



Quality Control

Norwest Labs
7217 Roper Road NW
Edmonton, AB. T6B 3J4
Phone: (780) 438-5522
Fax: (780) 438-0396

Bill to: Echo Bay Mines Ltd.
Report to: Echo Bay Mines Ltd.
9818 International Airport
Edmonton, AB, Canada
T5J 2T2
Attn: Michael Tansey
Sampled By: Steve Schlesak
Company: Kinross Gold Corporation

Project
ID:
Name: Lupin Mine
Location: Nunavut
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 396502
Control Number:
Date Received: Jul 21, 2005
Date Reported: Aug 02, 2005
Report Number: 724749

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Physical and Aggregate Properties

Replicates	Units	Replicate1	Replicate2	% RSD Criteria	Absolute Criteria	Passed QC
Solids	mg/L	117	117	10	15	✓
Material Used:	Edmonton Duplicate					
Date Acquired:	Jul 22, 2005					
Acquired By:	Christina Onyskiw					
Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Solids	mg/L	197	200	180	220	✓
Material Used:	Water High					
Date Acquired:	Jul 22, 2005					
Acquired By:	Christina Onyskiw					
Solids	mg/L	20	20	18	22	✓
Material Used:	Water Low					
Date Acquired:	Jul 22, 2005					
Acquired By:	Christina Onyskiw					



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Routine Water

Blanks	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Calcium	mq/L	<0.2	0.0	-0.2	0.2	✓
Magnesium	mq/L	<0.1	0.0	-0.1	0.1	✓
Sodium	mq/L	<0.4	0.0	-0.4	0.4	✓
Potassium	mq/L	<0.4	0.0	-0.4	0.4	✓
Iron	mq/L	<0.01	0.00	-0.01	0.01	✓
Manganese	mq/L	<0.005	0.000	-0.005	0.005	✓
Chloride	mq/L	<0.4	0.0	-0.5	0.5	✓
Nitrate - N	mq/L	<0.01	0.00	-0.01	0.01	✓
Nitrite - N	mq/L	<0.005	0.000	-0.005	0.005	✓

Material Used: Edmonton Method Blank

Date Acquired: Jul 22, 2005

Acquired By: Marc Dzura

Replicates	Units	Replicate1	Replicate2	% RSD Criteria	Absolute Criteria	Passed QC
pH		8.10	8.10	9.99	0.10	✓
Electrical Conductivity	dS/m at 25 C	40.3	40.3	9.990	0.002	✓
Calcium	mq/L	72	70	10.0	0.6	✓
Magnesium	mg/L	20	19	10.0	0.7	✓
Sodium	mq/L	8	8	10.0	1.2	✓
Potassium	mg/L	<4	<4	10.0	1.2	✓
Iron	mq/L	0.08	0.07	9.99	0.05	✓
Manganese	mq/L	0.71	0.67	9.990	0.010	✓
Chloride	mq/L	7.4	7.4	10.0	0.5	✓
Nitrate - N	mq/L	204	203	9.99	0.01	✓
Nitrite - N	mq/L	<0.05	<0.05	9.990	0.010	✓
Hydroxide	mq/L	<5	<5	10		✓
Carbonate	mq/L	7	9	10		✓
Bicarbonate	mq/L	153	152	10		✓
P-Alkalinity	mg/L	<5	<5	10	5	✓
T-Alkalinity	mq/L	6	8	10	5	✓

Material Used: Edmonton Duplicate

Date Acquired: Jul 22, 2005

Acquired By: Annva Hundal



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Routine Water (Continued...)

Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2130	2087.0	1875.2	2298.8	✓
Material Used:	Chloride High					
Date Acquired:	Jul 22, 2005					
Acquired By:	Wilailuk Somiit					
Calcium	mg/L	241	250.0	225.0	275.0	✓
Magnesium	mg/L	96.4	100.0	90.0	110.0	✓
Sodium	mg/L	248	250.0	225.0	275.0	✓
Potassium	mg/L	247	250.0	225.0	275.0	✓
Iron	mg/L	9.32	10.00	9.01	10.99	✓
Manganese	mg/L	2.38	2.500	2.260	2.740	✓
Material Used:	Metals High					
Date Acquired:	Jul 22, 2005					
Acquired By:	To Thong					
Calcium	mg/L	5.2	5.0	4.5	5.5	✓
Magnesium	mg/L	2.1	2.0	1.8	2.2	✓
Sodium	mg/L	5.2	5.0	4.5	5.5	✓
Potassium	mg/L	4.8	5.0	4.5	5.5	✓
Iron	mg/L	0.21	0.20	0.18	0.22	✓
Manganese	mg/L	0.051	0.050	0.045	0.055	✓
Material Used:	Metals Low					
Date Acquired:	Jul 21, 2005					
Acquired By:	Nicole Sehn					
pH		9.24	9.23	9.11	9.35	✓
Electrical Conductivity	dS/m at 25 C	2.82	2.730	2.611	2.849	✓
Chloride	mg/L	81.6	81.0	76.4	85.6	✓
Nitrate - N	mg/L	10.3	10.00	9.61	10.39	✓
Nitrite - N	mg/L	10.4	10.000	9.562	10.438	✓
P-Alkalinity	mg/L	492	507	415	599	✓
T-Alkalinity	mg/L	999	1009	969	1049	✓
Material Used:	Water High					
Date Acquired:	Jul 22, 2005					
Acquired By:	Annva Hundal					



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Attn: Michael Tansey
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NWL Lot ID: 396502
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Routine Water (Continued...)

Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
pH		6.93	6.90	6.83	6.97	✓
Electrical Conductivity	dS/m at 25 C	0.079	0.076	0.070	0.081	✓
Chloride	mq/L	14.6	14.9	13.2	16.6	✓
Nitrate - N	mq/L	0.52	0.50	0.44	0.56	✓
Nitrite - N	mq/L	0.515	0.495	0.437	0.553	✓
P-Alkalinity	mq/L	66	54	20	88	✓
T-Alkalinity	mq/L	132	127	118	136	✓
Material Used:	Water Low					
Date Acquired:	Jul 22, 2005					
Acquired By:	Annva Hundal					



Methodology and Notes

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Method of Analysis:

MethodName	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Conductivity - Laboratory Method, 2510 B	22-Jul-05	Norwest Labs Edmonton
Alkalinity, pH, and EC in water	APHA	* Electrometric Method, 4500-H+ B	22-Jul-05	Norwest Labs Edmonton
Alkalinity, pH, and EC in water	APHA	* Titration Method, 2320 B	22-Jul-05	Norwest Labs Edmonton
Ammonium-N in Water	APHA	* Automated Phenate Method, 4500-NH3 G	27-Jul-05	Norwest Labs Edmonton
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	25-Jul-05	Norwest Labs Edmonton
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	22-Jul-05	Norwest Labs Edmonton
Cyanide (Strong Acid Dissociable) in water	APHA	* Total Cyanide after Distillation, 4500-CN- C	26-Jul-05	Norwest Labs Edmonton
Cyanide (Strong Acid Dissociable) in water	APHA	* Total Cyanide after Distillation, 4500-CN- C	27-Jul-05	Norwest Labs Edmonton
Mercury (Total) in water	MDMES	* Determination of Mercury in Water by Cold Vapor Atomic Absor, 245.1	25-Jul-05	Norwest Labs Edmonton
Mercury (Total) in water	MDMES	* Determination of Mercury in Water by Cold Vapor Atomic Absor, 245.1	23-Jul-05	Norwest Labs Edmonton
Mercury Low Level (Total) in water	APHA	* Cold Vapour Atomic Absorption Spectrometric Method, 3112 B	29-Jul-05	Norwest Labs Surrey
Metals ICP-MS (Total) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	22-Jul-05	Norwest Labs Edmonton
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	22-Jul-05	Norwest Labs Edmonton
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	22-Jul-05	Norwest Labs Edmonton
Metals Trace (Total) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	22-Jul-05	Norwest Labs Edmonton
Metals Trace (Total) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	22-Jul-05	Norwest Labs Edmonton
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105°C, 2540 D	22-Jul-05	Norwest Labs Edmonton

Please direct any inquiries regarding this report to our Client Services group.

Results relate only to samples as submitted

The test report shall not be reproduced except in full, without the written approval of the laboratory



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* Norwest method(s) is based on reference method

References:

APHA	Standard Methods for the Examination of Water and Wastewater
MDMES	Mthds for the Determination of Metals in Enviromental Smpls
US EPA	US Environmental Protection Agency Test Methods

Comments:

For samples 3, 4, 12, 13, 14, 17, and 21, insufficient sample was provided to reach lower TSS detection limit of 1 mg/l.
The ion balance was outside the acceptable range for sample 396502-7. All parameters used in the ion balance calculation have been confirmed.
The ion balance was outside the acceptable range for samples 396502-14 and 16. The ion balance can be variable in samples with TDS less than 100 mg/L.

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Analytical Report

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Attn: Michael Tansey
Sampled By: M. Tansey/B. Lowe
Company:

Project
ID:
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 392192
Control Number:
Date Received: Jun 30, 2005
Date Reported: Jul 07, 2005
Report Number: 716952

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NWL Number	392192-16	392192-19	392192-24
Sample Date	Jun 29, 2005	Jun 29, 2005	Jun 29, 2005
Sample Description	51024 / Station 102	51026 / Station 102	51031 / Lower sewage lagoon
Matrix	Water - General	Water - General	Water - General

Analyte	Units	Results	Results	Results	Detection Limit
Metals Total					
Iron	Total	mg/L	0.2	-	0.4
Manganese	Total	mg/L	0.864	-	0.177
Silicon	Total	mg/L	1.60	-	0.41
Sulfur	Total	mg/L	82.8	-	16.0
Mercury	Total	mg/L	<0.0001	-	<0.0001
Mercury	Total	ug/L	-	0.05	-
Aluminum	Total	mg/L	0.243	-	0.153
Antimony	Total	mg/L	0.0046	-	0.0004
Arsenic	Total	mg/L	0.0185	-	0.0138
Barium	Total	mg/L	0.014	-	0.014
Beryllium	Total	mg/L	<0.0001	-	<0.0001
Bismuth	Total	mg/L	<0.0005	-	<0.0005
Boron	Total	mg/L	0.075	-	0.026
Cadmium	Total	mg/L	0.00013	-	<0.00001
Chromium	Total	mg/L	<0.0005	-	<0.0005
Cobalt	Total	mg/L	0.0426	-	0.0068
Copper	Total	mg/L	0.015	-	0.003
Lead	Total	mg/L	0.0019	-	0.0008
Lithium	Total	mg/L	0.020	-	0.136
Molybdenum	Total	mg/L	0.001	-	0.001
Nickel	Total	mg/L	0.0820	-	0.0092
Selenium	Total	mg/L	<0.0002	-	<0.0002
Silver	Total	mg/L	<0.0001	-	<0.0001
Strontium	Total	mg/L	0.250	-	0.744
Thallium	Total	mg/L	<0.00005	-	<0.00005
Tin	Total	mg/L	<0.001	-	<0.001
Titanium	Total	mg/L	0.0039	-	0.0052
Uranium	Total	mg/L	<0.0005	-	<0.0005
Vanadium	Total	mg/L	<0.0001	-	0.0004
Zinc	Total	mg/L	0.211	-	0.015



Appendix C

Water Quality Data and QA/QC Results



Table C.1. Water Quality Data for Exposure and Reference Sites

Table 3-1: Water Quality Data for Exposure and Reference Sites							
Parameter	Units	MDL	CWQG	Exposure		Reference	
				Dam 1a Lake	Seep Creek Pond 1&2	Fingers Lake	Fingers Creek
Nutrients							
Ammonia-N	mg/L	0.05	5.79	0.51	<0.05	<0.05	<0.05
Dissolved Organic Carbon	mg/L	1		2	6	3	<1
Phosphorus, Total	mg/L	0.02		<0.02	<0.02	0.02	<0.02
Total Organic Carbon	mg/L	1		2	6	3	3
Major Ions							
Nitrate+Nitrite-N	mg/L	0.1		5.7	0.4	0.1	<0.1
Nitrate-N	mg/L	0.1		5.7	0.4	0.1	<0.1
Nitrite-N	mg/L	0.05	0.06	<0.05	<0.05	<0.05	<0.05
Chloride (Cl)	mg/L	1		48	6	<1	<1
Iron (Fe)-Extractable	mg/L	0.06		<0.06	0.15	<0.06	0.14
Manganese(Mn)-Extractable	mg/L	0.02		1.24	0.09	<0.02	0.10
ICP Metals and SO ₄ for Routine Water Analysis							
Calcium (Ca)	mg/L	0.5		61.5	10.2	1.1	1.6
Potassium (K)	mg/L	0.5		5.2	1.1	<0.5	0.6
Magnesium (Mg)	mg/L	0.1		7.9	2.7	0.6	0.7
Sodium (Na)	mg/L	1		69	10	1	1
Sulfate (SO ₄)	mg/L	0.5		237	43.3	2.7	2.6
TDS and Hardness							
TDS (Calculated)	mg/L			454	75	6	7
Hardness (as CaCO ₃)	mg/L			186	37	5	7
pH, Conductivity and Total Alkalinity							
pH		0.1	6.5-9.0	5.8	6.1	6.5	6.3
Conductivity (EC)	µS/cm	0.2		738	141	14.8	15.3
Bicarbonate (HCO ₃)	mg/L	5		<5	<5	<5	<5
Carbonate (CO ₃)	mg/L	5		<5	<5	<5	<5
Hydroxide (OH)	mg/L	5		<5	<5	<5	<5
Alkalinity, Total (as CaCO ₃)	mg/L	5		<5	<5	<5	<5
Other							
Total Suspended Solids	mg/L	3		<3	<3	<3	<3
Cyanide, Total	mg/L	0.002		<0.002	<0.002	<0.002	<0.002
Radium-226	Bq/L	0.005		0.010	0.006	0.006	<0.005

MDL = Method Detection Limit; CWQG = Canadian Water Quality Guidelines for freshwater (CCME 2005); bold and highlighted values exceed, or fall outside the range of, CCME guideline values

Table C.2. Total Metal Data for Exposure and Reference Sites

Parameter	Units	MRV	MDL	CWQG	Exposure		Reference	
					Dam 1a Lake	Seep Creek Pond 1&2	Fingers Lake	Fingers Creek
Total Metals								
Aluminum (Al)	µg/L	0.50	2.00	100	110	72.4	16.4	10.3
Antimony (Sb)	µg/L	0.0005	0.0010		0.0389	0.0403	0.0106	0.0060
Arsenic (As)	µg/L	0.0020	0.0400	5	6.80	2.93	2.07	1.21
Barium (Ba)	µg/L	0.0040	0.1000		27.7	7.53	1.75	1.47
Beryllium (Be)	µg/L	0.0030	0.0100		0.141	0.0270	< 0.003	< 0.003
Bismuth (Bi)	µg/L	0.0010	0.0100		0.0015	0.0039	0.0017	< 0.001
Boron (B)	µg/L	0.050	0.800		63.5	9.59	1.45	< 0.05
Cadmium (Cd)	µg/L	0.0020	0.0060	0.017	0.411	0.0913	0.0089	< 0.002
Calcium (Ca)	mg/L	0.0040	0.1000		57.7	10.2	0.895	0.962
Chromium (Cr)	µg/L	0.030	0.300		< 0.03	0.379	0.0999	< 0.03
Cobalt (Co)	µg/L	0.0010	0.0100		42.1	5.50	0.0493	0.0691
Copper (Cu)	µg/L	0.050	0.100	2	13.1	6.53	0.562	0.390
Iron (Fe)	µg/L	2.0	4.0	300	30.2	171	30.2	18.1
Lead (Pb)	µg/L	0.0010	0.0060	1	0.115	1.39	0.279	0.0130
Lithium (Li)	µg/L	0.020	0.200		22.0	7.58	0.396	0.866
Magnesium (Mg)	mg/L	0.0001	0.0005		6.16	2.11	0.512	0.487
Manganese (Mn)	µg/L	0.0030	0.0300		1330	93.4	2.87	3.82
Mercury (Hg)	ng/L	0.0100	0.0500	100	0.0113	< 0.01	< 0.01	< 0.01
Molybdenum (Mo)	µg/L	0.0010	0.0080	73	0.236	0.166	0.0165	0.0084
Nickel (Ni)	µg/L	0.0050	0.0600	25	133	28.4	0.394	0.339
Phosphorus (P)	µg/L	0.80	5.00		9.88	14.5	38.2	10.7
Potassium (K)	µg/L	2.0	5.0		5260	1070	397	360
Selenium (Se)	µg/L	0.100	0.300	1	0.475	< 0.1	< 0.1	< 0.1
Silicon (Si)	mg/L	0.0100	0.8000		1.81	0.834	0.0923	0.0124
Silver (Ag)	µg/L	0.0005	0.0050	0.1	0.0023	0.0111	0.0033	0.0014
Sodium (Na)	µg/L	2.0	6.0		60700	8090	601	402
Strontium (Sr)	µg/L	0.0040	0.0080		244	43.3	4.89	5.30
Sulphur (S)	mg/L	0.20	0.60		95.5	15.7	1.29	< 0.2
Thallium (Tl)	µg/L	0.0003	0.0030		0.0145	0.0061	0.0011	0.0012
Thorium (Th)	µg/L	0.0003	0.0300		0.0066	0.0069	0.0011	0.0006
Tin (Sn)	µg/L	0.030	0.070		< 0.03	0.0323	< 0.03	< 0.03
Titanium (Ti)	µg/L	0.040	0.070		0.756	1.60	0.521	0.157
Uranium (U)	µg/L	0.0001	0.0030		0.0144	0.0247	0.0048	0.0047
Vanadium (V)	µg/L	0.0050	0.2000		< 0.005	0.0918	0.0533	< 0.005
Zinc (Zn)	µg/L	0.100	0.200	30	314	40.4	2.16	1.67

MRV = Minimum Reported Value; MDL = Method Detection Limit; CWQG = Canadian Water Quality Guidelines for freshwater (CCME 2005); Bold and shaded values exceed CWQG.

Table C.3. Dissolved Metal Data for Exposure and Reference Sites

Dissolved Metals Data for Exposure and Reference Sites							
Parameter	Units	MRV	MDL	Exposure		Reference	
				Dam 1a Lake	Seep Creek Pond 1&2	Fingers Lake	Fingers Creek
Dissolved Metals							
Aluminum (Al)	µg/L	0.20	2.00	92.1	33.6	2.03	3.37
Antimony (Sb)	µg/L	0.0005	0.0010	0.0342	0.0331	0.0104	0.0060
Arsenic (As)	µg/L	0.0020	0.0400	3.78	2.10	1.64	1.21
Barium (Ba)	µg/L	0.0040	0.1000	25.7	6.66	1.38	1.45
Beryllium (Be)	µg/L	0.0030	0.0100	0.106	0.0234	< 0.003	< 0.003
Bismuth (Bi)	µg/L	0.0010	0.0100	0.0014	0.0021	0.0016	< 0.001
Boron (B)	µg/L	0.030	0.800	59.6	8.34	0.492	< 0.03
Cadmium (Cd)	µg/L	0.0020	0.0060	0.373	0.0783	0.0066	< 0.002
Calcium (Ca)	mg/L	0.0040	0.1000	54.1	9.56	0.837	0.953
Chromium (Cr)	µg/L	0.030	0.300	< 0.03	0.200	0.0427	< 0.03
Cobalt (Co)	µg/L	0.0010	0.0100	38.7	5.20	0.0248	0.0396
Copper (Cu)	µg/L	0.050	0.100	12.2	5.15	0.557	0.363
Iron (Fe)	µg/L	2.0	4.0	< 2	55.6	< 2	< 2
Lead (Pb)	µg/L	0.0010	0.0060	0.0570	0.638	0.0930	0.0125
Lithium (Li)	µg/L	0.020	0.200	19.9	7.35	0.163	0.826
Magnesium (Mg)	mg/L	0.0001	0.0005	5.77	2.00	0.468	0.486
Manganese (Mn)	µg/L	0.0030	0.0300	1200	89.1	0.562	2.15
Mercury (Hg)	µg/L	0.0100	0.0500	0.0101	< 0.01	< 0.01	< 0.01
Molybdenum (Mo)	µg/L	0.0010	0.0080	0.217	0.161	0.0124	0.0081
Nickel (Ni)	µg/L	0.0050	0.0600	123	26.5	0.338	0.335
Phosphorus (P)	µg/L	0.80	5.00	7.46	9.49	24.6	10.5
Potassium (K)	µg/L	2.0	5.0	4890	1020	372	352
Selenium (Se)	µg/L	0.100	0.300	0.467	< 0.1	< 0.1	< 0.1
Silicon (Si)	mg/L	0.0100	0.8000	1.72	0.730	0.0606	0.0119
Silver (Ag)	µg/L	0.0005	0.0050	0.0009	0.0024	0.0008	0.0010
Sodium (Na)	µg/L	2.0	6.0	55700	7770	600	401
Strontium (Sr)	µg/L	0.0040	0.0080	234	42.7	4.54	5.20
Sulphur (S)	mg/L	0.20	0.60	90.4	15.0	1.29	< 0.2
Thallium (Tl)	µg/L	0.0003	0.0030	0.0144	0.0060	0.0011	0.0010
Thorium (Th)	µg/L	0.0003	0.0300	0.0065	0.0061	0.0011	0.0006
Tin (Sn)	µg/L	0.030	0.070	< 0.03	< 0.03	< 0.03	< 0.03
Titanium (Ti)	µg/L	0.040	0.070	0.537	0.405	0.0818	0.116
Uranium (U)	µg/L	0.0001	0.0030	0.0068	0.0178	0.0020	0.0023
Vanadium (V)	µg/L	0.0050	0.2000	< 0.005	0.0230	0.0293	< 0.005
Zinc (Zn)	µg/L	0.050	0.200	303	39.5	2.13	1.21
Total Chlorine (Cl)	mg/L	0.100	0.300	41.2	5.62	0.238	0.137
Dissolved Chlorine (Cl)	mg/L	0.100	0.300	39.4	5.60	0.237	0.132

MRV = Minimum Reported Value; MDL = Method Detection Limit

Table C.4. QA/QC Results

Parameter	Units	MDL	Field Blank	Trip Blank
Nutrients				
Ammonia-N	mg/L	0.05	<0.05	<0.05
Dissolved Organic Carbon	mg/L	1	<1	<1
Phosphorus, Total	mg/L	0.02	<0.02	<0.02
Total Organic Carbon	mg/L	1	<1	<1
Total Suspended Solids	mg/L	3	<3	<3
Major Ions				
Nitrate+Nitrite-N	mg/L	0.1	<0.1	<0.1
Nitrate-N	mg/L	0.1	<0.1	<0.1
Nitrite-N	mg/L	0.05	<0.05	<0.05
Chloride (Cl)	mg/L	1	<1	<1
Iron (Fe)-Extractable	mg/L	0.06	<0.06	<0.06
Manganese(Mn)-Extractable	mg/L	0.02	<0.02	<0.02
Calcium (Ca)	mg/L	0.5	<0.5	<0.5
Potassium (K)	mg/L	0.5	<0.5	<0.5
Magnesium (Mg)	mg/L	0.1	<0.1	<0.1
Sodium (Na)	mg/L	1	<1	<1
Sulphate (SO ₄)	mg/L	0.5	<0.5	<0.5
Ion Balance Calculation				
Ion Balance	%		Low TDS	Low TDS
TDS (Calculated)	mg/L		<1	<1
Hardness (as CaCO ₃)	mg/L		<1	<1
pH, Conductivity and Total Alkalinity				
pH	pH	0.1	5.7	8.4
Conductivity (EC)	µS/cm	0.2	1.1	1.1
Bicarbonate (HCO ₃)	mg/L	5	<5	<5
Carbonate (CO ₃)	mg/L	5	<5	<5
Hydroxide (OH)	mg/L	5	<5	<5
Alkalinity, Total (as CaCO ₃)	mg/L	5	<5	<5
Other				
Cyanide, Total	mg/L	0.002	<0.002	<0.002
Radium-226	Bq/L	0.005	<0.005	<0.005

MDL = Method Detection Limit; Samples were analysed at the Enviro-Test Laboratories; Bold and shaded values are greater than five times greater than the MDL.

Appendix D

Sediment Quality and Particle Size Data



Table D.1. Sediment quality and particle size data from the BIC survey reference area

Parameter	Units	MDL	ISQG	Reference Sites (Fingers Lake)						
				Site 1	Site 2	Site 3	Site 4	Site 5	Mean	SD
Total Carbon by Combustion	%	0.1		0.2	0.2	0.4	<0.1	0.4	0.3	0.115
Inorganic Carbon	%	0.01		0.06	0.03	0.03	0.08	0.07	0.054	0.023
Total Organic Carbon	%	0.1		0.1	0.2	0.3	<0.1	0.4	0.25	0.129
Particle Size										
%Sand (0.2 - 2.0 mm)	%			62.10	50.00	49.20	53.7	58	54.6	5.453
% Gravel (>2.0 - 16.0 mm)	%			0	0	0	0	0	0	0.000
Sand (>0.05 mm)	%	1		97	90	86	98	82	90.6	6.914
Slit (0.002 - 0.05 mm)	%	1		2	8	12	2	16	8	6.164
Clay (<0.002 mm)	%	1		1	2	2	<1	2	1.75	0.500
Texture				Sand	Sand	Sand/ Loam	Sand	Loamy Sand		
Metals in Sediment										
Silver (Ag)	mg/kg	1		<1	<1	<1	<1	<1	<1	
Arsenic (As)	mg/kg	0.2	5.9	7	3.9	4.1	2.9	3.1	4.2	1.646
Barium (Ba)	mg/kg	5		40	44	38	22	50	38.8	10.450
Beryllium (Be)	mg/kg	1		<1	<1	<1	<1	<1	<1	
Cadmium (Cd)	mg/kg	0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Cobalt (Co)	mg/kg	1		3	4	3	3	5	3.6	0.894
Chromium (Cr)	mg/kg	0.5	37.3	19.8	20.8	18.2	10.2	24.8	18.76	5.369
Copper (Cu)	mg/kg	2	35.7	12	9	7	3	9	8	3.317
Mercury (Hg)	mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Molybdenum (Mo)	mg/kg	1		<1	<1	<1	<1	<1	<1	
Nickel (Ni)	mg/kg	2		11	13	9	8	14	11	2.550
Lead (Pb)	mg/kg	5	35	<5	<5	<5	<5	<5	<5	
Antimony (Sb)	mg/kg	0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	
Selenium (Se)	mg/kg	0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	
Tin (Sn)	mg/kg	5		<5	<5	<5	<5	<5	<5	
Thallium (Tl)	mg/kg	1		<1	<1	<1	<1	<1	<1	
Uranium (U)	mg/kg	40		<40	<40	<40	<40	<40	<40	
Vanadium (V)	mg/kg	1		17	17	16	9	20	15.8	4.087
Zinc (Zn)	mg/kg	10	123	20	20	20	10	30	20	7.071

Notes: MDL=method detection limit; ISQG = Interim Sediment Quality Guideline for the protection of aquatic life (CCME 2005); bold and shaded values exceed ISQG

Table D.2. Sediment quality and particle size data from the BIC survey exposure area

Parameter	Units	MDL	ISQG	Exposure Sites (Seep Creek Pond 1 and Pond 2)						
				Site 1	Site 2	Site 3	Site 4	Site 5	Mean	SD
Total Carbon by Combustion	%	0.1		2.6	0.5	4.4	0.4	0.5	1.68	1.780
Inorganic Carbon	%	0.01		0.03	0.06	0.07	0.03	0.03	0.044	0.019
Total Organic Carbon	%	0.1		2.6	0.5	4.3	0.4	0.4	1.64	1.759
Particle Size										
% Sand (0.2 - 2.0 mm)	%			8.61	7.63	42.1	24.1	39.2	28.26	15.855
% Gravel (>2.0 - 16.0 mm)	%			0.0	0.0	0.0	0.0	0.1	0.025	0.050
Sand (>0.05 mm)	%	1		8	32	8	69	82	47.75	33.925
Slit (0.002 - 0.05 mm)	%	1		86	66	84	30	16	49	31.432
Clay (<0.002 mm)	%	1		6	2	8	1	2	3.25	3.202
Texture				Silt	Silt Loam	Silt	Sandy Loam	Loam		
Metals in Sediment										
Silver (Ag)	mg/kg	1		<1	<1	<1	<1	<1	<1	
Arsenic (As)	mg/kg	0.2	5.9	45.6	17.6	38.9	9.6	18.3	26	15.406
Barium (Ba)	mg/kg	5		78	37	65	28	28	47.2	22.950
Beryllium (Be)	mg/kg	1		<1	<1	<1	<1	<1	<1	
Cadmium (Cd)	mg/kg	0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Cobalt (Co)	mg/kg	1		20	9	21	9	10	13.8	6.140
Chromium (Cr)	mg/kg	0.5	37.3	64.9	27.9	57.5	14.7	15.1	36.02	23.736
Copper (Cu)	mg/kg	2	35.7	29	23	30	20	13	23	6.964
Mercury (Hg)	mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Molybdenum (Mo)	mg/kg	1		<1	<1	<1	<1	<1	<1	
Nickel (Ni)	mg/kg	2		46	26	48	22	16	31.6	14.519
Lead (Pb)	mg/kg	5	35	<5	<5	<5	<5	<5	<5	
Antimony (Sb)	mg/kg	0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	
Selenium (Se)	mg/kg	0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	
Tin (Sn)	mg/kg	5		<5	<5	<5	<5	<5	<5	
Thallium (Tl)	mg/kg	1		<1	<1	<1	<1	<1	<1	
Uranium (U)	mg/kg	40		<40	<40	<40	<40	<40	<40	
Vanadium (V)	mg/kg	1		44	21	40	12	14	26.2	14.873
Zinc (Zn)	mg/kg	10	123	90	50	90	50	30	62	26.833

Notes: MDL=method detection limit; ISQG = Interim Sediment Quality Guideline for the protection of aquatic life (CCME 2005); bold and shaded values exceed ISQG

Table D.1. Sediment quality and particle size data from the BIC survey reference area

Parameter	Units	MDL	ISQG	Reference Sites (Fingers Lake)						
				Site 1	Site 2	Site 3	Site 4	Site 5	Mean	SD
Total Carbon by Combustion	%	0.1		0.2	0.2	0.4	<0.1	0.4	0.3	0.115
Inorganic Carbon	%	0.01		0.06	0.03	0.03	0.08	0.07	0.054	0.023
Total Organic Carbon	%	0.1		0.1	0.2	0.3	<0.1	0.4	0.25	0.129
Particle Size										
% Sand (0.2 - 2.0 mm)	%			62.10	50.00	49.20	53.7	58	54.6	5.453
% Gravel (>2.0 - 16.0 mm)	%			0	0	0	0	0	0	0.000
Sand (>0.05 mm)	%	1		97	90	86	98	82	90.6	6.914
Slit (0.002 - 0.05 mm)	%	1		2	8	12	2	16	8	6.164
Clay (<0.002 mm)	%	1		1	2	2	<1	2	1.75	0.500
Texture				Sand	Sand	Sand/Loam	Sand	Loamy Sand		
Metals in Sediment										
Silver (Ag)	mg/kg	1		<1	<1	<1	<1	<1	<1	
Arsenic (As)	mg/kg	0.2	5.9	7	3.9	4.1	2.9	3.1	4.2	1.646
Barium (Ba)	mg/kg	5		40	44	38	22	50	38.8	10.450
Beryllium (Be)	mg/kg	1		<1	<1	<1	<1	<1	<1	
Cadmium (Cd)	mg/kg	0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Cobalt (Co)	mg/kg	1		3	4	3	3	5	3.6	0.894
Chromium (Cr)	mg/kg	0.5	37.3	19.8	20.8	18.2	10.2	24.8	18.76	5.369
Copper (Cu)	mg/kg	2	35.7	12	9	7	3	9	8	3.317
Mercury (Hg)	mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Molybdenum (Mo)	mg/kg	1		<1	<1	<1	<1	<1	<1	
Nickel (Ni)	mg/kg	2		11	13	9	8	14	11	2.550
Lead (Pb)	mg/kg	5	35	<5	<5	<5	<5	<5	<5	
Antimony (Sb)	mg/kg	0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	
Selenium (Se)	mg/kg	0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	
Tin (Sn)	mg/kg	5		<5	<5	<5	<5	<5	<5	
Thallium (Tl)	mg/kg	1		<1	<1	<1	<1	<1	<1	
Uranium (U)	mg/kg	40		<40	<40	<40	<40	<40	<40	
Vanadium (V)	mg/kg	1		17	17	16	9	20	15.8	4.087
Zinc (Zn)	mg/kg	10	123	20	20	20	10	30	20	7.071

Notes: MDL=method detection limit; ISQG = Interim Sediment Quality Guideline for the protection of aquatic life (CCME 2005); bold and shaded values exceed ISQG

Table D.2. Sediment quality and particle size data from the BIC survey exposure area

Parameter	Units	MDL	ISQG	Exposure Sites (Seep Creek Pond 1 and Pond 2)						
				Site 1	Site 2	Site 3	Site 4	Site 5	Mean	SD
Total Carbon by Combustion	%	0.1		2.6	0.5	4.4	0.4	0.5	1.68	1.780
Inorganic Carbon	%	0.01		0.03	0.06	0.07	0.03	0.03	0.044	0.019
Total Organic Carbon	%	0.1		2.6	0.5	4.3	0.4	0.4	1.64	1.759
Particle Size										
%Sand (0.2 - 2.0 mm)	%			8.61	7.63	42.1	24.1	39.2	28.26	15.855
% Gravel (>2.0 - 16.0 mm)	%			0.0	0.0	0.0	0.0	0.1	0.025	0.050
Sand (>0.05 mm)	%	1		8	32	8	69	82	47.75	33.925
Slit (0.002 - 0.05 mm)	%	1		86	66	84	30	16	49	31.432
Clay (<0.002 mm)	%	1		6	2	8	1	2	3.25	3.202
Texture				Silt	Silt Loam	Silt	Sandy Loam	Loam		
Metals in Sediment										
Silver (Ag)	mg/kg	1		<1	<1	<1	<1	<1	<1	
Arsenic (As)	mg/kg	0.2	5.9	45.6	17.6	38.9	9.6	18.3	26	15.406
Barium (Ba)	mg/kg	5		78	37	65	28	28	47.2	22.950
Beryllium (Be)	mg/kg	1		<1	<1	<1	<1	<1	<1	
Cadmium (Cd)	mg/kg	0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Cobalt (Co)	mg/kg	1		20	9	21	9	10	13.8	6.140
Chromium (Cr)	mg/kg	0.5	37.3	64.9	27.9	57.5	14.7	15.1	36.02	23.736
Copper (Cu)	mg/kg	2	35.7	29	23	30	20	13	23	6.964
Mercury (Hg)	mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Molybdenum (Mo)	mg/kg	1		<1	<1	<1	<1	<1	<1	
Nickel (Ni)	mg/kg	2		46	26	48	22	16	31.6	14.519
Lead (Pb)	mg/kg	5	35	<5	<5	<5	<5	<5	<5	
Antimony (Sb)	mg/kg	0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	
Selenium (Se)	mg/kg	0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	
Tin (Sn)	mg/kg	5		<5	<5	<5	<5	<5	<5	
Thallium (Tl)	mg/kg	1		<1	<1	<1	<1	<1	<1	
Uranium (U)	mg/kg	40		<40	<40	<40	<40	<40	<40	
Vanadium (V)	mg/kg	1		44	21	40	12	14	26.2	14.873
Zinc (Zn)	mg/kg	10	123	90	50	90	50	30	62	26.833

Notes: MDL=method detection limit; ISQG = Interim Sediment Quality Guideline for the protection of aquatic life (CCME 2005); bold and shaded values exceed ISQG