



GOLDER

Environmental Compliance Approval Quarterly Monitoring Report (August to November)

McCarthy Quarry

Submitted to:

Cindy Hood

Ontario Ministry of Environment and Climate Change
Barrie District Office
1203-54 Cedar Pointe Drive
Barrie ON L4N 5R7

Submitted by:

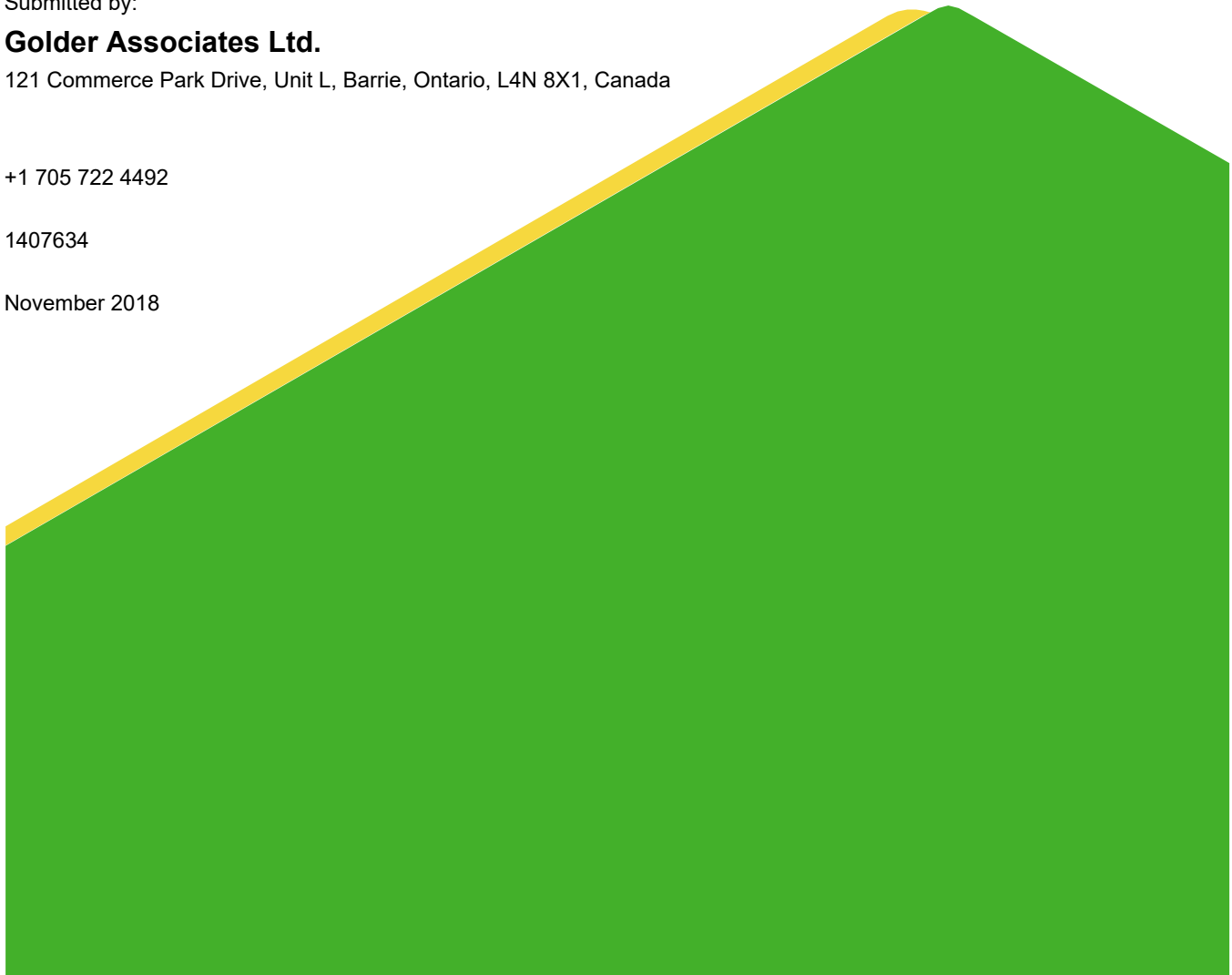
Golder Associates Ltd.

121 Commerce Park Drive, Unit L, Barrie, Ontario, L4N 8X1, Canada

+1 705 722 4492

1407634

November 2018



Distribution List

Distribution:

1 Copy - Ontario MOECC Barrie District Office

1 Copy - Coco Aggregates Inc.

1 Copy - Golder Associates Ltd.

Table of Contents

1.0 INTRODUCTION	1
2.0 BACKGROUND	1
3.0 QUARRY DISCHARGE MONITORING PLAN	1
4.0 QUARRY DISCHARGE MONITORING RESULTS	2
5.0 SUMMARY AND RECOMMENDATIONS	2

TABLES

Table 1 – McCarthy Pond Weekly Water Quality Results

Table 2 – McCarthy Pond Monthly Water Quality Results

Table 3 – McCarthy Semi-Annual Water Quality Results

Table 4 – Lethality Monitoring at McCarthy Pond

Table 5 – Measured Volume and Rate of Discharge from Quarry Sump

FIGURES

Figure 1 – Site Map and Monitoring Locations

APPENDICES

APPENDIX A

Appendix A – ECA No. 4731-987KM8

APPENDIX B

Appendix B – Water Quality Data

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.

The weekly water quality sample was not collected from the McCarthy Pond on the weeks of July 30 to August 3, September 3 to 7, September 10 to 14, September 17 to 21, September 24 to 28, October 1 to 5, October 8 to 12, October 15 to 19 and October 22 to 26, 2018 as quarry staff reported there was no discharge at the time of sampling. In addition, the monthly lethality sample was not collected from the McCarthy Pond during the months of September and October 2018 as there was no quarry discharge at the time of sampling.

4.0 QUARRY DISCHARGE MONITORING RESULTS

All laboratory certificates of analysis for the August to November 2018 monitoring period are included in Appendix B. Results of the quarry discharge monitoring are summarized below:

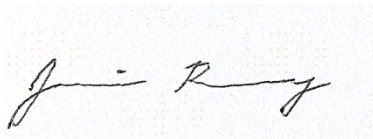
- The TSS, pH, Oil and Grease and Phenol (4AAP) concentrations were all below the daily concentration limits of the ECA (Table 1);
- The TSS, Oil and Grease and Phenol (4AAP) concentrations were all below the monthly concentration limits of the ECA (Table 2);
- The semi-annual surface water sampling results were below the PWQO, with the exception of phosphorus and iron at SW1 and phosphorus at SW1 (Table 3);
- The quarry discharge between August and November, 2018 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, 2018 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.

Signature Page

Golder Associates Ltd.



Jamie Bonany, M.A.Sc.
Project Scientist



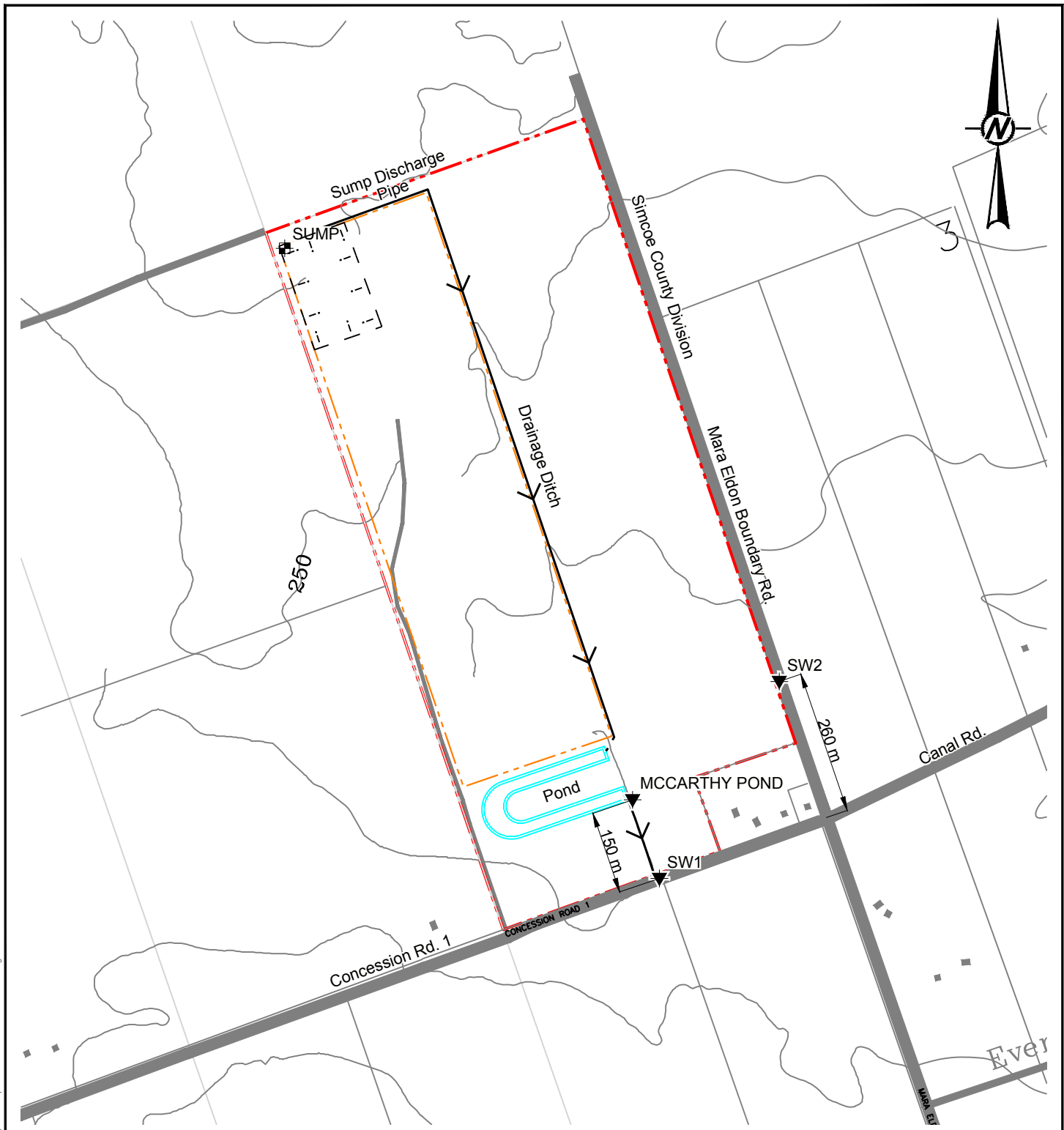
John Easton, M.Sc., P.Geol.
Associate Senior Hydrogeologist

JB/JE/cdr

Golder and the G logo are trademarks of Golder Associates Corporation

\\golder.gds\gal\barrie\active\2014\140-7634 coco enviro and hydrog brechin\report\eca reports\quarterly\eca aug to nov 2018\1407634 rep 2018 november eca quarterly report.docx

Figures



LEGEND

- - - Approximate Property Boundary
- - - Approximate Licenced Boundary
- - - 5 m Contour Line
- ▼ Surface Water Sampling Location
- i i i Approximate Extent of Quarry

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	2015-05-14
	PREPARED	STB
	DESIGN	
	REVIEW	
	APPROVED	



PROJECT No. 14-07634 SCALE AS SHOWN Rev. A Figure 1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A 26 mm

Path: \\golder\gib\barrie\CAD\Projects\2014\14-07634 (Brechin, Coco Enviro and Hydro)\18AA-1 | File Name: 140763418AA SITE.dwg

.

Tables

Table 1: McCarthy Pond Weekly Water Quality Results (August to November 2018)

	Unit	Reportable Detection Limit (RDL)	PWQO ¹	Daily Concentration Limit ²	McCarthy Quarry			
Sample ID					Pond			
Date					09-Aug-18	16-Aug-18	23-Aug-18	30-Aug-18
pH	pH	n/a		6.0-9.5	8.30	8.25	8.23	8.14
Total Suspended Solids	mg/L	1		30	5	6	6	11
Total Oil and Grease	mg/L	0.5	Note 3	30	6.1	0.8	0.8	2.5
Phenols (4AAP)	mg/L	<0.0010		0.04	<0.001	<0.001	<0.001	<0.001

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 2018)

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	7.0	-	-
Total Oil and Grease	mg/L	0.5	Note 3	15	2.6	-	-
Phenols (4AAP)	mg/L	<0.0010		0.02	<0.001	-	-

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 2018)

Sample ID	Unit	Reportable Detection Limit (RDL)	PWQO ¹	Interim PWQO ²	PTTW Effluent Limits	McCarthy Quarry	
						SW1	SW2
Date						30-Oct-18	30-Oct-18
Field Measured Parameters							
Conductivity	µS/cm					1172	1589
pH	pH	n/a	6.5-8.5		6.0-9.5	8.18	8.30
Temperature	°C	n/a				11.4	8.3
Calculated Parameters							
Hardness (CaCO3)	mg/L	1.0				500	580
Inorganics							
Total Ammonia-N	mg/L	0.050				0.31	0.057
Conductivity	ms/cm	0.001				1.50	1.95
Total Dissolved Solids	mg/L	10				895	1300
Fluoride (F-)	mg/L	0.10				0.36	0.49
Total Kjeldahl Nitrogen (TKN)	mg/L	0.10				0.45	0.33
Dissolved Organic Carbon	mg/L	0.50				4.5	8
pH	pH	N/A	6.5-8.5		6.0-9.5	8.02	7.71
Phenols-4AAP	mg/L	0.0010			0.04	<0.0010	0.0015
Total Phosphorus	mg/L	0.020		0.02 ^{5b}		0.056	0.027
Total Suspended Solids	mg/L	10			30	12	<10
Dissolved Sulphate (SO4)	mg/L	1				230	360
Alkalinity (Total as CaCO3)	mg/L	1.0				260	210
Dissolved Chloride (Cl)	mg/L	1				180	300
Nitrite (N)	mg/L	0.010				0.041	0.022
Nitrate (N)	mg/L	0.10				1.98	0.20
Petroleum Hydrocarbons							
Total Oil & Grease	mg/L	0.50	Note 3		30	<0.50	<0.50
Metals							
Total Arsenic (As)	ug/L	1	100	5		<1.0	1.0
Total Cadmium (Cd)	ug/L	0.1	0.2	0.1-0.5 ^{5d}		<0.10	<0.10
Dissolved Calcium (Ca)	mg/L	0.05				130	160
Total Calcium (Ca)	ug/L	200				130000	150000
Total Chromium (Cr)	ug/L	5	1-89 ^{5e}			<5.0	<5.0
Total Copper (Cu)	ug/L	1	5	1-5 ^{5f}		1.9	<1.0
Total Iron (Fe)	ug/L	100	300			420	<100
Total Lead (Pb)	ug/L	0.5	5-25 ^{5g}	1-5 ^{5h}		<0.50	<0.50
Dissolved Magnesium (Mg)	mg/L	0.05				41	43
Total Magnesium (Mg)	ug/L	50				41000	40000
Total Manganese (Mn)	ug/L	2				95	22
Total Nickel (Ni)	ug/L	1	25			1.5	<1.0
Dissolved Potassium (K)	mg/L	1				12	17
Total Potassium (K)	ug/L	200				12000	16000
Dissolved Sodium (Na)	mg/L	0.5				120	200
Total Sodium (Na)	ug/L	100				120000	180000
Total Zinc (Zn)	ug/L	5	30	20		<5.0	5.2
<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. <i>Phosphorus (Interim):</i></p> <ul style="list-style-type: none"> - Current scientific evidence is insufficient to develop a firm Objective at this time. - Accordingly, the following phosphorus concentrations should be considered as general guidelines which should be supplemented by site-specific studies: <ul style="list-style-type: none"> (a) To avoid nuisance concentrations of algae in lakes, average total phosphorus concentrations for the ice-free period should not exceed 20 ug/L; (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; (c) Excessive plant growth in rivers and streams should be eliminated at a total phosphorus concentration below 20 ug/L. 	
<p>5a. <i>Aluminum (Interim):</i></p> <ul style="list-style-type: none"> - At pH 4.5 to 5.5 the Interim PWQO is 15 ug/L based on inorganic monomeric aluminum measured in clay-free samples. - 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. - At pH >6.5 to 9.0, the Interim PWQO is 75 ug/L based on total aluminum measured in clay-free samples. - 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>5c. <i>Beryllium:</i></p>	
						<p>5d. <i>Cadmium: (Interim)</i></p>	
						<p>5e. <i>Chromium:</i></p>	
						<p>5f. <i>Copper: (Interim)</i></p>	
						<p>5g. <i>Lead:</i></p>	
						<p>5h. <i>Lead: (Interim)</i></p>	

Table 4: Lethality Monitoring at McCarthy Pond

	Unit	Mortality Limit	McCarthy Quarry
Sample ID			Pond
Date			29-Aug-18
Daphnia Magna	% Mortality Rate*	<50%	0
Rainbow Trout	% Mortality Rate*	<50%	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-18	NO PUMP		0	0	-	-	-
2-Aug-18	NO PUMP		0	0	-	-	-
3-Aug-18	NO PUMP		0	0	-	-	-
4-Aug-18	NO PUMP		0	0	-	-	-
5-Aug-18	NO PUMP		0	0	-	-	-
6-Aug-18	NO PUMP		0	0	-	-	-
7-Aug-18	NO PUMP		0	0	-	-	-
8-Aug-18	9AM	5PM	28800	480	1,008,000	35	2,100
9-Aug-18	NO PUMP		0	0	-	-	-
10-Aug-18	NO PUMP		0	0	-	-	-
11-Aug-18	NO PUMP		0	0	-	-	-
12-Aug-18	NO PUMP		0	0	-	-	-
13-Aug-18	8AM	4PM	28800	480	1,008,000	35	2,100
14-Aug-18	NO PUMP		0	0	-	-	-
15-Aug-18	NO PUMP		0	0	-	-	-
16-Aug-18	NO PUMP		0	0	-	-	-
17-Aug-18	6AM	4PM	36000	600	1,260,000	35	2,100
18-Aug-18	NO PUMP		0	0	-	-	-
19-Aug-18	NO PUMP		0	0	-	-	-
20-Aug-18	NO PUMP		0	0	-	-	-
21-Aug-18	NO PUMP		0	0	-	-	-
22-Aug-18	NO PUMP		0	0	-	-	-
23-Aug-18	NO PUMP		0	0	-	-	-
24-Aug-18	NO PUMP		0	0	-	-	-
25-Aug-18	NO PUMP		0	0	-	-	-
26-Aug-18	NO PUMP		0	0	-	-	-
27-Aug-18	NO PUMP		0	0	-	-	-
28-Aug-18	NO PUMP		0	0	-	-	-
29-Aug-18	NO PUMP		0	0	-	-	-
30-Aug-18	7AM	4PM	32400	540	1,134,000	35	2,100
31-Aug-18	NO PUMP		0	0	-	-	-
1-Sep-18	NO PUMP		0	0	-	-	-
2-Sep-18	NO PUMP		0	0	-	-	-
3-Sep-18	NO PUMP		0	0	-	-	-
4-Sep-18	NO PUMP		0	0	-	-	-
5-Sep-18	NO PUMP		0	0	-	-	-
6-Sep-18	NO PUMP		0	0	-	-	-
7-Sep-18	7AM	4PM	32400	540	1,134,000	35	2,100

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-18	NO PUMP		0	0	-	-	-
9-Sep-18	NO PUMP		0	0	-	-	-
10-Sep-18	NO PUMP		0	0	-	-	-
11-Sep-18	NO PUMP		0	0	-	-	-
12-Sep-18	NO PUMP		0	0	-	-	-
13-Sep-18	NO PUMP		0	0	-	-	-
14-Sep-18	7AM	4PM	32400	540	1,134,000	35	2,100
15-Sep-18	NO PUMP		0	0	-	-	-
16-Sep-18	NO PUMP		0	0	-	-	-
17-Sep-18	NO PUMP		0	0	-	-	-
18-Sep-18	NO PUMP		0	0	-	-	-
19-Sep-18	NO PUMP		0	0	-	-	-
20-Sep-18	NO PUMP		0	0	-	-	-
21-Sep-18	NO PUMP		0	0	-	-	-
22-Sep-18	NO PUMP		0	0	-	-	-
23-Sep-18	NO PUMP		0	0	-	-	-
24-Sep-18	8AM	3PM	25200	420	882,000	35	2,100
25-Sep-18	NO PUMP		0	0	-	-	-
26-Sep-18	7:30AM	5:30PM	36000	600	1,260,000	35	2,100
27-Sep-18	NO PUMP		0	0	-	-	-
28-Sep-18	NO PUMP		0	0	-	-	-
29-Sep-18	NO PUMP		0	0	-	-	-
30-Sep-18	NO PUMP		0	0	-	-	-
1-Oct-18	NO PUMP		0	0	-	-	-
2-Oct-18	NO PUMP		0	0	-	-	-
3-Oct-18	NO PUMP		0	0	-	-	-
4-Oct-18	NO PUMP		0	0	-	-	-
5-Oct-18	NO PUMP		0	0	-	-	-
6-Oct-18	NO PUMP		0	0	-	-	-
7-Oct-18	NO PUMP		0	0	-	-	-
8-Oct-18	NO PUMP		0	0	-	-	-
9-Oct-18	NO PUMP		0	0	-	-	-
10-Oct-18	NO PUMP		0	0	-	-	-
11-Oct-18	NO PUMP		0	0	-	-	-
12-Oct-18	NO PUMP		0	0	-	-	-
13-Oct-18	NO PUMP		0	0	-	-	-
14-Oct-18	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-18	NO PUMP		0	0	-	-	-
16-Oct-18	6AM	6PM	43200	720	1,512,000	35	2,100
17-Oct-18	6AM	6PM	43200	720	1,512,000	35	2,100
18-Oct-18	NO PUMP		0	0	-	-	-
19-Oct-18	7AM	5PM	36000	600	1,260,000	35	2,100
20-Oct-18	NO PUMP		0	0	-	-	-
21-Oct-18	NO PUMP		0	0	-	-	-
22-Oct-18	NO PUMP		0	0	-	-	-
23-Oct-18	7AM	5PM	36000	600	1,260,000	35	2,100
24-Oct-18	NO PUMP		0	0	-	-	-
25-Oct-18	7AM	5PM	36000	600	1,260,000	35	2,100
26-Oct-18	7AM	5PM	36000	600	1,260,000	35	2,100
27-Oct-18	NO PUMP		0	0	-	-	-
28-Oct-18	NO PUMP		0	0	-	-	-
29-Oct-18	NO PUMP		0	0	-	-	-
30-Oct-18	7AM	5PM	36000	600	1,260,000	35	2,100
31-Oct-18	NO PUMP		0	0	-	-	-

APPENDIX A

**Appendix A – ECA 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

Appendix B – Water Quality Data

Your Project #: 1407634
 Site#: 1407634
 Site Location: MCCARTHY
 Your C.O.C. #: 554700-05-01

Attention: Dawn Hoyle/Jamie Bonany

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

Report Date: 2018/08/15
 Report #: R5358052
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8K3685

Received: 2018/08/10, 09:03

Sample Matrix: Water
 # Samples Received: 1

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Animal and Vegetable Oil and Grease	1	N/A	2018/08/14	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2018/08/14	2018/08/14	CAM SOP-00326	EPA1664B m,SM5520A m
pH	1	N/A	2018/08/14	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2018/08/14	CAM SOP-00444	OMOE E3179 m
Mineral/Synthetic O & G (TPH Heavy Oil) (1)	1	2018/08/14	2018/08/14	CAM SOP-00326	EPA1664B m,SM5520F m
Low Level Total Suspended Solids	1	2018/08/14	2018/08/14	CAM SOP-00428	SM 23 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. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

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. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

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. When sampling is not conducted by Maxxam, results relate to the supplied 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#: 1407634
Site Location: MCCARTHY
Your C.O.C. #: 554700-05-01

Attention: Dawn Hoyle/Jamie Bonany

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

Report Date: 2018/08/15
Report #: R5358052
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8K3685
Received: 2018/08/10, 09:03

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			HLC751	HLC751		
Sampling Date			2018/08/09 13:12	2018/08/09 13:12		
COC Number			554700-05-01	554700-05-01		
	UNITS	Criteria	POND	POND Lab-Dup	RDL	QC Batch
Calculated Parameters						
Total Animal/Vegetable Oil and Grease	mg/L	-	6.1	N/A	0.50	5676370
Inorganics						
pH	pH	6.5:8.5	8.30	N/A	N/A	5676509
Phenols-4AAP	mg/L	0.001	<0.0010	<0.0010	0.0010	5679897
Total Suspended Solids	mg/L	-	5	N/A	1	5679248
Petroleum Hydrocarbons						
Total Oil & Grease	mg/L	-	6.1	N/A	0.50	5678293
Total Oil & Grease Mineral/Synthetic	mg/L	0.5	<0.50	N/A	0.50	5678298
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	21.0°C
-----------	--------

Sample containers received with temp >10C, 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
5676509	GTO	Spiked Blank	pH	2018/08/14		100	%	98 - 103
5676509	GTO	RPD	pH	2018/08/14	0.24		%	N/A
5678293	FA	Spiked Blank	Total Oil & Grease	2018/08/14		99	%	85 - 115
5678293	FA	RPD	Total Oil & Grease	2018/08/14	1.5		%	25
5678293	FA	Method Blank	Total Oil & Grease	2018/08/14	<0.50		mg/L	
5678298	FA	Spiked Blank	Total Oil & Grease Mineral/Synthetic	2018/08/14		93	%	85 - 115
5678298	FA	RPD	Total Oil & Grease Mineral/Synthetic	2018/08/14	1.6		%	25
5678298	FA	Method Blank	Total Oil & Grease Mineral/Synthetic	2018/08/14	<0.50		mg/L	
5679248	MJ1	QC Standard	Total Suspended Solids	2018/08/14		95	%	85 - 115
5679248	MJ1	Method Blank	Total Suspended Solids	2018/08/14	<1		mg/L	
5679248	MJ1	RPD	Total Suspended Solids	2018/08/14	NC		%	25
5679897	ZSK	Matrix Spike [HLC751-04]	Phenols-4AAP	2018/08/14		96	%	80 - 120
5679897	ZSK	Spiked Blank	Phenols-4AAP	2018/08/14		100	%	80 - 120
5679897	ZSK	Method Blank	Phenols-4AAP	2018/08/14	<0.0010		mg/L	
5679897	ZSK	RPD [HLC751-04]	Phenols-4AAP	2018/08/14	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).



Brad Newman, 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. #: C#635365-01-01

Attention: Dawn Hoyle/Jamie Bonany

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

Report Date: 2018/08/24
 Report #: R5371436
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8L1357

Received: 2018/08/17, 09:16

Sample Matrix: Water
 # Samples Received: 1

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Animal and Vegetable Oil and Grease	1	N/A	2018/08/20	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2018/08/20	2018/08/20	CAM SOP-00326	EPA1664B m,SM5520A m
pH	1	N/A	2018/08/21	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2018/08/20	CAM SOP-00444	OMOE E3179 m
Mineral/Synthetic O & G (TPH Heavy Oil) (1)	1	2018/08/20	2018/08/20	CAM SOP-00326	EPA1664B m,SM5520F m
Low Level Total Suspended Solids	1	2018/08/21	2018/08/22	CAM SOP-00428	SM 23 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. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

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. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

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. When sampling is not conducted by Maxxam, results relate to the supplied 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 Location: MCCARTHY
Your C.O.C. #: C#635365-01-01

Attention: Dawn Hoyle/Jamie Bonany

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

Report Date: 2018/08/24
Report #: R5371436
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8L1357
Received: 2018/08/17, 09:16

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Gemarie Balatico, Project Manager
Email: gbalatico@maxxam.ca
Phone# (905) 817-5700

=====
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			HMT170		
Sampling Date			2018/08/16 13:10		
COC Number			C#635365-01-01		
	UNITS	Criteria	POND	RDL	QC Batch
Calculated Parameters					
Total Animal/Vegetable Oil and Grease	mg/L	-	0.80	0.50	5685501
Inorganics					
pH	pH	6.5:8.5	8.25	N/A	5687499
Phenols-4AAP	mg/L	0.001	<0.0010	0.0010	5688591
Total Suspended Solids	mg/L	-	6	1	5690537
Petroleum Hydrocarbons					
Total Oil & Grease	mg/L	-	0.80	0.50	5688024
Total Oil & Grease Mineral/Synthetic	mg/L	0.5	<0.50	0.50	5688026
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	22.3°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
5687499	GTO	Spiked Blank	pH	2018/08/21		100	%	98 - 103
5687499	GTO	RPD	pH	2018/08/21	0.13		%	N/A
5688024	FA	Spiked Blank	Total Oil & Grease	2018/08/20		94	%	85 - 115
5688024	FA	RPD	Total Oil & Grease	2018/08/20	1.6		%	25
5688024	FA	Method Blank	Total Oil & Grease	2018/08/20	<0.50		mg/L	
5688026	FA	Spiked Blank	Total Oil & Grease Mineral/Synthetic	2018/08/20		96	%	85 - 115
5688026	FA	RPD	Total Oil & Grease Mineral/Synthetic	2018/08/20	1.1		%	25
5688026	FA	Method Blank	Total Oil & Grease Mineral/Synthetic	2018/08/20	<0.50		mg/L	
5688591	BMO	Matrix Spike	Phenols-4AAP	2018/08/20		95	%	80 - 120
5688591	BMO	Spiked Blank	Phenols-4AAP	2018/08/20		95	%	80 - 120
5688591	BMO	Method Blank	Phenols-4AAP	2018/08/20	<0.0010		mg/L	
5688591	BMO	RPD	Phenols-4AAP	2018/08/20	9.5		%	20
5690537	NKP	QC Standard	Total Suspended Solids	2018/08/22		96	%	85 - 115
5690537	NKP	Method Blank	Total Suspended Solids	2018/08/22	<1		mg/L	
5690537	NKP	RPD	Total Suspended Solids	2018/08/22	11		%	25

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 Pranjic


Ewa Pranjic, 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.

Your Project #: 1407634
 Site#: 1407634
 Site Location: MCCARTHY
 Your C.O.C. #: 641481-03-01

Attention: Dawn Hoyle/Jamie Bonany

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

Report Date: 2018/08/28
 Report #: R5377622
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8L8782

Received: 2018/08/24, 09:28

Sample Matrix: Water
 # Samples Received: 1

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Animal and Vegetable Oil and Grease	1	N/A	2018/08/27	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2018/08/26	2018/08/27	CAM SOP-00326	EPA1664B m,SM5520A m
pH	1	N/A	2018/08/27	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2018/08/27	CAM SOP-00444	OMOE E3179 m
Mineral/Synthetic O & G (TPH Heavy Oil) (1)	1	2018/08/26	2018/08/27	CAM SOP-00326	EPA1664B m,SM5520F m
Low Level Total Suspended Solids	1	2018/08/27	2018/08/27	CAM SOP-00428	SM 23 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. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

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. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

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. When sampling is not conducted by Maxxam, results relate to the supplied 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#: 1407634
Site Location: MCCARTHY
Your C.O.C. #: 641481-03-01

Attention: Dawn Hoyle/Jamie Bonany

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

Report Date: 2018/08/28
Report #: R5377622
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8L8782
Received: 2018/08/24, 09:28

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Gemarie Balatico, Project Manager
Email: gbalatico@maxxam.ca
Phone# (905) 817-5700

=====
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			HOH652		
Sampling Date			2018/08/23 12:42		
COC Number			641481-03-01		
	UNITS	Criteria	POND	RDL	QC Batch
Calculated Parameters					
Total Animal/Vegetable Oil and Grease	mg/L	-	0.80	0.50	5697512
Inorganics					
pH	pH	6.5:8.5	8.23	N/A	5699596
Phenols-4AAP	mg/L	0.001	<0.0010	0.0010	5700263
Total Suspended Solids	mg/L	-	6	1	5701484
Petroleum Hydrocarbons					
Total Oil & Grease	mg/L	-	0.80	0.50	5699974
Total Oil & Grease Mineral/Synthetic	mg/L	0.5	<0.50	0.50	5699976
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	14.3°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
5699596	GTO	Spiked Blank	pH	2018/08/27		100	%	98 - 103
5699596	GTO	RPD	pH	2018/08/27	0.57		%	N/A
5699974	FA	Spiked Blank	Total Oil & Grease	2018/08/27		94	%	85 - 115
5699974	FA	RPD	Total Oil & Grease	2018/08/27	3.9		%	25
5699974	FA	Method Blank	Total Oil & Grease	2018/08/27	<0.50		mg/L	
5699976	FA	Spiked Blank	Total Oil & Grease Mineral/Synthetic	2018/08/27		91	%	85 - 115
5699976	FA	RPD	Total Oil & Grease Mineral/Synthetic	2018/08/27	2.7		%	25
5699976	FA	Method Blank	Total Oil & Grease Mineral/Synthetic	2018/08/27	<0.50		mg/L	
5700263	BMO	Matrix Spike	Phenols-4AAP	2018/08/27		98	%	80 - 120
5700263	BMO	Spiked Blank	Phenols-4AAP	2018/08/27		100	%	80 - 120
5700263	BMO	Method Blank	Phenols-4AAP	2018/08/27	<0.0010		mg/L	
5700263	BMO	RPD	Phenols-4AAP	2018/08/27	9.5		%	20
5701484	JS7	QC Standard	Total Suspended Solids	2018/08/27		96	%	85 - 115
5701484	JS7	Method Blank	Total Suspended Solids	2018/08/27	<1		mg/L	
5701484	JS7	RPD	Total Suspended Solids	2018/08/27	10		%	25

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

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. #: 679276-01-01

Attention: Dawn Hoyle/Jamie Bonany

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

Report Date: 2018/09/07
 Report #: R5390239
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8M6463
Received: 2018/08/31, 09:22

Sample Matrix: Water
 # Samples Received: 1

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Animal and Vegetable Oil and Grease	1	N/A	2018/09/07	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2018/09/06	2018/09/07	CAM SOP-00326	EPA1664B m,SM5520A m
pH	1	N/A	2018/09/04	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2018/09/06	CAM SOP-00444	OMOE E3179 m
Mineral/Synthetic O & G (TPH Heavy Oil) (1)	1	2018/09/06	2018/09/07	CAM SOP-00326	EPA1664B m,SM5520F m
Low Level Total Suspended Solids	1	2018/09/01	2018/09/04	CAM SOP-00428	SM 23 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. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

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. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

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. When sampling is not conducted by Maxxam, results relate to the supplied 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. #: 679276-01-01

Attention: Dawn Hoyle/Jamie Bonany

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

Report Date: 2018/09/07
Report #: R5390239
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8M6463
Received: 2018/08/31, 09:22

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Gemarie Balatico, Project Manager
Email: gbalatico@maxxam.ca
Phone# (905) 817-5700

=====
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			HQA535		
Sampling Date			2018/08/30 13:13		
COC Number			679276-01-01		
	UNITS	Criteria	POND	RDL	QC Batch
Calculated Parameters					
Total Animal/Vegetable Oil and Grease	mg/L	-	2.5	0.50	5709269
Inorganics					
pH	pH	6.5:8.5	8.14	N/A	5711259
Phenols-4AAP	mg/L	0.001	<0.0010	0.0010	5714957
Total Suspended Solids	mg/L	-	11	1	5711526
Petroleum Hydrocarbons					
Total Oil & Grease	mg/L	-	2.5	0.50	5716526
Total Oil & Grease Mineral/Synthetic	mg/L	0.5	<0.50	0.50	5716528
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	15.0°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
5711259	GTO	Spiked Blank	pH	2018/09/04		100	%	98 - 103
5711259	GTO	RPD	pH	2018/09/04	0.17		%	N/A
5711526	MKX	QC Standard	Total Suspended Solids	2018/09/04		95	%	85 - 115
5711526	MKX	Method Blank	Total Suspended Solids	2018/09/04	<1		mg/L	
5711526	MKX	RPD	Total Suspended Solids	2018/09/04	4.8		%	25
5714957	BMO	Matrix Spike	Phenols-4AAP	2018/09/06		113	%	80 - 120
5714957	BMO	Spiked Blank	Phenols-4AAP	2018/09/06		96	%	80 - 120
5714957	BMO	Method Blank	Phenols-4AAP	2018/09/06	<0.0010		mg/L	
5714957	BMO	RPD	Phenols-4AAP	2018/09/06	2.1		%	20
5716526	FA	Spiked Blank	Total Oil & Grease	2018/09/07		94	%	85 - 115
5716526	FA	RPD	Total Oil & Grease	2018/09/07	1.8		%	25
5716526	FA	Method Blank	Total Oil & Grease	2018/09/07	<0.50		mg/L	
5716528	FA	Spiked Blank	Total Oil & Grease Mineral/Synthetic	2018/09/07		96	%	85 - 115
5716528	FA	RPD	Total Oil & Grease Mineral/Synthetic	2018/09/07	2.1		%	25
5716528	FA	Method Blank	Total Oil & Grease Mineral/Synthetic	2018/09/07	<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

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. #: 686265-01-01

Attention: Jamie Bonany

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

Report Date: 2018/11/16
 Report #: R5487834
 Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B8T2314

Received: 2018/11/02, 08:48

Sample Matrix: Water
 # Samples Received: 2

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Alkalinity	2	N/A	2018/11/07	CAM SOP-00448	SM 23 2320 B m
Chloride by Automated Colourimetry	2	N/A	2018/11/05	CAM SOP-00463	EPA 325.2 m
Conductivity	2	N/A	2018/11/07	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1)	2	N/A	2018/11/02	CAM SOP-00446	SM 23 5310 B m
Fluoride	2	2018/11/06	2018/11/07	CAM SOP-00449	SM 23 4500-F C m
Hardness (calculated as CaCO ₃)	2	N/A	2018/11/06	CAM SOP 00102/00408/00447	SM 2340 B
Lab Filtered Metals by ICPMS	2	2018/11/05	2018/11/06	CAM SOP-00447	EPA 6020B m
Total Metals Analysis by ICPMS	2	N/A	2018/11/07	CAM SOP-00447	EPA 6020B m
Anion and Cation Sum	2	N/A	2018/11/08		
Total Ammonia-N	2	N/A	2018/11/08	CAM SOP-00441	EPA GS I-2522-90 m
Nitrate (NO ₃) and Nitrite (NO ₂) in Water (2)	2	N/A	2018/11/06	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Total Oil and Grease	2	2018/11/06	2018/11/06	CAM SOP-00326	EPA1664B m,SM5520A m
pH	2	N/A	2018/11/07	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2018/11/07	CAM SOP-00444	OMOE E3179 m
Phenols (4AAP)	1	N/A	2018/11/08	CAM SOP-00444	OMOE E3179 m
Sulphate by Automated Colourimetry	2	N/A	2018/11/05	CAM SOP-00464	EPA 375.4 m
Total Dissolved Solids	2	2018/11/05	2018/11/06	CAM SOP-00428	SM 23 2540C m
Total Kjeldahl Nitrogen in Water	2	2018/11/05	2018/11/06	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	2	2018/11/06	2018/11/07	CAM SOP-00407	SM 23 4500 P B H m
Total Suspended Solids	2	2018/11/03	2018/11/05	CAM SOP-00428	SM 23 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. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Your Project #: 1407634
Site Location: MCCARTHY
Your C.O.C. #: 686265-01-01

Attention: Jamie Bonany

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

Report Date: 2018/11/16
Report #: R5487834
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B8T2314

Received: 2018/11/02, 08:48

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. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

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. When sampling is not conducted by Maxxam, results relate to the supplied 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		IEQ870			IEQ870			IEQ871		
Sampling Date		2018/10/30 15:35			2018/10/30 15:35			2018/10/30 13:30		
COC Number		686265-01-01			686265-01-01			686265-01-01		
	UNITS	SW1	RDL	QC Batch	SW1 Lab-Dup	RDL	QC Batch	SW2	RDL	QC Batch
Calculated Parameters										
Anion Sum	me/L	15.3	N/A	5817591				20.2	N/A	5817591
Cation Sum	me/L	15.7	N/A	5817591				20.5	N/A	5817591
Hardness (CaCO3)	mg/L	500	1.0	5817139				580	1.0	5817139
Inorganics										
Total Ammonia-N	mg/L	0.31	0.050	5820082				0.057	0.050	5820076
Conductivity	mS/cm	1.50	0.001	5823297	1.49	0.001	5823297	1.95	0.001	5823297
Total Dissolved Solids	mg/L	895	10	5820945				1300	10	5820945
Fluoride (F-)	mg/L	0.36	0.10	5823313	0.35	0.10	5823313	0.49	0.10	5823313
Total Kjeldahl Nitrogen (TKN)	mg/L	0.45	0.10	5820241				0.33	0.10	5820241
Dissolved Organic Carbon	mg/L	4.5	0.50	5818461	4.5	0.50	5818461	8.2	0.50	5818461
pH	pH	8.02		5823310	8.08		5823310	7.71		5823310
Phenols-4AAP	mg/L	<0.0010	0.0010	5819461				0.0015	0.0010	5824468
Total Phosphorus	mg/L	0.056	0.020	5822815				0.027	0.020	5822815
Total Suspended Solids	mg/L	12	10	5818629				<10	10	5818629
Dissolved Sulphate (SO4)	mg/L	230	1.0	5819446				360	1.0	5819446
Alkalinity (Total as CaCO3)	mg/L	260	1.0	5823305	270	1.0	5823305	210	1.0	5823305
Dissolved Chloride (Cl-)	mg/L	180	2.0	5819445				300	4.0	5819445
Nitrite (N)	mg/L	0.041	0.010	5819483				0.022	0.010	5819483
Nitrate (N)	mg/L	1.98	0.10	5819483				0.20	0.10	5819483
Nitrate + Nitrite (N)	mg/L	2.02	0.10	5819483				0.22	0.10	5819483
Petroleum Hydrocarbons										
Total Oil & Grease	mg/L	<0.50	0.50	5822829				<0.50	0.50	5822829
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable										

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		IEQ870			IEQ870			IEQ871		
Sampling Date		2018/10/30 15:35			2018/10/30 15:35			2018/10/30 13:30		
COC Number		686265-01-01			686265-01-01			686265-01-01		
	UNITS	SW1	RDL	QC Batch	SW1 Lab-Dup	RDL	QC Batch	SW2	RDL	QC Batch
Metals										
Total Arsenic (As)	ug/L	<1.0	1.0	5824650	<1.0	1.0	5824650	<1.0	1.0	5824650
Total Cadmium (Cd)	ug/L	<0.10	0.10	5824650	<0.10	0.10	5824650	<0.10	0.10	5824650
Dissolved Calcium (Ca)	ug/L	130000	200	5820679				160000	200	5820679
Total Calcium (Ca)	ug/L	130000	200	5824650	130000	200	5824650	150000	200	5824650
Total Chromium (Cr)	ug/L	<5.0	5.0	5824650	<5.0	5.0	5824650	<5.0	5.0	5824650
Total Copper (Cu)	ug/L	1.9	1.0	5839265				<1.0	1.0	5839265
Total Iron (Fe)	ug/L	420	100	5824650	420	100	5824650	<100	100	5824650
Total Lead (Pb)	ug/L	<0.50	0.50	5824650	<0.50	0.50	5824650	<0.50	0.50	5824650
Dissolved Magnesium (Mg)	ug/L	41000	50	5820679				43000	50	5820679
Total Magnesium (Mg)	ug/L	41000	50	5824650	40000	50	5824650	40000	50	5824650
Total Manganese (Mn)	ug/L	95	2.0	5824650	92	2.0	5824650	22	2.0	5824650
Total Nickel (Ni)	ug/L	1.5	1.0	5824650	1.4	1.0	5824650	<1.0	1.0	5824650
Dissolved Potassium (K)	ug/L	12000	200	5820679				17000	200	5820679
Total Potassium (K)	ug/L	12000	200	5824650	12000	200	5824650	16000	200	5824650
Dissolved Sodium (Na)	ug/L	120000	100	5820679				200000	100	5820679
Total Sodium (Na)	ug/L	120000	100	5824650	120000	100	5824650	180000	100	5824650
Total Zinc (Zn)	ug/L	<5.0	5.0	5824650	<5.0	5.0	5824650	5.2	5.0	5824650
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate										

TEST SUMMARY

Maxxam ID: IEQ870
Sample ID: SW1
Matrix: Water

Collected: 2018/10/30
Shipped:
Received: 2018/11/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	5823305	N/A	2018/11/07	Surinder Rai
Chloride by Automated Colourimetry	KONE	5819445	N/A	2018/11/05	Deonarine Ramnarine
Conductivity	AT	5823297	N/A	2018/11/07	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	5818461	N/A	2018/11/02	Nimarta Singh
Fluoride	ISE	5823313	2018/11/06	2018/11/07	Surinder Rai
Hardness (calculated as CaCO3)		5817139	N/A	2018/11/06	Anastassia Hamanov
Lab Filtered Metals by ICPMS	ICP/MS	5820679	2018/11/05	2018/11/06	Thao Nguyen
Total Metals Analysis by ICPMS	ICP/MS	5824650	N/A	2018/11/07	Thao Nguyen
Anion and Cation Sum	CALC	5817591	N/A	2018/11/08	Anastassia Hamanov
Total Ammonia-N	LACH/NH4	5820082	N/A	2018/11/08	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	5819483	N/A	2018/11/06	Chandra Nandlal
Total Oil and Grease	BAL	5822829	2018/11/06	2018/11/06	Mansoor Ahmed
pH	AT	5823310	N/A	2018/11/07	Surinder Rai
Phenols (4AAP)	TECH/PHEN	5819461	N/A	2018/11/07	Bramdeo Motiram
Sulphate by Automated Colourimetry	KONE	5819446	N/A	2018/11/05	Deonarine Ramnarine
Total Dissolved Solids	BAL	5820945	2018/11/05	2018/11/06	Nilam Borole
Total Kjeldahl Nitrogen in Water	SKAL	5820241	2018/11/05	2018/11/06	Rajni Tyagi
Total Phosphorus (Colourimetric)	LACH/P	5822815	2018/11/06	2018/11/07	Amanpreet Sappal
Total Suspended Solids	BAL	5818629	2018/11/03	2018/11/05	Mandeep Kaur

Maxxam ID: IEQ870 Dup
Sample ID: SW1
Matrix: Water

Collected: 2018/10/30
Shipped:
Received: 2018/11/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	5823305	N/A	2018/11/07	Surinder Rai
Conductivity	AT	5823297	N/A	2018/11/07	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	5818461	N/A	2018/11/02	Nimarta Singh
Fluoride	ISE	5823313	2018/11/06	2018/11/07	Surinder Rai
Total Metals Analysis by ICPMS	ICP/MS	5824650	N/A	2018/11/07	Thao Nguyen
pH	AT	5823310	N/A	2018/11/07	Surinder Rai

Maxxam ID: IEQ871
Sample ID: SW2
Matrix: Water

Collected: 2018/10/30
Shipped:
Received: 2018/11/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	5823305	N/A	2018/11/07	Surinder Rai
Chloride by Automated Colourimetry	KONE	5819445	N/A	2018/11/05	Deonarine Ramnarine
Conductivity	AT	5823297	N/A	2018/11/07	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	5818461	N/A	2018/11/02	Nimarta Singh
Fluoride	ISE	5823313	2018/11/06	2018/11/07	Surinder Rai
Hardness (calculated as CaCO3)		5817139	N/A	2018/11/06	Anastassia Hamanov
Lab Filtered Metals by ICPMS	ICP/MS	5820679	2018/11/05	2018/11/06	Thao Nguyen

TEST SUMMARY

Maxxam ID: IEQ871
Sample ID: SW2
Matrix: Water

Collected: 2018/10/30
Shipped:
Received: 2018/11/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals Analysis by ICPMS	ICP/MS	5824650	N/A	2018/11/07	Thao Nguyen
Anion and Cation Sum	CALC	5817591	N/A	2018/11/08	Anastassia Hamanov
Total Ammonia-N	LACH/NH4	5820076	N/A	2018/11/08	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	5819483	N/A	2018/11/06	Chandra Nandlal
Total Oil and Grease	BAL	5822829	2018/11/06	2018/11/06	Mansoor Ahmed
pH	AT	5823310	N/A	2018/11/07	Surinder Rai
Phenols (4AAP)	TECH/PHEN	5824468	N/A	2018/11/08	Bramdeo Motiram
Sulphate by Automated Colourimetry	KONE	5819446	N/A	2018/11/05	Deonarine Ramnarine
Total Dissolved Solids	BAL	5820945	2018/11/05	2018/11/06	Nilam Borole
Total Kjeldahl Nitrogen in Water	SKAL	5820241	2018/11/05	2018/11/06	Rajni Tyagi
Total Phosphorus (Colourimetric)	LACH/P	5822815	2018/11/06	2018/11/07	Amanpreet Sappal
Total Suspended Solids	BAL	5818629	2018/11/03	2018/11/05	Mandeep Kaur

GENERAL COMMENTS

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

Package 1	4.7°C
Package 2	4.0°C
Package 3	4.7°C

Revised report (2018/11/16): Metal parameter list amended.
Sample IEQ870, Total Metals Analysis by ICPMS: Test repeated.
Sample IEQ871, Total Metals Analysis by ICPMS: Test repeated.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5818461	NS3	Matrix Spike [IEQ870-05]	Dissolved Organic Carbon	2018/11/02		98	%	80 - 120
5818461	NS3	Spiked Blank	Dissolved Organic Carbon	2018/11/02		99	%	80 - 120
5818461	NS3	Method Blank	Dissolved Organic Carbon	2018/11/02	<0.50		mg/L	
5818461	NS3	RPD [IEQ870-05]	Dissolved Organic Carbon	2018/11/02	1.0		%	20
5818629	MKX	QC Standard	Total Suspended Solids	2018/11/05		100	%	85 - 115
5818629	MKX	Method Blank	Total Suspended Solids	2018/11/05	<10		mg/L	
5818629	MKX	RPD	Total Suspended Solids	2018/11/05	0		%	25
5819445	DRM	Matrix Spike	Dissolved Chloride (Cl-)	2018/11/05		109	%	80 - 120
5819445	DRM	Spiked Blank	Dissolved Chloride (Cl-)	2018/11/05		101	%	80 - 120
5819445	DRM	Method Blank	Dissolved Chloride (Cl-)	2018/11/05	<1.0		mg/L	
5819445	DRM	RPD	Dissolved Chloride (Cl-)	2018/11/05	1.9		%	20
5819446	DRM	Matrix Spike	Dissolved Sulphate (SO4)	2018/11/05		NC	%	75 - 125
5819446	DRM	Spiked Blank	Dissolved Sulphate (SO4)	2018/11/05		101	%	80 - 120
5819446	DRM	Method Blank	Dissolved Sulphate (SO4)	2018/11/05	<1.0		mg/L	
5819446	DRM	RPD	Dissolved Sulphate (SO4)	2018/11/05	0.31		%	20
5819461	BMO	Matrix Spike	Phenols-4AAP	2018/11/08		100	%	80 - 120
5819461	BMO	Spiked Blank	Phenols-4AAP	2018/11/07		97	%	80 - 120
5819461	BMO	Method Blank	Phenols-4AAP	2018/11/07	<0.0010		mg/L	
5819461	BMO	RPD	Phenols-4AAP	2018/11/08	14		%	20
5819483	C_N	Matrix Spike	Nitrite (N)	2018/11/06		101	%	80 - 120
			Nitrate (N)	2018/11/06		100	%	80 - 120
5819483	C_N	Spiked Blank	Nitrite (N)	2018/11/06		105	%	80 - 120
			Nitrate (N)	2018/11/06		104	%	80 - 120
5819483	C_N	Method Blank	Nitrite (N)	2018/11/06	<0.010		mg/L	
			Nitrate (N)	2018/11/06	<0.10		mg/L	
5819483	C_N	RPD	Nitrite (N)	2018/11/06	NC		%	20
			Nitrate (N)	2018/11/06	NC		%	20
5820076	COP	Matrix Spike	Total Ammonia-N	2018/11/08		98	%	75 - 125
5820076	COP	Spiked Blank	Total Ammonia-N	2018/11/08		100	%	80 - 120
5820076	COP	Method Blank	Total Ammonia-N	2018/11/08	<0.050		mg/L	
5820076	COP	RPD	Total Ammonia-N	2018/11/08	NC		%	20
5820082	COP	Matrix Spike	Total Ammonia-N	2018/11/08		95	%	75 - 125
5820082	COP	Spiked Blank	Total Ammonia-N	2018/11/08		99	%	80 - 120
5820082	COP	Method Blank	Total Ammonia-N	2018/11/08	<0.050		mg/L	
5820082	COP	RPD	Total Ammonia-N	2018/11/08	0.95		%	20
5820241	RTY	Matrix Spike	Total Kjeldahl Nitrogen (TKN)	2018/11/07		99	%	80 - 120
5820241	RTY	QC Standard	Total Kjeldahl Nitrogen (TKN)	2018/11/06		108	%	80 - 120
5820241	RTY	Spiked Blank	Total Kjeldahl Nitrogen (TKN)	2018/11/06		105	%	80 - 120
5820241	RTY	Method Blank	Total Kjeldahl Nitrogen (TKN)	2018/11/06	<0.10		mg/L	
5820241	RTY	RPD	Total Kjeldahl Nitrogen (TKN)	2018/11/07	NC (1)		%	20
5820679	TNG	Matrix Spike	Dissolved Calcium (Ca)	2018/11/06		NC	%	80 - 120
			Dissolved Magnesium (Mg)	2018/11/06		NC	%	80 - 120
			Dissolved Potassium (K)	2018/11/06		NC	%	80 - 120
			Dissolved Sodium (Na)	2018/11/06		NC	%	80 - 120
5820679	TNG	Spiked Blank	Dissolved Calcium (Ca)	2018/11/06		99	%	80 - 120
			Dissolved Magnesium (Mg)	2018/11/06		100	%	80 - 120
			Dissolved Potassium (K)	2018/11/06		99	%	80 - 120
			Dissolved Sodium (Na)	2018/11/06		100	%	80 - 120
5820679	TNG	Method Blank	Dissolved Calcium (Ca)	2018/11/06	<200		ug/L	
			Dissolved Magnesium (Mg)	2018/11/06	<50		ug/L	
			Dissolved Potassium (K)	2018/11/06	<200		ug/L	
			Dissolved Sodium (Na)	2018/11/06	<100		ug/L	

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5820679	TNG	RPD	Dissolved Calcium (Ca)	2018/11/06	1.4		%	20
			Dissolved Magnesium (Mg)	2018/11/06	1.4		%	20
			Dissolved Potassium (K)	2018/11/06	2.2		%	20
			Dissolved Sodium (Na)	2018/11/06	0.51		%	20
5820945	NB3	QC Standard	Total Dissolved Solids	2018/11/06		98	%	90 - 110
5820945	NB3	Method Blank	Total Dissolved Solids	2018/11/06	<10		mg/L	
5820945	NB3	RPD	Total Dissolved Solids	2018/11/06	13		%	25
5822815	ASP	Matrix Spike	Total Phosphorus	2018/11/07		96	%	80 - 120
5822815	ASP	QC Standard	Total Phosphorus	2018/11/07		96	%	80 - 120
5822815	ASP	Spiked Blank	Total Phosphorus	2018/11/07		98	%	80 - 120
5822815	ASP	Method Blank	Total Phosphorus	2018/11/07	<0.020		mg/L	
5822815	ASP	RPD	Total Phosphorus	2018/11/07	6.0		%	20
5822829	MA4	Matrix Spike	Total Oil & Grease	2018/11/06		102	%	75 - 125
5822829	MA4	Spiked Blank	Total Oil & Grease	2018/11/06		100	%	85 - 115
5822829	MA4	RPD	Total Oil & Grease	2018/11/06	4.4		%	25
			Total Oil & Grease	2018/11/06	16		%	25
5822829	MA4	Method Blank	Total Oil & Grease	2018/11/06	<0.50		mg/L	
5823297	SAU	Spiked Blank	Conductivity	2018/11/07		99	%	85 - 115
5823297	SAU	Method Blank	Conductivity	2018/11/07	<0.001		mS/cm	
5823297	SAU	RPD [IEQ870-02]	Conductivity	2018/11/07	0.56		%	25
5823305	SAU	Spiked Blank	Alkalinity (Total as CaCO3)	2018/11/07		97	%	85 - 115
5823305	SAU	Method Blank	Alkalinity (Total as CaCO3)	2018/11/07	<1.0		mg/L	
5823305	SAU	RPD [IEQ870-02]	Alkalinity (Total as CaCO3)	2018/11/07	1.9		%	20
5823310	SAU	Spiked Blank	pH	2018/11/07		102	%	98 - 103
5823310	SAU	RPD [IEQ870-02]	pH	2018/11/07	0.79		%	N/A
5823313	SAU	Matrix Spike [IEQ870-02]	Fluoride (F-)	2018/11/07		106	%	80 - 120
5823313	SAU	Spiked Blank	Fluoride (F-)	2018/11/07		104	%	80 - 120
5823313	SAU	Method Blank	Fluoride (F-)	2018/11/07	<0.10		mg/L	
5823313	SAU	RPD [IEQ870-02]	Fluoride (F-)	2018/11/07	2.4		%	20
5824468	BMO	Matrix Spike	Phenols-4AAP	2018/11/07		NC	%	80 - 120
5824468	BMO	Spiked Blank	Phenols-4AAP	2018/11/07		95	%	80 - 120
5824468	BMO	Method Blank	Phenols-4AAP	2018/11/07	<0.0010		mg/L	
5824468	BMO	RPD	Phenols-4AAP	2018/11/07	10		%	20
5824650	TNG	Matrix Spike [IEQ870-07]	Total Arsenic (As)	2018/11/07		97	%	80 - 120
			Total Cadmium (Cd)	2018/11/07		100	%	80 - 120
			Total Calcium (Ca)	2018/11/07		NC	%	80 - 120
			Total Chromium (Cr)	2018/11/07		95	%	80 - 120
			Total Iron (Fe)	2018/11/07		96	%	80 - 120
			Total Lead (Pb)	2018/11/07		94	%	80 - 120
			Total Magnesium (Mg)	2018/11/07		NC	%	80 - 120
			Total Manganese (Mn)	2018/11/07		93	%	80 - 120
			Total Nickel (Ni)	2018/11/07		95	%	80 - 120
			Total Potassium (K)	2018/11/07		94	%	80 - 120
			Total Sodium (Na)	2018/11/07		NC	%	80 - 120
			Total Zinc (Zn)	2018/11/07		98	%	80 - 120
			Total Arsenic (As)	2018/11/07		98	%	80 - 120
			Total Cadmium (Cd)	2018/11/07		99	%	80 - 120
Total Calcium (Ca)	2018/11/07		94	%	80 - 120			
Total Chromium (Cr)	2018/11/07		95	%	80 - 120			
Total Iron (Fe)	2018/11/07		96	%	80 - 120			
Total Lead (Pb)	2018/11/07		96	%	80 - 120			
Total Magnesium (Mg)	2018/11/07		97	%	80 - 120			

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Manganese (Mn)	2018/11/07		95	%	80 - 120
			Total Nickel (Ni)	2018/11/07		96	%	80 - 120
			Total Potassium (K)	2018/11/07		95	%	80 - 120
			Total Sodium (Na)	2018/11/07		95	%	80 - 120
			Total Zinc (Zn)	2018/11/07		100	%	80 - 120
5824650	TNG	Method Blank	Total Arsenic (As)	2018/11/07	<1.0		ug/L	
			Total Cadmium (Cd)	2018/11/07	<0.10		ug/L	
			Total Calcium (Ca)	2018/11/07	<200		ug/L	
			Total Chromium (Cr)	2018/11/07	<5.0		ug/L	
			Total Iron (Fe)	2018/11/07	<100		ug/L	
			Total Lead (Pb)	2018/11/07	<0.50		ug/L	
			Total Magnesium (Mg)	2018/11/07	<50		ug/L	
			Total Manganese (Mn)	2018/11/07	<2.0		ug/L	
			Total Nickel (Ni)	2018/11/07	<1.0		ug/L	
			Total Potassium (K)	2018/11/07	<200		ug/L	
			Total Sodium (Na)	2018/11/07	<100		ug/L	
			Total Zinc (Zn)	2018/11/07	<5.0		ug/L	
5824650	TNG	RPD [IEQ870-07]	Total Arsenic (As)	2018/11/07	NC		%	20
			Total Cadmium (Cd)	2018/11/07	NC		%	20
			Total Calcium (Ca)	2018/11/07	0.80		%	20
			Total Chromium (Cr)	2018/11/07	NC		%	20
			Total Iron (Fe)	2018/11/07	0.44		%	20
			Total Lead (Pb)	2018/11/07	NC		%	20
			Total Magnesium (Mg)	2018/11/07	1.2		%	20
			Total Manganese (Mn)	2018/11/07	2.7		%	20
			Total Nickel (Ni)	2018/11/07	9.1		%	20
			Total Potassium (K)	2018/11/07	1.6		%	20
			Total Sodium (Na)	2018/11/07	0.18		%	20
			Total Zinc (Zn)	2018/11/07	NC		%	20
5839265	ADA	Matrix Spike	Total Copper (Cu)	2018/11/16		101	%	80 - 120
5839265	ADA	Spiked Blank	Total Copper (Cu)	2018/11/16		100	%	80 - 120
5839265	ADA	Method Blank	Total Copper (Cu)	2018/11/16	<1.0		ug/L	
5839265	ADA	RPD	Total Copper (Cu)	2018/11/16	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 (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) Due to a high concentration of NOx, the sample required dilution. The detection limit was adjusted accordingly.

VALIDATION SIGNATURE PAGE

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



Anastassia Hamanov, 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: Jamie Bonany

PROJECT: 140634

AGAT WORK ORDER: 18M379617

ECOTOX ANALYSIS REVIEWED BY: Virginie Bérubé, biologiste

DATE REPORTED: 2018-09-26

VERSION*: 1

PAGES (INCLUDING COVER): 5

Should you require any information regarding this analysis please contact your client services representative at (514) 337-1000

*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: 18M379617

PROJECT: 140634

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

CLIENT NAME: GOLDER ASSOCIATES LTD.

SAMPLED BY: J. Neto

ATTENTION TO: Jamie Bonany

SAMPLING SITE: Mc Carthy

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

DATE RECEIVED: 2018-08-30

DATE REPORTED: 2018-09-26

		SAMPLE DESCRIPTION:		POND	
		SAMPLE TYPE:		SW	
		DATE SAMPLED:		2018-08-29	
Parameter	Unit	G / S	RDL	9510078	
Mortality 100% v/v	% mortality-48h			0	
Acute Lethality				NO	

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

9510078 Refer to the annex for analysis details.
Conclusion legend:
Acute lethality: NO (mortality: 50% or less)
Acute lethality: YES (mortality: more than 50%)

Certified By: _____



AGAT Laboratories' procedure for signatures and signatories adheres strictly to the requirements of accreditation ISO 17025:2005 as required by CALA, SCC and MDDELCC where applicable. All electronic signatures on AGAT certificates are password protected and all signatories meet their regional and scope of accreditation requirements and are approved by CALA, SCC and MDDELCC.



Certificate of Analysis

AGAT WORK ORDER: 18M379617

PROJECT: 140634

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

CLIENT NAME: GOLDER ASSOCIATES LTD.

SAMPLED BY: J. Neto

ATTENTION TO: Jamie Bonany

SAMPLING SITE: Mc Carthy

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

DATE RECEIVED: 2018-08-30

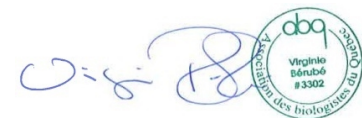
DATE REPORTED: 2018-09-26

		SAMPLE DESCRIPTION:		POND	
		SAMPLE TYPE:		SW	
		DATE SAMPLED:		2018-08-29	
Parameter	Unit	G / S	RDL	9510078	
Mortality 100% v/v	% mortality-96h			0	
Acute Lethality				NO	

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

9510078 Refer to the annex for analysis details.
Conclusion legend:
Acute lethality: NO (mortality: 50% or less)
Acute lethality: YES (mortality: more than 50%)

Certified By: _____



AGAT Laboratories' procedure for signatures and signatories adheres strictly to the requirements of accreditation ISO 17025:2005 as required by CALA, SCC and MDDELCC where applicable. All electronic signatures on AGAT certificates are password protected and all signatories meet their regional and scope of accreditation requirements and are approved by CALA, SCC and MDDELCC.



Method Summary

CLIENT NAME: GOLDER ASSOCIATES LTD.

AGAT WORK ORDER: 18M379617

PROJECT: 140634

ATTENTION TO: Jamie Bonany

SAMPLED BY: J. Neto

SAMPLING SITE: Mc Carthy

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



golder.com