

APPENDIX I
Freshwater Habitat Assessment Supporting Documentation

ATTACHMENT A – Watercourse Assessment Forms

ATTACHMENT B – Watercourse Photos

ATTACHMENT C – Water Quality Results

ATTACHMENT D – AGAT QA/QC Forms for Freshwater Samples

Black Point Quarry Project
Guysborough County, NS
SLR Project No.: 210.05913.00000

ATTACHMENT A
Watercourse Assessment Forms

Black Point Quarry Project
Guysborough County, NS
SLR Project No.: 210.05913.00000

**DNR&E / DFO - NEW BRUNSWICK
STREAM SURVEY and HABITAT ASSESSMENT**
Start Point: Fogherly Lake End Point: WPT 190

of _____

River: Unnamed Watercourse 1 - Fogherly Lake outflow.

Date: 24-Sep-10

Personnel: M. Cameron-MacMillan and B. Cameron

Stream/River No.
Stream Order No.

Unit No.	Stream Type	Channel Type	Channel End	Length (m)	Area Width (m)		Substrate (%)							Ave Depth - Wet Width (cm)	Undercut Bank 0-50%		Over-Hanging Bank Vegetation 0-50%		Large Woody Debris In-Stream (m)	Embedded (Criteria)	In-Stream Vegetation	Comments
					Wet	Bank Channel	Bedrock	Boeslifer	Rock	Rubble	Gravel	Sand	Fines		L	R	L	R				
1	13	1	187.0			12.0	30.0	0	0	0	0	0	0	100	0	0	40	40	3.0	4	✓	Photos 67 - 71
2	8	1	188.0			1.0	1.0	0	20	15	5	25	35	0	25	25	15	15	0.0	1		Photos 72,73
3	24	1	189.0			2.5	5.0	0	20	10	10	10	10	40	5	5	10	20	0.0	1		Photos 74,75
4	8	1	190.0			1.0	1.0	0	20	15	5	25	35	0	25	25	15	15	0.0	1		Photos 76,77. Debris dam at WPT189.

Photos 76,77 at WPT189 (bars of steep dropoff).
Hobbit looks similar as the down stream as we can see.

FASTWATER	STREAM TYPE					CHANNEL TYPE	SUBSTRATE	FLOW TYPE	POOL RATING (reverse side)	
	6. Sheet (Sdgs)	7. Chute	8. Run	9. Rapid	10. Meander				CRITERIA (NO.)	% OF POOL SITE (LETTER)
1. Fall	14. Trench	18. Eddy	22. Wood Debris	1. Mean (if measurement refers to mean area of river)	1. Boulder, Ledger	1. Shallow Stream	1. Pool Depth > 1.5 m	1. Pool Depth > 1.5 m	1. Pool Depth > 1.5 m	1. Pool Depth > 1.5 m
2. Cascade	15. Plunge	19. Gapon	23. Man-Made Dam	2. Side Channel (weir diverted by islands)	2. Boulder =	2. Shallow	1. Instream Cover > 30%	1. Instream Cover > 30%	1. Instream Cover > 30%	1. Instream Cover > 30%
3. Rife (GORE)	16	20. Loop Structure	24. Natural Obstacle	3. Split (if river is split into various different stream types)	3. Rock =	3. Brook/Over Tributary	2. Instream Cover < 30%	2. Instream Cover < 30%	2. Instream Cover < 30%	2. Instream Cover < 30%
4. Rife (Rf)	17. Bogen	21. Reed/Cresting		4. Bogen	4. Gravel =	4. Shallow Step	3. Brook/Over Tributary	3. Brook/Over Tributary	3. Brook/Over Tributary	3. Brook/Over Tributary
5. Rife (Ssd)				5. Specify Left (L), Right (R) or Middle (M)	5. Sand =		4. Shallow Step	4. Shallow Step	4. Shallow Step	4. Shallow Step

*For different left and right parameters, values are to be written as L/R.

River: Unnamed Watercourse 1 - Fogherly Lake outflow.

Valley Floor Slope (m/m)	Flood Plain Width (m)	Shade (%)	Stream Banks						Erosion (%)	pH	Water Temperature (°C)	Fish Species	Pool Rating			Turbulence (%)		
			Vegetation (%)		Left Bank (0-50%)		Right Bank (0-50%)						Embedded (Criteria)	Mean Substrate Size (cm)	Fines (%)			
			Bare	Grasses	Shrubs	Trees	Stable	Eroding									Stable	Eroding
L 0.1	> 25	50	0	0	40	60	0	0	50	0	0	0	0	0				
L 0.3	> 25	80	0	20	20	60	0	0	50	0	0	0	0	0				
L 0.2	> 25	80	0	0	40	60	0	0	50	0	0	0	0	0				
L 0.3	> 25	80	0	20	20	60	0	0	50	0	0	0	0	0				

NOTE: *For selected site only, these columns (reverse side) should be done for a habitat assessment.

WATER FLOW MEASUREMENT

LENGTH (m)	DROPP (m)	GRADIENT (%)	UNIT No.	STREAM TYPE	NET WIDTH (m)	DEPTH (cm)			AVERAGE DEPTH SUM/L4		COEFFICIENT OF DISCREPANCY (0.0 - rough)	LENGTH (cm)			FLOW (m³/s)
						14 way	12 way	34 way	CENTIMETERS	METERS (m)		14 way	12 way	34 way	

Formula: $Q_{EST} = W \cdot D_{AVG} \cdot V_{AVG}$ where W = width, D = depth, L = length, A is a coefficient for the stream bottom (A = 0.8 for rough bottom, 0.9 for smooth)

CRITERIA

1. Choose water depth equal to or greater than channel width.
2. Riffle (RFB) - 15 or more flowing over a gravel and/or rubble bottom.
3. Side channels - 10% of stream length.
4. Undercut Bank - % of bank overhanging (above water edge) for stream type. Specify left (L) or right (R).
5. Mean Substrate Size - % of sand & fines surrounding the largest substrate up to 100%.
6. Mean Substrate Size - % of sand & fines surrounding the largest substrate up to 100%.
7. Woody Debris - Total width should be > 10 cm in diameter.

*For different left and right parameters, values are to be written as L/R.

**DNR&E / DFO - NEW BRUNSWICK
STREAM SURVEY and HABITAT ASSESSMENT**
Start Point: WPT 180 End Point: WPT 181

River: Unnamed Watercourse 2 - North watercourse.

Date: 22-Sep-10

Personnel: M. Cameron-MacMillan and B. Cameron

Stream/River No.
Stream Order No.

Unit No.	Stream Type	Channel Type	Channel End	Length (m)	Ave Width (m)		Substrate (%)								Ave Depth - Wet Width (cm)	Undercut Bank 0-50%			Overhanging Bank Vegetation 0-50%			Large Woody Debris In-Stream (m)	Embedded (Criteria)	In-Stream Vegetation	Comments					
					Wet	Bank Channel	Bedrock	Boulder	Rock	Rubble	Gravel	Sand	Fines	L		R	L	R	L	R										
1		1	179.0			15.0																						Dry channel; very little standing water in places.		
2	24	1	181.0		0.8	16.0	0	0	0	0	0	0	0	100								15	15	35	35	20.0	4			Photos 75, 76. Intermittent flow.
3	8	1	181.0	10.0	0.5	16.0	0	10	10	30	40	5	5								10	15	35	35	20.0	1			Photos 77, 78. Survey ends at dropoff; habitat appears similar to the downstream as can be seen.	

FASTWATER	SINGLE W TYPE							CHANNEL TYPE				SUBSTRATE				FLOW TYPE				POOL RATING (reverse side)											
	6. Sheet (Scpp)	7. chute	8. Run	9. Rapid	10. Meandered	11. Convergence	12. Lateral	13. Bover	14. Trench	15. Plunge	16.	17. Bogen	18. Edgey	19. Gully	20. Log Structure	21. Road Crossing	22. Wood Debris	23. Man-Made Dam	24. Natural Obstacle	1. Bedrock, Ledge	2. Boulder	3. Cobble	4. Gravel	5. Gravel	6. Sand	7. Fines	1. Survey Stream	2. Spring	3. Brook/River Tributary	4. Scamp Seep	1. Pool Depth > 1.5 m
																			1. Mean of measurement refers to mean area of river 2. Side Channel (water diverted by ditches) 3. Soil if river is split into various different stream types 4. Bogen * * Specially Lat (L), Right (R) or Middle (M)	> 461 mm 180 - 170 mm 84 - 53 mm 2.6 - 2.5 mm 0.06 - 0.05 mm	1. Survey Stream 2. Spring 3. Brook/River Tributary 4. Scamp Seep	a. > 30% b. < 30% c. < 10%	a. > 50% b. < 50%								

*For different left and right parameters, values are to be written as L/R.

River: Unnamed Watercourse 2 - North watercourse.

Volley Bank Slope Height L/R/W (m)	Flood Stage Elevation (m)	Stream Banks						pH	Water Temperature (°C)	Fish Species	Pool Rating		Pool Tail		Turbulence (%)	
		Vegetation (%)			Erosion (%)						Embedded (C/feet)	Mean Substrate Size (cm)	Flies (%)	No.		Letter
		Bare	Grasses	Shrubs	Trees	Stable	Eroding									
H																
H	0.4	16	65	0	30	0	70	50	0	0	50	0	0	0		
H	0.4	16	65	0	10	30	60	50	0	0	50	0	0			

NOTE: * For selected site study, these columns (reverse side) should be done for a habitat assessment

WATER FLOW MEASUREMENT

LENGTH (m)	RIFLE GRADIENT		WET WIDTH (m)	STREAM TYPE	DEPTH (cm)			AVERAGE DEPTH SUM / 4		COEFFICIENT (0.0 - rough)	LENGTH (m)	FLOAT TIME (sec)			FLOW cm/s
	DROP (m)	GRADIENT (%)			10 way	12 way	34 way	CENTIMETERS	METERS (m)			14 way	12 way	34 way	

Formula (CMS): $W \times D \times V \times C$ Where: W = width, D = depth, V = velocity, C = coefficient for the stream bottom (A = 0.8 for rough bottom, 0.9 for smooth)

CRITERIA	
1. Channel water depth equal to or greater than channel width	
2. Rate GRG: is a riffle flowing over a gravel and/or rubble bottom	
3. Side channels: feed into a separate stream type	

- 4 Undercut Bank: % of bank overhang (above water edge) for stream type. Specify left (L) or right (R)
- 5 Overhanging Bank Vegetation: % of vegetation overhang for stream type. Specify L or R
- 6. Bank stability: 1 = Stable, 2 = Moderate, 3 = Poor, 4 = Very Poor
- 7. Woody Debris: total width should be > 10 cm in diameter

*For different left and right parameters, values are to be written as L/R.

11-06

**DNR&E / DFO - NEW BRUNSWICK
STREAM SURVEY and HABITAT ASSESSMENT**

River: Unnamed Watercourse 3 - Eastern edge of property
Date: 24-Aug-10

Start Point: WPT 171 End Point: WPT 195

Personnel: M. Cameron-MacMillan and B. Cameron

___ of ___

Stream/River No.
Stream Order No.

Unit No.	Stream Type	Channel Type	Chainage End	Length (m)	Are Width (m)		Substrate (%)								Ave Depth - Wet Width (cm)	Undercut Bank 0-50%		Over-Hanging Bank Vegetation 0-50%			Large Woody Debris In-Stream (m)	Embedded (Criteria)	In-Stream Vegetation	Comments
					Wet	Bank Channel	Bedrock	Boulder	Rock	Rubble	Gravel	Sand	Fines	L		R	L	R	L	R				
1	13	1			20.0	25.0	0	10	30	50	10	0	0	0	0	0	0	2	2	25.0	4	✓	Beaver pond at downstream end of unit 1.	
-	-	-	-	-																			Remainder of survey completed 24 September.	
2	8	1	193.0		1.4	2.2	0	0	0	0	0	0	30	70	0	0	10	10	5.0	4	✓	Unit starts at WPT192. Fen habitat. Photos 80,81		
3	4/8	1	194.0		0.8	2.5	0	0	0	20	30	30	20	20	5	5	10	10	0.0	2		Photos 82,83		
4	8	1	195.0		0.5	1.3	0	0	0	0	10	30	60	5	5	2	2	2	0.0	4		Photos 84, 85		

FASTWATER	STREAM TYPE					CHANNEL TYPE	SUBSTRATE	FLOW TYPE	POOL RATING (reverse side)	
	6 Sheet (ledge)	10 Midchannel	14 Trench	18 Eddy	22 Wood Debris				CRITERIA (IND)	% OF POOLS IN SITE (ETTER)
7 Chute	11 Convergence	15 Plunge	19 Gabion	23 Man-Made Dam	1. Mean (d measurement) next to mean area of river	1 Bedrock - Ledge	1 Survey Stream	Pool Depth > 1.5 m	e - > 30%	
8 Run	12 Lateral	16	20 Log Structure	24 Natural Deadwater	2. Side Channel (water diverted by islands)	2 Boulder =	2 Spring	1 - Instream Cover > 30%	b - 10% to 30%	
9 Rapid	13 Beaver	17 Egan	21 Road Crossing		3. Spit (river & spit into various different stream types)	3 Rock =	3 Brook/Over Trajectory	2 - Instream Cover < 30%	c - < 10%	
					4. Began	4 Gravel =	4 Spring Step	Pool Depth 5 to 1.5 m	e - > 50%	
					** Specify Left (L), Right (R) for Middle (M)	5 Sand =		4 - Instream Cover > 30%	d - < 50%	
						6 Sand =				
						7 Fines =				

*For different left and right parameters, values are to be written as L/R.

River: Unnamed Watercourse 3 - Eastern edge of property

Valley Bank Slope (L/H) (m)	Flood Plain Width (m)	Shade (%)	Stream Banks						pH	Water Temperature (°C)	Fish Species	Pool Rating			Turbulence (%)						
			Vegetation (%)			Erosion (%)						Embedded (Criteria) 1: < 20% 2: 20 - 35% 3: 35 - 50% 4: > 50%	Mean Substrate Size (cm)	Fines (%)							
			Bare	Grasses/ Shrubs	Trees	Left Bank (0-50%)		Right Bank (0-50%)													
						Stable	Eroding	Stable								Eroding					
L 0	30	5	0	30	70	0	50	0	0	50	0	0									
L 0.2	30	30	0	60	30	10	50	0	0	50	0	0									
L 0.4	12	90	0	10	10	80	40	0	10	40	0	10									
L 0.3	30	90	0	10	0	90	50	0	0	50	0	0									

NOTE: * For selected site study, these columns (reverse side) should be done for a habitat assessment

LENGTH (m)	RIFLE GRADIENT		UNIT No.	STREAM TYPE	NET WIDTH (m)	DEPTH (cm)			AVERAGE DEPTH SUM / 4			COEFFICIENT (0.8 - rough) (0.9 - smooth)	LENGTH (m)	FLOAT TIME (sec)								
	DROP (m)	GRADIENT (%)				1/4 WY	1/2 WY	3/4 WY	CENTIMETERS					METERS (m)	1/4 WY	1/2 WY	3/4 WY	AVERAGE				
									METERS (m)													

Formula: $CAS = \frac{W \cdot D \cdot L \cdot A}{L \cdot D \cdot L \cdot A}$ Where: W = width, D = depth, L = length, A is a coefficient for the stream bottom (As = 0.8 for rough bottom, 0.9 for smooth)

CRITERIA	
1. Channel depth equal to or greater than channel width	4. Undercut Bank - % of bank overhang above water edge by stream type
2. Run cover - % of surface area below water	5. Overhanging Bank Vegetation - % of vegetation overhang for stream type
3. Side channels - level as a coarse stream type	6. Visual Embeddedness - % of sands or fines surrounding the larger substrates, up to 100%
	7. Viscosity Index - total width should be > 10 cm in diameter

*For different left and right parameters, values are to be written as L/R.

ATTACHMENT B
Watercourse Photos

Black Point Quarry Project
Guysborough County, NS
SLR Project No.: 210.05913.00000



Photo D.2-1. Unnamed Watercourse 2, Unit 2



Photo D.2-2. Unnamed Watercourse 2, Unit 2



Photo D.2-3. Unnamed Watercourse 2, Unit 3



Photo D.2-4. Unnamed Watercourse 2, Unit 3



Photo D.2-5. Unnamed Watercourse 1, Unit 1



Photo D.2-6. Unnamed Watercourse 1, Unit 1



Photo D.2-7. Unnamed Watercourse 1, Unit 1



Photo D.2-8. Unnamed Watercourse 1, Unit 1



Photo D.2-9. Unnamed Watercourse 1, Unit 1



Photo D.2-10. Unnamed Watercourse 1, Unit 2



Photo D.2-11. Unnamed Watercourse 1, Unit 2



Photo D.2-12. Unnamed Watercourse 1, Unit 3



Photo D.2-13. Unnamed Watercourse 1, Unit 3



Photo D.2-14. Unnamed Watercourse 1, Unit 4



Photo D.2-15. Unnamed Watercourse 1, Unit 4



Photo D.2-16. Unnamed Watercourse 1, start of steep dropoff



Photo D.2-17. Unnamed Watercourse 1, start of steep dropoff



Photo D.2-18. Unnamed Watercourse 3, Unit 2



Photo D.2-19. Unnamed Watercourse 3, Unit 2



Photo D.2-20. Unnamed Watercourse 3, Unit 3



Photo D.2-21. Unnamed Watercourse 3, Unit 3



Photo D.2-22. Unnamed Watercourse 3, Unit 4



Photo D.2-23. Unnamed Watercourse 3, Unit 4

ATTACHMENT C
Water Quality Results

Black Point Quarry Project
Guysborough County, NS
SLR Project No.: 210.05913.00000

Table D.3-1. Analytical Results of Water Quality, Three Unnamed Watercourses and Fogherty Lake, 2010.

Sample Name				GRQ-1	GRQ-2	GRQ-3	GRQ-4
Location			CCME FWAL	Unnamed Watercourse 3 East stream	Fogherty Lake	Unnamed Watercourse 2 North stream	Unnamed Watercourse 1 Fogherty Lake outflow
Parameter	Unit	RDL	Guideline	24-Aug-10	27-Aug-10	22-Sep-10	22-Sep-10
Field Parameters							
pH			6.5-9	3.41	2.94	3.15	2.95
Water Temperature	°C			21.4	22.7	14.9	16
Conductivity	µS/cm			62	43	91	53
% Dissolved Oxygen	%			79.2	100.6	79.8	47
Dissolved Oxygen	mg/L			6.67	8.67	8.47	4.52
General Chemistry							
pH			6.5-9	4.3	4.3	3.9	4.2
Reactive Silica as SiO2	mg/L	0.5		7.2	0.9	10.2	1.8
Chloride	mg/L	1		14	10	18	13
Fluoride	mg/L	0.1	0.12	<0.1	<0.1	0.4	<0.1
Sulphate	mg/L	2		<2	<2	<2	<2
Alkalinity	mg/L	5		<5	<5	<5	<5
True Color	TCU	5	Narrative	395	198	411	195
Turbidity	NTU	0.1	Narrative	1	0.7	2.8	0.7
Electrical Conductivity	umho/cm	1		59	52	102	61
Nitrate + Nitrite as N	mg/L	0.05		<0.05	<0.05	0.24	<0.05
Nitrate as N	mg/L	0.05	2.9	<0.05	<0.05	0.24	<0.05
Nitrite as N	mg/L	0.05	0.06	<0.05	<0.05	<0.05	<0.05
Ammonia as N	mg/L	0.03	Fact Sheet	<0.03	0.03	0.06	0.11
Total Organic Carbon	mg/L	0.5		35.6	15.4	46.6	17.5
Ortho-Phosphate as P	mg/L	0.01		<0.01	<0.01	0.02	<0.01
Total Sodium	mg/L	0.1		8.8	6.8	10	6.8
Total Potassium	mg/L	0.1		0.3	0.4	0.4	0.5
Total Calcium	mg/L	0.1		0.5	0.3	0.5	0.4
Total Magnesium	mg/L	0.1		0.7	0.6	1.1	0.6
Bicarb. Alkalinity (as CaCO3)	mg/L	5		<5	<5	<5	<5
Carb. Alkalinity (as CaCO3)	mg/L	10		<10	<10	<10	<10
Hydroxide	mg/L	5		<5	<5	<5	<5
Calculated TDS	mg/L	1		26	19	33	22
Hardness	mg/L			4.1	3.2	5.8	3.5
Langelier Index (@20C)	NA			-6.84	-7.05	-7.25	-7.03
Langelier Index (@ 4C)	NA			-7.16	-7.37	-7.57	-7.35
Saturation pH (@ 20C)	NA			11.1	11.3	11.1	11.2
Saturation pH (@ 4C)	NA			11.5	11.7	11.5	11.5
Anion Sum	me/L			0.39	0.28	0.52	0.37
Cation sum	me/L			0.68	0.47	0.84	0.49
% Difference/ Ion Balance (NS)	%			26.2	25.2	23.3	14.8
Total Suspended Solids	mg/L	5	Narrative	n/a	n/a	<5	<5
Total Phosphorous as P	mg/L	0.002	Fact Sheet	0.157	0.035	0.03	0.012

Table D.3-1. Analytical Results of Water Quality, Three Unnamed Watercourses and Fogherty Lake, 2010.

Sample Name				GRQ-1	GRQ-2	GRQ-3	GRQ-4
Location			CCME FWAL	Unnamed Watercourse 3 East stream	Fogherty Lake	Unnamed Watercourse 2 North stream	Unnamed Watercourse 1 Fogherty Lake outflow
Total Metals							
Total Aluminum	ug/L	5	5.0	1050	335	1050	272
Total Antimony	ug/L	2		<2	<2	<2	<2
Total Arsenic	ug/L	2	5.0	<2	<2	5	<2
Total Barium	ug/L	5		<5	<5	16	<5
Total Beryllium	ug/L	2		<2	<2	<2	<2
Total Bismuth	ug/L	2		<2	<2	<2	<2
Total Boron	ug/L	5		14	11	20	14
Total Cadmium	ug/L	0.017	0.017	0.025	0.023	0.102	<0.017
Total Chromium	ug/L	1		4	<1	<1	<1
Total Cobalt	ug/L	1		<1	<1	<1	<1
Total Copper	ug/L	2	2	<2	<2	<2	<2
Total Iron	ug/L	50	300	976	319	936	415
Total Lead	ug/L	0.5	1	3.1	2.6	2.2	0.7
Total Manganese	ug/L	2		37	16	87	15
Total Molybdenum	ug/L	2	73	<2	<2	<2	<2
Total Nickel	ug/L	2	25	<2	<2	<2	<2
Total Selenium	ug/L	1	1.0	1	<1	<1	<1
Total Silver	ug/L	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Total Strontium	ug/L	5		<5	<5	9	<5
Total Thallium	ug/L	0.1	0.8	<0.1	<0.1	<0.1	<0.1
Total Tin	ug/L	2		<2	<2	<2	<2
Total Titanium	ug/L	2		5	2	5	<2
Total Uranium	ug/L	0.1		0.3	0.1	0.3	<0.1
Total Vanadium	ug/L	2		<2	<2	<2	<2
Total Zinc	ug/L	5	30	9	26	20	10
Mercury	mg/L	0.00005	0.000026	<0.00005	<0.00005	<0.00005	<0.00005

APPENDIX D

AGAT QA/QC Forms for Freshwater Samples

Black Point Quarry Project
Guysborough County, NS
SLR Project No.: 210.05913.00000

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL
580 MAIN STREET, SUITE 105
SAINT JOHN, NB E2K1J5

ATTENTION TO: CHYANN KIRBY

PROJECT NO: GRQ

AGAT WORK ORDER: 10X432414

WATER ANALYSIS REVIEWED BY: Mike Earp, Operations Manager

DATE REPORTED: Sep 10, 2010

PAGES (INCLUDING COVER): 8

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718, or at 1-888-468-8718

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

Certificate of Analysis

AGAT WORK ORDER: 10X432414

PROJECT NO: GRQ

 11 Morris Drive, Unit 122
 Dartmouth, Nova Scotia
 CANADA B3B 1M2
 TEL (902)468-8718
 FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

ATTENTION TO: CHYANN KIRBY

Standard Water Analysis + FWAL Metals (Total), Hg

DATE SAMPLED: Aug 24, 2010

DATE RECEIVED: Sep 02, 2010

DATE REPORTED: Sep 10, 2010

SAMPLE TYPE: Water

Parameter	Unit	G / S	RDL	GRQ-1	GRQ-2
				1970509	1970510
pH				4.3	4.3
Reactive Silica as SiO ₂	mg/L		0.5	7.2	0.9
Chloride	mg/L		1	14	10
Fluoride	mg/L		0.1	<0.1	<0.1
Sulphate	mg/L		2	<2	<2
Alkalinity	mg/L		5	<5	<5
True Color	TCU		5	395	198
Turbidity	NTU		0.1	1.0	0.7
Electrical Conductivity	umho/cm		1	59	52
Nitrate + Nitrite as N	mg/L		0.05	<0.05	<0.05
Nitrate as N	mg/L		0.05	<0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05	<0.05
Ammonia as N	mg/L		0.03	<0.03	0.03
Total Organic Carbon	mg/L		0.5	35.6	15.4
Ortho-Phosphate as P	mg/L		0.01	<0.01	<0.01
Total Sodium	mg/L		0.1	8.8	6.8
Total Potassium	mg/L		0.1	0.3	0.4
Total Calcium	mg/L		0.1	0.5	0.3
Total Magnesium	mg/L		0.1	0.7	0.6
Bicarb. Alkalinity (as CaCO ₃)	mg/L		5	<5	<5
Carb. Alkalinity (as CaCO ₃)	mg/L		10	<10	<10
Hydroxide	mg/L		5	<5	<5
Calculated TDS	mg/L		1	26	19
Hardness	mg/L			4.1	3.2
Langelier Index (@20C)	NA			-6.84	-7.05
Langelier Index (@ 4C)	NA			-7.16	-7.37
Saturation pH (@ 20C)	NA			11.1	11.3
Saturation pH (@ 4C)	NA			11.5	11.7
Anion Sum	me/L			0.39	0.28
Cation sum	me/L			0.68	0.47
% Difference/ Ion Balance (NS)	%			26.2	25.2
Total Aluminum	ug/L		5	1050	335
Total Antimony	ug/L		2	<2	<2

Certified By:





Certificate of Analysis

AGAT WORK ORDER: 10X432414

PROJECT NO: GRQ

11 Morris Drive, Unit 122
 Dartmouth, Nova Scotia
 CANADA B3B 1M2
 TEL (902)468-8718
 FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

ATTENTION TO: CHYANN KIRBY

Standard Water Analysis + FWAL Metals (Total), Hg					
DATE SAMPLED: Aug 24, 2010		DATE RECEIVED: Sep 02, 2010		DATE REPORTED: Sep 10, 2010	
		SAMPLE TYPE: Water			
Parameter	Unit	G / S	RDL	GRQ-1	GRQ-2
				1970509	1970510
Total Arsenic	ug/L		2	<2	<2
Total Barium	ug/L		5	<5	<5
Total Beryllium	ug/L		2	<2	<2
Total Bismuth	ug/L		2	<2	<2
Total Boron	ug/L		5	14	11
Total Cadmium	ug/L		0.017	0.025	0.023
Total Chromium	ug/L		1	4	<1
Total Cobalt	ug/L		1	<1	<1
Total Copper	ug/L		2	<2	<2
Total Iron	ug/L		50	976	319
Total Lead	ug/L		0.5	3.1	2.6
Total Manganese	ug/L		2	37	16
Total Molybdenum	ug/L		2	<2	<2
Total Nickel	ug/L		2	<2	<2
Total Selenium	ug/L		1	1	<1
Total Silver	ug/L		0.1	<0.1	<0.1
Total Strontium	ug/L		5	<5	<5
Total Thallium	ug/L		0.1	<0.1	<0.1
Total Tin	ug/L		2	<2	<2
Total Titanium	ug/L		2	5	2
Total Uranium	ug/L		0.1	0.3	0.1
Total Vanadium	ug/L		2	<2	<2
Total Zinc	ug/L		5	9	26
Mercury	mg/L		0.00005	<0.00005	<0.00005

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 10X432414

PROJECT NO: GRQ

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

ATTENTION TO: CHYANN KIRBY

Total Phosphorus (Low Level)

DATE SAMPLED: Aug 24, 2010

DATE RECEIVED: Sep 02, 2010

DATE REPORTED: Sep 10, 2010

SAMPLE TYPE: Water

Parameter	Unit	G / S	RDL	GRQ-1	GRQ-2
				1970509	1970510
Total Phosphorus	mg/L		0.002	0.157	0.035

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:

Quality Assurance

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

AGAT WORK ORDER: 10X432414

PROJECT NO: GRQ

ATTENTION TO: CHYANN KIRBY

Water Analysis															
RPT Date: Sep 10, 2010			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Standard Water Analysis + FWAL Metals (Total), Hg															
pH	1	1965945	6.9	7.0	1.4%	<	100%	80%	120%		80%	120%		80%	120%
Reactive Silica as SiO2	1	1976151	13.2	13.1	0.8%	< 0.5	103%	80%	120%		80%	120%	102%	80%	120%
Chloride	1	1962422	10	10	0.0%	< 1	94%	80%	120%		80%	120%	100%	80%	120%
Fluoride	1	1962422	< 0.1	< 0.1	0.0%	< 0.1	98%	80%	120%		80%	120%	87%	80%	120%
Sulphate	1	1962422	5	5	0.0%	< 2	100%	80%	120%		80%	120%	102%	80%	120%
Alkalinity	1	1965945	8	8	0.0%	< 5	99%	80%	120%		80%	120%	97%	80%	120%
True Color	1	1965027	< 5	< 5	0.0%	< 5	95%	80%	120%		80%	120%		80%	120%
Turbidity	1	1965027	0.3	0.3	0.0%	< 0.1	88%	80%	120%		80%	120%		80%	120%
Electrical Conductivity	1	1965945	184	187	1.6%	< 1	99%	80%	120%		80%	120%		80%	120%
Nitrate as N	1	1962422	0.08	0.09	11.8%	< 0.05	104%	80%	120%		80%	120%	83%	80%	120%
Nitrite as N	1	1962422	< 0.05	< 0.05	0.0%	< 0.05	110%	80%	120%		80%	120%	101%	80%	120%
Total Organic Carbon	1	1976101	2.4	2.1	13.3%	< 0.5	103%	80%	120%		80%	120%	93%	80%	120%
Ortho-Phosphate as P	1	1976151	< 0.01	0.01		< 0.01	99%	80%	120%		80%	120%	94%	80%	120%
Total Sodium	90810	1977594	32.5	31.2	4.1%	< 0.1	115%	80%	120%	108%	90%	110%	97%	80%	120%
Total Potassium	90810	1977594	1.4	1.5	6.9%	< 0.1	103%	90%	110%	103%	90%	110%	82%	80%	120%
Total Calcium	90810	1977594	10.3	10.5	1.9%	< 0.1	102%	90%	110%	103%	90%	110%	117%	80%	120%
Total Magnesium	90810	1977594	1.7	1.6	6.1%	< 0.1	113%	80%	120%	104%	90%	110%	91%	80%	120%
Total Aluminum	90810	1977594	288	294	2.1%	< 5	117%	80%	120%	108%	90%	110%	114%	80%	120%
Total Antimony	90810	1977594	< 2	< 2	0.0%	< 2	83%	80%	120%	110%	90%	110%	98%	80%	120%
Total Arsenic	90810	1977594	74	73	1.4%	< 2	98%	90%	110%	95%	90%	110%	92%	80%	120%
Total Barium	90810	1977594	22	22	0.0%	< 5	99%	90%	110%	98%	90%	110%	83%	80%	120%
Total Beryllium	90810	1977594	< 2	< 2	0.0%	< 2	109%	90%	110%	106%	90%	110%	100%	80%	120%
Total Bismuth	90810	1977594	< 2	< 2	0.0%	< 2	95%	90%	110%	93%	90%	110%	93%	70%	130%
Total Boron	90810	1977594	53	53	0.0%	< 5	110%	90%	110%	110%	90%	110%	103%	80%	120%
Total Cadmium	90810	1977594	0.156	0.157	0.6%	< 0.017	97%	90%	110%	102%	90%	110%	98%	80%	120%
Total Chromium	90810	1977594	< 1	< 1	0.0%	< 1	105%	90%	110%	104%	90%	110%	87%	80%	120%
Total Cobalt	90810	1977594	< 1	< 1	0.0%	< 1	109%	90%	110%	103%	90%	110%	80%	80%	120%
Total Copper	90810	1977594	4	4	0.0%	< 2	105%	90%	110%	102%	90%	110%	84%	80%	120%
Total Iron	90810	1977594	282	274	2.9%	< 50	100%	90%	110%	100%	90%	110%	80%	80%	120%
Total Lead	90810	1977594	5.5	6.3	13.6%	< 0.5	100%	90%	110%	103%	90%	110%	104%	80%	120%
Total Manganese	90810	1977594	33	34	3.0%	< 2	104%	90%	110%	102%	90%	110%	85%	80%	120%
Total Molybdenum	90810	1977594	32	32	0.0%	< 2	93%	90%	110%	101%	90%	110%	103%	70%	130%
Total Nickel	90810	1977594	< 2	< 2	0.0%	< 2	106%	90%	110%	104%	90%	110%	85%	80%	120%
Total Selenium	90810	1977594	< 1	< 1	0.0%	< 1	97%	90%	110%	98%	90%	110%	90%	80%	120%
Total Silver	90810	1977594	< 0.1	< 0.1	0.0%	< 0.1	99%	90%	110%	90%	90%	110%	85%	80%	120%
Total Strontium	90810	1977594	74	73	1.4%	< 5	94%	90%	110%	97%	90%	110%	85%	80%	120%
Total Thallium	90810	1977594	< 0.1	< 0.1	0.0%	< 0.1	102%	90%	110%	104%	90%	110%	99%	80%	120%
Total Tin	90810	1977594	< 2	< 2	0.0%	< 2	91%	90%	110%	101%	90%	110%	98%	80%	120%
Total Titanium	90810	1977594	19	15	23.5%	< 2	104%	90%	110%	100%	90%	110%	91%	80%	120%

Quality Assurance

 CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL
 PROJECT NO: GRQ

 AGAT WORK ORDER: 10X432414
 ATTENTION TO: CHYANN KIRBY

Water Analysis (Continued)

RPT Date: Sep 10, 2010			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits		
								Lower	Upper		Lower	Upper		Lower	Upper	
Total Uranium	90810	1977594	16.9	17.0	0.6%	< 0.1	102%	90%	110%	106%	90%	110%	100%	80%	120%	
Total Vanadium	90810	1977594	< 2	< 2	0.0%	< 2	104%	90%	110%	99%	90%	110%	80%	80%	120%	
Total Zinc	90810	1977594	19	19	0.0%	< 5	103%	90%	110%	102%	90%	110%	84%	80%	120%	
Mercury	1	1968366	< 0.00005	< 0.00005	0.0%	< 0.00005	103%	80%	120%		80%	120%	89%	80%	120%	
Standard Water Analysis + FWAL Metals (Total), Hg																
Ammonia as N	1	1965026	<0.05	<0.05	0.0%	< 0.03	92%	80%	120%		80%	120%	102%	80%	120%	
Total Phosphorus (Low Level)																
Total Phosphorus	1	1970509	0.157	0.136	14.3%	< 0.006	93%	90%	110%	96%	90%	110%	87%	80%	120%	

Certified By: _____



Method Summary

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

AGAT WORK ORDER: 10X432414

PROJECT NO: GRQ

ATTENTION TO: CHYANN KIRBY

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
pH	INOR-121-6001	SM 4500 H+B	PC-TITRATE
Reactive Silica as SiO ₂	INORG-121-6028	SM 4110 B	COLORIMETER
Chloride	INORG-121-6005	SM 4110 B	IC
Fluoride	INORG-121-6005	SM 4110 B	IC
Sulphate	INORG-121-6005	SM 4110 B	IC
Alkalinity	INORG-121-6001	SM 2320 B	PC-TITRATE
True Color	INORG-121-6014	EPA 110.2	NEPHELOMETER
Turbidity	INORG-121-6022	SM 2130 B	NEPHELOMETER
Electrical Conductivity	INOR-121-6001	SM 2510 B	PC-TITRATE
Nitrate + Nitrite as N	INORG-121-6005	SM 4110 B	IC
Nitrate as N	INORG-121-6005	SM 4110 B	IC
Nitrite as N	INORG-121-6005	SM 4110 B	IC
Ammonia as N	INORG-121-6003	SM 4500-NH ₃ G	COLORIMETER
Total Organic Carbon	INORG-121-6026	SM 5310 B	TOC ANALYZER
Ortho-Phosphate as P	INORG-121-6005	SM 4110 B	COLORIMETER
Total Sodium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Potassium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Calcium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Magnesium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Bicarb. Alkalinity (as CaCO ₃)	INORG-121-6001	SM 2320 B	PC-TITRATE
Carb. Alkalinity (as CaCO ₃)	INORG-121-6001	SM 2320 B	PC-TITRATE
Hydroxide	INORG-121-6001	SM 2320 B	PC-TITRATE
Calculated TDS			
Hardness			
Langelier Index (@20C)			CALCULATION
Langelier Index (@ 4C)			CALCULATION
Saturation pH (@ 20C)			CALCULATION
Saturation pH (@ 4C)			CALCULATION
Anion Sum			
Cation sum			
% Difference/ Ion Balance (NS)			
Total Aluminum	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Antimony	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Arsenic	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Barium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Beryllium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Bismuth	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Boron	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Cadmium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS

Method Summary

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

AGAT WORK ORDER: 10X432414

PROJECT NO: GRQ

ATTENTION TO: CHYANN KIRBY

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Chromium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Cobalt	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Copper	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Iron	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Lead	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Manganese	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Molybdenum	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Nickel	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Selenium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Silver	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Strontium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Thallium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Tin	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Titanium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Uranium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Vanadium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Zinc	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Mercury	INOR-121-6100 & INOR-121-6107	SM 3112 B	CVAAS
Total Phosphorus	INOR-93-1022	SM 4500-P B&E	SPECTROPHOTOMETER



AGAT Laboratories

Unit 122 - 11 Morris Dr.
Dartmouth, NS B3B 1M2
Phone: 902-468-8718 • Fax: 902-468-8924
www.agatlabs.com
<http://webearth.agatlabs.com>

Arrival Condition: Good Poor (complete notes)
Arrival Temperature: 15°C AGAT Job Number: 10x132444
Notes:

Drinking Water Sample (y/n): _____ Reg. No. _____
Waterworks Number: _____

CHAIN OF CUSTODY RECORD

Report To: AMEC
Company: Chyann Kirby
Address: Saint John's NB
Phone: (506) 652-9497 FAX: _____
PO#: _____
AGAT Quotation: _____
Client Project Name/ #: GRA
Invoice To: Same () N () Circle
Company: _____
Contact: _____
Address: _____
Phone: _____ FAX: _____
PO#/Credit Card #: _____

Report Information
1. Name: Chyann Kirby
Email: chyann.kirby@amec.com
2. Name: Maureen Cameron-MacMillan
Email: maureen.cameron@amec.com

Report Format
 Single PDF sample per page
 Multiple PDF samples per page
 Excel format included
Turnaround Time (TAT) Business Days
Regular TAT: 5 - 7 days
Rush TAT: 1 day 2 days
 3 - 4 days
Date Required: _____
Time Required: _____

Regulatory Requirements (Check)
 List Guidelines on Report Do Not List Guidelines on Report
 PIRI Site Info (check all that apply):
 Tier 1 Res. Pot. Coarse
 Tier 2 Com N/Pot. Fine
 Gas Fuel Lube
 CCME CDWQ
 Ind NSDFOSP
 Com HRM 101
 Res/p Storm Water
 Ag HRM 101
 FWAL Waste Water
 Sediment
 Other _____

Lab Sample #	Hazardous (Y/N)	Other	Other	PCB	PAH	THM	VOC	TPH/BTEX-Fractionation Tier 2	TPH/BTEX (PRL) Tier 1	Phenols	Anions	Total Phosphorus	TKN	TSS	pH	BOD	Mercury	(circle - (Vol, Miss or Available))	Metals	Standard Water Analysis + MS	Lab Filtration Required
	<u>N</u>	<u>Low-level phosphorus</u>	<input checked="" type="checkbox"/>						<u>1</u>					<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	<u>N</u>		<input checked="" type="checkbox"/>											<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

Sample Relinquished by (print name) Maureen Cameron-MacMillan Date/Time 01 Sept
Sample Relinquished by (sign) [Signature] Date/Time 17 Sept
Sample Received by (print name) H.L. Dymich Date/Time Sept 13
Sample Received by (sign) [Signature] Date/Time 17 Sept
PAGE 1 of 1
NO: **19868**

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL
580 MAIN STREET, SUITE 105
SAINT JOHN, NB E2K1J5

ATTENTION TO: CHYANN KIRBY

PROJECT NO: GRQ

AGAT WORK ORDER: 10X438935

WATER ANALYSIS REVIEWED BY: Jason Coughtrey, Inorganic Supervisor

DATE REPORTED: Oct 06, 2010

PAGES (INCLUDING COVER): 9

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718, or at 1-888-468-8718

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

Certificate of Analysis

AGAT WORK ORDER: 10X438935

PROJECT NO: GRQ

 11 Morris Drive, Unit 122
 Dartmouth, Nova Scotia
 CANADA B3B 1M2
 TEL (902)468-8718
 FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

ATTENTION TO: CHYANN KIRBY

Standard Water Analysis + Metals (Total)

DATE SAMPLED: Sep 22, 2010

DATE RECEIVED: Sep 28, 2010

DATE REPORTED: Oct 06, 2010

SAMPLE TYPE: Water

Parameter	Unit	G / S	RDL	GRQ-3	GRQ-4
				2018956	2018959
pH		6.5-9		3.9	4.2
Reactive Silica as SiO ₂	mg/L		0.5	10.2	1.8
Chloride	mg/L		1	18	13
Fluoride	mg/L	0.12	0.1	0.4	<0.1
Sulphate	mg/L		2	<2	<2
Alkalinity	mg/L		5	<5	<5
True Color	TCU	Narrative	5	411	195
Turbidity	NTU	Narrative	0.1	2.8	0.7
Electrical Conductivity	umho/cm		1	102	61
Nitrate + Nitrite as N	mg/L		0.05	0.24	<0.05
Nitrate as N	mg/L	2.9	0.05	0.24	<0.05
Nitrite as N	mg/L	0.06	0.05	<0.05	<0.05
Ammonia as N	mg/L	Fact Sheet	0.03	0.06	0.11
Total Organic Carbon	mg/L		0.5	46.6	17.5
Ortho-Phosphate as P	mg/L		0.01	0.02	<0.01
Total Sodium	mg/L		0.1	10.0	6.8
Total Potassium	mg/L		0.1	0.4	0.5
Total Calcium	mg/L		0.1	0.5	0.4
Total Magnesium	mg/L		0.1	1.1	0.6
Bicarb. Alkalinity (as CaCO ₃)	mg/L		5	<5	<5
Carb. Alkalinity (as CaCO ₃)	mg/L		10	<10	<10
Hydroxide	mg/L		5	<5	<5
Calculated TDS	mg/L		1	33	22
Hardness	mg/L			5.8	3.5
Langelier Index (@20C)	NA			-7.25	-7.03
Langelier Index (@ 4C)	NA			-7.57	-7.35
Saturation pH (@ 20C)	NA			11.1	11.2
Saturation pH (@ 4C)	NA			11.5	11.5
Anion Sum	me/L			0.52	0.37
Cation sum	me/L			0.84	0.49
% Difference/ Ion Balance (NS)	%			23.3	14.8
Total Aluminum	ug/L	5.0	5	1050	272
Total Antimony	ug/L		2	<2	<2

Certified By:





Certificate of Analysis

AGAT WORK ORDER: 10X438935

PROJECT NO: GRQ

11 Morris Drive, Unit 122
 Dartmouth, Nova Scotia
 CANADA B3B 1M2
 TEL (902)468-8718
 FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

ATTENTION TO: CHYANN KIRBY

Standard Water Analysis + Metals (Total)

DATE SAMPLED: Sep 22, 2010

DATE RECEIVED: Sep 28, 2010

DATE REPORTED: Oct 06, 2010

SAMPLE TYPE: Water

Parameter	Unit	G / S	RDL	GRQ-3	GRQ-4
				2018956	2018959
Total Arsenic	ug/L	5.0	2	5	<2
Total Barium	ug/L		5	16	<5
Total Beryllium	ug/L		2	<2	<2
Total Bismuth	ug/L		2	<2	<2
Total Boron	ug/L		5	20	14
Total Cadmium	ug/L	0.017	0.017	0.102	<0.017
Total Chromium	ug/L		1	<1	<1
Total Cobalt	ug/L		1	<1	<1
Total Copper	ug/L	2	2	<2	<2
Total Iron	ug/L	300	50	936	415
Total Lead	ug/L	1	0.5	2.2	0.7
Total Manganese	ug/L		2	87	15
Total Molybdenum	ug/L	73	2	<2	<2
Total Nickel	ug/L	25	2	<2	<2
Total Selenium	ug/L	1.0	1	<1	<1
Total Silver	ug/L	0.1	0.1	<0.1	<0.1
Total Strontium	ug/L		5	9	<5
Total Thallium	ug/L	0.8	0.1	<0.1	<0.1
Total Tin	ug/L		2	<2	<2
Total Titanium	ug/L		2	5	<2
Total Uranium	ug/L		0.1	0.3	<0.1
Total Vanadium	ug/L		2	<2	<2
Total Zinc	ug/L	30	5	20	10
Mercury	mg/L	0.026	0.00005	<0.00005	<0.00005

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to NS - FWAL(ug/L)

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 10X438935

PROJECT NO: GRQ

11 Morris Drive, Unit 122
 Dartmouth, Nova Scotia
 CANADA B3B 1M2
 TEL (902)468-8718
 FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

ATTENTION TO: CHYANN KIRBY

Water Analysis - Various Inorganics

DATE SAMPLED: Sep 22, 2010

DATE RECEIVED: Sep 28, 2010

DATE REPORTED: Oct 06, 2010

SAMPLE TYPE: Water

Parameter	Unit	G / S	RDL	GRQ-3	GRQ-4
				2018956	2018959
Total Suspended Solids	mg/L	Narrative	5	<5	<5
Total Phosphorous as P	mg/L	Fact Sheet	0.002	0.030	0.012

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to NS-FWAL(mg/L)

Certified By:



Guideline Violation

AGAT WORK ORDER: 10X438935

PROJECT NO: GRQ

11 Morris Drive, Unit 122
 Dartmouth, Nova Scotia
 CANADA B3B 1M2
 TEL (902)468-8718
 FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

ATTENTION TO: CHYANN KIRBY

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	GUIDEVALUE	RESULT
2018956	GRQ-3	NS - FWAL(ug/L)	Standard Water Analysis + Metals (Total)	Fluoride	0.12	0.4
2018956	GRQ-3	NS - FWAL(ug/L)	Standard Water Analysis + Metals (Total)	Total Aluminum	5.0	1050
2018956	GRQ-3	NS - FWAL(ug/L)	Standard Water Analysis + Metals (Total)	Total Cadmium	0.017	0.102
2018956	GRQ-3	NS - FWAL(ug/L)	Standard Water Analysis + Metals (Total)	Total Iron	300	936
2018956	GRQ-3	NS - FWAL(ug/L)	Standard Water Analysis + Metals (Total)	Total Lead	1	2.2
2018956	GRQ-3	NS - FWAL(ug/L)	Standard Water Analysis + Metals (Total)	pH	6.5-9	3.9
2018959	GRQ-4	NS - FWAL(ug/L)	Standard Water Analysis + Metals (Total)	Total Aluminum	5.0	272
2018959	GRQ-4	NS - FWAL(ug/L)	Standard Water Analysis + Metals (Total)	Total Iron	300	415
2018959	GRQ-4	NS - FWAL(ug/L)	Standard Water Analysis + Metals (Total)	pH	6.5-9	4.2

Quality Assurance

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

AGAT WORK ORDER: 10X438935

PROJECT NO: GRQ

ATTENTION TO: CHYANN KIRBY

Water Analysis															
RPT Date: Oct 06, 2010			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Standard Water Analysis + Metals (Total)															
pH	1	2017954	7.4	7.4	0.0%	< 0.5	100%	80%	120%	80%	120%	80%	120%		
Reactive Silica as SiO2	1	2014611	13.4	13.3	0.7%	< 1	99%	80%	120%	80%	120%	102%	80%	120%	
Chloride	1	2021445	8	7	13.3%	< 0.1	102%	80%	120%	80%	120%	106%	80%	120%	
Fluoride	1	2021445	< 0.1	< 0.1	0.0%	< 0.1	94%	80%	120%	80%	120%	94%	80%	120%	
Sulphate	1	2021445	14	15	6.9%	< 2	108%	80%	120%	80%	120%	105%	80%	120%	
Alkalinity	1	2017954	18	17	5.7%	< 5	101%	80%	120%	80%	120%	95%	80%	120%	
True Color	1	2016154	30	28	6.9%	< 5	90%	80%	120%	80%	120%		80%	120%	
Turbidity	1	2016154	7.6	7.5	1.3%	< 0.1	87%	80%	120%	80%	120%		80%	120%	
Electrical Conductivity	1	2017954	93	93	0.0%	< 1	98%	80%	120%	80%	120%		80%	120%	
Nitrate as N	1	2021445	2.63	2.67	1.5%	< 0.05	110%	80%	120%	80%	120%	102%	80%	120%	
Nitrite as N	1	2021445	< 0.05	< 0.05	0.0%	< 0.05	118%	80%	120%	80%	120%	105%	80%	120%	
Ammonia as N	1	2023292	< 0.05	< 0.05	0.0%	< 0.05	98%	80%	120%	80%	120%	97%	80%	120%	
Ortho-Phosphate as P	1	2016250	< 0.01	< 0.01	0.0%	< 0.01	97%	80%	120%	80%	120%	104%	80%	120%	
Total Sodium	92920	2018917	6.0	6.3	4.9%	< 0.1	102%	90%	110%	92%	90%	110%	113%	80%	120%
Total Potassium	92920	2018917	1.4	1.3	7.4%	< 0.1	105%	90%	110%	103%	90%	110%	89%	80%	1020
Total Calcium	92920	2018917	481	427	11.9%	< 0.1	104%	90%	110%	103%	90%	110%	90%	80%	120%
Total Magnesium	92920	2018917	15.7	16.6	5.6%	< 0.1	100%	90%	110%	99%	90%	110%	117%	80%	120%
Total Aluminum	92920	2018917	206	212	2.9%	< 10	100%	90%	110%	100%	90%	110%	106%	80%	120%
Total Antimony	92920	2018917	< 2	< 2	0.0%	< 2	97%	90%	110%	104%	90%	110%	109%	80%	120%
Total Arsenic	92920	2018917	14	14	0.0%	< 2	97%	90%	110%	97%	90%	110%	113%	80%	120%
Total Barium	92920	2018917	13	11	16.7%	< 5	97%	90%	110%	100%	90%	110%	106%	80%	120%
Total Beryllium	92920	2018917	< 2	< 2	0.0%	< 2	103%	90%	110%	102%	90%	110%	110%	80%	120%
Total Bismuth	92920	2018917	< 2	< 2	0.0%	< 2	102%	90%	110%	87%	80%	120%	84%	80%	120%
Total Boron	92920	2018917	79	77	2.6%	< 5	102%	90%	110%	94%	90%	110%	120%	80%	120%
Total Cadmium	92920	2018917	< 0.3	< 0.3	0.0%	< 0.3	98%	90%	110%	100%	90%	110%	101%	80%	120%
Total Chromium	92920	2018917	< 2	< 2	0.0%	< 2	105%	90%	110%	104%	90%	110%	80%	80%	120%
Total Cobalt	92920	2018917	< 1	< 1	0.0%	< 1	105%	90%	110%	103%	90%	110%	91%	80%	120%
Total Copper	92920	2018917	3	3	0.0%	< 2	108%	90%	110%	106%	90%	110%	107%	80%	120%
Total Iron	92920	2018917	2270	2000	12.6%	< 50	106%	90%	110%	105%	90%	110%	89%	80%	120%
Total Lead	92920	2018917	< 0.5	< 0.5	0.0%	< 0.5	102%	90%	110%	100%	90%	110%	86%	80%	120%
Total Manganese	92920	2018917	105	91	14.3%	< 2	105%	90%	110%	104%	90%	110%	80%	80%	120%
Total Molybdenum	92920	2018917	5	5	0.0%	< 2	99%	90%	110%	92%	90%	110%	86%	80%	120%
Total Nickel	92920	2018917	< 2	< 2	0.0%	< 2	107%	90%	110%	106%	90%	110%	90%	80%	120%
Total Selenium	92920	2018917	< 2	< 2	0.0%	< 2	99%	90%	110%	99%	90%	110%	111%	80%	120%
Total Silver	92920	2018917	< 0.5	< 0.5	0.0%	< 0.5	98%	90%	110%	105%	90%	110%	98%	80%	120%
Total Strontium	92920	2018917	7750	7650	1.3%	< 5	98%	90%	110%	98%	90%	110%	96%	80%	120%
Total Thallium	92920	2018917	< 0.1	< 0.1	0.0%	< 0.1	101%	90%	110%	100%	90%	110%	90%	80%	120%
Total Tin	92920	2018917	< 2	< 2	0.0%	< 2	96%	90%	110%	100%	90%	110%	115%	80%	120%
Total Titanium	92920	2018917	20	21	4.9%	< 2	103%	90%	110%	100%	90%	110%	106%	80%	120%

Quality Assurance

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL
 PROJECT NO: GRQ

AGAT WORK ORDER: 10X438935
 ATTENTION TO: CHYANN KIRBY

Water Analysis (Continued)

RPT Date: Oct 06, 2010			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits		
								Lower	Upper		Lower	Upper		Lower	Upper	
Total Uranium	92920	2018917	0.5	0.5	0.0%	< 0.1	102%	90%	110%	98%	90%	110%	84%	80%	120%	
Total Vanadium	92920	2018917	< 2	< 2	0.0%	< 2	105%	90%	110%	98%	90%	110%	91%	80%	120%	
Total Zinc	92920	2018917	< 5	< 5	0.0%	< 5	103%	90%	110%	103%	90%	110%	104%	80%	120%	
Mercury	1	2016154	< 0.00005	< 0.00005	0.0%	< 0.00005	103%	80%	120%		80%	120%	96%	80%	120%	
Water Analysis - Various Inorganics																
Total Suspended Solids	1	2020180	<5	<5	0.0%	< 5	100%	80%	120%		80%	120%	102%	80%	120%	
Total Phosphorous as P	1		0.055	0.051	7.5%	< 0.002	90%	80%	120%	95%	80%	120%	94%	80%	120%	

Certified By: _____



Method Summary

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

AGAT WORK ORDER: 10X438935

PROJECT NO: GRQ

ATTENTION TO: CHYANN KIRBY

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
pH	INOR-121-6001	SM 4500 H+B	PC-TITRATE
Reactive Silica as SiO ₂	INORG-121-6028	SM 4110 B	COLORIMETER
Chloride	INORG-121-6005	SM 4110 B	IC
Fluoride	INORG-121-6005	SM 4110 B	IC
Sulphate	INORG-121-6005	SM 4110 B	IC
Alkalinity	INORG-121-6001	SM 2320 B	PC-TITRATE
True Color	INORG-121-6014	EPA 110.2	NEPHELOMETER
Turbidity	INORG-121-6022	SM 2130 B	NEPHELOMETER
Electrical Conductivity	INOR-121-6001	SM 2510 B	PC-TITRATE
Nitrate + Nitrite as N	INORG-121-6005	SM 4110 B	IC
Nitrate as N	INORG-121-6005	SM 4110 B	IC
Nitrite as N	INORG-121-6005	SM 4110 B	IC
Ammonia as N	INORG-121-6003	SM 4500-NH ₃ G	COLORIMETER
Total Organic Carbon	INORG-121-6026	SM 5310 B	TOC ANALYZER
Ortho-Phosphate as P	INORG-121-6005	SM 4110 B	COLORIMETER
Total Sodium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Potassium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Calcium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Magnesium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Bicarb. Alkalinity (as CaCO ₃)	INORG-121-6001	SM 2320 B	PC-TITRATE
Carb. Alkalinity (as CaCO ₃)	INORG-121-6001	SM 2320 B	PC-TITRATE
Hydroxide	INORG-121-6001	SM 2320 B	PC-TITRATE
Calculated TDS			
Hardness			
Langelier Index (@20C)			CALCULATION
Langelier Index (@ 4C)			CALCULATION
Saturation pH (@ 20C)			CALCULATION
Saturation pH (@ 4C)			CALCULATION
Anion Sum			
Cation sum			
% Difference/ Ion Balance (NS)			
Total Aluminum	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Antimony	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Arsenic	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Barium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Beryllium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Bismuth	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Boron	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Cadmium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS

Method Summary

CLIENT NAME: AMEC EARTH AND ENVIRONMENTAL

AGAT WORK ORDER: 10X438935

PROJECT NO: GRQ

ATTENTION TO: CHYANN KIRBY

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Chromium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Cobalt	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Copper	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Iron	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Lead	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Manganese	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Molybdenum	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Nickel	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Selenium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Silver	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Strontium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Thallium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Tin	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Titanium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Uranium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Vanadium	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Total Zinc	MET121-6104 & MET-121-6105	SM 3125	ICP/MS
Mercury	INOR-121-6100 & INOR-121-6107	SM 3112 B	CVAAS
Total Suspended Solids	INOR-121-6024, 6025	SM 2540C, D	GRAVIMETRIC
Total Phosphorous as P	INORG-121-6009	SM 365.2	COLORIMETER

