

APPENDIX F:

Wilson Brook Water Quality Results

SW1 is a downstream sampling location			Surface Water Grab Sample Results		
Exceeds Groundwater Quality Guidelines			Wilson Brook Baseline		
Exceeds Freshwater Aquatic Life Guidelines			22-Feb-17		
Analyte	Unit	RL	NSE	CCME	SW-1
Sodium	mg/L	0.05			8.06
Potassium	mg/L	0.02			2.12
Calcium	mg/L	0.05			109
Magnesium	mg/L	0.01			22.5
Iron	mg/L	0.02	0.3	0.3	0.12
Manganese	mg/L	0.001	0.82		1.16
Copper	mg/L	0.001	0.002	0.002-0.004 ⁴	< 0.001
Zinc	mg/L	0.001	0.03	0.03	0.004
Ammonia (as N)	mg/L	0.05		0.019 ²	0.06
pH	unit			6.5-9.0	7.3
Alkalinity (as CaCO3)	mg/L	2			59
Chloride	mg/L	0.5			2.2
Sulphate	mg/L	1			290
Nitrate + Nitrite (as N)	mg/L	0.05			0.17
o-Phosphates (as P)	mg/L	0.01			< 0.01
r-Silica (as SiO2)	mg/L	0.1			5.8
Total Organic Carbon	mg/L	0.5			1.8
Turbidity	NTU	0.1			0.8
Conductivity	µS/cm	1			721
Metals	Unit	RL	NSE	CCME	SW1
Aluminum	µg/L	1.0	5	5-100 ²	26
Antimony	µg/L	0.1	20		< 0.1
Arsenic	µg/L	1.0	5	5	< 1
Barium	µg/L	1.0	1000		28
Beryllium	µg/L	0.1	5.3		< 0.1
Bismuth	µg/L	1.0			< 1
Boron	µg/L	1.0	1200	1500	9
Cadmium	µg/L	0.01	0.01	0.09	0.02
Calcium	µg/L	50.00			107000
Chromium (Total)	µg/L	1.0		1-8.9	< 1
Cobalt	µg/L	0.1	10		0.9
Copper	µg/L	1.0			< 1
Iron	µg/L	20.0			120
Lead	µg/L	0.1	1	1-7 ⁴	< 0.1
Lithium	µg/L	0.1			5.0
Magnesium	µg/L	10.0			21900
Manganese	µg/L	1.0			1130
Mercury	µg/L	0.025	0.026	0.026	< 0.025
Molybdenum	µg/L	0.1	73	73	0.1
Nickel	µg/L	1.0	25	25-150 ⁴	4
Potassium	µg/L	20.0			2080
Rubidium	µg/L	0.1			2.0
Selenium	µg/L	1.0	1.0	1.0	< 1
Silver	µg/L	0.1	0.1	0.1	< 0.1
Sodium	µg/L	50.0			8600
Strontium	µg/L	1.0	21000		1240
Tellurium	µg/L	0.1			< 0.1
Thallium	µg/L	0.1	0.8	0.8	< 0.1
Tin	µg/L	0.1			< 0.1
Uranium	µg/L	0.1	300	15	0.5
Vanadium	µg/L	1.0	6		< 1
Zinc	µg/L	1.00			4

1) sensitive livestock

2) value varies with pH and/or temperature

3) irrigation

4) value varies with hardness and/or alkalinity concentrations

NSE: Nova Scotia Environment Tier I
Environmental Quality Standards for
Groundwater (Table 4; Potable Groundwater,
Coarse-grained Soils, Commercial/Industrial
Land Use) and Surface Water (Table 3; Fresh
Water)

*OMOE: Ontario Ministry of the Environment
2011 Groundwater Standards for Use under
Part XV.1 of the Environmental Protection Act
(Table 3 Full Depth Generic Site Condition
Standards in a Non-Potable Groundwater
Condition; Coarse-grained soils) and Ontario
Drinking Water Quality Standards, Objective
and Guidelines 2006 (used for parameters
where non-potable criteria unavailable)*

*PWQO: Ontario Ministry of the Environment Provincial Water Quality Objectives 1999
CCME: Canadian Council of Ministers of the Environment 2015
BCWQG: British Columbia Approved and Working Water Quality Guidelines 2015 (Long-Term Average)*

Report ID: 227520-IAS
 Report Date: 01-Mar-17
 Date Received: 23-Feb-17

CERTIFICATE OF ANALYSIS

for
 Roy Consultants Group
 364 York Street, Suite 102
 Fredericton, NB E3B 3P7



921 College Hill Rd
 Fredericton NB
 Canada E3B 6Z9
 Tel: 506.452.1212
 Fax: 506.452.0594
 www.rpc.ca

Attention: Jon Burt

Project #: 316-16

Location: Kings Mine

Analysis of Water

RPC Sample ID:		227520-1	
Client Sample ID:		SW-1	
Date Sampled:		22-Feb-17	
Analytes	Units	RL	
Sodium	mg/L	0.05	8.06
Potassium	mg/L	0.02	2.12
Calcium	mg/L	0.05	109.
Magnesium	mg/L	0.01	22.5
Iron	mg/L	0.02	0.12
Manganese	mg/L	0.001	1.16
Copper	mg/L	0.001	< 0.001
Zinc	mg/L	0.001	0.004
Ammonia (as N)	mg/L	0.05	0.06
pH	units	-	7.3
Alkalinity (as CaCO ₃)	mg/L	2	59
Chloride	mg/L	0.5	2.2
Sulfate	mg/L	1	290
Nitrate + Nitrite (as N)	mg/L	0.05	0.17
o-Phosphate (as P)	mg/L	0.01	< 0.01
r-Silica (as SiO ₂)	mg/L	0.1	5.8
Carbon - Total Organic	mg/L	0.5	1.8
Turbidity	NTU	0.1	0.8
Conductivity	µS/cm	1	721
Calculated Parameters			
Bicarbonate (as CaCO ₃)	mg/L	-	58.9
Carbonate (as CaCO ₃)	mg/L	-	0.110
Hydroxide (as CaCO ₃)	mg/L	-	0.010
Cation Sum	meq/L	-	7.75
Anion Sum	meq/L	-	7.29
Percent Difference	%	-	3.05
Theoretical Conductivity	µS/cm	-	778
Hardness (as CaCO ₃)	mg/L	0.2	365
Ion Sum	mg/L	-	478
Saturation pH (5°C)	units	-	7.9
Langelier Index (5°C)	-	-	-0.60

This report relates only to the sample(s) and information provided to the laboratory.

RL = Reporting Limit; Organic Carbon and ion chemistries for turbid samples are determined on filtered aliquots.

A. Ross Kean, M.Sc.
 Department Head
 Inorganic Analytical Chemistry

Peter Crowhurst, B.Sc., C.Chem
 Analytical Chemist
 Inorganic Analytical Chemistry

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 Canada E3B 6Z9
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 Fax: 506.452.0594
 www.rpc.ca

Attention: Jon Burt

Project #: 316-16

Location: Kings Mine

Analysis of Metals in Water

RPC Sample ID:			227520-2
Client Sample ID:			SW-2
Date Sampled:			22-Feb-17
Analytes	Units	RL	
Aluminum	µg/L	1	26
Antimony	µg/L	0.1	< 0.1
Arsenic	µg/L	1	< 1
Barium	µg/L	1	28
Beryllium	µg/L	0.1	< 0.1
Bismuth	µg/L	1	< 1
Boron	µg/L	1	9
Cadmium	µg/L	0.01	0.02
Calcium	µg/L	50	107000
Chromium	µg/L	1	< 1
Cobalt	µg/L	0.1	0.9
Copper	µg/L	1	< 1
Iron	µg/L	20	120
Lead	µg/L	0.1	< 0.1
Lithium	µg/L	0.1	5.0
Magnesium	µg/L	10	21900
Manganese	µg/L	1	1130
Mercury	µg/L	0.025	< 0.025
Molybdenum	µg/L	0.1	0.1
Nickel	µg/L	1	4
Potassium	µg/L	20	2080
Rubidium	µg/L	0.1	2.0
Selenium	µg/L	1	< 1
Silver	µg/L	0.1	< 0.1
Sodium	µg/L	50	8600
Strontium	µg/L	1	1240
Tellurium	µg/L	0.1	< 0.1
Thallium	µg/L	0.1	< 0.1
Tin	µg/L	0.1	< 0.1
Uranium	µg/L	0.1	0.5
Vanadium	µg/L	1	< 1
Zinc	µg/L	1	4

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Methods

<u>Analyte</u>	<u>RPC SOP #</u>	<u>Method Reference</u>	<u>Method Principle</u>
Ammonia	4.M47	APHA 4500-NH ₃ G	"Phenate" Colourimetry
pH	4.M03	APHA 4500-H ⁺ B	pH Electrode - Electrometric
Alkalinity (as CaCO ₃)	4.M43	EPA 310.2	Methyl Orange Colourimetry
Chloride	4.M44	APHA 4500-CL E	Ferricyanide Colourimetry
Sulfate	4.M45	APHA 4500-SO ₄ E	Turbidimetry
Nitrate + Nitrite (as N)	4.M48	APHA 4500-NO ₃ H	Hydrazine Red., Derivatization, Colourimetry
o-Phosphate (as P)	4.M50	APHA 4500-P F	Molybdate/Ascorbic Acid Colourimetry
r-Silica (as SiO ₂)	4.M46	APHA 4500-SI F	Heteropoly Blue Colourimetry
Carbon - Total Organic	4.M38	APHA 5310 C	UV-Persulfate Digestion, NDIR Detection
Turbidity	4.M06	APHA 2130 B	Nephelometry
Conductivity	4.M04	APHA 2510 B	Conductivity Meter, Pt Electrode
Trace Metals	4.M01/4.M29	EPA 200.8/EPA 200.7	ICP-MS/ICP-ES
Mercury	4.M52	EPA 245.1	Cold Vapor AAS