0.000009	0.000010				
Thorium Th	mg/L				0.000005	0.000005	0.000004	0.000001	0.000006				
Tin Sn	mg/L				0.00010	0.00013	0.00011	0.00005	0.00018				
Titanium Ti	mg/L				0.0000	0.0000	0.0000	0.0000	0.0001				
Uranium U	mg/L				0.000058	0.000047	0.000048	0.000043	0.000049				
Vanadium V	mg/L				0.0011	0.0003	0.0005	0.0001	0.0002				
Zinc Zn	mg/L				0.0088	0.0028	0.0029	0.0013	0.0018				
Zirconium Zr	mg/L				0.0052	0.0052	0.0052	0.0050	0.0053				

Water Quality in Little Roberst Lake Outflow													
Date		Year 4 Mar-11	Year 4 Apr-11	Year 4 May-11	Year 4 Jun-11	Year 4 Jul-11	Year 4 Aug-11	Year 4 Sep-11	Year 4 Oct-11	Year 4 Nov-11	Year 4 Dec-11	Year 4 Jan-12	Year 4 Feb-12
Parameter													
TDS	mg/L				112	603	153	151	174				
TSS	mg/L				4.7	3.1	2.3	2.2	2.3				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.001	0.002	0.001	0.000	0.002				
Sulphate	mg/L				7.7	5.2	5.3	5.6	7.3				
Chloride	mg/L				59	88	76	72	101				
Total Ammonia-N	mg/L				0.006	0.008	0.007	0.007	0.007				
Nitrate-N	mg/L				0.07	0.20	0.12	0.03	0.22				
Nitrite-N	mg/L				0.003	0.001	0.001	0.001	0.001				
Alkalinity	mg/L				20	24	26	25	27				
OrthoPhosphate-P	mg/L				0.0033	0.0083	0.0050	0.0014	0.0085				
Phosphate-P	mg/L				0.0208	0.0235	0.0221	0.0174	0.0247				
Org. Carbon	mg/L				5.2	4.2	5.4	4.8	5.0				
Hardness CaCO3	mg/L				34	41	42	45	48				
Total Metals													
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06				
Antimony Sb	mg/L				0.0002	0.0007	0.0004	0.0001	0.0007				
Arsenic As	mg/L				0.0004	0.0005	0.0005	0.0005	0.0006				
Barium Ba	mg/L				0.0073	0.0037	0.0041	0.0033	0.0036				
Beryllium Be	mg/L				0.00002	0.00003	0.00002	0.00001	0.00003				
Bismuth Bi	mg/L				0.00020	0.00065	0.00035	0.00004	0.00066				
Boron B	mg/L				0.021	0.024	0.025	0.027	0.028				
Cadmium Cd	mg/L				0.0000029	0.0000042	0.0000033	0.0000025	0.0000042				
Calcium Ca	mg/L				7	13	10	7	13				
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0002	0.0002	0.0001	0.0001	0.0002				
Copper Cu	mg/L				0.0016	0.0014	0.0016	0.0016	0.0018				
Iron Fe	mg/L				0.36	0.13	0.16	0.13	0.14				
Lead Pb	mg/L				0.00018	0.00008	0.00013	0.00005	0.00006				
Lithium Li	mg/L				0.0000	0.0001	0.0000	0.0000	0.0001				
Magnesium Mg	mg/L				5.4	6.2	6.5	6.5	6.8				
Manganese Mn	mg/L				0.011	0.009	0.010	0.007	0.007				
Mercury Hg	ug/L				0.0006371	0.0007224	0.0006678	0.0006072	0.0007287				
Molybdenum Mo	mg/L				0.00021	0.00030	0.00026	0.00019	0.00033				
Nickel Ni	mg/L				0.0008	0.0007	0.0007	0.0005	0.0008				
Phosphorus P	mg/L				0.003	0.010	0.006	0.001	0.010				
Potassium K	mg/L				2.2	2.6	2.4	2.3	2.7				
Selenium Se	mg/L				0.00071	0.00079	0.00090	0.00135	0.00138				
Silicon SiO2	mg/L				0.03	0.10	0.06	0.01	0.10				
Silver Ag	mg/L				0.0000024	0.0000046	0.0000031	0.0000013	0.0000039				
Sodium Na	mg/L				26	32	33	33	34				
Strontium Sr	mg/L				0.037	0.040	0.042	0.042	0.044				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000064	0.000014	0.000002	0.000009	0.000010				
Thorium Th	mg/L				0.000002	0.000004	0.000003	0.000001	0.000005				
Tin Sn	mg/L				0.00006	0.00015	0.00010	0.00005	0.00015				
Titanium Ti	mg/L				0.0000	0.0000	0.0000	0.0000	0.0000				
Uranium U	mg/L				0.000055	0.000046	0.000047	0.000042	0.000047				
Vanadium V	mg/L				0.0011	0.0003	0.0005	0.0001	0.0002				
Zinc Zn	mg/L				0.0085	0.0028	0.0028	0.0012	0.0016				
Zirconium Zr	mg/L				0.0051	0.0053	0.0052	0.0050	0.0053				

Water Quality in Little Roberst Lake Outflow													
Date		Year 5 Mar-12	Year 5 Apr-12	Year 5 May-12	Year 5 Jun-12	Year 5 Jul-12	Year 5 Aug-12	Year 5 Sep-12	Year 5 Oct-12	Year 5 Nov-12	Year 5 Dec-12	Year 5 Jan-13	Year 5 Feb-13
Parameter													
TDS	mg/L				109	605	158	152	203				
TSS	mg/L				4.7	3.1	2.3	2.2	2.3				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.000	0.001	0.001	0.000	0.001				
Sulphate	mg/L				7.4	4.8	5.1	5.6	6.8				
Chloride	mg/L				54	85	77	72	113				
Total Ammonia-N	mg/L				0.006	0.008	0.007	0.007	0.007				
Nitrate-N	mg/L				0.04	0.15	0.09	0.03	0.16				
Nitrite-N	mg/L				0.001	0.002	0.001	0.001	0.001				
Alkalinity	mg/L				20	24	26	25	26				
OrthoPhosphate-P	mg/L				0.0021	0.0063	0.0038	0.0013	0.0063				
Phosphate-P	mg/L				0.0197	0.0215	0.0209	0.0173	0.0225				
Org. Carbon	mg/L				5.1	4.2	5.4	4.8	5.0				
Hardness CaCO3	mg/L				34	41	41	45	47				
Total Metals													
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06				
Antimony Sb	mg/L				0.0001	0.0005	0.0003	0.0000	0.0005				
Arsenic As	mg/L				0.0004	0.0004	0.0005	0.0005	0.0006				
Barium Ba	mg/L				0.0073	0.0037	0.0041	0.0033	0.0035				
Beryllium Be	mg/L				0.00002	0.00002	0.00002	0.00001	0.00002				
Bismuth Bi	mg/L				0.00010	0.00047	0.00025	0.00003	0.00046				
Boron B	mg/L				0.021	0.024	0.025	0.027	0.028				
Cadmium Cd	mg/L				0.0000027	0.0000040	0.0000032	0.0000025	0.0000040				
Calcium Ca	mg/L				6	12	10	7	13				
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0001	0.0001	0.0001	0.0001	0.0001				
Copper Cu	mg/L				0.0015	0.0013	0.0016	0.0016	0.0018				
Iron Fe	mg/L				0.36	0.13	0.16	0.13	0.14				
Lead Pb	mg/L				0.00018	0.00008	0.00013	0.00005	0.00006				
Lithium Li	mg/L				0.0000	0.0001	0.0000	0.0000	0.0001				
Magnesium Mg	mg/L				5.4	6.2	6.4	6.5	6.8				
Manganese Mn	mg/L				0.011	0.009	0.010	0.007	0.007				
Mercury Hg	ug/L				0.0006194	0.0006962	0.0006518	0.0006055	0.0006988				
Molybdenum Mo	mg/L				0.00018	0.00026	0.00024	0.00019	0.00029				
Nickel Ni	mg/L				0.0008	0.0007	0.0006	0.0005	0.0007				
Phosphorus P	mg/L				0.002	0.008	0.004	0.001	0.008				
Potassium K	mg/L				2.2	2.5	2.3	2.3	2.6				
Selenium Se	mg/L				0.00071	0.00079	0.00090	0.00135	0.00138				
Silicon SiO2	mg/L				0.02	0.08	0.04	0.01	0.08				
Silver Ag	mg/L				0.0000021	0.0000042	0.0000029	0.0000013	0.0000035				
Sodium Na	mg/L				26	35	36	34	46				
Strontium Sr	mg/L				0.036	0.040	0.042	0.042	0.044				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000064	0.000014	0.000002	0.000009	0.000010				
Thorium Th	mg/L				0.000001	0.000004	0.000003	0.000001	0.000004				
Tin Sn	mg/L				0.00005	0.00012	0.00008	0.00005	0.00012				
Titanium Ti	mg/L				0.0000	0.0000	0.0000	0.0000	0.0000				
Uranium U	mg/L				0.000054	0.000046	0.000047	0.000042	0.000046				
Vanadium V	mg/L				0.0010	0.0003	0.0005	0.0001	0.0002				
Zinc Zn	mg/L				0.0085	0.0028	0.0028	0.0012	0.0016				
Zirconium Zr	mg/L				0.0051	0.0053	0.0052	0.0050	0.0053				

Water Quality in Little Roberst Lake Outflow													
Date		Year 6 Mar-13	Year 6 Apr-13	Year 6 May-13	Year 6 Jun-13	Year 6 Jul-13	Year 6 Aug-13	Year 6 Sep-13	Year 6 Oct-13	Year 6 Nov-13	Year 6 Dec-13	Year 6 Jan-14	Year 6 Feb-14
Parameter													
TDS	mg/L				115	625	164	153	195				
TSS	mg/L				4.7	3.1	2.3	2.2	2.3				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.000	0.001	0.000	0.000	0.001				
Sulphate	mg/L				7.3	4.4	4.9	5.6	6.4				
Chloride	mg/L				57	94	78	72	105				
Total Ammonia-N	mg/L				0.004	0.006	0.005	0.005	0.005				
Nitrate-N	mg/L				0.02	0.09	0.05	0.01	0.10				
Nitrite-N	mg/L				0.001	0.001	0.001	0.001	0.001				
Alkalinity	mg/L				20	24	26	25	26				
OrthoPhosphate-P	mg/L				0.0018	0.0048	0.0030	0.0012	0.0047				
Phosphate-P	mg/L				0.0193	0.0200	0.0201	0.0172	0.0210				
Org. Carbon	mg/L				5.1	4.2	5.4	4.8	5.0				
Hardness CaCO3	mg/L				34	41	41	45	47				
Total Metals													
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06				
Antimony Sb	mg/L				0.0001	0.0003	0.0002	0.0000	0.0003				
Arsenic As	mg/L				0.0004	0.0004	0.0005	0.0005	0.0006				
Barium Ba	mg/L				0.0073	0.0036	0.0041	0.0033	0.0035				
Beryllium Be	mg/L				0.00001	0.00002	0.00001	0.00000	0.00002				
Bismuth Bi	mg/L				0.00007	0.00034	0.00017	0.00002	0.00033				
Boron B	mg/L				0.021	0.024	0.025	0.027	0.028				
Cadmium Cd	mg/L				0.0000023	0.0000034	0.0000027	0.0000021	0.0000034				
Calcium Ca	mg/L				6	12	10	7	12				
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0001	0.0001	0.0001	0.0001	0.0001				
Copper Cu	mg/L				0.0015	0.0013	0.0016	0.0016	0.0017				
Iron Fe	mg/L				0.36	0.13	0.16	0.13	0.14				
Lead Pb	mg/L				0.00017	0.00008	0.00013	0.00005	0.00006				
Lithium Li	mg/L				0.0000	0.0000	0.0000	0.0000	0.0000				
Magnesium Mg	mg/L				5.3	6.1	6.4	6.5	6.8				
Manganese Mn	mg/L				0.011	0.009	0.010	0.007	0.007				
Mercury Hg	ug/L				0.0006149	0.0006749	0.0006406	0.0006043	0.0006778				
Molybdenum Mo	mg/L				0.00018	0.00023	0.00022	0.00019	0.00026				
Nickel Ni	mg/L				0.0008	0.0006	0.0006	0.0005	0.0007				
Phosphorus P	mg/L				0.001	0.005	0.003	0.000	0.005				
Potassium K	mg/L				2.1	2.4	2.3	2.3	2.5				
Selenium Se	mg/L				0.00071	0.00079	0.00090	0.00135	0.00138				
Silicon SiO2	mg/L				0.01	0.05	0.03	0.00	0.05				
Silver Ag	mg/L				0.0000014	0.0000033	0.0000021	0.0000008	0.0000026				
Sodium Na	mg/L				28	43	39	34	44				
Strontium Sr	mg/L				0.036	0.039	0.042	0.042	0.044				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000064	0.000013	0.000002	0.000009	0.000010				
Thorium Th	mg/L				0.000001	0.000003	0.000001	0.000000	0.000003				
Tin Sn	mg/L				0.00004	0.00010	0.00007	0.00004	0.00010				
Titanium Ti	mg/L				0.0000	0.0000	0.0000	0.0000	0.0000				
Uranium U	mg/L				0.000053	0.000044	0.000046	0.000041	0.000045				
Vanadium V	mg/L				0.0010	0.0002	0.0005	0.0001	0.0001				
Zinc Zn	mg/L				0.0085	0.0027	0.0027	0.0012	0.0015				
Zirconium Zr	mg/L				0.0050	0.0052	0.0051	0.0050	0.0053				

Water Quality in Little Roberst Lake Outflow													
Date		Year 7 Mar-14	Year 7 Apr-14	Year 7 May-14	Year 7 Jun-14	Year 7 Jul-14	Year 7 Aug-14	Year 7 Sep-14	Year 7 Oct-14	Year 7 Nov-14	Year 7 Dec-14	Year 7 Jan-15	Year 7 Feb-15
Parameter													
TDS	mg/L				112	613	158	152	183				
TSS	mg/L				4.7	3.1	2.3	2.2	2.3				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.000	0.001	0.000	0.000	0.001				
Sulphate	mg/L				7.3	4.2	4.8	5.5	6.2				
Chloride	mg/L				55	84	73	72	95				
Total Ammonia-N	mg/L				0.004	0.005	0.005	0.005	0.005				
Nitrate-N	mg/L				0.01	0.05	0.03	0.01	0.05				
Nitrite-N	mg/L				0.001	0.001	0.001	0.001	0.001				
Alkalinity	mg/L				20	24	26	25	26				
OrthoPhosphate-P	mg/L				0.0016	0.0037	0.0024	0.0011	0.0037				
Phosphate-P	mg/L				0.0191	0.0189	0.0195	0.0172	0.0199				
Org. Carbon	mg/L				5.1	4.2	5.4	4.8	5.0				
Hardness CaCO3	mg/L				34	41	41	45	47				
Total Metals													
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06				
Antimony Sb	mg/L				0.0001	0.0002	0.0001	0.0000	0.0002				
Arsenic As	mg/L				0.0004	0.0004	0.0005	0.0005	0.0005				
Barium Ba	mg/L				0.0073	0.0036	0.0041	0.0033	0.0035				
Beryllium Be	mg/L				0.00001	0.00001	0.00001	0.00000	0.00001				
Bismuth Bi	mg/L				0.00005	0.00024	0.00012	0.00001	0.00023				
Boron B	mg/L				0.021	0.024	0.025	0.027	0.028				
Cadmium Cd	mg/L				0.0000023	0.0000031	0.0000025	0.0000021	0.0000030				
Calcium Ca	mg/L				6	10	9	7	10				
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0001	0.0001	0.0001	0.0001	0.0001				
Copper Cu	mg/L				0.0015	0.0013	0.0016	0.0016	0.0017				
Iron Fe	mg/L				0.36	0.13	0.16	0.13	0.14				
Lead Pb	mg/L				0.00017	0.00007	0.00013	0.00005	0.00005				
Lithium Li	mg/L				0.0000	0.0000	0.0000	0.0000	0.0000				
Magnesium Mg	mg/L				5.3	6.1	6.4	6.5	6.8				
Manganese Mn	mg/L				0.011	0.009	0.010	0.007	0.007				
Mercury Hg	ug/L				0.0006117	0.0006598	0.0006327	0.0006035	0.0006630				
Molybdenum Mo	mg/L				0.00017	0.00021	0.00021	0.00019	0.00024				
Nickel Ni	mg/L				0.0008	0.0006	0.0006	0.0005	0.0006				
Phosphorus P	mg/L				0.001	0.004	0.002	0.000	0.004				
Potassium K	mg/L				2.1	2.4	2.3	2.3	2.4				
Selenium Se	mg/L				0.00071	0.00079	0.00090	0.00135	0.00138				
Silicon SiO2	mg/L				0.01	0.04	0.02	0.00	0.04				
Silver Ag	mg/L				0.0000014	0.0000029	0.0000019	0.0000007	0.0000021				
Sodium Na	mg/L				28	39	37	33	41				
Strontium Sr	mg/L				0.036	0.039	0.042	0.042	0.044				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000064	0.000013	0.000002	0.000009	0.000009				
Thorium Th	mg/L				0.000000	0.000002	0.000001	0.000000	0.000002				
Tin Sn	mg/L				0.00004	0.00008	0.00006	0.00004	0.00008				
Titanium Ti	mg/L				0.0000	0.0000	0.0000	0.0000	0.0000				
Uranium U	mg/L				0.000053	0.000044	0.000045	0.000041	0.000044				
Vanadium V	mg/L				0.0010	0.0002	0.0004	0.0001	0.0001				
Zinc Zn	mg/L				0.0085	0.0027	0.0027	0.0012	0.0015				
Zirconium Zr	mg/L				0.0050	0.0052	0.0051	0.0050	0.0053				

Water Quality in Little Roberst Lake Outflow													
Date		Year 8 Mar-15	Year 8 Apr-15	Year 8 May-15	Year 8 Jun-15	Year 8 Jul-15	Year 8 Aug-15	Year 8 Sep-15	Year 8 Oct-15	Year 8 Nov-15	Year 8 Dec-15	Year 8 Jan-16	Year 8 Feb-16
Parameter													
TDS	mg/L				110	605	153	151	175				
TSS	mg/L				4.7	3.1	2.3	2.2	2.3				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.000	0.000	0.000	0.000	0.000				
Sulphate	mg/L				7.3	4.0	4.7	5.5	6.0				
Chloride	mg/L				53	77	69	71	88				
Total Ammonia-N	mg/L				0.004	0.005	0.005	0.005	0.005				
Nitrate-N	mg/L				0.01	0.01	0.01	0.01	0.01				
Nitrite-N	mg/L				0.001	0.001	0.001	0.001	0.001				
Alkalinity	mg/L				20	24	26	25	26				
OrthoPhosphate-P	mg/L				0.0014	0.0029	0.0020	0.0011	0.0029				
Phosphate-P	mg/L				0.0189	0.0181	0.0191	0.0171	0.0191				
Org. Carbon	mg/L				5.1	4.2	5.4	4.8	5.0				
Hardness CaCO3	mg/L				34	41	41	45	47				
Total Metals													
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06				
Antimony Sb	mg/L				0.0000	0.0002	0.0001	0.0000	0.0002				
Arsenic As	mg/L				0.0004	0.0004	0.0005	0.0005	0.0005				
Barium Ba	mg/L				0.0073	0.0036	0.0041	0.0033	0.0035				
Beryllium Be	mg/L				0.00001	0.00001	0.00001	0.00000	0.00001				
Bismuth Bi	mg/L				0.00004	0.00017	0.00009	0.00001	0.00016				
Boron B	mg/L				0.021	0.024	0.025	0.027	0.028				
Cadmium Cd	mg/L				0.0000022	0.0000029	0.0000024	0.0000020	0.0000028				
Calcium Ca	mg/L				6	9	8	7	9				
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0001	0.0001	0.0001	0.0001	0.0001				
Copper Cu	mg/L				0.0015	0.0013	0.0016	0.0016	0.0017				
Iron Fe	mg/L				0.36	0.13	0.16	0.13	0.14				
Lead Pb	mg/L				0.00017	0.00007	0.00012	0.00005	0.00005				
Lithium Li	mg/L				0.0000	0.0000	0.0000	0.0000	0.0000				
Magnesium Mg	mg/L				5.3	6.1	6.4	6.5	6.7				
Manganese Mn	mg/L				0.011	0.009	0.009	0.007	0.007				
Mercury Hg	ug/L				0.0006095	0.0006493	0.0006271	0.0006029	0.0006526				
Molybdenum Mo	mg/L				0.00017	0.00019	0.00020	0.00019	0.00022				
Nickel Ni	mg/L				0.0008	0.0006	0.0006	0.0005	0.0006				
Phosphorus P	mg/L				0.001	0.003	0.001	0.000	0.003				
Potassium K	mg/L				2.1	2.3	2.3	2.3	2.4				
Selenium Se	mg/L				0.00071	0.00079	0.00090	0.00135	0.00137				
Silicon SiO2	mg/L				0.01	0.03	0.01	0.00	0.03				
Silver Ag	mg/L				0.0000013	0.0000025	0.0000017	0.0000007	0.0000017				
Sodium Na	mg/L				27	37	36	33	39				
Strontium Sr	mg/L				0.036	0.039	0.042	0.042	0.044				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000064	0.000013	0.000002	0.000009	0.000009				
Thorium Th	mg/L				0.000000	0.000002	0.000001	0.000000	0.000002				
Tin Sn	mg/L				0.00004	0.00007	0.00006	0.00004	0.00007				
Titanium Ti	mg/L				0.0000	0.0000	0.0000	0.0000	0.0000				
Uranium U	mg/L				0.000053	0.000043	0.000045	0.000041	0.000043				
Vanadium V	mg/L				0.0010	0.0002	0.0004	0.0001	0.0001				
Zinc Zn	mg/L				0.0085	0.0026	0.0027	0.0012	0.0015				
Zirconium Zr	mg/L				0.0050	0.0052	0.0051	0.0050	0.0053				

Water Quality in Little Roberst Lake Outflow													
Date		Year 9 Mar-16	Year 9 Apr-16	Year 9 May-16	Year 9 Jun-16	Year 9 Jul-16	Year 9 Aug-16	Year 9 Sep-16	Year 9 Oct-16	Year 9 Nov-16	Year 9 Dec-16	Year 9 Jan-17	Year 9 Feb-17
Parameter													
TDS	mg/L				109	598	150	151	169				
TSS	mg/L				4.7	3.1	2.3	2.2	2.3				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.000	0.000	0.000	0.000	0.000				
Sulphate	mg/L				7.2	3.9	4.6	5.5	5.9				
Chloride	mg/L				52	72	67	71	83				
Total Ammonia-N	mg/L				0.004	0.005	0.005	0.005	0.005				
Nitrate-N	mg/L				0.01	0.01	0.01	0.01	0.01				
Nitrite-N	mg/L				0.001	0.001	0.001	0.001	0.001				
Alkalinity	mg/L				20	24	26	25	26				
OrthoPhosphate-P	mg/L				0.0013	0.0024	0.0017	0.0011	0.0024				
Phosphate-P	mg/L				0.0188	0.0176	0.0189	0.0171	0.0186				
Org. Carbon	mg/L				5.1	4.2	5.4	4.8	5.1				
Hardness CaCO3	mg/L				34	41	41	45	47				
Total Metals													
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06				
Antimony Sb	mg/L				0.0000	0.0001	0.0001	0.0000	0.0001				
Arsenic As	mg/L				0.0004	0.0004	0.0005	0.0005	0.0005				
Barium Ba	mg/L				0.0073	0.0036	0.0041	0.0033	0.0035				
Beryllium Be	mg/L				0.00001	0.00001	0.00001	0.00000	0.00001				
Bismuth Bi	mg/L				0.00003	0.00012	0.00006	0.00001	0.00011				
Boron B	mg/L				0.021	0.024	0.025	0.027	0.027				
Cadmium Cd	mg/L				0.0000022	0.0000027	0.0000023	0.0000020	0.0000026				
Calcium Ca	mg/L				6	8	8	7	9				
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0001	0.0001	0.0001	0.0001	0.0001				
Copper Cu	mg/L				0.0015	0.0013	0.0016	0.0016	0.0017				
Iron Fe	mg/L				0.36	0.13	0.16	0.13	0.14				
Lead Pb	mg/L				0.00017	0.00007	0.00012	0.00005	0.00005				
Lithium Li	mg/L				0.0000	0.0000	0.0000	0.0000	0.0000				
Magnesium Mg	mg/L				5.3	6.1	6.4	6.5	6.7				
Manganese Mn	mg/L				0.011	0.009	0.009	0.007	0.007				
Mercury Hg	ug/L				0.0006079	0.0006419	0.0006232	0.0006025	0.0006453				
Molybdenum Mo	mg/L				0.00017	0.00018	0.00019	0.00018	0.00021				
Nickel Ni	mg/L				0.0008	0.0005	0.0006	0.0005	0.0006				
Phosphorus P	mg/L				0.000	0.002	0.001	0.000	0.002				
Potassium K	mg/L				2.1	2.3	2.2	2.3	2.4				
Selenium Se	mg/L				0.00071	0.00079	0.00090	0.00135	0.00137				
Silicon SiO2	mg/L				0.00	0.02	0.01	0.00	0.02				
Silver Ag	mg/L				0.0000013	0.0000022	0.0000015	0.0000007	0.0000014				
Sodium Na	mg/L				27	36	35	33	38				
Strontium Sr	mg/L				0.036	0.039	0.042	0.042	0.043				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000064	0.000013	0.000002	0.000009	0.000009				
Thorium Th	mg/L				0.000000	0.000001	0.000001	0.000000	0.000001				
Tin Sn	mg/L				0.00003	0.00006	0.00005	0.00004	0.00006				
Titanium Ti	mg/L				0.0000	0.0000	0.0000	0.0000	0.0000				
Uranium U	mg/L				0.000053	0.000042	0.000045	0.000041	0.000043				
Vanadium V	mg/L				0.0010	0.0002	0.0004	0.0001	0.0001				
Zinc Zn	mg/L				0.0085	0.0026	0.0027	0.0012	0.0014				
Zirconium Zr	mg/L				0.0050	0.0052	0.0051	0.0050	0.0052				

Water Quality in Little Roberst Lake Outflow												
Date		Year 10 Mar-17	Year 10 Apr-17	Year 10 May-17	Year 10 Jun-17	Year 10 Jul-17	Year 10 Aug-17	Year 10 Sep-17	Year 10 Oct-17	Year 10 Nov-17	Year 10 Dec-17	Year 10 Jan-18
Parameter												
TDS	mg/L				108	594	148	151	165			
TSS	mg/L				4.7	3.1	2.3	2.2	2.3			
Free CN	mg/L											
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001			
WAD CN	mg/L											
CNO	mg/L											
SCN	mg/L				0.000	0.000	0.000	0.000	0.000			
Sulphate	mg/L				7.2	3.8	4.6	5.5	5.8			
Chloride	mg/L				52	68	65	71	80			
Total Ammonia-N	mg/L				0.004	0.005	0.005	0.005	0.005			
Nitrate-N	mg/L				0.01	0.01	0.01	0.01	0.01			
Nitrite-N	mg/L				0.001	0.001	0.001	0.001	0.001			
Alkalinity	mg/L				20	24	26	25	26			
OrthoPhosphate-P	mg/L				0.0012	0.0020	0.0015	0.0011	0.0020			
Phosphate-P	mg/L				0.0187	0.0172	0.0187	0.0171	0.0182			
Org. Carbon	mg/L				5.1	4.2	5.4	4.8	5.1			
Hardness CaCO3	mg/L				34	40	41	45	47			
Total Metals												
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06			
Antimony Sb	mg/L				0.0000	0.0001	0.0001	0.0000	0.0001			
Arsenic As	mg/L				0.0004	0.0004	0.0005	0.0005	0.0005			
Barium Ba	mg/L				0.0073	0.0036	0.0041	0.0033	0.0034			
Beryllium Be	mg/L				0.00001	0.00001	0.00001	0.00000	0.00001			
Bismuth Bi	mg/L				0.00002	0.00009	0.00004	0.00001	0.00008			
Boron B	mg/L				0.021	0.024	0.025	0.027	0.027			
Cadmium Cd	mg/L				0.0000021	0.0000025	0.0000022	0.0000020	0.0000024			
Calcium Ca	mg/L				5	8	7	7	8			
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000			
Cobalt Co	mg/L				0.0001	0.0001	0.0001	0.0001	0.0001			
Copper Cu	mg/L				0.0015	0.0013	0.0016	0.0016	0.0017			
Iron Fe	mg/L				0.36	0.13	0.16	0.13	0.14			
Lead Pb	mg/L				0.00017	0.00007	0.00012	0.00005	0.00005			
Lithium Li	mg/L				0.0000	0.0000	0.0000	0.0000	0.0000			
Magnesium Mg	mg/L				5.3	6.1	6.4	6.5	6.7			
Manganese Mn	mg/L				0.011	0.009	0.009	0.007	0.007			
Mercury Hg	ug/L				0.0006068	0.0006367	0.0006205	0.0006022	0.0006401			
Molybdenum Mo	mg/L				0.00017	0.00017	0.00019	0.00018	0.00021			
Nickel Ni	mg/L				0.0008	0.0005	0.0006	0.0005	0.0006			
Phosphorus P	mg/L				0.000	0.002	0.001	0.000	0.002			
Potassium K	mg/L				2.1	2.3	2.2	2.3	2.4			
Selenium Se	mg/L				0.00071	0.00079	0.00090	0.00135	0.00137			
Silicon SiO2	mg/L				0.00	0.01	0.01	0.00	0.01			
Silver Ag	mg/L				0.0000012	0.0000020	0.0000014	0.0000007	0.0000012			
Sodium Na	mg/L				27	35	34	33	36			
Strontium Sr	mg/L				0.036	0.039	0.042	0.042	0.043			
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000			
Thallium Tl	mg/L				0.000064	0.000013	0.000002	0.000009	0.000009			
Thorium Th	mg/L				0.000000	0.000001	0.000000	0.000000	0.000001			
Tin Sn	mg/L				0.00003	0.00006	0.00005	0.00004	0.00006			
Titanium Ti	mg/L				0.0000	0.0000	0.0000	0.0000	0.0000			
Uranium U	mg/L				0.000053	0.000042	0.000044	0.000041	0.000043			
Vanadium V	mg/L				0.0010	0.0002	0.0004	0.0001	0.0001			
Zinc Zn	mg/L				0.0085	0.0026	0.0027	0.0012	0.0014			
Zirconium Zr	mg/L				0.0050	0.0052	0.0051	0.0050	0.0052			

Loadings in Little Roberts Creek Outflow (kg/month)											
Date	Year 1 Mar-08	Year 1 Apr-08	Year 1 May-08	Year 1 Jun-08	Year 1 Jul-08	Year 1 Aug-08	Year 1 Sep-08	Year 1 Oct-08	Year 1 Nov-08	Year 1 Dec-08	Year 1 Jan-09 Feb-09
Parameter											
TDS				141	136	130	146	157			
TSS				2.9	3.8	2.9	3.0	2.9			
Free CN				0.00001	0.00000	0.00000	0.00000	0.00001			
Total CN				0.001	0.001	0.001	0.001	0.001			
WAD CN				0.0000	0.0000	0.0000	0.0000	0.0000			
CNO				0.01	0.01	0.01	0.00	0.01			
SCN				0.000	0.001	0.001	0.000	0.002			
Sulphate				3.7	3.9	3.8	3.3	5.0			
Chloride				60	73	72	67	89			
Total Ammonia				0.016	0.036	0.020	0.013	0.022			
Nitrate				0.05	0.14	0.14	0.07	0.30			
Nitrite				0.005	0.018	0.012	0.002	0.007			
Alkalinity				26	27	27	28	29			
OrthoPhosphate-P				0.0015	0.0033	0.0030	0.0015	0.0060			
Phosphate-P				0.0194	0.0225	0.0331	0.0274	0.0304			
Org. Carbon				5.0	5.1	5.0	5.0	5.1			
Hardness CaCO3				38	42	44	45	46			
Total Metals											
Aluminum Al				0.08	0.06	0.06	0.05	0.05			
Antimony Sb				0.0001	0.0003	0.0003	0.0001	0.0006			
Arsenic As				0.0004	0.0004	0.0005	0.0004	0.0005			
Barium Ba				0.0033	0.0032	0.0030	0.0030	0.0031			
Beryllium Be				0.00001	0.00002	0.00002	0.00001	0.00003			
Bismuth Bi				0.00005	0.00027	0.00026	0.00009	0.00058			
Boron B				0.019	0.021	0.023	0.023	0.023			
Cadmium Cd				0.0000032	0.0000038	0.0000037	0.0000031	0.0000050			
Calcium Ca				8	12	11	9	16			
Chromium Cr				0.000	0.000	0.000	0.000	0.000			
Cobalt Co				0.0001	0.0001	0.0001	0.0001	0.0002			
Copper Cu				0.0013	0.0015	0.0015	0.0014	0.0015			
Iron Fe				0.11	0.11	0.08	0.09	0.09			
Lead Pb				0.00005	0.00006	0.00012	0.00004	0.00005			
Lithium Li				0.0000	0.0000	0.0000	0.0000	0.0001			
Magnesium Mg				5.3	5.9	6.3	6.4	6.4			
Manganese Mn				0.011	0.014	0.015	0.010	0.010			
Mercury Hg				0.0006208	0.0006727	0.0006592	0.0006204	0.0007499			
Molybdenum Mo				0.00014	0.00024	0.00023	0.00017	0.00034			
Nickel Ni				0.0005	0.0007	0.0006	0.0005	0.0007			
Phosphorus P				0.002	0.005	0.004	0.002	0.009			
Potassium K				2.1	2.5	2.4	2.4	2.8			
Selenium Se				0.00077	0.00080	0.00081	0.00111	0.00107			
Silicon SiO2				0.03	0.07	0.07	0.03	0.14			
Silver Ag				0.0000027	0.0000032	0.0000030	0.0000021	0.0000045			
Sodium Na				26	30	32	32	32			
Strontium Sr				0.035	0.038	0.039	0.040	0.040			
Tellurium Te				0.000	0.000	0.000	0.000	0.000			
Thallium Tl				0.000018	0.000021	0.000011	0.000004	0.000005			
Thorium Th				0.0000022	0.0000039	0.0000038	0.0000024	0.0000066			
Tin Sn				0.00004	0.00016	0.00008	0.00005	0.00013			
Titanium Ti				0.0000	0.0000	0.0000	0.0000	0.0000			
Uranium U				0.000031	0.000035	0.000039	0.000034	0.000038			
Vanadium V				0.0006	0.0002	0.0002	0.0001	0.0002			
Zinc Zn				0.0015	0.0020	0.0031	0.0018	0.0023			
Zirconium Zr				0.0050	0.0051	0.0050	0.0050	0.0051			

Loadings in Little Roberts Creek Outflow (kg/month)											
Date	Year 2 Mar-09	Year 2 Apr-09	Year 2 May-09	Year 2 Jun-09	Year 2 Jul-09	Year 2 Aug-09	Year 2 Sep-09	Year 2 Oct-09	Year 2 Nov-09	Year 2 Dec-09	Year 2 Jan-10 Feb-10
Parameter											
TDS				161	147	141	149	175			
TSS				2.9	3.8	2.9	3.0	2.9			
Free CN				0.00004		0.00000	0.00000	0.00001			
Total CN				0.001	0.001	0.001	0.001	0.001			
WAD CN				0.0001		0.0000	0.0000	0.0000			
CNO				0.08		0.01	0.00	0.02			
SCN				0.004	0.003	0.003	0.001	0.005			
Sulphate				6.3	5.4	5.2	3.7	7.2			
Chloride				99	96	94	72	123			
Total Ammonia				0.044	0.045	0.017	0.013	0.023			
Nitrate				0.34	0.32	0.31	0.11	0.58			
Nitrite				0.023	0.013	0.014	0.002	0.007			
Alkalinity				27	28	28	28	30			
OrthoPhosphate-P				0.0091	0.0076	0.0069	0.0025	0.0122			
Phosphate-P				0.0263	0.0267	0.0369	0.0284	0.0365			
Org. Carbon				5.0	4.9	5.0	5.0	5.0			
Hardness CaCO3				40	43	45	45	48			
Total Metals											
Aluminum Al				0.07	0.06	0.06	0.05	0.05			
Antimony Sb				0.0007	0.0007	0.0006	0.0002	0.0012			
Arsenic As				0.0005	0.0005	0.0006	0.0005	0.0006			
Barium Ba				0.0034	0.0033	0.0031	0.0030	0.0033			
Beryllium Be				0.00004	0.00003	0.00003	0.00001	0.00006			
Bismuth Bi				0.00068	0.00065	0.00062	0.00018	0.00115			
Boron B				0.020	0.022	0.023	0.023	0.023			
Cadmium Cd				0.0000058	0.0000053	0.0000052	0.0000035	0.0000073			
Calcium Ca				21	19	18	10	27			
Chromium Cr				0.000	0.000	0.000	0.000	0.000			
Cobalt Co				0.0002	0.0002	0.0002	0.0001	0.0003			
Copper Cu				0.0015	0.0016	0.0016	0.0015	0.0018			
Iron Fe				0.11	0.11	0.08	0.09	0.09			
Lead Pb				0.00007	0.00007	0.00013	0.00004	0.00007			
Lithium Li				0.0001	0.0001	0.0001	0.0000	0.0002			
Magnesium Mg				5.4	5.9	6.4	6.4	6.6			
Manganese Mn				0.011	0.015	0.016	0.010	0.010			
Mercury Hg				0.0008325	0.0007875	0.0007701	0.0006496	0.0009268			
Molybdenum Mo				0.00044	0.00041	0.00039	0.00021	0.00059			
Nickel Ni				0.0008	0.0009	0.0008	0.0005	0.0011			
Phosphorus P				0.013	0.011	0.010	0.003	0.018			
Potassium K				2.8	2.9	2.8	2.5	3.4			
Selenium Se				0.00076	0.00080	0.00082	0.00111	0.00108			
Silicon SiO2				0.22	0.18	0.17	0.05	0.31			
Silver Ag				0.0000055	0.0000050	0.0000047	0.0000026	0.0000072			
Sodium Na				27	30	32	32	32			
Strontium Sr				0.036	0.039	0.040	0.040	0.042			
Tellurium Te				0.000	0.000	0.000	0.000	0.000			
Thallium Tl				0.000018	0.000022	0.000012	0.000004	0.000006			
Thorium Th				0.0000085	0.0000077	0.0000073	0.0000033	0.0000122			
Tin Sn				0.00015	0.00023	0.00014	0.00007	0.00023			
Titanium Ti				0.0001	0.0000	0.0000	0.0000	0.0001			
Uranium U				0.000038	0.000039	0.000043	0.000035	0.000045			
Vanadium V				0.0007	0.0003	0.0003	0.0002	0.0003			
Zinc Zn				0.0020	0.0021	0.0032	0.0018	0.0025			
Zirconium Zr				0.0051	0.0051	0.0051	0.0051	0.0052			

Loadings in Little Roberts Creek Outflow (kg/month)												
	Year 3	Year 3	Year 3	Year 3	Year 3	Year 3	Year 3	Year 3	Year 3	Year 3	Year 3	Year 3
Date	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11
Parameter												
TDS				166	157	145	149	186				
TSS				2.9	3.8	2.9	3.0	2.9				
Free CN				0.00002								
Total CN				0.001	0.001	0.001	0.001	0.001				
WAD CN				0.0000								
CNO				0.04								
SCN				0.004	0.004	0.003	0.000	0.005				
Sulphate				6.5	6.2	5.3	3.4	7.4				
Chloride				104	111	98	69	133				
Total Ammonia				0.031	0.035	0.015	0.011	0.014				
Nitrate				0.37	0.41	0.31	0.08	0.58				
Nitrite				0.018	0.014	0.012	0.002	0.005				
Alkalinity				27	28	28	28	29				
OrthoPhosphate-P				0.0108	0.0115	0.0088	0.0022	0.0172				
Phosphate-P				0.0283	0.0306	0.0390	0.0283	0.0414				
Org. Carbon				5.0	4.9	5.0	5.0	5.0				
Hardness CaCO3				40	44	45	45	48				
Total Metals												
Aluminum Al				0.08	0.06	0.06	0.05	0.05				
Antimony Sb				0.0009	0.0010	0.0008	0.0002	0.0016				
Arsenic As				0.0005	0.0005	0.0006	0.0004	0.0006				
Barium Ba				0.0035	0.0033	0.0031	0.0030	0.0033				
Beryllium Be				0.00004	0.00005	0.00004	0.00001	0.00007				
Bismuth Bi				0.00085	0.00100	0.00078	0.00015	0.00159				
Boron B				0.020	0.022	0.023	0.023	0.023				
Cadmium Cd				0.0000060	0.0000060	0.0000051	0.0000032	0.0000071				
Calcium Ca				21	22	18	9	26				
Chromium Cr				0.000	0.000	0.000	0.000	0.000				
Cobalt Co				0.0003	0.0003	0.0002	0.0001	0.0003				
Copper Cu				0.0015	0.0017	0.0016	0.0014	0.0017				
Iron Fe				0.11	0.11	0.08	0.09	0.09				
Lead Pb				0.00007	0.00008	0.00013	0.00004	0.00007				
Lithium Li				0.0002	0.0002	0.0001	0.0000	0.0002				
Magnesium Mg				5.4	6.0	6.4	6.4	6.6				
Manganese Mn				0.012	0.015	0.016	0.010	0.010				
Mercury Hg				0.0008377	0.0008367	0.0007632	0.0006287	0.0008991				
Molybdenum Mo				0.00045	0.00048	0.00038	0.00018	0.00056				
Nickel Ni				0.0009	0.0010	0.0008	0.0005	0.0011				
Phosphorus P				0.015	0.016	0.012	0.003	0.023				
Potassium K				2.9	3.1	2.8	2.4	3.3				
Selenium Se				0.00077	0.00081	0.00082	0.00112	0.00108				
Silicon SiO2				0.23	0.23	0.16	0.03	0.29				
Silver Ag				0.0000061	0.0000062	0.0000050	0.0000023	0.0000080				
Sodium Na				27	31	32	32	32				
Strontium Sr				0.037	0.040	0.040	0.040	0.042				
Tellurium Te				0.000	0.000	0.000	0.000	0.000				
Thallium Tl				0.000019	0.000022	0.000012	0.000004	0.000006				
Thorium Th				0.0000089	0.0000093	0.0000071	0.0000026	0.0000116				
Tin Sn				0.00017	0.00028	0.00016	0.00006	0.00029				
Titanium Ti				0.0001	0.0001	0.0001	0.0000	0.0001				
Uranium U				0.000039	0.000041	0.000043	0.000034	0.000044				
Vanadium V				0.0007	0.0003	0.0003	0.0002	0.0004				
Zinc Zn				0.0020	0.0022	0.0032	0.0018	0.0026				
Zirconium Zr				0.0051	0.0051	0.0051	0.0050	0.0052				

Loadings in Little Roberts Creek Outflow (kg/month)											
Date	Year 4 Mar-11	Year 4 Apr-11	Year 4 May-11	Year 4 Jun-11	Year 4 Jul-11	Year 4 Aug-11	Year 4 Sep-11	Year 4 Oct-11	Year 4 Nov-11	Year 4 Dec-11	Year 4 Jan-12 Feb-12
Parameter											
TDS				151	165	143	147	178			
TSS				3.0	3.8	2.9	3.0	2.9			
Free CN											
Total CN				0.001	0.001	0.001	0.001	0.001			
WAD CN											
CNO											
SCN				0.001	0.003	0.002	0.000	0.003			
Sulphate				4.5	6.0	4.7	3.2	6.1			
Chloride				74	114	90	66	115			
Total Ammonia				0.012	0.019	0.016	0.011	0.011			
Nitrate				0.14	0.38	0.23	0.05	0.40			
Nitrite				0.005	0.002	0.002	0.002	0.002			
Alkalinity				26	28	28	28	29			
OrthoPhosphate-P				0.0053	0.0146	0.0085	0.0016	0.0147			
Phosphate-P				0.0233	0.0338	0.0388	0.0277	0.0391			
Org. Carbon				5.0	5.0	5.0	5.0	5.0			
Hardness CaCO3				38	43	44	45	47			
Total Metals											
Aluminum Al				0.08	0.06	0.06	0.05	0.05			
Antimony Sb				0.0004	0.0012	0.0007	0.0001	0.0012			
Arsenic As				0.0004	0.0005	0.0005	0.0004	0.0005			
Barium Ba				0.0033	0.0033	0.0030	0.0030	0.0032			
Beryllium Be				0.00002	0.00005	0.00003	0.00001	0.00005			
Bismuth Bi				0.00041	0.00123	0.00068	0.00008	0.00123			
Boron B				0.020	0.022	0.023	0.023	0.023			
Cadmium Cd				0.0000039	0.0000058	0.0000045	0.0000030	0.0000061			
Calcium Ca				10	19	14	8	19			
Chromium Cr				0.000	0.000	0.000	0.000	0.000			
Cobalt Co				0.0001	0.0002	0.0002	0.0001	0.0003			
Copper Cu				0.0013	0.0016	0.0015	0.0014	0.0016			
Iron Fe				0.11	0.11	0.08	0.09	0.09			
Lead Pb				0.00006	0.00008	0.00013	0.00004	0.00006			
Lithium Li				0.0001	0.0002	0.0001	0.0000	0.0002			
Magnesium Mg				5.3	6.1	6.4	6.4	6.5			
Manganese Mn				0.011	0.015	0.016	0.010	0.010			
Mercury Hg				0.0006616	0.0007905	0.0007006	0.0006115	0.0007910			
Molybdenum Mo				0.00020	0.00041	0.00029	0.00016	0.00041			
Nickel Ni				0.0006	0.0009	0.0007	0.0005	0.0009			
Phosphorus P				0.007	0.019	0.011	0.002	0.019			
Potassium K				2.3	2.9	2.6	2.4	2.9			
Selenium Se				0.00077	0.00081	0.00082	0.00112	0.00108			
Silicon SiO2				0.07	0.19	0.11	0.02	0.19			
Silver Ag				0.0000040	0.0000067	0.0000045	0.0000021	0.0000068			
Sodium Na				26	31	32	32	32			
Strontium Sr				0.035	0.040	0.039	0.040	0.041			
Tellurium Te				0.000	0.000	0.000	0.000	0.000			
Thallium Tl				0.000018	0.000022	0.000011	0.000003	0.000005			
Thorium Th				0.0000038	0.0000084	0.0000055	0.0000021	0.0000089			
Tin Sn				0.00010	0.00031	0.00015	0.00005	0.00023			
Titanium Ti				0.0000	0.0001	0.0000	0.0000	0.0001			
Uranium U				0.000033	0.000040	0.000041	0.000034	0.000041			
Vanadium V				0.0007	0.0003	0.0003	0.0001	0.0003			
Zinc Zn				0.0016	0.0022	0.0031	0.0017	0.0024			
Zirconium Zr				0.0051	0.0051	0.0050	0.0050	0.0051			

Loadings in Little Roberts Creek Outflow (kg/month)												
	Year 5	Year 5	Year 5	Year 5	Year 5	Year 5	Year 5	Year 5	Year 5	Year 5	Year 5	Year 5
Date	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13
Parameter												
TDS				145	169	154	149	232				
TSS				3.0	3.8	2.9	3.0	2.9				
Free CN												
Total CN				0.001	0.001	0.001	0.001	0.001				
WAD CN												
CNO												
SCN				0.001	0.002	0.001	0.000	0.002				
Sulphate				4.0	5.2	4.2	3.2	5.2				
Chloride				65	108	92	67	138				
Total Ammonia				0.011	0.019	0.016	0.011	0.011				
Nitrate				0.08	0.27	0.17	0.05	0.29				
Nitrite				0.002	0.003	0.002	0.002	0.002				
Alkalinity				26	28	27	28	29				
OrthoPhosphate-P				0.0030	0.0109	0.0062	0.0013	0.0106				
Phosphate-P				0.0210	0.0301	0.0365	0.0275	0.0350				
Org. Carbon				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3				38	43	44	45	46				
Total Metals												
Aluminum Al				0.08	0.06	0.06	0.05	0.05				
Antimony Sb				0.0002	0.0009	0.0005	0.0001	0.0009				
Arsenic As				0.0004	0.0005	0.0005	0.0004	0.0005				
Barium Ba				0.0033	0.0033	0.0030	0.0030	0.0031				
Beryllium Be				0.00002	0.00004	0.00002	0.00001	0.00004				
Bismuth Bi				0.00020	0.00090	0.00048	0.00006	0.00087				
Boron B				0.019	0.022	0.023	0.023	0.023				
Cadmium Cd				0.0000035	0.0000054	0.0000042	0.0000030	0.0000056				
Calcium Ca				8	17	13	8	20				
Chromium Cr				0.000	0.000	0.000	0.000	0.000				
Cobalt Co				0.0001	0.0002	0.0001	0.0001	0.0002				
Copper Cu				0.0013	0.0016	0.0015	0.0014	0.0015				
Iron Fe				0.11	0.11	0.08	0.09	0.09				
Lead Pb				0.00005	0.00008	0.00013	0.00004	0.00006				
Lithium Li				0.0000	0.0001	0.0001	0.0000	0.0001				
Magnesium Mg				5.3	6.0	6.3	6.4	6.4				
Manganese Mn				0.011	0.015	0.016	0.010	0.010				
Mercury Hg				0.0006302	0.0007406	0.0006695	0.0006080	0.0007349				
Molybdenum Mo				0.00016	0.00034	0.00025	0.00015	0.00033				
Nickel Ni				0.0005	0.0008	0.0006	0.0005	0.0007				
Phosphorus P				0.004	0.014	0.008	0.001	0.014				
Potassium K				2.2	2.7	2.5	2.4	2.7				
Selenium Se				0.00077	0.00081	0.00082	0.00112	0.00108				
Silicon SiO2				0.04	0.14	0.08	0.02	0.14				
Silver Ag				0.0000033	0.0000060	0.0000040	0.0000020	0.0000059				
Sodium Na				26	35	38	33	53				
Strontium Sr				0.035	0.039	0.039	0.040	0.040				
Tellurium Te				0.000	0.000	0.000	0.000	0.000				
Thallium Tl				0.000018	0.000022	0.000011	0.000003	0.000005				
Thorium Th				0.0000029	0.0000074	0.0000049	0.0000020	0.0000078				
Tin Sn				0.00006	0.00026	0.00012	0.00005	0.00018				
Titanium Ti				0.0000	0.0001	0.0000	0.0000	0.0001				
Uranium U				0.000032	0.000039	0.000040	0.000034	0.000039				
Vanadium V				0.0006	0.0003	0.0002	0.0001	0.0003				
Zinc Zn				0.0015	0.0021	0.0031	0.0017	0.0022				
Zirconium Zr				0.0050	0.0051	0.0050	0.0050	0.0051				

Loadings in Little Roberts Creek Outflow (kg/month)												
	Year 6 Mar-13	Year 6 Apr-13	Year 6 May-13	Year 6 Jun-13	Year 6 Jul-13	Year 6 Aug-13	Year 6 Sep-13	Year 6 Oct-13	Year 6 Nov-13	Year 6 Dec-13	Year 6 Jan-14	Year 6 Feb-14
Date												
Parameter												
TDS				157	207	165	149	218				
TSS				3.0	3.8	2.9	3.0	2.9				
Free CN												
Total CN				0.001	0.001	0.001	0.001	0.001				
WAD CN												
CNO												
SCN				0.000	0.002	0.001	0.000	0.002				
Sulphate				3.8	4.6	3.8	3.1	4.5				
Chloride				70	124	95	67	123				
Total Ammonia				0.008	0.016	0.013	0.008	0.008				
Nitrate				0.04	0.17	0.10	0.02	0.19				
Nitrite				0.001	0.002	0.001	0.001	0.001				
Alkalinity				26	27	27	28	28				
OrthoPhosphate-P				0.0023	0.0079	0.0046	0.0012	0.0077				
Phosphate-P				0.0204	0.0271	0.0349	0.0273	0.0322				
Org. Carbon				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3				38	42	44	45	45				
Total Metals												
Aluminum Al				0.08	0.06	0.06	0.05	0.05				
Antimony Sb				0.0002	0.0006	0.0004	0.0001	0.0006				
Arsenic As				0.0004	0.0005	0.0005	0.0004	0.0005				
Barium Ba				0.0033	0.0032	0.0030	0.0030	0.0030				
Beryllium Be				0.00001	0.00003	0.00002	0.00000	0.00003				
Bismuth Bi				0.00014	0.00064	0.00034	0.00004	0.00061				
Boron B				0.019	0.022	0.023	0.022	0.023				
Cadmium Cd				0.0000026	0.0000043	0.0000033	0.0000021	0.0000045				
Calcium Ca				8	17	12	8	17				
Chromium Cr				0.000	0.000	0.000	0.000	0.000				
Cobalt Co				0.0001	0.0001	0.0001	0.0001	0.0002				
Copper Cu				0.0013	0.0015	0.0015	0.0014	0.0015				
Iron Fe				0.11	0.11	0.08	0.09	0.09				
Lead Pb				0.00005	0.00007	0.00012	0.00004	0.00005				
Lithium Li				0.0000	0.0001	0.0000	0.0000	0.0001				
Magnesium Mg				5.3	6.0	6.3	6.4	6.4				
Manganese Mn				0.011	0.015	0.016	0.010	0.010				
Mercury Hg				0.0006211	0.0006999	0.0006477	0.0006056	0.0006954				
Molybdenum Mo				0.00015	0.00028	0.00022	0.00015	0.00027				
Nickel Ni				0.0005	0.0007	0.0006	0.0005	0.0007				
Phosphorus P				0.002	0.010	0.005	0.001	0.010				
Potassium K				2.2	2.6	2.4	2.4	2.6				
Selenium Se				0.00077	0.00081	0.00082	0.00112	0.00108				
Silicon SiO2				0.02	0.10	0.05	0.01	0.10				
Silver Ag				0.0000021	0.0000043	0.0000026	0.0000009	0.0000043				
Sodium Na				31	50	43	33	51				
Strontium Sr				0.035	0.039	0.039	0.040	0.040				
Tellurium Te				0.000	0.000	0.000	0.000	0.000				
Thallium Tl				0.000017	0.000022	0.000011	0.000003	0.000004				
Thorium Th				0.0000010	0.0000050	0.0000028	0.0000003	0.0000054				
Tin Sn				0.00005	0.00022	0.00009	0.00004	0.00013				
Titanium Ti				0.0000	0.0001	0.0000	0.0000	0.0001				
Uranium U				0.000030	0.000036	0.000038	0.000032	0.000036				
Vanadium V				0.0006	0.0003	0.0002	0.0001	0.0002				
Zinc Zn				0.0015	0.0020	0.0030	0.0017	0.0021				
Zirconium Zr				0.0050	0.0051	0.0050	0.0050	0.0051				

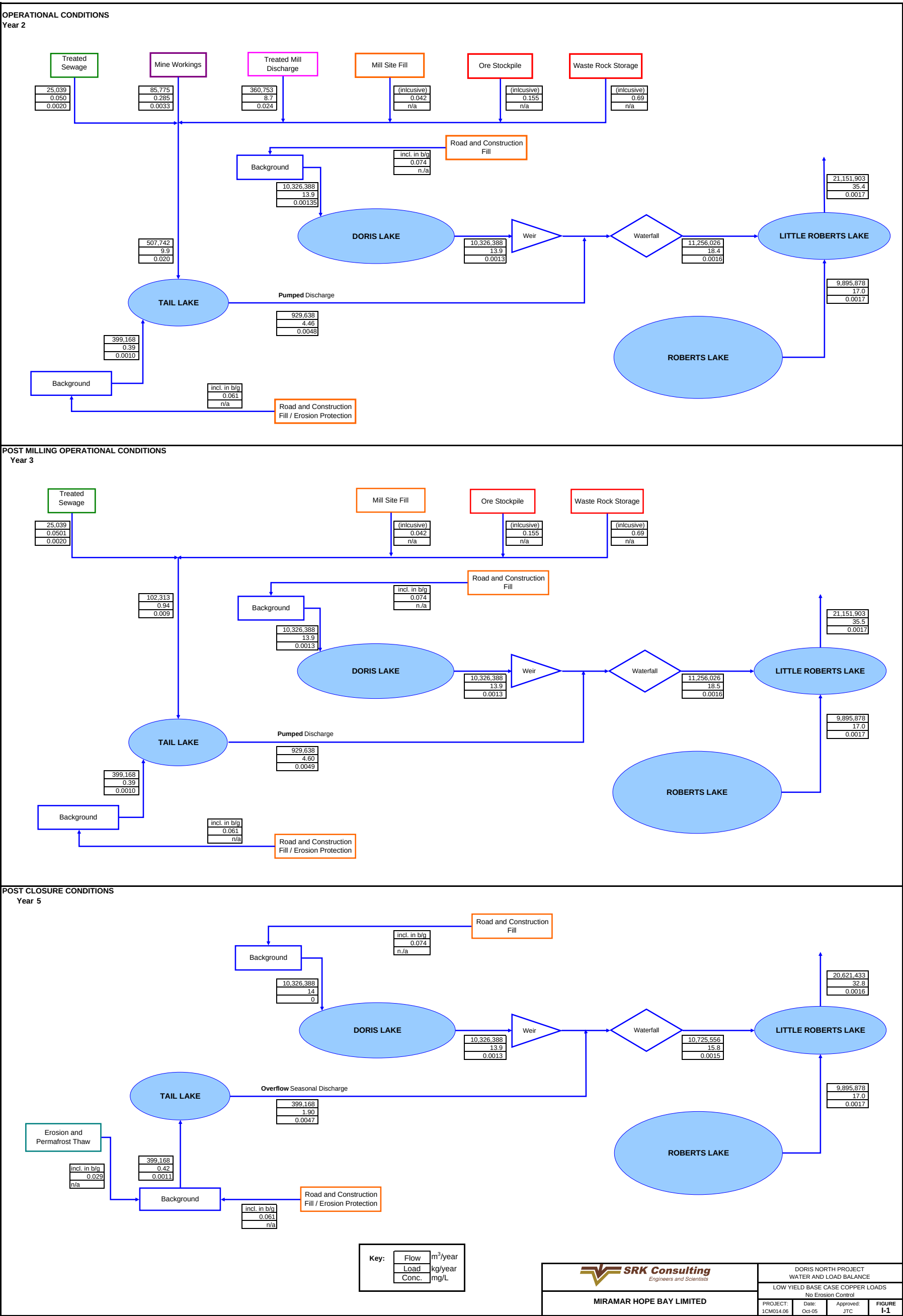
Loadings in Little Roberts Creek Outflow (kg/month)												
	Year 7	Year 7	Year 7	Year 7	Year 7	Year 7	Year 7	Year 7	Year 7	Year 7	Year 7	Year 7
Date	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15
Parameter												
TDS				152	184	153	148	195				
TSS				3.0	3.8	2.9	3.0	2.9				
Free CN												
Total CN				0.001	0.001	0.001	0.001	0.001				
WAD CN												
CNO												
SCN				0.000	0.001	0.001	0.000	0.001				
Sulphate				3.7	4.1	3.6	3.1	4.1				
Chloride				66	105	85	66	105				
Total Ammonia				0.008	0.014	0.012	0.008	0.007				
Nitrate				0.03	0.10	0.05	0.01	0.09				
Nitrite				0.001	0.002	0.001	0.001	0.001				
Alkalinity				26	27	27	28	28				
OrthoPhosphate-P				0.0019	0.0058	0.0035	0.0010	0.0057				
Phosphate-P				0.0199	0.0250	0.0338	0.0272	0.0302				
Org. Carbon				5.0	5.1	5.0	5.0	5.0				
Hardness CaCO3				38	42	43	45	45				
Total Metals												
Aluminum Al				0.08	0.06	0.06	0.05	0.05				
Antimony Sb				0.0001	0.0005	0.0003	0.0000	0.0004				
Arsenic As				0.0004	0.0004	0.0005	0.0004	0.0005				
Barium Ba				0.0033	0.0032	0.0030	0.0030	0.0030				
Beryllium Be				0.00001	0.00002	0.00001	0.00000	0.00002				
Bismuth Bi				0.00010	0.00045	0.00024	0.00003	0.00043				
Boron B				0.019	0.022	0.023	0.022	0.022				
Cadmium Cd				0.0000025	0.0000038	0.0000030	0.0000021	0.0000038				
Calcium Ca				8	14	11	8	14				
Chromium Cr				0.000	0.000	0.000	0.000	0.000				
Cobalt Co				0.0001	0.0001	0.0001	0.0001	0.0001				
Copper Cu				0.0013	0.0015	0.0014	0.0014	0.0014				
Iron Fe				0.11	0.11	0.08	0.09	0.09				
Lead Pb				0.00005	0.00007	0.00012	0.00004	0.00005				
Lithium Li				0.0000	0.0001	0.0000	0.0000	0.0001				
Magnesium Mg				5.3	5.9	6.3	6.4	6.3				
Manganese Mn				0.011	0.014	0.015	0.010	0.010				
Mercury Hg				0.0006147	0.0006713	0.0006324	0.0006039	0.0006677				
Molybdenum Mo				0.00014	0.00024	0.00020	0.00014	0.00023				
Nickel Ni				0.0005	0.0007	0.0005	0.0005	0.0006				
Phosphorus P				0.002	0.007	0.004	0.000	0.007				
Potassium K				2.1	2.5	2.3	2.3	2.5				
Selenium Se				0.00077	0.00081	0.00082	0.00112	0.00107				
Silicon SiO2				0.02	0.07	0.04	0.00	0.07				
Silver Ag				0.0000020	0.0000036	0.0000021	0.0000008	0.0000033				
Sodium Na				29	44	39	33	45				
Strontium Sr				0.035	0.039	0.039	0.040	0.040				
Tellurium Te				0.000	0.000	0.000	0.000	0.000				
Thallium Tl				0.000017	0.000021	0.000011	0.000003	0.000004				
Thorium Th				0.0000009	0.0000040	0.0000022	0.0000002	0.0000040				
Tin Sn				0.00005	0.00019	0.00007	0.00004	0.00010				
Titanium Ti				0.0000	0.0001	0.0000	0.0000	0.0001				
Uranium U				0.000029	0.000035	0.000037	0.000032	0.000034				
Vanadium V				0.0006	0.0002	0.0002	0.0001	0.0002				
Zinc Zn				0.0015	0.0019	0.0030	0.0017	0.0021				
Zirconium Zr				0.0050	0.0051	0.0050	0.0050	0.0051				

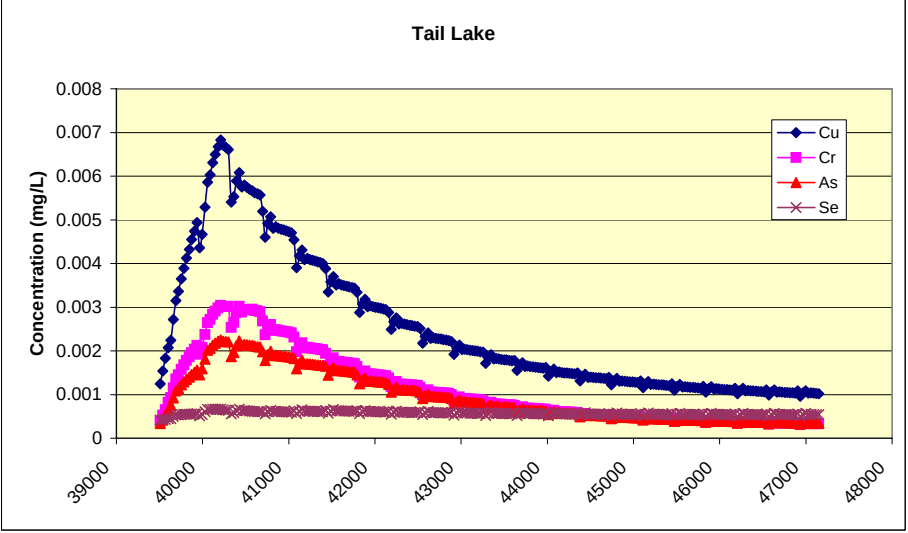
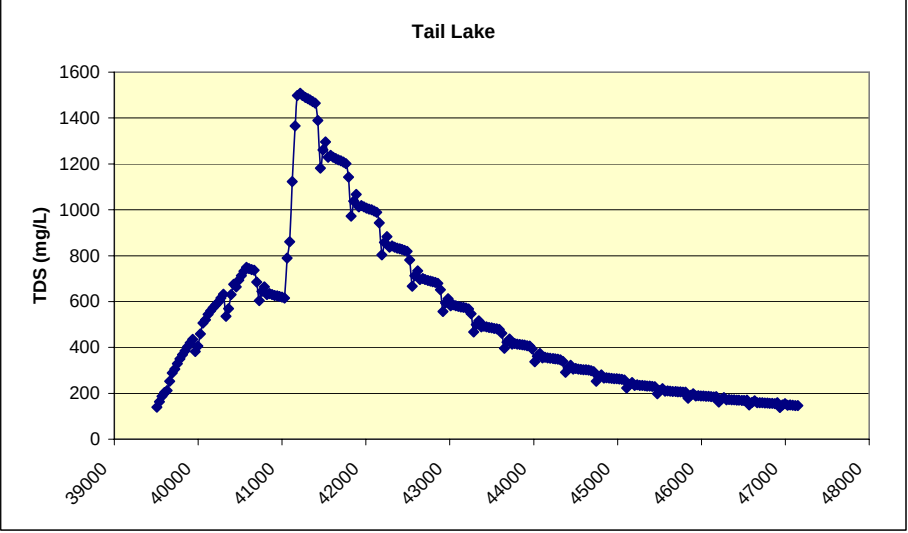
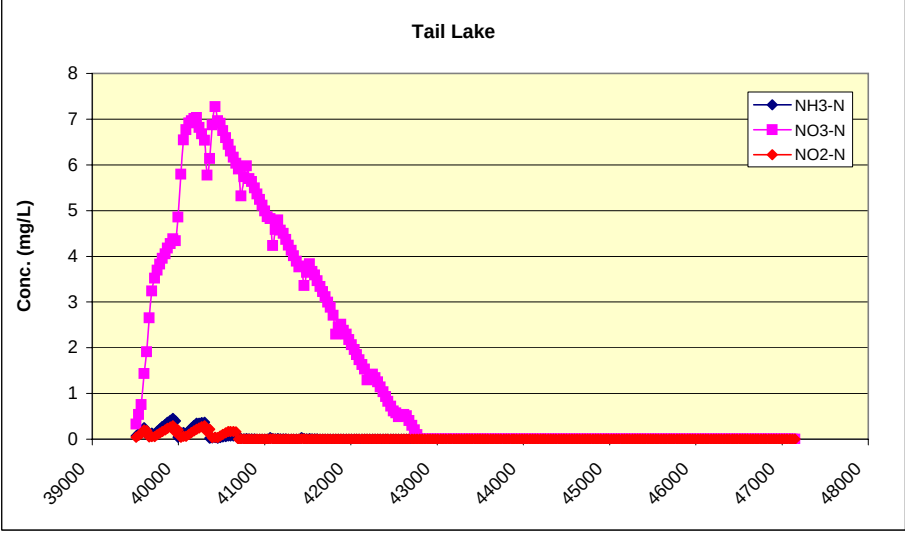
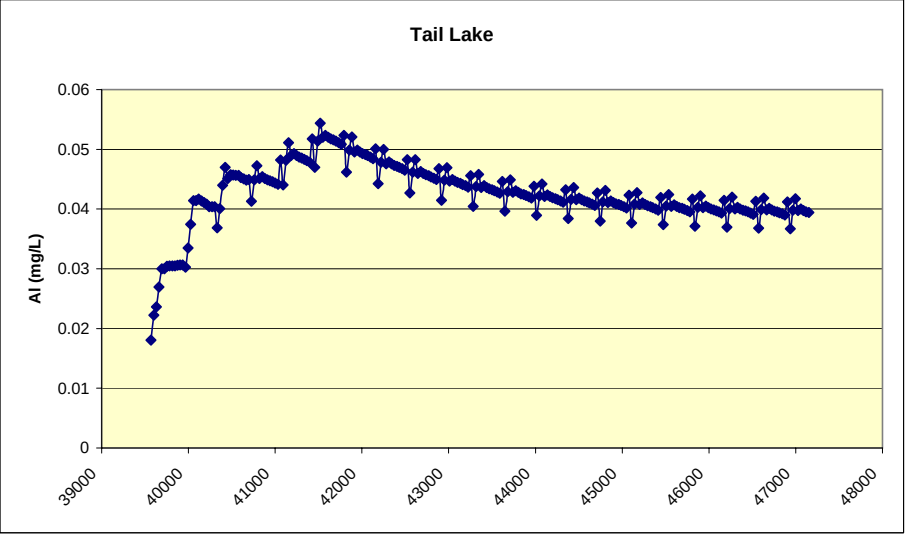
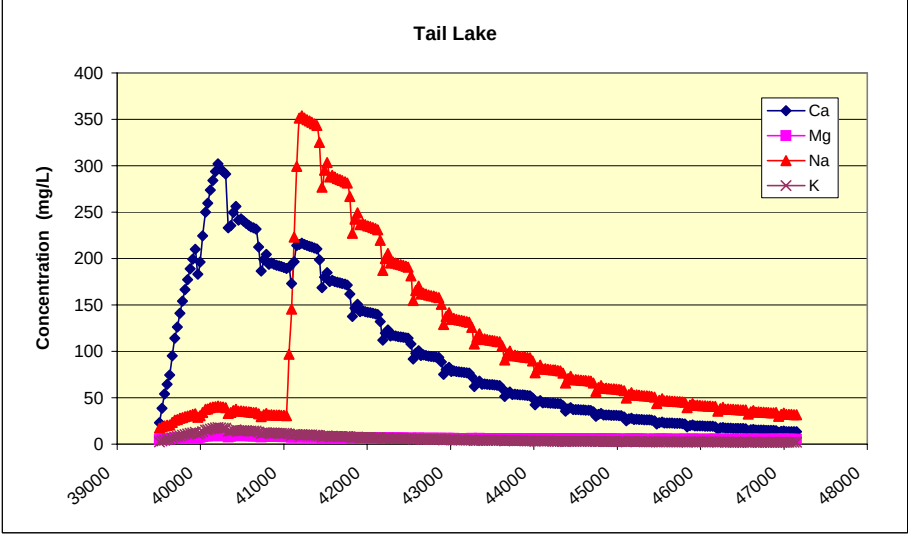
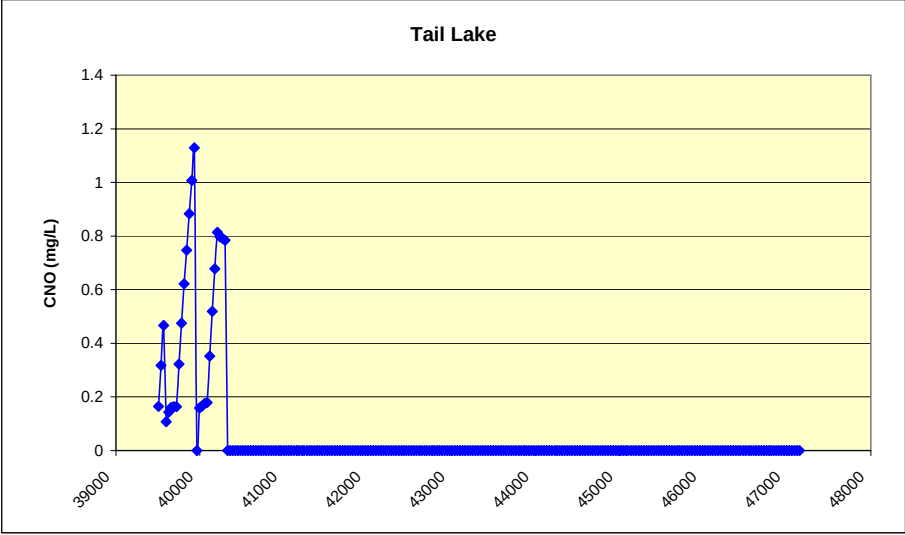
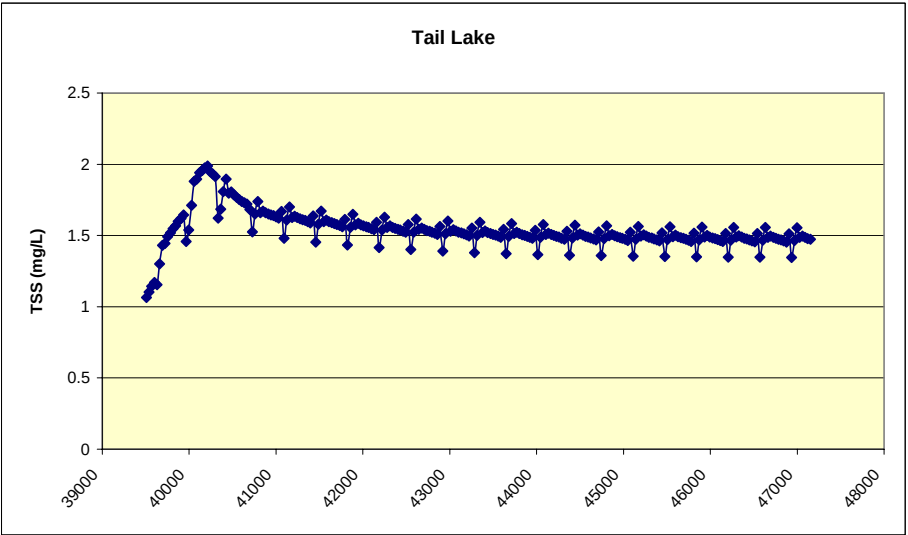
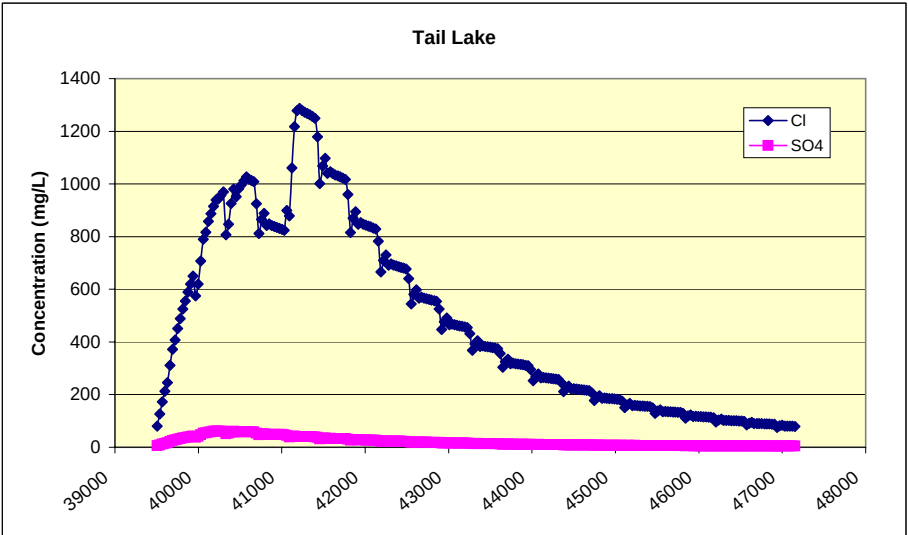
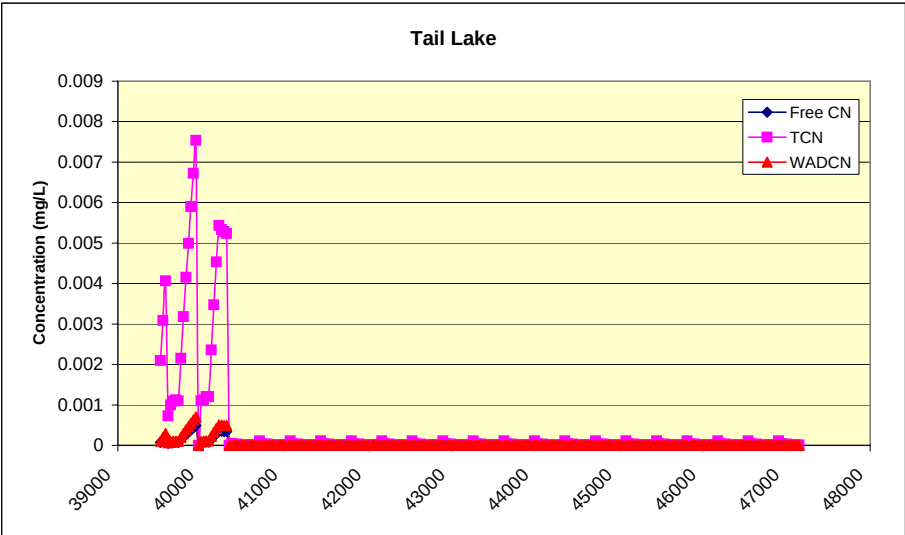
Loadings in Little Roberts Creek Outflow (kg/month)												
	Year 8	Year 8	Year 8	Year 8	Year 8	Year 8	Year 8	Year 8	Year 8	Year 8	Year 8	Year 8
Date	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16
Parameter												
TDS				148	167	144	147	179				
TSS				3.0	3.8	2.9	3.0	2.9				
Free CN												
Total CN				0.001	0.001	0.001	0.001	0.001				
WAD CN												
CNO												
SCN				0.000	0.001	0.000	0.000	0.001				
Sulphate				3.7	3.8	3.4	3.0	3.8				
Chloride				63	92	78	65	92				
Total Ammonia				0.008	0.014	0.012	0.008	0.007				
Nitrate				0.01	0.02	0.01	0.01	0.02				
Nitrite				0.001	0.002	0.001	0.001	0.001				
Alkalinity				26	27	27	28	28				
OrthoPhosphate-P				0.0015	0.0043	0.0027	0.0010	0.0042				
Phosphate-P				0.0196	0.0236	0.0330	0.0271	0.0287				
Org. Carbon				5.0	5.1	5.0	5.0	5.0				
Hardness CaCO3				38	42	43	45	45				
Total Metals												
Aluminum Al				0.08	0.06	0.06	0.05	0.05				
Antimony Sb				0.0001	0.0003	0.0002	0.0000	0.0003				
Arsenic As				0.0004	0.0004	0.0005	0.0004	0.0004				
Barium Ba				0.0033	0.0032	0.0029	0.0030	0.0030				
Beryllium Be				0.00001	0.00002	0.00001	0.00000	0.00002				
Bismuth Bi				0.00007	0.00032	0.00017	0.00002	0.00030				
Boron B				0.019	0.021	0.023	0.022	0.022				
Cadmium Cd				0.0000024	0.0000033	0.0000027	0.0000021	0.0000033				
Calcium Ca				7	12	10	8	12				
Chromium Cr				0.000	0.000	0.000	0.000	0.000				
Cobalt Co				0.0001	0.0001	0.0001	0.0001	0.0001				
Copper Cu				0.0012	0.0015	0.0014	0.0014	0.0014				
Iron Fe				0.11	0.11	0.08	0.09	0.09				
Lead Pb				0.00005	0.00006	0.00012	0.00004	0.00004				
Lithium Li				0.0000	0.0000	0.0000	0.0000	0.0000				
Magnesium Mg				5.3	5.9	6.3	6.4	6.3				
Manganese Mn				0.011	0.014	0.015	0.010	0.010				
Mercury Hg				0.0006103	0.0006512	0.0006216	0.0006027	0.0006482				
Molybdenum Mo				0.00013	0.00021	0.00018	0.00014	0.00020				
Nickel Ni				0.0004	0.0006	0.0005	0.0005	0.0006				
Phosphorus P				0.001	0.005	0.003	0.000	0.005				
Potassium K				2.1	2.4	2.3	2.3	2.5				
Selenium Se				0.00077	0.00081	0.00082	0.00112	0.00107				
Silicon SiO2				0.01	0.05	0.03	0.00	0.05				
Silver Ag				0.0000018	0.0000029	0.0000017	0.0000008	0.0000025				
Sodium Na				28	40	37	33	41				
Strontium Sr				0.035	0.039	0.039	0.040	0.040				
Tellurium Te				0.000	0.000	0.000	0.000	0.000				
Thallium Tl				0.000017	0.000021	0.000011	0.000003	0.000004				
Thorium Th				0.0000006	0.0000029	0.0000016	0.0000002	0.0000029				
Tin Sn				0.00004	0.00017	0.00006	0.00004	0.00008				
Titanium Ti				0.0000	0.0001	0.0000	0.0000	0.0001				
Uranium U				0.000029	0.000033	0.000037	0.000032	0.000033				
Vanadium V				0.0006	0.0002	0.0002	0.0001	0.0002				
Zinc Zn				0.0015	0.0019	0.0029	0.0017	0.0020				
Zirconium Zr				0.0050	0.0051	0.0050	0.0050	0.0051				

Loadings in Little Roberts Creek Outflow (kg/month)											
Date	Year 9 Mar-16	Year 9 Apr-16	Year 9 May-16	Year 9 Jun-16	Year 9 Jul-16	Year 9 Aug-16	Year 9 Sep-16	Year 9 Oct-16	Year 9 Nov-16	Year 9 Dec-16	Year 9 Jan-17 Feb-17
Parameter											
TDS				145	156	138	146	168			
TSS				3.0	3.8	2.9	3.0	2.9			
Free CN											
Total CN				0.001	0.001	0.001	0.001	0.001			
WAD CN											
CNO											
SCN				0.000	0.001	0.000	0.000	0.001			
Sulphate				3.6	3.6	3.3	3.0	3.5			
Chloride				61	82	72	64	82			
Total Ammonia				0.008	0.014	0.012	0.008	0.007			
Nitrate				0.01	0.01	0.00	0.00	0.00			
Nitrite				0.001	0.002	0.001	0.001	0.001			
Alkalinity				26	27	27	28	28			
OrthoPhosphate-P				0.0013	0.0033	0.0021	0.0009	0.0032			
Phosphate-P				0.0194	0.0225	0.0325	0.0270	0.0278			
Org. Carbon				5.0	5.1	5.0	5.0	5.1			
Hardness CaCO3				37	41	43	45	45			
Total Metals											
Aluminum Al				0.08	0.06	0.06	0.05	0.05			
Antimony Sb				0.0001	0.0002	0.0001	0.0000	0.0002			
Arsenic As				0.0004	0.0004	0.0005	0.0004	0.0004			
Barium Ba				0.0033	0.0031	0.0029	0.0030	0.0030			
Beryllium Be				0.00001	0.00001	0.00001	0.00000	0.00001			
Bismuth Bi				0.00005	0.00023	0.00012	0.00001	0.00021			
Boron B				0.019	0.021	0.022	0.022	0.022			
Cadmium Cd				0.0000024	0.0000029	0.0000025	0.0000021	0.0000029			
Calcium Ca				7	11	9	8	11			
Chromium Cr				0.000	0.000	0.000	0.000	0.000			
Cobalt Co				0.0001	0.0001	0.0001	0.0001	0.0001			
Copper Cu				0.0012	0.0014	0.0014	0.0014	0.0014			
Iron Fe				0.11	0.11	0.08	0.09	0.09			
Lead Pb				0.00005	0.00006	0.00012	0.00004	0.00004			
Lithium Li				0.0000	0.0000	0.0000	0.0000	0.0000			
Magnesium Mg				5.3	5.9	6.3	6.4	6.3			
Manganese Mn				0.011	0.014	0.015	0.010	0.010			
Mercury Hg				0.0006071	0.0006371	0.0006140	0.0006019	0.0006345			
Molybdenum Mo				0.00013	0.00019	0.00017	0.00014	0.00018			
Nickel Ni				0.0004	0.0006	0.0005	0.0005	0.0005			
Phosphorus P				0.001	0.004	0.002	0.000	0.004			
Potassium K				2.1	2.4	2.3	2.3	2.4			
Selenium Se				0.00077	0.00080	0.00082	0.00112	0.00107			
Silicon SiO2				0.01	0.04	0.02	0.00	0.04			
Silver Ag				0.0000017	0.0000023	0.0000014	0.0000007	0.0000020			
Sodium Na				28	37	36	32	38			
Strontium Sr				0.035	0.038	0.038	0.040	0.040			
Tellurium Te				0.000	0.000	0.000	0.000	0.000			
Thallium Tl				0.000017	0.000021	0.000010	0.000003	0.000004			
Thorium Th				0.0000005	0.0000022	0.0000012	0.0000001	0.0000021			
Tin Sn				0.00004	0.00015	0.00006	0.00004	0.00007			
Titanium Ti				0.0000	0.0001	0.0000	0.0000	0.0001			
Uranium U				0.000029	0.000033	0.000036	0.000032	0.000032			
Vanadium V				0.0006	0.0002	0.0002	0.0001	0.0002			
Zinc Zn				0.0015	0.0018	0.0029	0.0017	0.0020			
Zirconium Zr				0.0050	0.0051	0.0050	0.0050	0.0050			

Loadings in Little Roberts Creek Outflow (kg/month)											
Date	Year 10 Mar-17	Year 10 Apr-17	Year 10 May-17	Year 10 Jun-17	Year 10 Jul-17	Year 10 Aug-17	Year 10 Sep-17	Year 10 Oct-17	Year 10 Nov-17	Year 10 Dec-17	Year 10 Jan-18 Feb-18
Parameter											
TDS				144	148	133	146	160			
TSS				3.0	3.8	2.9	3.0	2.9			
Free CN											
Total CN				0.001	0.001	0.001	0.001	0.001			
WAD CN											
CNO											
SCN				0.000	0.000	0.000	0.000	0.000			
Sulphate				3.6	3.4	3.2	3.0	3.4			
Chloride				60	76	69	64	76			
Total Ammonia				0.008	0.014	0.012	0.008	0.007			
Nitrate				0.01	0.01	0.00	0.00	0.00			
Nitrite				0.001	0.002	0.001	0.001	0.001			
Alkalinity				26	27	27	28	28			
OrthoPhosphate-P				0.0012	0.0026	0.0017	0.0009	0.0025			
Phosphate-P				0.0192	0.0218	0.0321	0.0270	0.0271			
Org. Carbon				5.0	5.1	5.0	5.0	5.1			
Hardness CaCO3				37	41	43	45	45			
Total Metals											
Aluminum Al				0.08	0.06	0.06	0.05	0.05			
Antimony Sb				0.0000	0.0002	0.0001	0.0000	0.0002			
Arsenic As				0.0004	0.0004	0.0005	0.0004	0.0004			
Barium Ba				0.0033	0.0031	0.0029	0.0030	0.0029			
Beryllium Be				0.00001	0.00001	0.00001	0.00000	0.00001			
Bismuth Bi				0.00004	0.00016	0.00008	0.00001	0.00015			
Boron B				0.019	0.021	0.022	0.022	0.022			
Cadmium Cd				0.0000023	0.0000027	0.0000024	0.0000020	0.0000027			
Calcium Ca				7	10	9	7	10			
Chromium Cr				0.000	0.000	0.000	0.000	0.000			
Cobalt Co				0.0001	0.0001	0.0001	0.0001	0.0001			
Copper Cu				0.0012	0.0014	0.0014	0.0014	0.0014			
Iron Fe				0.11	0.11	0.08	0.09	0.09			
Lead Pb				0.00005	0.00006	0.00011	0.00004	0.00004			
Lithium Li				0.0000	0.0000	0.0000	0.0000	0.0000			
Magnesium Mg				5.3	5.9	6.3	6.4	6.3			
Manganese Mn				0.011	0.014	0.015	0.010	0.010			
Mercury Hg				0.0006049	0.0006272	0.0006087	0.0006013	0.0006249			
Molybdenum Mo				0.00012	0.00017	0.00016	0.00014	0.00017			
Nickel Ni				0.0004	0.0006	0.0005	0.0005	0.0005			
Phosphorus P				0.001	0.003	0.002	0.000	0.003			
Potassium K				2.1	2.3	2.3	2.3	2.4			
Selenium Se				0.00077	0.00080	0.00082	0.00112	0.00107			
Silicon SiO2				0.01	0.03	0.01	0.00	0.03			
Silver Ag				0.0000016	0.0000019	0.0000012	0.0000007	0.0000016			
Sodium Na				27	35	34	32	36			
Strontium Sr				0.035	0.038	0.038	0.040	0.039			
Tellurium Te				0.000	0.000	0.000	0.000	0.000			
Thallium Tl				0.000017	0.000021	0.000010	0.000003	0.000004			
Thorium Th				0.0000003	0.0000016	0.0000009	0.0000001	0.0000016			
Tin Sn				0.00004	0.00014	0.00005	0.00004	0.00006			
Titanium Ti				0.0000	0.0001	0.0000	0.0000	0.0001			
Uranium U				0.000029	0.000032	0.000036	0.000032	0.000032			
Vanadium V				0.0006	0.0002	0.0002	0.0001	0.0002			
Zinc Zn				0.0014	0.0018	0.0029	0.0017	0.0019			
Zirconium Zr				0.0050	0.0051	0.0050	0.0050	0.0050			

Appendix I
Water Quality Modelling Results – Base Case
Low Yield Conditions





Tailings Lake Summary Table

OUTPUT SUMMARY				
Max Annual Discharge rate		929,638 m ³ /year in		Year 2
Degradation Field(age)		Tail Lk Cu < CME Year		12
				Maximum in
Maximum Concentration	MMER	CCME	Tail Lake Background	Tail Lake Year 2
pH		6 to 9	7.29	7 to 8
TDS	mg/L		110	1508
TSS	mg/L	15	2.0	2.0
Free CN	mg/L	0.005		0.0005
Total CN	mg/L	1.0	0.002	0.008
WAD CN	mg/L			0.0007
CNO	mg/L			1.1
SCN	mg/L			0.080
Sulphate	mg/L		3	61
Chloride	mg/L		37	1287
Total Ammonia-N	mg/L	1.27	0.008	0.45
Nitrate-N	mg/L	2.9	0.006	7.3
Nitrite-N	mg/L	0.018	0.0020	0.30
Alkalinity	mg/L		30	51
OrthoPhosphate-P	mg/L		0.0020	0.2478
Phosphate-P	mg/L		0.0080	0.2518
Org. Carbon	mg/L		5.9	5.9
Hardness CaCO3	mg/L		41	92
Total Metals				
Aluminum Al	mg/L	0.1	0.017	0.054
Antimony Sb	mg/L		0.0000	0.0220
Arsenic As	mg/L	0.5	0.0003	0.0023
Barium Ba	mg/L		0.0031	0.0072
Beryllium Be	mg/L		0.00000	0.00079
Bismuth Bi	mg/L		0.00001	0.02187
Boron B	mg/L		0.015	0.035
Cadmium Cd	mg/L	0.000017	0.000003	0.000064
Calcium Ca	mg/L		7.6	302
Chromium Cr	mg/L	0.001	0.0003	0.0030
Cobalt Co	mg/L		0.0001	0.0041
Copper Cu	mg/L	0.3	0.001	0.007
Iron Fe	mg/L	0.3	0.40	0.12
Lead Pb	mg/L	0.2	0.00006	0.00049
Lithium Li	mg/L		-	0.0030
Magnesium Mg	mg/L		5.6	9.3
Manganese Mn	mg/L		0.008	0.016
Mercury Hg	ug/L	0.026	0.0006	0.0053
Molybdenum Mo	mg/L	0.073	0.0001	0.0067
Nickel Ni	mg/L	0.5	0.001	0.009
Phosphorus P	mg/L		0.008	0.328
Potassium K	mg/L		1.8	18
Selenium Se	mg/L	0.001	0.00062	0.00067
Silicon SiO2	mg/L		-	4.3
Silver Ag	mg/L	0.0001	0.00000	0.00008
Sodium Na	mg/L		19	354
Strontium Sr	mg/L		0.034	0.066
Tellurium Te	mg/L		-	0.00029
Thallium Tl	mg/L	0.0008	0.000014	0.000034
Thorium Th	mg/L		-	0.00015
Tin Sn	mg/L		0.00004	0.00351
Titanium Ti	mg/L		-	0.0014
Uranium U	mg/L		0.000011	0.000198
Vanadium V	mg/L		0.0004	0.0039
Zinc Zn	mg/L	0.5	0.005	0.012
Zirconium Zr	mg/L		0.0050	0.0067

Water Quality in TAIL LAKE													
Date		Year 1 Mar-08	Year 1 Apr-08	Year 1 May-08	Year 1 Jun-08	Year 1 Jul-08	Year 1 Aug-08	Year 1 Sep-08	Year 1 Oct-08	Year 1 Nov-08	Year 1 Dec-08	Year 1 Jan-09	Year 1 Feb-09
Parameter													
TDS	mg/L	139	163	187	203	212	253	289	305	330	350	369	385
TSS	mg/L	1.1	1.1	1.1	1.2	1.2	1.3	1.4	1.4	1.5	1.5	1.5	1.6
Free CN	mg/L	0.00007	0.00014	0.00020	0.00005	0.00006	0.00007	0.00007	0.00007	0.00014	0.00021	0.00027	0.00032
Total CN	mg/L	0.002	0.003	0.004	0.001	0.001	0.001	0.001	0.001	0.002	0.003	0.004	0.005
WAD CN	mg/L	0.0001	0.0002	0.0003	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0003	0.0004	0.0005
CNO	mg/L	0.17	0.32	0.47	0.11	0.14	0.16	0.16	0.16	0.32	0.48	0.62	0.75
SCN	mg/L	0.005	0.009	0.013	0.016	0.018	0.024	0.029	0.032	0.036	0.040	0.043	0.046
Sulphate	mg/L	6.1	8.8	11.6	15.0	17.4	21.8	25.9	28.1	30.7	32.9	35.0	36.8
Chloride	mg/L	81	127	172	212	245	311	372	407	451	488	525	555
Total Ammonia-N	mg/L	0.067	0.121	0.174	0.252	0.103	0.125	0.136	0.118	0.174	0.227	0.278	0.321
Nitrate-N	mg/L	0.33	0.54	0.76	1.43	1.91	2.65	3.24	3.52	3.70	3.83	3.96	4.05
Nitrite-N	mg/L	0.042	0.081	0.118	0.202	0.189	0.049	0.058	0.055	0.095	0.133	0.169	0.201
Alkalinity	mg/L	29	30	31	32	31	35	38	38	39	40	40	41
OrthoPhosphate-P	mg/L	0.0117	0.0205	0.0293	0.0350	0.0404	0.0520	0.0627	0.0695	0.0780	0.0854	0.0924	0.0985
Phosphate-P	mg/L	0.0176	0.0264	0.0350	0.0406	0.0456	0.0575	0.0683	0.0749	0.0832	0.0905	0.0974	0.1033
Org. Carbon	mg/L	5.9	5.7	5.6	5.5	5.2	5.5	5.6	5.4	5.3	5.2	5.0	4.9
Hardness CaCO3	mg/L	37	40	42	44	45	51	57	58	61	63	65	67
Total Metals													
Aluminum Al	mg/L	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Antimony Sb	mg/L	0.0006	0.0011	0.0016	0.0034	0.0045	0.0056	0.0068	0.0073	0.0077	0.0081	0.0084	0.0087
Arsenic As	mg/L	0.0003	0.0004	0.0005	0.0007	0.0008	0.0009	0.0011	0.0011	0.0012	0.0013	0.0013	0.0014
Barium Ba	mg/L	0.0024	0.0026	0.0028	0.0031	0.0032	0.0037	0.0041	0.0043	0.0045	0.0047	0.0049	0.0050
Beryllium Be	mg/L	0.00003	0.00006	0.00008	0.00015	0.00019	0.00024	0.00029	0.00031	0.00033	0.00035	0.00037	0.00038
Bismuth Bi	mg/L	0.00057	0.00109	0.00160	0.00336	0.00441	0.00558	0.00677	0.00720	0.00765	0.00800	0.00833	0.00861
Boron B	mg/L	0.015	0.015	0.016	0.018	0.018	0.021	0.023	0.023	0.024	0.024	0.024	0.025
Cadmium Cd	mg/L	0.0000049	0.0000075	0.0000100	0.0000152	0.0000186	0.0000234	0.0000280	0.0000300	0.0000323	0.0000343	0.0000361	0.0000377
Calcium Ca	mg/L	23	39	54	65	74	95	114	126	141	154	167	177
Chromium Cr	mg/L	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002
Cobalt Co	mg/L	0.0002	0.0004	0.0006	0.0008	0.0010	0.0013	0.0016	0.0017	0.0019	0.0021	0.0022	0.0024
Copper Cu	mg/L	0.0012	0.0015	0.0018	0.0021	0.0022	0.0027	0.0031	0.0034	0.0037	0.0039	0.0041	0.0043
Iron Fe	mg/L	0.04	0.04	0.04	0.04	0.04	0.05	0.06	0.05	0.05	0.05	0.05	0.05
Lead Pb	mg/L	0.00004	0.00006	0.00008	0.00012	0.00014	0.00018	0.00021	0.00023	0.00024	0.00025	0.00027	0.00028
Lithium Li	mg/L	0.0002	0.0003	0.0004	0.0006	0.0008	0.0010	0.0012	0.0013	0.0014	0.0015	0.0016	0.0017
Magnesium Mg	mg/L	4.9	5.0	5.2	5.5	5.5	6.1	6.7	6.7	6.9	7.0	7.1	7.1
Manganese Mn	mg/L	0.002	0.003	0.003	0.004	0.005	0.006	0.007	0.007	0.008	0.009	0.009	0.010
Mercury Hg	ug/L	0.0008809	0.0011265	0.0013692	0.0015289	0.0016577	0.0020285	0.0023588	0.0025372	0.0027772	0.0029806	0.0031753	0.0033407
Molybdenum Mo	mg/L	0.00048	0.00083	0.00118	0.00142	0.00164	0.00210	0.00253	0.00280	0.00313	0.00342	0.00370	0.00394
Nickel Ni	mg/L	0.0010	0.0014	0.0018	0.0023	0.0026	0.0032	0.0038	0.0041	0.0045	0.0049	0.0052	0.0055
Phosphorus P	mg/L	0.021	0.033	0.045	0.057	0.066	0.083	0.099	0.109	0.120	0.130	0.139	0.147
Potassium K	mg/L	2.5	3.4	4.2	4.8	5.3	6.5	7.6	8.2	9.1	9.7	10.4	11.0
Selenium Se	mg/L	0.00042	0.00042	0.00043	0.00045	0.00045	0.00050	0.00054	0.00053	0.00054	0.00055	0.00055	0.00055
Silicon SiO2	mg/L	0.24	0.46	0.68	0.87	1.03	1.33	1.61	1.79	1.99	2.18	2.35	2.50
Silver Ag	mg/L	0.0000032	0.0000055	0.0000077	0.0000168	0.0000221	0.0000278	0.0000336	0.0000355	0.0000374	0.0000389	0.0000402	0.0000414
Sodium Na	mg/L	17	18	20	20	21	23	26	27	28	29	30	30
Strontium Sr	mg/L	0.027	0.029	0.031	0.033	0.033	0.038	0.042	0.043	0.045	0.046	0.048	0.049
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000007	0.000008	0.000010	0.000012	0.000013	0.000016	0.000018	0.000019	0.000020	0.000021	0.000022	0.000022
Thorium Th	mg/L	0.000007	0.000013	0.000020	0.000031	0.000039	0.000050	0.000060	0.000065	0.000071	0.000076	0.000081	0.000085
Tin Sn	mg/L	0.00013	0.00021	0.00030	0.00058	0.00075	0.00095	0.00115	0.00122	0.00130	0.00136	0.00141	0.00146
Titanium Ti	mg/L	0.0000	0.0001	0.0001	0.0002	0.0003	0.0004	0.0005	0.0005	0.0005	0.0006	0.0006	0.0006
Uranium U	mg/L	0.000021	0.000029	0.000037	0.000050	0.000058	0.000073	0.000087	0.000093	0.000101	0.000107	0.000114	0.000119
Vanadium V	mg/L	0.0005	0.0006	0.0007	0.0010	0.0011	0.0013	0.0015	0.0016	0.0017	0.0017	0.0018	0.0018
Zinc Zn	mg/L	0.0058	0.0060	0.0063	0.0068	0.0068	0.0077	0.0084	0.0085	0.0088	0.0090	0.0092	0.0093
Zirconium Zr	mg/L	0.0051	0.0051	0.0051	0.0053	0.0052	0.0057	0.0060	0.0059	0.0060	0.0060	0.0059	0.0059

Water Quality in TAIL LAKE													
Date		Year 2 Mar-09	Year 2 Apr-09	Year 2 May-09	Year 2 Jun-09	Year 2 Jul-09	Year 2 Aug-09	Year 2 Sep-09	Year 2 Oct-09	Year 2 Nov-09	Year 2 Dec-09	Year 2 Jan-10	Year 2 Feb-10
Parameter													
TDS	mg/L	404	419	436	382	406	458	507	520	543	559	574	586
TSS	mg/L	1.6	1.6	1.6	1.5	1.5	1.7	1.9	1.9	1.9	2.0	2.0	2.0
Free CN	mg/L	0.00038	0.00044	0.00049		0.00007	0.00007	0.00008	0.00008	0.00015	0.00023	0.00029	0.00035
Total CN	mg/L	0.006	0.007	0.008		0.001	0.001	0.001	0.001	0.002	0.003	0.005	0.005
WAD CN	mg/L	0.0005	0.0006	0.0007		0.0001	0.0001	0.0001	0.0001	0.0002	0.0003	0.0004	0.0005
CNO	mg/L	0.88	1.01	1.13		0.16	0.17	0.18	0.18	0.35	0.52	0.68	0.81
SCN	mg/L	0.049	0.052	0.055	0.048	0.051	0.059	0.066	0.068	0.072	0.075	0.078	0.080
Sulphate	mg/L	38.8	40.6	42.3	38.2	41.5	47.4	52.9	54.5	57.0	58.6	60.2	61.5
Chloride	mg/L	590	620	650	575	620	708	789	817	858	888	916	939
Total Ammonia-N	mg/L	0.369	0.411	0.454	0.397	0.045	0.137	0.144	0.128	0.189	0.247	0.302	0.349
Nitrate-N	mg/L	4.18	4.28	4.38	4.34	4.86	5.80	6.55	6.77	6.91	6.96	7.01	7.04
Nitrite-N	mg/L	0.235	0.265	0.296	0.155	0.201	0.040	0.063	0.060	0.103	0.145	0.184	0.218
Alkalinity	mg/L	42	42	43	38	40	44	48	48	49	50	50	51
OrthoPhosphate-P	mg/L	0.1052	0.1112	0.1171	0.1019	0.1092	0.1248	0.1392	0.1446	0.1527	0.1585	0.1642	0.1689
Phosphate-P	mg/L	0.1100	0.1158	0.1216	0.1061	0.1134	0.1293	0.1439	0.1491	0.1571	0.1628	0.1684	0.1730
Org. Carbon	mg/L	4.8	4.7	4.6	4.2	4.3	4.6	4.8	4.7	4.6	4.5	4.3	4.2
Hardness CaCO3	mg/L	69	71	73	64	68	76	84	85	88	89	91	92
Total Metals													
Aluminum Al	mg/L	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Antimony Sb	mg/L	0.0090	0.0093	0.0096	0.0095	0.0108	0.0123	0.0139	0.0142	0.0146	0.0148	0.0149	0.0151
Arsenic As	mg/L	0.0015	0.0015	0.0016	0.0014	0.0016	0.0018	0.0020	0.0021	0.0021	0.0022	0.0022	0.0023
Barium Ba	mg/L	0.0052	0.0053	0.0055	0.0049	0.0052	0.0059	0.0065	0.0066	0.0068	0.0069	0.0071	0.0072
Beryllium Be	mg/L	0.00040	0.00042	0.00043	0.00041	0.00046	0.00053	0.00060	0.00061	0.00063	0.00064	0.00065	0.00066
Bismuth Bi	mg/L	0.00894	0.00922	0.00950	0.00940	0.01065	0.01219	0.01375	0.01404	0.01442	0.01460	0.01478	0.01492
Boron B	mg/L	0.025	0.025	0.026	0.024	0.026	0.029	0.032	0.032	0.032	0.032	0.032	0.033
Cadmium Cd	mg/L	0.0000394	0.0000410	0.0000425	0.0000399	0.0000442	0.0000504	0.0000566	0.0000580	0.0000602	0.0000614	0.0000627	0.0000637
Calcium Ca	mg/L	189	199	210	183	196	224	250	260	274	284	294	302
Chromium Cr	mg/L	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.003
Cobalt Co	mg/L	0.0025	0.0027	0.0028	0.0025	0.0027	0.0031	0.0035	0.0036	0.0038	0.0039	0.0040	0.0041
Copper Cu	mg/L	0.0045	0.0047	0.0049	0.0044	0.0047	0.0053	0.0059	0.0060	0.0063	0.0065	0.0067	0.0068
Iron Fe	mg/L	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Lead Pb	mg/L	0.00029	0.00030	0.00031	0.00029	0.00032	0.00037	0.00041	0.00042	0.00044	0.00045	0.00045	0.00046
Lithium Li	mg/L	0.0018	0.0019	0.0020	0.0018	0.0020	0.0023	0.0026	0.0026	0.0028	0.0029	0.0029	0.0030
Magnesium Mg	mg/L	7.2	7.3	7.4	6.7	7.1	7.9	8.6	8.7	8.8	8.9	8.9	9.0
Manganese Mn	mg/L	0.010	0.011	0.011	0.010	0.011	0.012	0.014	0.014	0.015	0.015	0.015	0.016
Mercury Hg	ug/L	0.0035280	0.0036907	0.0038541	0.0033713	0.0035988	0.0040857	0.0045315	0.0046733	0.0049031	0.0050625	0.0052158	0.0053428
Molybdenum Mo	mg/L	0.00420	0.00444	0.00467	0.00408	0.00437	0.00500	0.00558	0.00579	0.00610	0.00634	0.00656	0.00674
Nickel Ni	mg/L	0.0058	0.0061	0.0064	0.0057	0.0061	0.0070	0.0078	0.0080	0.0084	0.0087	0.0089	0.0091
Phosphorus P	mg/L	0.155	0.163	0.171	0.152	0.165	0.188	0.210	0.217	0.228	0.235	0.242	0.248
Potassium K	mg/L	11.6	12.2	12.7	11.2	11.9	13.6	15.1	15.6	16.3	16.9	17.4	17.9
Selenium Se	mg/L	0.00056	0.00056	0.00056	0.00051	0.00055	0.00061	0.00066	0.00066	0.00067	0.00067	0.00067	0.00067
Silicon SiO2	mg/L	2.67	2.81	2.96	2.61	2.82	3.22	3.60	3.74	3.93	4.08	4.21	4.33
Silver Ag	mg/L	0.0000428	0.0000439	0.0000451	0.0000453	0.0000516	0.0000591	0.0000667	0.0000679	0.0000695	0.0000701	0.0000707	0.0000712
Sodium Na	mg/L	31	32	33	29	31	34	37	38	39	40	40	41
Strontium Sr	mg/L	0.050	0.051	0.052	0.047	0.050	0.056	0.061	0.062	0.064	0.065	0.066	0.066
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000023	0.000024	0.000024	0.000023	0.000025	0.000028	0.000031	0.000032	0.000033	0.000033	0.000034	0.000034
Thorium Th	mg/L	0.000089	0.000093	0.000097	0.000090	0.000100	0.000114	0.000128	0.000132	0.000137	0.000141	0.000144	0.000147
Tin Sn	mg/L	0.00152	0.00157	0.00161	0.00158	0.00179	0.00205	0.00231	0.00235	0.00242	0.00245	0.00248	0.00251
Titanium Ti	mg/L	0.0006	0.0007	0.0007	0.0007	0.0007	0.0008	0.0009	0.0010	0.0010	0.0010	0.0010	0.0010
Uranium U	mg/L	0.000125	0.000130	0.000136	0.000124	0.000136	0.000155	0.000173	0.000178	0.000185	0.000190	0.000194	0.000198
Vanadium V	mg/L	0.0019	0.0019	0.0020	0.0019	0.0021	0.0024	0.0027	0.0027	0.0028	0.0028	0.0029	0.0029
Zinc Zn	mg/L	0.0095	0.0097	0.0098	0.0090	0.0095	0.0105	0.0115	0.0116	0.0119	0.0120	0.0121	0.0122
Zirconium Zr	mg/L	0.0059	0.0059	0.0059	0.0054	0.0057	0.0062	0.0067	0.0067	0.0067	0.0067	0.0066	0.0066

Water Quality in TAIL LAKE													
Date		Year 3 Mar-10	Year 3 Apr-10	Year 3 May-10	Year 3 Jun-10	Year 3 Jul-10	Year 3 Aug-10	Year 3 Sep-10	Year 3 Oct-10	Year 3 Nov-10	Year 3 Dec-10	Year 3 Jan-11	Year 3 Feb-11
Parameter													
TDS	mg/L	598	615	632	536	569	631	676	664	693	712	732	749
TSS	mg/L	1.9	1.9	1.9	1.6	1.7	1.8	1.9	1.8	1.8	1.8	1.8	1.8
Free CN	mg/L	0.00035	0.00034	0.00034									
Total CN	mg/L	0.005	0.005	0.005		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WAD CN	mg/L	0.0005	0.0005	0.0005									
CNO	mg/L	0.80	0.79	0.78									
SCN	mg/L	0.078	0.078	0.077		0.061	0.062	0.065	0.067	0.063	0.063	0.062	0.061
Sulphate	mg/L	60.8	60.9	60.9	51.0	53.3	57.7	60.5	57.9	58.9	58.9	59.0	59.1
Chloride	mg/L	943	956	970	807	847	926	981	951	981	996	1012	1027
Total Ammonia-N	mg/L	0.353	0.361	0.369	0.257	0.024	0.030	0.036	0.020	0.033	0.046	0.058	0.069
Nitrate-N	mg/L	6.82	6.68	6.54	5.77	6.14	6.87	7.28	6.96	6.91	6.74	6.59	6.45
Nitrite-N	mg/L	0.243	0.269	0.296	0.161	0.214	0.035	0.042	0.038	0.072	0.105	0.138	0.167
Alkalinity	mg/L	50	49	49	41	43	46	48	45	45	45	45	44
OrthoPhosphate-P	mg/L	0.1753	0.1831	0.1911	0.1616	0.1734	0.1949	0.2111	0.2101	0.2222	0.2310	0.2398	0.2478
Phosphate-P	mg/L	0.1792	0.1870	0.1950	0.1652	0.1774	0.1991	0.2155	0.2142	0.2263	0.2350	0.2438	0.2518
Org. Carbon	mg/L	4.1	4.1	4.1	3.8	4.1	4.4	4.7	4.4	4.4	4.4	4.3	4.3
Hardness CaCO3	mg/L	90	90	89	74	76	81	84	79	80	79	78	77
Total Metals													
Aluminum Al	mg/L	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05
Antimony Sb	mg/L	0.0153	0.0157	0.0161	0.0149	0.0166	0.0187	0.0204	0.0201	0.0208	0.0212	0.0216	0.0220
Arsenic As	mg/L	0.0022	0.0022	0.0022	0.0019	0.0020	0.0021	0.0022	0.0021	0.0021	0.0021	0.0021	0.0021
Barium Ba	mg/L	0.0071	0.0070	0.0070	0.0059	0.0061	0.0066	0.0068	0.0065	0.0066	0.0065	0.0065	0.0065
Beryllium Be	mg/L	0.00066	0.00067	0.00068	0.00060	0.00065	0.00072	0.00077	0.00075	0.00077	0.00077	0.00078	0.00079
Bismuth Bi	mg/L	0.01517	0.01557	0.01598	0.01474	0.01647	0.01854	0.02026	0.01993	0.02065	0.02106	0.02148	0.02187
Boron B	mg/L	0.032	0.032	0.032	0.028	0.031	0.033	0.035	0.034	0.034	0.034	0.034	0.034
Cadmium Cd	mg/L	0.0000624	0.0000620	0.0000615	0.0000514	0.0000536	0.0000575	0.0000599	0.0000568	0.0000571	0.0000565	0.0000560	0.0000556
Calcium Ca	mg/L	296	294	291	233	236	250	256	241	243	240	238	236
Chromium Cr	mg/L	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Cobalt Co	mg/L	0.0041	0.0040	0.0040	0.0033	0.0034	0.0037	0.0039	0.0037	0.0037	0.0037	0.0037	0.0037
Copper Cu	mg/L	0.0067	0.0067	0.0066	0.0054	0.0055	0.0059	0.0061	0.0058	0.0058	0.0057	0.0057	0.0057
Iron Fe	mg/L	0.06	0.06	0.06	0.05	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Lead Pb	mg/L	0.00046	0.00046	0.00046	0.00040	0.00042	0.00046	0.00049	0.00047	0.00048	0.00048	0.00048	0.00049
Lithium Li	mg/L	0.0030	0.0030	0.0030	0.0025	0.0026	0.0028	0.0029	0.0028	0.0028	0.0028	0.0028	0.0029
Magnesium Mg	mg/L	8.9	8.8	8.8	7.7	8.1	8.8	9.3	8.8	8.9	8.9	8.9	8.9
Manganese Mn	mg/L	0.016	0.015	0.015	0.013	0.013	0.014	0.015	0.014	0.014	0.014	0.014	0.014
Mercury Hg	ug/L	0.0052360	0.0051905	0.0051442	0.0041558	0.0042186	0.0044721	0.0045966	0.0043303	0.0043510	0.0043021	0.0042587	0.0042228
Molybdenum Mo	mg/L	0.00661	0.00656	0.00651	0.00521	0.00527	0.00559	0.00574	0.00541	0.00545	0.00539	0.00534	0.00530
Nickel Ni	mg/L	0.0090	0.0090	0.0089	0.0074	0.0076	0.0082	0.0085	0.0081	0.0082	0.0082	0.0082	0.0082
Phosphorus P	mg/L	0.254	0.261	0.270	0.229	0.245	0.273	0.293	0.289	0.302	0.311	0.320	0.328
Potassium K	mg/L	17.5	17.4	17.2	13.9	14.1	15.0	15.4	14.6	14.6	14.5	14.4	14.2
Selenium Se	mg/L	0.00065	0.00065	0.00064	0.00056	0.00059	0.00064	0.00067	0.00063	0.00063	0.00063	0.00062	0.00062
Silicon SiO2	mg/L	4.24	4.21	4.18	3.37	3.42	3.63	3.74	3.53	3.55	3.52	3.49	3.46
Silver Ag	mg/L	0.0000709	0.0000713	0.0000718	0.0000642	0.0000701	0.0000773	0.0000830	0.0000802	0.0000819	0.0000822	0.0000827	0.0000831
Sodium Na	mg/L	40	40	39	33	34	36	38	36	36	35	35	35
Strontium Sr	mg/L	0.065	0.065	0.064	0.054	0.057	0.061	0.063	0.060	0.060	0.060	0.059	0.059
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000034	0.000033	0.000033	0.000028	0.000029	0.000031	0.000033	0.000031	0.000031	0.000031	0.000030	0.000030
Thorium Th	mg/L	0.000144	0.000142	0.000141	0.000117	0.000121	0.000129	0.000134	0.000127	0.000128	0.000126	0.000125	0.000124
Tin Sn	mg/L	0.00254	0.00260	0.00266	0.00243	0.00270	0.00302	0.00329	0.00323	0.00334	0.00340	0.00346	0.00351
Titanium Ti	mg/L	0.0011	0.0011	0.0011	0.0010	0.0011	0.0012	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013
Uranium U	mg/L	0.000194	0.000193	0.000191	0.000158	0.000163	0.000174	0.000181	0.000171	0.000172	0.000171	0.000169	0.000168
Vanadium V	mg/L	0.0029	0.0030	0.0030	0.0028	0.0030	0.0034	0.0037	0.0036	0.0037	0.0037	0.0038	0.0039
Zinc Zn	mg/L	0.0121	0.0121	0.0120	0.0105	0.0110	0.0119	0.0125	0.0119	0.0121	0.0121	0.0120	0.0120
Zirconium Zr	mg/L	0.0065	0.0064	0.0063	0.0056	0.0060	0.0064	0.0067	0.0064	0.0064	0.0064	0.0063	0.0062

Water Quality in TAIL LAKE													
Date		Year 4 Mar-11	Year 4 Apr-11	Year 4 May-11	Year 4 Jun-11	Year 4 Jul-11	Year 4 Aug-11	Year 4 Sep-11	Year 4 Oct-11	Year 4 Nov-11	Year 4 Dec-11	Year 4 Jan-12	Year 4 Feb-12
Parameter													
TDS	mg/L	743	740	736	684	604	645	664	630	634	630	627	624
TSS	mg/L	1.7	1.7	1.7	1.7	1.5	1.7	1.7	1.7	1.7	1.7	1.7	1.6
Free CN	mg/L												
Total CN	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L	0.061	0.061	0.060	0.055	0.048	0.051	0.053	0.050	0.050	0.050	0.050	0.050
Sulphate	mg/L	58.6	58.3	58.0	53.4	47.0	50.1	51.5	48.9	49.2	48.9	48.6	48.4
Chloride	mg/L	1018	1014	1008	924	812	865	889	842	848	842	838	835
Total Ammonia-N	mg/L	0.069	0.068	0.068	0.026	0.016	0.008	0.011	0.004	0.004	0.004	0.003	0.003
Nitrate-N	mg/L	6.30	6.17	6.04	5.91	5.32	5.74	5.98	5.70	5.63	5.49	5.36	5.24
Nitrite-N	mg/L	0.166	0.165	0.164		0.006	0.003	0.003	0.002	0.002	0.002	0.002	0.002
Alkalinity	mg/L	44	44	43	43	39	42	44	41	42	41	41	41
OrthoPhosphate-P	mg/L	0.2458	0.2446	0.2433	0.2225	0.1951	0.2078	0.2133	0.2022	0.2035	0.2022	0.2011	0.2004
Phosphate-P	mg/L	0.2498	0.2486	0.2473	0.2267	0.1990	0.2120	0.2177	0.2064	0.2077	0.2064	0.2053	0.2046
Org. Carbon	mg/L	4.3	4.2	4.2	4.5	4.2	4.6	4.8	4.6	4.6	4.6	4.6	4.6
Hardness CaCO3	mg/L	77	76	76	73	66	71	74	70	70	70	70	69
Total Metals													
Aluminum Al	mg/L	0.05	0.05	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.04	0.04
Antimony Sb	mg/L	0.0218	0.0217	0.0216	0.0197	0.0173	0.0184	0.0189	0.0179	0.0181	0.0179	0.0178	0.0178
Arsenic As	mg/L	0.0021	0.0021	0.0021	0.0020	0.0018	0.0019	0.0020	0.0019	0.0019	0.0019	0.0019	0.0019
Barium Ba	mg/L	0.0064	0.0064	0.0063	0.0060	0.0054	0.0058	0.0060	0.0057	0.0057	0.0057	0.0057	0.0057
Beryllium Be	mg/L	0.00078	0.00078	0.00078	0.00072	0.00064	0.00068	0.00070	0.00067	0.00067	0.00067	0.00066	0.00066
Bismuth Bi	mg/L	0.02169	0.02159	0.02148	0.01963	0.01721	0.01833	0.01882	0.01783	0.01795	0.01783	0.01774	0.01768
Boron B	mg/L	0.034	0.034	0.033	0.033	0.030	0.032	0.033	0.032	0.032	0.032	0.032	0.031
Cadmium Cd	mg/L	0.0000552	0.0000549	0.0000546	0.0000526	0.0000478	0.0000516	0.0000540	0.0000514	0.0000518	0.0000515	0.0000512	0.0000510
Calcium Ca	mg/L	234	233	232	213	187	199	204	194	195	194	193	192
Chromium Cr	mg/L	0.003	0.003	0.003	0.003	0.002	0.003	0.003	0.002	0.002	0.002	0.002	0.002
Cobalt Co	mg/L	0.0037	0.0037	0.0036	0.0033	0.0029	0.0031	0.0032	0.0030	0.0031	0.0030	0.0030	0.0030
Copper Cu	mg/L	0.0056	0.0056	0.0056	0.0052	0.0046	0.0049	0.0051	0.0048	0.0048	0.0048	0.0048	0.0048
Iron Fe	mg/L	0.07	0.06	0.06	0.06	0.06	0.07	0.08	0.07	0.07	0.07	0.07	0.07
Lead Pb	mg/L	0.00048	0.00048	0.00048	0.00045	0.00040	0.00043	0.00045	0.00043	0.00043	0.00043	0.00042	0.00042
Lithium Li	mg/L	0.0028	0.0028	0.0028	0.0026	0.0023	0.0024	0.0025	0.0023	0.0024	0.0023	0.0023	0.0023
Magnesium Mg	mg/L	8.8	8.8	8.7	8.5	7.7	8.3	8.6	8.2	8.2	8.2	8.1	8.1
Manganese Mn	mg/L	0.014	0.014	0.014	0.013	0.011	0.012	0.012	0.012	0.012	0.012	0.012	0.012
Mercury Hg	ug/L	0.0041886	0.0041687	0.0041470	0.0038542	0.0034084	0.0036405	0.0037505	0.0035575	0.0035809	0.0035576	0.0035391	0.0035264
Molybdenum Mo	mg/L	0.00526	0.00524	0.00521	0.00477	0.00418	0.00446	0.00458	0.00434	0.00437	0.00434	0.00431	0.00430
Nickel Ni	mg/L	0.0081	0.0081	0.0080	0.0074	0.0065	0.0070	0.0072	0.0068	0.0068	0.0068	0.0067	0.0067
Phosphorus P	mg/L	0.326	0.324	0.322	0.297	0.261	0.279	0.287	0.272	0.274	0.272	0.271	0.270
Potassium K	mg/L	14.1	14.1	14.0	13.0	11.4	12.2	12.6	11.9	12.0	11.9	11.8	11.8
Selenium Se	mg/L	0.00061	0.00061	0.00061	0.00061	0.00056	0.00061	0.00064	0.00061	0.00061	0.00061	0.00061	0.00060
Silicon SiO2	mg/L	3.44	3.42	3.40	3.13	2.76	2.94	3.03	2.88	2.89	2.88	2.86	2.85
Silver Ag	mg/L	0.0000824	0.0000821	0.0000816	0.0000780	0.0000705	0.0000760	0.0000793	0.0000756	0.0000761	0.0000756	0.0000752	0.0000749
Sodium Na	mg/L	34	34	34	33	30	32	33	32	32	32	31	31
Strontium Sr	mg/L	0.059	0.058	0.058	0.056	0.050	0.054	0.056	0.053	0.054	0.053	0.053	0.053
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000030	0.000030	0.000030	0.000029	0.000026	0.000028	0.000030	0.000028	0.000028	0.000028	0.000028	0.000028
Thorium Th	mg/L	0.000123	0.000122	0.000122	0.000116	0.000105	0.000113	0.000118	0.000112	0.000113	0.000112	0.000112	0.000111
Tin Sn	mg/L	0.00349	0.00347	0.00345	0.00316	0.00278	0.00297	0.00305	0.00289	0.00291	0.00289	0.00288	0.00287
Titanium Ti	mg/L	0.0013	0.0013	0.0013	0.0012	0.0011	0.0011	0.0012	0.0011	0.0011	0.0011	0.0011	0.0011
Uranium U	mg/L	0.000166	0.000166	0.000165	0.000157	0.000141	0.000152	0.000158	0.000150	0.000151	0.000150	0.000150	0.000149
Vanadium V	mg/L	0.0038	0.0038	0.0038	0.0035	0.0031	0.0033	0.0034	0.0032	0.0033	0.0032	0.0032	0.0032
Zinc Zn	mg/L	0.0119	0.0119	0.0118	0.0114	0.0102	0.0109	0.0112	0.0107	0.0107	0.0107	0.0106	0.0106
Zirconium Zr	mg/L	0.0062	0.0062	0.0061	0.0062	0.0058	0.0063	0.0066	0.0063	0.0063	0.0063	0.0063	0.0062

Water Quality in TAIL LAKE													
Date		Year 5 Mar-12	Year 5 Apr-12	Year 5 May-12	Year 5 Jun-12	Year 5 Jul-12	Year 5 Aug-12	Year 5 Sep-12	Year 5 Oct-12	Year 5 Nov-12	Year 5 Dec-12	Year 5 Jan-13	Year 5 Feb-13
Parameter													
TDS	mg/L	622	619	616	789	861	1123	1365	1498	1508	1498	1490	1485
TSS	mg/L	1.6	1.6	1.6	1.7	1.5	1.6	1.7	1.6	1.6	1.6	1.6	1.6
Free CN	mg/L												
Total CN	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L	0.049	0.049	0.049	0.046	0.039	0.041	0.043	0.040	0.041	0.040	0.040	0.040
Sulphate	mg/L	48.3	48.0	47.8	45.3	38.6	41.2	42.4	40.2	40.5	40.2	40.0	39.9
Chloride	mg/L	832	828	823	899	878	1061	1218	1278	1287	1278	1272	1267
Total Ammonia-N	mg/L	0.003	0.003	0.003	0.032	0.015	0.008	0.011	0.004	0.004	0.004	0.003	0.003
Nitrate-N	mg/L	5.12	4.99	4.87	4.82	4.23	4.58	4.79	4.57	4.50	4.37	4.24	4.13
Nitrite-N	mg/L	0.002	0.002	0.002	0.006	0.006	0.003	0.003	0.002	0.002	0.002	0.002	0.002
Alkalinity	mg/L	41	41	40	41	36	39	41	39	39	39	39	39
OrthoPhosphate-P	mg/L	0.1996	0.1987	0.1976	0.1860	0.1578	0.1682	0.1727	0.1636	0.1647	0.1637	0.1628	0.1622
Phosphate-P	mg/L	0.2038	0.2028	0.2017	0.1907	0.1621	0.1729	0.1776	0.1683	0.1694	0.1683	0.1674	0.1668
Org. Carbon	mg/L	4.5	4.5	4.5	4.9	4.4	4.8	5.0	4.8	4.8	4.8	4.8	4.8
Hardness CaCO3	mg/L	69	69	68	68	59	64	67	63	64	63	63	63
Total Metals													
Aluminum Al	mg/L	0.04	0.04	0.04	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Antimony Sb	mg/L	0.0177	0.0176	0.0175	0.0165	0.0140	0.0149	0.0153	0.0145	0.0146	0.0145	0.0144	0.0144
Arsenic As	mg/L	0.0019	0.0019	0.0019	0.0018	0.0016	0.0017	0.0018	0.0017	0.0017	0.0017	0.0017	0.0017
Barium Ba	mg/L	0.0056	0.0056	0.0056	0.0055	0.0048	0.0051	0.0053	0.0050	0.0051	0.0050	0.0050	0.0050
Beryllium Be	mg/L	0.00066	0.00066	0.00065	0.00062	0.00054	0.00057	0.00059	0.00056	0.00057	0.00056	0.00056	0.00056
Bismuth Bi	mg/L	0.01761	0.01752	0.01743	0.01640	0.01391	0.01482	0.01522	0.01442	0.01452	0.01442	0.01435	0.01430
Boron B	mg/L	0.031	0.031	0.031	0.032	0.028	0.030	0.032	0.030	0.030	0.030	0.030	0.030
Cadmium Cd	mg/L	0.0000508	0.0000506	0.0000503	0.0000502	0.0000443	0.0000479	0.0000502	0.0000479	0.0000482	0.0000479	0.0000476	0.0000475
Calcium Ca	mg/L	191	190	189	191	173	197	214	215	217	215	214	213
Chromium Cr	mg/L	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Cobalt Co	mg/L	0.0030	0.0030	0.0030	0.0028	0.0024	0.0026	0.0026	0.0025	0.0025	0.0025	0.0025	0.0025
Copper Cu	mg/L	0.0047	0.0047	0.0047	0.0045	0.0039	0.0042	0.0043	0.0041	0.0041	0.0041	0.0041	0.0041
Iron Fe	mg/L	0.07	0.07	0.07	0.07	0.07	0.08	0.09	0.08	0.08	0.08	0.08	0.08
Lead Pb	mg/L	0.00042	0.00042	0.00042	0.00040	0.00035	0.00038	0.00039	0.00037	0.00038	0.00037	0.00037	0.00037
Lithium Li	mg/L	0.0023	0.0023	0.0023	0.0022	0.0019	0.0020	0.0021	0.0020	0.0020	0.0020	0.0019	0.0019
Magnesium Mg	mg/L	8.1	8.0	8.0	8.1	7.1	7.7	8.0	7.6	7.7	7.6	7.6	7.6
Manganese Mn	mg/L	0.012	0.012	0.012	0.011	0.010	0.010	0.011	0.010	0.010	0.010	0.010	0.010
Mercury Hg	ug/L	0.0035131	0.0034962	0.0034776	0.0033384	0.0028613	0.0030592	0.0031538	0.0029920	0.0030117	0.0029921	0.0029765	0.0029658
Molybdenum Mo	mg/L	0.00428	0.00426	0.00424	0.00400	0.00340	0.00362	0.00372	0.00352	0.00355	0.00353	0.00351	0.00349
Nickel Ni	mg/L	0.0067	0.0067	0.0066	0.0063	0.0054	0.0057	0.0059	0.0056	0.0056	0.0056	0.0056	0.0056
Phosphorus P	mg/L	0.269	0.267	0.266	0.252	0.215	0.230	0.237	0.224	0.226	0.224	0.223	0.222
Potassium K	mg/L	11.8	11.7	11.6	11.2	9.5	10.2	10.5	10.0	10.0	10.0	9.9	9.9
Selenium Se	mg/L	0.00060	0.00060	0.00060	0.00063	0.00056	0.00062	0.00065	0.00062	0.00062	0.00062	0.00062	0.00061
Silicon SiO2	mg/L	2.84	2.83	2.81	2.67	2.28	2.44	2.52	2.39	2.40	2.39	2.38	2.37
Silver Ag	mg/L	0.0000746	0.0000743	0.0000739	0.0000731	0.0000642	0.0000693	0.0000724	0.0000691	0.0000695	0.0000691	0.0000687	0.0000685
Sodium Na	mg/L	31	31	31	97	146	223	299	351	354	351	350	348
Strontium Sr	mg/L	0.053	0.053	0.052	0.052	0.046	0.049	0.051	0.049	0.049	0.049	0.049	0.048
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000028	0.000028	0.000028	0.000028	0.000025	0.000027	0.000028	0.000026	0.000027	0.000026	0.000026	0.000026
Thorium Th	mg/L	0.000111	0.000110	0.000110	0.000109	0.000096	0.000104	0.000109	0.000104	0.000104	0.000104	0.000103	0.000103
Tin Sn	mg/L	0.00285	0.00284	0.00283	0.00267	0.00227	0.00242	0.00249	0.00236	0.00238	0.00236	0.00235	0.00234
Titanium Ti	mg/L	0.0011	0.0011	0.0011	0.0012	0.0011	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012
Uranium U	mg/L	0.000148	0.000148	0.000147	0.000145	0.000127	0.000137	0.000143	0.000136	0.000137	0.000136	0.000135	0.000135
Vanadium V	mg/L	0.0032	0.0032	0.0032	0.0031	0.0026	0.0028	0.0029	0.0027	0.0028	0.0027	0.0027	0.0027
Zinc Zn	mg/L	0.0105	0.0105	0.0104	0.0105	0.0090	0.0097	0.0100	0.0095	0.0096	0.0095	0.0095	0.0094
Zirconium Zr	mg/L	0.0062	0.0062	0.0062	0.0065	0.0058	0.0063	0.0066	0.0063	0.0063	0.0063	0.0063	0.0062

Water Quality in TAIL LAKE													
Date		Year 6 Mar-13	Year 6 Apr-13	Year 6 May-13	Year 6 Jun-13	Year 6 Jul-13	Year 6 Aug-13	Year 6 Sep-13	Year 6 Oct-13	Year 6 Nov-13	Year 6 Dec-13	Year 6 Jan-14	Year 6 Feb-14
Parameter													
TDS	mg/L	1479	1472	1464	1389	1182	1261	1297	1229	1237	1229	1223	1218
TSS	mg/L	1.6	1.6	1.6	1.6	1.5	1.6	1.7	1.6	1.6	1.6	1.6	1.6
Free CN	mg/L												
Total CN	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L	0.040	0.040	0.039	0.037	0.031	0.034	0.034	0.033	0.033	0.033	0.032	0.032
Sulphate	mg/L	39.7	39.5	39.3	37.4	31.9	34.1	35.1	33.3	33.5	33.3	33.1	33.0
Chloride	mg/L	1262	1256	1250	1179	1002	1068	1097	1040	1047	1040	1035	1031
Total Ammonia-N	mg/L	0.003	0.003	0.003	0.032	0.015	0.008	0.011	0.004	0.004	0.004	0.003	0.003
Nitrate-N	mg/L	4.01	3.89	3.77	3.79	3.36	3.65	3.84	3.67	3.59	3.46	3.34	3.23
Nitrite-N	mg/L	0.002	0.002	0.002	0.006	0.006	0.003	0.003	0.002	0.002	0.002	0.002	0.002
Alkalinity	mg/L	38	38	38	39	34	37	39	37	37	37	37	37
OrthoPhosphate-P	mg/L	0.1616	0.1608	0.1600	0.1506	0.1278	0.1362	0.1399	0.1325	0.1334	0.1325	0.1319	0.1314
Phosphate-P	mg/L	0.1662	0.1654	0.1645	0.1558	0.1325	0.1413	0.1451	0.1376	0.1385	0.1376	0.1369	0.1364
Org. Carbon	mg/L	4.7	4.7	4.7	5.1	4.6	5.0	5.2	5.0	5.0	5.0	4.9	4.9
Hardness CaCO3	mg/L	62	62	62	62	54	58	61	58	58	58	58	57
Total Metals													
Aluminum Al	mg/L	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Antimony Sb	mg/L	0.0143	0.0143	0.0142	0.0133	0.0113	0.0121	0.0124	0.0117	0.0118	0.0117	0.0117	0.0116
Arsenic As	mg/L	0.0017	0.0017	0.0017	0.0016	0.0014	0.0016	0.0016	0.0015	0.0016	0.0015	0.0015	0.0015
Barium Ba	mg/L	0.0050	0.0050	0.0049	0.0049	0.0042	0.0046	0.0048	0.0045	0.0045	0.0045	0.0045	0.0045
Beryllium Be	mg/L	0.00056	0.00055	0.00055	0.00053	0.00045	0.00049	0.00050	0.00048	0.00048	0.00048	0.00048	0.00047
Bismuth Bi	mg/L	0.01424	0.01417	0.01410	0.01326	0.01125	0.01199	0.01231	0.01167	0.01175	0.01167	0.01161	0.01157
Boron B	mg/L	0.030	0.030	0.029	0.030	0.027	0.029	0.030	0.029	0.029	0.029	0.029	0.029
Cadmium Cd	mg/L	0.0000473	0.0000471	0.0000468	0.0000469	0.0000415	0.0000450	0.0000472	0.0000450	0.0000453	0.0000450	0.0000448	0.0000446
Calcium Ca	mg/L	212	211	210	199	169	180	185	175	176	175	174	174
Chromium Cr	mg/L	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Cobalt Co	mg/L	0.0025	0.0025	0.0024	0.0023	0.0020	0.0021	0.0022	0.0020	0.0021	0.0020	0.0020	0.0020
Copper Cu	mg/L	0.0040	0.0040	0.0040	0.0039	0.0033	0.0036	0.0037	0.0035	0.0035	0.0035	0.0035	0.0035
Iron Fe	mg/L	0.08	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Lead Pb	mg/L	0.00037	0.00037	0.00037	0.00036	0.00031	0.00034	0.00035	0.00033	0.00033	0.00033	0.00033	0.00033
Lithium Li	mg/L	0.0019	0.0019	0.0019	0.0018	0.0016	0.0017	0.0017	0.0016	0.0017	0.0016	0.0016	0.0016
Magnesium Mg	mg/L	7.5	7.5	7.4	7.6	6.7	7.2	7.5	7.2	7.2	7.2	7.1	7.1
Manganese Mn	mg/L	0.010	0.010	0.010	0.010	0.008	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Mercury Hg	ug/L	0.0029547	0.0029404	0.0029248	0.0028187	0.0024207	0.0025897	0.0026719	0.0025354	0.0025520	0.0025355	0.0025222	0.0025132
Molybdenum Mo	mg/L	0.00348	0.00346	0.00345	0.00325	0.00276	0.00295	0.00303	0.00287	0.00289	0.00287	0.00285	0.00284
Nickel Ni	mg/L	0.0055	0.0055	0.0055	0.0052	0.0045	0.0048	0.0049	0.0047	0.0047	0.0047	0.0046	0.0046
Phosphorus P	mg/L	0.222	0.221	0.219	0.209	0.178	0.190	0.196	0.186	0.187	0.186	0.185	0.184
Potassium K	mg/L	9.9	9.8	9.8	9.4	8.0	8.6	8.9	8.4	8.5	8.4	8.4	8.3
Selenium Se	mg/L	0.00061	0.00061	0.00061	0.00064	0.00057	0.00062	0.00066	0.00063	0.00063	0.00063	0.00062	0.00062
Silicon SiO2	mg/L	2.36	2.35	2.33	2.23	1.90	2.04	2.10	1.99	2.01	1.99	1.98	1.98
Silver Ag	mg/L	0.0000682	0.0000679	0.0000675	0.0000671	0.0000591	0.0000640	0.0000669	0.0000638	0.0000643	0.0000638	0.0000635	0.0000633
Sodium Na	mg/L	347	345	343	325	277	295	304	288	290	288	286	285
Strontium Sr	mg/L	0.048	0.048	0.048	0.048	0.042	0.046	0.047	0.045	0.045	0.045	0.045	0.045
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000026	0.000026	0.000026	0.000026	0.000023	0.000025	0.000026	0.000025	0.000025	0.000025	0.000025	0.000025
Thorium Th	mg/L	0.000102	0.000102	0.000101	0.000101	0.000089	0.000097	0.000101	0.000097	0.000097	0.000097	0.000096	0.000096
Tin Sn	mg/L	0.00233	0.00232	0.00231	0.00219	0.00186	0.00199	0.00204	0.00194	0.00195	0.00194	0.00193	0.00192
Titanium Ti	mg/L	0.0012	0.0012	0.0012	0.0012	0.0011	0.0012	0.0013	0.0012	0.0012	0.0012	0.0012	0.0012
Uranium U	mg/L	0.000134	0.000134	0.000133	0.000132	0.000116	0.000125	0.000130	0.000124	0.000125	0.000124	0.000124	0.000123
Vanadium V	mg/L	0.0027	0.0027	0.0027	0.0026	0.0022	0.0024	0.0025	0.0023	0.0024	0.0023	0.0023	0.0023
Zinc Zn	mg/L	0.0094	0.0094	0.0093	0.0094	0.0081	0.0087	0.0090	0.0086	0.0086	0.0086	0.0085	0.0085
Zirconium Zr	mg/L	0.0062	0.0062	0.0062	0.0065	0.0058	0.0063	0.0066	0.0063	0.0063	0.0063	0.0063	0.0062

Water Quality in TAIL LAKE													
Date		Year 7 Mar-14	Year 7 Apr-14	Year 7 May-14	Year 7 Jun-14	Year 7 Jul-14	Year 7 Aug-14	Year 7 Sep-14	Year 7 Oct-14	Year 7 Nov-14	Year 7 Dec-14	Year 7 Jan-15	Year 7 Feb-15
Parameter													
TDS	mg/L	1214	1208	1202	1142	973	1038	1068	1012	1019	1012	1007	1003
TSS	mg/L	1.6	1.6	1.6	1.6	1.4	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Free CN	mg/L												
Total CN	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L	0.032	0.032	0.032	0.030	0.025	0.027	0.028	0.026	0.026	0.026	0.026	0.026
Sulphate	mg/L	32.8	32.7	32.5	30.9	26.4	28.1	29.0	27.5	27.6	27.5	27.3	27.2
Chloride	mg/L	1027	1022	1017	960	816	870	894	848	853	848	843	840
Total Ammonia-N	mg/L	0.003	0.003	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Nitrate-N	mg/L	3.11	3.00	2.88	2.71	2.30	2.45	2.51	2.38	2.30	2.18	2.07	1.96
Nitrite-N	mg/L	0.002	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Alkalinity	mg/L	36	36	36	37	33	36	37	35	35	35	35	35
OrthoPhosphate-P	mg/L	0.1309	0.1303	0.1296	0.1220	0.1036	0.1104	0.1134	0.1074	0.1081	0.1074	0.1069	0.1065
Phosphate-P	mg/L	0.1359	0.1352	0.1345	0.1275	0.1085	0.1158	0.1190	0.1128	0.1135	0.1128	0.1122	0.1118
Org. Carbon	mg/L	4.9	4.9	4.9	5.2	4.7	5.1	5.4	5.1	5.1	5.1	5.1	5.1
Hardness CaCO3	mg/L	57	57	57	57	50	54	56	54	54	54	53	53
Total Metals													
Aluminum Al	mg/L	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Antimony Sb	mg/L	0.0116	0.0115	0.0115	0.0108	0.0092	0.0098	0.0100	0.0095	0.0096	0.0095	0.0094	0.0094
Arsenic As	mg/L	0.0015	0.0015	0.0015	0.0014	0.0012	0.0013	0.0014	0.0013	0.0013	0.0013	0.0013	0.0013
Barium Ba	mg/L	0.0045	0.0044	0.0044	0.0044	0.0038	0.0041	0.0043	0.0041	0.0041	0.0041	0.0041	0.0040
Beryllium Be	mg/L	0.00047	0.00047	0.00047	0.00044	0.00037	0.00040	0.00041	0.00039	0.00039	0.00039	0.00038	0.00038
Bismuth Bi	mg/L	0.01152	0.01147	0.01141	0.01073	0.00909	0.00969	0.00995	0.00942	0.00949	0.00943	0.00938	0.00934
Boron B	mg/L	0.028	0.028	0.028	0.028	0.025	0.027	0.028	0.027	0.027	0.027	0.027	0.026
Cadmium Cd	mg/L	0.0000445	0.0000442	0.0000440	0.0000417	0.0000356	0.0000380	0.0000390	0.0000370	0.0000372	0.0000370	0.0000368	0.0000367
Calcium Ca	mg/L	173	172	171	162	138	147	151	143	144	143	142	142
Chromium Cr	mg/L	0.002	0.002	0.002	0.002	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001
Cobalt Co	mg/L	0.0020	0.0020	0.0020	0.0019	0.0016	0.0017	0.0018	0.0017	0.0017	0.0017	0.0017	0.0016
Copper Cu	mg/L	0.0035	0.0035	0.0034	0.0033	0.0029	0.0031	0.0032	0.0030	0.0030	0.0030	0.0030	0.0030
Iron Fe	mg/L	0.09	0.09	0.09	0.09	0.08	0.09	0.10	0.09	0.09	0.09	0.09	0.09
Lead Pb	mg/L	0.00033	0.00033	0.00032	0.00031	0.00026	0.00028	0.00029	0.00028	0.00028	0.00028	0.00027	0.00027
Lithium Li	mg/L	0.0016	0.0016	0.0016	0.0015	0.0013	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014
Magnesium Mg	mg/L	7.1	7.0	7.0	7.2	6.3	6.8	7.1	6.8	6.8	6.8	6.7	6.7
Manganese Mn	mg/L	0.009	0.009	0.009	0.008	0.007	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Mercury Hg	ug/L	0.0025037	0.0024916	0.0024784	0.0023988	0.0020646	0.0022102	0.0022823	0.0021661	0.0021804	0.0021662	0.0021549	0.0021472
Molybdenum Mo	mg/L	0.00283	0.00282	0.00281	0.00265	0.00225	0.00240	0.00247	0.00234	0.00236	0.00234	0.00233	0.00232
Nickel Ni	mg/L	0.0046	0.0046	0.0046	0.0043	0.0037	0.0040	0.0041	0.0039	0.0039	0.0039	0.0038	0.0038
Phosphorus P	mg/L	0.184	0.183	0.182	0.172	0.146	0.156	0.160	0.151	0.152	0.151	0.151	0.150
Potassium K	mg/L	8.3	8.3	8.2	7.9	6.8	7.3	7.5	7.1	7.2	7.1	7.1	7.1
Selenium Se	mg/L	0.00062	0.00062	0.00061	0.00063	0.00056	0.00061	0.00064	0.00061	0.00061	0.00061	0.00061	0.00060
Silicon SiO2	mg/L	1.97	1.96	1.95	1.84	1.56	1.67	1.71	1.62	1.63	1.62	1.61	1.61
Silver Ag	mg/L	0.0000630	0.0000627	0.0000624	0.0000588	0.0000501	0.0000534	0.0000548	0.0000520	0.0000523	0.0000520	0.0000517	0.0000515
Sodium Na	mg/L	284	283	281	267	227	242	249	236	238	236	235	234
Strontium Sr	mg/L	0.045	0.044	0.044	0.045	0.039	0.042	0.044	0.042	0.042	0.042	0.042	0.042
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000025	0.000025	0.000025	0.000024	0.000021	0.000022	0.000023	0.000022	0.000022	0.000022	0.000022	0.000022
Thorium Th	mg/L	0.000095	0.000095	0.000094	0.000090	0.000076	0.000081	0.000084	0.000079	0.000080	0.000079	0.000079	0.000079
Tin Sn	mg/L	0.00191	0.00191	0.00190	0.00179	0.00152	0.00162	0.00166	0.00157	0.00158	0.00157	0.00156	0.00156
Titanium Ti	mg/L	0.0012	0.0012	0.0012	0.0013	0.0012	0.0013	0.0013	0.0013	0.0013	0.0013	0.0012	0.0012
Uranium U	mg/L	0.000123	0.000122	0.000122	0.000116	0.000099	0.000106	0.000109	0.000103	0.000104	0.000103	0.000103	0.000102
Vanadium V	mg/L	0.0023	0.0023	0.0023	0.0022	0.0019	0.0020	0.0021	0.0020	0.0020	0.0020	0.0020	0.0020
Zinc Zn	mg/L	0.0085	0.0084	0.0084	0.0085	0.0073	0.0079	0.0081	0.0077	0.0078	0.0077	0.0077	0.0076
Zirconium Zr	mg/L	0.0062	0.0062	0.0062	0.0064	0.0057	0.0061	0.0064	0.0061	0.0061	0.0061	0.0060	0.0060

Water Quality in TAIL LAKE													
Date		Year 8 Mar-15	Year 8 Apr-15	Year 8 May-15	Year 8 Jun-15	Year 8 Jul-15	Year 8 Aug-15	Year 8 Sep-15	Year 8 Oct-15	Year 8 Nov-15	Year 8 Dec-15	Year 8 Jan-16	Year 8 Feb-16
Parameter													
TDS	mg/L	1000	995	990	943	803	858	883	837	843	837	833	830
TSS	mg/L	1.6	1.5	1.5	1.6	1.4	1.5	1.6	1.6	1.6	1.6	1.5	1.5
Free CN	mg/L												
Total CN	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L	0.026	0.026	0.026	0.024	0.021	0.022	0.022	0.021	0.021	0.021	0.021	0.021
Sulphate	mg/L	27.1	27.0	26.8	25.6	21.8	23.3	24.0	22.8	22.9	22.8	22.7	22.6
Chloride	mg/L	837	833	828	783	666	710	730	692	697	692	688	686
Total Ammonia-N	mg/L	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Nitrate-N	mg/L	1.85	1.74	1.63	1.53	1.30	1.38	1.42	1.35	1.25	1.14	1.03	0.93
Nitrite-N	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Alkalinity	mg/L	35	35	34	36	32	34	36	34	34	34	34	34
OrthoPhosphate-P	mg/L	0.1061	0.1056	0.1050	0.0990	0.0840	0.0895	0.0920	0.0871	0.0877	0.0871	0.0867	0.0864
Phosphate-P	mg/L	0.1113	0.1108	0.1102	0.1047	0.0892	0.0952	0.0978	0.0927	0.0933	0.0927	0.0922	0.0919
Org. Carbon	mg/L	5.0	5.0	5.0	5.4	4.8	5.2	5.5	5.2	5.2	5.2	5.2	5.2
Hardness CaCO3	mg/L	53	53	52	53	47	50	53	50	50	50	50	50
Total Metals													
Aluminum Al	mg/L	0.05	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Antimony Sb	mg/L	0.0094	0.0093	0.0093	0.0087	0.0074	0.0079	0.0081	0.0077	0.0077	0.0077	0.0076	0.0076
Arsenic As	mg/L	0.0013	0.0013	0.0013	0.0012	0.0011	0.0011	0.0012	0.0011	0.0011	0.0011	0.0011	0.0011
Barium Ba	mg/L	0.0040	0.0040	0.0040	0.0040	0.0035	0.0038	0.0039	0.0037	0.0037	0.0037	0.0037	0.0037
Beryllium Be	mg/L	0.00038	0.00038	0.00038	0.00036	0.00030	0.00032	0.00033	0.00031	0.00032	0.00031	0.00031	0.00031
Bismuth Bi	mg/L	0.00931	0.00926	0.00921	0.00866	0.00734	0.00782	0.00803	0.00761	0.00766	0.00761	0.00757	0.00754
Boron B	mg/L	0.026	0.026	0.026	0.026	0.023	0.025	0.026	0.025	0.025	0.025	0.025	0.025
Cadmium Cd	mg/L	0.0000365	0.0000364	0.0000362	0.0000343	0.0000293	0.0000313	0.0000322	0.0000305	0.0000307	0.0000305	0.0000304	0.0000302
Calcium Ca	mg/L	141	140	140	132	112	120	123	117	117	117	116	116
Chromium Cr	mg/L	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt Co	mg/L	0.0016	0.0016	0.0016	0.0015	0.0013	0.0014	0.0014	0.0014	0.0014	0.0014	0.0013	0.0013
Copper Cu	mg/L	0.0030	0.0030	0.0029	0.0029	0.0025	0.0027	0.0028	0.0026	0.0026	0.0026	0.0026	0.0026
Iron Fe	mg/L	0.09	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Lead Pb	mg/L	0.00027	0.00027	0.00027	0.00026	0.00022	0.00024	0.00024	0.00023	0.00023	0.00023	0.00023	0.00023
Lithium Li	mg/L	0.0014	0.0013	0.0013	0.0013	0.0011	0.0012	0.0012	0.0011	0.0012	0.0011	0.0011	0.0011
Magnesium Mg	mg/L	6.7	6.7	6.6	6.8	6.0	6.5	6.8	6.5	6.5	6.5	6.4	6.4
Manganese Mn	mg/L	0.007	0.007	0.007	0.007	0.006	0.007	0.007	0.007	0.007	0.007	0.007	0.007
Mercury Hg	ug/L	0.0021391	0.0021288	0.0021175	0.0020595	0.0017769	0.0019037	0.0019676	0.0018680	0.0018803	0.0018681	0.0018583	0.0018517
Molybdenum Mo	mg/L	0.00231	0.00230	0.00229	0.00217	0.00184	0.00196	0.00202	0.00191	0.00193	0.00191	0.00190	0.00190
Nickel Ni	mg/L	0.0038	0.0038	0.0038	0.0036	0.0031	0.0033	0.0034	0.0032	0.0032	0.0032	0.0032	0.0032
Phosphorus P	mg/L	0.150	0.149	0.148	0.140	0.119	0.127	0.130	0.124	0.124	0.124	0.123	0.123
Potassium K	mg/L	7.1	7.0	7.0	6.8	5.8	6.2	6.5	6.1	6.2	6.1	6.1	6.1
Selenium Se	mg/L	0.00060	0.00060	0.00060	0.00062	0.00055	0.00060	0.00063	0.00060	0.00060	0.00060	0.00059	0.00059
Silicon SiO2	mg/L	1.60	1.59	1.58	1.50	1.27	1.36	1.39	1.32	1.33	1.32	1.31	1.31
Silver Ag	mg/L	0.0000513	0.0000511	0.0000508	0.0000479	0.0000408	0.0000435	0.0000447	0.0000424	0.0000426	0.0000424	0.0000421	0.0000420
Sodium Na	mg/L	234	232	231	220	187	200	206	195	196	195	194	193
Strontium Sr	mg/L	0.042	0.041	0.041	0.042	0.037	0.040	0.041	0.039	0.040	0.039	0.039	0.039
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000021	0.000021	0.000021	0.000021	0.000018	0.000019	0.000020	0.000019	0.000019	0.000019	0.000019	0.000019
Thorium Th	mg/L	0.000078	0.000078	0.000078	0.000074	0.000063	0.000067	0.000069	0.000065	0.000066	0.000065	0.000065	0.000065
Tin Sn	mg/L	0.00155	0.00155	0.00154	0.00145	0.00123	0.00131	0.00135	0.00128	0.00129	0.00128	0.00127	0.00127
Titanium Ti	mg/L	0.0012	0.0012	0.0012	0.0013	0.0012	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013
Uranium U	mg/L	0.000102	0.000102	0.000101	0.000097	0.000083	0.000088	0.000091	0.000086	0.000087	0.000086	0.000086	0.000086
Vanadium V	mg/L	0.0020	0.0019	0.0019	0.0019	0.0016	0.0017	0.0018	0.0017	0.0017	0.0017	0.0017	0.0017
Zinc Zn	mg/L	0.0076	0.0076	0.0075	0.0077	0.0067	0.0071	0.0074	0.0070	0.0071	0.0070	0.0070	0.0069
Zirconium Zr	mg/L	0.0060	0.0060	0.0059	0.0062	0.0055	0.0059	0.0062	0.0059	0.0059	0.0059	0.0059	0.0058

Water Quality in TAIL LAKE													
Date		Year 9 Mar-16	Year 9 Apr-16	Year 9 May-16	Year 9 Jun-16	Year 9 Jul-16	Year 9 Aug-16	Year 9 Sep-16	Year 9 Oct-16	Year 9 Nov-16	Year 9 Dec-16	Year 9 Jan-17	Year 9 Feb-17
Parameter													
TDS	mg/L	827	823	818	782	667	712	733	696	700	696	692	690
TSS	mg/L	1.5	1.5	1.5	1.6	1.4	1.5	1.6	1.5	1.6	1.5	1.5	1.5
Free CN	mg/L												
Total CN	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L	0.021	0.021	0.021	0.020	0.017	0.018	0.018	0.017	0.017	0.017	0.017	0.017
Sulphate	mg/L	22.5	22.4	22.3	21.3	18.2	19.4	20.0	19.0	19.1	19.0	18.9	18.8
Chloride	mg/L	683	680	677	640	545	581	598	567	570	567	564	562
Total Ammonia-N	mg/L	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Nitrate-N	mg/L	0.82	0.72	0.61	0.58	0.49	0.52	0.54	0.51	0.41	0.30	0.20	0.10
Nitrite-N	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Alkalinity	mg/L	34	33	33	34	31	33	35	33	33	33	33	33
OrthoPhosphate-P	mg/L	0.0861	0.0856	0.0852	0.0803	0.0682	0.0727	0.0747	0.0708	0.0712	0.0708	0.0704	0.0701
Phosphate-P	mg/L	0.0916	0.0911	0.0906	0.0863	0.0736	0.0785	0.0807	0.0765	0.0770	0.0765	0.0761	0.0759
Org. Carbon	mg/L	5.1	5.1	5.1	5.5	4.9	5.3	5.6	5.3	5.3	5.3	5.3	5.3
Hardness CaCO3	mg/L	49	49	49	50	44	48	50	47	48	47	47	47
Total Metals													
Aluminum Al	mg/L	0.05	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Antimony Sb	mg/L	0.0076	0.0075	0.0075	0.0070	0.0060	0.0064	0.0065	0.0062	0.0062	0.0062	0.0062	0.0061
Arsenic As	mg/L	0.0011	0.0011	0.0011	0.0011	0.0009	0.0010	0.0010	0.0010	0.0010	0.0010	0.0009	0.0009
Barium Ba	mg/L	0.0037	0.0037	0.0036	0.0037	0.0032	0.0035	0.0036	0.0034	0.0035	0.0034	0.0034	0.0034
Beryllium Be	mg/L	0.00031	0.00031	0.00031	0.00029	0.00024	0.00026	0.00027	0.00025	0.00026	0.00025	0.00025	0.00025
Bismuth Bi	mg/L	0.00752	0.00748	0.00744	0.00699	0.00593	0.00632	0.00649	0.00615	0.00619	0.00615	0.00612	0.00609
Boron B	mg/L	0.025	0.024	0.024	0.025	0.022	0.024	0.025	0.023	0.024	0.023	0.023	0.023
Cadmium Cd	mg/L	0.0000301	0.0000300	0.0000298	0.0000284	0.0000243	0.0000259	0.0000267	0.0000253	0.0000254	0.0000253	0.0000252	0.0000251
Calcium Ca	mg/L	115	115	114	108	92	98	101	95	96	95	95	95
Chromium Cr	mg/L	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt Co	mg/L	0.0013	0.0013	0.0013	0.0012	0.0011	0.0011	0.0012	0.0011	0.0011	0.0011	0.0011	0.0011
Copper Cu	mg/L	0.0026	0.0026	0.0026	0.0025	0.0022	0.0023	0.0024	0.0023	0.0023	0.0023	0.0023	0.0023
Iron Fe	mg/L	0.10	0.10	0.10	0.10	0.09	0.10	0.11	0.10	0.10	0.10	0.10	0.10
Lead Pb	mg/L	0.00023	0.00023	0.00022	0.00021	0.00018	0.00020	0.00020	0.00019	0.00019	0.00019	0.00019	0.00019
Lithium Li	mg/L	0.0011	0.0011	0.0011	0.0011	0.0009	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
Magnesium Mg	mg/L	6.4	6.4	6.3	6.5	5.8	6.2	6.5	6.2	6.3	6.2	6.2	6.2
Manganese Mn	mg/L	0.007	0.007	0.006	0.006	0.005	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Mercury Hg	ug/L	0.0018447	0.0018358	0.0018261	0.0017856	0.0015446	0.0016562	0.0017136	0.0016272	0.0016379	0.0016273	0.0016188	0.0016130
Molybdenum Mo	mg/L	0.00189	0.00188	0.00187	0.00177	0.00151	0.00161	0.00165	0.00157	0.00158	0.00157	0.00156	0.00155
Nickel Ni	mg/L	0.0032	0.0032	0.0032	0.0030	0.0026	0.0028	0.0029	0.0027	0.0027	0.0027	0.0027	0.0027
Phosphorus P	mg/L	0.122	0.121	0.121	0.115	0.097	0.104	0.107	0.101	0.102	0.101	0.101	0.100
Potassium K	mg/L	6.0	6.0	6.0	5.8	5.0	5.4	5.6	5.3	5.3	5.3	5.3	5.3
Selenium Se	mg/L	0.00059	0.00059	0.00058	0.00060	0.00054	0.00059	0.00061	0.00059	0.00059	0.00059	0.00058	0.00058
Silicon SiO2	mg/L	1.30	1.30	1.29	1.22	1.04	1.11	1.14	1.08	1.08	1.08	1.07	1.07
Silver Ag	mg/L	0.0000418	0.0000416	0.0000414	0.0000391	0.0000333	0.0000355	0.0000365	0.0000346	0.0000348	0.0000346	0.0000344	0.0000343
Sodium Na	mg/L	193	192	191	182	155	165	170	162	163	162	161	160
Strontium Sr	mg/L	0.039	0.039	0.039	0.039	0.035	0.038	0.039	0.037	0.038	0.037	0.037	0.037
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000019	0.000019	0.000019	0.000018	0.000016	0.000017	0.000018	0.000017	0.000017	0.000017	0.000017	0.000017
Thorium Th	mg/L	0.000065	0.000064	0.000064	0.000061	0.000052	0.000055	0.000057	0.000054	0.000054	0.000054	0.000054	0.000054
Tin Sn	mg/L	0.00126	0.00126	0.00125	0.00118	0.00100	0.00107	0.00110	0.00104	0.00105	0.00104	0.00103	0.00103
Titanium Ti	mg/L	0.0013	0.0013	0.0012	0.0013	0.0012	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013
Uranium U	mg/L	0.000085	0.000085	0.000084	0.000081	0.000070	0.000074	0.000077	0.000073	0.000073	0.000073	0.000072	0.000072
Vanadium V	mg/L	0.0017	0.0017	0.0016	0.0016	0.0014	0.0015	0.0015	0.0014	0.0015	0.0014	0.0014	0.0014
Zinc Zn	mg/L	0.0069	0.0069	0.0069	0.0071	0.0061	0.0066	0.0068	0.0064	0.0065	0.0064	0.0064	0.0064
Zirconium Zr	mg/L	0.0058	0.0058	0.0058	0.0060	0.0053	0.0058	0.0060	0.0057	0.0058	0.0057	0.0057	0.0057

Water Quality in TAIL LAKE												
Date		Year 10 Mar-17	Year 10 Apr-17	Year 10 May-17	Year 10 Jun-17	Year 10 Jul-17	Year 10 Aug-17	Year 10 Sep-17	Year 10 Oct-17	Year 10 Nov-17	Year 10 Dec-17	Year 10 Jan-18
Parameter												
TDS	mg/L	687	684	680	652	557	595	613	581	585	581	578
TSS	mg/L	1.5	1.5	1.5	1.6	1.4	1.5	1.6	1.5	1.5	1.5	1.5
Free CN	mg/L											
Total CN	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WAD CN	mg/L											
CNO	mg/L											
SCN	mg/L	0.017	0.017	0.017	0.016	0.013	0.014	0.015	0.014	0.014	0.014	0.014
Sulphate	mg/L	18.7	18.7	18.6	17.8	15.2	16.3	16.8	15.9	16.0	15.9	15.8
Chloride	mg/L	559	557	554	525	447	477	491	465	468	465	463
Total Ammonia-N	mg/L	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Nitrate-N	mg/L				0.00	0.00	0.00	0.00	0.00			
Nitrite-N	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Alkalinity	mg/L	32	32	32	33	30	32	34	32	32	32	32
OrthoPhosphate-P	mg/L	0.0699	0.0695	0.0692	0.0653	0.0554	0.0591	0.0607	0.0575	0.0579	0.0575	0.0572
Phosphate-P	mg/L	0.0756	0.0752	0.0748	0.0714	0.0610	0.0651	0.0669	0.0635	0.0639	0.0635	0.0631
Org. Carbon	mg/L	5.2	5.2	5.2	5.5	5.0	5.4	5.6	5.4	5.4	5.4	5.3
Hardness CaCO3	mg/L	47	46	46	47	42	45	47	45	45	45	45
Total Metals												
Aluminum Al	mg/L	0.05	0.05	0.04	0.05	0.04	0.04	0.05	0.04	0.04	0.04	0.04
Antimony Sb	mg/L	0.0061	0.0061	0.0061	0.0057	0.0048	0.0051	0.0053	0.0050	0.0050	0.0050	0.0050
Arsenic As	mg/L	0.0009	0.0009	0.0009	0.0009	0.0008	0.0008	0.0009	0.0008	0.0008	0.0008	0.0008
Barium Ba	mg/L	0.0034	0.0034	0.0034	0.0034	0.0030	0.0032	0.0034	0.0032	0.0032	0.0032	0.0032
Beryllium Be	mg/L	0.00025	0.00025	0.00025	0.00023	0.00020	0.00021	0.00022	0.00021	0.00021	0.00021	0.00020
Bismuth Bi	mg/L	0.00607	0.00604	0.00601	0.00565	0.00479	0.00510	0.00524	0.00496	0.00500	0.00496	0.00494
Boron B	mg/L	0.023	0.023	0.023	0.024	0.021	0.023	0.023	0.022	0.022	0.022	0.022
Cadmium Cd	mg/L	0.0000250	0.0000248	0.0000247	0.0000236	0.0000202	0.0000216	0.0000222	0.0000211	0.0000212	0.0000211	0.0000209
Calcium Ca	mg/L	94	94	93	88	75	80	83	78	79	78	78
Chromium Cr	mg/L	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt Co	mg/L	0.0011	0.0011	0.0011	0.0010	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009
Copper Cu	mg/L	0.0023	0.0022	0.0022	0.0022	0.0019	0.0021	0.0021	0.0020	0.0020	0.0020	0.0020
Iron Fe	mg/L	0.10	0.10	0.10	0.10	0.09	0.10	0.11	0.10	0.10	0.10	0.10
Lead Pb	mg/L	0.00019	0.00019	0.00019	0.00018	0.00016	0.00017	0.00017	0.00016	0.00016	0.00016	0.00016
Lithium Li	mg/L	0.0010	0.0010	0.0009	0.0009	0.0008	0.0008	0.0009	0.0008	0.0008	0.0008	0.0008
Magnesium Mg	mg/L	6.1	6.1	6.1	6.3	5.6	6.0	6.3	6.0	6.0	6.0	6.0
Manganese Mn	mg/L	0.006	0.006	0.006	0.006	0.005	0.005	0.006	0.005	0.005	0.005	0.005
Mercury Hg	ug/L	0.0016069	0.0015992	0.0015907	0.0015643	0.0013570	0.0014563	0.0015084	0.0014328	0.0014422	0.0014329	0.0014254
Molybdenum Mo	mg/L	0.00155	0.00154	0.00153	0.00146	0.00124	0.00132	0.00136	0.00129	0.00130	0.00129	0.00128
Nickel Ni	mg/L	0.0027	0.0027	0.0026	0.0026	0.0022	0.0023	0.0024	0.0023	0.0023	0.0023	0.0023
Phosphorus P	mg/L	0.100	0.099	0.099	0.094	0.080	0.085	0.088	0.083	0.084	0.083	0.083
Potassium K	mg/L	5.2	5.2	5.2	5.1	4.4	4.7	4.9	4.6	4.7	4.6	4.6
Selenium Se	mg/L	0.00058	0.00058	0.00057	0.00059	0.00053	0.00058	0.00061	0.00058	0.00058	0.00058	0.00057
Silicon SiO2	mg/L	1.06	1.06	1.05	1.00	0.85	0.90	0.93	0.88	0.89	0.88	0.88
Silver Ag	mg/L	0.0000342	0.0000340	0.0000338	0.0000320	0.0000273	0.0000291	0.0000299	0.0000283	0.0000285	0.0000283	0.0000282
Sodium Na	mg/L	160	159	158	151	129	138	142	135	135	135	134
Strontium Sr	mg/L	0.037	0.037	0.037	0.037	0.033	0.036	0.038	0.036	0.036	0.036	0.036
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000017	0.000016	0.000016	0.000016	0.000014	0.000015	0.000016	0.000015	0.000015	0.000015	0.000015
Thorium Th	mg/L	0.000053	0.000053	0.000053	0.000050	0.000043	0.000046	0.000047	0.000045	0.000045	0.000045	0.000045
Tin Sn	mg/L	0.00103	0.00102	0.00102	0.00096	0.00081	0.00087	0.00089	0.00085	0.00085	0.00085	0.00084
Titanium Ti	mg/L	0.0013	0.0013	0.0013	0.0013	0.0012	0.0013	0.0014	0.0013	0.0013	0.0013	0.0013
Uranium U	mg/L	0.000072	0.000072	0.000071	0.000069	0.000059	0.000063	0.000065	0.000062	0.000062	0.000062	0.000061
Vanadium V	mg/L	0.0014	0.0014	0.0014	0.0014	0.0012	0.0013	0.0013	0.0013	0.0013	0.0013	0.0012
Zinc Zn	mg/L	0.0064	0.0063	0.0063	0.0065	0.0057	0.0061	0.0063	0.0060	0.0060	0.0060	0.0059
Zirconium Zr	mg/L	0.0057	0.0056	0.0056	0.0059	0.0052	0.0056	0.0059	0.0056	0.0057	0.0056	0.0056

Loadings to Tail Lake (kg/month)												
Date	Year 1 Mar-08	Year 1 Apr-08	Year 1 May-08	Year 1 Jun-08	Year 1 Jul-08	Year 1 Aug-08	Year 1 Sep-08	Year 1 Oct-08	Year 1 Nov-08	Year 1 Dec-08	Year 1 Jan-09	Year 1 Feb-09
Parameter												
TDS	64532	62450	64532	86415	72741	67427	66684	65644	62450	64532	64532	58287
TSS	153	148	153	366	256	201	229	174	148	153	153	138
Free CN	0.16	0.15	0.16	0.15	0.16	0.16	0.15	0.16	0.15	0.16	0.16	0.14
Total CN	2	2	2	3	3	2	2	2	2	2	2	2
WAD CN	0.23	0.22	0.23	0.22	0.23	0.23	0.22	0.23	0.22	0.23	0.23	0.20
CNO	363	351	363	351	363	363	351	363	351	363	363	328
SCN	10	10	10	10	10	10	10	10	10	10	10	9
Sulphate	6786	6567	6786	11005	9441	7871	7964	7262	6567	6786	6786	6129
Chloride	111587	107988	111587	139121	129908	119198	117700	114848	107988	111587	111587	100788
Total Ammonia-N	130	125	130	266	217	166	172	146	125	130	130	117
Nitrate-N	716	693	716	1794	1399	1003	1061	844	693	716	716	646
Nitrite-N	91	88	91	114	107	98	97	94	88	91	91	82
Alkalinity	3854	3729	3854	9743	6778	4808	4749	4122	3729	3854	3854	3481
OrthoPhosphate-P	21	21	21	21	21	21	21	21	21	21	21	19
Phosphate-P	21	21	21	22	22	21	21	21	21	21	21	19
Org. Carbon				1285.41	543.89	160.86	199.58	52.45				
Hardness CaCO3	8585	8308	8585	15498	12084	9888	9820	8982	8308	8585	8585	7754
Total Metals												
Aluminum Al	1.90	1.84	1.90	14.58	8.81	4.82	5.54	3.14	1.84	1.90	1.90	1.72
Antimony Sb	1.26	1.22	1.26	4.57	3.34	2.14	2.34	1.65	1.22	1.26	1.26	1.14
Arsenic As	0.22	0.21	0.22	0.50	0.39	0.29	0.30	0.25	0.21	0.22	0.22	0.20
Barium Ba	0.68	0.66	0.68	1.29	1.00	0.83	0.81	0.73	0.66	0.68	0.68	0.61
Beryllium Be	0.06	0.06	0.06	0.18	0.13	0.09	0.10	0.07	0.06	0.06	0.06	0.05
Bismuth Bi	1.24	1.20	1.24	4.55	3.32	2.11	2.32	1.63	1.20	1.24	1.24	1.12
Boron B	2.17	2.10	2.17	8.50	5.79	3.52	3.75	2.70	2.10	2.17	2.17	1.96
Cadmium Cd	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Calcium Ca	37571	36359	37571	38832	38910	38115	37006	37774	36359	37571	37571	33935
Chromium Cr	0.33	0.31	0.33	0.57	0.46	0.39	0.39	0.35	0.31	0.33	0.33	0.29
Cobalt Co	0.48	0.47	0.48	0.67	0.61	0.54	0.53	0.50	0.47	0.48	0.48	0.43
Copper Cu	0.76	0.74	0.76	1.05	0.91	0.82	0.80	0.78	0.74	0.76	0.76	0.69
Iron Fe	1.65	1.60	1.65	12.93	12.10	15.22	5.08	2.63	1.60	1.65	1.65	1.49
Lead Pb	0.04	0.04	0.04	0.11	0.09	0.06	0.06	0.05	0.04	0.04	0.04	0.04
Lithium Li	0.34	0.33	0.34	0.53	0.47	0.40	0.40	0.37	0.33	0.34	0.34	0.31
Magnesium Mg	633	612	633	1997	1341	911	923	725	612	633	633	572
Manganese Mn	1.77	1.71	1.77	2.46	2.27	2.14	1.97	1.85	1.71	1.77	1.77	1.60
Mercury Hg	0.62	0.60	0.62	0.73	0.68	0.64	0.63	0.63	0.60	0.62	0.62	0.56
Molybdenum Mo	0.84	0.81	0.84	0.87	0.87	0.85	0.83	0.85	0.81	0.84	0.84	0.76
Nickel Ni	1.04	1.00	1.04	1.49	1.32	1.15	1.15	1.09	1.00	1.04	1.04	0.94
Phosphorus P	29	28	29	40	36	32	31	30	28	29	29	26
Potassium K	2106	2038	2106	2462	2294	2174	2139	2134	2038	2106	2106	1902
Selenium Se	0.04	0.04	0.04	0.16	0.10	0.07	0.07	0.05	0.04	0.04	0.04	0.04
Silicon SiO2	529	512	529	618	595	557	547	541	512	529	529	477
Silver Ag	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.00
Sodium Na	3713	3593	3713	7057	5382	4321	4337	3910	3593	3713	3713	3353
Strontium Sr	6	6	6	12	9	7	7	6	6	6	6	5
Tellurium Te	0.03	0.03	0.03	0.06	0.05	0.04	0.04	0.03	0.03	0.03	0.03	0.03
Thallium Tl	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thorium Th	0.02	0.01	0.02	0.03	0.03	0.02	0.02	0.02	0.01	0.02	0.02	0.01
Tin Sn	0.21	0.21	0.21	0.74	0.54	0.35	0.38	0.27	0.21	0.21	0.21	0.19
Titanium Ti	0.09	0.09	0.09	0.29	0.22	0.15	0.16	0.12	0.09	0.09	0.09	0.08
Uranium U	0.02	0.02	0.02	0.04	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02
Vanadium V	0.22	0.22	0.22	0.87	0.58	0.37	0.41	0.29	0.22	0.22	0.22	0.20
Zinc Zn	1.0	0.9	1.0	2.8	1.6	1.2	1.3	1.1	0.9	1.0	1.0	0.9
Zirconium Zr	0.31	0.30	0.31	1.72	1.03	0.55	0.61	0.40	0.30	0.31	0.31	0.28

Loadings to Tail Lake (kg/month)												
Date	Year 2 Mar-09	Year 2 Apr-09	Year 2 May-09	Year 2 Jun-09	Year 2 Jul-09	Year 2 Aug-09	Year 2 Sep-09	Year 2 Oct-09	Year 2 Nov-09	Year 2 Dec-09	Year 2 Jan-10	Year 2 Feb-10
Parameter												
TDS	64532	62450	64532	86017	72693	67416	66678	65644	62450	64532	64532	58287
TSS	153	148	153	363	255	201	229	174	148	153	153	138
Free CN	0.16	0.15	0.16	0.15	0.16	0.16	0.15	0.16	0.15	0.16	0.16	0.14
Total CN	2	2	2	3	3	2	2	2	2	2	2	2
WAD CN	0.23	0.22	0.23	0.22	0.23	0.23	0.22	0.23	0.22	0.23	0.23	0.20
CNO	363	351	363	351	363	363	351	363	351	363	363	328
SCN	10	10	10	10	10	10	10	10	10	10	10	9
Sulphate	6786	6567	6786	10995	9439	7871	7964	7262	6567	6786	6786	6129
Chloride	111587	107988	111587	139012	129890	119194	117698	114848	107988	111587	111587	100788
Total Ammonia-N	130	125	130	266	217	166	172	146	125	130	130	117
Nitrate-N	716	693	716	1794	1399	1003	1061	844	693	716	716	646
Nitrite-N	91	88	91	114	107	98	97	94	88	91	91	82
Alkalinity	3854	3729	3854	9643	6761	4804	4748	4122	3729	3854	3854	3481
OrthoPhosphate-P	21	21	21	21	21	21	21	21	21	21	21	19
Phosphate-P	21	21	21	22	22	21	21	21	21	21	21	19
Org. Carbon				1264.06	540.69	160.23	199.30	52.45				
Hardness CaCO3	8585	8308	8585	15378	12064	9883	9818	8982	8308	8585	8585	7754
Total Metals												
Aluminum Al	1.90	1.84	1.90	14.52	8.81	4.82	5.54	3.14	1.84	1.90	1.90	1.72
Antimony Sb	1.26	1.22	1.26	4.57	3.34	2.14	2.34	1.65	1.22	1.26	1.26	1.14
Arsenic As	0.22	0.21	0.22	0.50	0.39	0.29	0.30	0.25	0.21	0.22	0.22	0.20
Barium Ba	0.68	0.66	0.68	1.29	1.00	0.83	0.81	0.73	0.66	0.68	0.68	0.61
Beryllium Be	0.06	0.06	0.06	0.18	0.13	0.09	0.10	0.07	0.06	0.06	0.06	0.05
Bismuth Bi	1.24	1.20	1.24	4.55	3.32	2.11	2.32	1.63	1.20	1.24	1.24	1.12
Boron B	2.17	2.10	2.17	8.45	5.78	3.51	3.75	2.70	2.10	2.17	2.17	1.96
Cadmium Cd	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Calcium Ca	37571	36359	37571	38810	38907	38114	37006	37774	36359	37571	37571	33935
Chromium Cr	0.33	0.31	0.33	0.57	0.46	0.39	0.39	0.35	0.31	0.33	0.33	0.29
Cobalt Co	0.48	0.47	0.48	0.67	0.61	0.54	0.53	0.50	0.47	0.48	0.48	0.43
Copper Cu	0.76	0.74	0.76	1.04	0.91	0.82	0.80	0.78	0.74	0.76	0.76	0.69
Iron Fe	1.65	1.60	1.65	12.78	12.05	15.17	5.07	2.63	1.60	1.65	1.65	1.49
Lead Pb	0.04	0.04	0.04	0.11	0.09	0.06	0.06	0.05	0.04	0.04	0.04	0.04
Lithium Li	0.34	0.33	0.34	0.53	0.47	0.40	0.40	0.37	0.33	0.34	0.34	0.31
Magnesium Mg	633	612	633	1980	1338	910	923	725	612	633	633	572
Manganese Mn	1.77	1.71	1.77	2.45	2.27	2.14	1.97	1.85	1.71	1.77	1.77	1.60
Mercury Hg	0.62	0.60	0.62	0.73	0.68	0.64	0.63	0.63	0.60	0.62	0.62	0.56
Molybdenum Mo	0.84	0.81	0.84	0.87	0.87	0.85	0.83	0.85	0.81	0.84	0.84	0.76
Nickel Ni	1.04	1.00	1.04	1.48	1.32	1.15	1.15	1.09	1.00	1.04	1.04	0.94
Phosphorus P	29	28	29	40	36	32	31	30	28	29	29	26
Potassium K	2106	2038	2106	2456	2293	2174	2138	2134	2038	2106	2106	1902
Selenium Se	0.04	0.04	0.04	0.16	0.10	0.07	0.07	0.05	0.04	0.04	0.04	0.04
Silicon SiO2	529	512	529	618	595	557	547	541	512	529	529	477
Silver Ag	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.00
Sodium Na	3713	3593	3713	7000	5372	4319	4336	3910	3593	3713	3713	3353
Strontium Sr	6	6	6	12	9	7	7	6	6	6	6	5
Tellurium Te	0.03	0.03	0.03	0.06	0.05	0.04	0.04	0.03	0.03	0.03	0.03	0.03
Thallium Tl	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thorium Th	0.02	0.01	0.02	0.03	0.03	0.02	0.02	0.02	0.01	0.02	0.02	0.01
Tin Sn	0.21	0.21	0.21	0.74	0.54	0.35	0.38	0.27	0.21	0.21	0.21	0.19
Titanium Ti	0.09	0.09	0.09	0.29	0.22	0.15	0.16	0.12	0.09	0.09	0.09	0.08
Uranium U	0.02	0.02	0.02	0.04	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02
Vanadium V	0.22	0.22	0.22	0.87	0.58	0.37	0.41	0.29	0.22	0.22	0.22	0.20
Zinc Zn	1.0	0.9	1.0	2.8	1.6	1.2	1.3	1.1	0.9	1.0	1.0	0.9
Zirconium Zr	0.31	0.30	0.31	1.70	1.02	0.55	0.61	0.40	0.30	0.31	0.31	0.28

Loadings to Tail Lake (kg/month)												
Date	Year 3	Year 3	Year 3	Year 3	Year 3	Year 3	Year 3	Year 3	Year 3	Year 3	Year 3	Year 3
	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11
Parameter												
TDS	50662	49028	50662	72734	58879	53560	53265	51775	49028	50662	50662	45759
TSS				216	103	48	81	21				
Free CN												
Total CN				0	0	0	0	0				
WAD CN												
CNO												
SCN												
Sulphate	1289	1247	1289	5578	3882	2348	2611	1754	1247	1289	1289	1164
Chloride	49110	47526	49110	78588	67433	56722	57239	52371	47526	49110	49110	44357
Total Ammonia-N	25	24	25	151	103	58	66	39	24	25	25	22
Nitrate-N	28	28	28	1018	643	287	359	144	28	28	28	26
Nitrite-N	64	62	64	85	79	70	70	67	62	64	64	58
Alkalinity				5948	2927	955	1021	268				
OrthoPhosphate-P	21	21	21	21	21	21	21	21	21	21	21	19
Phosphate-P	21	21	21	22	22	21	21	21	21	21	21	19
Org. Carbon				1271.54	544.39	161.00	199.76	52.50				
Hardness CaCO3				7112	3503	1304	1513	398				
Total Metals												
Aluminum Al	0.81	0.78	0.81	10.53	5.89	2.95	3.50	1.70	0.78	0.81	0.81	0.73
Antimony Sb	1.21	1.17	1.21	4.51	3.28	2.08	2.29	1.60	1.17	1.21	1.21	1.09
Arsenic As	0.03	0.03	0.03	0.25	0.16	0.08	0.09	0.05	0.03	0.03	0.03	0.02
Barium Ba	0.06	0.06	0.06	0.68	0.38	0.21	0.21	0.11	0.06	0.06	0.06	0.05
Beryllium Be	0.03	0.03	0.03	0.13	0.09	0.06	0.06	0.04	0.03	0.03	0.03	0.03
Bismuth Bi	1.21	1.17	1.21	4.51	3.28	2.08	2.29	1.60	1.17	1.21	1.21	1.09
Boron B	0.60	0.58	0.60	6.26	3.79	1.77	2.01	1.05	0.58	0.60	0.60	0.55
Cadmium Cd	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Calcium Ca	263	254	263	2540	1495	761	843	446	254	263	263	237
Chromium Cr	0.07	0.06	0.07	0.30	0.20	0.12	0.13	0.09	0.06	0.07	0.07	0.06
Cobalt Co	0.06	0.06	0.06	0.25	0.18	0.11	0.12	0.08	0.06	0.06	0.06	0.05
Copper Cu	0.03	0.03	0.03	0.31	0.17	0.08	0.09	0.05	0.03	0.03	0.03	0.03
Iron Fe	0.23	0.23	0.23	10.78	10.26	13.63	3.48	1.13	0.23	0.23	0.23	0.21
Lead Pb	0.01	0.01	0.01	0.07	0.05	0.03	0.03	0.02	0.01	0.01	0.01	0.01
Lithium Li	0.06	0.06	0.06	0.24	0.18	0.11	0.12	0.08	0.06	0.06	0.06	0.05
Magnesium Mg	121	117	121	1474	819	395	423	212	117	121	121	110
Manganese Mn	0.16	0.15	0.16	0.88	0.65	0.53	0.40	0.24	0.15	0.16	0.16	0.14
Mercury Hg	0.00	0.00	0.00	0.13	0.06	0.02	0.02	0.01	0.00	0.00	0.00	0.00
Molybdenum Mo	0.01	0.01	0.01	0.07	0.04	0.02	0.03	0.02	0.01	0.01	0.01	0.01
Nickel Ni	0.12	0.12	0.12	0.58	0.39	0.23	0.25	0.17	0.12	0.12	0.12	0.11
Phosphorus P	23	22	23	32	29	25	25	24	22	23	23	21
Potassium K	25	24	25	441	211	92	124	54	24	25	25	23
Selenium Se	0.00	0.00	0.00	0.11	0.06	0.03	0.03	0.01	0.00	0.00	0.00	0.00
Silicon SiO2	10	9	10	84	56	29	34	18	9	10	10	9
Silver Ag	0.00	0.00	0.00	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00
Sodium Na	12	12	12	3435	1680	620	755	209	12	12	12	11
Strontium Sr	0	0	0	7	4	2	2	1	0	0	0	0
Tellurium Te				0.02	0.01	0.01	0.01	0.00				
Thallium Tl	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thorium Th				0.01	0.01	0.00	0.00	0.00				
Tin Sn	0.18	0.18	0.18	0.70	0.51	0.32	0.35	0.24	0.18	0.18	0.18	0.16
Titanium Ti	0.06	0.06	0.06	0.24	0.18	0.11	0.12	0.08	0.06	0.06	0.06	0.05
Uranium U	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vanadium V	0.18	0.18	0.18	0.80	0.52	0.32	0.36	0.24	0.18	0.18	0.18	0.16
Zinc Zn	0.2	0.2	0.2	2.0	0.8	0.5	0.5	0.3	0.2	0.2	0.2	0.2
Zirconium Zr				1.27	0.64	0.21	0.27	0.08				

Loadings to Tail Lake (kg/month)												
Date	Year 4 Mar-11	Year 4 Apr-11	Year 4 May-11	Year 4 Jun-11	Year 4 Jul-11	Year 4 Aug-11	Year 4 Sep-11	Year 4 Oct-11	Year 4 Nov-11	Year 4 Dec-11	Year 4 Jan-12	Year 4 Feb-12
Parameter												
TDS				24016	8219	2899	4239	1115				
TSS				218	103	48	81	21				
Free CN												
Total CN				0	0	0	0	0				
WAD CN												
CNO												
SCN												
Sulphate				802	399	135	180	52				
Chloride				6572	3082	1190	1494	393				
Total Ammonia-N				61	37	16	20	7				
Nitrate-N				469	291	122	157	55				
Nitrite-N				11	7	3	4	1				
Alkalinity				6026	2928	955	1022	269				
OrthoPhosphate-P				0	0	0	0	0				
Phosphate-P				2	1	0	0	0				
Org. Carbon				1288.15	544.54	161.08	199.86	52.54				
Hardness CaCO3				7205	3504	1305	1514	398				
Total Metals												
Aluminum Al				7.89	3.90	1.65	2.08	0.67				
Antimony Sb				0.02	0.01	0.01	0.01	0.00				
Arsenic As				0.15	0.09	0.04	0.04	0.01				
Barium Ba				0.46	0.21	0.10	0.10	0.03				
Beryllium Be				0.02	0.01	0.01	0.01	0.00				
Bismuth Bi				0.02	0.01	0.01	0.01	0.00				
Boron B				4.06	2.16	0.73	0.87	0.26				
Cadmium Cd				0.01	0.00	0.00	0.00	0.00				
Calcium Ca				1581	785	310	348	99				
Chromium Cr				0.07	0.03	0.01	0.02	0.00				
Cobalt Co				0.02	0.02	0.01	0.01	0.00				
Copper Cu				0.22	0.10	0.03	0.04	0.01				
Iron Fe				10.17	9.72	13.28	3.09	0.84				
Lead Pb				0.03	0.02	0.01	0.01	0.00				
Lithium Li				0.02	0.01	0.01	0.01	0.00				
Magnesium Mg				1036	491	187	194	52				
Manganese Mn				0.29	0.22	0.26	0.10	0.03				
Mercury Hg				0.13	0.06	0.02	0.02	0.01				
Molybdenum Mo				0.02	0.01	0.00	0.00	0.00				
Nickel Ni				0.13	0.07	0.02	0.02	0.01				
Phosphorus P				5	2	1	1	0				
Potassium K				351	143	49	76	20				
Selenium Se				0.11	0.06	0.02	0.03	0.01				
Silicon SiO2				47	29	12	16	6				
Silver Ag				0.01	0.00	0.00	0.00	0.00				
Sodium Na				3434	1648	599	733	193				
Strontium Sr				6	3	1	1	0				
Tellurium Te				0.02	0.01	0.01	0.01	0.00				
Thallium Tl				0.00	0.00	0.00	0.00	0.00				
Thorium Th				0.01	0.01	0.00	0.00	0.00				
Tin Sn				0.03	0.02	0.01	0.01	0.00				
Titanium Ti				0.02	0.01	0.01	0.01	0.00				
Uranium U				0.01	0.01	0.00	0.00	0.00				
Vanadium V				0.13	0.03	0.01	0.01	0.00				
Zinc Zn				1.3	0.3	0.1	0.1	0.0				
Zirconium Zr				1.29	0.64	0.21	0.27	0.08				

Loadings to Tail Lake (kg/month)												
Date	Year 5 Mar-12	Year 5 Apr-12	Year 5 May-12	Year 5 Jun-12	Year 5 Jul-12	Year 5 Aug-12	Year 5 Sep-12	Year 5 Oct-12	Year 5 Nov-12	Year 5 Dec-12	Year 5 Jan-13	Year 5 Feb-13
Parameter												
TDS				402298	386432	381112	382452	379327				
TSS				277	130	57	91	24				
Free CN												
Total CN				0	0	0	0	0				
WAD CN												
CNO												
SCN												
Sulphate				804	399	135	180	52				
Chloride				238558	234214	231815	232177	230862				
Total Ammonia-N				61	37	16	20	7				
Nitrate-N				469	291	122	157	55				
Nitrite-N				11	7	3	4	1				
Alkalinity				6043	2928	955	1022	269				
OrthoPhosphate-P				0	0	0	0	0				
Phosphate-P				2	1	0	0	0				
Org. Carbon				1291.85	544.52	161.08	199.86	52.54				
Hardness CaCO3				7226	3503	1305	1514	398				
Total Metals												
Aluminum Al				12.94	6.27	2.39	3.01	0.91				
Antimony Sb				0.02	0.01	0.01	0.01	0.00				
Arsenic As				0.16	0.09	0.04	0.04	0.01				
Barium Ba				0.46	0.21	0.10	0.10	0.03				
Beryllium Be				0.02	0.01	0.01	0.01	0.00				
Bismuth Bi				0.02	0.01	0.01	0.01	0.00				
Boron B				4.69	2.46	0.83	0.98	0.29				
Cadmium Cd				0.01	0.00	0.00	0.00	0.00				
Calcium Ca				23908	23083	22592	22632	22376				
Chromium Cr				0.08	0.03	0.01	0.02	0.01				
Cobalt Co				0.03	0.02	0.01	0.01	0.00				
Copper Cu				0.24	0.11	0.03	0.04	0.01				
Iron Fe				15.09	12.02	14.00	3.99	1.08				
Lead Pb				0.03	0.02	0.01	0.01	0.00				
Lithium Li				0.07	0.03	0.01	0.02	0.00				
Magnesium Mg				1106	523	197	206	55				
Manganese Mn				0.41	0.28	0.27	0.12	0.03				
Mercury Hg				0.13	0.06	0.02	0.02	0.01				
Molybdenum Mo				0.03	0.01	0.00	0.00	0.00				
Nickel Ni				0.14	0.07	0.02	0.03	0.01				
Phosphorus P				5	2	1	1	0				
Potassium K				405	167	57	86	23				
Selenium Se				0.13	0.07	0.03	0.03	0.01				
Silicon SiO2				60	35	14	18	6				
Silver Ag				0.01	0.00	0.00	0.00	0.00				
Sodium Na				129924	127631	126282	126450	125783				
Strontium Sr				6	3	1	1	0				
Tellurium Te				0.02	0.01	0.01	0.01	0.00				
Thallium Tl				0.00	0.00	0.00	0.00	0.00				
Thorium Th				0.01	0.01	0.00	0.00	0.00				
Tin Sn				0.03	0.02	0.01	0.01	0.00				
Titanium Ti				0.31	0.15	0.05	0.06	0.02				
Uranium U				0.01	0.01	0.00	0.00	0.00				
Vanadium V				0.17	0.05	0.02	0.02	0.01				
Zinc Zn				1.3	0.3	0.1	0.1	0.0				
Zirconium Zr				1.29	0.64	0.21	0.27	0.08				

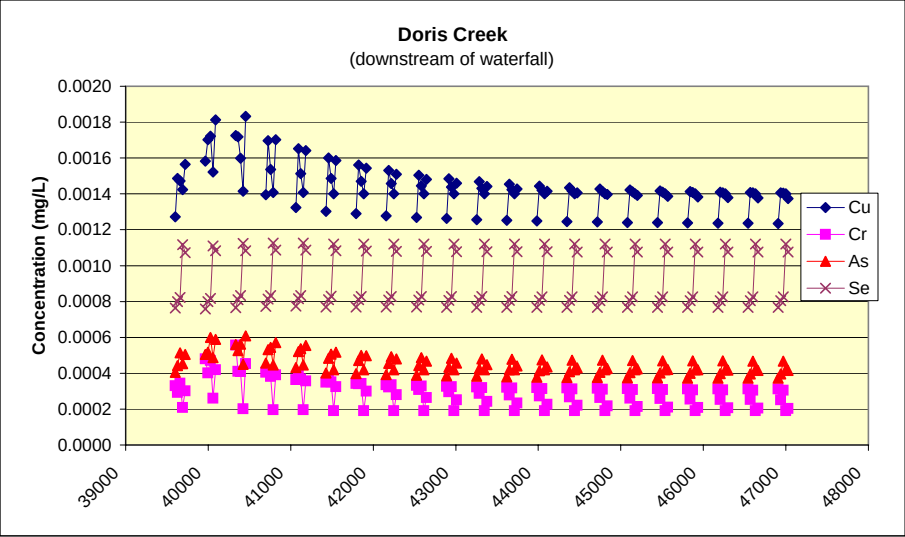
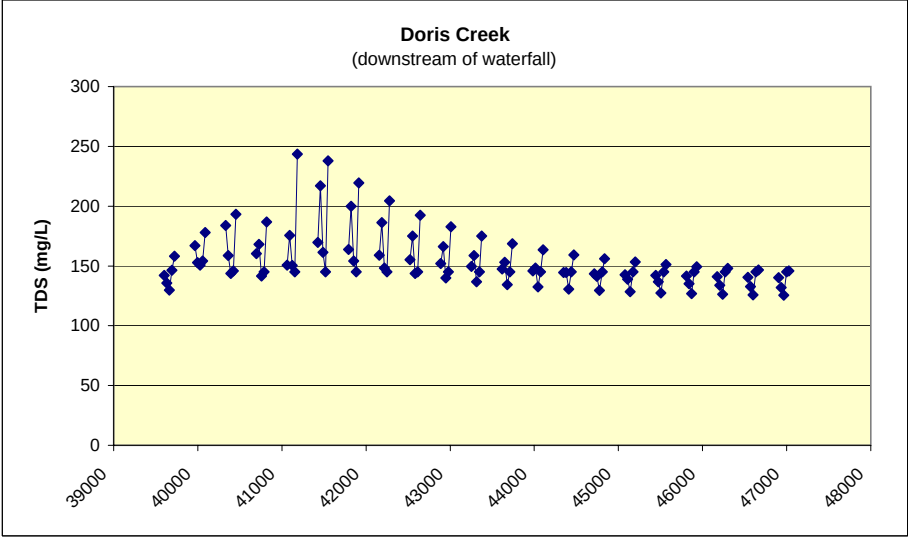
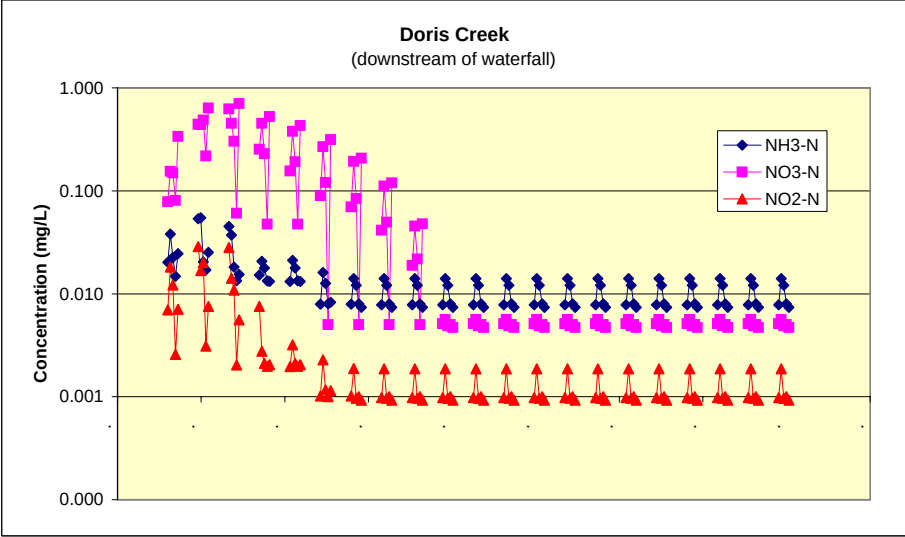
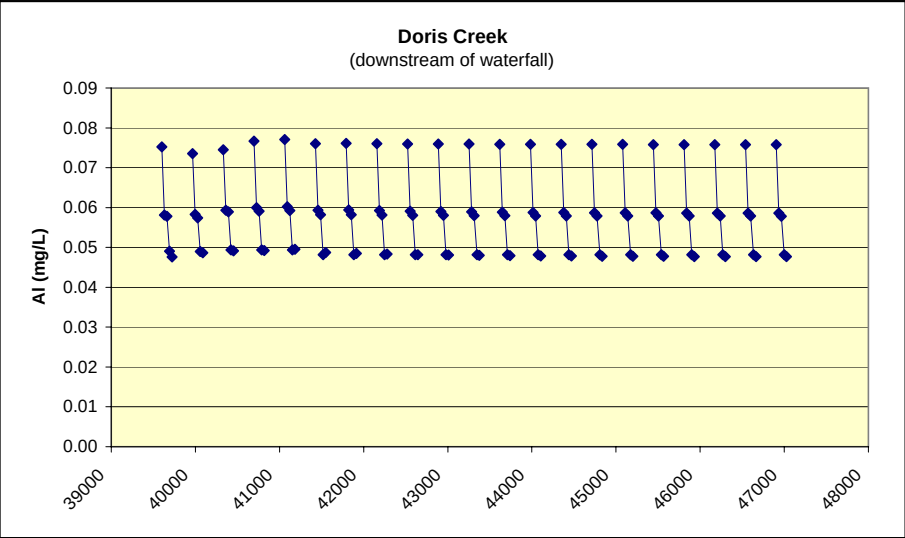
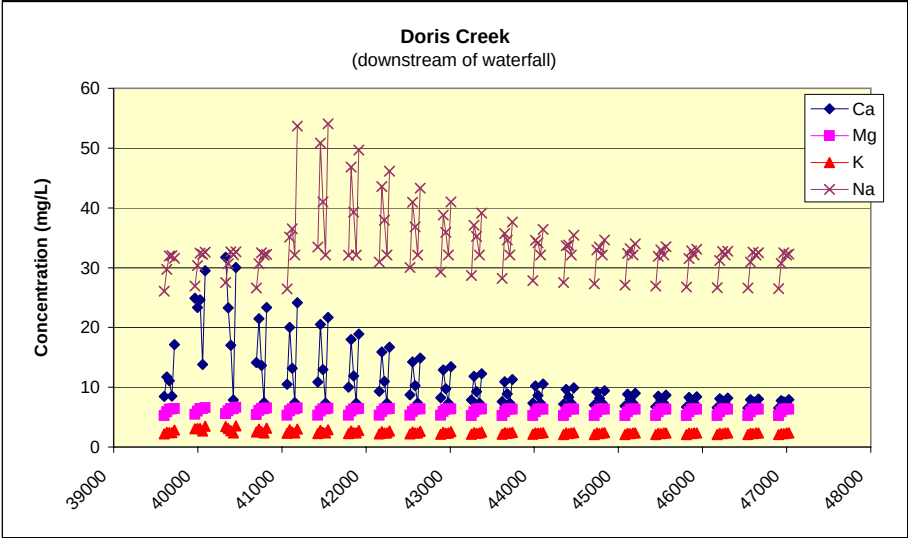
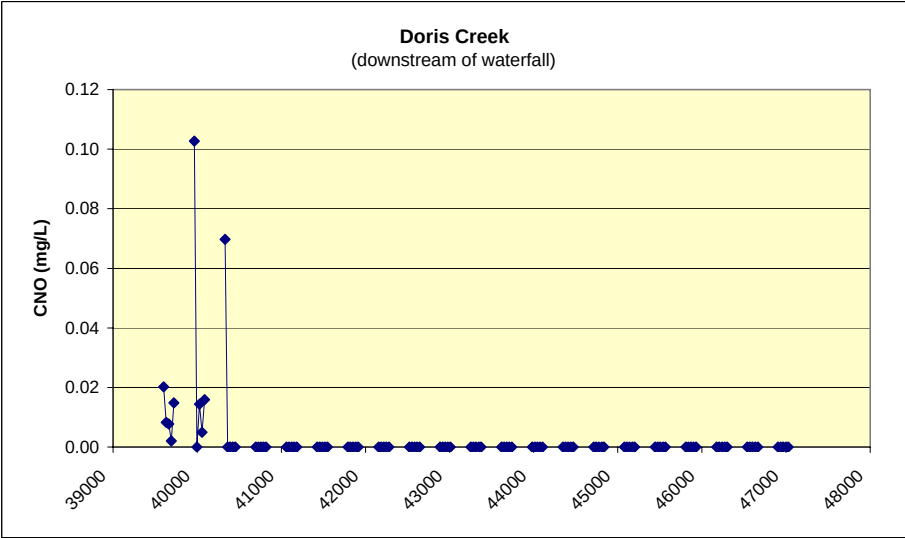
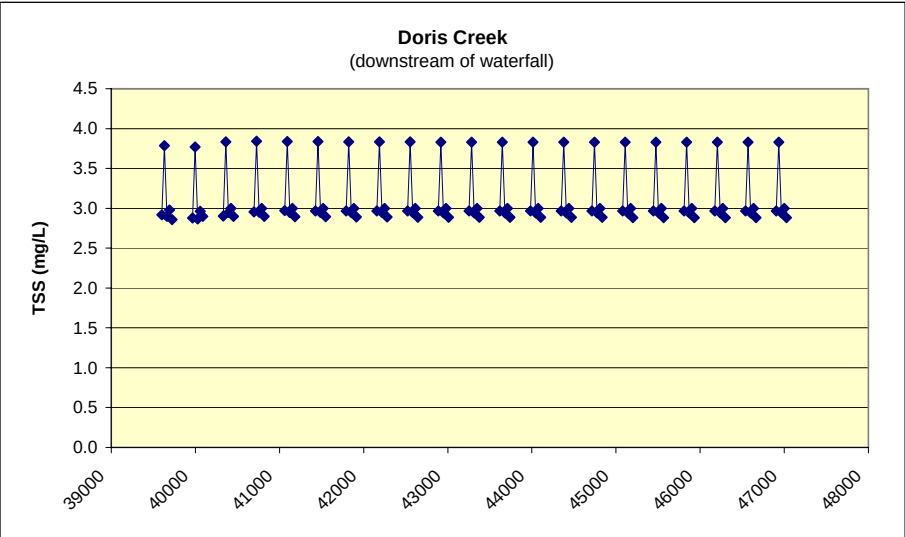
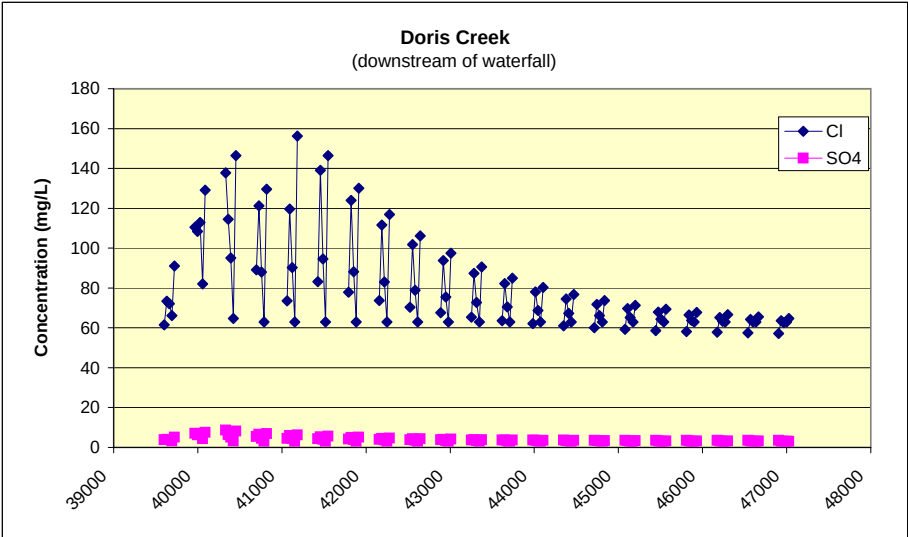
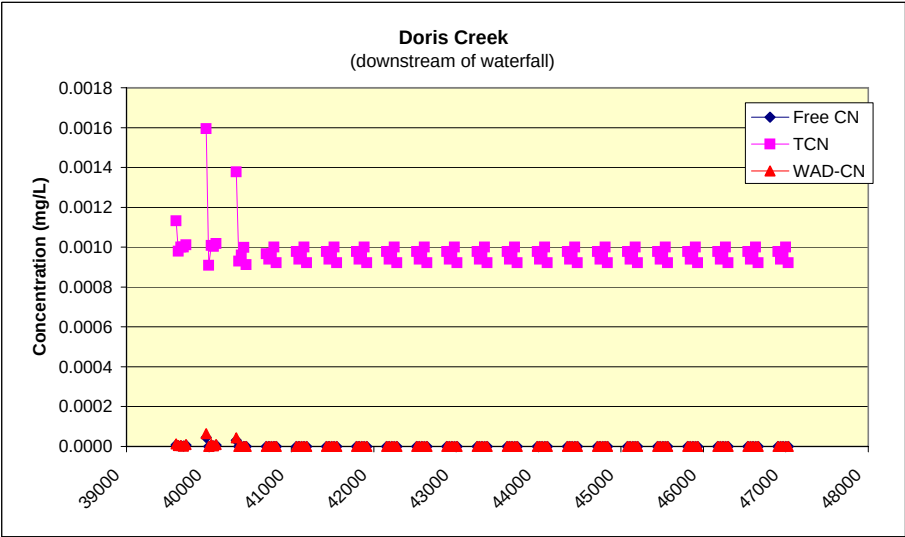
Loadings to Tail Lake (kg/month)												
Date	Year 6 Mar-13	Year 6 Apr-13	Year 6 May-13	Year 6 Jun-13	Year 6 Jul-13	Year 6 Aug-13	Year 6 Sep-13	Year 6 Oct-13	Year 6 Nov-13	Year 6 Dec-13	Year 6 Jan-14	Year 6 Feb-14
Parameter												
TDS				24085	8219	2899	4239	1115				
TSS				277	130	57	91	24				
Free CN												
Total CN				0	0	0	0	0				
WAD CN												
CNO												
SCN												
Sulphate				804	399	135	180	52				
Chloride				8166	3821	1422	1784	469				
Total Ammonia-N				61	37	16	20	7				
Nitrate-N				469	291	122	157	55				
Nitrite-N				11	7	3	4	1				
Alkalinity				6043	2928	955	1022	269				
OrthoPhosphate-P				0	0	0	0	0				
Phosphate-P				2	1	0	0	0				
Org. Carbon				1291.85	544.52	161.08	199.86	52.54				
Hardness CaCO3				7226	3503	1305	1514	398				
Total Metals												
Aluminum Al				12.94	6.27	2.39	3.01	0.91				
Antimony Sb				0.02	0.01	0.01	0.01	0.00				
Arsenic As				0.16	0.09	0.04	0.04	0.01				
Barium Ba				0.46	0.21	0.10	0.10	0.03				
Beryllium Be				0.02	0.01	0.01	0.01	0.00				
Bismuth Bi				0.02	0.01	0.01	0.01	0.00				
Boron B				4.69	2.46	0.83	0.98	0.29				
Cadmium Cd				0.01	0.00	0.00	0.00	0.00				
Calcium Ca				1633	808	317	357	101				
Chromium Cr				0.08	0.03	0.01	0.02	0.01				
Cobalt Co				0.03	0.02	0.01	0.01	0.00				
Copper Cu				0.24	0.11	0.03	0.04	0.01				
Iron Fe				15.09	12.02	14.00	3.99	1.08				
Lead Pb				0.03	0.02	0.01	0.01	0.00				
Lithium Li				0.07	0.03	0.01	0.02	0.00				
Magnesium Mg				1106	523	197	206	55				
Manganese Mn				0.41	0.28	0.27	0.12	0.03				
Mercury Hg				0.13	0.06	0.02	0.02	0.01				
Molybdenum Mo				0.03	0.01	0.00	0.00	0.00				
Nickel Ni				0.14	0.07	0.02	0.03	0.01				
Phosphorus P				5	2	1	1	0				
Potassium K				405	167	57	86	23				
Selenium Se				0.13	0.07	0.03	0.03	0.01				
Silicon SiO2				60	35	14	18	6				
Silver Ag				0.01	0.00	0.00	0.00	0.00				
Sodium Na				4379	2086	737	905	238				
Strontium Sr				6	3	1	1	0				
Tellurium Te				0.02	0.01	0.01	0.01	0.00				
Thallium Tl				0.00	0.00	0.00	0.00	0.00				
Thorium Th				0.01	0.01	0.00	0.00	0.00				
Tin Sn				0.03	0.02	0.01	0.01	0.00				
Titanium Ti				0.31	0.15	0.05	0.06	0.02				
Uranium U				0.01	0.01	0.00	0.00	0.00				
Vanadium V				0.17	0.05	0.02	0.02	0.01				
Zinc Zn				1.3	0.3	0.1	0.1	0.0				
Zirconium Zr				1.29	0.64	0.21	0.27	0.08				

Loadings to Tail Lake (kg/month)												
Date	Year 7 Mar-14	Year 7 Apr-14	Year 7 May-14	Year 7 Jun-14	Year 7 Jul-14	Year 7 Aug-14	Year 7 Sep-14	Year 7 Oct-14	Year 7 Nov-14	Year 7 Dec-14	Year 7 Jan-15	Year 7 Feb-15
Parameter												
TDS				24085	8219	2899	4239	1115				
TSS				277	130	57	91	24				
Free CN												
Total CN				0	0	0	0	0				
WAD CN												
CNO												
SCN												
Sulphate				657	308	97	131	34				
Chloride				8166	3821	1422	1784	469				
Total Ammonia-N				2	1	0	0	0				
Nitrate-N				1	1	0	0	0				
Nitrite-N				0	0	0	0	0				
Alkalinity				6043	2928	955	1022	269				
OrthoPhosphate-P				0	0	0	0	0				
Phosphate-P				2	1	0	0	0				
Org. Carbon				1291.85	544.52	161.08	199.86	52.54				
Hardness CaCO3				7226	3503	1305	1514	398				
Total Metals												
Aluminum Al				8.65	3.61	1.27	1.58	0.41				
Antimony Sb				0.00	0.00	0.00	0.00	0.00				
Arsenic As				0.06	0.03	0.01	0.01	0.00				
Barium Ba				0.45	0.21	0.10	0.09	0.02				
Beryllium Be				0.00	0.00	0.00	0.00	0.00				
Bismuth Bi				0.00	0.00	0.00	0.00	0.00				
Boron B				3.69	1.84	0.56	0.65	0.17				
Cadmium Cd				0.00	0.00	0.00	0.00	0.00				
Calcium Ca				1381	652	251	273	72				
Chromium Cr				0.06	0.02	0.01	0.01	0.00				
Cobalt Co				0.01	0.01	0.00	0.00	0.00				
Copper Cu				0.21	0.09	0.02	0.03	0.01				
Iron Fe				14.09	11.40	13.74	3.66	0.96				
Lead Pb				0.01	0.01	0.00	0.00	0.00				
Lithium Li				0.05	0.02	0.01	0.01	0.00				
Magnesium Mg				1081	507	190	198	52				
Manganese Mn				0.39	0.26	0.27	0.12	0.03				
Mercury Hg				0.13	0.06	0.02	0.02	0.01				
Molybdenum Mo				0.03	0.01	0.00	0.00	0.00				
Nickel Ni				0.12	0.06	0.02	0.02	0.00				
Phosphorus P				2	1	0	0	0				
Potassium K				398	163	55	84	22				
Selenium Se				0.11	0.05	0.02	0.02	0.01				
Silicon SiO2				12	6	2	2	1				
Silver Ag				0.00	0.00	0.00	0.00	0.00				
Sodium Na				4373	2083	735	903	237				
Strontium Sr				6	3	1	1	0				
Tellurium Te				0.00	0.00	0.00	0.00	0.00				
Thallium Tl				0.00	0.00	0.00	0.00	0.00				
Thorium Th				0.00	0.00	0.00	0.00	0.00				
Tin Sn				0.01	0.00	0.00	0.00	0.00				
Titanium Ti				0.29	0.13	0.04	0.05	0.01				
Uranium U				0.00	0.00	0.00	0.00	0.00				
Vanadium V				0.13	0.03	0.01	0.01	0.00				
Zinc Zn				1.2	0.2	0.1	0.1	0.0				
Zirconium Zr				1.10	0.51	0.16	0.20	0.05				

Loadings to Tail Lake (kg/month)												
Date	Year 8 Mar-15	Year 8 Apr-15	Year 8 May-15	Year 8 Jun-15	Year 8 Jul-15	Year 8 Aug-15	Year 8 Sep-15	Year 8 Oct-15	Year 8 Nov-15	Year 8 Dec-15	Year 8 Jan-16	Year 8 Feb-16
Parameter												
TDS				24085	8219	2899	4239	1115				
TSS				277	130	57	91	24				
Free CN												
Total CN				0	0	0	0	0				
WAD CN												
CNO												
SCN												
Sulphate				657	308	97	131	34				
Chloride				8166	3821	1422	1784	469				
Total Ammonia-N				2	1	0	0	0				
Nitrate-N				1	1	0	0	0				
Nitrite-N				0	0	0	0	0				
Alkalinity				6043	2928	955	1022	269				
OrthoPhosphate-P				0	0	0	0	0				
Phosphate-P				2	1	0	0	0				
Org. Carbon				1291.85	544.52	161.08	199.86	52.54				
Hardness CaCO3				7226	3503	1305	1514	398				
Total Metals												
Aluminum Al				8.65	3.61	1.27	1.58	0.41				
Antimony Sb				0.00	0.00	0.00	0.00	0.00				
Arsenic As				0.06	0.03	0.01	0.01	0.00				
Barium Ba				0.45	0.21	0.10	0.09	0.02				
Beryllium Be				0.00	0.00	0.00	0.00	0.00				
Bismuth Bi				0.00	0.00	0.00	0.00	0.00				
Boron B				3.69	1.84	0.56	0.65	0.17				
Cadmium Cd				0.00	0.00	0.00	0.00	0.00				
Calcium Ca				1381	652	251	273	72				
Chromium Cr				0.06	0.02	0.01	0.01	0.00				
Cobalt Co				0.01	0.01	0.00	0.00	0.00				
Copper Cu				0.21	0.09	0.02	0.03	0.01				
Iron Fe				14.09	11.40	13.74	3.66	0.96				
Lead Pb				0.01	0.01	0.00	0.00	0.00				
Lithium Li				0.05	0.02	0.01	0.01	0.00				
Magnesium Mg				1081	507	190	198	52				
Manganese Mn				0.39	0.26	0.27	0.12	0.03				
Mercury Hg				0.13	0.06	0.02	0.02	0.01				
Molybdenum Mo				0.03	0.01	0.00	0.00	0.00				
Nickel Ni				0.12	0.06	0.02	0.02	0.00				
Phosphorus P				2	1	0	0	0				
Potassium K				398	163	55	84	22				
Selenium Se				0.11	0.05	0.02	0.02	0.01				
Silicon SiO2				12	6	2	2	1				
Silver Ag				0.00	0.00	0.00	0.00	0.00				
Sodium Na				4373	2083	735	903	237				
Strontium Sr				6	3	1	1	0				
Tellurium Te				0.00	0.00	0.00	0.00	0.00				
Thallium Tl				0.00	0.00	0.00	0.00	0.00				
Thorium Th				0.00	0.00	0.00	0.00	0.00				
Tin Sn				0.01	0.00	0.00	0.00	0.00				
Titanium Ti				0.29	0.13	0.04	0.05	0.01				
Uranium U				0.00	0.00	0.00	0.00	0.00				
Vanadium V				0.13	0.03	0.01	0.01	0.00				
Zinc Zn				1.2	0.2	0.1	0.1	0.0				
Zirconium Zr				1.10	0.51	0.16	0.20	0.05				

Loadings to Tail Lake (kg/month)												
Date	Year 9 Mar-16	Year 9 Apr-16	Year 9 May-16	Year 9 Jun-16	Year 9 Jul-16	Year 9 Aug-16	Year 9 Sep-16	Year 9 Oct-16	Year 9 Nov-16	Year 9 Dec-16	Year 9 Jan-17	Year 9 Feb-17
Parameter												
TDS				24085	8219	2899	4239	1115				
TSS				277	130	57	91	24				
Free CN												
Total CN				0	0	0	0	0				
WAD CN												
CNO												
SCN												
Sulphate				657	308	97	131	34				
Chloride				8166	3821	1422	1784	469				
Total Ammonia-N				2	1	0	0	0				
Nitrate-N				1	1	0	0	0				
Nitrite-N				0	0	0	0	0				
Alkalinity				6043	2928	955	1022	269				
OrthoPhosphate-P				0	0	0	0	0				
Phosphate-P				2	1	0	0	0				
Org. Carbon				1291.85	544.52	161.08	199.86	52.54				
Hardness CaCO3				7226	3503	1305	1514	398				
Total Metals												
Aluminum Al				8.65	3.61	1.27	1.58	0.41				
Antimony Sb				0.00	0.00	0.00	0.00	0.00				
Arsenic As				0.06	0.03	0.01	0.01	0.00				
Barium Ba				0.45	0.21	0.10	0.09	0.02				
Beryllium Be				0.00	0.00	0.00	0.00	0.00				
Bismuth Bi				0.00	0.00	0.00	0.00	0.00				
Boron B				3.69	1.84	0.56	0.65	0.17				
Cadmium Cd				0.00	0.00	0.00	0.00	0.00				
Calcium Ca				1381	652	251	273	72				
Chromium Cr				0.06	0.02	0.01	0.01	0.00				
Cobalt Co				0.01	0.01	0.00	0.00	0.00				
Copper Cu				0.21	0.09	0.02	0.03	0.01				
Iron Fe				14.09	11.40	13.74	3.66	0.96				
Lead Pb				0.01	0.01	0.00	0.00	0.00				
Lithium Li				0.05	0.02	0.01	0.01	0.00				
Magnesium Mg				1081	507	190	198	52				
Manganese Mn				0.39	0.26	0.27	0.12	0.03				
Mercury Hg				0.13	0.06	0.02	0.02	0.01				
Molybdenum Mo				0.03	0.01	0.00	0.00	0.00				
Nickel Ni				0.12	0.06	0.02	0.02	0.00				
Phosphorus P				2	1	0	0	0				
Potassium K				398	163	55	84	22				
Selenium Se				0.11	0.05	0.02	0.02	0.01				
Silicon SiO2				12	6	2	2	1				
Silver Ag				0.00	0.00	0.00	0.00	0.00				
Sodium Na				4373	2083	735	903	237				
Strontium Sr				6	3	1	1	0				
Tellurium Te				0.00	0.00	0.00	0.00	0.00				
Thallium Tl				0.00	0.00	0.00	0.00	0.00				
Thorium Th				0.00	0.00	0.00	0.00	0.00				
Tin Sn				0.01	0.00	0.00	0.00	0.00				
Titanium Ti				0.29	0.13	0.04	0.05	0.01				
Uranium U				0.00	0.00	0.00	0.00	0.00				
Vanadium V				0.13	0.03	0.01	0.01	0.00				
Zinc Zn				1.2	0.2	0.1	0.1	0.0				
Zirconium Zr				1.10	0.51	0.16	0.20	0.05				

Loadings to Tail Lake (kg/month)												
Date	Year 10 Mar-17	Year 10 Apr-17	Year 10 May-17	Year 10 Jun-17	Year 10 Jul-17	Year 10 Aug-17	Year 10 Sep-17	Year 10 Oct-17	Year 10 Nov-17	Year 10 Dec-17	Year 10 Jan-18	Year 10 Feb-18
Parameter												
TDS				24085	8219	2899	4239	1115				
TSS				277	130	57	91	24				
Free CN												
Total CN				0	0	0	0	0				
WAD CN												
CNO												
SCN												
Sulphate				657	308	97	131	34				
Chloride				8166	3821	1422	1784	469				
Total Ammonia-N				2	1	0	0	0				
Nitrate-N				1	1	0	0	0				
Nitrite-N				0	0	0	0	0				
Alkalinity				6043	2928	955	1022	269				
OrthoPhosphate-P				0	0	0	0	0				
Phosphate-P				2	1	0	0	0				
Org. Carbon				1291.85	544.52	161.08	199.86	52.54				
Hardness CaCO3				7226	3503	1305	1514	398				
Total Metals												
Aluminum Al				8.65	3.61	1.27	1.58	0.41				
Antimony Sb				0.00	0.00	0.00	0.00	0.00				
Arsenic As				0.06	0.03	0.01	0.01	0.00				
Barium Ba				0.45	0.21	0.10	0.09	0.02				
Beryllium Be				0.00	0.00	0.00	0.00	0.00				
Bismuth Bi				0.00	0.00	0.00	0.00	0.00				
Boron B				3.69	1.84	0.56	0.65	0.17				
Cadmium Cd				0.00	0.00	0.00	0.00	0.00				
Calcium Ca				1381	652	251	273	72				
Chromium Cr				0.06	0.02	0.01	0.01	0.00				
Cobalt Co				0.01	0.01	0.00	0.00	0.00				
Copper Cu				0.21	0.09	0.02	0.03	0.01				
Iron Fe				14.09	11.40	13.74	3.66	0.96				
Lead Pb				0.01	0.01	0.00	0.00	0.00				
Lithium Li				0.05	0.02	0.01	0.01	0.00				
Magnesium Mg				1081	507	190	198	52				
Manganese Mn				0.39	0.26	0.27	0.12	0.03				
Mercury Hg				0.13	0.06	0.02	0.02	0.01				
Molybdenum Mo				0.03	0.01	0.00	0.00	0.00				
Nickel Ni				0.12	0.06	0.02	0.02	0.00				
Phosphorus P				2	1	0	0	0				
Potassium K				398	163	55	84	22				
Selenium Se				0.11	0.05	0.02	0.02	0.01				
Silicon SiO2				12	6	2	2	1				
Silver Ag				0.00	0.00	0.00	0.00	0.00				
Sodium Na				4373	2083	735	903	237				
Strontium Sr				6	3	1	1	0				
Tellurium Te				0.00	0.00	0.00	0.00	0.00				
Thallium Tl				0.00	0.00	0.00	0.00	0.00				
Thorium Th				0.00	0.00	0.00	0.00	0.00				
Tin Sn				0.01	0.00	0.00	0.00	0.00				
Titanium Ti				0.29	0.13	0.04	0.05	0.01				
Uranium U				0.00	0.00	0.00	0.00	0.00				
Vanadium V				0.13	0.03	0.01	0.01	0.00				
Zinc Zn				1.2	0.2	0.1	0.1	0.0				
Zirconium Zr				1.10	0.51	0.16	0.20	0.05				



OUTPUT SUMMARY							Increase in Above Background %	Fraction of CCME in Doris Creek (%)
Max Annual Discharge rate		929,638 m ³ /year in		Year 2				
Degradation Field(age)		Tail Lk Cu < CME Year		12				
				Maximum in Doris Creek				
Maximum Concentration		MMER	CCME	Tail Lake Year 2	Upstream	Downstream Year 3		
pH			6 to 9	7 to 8	7.6	7 to 8	68%	1%
TDS	mg/L			1508	145	243		
TSS	mg/L	15		2.0	4.0	3.8		
Free CN	mg/L		0.005	0.0005		0.00004		
Total CN	mg/L	1.0		0.008	0.001	0.002		
WAD CN	mg/L			0.0007		0.0001		
CNO	mg/L			1.1		0.10		
SCN	mg/L			0.080		0.007		
Sulphate	mg/L			61	4	8.6		
Chloride	mg/L			1287	63	156		
Total Ammonia-N	mg/L		1.27	0.45	0.02	0.055	264%	4%
Nitrate-N	mg/L		2.9	7.3	0.006	0.70	11642%	24%
Nitrite-N	mg/L		0.018	0.30	0.0020	0.029	1334%	157%
Alkalinity	mg/L			51	28	30		
OrthoPhosphate-P	mg/L			0.2478	0.0008	0.0199		
Phosphate-P	mg/L			0.2518	0.0325	0.0441		
Org. Carbon	mg/L			5.9	5.1	5.1		
Hardness CaCO3	mg/L			92	45	49		
Total Metals								
Aluminum Al	mg/L		0.1	0.054	0.08	0.0771	1%	77%
Antimony Sb	mg/L			0.0220	0.0000	0.0019		
Arsenic As	mg/L	0.5	0.005	0.0023	0.00047	0.0006		12%
Barium Ba	mg/L			0.0072	0.0033	0.0036		
Beryllium Be	mg/L			0.00079	0.00001	0.00008		
Bismuth Bi	mg/L			0.02187	0.00001	0.00185		
Boron B	mg/L			0.035	0.023	0.024		
Cadmium Cd	mg/L		0.000017	0.00006	0.000002	0.000009	303%	51%
Calcium Ca	mg/L			302	7	32		
Chromium Cr	mg/L		0.001	0.0030	0.0003	0.001	79%	56%
Cobalt Co	mg/L			0.0041	0.0001	0.0004		
Copper Cu	mg/L	0.3	0.002	0.007	0.0014	0.0018	28%	92%
Iron Fe	mg/L		0.3	0.12	0.11	0.11	0%	38%
Lead Pb	mg/L	0.2	0.001	0.00049	0.00012	0.00014		14%
Lithium Li	mg/L			0.0030		0.0003		
Magnesium Mg	mg/L			9.3	6.4	6.6		
Manganese Mn	mg/L			0.016	0.016	0.016		
Mercury Hg	ug/L		0.026	0.0053428	0.0006	0.0010047		4%
Molybdenum Mo	mg/L		0.073	0.0067	0.0001	0.00068		1%
Nickel Ni	mg/L	0.5	0.025	0.009	0.001	0.0012		5%
Phosphorus P	mg/L			0.328		0.027		
Potassium K	mg/L			18	2	3.5		
Selenium Se	mg/L		0.001	0.00067	0.0011	0.0011	0%	113%
Silicon SiO2	mg/L			4.3		0.38		
Silver Ag	mg/L		0.0001	0.00008	0.00000	0.0000098	599%	10%
Sodium Na	mg/L			354	33	54		
Strontium Sr	mg/L			0.066	0.040	0.042		
Tellurium Te	mg/L			0.000		0.000		
Thallium Tl	mg/L		0.0008	0.000034	0.000022	0.000023	4%	3%
Thorium Th	mg/L			0.000147		0.0000150		
Tin Sn	mg/L			0.00351	0.00012	0.00034		
Titanium Ti	mg/L			0.0014		0.0001		
Uranium U	mg/L			0.000198	0.000036	0.000048		
Vanadium V	mg/L			0.0039	0.0006	0.0008		
Zinc Zn	mg/L	0.5	0.03	0.012	0.003	0.0035	22%	12%
Zirconium Zr	mg/L			0.0067	0.0050	0.0052		

Water Quality in DORIS CREEK (d/s of the waterfall)

Date		Year 1 Mar-08	Year 1 Apr-08	Year 1 May-08	Year 1 Jun-08	Year 1 Jul-08	Year 1 Aug-08	Year 1 Sep-08	Year 1 Oct-08	Year 1 Nov-08	Year 1 Dec-08	Year 1 Jan-09	Year 1 Feb-09
Parameter													
TDS	mg/L				142	136	130	146	158				
TSS	mg/L				2.9	3.8	2.9	3.0	2.9				
Free CN	mg/L				0.00001	0.00000	0.00000	0.00000	0.00001				
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L				0.0000	0.0000	0.0000	0.0000	0.0000				
CNO	mg/L				0.02	0.01	0.01	0.00	0.01				
SCN	mg/L				0.001	0.001	0.001	0.000	0.003				
Sulphate	mg/L				3.9	4.0	3.8	3.3	5.1				
Chloride	mg/L				61	73	72	66	91				
Total Ammonia-N	mg/L				0.020	0.038	0.022	0.015	0.024				
Nitrate-N	mg/L				0.08	0.15	0.15	0.08	0.34				
Nitrite-N	mg/L				0.007	0.018	0.012	0.003	0.007				
Alkalinity	mg/L				26	27	27	28	29				
OrthoPhosphate-P	mg/L				0.0020	0.0034	0.0029	0.0014	0.0064				
Phosphate-P	mg/L				0.0197	0.0225	0.0332	0.0274	0.0308				
Org. Carbon	mg/L				5.0	5.0	5.1	5.0	5.1				
Hardness CaCO3	mg/L				38	42	44	45	46				
Total Metals													
Aluminum Al	mg/L				0.08	0.06	0.06	0.05	0.05				
Antimony Sb	mg/L				0.0001	0.0003	0.0003	0.0001	0.0006				
Arsenic As	mg/L				0.0004	0.0004	0.0005	0.0005	0.0005				
Barium Ba	mg/L				0.0033	0.0031	0.0030	0.0030	0.0031				
Beryllium Be	mg/L				0.00001	0.00002	0.00002	0.00001	0.00003				
Bismuth Bi	mg/L				0.00008	0.00027	0.00025	0.00008	0.00062				
Boron B	mg/L				0.019	0.021	0.023	0.023	0.023				
Cadmium Cd	mg/L				0.0000038	0.0000043	0.0000042	0.0000036	0.0000056				
Calcium Ca	mg/L				8	12	11	9	17				
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0001	0.0001	0.0001	0.0001	0.0002				
Copper Cu	mg/L				0.0013	0.0015	0.0015	0.0014	0.0016				
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09				
Lead Pb	mg/L				0.00005	0.00006	0.00012	0.00004	0.00006				
Lithium Li	mg/L				0.0000	0.0001	0.0000	0.0000	0.0001				
Magnesium Mg	mg/L				5.3	5.9	6.3	6.4	6.4				
Manganese Mn	mg/L				0.011	0.014	0.015	0.010	0.010				
Mercury Hg	ug/L				0.0006333	0.0006712	0.0006577	0.0006182	0.0007600				
Molybdenum Mo	mg/L				0.00016	0.00024	0.00023	0.00016	0.00036				
Nickel Ni	mg/L				0.0005	0.0007	0.0006	0.0005	0.0008				
Phosphorus P	mg/L				0.003	0.005	0.004	0.002	0.010				
Potassium K	mg/L				2.2	2.5	2.4	2.4	2.8				
Selenium Se	mg/L				0.00076	0.00080	0.00082	0.00112	0.00107				
Silicon SiO2	mg/L				0.04	0.08	0.07	0.03	0.16				
Silver Ag	mg/L				0.0000034	0.0000039	0.0000036	0.0000028	0.0000053				
Sodium Na	mg/L				26	30	32	32	32				
Strontium Sr	mg/L				0.035	0.038	0.039	0.040	0.040				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000018	0.000021	0.000011	0.000004	0.000005				
Thorium Th	mg/L				0.000003	0.000005	0.000005	0.000003	0.000008				
Tin Sn	mg/L				0.00005	0.00016	0.00008	0.00005	0.00014				
Titanium Ti	mg/L				0.0000	0.0000	0.0000	0.0000	0.0000				
Uranium U	mg/L				0.000032	0.000036	0.000040	0.000035	0.000039				
Vanadium V	mg/L				0.0006	0.0002	0.0002	0.0001	0.0003				
Zinc Zn	mg/L				0.0016	0.0020	0.0031	0.0018	0.0023				
Zirconium Zr	mg/L				0.0051	0.0051	0.0051	0.0051	0.0051				

Water Quality in DORIS CR Water Quality in DORIS CREEK (d/s of the waterfall)

Date		Year 2 Mar-09	Year 2 Apr-09	Year 2 May-09	Year 2 Jun-09	Year 2 Jul-09	Year 2 Aug-09	Year 2 Sep-09	Year 2 Oct-09	Year 2 Nov-09	Year 2 Dec-09	Year 2 Jan-10	Year 2 Feb-10
Parameter													
TDS	mg/L				167	153	151	154	178				
TSS	mg/L				2.9	3.8	2.9	3.0	2.9				
Free CN	mg/L				0.00004		0.00001	0.00000	0.00001				
Total CN	mg/L				0.002	0.001	0.001	0.001	0.001				
WAD CN	mg/L				0.0001		0.0000	0.0000	0.0000				
CNO	mg/L				0.10		0.01	0.00	0.02				
SCN	mg/L				0.005	0.004	0.005	0.002	0.006				
Sulphate	mg/L				7.1	6.2	6.5	4.3	7.6				
Chloride	mg/L				110	108	113	82	129				
Total Ammonia-N	mg/L				0.053	0.055	0.020	0.017	0.025				
Nitrate-N	mg/L				0.44	0.44	0.48	0.22	0.64				
Nitrite-N	mg/L				0.029	0.017	0.020	0.003	0.008				
Alkalinity	mg/L				27	28	28	28	30				
OrthoPhosphate-P	mg/L				0.0113	0.0099	0.0106	0.0044	0.0133				
Phosphate-P	mg/L				0.0283	0.0287	0.0399	0.0300	0.0376				
Org. Carbon	mg/L				5.0	4.9	5.0	5.0	5.0				
Hardness CaCO3	mg/L				41	43	46	46	49				
Total Metals													
Aluminum Al	mg/L				0.07	0.06	0.06	0.05	0.05				
Antimony Sb	mg/L				0.0009	0.0009	0.0010	0.0004	0.0013				
Arsenic As	mg/L				0.0005	0.0005	0.0006	0.0005	0.0006				
Barium Ba	mg/L				0.0035	0.0033	0.0032	0.0031	0.0033				
Beryllium Be	mg/L				0.00005	0.00005	0.00005	0.00002	0.00006				
Bismuth Bi	mg/L				0.00087	0.00087	0.00098	0.00037	0.00126				
Boron B	mg/L				0.020	0.022	0.023	0.023	0.023				
Cadmium Cd	mg/L				0.0000070	0.0000067	0.0000071	0.0000047	0.0000082				
Calcium Ca	mg/L				25	23	25	14	29				
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0003	0.0003	0.0003	0.0001	0.0004				
Copper Cu	mg/L				0.0016	0.0017	0.0017	0.0015	0.0018				
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09				
Lead Pb	mg/L				0.00007	0.00008	0.00014	0.00005	0.00007				
Lithium Li	mg/L				0.0002	0.0002	0.0002	0.0001	0.0002				
Magnesium Mg	mg/L				5.5	6.0	6.4	6.4	6.6				
Manganese Mn	mg/L				0.011	0.015	0.016	0.010	0.010				
Mercury Hg	ug/L				0.0008959	0.0008520	0.0008727	0.0007031	0.0009575				
Molybdenum Mo	mg/L				0.00053	0.00050	0.00053	0.00028	0.00063				
Nickel Ni	mg/L				0.0010	0.0010	0.0010	0.0006	0.0011				
Phosphorus P	mg/L				0.016	0.015	0.016	0.006	0.020				
Potassium K	mg/L				3.1	3.1	3.1	2.7	3.5				
Selenium Se	mg/L				0.00076	0.00080	0.00082	0.00111	0.00108				
Silicon SiO2	mg/L				0.28	0.25	0.27	0.11	0.34				
Silver Ag	mg/L				0.0000070	0.0000066	0.0000070	0.0000041	0.0000083				
Sodium Na	mg/L				27	30	32	32	33				
Strontium Sr	mg/L				0.037	0.040	0.040	0.041	0.042				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000019	0.000022	0.000012	0.000004	0.000006				
Thorium Th	mg/L				0.000011	0.000011	0.000012	0.000006	0.000014				
Tin Sn	mg/L				0.00018	0.00026	0.00020	0.00010	0.00025				
Titanium Ti	mg/L				0.0001	0.0001	0.0001	0.0000	0.0001				
Uranium U	mg/L				0.000041	0.000042	0.000048	0.000038	0.000047				
Vanadium V	mg/L				0.0007	0.0003	0.0003	0.0002	0.0004				
Zinc Zn	mg/L				0.0022	0.0023	0.0035	0.0020	0.0026				
Zirconium Zr	mg/L				0.0051	0.0051	0.0051	0.0051	0.0052				

Water Quality in DORIS CR Water Quality in DORIS CREEK (d/s of the waterfall)

Date	Year 3 Mar-10	Year 3 Apr-10	Year 3 May-10	Year 3 Jun-10	Year 3 Jul-10	Year 3 Aug-10	Year 3 Sep-10	Year 3 Oct-10	Year 3 Nov-10	Year 3 Dec-10	Year 3 Jan-11	Year 3 Feb-11
Parameter												
TDS mg/L				184	159	144	146	193				
TSS mg/L				2.9	3.8	2.9	3.0	2.9				
Free CN mg/L				0.00003								
Total CN mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN mg/L				0.0000								
CNO mg/L				0.07								
SCN mg/L				0.007	0.004	0.003	0.000	0.006				
Sulphate mg/L				8.6	6.4	5.1	3.1	8.3				
Chloride mg/L				138	114	95	65	146				
Total Ammonia-N mg/L				0.045	0.037	0.018	0.013	0.015				
Nitrate-N mg/L				0.63	0.45	0.30	0.06	0.70				
Nitrite-N mg/L				0.028	0.014	0.011	0.002	0.006				
Alkalinity mg/L				28	28	28	28	30				
OrthoPhosphate-P mg/L				0.0177	0.0121	0.0080	0.0011	0.0199				
Phosphate-P mg/L				0.0347	0.0312	0.0386	0.0273	0.0441				
Org. Carbon mg/L				4.9	4.9	5.0	5.0	5.0				
Hardness CaCO3 mg/L				42	44	45	45	49				
Total Metals												
Aluminum Al mg/L				0.07	0.06	0.06	0.05	0.05				
Antimony Sb mg/L				0.0015	0.0011	0.0007	0.0001	0.0019				
Arsenic As mg/L				0.0006	0.0005	0.0006	0.0004	0.0006				
Barium Ba mg/L				0.0036	0.0033	0.0031	0.0030	0.0033				
Beryllium Be mg/L				0.00007	0.00005	0.00004	0.00001	0.00008				
Bismuth Bi mg/L				0.00143	0.00106	0.00070	0.00004	0.00185				
Boron B mg/L				0.021	0.022	0.023	0.023	0.024				
Cadmium Cd mg/L				0.0000087	0.0000067	0.0000055	0.0000034	0.0000085				
Calcium Ca mg/L				32	23	17	8	30				
Chromium Cr mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co mg/L				0.0004	0.0003	0.0002	0.0001	0.0004				
Copper Cu mg/L				0.0017	0.0017	0.0016	0.0014	0.0018				
Iron Fe mg/L				0.11	0.11	0.08	0.09	0.09				
Lead Pb mg/L				0.00009	0.00008	0.00014	0.00004	0.00008				
Lithium Li mg/L				0.0003	0.0002	0.0001	0.0000	0.0003				
Magnesium Mg mg/L				5.6	6.0	6.4	6.4	6.6				
Manganese Mn mg/L				0.012	0.015	0.016	0.010	0.011				
Mercury Hg ug/L				0.0010047	0.0008511	0.0007519	0.0006074	0.0009634				
Molybdenum Mo mg/L				0.00068	0.00050	0.00036	0.00015	0.00065				
Nickel Ni mg/L				0.0012	0.0010	0.0008	0.0005	0.0012				
Phosphorus P mg/L				0.025	0.017	0.011	0.001	0.027				
Potassium K mg/L				3.4	3.1	2.7	2.4	3.5				
Selenium Se mg/L				0.00077	0.00081	0.00083	0.00112	0.00108				
Silicon SiO2 mg/L				0.38	0.25	0.16	0.02	0.35				
Silver Ag mg/L				0.0000093	0.0000071	0.0000053	0.0000026	0.0000098				
Sodium Na mg/L				28	31	33	32	33				
Strontium Sr mg/L				0.038	0.040	0.040	0.040	0.042				
Tellurium Te mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl mg/L				0.000019	0.000023	0.000012	0.000004	0.000006				
Thorium Th mg/L				0.000015	0.000011	0.000008	0.000003	0.000015				
Tin Sn mg/L				0.00027	0.00029	0.00015	0.00004	0.00033				
Titanium Ti mg/L				0.0001	0.0001	0.0001	0.0000	0.0001				
Uranium U mg/L				0.000046	0.000043	0.000044	0.000035	0.000048				
Vanadium V mg/L				0.0008	0.0003	0.0003	0.0001	0.0005				
Zinc Zn mg/L				0.0024	0.0022	0.0032	0.0017	0.0027				
Zirconium Zr mg/L				0.0052	0.0051	0.0051	0.0051	0.0052				

Water Quality in DORIS CR Water Quality in DORIS CREEK (d/s of the waterfall)

Date		Year 4 Mar-11	Year 4 Apr-11	Year 4 May-11	Year 4 Jun-11	Year 4 Jul-11	Year 4 Aug-11	Year 4 Sep-11	Year 4 Oct-11	Year 4 Nov-11	Year 4 Dec-11	Year 4 Jan-12	Year 4 Feb-12
Parameter													
TDS	mg/L				160	168	142	145	187				
TSS	mg/L				3.0	3.8	2.9	3.0	2.9				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.002	0.004	0.002		0.004				
Sulphate	mg/L				5.4	6.5	4.6	3.0	7.0				
Chloride	mg/L				89	121	88	63	130				
Total Ammonia-N	mg/L				0.015	0.021	0.018	0.013	0.013				
Nitrate-N	mg/L				0.25	0.45	0.23	0.05	0.53				
Nitrite-N	mg/L				0.008	0.003	0.002	0.002	0.002				
Alkalinity	mg/L				26	28	28	28	29				
OrthoPhosphate-P	mg/L				0.0091	0.0160	0.0075	0.0008	0.0179				
Phosphate-P	mg/L				0.0268	0.0352	0.0382	0.0270	0.0424				
Org. Carbon	mg/L				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3	mg/L				39	43	44	45	47				
Total Metals													
Aluminum Al	mg/L				0.08	0.06	0.06	0.05	0.05				
Antimony Sb	mg/L				0.0008	0.0014	0.0006	0.0000	0.0015				
Arsenic As	mg/L				0.0005	0.0005	0.0005	0.0004	0.0006				
Barium Ba	mg/L				0.0034	0.0034	0.0031	0.0030	0.0032				
Beryllium Be	mg/L				0.00004	0.00006	0.00003	0.00001	0.00006				
Bismuth Bi	mg/L				0.00074	0.00137	0.00060	0.00001	0.00153				
Boron B	mg/L				0.020	0.022	0.023	0.023	0.024				
Cadmium Cd	mg/L				0.0000052	0.0000067	0.0000049	0.0000033	0.0000074				
Calcium Ca	mg/L				14	21	14	7	23				
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0002	0.0003	0.0002	0.0001	0.0003				
Copper Cu	mg/L				0.0014	0.0017	0.0015	0.0014	0.0017				
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09				
Lead Pb	mg/L				0.00007	0.00009	0.00013	0.00004	0.00007				
Lithium Li	mg/L				0.0001	0.0002	0.0001	0.0000	0.0002				
Magnesium Mg	mg/L				5.4	6.1	6.4	6.4	6.6				
Manganese Mn	mg/L				0.012	0.015	0.016	0.010	0.010				
Mercury Hg	ug/L				0.0007217	0.0008242	0.0006970	0.0006001	0.0008544				
Molybdenum Mo	mg/L				0.00029	0.00046	0.00029	0.00014	0.00050				
Nickel Ni	mg/L				0.0007	0.0010	0.0007	0.0005	0.0010				
Phosphorus P	mg/L				0.012	0.021	0.010	0.001	0.024				
Potassium K	mg/L				2.5	3.0	2.6	2.3	3.2				
Selenium Se	mg/L				0.00077	0.00081	0.00083	0.00113	0.00109				
Silicon SiO2	mg/L				0.13	0.23	0.11	0.01	0.26				
Silver Ag	mg/L				0.0000059	0.0000080	0.0000048	0.0000025	0.0000087				
Sodium Na	mg/L				27	31	32	32	32				
Strontium Sr	mg/L				0.036	0.040	0.040	0.040	0.042				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000018	0.000023	0.000012	0.000004	0.000006				
Thorium Th	mg/L				0.000007	0.000011	0.000006	0.000003	0.000012				
Tin Sn	mg/L				0.00015	0.00034	0.00014	0.00004	0.00028				
Titanium Ti	mg/L				0.0001	0.0001	0.0000	0.0000	0.0001				
Uranium U	mg/L				0.000036	0.000043	0.000042	0.000034	0.000044				
Vanadium V	mg/L				0.0007	0.0004	0.0003	0.0001	0.0004				
Zinc Zn	mg/L				0.0018	0.0023	0.0031	0.0017	0.0025				
Zirconium Zr	mg/L				0.0051	0.0051	0.0051	0.0051	0.0052				

Water Quality in DORIS CR Water Quality in DORIS CREEK (d/s of the waterfall)

Date		Year 5 Mar-12	Year 5 Apr-12	Year 5 May-12	Year 5 Jun-12	Year 5 Jul-12	Year 5 Aug-12	Year 5 Sep-12	Year 5 Oct-12	Year 5 Nov-12	Year 5 Dec-12	Year 5 Jan-13	Year 5 Feb-13
Parameter													
TDS	mg/L				151	176	150	145	243				
TSS	mg/L				3.0	3.8	2.9	3.0	2.9				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.001	0.003	0.001		0.003				
Sulphate	mg/L				4.5	6.0	4.3	3.0	6.2				
Chloride	mg/L				74	120	90	63	156				
Total Ammonia-N	mg/L				0.013	0.021	0.018	0.013	0.013				
Nitrate-N	mg/L				0.16	0.38	0.19	0.05	0.43				
Nitrite-N	mg/L				0.002	0.003	0.002	0.002	0.002				
Alkalinity	mg/L				26	28	28	28	29				
OrthoPhosphate-P	mg/L				0.0052	0.0136	0.0062	0.0008	0.0146				
Phosphate-P	mg/L				0.0231	0.0327	0.0370	0.0270	0.0392				
Org. Carbon	mg/L				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3	mg/L				38	43	44	45	47				
Total Metals													
Aluminum Al	mg/L				0.08	0.06	0.06	0.05	0.05				
Antimony Sb	mg/L				0.0004	0.0012	0.0005	0.0000	0.0013				
Arsenic As	mg/L				0.0004	0.0005	0.0005	0.0004	0.0006				
Barium Ba	mg/L				0.0033	0.0033	0.0030	0.0030	0.0032				
Beryllium Be	mg/L				0.00002	0.00005	0.00003	0.00001	0.00006				
Bismuth Bi	mg/L				0.00040	0.00115	0.00049	0.00001	0.00123				
Boron B	mg/L				0.020	0.022	0.023	0.023	0.023				
Cadmium Cd	mg/L				0.0000045	0.0000066	0.0000048	0.0000033	0.0000071				
Calcium Ca	mg/L				10	20	13	7	24				
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0001	0.0002	0.0001	0.0001	0.0003				
Copper Cu	mg/L				0.0013	0.0017	0.0015	0.0014	0.0016				
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09				
Lead Pb	mg/L				0.00006	0.00008	0.00013	0.00004	0.00007				
Lithium Li	mg/L				0.0001	0.0002	0.0001	0.0000	0.0002				
Magnesium Mg	mg/L				5.3	6.1	6.4	6.4	6.5				
Manganese Mn	mg/L				0.011	0.015	0.016	0.010	0.010				
Mercury Hg	ug/L				0.0006645	0.0007894	0.0006781	0.0006001	0.0008062				
Molybdenum Mo	mg/L				0.00021	0.00041	0.00026	0.00014	0.00043				
Nickel Ni	mg/L				0.0006	0.0009	0.0006	0.0005	0.0009				
Phosphorus P	mg/L				0.007	0.018	0.008	0.001	0.020				
Potassium K	mg/L				2.3	2.9	2.5	2.3	3.0				
Selenium Se	mg/L				0.00077	0.00081	0.00083	0.00113	0.00109				
Silicon SiO2	mg/L				0.08	0.20	0.09	0.01	0.21				
Silver Ag	mg/L				0.0000048	0.0000076	0.0000046	0.0000025	0.0000081				
Sodium Na	mg/L				26	35	36	32	54				
Strontium Sr	mg/L				0.035	0.040	0.039	0.040	0.041				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000018	0.000023	0.000012	0.000004	0.000005				
Thorium Th	mg/L				0.000005	0.000010	0.000006	0.000003	0.000011				
Tin Sn	mg/L				0.00010	0.00031	0.00012	0.00004	0.00024				
Titanium Ti	mg/L				0.0000	0.0001	0.0000	0.0000	0.0001				
Uranium U	mg/L				0.000034	0.000042	0.000042	0.000034	0.000043				
Vanadium V	mg/L				0.0007	0.0003	0.0002	0.0001	0.0004				
Zinc Zn	mg/L				0.0016	0.0022	0.0031	0.0017	0.0024				
Zirconium Zr	mg/L				0.0051	0.0052	0.0051	0.0051	0.0052				

Water Quality in DORIS CR Water Quality in DORIS CREEK (d/s of the waterfall)

Date		Year 6 Mar-13	Year 6 Apr-13	Year 6 May-13	Year 6 Jun-13	Year 6 Jul-13	Year 6 Aug-13	Year 6 Sep-13	Year 6 Oct-13	Year 6 Nov-13	Year 6 Dec-13	Year 6 Jan-14	Year 6 Feb-14
Parameter													
TDS	mg/L				170	217	161	145	238				
TSS	mg/L				3.0	3.8	2.9	3.0	2.9				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.001	0.003	0.001		0.003				
Sulphate	mg/L				4.3	5.4	4.0	3.0	5.6				
Chloride	mg/L				83	139	95	63	146				
Total Ammonia-N	mg/L				0.008	0.016	0.013	0.008	0.008				
Nitrate-N	mg/L				0.09	0.27	0.12	0.01	0.31				
Nitrite-N	mg/L				0.001	0.002	0.001	0.001	0.001				
Alkalinity	mg/L				26	28	27	28	29				
OrthoPhosphate-P	mg/L				0.0043	0.0111	0.0051	0.0008	0.0120				
Phosphate-P	mg/L				0.0223	0.0303	0.0359	0.0270	0.0365				
Org. Carbon	mg/L				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3	mg/L				38	43	44	45	46				
Total Metals													
Aluminum Al	mg/L				0.08	0.06	0.06	0.05	0.05				
Antimony Sb	mg/L				0.0003	0.0009	0.0004	0.0000	0.0010				
Arsenic As	mg/L				0.0004	0.0005	0.0005	0.0004	0.0005				
Barium Ba	mg/L				0.0033	0.0033	0.0030	0.0030	0.0031				
Beryllium Be	mg/L				0.00002	0.00004	0.00002	0.00000	0.00004				
Bismuth Bi	mg/L				0.00032	0.00093	0.00039	0.00000	0.00100				
Boron B	mg/L				0.019	0.022	0.023	0.022	0.023				
Cadmium Cd	mg/L				0.0000031	0.0000051	0.0000034	0.0000020	0.0000056				
Calcium Ca	mg/L				11	21	13	7	22				
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0001	0.0002	0.0001	0.0001	0.0002				
Copper Cu	mg/L				0.0013	0.0016	0.0015	0.0014	0.0016				
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09				
Lead Pb	mg/L				0.00005	0.00008	0.00012	0.00004	0.00006				
Lithium Li	mg/L				0.0000	0.0001	0.0001		0.0001				
Magnesium Mg	mg/L				5.3	6.0	6.4	6.4	6.5				
Manganese Mn	mg/L				0.011	0.015	0.016	0.010	0.010				
Mercury Hg	ug/L				0.0006520	0.0007534	0.0006628	0.0006000	0.0007672				
Molybdenum Mo	mg/L				0.00019	0.00036	0.00024	0.00014	0.00037				
Nickel Ni	mg/L				0.0005	0.0009	0.0006	0.0004	0.0008				
Phosphorus P	mg/L				0.005	0.014	0.006		0.016				
Potassium K	mg/L				2.3	2.8	2.4	2.3	2.9				
Selenium Se	mg/L				0.00077	0.00081	0.00083	0.00112	0.00108				
Silicon SiO2	mg/L				0.05	0.15	0.07		0.17				
Silver Ag	mg/L				0.0000029	0.0000056	0.0000027	0.0000007	0.0000060				
Sodium Na	mg/L				33	51	41	32	54				
Strontium Sr	mg/L				0.035	0.039	0.039	0.040	0.041				
Tellurium Te	mg/L				0.000	0.000	0.000		0.000				
Thallium Tl	mg/L				0.000018	0.000022	0.000011	0.000003	0.000005				
Thorium Th	mg/L				0.000002	0.000007	0.000003		0.000008				
Tin Sn	mg/L				0.00008	0.00027	0.00010	0.00003	0.00020				
Titanium Ti	mg/L				0.0000	0.0001	0.0000		0.0001				
Uranium U	mg/L				0.000031	0.000039	0.000039	0.000032	0.000040				
Vanadium V	mg/L				0.0006	0.0003	0.0002	0.0001	0.0003				
Zinc Zn	mg/L				0.0016	0.0021	0.0030	0.0017	0.0023				
Zirconium Zr	mg/L				0.0050	0.0051	0.0050	0.0050	0.0051				

Water Quality in DORIS CR Water Quality in DORIS CREEK (d/s of the waterfall)

Date		Year 7 Mar-14	Year 7 Apr-14	Year 7 May-14	Year 7 Jun-14	Year 7 Jul-14	Year 7 Aug-14	Year 7 Sep-14	Year 7 Oct-14	Year 7 Nov-14	Year 7 Dec-14	Year 7 Jan-15	Year 7 Feb-15
Parameter													
TDS	mg/L				164	200	154	145	219				
TSS	mg/L				3.0	3.8	2.9	3.0	2.9				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.001	0.002	0.001		0.002				
Sulphate	mg/L				4.1	4.9	3.8	3.0	5.1				
Chloride	mg/L				78	124	88	63	130				
Total Ammonia-N	mg/L				0.008	0.014	0.012	0.008	0.007				
Nitrate-N	mg/L				0.07	0.19	0.08	0.01	0.21				
Nitrite-N	mg/L				0.001	0.002	0.001	0.001	0.001				
Alkalinity	mg/L				26	28	27	28	29				
OrthoPhosphate-P	mg/L				0.0036	0.0091	0.0043	0.0008	0.0098				
Phosphate-P	mg/L				0.0216	0.0284	0.0351	0.0270	0.0344				
Org. Carbon	mg/L				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3	mg/L				38	42	44	45	46				
Total Metals													
Aluminum Al	mg/L				0.08	0.06	0.06	0.05	0.05				
Antimony Sb	mg/L				0.0003	0.0008	0.0003	0.0000	0.0008				
Arsenic As	mg/L				0.0004	0.0005	0.0005	0.0004	0.0005				
Barium Ba	mg/L				0.0033	0.0032	0.0030	0.0030	0.0031				
Beryllium Be	mg/L				0.00002	0.00003	0.00002	0.00000	0.00004				
Bismuth Bi	mg/L				0.00026	0.00075	0.00032	0.00000	0.00080				
Boron B	mg/L				0.019	0.022	0.023	0.022	0.023				
Cadmium Cd	mg/L				0.0000031	0.0000047	0.0000032	0.0000020	0.0000050				
Calcium Ca	mg/L				10	18	12	7	19				
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0001	0.0002	0.0001	0.0001	0.0002				
Copper Cu	mg/L				0.0013	0.0016	0.0015	0.0014	0.0015				
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09				
Lead Pb	mg/L				0.00005	0.00007	0.00012	0.00004	0.00006				
Lithium Li	mg/L				0.0000	0.0001	0.0000		0.0001				
Magnesium Mg	mg/L				5.3	6.0	6.4	6.4	6.4				
Manganese Mn	mg/L				0.011	0.015	0.016	0.010	0.010				
Mercury Hg	ug/L				0.0006420	0.0007243	0.0006505	0.0006000	0.0007358				
Molybdenum Mo	mg/L				0.00018	0.00032	0.00022	0.00014	0.00033				
Nickel Ni	mg/L				0.0005	0.0008	0.0006	0.0004	0.0007				
Phosphorus P	mg/L				0.004	0.012	0.005		0.013				
Potassium K	mg/L				2.2	2.7	2.4	2.3	2.8				
Selenium Se	mg/L				0.00077	0.00081	0.00083	0.00112	0.00108				
Silicon SiO2	mg/L				0.04	0.13	0.05		0.14				
Silver Ag	mg/L				0.0000028	0.0000050	0.0000024	0.0000007	0.0000050				
Sodium Na	mg/L				32	47	39	32	50				
Strontium Sr	mg/L				0.035	0.039	0.039	0.040	0.041				
Tellurium Te	mg/L				0.000	0.000	0.000		0.000				
Thallium Tl	mg/L				0.000018	0.000022	0.000011	0.000003	0.000005				
Thorium Th	mg/L				0.000002	0.000006	0.000003		0.000007				
Tin Sn	mg/L				0.00007	0.00024	0.00009	0.00003	0.00017				
Titanium Ti	mg/L				0.0000	0.0001	0.0000		0.0001				
Uranium U	mg/L				0.000031	0.000037	0.000038	0.000032	0.000038				
Vanadium V	mg/L				0.0006	0.0003	0.0002	0.0001	0.0003				
Zinc Zn	mg/L				0.0016	0.0020	0.0030	0.0017	0.0022				
Zirconium Zr	mg/L				0.0050	0.0051	0.0050	0.0050	0.0051				

Water Quality in DORIS CR Water Quality in DORIS CREEK (d/s of the waterfall)

Date		Year 8 Mar-15	Year 8 Apr-15	Year 8 May-15	Year 8 Jun-15	Year 8 Jul-15	Year 8 Aug-15	Year 8 Sep-15	Year 8 Oct-15	Year 8 Nov-15	Year 8 Dec-15	Year 8 Jan-16	Year 8 Feb-16
Parameter													
TDS	mg/L				159	186	148	145	205				
TSS	mg/L				3.0	3.8	2.9	3.0	2.9				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.001	0.002	0.001		0.002				
Sulphate	mg/L				4.0	4.6	3.6	3.0	4.7				
Chloride	mg/L				74	112	83	63	117				
Total Ammonia-N	mg/L				0.008	0.014	0.012	0.008	0.007				
Nitrate-N	mg/L				0.04	0.11	0.05	0.01	0.12				
Nitrite-N	mg/L				0.001	0.002	0.001	0.001	0.001				
Alkalinity	mg/L				26	27	27	28	28				
OrthoPhosphate-P	mg/L				0.0031	0.0075	0.0036	0.0008	0.0081				
Phosphate-P	mg/L				0.0210	0.0268	0.0345	0.0270	0.0327				
Org. Carbon	mg/L				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3	mg/L				38	42	44	45	46				
Total Metals													
Aluminum Al	mg/L				0.08	0.06	0.06	0.05	0.05				
Antimony Sb	mg/L				0.0002	0.0006	0.0003	0.0000	0.0007				
Arsenic As	mg/L				0.0004	0.0005	0.0005	0.0004	0.0005				
Barium Ba	mg/L				0.0033	0.0032	0.0030	0.0030	0.0031				
Beryllium Be	mg/L				0.00001	0.00003	0.00001	0.00000	0.00003				
Bismuth Bi	mg/L				0.00021	0.00061	0.00026	0.00000	0.00065				
Boron B	mg/L				0.019	0.022	0.023	0.022	0.023				
Cadmium Cd	mg/L				0.0000029	0.0000042	0.0000029	0.0000020	0.0000044				
Calcium Ca	mg/L				9	16	11	7	17				
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0001	0.0001	0.0001	0.0001	0.0002				
Copper Cu	mg/L				0.0013	0.0015	0.0015	0.0014	0.0015				
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09				
Lead Pb	mg/L				0.00005	0.00007	0.00012	0.00004	0.00005				
Lithium Li	mg/L				0.0000	0.0001	0.0000		0.0001				
Magnesium Mg	mg/L				5.3	6.0	6.3	6.4	6.4				
Manganese Mn	mg/L				0.011	0.015	0.016	0.010	0.010				
Mercury Hg	ug/L				0.0006339	0.0007009	0.0006406	0.0006000	0.0007104				
Molybdenum Mo	mg/L				0.00016	0.00028	0.00021	0.00014	0.00029				
Nickel Ni	mg/L				0.0005	0.0007	0.0005	0.0004	0.0007				
Phosphorus P	mg/L				0.003	0.010	0.004		0.011				
Potassium K	mg/L				2.2	2.6	2.4	2.3	2.7				
Selenium Se	mg/L				0.00077	0.00081	0.00083	0.00112	0.00108				
Silicon SiO2	mg/L				0.04	0.10	0.04		0.11				
Silver Ag	mg/L				0.0000025	0.0000042	0.0000021	0.0000007	0.0000042				
Sodium Na	mg/L				31	44	38	32	46				
Strontium Sr	mg/L				0.035	0.039	0.039	0.040	0.040				
Tellurium Te	mg/L				0.000	0.000	0.000		0.000				
Thallium Tl	mg/L				0.000018	0.000022	0.000011	0.000003	0.000004				
Thorium Th	mg/L				0.000002	0.000005	0.000002		0.000006				
Tin Sn	mg/L				0.00006	0.00022	0.00008	0.00003	0.00014				
Titanium Ti	mg/L				0.0000	0.0001	0.0000		0.0001				
Uranium U	mg/L				0.000030	0.000036	0.000038	0.000032	0.000036				
Vanadium V	mg/L				0.0006	0.0003	0.0002	0.0001	0.0003				
Zinc Zn	mg/L				0.0015	0.0020	0.0030	0.0017	0.0022				
Zirconium Zr	mg/L				0.0050	0.0051	0.0050	0.0050	0.0051				

Water Quality in DORIS CR Water Quality in DORIS CREEK (d/s of the waterfall)

Date		Year 9 Mar-16	Year 9 Apr-16	Year 9 May-16	Year 9 Jun-16	Year 9 Jul-16	Year 9 Aug-16	Year 9 Sep-16	Year 9 Oct-16	Year 9 Nov-16	Year 9 Dec-16	Year 9 Jan-17	Year 9 Feb-17
Parameter													
TDS	mg/L				155	175	144	145	192				
TSS	mg/L				3.0	3.8	2.9	3.0	2.9				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.000	0.001	0.001		0.001				
Sulphate	mg/L				3.9	4.3	3.5	3.0	4.4				
Chloride	mg/L				70	102	79	63	106				
Total Ammonia-N	mg/L				0.008	0.014	0.012	0.008	0.007				
Nitrate-N	mg/L				0.02	0.05	0.02	0.01	0.05				
Nitrite-N	mg/L				0.001	0.002	0.001	0.001	0.001				
Alkalinity	mg/L				26	27	27	28	28				
OrthoPhosphate-P	mg/L				0.0026	0.0062	0.0031	0.0008	0.0067				
Phosphate-P	mg/L				0.0206	0.0255	0.0339	0.0270	0.0313				
Org. Carbon	mg/L				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3	mg/L				38	42	44	45	45				
Total Metals													
Aluminum Al	mg/L				0.08	0.06	0.06	0.05	0.05				
Antimony Sb	mg/L				0.0002	0.0005	0.0002	0.0000	0.0005				
Arsenic As	mg/L				0.0004	0.0004	0.0005	0.0004	0.0005				
Barium Ba	mg/L				0.0033	0.0032	0.0030	0.0030	0.0030				
Beryllium Be	mg/L				0.00001	0.00002	0.00001	0.00000	0.00002				
Bismuth Bi	mg/L				0.00017	0.00049	0.00021	0.00000	0.00053				
Boron B	mg/L				0.019	0.022	0.023	0.022	0.023				
Cadmium Cd	mg/L				0.0000028	0.0000038	0.0000028	0.0000020	0.0000040				
Calcium Ca	mg/L				9	14	10	7	15				
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0001	0.0001	0.0001	0.0001	0.0001				
Copper Cu	mg/L				0.0013	0.0015	0.0014	0.0014	0.0015				
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09				
Lead Pb	mg/L				0.00005	0.00007	0.00012	0.00004	0.00005				
Lithium Li	mg/L				0.0000	0.0001	0.0000		0.0001				
Magnesium Mg	mg/L				5.3	5.9	6.3	6.4	6.4				
Manganese Mn	mg/L				0.011	0.014	0.016	0.010	0.010				
Mercury Hg	ug/L				0.0006274	0.0006820	0.0006326	0.0006000	0.0006899				
Molybdenum Mo	mg/L				0.00015	0.00026	0.00019	0.00014	0.00026				
Nickel Ni	mg/L				0.0005	0.0007	0.0005	0.0004	0.0006				
Phosphorus P	mg/L				0.003	0.008	0.003		0.009				
Potassium K	mg/L				2.2	2.5	2.3	2.3	2.6				
Selenium Se	mg/L				0.00077	0.00081	0.00083	0.00112	0.00108				
Silicon SiO2	mg/L				0.03	0.08	0.04		0.09				
Silver Ag	mg/L				0.0000023	0.0000036	0.0000018	0.0000007	0.0000036				
Sodium Na	mg/L				30	41	37	32	43				
Strontium Sr	mg/L				0.035	0.039	0.039	0.040	0.040				
Tellurium Te	mg/L				0.000	0.000	0.000		0.000				
Thallium Tl	mg/L				0.000017	0.000021	0.000011	0.000003	0.000004				
Thorium Th	mg/L				0.000001	0.000004	0.000002		0.000005				
Tin Sn	mg/L				0.00006	0.00020	0.00007	0.00003	0.00012				
Titanium Ti	mg/L				0.0000	0.0001	0.0000		0.0001				
Uranium U	mg/L				0.000030	0.000035	0.000037	0.000032	0.000035				
Vanadium V	mg/L				0.0006	0.0002	0.0002	0.0001	0.0002				
Zinc Zn	mg/L				0.0015	0.0019	0.0030	0.0017	0.0021				
Zirconium Zr	mg/L				0.0050	0.0051	0.0050	0.0050	0.0051				

Water Quality in DORIS CR Water Quality in DORIS CREEK (d/s of the waterfall)

Date		Year 10 Mar-17	Year 10 Apr-17	Year 10 May-17	Year 10 Jun-17	Year 10 Jul-17	Year 10 Aug-17	Year 10 Sep-17	Year 10 Oct-17	Year 10 Nov-17	Year 10 Dec-17	Year 10 Jan-18
Parameter												
TDS	mg/L				152	166	140	145	183			
TSS	mg/L				3.0	3.8	2.9	3.0	2.9			
Free CN	mg/L											
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001			
WAD CN	mg/L											
CNO	mg/L											
SCN	mg/L				0.000	0.001	0.000		0.001			
Sulphate	mg/L				3.8	4.0	3.4	3.0	4.1			
Chloride	mg/L				68	94	75	63	98			
Total Ammonia-N	mg/L				0.008	0.014	0.012	0.008	0.007			
Nitrate-N	mg/L				0.01	0.01	0.00	0.01	0.00			
Nitrite-N	mg/L				0.001	0.002	0.001	0.001	0.001			
Alkalinity	mg/L				26	27	27	28	28			
OrthoPhosphate-P	mg/L				0.0023	0.0052	0.0026	0.0008	0.0056			
Phosphate-P	mg/L				0.0202	0.0245	0.0335	0.0270	0.0302			
Org. Carbon	mg/L				5.0	5.0	5.0	5.0	5.1			
Hardness CaCO3	mg/L				38	42	44	45	45			
Total Metals												
Aluminum Al	mg/L				0.08	0.06	0.06	0.05	0.05			
Antimony Sb	mg/L				0.0001	0.0004	0.0002	0.0000	0.0004			
Arsenic As	mg/L				0.0004	0.0004	0.0005	0.0004	0.0005			
Barium Ba	mg/L				0.0033	0.0032	0.0030	0.0030	0.0030			
Beryllium Be	mg/L				0.00001	0.00002	0.00001	0.00000	0.00002			
Bismuth Bi	mg/L				0.00014	0.00040	0.00017	0.00000	0.00042			
Boron B	mg/L				0.019	0.021	0.023	0.022	0.022			
Cadmium Cd	mg/L				0.0000027	0.0000035	0.0000026	0.0000020	0.0000036			
Calcium Ca	mg/L				8	13	10	7	13			
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000			
Cobalt Co	mg/L				0.0001	0.0001	0.0001	0.0001	0.0001			
Copper Cu	mg/L				0.0013	0.0015	0.0014	0.0014	0.0015			
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09			
Lead Pb	mg/L				0.00005	0.00006	0.00012	0.00004	0.00005			
Lithium Li	mg/L				0.0000	0.0001	0.0000		0.0001			
Magnesium Mg	mg/L				5.3	5.9	6.3	6.4	6.4			
Manganese Mn	mg/L				0.011	0.014	0.016	0.010	0.010			
Mercury Hg	ug/L				0.0006222	0.0006667	0.0006261	0.0006000	0.0006733			
Molybdenum Mo	mg/L				0.00015	0.00023	0.00019	0.00014	0.00024			
Nickel Ni	mg/L				0.0005	0.0007	0.0005	0.0004	0.0006			
Phosphorus P	mg/L				0.002	0.006	0.003		0.007			
Potassium K	mg/L				2.2	2.5	2.3	2.3	2.5			
Selenium Se	mg/L				0.00077	0.00081	0.00083	0.00112	0.00108			
Silicon SiO2	mg/L				0.02	0.07	0.03		0.08			
Silver Ag	mg/L				0.0000021	0.0000031	0.0000016	0.0000007	0.0000030			
Sodium Na	mg/L				29	39	36	32	41			
Strontium Sr	mg/L				0.035	0.039	0.039	0.040	0.040			
Tellurium Te	mg/L				0.000	0.000	0.000		0.000			
Thallium Tl	mg/L				0.000017	0.000021	0.000011	0.000003	0.000004			
Thorium Th	mg/L				0.000001	0.000003	0.000001		0.000004			
Tin Sn	mg/L				0.00005	0.00018	0.00006	0.00003	0.00010			
Titanium Ti	mg/L				0.0000	0.0001	0.0000		0.0001			
Uranium U	mg/L				0.000030	0.000034	0.000037	0.000032	0.000034			
Vanadium V	mg/L				0.0006	0.0002	0.0002	0.0001	0.0002			
Zinc Zn	mg/L				0.0015	0.0019	0.0029	0.0017	0.0021			
Zirconium Zr	mg/L				0.0050	0.0051	0.0050	0.0050	0.0051			

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)												
Date	Year 1 Mar-08	Year 1 Apr-08	Year 1 May-08	Year 1 Jun-08	Year 1 Jul-08	Year 1 Aug-08	Year 1 Sep-08	Year 1 Oct-08	Year 1 Nov-08	Year 1 Dec-08	Year 1 Jan-09	Year 1 Feb-09
Parameter												
TDS				657085	403079	158763	219513	89849				
TSS				13508	11248	3547	4467	1624				
Free CN				0.04	0.01	0.00	0.00	0.00				
Total CN				5	3	1	2	1				
WAD CN				0.06	0.02	0.01	0.00	0.01				
CNO				93	25	10	3	8				
SCN				3	4	1	0	1				
Sulphate				17981	11751	4676	4916	2911				
Chloride				284262	217937	88224	99192	51757				
Total Ammonia				94	113	28	22	14				
Nitrate				362	459	182	121	192				
Nitrite				32	54	15	4	4				
Alkalinity				120185	80795	33549	41857	16324				
OrthoPhosphate-P				9	10	4	2	4				
Phosphate-P				91	67	41	41	17				
Org. Carbon				23247	14978	6185	7507	2875				
Hardness CaCO3				174213	123424	53526	67605	26181				
Total Metals												
Aluminum Al				348	173	71	74	27				
Antimony Sb				0.4	0.8	0.3	0.1	0.4				
Arsenic As				1.9	1.3	0.6	0.7	0.3				
Barium Ba				15	9	4	4	2				
Beryllium Be				0.06	0.06	0.02	0.02	0.02				
Bismuth Bi				0.35	0.81	0.30	0.12	0.35				
Boron B				89	63	28	34	13				
Cadmium Cd				0.02	0.01	0.01	0.01	0.00				
Calcium Ca				39090	34878	13572	12794	9739				
Chromium Cr				2	1	0	0	0				
Cobalt Co				0.38	0.33	0.14	0.11	0.11				
Copper Cu				6	4	2	2	1				
Iron Fe				510	321	101	135	50				
Lead Pb				0.24	0.19	0.15	0.06	0.03				
Lithium Li				0	0	0	0	0				
Magnesium Mg				24329	17459	7729	9559	3639				
Manganese Mn				51	42	19	15	6				
Mercury Hg				2.93	2.00	0.80	0.93	0.43				
Molybdenum Mo				0.75	0.71	0.28	0.25	0.20				
Nickel Ni				2.25	1.99	0.71	0.73	0.43				
Phosphorus P				13	15	5	3	6				
Potassium K				10077	7353	2955	3591	1603				
Selenium Se				3.53	2.38	1.01	1.68	0.61				
Silicon SiO2				193	233	84	44	90				
Silver Ag				0.02	0.01	0.00	0.00	0.00				
Sodium Na				120568	88389	39085	48029	17944				
Strontium Sr				161	114	47	60	23				
Tellurium Te				0	0	0	0	0				
Thallium Tl				0.08	0.06	0.01	0.01	0.00				
Thorium Th				0.02	0.01	0.01	0.00	0.00				
Tin Sn				0.22	0.49	0.10	0.08	0.08				
Titanium Ti				0	0	0	0	0				
Uranium U				0.15	0.11	0.05	0.05	0.02				
Vanadium V				2.79	0.60	0.25	0.22	0.15				
Zinc Zn				7.57	5.89	3.77	2.70	1.32				
Zirconium Zr				23	15	6	8	3				

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)												
Date	Year 2 Mar-09	Year 2 Apr-09	Year 2 May-09	Year 2 Jun-09	Year 2 Jul-09	Year 2 Aug-09	Year 2 Sep-09	Year 2 Oct-09	Year 2 Nov-09	Year 2 Dec-09	Year 2 Jan-10	Year 2 Feb-10
Parameter												
TDS				812537	461870	191560	235365	101098				
TSS				14008	11382	3648	4519	1647				
Free CN				0.22		0.01	0.00	0.00				
Total CN				8	3	1	2	1				
WAD CN				0.31		0.01	0.00	0.01				
CNO				500		18	7	9				
SCN				24	13	6	3	3				
Sulphate				34417	18837	8320	6636	4304				
Chloride				537769	327540	143566	125175	73345				
Total Ammonia				260	165	26	26	14				
Nitrate				2150	1324	617	331	363				
Nitrite				140	51	26	5	4				
Alkalinity				132862	83986	36099	43192	16862				
OrthoPhosphate-P				55	30	13	7	8				
Phosphate-P				138	87	51	46	21				
Org. Carbon				24163	14871	6341	7611	2834				
Hardness CaCO3				198001	131038	58441	70071	27575				
Total Metals												
Aluminum Al				358	176	73	75	28				
Antimony Sb				4.3	2.7	1.3	0.6	0.7				
Arsenic As				2.5	1.6	0.8	0.7	0.3				
Barium Ba				17	10	4	5	2				
Beryllium Be				0.24	0.14	0.06	0.04	0.04				
Bismuth Bi				4.24	2.62	1.24	0.56	0.71				
Boron B				97	66	30	35	13				
Cadmium Cd				0.03	0.02	0.01	0.01	0.00				
Calcium Ca				121178	70461	31321	21095	16758				
Chromium Cr				2	1	1	0	0				
Cobalt Co				1.48	0.83	0.38	0.23	0.21				
Copper Cu				8	5	2	2	1				
Iron Fe				524	323	104	137	50				
Lead Pb				0.37	0.25	0.18	0.08	0.04				
Lithium Li				1	1	0	0	0				
Magnesium Mg				26567	18056	8191	9800	3742				
Manganese Mn				56	44	20	16	6				
Mercury Hg				4.36	2.57	1.11	1.07	0.54				
Molybdenum Mo				2.58	1.51	0.68	0.43	0.36				
Nickel Ni				4.70	3.03	1.24	0.99	0.64				
Phosphorus P				79	44	20	10	11				
Potassium K				14877	9328	3984	4079	1989				
Selenium Se				3.69	2.41	1.04	1.69	0.62				
Silicon SiO2				1367	752	341	164	193				
Silver Ag				0.03	0.02	0.01	0.01	0.00				
Sodium Na				131097	91667	41254	49123	18540				
Strontium Sr				179	119	51	62	24				
Tellurium Te				0	0	0	0	0				
Thallium Tl				0.09	0.07	0.02	0.01	0.00				
Thorium Th				0.06	0.03	0.01	0.01	0.01				
Tin Sn				0.87	0.79	0.26	0.15	0.14				
Titanium Ti				0	0	0	0	0				
Uranium U				0.20	0.13	0.06	0.06	0.03				
Vanadium V				3.52	0.91	0.42	0.30	0.21				
Zinc Zn				10.66	6.80	4.41	3.03	1.49				
Zirconium Zr				25	15	7	8	3				

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)													
Date	Year 3 Mar-10	Year 3 Apr-10	Year 3 May-10	Year 3 Jun-10	Year 3 Jul-10	Year 3 Aug-10	Year 3 Sep-10	Year 3 Oct-10	Year 3 Nov-10	Year 3 Dec-10	Year 3 Jan-11	Year 3 Feb-11	
Parameter													
TDS				893169	468655	173423	216474	109840					
TSS				14108	11320	3556	4447	1648					
Free CN				0.15									
Total CN				7	3	1	1	1					
WAD CN				0.21									
CNO				339									
SCN				33	13	3	0	3					
Sulphate				42019	18981	6217	4663	4698					
Chloride				669398	338043	114790	95886	83237					
Total Ammonia				219	110	22	20	9					
Nitrate				3039	1337	366	89	400					
Nitrite				137	42	13	3	3					
Alkalinity				135069	82226	33655	41323	16853					
OrthoPhosphate-P				86	36	10	2	11					
Phosphate-P				168	92	47	41	25					
Org. Carbon				23896	14522	6050	7416	2824					
Hardness CaCO3				204192	128797	54411	66860	27599					
Total Metals													
Aluminum Al				362	175	71	73	28					
Antimony Sb				7.1	3.2	0.9	0.1	1.1					
Arsenic As				2.7	1.6	0.7	0.7	0.3					
Barium Ba				18	10	4	4	2					
Beryllium Be				0.34	0.15	0.04	0.01	0.04					
Bismuth Bi				6.95	3.12	0.84	0.06	1.05					
Boron B				100	65	28	34	14					
Cadmium Cd				0.04	0.02	0.01	0.01	0.00					
Calcium Ca				154273	68785	20550	11685	17076					
Chromium Cr				3	1	0	0	0					
Cobalt Co				1.99	0.83	0.24	0.10	0.23					
Copper Cu				8	5	2	2	1					
Iron Fe				526	322	101	134	50					
Lead Pb				0.43	0.25	0.16	0.06	0.05					
Lithium Li				1	1	0	0	0					
Magnesium Mg				27102	17817	7777	9467	3774					
Manganese Mn				57	44	19	15	6					
Mercury Hg				4.88	2.51	0.91	0.90	0.55					
Molybdenum Mo				3.33	1.48	0.44	0.22	0.37					
Nickel Ni				5.76	3.01	0.92	0.70	0.68					
Phosphorus P				120	50	13	2	16					
Potassium K				16688	9166	3320	3510	2007					
Selenium Se				3.72	2.39	1.01	1.67	0.62					
Silicon SiO2				1865	737	188	29	200					
Silver Ag				0.05	0.02	0.01	0.00	0.01					
Sodium Na				133733	90619	39439	47685	18551					
Strontium Sr				183	118	48	60	24					
Tellurium Te				0	0	0	0	0					
Thallium Tl				0.09	0.07	0.01	0.01	0.00					
Thorium Th				0.07	0.03	0.01	0.00	0.01					
Tin Sn				1.31	0.86	0.19	0.07	0.19					
Titanium Ti				0	0	0	0	0					
Uranium U				0.22	0.13	0.05	0.05	0.03					
Vanadium V				3.96	0.96	0.33	0.21	0.26					
Zinc Zn				11.53	6.53	3.87	2.58	1.53					
Zirconium Zr				25	15	6	8	3					

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)												
Date	Year 4 Mar-11	Year 4 Apr-11	Year 4 May-11	Year 4 Jun-11	Year 4 Jul-11	Year 4 Aug-11	Year 4 Sep-11	Year 4 Oct-11	Year 4 Nov-11	Year 4 Dec-11	Year 4 Jan-12	Year 4 Feb-12
Parameter												
TDS				735420	495891	169555	214702	105055				
TSS				13551	11324	3533	4442	1629				
Free CN												
Total CN				4	3	1	1	1				
WAD CN												
CNO												
SCN				9	11	2		2				
Sulphate				24788	19187	5458	4501	3909				
Chloride				408369	357351	105430	93285	72872				
Total Ammonia				70	61	21	20	7				
Nitrate				1159	1332	275	70	296				
Nitrite				35	8	3	3	1				
Alkalinity				120803	82243	33070	41193	16351				
OrthoPhosphate-P				42	47	9	1	10				
Phosphate-P				123	104	46	40	24				
Org. Carbon				22797	14643	6016	7404	2802				
Hardness CaCO3				177734	128237	53272	66632	26587				
Total Metals												
Aluminum Al				352	177	71	73	28				
Antimony Sb				3.5	4.1	0.7	0.0	0.9				
Arsenic As				2.1	1.6	0.7	0.7	0.3				
Barium Ba				16	10	4	4	2				
Beryllium Be				0.17	0.17	0.04	0.01	0.04				
Bismuth Bi				3.41	4.03	0.72	0.01	0.86				
Boron B				91	66	28	34	13				
Cadmium Cd				0.02	0.02	0.01	0.00	0.00				
Calcium Ca				64711	63326	16328	10984	13106				
Chromium Cr				2	1	0	0	0				
Cobalt Co				0.82	0.82	0.19	0.09	0.18				
Copper Cu				6	5	2	2	1				
Iron Fe				512	324	101	134	50				
Lead Pb				0.30	0.26	0.16	0.06	0.04				
Lithium Li				0	1	0	0	0				
Magnesium Mg				24661	17938	7682	9442	3685				
Manganese Mn				53	44	19	15	6				
Mercury Hg				3.31	2.43	0.84	0.89	0.48				
Molybdenum Mo				1.33	1.36	0.34	0.21	0.28				
Nickel Ni				3.15	2.98	0.80	0.67	0.56				
Phosphorus P				54	62	12	1	13				
Potassium K				11436	8895	3077	3467	1780				
Selenium Se				3.54	2.40	1.00	1.67	0.61				
Silicon SiO2				592	671	129	19	144				
Silver Ag				0.03	0.02	0.01	0.00	0.00				
Sodium Na				122011	90420	38939	47583	18108				
Strontium Sr				164	118	47	60	23				
Tellurium Te				0	0	0	0	0				
Thallium Tl				0.08	0.07	0.01	0.01	0.00				
Thorium Th				0.03	0.03	0.01	0.00	0.01				
Tin Sn				0.70	1.00	0.16	0.06	0.16				
Titanium Ti				0	0	0	0	0				
Uranium U				0.16	0.13	0.05	0.05	0.02				
Vanadium V				3.25	1.10	0.30	0.20	0.22				
Zinc Zn				8.17	6.67	3.74	2.55	1.40				
Zirconium Zr				23	15	6	7	3				

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)													
Date	Year 5 Mar-12	Year 5 Apr-12	Year 5 May-12	Year 5 Jun-12	Year 5 Jul-12	Year 5 Aug-12	Year 5 Sep-12	Year 5 Oct-12	Year 5 Nov-12	Year 5 Dec-12	Year 5 Jan-13	Year 5 Feb-13	
Parameter													
TDS				682109	517838	180171	214702	136853					
TSS				13444	11322	3532	4442	1627					
Free CN													
Total CN				4	3	1	1	1					
WAD CN													
CNO													
SCN				5	9	2		2					
Sulphate				20509	17588	5112	4501	3496					
Chloride				333285	352925	108180	93285	87808					
Total Ammonia				59	62	21	20	7					
Nitrate				704	1116	230	70	242					
Nitrite				9	9	3	3	1					
Alkalinity				118089	81985	32969	41193	16231					
OrthoPhosphate-P				23	40	7	1	8					
Phosphate-P				105	97	44	40	22					
Org. Carbon				22588	14726	6025	7404	2812					
Hardness CaCO3				172699	127252	53006	66632	26270					
Total Metals													
Aluminum Al				349	177	71	73	28					
Antimony Sb				1.9	3.4	0.6	0.0	0.7					
Arsenic As				2.0	1.5	0.6	0.7	0.3					
Barium Ba				15	10	4	4	2					
Beryllium Be				0.11	0.15	0.03	0.01	0.03					
Bismuth Bi				1.80	3.39	0.58	0.01	0.69					
Boron B				89	66	28	34	13					
Cadmium Cd				0.02	0.02	0.01	0.00	0.00					
Calcium Ca				47461	59021	15763	10984	13555					
Chromium Cr				2	1	0	0	0					
Cobalt Co				0.55	0.71	0.17	0.09	0.15					
Copper Cu				6	5	2	2	1					
Iron Fe				509	326	101	134	51					
Lead Pb				0.27	0.25	0.16	0.06	0.04					
Lithium Li				0	0	0	0	0					
Magnesium Mg				24102	17867	7659	9442	3658					
Manganese Mn				52	44	19	15	6					
Mercury Hg				3.01	2.33	0.81	0.89	0.45					
Molybdenum Mo				0.94	1.21	0.31	0.21	0.24					
Nickel Ni				2.56	2.76	0.76	0.67	0.50					
Phosphorus P				31	54	10	1	11					
Potassium K				10417	8539	2999	3467	1687					
Selenium Se				3.50	2.40	1.00	1.67	0.61					
Silicon SiO2				342	580	109	19	121					
Silver Ag				0.02	0.02	0.01	0.00	0.00					
Sodium Na				119771	103500	43725	47583	30182					
Strontium Sr				161	117	47	60	23					
Tellurium Te				0	0	0	0	0					
Thallium Tl				0.08	0.07	0.01	0.01	0.00					
Thorium Th				0.02	0.03	0.01	0.00	0.01					
Tin Sn				0.44	0.90	0.14	0.06	0.13					
Titanium Ti				0	0	0	0	0					
Uranium U				0.15	0.12	0.05	0.05	0.02					
Vanadium V				2.97	1.01	0.28	0.20	0.20					
Zinc Zn				7.37	6.48	3.69	2.55	1.34					
Zirconium Zr				23	15	6	7	3					

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)												
Date	Year 6 Mar-13	Year 6 Apr-13	Year 6 May-13	Year 6 Jun-13	Year 6 Jul-13	Year 6 Aug-13	Year 6 Sep-13	Year 6 Oct-13	Year 6 Nov-13	Year 6 Dec-13	Year 6 Jan-14	Year 6 Feb-14
Parameter												
TDS				768041	640117	193422	214702	133747				
TSS				13441	11316	3530	4442	1626				
Free CN												
Total CN				4	3	1	1	1				
WAD CN												
CNO												
SCN				4	8	1		2				
Sulphate				19477	15860	4788	4442	3141				
Chloride				376466	410068	113273	93285	82336				
Total Ammonia				36	48	15	12	5				
Nitrate				405	789	145	7	177				
Nitrite				5	7	1	1	1				
Alkalinity				117841	81515	32889	41193	16134				
OrthoPhosphate-P				20	33	6	1	7				
Phosphate-P				101	89	43	40	21				
Org. Carbon				22609	14765	6031	7404	2820				
Hardness CaCO3				172042	126010	52792	66632	26014				
Total Metals												
Aluminum Al				344	175	70	71	27				
Antimony Sb				1.5	2.8	0.5	0.0	0.6				
Arsenic As				1.8	1.4	0.6	0.6	0.3				
Barium Ba				15	10	4	4	2				
Beryllium Be				0.08	0.12	0.02	0.00	0.02				
Bismuth Bi				1.44	2.73	0.47	0.00	0.56				
Boron B				88	65	27	33	13				
Cadmium Cd				0.01	0.02	0.00	0.00	0.00				
Calcium Ca				49276	60465	15508	10883	12188				
Chromium Cr				2	1	0	0	0				
Cobalt Co				0.47	0.60	0.14	0.08	0.13				
Copper Cu				6	5	2	2	1				
Iron Fe				508	327	101	134	51				
Lead Pb				0.24	0.22	0.15	0.05	0.03				
Lithium Li				0	0	0		0				
Magnesium Mg				24017	17744	7634	9432	3633				
Manganese Mn				52	43	19	15	6				
Mercury Hg				2.95	2.22	0.79	0.89	0.43				
Molybdenum Mo				0.86	1.06	0.29	0.21	0.21				
Nickel Ni				2.42	2.52	0.71	0.66	0.45				
Phosphorus P				22	43	7		9				
Potassium K				10218	8172	2935	3465	1611				
Selenium Se				3.48	2.39	0.99	1.66	0.61				
Silicon SiO2				236	454	79		95				
Silver Ag				0.01	0.02	0.00	0.00	0.00				
Sodium Na				151430	150032	49144	47580	30377				
Strontium Sr				160	116	47	60	23				
Tellurium Te				0	0	0		0				
Thallium Tl				0.08	0.06	0.01	0.00	0.00				
Thorium Th				0.01	0.02	0.00		0.00				
Tin Sn				0.37	0.79	0.12	0.05	0.11				
Titanium Ti				0	0	0		0				
Uranium U				0.14	0.11	0.05	0.05	0.02				
Vanadium V				2.88	0.89	0.25	0.18	0.17				
Zinc Zn				7.14	6.19	3.62	2.51	1.29				
Zirconium Zr				23	15	6	7	3				

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)												
Date	Year 7 Mar-14	Year 7 Apr-14	Year 7 May-14	Year 7 Jun-14	Year 7 Jul-14	Year 7 Aug-14	Year 7 Sep-14	Year 7 Oct-14	Year 7 Nov-14	Year 7 Dec-14	Year 7 Jan-15	Year 7 Feb-15
Parameter												
TDS				741443	589784	184775	214702	123360				
TSS				13438	11311	3530	4442	1625				
Free CN												
Total CN				4	3	1	1	1				
WAD CN												
CNO												
SCN				3	6	1		1				
Sulphate				18786	14537	4559	4442	2864				
Chloride				352861	365400	105599	93285	73119				
Total Ammonia				36	41	14	12	4				
Nitrate				315	569	101	7	117				
Nitrite				5	6	1	1	1				
Alkalinity				117641	81136	32823	41193	16056				
OrthoPhosphate-P				16	27	5	1	6				
Phosphate-P				98	84	42	40	19				
Org. Carbon				22625	14796	6037	7404	2827				
Hardness CaCO3				171512	125006	52620	66632	25806				
Total Metals												
Aluminum Al				344	175	70	71	27				
Antimony Sb				1.2	2.2	0.4	0.0	0.5				
Arsenic As				1.8	1.4	0.6	0.6	0.3				
Barium Ba				15	10	4	4	2				
Beryllium Be				0.07	0.10	0.02	0.00	0.02				
Bismuth Bi				1.17	2.22	0.38	0.00	0.45				
Boron B				88	64	27	33	13				
Cadmium Cd				0.01	0.01	0.00	0.00	0.00				
Calcium Ca				45332	52976	14218	10883	10635				
Chromium Cr				2	1	0	0	0				
Cobalt Co				0.43	0.51	0.13	0.08	0.11				
Copper Cu				6	5	2	2	1				
Iron Fe				509	328	101	134	51				
Lead Pb				0.24	0.21	0.15	0.05	0.03				
Lithium Li				0	0	0		0				
Magnesium Mg				23972	17657	7618	9432	3615				
Manganese Mn				51	43	19	15	6				
Mercury Hg				2.91	2.14	0.78	0.89	0.41				
Molybdenum Mo				0.80	0.93	0.26	0.21	0.18				
Nickel Ni				2.32	2.34	0.68	0.66	0.42				
Phosphorus P				18	35	6		7				
Potassium K				10063	7879	2884	3465	1551				
Selenium Se				3.48	2.39	0.99	1.66	0.61				
Silicon SiO2				197	375	65		78				
Silver Ag				0.01	0.01	0.00	0.00	0.00				
Sodium Na				145139	138125	47098	47580	27920				
Strontium Sr				160	116	47	60	23				
Tellurium Te				0	0	0		0				
Thallium Tl				0.08	0.06	0.01	0.00	0.00				
Thorium Th				0.01	0.02	0.00		0.00				
Tin Sn				0.32	0.70	0.10	0.05	0.09				
Titanium Ti				0	0	0		0				
Uranium U				0.14	0.11	0.05	0.05	0.02				
Vanadium V				2.84	0.81	0.24	0.18	0.16				
Zinc Zn				7.04	6.00	3.59	2.51	1.24				
Zirconium Zr				23	15	6	7	3				

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)												
Date	Year 8 Mar-15	Year 8 Apr-15	Year 8 May-15	Year 8 Jun-15	Year 8 Jul-15	Year 8 Aug-15	Year 8 Sep-15	Year 8 Oct-15	Year 8 Nov-15	Year 8 Dec-15	Year 8 Jan-16	Year 8 Feb-16
Parameter												
TDS				719963	549139	177792	214702	114973				
TSS				13436	11307	3529	4442	1624				
Free CN												
Total CN				4	3	1	1	1				
WAD CN												
CNO												
SCN				3	5	1		1				
Sulphate				18212	13450	4372	4442	2639				
Chloride				333800	329330	99402	93285	65675				
Total Ammonia				35	41	14	12	4				
Nitrate				188	328	59	7	67				
Nitrite				4	6	1	1	1				
Alkalinity				117479	80830	32771	41193	15993				
OrthoPhosphate-P				14	22	4	1	5				
Phosphate-P				95	79	41	40	18				
Org. Carbon				22639	14821	6041	7404	2832				
Hardness CaCO3				171084	124196	52481	66632	25639				
Total Metals												
Aluminum Al				344	175	70	71	27				
Antimony Sb				1.0	1.8	0.3	0.0	0.4				
Arsenic As				1.8	1.3	0.6	0.6	0.3				
Barium Ba				15	9	4	4	2				
Beryllium Be				0.06	0.08	0.02	0.00	0.02				
Bismuth Bi				0.94	1.80	0.31	0.00	0.37				
Boron B				87	64	27	33	13				
Cadmium Cd				0.01	0.01	0.00	0.00	0.00				
Calcium Ca				42119	46895	13173	10883	9380				
Chromium Cr				2	1	0	0	0				
Cobalt Co				0.39	0.44	0.12	0.08	0.09				
Copper Cu				6	5	2	2	1				
Iron Fe				510	329	101	134	51				
Lead Pb				0.23	0.20	0.14	0.05	0.03				
Lithium Li				0	0	0		0				
Magnesium Mg				23934	17584	7606	9432	3600				
Manganese Mn				51	43	19	15	6				
Mercury Hg				2.87	2.07	0.77	0.89	0.40				
Molybdenum Mo				0.74	0.83	0.25	0.21	0.16				
Nickel Ni				2.24	2.19	0.66	0.66	0.39				
Phosphorus P				15	29	5		6				
Potassium K				9937	7642	2844	3465	1502				
Selenium Se				3.48	2.39	0.99	1.66	0.61				
Silicon SiO2				161	305	53		63				
Silver Ag				0.01	0.01	0.00	0.00	0.00				
Sodium Na				140057	128509	45446	47580	25935				
Strontium Sr				159	115	47	60	23				
Tellurium Te				0	0	0		0				
Thallium Tl				0.08	0.06	0.01	0.00	0.00				
Thorium Th				0.01	0.02	0.00		0.00				
Tin Sn				0.29	0.64	0.09	0.05	0.08				
Titanium Ti				0	0	0		0				
Uranium U				0.14	0.11	0.05	0.05	0.02				
Vanadium V				2.80	0.74	0.23	0.18	0.14				
Zinc Zn				6.96	5.84	3.56	2.51	1.21				
Zirconium Zr				23	15	6	7	3				

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)												
Date	Year 9 Mar-16	Year 9 Apr-16	Year 9 May-16	Year 9 Jun-16	Year 9 Jul-16	Year 9 Aug-16	Year 9 Sep-16	Year 9 Oct-16	Year 9 Nov-16	Year 9 Dec-16	Year 9 Jan-17	Year 9 Feb-17
Parameter												
TDS				702618	516316	172154	214702	108199				
TSS				13434	11303	3528	4442	1623				
Free CN												
Total CN				4	3	1	1	1				
WAD CN												
CNO												
SCN				2	4	1		1				
Sulphate				17748	12572	4222	4442	2458				
Chloride				318407	300202	94398	93285	59664				
Total Ammonia				35	41	14	12	4				
Nitrate				85	134	26	7	27				
Nitrite				4	6	1	1	1				
Alkalinity				117348	80583	32728	41193	15942				
OrthoPhosphate-P				12	18	4	1	4				
Phosphate-P				93	75	41	40	18				
Org. Carbon				22650	14842	6044	7404	2836				
Hardness CaCO3				170738	123542	52368	66632	25504				
Total Metals												
Aluminum Al				344	174	70	71	27				
Antimony Sb				0.8	1.5	0.3	0.0	0.3				
Arsenic As				1.8	1.3	0.6	0.6	0.3				
Barium Ba				15	9	4	4	2				
Beryllium Be				0.05	0.07	0.01	0.00	0.01				
Bismuth Bi				0.76	1.46	0.25	0.00	0.30				
Boron B				87	64	27	33	13				
Cadmium Cd				0.01	0.01	0.00	0.00	0.00				
Calcium Ca				39524	41985	12330	10883	8367				
Chromium Cr				1	1	0	0	0				
Cobalt Co				0.36	0.38	0.11	0.08	0.08				
Copper Cu				6	4	2	2	1				
Iron Fe				510	330	102	134	52				
Lead Pb				0.23	0.20	0.14	0.05	0.03				
Lithium Li				0	0	0		0				
Magnesium Mg				23902	17525	7596	9432	3587				
Manganese Mn				51	43	19	15	6				
Mercury Hg				2.84	2.01	0.76	0.89	0.39				
Molybdenum Mo				0.70	0.75	0.23	0.21	0.15				
Nickel Ni				2.18	2.07	0.63	0.66	0.36				
Phosphorus P				12	23	4		5				
Potassium K				9836	7450	2811	3465	1462				
Selenium Se				3.48	2.38	0.99	1.66	0.61				
Silicon SiO2				131	249	43		52				
Silver Ag				0.01	0.01	0.00	0.00	0.00				
Sodium Na				135954	120744	44112	47580	24333				
Strontium Sr				159	115	47	60	23				
Tellurium Te				0	0	0		0				
Thallium Tl				0.08	0.06	0.01	0.00	0.00				
Thorium Th				0.01	0.01	0.00		0.00				
Tin Sn				0.26	0.58	0.08	0.05	0.07				
Titanium Ti				0	0	0		0				
Uranium U				0.14	0.10	0.04	0.05	0.02				
Vanadium V				2.77	0.68	0.22	0.18	0.13				
Zinc Zn				6.89	5.71	3.54	2.51	1.18				
Zirconium Zr				23	15	6	7	3				

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)												
Date	Year 10 Mar-17	Year 10 Apr-17	Year 10 May-17	Year 10 Jun-17	Year 10 Jul-17	Year 10 Aug-17	Year 10 Sep-17	Year 10 Oct-17	Year 10 Nov-17	Year 10 Dec-17	Year 10 Jan-18	Year 10 Feb-18
Parameter												
TDS				688612	489811	167600	214702	102730				
TSS				13433	11300	3528	4442	1623				
Free CN												
Total CN				4	3	1	1	1				
WAD CN												
CNO												
SCN				2	3	1		1				
Sulphate				17373	11863	4100	4442	2312				
Chloride				305977	276681	90357	93285	54810				
Total Ammonia				35	41	14	12	4				
Nitrate				23	17	6	7	3				
Nitrite				4	6	1	1	1				
Alkalinity				117243	80383	32694	41193	15901				
OrthoPhosphate-P				10	15	3	1	3				
Phosphate-P				92	72	40	40	17				
Org. Carbon				22658	14859	6047	7404	2839				
Hardness CaCO3				170459	123013	52278	66632	25395				
Total Metals												
Aluminum Al				344	174	70	71	27				
Antimony Sb				0.7	1.2	0.2	0.0	0.2				
Arsenic As				1.7	1.3	0.6	0.6	0.3				
Barium Ba				15	9	4	4	2				
Beryllium Be				0.05	0.06	0.01	0.00	0.01				
Bismuth Bi				0.62	1.18	0.20	0.00	0.24				
Boron B				87	63	27	33	13				
Cadmium Cd				0.01	0.01	0.00	0.00	0.00				
Calcium Ca				37429	38020	11649	10883	7548				
Chromium Cr				1	1	0	0	0				
Cobalt Co				0.33	0.33	0.10	0.08	0.07				
Copper Cu				6	4	2	2	1				
Iron Fe				510	331	102	134	52				
Lead Pb				0.22	0.19	0.14	0.05	0.03				
Lithium Li				0	0	0		0				
Magnesium Mg				23877	17477	7587	9432	3578				
Manganese Mn				51	43	19	15	5				
Mercury Hg				2.82	1.97	0.75	0.89	0.38				
Molybdenum Mo				0.67	0.69	0.22	0.21	0.13				
Nickel Ni				2.13	1.98	0.62	0.66	0.34				
Phosphorus P				10	19	3		4				
Potassium K				9754	7295	2784	3465	1430				
Selenium Se				3.48	2.38	0.99	1.66	0.61				
Silicon SiO2				107	203	35		42				
Silver Ag				0.01	0.01	0.00	0.00	0.00				
Sodium Na				132640	114473	43035	47580	23039				
Strontium Sr				159	114	47	60	22				
Tellurium Te				0	0	0		0				
Thallium Tl				0.08	0.06	0.01	0.00	0.00				
Thorium Th				0.01	0.01	0.00		0.00				
Tin Sn				0.24	0.54	0.08	0.05	0.06				
Titanium Ti				0	0	0		0				
Uranium U				0.13	0.10	0.04	0.05	0.02				
Vanadium V				2.75	0.64	0.21	0.18	0.12				
Zinc Zn				6.83	5.60	3.52	2.51	1.16				
Zirconium Zr				23	15	6	7	3				

OUTPUT SUMMARY							Fraction of CCME in LRL Creek (%)
Max Annual Discharge rate		929,638 m ³ /year in		Year 2			
Degradation Field(age)		Tail Lk Cu < CME Year		12			
				Doris Creek	Max L'Roberts L Outflow		
Maximum Concentration		MMER	CCME	Tail Lake Year 2	Downstream Year 3	Baseline Operational Year 3	
pH			6 to 9	7 to 8	7 to 8	7.6 7 to 8	
TDS		mg/L		1508	243	580 630	
TSS		mg/L	15	2.0	3.8	4.6 4.7	
Free CN		mg/L	0.005	0.0005	0.00004	0.00002	0%
Total CN		mg/L	1.0	0.008	0.002	0.001 0.001	
WAD CN		mg/L		0.0007	0.0001	0.0000	
CNO		mg/L		1.1	0.10	0.06	
SCN		mg/L		0.080	0.007	0.004	
Sulphate		mg/L		61	8.6	7.1 10.1	
Chloride		mg/L		1287	156	70 122	
Total Ammonia-N		mg/L	1.27	0.45	0.055	0.005 0.029	2%
Nitrate-N		mg/L	2.9	7.3	0.70	0.01 0.38	13%
Nitrite-N		mg/L	0.018	0.30	0.029	0.001 0.016	87%
Alkalinity		mg/L		51	30	25 27	
OrthoPhosphate-P		mg/L		0.2478	0.0199	0.0010 0.0113	
Phosphate-P		mg/L		0.2518	0.0441	0.0185 0.0278	
Org. Carbon		mg/L		5.9	5.1	5.3 5.5	
Hardness CaCO3		mg/L		92	49	45 49	
Total Metals							
Aluminum Al		mg/L	0.1	0.05	0.08	0.44 0.44	441%
Antimony Sb		mg/L		0.0220	0.0019	0.00002 0.0010	
Arsenic As		mg/L	0.5	0.00	0.0006	0.0005 0.0006	12%
Barium Ba		mg/L		0.0072	0.0036	0.0073 0.0076	
Beryllium Be		mg/L		0.00079	0.00008	0.000012 0.000047	
Bismuth Bi		mg/L		0.02187	0.0018	0.000007 0.0010	
Boron B		mg/L		0.035	0.024	0.027 0.028	
Cadmium Cd		mg/L	0.000017	0.000064	0.0000087	0.0000021 0.0000056	33%
Calcium Ca		mg/L		302	32	6.7 19	
Chromium Cr		mg/L	0.001	0.0030	0.0006	0.0009 0.0011	108%
Cobalt Co		mg/L		0.0041	0.0004	0.0001 0.0003	
Copper Cu		mg/L	0.3	0.007	0.0018	0.0016 0.0019	96%
Iron Fe		mg/L	0.3	0.12	0.11	0.36 0.3669	122%
Lead Pb		mg/L	0.2	0.00049	0.00014	0.00017 0.00020	20%
Lithium Li		mg/L		0.0030	0.0003	0.0001	
Magnesium Mg		mg/L		9.3	6.6	6.5 6.9	
Manganese Mn		mg/L		0.016	0.016	0.011 0.012	
Mercury Hg		ug/L	0.026	0.0053	0.0010	0.0006 0.0008	3%
Molybdenum Mo		mg/L	0.073	0.0067	0.00068	0.00018 0.00047	1%
Nickel Ni		mg/L	0.5	0.009	0.0012	0.0007 0.0012	5%
Phosphorus P		mg/L		0.328	0.027	0.015	
Potassium K		mg/L		18	3.5	2.3 3.0	
Selenium Se		mg/L	0.001	0.00067	0.00113	0.0014 0.0014	139%
Silicon SiO2		mg/L		4.3	0.38	0.21	
Silver Ag		mg/L	0.0001	0.00008	0.0000098	0.0000015 0.0000056	6%
Sodium Na		mg/L		354	54	33 46	
Strontium Sr		mg/L		0.066	0.042	0.042 0.045	
Tellurium Te		mg/L		0.000	0.000	0.000	
Thallium Tl		mg/L	0.0008	0.000034	0.000023	0.000064 0.000066	8%
Thorium Th		mg/L		0.000147	0.0000150	0.0000081	
Tin Sn		mg/L		0.00351	0.00034	0.00004 0.00020	
Titanium Ti		mg/L		0.0014	0.0001	0.0001	
Uranium U		mg/L		0.000198	0.000048	0.000052 0.000063	
Vanadium V		mg/L		0.0039	0.0008	0.0010 0.0012	
Zinc Zn		mg/L	0.5	0.012	0.0035	0.0084 0.0090	30%
Zirconium Zr		mg/L		0.0067	0.0052	0.0050 0.0054	

Water Quality in Little Roberts Lake Outflow													
Date		Year 1 Mar-08	Year 1 Apr-08	Year 1 May-08	Year 1 Jun-08	Year 1 Jul-08	Year 1 Aug-08	Year 1 Sep-08	Year 1 Oct-08	Year 1 Nov-08	Year 1 Dec-08	Year 1 Jan-09	Year 1 Feb-09
Parameter													
TDS	mg/L				110	588	146	152	164				
TSS	mg/L				4.7	3.0	2.3	2.2	2.3				
Free CN	mg/L				0.00000	0.00000	0.00000	0.00000	0.00000				
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L				0.0000	0.0000	0.0000	0.0000	0.0000				
CNO	mg/L				0.01	0.00	0.00	0.00	0.00				
SCN	mg/L				0.000	0.001	0.001	0.000	0.001				
Sulphate	mg/L				7.4	4.1	4.9	5.7	6.8				
Chloride	mg/L				54	67	67	72	88				
Total Ammonia-N	mg/L				0.010	0.018	0.011	0.008	0.014				
Nitrate-N	mg/L				0.04	0.08	0.08	0.04	0.18				
Nitrite-N	mg/L				0.004	0.010	0.007	0.002	0.004				
Alkalinity	mg/L				21	24	26	25	27				
OrthoPhosphate-P	mg/L				0.0016	0.0024	0.0021	0.0013	0.0041				
Phosphate-P	mg/L				0.0193	0.0176	0.0193	0.0174	0.0203				
Org. Carbon	mg/L				5.2	4.2	5.4	4.8	5.1				
Hardness CaCO3	mg/L				34	41	41	45	48				
Total Metals													
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06				
Antimony Sb	mg/L				0.0001	0.0002	0.0001	0.0001	0.0004				
Arsenic As	mg/L				0.0004	0.0004	0.0005	0.0005	0.0006				
Barium Ba	mg/L				0.0073	0.0036	0.0041	0.0034	0.0035				
Beryllium Be	mg/L				0.00002	0.00001	0.00001	0.00001	0.00002				
Bismuth Bi	mg/L				0.00004	0.00015	0.00013	0.00004	0.00033				
Boron B	mg/L				0.021	0.024	0.025	0.027	0.028				
Cadmium Cd	mg/L				0.0000029	0.0000034	0.0000032	0.0000028	0.0000040				
Calcium Ca	mg/L				6	9	9	7	12				
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0001	0.0001	0.0001	0.0001	0.0001				
Copper Cu	mg/L				0.0016	0.0013	0.0016	0.0016	0.0018				
Iron Fe	mg/L				0.37	0.13	0.16	0.13	0.14				
Lead Pb	mg/L				0.00018	0.00007	0.00013	0.00005	0.00006				
Lithium Li	mg/L				0.0000	0.0000	0.0000	0.0000	0.0001				
Magnesium Mg	mg/L				5.4	6.1	6.4	6.5	6.8				
Manganese Mn	mg/L				0.011	0.009	0.010	0.007	0.007				
Mercury Hg	ug/L				0.0006302	0.0006619	0.0006467	0.0006128	0.0007152				
Molybdenum Mo	mg/L				0.00019	0.00021	0.00023	0.00020	0.00031				
Nickel Ni	mg/L				0.0008	0.0006	0.0006	0.0006	0.0007				
Phosphorus P	mg/L				0.001	0.003	0.002	0.001	0.005				
Potassium K	mg/L				2.2	2.4	2.3	2.3	2.6				
Selenium Se	mg/L				0.00072	0.00079	0.00090	0.00136	0.00138				
Silicon SiO2	mg/L				0.02	0.04	0.04	0.01	0.09				
Silver Ag	mg/L				0.0000022	0.0000031	0.0000026	0.0000017	0.0000032				
Sodium Na	mg/L				26	32	33	33	34				
Strontium Sr	mg/L				0.037	0.039	0.042	0.042	0.044				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000064	0.000013	0.000002	0.000009	0.000010				
Thorium Th	mg/L				0.000002	0.000003	0.000002	0.000002	0.000004				
Tin Sn	mg/L				0.00004	0.00007	0.00007	0.00005	0.00010				
Titanium Ti	mg/L				0.0000	0.0000	0.0000	0.0000	0.0000				
Uranium U	mg/L				0.000054	0.000044	0.000047	0.000043	0.000047				
Vanadium V	mg/L				0.0010	0.0002	0.0005	0.0001	0.0002				
Zinc Zn	mg/L				0.0086	0.0027	0.0028	0.0013	0.0016				
Zirconium Zr	mg/L				0.0051	0.0052	0.0052	0.0051	0.0053				

Water Quality in Little Roberst Lake Outflow													
Date		Year 2 Mar-09	Year 2 Apr-09	Year 2 May-09	Year 2 Jun-09	Year 2 Jul-09	Year 2 Aug-09	Year 2 Sep-09	Year 2 Oct-09	Year 2 Nov-09	Year 2 Dec-09	Year 2 Jan-10	Year 2 Feb-10
Parameter													
TDS	mg/L				127	599	160	157	175				
TSS	mg/L				4.7	3.1	2.4	2.2	2.3				
Free CN	mg/L				0.00002		0.00000	0.00000	0.00000				
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L				0.0000		0.0000	0.0000	0.0000				
CNO	mg/L				0.06		0.01	0.00	0.01				
SCN	mg/L				0.003	0.002	0.003	0.001	0.003				
Sulphate	mg/L				9.2	5.4	6.4	6.2	8.1				
Chloride	mg/L				81	87	90	81	109				
Total Ammonia-N	mg/L				0.029	0.027	0.010	0.010	0.015				
Nitrate-N	mg/L				0.24	0.24	0.26	0.11	0.35				
Nitrite-N	mg/L				0.016	0.009	0.011	0.002	0.005				
Alkalinity	mg/L				22	24	27	26	27				
OrthoPhosphate-P	mg/L				0.0067	0.0060	0.0063	0.0029	0.0078				
Phosphate-P	mg/L				0.0244	0.0212	0.0235	0.0189	0.0240				
Org. Carbon	mg/L				5.3	4.2	5.5	4.9	5.0				
Hardness CaCO3	mg/L				37	42	44	46	49				
Total Metals													
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06				
Antimony Sb	mg/L				0.0005	0.0005	0.0005	0.0002	0.0007				
Arsenic As	mg/L				0.0005	0.0005	0.0005	0.0005	0.0006				
Barium Ba	mg/L				0.0075	0.0037	0.0043	0.0034	0.0036				
Beryllium Be	mg/L				0.00004	0.00003	0.00003	0.00001	0.00003				
Bismuth Bi	mg/L				0.00047	0.00047	0.00052	0.00019	0.00068				
Boron B	mg/L				0.022	0.024	0.026	0.027	0.028				
Cadmium Cd	mg/L				0.0000048	0.0000047	0.0000048	0.0000034	0.0000054				
Calcium Ca	mg/L				15	15	16	10	19				
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0003	0.0002	0.0002	0.0001	0.0002				
Copper Cu	mg/L				0.0018	0.0014	0.0018	0.0017	0.0019				
Iron Fe	mg/L				0.37	0.13	0.16	0.13	0.14				
Lead Pb	mg/L				0.00019	0.00008	0.00014	0.00005	0.00007				
Lithium Li	mg/L				0.0001	0.0001	0.0001	0.0000	0.0001				
Magnesium Mg	mg/L				5.7	6.2	6.6	6.6	6.9				
Manganese Mn	mg/L				0.012	0.010	0.010	0.007	0.008				
Mercury Hg	ug/L				0.0007882	0.0007646	0.0007757	0.0006608	0.0008213				
Molybdenum Mo	mg/L				0.00039	0.00035	0.00039	0.00026	0.00046				
Nickel Ni	mg/L				0.0011	0.0008	0.0008	0.0006	0.0009				
Phosphorus P	mg/L				0.009	0.008	0.008	0.003	0.011				
Potassium K	mg/L				2.7	2.7	2.8	2.5	3.0				
Selenium Se	mg/L				0.00073	0.00079	0.00092	0.00136	0.00138				
Silicon SiO2	mg/L				0.15	0.13	0.14	0.05	0.18				
Silver Ag	mg/L				0.0000042	0.0000046	0.0000045	0.0000024	0.0000048				
Sodium Na	mg/L				27	33	34	34	35				
Strontium Sr	mg/L				0.039	0.040	0.044	0.043	0.045				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000065	0.000014	0.000003	0.000009	0.000011				
Thorium Th	mg/L				0.000006	0.000006	0.000006	0.000003	0.000008				
Tin Sn	mg/L				0.00011	0.00012	0.00013	0.00007	0.00016				
Titanium Ti	mg/L				0.0000	0.0000	0.0000	0.0000	0.0000				
Uranium U	mg/L				0.000060	0.000048	0.000052	0.000045	0.000051				
Vanadium V	mg/L				0.0011	0.0003	0.0005	0.0001	0.0002				
Zinc Zn	mg/L				0.0089	0.0029	0.0030	0.0014	0.0018				
Zirconium Zr	mg/L				0.0053	0.0053	0.0053	0.0051	0.0054				

Water Quality in Little Roberst Lake Outflow													
Date		Year 3 Mar-10	Year 3 Apr-10	Year 3 May-10	Year 3 Jun-10	Year 3 Jul-10	Year 3 Aug-10	Year 3 Sep-10	Year 3 Oct-10	Year 3 Nov-10	Year 3 Dec-10	Year 3 Jan-11	Year 3 Feb-11
Parameter													
TDS	mg/L				136	600	152	151	183				
TSS	mg/L				4.7	3.1	2.3	2.2	2.3				
Free CN	mg/L				0.00002								
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L				0.0000								
CNO	mg/L				0.04								
SCN	mg/L				0.004	0.002	0.001	0.000	0.003				
Sulphate	mg/L				10.1	5.4	5.6	5.6	8.5				
Chloride	mg/L				96	89	78	71	118				
Total Ammonia-N	mg/L				0.024	0.017	0.008	0.008	0.009				
Nitrate-N	mg/L				0.34	0.24	0.16	0.03	0.38				
Nitrite-N	mg/L				0.016	0.007	0.006	0.002	0.004				
Alkalinity	mg/L				22	24	26	25	27				
OrthoPhosphate-P	mg/L				0.0101	0.0070	0.0047	0.0012	0.0113				
Phosphate-P	mg/L				0.0278	0.0221	0.0218	0.0172	0.0275				
Org. Carbon	mg/L				5.3	4.1	5.3	4.8	5.0				
Hardness CaCO3	mg/L				38	42	42	45	49				
Total Metals													
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06				
Antimony Sb	mg/L				0.0008	0.0006	0.0004	0.0000	0.0010				
Arsenic As	mg/L				0.0005	0.0005	0.0005	0.0005	0.0006				
Barium Ba	mg/L				0.0076	0.0037	0.0042	0.0033	0.0037				
Beryllium Be	mg/L				0.00005	0.00003	0.00002	0.00001	0.00004				
Bismuth Bi	mg/L				0.00077	0.00056	0.00036	0.00002	0.00099				
Boron B	mg/L				0.022	0.024	0.025	0.027	0.028				
Cadmium Cd	mg/L				0.0000056	0.0000047	0.0000038	0.0000027	0.0000056				
Calcium Ca	mg/L				19	15	12	7	19				
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0003	0.0002	0.0001	0.0001	0.0002				
Copper Cu	mg/L				0.0018	0.0014	0.0017	0.0016	0.0019				
Iron Fe	mg/L				0.37	0.13	0.16	0.13	0.14				
Lead Pb	mg/L				0.00020	0.00008	0.00013	0.00005	0.00007				
Lithium Li	mg/L				0.0001	0.0001	0.0001	0.0000	0.0001				
Magnesium Mg	mg/L				5.7	6.2	6.5	6.5	6.9				
Manganese Mn	mg/L				0.012	0.010	0.010	0.007	0.008				
Mercury Hg	ug/L				0.0008455	0.0007542	0.0006902	0.0006042	0.0008245				
Molybdenum Mo	mg/L				0.00047	0.00035	0.00029	0.00019	0.00046				
Nickel Ni	mg/L				0.0012	0.0008	0.0007	0.0005	0.0010				
Phosphorus P	mg/L				0.013	0.009	0.006	0.001	0.015				
Potassium K	mg/L				2.9	2.7	2.5	2.3	3.0				
Selenium Se	mg/L				0.00074	0.00079	0.00090	0.00135	0.00139				
Silicon SiO2	mg/L				0.21	0.13	0.08	0.01	0.19				
Silver Ag	mg/L				0.0000054	0.0000048	0.0000035	0.0000016	0.0000056				
Sodium Na	mg/L				28	32	33	33	35				
Strontium Sr	mg/L				0.039	0.040	0.042	0.042	0.045				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000066	0.000014	0.000003	0.000009	0.000011				
Thorium Th	mg/L				0.000008	0.000006	0.000004	0.000001	0.000008				
Tin Sn	mg/L				0.00016	0.00013	0.00010	0.00005	0.00020				
Titanium Ti	mg/L				0.0001	0.0000	0.0000	0.0000	0.0001				
Uranium U	mg/L				0.000063	0.000048	0.000048	0.000043	0.000051				
Vanadium V	mg/L				0.0012	0.0003	0.0005	0.0001	0.0003				
Zinc Zn	mg/L				0.0090	0.0028	0.0028	0.0012	0.0018				
Zirconium Zr	mg/L				0.0053	0.0052	0.0052	0.0050	0.0054				

Water Quality in Little Roberst Lake Outflow													
Date		Year 4	Year 4	Year 4	Year 4	Year 4	Year 4	Year 4	Year 4	Year 4	Year 4	Year 4	Year 4
		Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12
Parameter													
TDS	mg/L				118	605	151	150	178				
TSS	mg/L				4.7	3.1	2.3	2.2	2.3				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.001	0.002	0.001		0.002				
Sulphate	mg/L				8.2	5.4	5.2	5.5	7.7				
Chloride	mg/L				67	92	74	70	108				
Total Ammonia-N	mg/L				0.008	0.009	0.008	0.008	0.008				
Nitrate-N	mg/L				0.13	0.24	0.12	0.03	0.28				
Nitrite-N	mg/L				0.004	0.001	0.002	0.001	0.002				
Alkalinity	mg/L				21	24	26	25	27				
OrthoPhosphate-P	mg/L				0.0052	0.0090	0.0044	0.0010	0.0101				
Phosphate-P	mg/L				0.0228	0.0242	0.0215	0.0170	0.0263				
Org. Carbon	mg/L				5.2	4.2	5.3	4.8	5.0				
Hardness CaCO3	mg/L				35	42	41	45	48				
Total Metals													
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06				
Antimony Sb	mg/L				0.0004	0.0007	0.0003	0.0000	0.0008				
Arsenic As	mg/L				0.0005	0.0005	0.0005	0.0005	0.0006				
Barium Ba	mg/L				0.0074	0.0037	0.0041	0.0033	0.0036				
Beryllium Be	mg/L				0.00003	0.00003	0.00002	0.00001	0.00004				
Bismuth Bi	mg/L				0.00038	0.00072	0.00030	0.00000	0.00081				
Boron B	mg/L				0.021	0.024	0.025	0.027	0.028				
Cadmium Cd	mg/L				0.0000037	0.0000047	0.0000035	0.0000027	0.0000050				
Calcium Ca	mg/L				9	14	10	7	15				
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0002	0.0002	0.0001	0.0001	0.0002				
Copper Cu	mg/L				0.0016	0.0014	0.0016	0.0016	0.0018				
Iron Fe	mg/L				0.37	0.13	0.16	0.13	0.14				
Lead Pb	mg/L				0.00018	0.00009	0.00013	0.00005	0.00007				
Lithium Li	mg/L				0.0001	0.0001	0.0000	0.0000	0.0001				
Magnesium Mg	mg/L				5.5	6.2	6.4	6.5	6.9				
Manganese Mn	mg/L				0.011	0.010	0.010	0.007	0.007				
Mercury Hg	ug/L				0.0006719	0.0007392	0.0006595	0.0006001	0.0007608				
Molybdenum Mo	mg/L				0.00025	0.00033	0.00025	0.00018	0.00038				
Nickel Ni	mg/L				0.0009	0.0008	0.0007	0.0005	0.0008				
Phosphorus P	mg/L				0.006	0.011	0.005	0.000	0.013				
Potassium K	mg/L				2.3	2.6	2.4	2.3	2.8				
Selenium Se	mg/L				0.00072	0.00079	0.00090	0.00135	0.00138				
Silicon SiO2	mg/L				0.07	0.12	0.05	0.01	0.14				
Silver Ag	mg/L				0.0000034	0.0000052	0.0000033	0.0000015	0.0000049				
Sodium Na	mg/L				26	32	33	33	34				
Strontium Sr	mg/L				0.037	0.040	0.042	0.042	0.044				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000065	0.000014	0.000002	0.000009	0.000010				
Thorium Th	mg/L				0.000003	0.000006	0.000003	0.000001	0.000006				
Tin Sn	mg/L				0.00009	0.00016	0.00009	0.00004	0.00017				
Titanium Ti	mg/L				0.0000	0.0000	0.0000	0.0000	0.0001				
Uranium U	mg/L				0.000056	0.000048	0.000047	0.000042	0.000049				
Vanadium V	mg/L				0.0011	0.0003	0.0005	0.0001	0.0002				
Zinc Zn	mg/L				0.0086	0.0028	0.0028	0.0012	0.0017				
Zirconium Zr	mg/L				0.0051	0.0053	0.0051	0.0050	0.0053				

Water Quality in Little Roberst Lake Outflow													
Date		Year 5 Mar-12	Year 5 Apr-12	Year 5 May-12	Year 5 Jun-12	Year 5 Jul-12	Year 5 Aug-12	Year 5 Sep-12	Year 5 Oct-12	Year 5 Nov-12	Year 5 Dec-12	Year 5 Jan-13	Year 5 Feb-13
Parameter													
TDS	mg/L				112	609	155	150	209				
TSS	mg/L				4.7	3.1	2.3	2.2	2.3				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.001	0.002	0.001		0.002				
Sulphate	mg/L				7.7	5.2	5.1	5.5	7.3				
Chloride	mg/L				59	91	75	70	122				
Total Ammonia-N	mg/L				0.007	0.009	0.008	0.008	0.008				
Nitrate-N	mg/L				0.08	0.20	0.10	0.03	0.23				
Nitrite-N	mg/L				0.001	0.002	0.002	0.001	0.002				
Alkalinity	mg/L				20	24	26	25	27				
OrthoPhosphate-P	mg/L				0.0032	0.0077	0.0038	0.0010	0.0084				
Phosphate-P	mg/L				0.0208	0.0229	0.0208	0.0170	0.0246				
Org. Carbon	mg/L				5.2	4.2	5.3	4.8	5.0				
Hardness CaCO3	mg/L				34	41	41	45	48				
Total Metals													
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06				
Antimony Sb	mg/L				0.0002	0.0006	0.0003	0.0000	0.0007				
Arsenic As	mg/L				0.0004	0.0005	0.0005	0.0005	0.0006				
Barium Ba	mg/L				0.0073	0.0037	0.0041	0.0033	0.0036				
Beryllium Be	mg/L				0.00002	0.00003	0.00002	0.00001	0.00003				
Bismuth Bi	mg/L				0.00020	0.00060	0.00025	0.00000	0.00066				
Boron B	mg/L				0.021	0.024	0.025	0.027	0.028				
Cadmium Cd	mg/L				0.0000033	0.0000046	0.0000034	0.0000027	0.0000048				
Calcium Ca	mg/L				7	13	10	7	16				
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0002	0.0002	0.0001	0.0001	0.0002				
Copper Cu	mg/L				0.0016	0.0014	0.0016	0.0016	0.0018				
Iron Fe	mg/L				0.36	0.13	0.16	0.13	0.14				
Lead Pb	mg/L				0.00018	0.00008	0.00013	0.00005	0.00007				
Lithium Li	mg/L				0.0000	0.0001	0.0000	0.0000	0.0001				
Magnesium Mg	mg/L				5.4	6.2	6.4	6.5	6.8				
Manganese Mn	mg/L				0.011	0.009	0.010	0.007	0.007				
Mercury Hg	ug/L				0.0006389	0.0007211	0.0006499	0.0006001	0.0007352				
Molybdenum Mo	mg/L				0.00021	0.00030	0.00024	0.00018	0.00034				
Nickel Ni	mg/L				0.0008	0.0007	0.0006	0.0005	0.0008				
Phosphorus P	mg/L				0.003	0.010	0.004	0.000	0.011				
Potassium K	mg/L				2.2	2.6	2.3	2.3	2.7				
Selenium Se	mg/L				0.00071	0.00079	0.00090	0.00135	0.00138				
Silicon SiO2	mg/L				0.04	0.10	0.05	0.01	0.11				
Silver Ag	mg/L				0.0000028	0.0000050	0.0000031	0.0000015	0.0000046				
Sodium Na	mg/L				26	35	35	33	46				
Strontium Sr	mg/L				0.037	0.040	0.042	0.042	0.044				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000064	0.000014	0.000002	0.000009	0.000010				
Thorium Th	mg/L				0.000003	0.000005	0.000003	0.000001	0.000006				
Tin Sn	mg/L				0.00006	0.00014	0.00008	0.00004	0.00015				
Titanium Ti	mg/L				0.0000	0.0000	0.0000	0.0000	0.0001				
Uranium U	mg/L				0.000055	0.000047	0.000047	0.000042	0.000049				
Vanadium V	mg/L				0.0011	0.0003	0.0005	0.0001	0.0002				
Zinc Zn	mg/L				0.0085	0.0028	0.0027	0.0012	0.0017				
Zirconium Zr	mg/L				0.0051	0.0053	0.0051	0.0050	0.0053				

Water Quality in Little Roberst Lake Outflow													
Date		Year 6 Mar-13	Year 6 Apr-13	Year 6 May-13	Year 6 Jun-13	Year 6 Jul-13	Year 6 Aug-13	Year 6 Sep-13	Year 6 Oct-13	Year 6 Nov-13	Year 6 Dec-13	Year 6 Jan-14	Year 6 Feb-14
Parameter													
TDS	mg/L				122	630	161	150	206				
TSS	mg/L				4.7	3.1	2.3	2.2	2.3				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.000	0.001	0.001		0.001				
Sulphate	mg/L				7.6	4.9	5.0	5.5	7.0				
Chloride	mg/L				64	102	77	70	117				
Total Ammonia-N	mg/L				0.004	0.006	0.005	0.005	0.005				
Nitrate-N	mg/L				0.05	0.14	0.06	0.01	0.17				
Nitrite-N	mg/L				0.001	0.001	0.001	0.001	0.001				
Alkalinity	mg/L				20	24	26	25	27				
OrthoPhosphate-P	mg/L				0.0028	0.0065	0.0032	0.0010	0.0070				
Phosphate-P	mg/L				0.0203	0.0216	0.0203	0.0170	0.0232				
Org. Carbon	mg/L				5.2	4.2	5.3	4.8	5.0				
Hardness CaCO3	mg/L				34	41	41	45	48				
Total Metals													
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06				
Antimony Sb	mg/L				0.0002	0.0005	0.0002	0.0000	0.0005				
Arsenic As	mg/L				0.0004	0.0004	0.0005	0.0005	0.0006				
Barium Ba	mg/L				0.0073	0.0037	0.0041	0.0033	0.0035				
Beryllium Be	mg/L				0.00002	0.00002	0.00001	0.00000	0.00002				
Bismuth Bi	mg/L				0.00016	0.00049	0.00020	0.00000	0.00053				
Boron B	mg/L				0.021	0.024	0.025	0.027	0.028				
Cadmium Cd	mg/L				0.0000026	0.0000038	0.0000027	0.0000020	0.0000040				
Calcium Ca	mg/L				7	13	10	7	14				
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0002	0.0001	0.0001	0.0001	0.0001				
Copper Cu	mg/L				0.0016	0.0013	0.0016	0.0016	0.0018				
Iron Fe	mg/L				0.36	0.13	0.16	0.13	0.14				
Lead Pb	mg/L				0.00018	0.00008	0.00013	0.00005	0.00006				
Lithium Li	mg/L				0.0000	0.0001	0.0000		0.0001				
Magnesium Mg	mg/L				5.4	6.2	6.4	6.5	6.8				
Manganese Mn	mg/L				0.011	0.009	0.010	0.007	0.007				
Mercury Hg	ug/L				0.0006327	0.0007022	0.0006422	0.0006000	0.0007145				
Molybdenum Mo	mg/L				0.00020	0.00027	0.00023	0.00018	0.00031				
Nickel Ni	mg/L				0.0008	0.0007	0.0006	0.0005	0.0007				
Phosphorus P	mg/L				0.002	0.008	0.003		0.008				
Potassium K	mg/L				2.2	2.5	2.3	2.3	2.6				
Selenium Se	mg/L				0.00071	0.00079	0.00090	0.00135	0.00138				
Silicon SiO2	mg/L				0.03	0.08	0.03		0.09				
Silver Ag	mg/L				0.0000019	0.0000039	0.0000022	0.0000006	0.0000035				
Sodium Na	mg/L				30	43	37	33	46				
Strontium Sr	mg/L				0.037	0.040	0.042	0.042	0.044				
Tellurium Te	mg/L				0.000	0.000	0.000		0.000				
Thallium Tl	mg/L				0.000064	0.000014	0.000002	0.000009	0.000010				
Thorium Th	mg/L				0.000001	0.000004	0.000002		0.000004				
Tin Sn	mg/L				0.00006	0.00012	0.00007	0.00004	0.00013				
Titanium Ti	mg/L				0.0000	0.0000	0.0000		0.0001				
Uranium U	mg/L				0.000054	0.000045	0.000046	0.000041	0.000047				
Vanadium V	mg/L				0.0010	0.0003	0.0005	0.0001	0.0002				
Zinc Zn	mg/L				0.0085	0.0028	0.0027	0.0012	0.0016				
Zirconium Zr	mg/L				0.0051	0.0052	0.0051	0.0050	0.0053				

Water Quality in Little Roberst Lake Outflow													
Date		Year 7 Mar-14	Year 7 Apr-14	Year 7 May-14	Year 7 Jun-14	Year 7 Jul-14	Year 7 Aug-14	Year 7 Sep-14	Year 7 Oct-14	Year 7 Nov-14	Year 7 Dec-14	Year 7 Jan-15	Year 7 Feb-15
Parameter													
TDS	mg/L				119	621	157	150	196				
TSS	mg/L				4.7	3.1	2.3	2.2	2.3				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.000	0.001	0.000		0.001				
Sulphate	mg/L				7.5	4.6	4.9	5.5	6.7				
Chloride	mg/L				61	94	74	70	109				
Total Ammonia-N	mg/L				0.004	0.005	0.005	0.005	0.005				
Nitrate-N	mg/L				0.04	0.10	0.05	0.01	0.11				
Nitrite-N	mg/L				0.001	0.001	0.001	0.001	0.001				
Alkalinity	mg/L				20	24	26	25	26				
OrthoPhosphate-P	mg/L				0.0024	0.0054	0.0028	0.0010	0.0059				
Phosphate-P	mg/L				0.0200	0.0206	0.0199	0.0170	0.0221				
Org. Carbon	mg/L				5.2	4.2	5.3	4.8	5.0				
Hardness CaCO3	mg/L				34	41	41	45	47				
Total Metals													
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06				
Antimony Sb	mg/L				0.0001	0.0004	0.0002	0.0000	0.0004				
Arsenic As	mg/L				0.0004	0.0004	0.0005	0.0005	0.0006				
Barium Ba	mg/L				0.0073	0.0037	0.0041	0.0033	0.0035				
Beryllium Be	mg/L				0.00002	0.00002	0.00001	0.00000	0.00002				
Bismuth Bi	mg/L				0.00013	0.00040	0.00016	0.00000	0.00043				
Boron B	mg/L				0.021	0.024	0.025	0.027	0.028				
Cadmium Cd	mg/L				0.0000025	0.0000036	0.0000026	0.0000020	0.0000037				
Calcium Ca	mg/L				7	12	9	7	13				
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0002	0.0001	0.0001	0.0001	0.0001				
Copper Cu	mg/L				0.0016	0.0013	0.0016	0.0016	0.0018				
Iron Fe	mg/L				0.36	0.13	0.16	0.13	0.14				
Lead Pb	mg/L				0.00018	0.00008	0.00013	0.00005	0.00006				
Lithium Li	mg/L				0.0000	0.0001	0.0000		0.0001				
Magnesium Mg	mg/L				5.4	6.1	6.4	6.5	6.8				
Manganese Mn	mg/L				0.011	0.009	0.010	0.007	0.007				
Mercury Hg	ug/L				0.0006277	0.0006870	0.0006360	0.0006000	0.0006978				
Molybdenum Mo	mg/L				0.00019	0.00025	0.00022	0.00018	0.00029				
Nickel Ni	mg/L				0.0008	0.0006	0.0006	0.0005	0.0007				
Phosphorus P	mg/L				0.002	0.006	0.003		0.007				
Potassium K	mg/L				2.2	2.5	2.3	2.3	2.6				
Selenium Se	mg/L				0.00071	0.00079	0.00090	0.00135	0.00138				
Silicon SiO2	mg/L				0.02	0.07	0.03		0.07				
Silver Ag	mg/L				0.0000018	0.0000036	0.0000020	0.0000006	0.0000030				
Sodium Na	mg/L				29	41	36	33	44				
Strontium Sr	mg/L				0.036	0.039	0.042	0.042	0.044				
Tellurium Te	mg/L				0.000	0.000	0.000		0.000				
Thallium Tl	mg/L				0.000064	0.000014	0.000002	0.000009	0.000010				
Thorium Th	mg/L				0.000001	0.000003	0.000001		0.000004				
Tin Sn	mg/L				0.00005	0.00011	0.00007	0.00004	0.00011				
Titanium Ti	mg/L				0.0000	0.0000	0.0000		0.0001				
Uranium U	mg/L				0.000054	0.000045	0.000045	0.000041	0.000046				
Vanadium V	mg/L				0.0010	0.0003	0.0004	0.0001	0.0002				
Zinc Zn	mg/L				0.0085	0.0027	0.0027	0.0012	0.0016				
Zirconium Zr	mg/L				0.0051	0.0052	0.0051	0.0050	0.0053				

Water Quality in Little Roberst Lake Outflow													
Date		Year 8 Mar-15	Year 8 Apr-15	Year 8 May-15	Year 8 Jun-15	Year 8 Jul-15	Year 8 Aug-15	Year 8 Sep-15	Year 8 Oct-15	Year 8 Nov-15	Year 8 Dec-15	Year 8 Jan-16	Year 8 Feb-16
Parameter													
TDS	mg/L				117	614	154	150	188				
TSS	mg/L				4.7	3.1	2.3	2.2	2.3				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.000	0.001	0.000		0.001				
Sulphate	mg/L				7.4	4.4	4.8	5.5	6.5				
Chloride	mg/L				59	87	72	70	102				
Total Ammonia-N	mg/L				0.004	0.005	0.005	0.005	0.005				
Nitrate-N	mg/L				0.02	0.06	0.03	0.01	0.07				
Nitrite-N	mg/L				0.001	0.001	0.001	0.001	0.001				
Alkalinity	mg/L				20	24	26	25	26				
OrthoPhosphate-P	mg/L				0.0022	0.0046	0.0025	0.0010	0.0049				
Phosphate-P	mg/L				0.0197	0.0198	0.0196	0.0170	0.0212				
Org. Carbon	mg/L				5.2	4.2	5.3	4.8	5.0				
Hardness CaCO3	mg/L				34	41	41	45	47				
Total Metals													
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06				
Antimony Sb	mg/L				0.0001	0.0003	0.0001	0.0000	0.0004				
Arsenic As	mg/L				0.0004	0.0004	0.0005	0.0005	0.0006				
Barium Ba	mg/L				0.0073	0.0036	0.0041	0.0033	0.0035				
Beryllium Be	mg/L				0.00002	0.00002	0.00001	0.00000	0.00002				
Bismuth Bi	mg/L				0.00010	0.00032	0.00013	0.00000	0.00035				
Boron B	mg/L				0.021	0.024	0.025	0.027	0.028				
Cadmium Cd	mg/L				0.0000025	0.0000034	0.0000025	0.0000020	0.0000034				
Calcium Ca	mg/L				7	11	9	7	12				
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0002	0.0001	0.0001	0.0001	0.0001				
Copper Cu	mg/L				0.0016	0.0013	0.0016	0.0016	0.0017				
Iron Fe	mg/L				0.37	0.13	0.16	0.13	0.14				
Lead Pb	mg/L				0.00018	0.00008	0.00012	0.00005	0.00006				
Lithium Li	mg/L				0.0000	0.0000	0.0000		0.0001				
Magnesium Mg	mg/L				5.4	6.1	6.4	6.5	6.8				
Manganese Mn	mg/L				0.011	0.009	0.010	0.007	0.007				
Mercury Hg	ug/L				0.0006237	0.0006747	0.0006310	0.0006000	0.0006843				
Molybdenum Mo	mg/L				0.00019	0.00023	0.00021	0.00018	0.00027				
Nickel Ni	mg/L				0.0008	0.0006	0.0006	0.0005	0.0007				
Phosphorus P	mg/L				0.002	0.005	0.002		0.006				
Potassium K	mg/L				2.2	2.4	2.3	2.3	2.5				
Selenium Se	mg/L				0.00071	0.00079	0.00090	0.00135	0.00138				
Silicon SiO2	mg/L				0.02	0.05	0.02		0.06				
Silver Ag	mg/L				0.0000017	0.0000032	0.0000019	0.0000006	0.0000026				
Sodium Na	mg/L				28	39	36	33	42				
Strontium Sr	mg/L				0.036	0.039	0.042	0.042	0.044				
Tellurium Te	mg/L				0.000	0.000	0.000		0.000				
Thallium Tl	mg/L				0.000064	0.000013	0.000002	0.000009	0.000010				
Thorium Th	mg/L				0.000001	0.000003	0.000001		0.000003				
Tin Sn	mg/L				0.00005	0.00009	0.00006	0.00004	0.00010				
Titanium Ti	mg/L				0.0000	0.0000	0.0000		0.0001				
Uranium U	mg/L				0.000053	0.000044	0.000045	0.000041	0.000045				
Vanadium V	mg/L				0.0010	0.0002	0.0004	0.0001	0.0002				
Zinc Zn	mg/L				0.0085	0.0027	0.0027	0.0012	0.0015				
Zirconium Zr	mg/L				0.0051	0.0052	0.0051	0.0050	0.0053				

Water Quality in Little Roberst Lake Outflow													
Date		Year 9 Mar-16	Year 9 Apr-16	Year 9 May-16	Year 9 Jun-16	Year 9 Jul-16	Year 9 Aug-16	Year 9 Sep-16	Year 9 Oct-16	Year 9 Nov-16	Year 9 Dec-16	Year 9 Jan-17	Year 9 Feb-17
Parameter													
TDS	mg/L				115	608	152	150	181				
TSS	mg/L				4.7	3.1	2.3	2.2	2.3				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.000	0.001	0.000		0.001				
Sulphate	mg/L				7.4	4.3	4.7	5.5	6.4				
Chloride	mg/L				57	82	69	70	96				
Total Ammonia-N	mg/L				0.004	0.005	0.005	0.005	0.005				
Nitrate-N	mg/L				0.01	0.03	0.01	0.01	0.03				
Nitrite-N	mg/L				0.001	0.001	0.001	0.001	0.001				
Alkalinity	mg/L				20	24	26	25	26				
OrthoPhosphate-P	mg/L				0.0020	0.0039	0.0022	0.0010	0.0042				
Phosphate-P	mg/L				0.0195	0.0191	0.0193	0.0170	0.0205				
Org. Carbon	mg/L				5.2	4.2	5.3	4.8	5.0				
Hardness CaCO3	mg/L				34	41	41	45	47				
Total Metals													
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06				
Antimony Sb	mg/L				0.0001	0.0003	0.0001	0.0000	0.0003				
Arsenic As	mg/L				0.0004	0.0004	0.0005	0.0005	0.0005				
Barium Ba	mg/L				0.0073	0.0036	0.0041	0.0033	0.0035				
Beryllium Be	mg/L				0.00002	0.00001	0.00001	0.00000	0.00001				
Bismuth Bi	mg/L				0.00008	0.00026	0.00011	0.00000	0.00028				
Boron B	mg/L				0.021	0.024	0.025	0.027	0.028				
Cadmium Cd	mg/L				0.0000024	0.0000031	0.0000024	0.0000020	0.0000031				
Calcium Ca	mg/L				6	10	8	7	11				
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0001	0.0001	0.0001	0.0001	0.0001				
Copper Cu	mg/L				0.0015	0.0013	0.0016	0.0016	0.0017				
Iron Fe	mg/L				0.37	0.13	0.16	0.13	0.14				
Lead Pb	mg/L				0.00017	0.00008	0.00012	0.00005	0.00006				
Lithium Li	mg/L				0.0000	0.0000	0.0000		0.0000				
Magnesium Mg	mg/L				5.4	6.1	6.4	6.5	6.8				
Manganese Mn	mg/L				0.011	0.009	0.009	0.007	0.007				
Mercury Hg	ug/L				0.0006204	0.0006647	0.0006269	0.0006000	0.0006735				
Molybdenum Mo	mg/L				0.00018	0.00022	0.00021	0.00018	0.00025				
Nickel Ni	mg/L				0.0008	0.0006	0.0006	0.0005	0.0007				
Phosphorus P	mg/L				0.001	0.004	0.002		0.005				
Potassium K	mg/L				2.2	2.4	2.3	2.3	2.5				
Selenium Se	mg/L				0.00071	0.00079	0.00090	0.00135	0.00138				
Silicon SiO2	mg/L				0.01	0.04	0.02		0.05				
Silver Ag	mg/L				0.0000016	0.0000029	0.0000017	0.0000006	0.0000022				
Sodium Na	mg/L				28	38	35	33	40				
Strontium Sr	mg/L				0.036	0.039	0.042	0.042	0.044				
Tellurium Te	mg/L				0.000	0.000	0.000		0.000				
Thallium Tl	mg/L				0.000064	0.000013	0.000002	0.000009	0.000009				
Thorium Th	mg/L				0.000001	0.000002	0.000001		0.000002				
Tin Sn	mg/L				0.00004	0.00008	0.00006	0.00004	0.00009				
Titanium Ti	mg/L				0.0000	0.0000	0.0000		0.0001				
Uranium U	mg/L				0.000053	0.000044	0.000045	0.000041	0.000044				
Vanadium V	mg/L				0.0010	0.0002	0.0004	0.0001	0.0001				
Zinc Zn	mg/L				0.0085	0.0027	0.0027	0.0012	0.0015				
Zirconium Zr	mg/L				0.0051	0.0052	0.0051	0.0050	0.0053				

Water Quality in Little Roberst Lake Outflow												
Date		Year 10 Mar-17	Year 10 Apr-17	Year 10 May-17	Year 10 Jun-17	Year 10 Jul-17	Year 10 Aug-17	Year 10 Sep-17	Year 10 Oct-17	Year 10 Nov-17	Year 10 Dec-17	Year 10 Jan-18
Parameter												
TDS	mg/L				113	604	150	150	176			
TSS	mg/L				4.7	3.1	2.3	2.2	2.3			
Free CN	mg/L											
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001			
WAD CN	mg/L											
CNO	mg/L											
SCN	mg/L				0.000	0.001	0.000		0.001			
Sulphate	mg/L				7.4	4.1	4.7	5.5	6.2			
Chloride	mg/L				56	78	68	70	91			
Total Ammonia-N	mg/L				0.004	0.005	0.005	0.005	0.005			
Nitrate-N	mg/L				0.01	0.01	0.01	0.01	0.01			
Nitrite-N	mg/L				0.001	0.001	0.001	0.001	0.001			
Alkalinity	mg/L				20	24	26	25	26			
OrthoPhosphate-P	mg/L				0.0018	0.0034	0.0020	0.0010	0.0036			
Phosphate-P	mg/L				0.0193	0.0186	0.0191	0.0170	0.0199			
Org. Carbon	mg/L				5.2	4.2	5.3	4.8	5.0			
Hardness CaCO3	mg/L				34	41	41	45	47			
Total Metals												
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06			
Antimony Sb	mg/L				0.0001	0.0002	0.0001	0.0000	0.0002			
Arsenic As	mg/L				0.0004	0.0004	0.0005	0.0005	0.0005			
Barium Ba	mg/L				0.0073	0.0036	0.0041	0.0033	0.0035			
Beryllium Be	mg/L				0.00001	0.00001	0.00001	0.00000	0.00001			
Bismuth Bi	mg/L				0.00007	0.00021	0.00009	0.00000	0.00023			
Boron B	mg/L				0.021	0.024	0.025	0.027	0.028			
Cadmium Cd	mg/L				0.0000023	0.0000030	0.0000024	0.0000020	0.0000030			
Calcium Ca	mg/L				6	9	8	7	10			
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000			
Cobalt Co	mg/L				0.0001	0.0001	0.0001	0.0001	0.0001			
Copper Cu	mg/L				0.0015	0.0013	0.0016	0.0016	0.0017			
Iron Fe	mg/L				0.37	0.13	0.16	0.13	0.14			
Lead Pb	mg/L				0.00017	0.00007	0.00012	0.00005	0.00005			
Lithium Li	mg/L				0.0000	0.0000	0.0000		0.0000			
Magnesium Mg	mg/L				5.4	6.1	6.4	6.5	6.8			
Manganese Mn	mg/L				0.011	0.009	0.009	0.007	0.007			
Mercury Hg	ug/L				0.0006178	0.0006567	0.0006237	0.0006000	0.0006647			
Molybdenum Mo	mg/L				0.00018	0.00021	0.00020	0.00018	0.00024			
Nickel Ni	mg/L				0.0008	0.0006	0.0006	0.0005	0.0006			
Phosphorus P	mg/L				0.001	0.003	0.001		0.004			
Potassium K	mg/L				2.2	2.4	2.3	2.3	2.5			
Selenium Se	mg/L				0.00071	0.00079	0.00090	0.00135	0.00138			
Silicon SiO2	mg/L				0.01	0.04	0.01		0.04			
Silver Ag	mg/L				0.0000015	0.0000027	0.0000016	0.0000006	0.0000019			
Sodium Na	mg/L				28	37	35	33	39			
Strontium Sr	mg/L				0.036	0.039	0.042	0.042	0.044			
Tellurium Te	mg/L				0.000	0.000	0.000		0.000			
Thallium Tl	mg/L				0.000064	0.000013	0.000002	0.000009	0.000009			
Thorium Th	mg/L				0.000001	0.000002	0.000001		0.000002			
Tin Sn	mg/L				0.00004	0.00008	0.00006	0.00004	0.00008			
Titanium Ti	mg/L				0.0000	0.0000	0.0000		0.0001			
Uranium U	mg/L				0.000053	0.000043	0.000045	0.000041	0.000044			
Vanadium V	mg/L				0.0010	0.0002	0.0004	0.0001	0.0001			
Zinc Zn	mg/L				0.0085	0.0027	0.0027	0.0012	0.0015			
Zirconium Zr	mg/L				0.0051	0.0052	0.0051	0.0050	0.0053			

Loadings in Little Roberts Creek Outflow (kg/month)												
Date	Year 1 Mar-08	Year 1 Apr-08	Year 1 May-08	Year 1 Jun-08	Year 1 Jul-08	Year 1 Aug-08	Year 1 Sep-08	Year 1 Oct-08	Year 1 Nov-08	Year 1 Dec-08	Year 1 Jan-09	Year 1 Feb-09
Parameter												
TDS				142	136	130	146	158				
TSS				2.9	3.8	2.9	3.0	2.9				
Free CN				0.00001	0.00000	0.00000	0.00000	0.00001				
Total CN				0.001	0.001	0.001	0.001	0.001				
WAD CN				0.0000	0.0000	0.0000	0.0000	0.0000				
CNO				0.02	0.01	0.01	0.00	0.01				
SCN				0.001	0.001	0.001	0.000	0.003				
Sulphate				3.9	4.0	3.8	3.3	5.1				
Chloride				61	73	72	66	91				
Total Ammonia				0.020	0.038	0.022	0.015	0.024				
Nitrate				0.08	0.15	0.15	0.08	0.34				
Nitrite				0.007	0.018	0.012	0.003	0.007				
Alkalinity				26	27	27	28	29				
OrthoPhosphate-P				0.0020	0.0034	0.0029	0.0014	0.0064				
Phosphate-P				0.0197	0.0225	0.0332	0.0274	0.0308				
Org. Carbon				5.0	5.0	5.1	5.0	5.1				
Hardness CaCO3				38	42	44	45	46				
Total Metals												
Aluminum Al				0.08	0.06	0.06	0.05	0.05				
Antimony Sb				0.0001	0.0003	0.0003	0.0001	0.0006				
Arsenic As				0.0004	0.0004	0.0005	0.0005	0.0005				
Barium Ba				0.0033	0.0031	0.0030	0.0030	0.0031				
Beryllium Be				0.00001	0.00002	0.00002	0.00001	0.00003				
Bismuth Bi				0.00008	0.00027	0.00025	0.00008	0.00062				
Boron B				0.019	0.021	0.023	0.023	0.023				
Cadmium Cd				0.0000038	0.0000043	0.0000042	0.0000036	0.0000056				
Calcium Ca				8	12	11	9	17				
Chromium Cr				0.000	0.000	0.000	0.000	0.000				
Cobalt Co				0.0001	0.0001	0.0001	0.0001	0.0002				
Copper Cu				0.0013	0.0015	0.0015	0.0014	0.0016				
Iron Fe				0.11	0.11	0.08	0.09	0.09				
Lead Pb				0.00005	0.00006	0.00012	0.00004	0.00006				
Lithium Li				0.0000	0.0001	0.0000	0.0000	0.0001				
Magnesium Mg				5.3	5.9	6.3	6.4	6.4				
Manganese Mn				0.011	0.014	0.015	0.010	0.010				
Mercury Hg				0.0006333	0.0006712	0.0006577	0.0006182	0.0007600				
Molybdenum Mo				0.00016	0.00024	0.00023	0.00016	0.00036				
Nickel Ni				0.0005	0.0007	0.0006	0.0005	0.0008				
Phosphorus P				0.003	0.005	0.004	0.002	0.010				
Potassium K				2.2	2.5	2.4	2.4	2.8				
Selenium Se				0.00076	0.00080	0.00082	0.00112	0.00107				
Silicon SiO2				0.04	0.08	0.07	0.03	0.16				
Silver Ag				0.0000034	0.0000039	0.0000036	0.0000028	0.0000053				
Sodium Na				26	30	32	32	32				
Strontium Sr				0.035	0.038	0.039	0.040	0.040				
Tellurium Te				0.000	0.000	0.000	0.000	0.000				
Thallium Tl				0.000018	0.000021	0.000011	0.000004	0.000005				
Thorium Th				0.0000035	0.0000049	0.0000047	0.0000033	0.0000079				
Tin Sn				0.00005	0.00016	0.00008	0.00005	0.00014				
Titanium Ti				0.0000	0.0000	0.0000	0.0000	0.0000				
Uranium U				0.000032	0.000036	0.000040	0.000035	0.000039				
Vanadium V				0.0006	0.0002	0.0002	0.0001	0.0003				
Zinc Zn				0.0016	0.0020	0.0031	0.0018	0.0023				
Zirconium Zr				0.0051	0.0051	0.0051	0.0051	0.0051				

Loadings in Little Roberts Creek Outflow (kg/month)												
Date	Year 2 Mar-09	Year 2 Apr-09	Year 2 May-09	Year 2 Jun-09	Year 2 Jul-09	Year 2 Aug-09	Year 2 Sep-09	Year 2 Oct-09	Year 2 Nov-09	Year 2 Dec-09	Year 2 Jan-10	Year 2 Feb-10
Parameter												
TDS				167	153	151	154	178				
TSS				2.9	3.8	2.9	3.0	2.9				
Free CN				0.00004		0.00001	0.00000	0.00001				
Total CN				0.002	0.001	0.001	0.001	0.001				
WAD CN				0.0001		0.0000	0.0000	0.0000				
CNO				0.10		0.01	0.00	0.02				
SCN				0.005	0.004	0.005	0.002	0.006				
Sulphate				7.1	6.2	6.5	4.3	7.6				
Chloride				110	108	113	82	129				
Total Ammonia				0.053	0.055	0.020	0.017	0.025				
Nitrate				0.44	0.44	0.48	0.22	0.64				
Nitrite				0.029	0.017	0.020	0.003	0.008				
Alkalinity				27	28	28	28	30				
OrthoPhosphate-P				0.0113	0.0099	0.0106	0.0044	0.0133				
Phosphate-P				0.0283	0.0287	0.0399	0.0300	0.0376				
Org. Carbon				5.0	4.9	5.0	5.0	5.0				
Hardness CaCO3				41	43	46	46	49				
Total Metals												
Aluminum Al				0.07	0.06	0.06	0.05	0.05				
Antimony Sb				0.0009	0.0009	0.0010	0.0004	0.0013				
Arsenic As				0.0005	0.0005	0.0006	0.0005	0.0006				
Barium Ba				0.0035	0.0033	0.0032	0.0031	0.0033				
Beryllium Be				0.00005	0.00005	0.00005	0.00002	0.00006				
Bismuth Bi				0.00087	0.00087	0.00098	0.00037	0.00126				
Boron B				0.020	0.022	0.023	0.023	0.023				
Cadmium Cd				0.0000070	0.0000067	0.0000071	0.0000047	0.0000082				
Calcium Ca				25	23	25	14	29				
Chromium Cr				0.000	0.000	0.000	0.000	0.000				
Cobalt Co				0.0003	0.0003	0.0003	0.0001	0.0004				
Copper Cu				0.0016	0.0017	0.0017	0.0015	0.0018				
Iron Fe				0.11	0.11	0.08	0.09	0.09				
Lead Pb				0.00007	0.00008	0.00014	0.00005	0.00007				
Lithium Li				0.0002	0.0002	0.0002	0.0001	0.0002				
Magnesium Mg				5.5	6.0	6.4	6.4	6.6				
Manganese Mn				0.011	0.015	0.016	0.010	0.010				
Mercury Hg				0.0008959	0.0008520	0.0008727	0.0007031	0.0009575				
Molybdenum Mo				0.00053	0.00050	0.00053	0.00028	0.00063				
Nickel Ni				0.0010	0.0010	0.0010	0.0006	0.0011				
Phosphorus P				0.016	0.015	0.016	0.006	0.020				
Potassium K				3.1	3.1	3.1	2.7	3.5				
Selenium Se				0.00076	0.00080	0.00082	0.00111	0.00108				
Silicon SiO2				0.28	0.25	0.27	0.11	0.34				
Silver Ag				0.0000070	0.0000066	0.0000070	0.0000041	0.0000083				
Sodium Na				27	30	32	32	33				
Strontium Sr				0.037	0.040	0.040	0.041	0.042				
Tellurium Te				0.000	0.000	0.000	0.000	0.000				
Thallium Tl				0.000019	0.000022	0.000012	0.000004	0.000006				
Thorium Th				0.0000113	0.0000107	0.0000115	0.0000060	0.0000141				
Tin Sn				0.00018	0.00026	0.00020	0.00010	0.00025				
Titanium Ti				0.0001	0.0001	0.0001	0.0000	0.0001				
Uranium U				0.000041	0.000042	0.000048	0.000038	0.000047				
Vanadium V				0.0007	0.0003	0.0003	0.0002	0.0004				
Zinc Zn				0.0022	0.0023	0.0035	0.0020	0.0026				
Zirconium Zr				0.0051	0.0051	0.0051	0.0051	0.0052				

Loadings in Little Roberts Creek Outflow (kg/month)													
Date	Year 3 Mar-10	Year 3 Apr-10	Year 3 May-10	Year 3 Jun-10	Year 3 Jul-10	Year 3 Aug-10	Year 3 Sep-10	Year 3 Oct-10	Year 3 Nov-10	Year 3 Dec-10	Year 3 Jan-11	Year 3 Feb-11	
Parameter													
TDS				184	159	144	146	193					
TSS				2.9	3.8	2.9	3.0	2.9					
Free CN				0.00003									
Total CN				0.001	0.001	0.001	0.001	0.001					
WAD CN				0.0000									
CNO				0.07									
SCN				0.007	0.004	0.003	0.000	0.006					
Sulphate				8.6	6.4	5.1	3.1	8.3					
Chloride				138	114	95	65	146					
Total Ammonia				0.045	0.037	0.018	0.013	0.015					
Nitrate				0.63	0.45	0.30	0.06	0.70					
Nitrite				0.028	0.014	0.011	0.002	0.006					
Alkalinity				28	28	28	28	30					
OrthoPhosphate-P				0.0177	0.0121	0.0080	0.0011	0.0199					
Phosphate-P				0.0347	0.0312	0.0386	0.0273	0.0441					
Org. Carbon				4.9	4.9	5.0	5.0	5.0					
Hardness CaCO3				42	44	45	45	49					
Total Metals													
Aluminum Al				0.07	0.06	0.06	0.05	0.05					
Antimony Sb				0.0015	0.0011	0.0007	0.0001	0.0019					
Arsenic As				0.0006	0.0005	0.0006	0.0004	0.0006					
Barium Ba				0.0036	0.0033	0.0031	0.0030	0.0033					
Beryllium Be				0.00007	0.00005	0.00004	0.00001	0.00008					
Bismuth Bi				0.00143	0.00106	0.00070	0.00004	0.00185					
Boron B				0.021	0.022	0.023	0.023	0.024					
Cadmium Cd				0.0000087	0.0000067	0.0000055	0.0000034	0.0000085					
Calcium Ca				32	23	17	8	30					
Chromium Cr				0.001	0.000	0.000	0.000	0.000					
Cobalt Co				0.0004	0.0003	0.0002	0.0001	0.0004					
Copper Cu				0.0017	0.0017	0.0016	0.0014	0.0018					
Iron Fe				0.11	0.11	0.08	0.09	0.09					
Lead Pb				0.00009	0.00008	0.00014	0.00004	0.00008					
Lithium Li				0.0003	0.0002	0.0001	0.0000	0.0003					
Magnesium Mg				5.6	6.0	6.4	6.4	6.6					
Manganese Mn				0.012	0.015	0.016	0.010	0.011					
Mercury Hg				0.0010047	0.0008511	0.0007519	0.0006074	0.0009634					
Molybdenum Mo				0.00068	0.00050	0.00036	0.00015	0.00065					
Nickel Ni				0.0012	0.0010	0.0008	0.0005	0.0012					
Phosphorus P				0.025	0.017	0.011	0.001	0.027					
Potassium K				3.4	3.1	2.7	2.4	3.5					
Selenium Se				0.00077	0.00081	0.00083	0.00112	0.00108					
Silicon SiO2				0.38	0.25	0.16	0.02	0.35					
Silver Ag				0.0000093	0.0000071	0.0000053	0.0000026	0.0000098					
Sodium Na				28	31	33	32	33					
Strontium Sr				0.038	0.040	0.040	0.040	0.042					
Tellurium Te				0.000	0.000	0.000	0.000	0.000					
Thallium Tl				0.000019	0.000023	0.000012	0.000004	0.000006					
Thorium Th				0.0000150	0.0000108	0.0000077	0.0000030	0.0000147					
Tin Sn				0.00027	0.00029	0.00015	0.00004	0.00033					
Titanium Ti				0.0001	0.0001	0.0001	0.0000	0.0001					
Uranium U				0.000046	0.000043	0.000044	0.000035	0.000048					
Vanadium V				0.0008	0.0003	0.0003	0.0001	0.0005					
Zinc Zn				0.0024	0.0022	0.0032	0.0017	0.0027					
Zirconium Zr				0.0052	0.0051	0.0051	0.0051	0.0052					

Loadings in Little Roberts Creek Outflow (kg/month)

Date	Year 4 Mar-11	Year 4 Apr-11	Year 4 May-11	Year 4 Jun-11	Year 4 Jul-11	Year 4 Aug-11	Year 4 Sep-11	Year 4 Oct-11	Year 4 Nov-11	Year 4 Dec-11	Year 4 Jan-12	Year 4 Feb-12
Parameter												
TDS				160	168	142	145	187				
TSS				3.0	3.8	2.9	3.0	2.9				
Free CN												
Total CN				0.001	0.001	0.001	0.001	0.001				
WAD CN												
CNO												
SCN				0.002	0.004	0.002		0.004				
Sulphate				5.4	6.5	4.6	3.0	7.0				
Chloride				89	121	88	63	130				
Total Ammonia				0.015	0.021	0.018	0.013	0.013				
Nitrate				0.25	0.45	0.23	0.05	0.53				
Nitrite				0.008	0.003	0.002	0.002	0.002				
Alkalinity				26	28	28	28	29				
OrthoPhosphate-P				0.0091	0.0160	0.0075	0.0008	0.0179				
Phosphate-P				0.0268	0.0352	0.0382	0.0270	0.0424				
Org. Carbon				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3				39	43	44	45	47				
Total Metals												
Aluminum Al				0.08	0.06	0.06	0.05	0.05				
Antimony Sb				0.0008	0.0014	0.0006	0.0000	0.0015				
Arsenic As				0.0005	0.0005	0.0005	0.0004	0.0006				
Barium Ba				0.0034	0.0034	0.0031	0.0030	0.0032				
Beryllium Be				0.00004	0.00006	0.00003	0.00001	0.00006				
Bismuth Bi				0.00074	0.00137	0.00060	0.00001	0.00153				
Boron B				0.020	0.022	0.023	0.023	0.024				
Cadmium Cd				0.0000052	0.0000067	0.0000049	0.0000033	0.0000074				
Calcium Ca				14	21	14	7	23				
Chromium Cr				0.000	0.000	0.000	0.000	0.000				
Cobalt Co				0.0002	0.0003	0.0002	0.0001	0.0003				
Copper Cu				0.0014	0.0017	0.0015	0.0014	0.0017				
Iron Fe				0.11	0.11	0.08	0.09	0.09				
Lead Pb				0.00007	0.00009	0.00013	0.00004	0.00007				
Lithium Li				0.0001	0.0002	0.0001	0.0000	0.0002				
Magnesium Mg				5.4	6.1	6.4	6.4	6.6				
Manganese Mn				0.012	0.015	0.016	0.010	0.010				
Mercury Hg				0.0007217	0.0008242	0.0006970	0.0006001	0.0008544				
Molybdenum Mo				0.00029	0.00046	0.00029	0.00014	0.00050				
Nickel Ni				0.0007	0.0010	0.0007	0.0005	0.0010				
Phosphorus P				0.012	0.021	0.010	0.001	0.024				
Potassium K				2.5	3.0	2.6	2.3	3.2				
Selenium Se				0.00077	0.00081	0.00083	0.00113	0.00109				
Silicon SiO2				0.13	0.23	0.11	0.01	0.26				
Silver Ag				0.0000059	0.0000080	0.0000048	0.0000025	0.0000087				
Sodium Na				27	31	32	32	32				
Strontium Sr				0.036	0.040	0.040	0.040	0.042				
Tellurium Te				0.000	0.000	0.000	0.000	0.000				
Thallium Tl				0.000018	0.000023	0.000012	0.000004	0.000006				
Thorium Th				0.0000068	0.0000105	0.0000062	0.0000027	0.0000120				
Tin Sn				0.00015	0.00034	0.00014	0.00004	0.00028				
Titanium Ti				0.0001	0.0001	0.0000	0.0000	0.0001				
Uranium U				0.000036	0.000043	0.000042	0.000034	0.000044				
Vanadium V				0.0007	0.0004	0.0003	0.0001	0.0004				
Zinc Zn				0.0018	0.0023	0.0031	0.0017	0.0025				
Zirconium Zr				0.0051	0.0051	0.0051	0.0051	0.0052				

Loadings in Little Roberts Creek Outflow (kg/month)												
Date	Year 5 Mar-12	Year 5 Apr-12	Year 5 May-12	Year 5 Jun-12	Year 5 Jul-12	Year 5 Aug-12	Year 5 Sep-12	Year 5 Oct-12	Year 5 Nov-12	Year 5 Dec-12	Year 5 Jan-13	Year 5 Feb-13
Parameter												
TDS				151	176	150	145	243				
TSS				3.0	3.8	2.9	3.0	2.9				
Free CN												
Total CN				0.001	0.001	0.001	0.001	0.001				
WAD CN												
CNO												
SCN				0.001	0.003	0.001		0.003				
Sulphate				4.5	6.0	4.3	3.0	6.2				
Chloride				74	120	90	63	156				
Total Ammonia				0.013	0.021	0.018	0.013	0.013				
Nitrate				0.16	0.38	0.19	0.05	0.43				
Nitrite				0.002	0.003	0.002	0.002	0.002				
Alkalinity				26	28	28	28	29				
OrthoPhosphate-P				0.0052	0.0136	0.0062	0.0008	0.0146				
Phosphate-P				0.0231	0.0327	0.0370	0.0270	0.0392				
Org. Carbon				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3				38	43	44	45	47				
Total Metals												
Aluminum Al				0.08	0.06	0.06	0.05	0.05				
Antimony Sb				0.0004	0.0012	0.0005	0.0000	0.0013				
Arsenic As				0.0004	0.0005	0.0005	0.0004	0.0006				
Barium Ba				0.0033	0.0033	0.0030	0.0030	0.0032				
Beryllium Be				0.00002	0.00005	0.00003	0.00001	0.00006				
Bismuth Bi				0.00040	0.00115	0.00049	0.00001	0.00123				
Boron B				0.020	0.022	0.023	0.023	0.023				
Cadmium Cd				0.0000045	0.0000066	0.0000048	0.0000033	0.0000071				
Calcium Ca				10	20	13	7	24				
Chromium Cr				0.000	0.000	0.000	0.000	0.000				
Cobalt Co				0.0001	0.0002	0.0001	0.0001	0.0003				
Copper Cu				0.0013	0.0017	0.0015	0.0014	0.0016				
Iron Fe				0.11	0.11	0.08	0.09	0.09				
Lead Pb				0.00006	0.00008	0.00013	0.00004	0.00007				
Lithium Li				0.0001	0.0002	0.0001	0.0000	0.0002				
Magnesium Mg				5.3	6.1	6.4	6.4	6.5				
Manganese Mn				0.011	0.015	0.016	0.010	0.010				
Mercury Hg				0.0006645	0.0007894	0.0006781	0.0006001	0.0008062				
Molybdenum Mo				0.00021	0.00041	0.00026	0.00014	0.00043				
Nickel Ni				0.0006	0.0009	0.0006	0.0005	0.0009				
Phosphorus P				0.007	0.018	0.008	0.001	0.020				
Potassium K				2.3	2.9	2.5	2.3	3.0				
Selenium Se				0.00077	0.00081	0.00083	0.00113	0.00109				
Silicon SiO2				0.08	0.20	0.09	0.01	0.21				
Silver Ag				0.0000048	0.0000076	0.0000046	0.0000025	0.0000081				
Sodium Na				26	35	36	32	54				
Strontium Sr				0.035	0.040	0.039	0.040	0.041				
Tellurium Te				0.000	0.000	0.000	0.000	0.000				
Thallium Tl				0.000018	0.000023	0.000012	0.000004	0.000005				
Thorium Th				0.0000051	0.0000101	0.0000059	0.0000027	0.0000113				
Tin Sn				0.00010	0.00031	0.00012	0.00004	0.00024				
Titanium Ti				0.0000	0.0001	0.0000	0.0000	0.0001				
Uranium U				0.000034	0.000042	0.000042	0.000034	0.000043				
Vanadium V				0.0007	0.0003	0.0002	0.0001	0.0004				
Zinc Zn				0.0016	0.0022	0.0031	0.0017	0.0024				
Zirconium Zr				0.0051	0.0052	0.0051	0.0051	0.0052				

Loadings in Little Roberts Creek Outflow (kg/month)												
Date	Year 6 Mar-13	Year 6 Apr-13	Year 6 May-13	Year 6 Jun-13	Year 6 Jul-13	Year 6 Aug-13	Year 6 Sep-13	Year 6 Oct-13	Year 6 Nov-13	Year 6 Dec-13	Year 6 Jan-14	Year 6 Feb-14
Parameter												
TDS				170	217	161	145	238				
TSS				3.0	3.8	2.9	3.0	2.9				
Free CN												
Total CN				0.001	0.001	0.001	0.001	0.001				
WAD CN												
CNO												
SCN				0.001	0.003	0.001		0.003				
Sulphate				4.3	5.4	4.0	3.0	5.6				
Chloride				83	139	95	63	146				
Total Ammonia				0.008	0.016	0.013	0.008	0.008				
Nitrate				0.09	0.27	0.12	0.01	0.31				
Nitrite				0.001	0.002	0.001	0.001	0.001				
Alkalinity				26	28	27	28	29				
OrthoPhosphate-P				0.0043	0.0111	0.0051	0.0008	0.0120				
Phosphate-P				0.0223	0.0303	0.0359	0.0270	0.0365				
Org. Carbon				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3				38	43	44	45	46				
Total Metals												
Aluminum Al				0.08	0.06	0.06	0.05	0.05				
Antimony Sb				0.0003	0.0009	0.0004	0.0000	0.0010				
Arsenic As				0.0004	0.0005	0.0005	0.0004	0.0005				
Barium Ba				0.0033	0.0033	0.0030	0.0030	0.0031				
Beryllium Be				0.00002	0.00004	0.00002	0.00000	0.00004				
Bismuth Bi				0.00032	0.00093	0.00039	0.00000	0.00100				
Boron B				0.019	0.022	0.023	0.022	0.023				
Cadmium Cd				0.0000031	0.0000051	0.0000034	0.0000020	0.0000056				
Calcium Ca				11	21	13	7	22				
Chromium Cr				0.000	0.000	0.000	0.000	0.000				
Cobalt Co				0.0001	0.0002	0.0001	0.0001	0.0002				
Copper Cu				0.0013	0.0016	0.0015	0.0014	0.0016				
Iron Fe				0.11	0.11	0.08	0.09	0.09				
Lead Pb				0.00005	0.00008	0.00012	0.00004	0.00006				
Lithium Li				0.0000	0.0001	0.0001		0.0001				
Magnesium Mg				5.3	6.0	6.4	6.4	6.5				
Manganese Mn				0.011	0.015	0.016	0.010	0.010				
Mercury Hg				0.0006520	0.0007534	0.0006628	0.0006000	0.0007672				
Molybdenum Mo				0.00019	0.00036	0.00024	0.00014	0.00037				
Nickel Ni				0.0005	0.0009	0.0006	0.0004	0.0008				
Phosphorus P				0.005	0.014	0.006		0.016				
Potassium K				2.3	2.8	2.4	2.3	2.9				
Selenium Se				0.00077	0.00081	0.00083	0.00112	0.00108				
Silicon SiO2				0.05	0.15	0.07		0.17				
Silver Ag				0.0000029	0.0000056	0.0000027	0.0000007	0.0000060				
Sodium Na				33	51	41	32	54				
Strontium Sr				0.035	0.039	0.039	0.040	0.041				
Tellurium Te				0.000	0.000	0.000		0.000				
Thallium Tl				0.000018	0.000022	0.000011	0.000003	0.000005				
Thorium Th				0.0000023	0.0000070	0.0000031		0.0000082				
Tin Sn				0.00008	0.00027	0.00010	0.00003	0.00020				
Titanium Ti				0.0000	0.0001	0.0000		0.0001				
Uranium U				0.000031	0.000039	0.000039	0.000032	0.000040				
Vanadium V				0.0006	0.0003	0.0002	0.0001	0.0003				
Zinc Zn				0.0016	0.0021	0.0030	0.0017	0.0023				
Zirconium Zr				0.0050	0.0051	0.0050	0.0050	0.0051				

Loadings in Little Roberts Creek Outflow (kg/month)

Date	Year 7 Mar-14	Year 7 Apr-14	Year 7 May-14	Year 7 Jun-14	Year 7 Jul-14	Year 7 Aug-14	Year 7 Sep-14	Year 7 Oct-14	Year 7 Nov-14	Year 7 Dec-14	Year 7 Jan-15	Year 7 Feb-15
Parameter												
TDS				164	200	154	145	219				
TSS				3.0	3.8	2.9	3.0	2.9				
Free CN												
Total CN				0.001	0.001	0.001	0.001	0.001				
WAD CN												
CNO												
SCN				0.001	0.002	0.001		0.002				
Sulphate				4.1	4.9	3.8	3.0	5.1				
Chloride				78	124	88	63	130				
Total Ammonia				0.008	0.014	0.012	0.008	0.007				
Nitrate				0.07	0.19	0.08	0.01	0.21				
Nitrite				0.001	0.002	0.001	0.001	0.001				
Alkalinity				26	28	27	28	29				
OrthoPhosphate-P				0.0036	0.0091	0.0043	0.0008	0.0098				
Phosphate-P				0.0216	0.0284	0.0351	0.0270	0.0344				
Org. Carbon				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3				38	42	44	45	46				
Total Metals												
Aluminum Al				0.08	0.06	0.06	0.05	0.05				
Antimony Sb				0.0003	0.0008	0.0003	0.0000	0.0008				
Arsenic As				0.0004	0.0005	0.0005	0.0004	0.0005				
Barium Ba				0.0033	0.0032	0.0030	0.0030	0.0031				
Beryllium Be				0.00002	0.00003	0.00002	0.00000	0.00004				
Bismuth Bi				0.00026	0.00075	0.00032	0.00000	0.00080				
Boron B				0.019	0.022	0.023	0.022	0.023				
Cadmium Cd				0.0000031	0.0000047	0.0000032	0.0000020	0.0000050				
Calcium Ca				10	18	12	7	19				
Chromium Cr				0.000	0.000	0.000	0.000	0.000				
Cobalt Co				0.0001	0.0002	0.0001	0.0001	0.0002				
Copper Cu				0.0013	0.0016	0.0015	0.0014	0.0015				
Iron Fe				0.11	0.11	0.08	0.09	0.09				
Lead Pb				0.00005	0.00007	0.00012	0.00004	0.00006				
Lithium Li				0.0000	0.0001	0.0000		0.0001				
Magnesium Mg				5.3	6.0	6.4	6.4	6.4				
Manganese Mn				0.011	0.015	0.016	0.010	0.010				
Mercury Hg				0.0006420	0.0007243	0.0006505	0.0006000	0.0007358				
Molybdenum Mo				0.00018	0.00032	0.00022	0.00014	0.00033				
Nickel Ni				0.0005	0.0008	0.0006	0.0004	0.0007				
Phosphorus P				0.004	0.012	0.005		0.013				
Potassium K				2.2	2.7	2.4	2.3	2.8				
Selenium Se				0.00077	0.00081	0.00083	0.00112	0.00108				
Silicon SiO2				0.04	0.13	0.05		0.14				
Silver Ag				0.0000028	0.0000050	0.0000024	0.0000007	0.0000050				
Sodium Na				32	47	39	32	50				
Strontium Sr				0.035	0.039	0.039	0.040	0.041				
Tellurium Te				0.000	0.000	0.000		0.000				
Thallium Tl				0.000018	0.000022	0.000011	0.000003	0.000005				
Thorium Th				0.0000021	0.0000062	0.0000026		0.0000068				
Tin Sn				0.00007	0.00024	0.00009	0.00003	0.00017				
Titanium Ti				0.0000	0.0001	0.0000		0.0001				
Uranium U				0.000031	0.000037	0.000038	0.000032	0.000038				
Vanadium V				0.0006	0.0003	0.0002	0.0001	0.0003				
Zinc Zn				0.0016	0.0020	0.0030	0.0017	0.0022				
Zirconium Zr				0.0050	0.0051	0.0050	0.0050	0.0051				

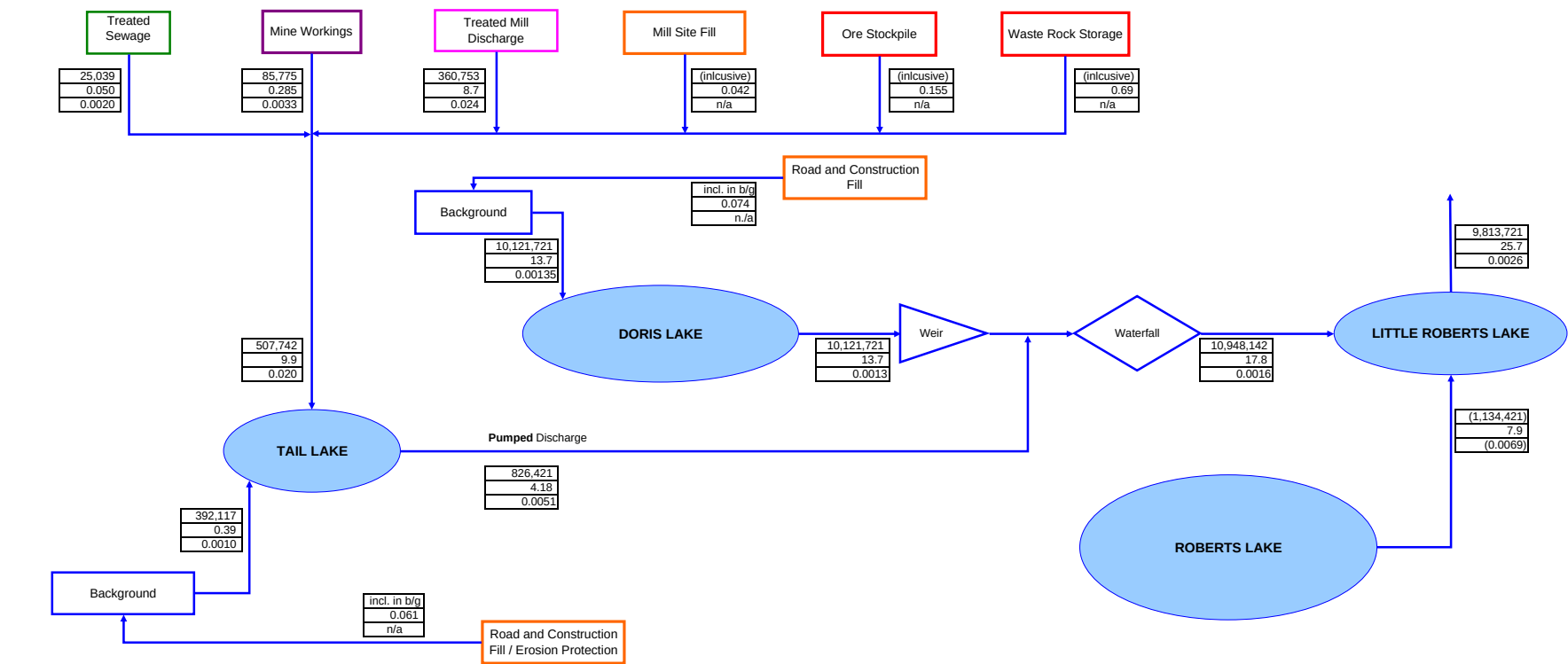
Loadings in Little Roberts Creek Outflow (kg/month)												
Date	Year 8 Mar-15	Year 8 Apr-15	Year 8 May-15	Year 8 Jun-15	Year 8 Jul-15	Year 8 Aug-15	Year 8 Sep-15	Year 8 Oct-15	Year 8 Nov-15	Year 8 Dec-15	Year 8 Jan-16	Year 8 Feb-16
Parameter												
TDS				159	186	148	145	205				
TSS				3.0	3.8	2.9	3.0	2.9				
Free CN												
Total CN				0.001	0.001	0.001	0.001	0.001				
WAD CN												
CNO												
SCN				0.001	0.002	0.001		0.002				
Sulphate				4.0	4.6	3.6	3.0	4.7				
Chloride				74	112	83	63	117				
Total Ammonia				0.008	0.014	0.012	0.008	0.007				
Nitrate				0.04	0.11	0.05	0.01	0.12				
Nitrite				0.0010	0.0019	0.001	0.001	0.001				
Alkalinity				26	27	27	28	28				
OrthoPhosphate-P				0.0031	0.0075	0.0036	0.0008	0.0081				
Phosphate-P				0.0210	0.0268	0.0345	0.0270	0.0327				
Org. Carbon				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3				38	42	44	45	46				
Total Metals												
Aluminum Al				0.08	0.06	0.06	0.05	0.05				
Antimony Sb				0.0002	0.0006	0.0003	0.0000	0.0007				
Arsenic As				0.0004	0.0005	0.0005	0.0004	0.0005				
Barium Ba				0.0033	0.0032	0.0030	0.0030	0.0031				
Beryllium Be				0.00001	0.00003	0.00001	0.00000	0.00003				
Bismuth Bi				0.00021	0.00061	0.00026	0.00000	0.00065				
Boron B				0.019	0.022	0.023	0.022	0.023				
Cadmium Cd				0.0000029	0.0000042	0.0000029	0.0000020	0.0000044				
Calcium Ca				9	16	11	7	17				
Chromium Cr				0.000	0.000	0.000	0.000	0.000				
Cobalt Co				0.0001	0.0001	0.0001	0.0001	0.0002				
Copper Cu				0.0013	0.0015	0.0015	0.0014	0.0015				
Iron Fe				0.11	0.11	0.08	0.09	0.09				
Lead Pb				0.00005	0.00007	0.00012	0.00004	0.00005				
Lithium Li				0.0000	0.0001	0.0000		0.0001				
Magnesium Mg				5.3	6.0	6.3	6.4	6.4				
Manganese Mn				0.011	0.015	0.016	0.010	0.010				
Mercury Hg				0.0006339	0.0007009	0.0006406	0.0006000	0.0007104				
Molybdenum Mo				0.00016	0.00028	0.00021	0.00014	0.00029				
Nickel Ni				0.0005	0.0007	0.0005	0.0004	0.0007				
Phosphorus P				0.003	0.010	0.004		0.011				
Potassium K				2.2	2.6	2.4	2.3	2.7				
Selenium Se				0.00077	0.00081	0.00083	0.00112	0.00108				
Silicon SiO2				0.04	0.10	0.04		0.11				
Silver Ag				0.0000025	0.0000042	0.0000021	0.0000007	0.0000042				
Sodium Na				31	44	38	32	46				
Strontium Sr				0.035	0.039	0.039	0.040	0.040				
Tellurium Te				0.000	0.000	0.000		0.000				
Thallium Tl				0.000018	0.000022	0.000011	0.000003	0.000004				
Thorium Th				0.0000017	0.0000051	0.0000022		0.0000056				
Tin Sn				0.00006	0.00022	0.00008	0.00003	0.00014				
Titanium Ti				0.0000	0.0001	0.0000		0.0001				
Uranium U				0.000030	0.000036	0.000038	0.000032	0.000036				
Vanadium V				0.0006	0.0003	0.0002	0.0001	0.0003				
Zinc Zn				0.0015	0.0020	0.0030	0.0017	0.0022				
Zirconium Zr				0.0050	0.0051	0.0050	0.0050	0.0051				

Loadings in Little Roberts Creek Outflow (kg/month)												
Date	Year 9 Mar-16	Year 9 Apr-16	Year 9 May-16	Year 9 Jun-16	Year 9 Jul-16	Year 9 Aug-16	Year 9 Sep-16	Year 9 Oct-16	Year 9 Nov-16	Year 9 Dec-16	Year 9 Jan-17	Year 9 Feb-17
Parameter												
TDS				155	175	144	145	192				
TSS				3.0	3.8	2.9	3.0	2.9				
Free CN												
Total CN				0.001	0.001	0.001	0.001	0.001				
WAD CN												
CNO												
SCN				0.000	0.001	0.001		0.001				
Sulphate				3.9	4.3	3.5	3.0	4.4				
Chloride				70	102	79	63	106				
Total Ammonia				0.008	0.014	0.012	0.008	0.007				
Nitrate				0.02	0.05	0.02	0.01	0.05				
Nitrite				0.001	0.002	0.001	0.001	0.001				
Alkalinity				26	27	27	28	28				
OrthoPhosphate-P				0.0026	0.0062	0.0031	0.0008	0.0067				
Phosphate-P				0.0206	0.0255	0.0339	0.0270	0.0313				
Org. Carbon				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3				38	42	44	45	45				
Total Metals												
Aluminum Al				0.08	0.06	0.06	0.05	0.05				
Antimony Sb				0.0002	0.0005	0.0002	0.0000	0.0005				
Arsenic As				0.0004	0.0004	0.0005	0.0004	0.0005				
Barium Ba				0.0033	0.0032	0.0030	0.0030	0.0030				
Beryllium Be				0.00001	0.00002	0.00001	0.00000	0.00002				
Bismuth Bi				0.00017	0.00049	0.00021	0.00000	0.00053				
Boron B				0.019	0.022	0.023	0.022	0.023				
Cadmium Cd				0.0000028	0.0000038	0.0000028	0.0000020	0.0000040				
Calcium Ca				9	14	10	7	15				
Chromium Cr				0.000	0.000	0.000	0.000	0.000				
Cobalt Co				0.0001	0.0001	0.0001	0.0001	0.0001				
Copper Cu				0.0013	0.0015	0.0014	0.0014	0.0015				
Iron Fe				0.11	0.11	0.08	0.09	0.09				
Lead Pb				0.00005	0.00007	0.00012	0.00004	0.00005				
Lithium Li				0.0000	0.0001	0.0000		0.0001				
Magnesium Mg				5.3	5.9	6.3	6.4	6.4				
Manganese Mn				0.011	0.014	0.016	0.010	0.010				
Mercury Hg				0.0006274	0.0006820	0.0006326	0.0006000	0.0006899				
Molybdenum Mo				0.00015	0.00026	0.00019	0.00014	0.00026				
Nickel Ni				0.0005	0.0007	0.0005	0.0004	0.0006				
Phosphorus P				0.003	0.008	0.003		0.009				
Potassium K				2.2	2.5	2.3	2.3	2.6				
Selenium Se				0.00077	0.00081	0.00083	0.00112	0.00108				
Silicon SiO2				0.03	0.08	0.04		0.09				
Silver Ag				0.0000023	0.0000036	0.0000018	0.0000007	0.0000036				
Sodium Na				30	41	37	32	43				
Strontium Sr				0.035	0.039	0.039	0.040	0.040				
Tellurium Te				0.000	0.000	0.000		0.000				
Thallium Tl				0.000017	0.000021	0.000011	0.000003	0.000004				
Thorium Th				0.0000014	0.0000042	0.0000018		0.0000046				
Tin Sn				0.00006	0.00020	0.00007	0.00003	0.00012				
Titanium Ti				0.0000	0.0001	0.0000		0.0001				
Uranium U				0.000030	0.000035	0.000037	0.000032	0.000035				
Vanadium V				0.0006	0.0002	0.0002	0.0001	0.0002				
Zinc Zn				0.0015	0.0019	0.0030	0.0017	0.0021				
Zirconium Zr				0.0050	0.0051	0.0050	0.0050	0.0051				

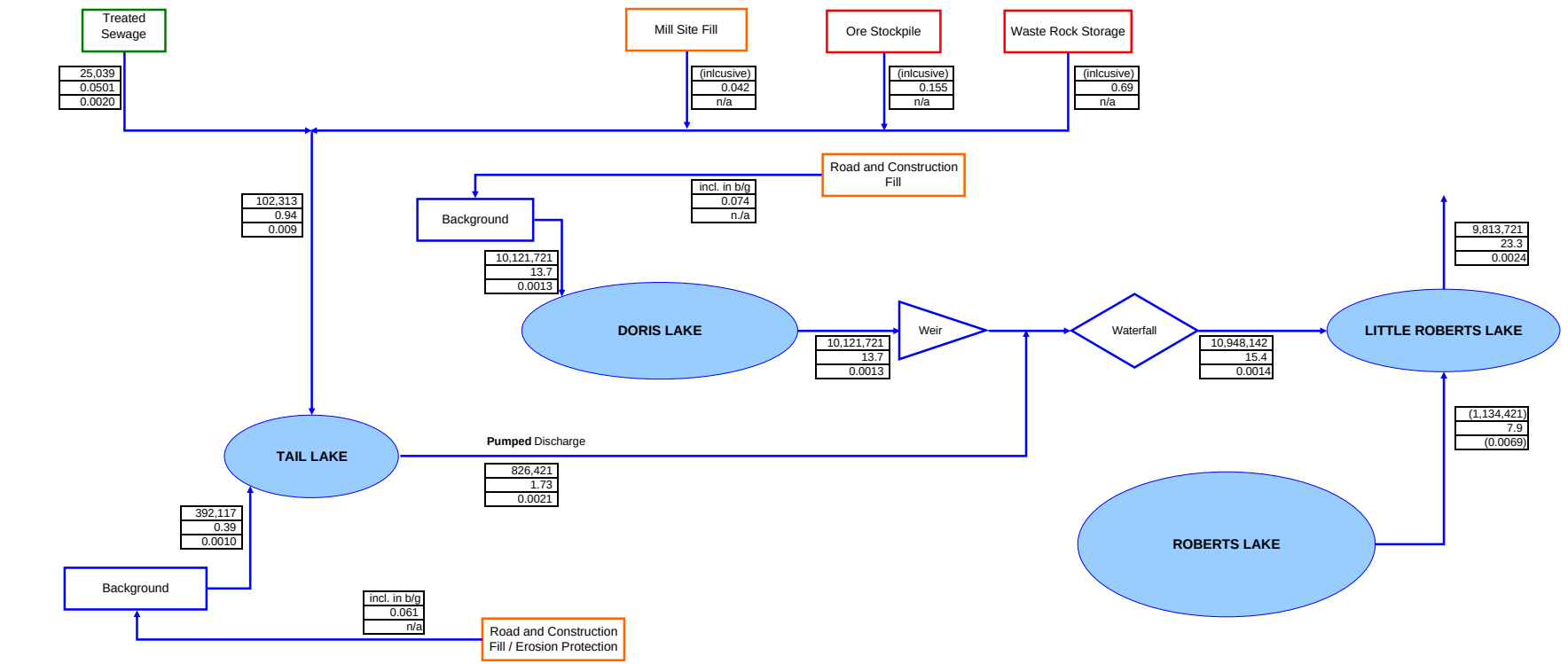
Loadings in Little Roberts Creek Outflow (kg/month)												
Date	Year 10 Mar-17	Year 10 Apr-17	Year 10 May-17	Year 10 Jun-17	Year 10 Jul-17	Year 10 Aug-17	Year 10 Sep-17	Year 10 Oct-17	Year 10 Nov-17	Year 10 Dec-17	Year 10 Jan-18	Year 10 Feb-18
Parameter												
TDS				152	166	140	145	183				
TSS				3.0	3.8	2.9	3.0	2.9				
Free CN												
Total CN				0.001	0.001	0.001	0.001	0.001				
WAD CN												
CNO												
SCN				0.000	0.001	0.000		0.001				
Sulphate				3.8	4.0	3.4	3.0	4.1				
Chloride				68	94	75	63	98				
Total Ammonia				0.008	0.014	0.012	0.008	0.007				
Nitrate				0.01	0.01	0.00	0.01	0.00				
Nitrite				0.001	0.002	0.001	0.001	0.001				
Alkalinity				26	27	27	28	28				
OrthoPhosphate-P				0.0023	0.0052	0.0026	0.0008	0.0056				
Phosphate-P				0.0202	0.0245	0.0335	0.0270	0.0302				
Org. Carbon				5.0	5.0	5.0	5.0	5.1				
Hardness CaCO3				38	42	44	45	45				
Total Metals												
Aluminum Al				0.08	0.06	0.06	0.05	0.05				
Antimony Sb				0.0001	0.0004	0.0002	0.0000	0.0004				
Arsenic As				0.0004	0.0004	0.0005	0.0004	0.0005				
Barium Ba				0.0033	0.0032	0.0030	0.0030	0.0030				
Beryllium Be				0.00001	0.00002	0.00001	0.00000	0.00002				
Bismuth Bi				0.00014	0.00040	0.00017	0.00000	0.00042				
Boron B				0.019	0.021	0.023	0.022	0.022				
Cadmium Cd				0.0000027	0.0000035	0.0000026	0.0000020	0.0000036				
Calcium Ca				8	13	10	7	13				
Chromium Cr				0.000	0.000	0.000	0.000	0.000				
Cobalt Co				0.0001	0.0001	0.0001	0.0001	0.0001				
Copper Cu				0.0013	0.0015	0.0014	0.0014	0.0015				
Iron Fe				0.11	0.11	0.08	0.09	0.09				
Lead Pb				0.00005	0.00006	0.00012	0.00004	0.00005				
Lithium Li				0.0000	0.0001	0.0000		0.0001				
Magnesium Mg				5.3	5.9	6.3	6.4	6.4				
Manganese Mn				0.011	0.014	0.016	0.010	0.010				
Mercury Hg				0.0006222	0.0006667	0.0006261	0.0006000	0.0006733				
Molybdenum Mo				0.00015	0.00023	0.00019	0.00014	0.00024				
Nickel Ni				0.0005	0.0007	0.0005	0.0004	0.0006				
Phosphorus P				0.002	0.006	0.003		0.007				
Potassium K				2.2	2.5	2.3	2.3	2.5				
Selenium Se				0.00077	0.00081	0.00083	0.00112	0.00108				
Silicon SiO2				0.02	0.07	0.03		0.08				
Silver Ag				0.0000021	0.0000031	0.0000016	0.0000007	0.0000030				
Sodium Na				29	39	36	32	41				
Strontium Sr				0.035	0.039	0.039	0.040	0.040				
Tellurium Te				0.000	0.000	0.000		0.000				
Thallium Tl				0.000017	0.000021	0.000011	0.000003	0.000004				
Thorium Th				0.0000012	0.0000035	0.0000015		0.0000038				
Tin Sn				0.00005	0.00018	0.00006	0.00003	0.00010				
Titanium Ti				0.0000	0.0001	0.0000		0.0001				
Uranium U				0.000030	0.000034	0.000037	0.000032	0.000034				
Vanadium V				0.0006	0.0002	0.0002	0.0001	0.0002				
Zinc Zn				0.0015	0.0019	0.0029	0.0017	0.0021				
Zirconium Zr				0.0050	0.0051	0.0050	0.0050	0.0051				

Appendix J
Water Quality Modelling Results – Exceptional Dry Conditions

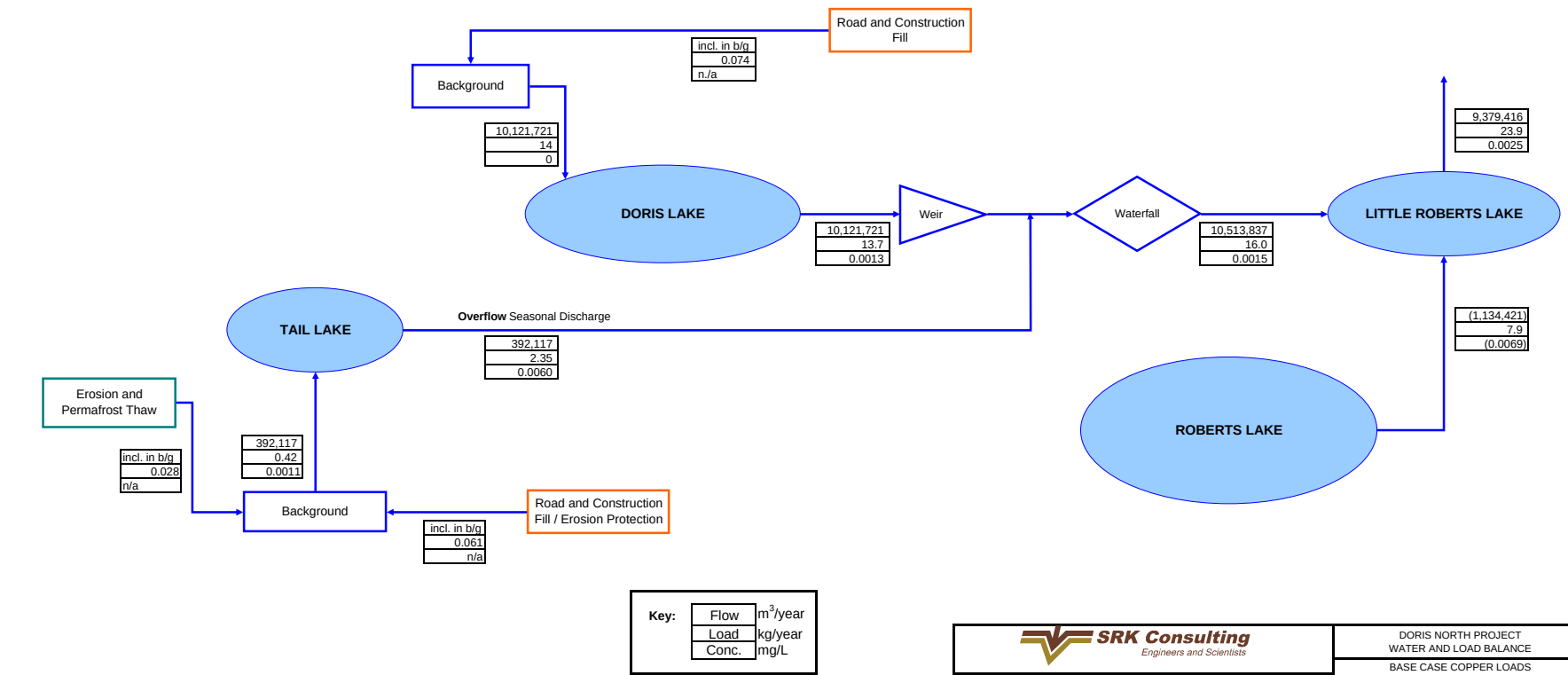
OPERATIONAL CONDITIONS
Year 2



POST MILLING OPERATIONAL CONDITIONS
Year 3



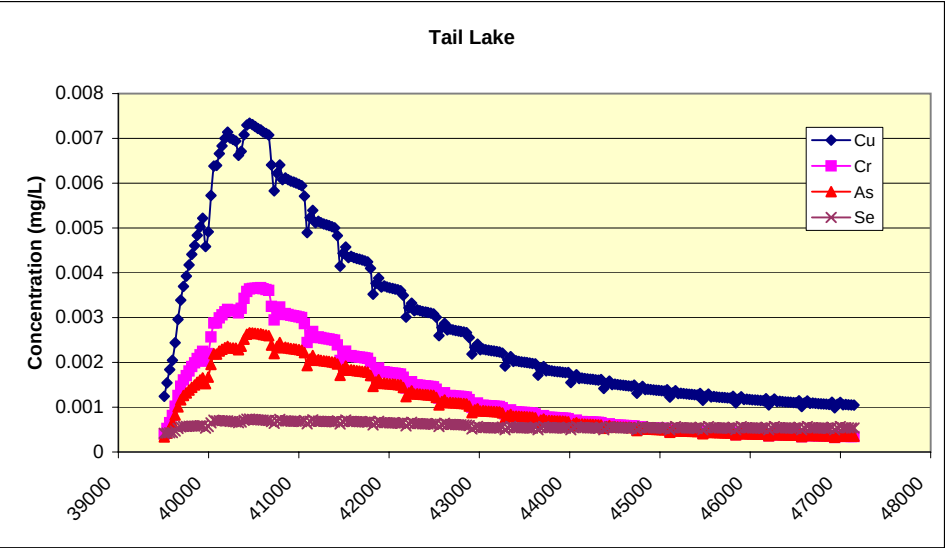
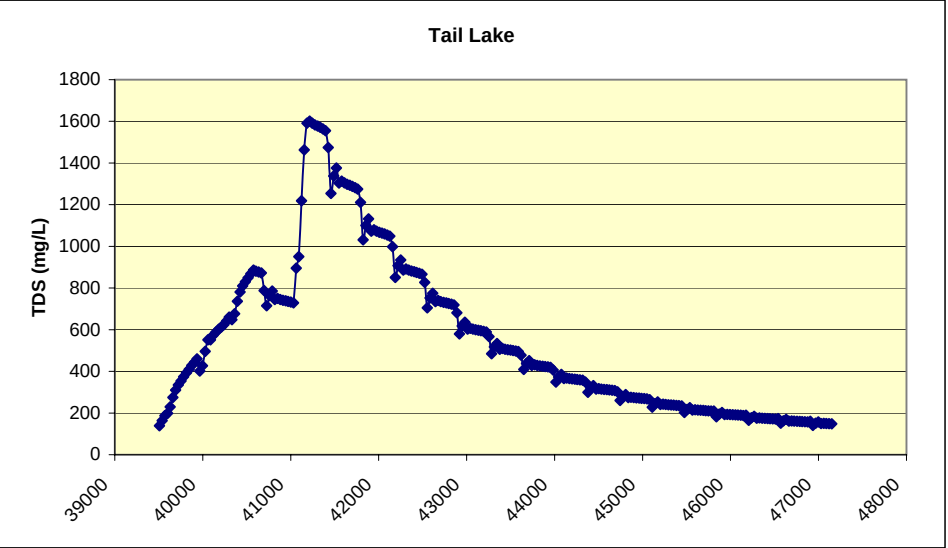
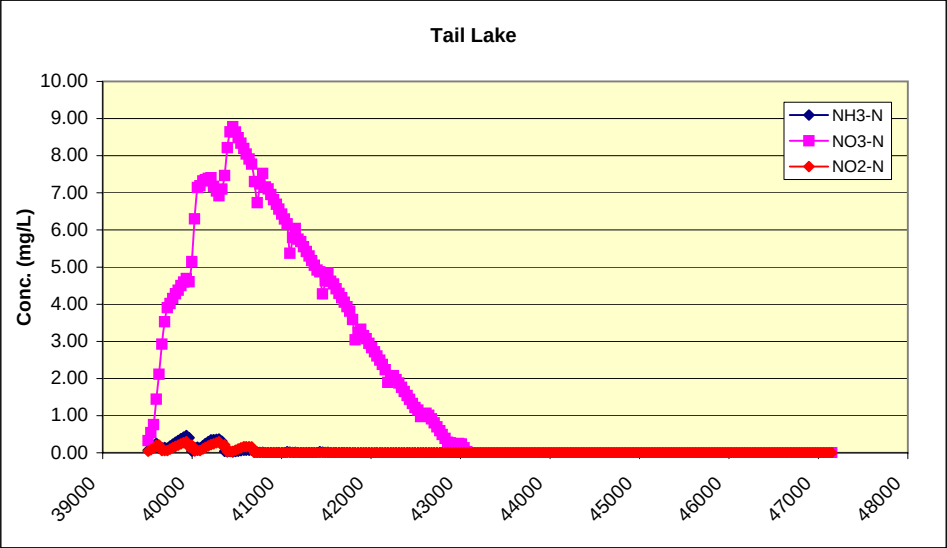
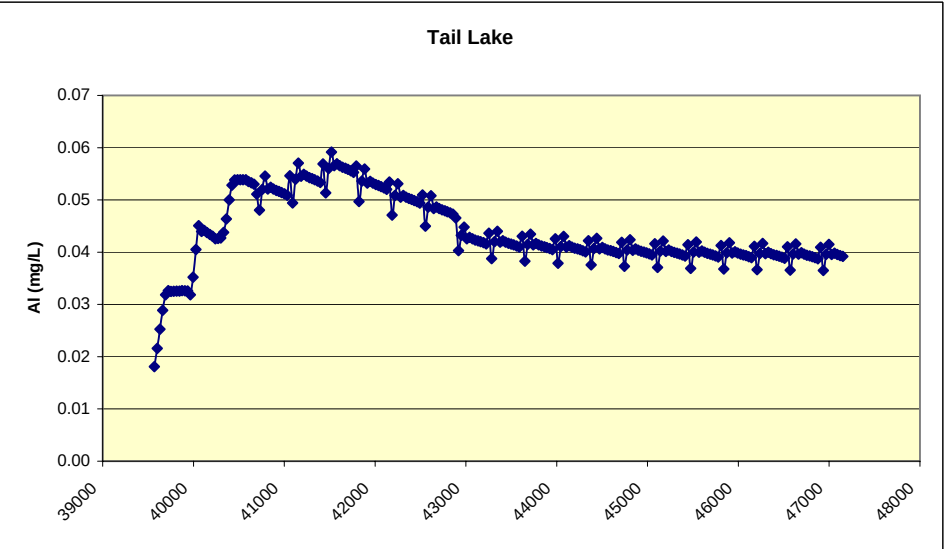
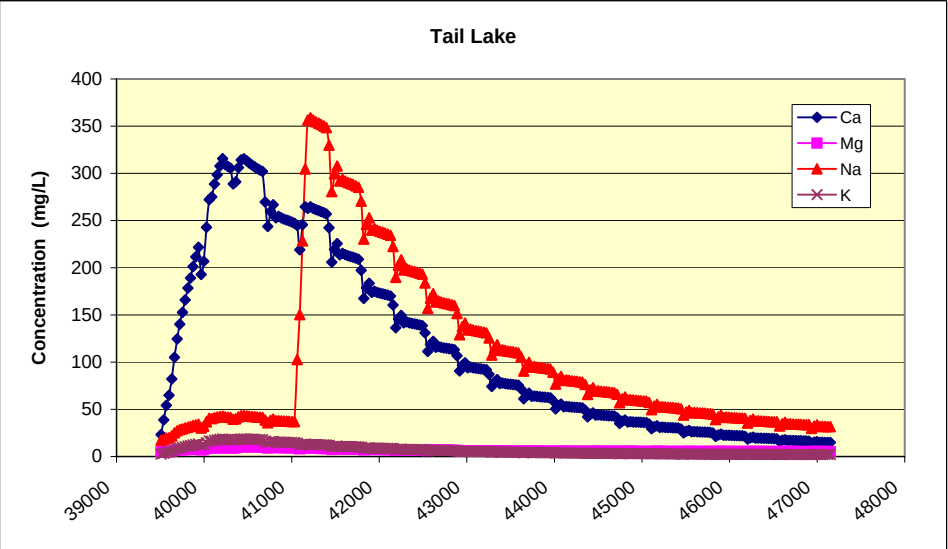
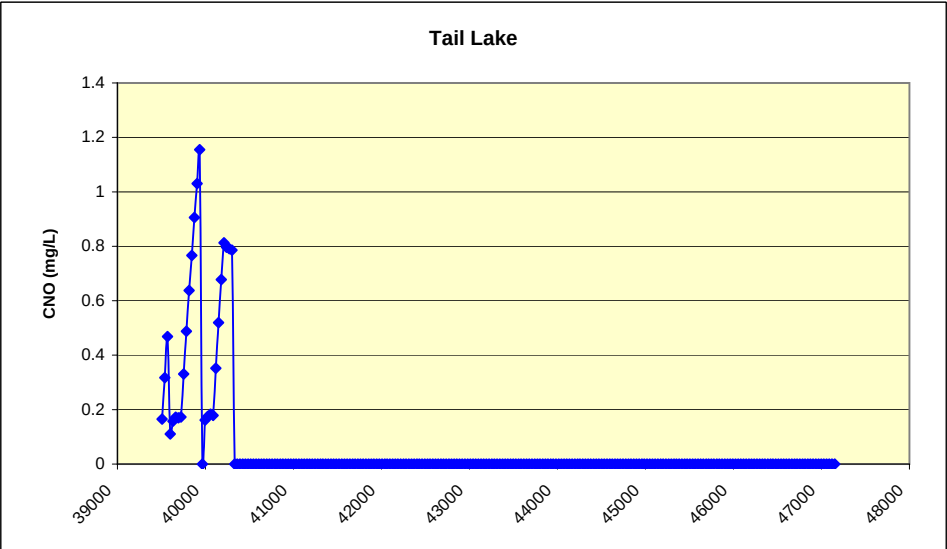
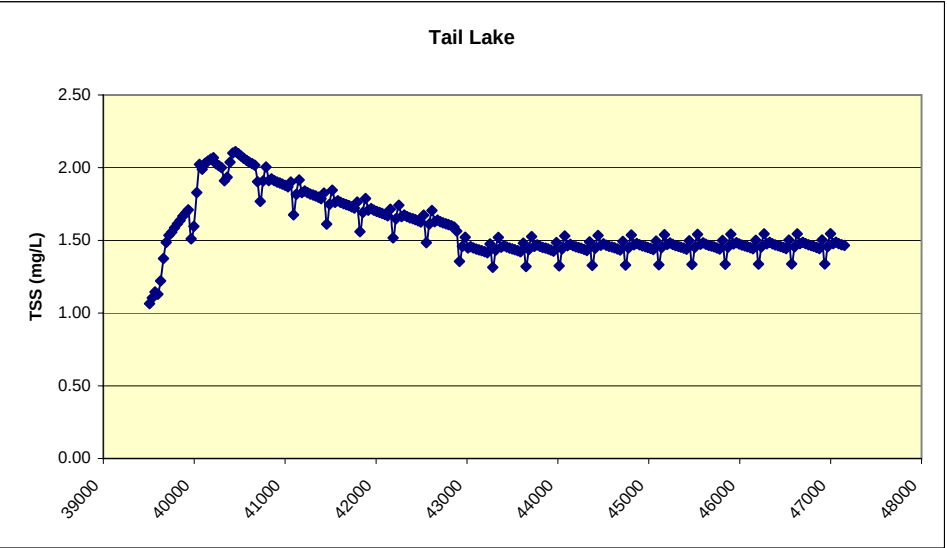
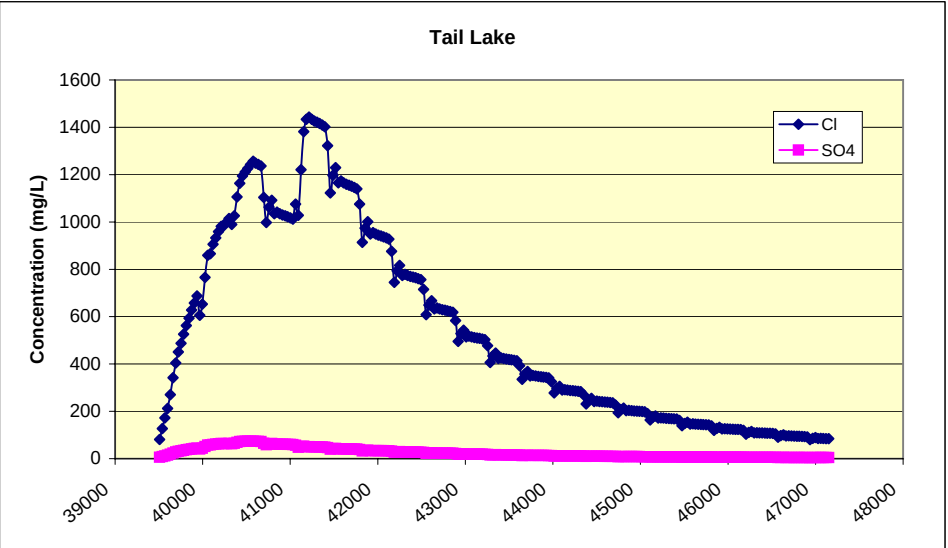
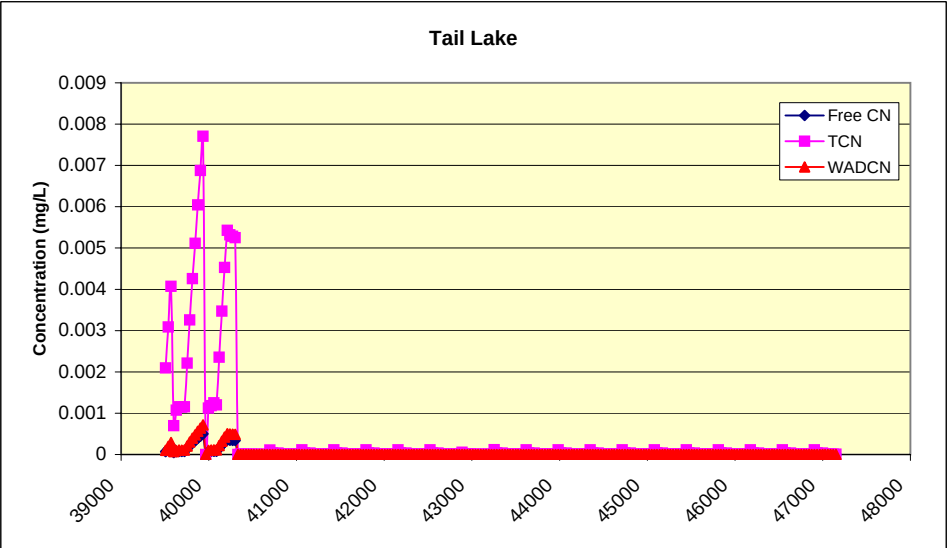
POST CLOSURE CONDITIONS
Year 5



Key:

Flow	m³/year
Load	kg/year
Conc.	mg/L

 SRK Consulting Engineers and Scientists	DORIS NORTH PROJECT WATER AND LOAD BALANCE		
	BASE CASE COPPER LOADS No Erosion Control		
	PROJECT: 1CM014.06	Date: Oct-05	Approved: JTC
MIRAMAR HOPE BAY LIMITED			FIGURE J-1



OUTPUT SUMMARY					
Max Annual Discharge rate		826,421 m ³ /year in		Year 2	
Degradation Field(age)		Tail Lk Cu < CME Year		12	
Maximum Concentration		MMER	CCME	Tail Lake Background	Tail Lake Year 3
pH			6 to 9	7.29	7 to 8
TDS	mg/L			110	1601
TSS	mg/L	15		2.0	2.1
Free CN	mg/L		0.005		0.0005
Total CN	mg/L	1.0		0.002	0.008
WAD CN	mg/L				0.0007
CNO	mg/L				1.2
SCN	mg/L				0.083
Sulphate	mg/L			3	74
Chloride	mg/L			37	1443
Total Ammonia-N	mg/L		1.27	0.008	0.47
Nitrate-N	mg/L		2.9	0.006	8.8
Nitrite-N	mg/L		0.018	0.0020	0.30
Alkalinity	mg/L			30	54
OrthoPhosphate-P	mg/L			0.0020	0.2921
Phosphate-P	mg/L			0.0080	0.2965
Org. Carbon	mg/L			5.9	5.9
Hardness CaCO3	mg/L			41	97
Total Metals					
Aluminum Al	mg/L		0.1	0.017	0.059
Antimony Sb	mg/L			0.0000	0.0260
Arsenic As	mg/L	0.5	0.005	0.0003	0.0027
Barium Ba	mg/L			0.0031	0.0080
Beryllium Be	mg/L			0.00000	0.00096
Bismuth Bi	mg/L			0.00001	0.02582
Boron B	mg/L			0.015	0.040
Cadmium Cd	mg/L		0.000017	0.000003	0.000073
Calcium Ca	mg/L			7.6	316
Chromium Cr	mg/L		0.001	0.0003	0.0037
Cobalt Co	mg/L			0.0001	0.0047
Copper Cu	mg/L	0.3	0.002	0.001	0.007
Iron Fe	mg/L		0.3	0.40	0.12
Lead Pb	mg/L	0.2	0.001	0.00006	0.00060
Lithium Li	mg/L			-	0.0036
Magnesium Mg	mg/L			5.6	10.4
Manganese Mn	mg/L			0.008	0.018
Mercury Hg	ug/L		0.026	0.0006	0.0056
Molybdenum Mo	mg/L		0.073	0.0001	0.0071
Nickel Ni	mg/L	0.5	0.025	0.001	0.010
Phosphorus P	mg/L			0.008	0.392
Potassium K	mg/L			1.8	19
Selenium Se	mg/L		0.001	0.00062	0.00074
Silicon SiO2	mg/L			-	4.6
Silver Ag	mg/L		0.0001	0.00000	0.00010
Sodium Na	mg/L			19	359
Strontium Sr	mg/L			0.034	0.073
Tellurium Te	mg/L			-	0.00033
Thallium Tl	mg/L		0.0008	0.000014	0.000038
Thorium Th	mg/L			-	0.00016
Tin Sn	mg/L			0.00004	0.00417
Titanium Ti	mg/L			-	0.0016
Uranium U	mg/L			0.000011	0.000220
Vanadium V	mg/L			0.0004	0.0046
Zinc Zn	mg/L	0.5	0.03	0.005	0.015
Zirconium Zr	mg/L			0.0050	0.0074

Water Quality in TAIL LAKE													
Date		Year 1 Mar-08	Year 1 Apr-08	Year 1 May-08	Year 1 Jun-08	Year 1 Jul-08	Year 1 Aug-08	Year 1 Sep-08	Year 1 Oct-08	Year 1 Nov-08	Year 1 Dec-08	Year 1 Jan-09	Year 1 Feb-09
Parameter													
TDS	mg/L	139	163	188	199	230	275	310	335	354	374	393	410
TSS	mg/L	1.1	1.1	1.1	1.1	1.2	1.4	1.5	1.5	1.6	1.6	1.6	1.6
Free CN	mg/L	0.00007	0.00014	0.00020	0.00005	0.00007	0.00007	0.00007	0.00007	0.00014	0.00021	0.00028	0.00033
Total CN	mg/L	0.002	0.003	0.004	0.001	0.001	0.001	0.001	0.001	0.002	0.003	0.004	0.005
WAD CN	mg/L	0.0001	0.0002	0.0003	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0003	0.0004	0.0005
CNO	mg/L	0.17	0.32	0.47	0.11	0.16	0.17	0.17	0.17	0.33	0.49	0.64	0.77
SCN	mg/L	0.005	0.009	0.013	0.016	0.020	0.026	0.032	0.036	0.039	0.043	0.046	0.049
Sulphate	mg/L	6.1	8.9	11.6	14.9	19.1	23.9	28.1	31.0	33.1	35.4	37.5	39.3
Chloride	mg/L	81	127	173	212	270	342	404	451	487	526	562	593
Total Ammonia-N	mg/L	0.067	0.121	0.175	0.254	0.124	0.135	0.142	0.125	0.180	0.234	0.286	0.331
Nitrate-N	mg/L	0.33	0.54	0.76	1.44	2.12	2.92	3.53	3.91	4.02	4.16	4.28	4.38
Nitrite-N	mg/L	0.042	0.081	0.119	0.203	0.208	0.059	0.060	0.059	0.098	0.137	0.174	0.206
Alkalinity	mg/L	29	30	31	31	33	37	40	41	41	42	42	43
OrthoPhosphate-P	mg/L	0.0117	0.0206	0.0294	0.0351	0.0448	0.0575	0.0684	0.0772	0.0844	0.0919	0.0991	0.1052
Phosphate-P	mg/L	0.0176	0.0264	0.0350	0.0405	0.0502	0.0632	0.0742	0.0829	0.0900	0.0974	0.1044	0.1104
Org. Carbon	mg/L	5.9	5.7	5.6	5.3	5.4	5.7	5.8	5.7	5.6	5.4	5.3	5.2
Hardness CaCO3	mg/L	37	40	42	43	47	55	60	63	65	67	69	71
Total Metals													
Aluminum Al	mg/L	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Antimony Sb	mg/L	0.0006	0.0011	0.0016	0.0034	0.0049	0.0062	0.0075	0.0081	0.0084	0.0088	0.0091	0.0094
Arsenic As	mg/L	0.0003	0.0004	0.0005	0.0007	0.0008	0.0010	0.0012	0.0013	0.0013	0.0014	0.0014	0.0015
Barium Ba	mg/L	0.0024	0.0026	0.0028	0.0030	0.0034	0.0039	0.0044	0.0046	0.0048	0.0050	0.0052	0.0053
Beryllium Be	mg/L	0.00003	0.00006	0.00008	0.00015	0.00021	0.00026	0.00032	0.00035	0.00036	0.00038	0.00040	0.00041
Bismuth Bi	mg/L	0.00057	0.00109	0.00160	0.00338	0.00487	0.00616	0.00738	0.00801	0.00832	0.00867	0.00901	0.00929
Boron B	mg/L	0.015	0.015	0.016	0.017	0.020	0.022	0.024	0.025	0.025	0.026	0.026	0.026
Cadmium Cd	mg/L	0.000005	0.000008	0.000010	0.000015	0.000020	0.000026	0.000030	0.000033	0.000035	0.000037	0.000039	0.000040
Calcium Ca	mg/L	23	39	54	65	82	105	125	140	153	166	179	189
Chromium Cr	mg/L	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002
Cobalt Co	mg/L	0.0002	0.0004	0.0006	0.0009	0.0011	0.0014	0.0017	0.0019	0.0021	0.0023	0.0024	0.0025
Copper Cu	mg/L	0.0012	0.0015	0.0018	0.0020	0.0024	0.0030	0.0034	0.0037	0.0039	0.0042	0.0044	0.0046
Iron Fe	mg/L	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Lead Pb	mg/L	0.00004	0.00006	0.00008	0.00012	0.00016	0.00020	0.00023	0.00025	0.00026	0.00027	0.00029	0.00030
Lithium Li	mg/L	0.0002	0.0003	0.0004	0.0006	0.0008	0.0011	0.0013	0.0014	0.0015	0.0017	0.0018	0.0019
Magnesium Mg	mg/L	4.9	5.0	5.2	5.3	5.8	6.5	7.0	7.2	7.2	7.3	7.4	7.5
Manganese Mn	mg/L	0.002	0.003	0.003	0.004	0.005	0.006	0.007	0.008	0.009	0.009	0.010	0.010
Mercury Hg	ug/L	0.00088	0.00113	0.00137	0.00151	0.00180	0.00221	0.00254	0.00279	0.00298	0.00319	0.00339	0.00356
Molybdenum Mo	mg/L	0.00048	0.00083	0.00118	0.00142	0.00181	0.00232	0.00276	0.00311	0.00339	0.00369	0.00397	0.00421
Nickel Ni	mg/L	0.0010	0.0014	0.0018	0.0022	0.0028	0.0035	0.0041	0.0046	0.0049	0.0053	0.0056	0.0059
Phosphorus P	mg/L	0.021	0.033	0.045	0.057	0.073	0.092	0.108	0.121	0.130	0.140	0.149	0.157
Potassium K	mg/L	2.5	3.4	4.2	4.7	5.7	7.1	8.2	9.1	9.7	10.5	11.1	11.7
Selenium Se	mg/L	0.00042	0.00042	0.00043	0.00043	0.00047	0.00052	0.00056	0.00057	0.00057	0.00057	0.00058	0.00058
Silicon SiO2	mg/L	0.24	0.46	0.68	0.87	1.14	1.47	1.76	1.99	2.16	2.35	2.52	2.67
Silver Ag	mg/L	0.0000032	0.0000055	0.0000077	0.0000168	0.0000243	0.0000306	0.0000365	0.0000394	0.0000407	0.0000421	0.0000435	0.0000446
Sodium Na	mg/L	17	18	20	20	22	25	27	29	29	30	31	32
Strontium Sr	mg/L	0.027	0.029	0.031	0.032	0.035	0.040	0.044	0.046	0.047	0.049	0.050	0.051
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000007	0.000008	0.000010	0.000012	0.000014	0.000017	0.000019	0.000020	0.000021	0.000022	0.000023	0.000024
Thorium Th	mg/L	0.000007	0.000013	0.000020	0.000031	0.000043	0.000055	0.000066	0.000072	0.000077	0.000082	0.000087	0.000091
Tin Sn	mg/L	0.00013	0.00021	0.00030	0.00059	0.00083	0.00105	0.00125	0.00135	0.00141	0.00147	0.00153	0.00157
Titanium Ti	mg/L	0.0000	0.0001	0.0001	0.0002	0.0003	0.0004	0.0005	0.0005	0.0006	0.0006	0.0006	0.0007
Uranium U	mg/L	0.000021	0.000029	0.000038	0.000050	0.000064	0.000080	0.000094	0.000103	0.000109	0.000116	0.000122	0.000127
Vanadium V	mg/L	0.0005	0.0006	0.0007	0.0009	0.0012	0.0015	0.0017	0.0018	0.0018	0.0019	0.0019	0.0020
Zinc Zn	mg/L	0.0058	0.0060	0.0063	0.0066	0.0073	0.0083	0.0090	0.0093	0.0094	0.0096	0.0098	0.0100
Zirconium Zr	mg/L	0.0051	0.0051	0.0051	0.0051	0.0054	0.0060	0.0063	0.0063	0.0063	0.0063	0.0062	0.0062

Water Quality in TAIL LAKE													
Date		Year 2 Mar-09	Year 2 Apr-09	Year 2 May-09	Year 2 Jun-09	Year 2 Jul-09	Year 2 Aug-09	Year 2 Sep-09	Year 2 Oct-09	Year 2 Nov-09	Year 2 Dec-09	Year 2 Jan-10	Year 2 Feb-10
Parameter													
TDS	mg/L	429	444	460	402	427	496	551	551	574	588	602	613
TSS	mg/L	1.7	1.7	1.7	1.5	1.6	1.8	2.0	2.0	2.0	2.0	2.1	2.1
Free CN	mg/L	0.00039	0.00045	0.00050		0.00007	0.00008	0.00008	0.00008	0.00015	0.00023	0.00029	0.00035
Total CN	mg/L	0.006	0.007	0.008		0.001	0.001	0.001	0.001	0.002	0.003	0.005	0.005
WAD CN	mg/L	0.0006	0.0006	0.0007		0.0001	0.0001	0.0001	0.0001	0.0002	0.0003	0.0004	0.0005
CNO	mg/L	0.91	1.03	1.15		0.16	0.18	0.18	0.18	0.35	0.52	0.68	0.81
SCN	mg/L	0.053	0.055	0.058	0.050	0.054	0.064	0.071	0.072	0.076	0.079	0.081	0.083
Sulphate	mg/L	41.4	43.1	44.8	40.3	43.8	51.3	57.6	57.8	60.1	61.6	63.1	64.3
Chloride	mg/L	628	658	688	605	653	766	859	866	906	933	959	981
Total Ammonia-N	mg/L	0.379	0.423	0.466	0.405	0.046	0.143	0.151	0.130	0.190	0.248	0.303	0.350
Nitrate-N	mg/L	4.50	4.60	4.69	4.60	5.15	6.30	7.14	7.19	7.32	7.36	7.39	7.40
Nitrite-N	mg/L	0.241	0.272	0.303	0.157	0.204	0.046	0.065	0.061	0.104	0.145	0.185	0.218
Alkalinity	mg/L	44	44	45	40	42	48	52	51	52	52	53	53
OrthoPhosphate-P	mg/L	0.1120	0.1179	0.1237	0.1073	0.1150	0.1352	0.1515	0.1533	0.1610	0.1666	0.1719	0.1764
Phosphate-P	mg/L	0.1171	0.1228	0.1286	0.1117	0.1195	0.1401	0.1566	0.1581	0.1658	0.1712	0.1764	0.1807
Org. Carbon	mg/L	5.0	4.9	4.8	4.3	4.5	4.9	5.2	5.0	4.9	4.7	4.6	4.5
Hardness CaCO3	mg/L	73	75	76	67	71	82	91	90	92	94	95	96
Total Metals													
Aluminum Al	mg/L	0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.04	0.04	0.04	0.04	0.04
Antimony Sb	mg/L	0.0097	0.0100	0.0103	0.0101	0.0114	0.0134	0.0151	0.0151	0.0154	0.0156	0.0157	0.0159
Arsenic As	mg/L	0.0016	0.0016	0.0017	0.0015	0.0017	0.0020	0.0022	0.0022	0.0023	0.0023	0.0023	0.0024
Barium Ba	mg/L	0.0055	0.0056	0.0058	0.0051	0.0055	0.0063	0.0070	0.0070	0.0072	0.0073	0.0074	0.0075
Beryllium Be	mg/L	0.00043	0.00044	0.00046	0.00044	0.00049	0.00057	0.00065	0.00065	0.00067	0.00068	0.00069	0.00069
Bismuth Bi	mg/L	0.00962	0.00988	0.01015	0.00994	0.01125	0.01323	0.01499	0.01492	0.01527	0.01542	0.01556	0.01568
Boron B	mg/L	0.026	0.027	0.027	0.025	0.027	0.031	0.034	0.034	0.034	0.034	0.034	0.034
Cadmium Cd	mg/L	0.000042	0.000044	0.000045	0.000042	0.000047	0.000055	0.000062	0.000062	0.000064	0.000065	0.000066	0.000067
Calcium Ca	mg/L	201	211	222	193	207	243	272	275	289	298	308	316
Chromium Cr	mg/L	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Cobalt Co	mg/L	0.0027	0.0028	0.0030	0.0026	0.0029	0.0034	0.0038	0.0038	0.0040	0.0041	0.0042	0.0043
Copper Cu	mg/L	0.0048	0.0050	0.0052	0.0046	0.0049	0.0057	0.0064	0.0064	0.0067	0.0068	0.0070	0.0071
Iron Fe	mg/L	0.05	0.05	0.05	0.04	0.05	0.06	0.07	0.06	0.06	0.06	0.06	0.06
Lead Pb	mg/L	0.00031	0.00032	0.00033	0.00031	0.00034	0.00040	0.00045	0.00045	0.00046	0.00047	0.00048	0.00048
Lithium Li	mg/L	0.0020	0.0021	0.0021	0.0019	0.0021	0.0025	0.0028	0.0028	0.0029	0.0030	0.0031	0.0031
Magnesium Mg	mg/L	7.6	7.7	7.8	7.0	7.5	8.5	9.4	9.2	9.3	9.4	9.4	9.4
Manganese Mn	mg/L	0.011	0.011	0.012	0.010	0.011	0.013	0.015	0.015	0.015	0.016	0.016	0.016
Mercury Hg	ug/L	0.00375	0.00391	0.00407	0.00354	0.00379	0.00442	0.00493	0.00495	0.00517	0.00532	0.00546	0.00558
Molybdenum Mo	mg/L	0.00448	0.00471	0.00494	0.00430	0.00461	0.00541	0.00607	0.00613	0.00644	0.00666	0.00687	0.00704
Nickel Ni	mg/L	0.0062	0.0065	0.0067	0.0060	0.0064	0.0076	0.0085	0.0085	0.0089	0.0091	0.0093	0.0095
Phosphorus P	mg/L	0.166	0.173	0.181	0.161	0.174	0.204	0.229	0.230	0.240	0.247	0.254	0.259
Potassium K	mg/L	12.4	12.9	13.5	11.7	12.6	14.7	16.4	16.5	17.2	17.8	18.2	18.7
Selenium Se	mg/L	0.00058	0.00058	0.00059	0.00053	0.00057	0.00065	0.00071	0.00069	0.00070	0.00070	0.00070	0.00070
Silicon SiO2	mg/L	2.84	2.99	3.13	2.75	2.97	3.49	3.92	3.96	4.15	4.29	4.41	4.52
Silver Ag	mg/L	0.0000460	0.0000471	0.0000482	0.0000479	0.0000545	0.0000641	0.0000726	0.0000721	0.0000736	0.0000740	0.0000745	0.0000749
Sodium Na	mg/L	33	34	34	30	32	37	41	40	41	42	42	43
Strontium Sr	mg/L	0.053	0.054	0.055	0.049	0.052	0.060	0.066	0.065	0.067	0.068	0.069	0.069
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000024	0.000025	0.000026	0.000024	0.000026	0.000030	0.000034	0.000034	0.000034	0.000035	0.000035	0.000036
Thorium Th	mg/L	0.000096	0.000099	0.000103	0.000095	0.000105	0.000124	0.000139	0.000140	0.000145	0.000148	0.000151	0.000154
Tin Sn	mg/L	0.00163	0.00168	0.00172	0.00167	0.00189	0.00222	0.00251	0.00250	0.00256	0.00259	0.00261	0.00264
Titanium Ti	mg/L	0.0007	0.0007	0.0007	0.0007	0.0008	0.0009	0.0010	0.0010	0.0011	0.0011	0.0011	0.0011
Uranium U	mg/L	0.000134	0.000139	0.000144	0.000131	0.000143	0.000168	0.000188	0.000189	0.000195	0.000200	0.000204	0.000207
Vanadium V	mg/L	0.0020	0.0021	0.0021	0.0020	0.0023	0.0026	0.0029	0.0029	0.0030	0.0030	0.0030	0.0030
Zinc Zn	mg/L	0.0102	0.0103	0.0104	0.0095	0.0100	0.0115	0.0126	0.0124	0.0127	0.0127	0.0128	0.0129
Zirconium Zr	mg/L	0.0062	0.0062	0.0061	0.0056	0.0059	0.0067	0.0073	0.0071	0.0071	0.0070	0.0070	0.0069

Water Quality in TAIL LAKE													
Date		Year 3 Mar-10	Year 3 Apr-10	Year 3 May-10	Year 3 Jun-10	Year 3 Jul-10	Year 3 Aug-10	Year 3 Sep-10	Year 3 Oct-10	Year 3 Nov-10	Year 3 Dec-10	Year 3 Jan-11	Year 3 Feb-11
Parameter													
TDS	mg/L	624	642	661	648	676	736	781	810	830	849	869	886
TSS	mg/L	2.0	2.0	2.0	1.9	1.9	2.0	2.1	2.1	2.1	2.1	2.1	2.1
Free CN	mg/L	0.00035	0.00034	0.00034									
Total CN	mg/L	0.005	0.005	0.005		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WAD CN	mg/L	0.0005	0.0005	0.0005									
CNO	mg/L	0.80	0.79	0.79									
SCN	mg/L	0.082	0.081	0.081	0.076	0.076	0.080	0.082	0.083	0.082	0.081	0.081	0.080
Sulphate	mg/L	63.6	63.7	63.9	62.6	64.6	69.1	72.1	73.2	73.4	73.5	73.6	73.7
Chloride	mg/L	984	999	1014	990	1026	1106	1163	1194	1211	1227	1242	1257
Total Ammonia-N	mg/L	0.354	0.362	0.371	0.312	0.038	0.028	0.033	0.020	0.032	0.045	0.057	0.068
Nitrate-N	mg/L	7.17	7.05	6.92	7.10	7.47	8.21	8.64	8.78	8.64	8.48	8.34	8.19
Nitrite-N	mg/L	0.243	0.270	0.297	0.204	0.215	0.036	0.038	0.038	0.070	0.103	0.135	0.163
Alkalinity	mg/L	52	52	51	49	50	52	54	54	54	53	53	52
OrthoPhosphate-P	mg/L	0.1826	0.1907	0.1990	0.1970	0.2081	0.2293	0.2457	0.2576	0.2666	0.2754	0.2842	0.2921
Phosphate-P	mg/L	0.1868	0.1949	0.2033	0.2011	0.2123	0.2337	0.2503	0.2622	0.2711	0.2799	0.2886	0.2965
Org. Carbon	mg/L	4.4	4.3	4.3	4.2	4.3	4.5	4.7	4.7	4.7	4.6	4.6	4.6
Hardness CaCO3	mg/L	94	94	93	89	90	94	97	97	97	96	95	95
Total Metals													
Aluminum Al	mg/L	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Antimony Sb	mg/L	0.0161	0.0165	0.0169	0.0180	0.0196	0.0217	0.0234	0.0243	0.0248	0.0252	0.0256	0.0260
Arsenic As	mg/L	0.0023	0.0023	0.0023	0.0023	0.0024	0.0025	0.0026	0.0027	0.0027	0.0026	0.0026	0.0026
Barium Ba	mg/L	0.0074	0.0074	0.0073	0.0071	0.0072	0.0077	0.0079	0.0080	0.0080	0.0079	0.0079	0.0079
Beryllium Be	mg/L	0.00069	0.00070	0.00071	0.00073	0.00078	0.00085	0.00090	0.00093	0.00093	0.00094	0.00095	0.00096
Bismuth Bi	mg/L	0.01591	0.01634	0.01678	0.01785	0.01948	0.02150	0.02323	0.02414	0.02459	0.02501	0.02544	0.02582
Boron B	mg/L	0.034	0.034	0.034	0.034	0.035	0.038	0.039	0.040	0.040	0.040	0.040	0.040
Cadmium Cd	mg/L	0.000065	0.000065	0.000065	0.000063	0.000065	0.000069	0.000072	0.000073	0.000072	0.000072	0.000071	0.000071
Calcium Ca	mg/L	309	307	305	289	291	306	314	315	313	311	309	307
Chromium Cr	mg/L	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.004	0.004	0.004	0.004	0.004
Cobalt Co	mg/L	0.0042	0.0042	0.0042	0.0041	0.0042	0.0045	0.0047	0.0047	0.0047	0.0047	0.0047	0.0047
Copper Cu	mg/L	0.0070	0.0070	0.0069	0.0066	0.0067	0.0071	0.0073	0.0073	0.0073	0.0073	0.0072	0.0072
Iron Fe	mg/L	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.06	0.06
Lead Pb	mg/L	0.00048	0.00048	0.00048	0.00048	0.00051	0.00055	0.00058	0.00059	0.00059	0.00059	0.00059	0.00060
Lithium Li	mg/L	0.0031	0.0031	0.0031	0.0031	0.0032	0.0034	0.0035	0.0036	0.0036	0.0036	0.0036	0.0036
Magnesium Mg	mg/L	9.3	9.3	9.3	9.1	9.3	9.9	10.3	10.4	10.4	10.4	10.4	10.4
Manganese Mn	mg/L	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.018	0.018	0.018	0.017	0.017
Mercury Hg	ug/L	0.00547	0.00543	0.00540	0.00511	0.00514	0.00541	0.00555	0.00557	0.00553	0.00549	0.00545	0.00541
Molybdenum Mo	mg/L	0.00691	0.00686	0.00682	0.00646	0.00651	0.00686	0.00704	0.00707	0.00703	0.00698	0.00694	0.00690
Nickel Ni	mg/L	0.0094	0.0094	0.0094	0.0091	0.0093	0.0099	0.0103	0.0104	0.0104	0.0103	0.0103	0.0103
Phosphorus P	mg/L	0.265	0.273	0.282	0.279	0.294	0.322	0.343	0.356	0.366	0.375	0.384	0.392
Potassium K	mg/L	18.3	18.2	18.1	17.1	17.3	18.2	18.7	18.8	18.7	18.5	18.4	18.3
Selenium Se	mg/L	0.00068	0.00068	0.00067	0.00065	0.00067	0.00071	0.00073	0.00074	0.00073	0.00072	0.00072	0.00071
Silicon SiO2	mg/L	4.43	4.41	4.38	4.17	4.22	4.45	4.58	4.61	4.58	4.55	4.52	4.50
Silver Ag	mg/L	0.0000745	0.0000750	0.0000756	0.0000784	0.0000838	0.0000910	0.0000968	0.0000992	0.0000998	0.0001002	0.0001007	0.0001011
Sodium Na	mg/L	42	42	41	39	40	42	43	43	43	43	42	42
Strontium Sr	mg/L	0.068	0.068	0.068	0.065	0.066	0.070	0.072	0.073	0.072	0.072	0.071	0.071
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000035	0.000035	0.000035	0.000034	0.000035	0.000037	0.000038	0.000038	0.000038	0.000038	0.000037	0.000037
Thorium Th	mg/L	0.000150	0.000149	0.000148	0.000145	0.000148	0.000157	0.000163	0.000164	0.000163	0.000162	0.000160	0.000159
Tin Sn	mg/L	0.00267	0.00273	0.00279	0.00294	0.00320	0.00352	0.00379	0.00392	0.00399	0.00405	0.00411	0.00417
Titanium Ti	mg/L	0.0011	0.0011	0.0011	0.0012	0.0013	0.0014	0.0015	0.0015	0.0016	0.0016	0.0016	0.0016
Uranium U	mg/L	0.000203	0.000202	0.000201	0.000195	0.000199	0.000211	0.000218	0.000220	0.000218	0.000217	0.000215	0.000214
Vanadium V	mg/L	0.0031	0.0031	0.0032	0.0033	0.0036	0.0039	0.0042	0.0043	0.0044	0.0045	0.0045	0.0046
Zinc Zn	mg/L	0.0127	0.0127	0.0128	0.0126	0.0129	0.0138	0.0144	0.0146	0.0146	0.0146	0.0146	0.0146
Zirconium Zr	mg/L	0.0068	0.0067	0.0067	0.0065	0.0067	0.0071	0.0073	0.0073	0.0073	0.0072	0.0072	0.0071

Water Quality in TAIL LAKE													
Date		Year 4 Mar-11	Year 4 Apr-11	Year 4 May-11	Year 4 Jun-11	Year 4 Jul-11	Year 4 Aug-11	Year 4 Sep-11	Year 4 Oct-11	Year 4 Nov-11	Year 4 Dec-11	Year 4 Jan-12	Year 4 Feb-12
Parameter													
TDS	mg/L	881	877	872	788	715	763	786	745	750	745	741	739
TSS	mg/L	2.0	2.0	2.0	1.9	1.8	1.9	2.0	1.9	1.9	1.9	1.9	1.9
Free CN	mg/L												
Total CN	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L	0.080	0.079	0.079	0.070	0.063	0.068	0.069	0.066	0.066	0.066	0.065	0.065
Sulphate	mg/L	73.2	72.9	72.5	65.0	58.8	62.7	64.4	61.1	61.5	61.1	60.8	60.6
Chloride	mg/L	1249	1243	1237	1104	998	1063	1092	1035	1042	1035	1030	1026
Total Ammonia-N	mg/L	0.068	0.067	0.067	0.023	0.016	0.008	0.011	0.004	0.004	0.004	0.003	0.003
Nitrate-N	mg/L	8.05	7.91	7.77	7.30	6.73	7.24	7.52	7.16	7.10	6.95	6.82	6.69
Nitrite-N	mg/L	0.162	0.162	0.161	0.006	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.002
Alkalinity	mg/L	52	52	52	49	46	49	51	48	49	48	48	48
OrthoPhosphate-P	mg/L	0.2902	0.2889	0.2874	0.2561	0.2311	0.2461	0.2527	0.2395	0.2410	0.2395	0.2382	0.2374
Phosphate-P	mg/L	0.2946	0.2932	0.2917	0.2606	0.2354	0.2507	0.2575	0.2440	0.2456	0.2440	0.2427	0.2419
Org. Carbon	mg/L	4.5	4.5	4.5	4.6	4.5	4.8	5.1	4.8	4.9	4.8	4.8	4.8
Hardness CaCO3	mg/L	94	93	93	86	80	86	89	84	85	84	84	83
Total Metals													
Aluminum Al	mg/L	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Antimony Sb	mg/L	0.0258	0.0257	0.0256	0.0228	0.0206	0.0219	0.0225	0.0213	0.0214	0.0213	0.0212	0.0211
Arsenic As	mg/L	0.0026	0.0026	0.0026	0.0024	0.0022	0.0024	0.0024	0.0023	0.0023	0.0023	0.0023	0.0023
Barium Ba	mg/L	0.0078	0.0078	0.0078	0.0071	0.0065	0.0070	0.0073	0.0069	0.0069	0.0069	0.0069	0.0068
Beryllium Be	mg/L	0.00095	0.00095	0.00094	0.00085	0.00077	0.00083	0.00085	0.00081	0.00081	0.00081	0.00080	0.00080
Bismuth Bi	mg/L	0.02566	0.02554	0.02541	0.02263	0.02043	0.02175	0.02233	0.02116	0.02130	0.02116	0.02105	0.02098
Boron B	mg/L	0.040	0.040	0.039	0.037	0.035	0.037	0.039	0.037	0.037	0.037	0.037	0.036
Cadmium Cd	mg/L	0.000070	0.000070	0.000070	0.000065	0.000060	0.000065	0.000067	0.000064	0.000065	0.000064	0.000064	0.000064
Calcium Ca	mg/L	305	304	302	270	244	260	267	253	254	253	251	251
Chromium Cr	mg/L	0.004	0.004	0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Cobalt Co	mg/L	0.0047	0.0046	0.0046	0.0041	0.0037	0.0040	0.0041	0.0039	0.0039	0.0039	0.0039	0.0038
Copper Cu	mg/L	0.0071	0.0071	0.0071	0.0064	0.0058	0.0062	0.0064	0.0061	0.0061	0.0061	0.0060	0.0060
Iron Fe	mg/L	0.06	0.06	0.06	0.06	0.06	0.07	0.08	0.07	0.07	0.07	0.07	0.07
Lead Pb	mg/L	0.00059	0.00059	0.00059	0.00053	0.00049	0.00053	0.00054	0.00052	0.00052	0.00052	0.00051	0.00051
Lithium Li	mg/L	0.0036	0.0036	0.0035	0.0032	0.0029	0.0030	0.0031	0.0030	0.0030	0.0030	0.0029	0.0029
Magnesium Mg	mg/L	10.3	10.3	10.2	9.6	8.9	9.6	10.0	9.5	9.5	9.5	9.4	9.4
Manganese Mn	mg/L	0.017	0.017	0.017	0.015	0.014	0.015	0.016	0.015	0.015	0.015	0.015	0.015
Mercury Hg	ug/L	0.00538	0.00535	0.00532	0.00480	0.00436	0.00466	0.00479	0.00455	0.00458	0.00455	0.00452	0.00451
Molybdenum Mo	mg/L	0.00685	0.00682	0.00679	0.00605	0.00547	0.00582	0.00598	0.00566	0.00570	0.00566	0.00563	0.00561
Nickel Ni	mg/L	0.0103	0.0102	0.0102	0.0091	0.0082	0.0088	0.0090	0.0086	0.0086	0.0086	0.0085	0.0085
Phosphorus P	mg/L	0.389	0.387	0.385	0.345	0.313	0.334	0.343	0.325	0.327	0.325	0.324	0.322
Potassium K	mg/L	18.2	18.1	18.0	16.2	14.7	15.7	16.1	15.3	15.4	15.3	15.2	15.1
Selenium Se	mg/L	0.00071	0.00071	0.00070	0.00068	0.00064	0.00069	0.00073	0.00069	0.00070	0.00069	0.00069	0.00069
Silicon SiO2	mg/L	4.47	4.45	4.43	3.96	3.59	3.83	3.94	3.74	3.76	3.74	3.72	3.70
Silver Ag	mg/L	0.0001005	0.0001000	0.0000995	0.0000919	0.0000851	0.0000916	0.0000952	0.0000907	0.0000913	0.0000907	0.0000902	0.0000899
Sodium Na	mg/L	42	42	42	39	36	38	40	38	38	38	38	37
Strontium Sr	mg/L	0.071	0.070	0.070	0.065	0.060	0.065	0.067	0.064	0.064	0.064	0.063	0.063
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000037	0.000037	0.000037	0.000034	0.000032	0.000035	0.000036	0.000034	0.000034	0.000034	0.000034	0.000034
Thorium Th	mg/L	0.000158	0.000158	0.000157	0.000145	0.000134	0.000144	0.000149	0.000142	0.000143	0.000142	0.000141	0.000141
Tin Sn	mg/L	0.00414	0.00412	0.00410	0.00366	0.00331	0.00353	0.00363	0.00344	0.00346	0.00344	0.00342	0.00341
Titanium Ti	mg/L	0.0016	0.0016	0.0016	0.0014	0.0013	0.0014	0.0014	0.0013	0.0014	0.0013	0.0013	0.0013
Uranium U	mg/L	0.000213	0.000212	0.000211	0.000194	0.000178	0.000192	0.000199	0.000189	0.000190	0.000189	0.000188	0.000187
Vanadium V	mg/L	0.0046	0.0045	0.0045	0.0041	0.0037	0.0039	0.0041	0.0038	0.0039	0.0038	0.0038	0.0038
Zinc Zn	mg/L	0.0145	0.0144	0.0144	0.0134	0.0122	0.0131	0.0135	0.0128	0.0129	0.0128	0.0128	0.0127
Zirconium Zr	mg/L	0.0071	0.0071	0.0070	0.0069	0.0065	0.0071	0.0074	0.0071	0.0071	0.0071	0.0070	0.0070

Water Quality in TAIL LAKE													
Date		Year 5 Mar-12	Year 5 Apr-12	Year 5 May-12	Year 5 Jun-12	Year 5 Jul-12	Year 5 Aug-12	Year 5 Sep-12	Year 5 Oct-12	Year 5 Nov-12	Year 5 Dec-12	Year 5 Jan-13	Year 5 Feb-13
Parameter													
TDS	mg/L	736	732	728	895	951	1219	1463	1591	1601	1591	1583	1577
TSS	mg/L	1.9	1.9	1.9	1.9	1.7	1.8	1.9	1.8	1.8	1.8	1.8	1.8
Free CN	mg/L												
Total CN	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L	0.065	0.065	0.064	0.060	0.051	0.055	0.056	0.053	0.053	0.053	0.053	0.053
Sulphate	mg/L	60.3	60.0	59.7	56.6	48.2	51.4	52.8	50.1	50.4	50.1	49.8	49.7
Chloride	mg/L	1022	1017	1012	1076	1028	1221	1382	1434	1443	1434	1427	1421
Total Ammonia-N	mg/L	0.003	0.003	0.003	0.032	0.015	0.008	0.011	0.004	0.004	0.004	0.003	0.003
Nitrate-N	mg/L	6.56	6.43	6.30	6.16	5.37	5.80	6.04	5.75	5.69	5.55	5.42	5.30
Nitrite-N	mg/L	0.002	0.002	0.002	0.006	0.006	0.003	0.003	0.002	0.002	0.002	0.002	0.002
Alkalinity	mg/L	48	48	47	48	42	45	47	45	45	45	44	44
OrthoPhosphate-P	mg/L	0.2365	0.2353	0.2341	0.2203	0.1869	0.1991	0.2045	0.1938	0.1950	0.1938	0.1928	0.1921
Phosphate-P	mg/L	0.2410	0.2398	0.2385	0.2253	0.1915	0.2041	0.2097	0.1987	0.2000	0.1987	0.1977	0.1970
Org. Carbon	mg/L	4.8	4.8	4.7	5.1	4.6	5.0	5.2	5.0	5.0	5.0	5.0	5.0
Hardness CaCO3	mg/L	83	83	82	81	71	76	79	75	75	75	74	74
Total Metals													
Aluminum Al	mg/L	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.05	0.05	0.05	0.05
Antimony Sb	mg/L	0.0210	0.0209	0.0208	0.0196	0.0166	0.0177	0.0182	0.0172	0.0173	0.0172	0.0171	0.0171
Arsenic As	mg/L	0.0023	0.0023	0.0023	0.0022	0.0019	0.0021	0.0022	0.0020	0.0021	0.0020	0.0020	0.0020
Barium Ba	mg/L	0.0068	0.0068	0.0067	0.0066	0.0057	0.0061	0.0063	0.0060	0.0060	0.0060	0.0060	0.0060
Beryllium Be	mg/L	0.00080	0.00079	0.00079	0.00075	0.00065	0.00069	0.00071	0.00068	0.00068	0.00068	0.00067	0.00067
Bismuth Bi	mg/L	0.02090	0.02080	0.02069	0.01946	0.01650	0.01759	0.01806	0.01711	0.01722	0.01711	0.01702	0.01696
Boron B	mg/L	0.036	0.036	0.036	0.036	0.032	0.034	0.036	0.034	0.034	0.034	0.034	0.034
Cadmium Cd	mg/L	0.000063	0.000063	0.000063	0.000062	0.000054	0.000058	0.000061	0.000058	0.000058	0.000058	0.000058	0.000058
Calcium Ca	mg/L	250	248	247	245	219	246	265	263	265	263	261	261
Chromium Cr	mg/L	0.003	0.003	0.003	0.003	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Cobalt Co	mg/L	0.0038	0.0038	0.0038	0.0036	0.0030	0.0032	0.0033	0.0032	0.0032	0.0032	0.0031	0.0031
Copper Cu	mg/L	0.0060	0.0060	0.0059	0.0057	0.0049	0.0052	0.0054	0.0051	0.0052	0.0051	0.0051	0.0051
Iron Fe	mg/L	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Lead Pb	mg/L	0.00051	0.00051	0.00051	0.00049	0.00042	0.00046	0.00047	0.00045	0.00045	0.00045	0.00045	0.00044
Lithium Li	mg/L	0.0029	0.0029	0.0029	0.0028	0.0024	0.0025	0.0026	0.0025	0.0025	0.0025	0.0024	0.0024
Magnesium Mg	mg/L	9.3	9.3	9.3	9.3	8.1	8.8	9.1	8.7	8.7	8.7	8.6	8.6
Manganese Mn	mg/L	0.015	0.014	0.014	0.014	0.012	0.013	0.013	0.012	0.013	0.012	0.012	0.012
Mercury Hg	ug/L	0.00449	0.00447	0.00444	0.00425	0.00363	0.00388	0.00400	0.00379	0.00382	0.00379	0.00377	0.00376
Molybdenum Mo	mg/L	0.00559	0.00557	0.00554	0.00522	0.00443	0.00472	0.00485	0.00460	0.00463	0.00460	0.00457	0.00456
Nickel Ni	mg/L	0.0085	0.0084	0.0084	0.0079	0.0068	0.0072	0.0074	0.0070	0.0071	0.0070	0.0070	0.0070
Phosphorus P	mg/L	0.321	0.320	0.318	0.301	0.257	0.274	0.282	0.267	0.269	0.267	0.266	0.265
Potassium K	mg/L	15.1	15.0	14.9	14.2	12.2	13.0	13.4	12.7	12.8	12.7	12.6	12.6
Selenium Se	mg/L	0.00068	0.00068	0.00068	0.00070	0.00063	0.00069	0.00072	0.00069	0.00069	0.00069	0.00068	0.00068
Silicon SiO2	mg/L	3.69	3.67	3.65	3.46	2.95	3.16	3.25	3.08	3.10	3.08	3.07	3.06
Silver Ag	mg/L	0.0000895	0.0000891	0.0000886	0.0000870	0.0000759	0.0000819	0.0000853	0.0000813	0.0000818	0.0000813	0.0000808	0.0000806
Sodium Na	mg/L	37	37	37	103	150	228	305	356	359	356	355	353
Strontium Sr	mg/L	0.063	0.063	0.062	0.062	0.054	0.058	0.060	0.057	0.057	0.057	0.057	0.057
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000034	0.000034	0.000033	0.000033	0.000029	0.000032	0.000033	0.000031	0.000032	0.000031	0.000031	0.000031
Thorium Th	mg/L	0.000140	0.000140	0.000139	0.000137	0.000119	0.000128	0.000134	0.000128	0.000128	0.000128	0.000127	0.000126
Tin Sn	mg/L	0.00340	0.00338	0.00336	0.00318	0.00270	0.00288	0.00296	0.00281	0.00283	0.00281	0.00279	0.00278
Titanium Ti	mg/L	0.0013	0.0013	0.0013	0.0014	0.0013	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014
Uranium U	mg/L	0.000187	0.000186	0.000185	0.000181	0.000157	0.000169	0.000176	0.000167	0.000168	0.000167	0.000166	0.000166
Vanadium V	mg/L	0.0038	0.0038	0.0038	0.0036	0.0031	0.0033	0.0034	0.0032	0.0033	0.0032	0.0032	0.0032
Zinc Zn	mg/L	0.0127	0.0126	0.0125	0.0125	0.0107	0.0115	0.0118	0.0112	0.0113	0.0112	0.0112	0.0112
Zirconium Zr	mg/L	0.0070	0.0069	0.0069	0.0072	0.0064	0.0069	0.0072	0.0069	0.0070	0.0069	0.0069	0.0069

Water Quality in TAIL LAKE													
Date		Year 6 Mar-13	Year 6 Apr-13	Year 6 May-13	Year 6 Jun-13	Year 6 Jul-13	Year 6 Aug-13	Year 6 Sep-13	Year 6 Oct-13	Year 6 Nov-13	Year 6 Dec-13	Year 6 Jan-14	Year 6 Feb-14
Parameter													
TDS	mg/L	1571	1563	1555	1475	1254	1338	1376	1304	1313	1304	1298	1293
TSS	mg/L	1.8	1.8	1.8	1.8	1.6	1.7	1.8	1.8	1.8	1.8	1.8	1.7
Free CN	mg/L												
Total CN	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L	0.052	0.052	0.052	0.049	0.041	0.044	0.045	0.043	0.043	0.043	0.043	0.043
Sulphate	mg/L	49.5	49.2	49.0	46.5	39.6	42.3	43.5	41.2	41.5	41.2	41.0	40.9
Chloride	mg/L	1416	1409	1402	1322	1123	1197	1230	1166	1173	1166	1160	1155
Total Ammonia-N	mg/L	0.003	0.003	0.003	0.032	0.015	0.008	0.011	0.004	0.004	0.004	0.003	0.003
Nitrate-N	mg/L	5.18	5.05	4.92	4.87	4.28	4.63	4.84	4.62	4.55	4.42	4.29	4.17
Nitrite-N	mg/L	0.002	0.002	0.002	0.006	0.006	0.003	0.003	0.002	0.002	0.002	0.002	0.002
Alkalinity	mg/L	44	44	44	44	39	42	44	41	42	41	41	41
OrthoPhosphate-P	mg/L	0.1913	0.1904	0.1894	0.1783	0.1513	0.1612	0.1655	0.1569	0.1579	0.1569	0.1561	0.1555
Phosphate-P	mg/L	0.1962	0.1953	0.1942	0.1837	0.1562	0.1665	0.1710	0.1621	0.1632	0.1621	0.1613	0.1607
Org. Carbon	mg/L	4.9	4.9	4.9	5.3	4.7	5.1	5.4	5.1	5.2	5.1	5.1	5.1
Hardness CaCO3	mg/L	74	74	73	73	63	68	71	67	68	67	67	67
Total Metals													
Aluminum Al	mg/L	0.05	0.05	0.05	0.06	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Antimony Sb	mg/L	0.0170	0.0169	0.0168	0.0158	0.0134	0.0143	0.0147	0.0139	0.0140	0.0139	0.0139	0.0138
Arsenic As	mg/L	0.0020	0.0020	0.0020	0.0020	0.0017	0.0018	0.0019	0.0018	0.0018	0.0018	0.0018	0.0018
Barium Ba	mg/L	0.0059	0.0059	0.0059	0.0058	0.0050	0.0054	0.0056	0.0053	0.0053	0.0053	0.0053	0.0052
Beryllium Be	mg/L	0.00067	0.00066	0.00066	0.00063	0.00054	0.00058	0.00060	0.00057	0.00057	0.00057	0.00057	0.00056
Bismuth Bi	mg/L	0.01690	0.01682	0.01673	0.01574	0.01335	0.01423	0.01461	0.01384	0.01393	0.01384	0.01377	0.01372
Boron B	mg/L	0.034	0.034	0.033	0.034	0.030	0.032	0.034	0.032	0.032	0.032	0.032	0.032
Cadmium Cd	mg/L	0.000057	0.000057	0.000057	0.000056	0.000049	0.000053	0.000056	0.000053	0.000054	0.000053	0.000053	0.000053
Calcium Ca	mg/L	260	258	257	242	206	220	226	214	215	214	213	212
Chromium Cr	mg/L	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Cobalt Co	mg/L	0.0031	0.0031	0.0031	0.0029	0.0025	0.0027	0.0027	0.0026	0.0026	0.0026	0.0026	0.0026
Copper Cu	mg/L	0.0051	0.0050	0.0050	0.0048	0.0041	0.0044	0.0046	0.0043	0.0044	0.0044	0.0043	0.0043
Iron Fe	mg/L	0.08	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Lead Pb	mg/L	0.00044	0.00044	0.00044	0.00043	0.00037	0.00040	0.00041	0.00039	0.00039	0.00039	0.00039	0.00039
Lithium Li	mg/L	0.0024	0.0024	0.0024	0.0023	0.0020	0.0021	0.0022	0.0020	0.0021	0.0020	0.0020	0.0020
Magnesium Mg	mg/L	8.6	8.5	8.5	8.5	7.5	8.1	8.4	8.0	8.1	8.0	8.0	7.9
Manganese Mn	mg/L	0.012	0.012	0.012	0.012	0.010	0.011	0.011	0.011	0.011	0.011	0.011	0.011
Mercury Hg	ug/L	0.00374	0.00373	0.00371	0.00355	0.00304	0.00325	0.00335	0.00318	0.00320	0.00318	0.00316	0.00315
Molybdenum Mo	mg/L	0.00454	0.00452	0.00449	0.00424	0.00360	0.00384	0.00394	0.00373	0.00376	0.00373	0.00372	0.00370
Nickel Ni	mg/L	0.0070	0.0069	0.0069	0.0066	0.0056	0.0060	0.0061	0.0058	0.0059	0.0058	0.0058	0.0058
Phosphorus P	mg/L	0.264	0.263	0.261	0.248	0.212	0.226	0.233	0.221	0.222	0.221	0.220	0.219
Potassium K	mg/L	12.5	12.5	12.4	11.9	10.2	10.8	11.2	10.6	10.7	10.6	10.6	10.5
Selenium Se	mg/L	0.00068	0.00067	0.00067	0.00070	0.00062	0.00068	0.00071	0.00068	0.00069	0.00068	0.00068	0.00067
Silicon SiO2	mg/L	3.04	3.03	3.01	2.86	2.45	2.61	2.69	2.56	2.57	2.56	2.54	2.53
Silver Ag	mg/L	0.0000803	0.0000799	0.0000794	0.0000783	0.0000686	0.0000741	0.0000773	0.0000737	0.0000742	0.0000737	0.0000733	0.0000730
Sodium Na	mg/L	352	350	348	330	281	299	308	292	294	292	290	289
Strontium Sr	mg/L	0.056	0.056	0.056	0.056	0.049	0.052	0.054	0.052	0.052	0.052	0.052	0.051
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000031	0.000031	0.000031	0.000031	0.000027	0.000029	0.000030	0.000029	0.000029	0.000029	0.000029	0.000029
Thorium Th	mg/L	0.000126	0.000125	0.000125	0.000123	0.000108	0.000116	0.000122	0.000116	0.000117	0.000116	0.000115	0.000115
Tin Sn	mg/L	0.00277	0.00276	0.00275	0.00260	0.00221	0.00236	0.00242	0.00230	0.00231	0.00230	0.00229	0.00228
Titanium Ti	mg/L	0.0014	0.0013	0.0013	0.0014	0.0013	0.0014	0.0015	0.0014	0.0014	0.0014	0.0014	0.0014
Uranium U	mg/L	0.000165	0.000164	0.000163	0.000161	0.000140	0.000151	0.000157	0.000150	0.000150	0.000150	0.000149	0.000148
Vanadium V	mg/L	0.0032	0.0032	0.0032	0.0031	0.0026	0.0028	0.0029	0.0027	0.0028	0.0027	0.0027	0.0027
Zinc Zn	mg/L	0.0111	0.0111	0.0110	0.0110	0.0095	0.0102	0.0105	0.0100	0.0100	0.0100	0.0099	0.0099
Zirconium Zr	mg/L	0.0068	0.0068	0.0068	0.0070	0.0063	0.0068	0.0071	0.0068	0.0068	0.0068	0.0068	0.0067

Water Quality in TAIL LAKE													
Date		Year 7 Mar-14	Year 7 Apr-14	Year 7 May-14	Year 7 Jun-14	Year 7 Jul-14	Year 7 Aug-14	Year 7 Sep-14	Year 7 Oct-14	Year 7 Nov-14	Year 7 Dec-14	Year 7 Jan-15	Year 7 Feb-15
Parameter													
TDS	mg/L	1288	1282	1275	1211	1031	1100	1132	1073	1080	1073	1067	1064
TSS	mg/L	1.7	1.7	1.7	1.8	1.6	1.7	1.8	1.7	1.7	1.7	1.7	1.7
Free CN	mg/L												
Total CN	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L	0.042	0.042	0.042	0.039	0.033	0.036	0.037	0.035	0.035	0.035	0.034	0.034
Sulphate	mg/L	40.7	40.5	40.3	38.2	32.6	34.7	35.7	33.9	34.1	33.9	33.7	33.6
Chloride	mg/L	1151	1146	1139	1075	914	974	1001	949	955	949	944	941
Total Ammonia-N	mg/L	0.003	0.003	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Nitrate-N	mg/L	4.06	3.94	3.81	3.59	3.04	3.24	3.33	3.15	3.07	2.95	2.83	2.72
Nitrite-N	mg/L	0.002	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Alkalinity	mg/L	41	41	40	41	36	39	41	39	39	39	39	39
OrthoPhosphate-P	mg/L	0.1549	0.1542	0.1533	0.1444	0.1225	0.1306	0.1341	0.1271	0.1279	0.1271	0.1264	0.1260
Phosphate-P	mg/L	0.1601	0.1593	0.1585	0.1501	0.1277	0.1361	0.1399	0.1326	0.1335	0.1326	0.1319	0.1314
Org. Carbon	mg/L	5.1	5.0	5.0	5.4	4.8	5.2	5.5	5.2	5.3	5.2	5.2	5.2
Hardness CaCO3	mg/L	66	66	66	66	57	62	64	61	62	61	61	61
Total Metals													
Aluminum Al	mg/L	0.06	0.06	0.06	0.06	0.05	0.05	0.06	0.05	0.05	0.05	0.05	0.05
Antimony Sb	mg/L	0.0138	0.0137	0.0136	0.0128	0.0109	0.0116	0.0119	0.0113	0.0113	0.0113	0.0112	0.0112
Arsenic As	mg/L	0.0018	0.0018	0.0018	0.0017	0.0015	0.0016	0.0016	0.0015	0.0015	0.0015	0.0015	0.0015
Barium Ba	mg/L	0.0052	0.0052	0.0052	0.0051	0.0044	0.0048	0.0049	0.0047	0.0047	0.0047	0.0047	0.0047
Beryllium Be	mg/L	0.00056	0.00056	0.00056	0.00052	0.00044	0.00047	0.00049	0.00046	0.00046	0.00046	0.00046	0.00046
Bismuth Bi	mg/L	0.01367	0.01360	0.01353	0.01272	0.01079	0.01149	0.01180	0.01118	0.01125	0.01118	0.01112	0.01108
Boron B	mg/L	0.032	0.032	0.031	0.031	0.028	0.030	0.031	0.029	0.030	0.029	0.029	0.029
Cadmium Cd	mg/L	0.000053	0.000052	0.000052	0.000049	0.000042	0.000045	0.000046	0.000044	0.000044	0.000044	0.000043	0.000043
Calcium Ca	mg/L	211	210	209	197	168	179	184	174	175	174	173	172
Chromium Cr	mg/L	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Cobalt Co	mg/L	0.0026	0.0025	0.0025	0.0024	0.0020	0.0022	0.0022	0.0021	0.0021	0.0021	0.0021	0.0021
Copper Cu	mg/L	0.0043	0.0043	0.0042	0.0041	0.0035	0.0038	0.0039	0.0037	0.0037	0.0037	0.0037	0.0037
Iron Fe	mg/L	0.09	0.09	0.09	0.09	0.08	0.09	0.10	0.09	0.09	0.09	0.09	0.09
Lead Pb	mg/L	0.00039	0.00039	0.00038	0.00036	0.00031	0.00033	0.00034	0.00032	0.00033	0.00032	0.00032	0.00032
Lithium Li	mg/L	0.0020	0.0020	0.0020	0.0019	0.0016	0.0017	0.0018	0.0017	0.0017	0.0017	0.0017	0.0017
Magnesium Mg	mg/L	7.9	7.9	7.8	7.9	7.0	7.5	7.8	7.5	7.5	7.5	7.4	7.4
Manganese Mn	mg/L	0.010	0.010	0.010	0.010	0.009	0.009	0.010	0.009	0.009	0.009	0.009	0.009
Mercury Hg	ug/L	0.00314	0.00313	0.00311	0.00299	0.00257	0.00275	0.00283	0.00269	0.00270	0.00269	0.00267	0.00266
Molybdenum Mo	mg/L	0.00369	0.00367	0.00365	0.00345	0.00293	0.00312	0.00321	0.00304	0.00306	0.00304	0.00302	0.00301
Nickel Ni	mg/L	0.0057	0.0057	0.0057	0.0054	0.0046	0.0049	0.0051	0.0048	0.0048	0.0048	0.0048	0.0048
Phosphorus P	mg/L	0.218	0.217	0.216	0.204	0.173	0.184	0.189	0.179	0.181	0.179	0.179	0.178
Potassium K	mg/L	10.5	10.4	10.4	10.0	8.5	9.1	9.4	8.9	9.0	8.9	8.9	8.8
Selenium Se	mg/L	0.00067	0.00067	0.00067	0.00068	0.00060	0.00066	0.00069	0.00065	0.00066	0.00065	0.00065	0.00065
Silicon SiO2	mg/L	2.52	2.51	2.50	2.35	2.00	2.13	2.19	2.07	2.09	2.07	2.06	2.06
Silver Ag	mg/L	0.0000728	0.0000724	0.0000720	0.0000679	0.0000577	0.0000615	0.0000632	0.0000599	0.0000603	0.0000599	0.0000596	0.0000594
Sodium Na	mg/L	288	287	285	271	230	246	253	240	241	240	239	238
Strontium Sr	mg/L	0.051	0.051	0.051	0.051	0.044	0.048	0.050	0.047	0.048	0.047	0.047	0.047
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000029	0.000029	0.000028	0.000027	0.000024	0.000026	0.000026	0.000025	0.000025	0.000025	0.000025	0.000025
Thorium Th	mg/L	0.000114	0.000114	0.000113	0.000107	0.000091	0.000097	0.000100	0.000095	0.000095	0.000095	0.000094	0.000094
Tin Sn	mg/L	0.00227	0.00226	0.00225	0.00212	0.00180	0.00191	0.00197	0.00186	0.00187	0.00186	0.00185	0.00185
Titanium Ti	mg/L	0.0014	0.0014	0.0014	0.0014	0.0013	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014
Uranium U	mg/L	0.000148	0.000147	0.000146	0.000139	0.000119	0.000127	0.000130	0.000124	0.000125	0.000124	0.000123	0.000123
Vanadium V	mg/L	0.0027	0.0027	0.0027	0.0026	0.0022	0.0024	0.0024	0.0023	0.0023	0.0023	0.0023	0.0023
Zinc Zn	mg/L	0.0099	0.0098	0.0098	0.0098	0.0084	0.0090	0.0093	0.0088	0.0089	0.0088	0.0088	0.0088
Zirconium Zr	mg/L	0.0067	0.0067	0.0066	0.0068	0.0060	0.0065	0.0068	0.0065	0.0065	0.0065	0.0064	0.0064

Water Quality in TAIL LAKE													
Date		Year 8 Mar-15	Year 8 Apr-15	Year 8 May-15	Year 8 Jun-15	Year 8 Jul-15	Year 8 Aug-15	Year 8 Sep-15	Year 8 Oct-15	Year 8 Nov-15	Year 8 Dec-15	Year 8 Jan-16	Year 8 Feb-16
Parameter													
TDS	mg/L	1060	1054	1049	999	851	908	934	886	892	886	881	878
TSS	mg/L	1.7	1.7	1.7	1.7	1.5	1.6	1.7	1.7	1.7	1.7	1.7	1.6
Free CN	mg/L												
Total CN	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L	0.034	0.034	0.034	0.032	0.027	0.029	0.030	0.028	0.028	0.028	0.028	0.028
Sulphate	mg/L	33.5	33.3	33.1	31.5	26.8	28.7	29.5	28.0	28.1	28.0	27.8	27.7
Chloride	mg/L	937	933	928	876	745	794	816	774	779	774	770	767
Total Ammonia-N	mg/L	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Nitrate-N	mg/L	2.61	2.49	2.38	2.24	1.90	2.02	2.08	1.97	1.88	1.76	1.65	1.54
Nitrite-N	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Alkalinity	mg/L	38	38	38	39	34	37	39	37	37	37	37	37
OrthoPhosphate-P	mg/L	0.1255	0.1249	0.1242	0.1170	0.0993	0.1058	0.1087	0.1030	0.1037	0.1030	0.1025	0.1021
Phosphate-P	mg/L	0.1309	0.1303	0.1296	0.1230	0.1046	0.1116	0.1147	0.1087	0.1094	0.1087	0.1082	0.1078
Org. Carbon	mg/L	5.2	5.1	5.1	5.5	4.9	5.3	5.6	5.3	5.4	5.3	5.3	5.3
Hardness CaCO3	mg/L	60	60	60	60	53	57	59	56	57	56	56	56
Total Metals													
Aluminum Al	mg/L	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Antimony Sb	mg/L	0.0111	0.0111	0.0110	0.0103	0.0088	0.0093	0.0096	0.0091	0.0092	0.0091	0.0090	0.0090
Arsenic As	mg/L	0.0015	0.0015	0.0015	0.0014	0.0012	0.0013	0.0014	0.0013	0.0013	0.0013	0.0013	0.0013
Barium Ba	mg/L	0.0046	0.0046	0.0046	0.0046	0.0040	0.0043	0.0044	0.0042	0.0043	0.0042	0.0042	0.0042
Beryllium Be	mg/L	0.00046	0.00045	0.00045	0.00042	0.00036	0.00038	0.00039	0.00037	0.00038	0.00037	0.00037	0.00037
Bismuth Bi	mg/L	0.01104	0.01099	0.01093	0.01027	0.00871	0.00928	0.00953	0.00903	0.00909	0.00903	0.00898	0.00895
Boron B	mg/L	0.029	0.029	0.029	0.029	0.025	0.027	0.028	0.027	0.027	0.027	0.027	0.027
Cadmium Cd	mg/L	0.000043	0.000043	0.000043	0.000040	0.000035	0.000037	0.000038	0.000036	0.000036	0.000036	0.000036	0.000036
Calcium Ca	mg/L	172	171	170	161	136	146	150	142	143	142	141	141
Chromium Cr	mg/L	0.002	0.002	0.002	0.002	0.001	0.002	0.002	0.001	0.001	0.001	0.001	0.001
Cobalt Co	mg/L	0.0021	0.0021	0.0020	0.0019	0.0016	0.0017	0.0018	0.0017	0.0017	0.0017	0.0017	0.0017
Copper Cu	mg/L	0.0036	0.0036	0.0036	0.0035	0.0030	0.0032	0.0033	0.0032	0.0032	0.0032	0.0031	0.0031
Iron Fe	mg/L	0.09	0.09	0.09	0.09	0.08	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Lead Pb	mg/L	0.00032	0.00032	0.00032	0.00030	0.00026	0.00028	0.00028	0.00027	0.00027	0.00027	0.00027	0.00027
Lithium Li	mg/L	0.0017	0.0017	0.0017	0.0016	0.0014	0.0014	0.0015	0.0014	0.0014	0.0014	0.0014	0.0014
Magnesium Mg	mg/L	7.4	7.3	7.3	7.4	6.5	7.1	7.4	7.0	7.1	7.0	7.0	7.0
Manganese Mn	mg/L	0.009	0.009	0.009	0.009	0.007	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Mercury Hg	ug/L	0.00265	0.00264	0.00263	0.00254	0.00218	0.00234	0.00241	0.00229	0.00230	0.00229	0.00228	0.00227
Molybdenum Mo	mg/L	0.00300	0.00299	0.00297	0.00281	0.00239	0.00254	0.00261	0.00248	0.00249	0.00248	0.00246	0.00246
Nickel Ni	mg/L	0.0047	0.0047	0.0047	0.0045	0.0038	0.0041	0.0042	0.0040	0.0040	0.0040	0.0040	0.0039
Phosphorus P	mg/L	0.177	0.176	0.175	0.166	0.141	0.150	0.154	0.146	0.147	0.146	0.145	0.145
Potassium K	mg/L	8.8	8.8	8.7	8.4	7.2	7.7	8.0	7.6	7.6	7.6	7.5	7.5
Selenium Se	mg/L	0.00065	0.00064	0.00064	0.00066	0.00058	0.00063	0.00066	0.00063	0.00064	0.00063	0.00063	0.00063
Silicon SiO2	mg/L	2.05	2.04	2.03	1.91	1.62	1.73	1.78	1.69	1.70	1.69	1.68	1.67
Silver Ag	mg/L	0.0000592	0.0000589	0.0000586	0.0000552	0.0000470	0.0000501	0.0000515	0.0000488	0.0000491	0.0000488	0.0000485	0.0000483
Sodium Na	mg/L	237	236	234	223	190	203	208	198	199	198	197	196
Strontium Sr	mg/L	0.047	0.047	0.046	0.047	0.041	0.044	0.046	0.044	0.044	0.044	0.044	0.043
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000025	0.000024	0.000024	0.000024	0.000021	0.000022	0.000023	0.000022	0.000022	0.000022	0.000021	0.000021
Thorium Th	mg/L	0.000094	0.000093	0.000093	0.000088	0.000075	0.000080	0.000082	0.000078	0.000078	0.000078	0.000078	0.000077
Tin Sn	mg/L	0.00184	0.00183	0.00182	0.00172	0.00146	0.00155	0.00159	0.00151	0.00152	0.00151	0.00150	0.00150
Titanium Ti	mg/L	0.0014	0.0014	0.0013	0.0014	0.0013	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014
Uranium U	mg/L	0.000122	0.000122	0.000121	0.000115	0.000099	0.000105	0.000108	0.000103	0.000104	0.000103	0.000102	0.000102
Vanadium V	mg/L	0.0023	0.0023	0.0022	0.0022	0.0019	0.0020	0.0020	0.0019	0.0020	0.0019	0.0019	0.0019
Zinc Zn	mg/L	0.0087	0.0087	0.0086	0.0088	0.0075	0.0081	0.0083	0.0079	0.0080	0.0079	0.0079	0.0078
Zirconium Zr	mg/L	0.0064	0.0064	0.0063	0.0065	0.0058	0.0063	0.0065	0.0062	0.0063	0.0062	0.0062	0.0062

Water Quality in TAIL LAKE													
Date		Year 9 Mar-16	Year 9 Apr-16	Year 9 May-16	Year 9 Jun-16	Year 9 Jul-16	Year 9 Aug-16	Year 9 Sep-16	Year 9 Oct-16	Year 9 Nov-16	Year 9 Dec-16	Year 9 Jan-17	Year 9 Feb-17
Parameter													
TDS	mg/L	875	871	866	827	705	753	775	735	740	735	731	729
TSS	mg/L	1.6	1.6	1.6	1.7	1.5	1.6	1.7	1.6	1.6	1.6	1.6	1.6
Free CN	mg/L												
Total CN	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L	0.028	0.027	0.027	0.026	0.022	0.023	0.024	0.023	0.023	0.023	0.022	0.022
Sulphate	mg/L	27.6	27.5	27.3	26.0	22.2	23.7	24.4	23.2	23.3	23.2	23.1	23.0
Chloride	mg/L	764	761	757	715	609	649	667	633	637	633	629	627
Total Ammonia-N	mg/L	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Nitrate-N	mg/L	1.44	1.33	1.22	1.15	0.97	1.04	1.07	1.01	0.91	0.81	0.70	0.60
Nitrite-N	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Alkalinity	mg/L	36	36	36	37	33	36	37	35	35	35	35	35
OrthoPhosphate-P	mg/L	0.1017	0.1012	0.1007	0.0949	0.0806	0.0859	0.0882	0.0836	0.0841	0.0836	0.0831	0.0828
Phosphate-P	mg/L	0.1074	0.1069	0.1063	0.1010	0.0861	0.0918	0.0944	0.0895	0.0901	0.0895	0.0890	0.0887
Org. Carbon	mg/L	5.3	5.2	5.2	5.6	5.0	5.4	5.7	5.4	5.4	5.4	5.4	5.3
Hardness CaCO3	mg/L	55	55	55	55	49	53	55	52	53	52	52	52
Total Metals													
Aluminum Al	mg/L	0.05	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Antimony Sb	mg/L	0.0090	0.0089	0.0089	0.0084	0.0071	0.0076	0.0078	0.0073	0.0074	0.0073	0.0073	0.0073
Arsenic As	mg/L	0.0013	0.0013	0.0013	0.0012	0.0010	0.0011	0.0012	0.0011	0.0011	0.0011	0.0011	0.0011
Barium Ba	mg/L	0.0042	0.0042	0.0041	0.0041	0.0036	0.0039	0.0040	0.0038	0.0039	0.0038	0.0038	0.0038
Beryllium Be	mg/L	0.00037	0.00037	0.00036	0.00034	0.00029	0.00031	0.00032	0.00030	0.00030	0.00030	0.00030	0.00030
Bismuth Bi	mg/L	0.00892	0.00887	0.00883	0.00830	0.00703	0.00750	0.00769	0.00729	0.00734	0.00729	0.00725	0.00723
Boron B	mg/L	0.027	0.027	0.026	0.027	0.024	0.025	0.027	0.025	0.025	0.025	0.025	0.025
Cadmium Cd	mg/L	0.000035	0.000035	0.000035	0.000033	0.000028	0.000030	0.000031	0.000030	0.000030	0.000030	0.000029	0.000029
Calcium Ca	mg/L	140	139	139	131	111	119	122	116	117	116	115	115
Chromium Cr	mg/L	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt Co	mg/L	0.0017	0.0017	0.0017	0.0016	0.0013	0.0014	0.0015	0.0014	0.0014	0.0014	0.0014	0.0014
Copper Cu	mg/L	0.0031	0.0031	0.0031	0.0030	0.0026	0.0028	0.0029	0.0027	0.0027	0.0027	0.0027	0.0027
Iron Fe	mg/L	0.10	0.10	0.10	0.10	0.09	0.10	0.11	0.10	0.10	0.10	0.10	0.10
Lead Pb	mg/L	0.00027	0.00026	0.00026	0.00025	0.00022	0.00023	0.00024	0.00022	0.00023	0.00022	0.00022	0.00022
Lithium Li	mg/L	0.0014	0.0014	0.0014	0.0013	0.0011	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012
Magnesium Mg	mg/L	6.9	6.9	6.9	7.0	6.2	6.7	7.0	6.7	6.7	6.7	6.6	6.6
Manganese Mn	mg/L	0.008	0.008	0.008	0.007	0.006	0.007	0.007	0.007	0.007	0.007	0.007	0.007
Mercury Hg	ug/L	0.00226	0.00225	0.00224	0.00217	0.00187	0.00201	0.00207	0.00197	0.00198	0.00197	0.00196	0.00195
Molybdenum Mo	mg/L	0.00245	0.00243	0.00242	0.00229	0.00195	0.00208	0.00213	0.00202	0.00204	0.00202	0.00201	0.00201
Nickel Ni	mg/L	0.0039	0.0039	0.0039	0.0037	0.0032	0.0034	0.0035	0.0033	0.0033	0.0033	0.0033	0.0033
Phosphorus P	mg/L	0.144	0.144	0.143	0.135	0.115	0.123	0.126	0.119	0.120	0.119	0.119	0.118
Potassium K	mg/L	7.5	7.4	7.4	7.2	6.1	6.6	6.8	6.5	6.5	6.5	6.4	6.4
Selenium Se	mg/L	0.00062	0.00062	0.00062	0.00064	0.00057	0.00062	0.00064	0.00061	0.00062	0.00061	0.00061	0.00061
Silicon SiO2	mg/L	1.67	1.66	1.65	1.56	1.32	1.41	1.45	1.37	1.38	1.37	1.37	1.36
Silver Ag	mg/L	0.0000482	0.0000479	0.0000477	0.0000450	0.0000383	0.0000409	0.0000420	0.0000398	0.0000400	0.0000398	0.0000396	0.0000394
Sodium Na	mg/L	195	194	193	184	157	168	173	164	165	164	163	162
Strontium Sr	mg/L	0.043	0.043	0.043	0.043	0.038	0.041	0.043	0.041	0.041	0.041	0.041	0.041
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000021	0.000021	0.000021	0.000020	0.000018	0.000019	0.000020	0.000019	0.000019	0.000019	0.000019	0.000019
Thorium Th	mg/L	0.000077	0.000077	0.000076	0.000072	0.000062	0.000066	0.000068	0.000064	0.000065	0.000064	0.000064	0.000064
Tin Sn	mg/L	0.00149	0.00149	0.00148	0.00139	0.00118	0.00126	0.00130	0.00123	0.00124	0.00123	0.00122	0.00122
Titanium Ti	mg/L	0.0014	0.0013	0.0013	0.0014	0.0013	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014
Uranium U	mg/L	0.000102	0.000101	0.000101	0.000096	0.000082	0.000088	0.000091	0.000086	0.000087	0.000086	0.000086	0.000085
Vanadium V	mg/L	0.0019	0.0019	0.0019	0.0019	0.0016	0.0017	0.0017	0.0017	0.0017	0.0017	0.0016	0.0016
Zinc Zn	mg/L	0.0078	0.0078	0.0077	0.0079	0.0068	0.0073	0.0076	0.0072	0.0072	0.0072	0.0071	0.0071
Zirconium Zr	mg/L	0.0061	0.0061	0.0061	0.0063	0.0056	0.0060	0.0063	0.0060	0.0060	0.0060	0.0060	0.0060

Water Quality in TAIL LAKE												
Date		Year 10	Year 10	Year 10	Year 10	Year 10	Year 10	Year 10	Year 10	Year 10	Year 10	Year 10
		Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18
Parameter												
TDS	mg/L	726	722	719	681	580	618	636	603	607	603	600
TSS	mg/L	1.6	1.6	1.6	1.6	1.4	1.5	1.5	1.4	1.5	1.4	1.4
Free CN	mg/L											
Total CN	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WAD CN	mg/L											
CNO	mg/L											
SCN	mg/L	0.022	0.022	0.022	0.021	0.018	0.019	0.019	0.018	0.018	0.018	0.018
Sulphate	mg/L	22.9	22.8	22.7	21.5	18.3	19.5	20.0	19.0	19.1	19.0	18.9
Chloride	mg/L	625	622	618	583	495	528	543	514	518	514	512
Total Ammonia-N	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Nitrate-N	mg/L	0.49	0.39	0.29	0.27	0.23	0.24	0.25	0.24	0.14	0.03	
Nitrite-N	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Alkalinity	mg/L	35	35	34	34	29	32	33	31	31	31	31
OrthoPhosphate-P	mg/L	0.0825	0.0821	0.0817	0.0769	0.0653	0.0695	0.0714	0.0677	0.0681	0.0677	0.0673
Phosphate-P	mg/L	0.0883	0.0879	0.0875	0.0827	0.0703	0.0750	0.0770	0.0730	0.0735	0.0730	0.0726
Org. Carbon	mg/L	5.3	5.3	5.3	5.3	4.6	4.9	5.1	4.9	4.9	4.9	4.8
Hardness CaCO3	mg/L	52	51	51	50	43	46	48	45	46	45	45
Total Metals												
Aluminum Al	mg/L	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Antimony Sb	mg/L	0.0073	0.0072	0.0072	0.0068	0.0057	0.0061	0.0063	0.0059	0.0060	0.0059	0.0059
Arsenic As	mg/L	0.0011	0.0011	0.0011	0.0010	0.0009	0.0009	0.0010	0.0009	0.0009	0.0009	0.0009
Barium Ba	mg/L	0.0038	0.0038	0.0038	0.0036	0.0031	0.0034	0.0035	0.0033	0.0033	0.0033	0.0033
Beryllium Be	mg/L	0.00030	0.00030	0.00030	0.00028	0.00024	0.00025	0.00026	0.00024	0.00025	0.00024	0.00024
Bismuth Bi	mg/L	0.00720	0.00717	0.00713	0.00670	0.00568	0.00605	0.00621	0.00589	0.00593	0.00589	0.00586
Boron B	mg/L	0.025	0.025	0.025	0.024	0.021	0.022	0.023	0.022	0.022	0.022	0.022
Cadmium Cd	mg/L	0.000029	0.000029	0.000029	0.000027	0.000023	0.000025	0.000026	0.000024	0.000024	0.000024	0.000024
Calcium Ca	mg/L	114	114	113	107	91	97	99	94	95	94	94
Chromium Cr	mg/L	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt Co	mg/L	0.0014	0.0014	0.0014	0.0013	0.0011	0.0012	0.0012	0.0011	0.0011	0.0011	0.0011
Copper Cu	mg/L	0.0027	0.0027	0.0027	0.0026	0.0022	0.0023	0.0024	0.0023	0.0023	0.0023	0.0023
Iron Fe	mg/L	0.10	0.10	0.10	0.10	0.08	0.09	0.10	0.09	0.09	0.09	0.09
Lead Pb	mg/L	0.00022	0.00022	0.00022	0.00021	0.00018	0.00019	0.00019	0.00018	0.00019	0.00018	0.00018
Lithium Li	mg/L	0.0012	0.0012	0.0012	0.0011	0.0009	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
Magnesium Mg	mg/L	6.6	6.5	6.5	6.4	5.5	5.9	6.1	5.8	5.9	5.8	5.8
Manganese Mn	mg/L	0.007	0.007	0.007	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Mercury Hg	ug/L	0.00194	0.00193	0.00192	0.00184	0.00157	0.00168	0.00173	0.00164	0.00165	0.00164	0.00163
Molybdenum Mo	mg/L	0.00200	0.00199	0.00198	0.00187	0.00158	0.00169	0.00174	0.00164	0.00166	0.00164	0.00164
Nickel Ni	mg/L	0.0033	0.0033	0.0032	0.0031	0.0026	0.0028	0.0029	0.0027	0.0027	0.0027	0.0027
Phosphorus P	mg/L	0.118	0.117	0.117	0.110	0.094	0.100	0.102	0.097	0.098	0.097	0.097
Potassium K	mg/L	6.4	6.3	6.3	6.0	5.1	5.5	5.7	5.4	5.4	5.4	5.3
Selenium Se	mg/L	0.00061	0.00060	0.00060	0.00059	0.00051	0.00055	0.00057	0.00054	0.00055	0.00054	0.00054
Silicon SiO2	mg/L	1.36	1.35	1.34	1.26	1.07	1.14	1.18	1.11	1.12	1.11	1.11
Silver Ag	mg/L	0.0000393	0.0000391	0.0000389	0.0000367	0.0000311	0.0000332	0.0000341	0.0000323	0.0000325	0.0000323	0.0000321
Sodium Na	mg/L	162	161	160	152	129	138	141	134	135	134	133
Strontium Sr	mg/L	0.040	0.040	0.040	0.039	0.034	0.036	0.038	0.036	0.036	0.036	0.035
Tellurium Te	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Thallium Tl	mg/L	0.000019	0.000019	0.000018	0.000018	0.000015	0.000016	0.000017	0.000016	0.000016	0.000016	0.000016
Thorium Th	mg/L	0.000063	0.000063	0.000063	0.000059	0.000051	0.000054	0.000055	0.000052	0.000053	0.000052	0.000052
Tin Sn	mg/L	0.00121	0.00121	0.00120	0.00113	0.00096	0.00102	0.00105	0.00099	0.00100	0.00099	0.00099
Titanium Ti	mg/L	0.0013	0.0013	0.0013	0.0013	0.0012	0.0012	0.0013	0.0012	0.0012	0.0012	0.0012
Uranium U	mg/L	0.000085	0.000085	0.000084	0.000080	0.000068	0.000073	0.000075	0.000071	0.000071	0.000071	0.000071
Vanadium V	mg/L	0.0016	0.0016	0.0016	0.0016	0.0013	0.0014	0.0015	0.0014	0.0014	0.0014	0.0014
Zinc Zn	mg/L	0.0071	0.0071	0.0070	0.0069	0.0059	0.0063	0.0065	0.0062	0.0062	0.0062	0.0061
Zirconium Zr	mg/L	0.0059	0.0059	0.0059	0.0058	0.0050	0.0054	0.0056	0.0053	0.0053	0.0053	0.0053

Loadings to Tail Lake (kg/month)												
Date	Year 1 Mar-08	Year 1 Apr-08	Year 1 May-08	Year 1 Jun-08	Year 1 Jul-08	Year 1 Aug-08	Year 1 Sep-08	Year 1 Oct-08	Year 1 Nov-08	Year 1 Dec-08	Year 1 Jan-09	Year 1 Feb-09
Parameter												
TDS	64532	62450	64532	73575	68366	65881	64421	65050	62450	64532	64532	58287
TSS	153	148	153	249	201	176	186	163	148	153	153	138
Free CN	0.16	0.15	0.16	0.15	0.16	0.16	0.15	0.16	0.15	0.16	0.16	0.14
Total CN	2	2	2	2	2	2	2	2	2	2	2	2
WAD CN	0.23	0.22	0.23	0.22	0.23	0.23	0.22	0.23	0.22	0.23	0.23	0.20
CNO	363	351	363	351	363	363	351	363	351	363	363	328
SCN	10	10	10	10	10	10	10	10	10	10	10	9
Sulphate	6786	6567	6786	10655	9277	7820	7894	7244	6567	6786	6786	6129
Chloride	111587	107988	111587	135607	128267	118564	116903	114638	107988	111587	111587	100788
Total Ammonia-N	130	125	130	265	216	166	172	146	125	130	130	117
Nitrate-N	716	693	716	1793	1398	1003	1061	844	693	716	716	646
Nitrite-N	91	88	91	114	107	98	97	94	88	91	91	82
Alkalinity	3854	3729	3854	6521	5220	4298	4204	3979	3729	3854	3854	3481
OrthoPhosphate-P	21	21	21	21	21	21	21	21	21	21	21	19
Phosphate-P	21	21	21	21	22	21	21	21	21	21	21	19
Org. Carbon				596.68	254.01	74.97	92.91	24.43				
Hardness CaCO3	8585	8308	8585	11645	10219	9192	9012	8770	8308	8585	8585	7754
Total Metals												
Aluminum Al	1.90	1.84	1.90	12.65	8.15	4.54	5.20	3.05	1.84	1.90	1.90	1.72
Antimony Sb	1.26	1.22	1.26	4.57	3.34	2.14	2.34	1.65	1.22	1.26	1.26	1.14
Arsenic As	0.22	0.21	0.22	0.47	0.38	0.28	0.29	0.25	0.21	0.22	0.22	0.20
Barium Ba	0.68	0.66	0.68	1.05	0.89	0.77	0.76	0.71	0.66	0.68	0.68	0.61
Beryllium Be	0.06	0.06	0.06	0.18	0.13	0.09	0.10	0.07	0.06	0.06	0.06	0.05
Bismuth Bi	1.24	1.20	1.24	4.55	3.32	2.11	2.32	1.63	1.20	1.24	1.24	1.12
Boron B	2.17	2.10	2.17	6.86	4.96	3.26	3.47	2.63	2.10	2.17	2.17	1.96
Cadmium Cd	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Calcium Ca	37571	36359	37571	38121	38575	37984	36865	37737	36359	37571	37571	33935
Chromium Cr	0.33	0.31	0.33	0.54	0.46	0.38	0.39	0.35	0.31	0.33	0.33	0.29
Cobalt Co	0.48	0.47	0.48	0.67	0.61	0.53	0.53	0.50	0.47	0.48	0.48	0.43
Copper Cu	0.76	0.74	0.76	0.94	0.87	0.80	0.79	0.78	0.74	0.76	0.76	0.69
Iron Fe	1.65	1.60	1.65	8.03	7.25	8.28	3.61	2.24	1.60	1.65	1.65	1.49
Lead Pb	0.04	0.04	0.04	0.11	0.09	0.06	0.06	0.05	0.04	0.04	0.04	0.04
Lithium Li	0.34	0.33	0.34	0.53	0.47	0.40	0.40	0.37	0.33	0.34	0.34	0.31
Magnesium Mg	633	612	633	1456	1088	815	824	699	612	633	633	572
Manganese Mn	1.77	1.71	1.77	2.31	2.16	2.01	1.91	1.84	1.71	1.77	1.77	1.60
Mercury Hg	0.62	0.60	0.62	0.66	0.65	0.63	0.61	0.63	0.60	0.62	0.62	0.56
Molybdenum Mo	0.84	0.81	0.84	0.86	0.86	0.85	0.83	0.85	0.81	0.84	0.84	0.76
Nickel Ni	1.04	1.00	1.04	1.43	1.29	1.14	1.14	1.08	1.00	1.04	1.04	0.94
Phosphorus P	29	28	29	39	35	32	31	30	28	29	29	26
Potassium K	2106	2038	2106	2277	2220	2149	2099	2124	2038	2106	2106	1902
Selenium Se	0.04	0.04	0.04	0.11	0.08	0.06	0.06	0.05	0.04	0.04	0.04	0.04
Silicon SiO2	529	512	529	618	595	557	547	541	512	529	529	477
Silver Ag	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.00
Sodium Na	3713	3593	3713	5224	4507	4002	3947	3807	3593	3713	3713	3353
Strontium Sr	6	6	6	9	8	7	7	6	6	6	6	5
Tellurium Te	0.03	0.03	0.03	0.06	0.05	0.04	0.04	0.03	0.03	0.03	0.03	0.03
Thallium Tl	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thorium Th	0.02	0.01	0.02	0.03	0.03	0.02	0.02	0.02	0.01	0.02	0.02	0.01
Tin Sn	0.21	0.21	0.21	0.74	0.54	0.35	0.38	0.27	0.21	0.21	0.21	0.19
Titanium Ti	0.09	0.09	0.09	0.29	0.22	0.15	0.16	0.12	0.09	0.09	0.09	0.08
Uranium U	0.02	0.02	0.02	0.04	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02
Vanadium V	0.22	0.22	0.22	0.82	0.58	0.37	0.40	0.29	0.22	0.22	0.22	0.20
Zinc Zn	1.0	0.9	1.0	2.2	1.5	1.2	1.2	1.1	0.9	1.0	1.0	0.9
Zirconium Zr	0.31	0.30	0.31	1.13	0.75	0.47	0.50	0.37	0.30	0.31	0.31	0.28

Loadings to Tail Lake (kg/month)												
Date	Year 2 Mar-09	Year 2 Apr-09	Year 2 May-09	Year 2 Jun-09	Year 2 Jul-09	Year 2 Aug-09	Year 2 Sep-09	Year 2 Oct-09	Year 2 Nov-09	Year 2 Dec-09	Year 2 Jan-10	Year 2 Feb-10
Parameter												
TDS	64532	62450	64532	85596	72550	67369	66604	65622	62450	64532	64532	58287
TSS	153	148	153	359	253	200	227	174	148	153	153	138
Free CN	0.16	0.15	0.16	0.15	0.16	0.16	0.15	0.16	0.15	0.16	0.16	0.14
Total CN	2	2	2	3	3	2	2	2	2	2	2	2
WAD CN	0.23	0.22	0.23	0.22	0.23	0.23	0.22	0.23	0.22	0.23	0.23	0.20
CNO	363	351	363	351	363	363	351	363	351	363	363	328
SCN	10	10	10	10	10	10	10	10	10	10	10	9
Sulphate	6786	6567	6786	10983	9434	7869	7961	7261	6567	6786	6786	6129
Chloride	111587	107988	111587	138897	129836	119174	117672	114840	107988	111587	111587	100788
Total Ammonia-N	130	125	130	266	217	166	172	146	125	130	130	117
Nitrate-N	716	693	716	1794	1399	1003	1061	844	693	716	716	646
Nitrite-N	91	88	91	114	107	98	97	94	88	91	91	82
Alkalinity	3854	3729	3854	9537	6710	4788	4730	4117	3729	3854	3854	3481
OrthoPhosphate-P	21	21	21	21	21	21	21	21	21	21	21	19
Phosphate-P	21	21	21	22	22	21	21	21	21	21	21	19
Org. Carbon				1241.44	531.22	157.63	195.82	51.42				
Hardness CaCO3	8585	8308	8585	15252	12003	9862	9791	8974	8308	8585	8585	7754
Total Metals												
Aluminum Al	1.90	1.84	1.90	14.45	8.78	4.81	5.53	3.13	1.84	1.90	1.90	1.72
Antimony Sb	1.26	1.22	1.26	4.57	3.34	2.14	2.34	1.65	1.22	1.26	1.26	1.14
Arsenic As	0.22	0.21	0.22	0.50	0.39	0.29	0.30	0.25	0.21	0.22	0.22	0.20
Barium Ba	0.68	0.66	0.68	1.28	1.00	0.82	0.81	0.72	0.66	0.68	0.68	0.61
Beryllium Be	0.06	0.06	0.06	0.18	0.13	0.09	0.10	0.07	0.06	0.06	0.06	0.05
Bismuth Bi	1.24	1.20	1.24	4.55	3.32	2.11	2.32	1.63	1.20	1.24	1.24	1.12
Boron B	2.17	2.10	2.17	8.39	5.75	3.51	3.74	2.70	2.10	2.17	2.17	1.96
Cadmium Cd	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Calcium Ca	37571	36359	37571	38786	38896	38110	37001	37773	36359	37571	37571	33935
Chromium Cr	0.33	0.31	0.33	0.57	0.46	0.38	0.39	0.35	0.31	0.33	0.33	0.29
Cobalt Co	0.48	0.47	0.48	0.67	0.61	0.54	0.53	0.50	0.47	0.48	0.48	0.43
Copper Cu	0.76	0.74	0.76	1.04	0.91	0.81	0.80	0.78	0.74	0.76	0.76	0.69
Iron Fe	1.65	1.60	1.65	12.62	11.89	14.96	5.03	2.61	1.60	1.65	1.65	1.49
Lead Pb	0.04	0.04	0.04	0.11	0.09	0.06	0.06	0.05	0.04	0.04	0.04	0.04
Lithium Li	0.34	0.33	0.34	0.53	0.47	0.40	0.40	0.37	0.33	0.34	0.34	0.31
Magnesium Mg	633	612	633	1962	1330	907	920	724	612	633	633	572
Manganese Mn	1.77	1.71	1.77	2.45	2.27	2.14	1.96	1.85	1.71	1.77	1.77	1.60
Mercury Hg	0.62	0.60	0.62	0.73	0.68	0.64	0.63	0.63	0.60	0.62	0.62	0.56
Molybdenum Mo	0.84	0.81	0.84	0.87	0.87	0.85	0.83	0.85	0.81	0.84	0.84	0.76
Nickel Ni	1.04	1.00	1.04	1.48	1.32	1.15	1.15	1.09	1.00	1.04	1.04	0.94
Phosphorus P	29	28	29	40	36	32	31	30	28	29	29	26
Potassium K	2106	2038	2106	2450	2290	2173	2137	2134	2038	2106	2106	1902
Selenium Se	0.04	0.04	0.04	0.16	0.10	0.07	0.07	0.05	0.04	0.04	0.04	0.04
Silicon SiO2	529	512	529	618	595	557	547	541	512	529	529	477
Silver Ag	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.00
Sodium Na	3713	3593	3713	6940	5343	4309	4324	3906	3593	3713	3713	3353
Strontium Sr	6	6	6	12	9	7	7	6	6	6	6	5
Tellurium Te	0.03	0.03	0.03	0.06	0.05	0.04	0.04	0.03	0.03	0.03	0.03	0.03
Thallium Tl	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thorium Th	0.02	0.01	0.02	0.03	0.03	0.02	0.02	0.02	0.01	0.02	0.02	0.01
Tin Sn	0.21	0.21	0.21	0.74	0.54	0.35	0.38	0.27	0.21	0.21	0.21	0.19
Titanium Ti	0.09	0.09	0.09	0.29	0.22	0.15	0.16	0.12	0.09	0.09	0.09	0.08
Uranium U	0.02	0.02	0.02	0.04	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02
Vanadium V	0.22	0.22	0.22	0.86	0.58	0.37	0.41	0.29	0.22	0.22	0.22	0.20
Zinc Zn	1.0	0.9	1.0	2.8	1.6	1.2	1.3	1.1	0.9	1.0	1.0	0.9
Zirconium Zr	0.31	0.30	0.31	1.68	1.01	0.55	0.61	0.40	0.30	0.31	0.31	0.28

Loadings to Tail Lake (kg/month)												
Date	Year 3 Mar-10	Year 3 Apr-10	Year 3 May-10	Year 3 Jun-10	Year 3 Jul-10	Year 3 Aug-10	Year 3 Sep-10	Year 3 Oct-10	Year 3 Nov-10	Year 3 Dec-10	Year 3 Jan-11	Year 3 Feb-11
Parameter												
TDS	50662	49028	50662	54904	52685	51374	50071	50937	49028	50662	50662	45759
TSS				53	25	12	20	5				
Free CN												
Total CN				0	0	0	0	0				
WAD CN												
CNO												
SCN												
Sulphate	1289	1247	1289	5092	3650	2276	2512	1728	1247	1289	1289	1164
Chloride	49110	47526	49110	73710	65111	55825	56114	52076	47526	49110	49110	44357
Total Ammonia-N	25	24	25	149	102	57	66	39	24	25	25	22
Nitrate-N	28	28	28	1017	642	287	359	144	28	28	28	26
Nitrite-N	64	62	64	85	79	70	70	67	62	64	64	58
Alkalinity				1475	721	235	251	66				
OrthoPhosphate-P	21	21	21	21	21	21	21	21	21	21	21	19
Phosphate-P	21	21	21	21	21	21	21	21	21	21	21	19
Org. Carbon				315.21	134.04	39.57	49.17	12.98				
Hardness CaCO3				1763	862	320	373	98				
Total Metals												
Aluminum Al	0.81	0.78	0.81	7.86	4.95	2.56	3.01	1.57	0.78	0.81	0.81	0.73
Antimony Sb	1.21	1.17	1.21	4.51	3.28	2.08	2.29	1.60	1.17	1.21	1.21	1.09
Arsenic As	0.03	0.03	0.03	0.21	0.14	0.08	0.09	0.05	0.03	0.03	0.03	0.02
Barium Ba	0.06	0.06	0.06	0.35	0.22	0.13	0.14	0.09	0.06	0.06	0.06	0.05
Beryllium Be	0.03	0.03	0.03	0.13	0.09	0.06	0.06	0.04	0.03	0.03	0.03	0.03
Bismuth Bi	1.21	1.17	1.21	4.51	3.28	2.08	2.29	1.60	1.17	1.21	1.21	1.09
Boron B	0.60	0.58	0.60	3.99	2.63	1.42	1.61	0.95	0.58	0.60	0.60	0.55
Cadmium Cd	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Calcium Ca	263	254	263	1552	1021	577	645	394	254	263	263	237
Chromium Cr	0.07	0.06	0.07	0.26	0.18	0.12	0.13	0.09	0.06	0.07	0.07	0.06
Cobalt Co	0.06	0.06	0.06	0.24	0.18	0.11	0.12	0.08	0.06	0.06	0.06	0.05
Copper Cu	0.03	0.03	0.03	0.17	0.11	0.06	0.07	0.04	0.03	0.03	0.03	0.03
Iron Fe	0.23	0.23	0.23	3.97	3.40	3.82	1.41	0.59	0.23	0.23	0.23	0.21
Lead Pb	0.01	0.01	0.01	0.07	0.05	0.03	0.03	0.02	0.01	0.01	0.01	0.01
Lithium Li	0.06	0.06	0.06	0.24	0.18	0.11	0.12	0.08	0.06	0.06	0.06	0.05
Magnesium Mg	121	117	121	723	461	259	283	175	117	121	121	110
Manganese Mn	0.16	0.15	0.16	0.68	0.50	0.34	0.33	0.22	0.15	0.16	0.16	0.14
Mercury Hg	0.00	0.00	0.00	0.03	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.00
Molybdenum Mo	0.01	0.01	0.01	0.05	0.03	0.02	0.02	0.02	0.01	0.01	0.01	0.01
Nickel Ni	0.12	0.12	0.12	0.50	0.35	0.22	0.24	0.16	0.12	0.12	0.12	0.11
Phosphorus P	23	22	23	31	28	25	25	24	22	23	23	21
Potassium K	25	24	25	184	106	57	68	39	24	25	25	23
Selenium Se	0.00	0.00	0.00	0.04	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00
Silicon SiO2	10	9	10	84	56	29	34	18	9	10	10	9
Silver Ag	0.00	0.00	0.00	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00
Sodium Na	12	12	12	890	441	169	205	64	12	12	12	11
Strontium Sr	0	0	0	3	2	1	1	1	0	0	0	0
Tellurium Te				0.02	0.01	0.01	0.01	0.00				
Thallium Tl	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thorium Th				0.01	0.01	0.00	0.00	0.00				
Tin Sn	0.18	0.18	0.18	0.69	0.50	0.32	0.35	0.24	0.18	0.18	0.18	0.16
Titanium Ti	0.06	0.06	0.06	0.24	0.18	0.11	0.12	0.08	0.06	0.06	0.06	0.05
Uranium U	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vanadium V	0.18	0.18	0.18	0.73	0.52	0.32	0.36	0.24	0.18	0.18	0.18	0.16
Zinc Zn	0.2	0.2	0.2	1.2	0.7	0.4	0.5	0.3	0.2	0.2	0.2	0.2
Zirconium Zr				0.46	0.25	0.09	0.12	0.04				

Loadings to Tail Lake (kg/month)												
Date	Year 4 Mar-11	Year 4 Apr-11	Year 4 May-11	Year 4 Jun-11	Year 4 Jul-11	Year 4 Aug-11	Year 4 Sep-11	Year 4 Oct-11	Year 4 Nov-11	Year 4 Dec-11	Year 4 Jan-12	Year 4 Feb-12
Parameter												
TDS				23955	8220	2899	4239	1115				
TSS				218	103	48	81	21				
Free CN												
Total CN				0	0	0	0	0				
WAD CN												
CNO												
SCN												
Sulphate				800	399	135	180	52				
Chloride				6555	3082	1190	1494	393				
Total Ammonia-N				61	37	16	20	7				
Nitrate-N				469	291	122	157	55				
Nitrite-N				11	7	3	4	1				
Alkalinity				6011	2928	955	1022	269				
OrthoPhosphate-P				0	0	0	0	0				
Phosphate-P				2	1	0	0	0				
Org. Carbon				1284.88	544.56	161.08	199.86	52.54				
Hardness CaCO3				7187	3504	1305	1514	398				
Total Metals												
Aluminum Al				7.88	3.90	1.65	2.08	0.67				
Antimony Sb				0.02	0.01	0.01	0.01	0.00				
Arsenic As				0.15	0.09	0.04	0.04	0.01				
Barium Ba				0.46	0.21	0.10	0.10	0.03				
Beryllium Be				0.02	0.01	0.01	0.01	0.00				
Bismuth Bi				0.02	0.01	0.01	0.01	0.00				
Boron B				4.05	2.16	0.73	0.87	0.26				
Cadmium Cd				0.01	0.00	0.00	0.00	0.00				
Calcium Ca				1578	785	310	348	99				
Chromium Cr				0.07	0.03	0.01	0.02	0.00				
Cobalt Co				0.02	0.02	0.01	0.01	0.00				
Copper Cu				0.22	0.10	0.03	0.04	0.01				
Iron Fe				10.15	9.72	13.28	3.09	0.84				
Lead Pb				0.03	0.02	0.01	0.01	0.00				
Lithium Li				0.02	0.01	0.01	0.01	0.00				
Magnesium Mg				1034	491	187	194	52				
Manganese Mn				0.29	0.22	0.26	0.10	0.03				
Mercury Hg				0.13	0.06	0.02	0.02	0.01				
Molybdenum Mo				0.02	0.01	0.00	0.00	0.00				
Nickel Ni				0.13	0.07	0.02	0.02	0.01				
Phosphorus P				5	2	1	1	0				
Potassium K				350	143	49	76	20				
Selenium Se				0.11	0.06	0.02	0.03	0.01				
Silicon SiO2				47	29	12	16	6				
Silver Ag				0.01	0.00	0.00	0.00	0.00				
Sodium Na				3425	1648	599	733	193				
Strontium Sr				6	3	1	1	0				
Tellurium Te				0.02	0.01	0.01	0.01	0.00				
Thallium Tl				0.00	0.00	0.00	0.00	0.00				
Thorium Th				0.01	0.01	0.00	0.00	0.00				
Tin Sn				0.03	0.02	0.01	0.01	0.00				
Titanium Ti				0.02	0.01	0.01	0.01	0.00				
Uranium U				0.01	0.01	0.00	0.00	0.00				
Vanadium V				0.13	0.03	0.01	0.01	0.00				
Zinc Zn				1.3	0.3	0.1	0.1	0.0				
Zirconium Zr				1.29	0.64	0.21	0.27	0.08				

Loadings to Tail Lake (kg/month)												
Date	Year 5 Mar-12	Year 5 Apr-12	Year 5 May-12	Year 5 Jun-12	Year 5 Jul-12	Year 5 Aug-12	Year 5 Sep-12	Year 5 Oct-12	Year 5 Nov-12	Year 5 Dec-12	Year 5 Jan-13	Year 5 Feb-13
Parameter												
TDS				402298	386432	381112	382452	379327				
TSS				277	130	57	91	24				
Free CN												
Total CN				0	0	0	0	0				
WAD CN												
CNO												
SCN												
Sulphate				804	399	135	180	52				
Chloride				238558	234214	231815	232177	230862				
Total Ammonia-N				61	37	16	20	7				
Nitrate-N				469	291	122	157	55				
Nitrite-N				11	7	3	4	1				
Alkalinity				6043	2928	955	1022	269				
OrthoPhosphate-P				0	0	0	0	0				
Phosphate-P				2	1	0	0	0				
Org. Carbon				1291.85	544.52	161.08	199.86	52.54				
Hardness CaCO3				7226	3503	1305	1514	398				
Total Metals												
Aluminum Al				12.94	6.27	2.39	3.01	0.91				
Antimony Sb				0.02	0.01	0.01	0.01	0.00				
Arsenic As				0.16	0.09	0.04	0.04	0.01				
Barium Ba				0.46	0.21	0.10	0.10	0.03				
Beryllium Be				0.02	0.01	0.01	0.01	0.00				
Bismuth Bi				0.02	0.01	0.01	0.01	0.00				
Boron B				4.69	2.46	0.83	0.98	0.29				
Cadmium Cd				0.01	0.00	0.00	0.00	0.00				
Calcium Ca				23908	23083	22592	22632	22376				
Chromium Cr				0.08	0.03	0.01	0.02	0.01				
Cobalt Co				0.03	0.02	0.01	0.01	0.00				
Copper Cu				0.24	0.11	0.03	0.04	0.01				
Iron Fe				15.09	12.02	14.00	3.99	1.08				
Lead Pb				0.03	0.02	0.01	0.01	0.00				
Lithium Li				0.07	0.03	0.01	0.02	0.00				
Magnesium Mg				1106	523	197	206	55				
Manganese Mn				0.41	0.28	0.27	0.12	0.03				
Mercury Hg				0.13	0.06	0.02	0.02	0.01				
Molybdenum Mo				0.03	0.01	0.00	0.00	0.00				
Nickel Ni				0.14	0.07	0.02	0.03	0.01				
Phosphorus P				5	2	1	1	0				
Potassium K				405	167	57	86	23				
Selenium Se				0.13	0.07	0.03	0.03	0.01				
Silicon SiO2				60	35	14	18	6				
Silver Ag				0.01	0.00	0.00	0.00	0.00				
Sodium Na				129924	127631	126282	126450	125783				
Strontium Sr				6	3	1	1	0				
Tellurium Te				0.02	0.01	0.01	0.01	0.00				
Thallium Tl				0.00	0.00	0.00	0.00	0.00				
Thorium Th				0.01	0.01	0.00	0.00	0.00				
Tin Sn				0.03	0.02	0.01	0.01	0.00				
Titanium Ti				0.31	0.15	0.05	0.06	0.02				
Uranium U				0.01	0.01	0.00	0.00	0.00				
Vanadium V				0.17	0.05	0.02	0.02	0.01				
Zinc Zn				1.3	0.3	0.1	0.1	0.0				
Zirconium Zr				1.29	0.64	0.21	0.27	0.08				

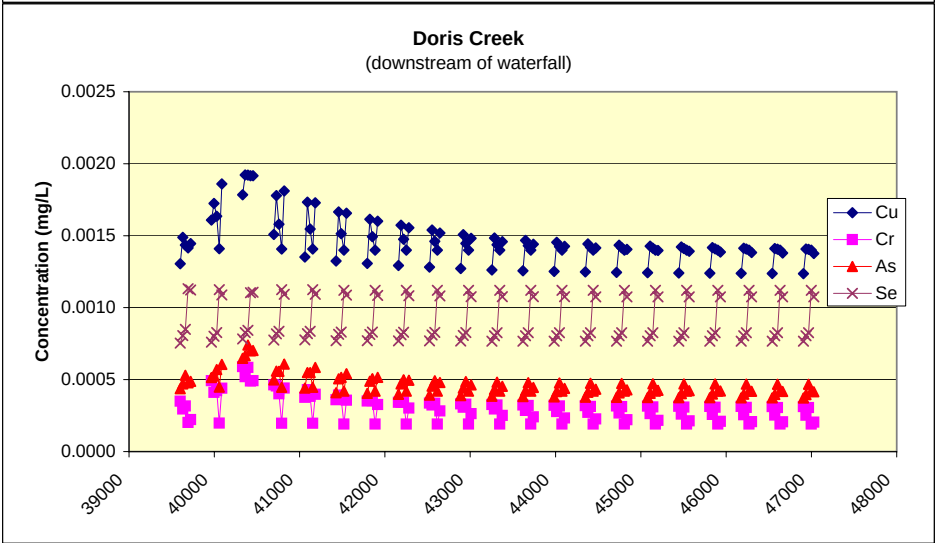
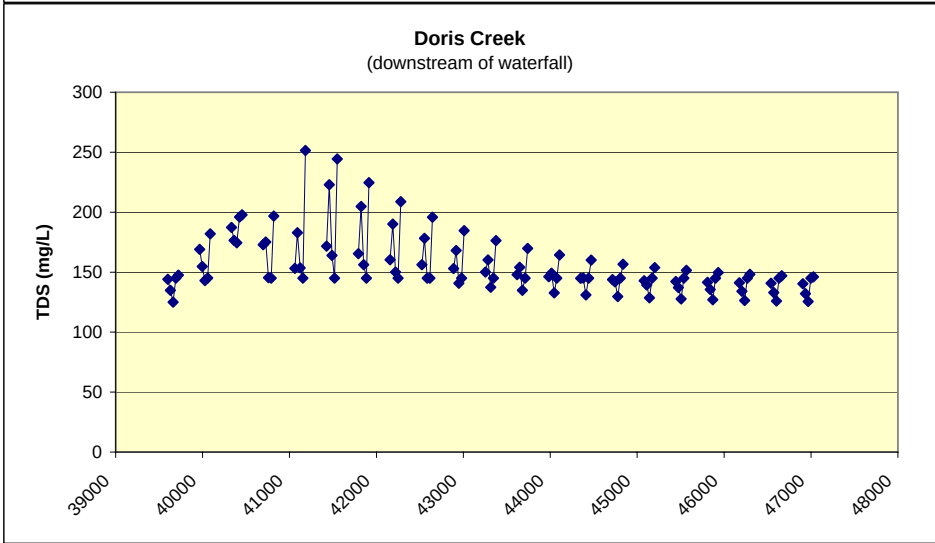
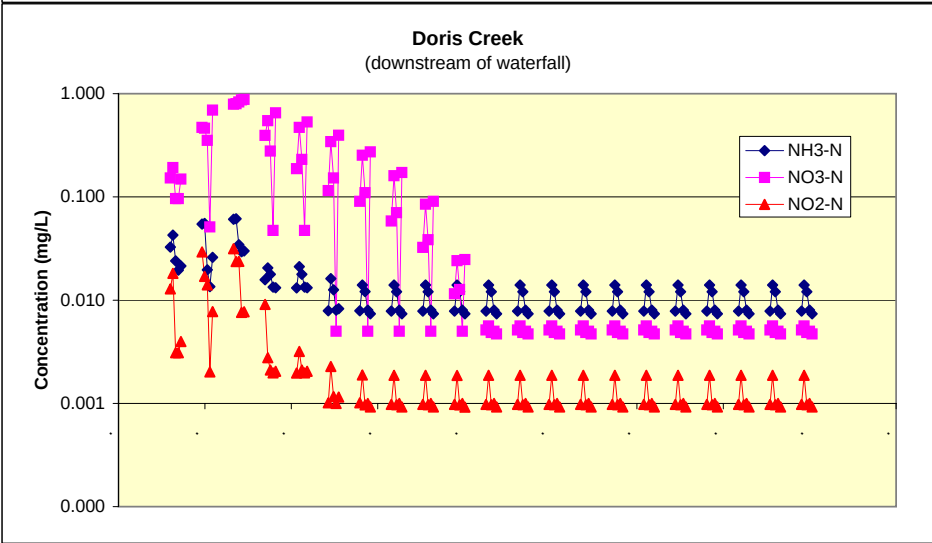
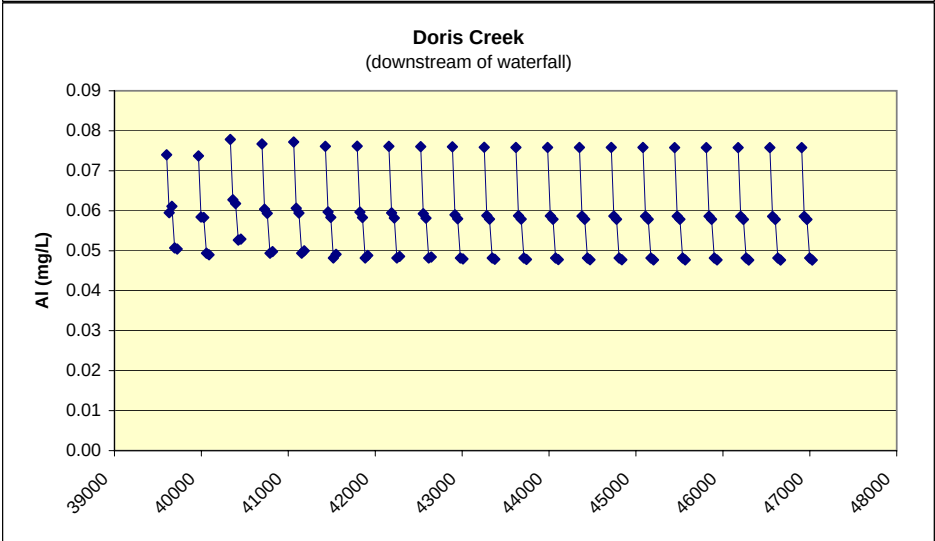
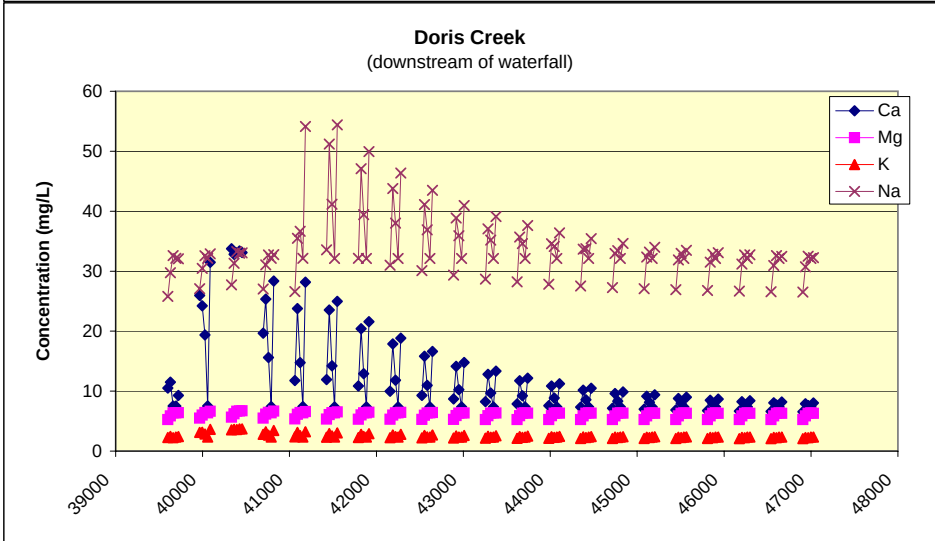
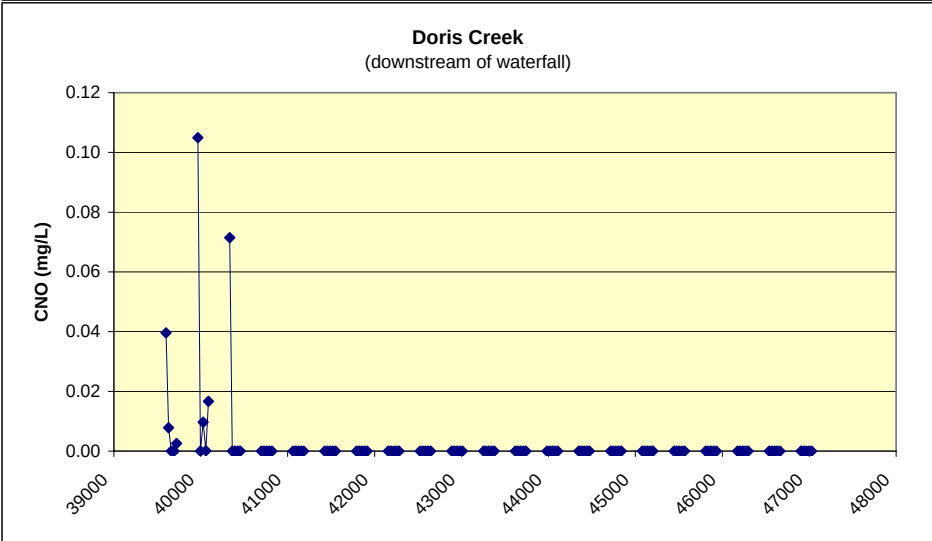
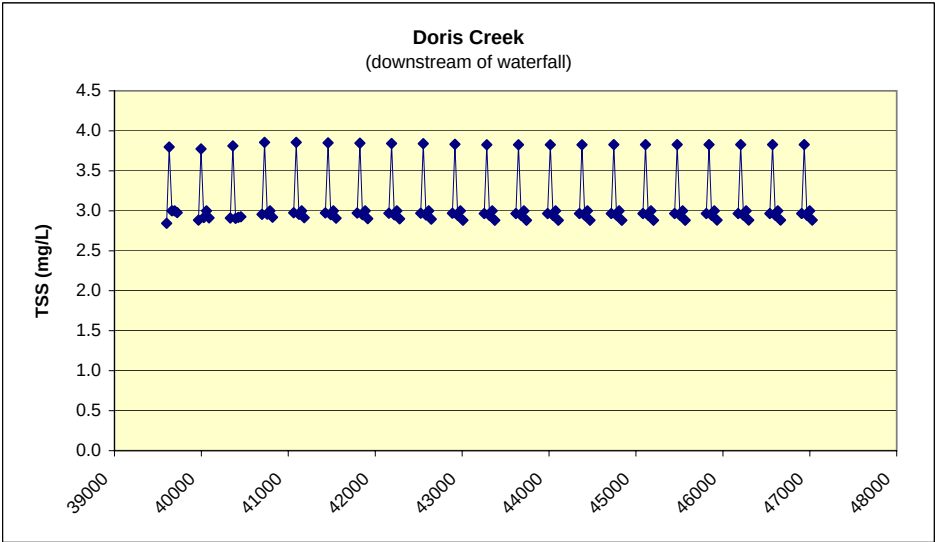
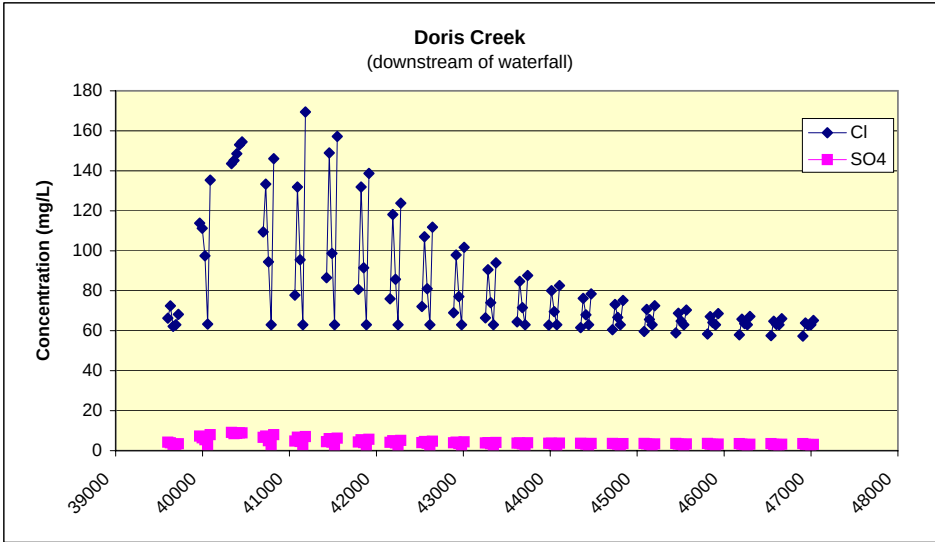
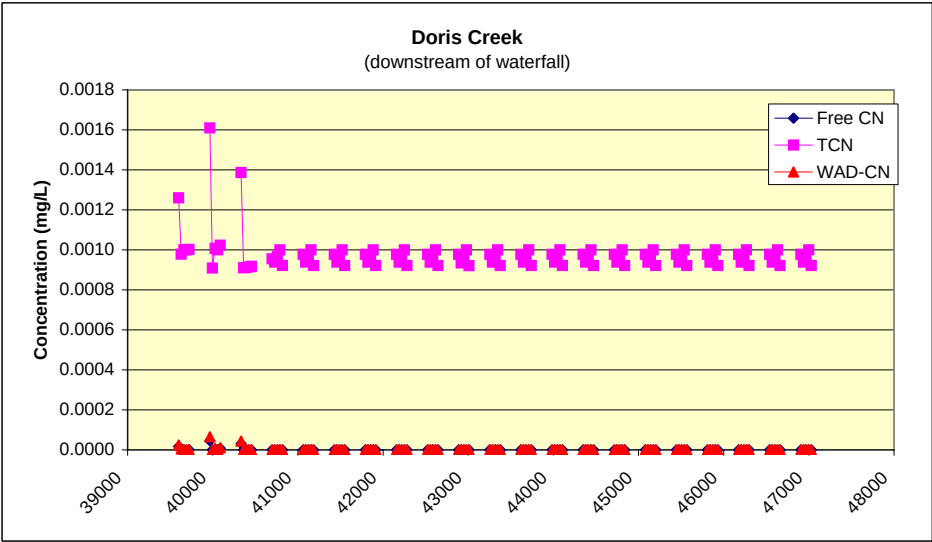
Loadings to Tail Lake (kg/month)												
Date	Year 6 Mar-13	Year 6 Apr-13	Year 6 May-13	Year 6 Jun-13	Year 6 Jul-13	Year 6 Aug-13	Year 6 Sep-13	Year 6 Oct-13	Year 6 Nov-13	Year 6 Dec-13	Year 6 Jan-14	Year 6 Feb-14
Parameter												
TDS				24085	8219	2899	4239	1115				
TSS				277	130	57	91	24				
Free CN												
Total CN				0	0	0	0	0				
WAD CN												
CNO												
SCN												
Sulphate				804	399	135	180	52				
Chloride				8166	3821	1422	1784	469				
Total Ammonia-N				61	37	16	20	7				
Nitrate-N				469	291	122	157	55				
Nitrite-N				11	7	3	4	1				
Alkalinity				6043	2928	955	1022	269				
OrthoPhosphate-P				0	0	0	0	0				
Phosphate-P				2	1	0	0	0				
Org. Carbon				1291.85	544.52	161.08	199.86	52.54				
Hardness CaCO3				7226	3503	1305	1514	398				
Total Metals												
Aluminum Al				12.94	6.27	2.39	3.01	0.91				
Antimony Sb				0.02	0.01	0.01	0.01	0.00				
Arsenic As				0.16	0.09	0.04	0.04	0.01				
Barium Ba				0.46	0.21	0.10	0.10	0.03				
Beryllium Be				0.02	0.01	0.01	0.01	0.00				
Bismuth Bi				0.02	0.01	0.01	0.01	0.00				
Boron B				4.69	2.46	0.83	0.98	0.29				
Cadmium Cd				0.01	0.00	0.00	0.00	0.00				
Calcium Ca				1633	808	317	357	101				
Chromium Cr				0.08	0.03	0.01	0.02	0.01				
Cobalt Co				0.03	0.02	0.01	0.01	0.00				
Copper Cu				0.24	0.11	0.03	0.04	0.01				
Iron Fe				15.09	12.02	14.00	3.99	1.08				
Lead Pb				0.03	0.02	0.01	0.01	0.00				
Lithium Li				0.07	0.03	0.01	0.02	0.00				
Magnesium Mg				1106	523	197	206	55				
Manganese Mn				0.41	0.28	0.27	0.12	0.03				
Mercury Hg				0.13	0.06	0.02	0.02	0.01				
Molybdenum Mo				0.03	0.01	0.00	0.00	0.00				
Nickel Ni				0.14	0.07	0.02	0.03	0.01				
Phosphorus P				5	2	1	1	0				
Potassium K				405	167	57	86	23				
Selenium Se				0.13	0.07	0.03	0.03	0.01				
Silicon SiO2				60	35	14	18	6				
Silver Ag				0.01	0.00	0.00	0.00	0.00				
Sodium Na				4379	2086	737	905	238				
Strontium Sr				6	3	1	1	0				
Tellurium Te				0.02	0.01	0.01	0.01	0.00				
Thallium Tl				0.00	0.00	0.00	0.00	0.00				
Thorium Th				0.01	0.01	0.00	0.00	0.00				
Tin Sn				0.03	0.02	0.01	0.01	0.00				
Titanium Ti				0.31	0.15	0.05	0.06	0.02				
Uranium U				0.01	0.01	0.00	0.00	0.00				
Vanadium V				0.17	0.05	0.02	0.02	0.01				
Zinc Zn				1.3	0.3	0.1	0.1	0.0				
Zirconium Zr				1.29	0.64	0.21	0.27	0.08				

Loadings to Tail Lake (kg/month)												
Date	Year 7 Mar-14	Year 7 Apr-14	Year 7 May-14	Year 7 Jun-14	Year 7 Jul-14	Year 7 Aug-14	Year 7 Sep-14	Year 7 Oct-14	Year 7 Nov-14	Year 7 Dec-14	Year 7 Jan-15	Year 7 Feb-15
Parameter												
TDS				24085	8219	2899	4239	1115				
TSS				277	130	57	91	24				
Free CN												
Total CN				0	0	0	0	0				
WAD CN												
CNO												
SCN												
Sulphate				657	308	97	131	34				
Chloride				8166	3821	1422	1784	469				
Total Ammonia-N				2	1	0	0	0				
Nitrate-N				1	1	0	0	0				
Nitrite-N				0	0	0	0	0				
Alkalinity				6043	2928	955	1022	269				
OrthoPhosphate-P				0	0	0	0	0				
Phosphate-P				2	1	0	0	0				
Org. Carbon				1291.85	544.52	161.08	199.86	52.54				
Hardness CaCO3				7226	3503	1305	1514	398				
Total Metals												
Aluminum Al				8.65	3.61	1.27	1.58	0.41				
Antimony Sb				0.00	0.00	0.00	0.00	0.00				
Arsenic As				0.06	0.03	0.01	0.01	0.00				
Barium Ba				0.45	0.21	0.10	0.09	0.02				
Beryllium Be				0.00	0.00	0.00	0.00	0.00				
Bismuth Bi				0.00	0.00	0.00	0.00	0.00				
Boron B				3.69	1.84	0.56	0.65	0.17				
Cadmium Cd				0.00	0.00	0.00	0.00	0.00				
Calcium Ca				1381	652	251	273	72				
Chromium Cr				0.06	0.02	0.01	0.01	0.00				
Cobalt Co				0.01	0.01	0.00	0.00	0.00				
Copper Cu				0.21	0.09	0.02	0.03	0.01				
Iron Fe				14.09	11.40	13.74	3.66	0.96				
Lead Pb				0.01	0.01	0.00	0.00	0.00				
Lithium Li				0.05	0.02	0.01	0.01	0.00				
Magnesium Mg				1081	507	190	198	52				
Manganese Mn				0.39	0.26	0.27	0.12	0.03				
Mercury Hg				0.13	0.06	0.02	0.02	0.01				
Molybdenum Mo				0.03	0.01	0.00	0.00	0.00				
Nickel Ni				0.12	0.06	0.02	0.02	0.00				
Phosphorus P				2	1	0	0	0				
Potassium K				398	163	55	84	22				
Selenium Se				0.11	0.05	0.02	0.02	0.01				
Silicon SiO2				12	6	2	2	1				
Silver Ag				0.00	0.00	0.00	0.00	0.00				
Sodium Na				4373	2083	735	903	237				
Strontium Sr				6	3	1	1	0				
Tellurium Te				0.00	0.00	0.00	0.00	0.00				
Thallium Tl				0.00	0.00	0.00	0.00	0.00				
Thorium Th				0.00	0.00	0.00	0.00	0.00				
Tin Sn				0.01	0.00	0.00	0.00	0.00				
Titanium Ti				0.29	0.13	0.04	0.05	0.01				
Uranium U				0.00	0.00	0.00	0.00	0.00				
Vanadium V				0.13	0.03	0.01	0.01	0.00				
Zinc Zn				1.2	0.2	0.1	0.1	0.0				
Zirconium Zr				1.10	0.51	0.16	0.20	0.05				

Loadings to Tail Lake (kg/month)												
Date	Year 8 Mar-15	Year 8 Apr-15	Year 8 May-15	Year 8 Jun-15	Year 8 Jul-15	Year 8 Aug-15	Year 8 Sep-15	Year 8 Oct-15	Year 8 Nov-15	Year 8 Dec-15	Year 8 Jan-16	Year 8 Feb-16
Parameter												
TDS				24085	8219	2899	4239	1115				
TSS				277	130	57	91	24				
Free CN												
Total CN				0	0	0	0	0				
WAD CN												
CNO												
SCN												
Sulphate				657	308	97	131	34				
Chloride				8166	3821	1422	1784	469				
Total Ammonia-N				2	1	0	0	0				
Nitrate-N				1	1	0	0	0				
Nitrite-N				0	0	0	0	0				
Alkalinity				6043	2928	955	1022	269				
OrthoPhosphate-P				0	0	0	0	0				
Phosphate-P				2	1	0	0	0				
Org. Carbon				1291.85	544.52	161.08	199.86	52.54				
Hardness CaCO3				7226	3503	1305	1514	398				
Total Metals												
Aluminum Al				8.65	3.61	1.27	1.58	0.41				
Antimony Sb				0.00	0.00	0.00	0.00	0.00				
Arsenic As				0.06	0.03	0.01	0.01	0.00				
Barium Ba				0.45	0.21	0.10	0.09	0.02				
Beryllium Be				0.00	0.00	0.00	0.00	0.00				
Bismuth Bi				0.00	0.00	0.00	0.00	0.00				
Boron B				3.69	1.84	0.56	0.65	0.17				
Cadmium Cd				0.00	0.00	0.00	0.00	0.00				
Calcium Ca				1381	652	251	273	72				
Chromium Cr				0.06	0.02	0.01	0.01	0.00				
Cobalt Co				0.01	0.01	0.00	0.00	0.00				
Copper Cu				0.21	0.09	0.02	0.03	0.01				
Iron Fe				14.09	11.40	13.74	3.66	0.96				
Lead Pb				0.01	0.01	0.00	0.00	0.00				
Lithium Li				0.05	0.02	0.01	0.01	0.00				
Magnesium Mg				1081	507	190	198	52				
Manganese Mn				0.39	0.26	0.27	0.12	0.03				
Mercury Hg				0.13	0.06	0.02	0.02	0.01				
Molybdenum Mo				0.03	0.01	0.00	0.00	0.00				
Nickel Ni				0.12	0.06	0.02	0.02	0.00				
Phosphorus P				2	1	0	0	0				
Potassium K				398	163	55	84	22				
Selenium Se				0.11	0.05	0.02	0.02	0.01				
Silicon SiO2				12	6	2	2	1				
Silver Ag				0.00	0.00	0.00	0.00	0.00				
Sodium Na				4373	2083	735	903	237				
Strontium Sr				6	3	1	1	0				
Tellurium Te				0.00	0.00	0.00	0.00	0.00				
Thallium Tl				0.00	0.00	0.00	0.00	0.00				
Thorium Th				0.00	0.00	0.00	0.00	0.00				
Tin Sn				0.01	0.00	0.00	0.00	0.00				
Titanium Ti				0.29	0.13	0.04	0.05	0.01				
Uranium U				0.00	0.00	0.00	0.00	0.00				
Vanadium V				0.13	0.03	0.01	0.01	0.00				
Zinc Zn				1.2	0.2	0.1	0.1	0.0				
Zirconium Zr				1.10	0.51	0.16	0.20	0.05				

Loadings to Tail Lake (kg/month)												
Date	Year 9 Mar-16	Year 9 Apr-16	Year 9 May-16	Year 9 Jun-16	Year 9 Jul-16	Year 9 Aug-16	Year 9 Sep-16	Year 9 Oct-16	Year 9 Nov-16	Year 9 Dec-16	Year 9 Jan-17	Year 9 Feb-17
Parameter												
TDS				24085	8219	2899	4239	1115				
TSS				277	130	57	91	24				
Free CN												
Total CN				0	0	0	0	0				
WAD CN												
CNO												
SCN												
Sulphate				657	308	97	131	34				
Chloride				8166	3821	1422	1784	469				
Total Ammonia-N				2	1	0	0	0				
Nitrate-N				1	1	0	0	0				
Nitrite-N				0	0	0	0	0				
Alkalinity				6043	2928	955	1022	269				
OrthoPhosphate-P				0	0	0	0	0				
Phosphate-P				2	1	0	0	0				
Org. Carbon				1291.85	544.52	161.08	199.86	52.54				
Hardness CaCO3				7226	3503	1305	1514	398				
Total Metals												
Aluminum Al				8.65	3.61	1.27	1.58	0.41				
Antimony Sb				0.00	0.00	0.00	0.00	0.00				
Arsenic As				0.06	0.03	0.01	0.01	0.00				
Barium Ba				0.45	0.21	0.10	0.09	0.02				
Beryllium Be				0.00	0.00	0.00	0.00	0.00				
Bismuth Bi				0.00	0.00	0.00	0.00	0.00				
Boron B				3.69	1.84	0.56	0.65	0.17				
Cadmium Cd				0.00	0.00	0.00	0.00	0.00				
Calcium Ca				1381	652	251	273	72				
Chromium Cr				0.06	0.02	0.01	0.01	0.00				
Cobalt Co				0.01	0.01	0.00	0.00	0.00				
Copper Cu				0.21	0.09	0.02	0.03	0.01				
Iron Fe				14.09	11.40	13.74	3.66	0.96				
Lead Pb				0.01	0.01	0.00	0.00	0.00				
Lithium Li				0.05	0.02	0.01	0.01	0.00				
Magnesium Mg				1081	507	190	198	52				
Manganese Mn				0.39	0.26	0.27	0.12	0.03				
Mercury Hg				0.13	0.06	0.02	0.02	0.01				
Molybdenum Mo				0.03	0.01	0.00	0.00	0.00				
Nickel Ni				0.12	0.06	0.02	0.02	0.00				
Phosphorus P				2	1	0	0	0				
Potassium K				398	163	55	84	22				
Selenium Se				0.11	0.05	0.02	0.02	0.01				
Silicon SiO2				12	6	2	2	1				
Silver Ag				0.00	0.00	0.00	0.00	0.00				
Sodium Na				4373	2083	735	903	237				
Strontium Sr				6	3	1	1	0				
Tellurium Te				0.00	0.00	0.00	0.00	0.00				
Thallium Tl				0.00	0.00	0.00	0.00	0.00				
Thorium Th				0.00	0.00	0.00	0.00	0.00				
Tin Sn				0.01	0.00	0.00	0.00	0.00				
Titanium Ti				0.29	0.13	0.04	0.05	0.01				
Uranium U				0.00	0.00	0.00	0.00	0.00				
Vanadium V				0.13	0.03	0.01	0.01	0.00				
Zinc Zn				1.2	0.2	0.1	0.1	0.0				
Zirconium Zr				1.10	0.51	0.16	0.20	0.05				

Loadings to Tail Lake (kg/month)												
Date	Year 10 Mar-17	Year 10 Apr-17	Year 10 May-17	Year 10 Jun-17	Year 10 Jul-17	Year 10 Aug-17	Year 10 Sep-17	Year 10 Oct-17	Year 10 Nov-17	Year 10 Dec-17	Year 10 Jan-18	Year 10 Feb-18
Parameter												
TDS				11175	3813	1345	1967	517				
TSS				129	60	26	42	11				
Free CN												
Total CN				0	0	0	0	0				
WAD CN												
CNO												
SCN												
Sulphate				305	143	45	61	16				
Chloride				3789	1773	660	828	218				
Total Ammonia-N				1	0	0	0	0				
Nitrate-N				1	0	0	0	0				
Nitrite-N				0	0	0	0	0				
Alkalinity				2804	1359	443	474	125				
OrthoPhosphate-P				0	0	0	0	0				
Phosphate-P				1	0	0	0	0				
Org. Carbon				599.37	252.64	74.74	92.73	24.38				
Hardness CaCO3				3352	1625	605	702	185				
Total Metals												
Aluminum Al				4.01	1.67	0.59	0.73	0.19				
Antimony Sb				0.00	0.00	0.00	0.00	0.00				
Arsenic As				0.03	0.01	0.01	0.00	0.00				
Barium Ba				0.21	0.10	0.05	0.04	0.01				
Beryllium Be				0.00	0.00	0.00	0.00	0.00				
Bismuth Bi				0.00	0.00	0.00	0.00	0.00				
Boron B				1.71	0.85	0.26	0.30	0.08				
Cadmium Cd				0.00	0.00	0.00	0.00	0.00				
Calcium Ca				641	302	117	127	33				
Chromium Cr				0.03	0.01	0.00	0.01	0.00				
Cobalt Co				0.00	0.00	0.00	0.00	0.00				
Copper Cu				0.10	0.04	0.01	0.01	0.00				
Iron Fe				6.54	5.29	6.37	1.70	0.45				
Lead Pb				0.00	0.00	0.00	0.00	0.00				
Lithium Li				0.02	0.01	0.00	0.00	0.00				
Magnesium Mg				501	235	88	92	24				
Manganese Mn				0.18	0.12	0.12	0.05	0.01				
Mercury Hg				0.06	0.03	0.01	0.01	0.00				
Molybdenum Mo				0.01	0.00	0.00	0.00	0.00				
Nickel Ni				0.06	0.03	0.01	0.01	0.00				
Phosphorus P				1	0	0	0	0				
Potassium K				185	76	26	39	10				
Selenium Se				0.05	0.02	0.01	0.01	0.00				
Silicon SiO2				6	3	1	1	0				
Silver Ag				0.00	0.00	0.00	0.00	0.00				
Sodium Na				2029	966	341	419	110				
Strontium Sr				3	1	1	1	0				
Tellurium Te				0.00	0.00	0.00	0.00	0.00				
Thallium Tl				0.00	0.00	0.00	0.00	0.00				
Thorium Th				0.00	0.00	0.00	0.00	0.00				
Tin Sn				0.00	0.00	0.00	0.00	0.00				
Titanium Ti				0.13	0.06	0.02	0.02	0.01				
Uranium U				0.00	0.00	0.00	0.00	0.00				
Vanadium V				0.06	0.01	0.00	0.00	0.00				
Zinc Zn				0.6	0.1	0.0	0.0	0.0				
Zirconium Zr				0.51	0.24	0.07	0.09	0.02				



OUTPUT SUMMARY							Increase in Above Background %	Fraction of CCME in Doris Creek (%)
Max Annual Discharge rate		826,421 m³/year in	Year 2	Maximum in Doris Creek				
Degradation Field(age)		Tail Lk Cu < CME Year	12					
Maximum Concentration		MMER	CCME	Tail Lake Year 3	Upstream	Downstream Year 3		
pH			6 to 9	7 to 8	7.6	7 to 8		
TDS	mg/L			1601	145	251	73%	
TSS	mg/L	15		2.1	4.0	3.9		
Free CN	mg/L		0.005	0.0005		0.00005		1%
Total CN	mg/L	1.0		0.008	0.001	0.002		
WAD CN	mg/L			0.0007		0.0001		
CNO	mg/L			1.2		0.10		
SCN	mg/L			0.083		0.007		
Sulphate	mg/L			74	4	9.1		
Chloride	mg/L			1443	63	169		
Total Ammonia-N	mg/L		1.27	0.47	0.02	0.061	309%	5%
Nitrate-N	mg/L		2.9	8.8	0.006	0.88	14562%	30%
Nitrite-N	mg/L		0.018	0.30	0.0020	0.032	1476%	173%
Alkalinity	mg/L			54	28	30		
OrthoPhosphate-P	mg/L			0.2921	0.0008	0.0211		
Phosphate-P	mg/L			0.2965	0.0325	0.0486		
Org. Carbon	mg/L			5.9	5.1	5.1		
Hardness CaCO3	mg/L			97	45	49		
Total Metals								
Aluminum Al	mg/L		0.1	0.059	0.08	0.0778	2%	78%
Antimony Sb	mg/L			0.0260	0.0000	0.0020		
Arsenic As	mg/L	0.5	0.005	0.0027	0.00047	0.0007		15%
Barium Ba	mg/L			0.0080	0.0033	0.0037		
Beryllium Be	mg/L			0.00096	0.00001	0.00010		
Bismuth Bi	mg/L			0.02582	0.00001	0.00195		
Boron B	mg/L			0.040	0.023	0.025		
Cadmium Cd	mg/L		0.000017	0.00007	0.000002	0.000013	495%	75%
Calcium Ca	mg/L			316	7	34		
Chromium Cr	mg/L		0.001	0.0037	0.0003	0.001	90%	59%
Cobalt Co	mg/L			0.0047	0.0001	0.0005		
Copper Cu	mg/L	0.3	0.002	0.007	0.0014	0.0019	34%	96%
Iron Fe	mg/L		0.3	0.12	0.11	0.11	0%	38%
Lead Pb	mg/L	0.2	0.001	0.00060	0.00012	0.00017		17%
Lithium Li	mg/L			0.0036		0.0003		
Magnesium Mg	mg/L			10.4	6.4	6.7		
Manganese Mn	mg/L			0.018	0.016	0.016		
Mercury Hg	ug/L		0.026	0.0055824	0.0006	0.0010365		4%
Molybdenum Mo	mg/L		0.073	0.0071	0.0001	0.00073		1%
Nickel Ni	mg/L	0.5	0.025	0.010	0.001	0.0013		5%
Phosphorus P	mg/L			0.392		0.031		
Potassium K	mg/L			19	2	3.7		
Selenium Se	mg/L		0.001	0.00074	0.0011	0.0011	1%	113%
Silicon SiO2	mg/L			4.6		0.45		
Silver Ag	mg/L		0.0001	0.00010	0.00000	0.0000153	994%	15%
Sodium Na	mg/L			359	33	54		
Strontium Sr	mg/L			0.073	0.040	0.043		
Tellurium Te	mg/L			0.000		0.000		
Thallium Tl	mg/L		0.0008	0.000038	0.000022	0.000025	14%	3%
Thorium Th	mg/L			0.000164		0.0000236		
Tin Sn	mg/L			0.00417	0.00012	0.00040		
Titanium Ti	mg/L			0.0016		0.0001		
Uranium U	mg/L			0.000220	0.000036	0.000061		
Vanadium V	mg/L			0.0046	0.0006	0.0009		
Zinc Zn	mg/L	0.5	0.03	0.015	0.003	0.0038	35%	13%
Zirconium Zr	mg/L			0.0074	0.0050	0.0054		

Water Quality in DORIS CREEK (d/s of the waterfall)													
Date		Year 1	Year 1	Year 1	Year 1	Year 1	Year 1	Year 1	Year 1	Year 1	Year 1	Year 1	Year 1
		Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09
Parameter													
TDS	mg/L				144	135	125	145	148				
TSS	mg/L				2.8	3.8	3.0	3.0	3.0				
Free CN	mg/L				0.00002	0.00000			0.00000				
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L				0.0000	0.0000			0.0000				
CNO	mg/L				0.04	0.01			0.00				
SCN	mg/L				0.001	0.001			0.000				
Sulphate	mg/L				4.3	3.9	3.1	3.1	3.5				
Chloride	mg/L				66	72	62	63	68				
Total Ammonia-N	mg/L				0.033	0.043	0.024	0.020	0.021				
Nitrate-N	mg/L				0.15	0.19	0.10	0.10	0.15				
Nitrite-N	mg/L				0.013	0.018	0.003	0.003	0.004				
Alkalinity	mg/L				26	27	27	28	28				
OrthoPhosphate-P	mg/L				0.0032	0.0032	0.0008	0.0008	0.0018				
Phosphate-P	mg/L				0.0204	0.0224	0.0325	0.0270	0.0277				
Org. Carbon	mg/L				5.0	5.0	5.1	5.0	5.0				
Hardness CaCO3	mg/L				38	41	44	45	45				
Total Metals													
Aluminum Al	mg/L				0.07	0.06	0.06	0.05	0.05				
Antimony Sb	mg/L				0.0002	0.0003	0.0000	0.0000	0.0001				
Arsenic As	mg/L				0.0004	0.0005	0.0005	0.0005	0.0005				
Barium Ba	mg/L				0.0032	0.0031	0.0030	0.0030	0.0030				
Beryllium Be	mg/L				0.00002	0.00002	0.00001	0.00001	0.00002				
Bismuth Bi	mg/L				0.00015	0.00026	0.00001	0.00001	0.00013				
Boron B	mg/L				0.019	0.022	0.023	0.023	0.023				
Cadmium Cd	mg/L				0.0000055	0.0000056	0.0000049	0.0000049	0.0000053				
Calcium Ca	mg/L				11	11	8	7	9				
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0001	0.0001	0.0001	0.0001	0.0001				
Copper Cu	mg/L				0.0013	0.0015	0.0014	0.0014	0.0014				
Iron Fe	mg/L				0.11	0.11	0.09	0.09	0.09				
Lead Pb	mg/L				0.00006	0.00007	0.00013	0.00005	0.00005				
Lithium Li	mg/L				0.0000	0.0001	0.0000	0.0000	0.0000				
Magnesium Mg	mg/L				5.3	5.9	6.4	6.4	6.4				
Manganese Mn	mg/L				0.011	0.014	0.016	0.010	0.010				
Mercury Hg	ug/L				0.0006655	0.0006647	0.0006002	0.0006002	0.0006299				
Molybdenum Mo	mg/L				0.00021	0.00023	0.00015	0.00014	0.00018				
Nickel Ni	mg/L				0.0006	0.0007	0.0005	0.0005	0.0005				
Phosphorus P	mg/L				0.005	0.006	0.002	0.002	0.003				
Potassium K	mg/L				2.3	2.5	2.3	2.3	2.4				
Selenium Se	mg/L				0.00075	0.00081	0.00085	0.00113	0.00112				
Silicon SiO2	mg/L				0.08	0.09	0.03	0.03	0.05				
Silver Ag	mg/L				0.0000055	0.0000057	0.0000046	0.0000045	0.0000050				
Sodium Na	mg/L				26	30	33	32	32				
Strontium Sr	mg/L				0.035	0.038	0.039	0.040	0.040				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000018	0.000022	0.000012	0.000004	0.000004				
Thorium Th	mg/L				0.000007	0.000008	0.000006	0.000006	0.000007				
Tin Sn	mg/L				0.00006	0.00017	0.00005	0.00005	0.00006				
Titanium Ti	mg/L				0.0000	0.0000	0.0000	0.0000	0.0000				
Uranium U	mg/L				0.000035	0.000038	0.000042	0.000037	0.000038				
Vanadium V	mg/L				0.0006	0.0002	0.0002	0.0001	0.0002				
Zinc Zn	mg/L				0.0019	0.0020	0.0029	0.0018	0.0019				
Zirconium Zr	mg/L				0.0051	0.0051	0.0051	0.0051	0.0051				

Water Quality in DORIS CREEK (d/s of the waterfall)													
Date		Year 2	Year 2	Year 2	Year 2	Year 2	Year 2	Year 2	Year 2	Year 2	Year 2	Year 2	Year 2
		Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10
Parameter													
TDS	mg/L				169	155	143	145	182				
TSS	mg/L				2.9	3.8	2.9	3.0	2.9				
Free CN	mg/L				0.00005		0.00000	0.00000	0.00001				
Total CN	mg/L				0.002	0.001	0.001	0.001	0.001				
WAD CN	mg/L				0.0001		0.0000	0.0000	0.0000				
CNO	mg/L				0.10		0.01	0.00	0.02				
SCN	mg/L				0.005	0.005	0.003	0.000	0.006				
Sulphate	mg/L				7.3	6.4	5.5	3.1	8.0				
Chloride	mg/L				114	111	97	63	135				
Total Ammonia-N	mg/L				0.055	0.055	0.020	0.014	0.026				
Nitrate-N	mg/L				0.47	0.46	0.35	0.05	0.69				
Nitrite-N	mg/L				0.029	0.017	0.014	0.002	0.008				
Alkalinity	mg/L				27	28	28	28	30				
OrthoPhosphate-P	mg/L				0.0119	0.0104	0.0076	0.0008	0.0145				
Phosphate-P	mg/L				0.0290	0.0292	0.0377	0.0271	0.0388				
Org. Carbon	mg/L				5.0	4.9	5.0	5.0	5.0				
Hardness CaCO3	mg/L				41	44	45	45	49				
Total Metals													
Aluminum Al	mg/L				0.07	0.06	0.06	0.05	0.05				
Antimony Sb	mg/L				0.0010	0.0009	0.0007	0.0000	0.0014				
Arsenic As	mg/L				0.0005	0.0005	0.0006	0.0004	0.0006				
Barium Ba	mg/L				0.0035	0.0033	0.0031	0.0030	0.0034				
Beryllium Be	mg/L				0.00005	0.00005	0.00004	0.00001	0.00007				
Bismuth Bi	mg/L				0.00093	0.00092	0.00068	0.00001	0.00137				
Boron B	mg/L				0.020	0.022	0.023	0.023	0.024				
Cadmium Cd	mg/L				0.0000073	0.0000069	0.0000060	0.0000034	0.0000087				
Calcium Ca	mg/L				26	24	19	8	31				
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0003	0.0003	0.0002	0.0001	0.0004				
Copper Cu	mg/L				0.0016	0.0017	0.0016	0.0014	0.0019				
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09				
Lead Pb	mg/L				0.00008	0.00008	0.00014	0.00004	0.00008				
Lithium Li	mg/L				0.0002	0.0002	0.0001	0.0000	0.0003				
Magnesium Mg	mg/L				5.5	6.0	6.4	6.4	6.6				
Manganese Mn	mg/L				0.011	0.015	0.016	0.010	0.011				
Mercury Hg	ug/L				0.0009152	0.0008676	0.0007905	0.0006019	0.0009935				
Molybdenum Mo	mg/L				0.00055	0.00052	0.00041	0.00014	0.00068				
Nickel Ni	mg/L				0.0010	0.0010	0.0008	0.0005	0.0012				
Phosphorus P	mg/L				0.017	0.015	0.011	0.001	0.022				
Potassium K	mg/L				3.1	3.1	2.9	2.3	3.6				
Selenium Se	mg/L				0.00076	0.00080	0.00083	0.00113	0.00109				
Silicon SiO2	mg/L				0.30	0.26	0.19	0.01	0.37				
Silver Ag	mg/L				0.0000073	0.0000069	0.0000056	0.0000025	0.0000089				
Sodium Na	mg/L				27	30	33	32	33				
Strontium Sr	mg/L				0.037	0.040	0.040	0.040	0.043				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000019	0.000022	0.000012	0.000004	0.000006				
Thorium Th	mg/L				0.000012	0.000011	0.000009	0.000003	0.000015				
Tin Sn	mg/L				0.00019	0.00027	0.00015	0.00004	0.00026				
Titanium Ti	mg/L				0.0001	0.0001	0.0001	0.0000	0.0001				
Uranium U	mg/L				0.000042	0.000043	0.000045	0.000034	0.000048				
Vanadium V	mg/L				0.0007	0.0003	0.0003	0.0001	0.0004				
Zinc Zn	mg/L				0.0022	0.0023	0.0033	0.0017	0.0027				
Zirconium Zr	mg/L				0.0052	0.0051	0.0051	0.0051	0.0053				

Water Quality in DORIS CREEK (d/s of the waterfall)													
Date		Year 3 Mar-10	Year 3 Apr-10	Year 3 May-10	Year 3 Jun-10	Year 3 Jul-10	Year 3 Aug-10	Year 3 Sep-10	Year 3 Oct-10	Year 3 Nov-10	Year 3 Dec-10	Year 3 Jan-11	Year 3 Feb-11
Parameter													
TDS	mg/L				187	177	174	196	198				
TSS	mg/L				2.9	3.8	2.9	2.9	2.9				
Free CN	mg/L				0.00003								
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L				0.0000								
CNO	mg/L				0.07								
SCN	mg/L				0.007	0.007	0.007	0.007	0.007				
Sulphate	mg/L				9.1	8.5	8.7	8.8	8.9				
Chloride	mg/L				144	145	149	153	154				
Total Ammonia-N	mg/L				0.061	0.061	0.034	0.029	0.030				
Nitrate-N	mg/L				0.79	0.80	0.83	0.87	0.88				
Nitrite-N	mg/L				0.032	0.024	0.024	0.008	0.008				
Alkalinity	mg/L				28	29	29	30	30				
OrthoPhosphate-P	mg/L				0.0188	0.0184	0.0193	0.0205	0.0211				
Phosphate-P	mg/L				0.0358	0.0372	0.0486	0.0448	0.0456				
Org. Carbon	mg/L				4.9	4.9	5.0	5.0	5.0				
Hardness CaCO3	mg/L				43	46	48	49	49				
Total Metals													
Aluminum Al	mg/L				0.08	0.06	0.06	0.05	0.05				
Antimony Sb	mg/L				0.0016	0.0017	0.0018	0.0019	0.0020				
Arsenic As	mg/L				0.0006	0.0007	0.0007	0.0007	0.0007				
Barium Ba	mg/L				0.0037	0.0035	0.0034	0.0034	0.0034				
Beryllium Be	mg/L				0.00009	0.00009	0.00009	0.00010	0.00010				
Bismuth Bi	mg/L				0.00155	0.00163	0.00177	0.00188	0.00195				
Boron B	mg/L				0.021	0.023	0.025	0.025	0.025				
Cadmium Cd	mg/L				0.0000128	0.0000124	0.0000126	0.0000128	0.0000128				
Calcium Ca	mg/L				34	33	33	33	33				
Chromium Cr	mg/L				0.001	0.001	0.001	0.000	0.000				
Cobalt Co	mg/L				0.0005	0.0004	0.0004	0.0005	0.0005				
Copper Cu	mg/L				0.0018	0.0019	0.0019	0.0019	0.0019				
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09				
Lead Pb	mg/L				0.00011	0.00011	0.00017	0.00010	0.00010				
Lithium Li	mg/L				0.0003	0.0003	0.0003	0.0003	0.0003				
Magnesium Mg	mg/L				5.6	6.2	6.7	6.7	6.7				
Manganese Mn	mg/L				0.012	0.015	0.016	0.011	0.011				
Mercury Hg	ug/L				0.0010365	0.0010050	0.0010077	0.0010153	0.0010116				
Molybdenum Mo	mg/L				0.00073	0.00071	0.00072	0.00072	0.00071				
Nickel Ni	mg/L				0.0013	0.0013	0.0013	0.0013	0.0013				
Phosphorus P	mg/L				0.029	0.028	0.029	0.031	0.031				
Potassium K	mg/L				3.5	3.6	3.6	3.7	3.7				
Selenium Se	mg/L				0.00078	0.00083	0.00084	0.00110	0.00111				
Silicon SiO2	mg/L				0.45	0.42	0.43	0.43	0.43				
Silver Ag	mg/L				0.0000148	0.0000146	0.0000148	0.0000151	0.0000153				
Sodium Na	mg/L				28	31	33	33	33				
Strontium Sr	mg/L				0.038	0.041	0.042	0.043	0.043				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000021	0.000025	0.000015	0.000008	0.000008				
Thorium Th	mg/L				0.000023	0.000023	0.000023	0.000024	0.000024				
Tin Sn	mg/L				0.00030	0.00040	0.00034	0.00035	0.00037				
Titanium Ti	mg/L				0.0001	0.0001	0.0001	0.0001	0.0001				
Uranium U	mg/L				0.000054	0.000056	0.000061	0.000057	0.000057				
Vanadium V	mg/L				0.0009	0.0005	0.0005	0.0005	0.0005				
Zinc Zn	mg/L				0.0025	0.0026	0.0038	0.0028	0.0029				
Zirconium Zr	mg/L				0.0054	0.0053	0.0053	0.0054	0.0054				

Water Quality in DORIS CREEK (d/s of the waterfall)													
Date		Year 4 Mar-11	Year 4 Apr-11	Year 4 May-11	Year 4 Jun-11	Year 4 Jul-11	Year 4 Aug-11	Year 4 Sep-11	Year 4 Oct-11	Year 4 Nov-11	Year 4 Dec-11	Year 4 Jan-12	Year 4 Feb-12
Parameter													
TDS	mg/L				173	175	145	145	197				
TSS	mg/L				3.0	3.9	3.0	3.0	2.9				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.004	0.005	0.002		0.006				
Sulphate	mg/L				6.6	7.3	5.0	3.0	8.0				
Chloride	mg/L				109	133	94	63	146				
Total Ammonia-N	mg/L				0.016	0.021	0.018	0.013	0.013				
Nitrate-N	mg/L				0.39	0.55	0.28	0.05	0.65				
Nitrite-N	mg/L				0.009	0.003	0.002	0.002	0.002				
Alkalinity	mg/L				27	28	28	28	30				
OrthoPhosphate-P	mg/L				0.0136	0.0183	0.0087	0.0008	0.0211				
Phosphate-P	mg/L				0.0312	0.0374	0.0395	0.0270	0.0456				
Org. Carbon	mg/L				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3	mg/L				40	44	45	45	49				
Total Metals													
Aluminum Al	mg/L				0.08	0.06	0.06	0.05	0.05				
Antimony Sb	mg/L				0.0012	0.0016	0.0007	0.0000	0.0018				
Arsenic As	mg/L				0.0005	0.0006	0.0006	0.0004	0.0006				
Barium Ba	mg/L				0.0035	0.0034	0.0031	0.0030	0.0033				
Beryllium Be	mg/L				0.00005	0.00007	0.00003	0.00001	0.00008				
Bismuth Bi	mg/L				0.00115	0.00157	0.00071	0.00001	0.00181				
Boron B	mg/L				0.020	0.023	0.023	0.023	0.024				
Cadmium Cd	mg/L				0.0000065	0.0000076	0.0000053	0.0000033	0.0000085				
Calcium Ca	mg/L				20	25	16	7	28				
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0003	0.0003	0.0002	0.0001	0.0004				
Copper Cu	mg/L				0.0015	0.0018	0.0016	0.0014	0.0018				
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09				
Lead Pb	mg/L				0.00008	0.00009	0.00014	0.00004	0.00008				
Lithium Li	mg/L				0.0002	0.0002	0.0001	0.0000	0.0003				
Magnesium Mg	mg/L				5.5	6.2	6.5	6.4	6.7				
Manganese Mn	mg/L				0.012	0.015	0.016	0.010	0.011				
Mercury Hg	ug/L				0.0008120	0.0008886	0.0007300	0.0006001	0.0009387				
Molybdenum Mo	mg/L				0.00041	0.00055	0.00033	0.00014	0.00061				
Nickel Ni	mg/L				0.0009	0.0011	0.0007	0.0005	0.0011				
Phosphorus P	mg/L				0.018	0.024	0.012	0.001	0.028				
Potassium K	mg/L				2.8	3.2	2.7	2.3	3.5				
Selenium Se	mg/L				0.00077	0.00082	0.00084	0.00113	0.00109				
Silicon SiO2	mg/L				0.21	0.28	0.14	0.01	0.33				
Silver Ag	mg/L				0.0000075	0.0000089	0.0000053	0.0000025	0.0000099				
Sodium Na	mg/L				27	31	33	32	33				
Strontium Sr	mg/L				0.037	0.041	0.040	0.040	0.042				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000019	0.000023	0.000012	0.000004	0.000006				
Thorium Th	mg/L				0.000010	0.000012	0.000007	0.000003	0.000015				
Tin Sn	mg/L				0.00022	0.00037	0.00015	0.00004	0.00033				
Titanium Ti	mg/L				0.0001	0.0001	0.0000	0.0000	0.0001				
Uranium U	mg/L				0.000039	0.000045	0.000044	0.000034	0.000048				
Vanadium V	mg/L				0.0008	0.0004	0.0003	0.0001	0.0004				
Zinc Zn	mg/L				0.0020	0.0024	0.0032	0.0017	0.0027				
Zirconium Zr	mg/L				0.0051	0.0052	0.0051	0.0051	0.0052				

Water Quality in DORIS CREEK (d/s of the waterfall)													
Date		Year 5 Mar-12	Year 5 Apr-12	Year 5 May-12	Year 5 Jun-12	Year 5 Jul-12	Year 5 Aug-12	Year 5 Sep-12	Year 5 Oct-12	Year 5 Nov-12	Year 5 Dec-12	Year 5 Jan-13	Year 5 Feb-13
Parameter													
TDS	mg/L				153	183	153	145	251				
TSS	mg/L				3.0	3.9	3.0	3.0	2.9				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.001	0.004	0.002		0.005				
Sulphate	mg/L				4.8	6.7	4.6	3.0	7.1				
Chloride	mg/L				78	132	95	63	169				
Total Ammonia-N	mg/L				0.013	0.021	0.018	0.013	0.013				
Nitrate-N	mg/L				0.19	0.47	0.23	0.05	0.53				
Nitrite-N	mg/L				0.002	0.003	0.002	0.002	0.002				
Alkalinity	mg/L				26	28	28	28	29				
OrthoPhosphate-P	mg/L				0.0060	0.0159	0.0072	0.0008	0.0172				
Phosphate-P	mg/L				0.0239	0.0351	0.0380	0.0270	0.0417				
Org. Carbon	mg/L				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3	mg/L				38	44	45	45	48				
Total Metals													
Aluminum Al	mg/L				0.08	0.06	0.06	0.05	0.05				
Antimony Sb	mg/L				0.0005	0.0014	0.0006	0.0000	0.0015				
Arsenic As	mg/L				0.0004	0.0005	0.0005	0.0004	0.0006				
Barium Ba	mg/L				0.0034	0.0034	0.0031	0.0030	0.0033				
Beryllium Be	mg/L				0.00003	0.00006	0.00003	0.00001	0.00007				
Bismuth Bi	mg/L				0.00047	0.00136	0.00058	0.00001	0.00146				
Boron B	mg/L				0.020	0.023	0.023	0.023	0.024				
Cadmium Cd	mg/L				0.0000048	0.0000074	0.0000051	0.0000033	0.0000080				
Calcium Ca	mg/L				12	24	15	7	28				
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0001	0.0003	0.0002	0.0001	0.0003				
Copper Cu	mg/L				0.0014	0.0017	0.0015	0.0014	0.0017				
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09				
Lead Pb	mg/L				0.00006	0.00009	0.00013	0.00004	0.00008				
Lithium Li	mg/L				0.0001	0.0002	0.0001	0.0000	0.0002				
Magnesium Mg	mg/L				5.4	6.1	6.4	6.4	6.6				
Manganese Mn	mg/L				0.012	0.015	0.016	0.010	0.010				
Mercury Hg	ug/L				0.0006861	0.0008522	0.0007046	0.0006001	0.0008743				
Molybdenum Mo	mg/L				0.00024	0.00049	0.00030	0.00014	0.00052				
Nickel Ni	mg/L				0.0006	0.0010	0.0007	0.0005	0.0010				
Phosphorus P	mg/L				0.008	0.022	0.010	0.001	0.024				
Potassium K	mg/L				2.4	3.1	2.6	2.3	3.2				
Selenium Se	mg/L				0.00078	0.00082	0.00084	0.00113	0.00109				
Silicon SiO2	mg/L				0.09	0.25	0.11	0.01	0.27				
Silver Ag	mg/L				0.0000051	0.0000086	0.0000050	0.0000025	0.0000091				
Sodium Na	mg/L				27	35	37	32	54				
Strontium Sr	mg/L				0.036	0.040	0.040	0.040	0.042				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000018	0.000023	0.000012	0.000004	0.000006				
Thorium Th	mg/L				0.000006	0.000012	0.000007	0.000003	0.000013				
Tin Sn	mg/L				0.00011	0.00034	0.00013	0.00004	0.00028				
Titanium Ti	mg/L				0.0000	0.0001	0.0000	0.0000	0.0001				
Uranium U	mg/L				0.000035	0.000044	0.000043	0.000034	0.000046				
Vanadium V	mg/L				0.0007	0.0004	0.0003	0.0001	0.0004				
Zinc Zn	mg/L				0.0017	0.0023	0.0031	0.0017	0.0025				
Zirconium Zr	mg/L				0.0051	0.0052	0.0051	0.0051	0.0052				

Water Quality in DORIS CREEK (d/s of the waterfall)													
Date		Year 6 Mar-13	Year 6 Apr-13	Year 6 May-13	Year 6 Jun-13	Year 6 Jul-13	Year 6 Aug-13	Year 6 Sep-13	Year 6 Oct-13	Year 6 Nov-13	Year 6 Dec-13	Year 6 Jan-14	Year 6 Feb-14
Parameter													
TDS	mg/L				172	223	164	145	244				
TSS	mg/L				3.0	3.8	3.0	3.0	2.9				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.001	0.003	0.001		0.004				
Sulphate	mg/L				4.5	6.0	4.3	3.0	6.3				
Chloride	mg/L				87	149	99	63	157				
Total Ammonia-N	mg/L				0.008	0.016	0.013	0.008	0.008				
Nitrate-N	mg/L				0.12	0.34	0.15	0.01	0.40				
Nitrite-N	mg/L				0.001	0.002	0.001	0.001	0.001				
Alkalinity	mg/L				26	28	28	28	29				
OrthoPhosphate-P	mg/L				0.0050	0.0130	0.0059	0.0008	0.0141				
Phosphate-P	mg/L				0.0229	0.0322	0.0368	0.0270	0.0386				
Org. Carbon	mg/L				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3	mg/L				38	43	44	45	47				
Total Metals													
Aluminum Al	mg/L				0.08	0.06	0.06	0.05	0.05				
Antimony Sb	mg/L				0.0004	0.0011	0.0005	0.0000	0.0012				
Arsenic As	mg/L				0.0004	0.0005	0.0005	0.0004	0.0005				
Barium Ba	mg/L				0.0033	0.0033	0.0030	0.0030	0.0032				
Beryllium Be	mg/L				0.00002	0.00005	0.00002	0.00000	0.00005				
Bismuth Bi	mg/L				0.00038	0.00110	0.00046	0.00000	0.00118				
Boron B	mg/L				0.019	0.022	0.023	0.022	0.023				
Cadmium Cd	mg/L				0.0000034	0.0000058	0.0000036	0.0000020	0.0000063				
Calcium Ca	mg/L				12	24	14	7	25				
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0001	0.0002	0.0001	0.0001	0.0003				
Copper Cu	mg/L				0.0013	0.0017	0.0015	0.0014	0.0017				
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09				
Lead Pb	mg/L				0.00006	0.00008	0.00013	0.00004	0.00007				
Lithium Li	mg/L				0.0001	0.0002	0.0001		0.0002				
Magnesium Mg	mg/L				5.3	6.1	6.4	6.4	6.5				
Manganese Mn	mg/L				0.011	0.015	0.016	0.010	0.010				
Mercury Hg	ug/L				0.0006695	0.0008041	0.0006842	0.0006000	0.0008222				
Molybdenum Mo	mg/L				0.00021	0.00043	0.00027	0.00014	0.00045				
Nickel Ni	mg/L				0.0006	0.0009	0.0006	0.0004	0.0009				
Phosphorus P	mg/L				0.006	0.017	0.007		0.019				
Potassium K	mg/L				2.3	2.9	2.5	2.3	3.1				
Selenium Se	mg/L				0.00077	0.00081	0.00083	0.00112	0.00109				
Silicon SiO2	mg/L				0.07	0.20	0.08		0.22				
Silver Ag	mg/L				0.0000031	0.0000063	0.0000030	0.0000007	0.0000068				
Sodium Na	mg/L				34	51	41	32	54				
Strontium Sr	mg/L				0.036	0.040	0.039	0.040	0.041				
Tellurium Te	mg/L				0.000	0.000	0.000		0.000				
Thallium Tl	mg/L				0.000018	0.000022	0.000011	0.000003	0.000005				
Thorium Th	mg/L				0.000003	0.000009	0.000004		0.000010				
Tin Sn	mg/L				0.00009	0.00029	0.00011	0.00003	0.00023				
Titanium Ti	mg/L				0.0000	0.0001	0.0000		0.0001				
Uranium U	mg/L				0.000032	0.000041	0.000040	0.000032	0.000042				
Vanadium V	mg/L				0.0006	0.0003	0.0002	0.0001	0.0003				
Zinc Zn	mg/L				0.0016	0.0022	0.0031	0.0017	0.0024				
Zirconium Zr	mg/L				0.0050	0.0051	0.0050	0.0050	0.0052				

Water Quality in DORIS CREEK (d/s of the waterfall)													
Date		Year 7 Mar-14	Year 7 Apr-14	Year 7 May-14	Year 7 Jun-14	Year 7 Jul-14	Year 7 Aug-14	Year 7 Sep-14	Year 7 Oct-14	Year 7 Nov-14	Year 7 Dec-14	Year 7 Jan-15	Year 7 Feb-15
Parameter													
TDS	mg/L				165	205	156	145	225				
TSS	mg/L				3.0	3.8	3.0	3.0	2.9				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.001	0.003	0.001		0.003				
Sulphate	mg/L				4.3	5.4	4.0	3.0	5.6				
Chloride	mg/L				81	132	92	63	139				
Total Ammonia-N	mg/L				0.008	0.014	0.012	0.008	0.007				
Nitrate-N	mg/L				0.09	0.25	0.11	0.01	0.27				
Nitrite-N	mg/L				0.001	0.002	0.001	0.001	0.001				
Alkalinity	mg/L				26	28	28	28	29				
OrthoPhosphate-P	mg/L				0.0042	0.0107	0.0049	0.0008	0.0115				
Phosphate-P	mg/L				0.0221	0.0299	0.0358	0.0270	0.0361				
Org. Carbon	mg/L				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3	mg/L				38	43	44	45	47				
Total Metals													
Aluminum Al	mg/L				0.08	0.06	0.06	0.05	0.05				
Antimony Sb	mg/L				0.0003	0.0009	0.0004	0.0000	0.0010				
Arsenic As	mg/L				0.0004	0.0005	0.0005	0.0004	0.0005				
Barium Ba	mg/L				0.0033	0.0033	0.0030	0.0030	0.0031				
Beryllium Be	mg/L				0.00002	0.00004	0.00002	0.00000	0.00004				
Bismuth Bi	mg/L				0.00030	0.00089	0.00037	0.00000	0.00095				
Boron B	mg/L				0.019	0.022	0.023	0.022	0.023				
Cadmium Cd	mg/L				0.0000033	0.0000053	0.0000034	0.0000020	0.0000056				
Calcium Ca	mg/L				11	20	13	7	22				
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0001	0.0002	0.0001	0.0001	0.0002				
Copper Cu	mg/L				0.0013	0.0016	0.0015	0.0014	0.0016				
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09				
Lead Pb	mg/L				0.00005	0.00008	0.00012	0.00004	0.00006				
Lithium Li	mg/L				0.0000	0.0001	0.0001		0.0001				
Magnesium Mg	mg/L				5.3	6.0	6.4	6.4	6.5				
Manganese Mn	mg/L				0.011	0.015	0.016	0.010	0.010				
Mercury Hg	ug/L				0.0006561	0.0007653	0.0006678	0.0006000	0.0007802				
Molybdenum Mo	mg/L				0.00019	0.00037	0.00024	0.00014	0.00039				
Nickel Ni	mg/L				0.0005	0.0009	0.0006	0.0004	0.0008				
Phosphorus P	mg/L				0.005	0.014	0.006		0.015				
Potassium K	mg/L				2.3	2.8	2.5	2.3	2.9				
Selenium Se	mg/L				0.00077	0.00081	0.00083	0.00112	0.00109				
Silicon SiO2	mg/L				0.06	0.16	0.07		0.18				
Silver Ag	mg/L				0.0000030	0.0000056	0.0000027	0.0000007	0.0000057				
Sodium Na	mg/L				32	47	39	32	50				
Strontium Sr	mg/L				0.035	0.040	0.039	0.040	0.041				
Tellurium Te	mg/L				0.000	0.000	0.000		0.000				
Thallium Tl	mg/L				0.000018	0.000022	0.000011	0.000003	0.000005				
Thorium Th	mg/L				0.000003	0.000007	0.000003		0.000008				
Tin Sn	mg/L				0.00008	0.00026	0.00010	0.00003	0.00019				
Titanium Ti	mg/L				0.0000	0.0001	0.0000		0.0001				
Uranium U	mg/L				0.000031	0.000039	0.000039	0.000032	0.000040				
Vanadium V	mg/L				0.0006	0.0003	0.0002	0.0001	0.0003				
Zinc Zn	mg/L				0.0016	0.0021	0.0030	0.0017	0.0023				
Zirconium Zr	mg/L				0.0050	0.0051	0.0050	0.0050	0.0051				

Water Quality in DORIS CREEK (d/s of the waterfall)													
Date		Year 8 Mar-15	Year 8 Apr-15	Year 8 May-15	Year 8 Jun-15	Year 8 Jul-15	Year 8 Aug-15	Year 8 Sep-15	Year 8 Oct-15	Year 8 Nov-15	Year 8 Dec-15	Year 8 Jan-16	Year 8 Feb-16
Parameter													
TDS	mg/L				160	190	150	145	209				
TSS	mg/L				3.0	3.8	2.9	3.0	2.9				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.001	0.002	0.001		0.002				
Sulphate	mg/L				4.2	5.0	3.8	3.0	5.1				
Chloride	mg/L				76	118	86	63	124				
Total Ammonia-N	mg/L				0.008	0.014	0.012	0.008	0.007				
Nitrate-N	mg/L				0.06	0.16	0.07	0.01	0.17				
Nitrite-N	mg/L				0.001	0.002	0.001	0.001	0.001				
Alkalinity	mg/L				26	28	27	28	29				
OrthoPhosphate-P	mg/L				0.0035	0.0088	0.0041	0.0008	0.0095				
Phosphate-P	mg/L				0.0215	0.0280	0.0350	0.0270	0.0341				
Org. Carbon	mg/L				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3	mg/L				38	43	44	45	46				
Total Metals													
Aluminum Al	mg/L				0.08	0.06	0.06	0.05	0.05				
Antimony Sb	mg/L				0.0003	0.0007	0.0003	0.0000	0.0008				
Arsenic As	mg/L				0.0004	0.0005	0.0005	0.0004	0.0005				
Barium Ba	mg/L				0.0033	0.0032	0.0030	0.0030	0.0031				
Beryllium Be	mg/L				0.00002	0.00003	0.00002	0.00000	0.00003				
Bismuth Bi	mg/L				0.00025	0.00072	0.00030	0.00000	0.00077				
Boron B	mg/L				0.019	0.022	0.023	0.022	0.023				
Cadmium Cd	mg/L				0.0000031	0.0000047	0.0000031	0.0000020	0.0000049				
Calcium Ca	mg/L				10	18	12	7	19				
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0001	0.0002	0.0001	0.0001	0.0002				
Copper Cu	mg/L				0.0013	0.0016	0.0015	0.0014	0.0016				
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09				
Lead Pb	mg/L				0.00005	0.00007	0.00012	0.00004	0.00006				
Lithium Li	mg/L				0.0000	0.0001	0.0000		0.0001				
Magnesium Mg	mg/L				5.3	6.0	6.4	6.4	6.5				
Manganese Mn	mg/L				0.011	0.015	0.016	0.010	0.010				
Mercury Hg	ug/L				0.0006453	0.0007340	0.0006546	0.0006000	0.0007462				
Molybdenum Mo	mg/L				0.00018	0.00033	0.00023	0.00014	0.00034				
Nickel Ni	mg/L				0.0005	0.0008	0.0006	0.0004	0.0008				
Phosphorus P	mg/L				0.004	0.011	0.005		0.012				
Potassium K	mg/L				2.2	2.7	2.4	2.3	2.8				
Selenium Se	mg/L				0.00077	0.00081	0.00083	0.00112	0.00108				
Silicon SiO2	mg/L				0.05	0.13	0.06		0.14				
Silver Ag	mg/L				0.0000027	0.0000047	0.0000023	0.0000007	0.0000048				
Sodium Na	mg/L				31	44	38	32	46				
Strontium Sr	mg/L				0.035	0.039	0.039	0.040	0.041				
Tellurium Te	mg/L				0.000	0.000	0.000		0.000				
Thallium Tl	mg/L				0.000018	0.000022	0.000011	0.000003	0.000005				
Thorium Th	mg/L				0.000002	0.000006	0.000003		0.000007				
Tin Sn	mg/L				0.00007	0.00023	0.00009	0.00003	0.00016				
Titanium Ti	mg/L				0.0000	0.0001	0.0000		0.0001				
Uranium U	mg/L				0.000031	0.000037	0.000038	0.000032	0.000038				
Vanadium V	mg/L				0.0006	0.0003	0.0002	0.0001	0.0003				
Zinc Zn	mg/L				0.0016	0.0021	0.0030	0.0017	0.0022				
Zirconium Zr	mg/L				0.0050	0.0051	0.0050	0.0050	0.0051				

Water Quality in DORIS CREEK (d/s of the waterfall)													
Date		Year 9 Mar-16	Year 9 Apr-16	Year 9 May-16	Year 9 Jun-16	Year 9 Jul-16	Year 9 Aug-16	Year 9 Sep-16	Year 9 Oct-16	Year 9 Nov-16	Year 9 Dec-16	Year 9 Jan-17	Year 9 Feb-17
Parameter													
TDS	mg/L				156	178	145	145	196				
TSS	mg/L				3.0	3.8	2.9	3.0	2.9				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.001	0.002	0.001		0.002				
Sulphate	mg/L				4.0	4.6	3.7	3.0	4.7				
Chloride	mg/L				72	107	81	63	112				
Total Ammonia-N	mg/L				0.008	0.014	0.012	0.008	0.007				
Nitrate-N	mg/L				0.03	0.08	0.04	0.01	0.09				
Nitrite-N	mg/L				0.001	0.002	0.001	0.001	0.001				
Alkalinity	mg/L				26	28	27	28	29				
OrthoPhosphate-P	mg/L				0.0030	0.0073	0.0035	0.0008	0.0078				
Phosphate-P	mg/L				0.0210	0.0265	0.0343	0.0270	0.0324				
Org. Carbon	mg/L				5.0	5.0	5.0	5.0	5.1				
Hardness CaCO3	mg/L				38	42	44	45	46				
Total Metals													
Aluminum Al	mg/L				0.08	0.06	0.06	0.05	0.05				
Antimony Sb	mg/L				0.0002	0.0006	0.0003	0.0000	0.0006				
Arsenic As	mg/L				0.0004	0.0005	0.0005	0.0004	0.0005				
Barium Ba	mg/L				0.0033	0.0032	0.0030	0.0030	0.0031				
Beryllium Be	mg/L				0.00001	0.00003	0.00001	0.00000	0.00003				
Bismuth Bi	mg/L				0.00020	0.00058	0.00025	0.00000	0.00062				
Boron B	mg/L				0.019	0.022	0.023	0.022	0.023				
Cadmium Cd	mg/L				0.0000029	0.0000042	0.0000029	0.0000020	0.0000044				
Calcium Ca	mg/L				9	16	11	7	17				
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0001	0.0002	0.0001	0.0001	0.0002				
Copper Cu	mg/L				0.0013	0.0015	0.0015	0.0014	0.0015				
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09				
Lead Pb	mg/L				0.00005	0.00007	0.00012	0.00004	0.00005				
Lithium Li	mg/L				0.0000	0.0001	0.0000		0.0001				
Magnesium Mg	mg/L				5.3	6.0	6.4	6.4	6.4				
Manganese Mn	mg/L				0.011	0.015	0.016	0.010	0.010				
Mercury Hg	ug/L				0.0006366	0.0007087	0.0006439	0.0006000	0.0007188				
Molybdenum Mo	mg/L				0.00017	0.00029	0.00021	0.00014	0.00030				
Nickel Ni	mg/L				0.0005	0.0008	0.0006	0.0004	0.0007				
Phosphorus P	mg/L				0.003	0.009	0.004		0.010				
Potassium K	mg/L				2.2	2.6	2.4	2.3	2.7				
Selenium Se	mg/L				0.00077	0.00081	0.00083	0.00112	0.00108				
Silicon SiO2	mg/L				0.04	0.11	0.05		0.12				
Silver Ag	mg/L				0.0000024	0.0000040	0.0000020	0.0000007	0.0000040				
Sodium Na	mg/L				30	41	37	32	43				
Strontium Sr	mg/L				0.035	0.039	0.039	0.040	0.040				
Tellurium Te	mg/L				0.000	0.000	0.000		0.000				
Thallium Tl	mg/L				0.000018	0.000022	0.000011	0.000003	0.000004				
Thorium Th	mg/L				0.000002	0.000005	0.000002		0.000005				
Tin Sn	mg/L				0.00006	0.00021	0.00008	0.00003	0.00014				
Titanium Ti	mg/L				0.0000	0.0001	0.0000		0.0001				
Uranium U	mg/L				0.000030	0.000036	0.000038	0.000032	0.000036				
Vanadium V	mg/L				0.0006	0.0002	0.0002	0.0001	0.0003				
Zinc Zn	mg/L				0.0015	0.0020	0.0030	0.0017	0.0022				
Zirconium Zr	mg/L				0.0050	0.0051	0.0050	0.0050	0.0051				

Water Quality in DORIS CREEK (d/s of the waterfall)												
Date		Year 10 Mar-17	Year 10 Apr-17	Year 10 May-17	Year 10 Jun-17	Year 10 Jul-17	Year 10 Aug-17	Year 10 Sep-17	Year 10 Oct-17	Year 10 Nov-17	Year 10 Dec-17	Year 10 Jan-18
Parameter												
TDS	mg/L				153	168	141	145	185			
TSS	mg/L				3.0	3.8	2.9	3.0	2.9			
Free CN	mg/L											
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001			
WAD CN	mg/L											
CNO	mg/L											
SCN	mg/L				0.000	0.001	0.001		0.002			
Sulphate	mg/L				3.9	4.3	3.5	3.0	4.4			
Chloride	mg/L				69	98	77	63	102			
Total Ammonia-N	mg/L				0.008	0.014	0.012	0.008	0.007			
Nitrate-N	mg/L				0.01	0.02	0.01	0.01	0.02			
Nitrite-N	mg/L				0.001	0.002	0.001	0.001	0.001			
Alkalinity	mg/L				26	27	27	28	28			
OrthoPhosphate-P	mg/L				0.0026	0.0060	0.0030	0.0008	0.0065			
Phosphate-P	mg/L				0.0205	0.0253	0.0338	0.0270	0.0310			
Org. Carbon	mg/L				5.0	5.0	5.0	5.0	5.0			
Hardness CaCO3	mg/L				38	42	44	45	45			
Total Metals												
Aluminum Al	mg/L				0.08	0.06	0.06	0.05	0.05			
Antimony Sb	mg/L				0.0002	0.0005	0.0002	0.0000	0.0005			
Arsenic As	mg/L				0.0004	0.0004	0.0005	0.0004	0.0005			
Barium Ba	mg/L				0.0033	0.0032	0.0030	0.0030	0.0030			
Beryllium Be	mg/L				0.00001	0.00002	0.00001	0.00000	0.00002			
Bismuth Bi	mg/L				0.00016	0.00047	0.00020	0.00000	0.00050			
Boron B	mg/L				0.019	0.021	0.023	0.022	0.022			
Cadmium Cd	mg/L				0.0000027	0.0000038	0.0000027	0.0000020	0.0000039			
Calcium Ca	mg/L				9	14	10	7	15			
Chromium Cr	mg/L				0.000	0.000	0.000	0.000	0.000			
Cobalt Co	mg/L				0.0001	0.0001	0.0001	0.0001	0.0001			
Copper Cu	mg/L				0.0013	0.0015	0.0014	0.0014	0.0015			
Iron Fe	mg/L				0.11	0.11	0.08	0.09	0.09			
Lead Pb	mg/L				0.00005	0.00007	0.00012	0.00004	0.00005			
Lithium Li	mg/L				0.0000	0.0001	0.0000		0.0001			
Magnesium Mg	mg/L				5.3	5.9	6.3	6.4	6.4			
Manganese Mn	mg/L				0.011	0.015	0.016	0.010	0.010			
Mercury Hg	ug/L				0.0006296	0.0006857	0.0006336	0.0006000	0.0006914			
Molybdenum Mo	mg/L				0.00016	0.00026	0.00020	0.00014	0.00027			
Nickel Ni	mg/L				0.0005	0.0007	0.0005	0.0004	0.0006			
Phosphorus P	mg/L				0.003	0.008	0.003		0.008			
Potassium K	mg/L				2.2	2.5	2.3	2.3	2.6			
Selenium Se	mg/L				0.00077	0.00081	0.00083	0.00112	0.00108			
Silicon SiO2	mg/L				0.03	0.09	0.04		0.09			
Silver Ag	mg/L				0.0000022	0.0000035	0.0000017	0.0000007	0.0000034			
Sodium Na	mg/L				29	39	36	32	41			
Strontium Sr	mg/L				0.035	0.039	0.039	0.040	0.040			
Tellurium Te	mg/L				0.000	0.000	0.000		0.000			
Thallium Tl	mg/L				0.000017	0.000021	0.000011	0.000003	0.000004			
Thorium Th	mg/L				0.000001	0.000004	0.000002		0.000004			
Tin Sn	mg/L				0.00006	0.00019	0.00007	0.00003	0.00012			
Titanium Ti	mg/L				0.0000	0.0001	0.0000		0.0001			
Uranium U	mg/L				0.000030	0.000035	0.000037	0.000032	0.000035			
Vanadium V	mg/L				0.0006	0.0002	0.0002	0.0001	0.0002			
Zinc Zn	mg/L				0.0015	0.0019	0.0029	0.0017	0.0021			
Zirconium Zr	mg/L				0.0050	0.0051	0.0050	0.0050	0.0050			

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)												
Date	Year 1 Mar-08	Year 1 Apr-08	Year 1 May-08	Year 1 Jun-08	Year 1 Jul-08	Year 1 Aug-08	Year 1 Sep-08	Year 1 Oct-08	Year 1 Nov-08	Year 1 Dec-08	Year 1 Jan-09	Year 1 Feb-09
Parameter												
TDS				323109	184906	67089	99614	35915				
TSS				6379	5205	1610	2061	725				
Free CN				0.04	0.00			0.00				
Total CN				3	1	1	1	0				
WAD CN				0.06	0.01			0.00				
CNO				89	11			1				
SCN				2	2			0				
Sulphate				9566	5379	1656	2120	845				
Chloride				148681	99312	33357	43281	16607				
Total Ammonia				73	58	13	13	5				
Nitrate				342	264	52	66	36				
Nitrite				29	25	2	2	1				
Alkalinity				58790	37107	14599	19112	6816				
OrthoPhosphate-P				7	4	0	1	0				
Phosphate-P				46	31	17	19	7				
Org. Carbon				11329	6878	2710	3435	1220				
Hardness CaCO3				84949	56763	23454	30915	11010				
Total Metals												
Aluminum Al				166	82	33	35	12				
Antimony Sb				0.4	0.4	0.0	0.0	0.0				
Arsenic As				1.0	0.6	0.3	0.3	0.1				
Barium Ba				7	4	2	2	1				
Beryllium Be				0.05	0.03	0.01	0.01	0.00				
Bismuth Bi				0.33	0.36	0.01	0.01	0.03				
Boron B				44	30	13	16	6				
Cadmium Cd				0.01	0.01	0.00	0.00	0.00				
Calcium Ca				23580	15749	4040	5151	2261				
Chromium Cr				1	0	0	0	0				
Cobalt Co				0.25	0.16	0.03	0.05	0.02				
Copper Cu				3	2	1	1	0				
Iron Fe				241	149	46	62	22				
Lead Pb				0.13	0.10	0.07	0.03	0.01				
Lithium Li				0	0	0	0	0				
Magnesium Mg				11810	8046	3421	4386	1557				
Manganese Mn				24	20	9	7	2				
Mercury Hg				1.49	0.91	0.32	0.41	0.15				
Molybdenum Mo				0.46	0.32	0.08	0.10	0.04				
Nickel Ni				1.24	0.91	0.25	0.32	0.13				
Phosphorus P				12	8	1	1	1				
Potassium K				5090	3369	1210	1610	592				
Selenium Se				1.69	1.10	0.46	0.78	0.27				
Silicon SiO2				187	120	15	19	13				
Silver Ag				0.01	0.01	0.00	0.00	0.00				
Sodium Na				57856	40777	17499	22078	7806				
Strontium Sr				78	53	21	28	10				
Tellurium Te				0	0	0	0	0				
Thallium Tl				0.04	0.03	0.01	0.00	0.00				
Thorium Th				0.02	0.01	0.00	0.00	0.00				
Tin Sn				0.14	0.23	0.03	0.03	0.02				
Titanium Ti				0	0	0	0	0				
Uranium U				0.08	0.05	0.02	0.03	0.01				
Vanadium V				1.38	0.29	0.09	0.10	0.04				
Zinc Zn				4.19	2.69	1.56	1.20	0.45				
Zirconium Zr				11	7	3	4	1				

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)												
Date	Year 2 Mar-09	Year 2 Apr-09	Year 2 May-09	Year 2 Jun-09	Year 2 Jul-09	Year 2 Aug-09	Year 2 Sep-09	Year 2 Oct-09	Year 2 Nov-09	Year 2 Dec-09	Year 2 Jan-10	Year 2 Feb-10
Parameter												
TDS				806930	457968	172528	210783	101353				
TSS				13759	11171	3517	4355	1622				
Free CN				0.22		0.01	0.00	0.00				
Total CN				8	3	1	1	1				
WAD CN				0.31		0.01	0.00	0.01				
CNO				501		12	0	9				
SCN				25	14	4	0	4				
Sulphate				34820	19016	6603	4448	4456				
Chloride				543321	329233	117528	91954	75419				
Total Ammonia				260	164	24	20	14				
Nitrate				2247	1371	426	74	386				
Nitrite				140	50	17	3	4				
Alkalinity				131121	82765	33859	40409	16730				
OrthoPhosphate-P				57	31	9	1	8				
Phosphate-P				138	87	45	39	22				
Org. Carbon				23776	14621	6050	7260	2798				
Hardness CaCO3				195634	129217	54694	65367	27382				
Total Metals												
Aluminum Al				352	173	70	72	27				
Antimony Sb				4.5	2.8	0.8	0.0	0.8				
Arsenic As				2.5	1.6	0.7	0.7	0.3				
Barium Ba				17	10	4	4	2				
Beryllium Be				0.24	0.14	0.04	0.01	0.04				
Bismuth Bi				4.44	2.72	0.82	0.02	0.76				
Boron B				96	65	28	33	13				
Cadmium Cd				0.03	0.02	0.01	0.00	0.00				
Calcium Ca				123950	71668	23355	10933	17544				
Chromium Cr				2	1	1	0	0				
Cobalt Co				1.53	0.85	0.27	0.09	0.22				
Copper Cu				8	5	2	2	1				
Iron Fe				513	317	100	132	49				
Lead Pb				0.37	0.25	0.16	0.06	0.04				
Lithium Li				1	1	0	0	0				
Magnesium Mg				26200	17778	7757	9261	3704				
Manganese Mn				55	43	19	15	6				
Mercury Hg				4.37	2.57	0.95	0.87	0.55				
Molybdenum Mo				2.64	1.54	0.50	0.21	0.38				
Nickel Ni				4.77	3.05	0.99	0.66	0.66				
Phosphorus P				82	45	13	1	12				
Potassium K				14891	9298	3458	3409	2016				
Selenium Se				3.63	2.37	1.00	1.63	0.61				
Silicon SiO2				1416	776	229	21	205				
Silver Ag				0.03	0.02	0.01	0.00	0.00				
Sodium Na				129194	90196	39274	46664	18330				
Strontium Sr				176	118	48	58	24				
Tellurium Te				0	0	0	0	0				
Thallium Tl				0.09	0.07	0.01	0.01	0.00				
Thorium Th				0.06	0.03	0.01	0.00	0.01				
Tin Sn				0.90	0.80	0.18	0.06	0.15				
Titanium Ti				0	0	0	0	0				
Uranium U				0.20	0.13	0.05	0.05	0.03				
Vanadium V				3.52	0.92	0.33	0.19	0.22				
Zinc Zn				10.73	6.81	3.97	2.51	1.51				
Zirconium Zr				25	15	6	7	3				

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)												
Date	Year 3 Mar-10	Year 3 Apr-10	Year 3 May-10	Year 3 Jun-10	Year 3 Jul-10	Year 3 Aug-10	Year 3 Sep-10	Year 3 Oct-10	Year 3 Nov-10	Year 3 Dec-10	Year 3 Jan-11	Year 3 Feb-11
Parameter												
TDS				226000	131898	54912	78698	27620				
TSS				3509	2849	914	1171	408				
Free CN				0.04								
Total CN				2	1	0	0	0				
WAD CN				0.05								
CNO				86								
SCN				9	5	2	3	1				
Sulphate				11023	6348	2730	3552	1241				
Chloride				173168	108467	46778	61437	21562				
Total Ammonia				73	46	11	12	4				
Nitrate				952	597	261	349	123				
Nitrite				38	18	7	3	1				
Alkalinity				33858	21515	9196	12016	4184				
OrthoPhosphate-P				23	14	6	8	3				
Phosphate-P				43	28	15	18	6				
Org. Carbon				5957	3684	1569	1992	694				
Hardness CaCO3				51288	34041	15053	19776	6885				
Total Metals												
Aluminum Al				94	47	19	21	7				
Antimony Sb				1.9	1.2	0.6	0.8	0.3				
Arsenic As				0.8	0.5	0.2	0.3	0.1				
Barium Ba				4	3	1	1	0				
Beryllium Be				0.11	0.07	0.03	0.04	0.01				
Bismuth Bi				1.87	1.22	0.56	0.75	0.27				
Boron B				26	17	8	10	3				
Cadmium Cd				0.02	0.01	0.00	0.01	0.00				
Calcium Ca				40726	24516	10407	13402	4622				
Chromium Cr				1	0	0	0	0				
Cobalt Co				0.54	0.32	0.14	0.18	0.06				
Copper Cu				2	1	1	1	0				
Iron Fe				131	81	26	36	12				
Lead Pb				0.13	0.08	0.05	0.04	0.01				
Lithium Li				0	0	0	0	0				
Magnesium Mg				6808	4639	2094	2691	939				
Manganese Mn				14	11	5	4	2				
Mercury Hg				1.25	0.75	0.32	0.41	0.14				
Molybdenum Mo				0.88	0.53	0.23	0.29	0.10				
Nickel Ni				1.52	0.99	0.40	0.52	0.18				
Phosphorus P				34	21	9	12	4				
Potassium K				4276	2705	1134	1491	517				
Selenium Se				0.94	0.62	0.27	0.44	0.15				
Silicon SiO2				538	315	134	173	60				
Silver Ag				0.02	0.01	0.00	0.01	0.00				
Sodium Na				33449	23400	10472	13247	4616				
Strontium Sr				46	31	13	17	6				
Tellurium Te				0	0	0	0	0				
Thallium Tl				0.03	0.02	0.00	0.00	0.00				
Thorium Th				0.03	0.02	0.01	0.01	0.00				
Tin Sn				0.36	0.30	0.11	0.14	0.05				
Titanium Ti				0	0	0	0	0				
Uranium U				0.07	0.04	0.02	0.02	0.01				
Vanadium V				1.04	0.34	0.15	0.20	0.07				
Zinc Zn				3.05	1.97	1.21	1.14	0.40				
Zirconium Zr				6	4	2	2	1				

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)												
Date	Year 4 Mar-11	Year 4 Apr-11	Year 4 May-11	Year 4 Jun-11	Year 4 Jul-11	Year 4 Aug-11	Year 4 Sep-11	Year 4 Oct-11	Year 4 Nov-11	Year 4 Dec-11	Year 4 Jan-12	Year 4 Feb-12
Parameter												
TDS				801080	516417	174169	214702	110568				
TSS				13700	11367	3544	4442	1641				
Free CN												
Total CN				4	3	1	1	1				
WAD CN												
CNO												
SCN				16	14	3		3				
Sulphate				30749	21489	5947	4501	4494				
Chloride				507020	393091	113139	93285	82091				
Total Ammonia				73	61	21	20	7				
Nitrate				1827	1611	333	70	366				
Nitrite				42	8	3	3	1				
Alkalinity				124706	83467	33348	41193	16683				
OrthoPhosphate-P				63	54	10	1	12				
Phosphate-P				145	110	47	40	26				
Org. Carbon				23069	14667	6026	7404	2814				
Hardness CaCO3				185118	130862	53845	66632	27272				
Total Metals												
Aluminum Al				355	178	71	73	28				
Antimony Sb				5.4	4.7	0.9	0.0	1.0				
Arsenic As				2.3	1.6	0.7	0.7	0.3				
Barium Ba				16	10	4	4	2				
Beryllium Be				0.24	0.20	0.04	0.01	0.04				
Bismuth Bi				5.32	4.63	0.85	0.01	1.02				
Boron B				94	67	28	34	13				
Cadmium Cd				0.03	0.02	0.01	0.00	0.00				
Calcium Ca				91091	74749	18691	10984	15934				
Chromium Cr				2	1	0	0	0				
Cobalt Co				1.21	0.98	0.22	0.09	0.22				
Copper Cu				7	5	2	2	1				
Iron Fe				515	323	101	134	50				
Lead Pb				0.35	0.27	0.16	0.06	0.05				
Lithium Li				1	1	0	0	0				
Magnesium Mg				25419	18163	7734	9442	3747				
Manganese Mn				54	45	19	15	6				
Mercury Hg				3.76	2.62	0.87	0.89	0.53				
Molybdenum Mo				1.92	1.62	0.40	0.21	0.34				
Nickel Ni				4.00	3.32	0.88	0.67	0.64				
Phosphorus P				84	72	14	1	16				
Potassium K				12978	9540	3211	3467	1941				
Selenium Se				3.59	2.41	1.00	1.67	0.61				
Silicon SiO2				977	837	163	19	185				
Silver Ag				0.03	0.03	0.01	0.00	0.01				
Sodium Na				125282	91562	39189	47583	18407				
Strontium Sr				170	120	48	60	24				
Tellurium Te				0	0	0	0	0				
Thallium Tl				0.09	0.07	0.01	0.01	0.00				
Thorium Th				0.04	0.04	0.01	0.00	0.01				
Tin Sn				1.01	1.10	0.19	0.06	0.18				
Titanium Ti				0	0	0	0	0				
Uranium U				0.18	0.13	0.05	0.05	0.03				
Vanadium V				3.59	1.21	0.33	0.20	0.25				
Zinc Zn				9.30	7.06	3.82	2.55	1.50				
Zirconium Zr				24	15	6	7	3				

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)												
Date	Year 5 Mar-12	Year 5 Apr-12	Year 5 May-12	Year 5 Jun-12	Year 5 Jul-12	Year 5 Aug-12	Year 5 Sep-12	Year 5 Oct-12	Year 5 Nov-12	Year 5 Dec-12	Year 5 Jan-13	Year 5 Feb-13
Parameter												
TDS				693511	539414	183878	214702	141305				
TSS				13469	11369	3540	4442	1637				
Free CN												
Total CN				4	3	1	1	1				
WAD CN												
CNO												
SCN				7	12	2		3				
Sulphate				21719	19877	5506	4501	3968				
Chloride				352350	389001	114378	93285	95252				
Total Ammonia				59	62	21	20	7				
Nitrate				849	1390	277	70	298				
Nitrite				9	9	3	3	1				
Alkalinity				118775	83282	33192	41193	16499				
OrthoPhosphate-P				27	47	9	1	10				
Phosphate-P				108	104	46	40	23				
Org. Carbon				22612	14771	6032	7404	2821				
Hardness CaCO3				174115	129931	53466	66632	26823				
Total Metals												
Aluminum Al				350	179	71	73	28				
Antimony Sb				2.2	4.0	0.7	0.0	0.8				
Arsenic As				2.0	1.6	0.7	0.7	0.3				
Barium Ba				15	10	4	4	2				
Beryllium Be				0.13	0.18	0.04	0.01	0.04				
Bismuth Bi				2.13	4.01	0.69	0.01	0.82				
Boron B				90	67	28	34	13				
Cadmium Cd				0.02	0.02	0.01	0.00	0.00				
Calcium Ca				53309	70089	17665	10984	15839				
Chromium Cr				2	1	0	0	0				
Cobalt Co				0.63	0.87	0.19	0.09	0.18				
Copper Cu				6	5	2	2	1				
Iron Fe				509	326	101	134	51				
Lead Pb				0.28	0.27	0.16	0.06	0.04				
Lithium Li				0	1	0	0	0				
Magnesium Mg				24230	18108	7701	9442	3708				
Manganese Mn				52	44	19	15	6				
Mercury Hg				3.11	2.51	0.84	0.89	0.49				
Molybdenum Mo				1.07	1.46	0.35	0.21	0.29				
Nickel Ni				2.74	3.09	0.81	0.67	0.57				
Phosphorus P				36	64	12	1	13				
Potassium K				10750	9170	3107	3467	1817				
Selenium Se				3.51	2.42	1.00	1.67	0.61				
Silicon SiO2				427	742	137	19	154				
Silver Ag				0.02	0.03	0.01	0.00	0.01				
Sodium Na				120390	104672	43927	47583	30423				
Strontium Sr				162	119	47	60	24				
Tellurium Te				0	0	0	0	0				
Thallium Tl				0.08	0.07	0.01	0.01	0.00				
Thorium Th				0.03	0.04	0.01	0.00	0.01				
Tin Sn				0.50	1.00	0.16	0.06	0.15				
Titanium Ti				0	0	0	0	0				
Uranium U				0.16	0.13	0.05	0.05	0.03				
Vanadium V				3.03	1.12	0.30	0.20	0.22				
Zinc Zn				7.58	6.88	3.76	2.55	1.43				
Zirconium Zr				23	15	6	7	3				

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)												
Date	Year 6 Mar-13	Year 6 Apr-13	Year 6 May-13	Year 6 Jun-13	Year 6 Jul-13	Year 6 Aug-13	Year 6 Sep-13	Year 6 Oct-13	Year 6 Nov-13	Year 6 Dec-13	Year 6 Jan-14	Year 6 Feb-14
Parameter												
TDS				777249	657540	196415	214702	137343				
TSS				13461	11354	3537	4442	1634				
Free CN												
Total CN				4	3	1	1	1				
WAD CN												
CNO												
SCN				5	10	2		2				
Sulphate				20454	17709	5106	4442	3523				
Chloride				391861	439200	118278	93285	88348				
Total Ammonia				36	48	15	12	5				
Nitrate				522	1010	183	7	222				
Nitrite				5	7	1	1	1				
Alkalinity				118395	82563	33068	41193	16351				
OrthoPhosphate-P				23	38	7	1	8				
Phosphate-P				104	95	44	40	22				
Org. Carbon				22628	14801	6038	7404	2828				
Hardness CaCO3				173186	128173	53164	66632	26460				
Total Metals												
Aluminum Al				345	176	70	71	28				
Antimony Sb				1.8	3.3	0.6	0.0	0.7				
Arsenic As				1.9	1.5	0.6	0.6	0.3				
Barium Ba				15	10	4	4	2				
Beryllium Be				0.09	0.14	0.03	0.00	0.03				
Bismuth Bi				1.70	3.24	0.55	0.00	0.66				
Boron B				88	65	28	33	13				
Cadmium Cd				0.02	0.02	0.00	0.00	0.00				
Calcium Ca				53999	69402	17043	10883	14032				
Chromium Cr				2	1	0	0	0				
Cobalt Co				0.54	0.72	0.16	0.08	0.15				
Copper Cu				6	5	2	2	1				
Iron Fe				508	327	101	134	51				
Lead Pb				0.25	0.24	0.15	0.05	0.04				
Lithium Li				0	0	0		0				
Magnesium Mg				24120	17939	7667	9432	3674				
Manganese Mn				52	44	19	15	6				
Mercury Hg				3.03	2.37	0.82	0.89	0.46				
Molybdenum Mo				0.97	1.26	0.32	0.21	0.25				
Nickel Ni				2.56	2.79	0.76	0.66	0.51				
Phosphorus P				26	51	9		11				
Potassium K				10487	8681	3022	3465	1717				
Selenium Se				3.49	2.40	1.00	1.66	0.61				
Silicon SiO2				305	584	101		122				
Silver Ag				0.01	0.02	0.00	0.00	0.00				
Sodium Na				151930	150977	49306	47580	30572				
Strontium Sr				161	118	47	60	23				
Tellurium Te				0	0	0		0				
Thallium Tl				0.08	0.07	0.01	0.00	0.00				
Thorium Th				0.01	0.03	0.00		0.01				
Tin Sn				0.41	0.87	0.13	0.05	0.13				
Titanium Ti				0	0	0		0				
Uranium U				0.14	0.12	0.05	0.05	0.02				
Vanadium V				2.93	0.98	0.27	0.18	0.19				
Zinc Zn				7.31	6.52	3.68	2.51	1.35				
Zirconium Zr				23	15	6	7	3				

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)												
Date	Year 7 Mar-14	Year 7 Apr-14	Year 7 May-14	Year 7 Jun-14	Year 7 Jul-14	Year 7 Aug-14	Year 7 Sep-14	Year 7 Oct-14	Year 7 Nov-14	Year 7 Dec-14	Year 7 Jan-15	Year 7 Feb-15
Parameter												
TDS				748878	603854	187192	214702	126264				
TSS				13454	11341	3535	4442	1631				
Free CN												
Total CN				4	3	1	1	1				
WAD CN												
CNO												
SCN				4	8	1		2				
Sulphate				19575	16030	4816	4442	3172				
Chloride				365293	388926	109641	93285	77973				
Total Ammonia				36	41	14	12	4				
Nitrate				409	748	131	7	154				
Nitrite				5	6	1	1	1				
Alkalinity				118088	81982	32969	41193	16231				
OrthoPhosphate-P				19	31	6	1	6				
Phosphate-P				100	88	43	40	20				
Org. Carbon				22641	14826	6042	7404	2833				
Hardness CaCO3				172435	126753	52920	66632	26167				
Total Metals												
Aluminum Al				345	176	70	71	27				
Antimony Sb				1.4	2.7	0.5	0.0	0.5				
Arsenic As				1.8	1.4	0.6	0.6	0.3				
Barium Ba				15	10	4	4	2				
Beryllium Be				0.08	0.12	0.02	0.00	0.02				
Bismuth Bi				1.38	2.62	0.45	0.00	0.54				
Boron B				88	65	28	33	13				
Cadmium Cd				0.01	0.02	0.00	0.00	0.00				
Calcium Ca				49146	60193	15458	10883	12124				
Chromium Cr				2	1	0	0	0				
Cobalt Co				0.48	0.61	0.14	0.08	0.13				
Copper Cu				6	5	2	2	1				
Iron Fe				509	328	101	134	51				
Lead Pb				0.24	0.23	0.15	0.05	0.03				
Lithium Li				0	0	0		0				
Magnesium Mg				24056	17815	7645	9432	3647				
Manganese Mn				52	43	19	15	6				
Mercury Hg				2.97	2.26	0.80	0.89	0.44				
Molybdenum Mo				0.88	1.10	0.29	0.21	0.22				
Nickel Ni				2.44	2.56	0.72	0.66	0.46				
Phosphorus P				22	42	7		9				
Potassium K				10280	8290	2955	3465	1636				
Selenium Se				3.49	2.40	0.99	1.66	0.61				
Silicon SiO2				253	480	83		99				
Silver Ag				0.01	0.02	0.00	0.00	0.00				
Sodium Na				145542	138889	47229	47580	28077				
Strontium Sr				160	117	47	60	23				
Tellurium Te				0	0	0		0				
Thallium Tl				0.08	0.07	0.01	0.00	0.00				
Thorium Th				0.01	0.02	0.00		0.00				
Tin Sn				0.36	0.77	0.12	0.05	0.11				
Titanium Ti				0	0	0		0				
Uranium U				0.14	0.12	0.05	0.05	0.02				
Vanadium V				2.88	0.88	0.25	0.18	0.17				
Zinc Zn				7.18	6.27	3.63	2.51	1.30				
Zirconium Zr				23	15	6	7	3				

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)												
Date	Year 8 Mar-15	Year 8 Apr-15	Year 8 May-15	Year 8 Jun-15	Year 8 Jul-15	Year 8 Aug-15	Year 8 Sep-15	Year 8 Oct-15	Year 8 Nov-15	Year 8 Dec-15	Year 8 Jan-16	Year 8 Feb-16
Parameter												
TDS				725968	560500	179744	214702	117317				
TSS				13449	11331	3533	4442	1629				
Free CN												
Total CN				4	3	1	1	1				
WAD CN												
CNO												
SCN				3	6	1		1				
Sulphate				18849	14656	4580	4442	2888				
Chloride				343839	348328	102666	93285	69595				
Total Ammonia				35	41	14	12	4				
Nitrate				264	473	84	7	97				
Nitrite				4	6	1	1	1				
Alkalinity				117840	81513	32888	41193	16134				
OrthoPhosphate-P				16	26	5	1	5				
Phosphate-P				97	83	42	40	19				
Org. Carbon				22651	14845	6045	7404	2837				
Hardness CaCO3				171829	125607	52723	66632	25930				
Total Metals												
Aluminum Al				345	175	70	71	27				
Antimony Sb				1.2	2.2	0.4	0.0	0.4				
Arsenic As				1.8	1.4	0.6	0.6	0.3				
Barium Ba				15	10	4	4	2				
Beryllium Be				0.07	0.09	0.02	0.00	0.02				
Bismuth Bi				1.12	2.12	0.36	0.00	0.43				
Boron B				88	64	27	33	13				
Cadmium Cd				0.01	0.01	0.00	0.00	0.00				
Calcium Ca				45199	52723	14175	10883	10583				
Chromium Cr				2	1	0	0	0				
Cobalt Co				0.43	0.52	0.13	0.08	0.11				
Copper Cu				6	5	2	2	1				
Iron Fe				509	329	101	134	51				
Lead Pb				0.24	0.21	0.15	0.05	0.03				
Lithium Li				0	0	0		0				
Magnesium Mg				24001	17711	7628	9432	3626				
Manganese Mn				51	43	19	15	6				
Mercury Hg				2.92	2.16	0.78	0.89	0.42				
Molybdenum Mo				0.81	0.96	0.27	0.21	0.19				
Nickel Ni				2.34	2.37	0.69	0.66	0.42				
Phosphorus P				18	34	6		7				
Potassium K				10113	7974	2901	3465	1570				
Selenium Se				3.48	2.39	0.99	1.66	0.61				
Silicon SiO2				205	390	67		81				
Silver Ag				0.01	0.01	0.00	0.00	0.00				
Sodium Na				140383	129126	45552	47580	26063				
Strontium Sr				160	116	47	60	23				
Tellurium Te				0	0	0		0				
Thallium Tl				0.08	0.06	0.01	0.00	0.00				
Thorium Th				0.01	0.02	0.00		0.00				
Tin Sn				0.32	0.69	0.10	0.05	0.09				
Titanium Ti				0	0	0		0				
Uranium U				0.14	0.11	0.05	0.05	0.02				
Vanadium V				2.83	0.80	0.24	0.18	0.16				
Zinc Zn				7.07	6.05	3.60	2.51	1.25				
Zirconium Zr				23	15	6	7	3				

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)												
Date	Year 9 Mar-16	Year 9 Apr-16	Year 9 May-16	Year 9 Jun-16	Year 9 Jul-16	Year 9 Aug-16	Year 9 Sep-16	Year 9 Oct-16	Year 9 Nov-16	Year 9 Dec-16	Year 9 Jan-17	Year 9 Feb-17
Parameter												
TDS				707467	525491	173730	214702	110093				
TSS				13445	11323	3532	4442	1627				
Free CN												
Total CN				4	3	1	1	1				
WAD CN												
CNO												
SCN				3	5	1		1				
Sulphate				18262	13546	4389	4442	2659				
Chloride				326514	315543	97034	93285	62830				
Total Ammonia				35	41	14	12	4				
Nitrate				147	251	46	7	51				
Nitrite				4	6	1	1	1				
Alkalinity				117640	81134	32823	41193	16056				
OrthoPhosphate-P				14	21	4	1	4				
Phosphate-P				95	78	41	40	18				
Org. Carbon				22660	14861	6048	7404	2840				
Hardness CaCO3				171340	124681	52564	66632	25739				
Total Metals												
Aluminum Al				344	175	70	71	27				
Antimony Sb				1.0	1.7	0.3	0.0	0.4				
Arsenic As				1.8	1.3	0.6	0.6	0.3				
Barium Ba				15	9	4	4	2				
Beryllium Be				0.06	0.08	0.02	0.00	0.02				
Bismuth Bi				0.90	1.72	0.29	0.00	0.35				
Boron B				87	64	27	33	13				
Cadmium Cd				0.01	0.01	0.00	0.00	0.00				
Calcium Ca				42011	46692	13138	10883	9338				
Chromium Cr				2	1	0	0	0				
Cobalt Co				0.39	0.45	0.12	0.08	0.09				
Copper Cu				6	5	2	2	1				
Iron Fe				510	330	102	134	51				
Lead Pb				0.23	0.20	0.14	0.05	0.03				
Lithium Li				0	0	0		0				
Magnesium Mg				23957	17627	7613	9432	3609				
Manganese Mn				51	43	19	15	6				
Mercury Hg				2.88	2.09	0.77	0.89	0.40				
Molybdenum Mo				0.76	0.86	0.25	0.21	0.17				
Nickel Ni				2.26	2.22	0.66	0.66	0.39				
Phosphorus P				14	28	5		6				
Potassium K				9978	7718	2857	3465	1518				
Selenium Se				3.48	2.39	0.99	1.66	0.61				
Silicon SiO2				167	317	55		66				
Silver Ag				0.01	0.01	0.00	0.00	0.00				
Sodium Na				136217	121242	44198	47580	24436				
Strontium Sr				159	115	47	60	23				
Tellurium Te				0	0	0		0				
Thallium Tl				0.08	0.06	0.01	0.00	0.00				
Thorium Th				0.01	0.01	0.00		0.00				
Tin Sn				0.28	0.62	0.09	0.05	0.08				
Titanium Ti				0	0	0		0				
Uranium U				0.14	0.11	0.05	0.05	0.02				
Vanadium V				2.80	0.73	0.23	0.18	0.14				
Zinc Zn				6.98	5.88	3.57	2.51	1.22				
Zirconium Zr				23	15	6	7	3				

Solute Loadings in DORIS CREEK D/S of waterfall (kg/month)												
Date	Year 10 Mar-17	Year 10 Apr-17	Year 10 May-17	Year 10 Jun-17	Year 10 Jul-17	Year 10 Aug-17	Year 10 Sep-17	Year 10 Oct-17	Year 10 Nov-17	Year 10 Dec-17	Year 10 Jan-18	Year 10 Feb-18
Parameter												
TDS				692527	495844	168546	214702	103770				
TSS				13441	11301	3526	4442	1619				
Free CN												
Total CN				4	3	1	1	1				
WAD CN												
CNO												
SCN				2	4	1		1				
Sulphate				17789	12612	4225	4442	2459				
Chloride				312524	288602	92364	93285	57177				
Total Ammonia				35	41	14	12	4				
Nitrate				52	71	15	7	14				
Nitrite				4	6	1	1	1				
Alkalinity				117478	80483	32679	41193	15856				
OrthoPhosphate-P				12	18	4	1	4				
Phosphate-P				93	75	41	40	17				
Org. Carbon				22667	14800	6031	7404	2815				
Hardness CaCO3				170945	123520	52326	66632	25415				
Total Metals												
Aluminum Al				344	174	69	71	27				
Antimony Sb				0.8	1.4	0.3	0.0	0.3				
Arsenic As				1.8	1.3	0.6	0.6	0.3				
Barium Ba				15	9	4	4	2				
Beryllium Be				0.05	0.06	0.01	0.00	0.01				
Bismuth Bi				0.73	1.40	0.24	0.00	0.28				
Boron B				87	63	27	33	13				
Cadmium Cd				0.01	0.01	0.00	0.00	0.00				
Calcium Ca				39437	41742	12281	10883	8301				
Chromium Cr				2	1	0	0	0				
Cobalt Co				0.36	0.39	0.11	0.08	0.08				
Copper Cu				6	4	2	2	1				
Iron Fe				510	330	101	134	51				
Lead Pb				0.23	0.19	0.14	0.05	0.03				
Lithium Li				0	0	0		0				
Magnesium Mg				23921	17498	7585	9432	3570				
Manganese Mn				51	43	19	15	6				
Mercury Hg				2.85	2.02	0.76	0.89	0.39				
Molybdenum Mo				0.71	0.77	0.24	0.21	0.15				
Nickel Ni				2.19	2.09	0.64	0.66	0.36				
Phosphorus P				12	22	4		5				
Potassium K				9869	7489	2815	3465	1466				
Selenium Se				3.48	2.38	0.99	1.66	0.60				
Silicon SiO2				136	258	44		53				
Silver Ag				0.01	0.01	0.00	0.00	0.00				
Sodium Na				132852	114626	43038	47580	23021				
Strontium Sr				159	114	47	60	22				
Tellurium Te				0	0	0		0				
Thallium Tl				0.08	0.06	0.01	0.00	0.00				
Thorium Th				0.01	0.01	0.00		0.00				
Tin Sn				0.25	0.57	0.08	0.05	0.07				
Titanium Ti				0	0	0		0				
Uranium U				0.14	0.10	0.04	0.05	0.02				
Vanadium V				2.77	0.67	0.22	0.18	0.13				
Zinc Zn				6.91	5.67	3.53	2.51	1.17				
Zirconium Zr				23	15	6	7	3				

OUTPUT SUMMARY							Fraction of CCME in LRL Creek (%)	
Max Annual Discharge rate		826,421 m ³ /year in		Year 2				
Degradation Field(age)		Tail Lk Cu < CME Year		12				
				Doris Creek	Max L'Roberts L Outflow			
Maximum Concentration		MMER	CCME	Tail Lake Year 3	Downstream Year 3	Baseline Operational Year 3		
pH			6 to 9	7 to 8	7 to 8	7.6	7 to 8	
TDS		mg/L		1601	251	580	633	
TSS		mg/L	15	2.1	3.9	4.6	4.7	
Free CN		mg/L		0.0005	0.00005		0.00002	0%
Total CN		mg/L	1.0	0.008	0.002	0.001	0.001	
WAD CN		mg/L		0.0007	0.0001		0.0000	
CNO		mg/L		1.2	0.10		0.06	
SCN		mg/L		0.083	0.007		0.004	
Sulphate		mg/L		74	9.1	7.1	10.3	
Chloride		mg/L		1443	169	70	129	
Total Ammonia-N		mg/L		0.47	0.061	0.005	0.033	3%
Nitrate-N		mg/L		8.8	0.88	0.01	0.47	16%
Nitrite-N		mg/L	0.018	0.30	0.032	0.001	0.017	95%
Alkalinity		mg/L		54	30	25	27	
OrthoPhosphate-P		mg/L		0.2921	0.0211	0.0010	0.0119	
Phosphate-P		mg/L		0.2965	0.0486	0.0185	0.0284	
Org. Carbon		mg/L		5.9	5.1	5.3	5.5	
Hardness CaCO3		mg/L		97	49	45	49	
Total Metals								
Aluminum Al		mg/L	0.1	0.06	0.08	0.44	0.44	443%
Antimony Sb		mg/L		0.0260	0.0020	0.00002	0.0011	
Arsenic As		mg/L	0.5	0.00	0.0007	0.0005	0.0007	13%
Barium Ba		mg/L		0.0080	0.0037	0.0073	0.0076	
Beryllium Be		mg/L		0.00096	0.00010	0.000012	0.000057	
Bismuth Bi		mg/L		0.02582	0.0020	0.000007	0.0010	
Boron B		mg/L		0.040	0.025	0.027	0.029	
Cadmium Cd		mg/L	0.000017	0.000073	0.0000128	0.0000021	0.0000079	46%
Calcium Ca		mg/L		316	34	6.7	21	
Chromium Cr		mg/L	0.001	0.0037	0.0006	0.0009	0.0011	110%
Cobalt Co		mg/L		0.0047	0.0005	0.0001	0.0003	
Copper Cu		mg/L	0.3	0.007	0.0019	0.0016	0.0020	98%
Iron Fe		mg/L	0.3	0.12	0.11	0.36	0.3674	122%
Lead Pb		mg/L	0.2	0.00060	0.00017	0.00017	0.00021	21%
Lithium Li		mg/L		0.0036	0.0003		0.0002	
Magnesium Mg		mg/L		10.4	6.7	6.5	7.0	
Manganese Mn		mg/L		0.018	0.016	0.011	0.012	
Mercury Hg		ug/L	0.026	0.0056	0.0010	0.0006	0.0009	3%
Molybdenum Mo		mg/L	0.073	0.0071	0.00073	0.00018	0.00050	1%
Nickel Ni		mg/L	0.5	0.010	0.0013	0.0007	0.0012	5%
Phosphorus P		mg/L		0.392	0.031		0.017	
Potassium K		mg/L		19	3.7	2.3	3.1	
Selenium Se		mg/L	0.001	0.00074	0.00113	0.0014	0.0014	139%
Silicon SiO2		mg/L		4.6	0.45		0.24	
Silver Ag		mg/L	0.0001	0.00010	0.0000153	0.0000015	0.0000088	9%
Sodium Na		mg/L		359	54	33	46	
Strontium Sr		mg/L		0.073	0.043	0.042	0.045	
Tellurium Te		mg/L		0.000	0.000		0.000	
Thallium Tl		mg/L	0.0008	0.000038	0.000025	0.000064	0.000067	8%
Thorium Th		mg/L		0.000164	0.0000236		0.0000126	
Tin Sn		mg/L		0.00417	0.00040	0.00004	0.00022	
Titanium Ti		mg/L		0.0016	0.0001		0.0001	
Uranium U		mg/L		0.000220	0.000061	0.000052	0.000067	
Vanadium V		mg/L		0.0046	0.0009	0.0010	0.0012	
Zinc Zn		mg/L	0.5	0.015	0.0038	0.0084	0.0091	30%
Zirconium Zr		mg/L		0.0074	0.0054	0.0050	0.0054	

Water Quality in Little Roberts Lake Outflow													
Date		Year 1 Mar-08	Year 1 Apr-08	Year 1 May-08	Year 1 Jun-08	Year 1 Jul-08	Year 1 Aug-08	Year 1 Sep-08	Year 1 Oct-08	Year 1 Nov-08	Year 1 Dec-08	Year 1 Jan-09	Year 1 Feb-09
Parameter													
TDS	mg/L				114	587	140	150	152				
TSS	mg/L				4.7	3.0	2.3	2.2	2.2				
Free CN	mg/L				0.00001	0.00000			0.00000				
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L				0.0000	0.0000			0.0000				
CNO	mg/L				0.02	0.00			0.00				
SCN	mg/L				0.001	0.001			0.000				
Sulphate	mg/L				7.7	4.1	4.4	5.5	5.8				
Chloride	mg/L				58	67	60	70	73				
Total Ammonia-N	mg/L				0.018	0.020	0.011	0.011	0.012				
Nitrate-N	mg/L				0.08	0.10	0.05	0.05	0.08				
Nitrite-N	mg/L				0.007	0.010	0.002	0.002	0.002				
Alkalinity	mg/L				21	24	25	25	25				
OrthoPhosphate-P	mg/L				0.0023	0.0023	0.0010	0.0010	0.0015				
Phosphate-P	mg/L				0.0201	0.0175	0.0180	0.0170	0.0176				
Org. Carbon	mg/L				5.4	4.2	5.3	4.8	4.8				
Hardness CaCO3	mg/L				35	40	40	45	45				
Total Metals													
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06				
Antimony Sb	mg/L				0.0001	0.0001	0.0000	0.0000	0.0001				
Arsenic As	mg/L				0.0005	0.0004	0.0005	0.0005	0.0005				
Barium Ba	mg/L				0.0074	0.0036	0.0040	0.0033	0.0034				
Beryllium Be	mg/L				0.00002	0.00002	0.00001	0.00001	0.00001				
Bismuth Bi	mg/L				0.00008	0.00014	0.00001	0.00001	0.00006				
Boron B	mg/L				0.021	0.024	0.025	0.027	0.027				
Cadmium Cd	mg/L				0.0000039	0.0000041	0.0000034	0.0000034	0.0000036				
Calcium Ca	mg/L				8	9	7	7	8				
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0002	0.0001	0.0001	0.0001	0.0001				
Copper Cu	mg/L				0.0016	0.0013	0.0016	0.0016	0.0017				
Iron Fe	mg/L				0.37	0.13	0.16	0.13	0.13				
Lead Pb	mg/L				0.00018	0.00008	0.00013	0.00005	0.00005				
Lithium Li	mg/L				0.0000	0.0000	0.0000	0.0000	0.0000				
Magnesium Mg	mg/L				5.5	6.1	6.3	6.5	6.6				
Manganese Mn	mg/L				0.011	0.009	0.009	0.007	0.007				
Mercury Hg	ug/L				0.0006620	0.0006563	0.0006001	0.0006001	0.0006194				
Molybdenum Mo	mg/L				0.00021	0.00021	0.00018	0.00018	0.00020				
Nickel Ni	mg/L				0.0008	0.0006	0.0006	0.0005	0.0006				
Phosphorus P	mg/L				0.003	0.003	0.001	0.001	0.002				
Potassium K	mg/L				2.3	2.3	2.2	2.3	2.3				
Selenium Se	mg/L				0.00073	0.00079	0.00089	0.00136	0.00136				
Silicon SiO2	mg/L				0.04	0.05	0.01	0.01	0.03				
Silver Ag	mg/L				0.0000033	0.0000040	0.0000030	0.0000025	0.0000028				
Sodium Na	mg/L				27	32	32	33	33				
Strontium Sr	mg/L				0.037	0.039	0.041	0.042	0.042				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000065	0.000014	0.000002	0.000009	0.000009				
Thorium Th	mg/L				0.000004	0.000004	0.000003	0.000003	0.000003				
Tin Sn	mg/L				0.00005	0.00007	0.00005	0.00005	0.00006				
Titanium Ti	mg/L				0.0000	0.0000	0.0000	0.0000	0.0000				
Uranium U	mg/L				0.000057	0.000045	0.000046	0.000044	0.000045				
Vanadium V	mg/L				0.0011	0.0002	0.0004	0.0001	0.0001				
Zinc Zn	mg/L				0.0087	0.0027	0.0026	0.0012	0.0013				
Zirconium Zr	mg/L				0.0053	0.0052	0.0051	0.0051	0.0051				

Water Quality in Little Roberst Lake Outflow												
Date		Year 2	Year 2	Year 2	Year 2	Year 2	Year 2	Year 2	Year 2	Year 2	Year 2	Year 2
		Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10
		Feb-10										
Parameter												
TDS	mg/L				128	600	153	150	177			
TSS	mg/L				4.7	3.1	2.3	2.2	2.3			
Free CN	mg/L				0.00002		0.00000	0.00000	0.00000			
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001			
WAD CN	mg/L				0.0000		0.0000	0.0000	0.0000			
CNO	mg/L				0.06		0.01	0.00	0.01			
SCN	mg/L				0.003	0.002	0.002	0.000	0.003			
Sulphate	mg/L				9.4	5.5	5.8	5.5	8.3			
Chloride	mg/L				83	88	80	70	112			
Total Ammonia-N	mg/L				0.029	0.027	0.009	0.008	0.015			
Nitrate-N	mg/L				0.26	0.25	0.19	0.03	0.37			
Nitrite-N	mg/L				0.016	0.009	0.008	0.001	0.005			
Alkalinity	mg/L				22	25	26	25	27			
OrthoPhosphate-P	mg/L				0.0070	0.0062	0.0046	0.0010	0.0084			
Phosphate-P	mg/L				0.0248	0.0215	0.0217	0.0170	0.0246			
Org. Carbon	mg/L				5.3	4.2	5.4	4.8	5.1			
Hardness CaCO3	mg/L				37	42	42	45	49			
Total Metals												
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06			
Antimony Sb	mg/L				0.0005	0.0005	0.0004	0.0000	0.0008			
Arsenic As	mg/L				0.0005	0.0005	0.0005	0.0005	0.0006			
Barium Ba	mg/L				0.0075	0.0038	0.0042	0.0033	0.0037			
Beryllium Be	mg/L				0.00004	0.00003	0.00002	0.00001	0.00004			
Bismuth Bi	mg/L				0.00050	0.00049	0.00035	0.00001	0.00074			
Boron B	mg/L				0.022	0.024	0.026	0.027	0.028			
Cadmium Cd	mg/L				0.0000049	0.0000048	0.0000041	0.0000027	0.0000057			
Calcium Ca	mg/L				16	16	13	7	20			
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000			
Cobalt Co	mg/L				0.0003	0.0002	0.0002	0.0001	0.0002			
Copper Cu	mg/L				0.0018	0.0014	0.0017	0.0016	0.0019			
Iron Fe	mg/L				0.37	0.13	0.16	0.13	0.14			
Lead Pb	mg/L				0.00019	0.00009	0.00013	0.00005	0.00007			
Lithium Li	mg/L				0.0001	0.0001	0.0001	0.0000	0.0001			
Magnesium Mg	mg/L				5.7	6.2	6.5	6.5	7.0			
Manganese Mn	mg/L				0.012	0.010	0.010	0.007	0.008			
Mercury Hg	ug/L				0.0007986	0.0007730	0.0007176	0.0006011	0.0008406			
Molybdenum Mo	mg/L				0.00040	0.00036	0.00032	0.00018	0.00048			
Nickel Ni	mg/L				0.0011	0.0008	0.0007	0.0005	0.0009			
Phosphorus P	mg/L				0.009	0.008	0.006	0.000	0.012			
Potassium K	mg/L				2.8	2.7	2.6	2.3	3.1			
Selenium Se	mg/L				0.00073	0.00080	0.00091	0.00135	0.00139			
Silicon SiO2	mg/L				0.16	0.14	0.10	0.01	0.20			
Silver Ag	mg/L				0.0000044	0.0000047	0.0000037	0.0000016	0.0000051			
Sodium Na	mg/L				28	33	33	33	35			
Strontium Sr	mg/L				0.039	0.040	0.043	0.042	0.045			
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000			
Thallium Tl	mg/L				0.000065	0.000014	0.000003	0.000009	0.000011			
Thorium Th	mg/L				0.000006	0.000006	0.000005	0.000001	0.000008			
Tin Sn	mg/L				0.00012	0.00013	0.00010	0.00004	0.00017			
Titanium Ti	mg/L				0.0000	0.0000	0.0000	0.0000	0.0001			
Uranium U	mg/L				0.000061	0.000048	0.000049	0.000042	0.000052			
Vanadium V	mg/L				0.0011	0.0003	0.0005	0.0001	0.0002			
Zinc Zn	mg/L				0.0089	0.0029	0.0029	0.0012	0.0018			
Zirconium Zr	mg/L				0.0053	0.0053	0.0052	0.0050	0.0054			

Water Quality in Little Roberst Lake Outflow													
Date		Year 3 Mar-10	Year 3 Apr-10	Year 3 May-10	Year 3 Jun-10	Year 3 Jul-10	Year 3 Aug-10	Year 3 Sep-10	Year 3 Oct-10	Year 3 Nov-10	Year 3 Dec-10	Year 3 Jan-11	Year 3 Feb-11
Parameter													
TDS	mg/L				138	611	173	184	185				
TSS	mg/L				4.7	3.1	2.4	2.3	2.3				
Free CN	mg/L				0.00002								
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L				0.0000								
CNO	mg/L				0.04								
SCN	mg/L				0.004	0.004	0.004	0.004	0.004				
Sulphate	mg/L				10.3	6.6	7.6	8.8	8.8				
Chloride	mg/L				99	106	109	121	122				
Total Ammonia-N	mg/L				0.033	0.031	0.017	0.017	0.017				
Nitrate-N	mg/L				0.43	0.43	0.45	0.47	0.47				
Nitrite-N	mg/L				0.017	0.013	0.013	0.005	0.005				
Alkalinity	mg/L				22	25	27	27	27				
OrthoPhosphate-P	mg/L				0.0107	0.0105	0.0110	0.0116	0.0119				
Phosphate-P	mg/L				0.0284	0.0257	0.0282	0.0278	0.0281				
Org. Carbon	mg/L				5.3	4.2	5.5	5.0	5.0				
Hardness CaCO3	mg/L				38	43	45	49	49				
Total Metals													
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06				
Antimony Sb	mg/L				0.0009	0.0009	0.0010	0.0010	0.0011				
Arsenic As	mg/L				0.0006	0.0005	0.0006	0.0007	0.0007				
Barium Ba	mg/L				0.0076	0.0038	0.0044	0.0037	0.0037				
Beryllium Be	mg/L				0.00006	0.00005	0.00005	0.00005	0.00005				
Bismuth Bi	mg/L				0.00083	0.00088	0.00095	0.00100	0.00104				
Boron B	mg/L				0.023	0.025	0.027	0.029	0.029				
Cadmium Cd	mg/L				0.0000079	0.0000078	0.0000078	0.0000078	0.0000078				
Calcium Ca	mg/L				20	20	21	21	21				
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0003	0.0003	0.0003	0.0003	0.0003				
Copper Cu	mg/L				0.0019	0.0015	0.0019	0.0020	0.0020				
Iron Fe	mg/L				0.37	0.13	0.16	0.14	0.14				
Lead Pb	mg/L				0.00021	0.00010	0.00016	0.00008	0.00008				
Lithium Li	mg/L				0.0002	0.0002	0.0002	0.0002	0.0002				
Magnesium Mg	mg/L				5.8	6.3	6.7	7.0	7.0				
Manganese Mn	mg/L				0.012	0.010	0.010	0.008	0.008				
Mercury Hg	ug/L				0.0008637	0.0008461	0.0008475	0.0008496	0.0008457				
Molybdenum Mo	mg/L				0.00049	0.00046	0.00049	0.00050	0.00049				
Nickel Ni	mg/L				0.0012	0.0009	0.0010	0.0010	0.0010				
Phosphorus P	mg/L				0.015	0.015	0.016	0.016	0.017				
Potassium K	mg/L				3.0	3.0	3.0	3.1	3.1				
Selenium Se	mg/L				0.00075	0.00081	0.00093	0.00139	0.00139				
Silicon SiO2	mg/L				0.24	0.23	0.23	0.23	0.23				
Silver Ag	mg/L				0.0000083	0.0000088	0.0000087	0.0000084	0.0000085				
Sodium Na	mg/L				28	33	34	35	35				
Strontium Sr	mg/L				0.039	0.041	0.044	0.045	0.045				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000067	0.000015	0.000004	0.000011	0.000011				
Thorium Th	mg/L				0.000013	0.000012	0.000012	0.000013	0.000013				
Tin Sn	mg/L				0.00018	0.00019	0.00021	0.00021	0.00022				
Titanium Ti	mg/L				0.0001	0.0001	0.0001	0.0001	0.0001				
Uranium U	mg/L				0.000067	0.000055	0.000059	0.000056	0.000056				
Vanadium V	mg/L				0.0012	0.0004	0.0006	0.0003	0.0003				
Zinc Zn	mg/L				0.0091	0.0031	0.0032	0.0019	0.0019				
Zirconium Zr	mg/L				0.0054	0.0054	0.0054	0.0054	0.0054				

Water Quality in Little Roberst Lake Outflow													
Date		Year 4 Mar-11	Year 4 Apr-11	Year 4 May-11	Year 4 Jun-11	Year 4 Jul-11	Year 4 Aug-11	Year 4 Sep-11	Year 4 Oct-11	Year 4 Nov-11	Year 4 Dec-11	Year 4 Jan-12	Year 4 Feb-12
Parameter													
TDS	mg/L				125	608	152	150	184				
TSS	mg/L				4.7	3.1	2.3	2.2	2.3				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.002	0.003	0.001		0.003				
Sulphate	mg/L				8.8	5.9	5.4	5.5	8.3				
Chloride	mg/L				78	98	77	70	117				
Total Ammonia-N	mg/L				0.008	0.008	0.008	0.008	0.008				
Nitrate-N	mg/L				0.20	0.29	0.14	0.03	0.35				
Nitrite-N	mg/L				0.005	0.001	0.002	0.001	0.002				
Alkalinity	mg/L				21	24	26	25	27				
OrthoPhosphate-P	mg/L				0.0076	0.0102	0.0050	0.0010	0.0118				
Phosphate-P	mg/L				0.0252	0.0254	0.0221	0.0170	0.0280				
Org. Carbon	mg/L				5.2	4.2	5.3	4.8	5.0				
Hardness CaCO3	mg/L				36	42	42	45	49				
Total Metals													
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06				
Antimony Sb	mg/L				0.0006	0.0008	0.0004	0.0000	0.0010				
Arsenic As	mg/L				0.0005	0.0005	0.0005	0.0005	0.0006				
Barium Ba	mg/L				0.0074	0.0038	0.0041	0.0033	0.0036				
Beryllium Be	mg/L				0.00004	0.00004	0.00002	0.00001	0.00004				
Bismuth Bi	mg/L				0.00059	0.00082	0.00036	0.00000	0.00096				
Boron B	mg/L				0.021	0.024	0.025	0.027	0.028				
Cadmium Cd	mg/L				0.0000043	0.0000051	0.0000037	0.0000027	0.0000055				
Calcium Ca	mg/L				12	16	11	7	18				
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0002	0.0002	0.0001	0.0001	0.0002				
Copper Cu	mg/L				0.0017	0.0014	0.0017	0.0016	0.0019				
Iron Fe	mg/L				0.37	0.13	0.16	0.13	0.14				
Lead Pb	mg/L				0.00019	0.00009	0.00013	0.00005	0.00007				
Lithium Li	mg/L				0.0001	0.0001	0.0001	0.0000	0.0001				
Magnesium Mg	mg/L				5.5	6.2	6.4	6.5	6.9				
Manganese Mn	mg/L				0.011	0.010	0.010	0.007	0.008				
Mercury Hg	ug/L				0.0007221	0.0007729	0.0006762	0.0006001	0.0008056				
Molybdenum Mo	mg/L				0.00032	0.00037	0.00027	0.00018	0.00044				
Nickel Ni	mg/L				0.0010	0.0008	0.0007	0.0005	0.0009				
Phosphorus P	mg/L				0.009	0.013	0.006	0.000	0.015				
Potassium K	mg/L				2.5	2.8	2.4	2.3	2.9				
Selenium Se	mg/L				0.00072	0.00079	0.00090	0.00135	0.00138				
Silicon SiO2	mg/L				0.11	0.15	0.07	0.01	0.18				
Silver Ag	mg/L				0.0000043	0.0000057	0.0000035	0.0000015	0.0000056				
Sodium Na	mg/L				27	33	33	33	35				
Strontium Sr	mg/L				0.038	0.040	0.042	0.042	0.045				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000065	0.000014	0.000002	0.000009	0.000011				
Thorium Th	mg/L				0.000005	0.000007	0.000004	0.000001	0.000008				
Tin Sn	mg/L				0.00013	0.00018	0.00010	0.00004	0.00020				
Titanium Ti	mg/L				0.0000	0.0001	0.0000	0.0000	0.0001				
Uranium U	mg/L				0.000058	0.000049	0.000048	0.000042	0.000051				
Vanadium V	mg/L				0.0011	0.0003	0.0005	0.0001	0.0003				
Zinc Zn	mg/L				0.0088	0.0029	0.0028	0.0012	0.0018				
Zirconium Zr	mg/L				0.0052	0.0053	0.0051	0.0050	0.0053				

Water Quality in Little Roberst Lake Outflow													
Date		Year 5 Mar-12	Year 5 Apr-12	Year 5 May-12	Year 5 Jun-12	Year 5 Jul-12	Year 5 Aug-12	Year 5 Sep-12	Year 5 Oct-12	Year 5 Nov-12	Year 5 Dec-12	Year 5 Jan-13	Year 5 Feb-13
Parameter													
TDS	mg/L				114	612	157	150	213				
TSS	mg/L				4.7	3.1	2.3	2.2	2.3				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.001	0.002	0.001		0.002				
Sulphate	mg/L				7.8	5.6	5.3	5.5	7.8				
Chloride	mg/L				61	98	78	70	129				
Total Ammonia-N	mg/L				0.007	0.009	0.008	0.008	0.008				
Nitrate-N	mg/L				0.10	0.25	0.12	0.03	0.28				
Nitrite-N	mg/L				0.001	0.002	0.002	0.001	0.002				
Alkalinity	mg/L				20	24	26	25	27				
OrthoPhosphate-P	mg/L				0.0036	0.0090	0.0043	0.0010	0.0098				
Phosphate-P	mg/L				0.0212	0.0242	0.0213	0.0170	0.0260				
Org. Carbon	mg/L				5.2	4.2	5.3	4.8	5.0				
Hardness CaCO3	mg/L				34	42	41	45	48				
Total Metals													
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06				
Antimony Sb	mg/L				0.0002	0.0007	0.0003	0.0000	0.0008				
Arsenic As	mg/L				0.0004	0.0005	0.0005	0.0005	0.0006				
Barium Ba	mg/L				0.0073	0.0037	0.0041	0.0033	0.0036				
Beryllium Be	mg/L				0.00002	0.00003	0.00002	0.00001	0.00004				
Bismuth Bi	mg/L				0.00023	0.00071	0.00029	0.00000	0.00078				
Boron B	mg/L				0.021	0.024	0.025	0.027	0.028				
Cadmium Cd	mg/L				0.0000034	0.0000050	0.0000036	0.0000027	0.0000053				
Calcium Ca	mg/L				8	15	11	7	18				
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0002	0.0002	0.0001	0.0001	0.0002				
Copper Cu	mg/L				0.0016	0.0014	0.0016	0.0016	0.0019				
Iron Fe	mg/L				0.36	0.13	0.16	0.13	0.14				
Lead Pb	mg/L				0.00018	0.00009	0.00013	0.00005	0.00007				
Lithium Li	mg/L				0.0000	0.0001	0.0000	0.0000	0.0001				
Magnesium Mg	mg/L				5.4	6.2	6.4	6.5	6.9				
Manganese Mn	mg/L				0.011	0.010	0.010	0.007	0.007				
Mercury Hg	ug/L				0.0006497	0.0007540	0.0006634	0.0006001	0.0007714				
Molybdenum Mo	mg/L				0.00022	0.00034	0.00026	0.00018	0.00039				
Nickel Ni	mg/L				0.0008	0.0008	0.0007	0.0005	0.0009				
Phosphorus P	mg/L				0.004	0.011	0.005	0.000	0.012				
Potassium K	mg/L				2.3	2.7	2.4	2.3	2.8				
Selenium Se	mg/L				0.00071	0.00080	0.00090	0.00135	0.00138				
Silicon SiO2	mg/L				0.05	0.13	0.06	0.01	0.15				
Silver Ag	mg/L				0.0000030	0.0000055	0.0000033	0.0000015	0.0000052				
Sodium Na	mg/L				26	35	35	33	46				
Strontium Sr	mg/L				0.037	0.040	0.042	0.042	0.045				
Tellurium Te	mg/L				0.000	0.000	0.000	0.000	0.000				
Thallium Tl	mg/L				0.000064	0.000014	0.000002	0.000009	0.000010				
Thorium Th	mg/L				0.000003	0.000006	0.000003	0.000001	0.000007				
Tin Sn	mg/L				0.00007	0.00016	0.00009	0.00004	0.00017				
Titanium Ti	mg/L				0.0000	0.0001	0.0000	0.0000	0.0001				
Uranium U	mg/L				0.000056	0.000049	0.000048	0.000042	0.000050				
Vanadium V	mg/L				0.0011	0.0003	0.0005	0.0001	0.0002				
Zinc Zn	mg/L				0.0086	0.0029	0.0028	0.0012	0.0017				
Zirconium Zr	mg/L				0.0051	0.0053	0.0051	0.0050	0.0053				

Water Quality in Little Roberst Lake Outflow													
Date		Year 6 Mar-13	Year 6 Apr-13	Year 6 May-13	Year 6 Jun-13	Year 6 Jul-13	Year 6 Aug-13	Year 6 Sep-13	Year 6 Oct-13	Year 6 Nov-13	Year 6 Dec-13	Year 6 Jan-14	Year 6 Feb-14
Parameter													
TDS	mg/L				123	633	162	150	209				
TSS	mg/L				4.7	3.1	2.3	2.2	2.3				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.001	0.002	0.001		0.002				
Sulphate	mg/L				7.7	5.2	5.1	5.5	7.4				
Chloride	mg/L				65	107	79	70	123				
Total Ammonia-N	mg/L				0.004	0.006	0.005	0.005	0.005				
Nitrate-N	mg/L				0.06	0.18	0.08	0.01	0.21				
Nitrite-N	mg/L				0.001	0.001	0.001	0.001	0.001				
Alkalinity	mg/L				20	24	26	25	27				
OrthoPhosphate-P	mg/L				0.0031	0.0075	0.0036	0.0010	0.0081				
Phosphate-P	mg/L				0.0207	0.0227	0.0207	0.0170	0.0243				
Org. Carbon	mg/L				5.2	4.2	5.3	4.8	5.0				
Hardness CaCO3	mg/L				34	42	41	45	48				
Total Metals													
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06				
Antimony Sb	mg/L				0.0002	0.0006	0.0002	0.0000	0.0006				
Arsenic As	mg/L				0.0004	0.0005	0.0005	0.0005	0.0006				
Barium Ba	mg/L				0.0073	0.0037	0.0041	0.0033	0.0036				
Beryllium Be	mg/L				0.00002	0.00003	0.00001	0.00000	0.00003				
Bismuth Bi	mg/L				0.00019	0.00058	0.00023	0.00000	0.00063				
Boron B	mg/L				0.021	0.024	0.025	0.027	0.028				
Cadmium Cd	mg/L				0.0000027	0.0000042	0.0000029	0.0000020	0.0000044				
Calcium Ca	mg/L				8	15	10	7	16				
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0002	0.0002	0.0001	0.0001	0.0002				
Copper Cu	mg/L				0.0016	0.0014	0.0016	0.0016	0.0018				
Iron Fe	mg/L				0.36	0.13	0.16	0.13	0.14				
Lead Pb	mg/L				0.00018	0.00008	0.00013	0.00005	0.00006				
Lithium Li	mg/L				0.0000	0.0001	0.0000		0.0001				
Magnesium Mg	mg/L				5.4	6.2	6.4	6.5	6.9				
Manganese Mn	mg/L				0.011	0.009	0.010	0.007	0.007				
Mercury Hg	ug/L				0.0006414	0.0007288	0.0006531	0.0006000	0.0007437				
Molybdenum Mo	mg/L				0.00021	0.00031	0.00024	0.00018	0.00035				
Nickel Ni	mg/L				0.0008	0.0007	0.0006	0.0005	0.0008				
Phosphorus P	mg/L				0.003	0.009	0.004		0.010				
Potassium K	mg/L				2.2	2.6	2.4	2.3	2.7				
Selenium Se	mg/L				0.00071	0.00079	0.00090	0.00135	0.00138				
Silicon SiO2	mg/L				0.03	0.10	0.04		0.12				
Silver Ag	mg/L				0.0000020	0.0000043	0.0000023	0.0000006	0.0000040				
Sodium Na	mg/L				30	43	37	33	46				
Strontium Sr	mg/L				0.037	0.040	0.042	0.042	0.044				
Tellurium Te	mg/L				0.000	0.000	0.000		0.000				
Thallium Tl	mg/L				0.000064	0.000014	0.000002	0.000009	0.000010				
Thorium Th	mg/L				0.000001	0.000004	0.000002		0.000005				
Tin Sn	mg/L				0.00006	0.00013	0.00008	0.00004	0.00014				
Titanium Ti	mg/L				0.0000	0.0001	0.0000		0.0001				
Uranium U	mg/L				0.000054	0.000047	0.000046	0.000041	0.000048				
Vanadium V	mg/L				0.0011	0.0003	0.0005	0.0001	0.0002				
Zinc Zn	mg/L				0.0085	0.0028	0.0027	0.0012	0.0017				
Zirconium Zr	mg/L				0.0051	0.0053	0.0051	0.0050	0.0053				

Water Quality in Little Roberst Lake Outflow													
Date		Year 7 Mar-14	Year 7 Apr-14	Year 7 May-14	Year 7 Jun-14	Year 7 Jul-14	Year 7 Aug-14	Year 7 Sep-14	Year 7 Oct-14	Year 7 Nov-14	Year 7 Dec-14	Year 7 Jan-15	Year 7 Feb-15
Parameter													
TDS	mg/L				120	624	158	150	199				
TSS	mg/L				4.7	3.1	2.3	2.2	2.3				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.000	0.001	0.001		0.002				
Sulphate	mg/L				7.6	4.9	5.0	5.5	7.0				
Chloride	mg/L				62	98	76	70	113				
Total Ammonia-N	mg/L				0.004	0.005	0.005	0.005	0.005				
Nitrate-N	mg/L				0.05	0.14	0.06	0.01	0.15				
Nitrite-N	mg/L				0.001	0.001	0.001	0.001	0.001				
Alkalinity	mg/L				20	24	26	25	27				
OrthoPhosphate-P	mg/L				0.0027	0.0062	0.0031	0.0010	0.0067				
Phosphate-P	mg/L				0.0203	0.0214	0.0202	0.0170	0.0230				
Org. Carbon	mg/L				5.2	4.2	5.3	4.8	5.0				
Hardness CaCO3	mg/L				34	41	41	45	48				
Total Metals													
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06				
Antimony Sb	mg/L				0.0002	0.0005	0.0002	0.0000	0.0005				
Arsenic As	mg/L				0.0004	0.0004	0.0005	0.0005	0.0006				
Barium Ba	mg/L				0.0073	0.0037	0.0041	0.0033	0.0035				
Beryllium Be	mg/L				0.00002	0.00002	0.00001	0.00000	0.00002				
Bismuth Bi	mg/L				0.00015	0.00047	0.00019	0.00000	0.00051				
Boron B	mg/L				0.021	0.024	0.025	0.027	0.028				
Cadmium Cd	mg/L				0.0000026	0.0000039	0.0000027	0.0000020	0.0000040				
Calcium Ca	mg/L				7	13	10	7	14				
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0002	0.0001	0.0001	0.0001	0.0001				
Copper Cu	mg/L				0.0016	0.0013	0.0016	0.0016	0.0018				
Iron Fe	mg/L				0.36	0.13	0.16	0.13	0.14				
Lead Pb	mg/L				0.00018	0.00008	0.00013	0.00005	0.00006				
Lithium Li	mg/L				0.0000	0.0001	0.0000		0.0001				
Magnesium Mg	mg/L				5.4	6.2	6.4	6.5	6.8				
Manganese Mn	mg/L				0.011	0.009	0.010	0.007	0.007				
Mercury Hg	ug/L				0.0006347	0.0007085	0.0006448	0.0006000	0.0007214				
Molybdenum Mo	mg/L				0.00020	0.00028	0.00023	0.00018	0.00032				
Nickel Ni	mg/L				0.0008	0.0007	0.0006	0.0005	0.0007				
Phosphorus P	mg/L				0.002	0.007	0.003		0.008				
Potassium K	mg/L				2.2	2.5	2.3	2.3	2.7				
Selenium Se	mg/L				0.00071	0.00079	0.00090	0.00135	0.00138				
Silicon SiO2	mg/L				0.03	0.09	0.03		0.09				
Silver Ag	mg/L				0.0000019	0.0000040	0.0000021	0.0000006	0.0000034				
Sodium Na	mg/L				29	41	36	33	44				
Strontium Sr	mg/L				0.037	0.040	0.042	0.042	0.044				
Tellurium Te	mg/L				0.000	0.000	0.000		0.000				
Thallium Tl	mg/L				0.000064	0.000014	0.000002	0.000009	0.000010				
Thorium Th	mg/L				0.000001	0.000004	0.000002		0.000004				
Tin Sn	mg/L				0.00006	0.00012	0.00007	0.00004	0.00012				
Titanium Ti	mg/L				0.0000	0.0001	0.0000		0.0001				
Uranium U	mg/L				0.000054	0.000046	0.000046	0.000041	0.000047				
Vanadium V	mg/L				0.0010	0.0003	0.0005	0.0001	0.0002				
Zinc Zn	mg/L				0.0085	0.0028	0.0027	0.0012	0.0016				
Zirconium Zr	mg/L				0.0051	0.0052	0.0051	0.0050	0.0053				

Water Quality in Little Roberst Lake Outflow													
Date		Year 8 Mar-15	Year 8 Apr-15	Year 8 May-15	Year 8 Jun-15	Year 8 Jul-15	Year 8 Aug-15	Year 8 Sep-15	Year 8 Oct-15	Year 8 Nov-15	Year 8 Dec-15	Year 8 Jan-16	Year 8 Feb-16
Parameter													
TDS	mg/L				117	616	155	150	190				
TSS	mg/L				4.7	3.1	2.3	2.2	2.3				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.000	0.001	0.000		0.001				
Sulphate	mg/L				7.5	4.6	4.9	5.5	6.8				
Chloride	mg/L				60	91	73	70	105				
Total Ammonia-N	mg/L				0.004	0.005	0.005	0.005	0.005				
Nitrate-N	mg/L				0.03	0.09	0.04	0.01	0.09				
Nitrite-N	mg/L				0.001	0.001	0.001	0.001	0.001				
Alkalinity	mg/L				20	24	26	25	27				
OrthoPhosphate-P	mg/L				0.0024	0.0052	0.0027	0.0010	0.0057				
Phosphate-P	mg/L				0.0199	0.0205	0.0198	0.0170	0.0219				
Org. Carbon	mg/L				5.2	4.2	5.3	4.8	5.0				
Hardness CaCO3	mg/L				34	41	41	45	48				
Total Metals													
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06				
Antimony Sb	mg/L				0.0001	0.0004	0.0002	0.0000	0.0004				
Arsenic As	mg/L				0.0004	0.0004	0.0005	0.0005	0.0006				
Barium Ba	mg/L				0.0073	0.0037	0.0041	0.0033	0.0035				
Beryllium Be	mg/L				0.00002	0.00002	0.00001	0.00000	0.00002				
Bismuth Bi	mg/L				0.00012	0.00038	0.00015	0.00000	0.00041				
Boron B	mg/L				0.021	0.024	0.025	0.027	0.028				
Cadmium Cd	mg/L				0.0000025	0.0000036	0.0000026	0.0000020	0.0000036				
Calcium Ca	mg/L				7	12	9	7	13				
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0002	0.0001	0.0001	0.0001	0.0001				
Copper Cu	mg/L				0.0016	0.0013	0.0016	0.0016	0.0018				
Iron Fe	mg/L				0.37	0.13	0.16	0.13	0.14				
Lead Pb	mg/L				0.00018	0.00008	0.00013	0.00005	0.00006				
Lithium Li	mg/L				0.0000	0.0001	0.0000		0.0001				
Magnesium Mg	mg/L				5.4	6.2	6.4	6.5	6.8				
Manganese Mn	mg/L				0.011	0.009	0.010	0.007	0.007				
Mercury Hg	ug/L				0.0006293	0.0006920	0.0006381	0.0006000	0.0007034				
Molybdenum Mo	mg/L				0.00019	0.00025	0.00022	0.00018	0.00030				
Nickel Ni	mg/L				0.0008	0.0006	0.0006	0.0005	0.0007				
Phosphorus P	mg/L				0.002	0.006	0.002		0.007				
Potassium K	mg/L				2.2	2.5	2.3	2.3	2.6				
Selenium Se	mg/L				0.00071	0.00079	0.00090	0.00135	0.00138				
Silicon SiO2	mg/L				0.02	0.07	0.03		0.08				
Silver Ag	mg/L				0.0000018	0.0000035	0.0000020	0.0000006	0.0000029				
Sodium Na	mg/L				29	39	36	33	42				
Strontium Sr	mg/L				0.037	0.039	0.042	0.042	0.044				
Tellurium Te	mg/L				0.000	0.000	0.000		0.000				
Thallium Tl	mg/L				0.000064	0.000014	0.000002	0.000009	0.000010				
Thorium Th	mg/L				0.000001	0.000003	0.000001		0.000004				
Tin Sn	mg/L				0.00005	0.00010	0.00007	0.00004	0.00011				
Titanium Ti	mg/L				0.0000	0.0001	0.0000		0.0001				
Uranium U	mg/L				0.000054	0.000045	0.000045	0.000041	0.000046				
Vanadium V	mg/L				0.0010	0.0003	0.0004	0.0001	0.0002				
Zinc Zn	mg/L				0.0085	0.0027	0.0027	0.0012	0.0016				
Zirconium Zr	mg/L				0.0051	0.0052	0.0051	0.0050	0.0053				

Water Quality in Little Roberst Lake Outflow													
Date		Year 9 Mar-16	Year 9 Apr-16	Year 9 May-16	Year 9 Jun-16	Year 9 Jul-16	Year 9 Aug-16	Year 9 Sep-16	Year 9 Oct-16	Year 9 Nov-16	Year 9 Dec-16	Year 9 Jan-17	Year 9 Feb-17
Parameter													
TDS	mg/L				115	610	152	150	183				
TSS	mg/L				4.7	3.1	2.3	2.2	2.3				
Free CN	mg/L												
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001				
WAD CN	mg/L												
CNO	mg/L												
SCN	mg/L				0.000	0.001	0.000		0.001				
Sulphate	mg/L				7.5	4.4	4.8	5.5	6.5				
Chloride	mg/L				58	85	71	70	99				
Total Ammonia-N	mg/L				0.004	0.005	0.005	0.005	0.005				
Nitrate-N	mg/L				0.02	0.05	0.02	0.01	0.05				
Nitrite-N	mg/L				0.001	0.001	0.001	0.001	0.001				
Alkalinity	mg/L				20	24	26	25	26				
OrthoPhosphate-P	mg/L				0.0021	0.0044	0.0024	0.0010	0.0048				
Phosphate-P	mg/L				0.0197	0.0197	0.0195	0.0170	0.0210				
Org. Carbon	mg/L				5.2	4.2	5.3	4.8	5.0				
Hardness CaCO3	mg/L				34	41	41	45	47				
Total Metals													
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06				
Antimony Sb	mg/L				0.0001	0.0003	0.0001	0.0000	0.0003				
Arsenic As	mg/L				0.0004	0.0004	0.0005	0.0005	0.0006				
Barium Ba	mg/L				0.0073	0.0036	0.0041	0.0033	0.0035				
Beryllium Be	mg/L				0.00002	0.00002	0.00001	0.00000	0.00002				
Bismuth Bi	mg/L				0.00010	0.00031	0.00012	0.00000	0.00033				
Boron B	mg/L				0.021	0.024	0.025	0.027	0.028				
Cadmium Cd	mg/L				0.0000024	0.0000033	0.0000025	0.0000020	0.0000033				
Calcium Ca	mg/L				7	11	9	7	12				
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000				
Cobalt Co	mg/L				0.0002	0.0001	0.0001	0.0001	0.0001				
Copper Cu	mg/L				0.0016	0.0013	0.0016	0.0016	0.0017				
Iron Fe	mg/L				0.37	0.13	0.16	0.13	0.14				
Lead Pb	mg/L				0.00017	0.00008	0.00012	0.00005	0.00006				
Lithium Li	mg/L				0.0000	0.0000	0.0000		0.0001				
Magnesium Mg	mg/L				5.4	6.1	6.4	6.5	6.8				
Manganese Mn	mg/L				0.011	0.009	0.010	0.007	0.007				
Mercury Hg	ug/L				0.0006250	0.0006787	0.0006326	0.0006000	0.0006888				
Molybdenum Mo	mg/L				0.00019	0.00024	0.00021	0.00018	0.00027				
Nickel Ni	mg/L				0.0008	0.0006	0.0006	0.0005	0.0007				
Phosphorus P	mg/L				0.002	0.005	0.002		0.005				
Potassium K	mg/L				2.2	2.4	2.3	2.3	2.5				
Selenium Se	mg/L				0.00071	0.00079	0.00090	0.00135	0.00138				
Silicon SiO2	mg/L				0.02	0.06	0.02		0.06				
Silver Ag	mg/L				0.0000016	0.0000031	0.0000018	0.0000006	0.0000024				
Sodium Na	mg/L				28	38	35	33	40				
Strontium Sr	mg/L				0.036	0.039	0.042	0.042	0.044				
Tellurium Te	mg/L				0.000	0.000	0.000		0.000				
Thallium Tl	mg/L				0.000064	0.000013	0.000002	0.000009	0.000010				
Thorium Th	mg/L				0.000001	0.000003	0.000001		0.000003				
Tin Sn	mg/L				0.00005	0.00009	0.00006	0.00004	0.00010				
Titanium Ti	mg/L				0.0000	0.0001	0.0000		0.0001				
Uranium U	mg/L				0.000053	0.000044	0.000045	0.000041	0.000045				
Vanadium V	mg/L				0.0010	0.0002	0.0004	0.0001	0.0001				
Zinc Zn	mg/L				0.0085	0.0027	0.0027	0.0012	0.0015				
Zirconium Zr	mg/L				0.0051	0.0052	0.0051	0.0050	0.0053				

Water Quality in Little Roberst Lake Outflow											
Date		Year 10 Mar-17	Year 10 Apr-17	Year 10 May-17	Year 10 Jun-17	Year 10 Jul-17	Year 10 Aug-17	Year 10 Sep-17	Year 10 Oct-17	Year 10 Nov-17	Year 10 Dec-17 Jan-18
Parameter											
TDS	mg/L				114	605	150	150	177		
TSS	mg/L				4.7	3.1	2.3	2.2	2.3		
Free CN	mg/L										
Total CN	mg/L				0.001	0.001	0.001	0.001	0.001		
WAD CN	mg/L										
CNO	mg/L										
SCN	mg/L				0.000	0.001	0.000		0.001		
Sulphate	mg/L				7.4	4.3	4.7	5.5	6.4		
Chloride	mg/L				57	80	69	70	93		
Total Ammonia-N	mg/L				0.004	0.005	0.005	0.005	0.005		
Nitrate-N	mg/L				0.01	0.01	0.01	0.01	0.02		
Nitrite-N	mg/L				0.001	0.001	0.001	0.001	0.001		
Alkalinity	mg/L				20	24	26	25	26		
OrthoPhosphate-P	mg/L				0.0019	0.0038	0.0021	0.0010	0.0041		
Phosphate-P	mg/L				0.0195	0.0190	0.0192	0.0170	0.0203		
Org. Carbon	mg/L				5.2	4.2	5.3	4.8	5.0		
Hardness CaCO3	mg/L				34	41	41	45	47		
Total Metals											
Aluminum Al	mg/L				0.44	0.10	0.13	0.06	0.06		
Antimony Sb	mg/L				0.0001	0.0003	0.0001	0.0000	0.0003		
Arsenic As	mg/L				0.0004	0.0004	0.0005	0.0005	0.0005		
Barium Ba	mg/L				0.0073	0.0036	0.0041	0.0033	0.0035		
Beryllium Be	mg/L				0.00002	0.00001	0.00001	0.00000	0.00001		
Bismuth Bi	mg/L				0.00008	0.00025	0.00010	0.00000	0.00027		
Boron B	mg/L				0.021	0.024	0.025	0.027	0.028		
Cadmium Cd	mg/L				0.0000024	0.0000031	0.0000024	0.0000020	0.0000031		
Calcium Ca	mg/L				6	10	8	7	11		
Chromium Cr	mg/L				0.001	0.000	0.000	0.000	0.000		
Cobalt Co	mg/L				0.0001	0.0001	0.0001	0.0001	0.0001		
Copper Cu	mg/L				0.0015	0.0013	0.0016	0.0016	0.0017		
Iron Fe	mg/L				0.37	0.13	0.16	0.13	0.14		
Lead Pb	mg/L				0.00017	0.00007	0.00012	0.00005	0.00005		
Lithium Li	mg/L				0.0000	0.0000	0.0000		0.0000		
Magnesium Mg	mg/L				5.4	6.1	6.4	6.5	6.8		
Manganese Mn	mg/L				0.011	0.009	0.009	0.007	0.007		
Mercury Hg	ug/L				0.0006215	0.0006667	0.0006274	0.0006000	0.0006743		
Molybdenum Mo	mg/L				0.00018	0.00022	0.00021	0.00018	0.00026		
Nickel Ni	mg/L				0.0008	0.0006	0.0006	0.0005	0.0007		
Phosphorus P	mg/L				0.001	0.004	0.002		0.004		
Potassium K	mg/L				2.2	2.4	2.3	2.3	2.5		
Selenium Se	mg/L				0.00071	0.00079	0.00090	0.00135	0.00137		
Silicon SiO2	mg/L				0.01	0.05	0.02		0.05		
Silver Ag	mg/L				0.0000015	0.0000028	0.0000017	0.0000006	0.0000021		
Sodium Na	mg/L				28	37	35	33	39		
Strontium Sr	mg/L				0.036	0.039	0.042	0.042	0.044		
Tellurium Te	mg/L				0.000	0.000	0.000		0.000		
Thallium Tl	mg/L				0.000064	0.000013	0.000002	0.000009	0.000009		
Thorium Th	mg/L				0.000001	0.000002	0.000001		0.000002		
Tin Sn	mg/L				0.00004	0.00008	0.00006	0.00004	0.00009		
Titanium Ti	mg/L				0.0000	0.0000	0.0000		0.0001		
Uranium U	mg/L				0.000053	0.000044	0.000045	0.000041	0.000044		
Vanadium V	mg/L				0.0010	0.0002	0.0004	0.0001	0.0001		
Zinc Zn	mg/L				0.0085	0.0027	0.0027	0.0012	0.0015		
Zirconium Zr	mg/L				0.0051	0.0052	0.0051	0.0050	0.0052		

Loadings in Little Roberts Creek Outflow (kg/month)												
Date	Year 1 Mar-08	Year 1 Apr-08	Year 1 May-08	Year 1 Jun-08	Year 1 Jul-08	Year 1 Aug-08	Year 1 Sep-08	Year 1 Oct-08	Year 1 Nov-08	Year 1 Dec-08	Year 1 Jan-09	Year 1 Feb-09
Parameter												
TDS				144	135	125	145	148				
TSS				2.8	3.8	3.0	3.0	3.0				
Free CN				0.00002	0.00000			0.00000				
Total CN				0.001	0.001	0.001	0.001	0.001				
WAD CN				0.0000	0.0000			0.0000				
CNO				0.04	0.01			0.00				
SCN				0.001	0.001			0.000				
Sulphate				4.3	3.9	3.1	3.1	3.5				
Chloride				66	72	62	63	68				
Total Ammonia				0.033	0.043	0.024	0.020	0.021				
Nitrate				0.15	0.19	0.10	0.10	0.15				
Nitrite				0.013	0.018	0.003	0.003	0.004				
Alkalinity				26	27	27	28	28				
OrthoPhosphate-P				0.0032	0.0032	0.0008	0.0008	0.0018				
Phosphate-P				0.0204	0.0224	0.0325	0.0270	0.0277				
Org. Carbon				5.0	5.0	5.1	5.0	5.0				
Hardness CaCO3				38	41	44	45	45				
Total Metals												
Aluminum Al				0.07	0.06	0.06	0.05	0.05				
Antimony Sb				0.0002	0.0003	0.0000	0.0000	0.0001				
Arsenic As				0.0004	0.0005	0.0005	0.0005	0.0005				
Barium Ba				0.0032	0.0031	0.0030	0.0030	0.0030				
Beryllium Be				0.00002	0.00002	0.00001	0.00001	0.00002				
Bismuth Bi				0.00015	0.00026	0.00001	0.00001	0.00013				
Boron B				0.019	0.022	0.023	0.023	0.023				
Cadmium Cd				0.0000055	0.0000056	0.0000049	0.0000049	0.0000053				
Calcium Ca				11	11	8	7	9				
Chromium Cr				0.000	0.000	0.000	0.000	0.000				
Cobalt Co				0.0001	0.0001	0.0001	0.0001	0.0001				
Copper Cu				0.0013	0.0015	0.0014	0.0014	0.0014				
Iron Fe				0.11	0.11	0.09	0.09	0.09				
Lead Pb				0.00006	0.00007	0.00013	0.00005	0.00005				
Lithium Li				0.0000	0.0001	0.0000	0.0000	0.0000				
Magnesium Mg				5.3	5.9	6.4	6.4	6.4				
Manganese Mn				0.011	0.014	0.016	0.010	0.010				
Mercury Hg				0.0006655	0.0006647	0.0006002	0.0006002	0.0006299				
Molybdenum Mo				0.00021	0.00023	0.00015	0.00014	0.00018				
Nickel Ni				0.0006	0.0007	0.0005	0.0005	0.0005				
Phosphorus P				0.005	0.006	0.002	0.002	0.003				
Potassium K				2.3	2.5	2.3	2.3	2.4				
Selenium Se				0.00075	0.00081	0.00085	0.00113	0.00112				
Silicon SiO2				0.08	0.09	0.03	0.03	0.05				
Silver Ag				0.0000055	0.0000057	0.0000046	0.0000045	0.0000050				
Sodium Na				26	30	33	32	32				
Strontium Sr				0.035	0.038	0.039	0.040	0.040				
Tellurium Te				0.000	0.000	0.000	0.000	0.000				
Thallium Tl				0.000018	0.000022	0.000012	0.000004	0.000004				
Thorium Th				0.0000070	0.0000077	0.0000059	0.0000059	0.0000068				
Tin Sn				0.00006	0.00017	0.00005	0.00005	0.00006				
Titanium Ti				0.0000	0.0000	0.0000	0.0000	0.0000				
Uranium U				0.000035	0.000038	0.000042	0.000037	0.000038				
Vanadium V				0.0006	0.0002	0.0002	0.0001	0.0002				
Zinc Zn				0.0019	0.0020	0.0029	0.0018	0.0019				
Zirconium Zr				0.0051	0.0051	0.0051	0.0051	0.0051				

Loadings in Little Roberts Creek Outflow (kg/month)												
Date	Year 2 Mar-09	Year 2 Apr-09	Year 2 May-09	Year 2 Jun-09	Year 2 Jul-09	Year 2 Aug-09	Year 2 Sep-09	Year 2 Oct-09	Year 2 Nov-09	Year 2 Dec-09	Year 2 Jan-10	Year 2 Feb-10
Parameter												
TDS				169	155	143	145	182				
TSS				2.9	3.8	2.9	3.0	2.9				
Free CN				0.00005		0.00000	0.00000	0.00001				
Total CN				0.002	0.001	0.001	0.001	0.001				
WAD CN				0.0001		0.0000	0.0000	0.0000				
CNO				0.10		0.01	0.00	0.02				
SCN				0.005	0.005	0.003	0.000	0.006				
Sulphate				7.3	6.4	5.5	3.1	8.0				
Chloride				114	111	97	63	135				
Total Ammonia				0.055	0.055	0.020	0.014	0.026				
Nitrate				0.47	0.46	0.35	0.05	0.69				
Nitrite				0.029	0.017	0.014	0.002	0.008				
Alkalinity				27	28	28	28	30				
OrthoPhosphate-P				0.0119	0.0104	0.0076	0.0008	0.0145				
Phosphate-P				0.0290	0.0292	0.0377	0.0271	0.0388				
Org. Carbon				5.0	4.9	5.0	5.0	5.0				
Hardness CaCO3				41	44	45	45	49				
Total Metals												
Aluminum Al				0.07	0.06	0.06	0.05	0.05				
Antimony Sb				0.0010	0.0009	0.0007	0.0000	0.0014				
Arsenic As				0.0005	0.0005	0.0006	0.0004	0.0006				
Barium Ba				0.0035	0.0033	0.0031	0.0030	0.0034				
Beryllium Be				0.00005	0.00005	0.00004	0.00001	0.00007				
Bismuth Bi				0.00093	0.00092	0.00068	0.00001	0.00137				
Boron B				0.020	0.022	0.023	0.023	0.024				
Cadmium Cd				0.0000073	0.0000069	0.0000060	0.0000034	0.0000087				
Calcium Ca				26	24	19	8	31				
Chromium Cr				0.000	0.000	0.000	0.000	0.000				
Cobalt Co				0.0003	0.0003	0.0002	0.0001	0.0004				
Copper Cu				0.0016	0.0017	0.0016	0.0014	0.0019				
Iron Fe				0.11	0.11	0.08	0.09	0.09				
Lead Pb				0.00008	0.00008	0.00014	0.00004	0.00008				
Lithium Li				0.0002	0.0002	0.0001	0.0000	0.0003				
Magnesium Mg				5.5	6.0	6.4	6.4	6.6				
Manganese Mn				0.011	0.015	0.016	0.010	0.011				
Mercury Hg				0.0009152	0.0008676	0.0007905	0.0006019	0.0009935				
Molybdenum Mo				0.00055	0.00052	0.00041	0.00014	0.00068				
Nickel Ni				0.0010	0.0010	0.0008	0.0005	0.0012				
Phosphorus P				0.017	0.015	0.011	0.001	0.022				
Potassium K				3.1	3.1	2.9	2.3	3.6				
Selenium Se				0.00076	0.00080	0.00083	0.00113	0.00109				
Silicon SiO2				0.30	0.26	0.19	0.01	0.37				
Silver Ag				0.0000073	0.0000069	0.0000056	0.0000025	0.0000089				
Sodium Na				27	30	33	32	33				
Strontium Sr				0.037	0.040	0.040	0.040	0.043				
Tellurium Te				0.000	0.000	0.000	0.000	0.000				
Thallium Tl				0.000019	0.000022	0.000012	0.000004	0.000006				
Thorium Th				0.0000119	0.0000112	0.0000089	0.0000028	0.0000152				
Tin Sn				0.00019	0.00027	0.00015	0.00004	0.00026				
Titanium Ti				0.0001	0.0001	0.0001	0.0000	0.0001				
Uranium U				0.000042	0.000043	0.000045	0.000034	0.000048				
Vanadium V				0.0007	0.0003	0.0003	0.0001	0.0004				
Zinc Zn				0.0022	0.0023	0.0033	0.0017	0.0027				
Zirconium Zr				0.0052	0.0051	0.0051	0.0051	0.0053				

Loadings in Little Roberts Creek Outflow (kg/month)												
Date	Year 3 Mar-10	Year 3 Apr-10	Year 3 May-10	Year 3 Jun-10	Year 3 Jul-10	Year 3 Aug-10	Year 3 Sep-10	Year 3 Oct-10	Year 3 Nov-10	Year 3 Dec-10	Year 3 Jan-11	Year 3 Feb-11
Parameter												
TDS				187	177	174	196	198				
TSS				2.9	3.8	2.9	2.9	2.9				
Free CN				0.00003								
Total CN				0.001	0.001	0.001	0.001	0.001				
WAD CN				0.0000								
CNO				0.07								
SCN				0.007	0.007	0.007	0.007	0.007				
Sulphate				9.1	8.5	8.7	8.8	8.9				
Chloride				144	145	149	153	154				
Total Ammonia				0.061	0.061	0.034	0.029	0.030				
Nitrate				0.79	0.80	0.83	0.87	0.88				
Nitrite				0.032	0.024	0.024	0.008	0.008				
Alkalinity				28	29	29	30	30				
OrthoPhosphate-P				0.0188	0.0184	0.0193	0.0205	0.0211				
Phosphate-P				0.0358	0.0372	0.0486	0.0448	0.0456				
Org. Carbon				4.9	4.9	5.0	5.0	5.0				
Hardness CaCO3				43	46	48	49	49				
Total Metals												
Aluminum Al				0.08	0.06	0.06	0.05	0.05				
Antimony Sb				0.0016	0.0017	0.0018	0.0019	0.0020				
Arsenic As				0.0006	0.0007	0.0007	0.0007	0.0007				
Barium Ba				0.0037	0.0035	0.0034	0.0034	0.0034				
Beryllium Be				0.00009	0.00009	0.00009	0.00010	0.00010				
Bismuth Bi				0.00155	0.00163	0.00177	0.00188	0.00195				
Boron B				0.021	0.023	0.025	0.025	0.025				
Cadmium Cd				0.0000128	0.0000124	0.0000126	0.0000128	0.0000128				
Calcium Ca				34	33	33	33	33				
Chromium Cr				0.001	0.001	0.001	0.000	0.000				
Cobalt Co				0.0005	0.0004	0.0004	0.0005	0.0005				
Copper Cu				0.0018	0.0019	0.0019	0.0019	0.0019				
Iron Fe				0.11	0.11	0.08	0.09	0.09				
Lead Pb				0.00011	0.00011	0.00017	0.00010	0.00010				
Lithium Li				0.0003	0.0003	0.0003	0.0003	0.0003				
Magnesium Mg				5.6	6.2	6.7	6.7	6.7				
Manganese Mn				0.012	0.015	0.016	0.011	0.011				
Mercury Hg				0.0010365	0.0010050	0.0010077	0.0010153	0.0010116				
Molybdenum Mo				0.00073	0.00071	0.00072	0.00072	0.00071				
Nickel Ni				0.0013	0.0013	0.0013	0.0013	0.0013				
Phosphorus P				0.029	0.028	0.029	0.031	0.031				
Potassium K				3.5	3.6	3.6	3.7	3.7				
Selenium Se				0.00078	0.00083	0.00084	0.00110	0.00111				
Silicon SiO2				0.45	0.42	0.43	0.43	0.43				
Silver Ag				0.0000148	0.0000146	0.0000148	0.0000151	0.0000153				
Sodium Na				28	31	33	33	33				
Strontium Sr				0.038	0.041	0.042	0.043	0.043				
Tellurium Te				0.000	0.000	0.000	0.000	0.000				
Thallium Tl				0.000021	0.000025	0.000015	0.000008	0.000008				
Thorium Th				0.0000235	0.0000230	0.0000233	0.0000236	0.0000236				
Tin Sn				0.00030	0.00040	0.00034	0.00035	0.00037				
Titanium Ti				0.0001	0.0001	0.0001	0.0001	0.0001				
Uranium U				0.000054	0.000056	0.000061	0.000057	0.000057				
Vanadium V				0.0009	0.0005	0.0005	0.0005	0.0005				
Zinc Zn				0.0025	0.0026	0.0038	0.0028	0.0029				
Zirconium Zr				0.0054	0.0053	0.0053	0.0054	0.0054				

Loadings in Little Roberts Creek Outflow (kg/month)												
Date	Year 4 Mar-11	Year 4 Apr-11	Year 4 May-11	Year 4 Jun-11	Year 4 Jul-11	Year 4 Aug-11	Year 4 Sep-11	Year 4 Oct-11	Year 4 Nov-11	Year 4 Dec-11	Year 4 Jan-12	Year 4 Feb-12
Parameter												
TDS				173	175	145	145	197				
TSS				3.0	3.9	3.0	3.0	2.9				
Free CN												
Total CN				0.001	0.001	0.001	0.001	0.001				
WAD CN												
CNO												
SCN				0.004	0.005	0.002		0.006				
Sulphate				6.6	7.3	5.0	3.0	8.0				
Chloride				109	133	94	63	146				
Total Ammonia				0.016	0.021	0.018	0.013	0.013				
Nitrate				0.39	0.55	0.28	0.05	0.65				
Nitrite				0.009	0.003	0.002	0.002	0.002				
Alkalinity				27	28	28	28	30				
OrthoPhosphate-P				0.0136	0.0183	0.0087	0.0008	0.0211				
Phosphate-P				0.0312	0.0374	0.0395	0.0270	0.0456				
Org. Carbon				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3				40	44	45	45	49				
Total Metals												
Aluminum Al				0.08	0.06	0.06	0.05	0.05				
Antimony Sb				0.0012	0.0016	0.0007	0.0000	0.0018				
Arsenic As				0.0005	0.0006	0.0006	0.0004	0.0006				
Barium Ba				0.0035	0.0034	0.0031	0.0030	0.0033				
Beryllium Be				0.00005	0.00007	0.00003	0.00001	0.00008				
Bismuth Bi				0.00115	0.00157	0.00071	0.00001	0.00181				
Boron B				0.020	0.023	0.023	0.023	0.024				
Cadmium Cd				0.0000065	0.0000076	0.0000053	0.0000033	0.0000085				
Calcium Ca				20	25	16	7	28				
Chromium Cr				0.000	0.000	0.000	0.000	0.000				
Cobalt Co				0.0003	0.0003	0.0002	0.0001	0.0004				
Copper Cu				0.0015	0.0018	0.0016	0.0014	0.0018				
Iron Fe				0.11	0.11	0.08	0.09	0.09				
Lead Pb				0.00008	0.00009	0.00014	0.00004	0.00008				
Lithium Li				0.0002	0.0002	0.0001	0.0000	0.0003				
Magnesium Mg				5.5	6.2	6.5	6.4	6.7				
Manganese Mn				0.012	0.015	0.016	0.010	0.011				
Mercury Hg				0.0008120	0.0008886	0.0007300	0.0006001	0.0009387				
Molybdenum Mo				0.00041	0.00055	0.00033	0.00014	0.00061				
Nickel Ni				0.0009	0.0011	0.0007	0.0005	0.0011				
Phosphorus P				0.018	0.024	0.012	0.001	0.028				
Potassium K				2.8	3.2	2.7	2.3	3.5				
Selenium Se				0.00077	0.00082	0.00084	0.00113	0.00109				
Silicon SiO2				0.21	0.28	0.14	0.01	0.33				
Silver Ag				0.0000075	0.0000089	0.0000053	0.0000025	0.0000099				
Sodium Na				27	31	33	32	33				
Strontium Sr				0.037	0.041	0.040	0.040	0.042				
Tellurium Te				0.000	0.000	0.000	0.000	0.000				
Thallium Tl				0.000019	0.000023	0.000012	0.000004	0.000006				
Thorium Th				0.0000096	0.0000125	0.0000072	0.0000027	0.0000145				
Tin Sn				0.00022	0.00037	0.00015	0.00004	0.00033				
Titanium Ti				0.0001	0.0001	0.0000	0.0000	0.0001				
Uranium U				0.000039	0.000045	0.000044	0.000034	0.000048				
Vanadium V				0.0008	0.0004	0.0003	0.0001	0.0004				
Zinc Zn				0.0020	0.0024	0.0032	0.0017	0.0027				
Zirconium Zr				0.0051	0.0052	0.0051	0.0051	0.0052				

Loadings in Little Roberts Creek Outflow (kg/month)												
Date	Year 5 Mar-12	Year 5 Apr-12	Year 5 May-12	Year 5 Jun-12	Year 5 Jul-12	Year 5 Aug-12	Year 5 Sep-12	Year 5 Oct-12	Year 5 Nov-12	Year 5 Dec-12	Year 5 Jan-13	Year 5 Feb-13
Parameter												
TDS				153	183	153	145	251				
TSS				3.0	3.9	3.0	3.0	2.9				
Free CN												
Total CN				0.001	0.001	0.001	0.001	0.001				
WAD CN												
CNO												
SCN				0.001	0.004	0.002		0.005				
Sulphate				4.8	6.7	4.6	3.0	7.1				
Chloride				78	132	95	63	169				
Total Ammonia				0.013	0.021	0.018	0.013	0.013				
Nitrate				0.19	0.47	0.23	0.05	0.53				
Nitrite				0.002	0.003	0.002	0.002	0.002				
Alkalinity				26	28	28	28	29				
OrthoPhosphate-P				0.0060	0.0159	0.0072	0.0008	0.0172				
Phosphate-P				0.0239	0.0351	0.0380	0.0270	0.0417				
Org. Carbon				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3				38	44	45	45	48				
Total Metals												
Aluminum Al				0.08	0.06	0.06	0.05	0.05				
Antimony Sb				0.0005	0.0014	0.0006	0.0000	0.0015				
Arsenic As				0.0004	0.0005	0.0005	0.0004	0.0006				
Barium Ba				0.0034	0.0034	0.0031	0.0030	0.0033				
Beryllium Be				0.00003	0.00006	0.00003	0.00001	0.00007				
Bismuth Bi				0.00047	0.00136	0.00058	0.00001	0.00146				
Boron B				0.020	0.023	0.023	0.023	0.024				
Cadmium Cd				0.0000048	0.0000074	0.0000051	0.0000033	0.0000080				
Calcium Ca				12	24	15	7	28				
Chromium Cr				0.000	0.000	0.000	0.000	0.000				
Cobalt Co				0.0001	0.0003	0.0002	0.0001	0.0003				
Copper Cu				0.0014	0.0017	0.0015	0.0014	0.0017				
Iron Fe				0.11	0.11	0.08	0.09	0.09				
Lead Pb				0.00006	0.00009	0.00013	0.00004	0.00008				
Lithium Li				0.0001	0.0002	0.0001	0.0000	0.0002				
Magnesium Mg				5.4	6.1	6.4	6.4	6.6				
Manganese Mn				0.012	0.015	0.016	0.010	0.010				
Mercury Hg				0.0006861	0.0008522	0.0007046	0.0006001	0.0008743				
Molybdenum Mo				0.00024	0.00049	0.00030	0.00014	0.00052				
Nickel Ni				0.0006	0.0010	0.0007	0.0005	0.0010				
Phosphorus P				0.008	0.022	0.010	0.001	0.024				
Potassium K				2.4	3.1	2.6	2.3	3.2				
Selenium Se				0.00078	0.00082	0.00084	0.00113	0.00109				
Silicon SiO2				0.09	0.25	0.11	0.01	0.27				
Silver Ag				0.0000051	0.0000086	0.0000050	0.0000025	0.0000091				
Sodium Na				27	35	37	32	54				
Strontium Sr				0.036	0.040	0.040	0.040	0.042				
Tellurium Te				0.000	0.000	0.000	0.000	0.000				
Thallium Tl				0.000018	0.000023	0.000012	0.000004	0.000006				
Thorium Th				0.0000058	0.0000120	0.0000067	0.0000027	0.0000133				
Tin Sn				0.00011	0.00034	0.00013	0.00004	0.00028				
Titanium Ti				0.0000	0.0001	0.0000	0.0000	0.0001				
Uranium U				0.000035	0.000044	0.000043	0.000034	0.000046				
Vanadium V				0.0007	0.0004	0.0003	0.0001	0.0004				
Zinc Zn				0.0017	0.0023	0.0031	0.0017	0.0025				
Zirconium Zr				0.0051	0.0052	0.0051	0.0051	0.0052				

Loadings in Little Roberts Creek Outflow (kg/month)												
Date	Year 6 Mar-13	Year 6 Apr-13	Year 6 May-13	Year 6 Jun-13	Year 6 Jul-13	Year 6 Aug-13	Year 6 Sep-13	Year 6 Oct-13	Year 6 Nov-13	Year 6 Dec-13	Year 6 Jan-14	Year 6 Feb-14
Parameter												
TDS				172	223	164	145	244				
TSS				3.0	3.8	3.0	3.0	2.9				
Free CN												
Total CN				0.001	0.001	0.001	0.001	0.001				
WAD CN												
CNO												
SCN				0.001	0.003	0.001		0.004				
Sulphate				4.5	6.0	4.3	3.0	6.3				
Chloride				87	149	99	63	157				
Total Ammonia				0.008	0.016	0.013	0.008	0.008				
Nitrate				0.12	0.34	0.15	0.01	0.40				
Nitrite				0.001	0.002	0.001	0.001	0.001				
Alkalinity				26	28	28	28	29				
OrthoPhosphate-P				0.0050	0.0130	0.0059	0.0008	0.0141				
Phosphate-P				0.0229	0.0322	0.0368	0.0270	0.0386				
Org. Carbon				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3				38	43	44	45	47				
Total Metals												
Aluminum Al				0.08	0.06	0.06	0.05	0.05				
Antimony Sb				0.0004	0.0011	0.0005	0.0000	0.0012				
Arsenic As				0.0004	0.0005	0.0005	0.0004	0.0005				
Barium Ba				0.0033	0.0033	0.0030	0.0030	0.0032				
Beryllium Be				0.00002	0.00005	0.00002	0.00000	0.00005				
Bismuth Bi				0.00038	0.00110	0.00046	0.00000	0.00118				
Boron B				0.019	0.022	0.023	0.022	0.023				
Cadmium Cd				0.0000034	0.0000058	0.0000036	0.0000020	0.0000063				
Calcium Ca				12	24	14	7	25				
Chromium Cr				0.000	0.000	0.000	0.000	0.000				
Cobalt Co				0.0001	0.0002	0.0001	0.0001	0.0003				
Copper Cu				0.0013	0.0017	0.0015	0.0014	0.0017				
Iron Fe				0.11	0.11	0.08	0.09	0.09				
Lead Pb				0.00006	0.00008	0.00013	0.00004	0.00007				
Lithium Li				0.0001	0.0002	0.0001		0.0002				
Magnesium Mg				5.3	6.1	6.4	6.4	6.5				
Manganese Mn				0.011	0.015	0.016	0.010	0.010				
Mercury Hg				0.0006695	0.0008041	0.0006842	0.0006000	0.0008222				
Molybdenum Mo				0.00021	0.00043	0.00027	0.00014	0.00045				
Nickel Ni				0.0006	0.0009	0.0006	0.0004	0.0009				
Phosphorus P				0.006	0.017	0.007		0.019				
Potassium K				2.3	2.9	2.5	2.3	3.1				
Selenium Se				0.00077	0.00081	0.00083	0.00112	0.00109				
Silicon SiO2				0.07	0.20	0.08		0.22				
Silver Ag				0.0000031	0.0000063	0.0000030	0.0000007	0.0000068				
Sodium Na				34	51	41	32	54				
Strontium Sr				0.036	0.040	0.039	0.040	0.041				
Tellurium Te				0.000	0.000	0.000		0.000				
Thallium Tl				0.000018	0.000022	0.000011	0.000003	0.000005				
Thorium Th				0.0000028	0.0000085	0.0000037		0.0000098				
Tin Sn				0.00009	0.00029	0.00011	0.00003	0.00023				
Titanium Ti				0.0000	0.0001	0.0000		0.0001				
Uranium U				0.000032	0.000041	0.000040	0.000032	0.000042				
Vanadium V				0.0006	0.0003	0.0002	0.0001	0.0003				
Zinc Zn				0.0016	0.0022	0.0031	0.0017	0.0024				
Zirconium Zr				0.0050	0.0051	0.0050	0.0050	0.0052				

Loadings in Little Roberts Creek Outflow (kg/month)												
Date	Year 7 Mar-14	Year 7 Apr-14	Year 7 May-14	Year 7 Jun-14	Year 7 Jul-14	Year 7 Aug-14	Year 7 Sep-14	Year 7 Oct-14	Year 7 Nov-14	Year 7 Dec-14	Year 7 Jan-15	Year 7 Feb-15
Parameter												
TDS				165	205	156	145	225				
TSS				3.0	3.8	3.0	3.0	2.9				
Free CN												
Total CN				0.001	0.001	0.001	0.001	0.001				
WAD CN												
CNO												
SCN				0.001	0.003	0.001		0.003				
Sulphate				4.3	5.4	4.0	3.0	5.6				
Chloride				81	132	92	63	139				
Total Ammonia				0.008	0.014	0.012	0.008	0.007				
Nitrate				0.09	0.25	0.11	0.01	0.27				
Nitrite				0.001	0.002	0.001	0.001	0.001				
Alkalinity				26	28	28	28	29				
OrthoPhosphate-P				0.0042	0.0107	0.0049	0.0008	0.0115				
Phosphate-P				0.0221	0.0299	0.0358	0.0270	0.0361				
Org. Carbon				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3				38	43	44	45	47				
Total Metals												
Aluminum Al				0.08	0.06	0.06	0.05	0.05				
Antimony Sb				0.0003	0.0009	0.0004	0.0000	0.0010				
Arsenic As				0.0004	0.0005	0.0005	0.0004	0.0005				
Barium Ba				0.0033	0.0033	0.0030	0.0030	0.0031				
Beryllium Be				0.00002	0.00004	0.00002	0.00000	0.00004				
Bismuth Bi				0.00030	0.00089	0.00037	0.00000	0.00095				
Boron B				0.019	0.022	0.023	0.022	0.023				
Cadmium Cd				0.0000033	0.0000053	0.0000034	0.0000020	0.0000056				
Calcium Ca				11	20	13	7	22				
Chromium Cr				0.000	0.000	0.000	0.000	0.000				
Cobalt Co				0.0001	0.0002	0.0001	0.0001	0.0002				
Copper Cu				0.0013	0.0016	0.0015	0.0014	0.0016				
Iron Fe				0.11	0.11	0.08	0.09	0.09				
Lead Pb				0.00005	0.00008	0.00012	0.00004	0.00006				
Lithium Li				0.0000	0.0001	0.0001		0.0001				
Magnesium Mg				5.3	6.0	6.4	6.4	6.5				
Manganese Mn				0.011	0.015	0.016	0.010	0.010				
Mercury Hg				0.0006561	0.0007653	0.0006678	0.0006000	0.0007802				
Molybdenum Mo				0.00019	0.00037	0.00024	0.00014	0.00039				
Nickel Ni				0.0005	0.0009	0.0006	0.0004	0.0008				
Phosphorus P				0.005	0.014	0.006		0.015				
Potassium K				2.3	2.8	2.5	2.3	2.9				
Selenium Se				0.00077	0.00081	0.00083	0.00112	0.00109				
Silicon SiO2				0.06	0.16	0.07		0.18				
Silver Ag				0.0000030	0.0000056	0.0000027	0.0000007	0.0000057				
Sodium Na				32	47	39	32	50				
Strontium Sr				0.035	0.040	0.039	0.040	0.041				
Tellurium Te				0.000	0.000	0.000		0.000				
Thallium Tl				0.000018	0.000022	0.000011	0.000003	0.000005				
Thorium Th				0.0000025	0.0000074	0.0000031		0.0000081				
Tin Sn				0.00008	0.00026	0.00010	0.00003	0.00019				
Titanium Ti				0.0000	0.0001	0.0000		0.0001				
Uranium U				0.000031	0.000039	0.000039	0.000032	0.000040				
Vanadium V				0.0006	0.0003	0.0002	0.0001	0.0003				
Zinc Zn				0.0016	0.0021	0.0030	0.0017	0.0023				
Zirconium Zr				0.0050	0.0051	0.0050	0.0050	0.0051				

Loadings in Little Roberts Creek Outflow (kg/month)												
Date	Year 8 Mar-15	Year 8 Apr-15	Year 8 May-15	Year 8 Jun-15	Year 8 Jul-15	Year 8 Aug-15	Year 8 Sep-15	Year 8 Oct-15	Year 8 Nov-15	Year 8 Dec-15	Year 8 Jan-16	Year 8 Feb-16
Parameter												
TDS				160	190	150	145	209				
TSS				3.0	3.8	2.9	3.0	2.9				
Free CN												
Total CN				0.001	0.001	0.001	0.001	0.001				
WAD CN												
CNO												
SCN				0.001	0.002	0.001		0.002				
Sulphate				4.2	5.0	3.8	3.0	5.1				
Chloride				76	118	86	63	124				
Total Ammonia				0.008	0.014	0.012	0.008	0.007				
Nitrate				0.06	0.16	0.07	0.01	0.17				
Nitrite				0.0010	0.0019	0.001	0.001	0.001				
Alkalinity				26	28	27	28	29				
OrthoPhosphate-P				0.0035	0.0088	0.0041	0.0008	0.0095				
Phosphate-P				0.0215	0.0280	0.0350	0.0270	0.0341				
Org. Carbon				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3				38	43	44	45	46				
Total Metals												
Aluminum Al				0.08	0.06	0.06	0.05	0.05				
Antimony Sb				0.0003	0.0007	0.0003	0.0000	0.0008				
Arsenic As				0.0004	0.0005	0.0005	0.0004	0.0005				
Barium Ba				0.0033	0.0032	0.0030	0.0030	0.0031				
Beryllium Be				0.00002	0.00003	0.00002	0.00000	0.00003				
Bismuth Bi				0.00025	0.00072	0.00030	0.00000	0.00077				
Boron B				0.019	0.022	0.023	0.022	0.023				
Cadmium Cd				0.0000031	0.0000047	0.0000031	0.0000020	0.0000049				
Calcium Ca				10	18	12	7	19				
Chromium Cr				0.000	0.000	0.000	0.000	0.000				
Cobalt Co				0.0001	0.0002	0.0001	0.0001	0.0002				
Copper Cu				0.0013	0.0016	0.0015	0.0014	0.0016				
Iron Fe				0.11	0.11	0.08	0.09	0.09				
Lead Pb				0.00005	0.00007	0.00012	0.00004	0.00006				
Lithium Li				0.0000	0.0001	0.0000		0.0001				
Magnesium Mg				5.3	6.0	6.4	6.4	6.5				
Manganese Mn				0.011	0.015	0.016	0.010	0.010				
Mercury Hg				0.0006453	0.0007340	0.0006546	0.0006000	0.0007462				
Molybdenum Mo				0.00018	0.00033	0.00023	0.00014	0.00034				
Nickel Ni				0.0005	0.0008	0.0006	0.0004	0.0008				
Phosphorus P				0.004	0.011	0.005		0.012				
Potassium K				2.2	2.7	2.4	2.3	2.8				
Selenium Se				0.00077	0.00081	0.00083	0.00112	0.00108				
Silicon SiO2				0.05	0.13	0.06		0.14				
Silver Ag				0.0000027	0.0000047	0.0000023	0.0000007	0.0000048				
Sodium Na				31	44	38	32	46				
Strontium Sr				0.035	0.039	0.039	0.040	0.041				
Tellurium Te				0.000	0.000	0.000		0.000				
Thallium Tl				0.000018	0.000022	0.000011	0.000003	0.000005				
Thorium Th				0.0000021	0.0000061	0.0000026		0.0000066				
Tin Sn				0.00007	0.00023	0.00009	0.00003	0.00016				
Titanium Ti				0.0000	0.0001	0.0000		0.0001				
Uranium U				0.000031	0.000037	0.000038	0.000032	0.000038				
Vanadium V				0.0006	0.0003	0.0002	0.0001	0.0003				
Zinc Zn				0.0016	0.0021	0.0030	0.0017	0.0022				
Zirconium Zr				0.0050	0.0051	0.0050	0.0050	0.0051				

Loadings in Little Roberts Creek Outflow (kg/month)												
Date	Year 9 Mar-16	Year 9 Apr-16	Year 9 May-16	Year 9 Jun-16	Year 9 Jul-16	Year 9 Aug-16	Year 9 Sep-16	Year 9 Oct-16	Year 9 Nov-16	Year 9 Dec-16	Year 9 Jan-17	Year 9 Feb-17
Parameter												
TDS				156	178	145	145	196				
TSS				3.0	3.8	2.9	3.0	2.9				
Free CN												
Total CN				0.001	0.001	0.001	0.001	0.001				
WAD CN												
CNO												
SCN				0.001	0.002	0.001		0.002				
Sulphate				4.0	4.6	3.7	3.0	4.7				
Chloride				72	107	81	63	112				
Total Ammonia				0.008	0.014	0.012	0.008	0.007				
Nitrate				0.03	0.08	0.04	0.01	0.09				
Nitrite				0.001	0.002	0.001	0.001	0.001				
Alkalinity				26	28	27	28	29				
OrthoPhosphate-P				0.0030	0.0073	0.0035	0.0008	0.0078				
Phosphate-P				0.0210	0.0265	0.0343	0.0270	0.0324				
Org. Carbon				5.0	5.0	5.0	5.0	5.1				
Hardness CaCO3				38	42	44	45	46				
Total Metals												
Aluminum Al				0.08	0.06	0.06	0.05	0.05				
Antimony Sb				0.0002	0.0006	0.0003	0.0000	0.0006				
Arsenic As				0.0004	0.0005	0.0005	0.0004	0.0005				
Barium Ba				0.0033	0.0032	0.0030	0.0030	0.0031				
Beryllium Be				0.00001	0.00003	0.00001	0.00000	0.00003				
Bismuth Bi				0.00020	0.00058	0.00025	0.00000	0.00062				
Boron B				0.019	0.022	0.023	0.022	0.023				
Cadmium Cd				0.0000029	0.0000042	0.0000029	0.0000020	0.0000044				
Calcium Ca				9	16	11	7	17				
Chromium Cr				0.000	0.000	0.000	0.000	0.000				
Cobalt Co				0.0001	0.0002	0.0001	0.0001	0.0002				
Copper Cu				0.0013	0.0015	0.0015	0.0014	0.0015				
Iron Fe				0.11	0.11	0.08	0.09	0.09				
Lead Pb				0.00005	0.00007	0.00012	0.00004	0.00005				
Lithium Li				0.0000	0.0001	0.0000		0.0001				
Magnesium Mg				5.3	6.0	6.4	6.4	6.4				
Manganese Mn				0.011	0.015	0.016	0.010	0.010				
Mercury Hg				0.0006366	0.0007087	0.0006439	0.0006000	0.0007188				
Molybdenum Mo				0.00017	0.00029	0.00021	0.00014	0.00030				
Nickel Ni				0.0005	0.0008	0.0006	0.0004	0.0007				
Phosphorus P				0.003	0.009	0.004		0.010				
Potassium K				2.2	2.6	2.4	2.3	2.7				
Selenium Se				0.00077	0.00081	0.00083	0.00112	0.00108				
Silicon SiO2				0.04	0.11	0.05		0.12				
Silver Ag				0.0000024	0.0000040	0.0000020	0.0000007	0.0000040				
Sodium Na				30	41	37	32	43				
Strontium Sr				0.035	0.039	0.039	0.040	0.040				
Tellurium Te				0.000	0.000	0.000		0.000				
Thallium Tl				0.000018	0.000022	0.000011	0.000003	0.000004				
Thorium Th				0.0000017	0.0000050	0.0000021		0.0000055				
Tin Sn				0.00006	0.00021	0.00008	0.00003	0.00014				
Titanium Ti				0.0000	0.0001	0.0000		0.0001				
Uranium U				0.000030	0.000036	0.000038	0.000032	0.000036				
Vanadium V				0.0006	0.0002	0.0002	0.0001	0.0003				
Zinc Zn				0.0015	0.0020	0.0030	0.0017	0.0022				
Zirconium Zr				0.0050	0.0051	0.0050	0.0050	0.0051				

Loadings in Little Roberts Creek Outflow (kg/month)												
Date	Year 10 Mar-17	Year 10 Apr-17	Year 10 May-17	Year 10 Jun-17	Year 10 Jul-17	Year 10 Aug-17	Year 10 Sep-17	Year 10 Oct-17	Year 10 Nov-17	Year 10 Dec-17	Year 10 Jan-18	Year 10 Feb-18
Parameter												
TDS				153	168	141	145	185				
TSS				3.0	3.8	2.9	3.0	2.9				
Free CN												
Total CN				0.001	0.001	0.001	0.001	0.001				
WAD CN												
CNO												
SCN				0.000	0.001	0.001		0.002				
Sulphate				3.9	4.3	3.5	3.0	4.4				
Chloride				69	98	77	63	102				
Total Ammonia				0.008	0.014	0.012	0.008	0.007				
Nitrate				0.01	0.02	0.01	0.01	0.02				
Nitrite				0.001	0.002	0.001	0.001	0.001				
Alkalinity				26	27	27	28	28				
OrthoPhosphate-P				0.0026	0.0060	0.0030	0.0008	0.0065				
Phosphate-P				0.0205	0.0253	0.0338	0.0270	0.0310				
Org. Carbon				5.0	5.0	5.0	5.0	5.0				
Hardness CaCO3				38	42	44	45	45				
Total Metals												
Aluminum Al				0.08	0.06	0.06	0.05	0.05				
Antimony Sb				0.0002	0.0005	0.0002	0.0000	0.0005				
Arsenic As				0.0004	0.0004	0.0005	0.0004	0.0005				
Barium Ba				0.0033	0.0032	0.0030	0.0030	0.0030				
Beryllium Be				0.00001	0.00002	0.00001	0.00000	0.00002				
Bismuth Bi				0.00016	0.00047	0.00020	0.00000	0.00050				
Boron B				0.019	0.021	0.023	0.022	0.022				
Cadmium Cd				0.0000027	0.0000038	0.0000027	0.0000020	0.0000039				
Calcium Ca				9	14	10	7	15				
Chromium Cr				0.000	0.000	0.000	0.000	0.000				
Cobalt Co				0.0001	0.0001	0.0001	0.0001	0.0001				
Copper Cu				0.0013	0.0015	0.0014	0.0014	0.0015				
Iron Fe				0.11	0.11	0.08	0.09	0.09				
Lead Pb				0.00005	0.00007	0.00012	0.00004	0.00005				
Lithium Li				0.0000	0.0001	0.0000		0.0001				
Magnesium Mg				5.3	5.9	6.3	6.4	6.4				
Manganese Mn				0.011	0.015	0.016	0.010	0.010				
Mercury Hg				0.0006296	0.0006857	0.0006336	0.0006000	0.0006914				
Molybdenum Mo				0.00016	0.00026	0.00020	0.00014	0.00027				
Nickel Ni				0.0005	0.0007	0.0005	0.0004	0.0006				
Phosphorus P				0.003	0.008	0.003		0.008				
Potassium K				2.2	2.5	2.3	2.3	2.6				
Selenium Se				0.00077	0.00081	0.00083	0.00112	0.00108				
Silicon SiO2				0.03	0.09	0.04		0.09				
Silver Ag				0.0000022	0.0000035	0.0000017	0.0000007	0.0000034				
Sodium Na				29	39	36	32	41				
Strontium Sr				0.035	0.039	0.039	0.040	0.040				
Tellurium Te				0.000	0.000	0.000		0.000				
Thallium Tl				0.000017	0.000021	0.000011	0.000003	0.000004				
Thorium Th				0.0000014	0.0000041	0.0000017		0.0000045				
Tin Sn				0.00006	0.00019	0.00007	0.00003	0.00012				
Titanium Ti				0.0000	0.0001	0.0000		0.0001				
Uranium U				0.000030	0.000035	0.000037	0.000032	0.000035				
Vanadium V				0.0006	0.0002	0.0002	0.0001	0.0002				
Zinc Zn				0.0015	0.0019	0.0029	0.0017	0.0021				
Zirconium Zr				0.0050	0.0051	0.0050	0.0050	0.0050				

Appendix K
Varian Inductively Coupled Plasma MS Product Information

Technical Memorandum

To:	Brian Labadie, MHBL	Date:	October 25, 2005
cc:	Project File	From:	John Chapman
Subject:	Doris North Project - Varian Inductively Coupled Plasma MS Product Information	Project #:	1CM014.006

1 Description of the unit proposed for the Doris North Project

See attached Technical Brochure.

2 Analytical Laboratory Set-up

Due to the extremely low detection limits of the unit and the extremely low values to be measured all potential contamination exposures must be limited. In discussions with Varian it has been decided that a small self contained trailer unit would be erected near the North Dam (in close proximity to the Tail Lake discharge pump) well away from the mill site and any potential dust emissions. The Laboratory would be cordoned off into three areas, a change room, a sample prep room and an analytical room. The entire Laboratory would be equipped with its own HVAC system. Laboratory employees would be required to wear clothing suitable for the Laboratory environment and change when coming on and off shift.

3 Training

Varian provides all of the training needs to operate the system. Programs include both classroom (Toronto or Edmonton) and on-site programs. The onsite programs are geared specifically to the work to be undertaken by the “technicians”.

4 Technical Support

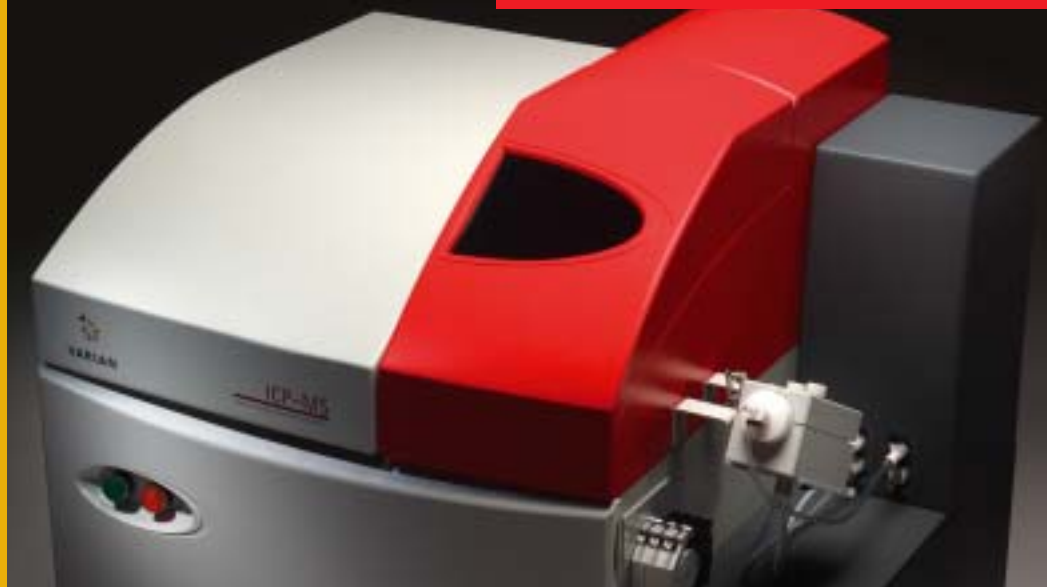
Varian would send a field rep to site prior to the commencement of the annual discharge from Tail Lake. The purpose would be to ensure the unit is properly calibrated and to provide any refresher training. In addition Varian has a full compliment of technicians available in Edmonton and could be on site within a day or two if needed. Another feature of the unit is the ability to have the units performance monitored from Varian’s Edmonton or Toronto facilities from which a fully trained Varian technician could instruct a MHBL Instrument Technician to effect minor adjustments.

5 Operation

Operations of the analytical Laboratory would be seasonal and used strictly as an environmental Laboratory. In addition to providing control assays for the annual water discharge from Tail Lake the unit would prove invaluable in the broadening of the Hope Bay water quality data base. Varian estimates that from the time a sample enters the prep room until a result is available requires 45 minutes. This implies that any rationale sampling frequency set out within the water license can easily be achieved.

ICP-MS

Varian
ICP-MS



VARIAN

With greater ease-of-use and the highest sensitivity, Varian sets a new direction in ICP-MS.

The Varian ICP-MS with tunable sensitivity is ideal for environmental, semiconductor, and laser ablation geochemistry applications. With Varian's ICP-MS you can choose workhorse conditions for routine operation at high concentrations and gigahertz performance for the ultimate detection limits.

Varian's unique ion-mirror* reflects analyte ions through 90 degrees while neutrals and photons pass through the hollow structure. This produces the highest signal-to-background ratio available and the lowest detection limits.

The Varian ICP-MS is the world's first ICP-MS with tunable gigahertz sensitivity, providing one thousand million counts per second for every part per million. This sensitivity does not compromise performance, with the formation of oxide and doubly charged interferences remaining very low ($\text{CeO}^+/\text{Ce}^+ < 3\%$, $\text{Ce}^{++}/\text{Ce}^+ < 2\%$).

The all-digital, extended range detector provides nine orders of linear dynamic range without digital to analog cross calibration. This means the detector is more reliable, easier to use and offers linear performance from parts per trillion to hundreds of parts per million.

The ICP-Expert software that controls the Varian ICP-MS provides one step optimization and method development. Standard preparation is easy, as ICP-Expert can instruct you on what solutions to make and how to make them.

To further enhance productivity, we've sped up the slowest part of the analysis – sample introduction. Our new SPS-3 is Varian's fastest ever autosampler, while the diluter further extends linear dynamic range, maximizing productivity for very concentrated samples.

The ICP-MS features an all-Varian manufactured and guaranteed vacuum system, and the hollow ion mirror is virtually maintenance free. Both turbomolecular pumps are easily accessible, with the first pump swinging away to provide access to the ion optics system. For peace of mind, the detector has a one year guarantee.

If you need a competitive edge in performance and technology, Varian's new ICP-MS is better by ninety degrees.

* Patent pending





"The 90 degree reflecting ion optics revolutionizes ICP-MS performance"

When you require high sample throughput and the ultimate in analytical performance, the Varian ICP-MS delivers.

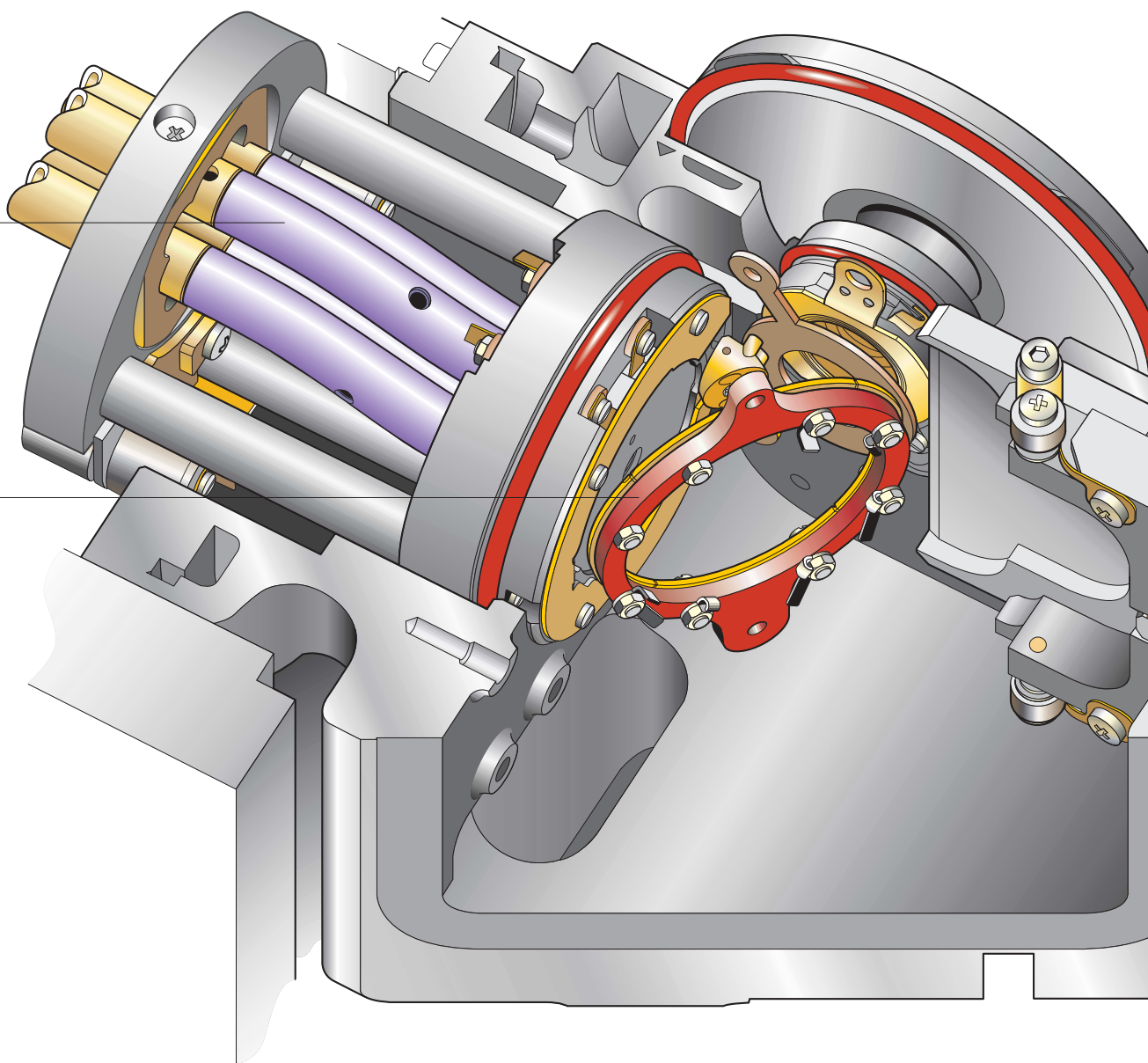
All-Digital Extended Dynamic Range Detector

At last, an all-digital Extended Dynamic Range system that works! Varian's nine orders detector achieves linear performance from ppt to hundreds of ppm without clumsy digital to analog cross calibrations. Ease-of-use, fewer dilutions and a guaranteed one year detector lifetime mean greater productivity and lower running costs for your laboratory.

Low noise quadrupole with curved fringe rods* for ultimate efficiency and low background.

* Patent applied for

Varian's ion mirror reflects the ion beam through 90 degrees, focusing the analyte ions into the quadrupole with the highest possible efficiency. By keeping photons and neutrals away from the mass analyzer, the ion mirror greatly reduces background signal.



Industry benchmark sensitivity, patented Turner Interlaced Coils, and 27MHz plasma combine to deliver the remarkable performance of the Varian ICP-MS.

Isotope/Species	Typical Hot Plasma Performance
⁹ Be	> 50 Million cps/ppm
¹¹⁵ In	> 1000 Million cps/ppm
²³² Th	> 500 Million cps/ppm
CeO ⁺ /Ce ⁺	< 3%

Isotope/Species	Typical Cool Plasma Performance
⁷ Li	> 2000 Million cps/ppm
²³ Na	> 1000 Million cps/ppm
²⁴ Mg	> 500 Million cps/ppm
⁴⁰ Ca	> 100 Million cps/ppm
⁵⁶ Fe	> 100 Million cps/ppm

Solutions for Environmental Speciation

Determining the oxidation state or molecular form of an element requires high sensitivity, accurate separation and rapid measurement. Varian makes elemental and molecular speciation easy with:

- Varian-manufactured ICP-MS and HPLC systems
- Fast 3 MHz quadrupole scanning for superior transient peak resolution and precision
- Gigahertz ICP-MS sensitivity providing better multi-element detection limits and faster scan rates

Real Gigahertz Sensitivity for Semiconductor Applications

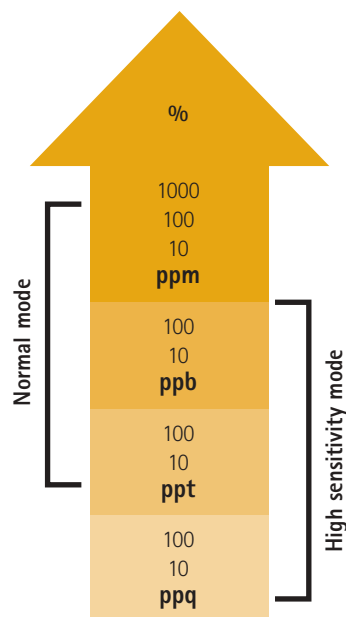
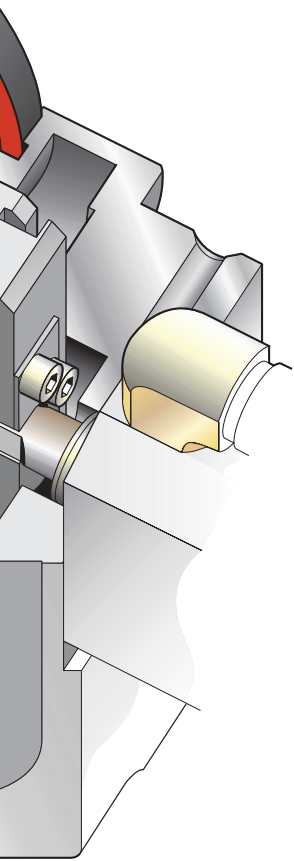
Varian's tunable gigahertz sensitivity sets a new benchmark in elemental detection limits. For semiconductor applications, the push continues to lower acceptance limits of contaminants both in process chemicals and final products. The very low detection limits achievable with the Varian ICP-MS make it ideal for these applications.

Unmatched Sensitivity for Laser Ablation

Varian's ICP-MS takes your laboratory to the leading edge of laser ablation performance with tunable gigahertz sensitivity unmatched by any commercially available quadrupole ICP-MS.

With the Varian ICP-MS you can:

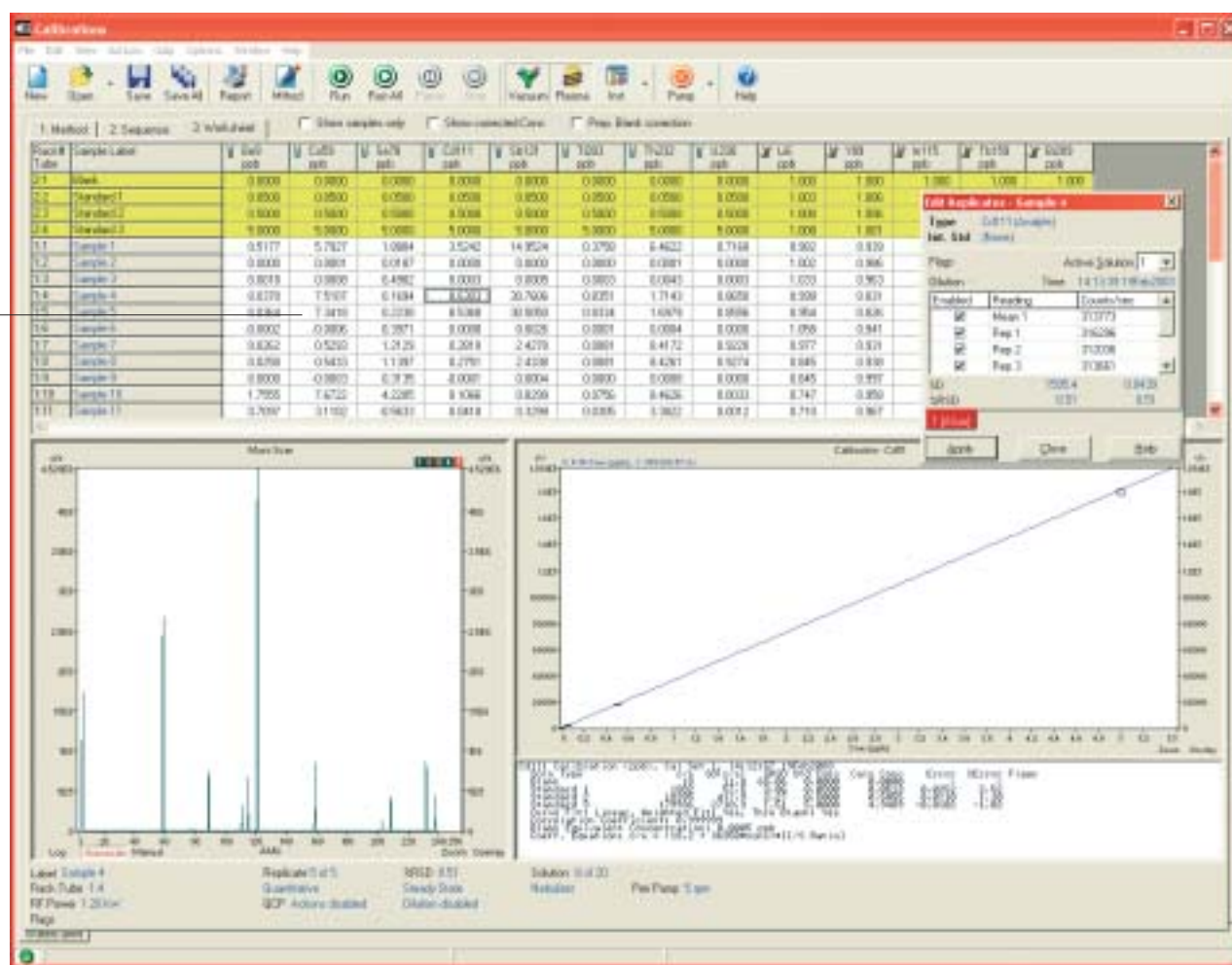
- Use the smallest possible spot sizes for characterizing fluid inclusions or individual crystals, and identifying microscopic features
- Examine the finest details of art pieces, jewelry or artefacts with minimal damage and cost
- Scan for accurate isotope ratios for geochronology, palaeothermometry, marine science and climatology



In high sensitivity mode, oxides such as CeO remain at <3% and can be further reduced under normal mode conditions to <1%.

ICP-Expert software for ICP-MS —
setting the benchmark for ease-of-use

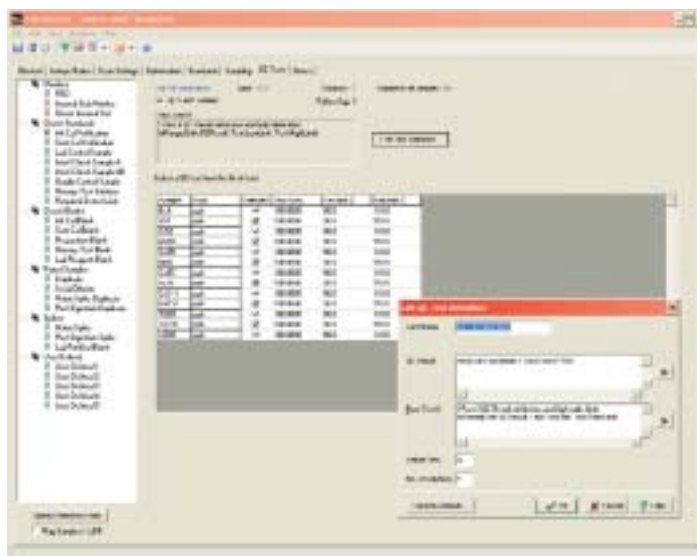
Each worksheet cell gives all the results you need – including concentrations, intensities, statistics, replicate readings and graphical mass scans.



If you thought ICP-MS was difficult to use, think again. Varian redefines ease-of-use with our new web-integrated ICP-MS worksheet software. ICP-Expert features a range of automated options, including setup and initialization routines such as plasma alignment, mass calibration and resolution tests. Varian's AutoMax makes method development easy by automating all ion optics, nebulizer and plasma settings for optimum results.

ICP-Expert includes wizards to guide you through every aspect of the analysis, from method development to analysis setup. The unique standards preparation wizard outlines how to prepare calibration standards, including which pipettes and flasks to use. You can then use Smart Rinse to maximize your sample throughput. Smart Rinse automatically spends less time rinsing samples that don't need it and more time rinsing those that do.

Varian's web-integrated ICP-Expert software directly links you to all of Varian's support resources. You can download the latest methods and application notes and access the latest software upgrades and product announcements. You can also get expert advice from MassNet, our ICP-MS user forum. In fact, with Varian's ICP-Expert software, ICP-MS has never been easier.



Ensuring the quality of your data is simple. Whether you're analyzing a check standard with each batch or a range of blanks, quality controls, spikes and duplicates, ICP-Expert's Quality Control Protocols can be customized to your needs. The software includes compatible methods for US EPA 6020, 200.8 and 1638.



With intuitive one-button instrument set-up and optimization, Varian's ICP-MS software gets you up and running quickly.



The online video help includes complete hardware setup and routine maintenance procedures.

Varian Spectroscopy and Chromatography Supplies – Performance, Selection, and Value

Varian's 50-plus years of continuous innovation in analytical instrumentation assures you the best in high performance products. Varian is committed to providing analytical products and supplies at affordable prices, supported by superior customer service. To maximize the performance of the Varian ICP-MS, and other Varian MS instruments, ensure you select Varian consumables.

Sample introduction systems

Every analysis presents its own unique challenges. Varian's comprehensive range of sample introduction components for both ICP and ICP-MS allow you to tailor your instrument to achieve the best, most accurate results as quickly as possible.

Shop Varian online

Thousands of products for GC, LC, MS, AA, ICP, ICP-MS, UV-Vis, Fluorescence and sample preparation from Varian and other leading manufacturers are highlighted in our latest catalogs. Call today to request your free copy or shop online at www.varianinc.com

Shop

Superior customer support

To maximize instrument productivity and uptime, Varian provides a worldwide network of factory-trained service personnel who are able to offer a range of services, including Telediagnosics®, Varian's remote diagnosis service. Telediagnosics minimizes on-site calls and reduces downtime, saving both time and money.

Safety

It is Varian's policy to manufacture safe products and to meet all legal requirements governing the design, manufacture and sale of safe products. As with all similar products, some or all of the following hazards may be present: high temperatures, high pressure gases, explosive gases, magnetic and radio frequency radiation, UV and visible light and electricity. Each product is designed to protect operators from potential hazards. Varian supplies instructions that describe the correct procedures for the operation and maintenance of each product.

The Varian ICP-MS instrument is designed to be used to determine trace elements.

CE The Varian ICP-MS is certified to comply with the requirements of the EMC and LV directives of the European Union.





Varian 1200L LC/MS. The high performance, affordable triple quadrupole setting new standards for selectivity and sensitivity.

Mass Spectrometry

Our new ICP-MS complements Varian's range of innovative spectrometry products. Varian offers a complete line including benchtop and portable gas chromatographs (GC and Micro-GC), gas chromatograph/mass spectrometer (GC/MS and GC/MS/MS) systems, liquid chromatograph/mass spectrometer (LC/MS and LC/MS/MS) systems, chromatographic columns and supplies, and custom solutions.

Varian MS instruments maximize laboratory efficiency with easy-to-use, reliable products supported by superior customer service.

The Varian 1200LC/MS

- Productivity with the only single quadrupole that can be upgraded to the full selectivity of triple quadrupole MS/MS at any time
- Superior performance with robust and sensitive Atmospheric Pressure Ionizations (API) interface
- Keep pace with changing applications by adding the analytical capabilities of a GC interface for EI, PCI, or NCI

The Varian Saturn 2200 GC/MS

- Sets the industry standard for EI and CI sensitivity
- Add GC and MS options, any or all, as needed
- Highly productive, easy-to use options include gas and liquid CI, MS/MS, and Chromatoprobe for solid samples
- Element-specific GC detectors for complimentary compound identification

Varian Saturn 2200 GC/MS. The world's most versatile GC and flexible MS provides the highest level of performance and easily expands to support any application.



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