



November 2017

MCCARTHY QUARRY

Environmental Compliance Approval Quarterly Monitoring Report (August to November)

Submitted to:

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Barrie District Office
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REPORT



Report Number: 1407634

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1.0 INTRODUCTION

Golder Associates Ltd. (Golder) was retained by QBJR/Coco Aggregates Inc. (Coco) to prepare a quarterly compliance report for the McCarthy Quarry located in the Township of Ramara, County of Simcoe (Figure 1). The Environmental Compliance Approval (ECA) No. 4731-987KM8 issued on October 15, 2013 requires this task. A copy of the ECA No. 4731-987KM8 is found in Appendix A.

The following report addresses the requirements described in Sections 7 and 8 of the ECA. Included herein are a brief background, summary and discussion of the sampling results and data collected on-site during each sampling event.

2.0 BACKGROUND

The McCarthy Quarry dewatering system consists of the collection of groundwater and surface water (hereafter referred to as “quarry discharge”) at the base of the quarry floor in a quarry sump which is pumped to a settling pond, at grade, to the south of the active quarry area (Figure 1). The sump is equipped with a 4-inch Grindex pump which is rated at 35 L/sec and is attached to a 4-inch (101 mm) diameter discharge line. Water is pumped from the quarry floor up the quarry face to a 4-inch (101 mm) diameter pipeline that directs the water to the 14,000 m³ settling pond. The water in the settling pond is equipped with a Hickenbottom control structure that discharges the water to the roadside ditch along Concession Road 1. The water flows eastward along the north side of Concession Road 1 to a municipal drain and eventually to the Talbot River, which discharges into Lake Simcoe.

The dewatering activities from the McCarthy Quarry are currently carried out under the existing ECA No. 4731-987KM8 issued on October 15, 2013. Under the current ECA Coco is permitted to pump water from the quarry sump at a rate of 4,545 L/min (76 L/sec).

3.0 QUARRY DISCHARGE MONITORING PLAN

Weekly monitoring of the effluent is required by the ECA at three locations, as shown on Figure 1:

- The outfall of the settling pond (labelled as McCarthy Pond);
- The culvert along Concession Road 1 at the McCarthy property (SW1) downstream of the McCarthy Pond discharge location; and,
- 260 m north of the intersection of Concession Road 1 and the Mara Eldon Boundary Road (labelled as SW2) representing upstream conditions.

Weekly quarry discharge monitoring is required per Section 7(2) for Total Suspended Solids (TSS), Oil and Grease, Phenolics (4AAP) and pH at the McCarthy Pond. Additional water quality sampling is required under Section 7(3) at a semi-annual frequency at all three locations, recognizing that, as of April 24, 2014 this monitoring was reduced from weekly sampling frequency to a semi-annual frequency following one year of quarry operation according to Section 7(7). The parameters required for semi-annual water quality monitoring at all three locations are listed in Table 3 of the ECA. Monthly acute lethality is also required at the McCarthy Pond under Section 8.

As per Section 7(8) an inline flow meter is installed in the discharge line of the sump pump in order to measure continuous flow rates. The flow rates are recorded and provided to Golder by staff at McCarthy Quarry.



The weekly quarry discharge samples (Section 7(2)) were collected by staff at the McCarthy Quarry. The semi-annual water quality samples (Section 7(3) and Section 7(7)) were collected by Golder. Both the weekly and semi-annual water quality samples were sent to Maxxam Analytics Laboratory for analysis. Additionally, the monthly lethality samples were collected by Golder and sent to AGAT Laboratories Ltd.

4.0 QUARRY DISCHARGE MONITORING RESULTS

All laboratory certificates of analysis for the August to October 2017 monitoring period are included in Appendix B. Results of the quarry discharge monitoring are summarized below:

- The TSS, pH, Oil and Grease and Phenol (4AAP) concentrations were all below the daily concentration limits of the ECA (Table 1);
- The TSS, Oil and Grease and Phenol (4AAP) concentrations were all below the monthly concentration limits of the ECA (Table 2);
- The semi-annual surface water sampling results were below the PWQO, with the exception of phosphors at SW2 (Table 3);
- The quarry discharge between August and November, 2017 was found to be non-lethal to rainbow trout and *Daphnia magna* (Table 4). Zero rainbow trout and zero *Daphnia* died during lethality testing during the past quarter.; and,
- The discharge rate between August and November, 2017 was below the permitted rate of 4,545 L/min (76 L/sec) (Table 5).

5.0 SUMMARY AND RECOMMENDATIONS

All samples met the daily and monthly concentration limits of the ECA No. 4731-987KM8.



Report Signature Page

GOLDER ASSOCIATES LTD.

Handwritten signature of Jamie Bonany in blue ink.

Jamie Bonany, M.A.Sc.
Project Scientist

Handwritten signature of John Easton in blue ink.

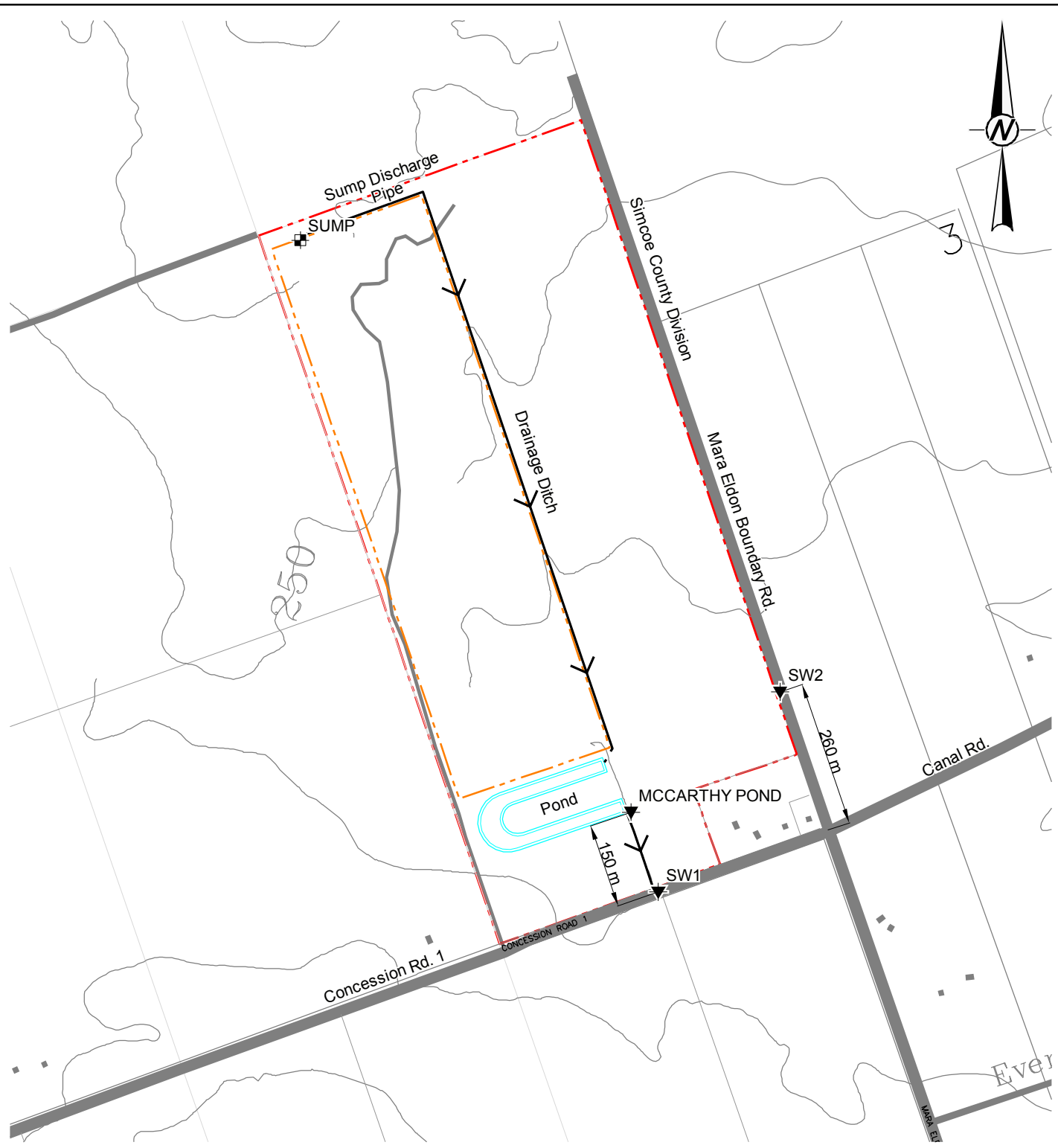
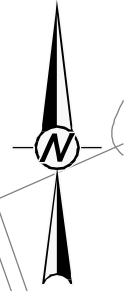
John Easton, M.Sc., P.Geo.
Associate Senior Hydrogeologist

JEB/JAE/plc

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FIGURE

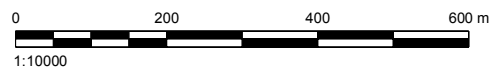


LEGEND

	Approximate Property Boundary
	Approximate Licenced Boundary
	5 m Contour Line
	Surface Water Sampling Location

REFERENCES AND NOTES

1. Projection UTM NAD83 Zone 17
2. Mapping based on ESRI Geography Network OBM Features and Bing Orthophotos



CLIENT
COCO / QBJR AGGREGATES INC.

PROJECT
STAN MCCARTHY QUARRY

TITLE
LOCATION MAP

CONSULTANT	YYYY-MM-DD	2014-09-02
	PREPARED	STB
	DESIGN	
	REVIEW	
	APPROVED	



PROJECT No. 14-07634	SCALE AS SHOWN	Rev. AB	Figure 1
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Path: \\golder\gdr\gait\barrie\CAD\Projects\2014\14-07634 (Barrie) - Coco Enviro and Hydro\0\ABA... | File Name: 1407634\SITE.dwg

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANS/A 25 mm



TABLES

Table 1: McCarthy Pond Weekly Water Quality Results (August to November 2017)

Sample ID	Unit	Reportable Detection Limit (RDL)	PWQO ¹	Daily Concentration Limit ²	McCarthy Quarry												
					Pond												
Date					03-Aug-17	10-Aug-17	17-Aug-17	24-Aug-17	31-Aug-17	07-Sep-17	14-Sep-17	21-Sep-17	28-Sep-17	05-Oct-17	12-Oct-17	19-Oct-17	26-Oct-17
pH	pH	n/a		6.0-9.5	8.56	8.69	8.21	8.24	8.48	8.40	8.21	8.19	8.08	8.15	8.15	8.07	8.22
Total Suspended Solids	mg/L	1		30	3	4	5	4	6	5	4	5	5	5	4	4	2
Total Oil and Grease	mg/L	0.5	Note 3	30	3.7	1.3	<0.5	1.1	1.8	1.6	1.7	1.7	<0.5	2.1	1.9	2.9	<0.5
Phenols (4AAP)	mg/L	<0.0010		0.04	<0.001	<0.002	<0.001	<0.001	0.001	0.0054	0.0013	0.0042	0.0045	<0.002	0.002	0.0013	0.0026

Notes

1. Provincial Water Quality Objectives (PWQO); shaded cells denote PWQO exceedance; some PWQOs are dependent on other water quality parameters hence the range in guideline values, refer to PWQO notes.
2. Daily Concentration Limit; bolded values denote exceedances in the Permit to Take Waters daily concentration limits.
3. The PWQO for Oil and Grease indicates that oil or petrochemicals should not be present in concentrations that: can be detected as a visible film, sheen or discoloration on the surface, can be detected by odour, can cause tainting of edible organisms, can form detectable deposits on shorelines and bottom sediments.
4. Results that are preceded by "<" denote concentrations that are below the laboratory Reportable Detection Limit (RDL).

Table 2: McCarthy Pond Monthly Water Quality Results (August to November 2017)

Sample ID	Unit	Reportable Detection Limit (RDL)	PWQO ¹	Monthly Concentration Limit ²	McCarthy Quarry		
					Pond		
Date					August	September	October
Total Suspended Solids	mg/L	1		15	4.40	4.75	3.75
Total Oil and Grease	mg/L	0.5	Note 3	15	1.7	1.4	1.9
Phenols (4AAP)	mg/L	<0.0010		0.02	0.001	0.004	0.002

Notes

1. Provincial Water Quality Objectives (PWQO); shaded cells denote PWQO exceedance; some PWQOs are dependent on other water quality parameters hence the range in guideline values, refer to PWQO notes.
2. Monthly Concentration Limit; bolded values denote exceedances in the Permit to Take Waters monthly concentration limits.
3. The PWQO for Oil and Grease indicates that oil or petrochemicals should not be present in concentrations that: can be detected as a visible film, sheen or discoloration on the surface, can be detected by odour, can cause tainting of edible organisms, can form detectable deposits on shorelines and bottom sediments.
4. Results that are preceded by "<" denote concentrations that are below the laboratory Reportable Detection Limit (RDL).

Table 3: McCarthy Semi-Annual Water Quality Monitoring Results (October 2017)

Sample ID	Unit	Reportable Detection Limit (RDL)	PWQO ¹	Interim PWQO ²	PTTW Effluent Limits	McCarthy Quarry		
						Pond	SW1	SW2
Date						26-Oct-17	26-Oct-17	26-Oct-17
Field Measured Parameters								
Conductivity	mS/cm					2035	2020	980
pH	pH	n/a	6.5-8.5		6.0-9.5	8.47	8.35	6.75
Temperature	°C	n/a				10.6	11.6	8.5
Calculated Parameters								
Anion Sum	me/L	N/A				20.2	20.1	10.2
Cation Sum	me/L	N/A				19	19.1	9.4
Hardness (CaCO3)	mg/L	1.0				400	400	440
Inorganics								
Total Ammonia-N	mg/L	0.050				0.37	0.35	<0.050
Conductivity	µS/cm	1.0				2.12	2.11	0.903
Total Dissolved Solids	mg/L	10				1300	1180	580
Fluoride (F-)	mg/L	0.10				0.8	0.8	<0.10
Total Kjeldahl Nitrogen (TKN)	mg/L	0.10				1.1	1	0.51
Dissolved Organic Carbon	mg/L	0.20				4.8	4.8	11
pH	pH	N/A	6.5-8.5		6.0-9.5	8.18	8.22	8.03
Phenols-4AAP	mg/L	0.0010			0.04	<0.0010	<0.0010	0.0024
Total Phosphorus	mg/L	0.020		0.02 ^{5b}		<0.020	<0.020	0.028
Total Suspended Solids	mg/L	10			30	<10	<10	<10
Dissolved Sulphate (SO4)	mg/L	1				360	360	150
Alkalinity (Total as CaCO3)	mg/L	1.0				140	140	330
Dissolved Chloride (Cl)	mg/L	1				340	340	16
Nitrite (N)	mg/L	0.010				0.054	0.05	<0.010
Nitrate (N)	mg/L	0.10				0.87	0.87	<0.10
Petroleum Hydrocarbons								
Total Oil & Grease	mg/L	0.50	Note 3		30	<0.50	<0.50	<0.50
Metals								
Total Arsenic (As)	ug/L	1	100	5		<1.0	<1.0	<1.0
Total Cadmium (Cd)	ug/L	0.1	0.2	0.1-0.5 ^{5d}		<0.10	<0.10	<0.10
Dissolved Calcium (Ca)	ug/L	200				81000	82000	150000
Total Calcium (Ca)	ug/L	200				99000	88000	170000
Total Chromium (Cr)	ug/L	5	1-89 ^{5e}			<5.0	<5.0	<5.0
Total Copper (Cu)	ug/L	1	5	1-5 ^{5f}		<1.0	<1.0	<1.0
Total Iron (Fe)	ug/L	100	300			<100	<100	280
Total Lead (Pb)	ug/L	0.5	5-25 ^{5g}	1-5 ^{5h}		<0.50	<0.50	<0.50
Dissolved Magnesium (Mg)	ug/L	50				47000	48000	15000
Total Magnesium (Mg)	ug/L	50				54000	50000	16000
Total Manganese (Mn)	ug/L	2				21	14	26
Total Nickel (Ni)	ug/L	1	25			1.3	1.3	<1.0
Dissolved Potassium (K)	ug/L	200				18000	18000	5900
Total Potassium (K)	ug/L	200				21000	19000	6200
Dissolved Sodium (Na)	ug/L	100				240000	240000	11000
Total Sodium (Na)	ug/L	100				280000	260000	11000
Total Zinc (Zn)	ug/L	5	30	20		<5.0	5.3	<5.0
<p>1. Provincial Water Quality Objectives (PWQO); shaded cells denote PWQO exceedance; some PWQOs are dependent on other water quality parameters hence the range in guideline values, refer to PWQO notes.</p> <p>2. Interim Provincial Water Quality Objectives (Interim PWQO); <i>shaded cells and italics denote Interim PWQO exceedance</i>; some PWQOs are dependent on other water quality parameters hence the range in guideline values, refer to PQWO notes.</p> <p>3. The PWQO for Oil and Grease indicates that oil or petrochemicals should not be present in concentrations that: can be detected as a visible film, sheen or discoloration on the surface, can be detected by odour, can cause tainting of edible organisms, can form detectable deposits on shorelines and bottom sediments.</p> <p>4. Results that are preceded by "<" denote concentrations that are below the laboratory Reportable Detection Limit (RDL).</p>						<p>5b. Phosphorus (Interim):</p> <p>- Current scientific evidence is insufficient to develop a firm Objective at this time.</p> <p>- Accordingly, the following phosphorus concentrations should be considered as general guidelines which should be supplemented by site-specific studies:</p> <p>(a) To avoid nuisance concentrations of algae in lakes, average total phosphorus concentrations for the ice-free period should not exceed 20 ug/L;</p> <p>(b) A high level of protection against aesthetic deterioration will be provided by a total phosphorus concentration for the ice-free period of 10 ug/L or less. This should apply to all lakes naturally below this value;</p> <p>(c) Excessive plant growth in rivers and streams should be eliminated at a total phosphorus concentration below 30 ug/L.</p>		
<p>5a. Aluminum (Interim):</p> <p>- At pH 4.5 to 5.5 the Interim PWQO is 15 ug/L based on inorganic monomeric aluminum measured in clay-free samples.</p> <p>- At pH >5.5 to 6.5, no condition should be permitted which would increase the acid soluble inorganic aluminum concentration in clay-free samples to more than 10% above natural background concentrations for waters representative of that geological area of the Province that are unaffected by man-made inputs.</p> <p>- At pH >6.5 to 9.0, the Interim PWQO is 75 ug/L based on total aluminum measured in clay-free samples.</p> <p>- If natural background aluminum concentrations in water bodies unaffected by manmade inputs are greater than the numerical Interim PWQO (above), no condition is permitted that would increase the aluminum concentration in clay-free samples by more than 10% of the natural background level.</p>						<p>5c. Beryllium: If Hardness <75 mg/L (CaCO3), use 11 ug/L If Hardness >75 mg/L (CaCO3), use 1100 ug/L</p> <p>5d. Cadmium (Interim): If Hardness 0-100 mg/L (CaCO3), then use 0.1 ug/L If Hardness >100 mg/L (CaCO3), then use 0.5 ug/L</p> <p>5e. Chromium: 1 ug/L for hexavalent chromium (Cr VI) 8.9 ug/L for trivalent chromium (Cr III)</p> <p>5f. Copper (Interim): If Hardness as CaCO3 (mg/L) is 0 - 20, then use 1 ug/L If Hardness as CaCO3 (mg/L) is >20, then use 5 ug/L</p> <p>5g. Lead: If Alkalinity as CaCO3 (mg/L) is < 20, use 5 ug/L If Alkalinity as CaCO3 (mg/L) is 20 to 40, use 10 ug/L If Alkalinity as CaCO3 (mg/L) is 40 to 80, use 20 ug/L If Alkalinity as CaCO3 (mg/L) is > 80, use 25 ug/L</p> <p>5h. Lead (Interim): If Hardness as CaCO3 (mg/L) is < 30, then use 1 ug/L If Hardness as CaCO3 (mg/L) is 30 to 80, then use 3 ug/L If Hardness as CaCO3 (mg/L) is > 80, then use 5 ug/L</p>		

Table 4: Lethality Monitoring at McCarthy Pond

	Unit	Mortality Limit	McCarthy Quarry		
Sample ID			Pond		
Date			24-Aug-17	28-Sep-17	26-Oct-17
Daphnia Magna	% Mortality Rate*	<50%	0	0	0
Rainbow Trout	% Mortality Rate*	<50%	0	0	0

* Test results represent acute lethality (100% effluent) of toxicants to Daphnia Magna and Rainbow Trout

Table 5: Measured Water Volume and Rate of Discharge from Quarry Sump

Date	Start	Stop	Total Sec.	Total Min.	Total Litres	Rate of Taking (L/sec)	Rate of Taking (L/min)
ECA Permitted Rate					6,550,000	76	4,545
1-Aug-17	NO PUMP		0	0	-	-	-
2-Aug-17	NO PUMP		0	0	-	-	-
3-Aug-17	NO PUMP		0	0	-	-	-
4-Aug-17	NO PUMP		0	0	-	-	-
5-Aug-17	NO PUMP		0	0	-	-	-
6-Aug-17	NO PUMP		0	0	-	-	-
7-Aug-17	NO PUMP		0	0	-	-	-
8-Aug-17	6AM	5PM	39600	660	1,386,000	35	2,100
9-Aug-17	NO PUMP		0	0	-	-	-
10-Aug-17	NO PUMP		0	0	-	-	-
11-Aug-17	NO PUMP		0	0	-	-	-
12-Aug-17	6AM	7PM	46800	780	1,638,000	35	2,100
13-Aug-17	6AM	4PM	36000	600	-	-	-
14-Aug-17	NO PUMP		0	0	-	-	-
15-Aug-17	NO PUMP		0	0	-	-	-
16-Aug-17	7AM	5PM	36000	600	1,260,000	35	2,100
17-Aug-17	6AM	4PM	36000	600	1,260,000	35	2,100
18-Aug-17	NO PUMP		0	0	-	-	-
19-Aug-17	NO PUMP		0	0	-	-	-
20-Aug-17	NO PUMP		0	0	-	-	-
21-Aug-17	NO PUMP		0	0	-	-	-
22-Aug-17	NO PUMP		0	0	-	-	-
23-Aug-17	NO PUMP		0	0	-	-	-
24-Aug-17	NO PUMP		0	0	-	-	-
25-Aug-17	NO PUMP		0	0	-	-	-
26-Aug-17	NO PUMP		0	0	-	-	-
27-Aug-17	NO PUMP		0	0	-	-	-
28-Aug-17	NO PUMP		0	0	-	-	-
29-Aug-17	NO PUMP		0	0	-	-	-
30-Aug-17	7AM	5:30PM	37800	630	1,323,000	35	2,100
31-Aug-17	NO PUMP		0	0	-	-	-
1-Sep-17	NO PUMP		0	0	-	-	-
2-Sep-17	NO PUMP		0	0	-	-	-
3-Sep-17	NO PUMP		0	0	-	-	-
4-Sep-17	NO PUMP		0	0	-	-	-
5-Sep-17	NO PUMP		0	0	-	-	-
6-Sep-17	NO PUMP		0	0	-	-	-
7-Sep-17	NO PUMP		0	0	-	-	-

Table 5: Measured Water Volume and Rate of Discharge from Quarry Sump

Date	Start	Stop	Total Sec.	Total Min.	Total Litres	Rate of Taking (L/sec)	Rate of Taking (L/min)
ECA Permitted Rate					6,550,000	76	4,545
8-Sep-17	NO PUMP		0	0	-	-	-
9-Sep-17	NO PUMP		0	0	-	-	-
10-Sep-17	NO PUMP		0	0	-	-	-
11-Sep-17	NO PUMP		0	0	-	-	-
12-Sep-17	NO PUMP		0	0	-	-	-
13-Sep-17	NO PUMP		0	0	-	-	-
14-Sep-17	7AM	4PM	32400	540	1,134,000	35	2,100
15-Sep-17	NO PUMP		0	0	-	-	-
16-Sep-17	NO PUMP		0	0	-	-	-
17-Sep-17	NO PUMP		0	0	-	-	-
18-Sep-17	NO PUMP		0	0	-	-	-
19-Sep-17	NO PUMP		0	0	-	-	-
20-Sep-17	NO PUMP		0	0	-	-	-
21-Sep-17	NO PUMP		0	0	-	-	-
22-Sep-17	NO PUMP		0	0	-	-	-
23-Sep-17	NO PUMP		0	0	-	-	-
24-Sep-17	NO PUMP		0	0	-	-	-
25-Sep-17	NO PUMP		0	0	-	-	-
26-Sep-17	7:30AM	5:30PM	36000	600	1,260,000	35	2,100
27-Sep-17	NO PUMP		0	0	-	-	-
28-Sep-17	NO PUMP		0	0	-	-	-
29-Sep-17	NO PUMP		0	0	-	-	-
30-Sep-17	NO PUMP		0	0	-	-	-
1-Oct-17	NO PUMP		0	0	-	-	-
2-Oct-17	NO PUMP		0	0	-	-	-
3-Oct-17	NO PUMP		0	0	-	-	-
4-Oct-17	NO PUMP		0	0	-	-	-
5-Oct-17	NO PUMP		0	0	-	-	-
6-Oct-17	NO PUMP		0	0	-	-	-
7-Oct-17	NO PUMP		0	0	-	-	-
8-Oct-17	NO PUMP		0	0	-	-	-
9-Oct-17	NO PUMP		0	0	-	-	-
10-Oct-17	NO PUMP		0	0	-	-	-
11-Oct-17	NO PUMP		0	0	-	-	-
12-Oct-17	NO PUMP		0	0	-	-	-
13-Oct-17	NO PUMP		0	0	-	-	-
14-Oct-17	NO PUMP		0	0	-	-	-

Table 5: Measured Water Volume and Rate of Discharge from Quarry Sump

Date	Start	Stop	Total Sec.	Total Min.	Total Litres	Rate of Taking (L/sec)	Rate of Taking (L/min)
ECA Permitted Rate					6,550,000	76	4,545
15-Oct-17	NO PUMP		0	0	-	-	-
16-Oct-17	6AM	6PM	43200	720	1,512,000	35	2,100
17-Oct-17	6AM	6PM	43200	720	1,512,000	35	2,100
18-Oct-17	7AM	5PM	36000	600	1,260,000	35	2,100
19-Oct-17	7AM	5PM	36000	600	1,260,000	35	2,100
20-Oct-17	6AM	4PM	36000	600	1,260,000	35	2,100
21-Oct-17	NO PUMP		0	0	-	-	-
22-Oct-17	NO PUMP		0	0	-	-	-
23-Oct-17	7AM	5PM	36000	600	1,260,000	35	2,100
24-Oct-17	NO PUMP		0	0	-	-	-
25-Oct-17	7AM	5PM	36000	600	1,260,000	35	2,100
26-Oct-17	7AM	5PM	36000	600	1,260,000	35	2,100
27-Oct-17	7AM	5PM	36000	600	1,260,000	35	2,100
28-Oct-17	NO PUMP		0	0	-	-	-
29-Oct-17	NO PUMP		0	0	-	-	-
30-Oct-17	7AM	5PM	36000	600	1,260,000	35	2,100
31-Oct-17	NO PUMP		0	0	-	-	-



APPENDIX A

Environmental Compliance Approval No. 4731-987KM8



- AKossi
- GA

Ministry of the Environment
Ministère de l'Environnement

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER 4731-987KM8

Issue Date: October 15, 2013

QBJR Aggregates Inc.
949 Wilson Ave
Toronto, Ontario, M3K 1G2

Site Location: McCarthy Quarry
Lot 1, Concession 1, Original Township of Mara
Lot 1, Concession 1
Ramara Township, County of Simcoe, L0K 1B0

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

a sewage works for the collection, transmission, treatment and disposal of quarry water effluent from an aggregate quarry consisting of the following:

- one (1) sump, measuring 20 metres long, 10 metres wide and 3 metres deep, located at the base of the quarry floor, equipped with two (2) submersible pumps each rated at 38 litres per second with a suction intake approximately one (1) metre above the bottom of the sump, discharging to a settling pond via a 203 millimetre diameter pipeline;
- one (1) horse-shoe shaped settling pond with an approximate volume of 14,000 cubic metres (at elevation 248.2 metres), with a Hickenbottom control structure equipped with a 150 millimetre diameter orifice plate, discharging to the roadside ditch along Concession Road 1 with ultimate discharge to the Talbot River via a private ditch;
- all other controls, electrical equipment, instrumentation, piping, pumps, valves and appurtenances essential for the proper operation of the aforementioned sewage works;

all in accordance with supporting documents listed in **Schedule A**.

For the purpose of this environmental compliance approval, the following definitions apply:

"Approval" means this entire document and any schedules attached to it, and the application;

"Director" means a person appointed by the Minister pursuant to section 5 of the *EPA* for the purposes of Part II.1 of the *EPA*;

"District Manager" means the District Manager of the Barrie District Office of the Ministry;

"EPA" means the Environmental Protection Act, R.S.O. 1990, c.E.19, as amended;

"Ministry" means the ministry of the government of Ontario responsible for the *EPA* and *OWRA* and includes all officials, employees or other persons acting on its behalf;

"Owner" means QBJR Aggregates Inc. and its successors and assignees;

"OWRA" means the Ontario Water Resources Act, R.S.O. 1990, c. O.40, as amended;

"Quarterly" means all or part of a period of three consecutive months beginning on the first day of January, April, July or October;

"Semi-annually" means all or part of a period of six months beginning on the first day of January or July;

"Weekly" means a period of seven days, starting on Sunday and ending on Saturday; and

"Works" means the sewage works described in the Owner's application, this *Approval* and in the supporting documentation referred to herein, to the extent approved by this *Approval* .

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL CONDITION

(1) Except as otherwise provided by these Conditions, the *Owner* shall design, build, install, operate and maintain the *Works* in accordance with the description given in this *Approval* , the application for approval of the *Works* and the submitted supporting documents and plans and specifications as listed in this *Approval* .

(2) Where there is a conflict between a provision of any submitted document referred to in this *Approval* and the Conditions of this *Approval* , the Conditions in this *Approval* shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

2. CHANGE OF OWNER

(1) The *Owner* shall notify the *District Manager* and the *Director* , in writing, of any of the following changes within seven (7) days of the change occurring:

(a) change of *Owner* or operating authority, or both;

(b) change of address of *Owner* or operating authority or address of new owner or operating authority;

(c) change of partners where the *Owner* or operating authority is or at any time becomes a partnership, and a copy of the most recent declaration filed under the *Partnerships Registration Act* ;

(d) change of name of the corporation where the *Owner* or operator is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" (Form 1, 2 or 3 of O. Reg. 189, R.R.O. 1980, as amended from time to time), filed under the *Corporations Informations Act* shall be included in the notification to the *District Manager* ;

(2) In the event of any change in ownership of the *Works* , the *Owner* shall notify in writing the succeeding owner of the existence of this certificate, and a copy of such notice shall be forwarded to the *District Manager* .

(3) The *Owner* shall ensure that all communications made pursuant to this condition will refer to this Approval's number.

3. CHANGES IN PROCESSES OR PROCESS MATERIALS

The *Owner* shall give written notice to the *District Manager* of any plans to change the processes or process materials in the *Owner's* enterprise serviced by the *Works* where the change may significantly alter the quantity or quality of the influent to or effluent from the *Works* , and no such changes shall be made unless with the written concurrence or approval of the *District Manager* .

4. OPERATIONS MANUAL

(1) The *Owner* shall prepare an operations manual prior to the commencement of operation of the sewage *Works* , that includes, but not necessarily limited to, the following information:

(a) operating procedures for routine operation of the *Works* ;

(b) inspection programs, including frequency of inspection, for the *Works* and the methods or tests employed to detect when maintenance is necessary;

(c) repair and maintenance programs, including the frequency of repair and maintenance for the *Works* ;

(d) contingency plans and procedures for dealing with potential spill, bypasses and any other abnormal situations and for notifying the *District Manager* ; and

(e) complaint procedures for receiving and responding to public complaints.

(2) The *Owner* shall maintain the operations manual up to date through revisions undertaken from time to time and retain a copy at the location of the sewage works. Upon request, the *Owner* shall make the manual available for inspection and copying by Ministry personnel.

(3) A copy of the operations manual required by subsection (1) shall be provided to the *Director* no later than **three (3) months** prior to the commencement of operation of the sewage works.

5. EFFLUENT LIMITS

(1) The *Owner* shall design, construct and operate the *Works* such that the concentrations of the materials named below as effluent parameters are not exceeded in the effluent from the *Works* .

Effluent Parameter	Daily Concentration Limit (mg/L)	Monthly Average Concentration Limit (mg/L)
Column 1	Column 2	Column 3
Total Suspended Solids	30	15
Oil and Grease	30	15
Phenolics (4AAP)	0.04	0.02

(2) pH of the effluent maintained between 6.0 to 9.5, inclusive, at all times.

(3) The *Owner* shall ensure that the quarry water effluent shall be non-lethal to rainbow trout and *Daphnia magna* at all times.

(4) For the purposes of determining compliance with and enforcing subsection (1), exceedance of a daily concentration is deemed to have occurred when any daily single grab sample, analyzed for a parameter named in Column 1 of Table 1, is greater than the corresponding daily concentration set in Column 2 of Table 1.

(5) For the purposes of determining compliance with and enforcing subsection (1), exceedance of a monthly average concentration is deemed to have occurred when the arithmetic mean concentration of all samples taken in a calendar month, analyzed for a parameter named in Column 1 of Table 1, is greater than the corresponding monthly average concentration set in Column 3 of Table 1.

(6) Non-compliance with respect to pH is deemed to have occurred when any single measurement is outside of the indicated range.

(7) For the purposes of determining compliance with and enforcing subsection (3), the effluent is deemed to be non-lethal if the test results, required pursuant to Condition 8, show mortality for no more than 50 percent of either test organism in each sample of undiluted effluent.

6. EFFLUENT - VISUAL OBSERVATIONS

Notwithstanding any other condition in this *Approval* the *Owner* shall ensure that the effluent from the *Works* is essentially free of floating and settleable solids and does not contain oil or any other substance in amounts sufficient to create a visible film, sheen or foam on the receiving waters.

7. EFFLUENT MONITORING AND RECORDING

The *Owner* shall, upon commencement of operation of the sewage works, carry out the following sampling from the final effluent control point (i.e. the outfall of the settling pond which is approximately 150 metres north of Concession 1) at the commencement of effluent discharge and for the duration of the discharge period, as follows:

(1) All samples and measurements taken for the purposes of this *Approval* are to be taken at a time and in a location characteristic of the quality and quantity of the effluent stream over the time period being monitored.

(2) Samples shall be collected and analyzed at the following sampling point, at the sampling frequencies and using the sample type specified for each parameter listed:

Effluent Parameter	Frequency	Sample Type
Total Suspended Solids	Weekly	Grab
Oil and Grease	Weekly	Grab
Phenolics (4AAP)	Weekly	Grab

(3) The *Owner* shall collect effluent samples at the following locations and analyze for the parameters listed in Table 3 at a frequency of once per week:

- (a) Outfall of settling pond approximately 150 metres north of Concession 1 (i.e. end of pipe discharge);
- (b) Box culvert on Eldon-Ramara Townline approximately 260 metres north of intersection of Ramara Concession 1 and Eldon-Ramara Townline (i.e. upgradient of end of pipe discharge);

- (c) 80 centimetre CSP located at Concession 1 Road on McCarthy property (i.e. downgradient of end of pipe discharge).

Table 3 - Effluent and Surface Water Monitoring	
Frequency	Weekly
Sample Type	Grab
Parameters	Total Suspended Solids, Copper, Lead, Nickel, Zinc, Arsenic, Oil and Grease, Phenolics (4AAP), Hardness (as CaCO ₃), Alkalinity(as CaCO ₃), Conductivity, pH, Fluoride, Chloride, Nitrate (N), Nitrite (N), Sulphate, Calcium, Magnesium, Sodium, Potassium, Ammonia (N), Dissolved Organic Carbon, Iron, Total Kjeldahl Nitrogen, Phosphorus (Total), Cadmium, Chromium, Manganese, Anion (Sum), Cation (Sum) and Total Dissolved Solids

- (4) There shall be at least **four days** between successive sampling.
- (5) The methods and protocols for sampling, analysis, and recording shall conform, in order of precedence, to the methods and protocols specified in the following:
- (a) the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" (August 1994), ISBN 0-7778-1880-9, as amended from time to time by more recently published editions;
 - (b) the publication "Standard Methods for the Examination of Water and Wastewater" (17th edition) as amended from time to time by more recently published editions; and,
 - (c) in respect of any parameters not mentioned in (a) and (b), the written approval of the *District Manager* , shall be obtained prior to sampling.
- (6) The measurement frequencies specified in subsection (2) in respect of any parameter are minimum requirements which may, **after 48 months** of monitoring in accordance with this Condition, be modified by the *District Manager* in writing from time to time.
- (7) The measurement frequencies specified in subsection (3) in respect of any parameter shall be changed to semi-annually after one year of quarry operation.
- (8) A continuous flow measuring device shall be installed and maintained to measure the flowrate of the effluent from the sewage works, with an accuracy to within plus or minus 15 per cent of the actual flowrate for the entire design range of the flow measuring device and the *Owner* shall measure, record and calculate the flowrate for each effluent stream on each day of sampling.
- (9) The *Owner* shall retain for a minimum of **three (3) years** from the date of their creation, all records

and information related to or resulting from the monitoring activities required by this *Approval* .

8. LETHALITY MONITORING

(1) The *Owner* shall perform rainbow trout acute lethality test and *Daphnia magna* acute lethality test at least once a month on the quarry water effluent according to procedures published in Environment Canada publications entitled "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout", dated July 1990 and "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna* ", dated July 1990 and as updated from time to time.

(2) The acute lethality tests shall be carried out on a grab sample as a single concentration test using 100 per cent quarry water effluent.

(3) A minimum of two samples shall be tested for either test animal per each discharge period.

9. RECEIVER INSPECTION

The *Owner* shall, at least once per year, undertake a visual inspection of the downstream ditches for evidence of erosion and/or flooding and shall report the observations in the annual report.

10. REPORTING

(1) One week prior to the start up of the operation of the *Works* , the *Owner* shall notify the *District Manager* (in writing) of the pending start up date.

(2) The *Owner* shall report to the *District Manager* or designate, any exceedance of any parameter specified in Condition 5 orally, forthwith, and in writing within seven (7) days of the exceedance.

(3) In addition to the obligations under Part X of the *Environmental Protection Act* , the *Owner* shall, within 10 working days of the occurrence of any spill, bypass or loss of any product, by product, intermediate product, oils, solvents, waste material or any other polluting substance into the environment, submit a full written report of the occurrence to the *District Manager* describing the cause and discovery of the spill or loss, clean-up and recovery measures taken, preventative measures to be taken and schedule of implementation.

(4) The *Owner* shall submit quarterly reports of the information obtained under Conditions 7 and 8 within 30 days of the end of each quarter.

(5) The *Owner* shall prepare and submit a performance report to the *District Manager* on an annual basis within sixty (60) days following the end of the period being reported upon. The first such report shall cover the first annual period following the commencement of operation of the *Works* and subsequent reports shall be submitted to cover successive annual periods following thereafter. The reports shall contain, but shall not be limited to, the following information:

- (a) a summary and interpretation of all monitoring data and a comparison to the effluent limits outlined in Condition 5, including an overview of the success and adequacy of the sewage works;
- (b) a description of any operating problems encountered and corrective actions taken;
- (c) a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the sewage works;
- (d) a summary of any effluent quality assurance or control measures undertaken in the reporting period; and
- (e) a summary of the calibration and maintenance carried out on all effluent monitoring equipment.

Schedule A

Environmental Compliance Approval (ECA) supporting documents:

1. Application for Approval of Industrial Sewage Works submitted by Thomas S. McCarthy dated July 21, 2001 and revised January 25, 2002;
2. McCarthy Property - Certificate of Approval Application prepared by Dixon Hydrogeology Limited dated July 2001;
3. Revised Permit to Take Water - McCarthy Property prepared by Dixon Hydrogeology Limited dated April 11, 2002;
4. Letter and attachments dated January 25, 2002 from John Easton of Dixon Hydrogeology Limited to Mohamed Dhalla of the Ministry of the Environment;
5. Letter and attachments dated April 1, 2002 from Dave Hulme of Dave T. Hulme Enterprises Inc. to Stefanos Habtom of the Ministry of the Environment;
6. Letter dated April 10, 2002 from John Easton of Dixon Hydrogeology Limited to Stefanos Habtom of the Ministry of the Environment;
7. Environmental Review Amended Tribunal Decision: 02-214/02-217 and 03-188/03-189, dated May 25, 2006 - Trent Talbot River Property Owners Association, Marchand Lamarre and Jodi McIntosh v. Director, Ministry of the Environment; and
8. Notification of Change of Address/Ownership dated June 29, 2012, MOE Reference Number 3620-8VQPTZ acknowledging change in company address/ownership from Thomas S. McCarty, Rural Route No.1 Brechin, Ontario, L0K 1B0 to QBJR Aggregates Inc., 949 Wilson Ave., Toronto, Ontario, M3K 1G.

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of
Part II.1 of the Environmental Protection Act
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 314-4506 or www.ert.gov.on.ca

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 15th day of October, 2013



Edgardo Tovilla
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act



APPENDIX B

Water Quality Results

Your Project #: 1407634
 Site#: McCarthy
 Site Location: McCarthy
 Your C.O.C. #: 618756-01-01

Attention: Dawn Hoyle/Jamie Bonany

Golder Associates Ltd
 121 Commerce Park Drive
 Unit L
 Barrie, ON
 L4N 8X1

Report Date: 2017/08/11
 Report #: R4644400
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7G7333
Received: 2017/08/04, 09:25

Sample Matrix: Water
 # Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Animal and Vegetable Oil & Grease	1	N/A	2017/08/08	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2017/08/08	2017/08/08	CAM SOP-00326	EPA1664B m,SM5520A m
pH	1	N/A	2017/08/08	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2017/08/10	CAM SOP-00444	OMOE E3179 m
TPH (Heavy Oil) (1)	1	2017/08/08	2017/08/08	CAM SOP-00326	EPA1664B m,SM5520F m
Low Level Total Suspended Solids	1	2017/08/05	2017/08/05	CAM SOP-00428	SM 22 2540D m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease

Your Project #: 1407634
Site#: McCarthy
Site Location: McCarthy
Your C.O.C. #: 618756-01-01

Attention:Dawn Hoyle/Jamie Bonany

Golder Associates Ltd
121 Commerce Park Drive
Unit L
Barrie, ON
L4N 8X1

Report Date: 2017/08/11
Report #: R4644400
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7G7333
Received: 2017/08/04, 09:25

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Antonella Brasil, Senior Project Manager
Email: ABrasil@maxxam.ca
Phone# (905)817-5817

=====
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

RESULTS OF ANALYSES OF WATER

Maxxam ID		EWP729		
Sampling Date		2017/08/03 12:00		
COC Number		618756-01-01		
	UNITS	POND	RDL	QC Batch
Calculated Parameters				
Total Animal/Vegetable Oil and Grease	mg/L	3.7	0.50	5105610
Inorganics				
pH	pH	8.56	N/A	5107706
Phenols-4AAP	mg/L	<0.0010	0.0010	5113243
Total Suspended Solids	mg/L	3	1	5107618
Petroleum Hydrocarbons				
Total Oil & Grease	mg/L	3.7	0.50	5108262
Total Oil & Grease Mineral/Synthetic	mg/L	<0.50	0.50	5108266
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable				

GENERAL COMMENTS

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5107618	XZH	QC Standard	Total Suspended Solids	2017/08/05		100	%	85 - 115
5107618	XZH	Method Blank	Total Suspended Solids	2017/08/05	<1		mg/L	
5107618	XZH	RPD	Total Suspended Solids	2017/08/05	8.0		%	25
5107706	TA1	Spiked Blank	pH	2017/08/08		102	%	98 - 103
5107706	TA1	RPD	pH	2017/08/08	0.43		%	N/A
5108262	FA	Spiked Blank	Total Oil & Grease	2017/08/08		101	%	85 - 115
5108262	FA	RPD	Total Oil & Grease	2017/08/08			%	25
5108262	FA	Method Blank	Total Oil & Grease	2017/08/08	<0.50		mg/L	
5108266	FA	Spiked Blank	Total Oil & Grease Mineral/Synthetic	2017/08/08		91	%	85 - 115
5108266	FA	RPD	Total Oil & Grease Mineral/Synthetic	2017/08/08			%	25
5108266	FA	Method Blank	Total Oil & Grease Mineral/Synthetic	2017/08/08	<0.50		mg/L	
5113243	ZSK	Matrix Spike	Phenols-4AAP	2017/08/10		108	%	80 - 120
5113243	ZSK	Spiked Blank	Phenols-4AAP	2017/08/10		100	%	85 - 115
5113243	ZSK	Method Blank	Phenols-4AAP	2017/08/10	<0.0010		mg/L	
5113243	ZSK	RPD	Phenols-4AAP	2017/08/10	NC		%	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Cristina Carriere

Cristina Carriere, Scientific Service Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Your Project #: 1407634
 Site#: McCarthy
 Site Location: McCarthy
 Your C.O.C. #: 618752-01-01

Attention: Dawn Hoyle/Jamie Bonany

Golder Associates Ltd
 121 Commerce Park Drive
 Unit L
 Barrie, ON
 L4N 8X1

Report Date: 2017/08/17
 Report #: R4657359
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7H2470

Received: 2017/08/11, 08:51

Sample Matrix: Water
 # Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Animal and Vegetable Oil & Grease	1	N/A	2017/08/16	CAM SOP-00326	EPA1664B m, SM5520B m
Total Oil and Grease	1	2017/08/15	2017/08/16	CAM SOP-00326	EPA1664B m, SM5520A m
pH	1	N/A	2017/08/14	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2017/08/14	CAM SOP-00444	OMOE E3179 m
TPH (Heavy Oil) (1)	1	2017/08/15	2017/08/16	CAM SOP-00326	EPA1664B m, SM5520F m
Low Level Total Suspended Solids	1	2017/08/12	2017/08/14	CAM SOP-00428	SM 22 2540D m

Remarks:

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All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease

Your Project #: 1407634
Site#: McCarthy
Site Location: McCarthy
Your C.O.C. #: 618752-01-01

Attention:Dawn Hoyle/Jamie Bonany

Golder Associates Ltd
121 Commerce Park Drive
Unit L
Barrie, ON
L4N 8X1

Report Date: 2017/08/17
Report #: R4657359
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7H2470
Received: 2017/08/11, 08:51

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Antonella Brasil, Senior Project Manager
Email: ABrasil@maxxam.ca
Phone# (905)817-5817

=====
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RESULTS OF ANALYSES OF WATER

Maxxam ID		EXQ315		
Sampling Date		2017/08/10 12:00		
COC Number		618752-01-01		
	UNITS	POND	RDL	QC Batch
Calculated Parameters				
Total Animal/Vegetable Oil and Grease	mg/L	1.3	0.50	5114768
Inorganics				
pH	pH	8.69	N/A	5117680
Phenols-4AAP	mg/L	<0.0020 (1)	0.0020	5117742
Total Suspended Solids	mg/L	4	1	5116726
Petroleum Hydrocarbons				
Total Oil & Grease	mg/L	1.3	0.50	5119243
Total Oil & Grease Mineral/Synthetic	mg/L	<0.50	0.50	5119246
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable (1) Detection limit was raised due to matrix interferences.				

GENERAL COMMENTS

Samples received with temp >10 C and analyses conducted with client's consent.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5116726	FW	QC Standard	Total Suspended Solids	2017/08/14		97	%	85 - 115
5116726	FW	Method Blank	Total Suspended Solids	2017/08/14	<1		mg/L	
5116726	FW	RPD	Total Suspended Solids	2017/08/14	14		%	25
5117680	TA1	Spiked Blank	pH	2017/08/14		102	%	98 - 103
5117680	TA1	RPD	pH	2017/08/14	0.49		%	N/A
5117742	ZSK	Matrix Spike	Phenols-4AAP	2017/08/14		103	%	80 - 120
5117742	ZSK	Spiked Blank	Phenols-4AAP	2017/08/14		100	%	85 - 115
5117742	ZSK	Method Blank	Phenols-4AAP	2017/08/14	0.0010, RDL=0.0010		mg/L	
5117742	ZSK	RPD	Phenols-4AAP	2017/08/14	NC		%	20
5119243	FA	Spiked Blank	Total Oil & Grease	2017/08/16		96	%	85 - 115
5119243	FA	RPD	Total Oil & Grease	2017/08/16	4.0		%	25
5119243	FA	Method Blank	Total Oil & Grease	2017/08/16	<0.50		mg/L	
5119246	FA	Spiked Blank	Total Oil & Grease Mineral/Synthetic	2017/08/16		91	%	85 - 115
5119246	FA	RPD	Total Oil & Grease Mineral/Synthetic	2017/08/16	3.6		%	25
5119246	FA	Method Blank	Total Oil & Grease Mineral/Synthetic	2017/08/16	<0.50		mg/L	

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

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Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Cristina Carriere

Cristina Carriere, Scientific Service Specialist

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Your Project #: 1407634
 Site#: 1407634
 Site Location: McCarthy
 Your C.O.C. #: 618757-01-01

Attention: Dawn Hoyle/Jamie Bonany

Golder Associates Ltd
 121 Commerce Park Drive
 Unit L
 Barrie, ON
 L4N 8X1

Report Date: 2017/08/24
 Report #: R4672631
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7H8539

Received: 2017/08/18, 08:48

Sample Matrix: Water
 # Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Animal and Vegetable Oil & Grease	1	N/A	2017/08/22	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2017/08/21	2017/08/22	CAM SOP-00326	EPA1664B m,SM5520A m
pH	1	N/A	2017/08/21	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2017/08/22	CAM SOP-00444	OMOE E3179 m
TPH (Heavy Oil) (1)	1	2017/08/21	2017/08/22	CAM SOP-00326	EPA1664B m,SM5520F m
Low Level Total Suspended Solids	1	2017/08/21	2017/08/21	CAM SOP-00428	SM 22 2540D m

Remarks:

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Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested.

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease

Your Project #: 1407634
Site#: 1407634
Site Location: McCarthy
Your C.O.C. #: 618757-01-01

Attention:Dawn Hoyle/Jamie Bonany

Golder Associates Ltd
121 Commerce Park Drive
Unit L
Barrie, ON
L4N 8X1

Report Date: 2017/08/24
Report #: R4672631
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7H8539
Received: 2017/08/18, 08:48

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Antonella Brasil, Senior Project Manager
Email: ABrasil@maxxam.ca
Phone# (905)817-5817

=====
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RESULTS OF ANALYSES OF WATER

Maxxam ID		EYU517		
Sampling Date		2017/08/17 12:30		
COC Number		618757-01-01		
	UNITS	POND	RDL	QC Batch
Calculated Parameters				
Total Animal/Vegetable Oil and Grease	mg/L	<0.50	0.50	5125187
Inorganics				
pH	pH	8.21	N/A	5127434
Phenols-4AAP	mg/L	<0.0010	0.0010	5130435
Total Suspended Solids	mg/L	5	1	5128776
Petroleum Hydrocarbons				
Total Oil & Grease	mg/L	<0.50	0.50	5128704
Total Oil & Grease Mineral/Synthetic	mg/L	<0.50	0.50	5128714
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable				

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	21.0°C
-----------	--------

Sample containers received with temp > 10 C and analyses conducted with client's consent.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5127434	TA1	Spiked Blank	pH	2017/08/21		101	%	98 - 103
5127434	TA1	RPD	pH	2017/08/21	0.028		%	N/A
5128704	AMJ	Spiked Blank	Total Oil & Grease	2017/08/22		98	%	85 - 115
5128704	AMJ	RPD	Total Oil & Grease	2017/08/22	0.86		%	25
5128704	AMJ	Method Blank	Total Oil & Grease	2017/08/22	<0.50		mg/L	
5128714	AMJ	Spiked Blank	Total Oil & Grease Mineral/Synthetic	2017/08/22		94	%	85 - 115
5128714	AMJ	RPD	Total Oil & Grease Mineral/Synthetic	2017/08/22	1.2		%	25
5128714	AMJ	Method Blank	Total Oil & Grease Mineral/Synthetic	2017/08/22	<0.50		mg/L	
5128776	XZH	QC Standard	Total Suspended Solids	2017/08/21		99	%	85 - 115
5128776	XZH	Method Blank	Total Suspended Solids	2017/08/21	<1		mg/L	
5128776	XZH	RPD	Total Suspended Solids	2017/08/21	2.7		%	25
5130435	ZSK	Matrix Spike	Phenols-4AAP	2017/08/22		106	%	80 - 120
5130435	ZSK	Spiked Blank	Phenols-4AAP	2017/08/22		101	%	85 - 115
5130435	ZSK	Method Blank	Phenols-4AAP	2017/08/22	<0.0010		mg/L	
5130435	ZSK	RPD	Phenols-4AAP	2017/08/22	NC		%	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

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Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times$ RDL).

VALIDATION SIGNATURE PAGE

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Cristina Carriere

Cristina Carriere, Scientific Service Specialist

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Your Project #: 1407634
 Site#: 1407634
 Site Location: BRECHIN, ON
 Your C.O.C. #: 56454

Attention: Dawn Hoyle/Jamie Bonany

Golder Associates Ltd
 121 Commerce Park Drive
 Unit L
 Barrie, ON
 L4N 8X1

Report Date: 2017/08/31
 Report #: R4683406
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7I4911

Received: 2017/08/25, 08:51

Sample Matrix: Water
 # Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Animal and Vegetable Oil & Grease	1	N/A	2017/08/28	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2017/08/28	2017/08/28	CAM SOP-00326	EPA1664B m,SM5520A m
pH	1	N/A	2017/08/29	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2017/08/30	CAM SOP-00444	OMOE E3179 m
TPH (Heavy Oil) (1)	1	2017/08/28	2017/08/28	CAM SOP-00326	EPA1664B m,SM5520F m
Low Level Total Suspended Solids	1	2017/08/26	2017/08/26	CAM SOP-00428	SM 22 2540D m

Remarks:

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Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

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* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease

Your Project #: 1407634
Site#: 1407634
Site Location: BRECHIN, ON
Your C.O.C. #: 56454

Attention:Dawn Hoyle/Jamie Bonany

Golder Associates Ltd
121 Commerce Park Drive
Unit L
Barrie, ON
L4N 8X1

Report Date: 2017/08/31
Report #: R4683406
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7I4911
Received: 2017/08/25, 08:51

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Antonella Brasil, Senior Project Manager
Email: ABrasil@maxxam.ca
Phone# (905)817-5817

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RESULTS OF ANALYSES OF WATER

Maxxam ID			EZY169		
Sampling Date			2017/08/24 11:00		
COC Number			56454		
	UNITS	Criteria	POND	RDL	QC Batch
Calculated Parameters					
Total Animal/Vegetable Oil and Grease	mg/L	-	1.1	0.50	5136001
Inorganics					
pH	pH	6.5:8.5	8.24	N/A	5137953
Phenols-4AAP	mg/L	0.001	<0.0010	0.0010	5142845
Total Suspended Solids	mg/L	-	4	1	5138185
Petroleum Hydrocarbons					
Total Oil & Grease	mg/L	-	1.1	0.50	5139050
Total Oil & Grease Mineral/Synthetic	mg/L	0.5	<0.50	0.50	5139057
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Criteria: Ontario Provincial Water Quality Objectives Ref. to MOEE Water Management document dated Feb.1999 N/A = Not Applicable					

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.3°C
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Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5137953	TA1	Spiked Blank	pH	2017/08/29		101	%	98 - 103
5137953	TA1	RPD	pH	2017/08/29	0.11		%	N/A
5138185	AS6	QC Standard	Total Suspended Solids	2017/08/26		97	%	85 - 115
5138185	AS6	Method Blank	Total Suspended Solids	2017/08/26	<1		mg/L	
5138185	AS6	RPD	Total Suspended Solids	2017/08/26	NC		%	25
5139050	FA	Spiked Blank	Total Oil & Grease	2017/08/28		98	%	85 - 115
5139050	FA	RPD	Total Oil & Grease	2017/08/28	4.1		%	25
5139050	FA	Method Blank	Total Oil & Grease	2017/08/28	<0.50		mg/L	
5139057	FA	Spiked Blank	Total Oil & Grease Mineral/Synthetic	2017/08/28		95	%	85 - 115
5139057	FA	RPD	Total Oil & Grease Mineral/Synthetic	2017/08/28	4.2		%	25
5139057	FA	Method Blank	Total Oil & Grease Mineral/Synthetic	2017/08/28	<0.50		mg/L	
5142845	ZSK	Matrix Spike	Phenols-4AAP	2017/08/30		103	%	80 - 120
5142845	ZSK	Spiked Blank	Phenols-4AAP	2017/08/30		98	%	85 - 115
5142845	ZSK	Method Blank	Phenols-4AAP	2017/08/30	<0.0010		mg/L	
5142845	ZSK	RPD	Phenols-4AAP	2017/08/30	NC		%	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

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QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

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Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

VALIDATION SIGNATURE PAGE

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Cristina Carriere

Cristina Carriere, Scientific Service Specialist

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Your Project #: 1407634
 Site#: 1407634
 Site Location: MCCARTHY
 Your C.O.C. #: 627121-01-01

Attention: Dawn Hoyle/Jamie Bonany

Golder Associates Ltd
 121 Commerce Park Drive
 Unit L
 Barrie, ON
 L4N 8X1

Report Date: 2017/09/08
 Report #: R4691781
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7J0444

Received: 2017/09/01, 08:55

Sample Matrix: Water
 # Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Animal and Vegetable Oil & Grease	1	N/A	2017/09/06	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2017/09/05	2017/09/06	CAM SOP-00326	EPA1664B m,SM5520A m
pH	1	N/A	2017/09/05	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2017/09/07	CAM SOP-00444	OMOE E3179 m
TPH (Heavy Oil) (1)	1	2017/09/05	2017/09/06	CAM SOP-00326	EPA1664B m,SM5520F m
Low Level Total Suspended Solids	1	2017/09/05	2017/09/06	CAM SOP-00428	SM 22 2540D m

Remarks:

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Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested.

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* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease

Your Project #: 1407634
Site#: 1407634
Site Location: MCCARTHY
Your C.O.C. #: 627121-01-01

Attention:Dawn Hoyle/Jamie Bonany

Golder Associates Ltd
121 Commerce Park Drive
Unit L
Barrie, ON
L4N 8X1

Report Date: 2017/09/08
Report #: R4691781
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7J0444
Received: 2017/09/01, 08:55

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Email: ABrasil@maxxam.ca
Phone# (905)817-5817

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RESULTS OF ANALYSES OF WATER

Maxxam ID		FAZ974		
Sampling Date		2017/08/31		
COC Number		627121-01-01		
	UNITS	POND	RDL	QC Batch
Calculated Parameters				
Total Animal/Vegetable Oil and Grease	mg/L	1.8	0.50	5146424
Inorganics				
pH	pH	8.48	N/A	5148638
Phenols-4AAP	mg/L	0.0010	0.0010	5153962
Total Suspended Solids	mg/L	6	1	5150093
Petroleum Hydrocarbons				
Total Oil & Grease	mg/L	1.8	0.50	5149032
Total Oil & Grease Mineral/Synthetic	mg/L	<0.50	0.50	5149033
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				
N/A = Not Applicable				

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	19.0°C
-----------	--------

Sample containers received with temp >10 C and analyses conducted with client's consent.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5148638	TA1	Spiked Blank	pH	2017/09/05		101	%	98 - 103
5148638	TA1	RPD	pH	2017/09/05	0.48		%	N/A
5149032	FA	Spiked Blank	Total Oil & Grease	2017/09/06		102	%	85 - 115
5149032	FA	RPD	Total Oil & Grease	2017/09/06	4.5		%	25
5149032	FA	Method Blank	Total Oil & Grease	2017/09/06	<0.50		mg/L	
5149033	FA	Spiked Blank	Total Oil & Grease Mineral/Synthetic	2017/09/06		93	%	85 - 115
5149033	FA	RPD	Total Oil & Grease Mineral/Synthetic	2017/09/06	2.4		%	25
5149033	FA	Method Blank	Total Oil & Grease Mineral/Synthetic	2017/09/06	<0.50		mg/L	
5150093	RAY	QC Standard	Total Suspended Solids	2017/09/06		97	%	85 - 115
5150093	RAY	Method Blank	Total Suspended Solids	2017/09/06	<1		mg/L	
5150093	RAY	RPD	Total Suspended Solids	2017/09/06	6.9		%	25
5153962	ZSK	Matrix Spike	Phenols-4AAP	2017/09/07		100	%	80 - 120
5153962	ZSK	Spiked Blank	Phenols-4AAP	2017/09/07		99	%	85 - 115
5153962	ZSK	Method Blank	Phenols-4AAP	2017/09/07	<0.0010		mg/L	
5153962	ZSK	RPD	Phenols-4AAP	2017/09/07	9.5		%	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

VALIDATION SIGNATURE PAGE

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Cristina Carriere

Cristina Carriere, Scientific Service Specialist

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Your Project #: 1407634
 Site#: 1407634
 Site Location: MCCARTHY
 Your C.O.C. #: NA

Attention: Dawn Hoyle/Jamie Bonany

Golder Associates Ltd
 121 Commerce Park Drive
 Unit L
 Barrie, ON
 L4N 8X1

Report Date: 2017/09/14
 Report #: R4701008
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7J6076

Received: 2017/09/08, 09:29

Sample Matrix: Water
 # Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Animal and Vegetable Oil & Grease	1	N/A	2017/09/13	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2017/09/13	2017/09/13	CAM SOP-00326	EPA1664B m,SM5520A m
pH	1	N/A	2017/09/13	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2017/09/13	CAM SOP-00444	OMOE E3179 m
TPH (Heavy Oil) (1)	1	2017/09/13	2017/09/13	CAM SOP-00326	EPA1664B m,SM5520F m
Low Level Total Suspended Solids	1	2017/09/12	2017/09/12	CAM SOP-00428	SM 22 2540D m

Remarks:

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Results relate to samples tested.

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease

Your Project #: 1407634
Site#: 1407634
Site Location: MCCARTHY
Your C.O.C. #: NA

Attention:Dawn Hoyle/Jamie Bonany

Golder Associates Ltd
121 Commerce Park Drive
Unit L
Barrie, ON
L4N 8X1

Report Date: 2017/09/14
Report #: R4701008
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7J6076
Received: 2017/09/08, 09:29

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Antonella Brasil, Senior Project Manager
Email: ABrasil@maxxam.ca
Phone# (905)817-5817

=====
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RESULTS OF ANALYSES OF WATER

Maxxam ID		FCA452	FCA452		
Sampling Date		2017/09/07 11:45	2017/09/07 11:45		
COC Number		NA	NA		
	UNITS	POND	POND Lab-Dup	RDL	QC Batch
Calculated Parameters					
Total Animal/Vegetable Oil and Grease	mg/L	1.6	N/A	0.50	5159633
Inorganics					
pH	pH	8.40	N/A	N/A	5160772
Phenols-4AAP	mg/L	0.0054	N/A	0.0010	5162143
Total Suspended Solids	mg/L	5	5	1	5161119
Petroleum Hydrocarbons					
Total Oil & Grease	mg/L	1.6	N/A	0.50	5161674
Total Oil & Grease Mineral/Synthetic	mg/L	<0.50	N/A	0.50	5161685
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable					

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.3°C
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Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5160772	TA1	Spiked Blank	pH	2017/09/13		102	%	98 - 103
5160772	TA1	RPD	pH	2017/09/13	0.51		%	N/A
5161119	AS6	QC Standard	Total Suspended Solids	2017/09/12		98	%	85 - 115
5161119	AS6	Method Blank	Total Suspended Solids	2017/09/12	<1		mg/L	
5161119	AS6	RPD [FCA452-03]	Total Suspended Solids	2017/09/12	0		%	25
5161119	AS6	RPD	Total Suspended Solids	2017/09/12	100 (1)		%	25
5161674	AMJ	Spiked Blank	Total Oil & Grease	2017/09/13		98	%	85 - 115
5161674	AMJ	RPD	Total Oil & Grease	2017/09/13	2.6		%	25
5161674	AMJ	Method Blank	Total Oil & Grease	2017/09/13	<0.50		mg/L	
5161685	AMJ	Spiked Blank	Total Oil & Grease Mineral/Synthetic	2017/09/13		95	%	85 - 115
5161685	AMJ	RPD	Total Oil & Grease Mineral/Synthetic	2017/09/13	1.2		%	25
5161685	AMJ	Method Blank	Total Oil & Grease Mineral/Synthetic	2017/09/13	<0.50		mg/L	
5162143	ZSK	Matrix Spike	Phenols-4AAP	2017/09/13		94	%	80 - 120
5162143	ZSK	Spiked Blank	Phenols-4AAP	2017/09/13		100	%	85 - 115
5162143	ZSK	Method Blank	Phenols-4AAP	2017/09/13	<0.0010		mg/L	
5162143	ZSK	RPD	Phenols-4AAP	2017/09/13	3.2		%	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Service Specialist

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Your Project #: 1407634
 Site#: 1407634
 Site Location: MCCARTHY
 Your C.O.C. #: 571437-03-01

Attention: Dawn Hoyle/Jamie Bonany

Golder Associates Ltd
 121 Commerce Park Drive
 Unit L
 Barrie, ON
 L4N 8X1

Report Date: 2017/09/21
 Report #: R4725478
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7K2210

Received: 2017/09/15, 09:14

Sample Matrix: Water
 # Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Animal and Vegetable Oil & Grease	1	N/A	2017/09/19	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2017/09/19	2017/09/19	CAM SOP-00326	EPA1664B m,SM5520A m
pH	1	N/A	2017/09/18	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2017/09/20	CAM SOP-00444	OMOE E3179 m
TPH (Heavy Oil) (1)	1	2017/09/19	2017/09/19	CAM SOP-00326	EPA1664B m,SM5520F m
Low Level Total Suspended Solids	1	2017/09/18	2017/09/18	CAM SOP-00428	SM 22 2540D m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

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Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested.

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease

Your Project #: 1407634
Site#: 1407634
Site Location: MCCARTHY
Your C.O.C. #: 571437-03-01

Attention:Dawn Hoyle/Jamie Bonany

Golder Associates Ltd
121 Commerce Park Drive
Unit L
Barrie, ON
L4N 8X1

Report Date: 2017/09/21
Report #: R4725478
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7K2210
Received: 2017/09/15, 09:14

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Antonella Brasil, Senior Project Manager
Email: ABrasil@maxxam.ca
Phone# (905)817-5817

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RESULTS OF ANALYSES OF WATER

Maxxam ID		FDD985		
Sampling Date		2017/09/14 11:15		
COC Number		571437-03-01		
	UNITS	POND	RDL	QC Batch
Calculated Parameters				
Total Animal/Vegetable Oil and Grease	mg/L	1.7	0.50	5167323
Inorganics				
pH	pH	8.21	N/A	5168000
Phenols-4AAP	mg/L	0.0013	0.0010	5173825
Total Suspended Solids	mg/L	4	1	5168980
Petroleum Hydrocarbons				
Total Oil & Grease	mg/L	1.7	0.50	5170318
Total Oil & Grease Mineral/Synthetic	mg/L	<0.50	0.50	5170323
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable				

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.7°C
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Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5168000	TA1	Spiked Blank	pH	2017/09/18		102	%	98 - 103
5168000	TA1	RPD	pH	2017/09/18	0.25		%	N/A
5168980	XZH	QC Standard	Total Suspended Solids	2017/09/18		95	%	85 - 115
5168980	XZH	Method Blank	Total Suspended Solids	2017/09/18	<1		mg/L	
5168980	XZH	RPD	Total Suspended Solids	2017/09/18	5.3		%	25
5170318	FA	Spiked Blank	Total Oil & Grease	2017/09/19		99	%	85 - 115
5170318	FA	RPD	Total Oil & Grease	2017/09/19	1.4		%	25
5170318	FA	Method Blank	Total Oil & Grease	2017/09/19	<0.50		mg/L	
5170323	FA	Spiked Blank	Total Oil & Grease Mineral/Synthetic	2017/09/19		91	%	85 - 115
5170323	FA	RPD	Total Oil & Grease Mineral/Synthetic	2017/09/19	5.4		%	25
5170323	FA	Method Blank	Total Oil & Grease Mineral/Synthetic	2017/09/19	<0.50		mg/L	
5173825	ZSK	Matrix Spike	Phenols-4AAP	2017/09/20		96	%	80 - 120
5173825	ZSK	Spiked Blank	Phenols-4AAP	2017/09/20		99	%	85 - 115
5173825	ZSK	Method Blank	Phenols-4AAP	2017/09/20	<0.0010		mg/L	
5173825	ZSK	RPD	Phenols-4AAP	2017/09/20	NC		%	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

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Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2x$ RDL).

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Cristina Carriere

Cristina Carriere, Scientific Service Specialist

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Your Project #: 1407634
 Site#: 1407634
 Site Location: MCCARTHY
 Your C.O.C. #: 571437-05-01

Attention: Dawn Hoyle/Jamie Bonany

Golder Associates Ltd
 121 Commerce Park Drive
 Unit L
 Barrie, ON
 L4N 8X1

Report Date: 2017/09/29
 Report #: R4745122
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7K7724

Received: 2017/09/22, 09:30

Sample Matrix: Water
 # Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Animal and Vegetable Oil & Grease	1	N/A	2017/09/26	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2017/09/25	2017/09/26	CAM SOP-00326	EPA1664B m,SM5520A m
pH	1	N/A	2017/09/25	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2017/09/26	CAM SOP-00444	OMOE E3179 m
TPH (Heavy Oil) (1)	1	2017/09/25	2017/09/25	CAM SOP-00326	EPA1664B m,SM5520F m
Low Level Total Suspended Solids	1	2017/09/23	2017/09/23	CAM SOP-00428	SM 22 2540D m

Remarks:

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Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested.

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* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease

Your Project #: 1407634
Site#: 1407634
Site Location: MCCARTHY
Your C.O.C. #: 571437-05-01

Attention:Dawn Hoyle/Jamie Bonany

Golder Associates Ltd
121 Commerce Park Drive
Unit L
Barrie, ON
L4N 8X1

Report Date: 2017/09/29
Report #: R4745122
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7K7724
Received: 2017/09/22, 09:30

Encryption Key

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Antonella Brasil, Senior Project Manager
Email: ABrasil@maxxam.ca
Phone# (905)817-5817

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RESULTS OF ANALYSES OF WATER

Maxxam ID		FEF823		
Sampling Date		2017/09/21 11:05		
COC Number		571437-05-01		
	UNITS	POND	RDL	QC Batch
Calculated Parameters				
Total Animal/Vegetable Oil and Grease	mg/L	1.7	0.50	5177305
Inorganics				
pH	pH	8.19	N/A	5179398
Phenols-4AAP	mg/L	0.0042	0.0020	5183116
Total Suspended Solids	mg/L	5	1	5179576
Petroleum Hydrocarbons				
Total Oil & Grease	mg/L	1.7	0.50	5180552
Total Oil & Grease Mineral/Synthetic	mg/L	<0.50	0.50	5180553
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable				

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	8.3°C
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Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5179398	TA1	Spiked Blank	pH	2017/09/25		102	%	98 - 103
5179398	TA1	RPD	pH	2017/09/25	0.19		%	N/A
5179576	XZH	QC Standard	Total Suspended Solids	2017/09/23		97	%	85 - 115
5179576	XZH	Method Blank	Total Suspended Solids	2017/09/23	<1		mg/L	
5179576	XZH	RPD	Total Suspended Solids	2017/09/23	18		%	25
5180552	FA	Spiked Blank	Total Oil & Grease	2017/09/26		98	%	85 - 115
5180552	FA	RPD	Total Oil & Grease	2017/09/26	2.6		%	25
5180552	FA	Method Blank	Total Oil & Grease	2017/09/26	<0.50		mg/L	
5180553	FA	Spiked Blank	Total Oil & Grease Mineral/Synthetic	2017/09/25		97	%	85 - 115
5180553	FA	RPD	Total Oil & Grease Mineral/Synthetic	2017/09/25	3.5		%	25
5180553	FA	Method Blank	Total Oil & Grease Mineral/Synthetic	2017/09/25	<0.50		mg/L	
5183116	ZSK	Matrix Spike	Phenols-4AAP	2017/09/26		94	%	80 - 120
5183116	ZSK	Spiked Blank	Phenols-4AAP	2017/09/26		96	%	85 - 115
5183116	ZSK	Method Blank	Phenols-4AAP	2017/09/26	<0.0010		mg/L	
5183116	ZSK	RPD	Phenols-4AAP	2017/09/26	NC		%	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.


Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times$ RDL).

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

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Your Project #: 1407634
 Site#: MCCARTHY
 Site Location: MCCARTHY
 Your C.O.C. #: 628645-03-01

Attention: Dawn Hoyle/Jamie Bonany

Golder Associates Ltd
 121 Commerce Park Drive
 Unit L
 Barrie, ON
 L4N 8X1

Report Date: 2017/10/05
 Report #: R4763170
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7L4244

Received: 2017/09/29, 09:42

Sample Matrix: Water
 # Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Animal and Vegetable Oil & Grease	1	N/A	2017/10/04	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2017/10/03	2017/10/04	CAM SOP-00326	EPA1664B m,SM5520A m
pH	1	N/A	2017/10/02	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2017/10/03	CAM SOP-00444	OMOE E3179 m
TPH (Heavy Oil) (1)	1	2017/10/03	2017/10/04	CAM SOP-00326	EPA1664B m,SM5520F m
Low Level Total Suspended Solids	1	2017/09/30	2017/10/02	CAM SOP-00428	SM 22 2540D m

Remarks:

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Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested.

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* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease

Your Project #: 1407634
Site#: MCCARTHY
Site Location: MCCARTHY
Your C.O.C. #: 628645-03-01

Attention:Dawn Hoyle/Jamie Bonany

Golder Associates Ltd
121 Commerce Park Drive
Unit L
Barrie, ON
L4N 8X1

Report Date: 2017/10/05
Report #: R4763170
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7L4244
Received: 2017/09/29, 09:42

Encryption Key

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Antonella Brasil, Senior Project Manager
Email: ABrasil@maxxam.ca
Phone# (905)817-5817

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RESULTS OF ANALYSES OF WATER

Maxxam ID		FFM830		
Sampling Date		2017/09/28 11:55		
COC Number		628645-03-01		
	UNITS	POND	RDL	QC Batch
Calculated Parameters				
Total Animal/Vegetable Oil and Grease	mg/L	<0.50	0.50	5188950
Inorganics				
pH	pH	8.08	N/A	5191271
Phenols-4AAP	mg/L	0.0045	0.0020	5194315
Total Suspended Solids	mg/L	5	1	5191263
Petroleum Hydrocarbons				
Total Oil & Grease	mg/L	<0.50	0.50	5194401
Total Oil & Grease Mineral/Synthetic	mg/L	<0.50	0.50	5194421
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable				

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.0°C
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Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5191263	AS6	QC Standard	Total Suspended Solids	2017/10/02		98	%	85 - 115
5191263	AS6	Method Blank	Total Suspended Solids	2017/10/02	<1		mg/L	
5191263	AS6	RPD	Total Suspended Solids	2017/10/02	12		%	25
5191271	TA1	Spiked Blank	pH	2017/10/02		102	%	98 - 103
5191271	TA1	RPD	pH	2017/10/02	0.18		%	N/A
5194315	ZSK	Matrix Spike	Phenols-4AAP	2017/10/03		92	%	80 - 120
5194315	ZSK	Spiked Blank	Phenols-4AAP	2017/10/03		98	%	85 - 115
5194315	ZSK	Method Blank	Phenols-4AAP	2017/10/03	<0.0010		mg/L	
5194315	ZSK	RPD	Phenols-4AAP	2017/10/03	14		%	20
5194401	AMJ	Spiked Blank	Total Oil & Grease	2017/10/04		95	%	85 - 115
5194401	AMJ	RPD	Total Oil & Grease	2017/10/04	2.6		%	25
5194401	AMJ	Method Blank	Total Oil & Grease	2017/10/04	<0.50		mg/L	
5194421	AMJ	Spiked Blank	Total Oil & Grease Mineral/Synthetic	2017/10/04		93	%	85 - 115
5194421	AMJ	RPD	Total Oil & Grease Mineral/Synthetic	2017/10/04	1.8		%	25
5194421	AMJ	Method Blank	Total Oil & Grease Mineral/Synthetic	2017/10/04	<0.50		mg/L	

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).




Ewa Pranjić, M.Sc., C.Chem, Scientific Specialist

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Your Project #: 1407634
 Site#: McCarthy
 Your C.O.C. #: 628645-02-01

Attention: Dawn Hoyle/Jamie Bonany

Golder Associates Ltd
 121 Commerce Park Drive
 Unit L
 Barrie, ON
 L4N 8X1

Report Date: 2017/10/16
 Report #: R4785354
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7M0992
Received: 2017/10/06, 10:21

Sample Matrix: Water
 # Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Animal and Vegetable Oil & Grease	1	N/A	2017/10/13	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2017/10/12	2017/10/13	CAM SOP-00326	EPA1664B m,SM5520A m
pH	1	N/A	2017/10/10	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2017/10/12	CAM SOP-00444	OMOE E3179 m
TPH (Heavy Oil) (1)	1	2017/10/12	2017/10/13	CAM SOP-00326	EPA1664B m,SM5520F m
Low Level Total Suspended Solids	1	2017/10/07	2017/10/10	CAM SOP-00428	SM 22 2540D m

Remarks:

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Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested.

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease

Your Project #: 1407634
Site#: McCarthy
Your C.O.C. #: 628645-02-01

Attention:Dawn Hoyle/Jamie Bonany

Golder Associates Ltd
121 Commerce Park Drive
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Barrie, ON
L4N 8X1

Report Date: 2017/10/16
Report #: R4785354
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7M0992
Received: 2017/10/06, 10:21

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Antonella Brasil, Senior Project Manager
Email: ABrasil@maxxam.ca
Phone# (905)817-5817

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RESULTS OF ANALYSES OF WATER

Maxxam ID			FGU912		
Sampling Date			2017/10/05		
COC Number			628645-02-01		
	UNITS	Criteria	POND	RDL	QC Batch
Calculated Parameters					
Total Animal/Vegetable Oil and Grease	mg/L	-	2.1	0.50	5200473
Inorganics					
pH	pH	6.5:8.5	8.15	N/A	5202586
Phenols-4AAP	mg/L	0.001	<0.0020 (1)	0.0020	5208367
Total Suspended Solids	mg/L	-	5	1	5202691
Petroleum Hydrocarbons					
Total Oil & Grease	mg/L	-	2.1	0.50	5207873
Total Oil & Grease Mineral/Synthetic	mg/L	0.5	<0.50	0.50	5207876
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Criteria: Ontario Provincial Water Quality Objectives Ref. to MOEE Water Management document dated Feb.1999 N/A = Not Applicable (1) Due to the sample matrix, sample required dilution. Detection Limit was adjusted accordingly.					

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	9.3°C
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Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5202586	TA1	Spiked Blank	pH	2017/10/10		102	%	98 - 103
5202586	TA1	RPD	pH	2017/10/10	0.045		%	N/A
5202691	XZH	QC Standard	Total Suspended Solids	2017/10/10		95	%	85 - 115
5202691	XZH	Method Blank	Total Suspended Solids	2017/10/10	<1		mg/L	
5202691	XZH	RPD	Total Suspended Solids	2017/10/10	12		%	25
5207873	FA	Spiked Blank	Total Oil & Grease	2017/10/13		99	%	85 - 115
5207873	FA	RPD	Total Oil & Grease	2017/10/13	2.3		%	25
5207873	FA	Method Blank	Total Oil & Grease	2017/10/13	<0.50		mg/L	
5207876	FA	Spiked Blank	Total Oil & Grease Mineral/Synthetic	2017/10/13		92	%	85 - 115
5207876	FA	RPD	Total Oil & Grease Mineral/Synthetic	2017/10/13	1.8		%	25
5207876	FA	Method Blank	Total Oil & Grease Mineral/Synthetic	2017/10/13	<0.50		mg/L	
5208367	ZSK	Matrix Spike	Phenols-4AAP	2017/10/12		98	%	80 - 120
5208367	ZSK	Spiked Blank	Phenols-4AAP	2017/10/12		101	%	80 - 120
5208367	ZSK	Method Blank	Phenols-4AAP	2017/10/12	<0.0010		mg/L	
5208367	ZSK	RPD	Phenols-4AAP	2017/10/12	NC		%	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.


Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times$ RDL).

VALIDATION SIGNATURE PAGE

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Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

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Your Project #: 1407634
 Site#: McCarthy
 Site Location: MCCARTHY
 Your C.O.C. #: 628645-06-01

Attention: Dawn Hoyle/Jamie Bonany

Golder Associates Ltd
 121 Commerce Park Drive
 Unit L
 Barrie, ON
 L4N 8X1

Report Date: 2017/10/20
 Report #: R4794254
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7M7153
Received: 2017/10/13, 11:37

Sample Matrix: Water
 # Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Animal and Vegetable Oil & Grease	1	N/A	2017/10/18	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2017/10/18	2017/10/18	CAM SOP-00326	EPA1664B m,SM5520A m
pH	1	N/A	2017/10/18	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2017/10/17	CAM SOP-00444	OMOE E3179 m
TPH (Heavy Oil) (1)	1	2017/10/18	2017/10/18	CAM SOP-00326	EPA1664B m,SM5520F m
Low Level Total Suspended Solids	1	2017/10/16	2017/10/16	CAM SOP-00428	SM 22 2540D m

Remarks:

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Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested.

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease

Your Project #: 1407634
Site#: McCarthy
Site Location: MCCARTHY
Your C.O.C. #: 628645-06-01

Attention:Dawn Hoyle/Jamie Bonany

Golder Associates Ltd
121 Commerce Park Drive
Unit L
Barrie, ON
L4N 8X1

Report Date: 2017/10/20
Report #: R4794254
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7M7153
Received: 2017/10/13, 11:37

Encryption Key

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Antonella Brasil, Senior Project Manager
Email: ABrasil@maxxam.ca
Phone# (905)817-5817

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RESULTS OF ANALYSES OF WATER

Maxxam ID		FIA760	FIA760		
Sampling Date		2017/10/12 11:15	2017/10/12 11:15		
COC Number		628645-06-01	628645-06-01		
	UNITS	POND	POND Lab-Dup	RDL	QC Batch
Calculated Parameters					
Total Animal/Vegetable Oil and Grease	mg/L	1.9	N/A	0.50	5212322
Inorganics					
pH	pH	8.15	N/A	N/A	5217060
Phenols-4AAP	mg/L	0.0020	0.0021	0.0010	5215813
Total Suspended Solids	mg/L	4	N/A	1	5213662
Petroleum Hydrocarbons					
Total Oil & Grease	mg/L	1.9	N/A	0.50	5217418
Total Oil & Grease Mineral/Synthetic	mg/L	<0.50	N/A	0.50	5217424
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable					

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	7.7°C
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Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5213662	SDE	QC Standard	Total Suspended Solids	2017/10/16		102	%	85 - 115
5213662	SDE	Method Blank	Total Suspended Solids	2017/10/16	<1		mg/L	
5213662	SDE	RPD	Total Suspended Solids	2017/10/16	15		%	25
5215813	ZSK	Matrix Spike [FIA760-04]	Phenols-4AAP	2017/10/17		95	%	80 - 120
5215813	ZSK	Spiked Blank	Phenols-4AAP	2017/10/17		100	%	80 - 120
5215813	ZSK	Method Blank	Phenols-4AAP	2017/10/17	<0.0010		mg/L	
5215813	ZSK	RPD [FIA760-04]	Phenols-4AAP	2017/10/17	4.9		%	20
5217060	TA1	Spiked Blank	pH	2017/10/18		102	%	98 - 103
5217060	TA1	RPD	pH	2017/10/18	0.21		%	N/A
5217418	FA	Spiked Blank	Total Oil & Grease	2017/10/18		98	%	85 - 115
5217418	FA	RPD	Total Oil & Grease	2017/10/18	1.4		%	25
5217418	FA	Method Blank	Total Oil & Grease	2017/10/18	<0.50		mg/L	
5217424	FA	Spiked Blank	Total Oil & Grease Mineral/Synthetic	2017/10/18		95	%	85 - 115
5217424	FA	RPD	Total Oil & Grease Mineral/Synthetic	2017/10/18	3.6		%	25
5217424	FA	Method Blank	Total Oil & Grease Mineral/Synthetic	2017/10/18	<0.50		mg/L	

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

VALIDATION SIGNATURE PAGE

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Brad Newman, Scientific Service Specialist

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Your Project #: 1407634
 Site#: MCCARTHY
 Site Location: MCCARTHY
 Your C.O.C. #: 628645-04-01

Attention: Dawn Hoyle/Jamie Bonany

Golder Associates Ltd
 121 Commerce Park Drive
 Unit L
 Barrie, ON
 L4N 8X1

Report Date: 2017/10/27
 Report #: R4806725
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7N4178

Received: 2017/10/20, 09:52

Sample Matrix: Water
 # Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Animal and Vegetable Oil & Grease	1	N/A	2017/10/26	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2017/10/26	2017/10/26	CAM SOP-00326	EPA1664B m,SM5520A m
pH	1	N/A	2017/10/25	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2017/10/24	CAM SOP-00444	OMOE E3179 m
TPH (Heavy Oil) (1)	1	2017/10/26	2017/10/26	CAM SOP-00326	EPA1664B m,SM5520F m
Low Level Total Suspended Solids	1	2017/10/23	2017/10/24	CAM SOP-00428	SM 22 2540D m

Remarks:

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Results relate to samples tested.

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(1) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease

Your Project #: 1407634
Site#: MCCARTHY
Site Location: MCCARTHY
Your C.O.C. #: 628645-04-01

Attention:Dawn Hoyle/Jamie Bonany

Golder Associates Ltd
121 Commerce Park Drive
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L4N 8X1

Report Date: 2017/10/27
Report #: R4806725
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7N4178
Received: 2017/10/20, 09:52

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RESULTS OF ANALYSES OF WATER

Maxxam ID			FJP824		
Sampling Date			2017/10/19 12:50		
COC Number			628645-04-01		
	UNITS	Criteria	POND	RDL	QC Batch
Calculated Parameters					
Total Animal/Vegetable Oil and Grease	mg/L	-	2.3	0.50	5224341
Inorganics					
pH	pH	6.5:8.5	8.07	N/A	5228573
Phenols-4AAP	mg/L	0.001	0.0013	0.0010	5227234
Total Suspended Solids	mg/L	-	4	1	5225523
Petroleum Hydrocarbons					
Total Oil & Grease	mg/L	-	2.9	0.50	5232116
Total Oil & Grease Mineral/Synthetic	mg/L	0.5	0.60	0.50	5232117
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Criteria: Ontario Provincial Water Quality Objectives Ref. to MOEE Water Management document dated Feb.1999 N/A = Not Applicable					

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.7°C
-----------	-------

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5225523	XZH	QC Standard	Total Suspended Solids	2017/10/24		98	%	85 - 115
5225523	XZH	Method Blank	Total Suspended Solids	2017/10/24	<1		mg/L	
5225523	XZH	RPD	Total Suspended Solids	2017/10/24	0		%	25
5227234	BMO	Matrix Spike	Phenols-4AAP	2017/10/24		96	%	80 - 120
5227234	BMO	Spiked Blank	Phenols-4AAP	2017/10/24		97	%	80 - 120
5227234	BMO	Method Blank	Phenols-4AAP	2017/10/24	<0.0010		mg/L	
5227234	BMO	RPD	Phenols-4AAP	2017/10/24	NC		%	20
5228573	NYS	Spiked Blank	pH	2017/10/25		102	%	98 - 103
5228573	NYS	RPD	pH	2017/10/25	0.28		%	N/A
5232116	FA	Spiked Blank	Total Oil & Grease	2017/10/26		99	%	85 - 115
5232116	FA	RPD	Total Oil & Grease	2017/10/26	1.4		%	25
5232116	FA	Method Blank	Total Oil & Grease	2017/10/26	<0.50		mg/L	
5232117	FA	Spiked Blank	Total Oil & Grease Mineral/Synthetic	2017/10/26		96	%	85 - 115
5232117	FA	RPD	Total Oil & Grease Mineral/Synthetic	2017/10/26	3.0		%	25
5232117	FA	Method Blank	Total Oil & Grease Mineral/Synthetic	2017/10/26	<0.50		mg/L	

N/A = Not Applicable

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Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times$ RDL).

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Cristina Carriere

Cristina Carriere, Scientific Service Specialist

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Your Project #: 1407634
 Site#: 1407634
 Site Location: MCCARTHY
 Your C.O.C. #: 571437-06-01

Attention: Dawn Hoyle/Jamie Bonany

Golder Associates Ltd
 121 Commerce Park Drive
 Unit L
 Barrie, ON
 L4N 8X1

Report Date: 2017/11/03
 Report #: R4822740
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B700165
Received: 2017/10/27, 09:32

Sample Matrix: Water
 # Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Animal and Vegetable Oil & Grease	1	N/A	2017/11/01	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2017/11/01	2017/11/01	CAM SOP-00326	EPA1664B m,SM5520A m
pH	1	N/A	2017/10/30	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2017/11/02	CAM SOP-00444	OMOE E3179 m
TPH (Heavy Oil) (1)	1	2017/11/01	2017/11/01	CAM SOP-00326	EPA1664B m,SM5520F m
Low Level Total Suspended Solids	1	2017/10/30	2017/10/30	CAM SOP-00428	SM 22 2540D m

Remarks:

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Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

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* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease

Your Project #: 1407634
Site#: 1407634
Site Location: MCCARTHY
Your C.O.C. #: 571437-06-01

Attention:Dawn Hoyle/Jamie Bonany

Golder Associates Ltd
121 Commerce Park Drive
Unit L
Barrie, ON
L4N 8X1

Report Date: 2017/11/03
Report #: R4822740
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7O0165
Received: 2017/10/27, 09:32

Encryption Key

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Antonella Brasil, Senior Project Manager
Email: ABrasil@maxxam.ca
Phone# (905)817-5817

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RESULTS OF ANALYSES OF WATER

Maxxam ID			FKV592	FKV592		
Sampling Date			2017/10/26	2017/10/26		
COC Number			571437-06-01	571437-06-01		
	UNITS	Criteria	POND	POND Lab-Dup	RDL	QC Batch
Calculated Parameters						
Total Animal/Vegetable Oil and Grease	mg/L	-	<0.50	N/A	0.50	5235072
Inorganics						
pH	pH	6.5:8.5	8.22	N/A	N/A	5237066
Phenols-4AAP	mg/L	0.001	0.0026	N/A	0.0010	5244825
Total Suspended Solids	mg/L	-	2	2	1	5238752
Petroleum Hydrocarbons						
Total Oil & Grease	mg/L	-	<0.50	N/A	0.50	5242548
Total Oil & Grease Mineral/Synthetic	mg/L	0.5	<0.50	N/A	0.50	5242552
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate Criteria: Ontario Provincial Water Quality Objectives Ref. to MOEE Water Management document dated Feb.1999 N/A = Not Applicable						

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	9.3°C
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Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5237066	TA1	Spiked Blank	pH	2017/10/30		102	%	98 - 103
5237066	TA1	RPD	pH	2017/10/30	0.30		%	N/A
5238752	XZH	QC Standard	Total Suspended Solids	2017/10/30		94	%	85 - 115
5238752	XZH	Method Blank	Total Suspended Solids	2017/10/30	<1		mg/L	
5238752	XZH	RPD [FKV592-03]	Total Suspended Solids	2017/10/30	0		%	25
5242548	MA4	Spiked Blank	Total Oil & Grease	2017/11/01		95	%	85 - 115
5242548	MA4	RPD	Total Oil & Grease	2017/11/01	3.7		%	25
5242548	MA4	Method Blank	Total Oil & Grease	2017/11/01	<0.50		mg/L	
5242552	MA4	Spiked Blank	Total Oil & Grease Mineral/Synthetic	2017/11/01		93	%	85 - 115
5242552	MA4	RPD	Total Oil & Grease Mineral/Synthetic	2017/11/01	1.8		%	25
5242552	MA4	Method Blank	Total Oil & Grease Mineral/Synthetic	2017/11/01	<0.50		mg/L	
5244825	ZSK	Matrix Spike	Phenols-4AAP	2017/11/02		96	%	80 - 120
5244825	ZSK	Spiked Blank	Phenols-4AAP	2017/11/02		100	%	80 - 120
5244825	ZSK	Method Blank	Phenols-4AAP	2017/11/02	<0.0010		mg/L	
5244825	ZSK	RPD	Phenols-4AAP	2017/11/02	9.5		%	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Cristina Carriere

Cristina Carriere, Scientific Service Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Your Project #: 1407634
 Site Location: MCCARTHY
 Your C.O.C. #: 634301-01-01

Attention: Jamie Bonany

Golder Associates Ltd
 121 Commerce Park Drive
 Unit L
 Barrie, ON
 L4N 8X1

Report Date: 2017/11/02
 Report #: R4818934
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B700348
Received: 2017/10/27, 09:14

Sample Matrix: Water
 # Samples Received: 3

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Alkalinity	3	N/A	2017/10/31	CAM SOP-00448	SM 22 2320 B m
Chloride by Automated Colourimetry	3	N/A	2017/10/30	CAM SOP-00463	EPA 325.2 m
Conductivity	3	N/A	2017/10/31	CAM SOP-00414	SM 22 2510 m
Dissolved Organic Carbon (DOC) (1)	3	N/A	2017/10/30	CAM SOP-00446	SM 22 5310 B m
Fluoride	3	2017/10/30	2017/10/31	CAM SOP-00449	SM 22 4500-F C m
Hardness (calculated as CaCO ₃)	3	N/A	2017/11/01	CAM SOP 00102/00408/00447	SM 2340 B
Lab Filtered Metals by ICPMS	3	2017/10/31	2017/11/01	CAM SOP-00447	EPA 6020B m
Total Metals Analysis by ICPMS	3	N/A	2017/11/01	CAM SOP-00447	EPA 6020B m
Anion and Cation Sum	3	N/A	2017/11/01		
Total Ammonia-N	3	N/A	2017/10/31	CAM SOP-00441	EPA GS I-2522-90 m
Nitrate (NO ₃) and Nitrite (NO ₂) in Water (2)	3	N/A	2017/10/31	CAM SOP-00440	SM 22 4500-NO3I/NO2B
Total Oil and Grease	3	2017/10/31	2017/11/01	CAM SOP-00326	EPA1664B m, SM5520A m
pH	3	N/A	2017/10/31	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	3	N/A	2017/11/01	CAM SOP-00444	OMOE E3179 m
Sulphate by Automated Colourimetry	3	N/A	2017/10/30	CAM SOP-00464	EPA 375.4 m
Total Dissolved Solids	3	2017/10/30	2017/10/31	CAM SOP-00428	SM 22 2540C m
Total Kjeldahl Nitrogen in Water	3	2017/10/31	2017/11/01	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	3	2017/10/31	2017/10/31	CAM SOP-00407	SM 22 4500 P B H m
Total Suspended Solids	3	2017/10/30	2017/10/30	CAM SOP-00428	SM 22 2540D m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed

Your Project #: 1407634
Site Location: MCCARTHY
Your C.O.C. #: 634301-01-01

Attention: Jamie Bonany

Golder Associates Ltd
121 Commerce Park Drive
Unit L
Barrie, ON
L4N 8X1

Report Date: 2017/11/02
Report #: R4818934
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7O0348

Received: 2017/10/27, 09:14

or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

- (1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
- (2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Ema Gitej, Senior Project Manager
Email: EGitej@maxxam.ca
Phone# (905)817-5829

=====
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

RESULTS OF ANALYSES OF WATER

Maxxam ID		FKW250	FKW251	FKW251			FKW252		
Sampling Date		2017/10/26 16:15	2017/10/26 16:15	2017/10/26 16:15			2017/10/26 12:45		
COC Number		634301-01-01	634301-01-01	634301-01-01			634301-01-01		
	UNITS	POND	SW1	SW1 Lab-Dup	RDL	QC Batch	SW2	RDL	QC Batch
Calculated Parameters									
Anion Sum	me/L	20.2	20.1		N/A	5235950	10.2	N/A	5235950
Cation Sum	me/L	19.0	19.1		N/A	5235950	9.40	N/A	5235950
Hardness (CaCO3)	mg/L	400	400		1.0	5235583	440	1.0	5235583
Inorganics									
Total Ammonia-N	mg/L	0.37	0.35		0.050	5240332	<0.050	0.050	5240332
Conductivity	mS/cm	2.12	2.11		0.001	5239134	0.903	0.001	5239134
Total Dissolved Solids	mg/L	1300	1180		10	5238971	580	10	5238971
Fluoride (F-)	mg/L	0.80	0.80		0.10	5239150	<0.10	0.10	5239150
Total Kjeldahl Nitrogen (TKN)	mg/L	1.1	1.0		0.10	5240064	0.51	0.10	5240847
Dissolved Organic Carbon	mg/L	4.8	4.8		0.20	5238246	11	0.20	5238246
pH	pH	8.18	8.22			5239153	8.03		5239153
Phenols-4AAP	mg/L	<0.0010	<0.0010		0.0010	5242580	0.0024	0.0020	5242601
Total Phosphorus	mg/L	<0.020	<0.020		0.020	5240093	0.028	0.020	5240093
Total Suspended Solids	mg/L	<10	<10	<10	10	5238963	<10	10	5238963
Dissolved Sulphate (SO4)	mg/L	360	360		1.0	5237479	150	1.0	5237479
Alkalinity (Total as CaCO3)	mg/L	140	140		1.0	5239146	330	1.0	5239146
Dissolved Chloride (Cl)	mg/L	340	340		4.0	5237474	16	1.0	5237474
Nitrite (N)	mg/L	0.054	0.050	0.050	0.010	5237435	<0.010	0.010	5237435
Nitrate (N)	mg/L	0.87	0.87	0.88	0.10	5237435	<0.10	0.10	5237435
Nitrate + Nitrite (N)	mg/L	0.93	0.92	0.93	0.10	5237435	<0.10	0.10	5237435
Petroleum Hydrocarbons									
Total Oil & Grease	mg/L	<0.50	<0.50		0.50	5240220	<0.50	0.50	5240220
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable									

RESULTS OF ANALYSES OF WATER

Maxxam ID		FKW252		
Sampling Date		2017/10/26 12:45		
COC Number		634301-01-01		
	UNITS	SW2 Lab-Dup	RDL	QC Batch
Inorganics				
Total Dissolved Solids	mg/L	570	10	5238971
Phenols-4AAP	mg/L	0.0024	0.0020	5242601
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate				

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		FKW250	FKW250	FKW251	FKW252		
Sampling Date		2017/10/26 16:15	2017/10/26 16:15	2017/10/26 16:15	2017/10/26 12:45		
COC Number		634301-01-01	634301-01-01	634301-01-01	634301-01-01		
	UNITS	POND	POND Lab-Dup	SW1	SW2	RDL	QC Batch
Metals							
Total Arsenic (As)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	5240962
Total Cadmium (Cd)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	5240962
Dissolved Calcium (Ca)	ug/L	81000		82000	150000	200	5240393
Total Calcium (Ca)	ug/L	99000	89000	88000	170000	200	5240962
Total Chromium (Cr)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	5240962
Total Copper (Cu)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	5240962
Total Iron (Fe)	ug/L	<100	<100	<100	280	100	5240962
Total Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	5240962
Dissolved Magnesium (Mg)	ug/L	47000		48000	15000	50	5240393
Total Magnesium (Mg)	ug/L	54000	50000	50000	16000	50	5240962
Total Manganese (Mn)	ug/L	21	20	14	26	2.0	5240962
Total Nickel (Ni)	ug/L	1.3	1.2	1.3	<1.0	1.0	5240962
Dissolved Potassium (K)	ug/L	18000		18000	5900	200	5240393
Total Potassium (K)	ug/L	21000	20000	19000	6200	200	5240962
Dissolved Sodium (Na)	ug/L	240000		240000	11000	100	5240393
Total Sodium (Na)	ug/L	280000	260000	260000	11000	100	5240962
Total Zinc (Zn)	ug/L	<5.0	<5.0	5.3	<5.0	5.0	5240962
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate							

TEST SUMMARY

Maxxam ID: FKW250
Sample ID: POND
Matrix: Water

Collected: 2017/10/26
Shipped:
Received: 2017/10/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	5239146	N/A	2017/10/31	Surinder Rai
Chloride by Automated Colourimetry	KONE	5237474	N/A	2017/10/30	Deonarine Ramnarine
Conductivity	AT	5239134	N/A	2017/10/31	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	5238246	N/A	2017/10/30	Anastasia Hamanov
Fluoride	ISE	5239150	2017/10/30	2017/10/31	Surinder Rai
Hardness (calculated as CaCO3)		5235583	N/A	2017/11/01	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	5240393	2017/10/31	2017/11/01	Thao Nguyen
Total Metals Analysis by ICPMS	ICP/MS	5240962	N/A	2017/11/01	Arefa Dabhad
Anion and Cation Sum	CALC	5235950	N/A	2017/11/01	Automated Statchk
Total Ammonia-N	LACH/NH4	5240332	N/A	2017/10/31	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	5237435	N/A	2017/10/31	Chandra Nandlal
Total Oil and Grease	BAL	5240220	2017/10/31	2017/11/01	Amjad Mir
pH	AT	5239153	N/A	2017/10/31	Surinder Rai
Phenols (4AAP)	TECH/PHEN	5242580	N/A	2017/11/01	Zahid Soikot
Sulphate by Automated Colourimetry	KONE	5237479	N/A	2017/10/30	Deonarine Ramnarine
Total Dissolved Solids	BAL	5238971	2017/10/30	2017/10/31	Fang Wang
Total Kjeldahl Nitrogen in Water	SKAL	5240064	2017/10/31	2017/11/01	Bramdeo Motiram
Total Phosphorus (Colourimetric)	LACH/P	5240093	2017/10/31	2017/10/31	Amanpreet Sappal
Total Suspended Solids	BAL	5238963	2017/10/30	2017/10/30	Arpan Shah

Maxxam ID: FKW250 Dup
Sample ID: POND
Matrix: Water

Collected: 2017/10/26
Shipped:
Received: 2017/10/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals Analysis by ICPMS	ICP/MS	5240962	N/A	2017/11/01	Arefa Dabhad

Maxxam ID: FKW251
Sample ID: SW1
Matrix: Water

Collected: 2017/10/26
Shipped:
Received: 2017/10/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	5239146	N/A	2017/10/31	Surinder Rai
Chloride by Automated Colourimetry	KONE	5237474	N/A	2017/10/30	Deonarine Ramnarine
Conductivity	AT	5239134	N/A	2017/10/31	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	5238246	N/A	2017/10/30	Anastasia Hamanov
Fluoride	ISE	5239150	2017/10/30	2017/10/31	Surinder Rai
Hardness (calculated as CaCO3)		5235583	N/A	2017/11/01	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	5240393	2017/10/31	2017/11/01	Thao Nguyen
Total Metals Analysis by ICPMS	ICP/MS	5240962	N/A	2017/11/01	Arefa Dabhad
Anion and Cation Sum	CALC	5235950	N/A	2017/11/01	Automated Statchk
Total Ammonia-N	LACH/NH4	5240332	N/A	2017/10/31	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	5237435	N/A	2017/10/31	Chandra Nandlal
Total Oil and Grease	BAL	5240220	2017/10/31	2017/11/01	Amjad Mir

TEST SUMMARY

Maxxam ID: FKW251
Sample ID: SW1
Matrix: Water

Collected: 2017/10/26
Shipped:
Received: 2017/10/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
pH	AT	5239153	N/A	2017/10/31	Surinder Rai
Phenols (4AAP)	TECH/PHEN	5242580	N/A	2017/11/01	Zahid Soikot
Sulphate by Automated Colourimetry	KONE	5237479	N/A	2017/10/30	Deonarine Ramnarine
Total Dissolved Solids	BAL	5238971	2017/10/30	2017/10/31	Fang Wang
Total Kjeldahl Nitrogen in Water	SKAL	5240064	2017/10/31	2017/11/01	Bramdeo Motiram
Total Phosphorus (Colourimetric)	LACH/P	5240093	2017/10/31	2017/10/31	Amanpreet Sappal
Total Suspended Solids	BAL	5238963	2017/10/30	2017/10/30	Arpan Shah

Maxxam ID: FKW251 Dup
Sample ID: SW1
Matrix: Water

Collected: 2017/10/26
Shipped:
Received: 2017/10/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	5237435	N/A	2017/10/31	Chandra Nandlal
Total Suspended Solids	BAL	5238963	2017/10/30	2017/10/30	Arpan Shah

Maxxam ID: FKW252
Sample ID: SW2
Matrix: Water

Collected: 2017/10/26
Shipped:
Received: 2017/10/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	5239146	N/A	2017/10/31	Surinder Rai
Chloride by Automated Colourimetry	KONE	5237474	N/A	2017/10/30	Deonarine Ramnarine
Conductivity	AT	5239134	N/A	2017/10/31	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	5238246	N/A	2017/10/30	Anastasia Hamanov
Fluoride	ISE	5239150	2017/10/30	2017/10/31	Surinder Rai
Hardness (calculated as CaCO3)		5235583	N/A	2017/11/01	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	5240393	2017/10/31	2017/11/01	Thao Nguyen
Total Metals Analysis by ICPMS	ICP/MS	5240962	N/A	2017/11/01	Arefa Dabhad
Anion and Cation Sum	CALC	5235950	N/A	2017/11/01	Automated Statchk
Total Ammonia-N	LACH/NH4	5240332	N/A	2017/10/31	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	5237435	N/A	2017/10/31	Chandra Nandlal
Total Oil and Grease	BAL	5240220	2017/10/31	2017/11/01	Amjad Mir
pH	AT	5239153	N/A	2017/10/31	Surinder Rai
Phenols (4AAP)	TECH/PHEN	5242601	N/A	2017/11/01	Zahid Soikot
Sulphate by Automated Colourimetry	KONE	5237479	N/A	2017/10/30	Deonarine Ramnarine
Total Dissolved Solids	BAL	5238971	2017/10/30	2017/10/31	Fang Wang
Total Kjeldahl Nitrogen in Water	SKAL	5240847	2017/10/31	2017/11/01	Rajni Tyagi
Total Phosphorus (Colourimetric)	LACH/P	5240093	2017/10/31	2017/10/31	Amanpreet Sappal
Total Suspended Solids	BAL	5238963	2017/10/30	2017/10/30	Arpan Shah

TEST SUMMARY

Maxxam ID: FKW252 Dup
Sample ID: SW2
Matrix: Water

Collected: 2017/10/26
Shipped:
Received: 2017/10/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	5242601	N/A	2017/11/01	Zahid Soikot
Total Dissolved Solids	BAL	5238971	2017/10/30	2017/10/31	Fang Wang

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.7°C
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Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5237435	C_N	Matrix Spike [FKW251-03]	Nitrite (N)	2017/10/31		107	%	80 - 120
			Nitrate (N)	2017/10/31		105	%	80 - 120
5237435	C_N	Spiked Blank	Nitrite (N)	2017/10/31		100	%	80 - 120
			Nitrate (N)	2017/10/31		101	%	80 - 120
5237435	C_N	Method Blank	Nitrite (N)	2017/10/31	<0.010		mg/L	
			Nitrate (N)	2017/10/31	<0.10		mg/L	
5237435	C_N	RPD [FKW251-03]	Nitrite (N)	2017/10/31	0.20		%	20
			Nitrate (N)	2017/10/31	2.0		%	20
5237474	DRM	Matrix Spike	Dissolved Chloride (Cl)	2017/10/30		120	%	80 - 120
5237474	DRM	Spiked Blank	Dissolved Chloride (Cl)	2017/10/30		102	%	80 - 120
5237474	DRM	Method Blank	Dissolved Chloride (Cl)	2017/10/30	<1.0		mg/L	
5237474	DRM	RPD	Dissolved Chloride (Cl)	2017/10/30	2.2		%	20
5237479	DRM	Matrix Spike	Dissolved Sulphate (SO4)	2017/10/30		98	%	75 - 125
5237479	DRM	Spiked Blank	Dissolved Sulphate (SO4)	2017/10/30		101	%	80 - 120
5237479	DRM	Method Blank	Dissolved Sulphate (SO4)	2017/10/30	<1.0		mg/L	
5237479	DRM	RPD	Dissolved Sulphate (SO4)	2017/10/30	NC		%	20
5238246	AHA	Matrix Spike	Dissolved Organic Carbon	2017/10/30		NC	%	80 - 120
5238246	AHA	Spiked Blank	Dissolved Organic Carbon	2017/10/30		101	%	80 - 120
5238246	AHA	Method Blank	Dissolved Organic Carbon	2017/10/30	<0.20		mg/L	
5238246	AHA	RPD	Dissolved Organic Carbon	2017/10/30	0.084		%	20
5238963	AS6	QC Standard	Total Suspended Solids	2017/10/30		95	%	85 - 115
5238963	AS6	Method Blank	Total Suspended Solids	2017/10/30	<10		mg/L	
5238963	AS6	RPD [FKW251-02]	Total Suspended Solids	2017/10/30	NC		%	25
5238971	FW	QC Standard	Total Dissolved Solids	2017/10/31		97	%	90 - 110
5238971	FW	Method Blank	Total Dissolved Solids	2017/10/31	<10		mg/L	
5238971	FW	RPD [FKW252-02]	Total Dissolved Solids	2017/10/31	1.7		%	25
5239134	SAU	Spiked Blank	Conductivity	2017/10/31		101	%	85 - 115
5239134	SAU	Method Blank	Conductivity	2017/10/31	<0.001		mS/cm	
5239134	SAU	RPD	Conductivity	2017/10/31	0.26		%	25
5239146	SAU	Spiked Blank	Alkalinity (Total as CaCO3)	2017/10/31		95	%	85 - 115
5239146	SAU	Method Blank	Alkalinity (Total as CaCO3)	2017/10/31	<1.0		mg/L	
5239146	SAU	RPD	Alkalinity (Total as CaCO3)	2017/10/31	0.0016		%	20
5239150	SAU	Matrix Spike	Fluoride (F-)	2017/10/31		107	%	80 - 120
5239150	SAU	Spiked Blank	Fluoride (F-)	2017/10/31		102	%	80 - 120
5239150	SAU	Method Blank	Fluoride (F-)	2017/10/31	<0.10		mg/L	
5239150	SAU	RPD	Fluoride (F-)	2017/10/31	7.6		%	20
5239153	SAU	Spiked Blank	pH	2017/10/31		101	%	98 - 103
5239153	SAU	RPD	pH	2017/10/31	0.35		%	N/A
5240064	BMO	Matrix Spike	Total Kjeldahl Nitrogen (TKN)	2017/11/01		104	%	80 - 120
5240064	BMO	QC Standard	Total Kjeldahl Nitrogen (TKN)	2017/11/01		94	%	80 - 120
5240064	BMO	Spiked Blank	Total Kjeldahl Nitrogen (TKN)	2017/11/01		96	%	80 - 120
5240064	BMO	Method Blank	Total Kjeldahl Nitrogen (TKN)	2017/11/01	<0.10		mg/L	
5240064	BMO	RPD	Total Kjeldahl Nitrogen (TKN)	2017/11/01	NC		%	20
5240093	ASP	Matrix Spike	Total Phosphorus	2017/10/31		104	%	80 - 120
5240093	ASP	QC Standard	Total Phosphorus	2017/10/31		103	%	80 - 120
5240093	ASP	Spiked Blank	Total Phosphorus	2017/10/31		97	%	80 - 120
5240093	ASP	Method Blank	Total Phosphorus	2017/10/31	<0.020		mg/L	
5240093	ASP	RPD	Total Phosphorus	2017/10/31	5.4		%	20
5240220	AMJ	Matrix Spike	Total Oil & Grease	2017/11/01		103	%	75 - 125
5240220	AMJ	Spiked Blank	Total Oil & Grease	2017/11/01		97	%	85 - 115
5240220	AMJ	RPD	Total Oil & Grease	2017/11/01	2.3		%	25

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5240220	AMJ	Method Blank	Total Oil & Grease	2017/11/01	<0.50		mg/L	
5240332	COP	Matrix Spike	Total Ammonia-N	2017/10/31		96	%	80 - 120
5240332	COP	Spiked Blank	Total Ammonia-N	2017/10/31		97	%	85 - 115
5240332	COP	Method Blank	Total Ammonia-N	2017/10/31	<0.050		mg/L	
5240332	COP	RPD	Total Ammonia-N	2017/10/31	NC		%	20
5240393	TNG	Matrix Spike	Dissolved Calcium (Ca)	2017/11/01		NC	%	80 - 120
			Dissolved Magnesium (Mg)	2017/11/01		NC	%	80 - 120
			Dissolved Potassium (K)	2017/11/01		102	%	80 - 120
			Dissolved Sodium (Na)	2017/11/01		NC	%	80 - 120
5240393	TNG	Spiked Blank	Dissolved Calcium (Ca)	2017/11/01		94	%	80 - 120
			Dissolved Magnesium (Mg)	2017/11/01		98	%	80 - 120
			Dissolved Potassium (K)	2017/11/01		98	%	80 - 120
			Dissolved Sodium (Na)	2017/11/01		98	%	80 - 120
5240393	TNG	Method Blank	Dissolved Calcium (Ca)	2017/11/01	<200		ug/L	
			Dissolved Magnesium (Mg)	2017/11/01	<50		ug/L	
			Dissolved Potassium (K)	2017/11/01	<200		ug/L	
			Dissolved Sodium (Na)	2017/11/01	<100		ug/L	
5240393	TNG	RPD	Dissolved Sodium (Na)	2017/11/01	1.2		%	20
5240847	RTY	Matrix Spike	Total Kjeldahl Nitrogen (TKN)	2017/11/01		104	%	80 - 120
5240847	RTY	QC Standard	Total Kjeldahl Nitrogen (TKN)	2017/11/01		96	%	80 - 120
5240847	RTY	Spiked Blank	Total Kjeldahl Nitrogen (TKN)	2017/11/01		97	%	80 - 120
5240847	RTY	Method Blank	Total Kjeldahl Nitrogen (TKN)	2017/11/01	<0.10		mg/L	
5240847	RTY	RPD	Total Kjeldahl Nitrogen (TKN)	2017/11/01	NC (1)		%	20
5240962	ADA	Matrix Spike [FKW250-07]	Total Arsenic (As)	2017/11/01		94	%	80 - 120
			Total Cadmium (Cd)	2017/11/01		95	%	80 - 120
			Total Calcium (Ca)	2017/11/01		NC	%	80 - 120
			Total Chromium (Cr)	2017/11/01		94	%	80 - 120
			Total Copper (Cu)	2017/11/01		97	%	80 - 120
			Total Iron (Fe)	2017/11/01		95	%	80 - 120
			Total Lead (Pb)	2017/11/01		91	%	80 - 120
			Total Magnesium (Mg)	2017/11/01		NC	%	80 - 120
			Total Manganese (Mn)	2017/11/01		91	%	80 - 120
			Total Nickel (Ni)	2017/11/01		88	%	80 - 120
			Total Potassium (K)	2017/11/01		90	%	80 - 120
			Total Sodium (Na)	2017/11/01		NC	%	80 - 120
			Total Zinc (Zn)	2017/11/01		94	%	80 - 120
5240962	ADA	Spiked Blank	Total Arsenic (As)	2017/11/01		97	%	80 - 120
			Total Cadmium (Cd)	2017/11/01		101	%	80 - 120
			Total Calcium (Ca)	2017/11/01		100	%	80 - 120
			Total Chromium (Cr)	2017/11/01		99	%	80 - 120
			Total Copper (Cu)	2017/11/01		102	%	80 - 120
			Total Iron (Fe)	2017/11/01		99	%	80 - 120
			Total Lead (Pb)	2017/11/01		98	%	80 - 120
			Total Magnesium (Mg)	2017/11/01		103	%	80 - 120
			Total Manganese (Mn)	2017/11/01		97	%	80 - 120
			Total Nickel (Ni)	2017/11/01		94	%	80 - 120
			Total Potassium (K)	2017/11/01		105	%	80 - 120
			Total Sodium (Na)	2017/11/01		100	%	80 - 120
			Total Zinc (Zn)	2017/11/01		100	%	80 - 120
5240962	ADA	Method Blank	Total Arsenic (As)	2017/11/01	<1.0		ug/L	
			Total Cadmium (Cd)	2017/11/01	<0.10		ug/L	

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Calcium (Ca)	2017/11/01	<200		ug/L	
			Total Chromium (Cr)	2017/11/01	<5.0		ug/L	
			Total Copper (Cu)	2017/11/01	<1.0		ug/L	
			Total Iron (Fe)	2017/11/01	<100		ug/L	
			Total Lead (Pb)	2017/11/01	<0.50		ug/L	
			Total Magnesium (Mg)	2017/11/01	<50		ug/L	
			Total Manganese (Mn)	2017/11/01	<2.0		ug/L	
			Total Nickel (Ni)	2017/11/01	<1.0		ug/L	
			Total Potassium (K)	2017/11/01	<200		ug/L	
			Total Sodium (Na)	2017/11/01	<100		ug/L	
			Total Zinc (Zn)	2017/11/01	<5.0		ug/L	
5240962	ADA	RPD [FKW250-07]	Total Arsenic (As)	2017/11/01	NC		%	20
			Total Cadmium (Cd)	2017/11/01	NC		%	20
			Total Calcium (Ca)	2017/11/01	10		%	20
			Total Chromium (Cr)	2017/11/01	NC		%	20
			Total Copper (Cu)	2017/11/01	NC		%	20
			Total Iron (Fe)	2017/11/01	NC		%	20
			Total Lead (Pb)	2017/11/01	NC		%	20
			Total Magnesium (Mg)	2017/11/01	7.6		%	20
			Total Manganese (Mn)	2017/11/01	7.3		%	20
			Total Nickel (Ni)	2017/11/01	11		%	20
			Total Potassium (K)	2017/11/01	5.5		%	20
			Total Sodium (Na)	2017/11/01	7.3		%	20
			Total Zinc (Zn)	2017/11/01	NC		%	20
5242580	ZSK	Matrix Spike	Phenols-4AAP	2017/11/01		98	%	80 - 120
5242580	ZSK	Spiked Blank	Phenols-4AAP	2017/11/01		100	%	80 - 120
5242580	ZSK	Method Blank	Phenols-4AAP	2017/11/01	<0.0010		mg/L	
5242580	ZSK	RPD	Phenols-4AAP	2017/11/01	NC		%	20
5242601	ZSK	Matrix Spike [FKW252-05]	Phenols-4AAP	2017/11/01		93	%	80 - 120
5242601	ZSK	Spiked Blank	Phenols-4AAP	2017/11/01		96	%	80 - 120
5242601	ZSK	Method Blank	Phenols-4AAP	2017/11/01	<0.0010		mg/L	
5242601	ZSK	RPD [FKW252-05]	Phenols-4AAP	2017/11/01	0		%	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.



NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) TKN: Due to high concentrations of NO3NO2 analytes, sample required dilution. Detection limits were adjusted accordingly.

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Ewa Pranjić, M.Sc., C.Chem, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

**CLIENT NAME: GOLDER ASSOCIATES LTD.
121 COMMERCE PARK DRIVE, UNIT L
BARRIE, ON L4N8X1
(705) 722-4492**

ATTENTION TO: Dawn Hoyle

PROJECT: 1407634

AGAT WORK ORDER: 17T253580

ECOTOX ANALYSIS REVIEWED BY: Virginie Bérubé, biologiste

DATE REPORTED: Sep 19, 2017

PAGES (INCLUDING COVER): 5

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*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: 17T253580

PROJECT: 1407634

5835 COOPERS AVENUE
 MISSISSAUGA, ONTARIO
 CANADA L4Z 1Y2
 TEL (905)712-5100
 FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Dawn Hoyle

SAMPLING SITE:

SAMPLED BY:

Daphnia Lethality (D. magna) single concentration-48h

DATE RECEIVED: 2017-08-25

DATE REPORTED: 2017-09-19

		SAMPLE DESCRIPTION:		POND	
		SAMPLE TYPE:		Water	
		DATE SAMPLED:		2017-08-24	
Parameter	Unit	G / S	RDL	8669510	
Mortality 100% v/v	% mortality-48h			0	
Acute Lethality				NO	

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

8669510 Refer to the annex for analysis details.
 Acute lethality: NO (mortality: 50% or less)
 Acute lethality: YES (mortality: more than 50%)

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 17T253580

PROJECT: 1407634

5835 COOPERS AVENUE
 MISSISSAUGA, ONTARIO
 CANADA L4Z 1Y2
 TEL (905)712-5100
 FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Dawn Hoyle

SAMPLING SITE:

SAMPLED BY:

Rainbow Trout Lethality (O. mykiss) single concentration-96h

DATE RECEIVED: 2017-08-25

DATE REPORTED: 2017-09-19

		SAMPLE DESCRIPTION:		POND	
		SAMPLE TYPE:		Water	
		DATE SAMPLED:		2017-08-24	
Parameter	Unit	G / S	RDL	8669510	
Mortality 100% v/v	% mortality-96h			0	
Acute Lethality				NO	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
 8669510 Refer to the annex for analysis details.
 Acute lethality: NO (mortality: 50% or less)
 Acute lethality: YES (mortality: more than 50%)

Certified By:



Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD.

AGAT WORK ORDER: 17T253580

PROJECT: 1407634

ATTENTION TO: Dawn Hoyle

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
ECOTOX Analysis			
Mortality 100% v/v			NA
Acute Lethality			
Mortality 100% v/v	ECO-152-20000F	EPS1/RM/13	



AGAT

Laboratories

1 ORANGE PALE

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Laboratory Use Only

Work Order #: 17T253580

Cooler Quantity: _____
Arrival Temperatures: 8 84 91

Custody Seal intact: Yes No N/A
Notes: _____

Turnaround Time (TAT) Required:

Regular TAT 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

3 Business Days 2 Business Days Next Business Day

OR Date Required (Rush Surcharges May Apply): _____

Please provide prior notification for rush TAT
*TAT is exclusive of weekends and statutory holidays

For 'Same Day' analysis, please contact your AGAT CPM

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: Goldier associates Ltd.
Contact: Jamie Bonamy / Dawn Hoyle
Address: 121 Commerce Park Dr. Unit C
Barrie ON L4N 8X1
Phone: 705-722-4492 Fax: 705-722-3736
Reports to be sent to:
1. Email: Jamie_bonamy@goldier.com
2. Email: Dawn-Hoyle@goldier.com

Regulatory Requirements: No Regulatory Requirement

(Please check all applicable boxes)

Regulation 153/04 Sewer Use Regulation 558
Table Indicate One Sanitary CCME
 Ind/Com Storm Prov. Water Quality Objectives (PWQO)
 Res/Park Agriculture Other
Soil Texture (Check One) Region Indicate One
 Coarse MISA
 Fine Indicate One

Project Information:

Project: 1407634
Site Location: McCarthy (Brechin)
Sampled By: D. Hoyle
AGAT Quote #: _____ PO: _____
Please note: If quotation number is not provided, client will be billed full price for analysis.

Is this submission for a Record of Site Condition?

Yes No

Report Guideline on Certificate of Analysis

Yes No

Sample Matrix Legend

B Biota
GW Ground Water
O Oil
P Paint
S Soil
SD Sediment
SW Surface Water

Invoice Information:

Bill To Same: Yes No

Company: _____
Contact: Patti Chapple
Address: _____
Email: _____

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Y/N	Field Filtered - Metals, Hg, CrVI	Metals and Inorganics	0. Reg 153	Full Metals Scan	Regulation/Custom Metals	Nutrients: <input type="checkbox"/> TP <input type="checkbox"/> NH ₃ <input type="checkbox"/> TKN <input type="checkbox"/> NO ₃ <input type="checkbox"/> NO ₂ <input type="checkbox"/> NO ₃ +NO ₂	Volatiles: <input type="checkbox"/> VOC <input type="checkbox"/> BTEX <input type="checkbox"/> THM	CCME Fractions 1 to 4	ABNs	PAHs	PCBs: <input type="checkbox"/> Total <input type="checkbox"/> Aroclors	Organochlorine Pesticides	TCLP: <input type="checkbox"/> M&I <input type="checkbox"/> VOCs <input type="checkbox"/> ABNs <input type="checkbox"/> B(a)P <input type="checkbox"/> PCBs	Sewer Use	
<u>POND</u>	<u>24-Aug-17</u>	<u>11:00</u>	<u>1</u>	<u>SW</u>				<input type="checkbox"/> All Metals <input type="checkbox"/> 153 Metals (excl. Hydrides) <input type="checkbox"/> Hydride Metals <input type="checkbox"/> 153 Metals (incl. Hydrides) ORPs: <input type="checkbox"/> B-HWS <input type="checkbox"/> Cl <input type="checkbox"/> CN <input type="checkbox"/> Cr ⁶⁺ <input type="checkbox"/> EC <input type="checkbox"/> FOC <input type="checkbox"/> Hg <input type="checkbox"/> pH <input type="checkbox"/> SAR													<input checked="" type="checkbox"/> <u>Single C. Daphnia</u> <input checked="" type="checkbox"/> <u>Single C. Trout</u>

Samples Relinquished By (Print Name and Sign): <u>Dawn Hoyle</u> <u>Hoyle</u>	Date: <u>24-Aug-17</u>	Time: <u>3:30pm</u>	Samples Received By (Print Name and Sign): <u>Simeon</u>	Date: <u>17/9/25</u>	Time: <u>10:06</u>
Samples Relinquished By (Print Name and Sign):	Date:	Time:	Samples Received By (Print Name and Sign):	Date:	Time:
Samples Relinquished By (Print Name and Sign):	Date:	Time:	Samples Received By (Print Name and Sign):	Date:	Time:

Page 1 of 1
N#: **T 053426**



NOM DU CLIENT: GOLDER ASSOCIATES LTD.
121 COMMERCE PARK DRIVE, UNIT L
BARRIE, ON L4N8X1
(705) 722-4492

À L'ATTENTION DE: Dawn Hoyle

N° DE PROJET: M01634

N° BON DE TRAVAIL: 17M265819

ÉCOTOX VÉRIFIÉ PAR: Virginie Bérubé, biologiste

DATE DU RAPPORT: 2017-10-19

VERSION*: 1

NOMBRE DE PAGES: 4

Si vous désirez de l'information concernant cette analyse, S.V.P. contacter votre chargé de projets au (514) 337-1000.

*NOTES

Nous disposerons des échantillons dans les 30 jours suivants les analyses. S.V.P. Contactez le laboratoire si vous désirez avoir un délai d'entreposage.



AGAT Laboratoires

Certificat d'analyse

N° BON DE TRAVAIL: 17M265819

N° DE PROJET: M01634

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

NOM DU CLIENT: GOLDER ASSOCIATES LTD.

PRÉLEVÉ PAR:Dawn Hoyle

À L'ATTENTION DE: Dawn Hoyle

LIEU DE PRÉLÈVEMENT:BRICHIN (CO CO)

Létalité-Daphnie (D. magna) CU-48h

DATE DE RÉCEPTION: 2017-09-29

DATE DU RAPPORT: 2017-10-19

IDENTIFICATION DE L'ÉCHANTILLON: POND

MATRICE: Eau de surface

DATE D'ÉCHANTILLONNAGE: 2017-09-28

Paramètre	Unités	C / N	LDR	8767961
-----------	--------	-------	-----	---------

Mortalité 100% v/v	% mort-48h			0
--------------------	------------	--	--	---

Létalité aiguë				NO
----------------	--	--	--	----

Commentaires: LDR - Limite de détection rapportée; C / N - Critères Normes

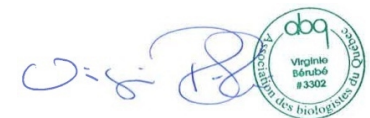
8767961 Détails de l'analyse en annexe.

Légende conclusion:

Létalité aiguë : non (50% mortalité ou moins)

Létalité aiguë : oui (plus de 50% mortalité)

Certifié par:



La procédure des Laboratoires AGAT concernant les signatures et les signataires se conforme strictement aux exigences d'accréditation ISO 17025:2005 comme le requiert, lorsque applicable, CALA, CCN et MDDELCC. Toutes les signatures sur les certificats d'AGAT sont protégées par des mots de passe et les signataires rencontrent les exigences des domaines d'accréditation ainsi que les exigences régionales approuvées par CALA, CCN et MDDELCC.



AGAT Laboratoires

Certificat d'analyse

N° BON DE TRAVAIL: 17M265819

N° DE PROJET: M01634

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

NOM DU CLIENT: GOLDER ASSOCIATES LTD.

PRÉLEVÉ PAR: Dawn Hoyle

À L'ATTENTION DE: Dawn Hoyle

LIEU DE PRÉLÈVEMENT: BRICHIN (CO CO)

Létalité-Truite arc-en-ciel (O. mykiss) CU-96h

DATE DE RÉCEPTION: 2017-09-29

DATE DU RAPPORT: 2017-10-19

IDENTIFICATION DE L'ÉCHANTILLON: POND

MATRICE: Eau de surface

DATE D'ÉCHANTILLONNAGE: 2017-09-28

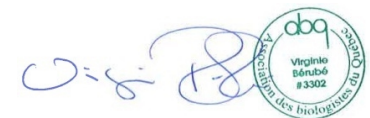
Paramètre	Unités	C / N	LDR	8767961
-----------	--------	-------	-----	---------

Mortalité 100% v/v	% mort-96h			0
Létalité aiguë				NO

Commentaires: LDR - Limite de détection rapportée; C / N - Critères Normes

8767961 Détails de l'analyse en annexe.
Létalité aiguë : non (50% mortalité ou moins)
Létalité aiguë : oui (plus de 50% mortalité)

Certifié par:



La procédure des Laboratoires AGAT concernant les signatures et les signataires se conforme strictement aux exigences d'accréditation ISO 17025:2005 comme le requiert, lorsque applicable, CALA, CCN et MDDELCC. Toutes les signatures sur les certificats d'AGAT sont protégées par des mots de passe et les signataires rencontrent les exigences des domaines d'accréditation ainsi que les exigences régionales approuvées par CALA, CCN et MDDELCC.



Sommaire de méthode

NOM DU CLIENT: GOLDER ASSOCIATES LTD.

N° BON DE TRAVAIL: 17M265819

N° DE PROJET: M01634

À L'ATTENTION DE: Dawn Hoyle

PRÉLEVÉ PAR: Dawn Hoyle

LIEU DE PRÉLÈVEMENT: BRICHIN (CO CO)

PARAMÈTRE	PRÉPARÉ LE	ANALYSÉ LE	AGAT P.O.N.	RÉFÉRENCE DE LITTÉRATURE	TECHNIQUE ANALYTIQUE
Analyse écotox					
Mortalité 100% v/v					NA
Létalité aiguë					
Mortalité 100% v/v			ECO-152-20000F	SPE1/RM/13	
Létalité aiguë					



NOM DU CLIENT: GOLDER ASSOCIATES LTD.
121 COMMERCE PARK DRIVE, UNIT L
BARRIE, ON L4N8X1
(705) 722-4492

À L'ATTENTION DE: Jamie Bonary

N° DE PROJET: 1407634

N° BON DE TRAVAIL: 17M276976

ÉCOTOX VÉRIFIÉ PAR: Virginie Bérubé, biologiste

DATE DU RAPPORT: 2017-11-13

VERSION*: 1

NOMBRE DE PAGES: 4

Si vous désirez de l'information concernant cette analyse, S.V.P. contacter votre chargé de projets au (514) 337-1000.

*NOTES

Nous disposerons des échantillons dans les 30 jours suivants les analyses. S.V.P. Contactez le laboratoire si vous désirez avoir un délai d'entreposage.



AGAT Laboratoires

Certificat d'analyse

N° BON DE TRAVAIL: 17M276976

N° DE PROJET: 1407634

9770 ROUTE TRANSCANADIENNE
ST. LAURENT, QUEBEC
CANADA H4S 1V9
TEL (514)337-1000
FAX (514)333-3046
<http://www.agatlabs.com>

NOM DU CLIENT: GOLDER ASSOCIATES LTD.

PRÉLEVÉ PAR: S. Patrica

À L'ATTENTION DE: Jamie Bonary

LIEU DE PRÉLÈVEMENT: Mc Carthy (Brechin)

Létalité-Daphnie (D. magna) CU-48h

DATE DE RÉCEPTION: 2017-10-27

DATE DU RAPPORT: 2017-11-13

IDENTIFICATION DE L'ÉCHANTILLON: POND
MATRICE: Eau de surface
DATE D'ÉCHANTILLONNAGE: 2017-10-26

Paramètre	Unités	C / N	LDR	8855278
Mortalité 100% v/v	% mort-48h			0
Létalité aiguë				NO

Commentaires: LDR - Limite de détection rapportée; C / N - Critères Normes

8855278

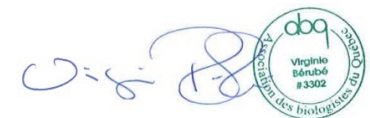
Détails de l'analyse en annexe.

Légende conclusion:

Létalité aiguë : non (50% mortalité ou moins)

Létalité aiguë : oui (plus de 50% mortalité)

Certifié par:



La procédure des Laboratoires AGAT concernant les signatures et les signataires se conforme strictement aux exigences d'accréditation ISO 17025:2005 comme le requiert, lorsque applicable, CALA, CCN et MDDELCC. Toutes les signatures sur les certificats d'AGAT sont protégées par des mots de passe et les signataires rencontrent les exigences des domaines d'accréditation ainsi que les exigences régionales approuvées par CALA, CCN et MDDELCC.



Certificat d'analyse

N° BON DE TRAVAIL: 17M276976

N° DE PROJET: 1407634

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CANADA H4S 1V9
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NOM DU CLIENT: GOLDER ASSOCIATES LTD.

PRÉLEVÉ PAR: S. Patrica

À L'ATTENTION DE: Jamie Bonary

LIEU DE PRÉLÈVEMENT: Mc Carthy (Brechin)

Létalité-Truite arc-en-ciel (O. mykiss) CU-96h

DATE DE RÉCEPTION: 2017-10-27

DATE DU RAPPORT: 2017-11-13

IDENTIFICATION DE L'ÉCHANTILLON: POND

MATRICE: Eau de surface

DATE D'ÉCHANTILLONNAGE: 2017-10-26

Paramètre	Unités	C / N	LDR	8855278
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Mortalité 100% v/v	% mort-96h			0
Létalité aiguë				NO

Mortalité 100% v/v	% mort-96h			0
Létalité aiguë				NO

Commentaires: LDR - Limite de détection rapportée; C / N - Critères Normes

8855278 Détails de l'analyse en annexe.
Létalité aiguë : non (50% mortalité ou moins)
Létalité aiguë : oui (plus de 50% mortalité)

Certifié par:



La procédure des Laboratoires AGAT concernant les signatures et les signataires se conforme strictement aux exigences d'accréditation ISO 17025:2005 comme le requiert, lorsque applicable, CALA, CCN et MDDELCC. Toutes les signatures sur les certificats d'AGAT sont protégées par des mots de passe et les signataires rencontrent les exigences des domaines d'accréditation ainsi que les exigences régionales approuvées par CALA, CCN et MDDELCC.

Sommaire de méthode

NOM DU CLIENT: GOLDER ASSOCIATES LTD.

N° BON DE TRAVAIL: 17M276976

N° DE PROJET: 1407634

À L'ATTENTION DE: Jamie Bonary

PRÉLEVÉ PAR: S.Patrica

LIEU DE PRÉLÈVEMENT: Mc Carthy (Breachin)

PARAMÈTRE	PRÉPARÉ LE	ANALYSÉ LE	AGAT P.O.N.	RÉFÉRENCE DE LITTÉRATURE	TECHNIQUE ANALYTIQUE
Analyse écotox					
Mortalité 100% v/v					NA
Létalité aiguë					
Mortalité 100% v/v			ECO-152-20000F	SPE1/RM/13	
Létalité aiguë					

As a global, employee-owned organisation with over 50 years of experience, Golder Associates is driven by our purpose to engineer earth's development while preserving earth's integrity. We deliver solutions that help our clients achieve their sustainable development goals by providing a wide range of independent consulting, design and construction services in our specialist areas of earth, environment and energy.

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