GOLDER

REPORT

MCCARTHY QUARRY

McCarthy Quarry 2019 Annual Permit To Take Water Compliance Report

Submitted to:

Cindy Hood
Ontario Ministry of Environment, Conservation and Parks
Barrie District Office
1203-54 Cedar Pointe Drive
Barrie, ON L4N 5R7

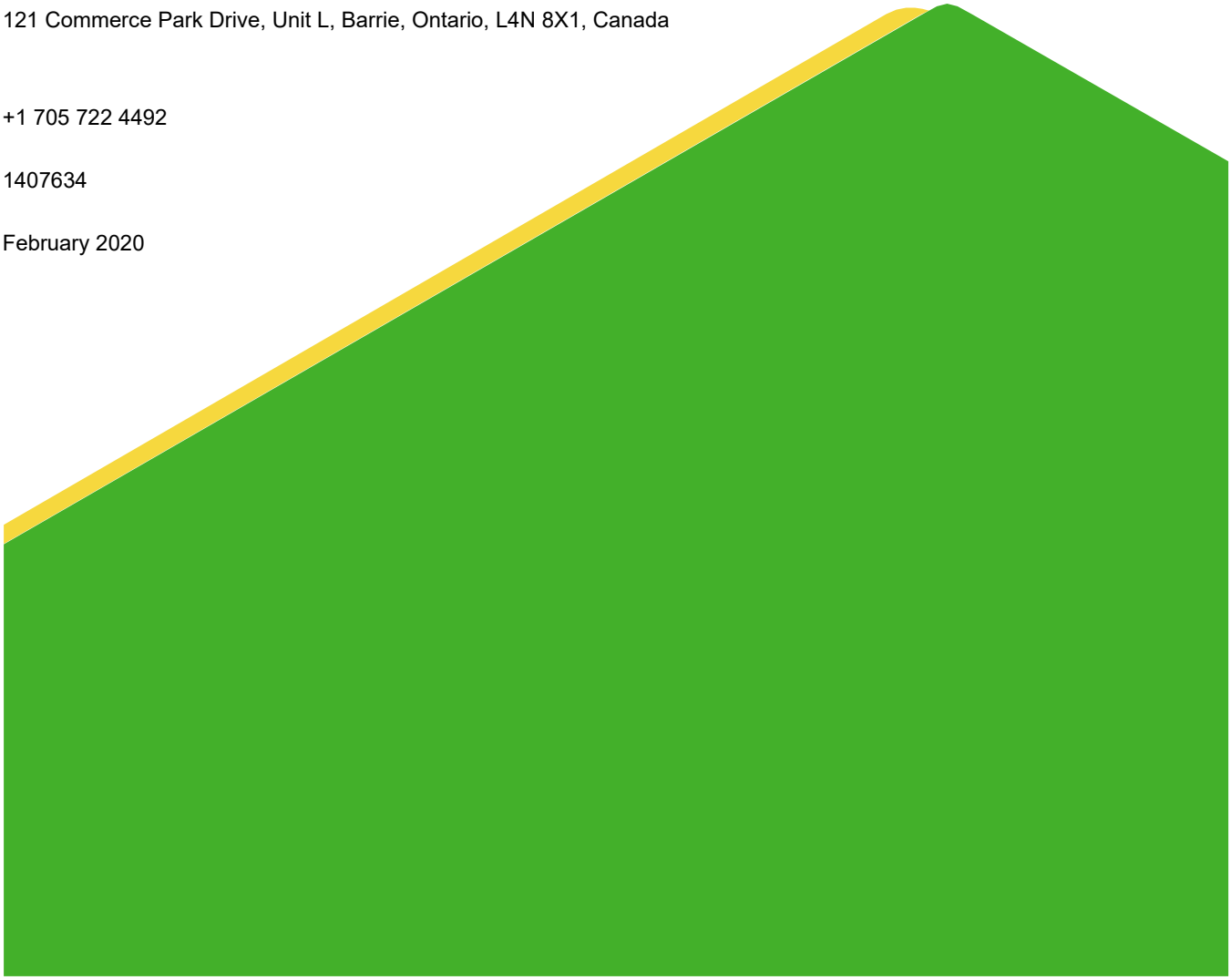
Submitted by:

Golder Associates Ltd.
121 Commerce Park Drive, Unit L, Barrie, Ontario, L4N 8X1, Canada

+1 705 722 4492

1407634

February 2020



Distribution List

1 Copy - Ontario MECP Barrie District Office

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TABLES (APPENDED)

APPENDICES

1.0 INTRODUCTION

Golder Associates Ltd. (Golder) was retained by QBJR/Coco Aggregates Inc. (Coco) to prepare the annual Permit To Take Water (PTTW) report for the McCarthy Quarry (the Site) located in the Township of Ramara, County of Simcoe (Figure 1). The monitoring activities documented in this report were conducted as a requirement of PTTW No. 7818-9QJNL4 (the 'Permit'; Appendix A). The Permit expired in December 2019, and a renewal was submitted to the Ministry of the Environment, Conservation, and Parks (MECP) in November 2019. A new PTTW No. 1603-BKTPQH was issued for the Site on January 31, 2010 and will be in place until January 31, 2025. Disposal of water from the Site was governed by Environmental Compliance Approval (ECA) No. 4731-987KM8 (under Section 20.2 of the Environmental Protection Act) until October 2019. An application to amend the ECA was submitted to the MECP in September 2019 and an updated ECA No. 7737-BH6QEA was issued on October 22, 2019.

The Site is located approximately six kilometres south-east of the Community of Brechin at Lot 1, Concession 1, Township of Ramara former Mara, Simcoe County (Figure 1). The site began operations on March 15, 2013 with the creation of the sinking cut. Aggregate from this area was used to build the new entrance to the Stan McCarthy Quarry and a portion of the haul route. As of the end of 2019, the quarry floor is currently approximately 15 metres below ground level (mbgl) or 240 metres above sea level (masl) and the approximate area is shown on Figure 2.

The area around the Site is primarily rural consisting of woodlots, pasture and scattered single-family homes. To the south and east along the Talbot River and Canal Lake are numerous seasonal and year-round residences.

2.0 BACKGROUND INFORMATION

2.1 Geology

The quarry is located on a broad, arching, low relief upland area within a low relief clay and limestone plain typical of the physiography to the east of Lake Simcoe (Chapman & Putman, 1984). The elevation of the land in the area of the Site is approximately 255 masl, with the higher elevations on the property coincident with the shoreline of the glacial Lake Algonquin. The original aggregate operation on this Site extracted gravel deposited on the shoreline of Lake Algonquin. The overburden deposits thicken to the south of the Site, with older silt and clay materials present over the bedrock (Figures 3 and 4). Land at elevations above 254 masl was in an active erosional environment associated with Lake Algonquin for approximately 700 years which drained across this area and out the Kirkfield Outlet toward Lake Ontario. In this "washed zone" the surficial geological deposits consist of a patchwork of thin layers of clayey-silt, sandy-silt to silty-sand glacial till, with occasional gravelly beach ridges. Below the level of Lake Algonquin, the pre-existing fine-grained glaciolacustrine and fine-grained till deposits, the land escaped shoreline erosion and in the Talbot River Valley the overburden thickness can reach tens of metres in thickness. The overburden thickness on the Site ranges from 0.3 m in the north (e.g. at OW9) to approximately 8 m at OW4 to the south.

Underlying the overburden material are Middle Ordovician aged limestone deposits of the Verulam, Bobcaygeon and Gull River Formations, which are part of the Simcoe Group. The Verulam Formation consists of thinly bedded limestone and shale or shaley limestone. The Verulam Formation is relatively thin at the Site (0 to 4 m in thickness).

The underlying Bobcaygeon Formation consists of thin to medium bedded limestones ranging in thickness from approximately 31 m (OW6) to 40 m (OW9) within the area of investigation (Figures 3 and 4). Quarrying at the Site will be primarily in the Bobcaygeon Formation.

The Gull River Formation (approximately 16 m in thickness) will not be quarried at the Site. It consists of fine-grained limestone with minor interbeds of shale or shaley limestone. Beneath the Gull River Formation is the Shadow Lake Formation (estimated to be approximately 7 m thick), which consists of conglomerate sandstone and mudstone, and in turn overlies the Precambrian Bedrock. Both the Shadow Lake Formation and the Precambrian Bedrock were encountered at OW8 and OW7.

2.2 Hydrogeological Setting

The overburden deposits in the area are thin and generally fine-grained. These deposits host numerous dug or bored wells in the area. Both bored and dug well are often vulnerable to the impact of surface activities and frequently filtration and ultraviolet disinfection is a part of domestic water supply treatment. Buried granular deposits in the Talbot River Valley provide sufficient groundwater for domestic use through both dug and drilled wells. The regional groundwater flow direction in the Upper Bobcaygeon Formation is generally to the southwest towards Lake Simcoe (Figure 5). The regional groundwater flow in the overburden material is most influenced by the topography in the area and the Talbot River and is generally in the south-southeast direction (Figure 1).

Wells constructed in the bedrock are generally completed within the Gull River Formation. The Gull River Formation is known to contain sulfate minerals and as a result the water often has a sulphurous odour. Some deep bedrock wells are also known to produce salty water, ostensibly in areas where wells intersect a sluggish groundwater flow system. Bedrock wells often produce sufficient water supplies for domestic use. Bedrock wells drilled deeper than 5 m to 10 m into the bedrock have yields consistent with shallower bedrock wells, however the deeper groundwater is reportedly prone to containing elevated levels of chloride and sulphur.

The Ministry of Environment, Conservation and Parks (MECP) water well database was reviewed to identify accessible private water wells located in the vicinity of the Site. Nine wells were located within 1,000 m of Site, seven of which are on Concession Road 1 and two of which are on the Mara-Eldon Boundary Road (Figure 1).

2.3 Quarry Dewatering

The Permit (Appendix A) authorizes a maximum daily water taking volume of 6,544,800 L/day from a sump located within the floor of the quarry, with a maximum of 150 days of taking. The yearly maximum permitted water taking from the sump is capped at 196,500,000 L/year.

The groundwater pumping rate from the quarry sump in 2019 varied from 20 L/sec to 35 L/sec, with the daily pumping volume ranging from 0 to 1,386,000 L/day (Table 6). These values were consistently below both the permitted taking rate of 76 L/sec, and the maximum daily pumping volume of 6,544,800 L/day.

Groundwater and precipitation entering the quarry is collected in a sump in the quarry floor. The sump is equipped with a 4-inch Grindex pump with a maximum discharge rate of 35 L/sec which is attached to a 4-inch (101 mm) diameter discharge line. The water is pumped from the quarry floor up the quarry face via the discharge line to a 4-inch (101 mm) diameter discharge pipeline that directs the water to a ditch that runs southward through the McCarthy property to the 14,000 m^3 settling pond. The water in the settling pond discharges via a Hickenbottom control structure to the roadside ditches along Concession Road 1 . The water in the roadside ditch travels eastward along the north side of Concession Road 1 to a municipal drain and eventually discharges to the Talbot River, which in turn discharges to Lake Simcoe.

3.0 MONITORING PROGRAM

The monitoring program for the Site, which is outlined in Section 4 of the Permit (Appendix A), directs Coco to monitor the Site water taking, groundwater levels in the on-Site monitoring wells and off-Site residential wells, groundwater quality in selected on-Site monitoring wells and off-Site residential wells and meteorological data from an on-Site meteorological station. Coco is also required to maintain a publicly accessible site on the internet containing the required monitoring data and every report that has been required by the PTTW, and to establish a Public Liaison Committee (PLC) that is to meet once every four months.

4.0 MONITORING METHODS AND RESULTS

Quarry Operations Update

The current quarry footprint is approximately 400 m by 100 m, with the ultimate limit of extraction shown in Figure 2. The extraction rate for the aggregate recourse is dictated by market demand and cannot be determined with certainty for the coming twelve-month period. The current extraction rate is approximately 150,000 m^3/year. At this rate of extraction, the footprint of the quarry would be 18 to 20 ha in ten years if a second lift is not started. If a second lift into the Bobcaygeon Formation is started, then the quarry footprint will be smaller.

Monitoring Condition 4.1: Water Level Monitoring of Sump

Condition 4.1 of the Permit stipulates that the water level in the quarry cannot be lowered below an elevation of 232.0 masl. The quarry floor is currently approximately 15 metres below ground level (mbgl) or 240 masl. As such, the water level in the quarry remains above 232.0 masl.

Monitoring Condition 4.2: Local Climatic Conditions

The on-Site climate conditions are monitored with an RM Young tipping bucket precipitation gauge with a heater that is connected to the Solinst Rainlogger as well as an on-Site Barologger that measures temperature. Precipitation data was not available for the weather station in 2019 and the 2019 on-Site weather data was supplemented with weather data from the Environment Canada Barrie-Oro weather station located approximately 36 km west of the Site. Figure 5 illustrates the precipitation and temperature data collected at the meteorological station for the 2019 monitoring period.

Monitoring Condition 4.3, 4.4 and 4.5: Groundwater Elevations

Water level monitoring has been ongoing at the Site since the early stages of quarry development in 2002. Both on-Site observation wells and off-Site residential wells have been incorporated into the monitoring program in order to meet the requirements of Conditions 4.3, 4.4, 4.5, and 4.6 of the Permit. Groundwater elevation readings at the Site are collected though a combination of monthly manual water level measurements at all the wells, and pressure transducers installed in select wells for semi-continuous (i.e. daily) monitoring. The wells (both monitoring and residential) included in the 2019 monitoring program in order to meet the requirements of the Permit are listed in Table 1. The location of the groundwater monitoring points is provided on Figures 1 and 2.

Table 1: Groundwater Monitoring Locations and Measurement Frequency

	Daily Monitoring **	Monthly Monitoring
Monitoring Wells	OW4-1, OW4-2, OW5-1, OW6-1, OW6-2, OW9-1, OW9-2, Bored, CKL-1 and CKL-2	AM1b, AMx-R, TW1-1, OW4-1, OW4-2, OW5-1, OW5-2, OW5-3, OW6-1, OW6-2, OW6-3, OW7-1, OW7-2, OW7-3, OW8-1, OW8-2, OW8-3, OW9-1, OW9-2, Bored, CKL-1 and CKL-2
Residential Wells	DW3	DW3, DW1, DW2, DW4, DW5*, DW6*, DW7* and DW8*

*Monitored at least once every two months

**Daily monitoring completed with a pressure transducer

Table 3 presents the manual groundwater level readings collected at each of the monitoring location (both monitoring and residential wells). Groundwater hydrographs for the manual groundwater level measurements at individual monitoring locations are presented in Figures 6 through 10 and include data from 2015 through 2020. Each of the hydrograph figures includes wells completed within the same geologic formations (e.g., overburden, Verulam). Appendix B provides groundwater hydrographs at each of the wells over the period from 2006 through 2019.

In 2019 most of the monitoring wells showed a pattern of groundwater levels rising in January through the Spring, and then starting to fall in the summer. This general pattern is consistent with the measurements in previous years. Groundwater levels were generally stable, with the measured range of water level fluctuations at individual wells generally consistent with historical data. Exceptions to the trend of relatively stable water levels and routine seasonal fluctuations include:

- Well AMx-R (Verulam Formation): well AMx was monitored until April 2015 when it was removed due to the advance of the south quarry face. Well AMx-R was installed as a replacement for AMx along the western property boundary between the quarry face (about 375 m south of the quarry face) and OW4 in late 2017; water level monitoring started in April 2018. Groundwater levels at AMx-R rose by approximately 6 m between April 2018 and about July 2019, when groundwater level measurements appeared to stabilize (Figure 7);
- Wells OW9-1 and OW9-2 (Bobcaygeon Formation): the groundwater level at OW9-1 has declined approximately 1.5 m since 2015 and the water level at OW9-2 has declined approximately 0.5 m since 2016 (Figure 8). The groundwater level at this location has almost declined below the bottom of each well;
- Well OW6-3 (Gull River Formation): groundwater levels have risen gradually but consistently by approximately 7 m at OW6-3 since the start of 2015 (Figure 9); and
- Well OW8-3 (Gull River Formation): groundwater levels have gradually declined by approximately 6 m at OW8-3 since the start of 2015 (Figure 9).

Impact Assessment

Wells where the 2019 groundwater level fluctuations and the range of fluctuations were consistent with historical trends are inferred to be beyond the influence of dewatering activities at the quarry. For the wells indicated above that exhibited anomalous readings:

- Well AMx-R: the noted gradual rise and stabilization of the groundwater level is attributed to the water level reaching “static” conditions following installation. The relatively long time period for stabilization is assumed to be due to the low conductivity of the surrounding bedrock;
- Well OW9-1 and OW9-2: the decline in water levels at both OW9-1 and OW9-2 is attributed to the on-going dewatering operations at the Site. OW9 was installed after extraction had begun at the quarry; therefore there are no pre-extraction water level data; however water levels were stable until the quarry face was about 150 m from OW9. The OW9 wells are currently approximately 10 m from the working face of the quarry and the water levels in the upper screen have declined approximately 15 m since 2014 in response to the lowering of the groundwater table in the quarry footprint.
- Wells OW6-3 and OW8-3: each of these wells are completed in the Gull River Formation, which is located more than 30 m below the current quarry bottom. Based on the vertical separation and the presence of (thin) shale and shaley limestone layers within the formation it is assumed that the Gull River Formation is hydraulically isolated from the quarry dewatering operations, and the measured water level fluctuations are a response to regional groundwater level trends.

Based on the water level monitoring results, both historical and in 2019, drawdown is occurring in the shallow bedrock as a result of the on-going dewatering activities and is limited to a distance of not more than 150 m from the quarry face. It can be concluded from the water level monitoring that the impact area of quarry dewatering is restricted to less than 150 m from the quarry face. Off-Site impacts are not expected for several years as quarrying will be in the northern part of the Site. At the current extraction rate of approximately 2 ha per year, the quarry will expand to approximately 12 ha over the next five years or 20 ha over the next ten years, unless a deeper lift is developed, then the quarry footprint would be smaller.

The McIntosh residence is the closest groundwater user to the Site; the McIntosh water well is located approximately 280 m from the current quarry excavation. It is not expected that this well will be impacted during the five-year life of the current PTTW (No. 1603-BKTPQH). On-Site observation wells OW4 and OW6 are situated between the quarry and the McIntosh well, and will serve as sentinel wells assessing the extent of the drawdown effects.

Monitoring Condition 4.6 and 4.7: Groundwater Quality

As per the requirements of the Permit groundwater quality sampling is conducted on a semi-annual basis at both on-Site monitoring wells and off-Site residential wells. Sampling events were completed in May and October in 2019. A summary of the sampled parameters and the wells included in the sampling program are provided in Table 2.

Table 2: Groundwater Quality Sampling Program

	Monitoring Locations	Water Quality Parameters
Monitoring Wells	AM1b, AMx, TW1-1, Bored, OW4-1, OW4-2, OW5-1, OW5-2, OW5-3, OW6-2, OW7-1, OW7-2, OW8-1, OW8-2, OW9-1, and OW9-2	pH, alkalinity, bicarbonate, fluoride, chloride, magnesium, calcium, sodium, potassium, ammonia, sulphate, nitrate, nitrite, phosphate, phosphorous, conductivity, DOC, colour, TDS, hardness

	Monitoring Locations	Water Quality Parameters
Residential Wells	DW3, DW1, and DW2	pH, alkalinity (CaCO3), bicarbonate, conductivity, fluoride, chloride, nitrate, nitrite, chromium, tannins, sulphate, magnesium, calcium, sodium, potassium, ammonia (N), phosphate, phosphorous, anion sum, cation sum, DOC, colour, turbidity, aluminium, arsenic, barium, boron, cadmium, ion ratio, % difference, copper, iron, lead, manganese, selenium, zinc, hardness (CaCO3), TDS (iron sum calc.), Langelier Index

The laboratory analytical data sheets for the 2019 sampling events are provided in Appendix C, and the results are summarized in Table 4 (Residential Wells) and Table 5 (Monitoring Wells). Table 4 and 5 provide a comparison of the laboratory results to Ontario Drinking Water Standards (ODWS).

The off-Site private residential wells were tested in May and October of 2019 (Table 4). The water quality at DW1, DW2, and DW3 met the ODWS during the 2019 sampling events for the parameters tested with the exception of total dissolved solids (TDS) at DW1 and DW2 and hardness (as $CaCO_3$) at DW1, DW2, and DW3. None of these exceedances are attributed to the effects of the dewatering activities.

The laboratory analytical results from the 2019 monitoring events indicate that the groundwater quality at the on-Site monitoring wells is consistent with the pre-quarry conditions (Whitewater Hydrogeology Ltd., 2013). High hardness and high TDS are common in groundwater in the area of the Site and are considered representative of the overburden and bedrock conditions found in the Carden Plain.

Monitoring Conditions 4.10 and 4.12 Water Taking Measurements and Reporting

The rate and volume of groundwater extraction and discharge from the quarry are provided to Golder by McCarthy Quarry staff. The pumping records for January 2019 to December 2019 are presented in Table 6. The daily discharge rate (L/min) between January 1, 2019 and December 31, 2019, which was calculate by dividing the total volume pumped per day by the total minutes of pumping, was consistently below the permitted rate of 4,545 L/min (76 L/sec). The total volume of water removed (170,334,000 L) was less than the maximum taking of 196,500,000 L/year; however, the pumping was conducted on a total of 171 days in 2019, which exceeded the maximum of 150 days per year. The predicted dewatering activities over the next twelve months are expected to remain consistent with those in 2019.

Estimating the contribution of precipitation in the overall water taking can be done by assuming the moisture surplus is 500 mm/year and that the capture area for the excavation is 15 ha (i.e. the stripped area plus the excavation). Based on these estimated the volume of water entering the quarry due to precipitation was 75,000,000 L. The total volume of water pumped form the quarry from January 1 to December 31, 2019 was 170,334,000 L, which means that groundwater comprised of approximately 56% of the discharge.

Condition 4.13 Publicly-Accessible Site

The water quality and quantity monitoring data that is required by the PTTW is available at:

www.cocoaggregates.com

To access the reports for the McCarthy Quarry click “Documents” on the homepage.

A Public Liaison Committee have been maintained and the most recent meeting was held on May 23, 2019. Issues of noise, dust, blasting and the local newsletter were discussed with attendees.

5.0 RECOMMENDATIONS

Golder recommends that the groundwater monitoring continue as outlined in PTTW No. 7818-9QJNL4.

6.0 LIMITATIONS AND USE OF REPORT

The services performed as described in this report were conducted in a manner consistent with the level of care and skill normally exercised by other members of the engineering and science professions currently practicing under similar conditions, subject to the time limits and financial and physical constraints applicable to the services.

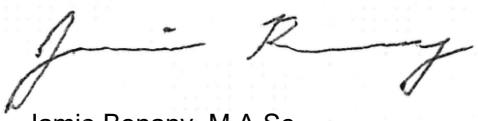
Any use which a third party makes this report, or any reliance on, or decisions to be made based on it, are the responsibilities of such third parties. Golder accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

7.0 CLOSURE

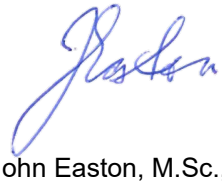
We trust that this report meets your needs at the present time. If you have any questions or require clarification, please do not hesitate to contact the undersigned.

Signature Page

Golder Associates Ltd.



Jamie Bonany, M.A.Sc.
Project Scientist



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

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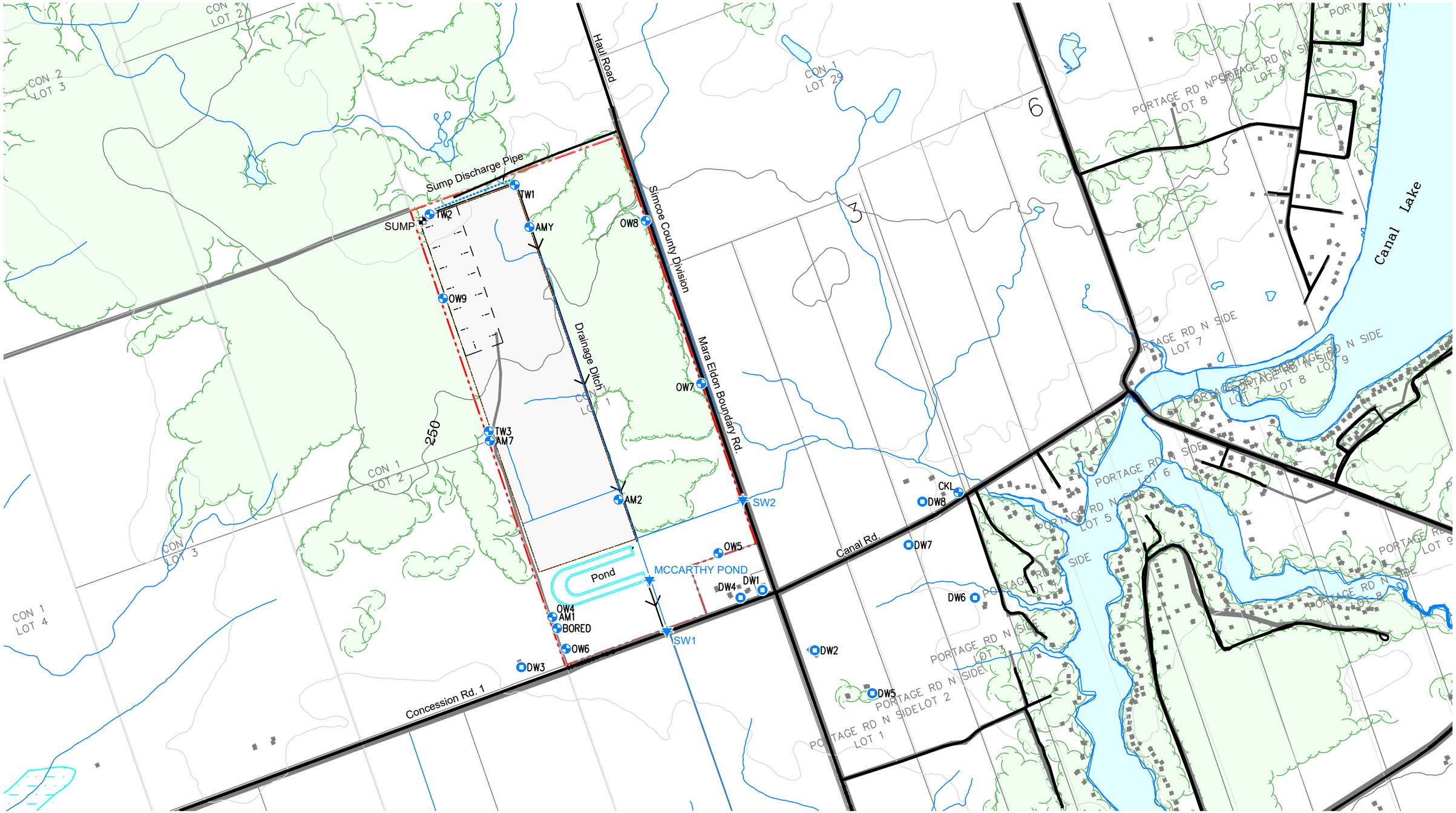
REFERENCES

Chapman, L.J., Putnam D.F., 1984. Physiography of Southern Ontario; Ontario Geological Survey, Map P.2715 (coloured.) Scale 1:600,000.

Whitewater Hydrogeology Ltd., 2013. 2012 Compliance Report #2, Stan McCarthy Quarry. Whitewater Hydrogeology Ltd., Collingwood, Ontario, January 2013.

FIGURES



LEGEND

- Approximate Property Boundary
- Approximate Licenced Boundary
- Approximate Extent of Quarry
- Private Well Monitoring Location
- Observation Well Monitoring Location
- Surface Water Sampling Location

REFERENCES AND NOTES

1. Projection UTM NAD83 Zone 17
2. Mapping based on ESRI Geography Network OBM Features and 2012 Road Network
3. All Mapped features are Approximate and Not to Scale

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CLIENT
COCO / QBJR AGGREGATES INC.

CONSULTANT
GOLDER

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DESIGN	
REVIEW	JEB
APPROVED	

PROJECT
STAN McCARTHY QUARRY
2019 ANNUAL MONITORING REPORT

TITLE
LOCATION MAP

PROJECT No.	Phase	Rev.	Figure
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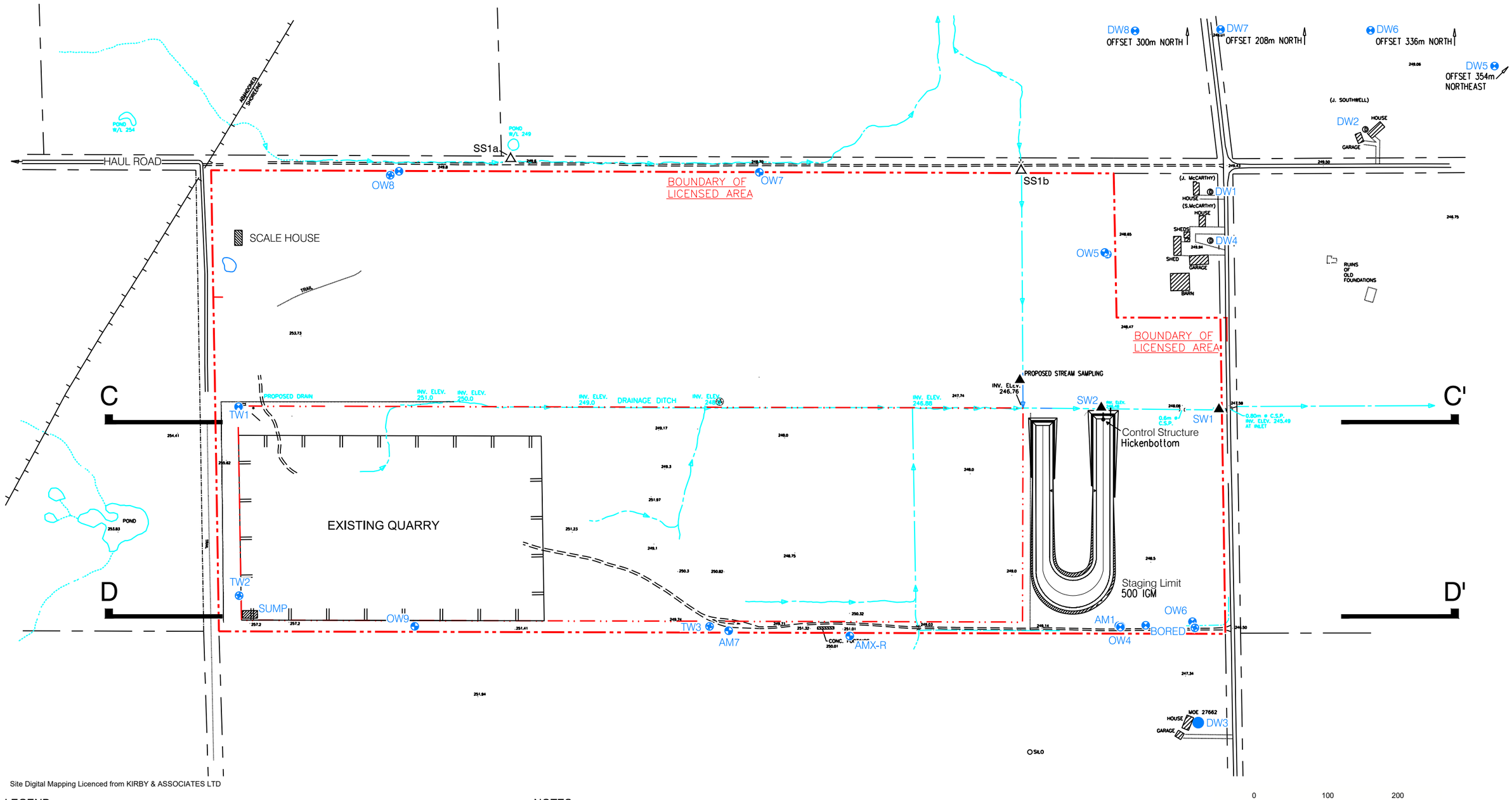

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LEGEND

- Quarry Boundary
- Limit of Extraction
- Swales and Drainage Plan
- ▲ Surface Water Sampling Location
- · Private Dug Well
- ● Private Drilled Well
- ■ Standpipe
- ◕ Observation Well

NOTES

1. Test Well AM7 inaccessible
2. DW1 Formally Degroot
3. DW2 Formally Southwell
4. DW3 Formally Lamarre
5. DW4 Formally McCarthy
6. AMX decommissioned replaced with AMX-R

CLIENT
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CONSULTANT
GOLDER

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DESIGN	
REVIEW	JEB
APPROVED	

PROJECT
STAN McCARTHY QUARRY
2019 ANNUAL MONITORING REPORT

TITLE
SITE LOCATION MAP

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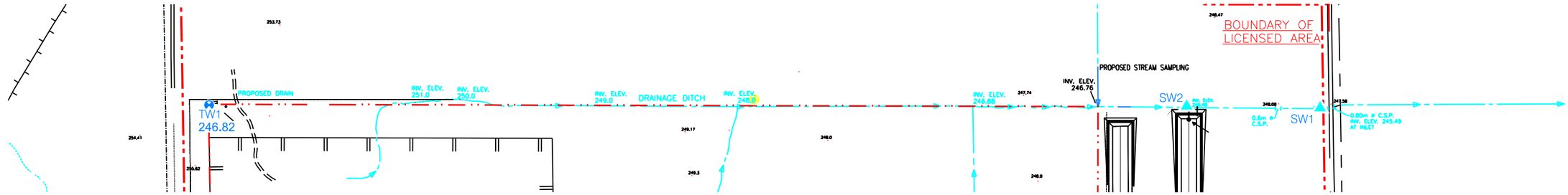

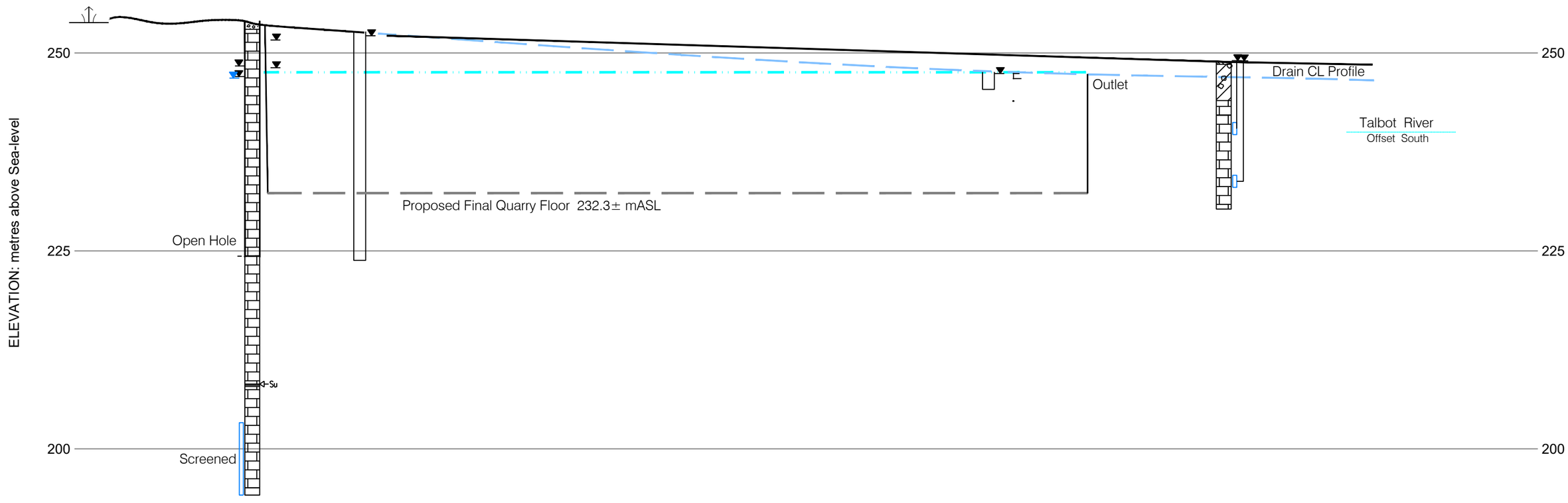

On all sections, boundaries between soil strata have been determined only at well and test well locations. Between Between the wells and test wells, boundaries are not proven but are assumed from geological evidence.

CLIENT
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PROJECT
STAN McCARTHY QUARRY
2019 ANNUAL MONITORING REPORT

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SITE SECTION C-C'

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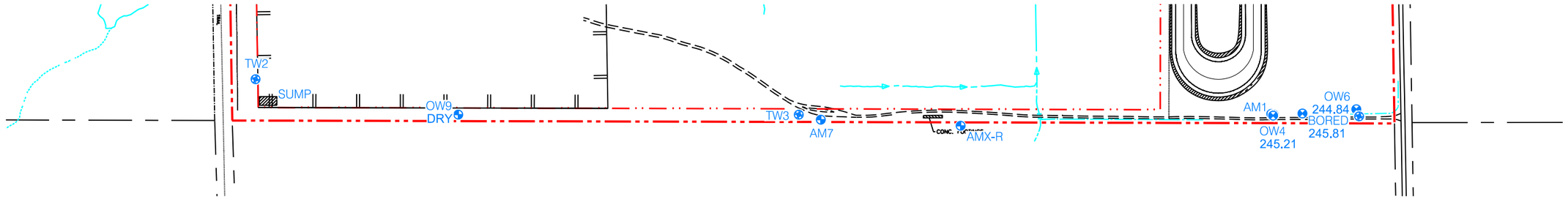

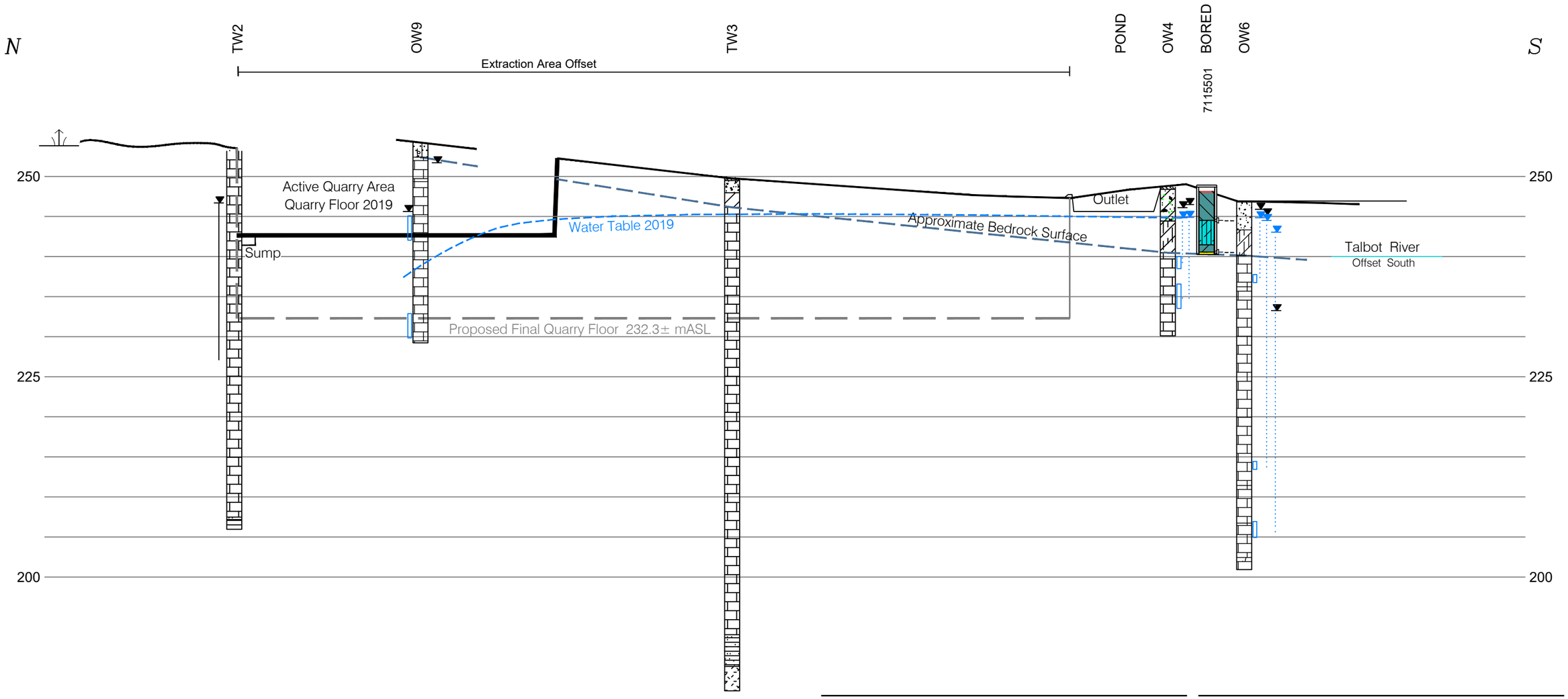

On all sections, boundaries between soil strata have been determined only at well and test well locations. Between Between the wells and test wells, boundaries are not proven but are assumed from geological evidence.

Depth of Quarry measured in offset Blast Hole drilling 2014 and reflecting maximum depth

CLIENT
COCO / QBJR AGGREGATES INC.

CONSULTANT
GOLDER

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REVIEW	JEB
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PROJECT
STAN McCARTHY QUARRY
2019 ANNUAL MONITORING REPORT

TITLE
SITE SECTION D - D'

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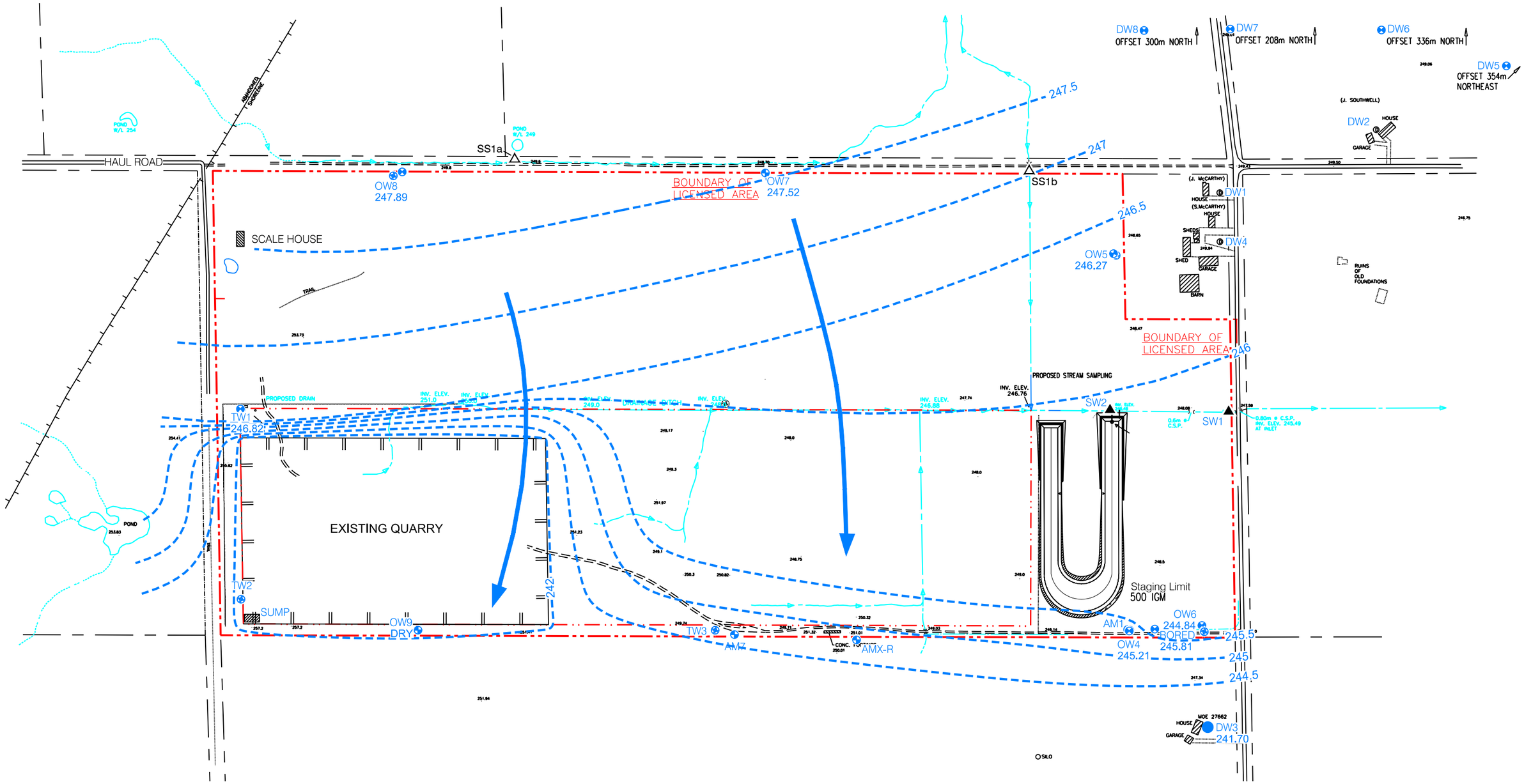

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- Quarry Boundary
- Limit of Extraction
- Swales and Drainage Plan
- 245.67 Static Water Level (September 2019
- Equipotential Line (masl)
- Inferred Groundwater Flow (Upper Bobcaygeon)
- ▲ Surface Water Sampling Location
- · Private Dug Well
- ● Private Drilled Well
- ■ Standpipe
- ◔ Test Well

NOTES:

1. Test Well AM7 inaccessible
2. DW1 Formally Degroot
3. DW2 Formally Southwell
4. DW3 Formally Lamarre
5. DW4 Formally McCarthy
6. AMX decommissioned replaced with AMX-R
7. Static levels taken September, 2019

0 100 200
1:5,000 METRES

CLIENT
COCO / QBJR AGGREGATES INC.

CONSULTANT
GOLDER

YYYY-MM-DD	2020-01-21
PREPARED	STB
DESIGN	
REVIEW	JEB
APPROVED	

PROJECT
STAN McCARTHY QUARRY
2019 ANNUAL MONITORING REPORT

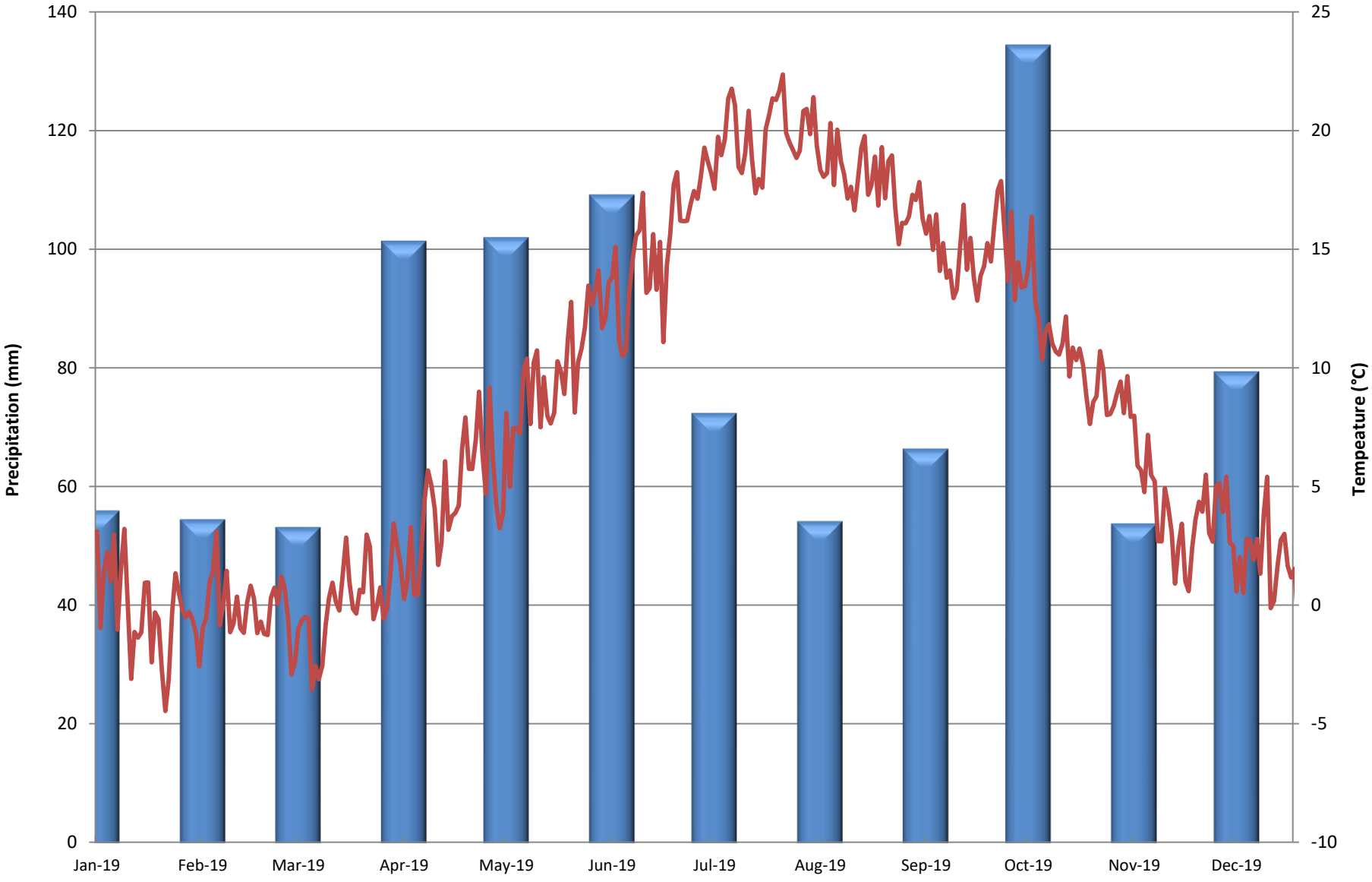
TITLE
GROUNDWATER FLOW - BOBCAYGEON FORMATION

PROJECT No.	Phase	Rev.	Figure
1407634		A	5

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

25 mm

Path: \\golder.gds\gal\Barrie\CAD\Projects\2014\1407634 (Brechin, Coco Enviro and Hydro)\-19AW-\ - | File Name: 1407634-19AWCLSE.dwg



Precipitation

Temperature

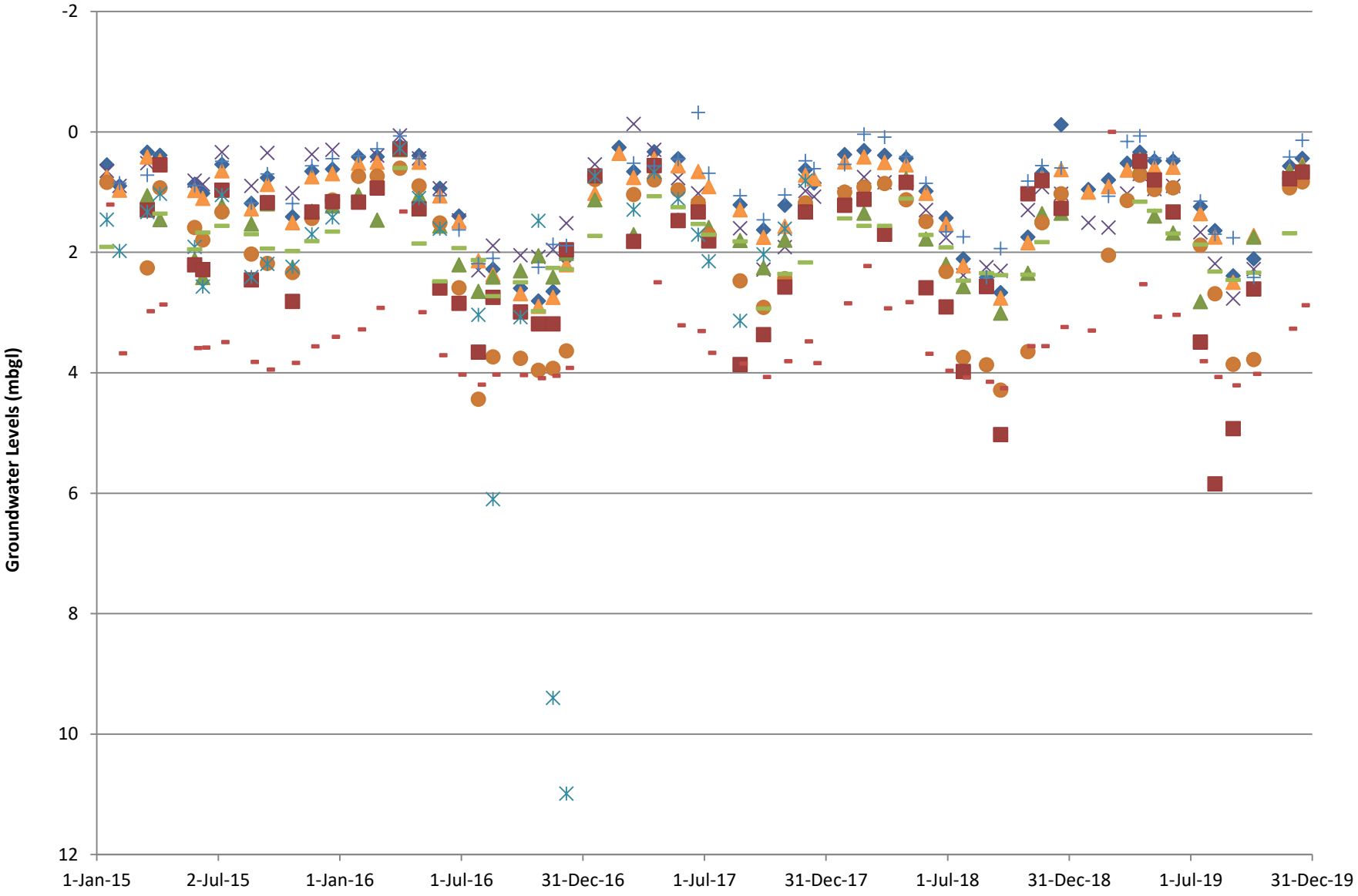
Golder Associates

SCALE:	NTS
DATE:	5-Feb-20
CAD:	JEB
FILE No.	
TEST:	
PROJECT No.	1407634
REVIEW:	JAE

McCarthy Quarry
On Site 2019 Weather

QBJR/Coco Aggregates Inc.
2019 Annual Monitoring Report

FIGURE No
6



◆ Bored	✕ OW5-1	▲ AM1b	
▲ DW1	● DW2	■ DW4	
✳ DW5	▬ DW6	+ DW7	
▪ DW8			

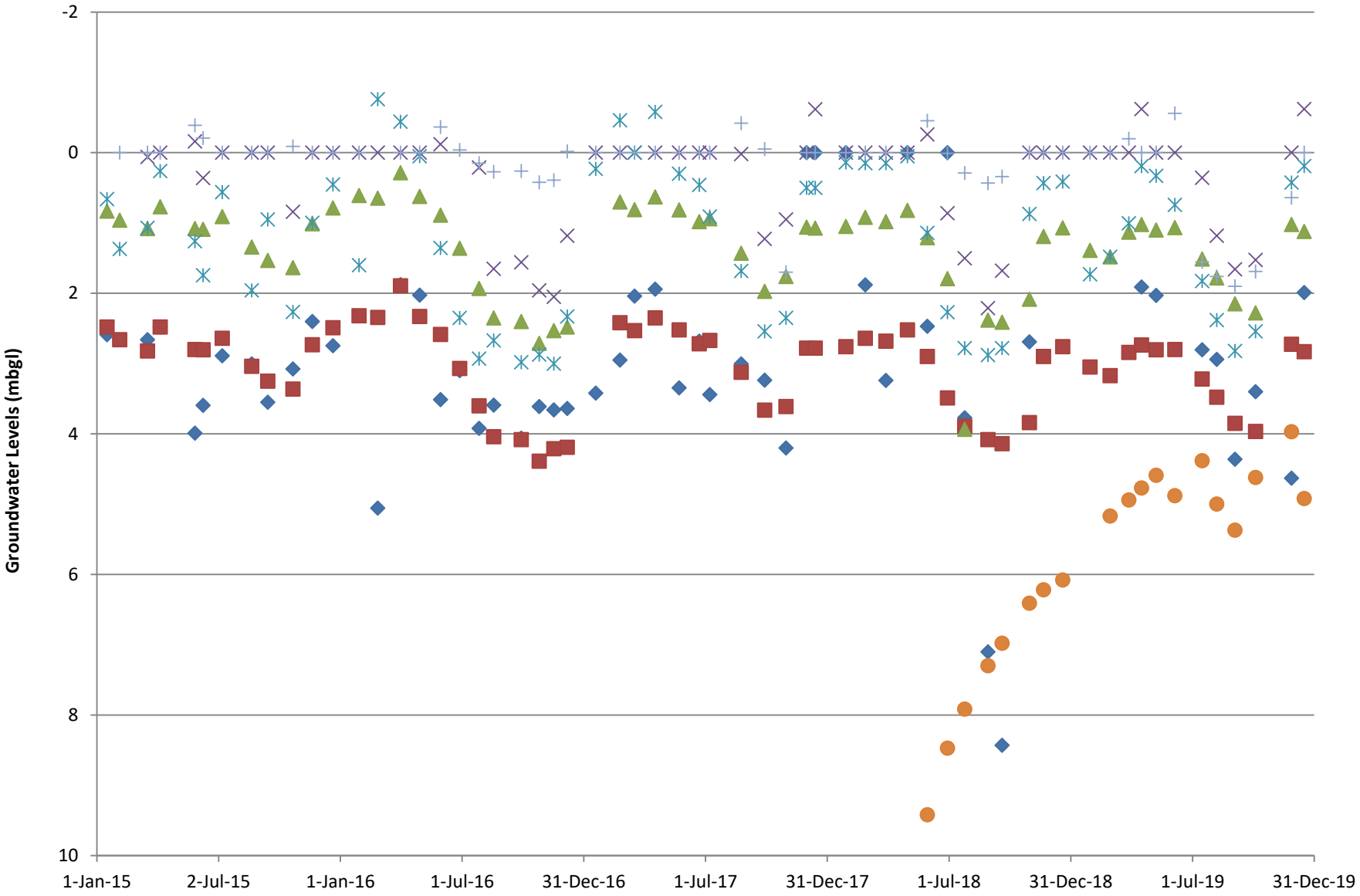
GOLDER

SCALE:	NTS
DATE:	21-Jan-20
CAD:	JEB
FILE No.	
TEST:	
PROJECT No.	1407634
REVIEW:	JAE

McCarthy Quarry
Overburden Monitoring Wells
Groundwater Levels

QBJR/Coco Aggregates Inc.
2019 Annual Monitoring Report

FIGURE No
7



◆ DW3 ■ OW4-1 ▲ OW6-1

× OW7-1 ✳ OW8-1 ● Amx-R

+ CKL-1

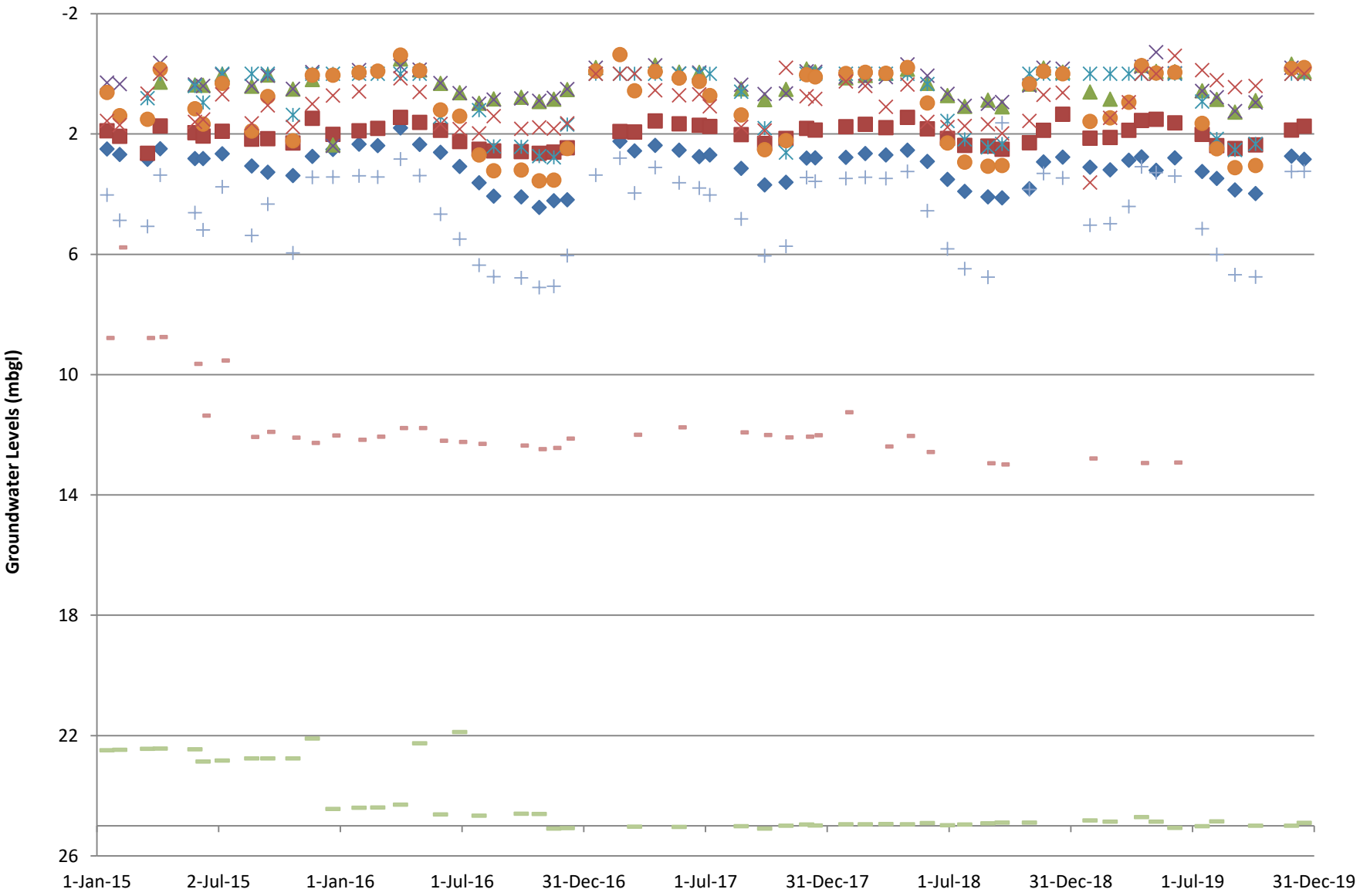
GOLDER

SCALE:	NTS
DATE:	21-Jan-20
CAD:	JEB
FILE No.	
TEST:	
PROJECT No.	1407634
REVIEW:	JAE

McCarthy Quarry
Verulam Monitoring Wells
Groundwater Levels

QBJR/Coco Aggregates Inc.
2019 Annual Monitoring Report

FIGURE No
8



OW4-2 OW6-2 OW5-2
OW5-3 OW7-2 OW8-2
TW1-1 OW9-1 OW9-2
CLK-2

GOLDER

SCALE:	NTS
DATE:	21-Jan-20
CAD:	JEB
TEST:	
REVIEW:	JAE

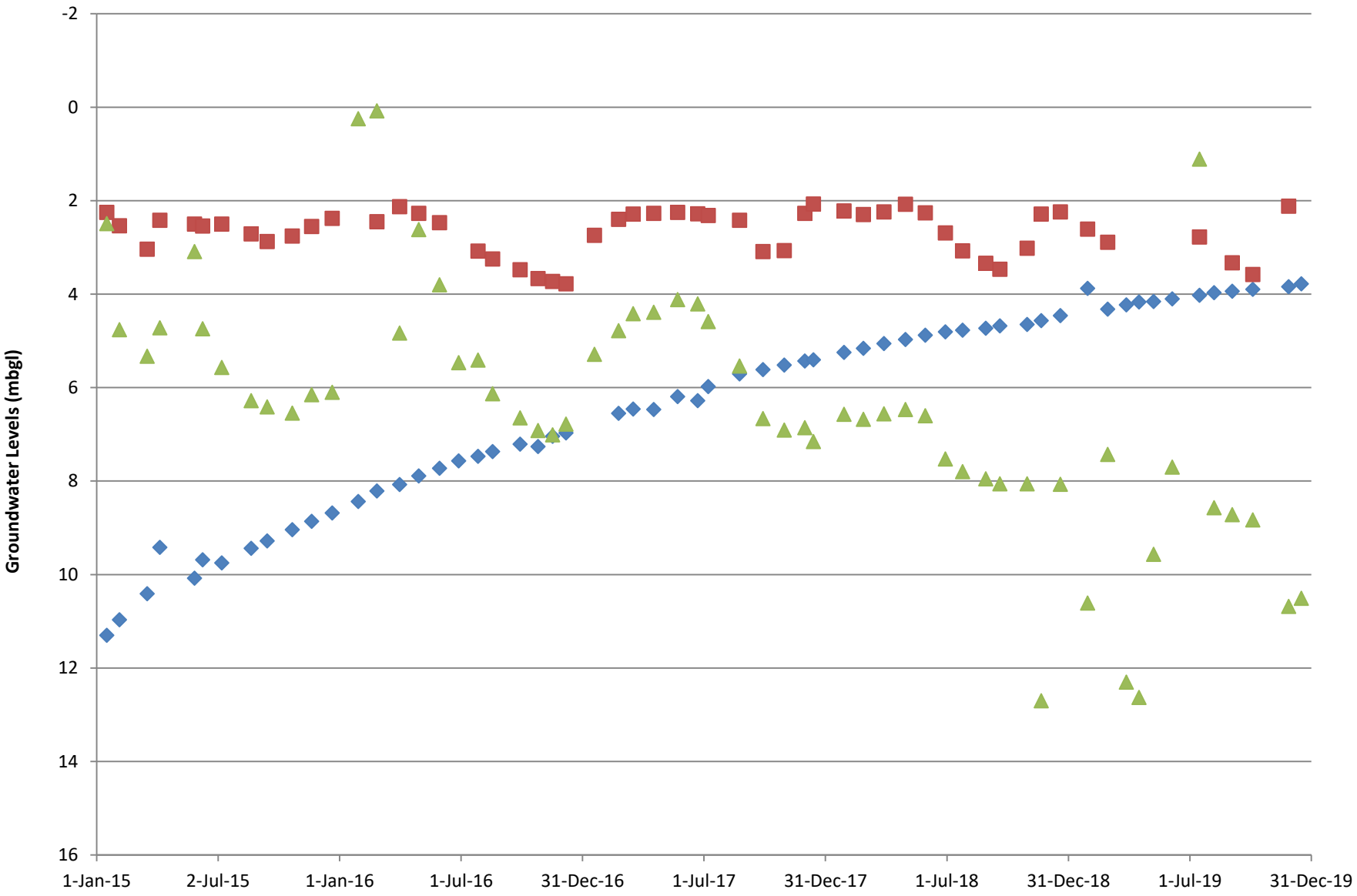
FILE No.

PROJECT No. 1407634

McCarthy Quarry
Bobcaygeon Monitoring Wells
Groundwater Level

QBJR/Coco Aggregates Inc.
2019 Annual Monitoring Report

FIGURE No
9



◆ OW6-3
■ OW7-3
▲ OW8-3

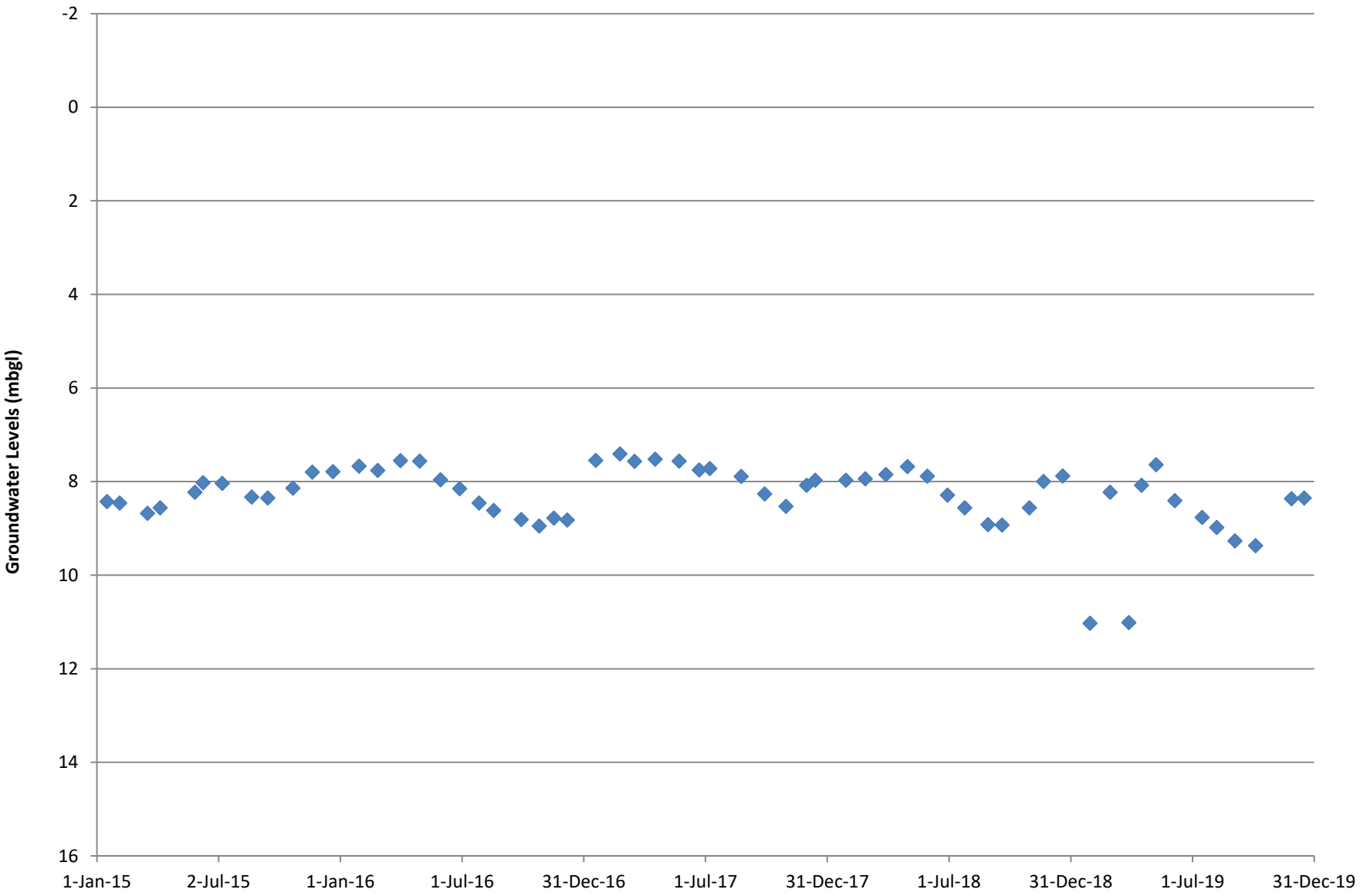
GOLDER

SCALE:	NTS
DATE:	21-Jan-20
CAD:	JEB
FILE No.	
TEST:	
PROJECT No.	1407634
REVIEW:	JAE

McCarthy Quarry
Gull River Monitoring Wells
Groundwater Level

QBJR/Coco Aggregates Inc.
2019 Annual Monitoring Report

FIGURE No
10



GOLDER	SCALE: NTS	McCarthy Quarry Precambrian Monitoring Wells Groundwater Level	
	DATE: 10-Jan-20		
	CAD: JEB		
FILE No.	TEST:	QBJR/Coco Aggregates Inc. 2019 Annual Monitoring Report	FIGURE No 11
PROJECT No. 1407634	REVIEW: JAE		

TABLES

Well	Unit	Elevation (masl)	Stick up (m)	29-Jan-19	28-Feb-19	28-Mar-19	16-Apr-19	08-May-19	05-Jun-19	16-Jul-19	7-Aug-19	3-Sep-19	4-Oct-19	27-Nov-19	16-Dec-19
				Water Levels (mbgl)											
DW3	Verulam	246.52	0.46	NA	NA	NA	1.91	2.03	NA	2.80	2.94	4.36	3.40	4.63	1.99
OW4-1	Verulam	249.57	0.88	3.05	3.17	2.84	2.74	2.81	2.80	3.22	3.48	3.85	3.97	2.73	2.83
OW4-2	Bobcaygeon	249.62	0.86	3.11	3.19	2.87	2.76	3.21	2.80	3.25	3.48	3.86	3.98	2.74	2.84
Bored	Overburden	248.86	0.66	0.96	0.80	0.52	0.34	0.48	0.48	1.25	1.64	2.39	2.11	0.57	0.44
OW6-1	Verulam	247.60	0.61	1.39	1.48	1.13	1.02	1.10	1.07	1.51	1.78	2.15	2.28	1.02	1.12
OW6-2	Bobcaygeon	247.52	0.53	2.14	2.12	1.88	1.55	1.51	1.63	2.01	2.39	2.48	2.36	1.87	1.74
OW6-3	Gull River	247.46	0.47	3.88	4.32	4.23	4.17	4.16	4.10	4.03	3.97	3.94	3.90	3.84	3.78
DW4	Overburden	250.19	0.24	frozen	frozen	frozen	0.49	0.80	1.33	3.49	5.85	4.93	2.61	0.78	0.67
DW1	Overburden	249.83	0.3	frozen	frozen	frozen	0.56	1.40	1.68	2.82	NA	NA	1.75	0.67	0.58
OW5-1	Overburden	249.84	0.8	1.51	1.59	1.03	0.70	0.95	0.90	1.67	2.19	2.77	2.28	0.76	0.71
OW5-2	Bobcaygeon	249.76	1.0	0.60	0.84	frozen	-0.29	-0.08	-0.07	0.57	0.85	1.27	0.89	-0.32	-0.07
OW5-3	Bobcaygeon	249.70	1.0	frozen	frozen	frozen	-0.23	-0.72	-0.02	0.57	0.78	1.24	0.95	-0.20	frozen
DW5	Overburden		0.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DW2	Overburden	247.50	0.8	frozen	2.05	1.14	0.72	0.96	0.93	1.89	2.69	3.86	3.78	0.93	0.83
DW7	Overburden		0.32	frozen	1.07	0.16	0.07	0.43	0.44	1.15	1.70	1.76	3.42	0.42	0.14
DW8	Overburden			3.30	frozen	frozen	2.53	3.07	3.04	3.81	4.07	4.21	4.02	3.27	2.88
DW6	Overburden		0.5	frozen	frozen	frozen	1.16	1.31	1.69	1.87	2.32	2.46	2.34	1.69	frozen
OW7-1	Verulam	249.80	0.62	flowing	flowing	flowing	flowing	flowing	flowing	0.36	1.18	1.66	1.53	flowing	-0.62
OW7-2	Bobcaygeon	249.78		flowing	flowing	flowing	flowing	flowing	flowing	0.93	2.16	2.53	2.33	flowing	0.00
OW7-3	Gull River	249.74	0.61	2.61	2.89	NA	NA	NA	NA	2.78	NA	3.33	3.58	2.12	NA
OW8-1	Verulam	251.47	0.76	1.73	1.48	1.01	0.19	0.33	0.74	1.83	2.38	2.82	2.54	0.43	0.19
OW8-2	Bobcaygeon	251.44	0.83	1.58	1.46	0.95	-0.27	-0.03	-0.05	1.65	2.49	3.12	3.05	-0.18	-0.21
OW8-3	Gull River	251.40	0.8	10.61	7.43	12.31	12.63	9.57	7.70	1.11	8.57	8.72	NM	10.68	10.51
TW1-1	Bobcaygeon	254.10	0.6	5.03	4.98	4.41	3.09	3.29	3.40	5.15	6.01	6.68	6.75	3.25	3.24
TW1-2	Precambrian	254.10	0.52	11.03	8.23	11.02	8.08	7.64	8.41	8.77	8.98	9.27	9.37	8.37	8.35
OW9-1	Bobcaygeon	253.40	0.41	12.79	dry	dry	12.94	dry	12.92	dry	dry	dry	dry	dry	dry
OW9-2	Bobcaygeon	253.31	0.35	24.82	24.86	dry	24.71	24.86	25.07	25.02	24.85	28.00	25.00	24.99	24.90
CKL-1	Verulam		0.6	flowing	flowing	-0.20	flowing	flowing	-0.56	1.55	1.76	1.90	1.69	0.64	frozen
CKL-2	Bobcaygeon		0.65	3.61	1.46	0.95	flowing	flowing	-0.60	-0.13	0.21	0.44	0.40	flowing	frozen
AM1b	Overburden	249.45	0.2	1.00	0.91	0.64	0.46	0.59	0.59	1.36	1.75	2.50	1.72	0.65	0.55
AMX-R	Verulam			NA	5.17	4.94	4.77	4.59	4.88	4.38	5.00	5.37	4.62	3.97	4.92

Notes:

1. Highlighted cells represent groundwater measurements in terms of meters above sea level (masl)

2. Not Accessible (NA)

		Sample	DW1										DW2									
		Date	28-May-15	22-Oct-15	30-May-16	25-Oct-16	23-May-17	30-Oct-17	30-May-18	31-Oct-18	09-May-19	04-Oct-19	28-May-15	22-Oct-15	30-May-16	25-Oct-16	23-May-17	30-Oct-17	30-May-18	31-Oct-18	09-May-19	04-Oct-19
		ODWS																				
Anion Sum	Sum		13	11.9	12.6	12.3	12.3	9.78	12.7	12.1	10.7	12.6	7.53	7.44	8.62	11.2	7.76	9.18	8.33	11.6	7.59	11.2
Bicarb. Alkalinity (calc. as CaCO3)	mg/L		320	320	330	340	310	350	320	320	340	320	310	290	340	330	340	340	350	330	320	310
Calculated TDS	mg/L	500 (AO)	**964**	**670**	**700**	**640**	**660**	**530**	**690**	**650**	**570**	**690**	430	410	470	**570**	400	470	430	**610**	390	**590**
Cation Sum	Sum		13.5	13.3	13.8	11.5	12.4	10.5	13.2	12.2	10.8	13.2	8.46	8.1	9.22	10.3	7.36	8.51	7.65	11.3	7.11	11.4
Hardness (CaCO3)	mg/L	80-100 (OG)	**590**	**580**	**600**	**500**	**540**	**460**	**560**	**510**	**470**	**550**	**380**	**350**	**400**	**450**	**340**	**380**	**340**	**480**	**330**	**490**
Ion Balance (% Difference)	%		2.07	5.68	4.69	3.23	0.37	3.6	1.80	0.410	0.440	2.31	5.81	4.24	3.37	4.12	2.61	3.8	4.21	1.32	3.24	1.02
Langelier Index (@ 20C)	NA		0.783	0.872	0.917	1.10	0.778	1.08	1.06	0.725	0.874	0.847	0.78	0.984	1.01	0.923	0.905	1.04	1.04	0.665	0.920	0.821
Langelier Index (@ 4C)	NA		0.537	0.625	0.670	0.848	0.531	0.835	0.815	0.478	0.627	0.600	0.532	0.736	0.757	0.675	0.657	0.792	0.791	0.418	0.671	0.574
Saturation pH (@ 20C)	NA		6.79	6.75	6.71	6.77	6.8	6.75	6.76	6.84	6.81	6.79	6.88	6.97	6.81	7.01	6.84	6.9	6.85	6.99	6.87	6.98
Saturation pH (@ 4C)	NA		7.04	7	6.96	7.02	7.05	6.99	7.01	7.09	7.05	7.04	7.13	7.22	7.06	7.26	7.09	7.15	7.09	7.23	7.12	7.22
Total Ammonia-N	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.086	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.084	<0.050	<0.050	<0.050
Colour	TCU	5 (AO)	<2	<2	<2	<2	<2	4	<2	3	2	<2	<2	<2	<2	<2	<2	<2	<2	3	4	<2
Conductivity	uS/cm		1300	1200	1300	1200	1300	910	1400	1200	1000	1300	710	730	810	1100	730	840	780	1100	720	1100
Fluoride (F-)	mg/L	1.5	<0.10	<0.10	0.10	<0.10	<0.10	<0.10	<0.10	0.12	<0.10	<0.10	<0.10	0.11	0.10	0.17	0.11	0.1	<0.10	0.18	<0.10	0.13
Dissolved Organic Carbon	mg/L	5 (AO)	1.3	1.1	1.1	1.5	1.4	2.0	1.1	0.93	2.0	1.0	2.9	1.7	3.6	1.9	3.2	2	3.0	2.0	3.2	1.6
Orthophosphate (P)	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
pH	units	6.5-8.5 (OG)	7.57	7.62	7.62	7.86	7.58	7.83	7.83	7.57	7.68	7.64	7.66	7.96	7.81	7.94	7.75	7.94	7.88	7.65	7.79	7.80
Dissolved Sulphate (SO4)	mg/L	500 (AO)	36	33	35	32	30	21	32	32	20	33	19	24	32	47	18	29	25	54	19	40
Tannins & Lignins	mg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Turbidity	NTU	5	<0.2	1.8	0.2	1.7	0.2	0.1	0.1	<0.1	<0.1	<0.1	<0.2	<0.2	0.6	<0.1	0.3	0.3	0.6	<0.1	<0.1	2.3
Alkalinity (Total as CaCO3)	mg/L	30-500 (OG)	320	320	330	350	310	360	320	320	340	320	310	290	340	330	340	340	350	330	320	310
Dissolved Chloride (Cl)	mg/L	250 (OG)	210	170	190	170	200	77	200	180	120	200	35	41	38	130	22	63	27	140	26	140
Nitrite (N)	mg/L	1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.025	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Nitrate (N)	mg/L	10	0.59	0.35	0.29	0.16	0.13	0.43	0.40	0.24	0.83	<0.10	<0.10	<0.10	<0.10	1.39	<0.10	0.14	<0.10	2.05	0.13	1.77
Nitrate + Nitrite	mg/L	10	0.59	0.35	0.29	0.16	0.13	0.43	0.40	0.24	0.83	0.12	<0.10	<0.10	<0.10	1.39	<0.10	0.14	<0.10	2.05	0.13	1.77
Dissolved Aluminum (Al)	mg/L	0.1 (OG)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0056
Dissolved Antimony (Sb)	ug/L	6		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Arsenic (As)	ug/L	25	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved Barium (Ba)	ug/L	1000	180	140	170	110	170	90	190	170	150	190	74	76	85	170	51	69	71	220	50	230
Dissolved Beryllium (Be)	ug/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Boron (B)	ug/L	5000	21	25	25	30	36	40	25	40	27	37	88	11	30	33	44	17	37	33	55	26
Dissolved Cadmium (Cd)	ug/L	5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Calcium (Ca)	mg/L		180	170.0	190	150	160	150	170	140	140	160	120	100.0	130	89	120	110	120	98	110	100
Dissolved Chromium (Cr)	ug/L	50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dissolved Cobalt (Co)	ug/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Copper (Cu)	ug/L	1000 (AO)	96	1.5	110	1.6	130	<1.0	100	62	69	42	2.7	<1.0	1.3	1.9	1.5	<1.0	3.7	5.0	3.5	1.5
Dissolved Iron (Fe)	mg/L	0.3 (AO)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dissolved Lead (Pb)	ug/L	10	3.5	<0.50	2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Magnesium (Mg)	mg/L		36	35.0	30	29	32	21	32	37	28	37	17	23.0	19	55	10	26	12	58	10	56
Dissolved Manganese (Mn)	ug/L	50 (AO)	6.8	44	3.1	34	4.1	32	<2.0	<2.0	<2.0	31	17	6.5	32	6.6	15	<2.0	9.5	5.1	<2.0	7.7
Dissolved Molybdenum (Mo)	ug/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.60		<0.50	<0.50	1.4	<0.50	<0.50	<0.50	1.0	<0.50	1.0
Dissolved Nickel (Ni)	ug/L			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		<1.0	1.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved Phosphorus (P)	mg/L			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dissolved Potassium (K)	mg/L		1.60	2.1	1.6	2.0	1.8	1.6	2.0	2.3	1.6	2	7.0	3.5	8.6	3.3	4.3	3.2	11.0	3.4	5.2	3.2
Dissolved Selenium (Se)	ug/L	50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Dissolved Silicon (Si)	mg/L			8.70	7.2	8.0	7.0	8.4	7.0	8.9	7.2	9		6.7	5.0	9.1	3.9	7.6	4.6	9.0	3.4	9.4
Dissolved Silver (Ag)	ug/L			<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Sodium (Na)	mg/L	200 (OG)	37	41.0	41	33	38	29	45	46	33	48	18	22	22	30	12	21	14	36	11	35
Dissolved Strontium (Sr)	mg/L			0.570	0.580	0.520	0.630	0.390	0.620	0.570	0.510	0.620		0.0003	0.350	0.630	0.280	0.340	0.300	0.590	0.270	0.580
Dissolved Thallium (Tl)	mg/L			<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005		<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Dissolved Titanium (Ti)	ug/L			<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dissolved Uranium (U)	mg/L	0.02		0.0011	0.0015	0.00088	0.0014	0.00076	0.0015	0.0015	0.0013	0.0016		0.00052	0.00072	0.0029	0.00031	0.00071	0.00030	0.00260	0.00028	0.00260
Dissolved Vanadium (V)	ug/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50		<0.50	<0.50	0.77	<0.50	0.56	<0.50	0.65	<0.50	0.64
Dissolved Zinc (Zn)	ug/L	5000 (AO)	41	6.8	36	<5.0	14	<5.0	17	16	5.6	7.7	5.5	5.4	19	<5.0	5.1	<5.0	10	7.0	<5.0	<5.0

		Sample	MOE 5727662 (DW3)									
		Date	28-May-15	22-Oct-15	30-May-16	25-Oct-16	23-May-17	30-Oct-17	30-May-18	31-Oct-18	09-May-19	08-Oct-19
		ODWS										
Anion Sum	Sum		8.57	10.2	8.90	9.10	8.79	8.57	8.77	10.7	8.73	9.01
Bicarb. Alkalinity (calc. as CaCO3)	mg/L		230	250	240	230	240	230	230	230	220	220
Calculated TDS	mg/L	500 (AO)	464	**570**	490	490	480	460	470	**580**	480	490
Cation Sum	Sum		9.11	11	9.05	8.86	8.74	8.6	8.68	10.7	8.97	8.86
Hardness (CaCO3)	mg/L	80-100 (OG)	**190**	**190**	**200**	**180**	**180**	**180**	**190**	**190**	**200**	**190**
Ion Balance (% Difference)	%		3.06	3.82	0.820	1.34	0.29	0.16	0.520	0.310	1.33	0.820
Langelier Index (@ 20C)	NA		0.471	0.635	0.439	0.548	0.368	0.48	0.393	0.404	0.358	0.512
Langelier Index (@ 4C)	NA		0.223	0.387	0.191	0.300	0.12	0.232	0.145	0.157	0.110	0.264
Saturation pH (@ 20C)	NA		7.55	7.55	7.53	7.59	7.57	7.61	7.56	7.58	7.57	7.59
Saturation pH (@ 4C)	NA		7.8	7.8	7.78	7.83	7.82	7.85	7.81	7.83	7.82	7.84
Total Ammonia-N	mg/L		0.42	<0.050	<0.050	0.46	<0.050	0.41	0.51	<0.050	<0.050	0.33
Colour	TCU	5 (AO)	<2	<2	<2	<2	<2	<2	<2	5	<2	<2
Conductivity	uS/cm		890	1100	900	960	900	860	880	1100	930	970
Fluoride (F-)	mg/L	1.5	0.72	0.8	0.75	0.79	0.75	0.77	0.70	0.73	0.71	0.69
Dissolved Organic Carbon	mg/L	5 (AO)	0.72	0.78	0.23	1.1	0.38	<0.50	<0.50	0.67	0.50	0.69
Orthophosphate (P)	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
pH	units	6.5-8.5 (OG)	8.02	8.19	7.97	8.13	7.94	8.08	7.95	7.99	7.93	8.10
Dissolved Sulphate (SO4)	mg/L	500 (AO)	5	<10	6.9	1.5	6	2.4	5.0	<1.0	7.3	1.2
Tannins & Lignins	mg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Turbidity	NTU	5	<0.2	<0.2	0.1	0.3	0.4	2.4	1.3	<0.1	<0.1	0.2
Alkalinity (Total as CaCO3)	mg/L	30-500 (OG)	230	250	240	230	240	230	240	240	230	220
Dissolved Chloride (Cl)	mg/L	250 (OG)	130	180	140	160	140	140	140	210	140	160
Nitrite (N)	mg/L	1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Nitrate (N)	mg/L	10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrate + Nitrite	mg/L	10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Aluminum (Al)	mg/L	0.1 (OG)	0.011	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<5.0
Dissolved Antimony (Sb)	ug/L	6		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Arsenic (As)	ug/L	25	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved Barium (Ba)	ug/L	1000	190	220	190	210	190	190	200	200	200	220
Dissolved Beryllium (Be)	ug/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Boron (B)	ug/L	5000	790	770	730	760	820	790	780	610	840	730
Dissolved Cadmium (Cd)	ug/L	5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Calcium (Ca)	mg/L		35	34.0	36	33	33	31	34	34	34	34
Dissolved Chromium (Cr)	ug/L	50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dissolved Cobalt (Co)	ug/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Copper (Cu)	ug/L	1000 (AO)	2.7	97	9.5	<1.0	<1.0	<1.0	2.6	43	13	23
Dissolved Iron (Fe)	mg/L	0.3 (AO)	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	0.190	<0.1	<0.1	<0.1
Dissolved Lead (Pb)	ug/L	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.1
Dissolved Magnesium (Mg)	mg/L		26	26.0	26	24	25	25	26	26	27	25
Dissolved Manganese (Mn)	ug/L	50 (AO)	4.6	<2.0	<2.0	4.3	3.9	4.9	5.5	<2.0	<2.0	3.3
Dissolved Molybdenum (Mo)	ug/L			0.65	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Nickel (Ni)	ug/L			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved Phosphorus (P)	mg/L			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dissolved Potassium (K)	mg/L		7.4	7.20	6.9	7.6	7.1	7.2	7.2	7.2	7.1	7.1
Dissolved Selenium (Se)	ug/L	50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Dissolved Silicon (Si)	mg/L			5.40	5.60	5.00	5.50	5.30	5.6	5.0	5.6	4.8
Dissolved Silver (Ag)	ug/L			0.64	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Sodium (Na)	mg/L	200 (OG)	120	160.0	110	120	110	110	110	150	110	110
Dissolved Strontium (Sr)	mg/L			2.50	2.5	2.5	2.2	2.3	2.3	2.6	2.5	3
Dissolved Thallium (Tl)	mg/L			<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Dissolved Titanium (Ti)	ug/L			<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dissolved Uranium (U)	mg/L	0.02		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dissolved Vanadium (V)	ug/L			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Zinc (Zn)	ug/L	5000 (AO)	<5.0	480	210	<5.0	6.9	180	8.9	630	130	170

		Sample	AM1B										BORED WELL									
		Date	28-May-15	22-Oct-15	30-May-16	25-Oct-16	23-May-17	26-Oct-17	30-May-18	30-Oct-18	08-May-19	04-Oct-19	28-May-15	22-Oct-15	30-May-16	25-Oct-16	23-May-17	26-Oct-17	30-May-18	31-Oct-18	08-May-19	04-Oct-19
Parameter	Units	ODWS																				
Bicarb. Alkalinity (calc. as $CaCO_3$)	mg/L		210	200	220	240	210	220	220	240	230	250	210	210	230	210	230	220	260	240	260	250
Total Ammonia-N	mg/L		0.075	0.12	0.14	0.11	0.12	0.16	0.17	0.098	0.11	0.12	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.084	<0.050	<0.050	<0.050
Colour	TCU	**5 (AO)**	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Conductivity	uS/cm		480	470	480	500	470	490	480	480	480	510	490	490	490	470	490	490	540	500	550	520
Total Dissolved Solids	mg/L	**500 (AO)**	280	280	290	290	280	270	290	290	340	300	290	290	300	280	300	280	310	300	320	310
Fluoride (F-)	mg/L	**1.5**	0.23	0.26	0.24	0.23	0.25	0.27	0.21	0.20	0.23	0.22	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.14	0.13	0.13
Dissolved Organic Carbon	mg/L	**5 (AO)**	0.7	0.63	0.81	0.61	0.82	0.72	0.75	0.75	0.71	0.69	0.92	0.88	0.91	1.0	1	1	1.1	0.99	0.88	1.0
Hardness	mg/L	**80-100 (OG)**	240	240	240	240	240	220	250	260	340	260	180	190	210	190	220	170	250	230	270	240
Phosphate	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
pH	units	**6.5-8.5 (OG)**	7.92	7.92	7.98	8.03	7.92	7.99	8.02	8.08	7.98	8.09	8.18	8.2	8.13	8.23	8.17	8.19	8.07	8.25	8.12	8.26
Dissolved Sulphate (SO_4)	mg/L	**500 (AO)**	38	41	41	33	41	37	41	30	44	32	34	33	34	31	32	30	28	28	28	26
Alkalinity (Total as $CaCO_3$)	mg/L	**30-500 (OG)**	210	210	220	240	210	220	220	240	230	250	210	210	230	210	230	230	260	240	270	260
Dissolved Chloride (Cl)	mg/L	**250 (AO)**	4	3.9	3.0	3.4	3.2	2.7	2.3	2.4	2.0	1.9	7	6.1	4.2	4.5	3.5	3.1	2.1	2.3	2.1	1.7
Nitrite (N)	mg/L	**1**	0.019	<0.010	0.012	<0.010	0.012	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Nitrate (N)	mg/L	**10**	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.29	0.33	0.36	0.44	0.38	0.45	0.33	0.29	0.30	0.32
Nitrate + Nitrite	mg/L	**10**	<0.10		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.29		0.36	0.44	0.38	0.45	0.33	0.29	0.30	0.32
Dissolved Calcium (Ca)	mg/L		46	46	47	48	45	42	47	53	84	52	39	40	48	40	48	35	56	52	64	54
Dissolved Magnesium (Mg)	mg/L		30	30	31	30	31	29	31	31	32	32	21	21	23	21	25	21	26	25	28	25
Dissolved Phosphorus (P)	mg/L		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.13	0.12	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.11
Dissolved Potassium (K)	mg/L		2.3	2.0	2.3	2.3	2.4	2.3	2.3	2.4	2.4	2	16	18	13	14	13	13	7.1	8.8	6.0	7.6
Dissolved Sodium (Na)	mg/L	**200 (AO)**	6.8	6.9	6.5	6.5	7.6	6.4	6.7	6.3	6.8	6	25	26	21	19	19	20	15	16	14	19

Notes:
AO: aesthetic objective
OG: operational guideline
Exceedances of the OWDS (operational guidelines excluded) are shown in bold.

		Sample	OW4-I										OW4-II									
		Date	28-May-15	22-Oct-15	30-May-16	25-Oct-16	23-May-17	26-Oct-17	30-May-18	30-Oct-18	08-May-19	04-Oct-19	28-May-15	22-Oct-15	30-May-16	25-Oct-16	23-May-17	26-Oct-17	30-May-18	30-Oct-18	08-May-19	04-Oct-19
Parameter	Units	ODWS																				
Bicarb. Alkalinity (calc. as $CaCO_3$)	mg/L		260	270	280	260	260	250	240	240	210	230	280	270	280	240	230	230	250	230	230	230
Total Ammonia-N	mg/L		0.72	0.89	0.74	0.84	0.77	1.3	1.2	1.3	1.0	1.4	0.77	0.81	0.80	1.1	1.1	1.1	1.2	1.2	1.2	1.2
Colour	TCU	**5 (AO)**	<2	3	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Conductivity	uS/cm		760	850	950	910	1200	1600	1400	1300	1300	1400	900	1000	1100	1800	1800	1900	1600	1800	1600	1800
Total Dissolved Solids	mg/L	**500 (AO)**	430	460	**530**	490	**630**	**780**	**690**	**700**	**630**	**680**	**530**	**550**	**570**	**930**	**910**	**910**	**810**	**920**	**840**	**920**
Fluoride (F-)	mg/L	**1.5**	1.5	1.5	1.4	1.4	1.2	0.99	1.0	1.1	1.0	0.99	1.5	1.4	1.3	0.95	0.95	0.91	0.98	0.90	0.96	0.88
Dissolved Organic Carbon	mg/L	**5 (AO)**	1.6	1.3	1.8	3.2	2.2	1.9	1.7	2.7	2.4	1.8	1.1	1.1	1.2	1.1	1.1	1.1	1.1	1.2	1.0	1.1
Hardness	mg/L	**80-100 (OG)**	72	76	94	82	130	170	140	170	140	140	120	120	130	250	250	230	210	240	230	260
Phosphate	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
pH	units	**6.5-8.5 (OG)**	8.33	8.27	8.28	8.45	8.16	8.06	8.19	8.42	8.40	8.39	8.18	8.13	8.09	8.05	7.94	7.96	8.05	8.29	8.03	8.21
Dissolved Sulphate (SO_4)	mg/L	**500 (AO)**	4	6.3	4.1	11	6.7	2.9	7.5	2.8	2.9	6.9	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity (Total as $CaCO_3$)	mg/L	**30-500 (OG)**	260	280	290	270	260	260	240	250	220	240	280	280	280	240	230	240	250	240	240	230
Dissolved Chloride (Cl)	mg/L	**250 (AO)**	84	95	130	120	210	**330**	**270**	**260**	250	**260**	110	140	160	**430**	**400**	**430**	**340**	**430**	**350**	**400**
Nitrite (N)	mg/L	**1**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Nitrate (N)	mg/L	**10**	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrate + Nitrite	mg/L	**10**	<0.10		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Calcium (Ca)	mg/L		14	15	18	16	24	32	28	33	27	27	22	22	24	45	47	42	39	47	43	49
Dissolved Magnesium (Mg)	mg/L		9	9.3	12	10	17	22	18	21	18	18	15	15	16	32	33	31	27	31	30	34
Dissolved Phosphorus (P)	mg/L		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.13	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.13
Dissolved Potassium (K)	mg/L		4.9	6.0	6.2	5.2	6.7	7.5	7.0	7.8	6.4	6.8	6.8	7.0	7.3	9.9	11	9.8	9.3	9.8	9.7	11
Dissolved Sodium (Na)	mg/L	**200 (AO)**	140	150	170	150	190	**210**	200	**220**	180	200	190	190	180	**260**	**260**	**250**	**230**	**260**	**250**	**270**

Notes:
AO: aesthetic objective
OG: operational guideline
Exceedances of the OWDS (operational guidelines excluded) are shown in bold.

		Sample	OW5-I										OW5-II									
		Date	28-May-15	22-Oct-15	30-May-16	25-Oct-16	23-May-17	26-Oct-17	30-May-18	30-Oct-18	08-May-19	04-Oct-19	28-May-15	22-Oct-15	30-May-16	25-Oct-16	23-May-17	26-Oct-17	30-May-18	30-Oct-18	08-May-19	04-Oct-19
Parameter	Units	ODWS																				
Bicarb. Alkalinity (calc. as $CaCO_3$)	mg/L		220	230	230	240	230	250	260	260	270	260	110	110	110	110	110	110	110	110	110	120
Total Ammonia-N	mg/L		0.84	0.91	0.65	0.78	0.81	0.78	0.75	0.72	0.54	0.62	9.4	9.9	9.2	9.5	9.4	9.6	12	9.9	8.6	9.1
Colour	TCU	**5 (AO)**	<2	<2	<2	4	<2	<2	<2	2	<2	<2	**73**	**26**	**51**	**100**	**51**	**9**	**6**	**34**	<2	**12**
Conductivity	uS/cm		610	610	620	620	600	690	710	690	740	620	28000	26000	29000	27000	28000	28000	28000	25000	27000	26000
Total Dissolved Solids	mg/L	**500 (AO)**	330	340	350	340	340	360	390	390	460	360	**17000**	**16000**	**16000**	**16000**	**16000**	**16000**	**18000**	**16000**	**16000**	**15000**
Fluoride (F-)	mg/L	**1.5**	0.85	0.90	0.85	0.89	0.82	0.8	0.65	0.73	0.56	0.70	0.44	0.46	0.45	0.45	0.44	0.47	0.42	0.44	0.40	0.41
Dissolved Organic Carbon	mg/L	**5 (AO)**	1.2	1.1	1.2	1.3	1.4	1.3	1.3	1.3	1.2	1.5	0.49	0.34	0.53	0.48	0.7	0.49	0.51	0.62	0.57	<0.50
Hardness	mg/L	**80-100 (OG)**	160	160	170	160	170	160	210	200	330	190	6100	5900	6300	6300	6300	5200	7900	6300	6000	5800
Phosphate	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
pH	units	**6.5-8.5 (OG)**	8.04	8.05	8.02	8.11	8.01	8.02	8.01	8.28	7.97	8.20	7.23	7.31	7.28	7.34	7.27	7.34	7.31	7.69	7.35	7.58
Dissolved Sulphate (SO_4)	mg/L	**500 (AO)**	28	29	32	27	28	31	35	35	44	36	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.3	5.3
Alkalinity (Total as $CaCO_3$)	mg/L	**30-500 (OG)**	230	230	240	240	230	250	260	260	270	260	110	110	110	110	110	110	110	110	110	120
Dissolved Chloride (Cl)	mg/L	**250 (AO)**	36	37	39	35	37	44	46	43	52	26	**11000**	**9900**	**10000**	**9800**	**10000**	**11000**	**10000**	**9700**	**10000**	**9400**
Nitrite (N)	mg/L	**1**	0.072	0.121	0.107	0.066	0.033	0.055	<0.010	0.086	<0.010	0.046	<0.010	<0.010	0.013	<0.010	<0.050	<0.010	<0.010	<0.010	<0.010	<0.010
Nitrate (N)	mg/L	**10**	0.24	0.25	0.41	0.26	<0.10	0.39	0.43	0.26	0.59	0.26	<0.10	<0.10	<0.10	<0.10	<0.50	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrate + Nitrite	mg/L	**10**	0.31		0.52	0.32	<0.10	0.45	0.43	0.34	0.59	0.31	<0.10		<0.10	<0.10	<0.50	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Calcium (Ca)	mg/L		28	31	31	29	29	29	39	37	84	33	1300	1200	1300	1300	1200	1000	1600	1300	1200	1200
Dissolved Magnesium (Mg)	mg/L		21	21	22	21	22	22	27	25	29	25	730	710	750	760	780	640	920	750	720	690
Dissolved Phosphorus (P)	mg/L		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.17	0.12	<1	<1	<1	<1	<0.5	<1	<0.5	<0.5	<0.5	0.56
Dissolved Potassium (K)	mg/L		6.6	8.0	7.2	7.5	6.9	7.4	6.9	7.5	6.6	6.8	68	70	69	77	74	62	77	70	66	67
Dissolved Sodium (Na)	mg/L	**200 (AO)**	65	64	63	64	64	64	66	70	66	59	**3700**	**3700**	**3800**	**3900**	**3900**	**3300**	**4400**	**4000**	**3400**	**3800**

Notes:
AO: aesthetic objective
OG: operational guideline
Exceedances of the OWDS (operational guidelines excluded) are shown in bold.

		Sample	OW5-III										OW6-II									
		Date	28-May-15	22-Oct-15	30-May-16	25-Oct-16	23-May-17	26-Oct-17	30-May-18	30-Oct-18	08-May-19	04-Oct-19	28-May-15	22-Oct-15	30-May-16	25-Oct-16	23-May-17	30-Oct-17	30-May-18	30-Oct-18	08-May-19	04-Oct-19
Parameter	Units	ODWS																				
Bicarb. Alkalinity (calc. as $CaCO_3$)	mg/L		110	100	110	120	110	130	130	100	110	110	150	160	160	160	150	150	150	150	140	150
Total Ammonia-N	mg/L		9.5	11	8.9	10	9.6	10	9.6	9.4	9.7	9.5	0.82	1.4	1.0	1.3	0.059	0.96	0.12	1.2	<0.050	1.4
Colour	TCU	**5 (AO)**	**38**	**18**	**35**	**59**	2	5	3	**12**	<2	4	<2	2	<2	<2	<2	<2	<2	3	<2	<2
Conductivity	uS/cm		29000	37000	27000	32000	29000	33000	31000	21000	29000	28000	5400	6000	6200	6300	6400	6300	6500	6100	6500	6400
Total Dissolved Solids	mg/L	**500 (AO)**	**17000**	**22000**	**16000**	**18000**	**17000**	**20000**	**18000**	**13000**	**17000**	**16000**	**3100**	**3800**	**3800**	**4000**	**4000**	**3700**	**4100**	**4000**	**4000**	**4000**
Fluoride (F-)	mg/L	**1.5**	0.42	0.44	0.44	0.43	0.44	0.43	0.39	0.34	0.40	0.39	0.46	0.49	0.49	0.51	0.51	0.52	0.57	0.60	0.62	0.63
Dissolved Organic Carbon	mg/L	**5 (AO)**	0.97	1.4	1.1	1.3	0.78	1.1	0.85	2.8	0.99	0.79	1.2	0.86	1.0	0.63	0.77	0.82	0.58	0.66	0.58	0.57
Hardness	mg/L	**80-100 (OG)**	6200	8300	6600	6900	6500	6400	6300	5300	6700	6200	1100	1400	1600	1600	1600	1400	1600	1600	1600	1700
Phosphate	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
pH	units	**6.5-8.5 (OG)**	7.35	7.21	7.28	7.45	7.33	7.36	7.35	7.17	7.39	7.53	7.82	7.67	7.69	7.77	7.6	7.67	7.67	8.00	7.69	7.86
Dissolved Sulphate (SO_4)	mg/L	**500 (AO)**	20	150	33	77	14	83	79	2.8	34	11	**570**	**1000**	**1000**	**1100**	**1100**	**990**	**1100**	**990**	**960**	**930**
Alkalinity (Total as $CaCO_3$)	mg/L	**30-500 (OG)**	110	100	110	120	110	130	130	100	110	110	150	160	160	160	150	150	150	160	140	150
Dissolved Chloride (Cl)	mg/L	**250 (AO)**	**11000**	**14000**	**9900**	**11000**	**10000**	**13000**	**12000**	**7500**	**10000**	**10000**	**1400**	**1400**	**1400**	**1500**	**1500**	**1400**	**1600**	**1600**	**1500**	**1600**
Nitrite (N)	mg/L	**1**	<0.010	0.015	0.013	<0.010	<0.050	<0.010	<0.010	0.180	<0.010	<0.010	0.256	0.026	0.127	0.020	0.019	0.114	0.164	0.077	<0.010	0.072
Nitrate (N)	mg/L	**10**	<0.10	<0.10	<0.10	<0.10	<0.50	<0.10	<0.10	0.64	<0.10	<0.10	0.66	<0.10	<0.10	<0.10	1.24	0.18	0.80	0.20	0.95	<0.10
Nitrate + Nitrite	mg/L	**10**	<0.10		0.10	<0.10	<0.50	<0.10	<0.10	0.82	<0.10	<0.10	0.91		0.21	<0.10	1.26	0.29	0.97	0.27	0.95	<0.10
Dissolved Calcium (Ca)	mg/L		1300	1700	1400	1400	1300	1300	1300	1100	1400	1300	230	280	330	320	310	280	320	330	340	330
Dissolved Magnesium (Mg)	mg/L		740	960	770	800	790	780	760	630	770	730	120	170	180	190	200	180	200	190	190	200
Dissolved Phosphorus (P)	mg/L		<1	<1	<1	<1	<0.5	<1	<0.5	<0.5	<1	0.62	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	0.10
Dissolved Potassium (K)	mg/L		71	79	67	71	76	67	69	59	68	68	13	14	15	16	18	15	17	17	18	19
Dissolved Sodium (Na)	mg/L	**200 (AO)**	**3800**	**5200**	**4200**	**4300**	**4200**	**4200**	**3800**	**3300**	**4000**	**3800**	**650**	**790**	**760**	**770**	**790**	**720**	**760**	**800**	**810**	**800**

Notes:
AO: aesthetic objective
OG: operational guideline
Exceedances of the OWDS (operational guidelines excluded) are shown in bold.

		Sample	OW7-I										OW7-II									
		Date	28-May-15	22-Oct-15	30-May-16	25-Oct-16	23-May-17	30-Oct-17	30-May-18	30-Oct-18	08-May-19	04-Oct-19	28-May-15	22-Oct-15	30-May-16	25-Oct-16	23-May-17	26-Oct-17	30-May-18	30-Oct-18	08-May-19	04-Oct-19
Parameter	Units	ODWS																				
Bicarb. Alkalinity (calc. as $CaCO_3$)	mg/L		270	230	270	220	310	230	280	260	290	210	270	280	270	290	320	250	280	230	290	270
Total Ammonia-N	mg/L		3.7	3.1	3.0	2.5	2.8	4.7	3.0	3.1	2.0	1.8	2.3	2.4	2.6	1.6	1.6	3.6	2.2	2.8	2.4	1.6
Colour	TCU	**5 (AO)**	3	3	**76**	**21**	**23**	**90**	**190**	**17**	<2	**17**	3	<2	**20**	<2	3	<2	<2	<2	<2	<2
Conductivity	uS/cm		5600	700	5800	690	5300	11000	6400	6500	6400	720	8000	7300	9800	860	5600	15000	6800	7300	6200	2200
Total Dissolved Solids	mg/L	**500 (AO)**	**3200**	**520**	**3100**	360	**2800**	**5600**	**3400**	**3800**	**3500**	430	**4700**	**3800**	**5400**	470	**3000**	**8300**	**3800**	**4300**	**3400**	**1100**
Fluoride (F-)	mg/L	**1.5**	**2.7**	0.51	**2.7**	0.46	**2.8**	1.2	**2.2**	1.1	**2.1**	0.46	**2.4**	1.2	**2.1**	0.49	**2.8**	1.4	**2.1**	1.1	**2.1**	0.75
Dissolved Organic Carbon	mg/L	**5 (AO)**	1	1.8	0.92	1.8	0.98	0.92	1.0	1.3	0.84	1.9	0.86	1.9	2.0	3.2	1	1	1.0	1.4	0.77	2.4
Hardness	mg/L	**80-100 (OG)**	890	450	860	250	710	1900	830	1300	910	320	1500	1500	1800	330	800	3000	1100	1400	830	500
Phosphate	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.010
pH	units	**6.5-8.5 (OG)**	7.76	7.98	7.93	7.90	7.86	7.72	7.85	7.98	7.83	8.05	7.78	7.83	7.73	8.14	7.87	7.66	7.74	7.77	7.89	8.07
Dissolved Sulphate (SO_4)	mg/L	**500 (AO)**	23	49	9.1	49	37	32	14	32	25	73	31	55	23	50	24	7	28	28	20	43
Alkalinity (Total as $CaCO_3$)	mg/L	**30-500 (OG)**	270	230	280	220	310	230	280	260	290	210	280	280	270	300	320	250	280	230	300	270
Dissolved Chloride (Cl)	mg/L	**250 (AO)**	**1700**	55	**1700**	46	**1500**	**3600**	**2000**	**2200**	**1900**	47	**2700**	**2200**	**3200**	71	**1600**	**5300**	**2200**	**2600**	**1900**	**490**
Nitrite (N)	mg/L	**1**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.012
Nitrate (N)	mg/L	**10**	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrate + Nitrite	mg/L	**10**	<0.10		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Calcium (Ca)	mg/L		180	91	170	52	140	390	160	270	190	63	320	300	380	66	160	600	220	290	180	100
Dissolved Magnesium (Mg)	mg/L		110	54	110	30	86	230	100	150	100	39	180	180	210	39	97	360	130	160	95	60
Dissolved Phosphorus (P)	mg/L		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	0.11	<0.1	0.10
Dissolved Potassium (K)	mg/L		15	13	15	12	13	26	14	22	16	13	20	19	21	13	14	29	16	22	15	12
Dissolved Sodium (Na)	mg/L	**200 (AO)**	**910**	110	**890**	28	**790**	**1200**	**890**	**950**	**1000**	50	**1300**	**880**	**1400**	44	**850**	**1900**	**1000**	**1100**	**960**	**250**

Notes:
AO: aesthetic objective
OG: operational guideline
Exceedances of the OWDS (operational guidelines excluded) are shown in bold.

		Sample	OW8-I										OW8-II									
		Date	28-May-15	22-Oct-15	30-May-16	25-Oct-16	23-May-17	30-Oct-17	29-May-18	30-Oct-18	08-May-19	04-Oct-19	28-May-15	22-Oct-15	30-May-16	25-Oct-16	23-May-17	26-Oct-17	29-May-18	30-Oct-18	08-May-19	04-Oct-19
Parameter	Units	ODWS																				
Bicarb. Alkalinity (calc. as $CaCO_3$)	mg/L		340	240	330	370	310	300	290	300	250	300	300	250	290	340	320	300	300	290	300	310
Total Ammonia-N	mg/L		0.58	2.4	0.72	1.3	0.63	1.4	0.84	0.43	1.1	0.84	0.93	2.4	1.1	1.7	0.48	1.1	0.51	0.95	0.39	0.87
Colour	TCU	**5 (AO)**	<2	3	<2	<2	<2	<2	**7**	<2	<2	<2	<2	**9**	**40**	<2	<2	<2	4	<2	<2	<2
Conductivity	uS/cm		1300	7300	2000	3200	980	2400	1300	770	2000	1600	1200	8400	4700	5100	800	3000	810	2500	760	2100
Total Dissolved Solids	mg/L	**500 (AO)**	**680**	**3900**	**1100**	**1700**	**600**	**1200**	**780**	450	**1200**	**880**	**1000**	**4500**	**2500**	**2700**	470	**1500**	450	**1400**	440	**1100**
Fluoride (F-)	mg/L	**1.5**	**2.4**	0.82	**2.2**	1.3	**1.6**	0.89	0.91	0.69	1.1	0.86	0.8	0.71	0.47	1.2	0.71	0.79	0.47	0.90	0.60	0.94
Dissolved Organic Carbon	mg/L	**5 (AO)**	1.3	1.1	1.4	1.3	1.5	1.4	1.5	1.5	1.5	1.5	1.7	1.2	1.7	1.2	1.9	1.4	1.7	1.4	1.7	1.4
Hardness	mg/L	**80-100 (OG)**	250	1500	550	450	240	520	500	290	450	390	890	1900	1300	780	260	660	320	480	300	430
Phosphate	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
pH	units	**6.5-8.5 (OG)**	8.02	7.62	7.92	7.85	7.96	7.86	7.85	7.81	8.04	7.98	7.88	7.62	7.65	7.85	7.73	7.67	7.76	7.96	7.85	7.99
Dissolved Sulphate (SO_4)	mg/L	**500 (AO)**	33	19	30	20	53	45	46	54	58	38	37	20	54	8.4	52	37	60	22	51	22
Alkalinity (Total as $CaCO_3$)	mg/L	**30-500 (OG)**	350	240	330	370	310	300	290	300	250	300	300	260	290	340	330	300	310	300	300	310
Dissolved Chloride (Cl)	mg/L	**250 (AO)**	160	**2300**	**420**	**820**	110	**540**	240	36	**470**	**310**	180	**2700**	**1300**	**1500**	36	**770**	44	**630**	33	**460**
Nitrite (N)	mg/L	**1**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Nitrate (N)	mg/L	**10**	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrate + Nitrite	mg/L	**10**	<0.10		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Calcium (Ca)	mg/L		66	370	140	110	62	140	140	86	120	100	220	450	340	180	70	170	96	130	89	110
Dissolved Magnesium (Mg)	mg/L		21	150	45	43	22	44	39	18	39	34	85	180	120	79	20	58	18	41	18	38
Dissolved Phosphorus (P)	mg/L		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.13	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.11
Dissolved Potassium (K)	mg/L		5.4	20	6.9	11	5.5	8.4	5.7	4.3	8.5	7.0	7.3	20	9.5	14	4.9	9.0	3.9	8.5	4.0	7.2
Dissolved Sodium (Na)	mg/L	**200 (AO)**	170	920	**270**	**480**	150	**250**	130	57	**330**	200	**310**	**1000**	**430**	**710**	84	**300**	36	**340**	51	**250**

Notes:
AO: aesthetic objective
OG: operational guideline
Exceedances of the OWDS (operational guidelines excluded) are shown in bold.

		Sample	OW9-I							OW9-II				
		Date	28-May-15	22-Oct-15	30-May-16	25-Oct-16	23-May-17	26-Oct-17	29-May-18	28-May-15	22-Oct-15	30-May-16	25-Oct-16	08-May-19
Parameter	Units	ODWS												
Bicarb. Alkalinity (calc. as $CaCO_3$)	mg/L		220	470	230	150	170	130	200	280	260	250	230	170
Total Ammonia-N	mg/L		5.2	2.5	12	18	18	21	18	1.9	2.9	0.23	0.22	0.11
Colour	TCU	**5 (AO)**	**7**	**6**	**21**	**87**	**110**	**49**	**14**	**7**	**8**	**7**	4	3
Conductivity	uS/cm		15000	5200	50000	80000	81000	88000	73000	7000	13000	15000	16000	39000
Total Dissolved Solids	mg/L	**500 (AO)**	**8500**	**3200**	**31000**	**55000**	**58000**	**57000**	**46000**	**4600**	**7400**	**8300**	**9000**	**23000**
Fluoride (F-)	mg/L	**1.5**	0.18	0.23	<0.10	<0.1	<0.10	<0.10	<0.10	0.36	0.12	0.11	0.11	<0.10
Dissolved Organic Carbon	mg/L	**5 (AO)**	**8.8**	**11**	**10**	**9.1**	**12**	**9.1**	**8.7**	**8.8**	**9.6**	**8.8**	**8.7**	**7.8**
Hardness	mg/L	**80-100 (OG)**	2900	1200	16000	26000	27000	25000	22000	1900	2700	3300	3900	12000
Phosphate	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
pH	units	**6.5-8.5 (OG)**	7.6	7.63	7.02	6.90	6.73	6.95	6.93	7.61	7.4	7.37	7.40	7.09
Dissolved Sulphate (SO_4)	mg/L	**500 (AO)**	150	77	150	210	180	160	120	270	380	380	320	**880**
Alkalinity (Total as $CaCO_3$)	mg/L	**30-500 (OG)**	220	470	230	150	170	130	200	290	260	250	240	170
Dissolved Chloride (Cl)	mg/L	**250 (AO)**	**5200**	**1400**	**19000**	**35000**	**37000**	**39000**	**30000**	**2100**	**4200**	**4700**	**5000**	**13000**
Nitrite (N)	mg/L	**1**	<0.010	<0.010	<0.050	<0.050	<0.10	<0.010	<0.050	<0.010	<0.010	0.065	0.026	0.013
Nitrate (N)	mg/L	**10**	<0.10	<0.10	<0.50	<0.50	<1.0	<0.10	<0.50	<0.10	<0.10	3.38	2.84	0.51
Nitrate + Nitrite	mg/L	**10**	<0.10		<0.50	<0.50	<1.0	<0.10	<0.50	<0.10		3.44	2.86	0.52
Dissolved Calcium (Ca)	mg/L		660	260	3500	5500	5700	5000	4600	480	670	800	930	2900
Dissolved Magnesium (Mg)	mg/L		300	120	1800	3100	3200	3100	2500	180	260	310	370	1200
Dissolved Phosphorus (P)	mg/L		<0.1	<0.1	<1	<1	<2	<1	<1	<0.1	<0.1	<0.5	<0.5	<0.1
Dissolved Potassium (K)	mg/L		40	24	100	150	140	140	120	25	33	34	42	69
Dissolved Sodium (Na)	mg/L	**200 (AO)**	**2000**	**1000**	**6500**	**11000**	**11000**	**10000**	**9000**	**1300**	**1700**	**1900**	**2200**	**4200**

Notes:
AO: aesthetic objective
OG: operational guideline
Exceedances of the OWDS (operational guidelines excluded) are shown in bold.

		Sample	TW1-1										AMx-R		
		Date	28-May-15	22-Oct-15	30-May-16	25-Oct-16	23-May-17	26-Oct-17	30-May-18	31-Oct-18	08-May-19	04-Oct-19	31-Oct-18	08-May-19	04-Oct-19
Parameter	Units	ODWS													
Bicarb. Alkalinity (calc. as $CaCO_3$)	mg/L		250	270	260	280	290	290	290	280	280	280	100	66	39
Total Ammonia-N	mg/L		0.89	0.93	1.0	1.0	0.47	1.2	0.80	0.62	0.68	1.2	6.4	6.0	5.8
Colour	TCU	**5 (AO)**	<2	<2	<2	2	<2	<2	<2	2	<2	<2	<2	<2	**18**
Conductivity	uS/cm		2400	3000	2800	3500	1300	2300	1900	1800	1900	3100	22000	20000	21000
Total Dissolved Solids	mg/L	**500 (AO)**	**1200**	**1400**	**1400**	**1800**	**670**	**1300**	**950**	**930**	**1000**	**1700**	**14000**	**11000**	**12000**
Fluoride (F-)	mg/L	**1.5**	0.55	0.51	0.54	0.50	0.5	0.5	0.49	0.49	0.51	0.50	0.61	0.58	0.57
Dissolved Organic Carbon	mg/L	**5 (AO)**	1.5	1.5	1.6	1.7	1.8	1.7	1.6	1.8	1.6	1.6	3.6	2.7	2.6
Hardness	mg/L	**80-100 (OG)**	550	640	650	810	410	760	450	490	490	830	5700	4800	4700
Phosphate	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
pH	units	**6.5-8.5 (OG)**	7.82	7.76	7.85	7.84	7.71	7.78	7.83	8.10	7.78	7.99	7.66	7.13	7.12
Dissolved Sulphate (SO_4)	mg/L	**500 (AO)**	14	12	17	11	22	20	27	24	28	33	53	29	37
Alkalinity (Total as $CaCO_3$)	mg/L	**30-500 (OG)**	250	270	260	280	290	290	290	280	280	280	100	67	39
Dissolved Chloride (Cl)	mg/L	**250 (AO)**	**580**	**770**	**690**	**980**	**220**	**510**	**420**	**390**	**420**	**830**	**9200**	**7200**	**7800**
Nitrite (N)	mg/L	**1**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.030	<0.010	<0.010	<0.010
Nitrate (N)	mg/L	**10**	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.18	0.14	<0.10	<0.10	<0.10
Nitrate + Nitrite	mg/L	**10**	<0.10		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.18	0.17	<0.10	<0.10	<0.10
Dissolved Calcium (Ca)	mg/L		120	140	140	180	96	160	100	120	110	180	1100	920	910
Dissolved Magnesium (Mg)	mg/L		61	69	75	89	41	86	48	50	52	91	720	610	600
Dissolved Phosphorus (P)	mg/L		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.11	<0.5	<0.5	0.64
Dissolved Potassium (K)	mg/L		9.6	10	12	10	6.1	10	7.7	7.1	8.6	13	56	49	50
Dissolved Sodium (Na)	mg/L	**200 (AO)**	**230**	**250**	**300**	**320**	100	**320**	160	160	**210**	**400**	**3200**	**2600**	**2600**

Notes:
AO: aesthetic objective
OG: operational guideline
Exceedances of the OWDS (operational guidelines excluded) are shown in bold.

Table 6: 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-Jan-19	NO PUMP		0	0	-	-	-
2-Jan-19	NO PUMP		0	0	-	-	-
3-Jan-19	NO PUMP		0	0	-	-	-
4-Jan-19	NO PUMP		0	0	-	-	-
5-Jan-19	NO PUMP		0	0	-	-	-
6-Jan-19	NO PUMP		0	0	-	-	-
7-Jan-19	NO PUMP		0	0	-	-	-
8-Jan-19	NO PUMP		0	0	-	-	-
9-Jan-19	NO PUMP		0	0	-	-	-
10-Jan-19	NO PUMP		0	0	-	-	-
11-Jan-19	NO PUMP		0	0	-	-	-
12-Jan-19	NO PUMP		0	0	-	-	-
13-Jan-19	NO PUMP		0	0	-	-	-
14-Jan-19	6:30AM	4:30PM	36000	600	1,260,000	35	2,100
15-Jan-19	NO PUMP		0	0	-	-	-
16-Jan-19	6:30AM	4:30 AM	36000	600	1,260,000	35	2,100
17-Jan-19	NO PUMP		0	0	-	-	-
18-Jan-19	NO PUMP		0	0	-	-	-
19-Jan-19	NO PUMP		0	0	-	-	-
20-Jan-19	NO PUMP		0	0	-	-	-
21-Jan-19	NO PUMP		0	0	-	-	-
22-Jan-19	7AM	5PM	36000	600	1,260,000	35	2,100
23-Jan-19	7AM	5PM	36000	600	1,260,000	35	2,100
24-Jan-19	7AM	5PM	36000	600	1,260,000	35	2,100
25-Jan-19	7AM	4PM	32400	540	1,134,000	35	2,100
26-Jan-19	NO PUMP		0	0	-	-	-
27-Jan-19	NO PUMP		0	0	-	-	-
28-Jan-19	NO PUMP		0	0	-	-	-
29-Jan-19	7AM	5PM	36000	600	1,260,000	35	2,100
30-Jan-19	7AM	5PM	36000	600	1,260,000	35	2,100
31-Jan-19	7AM	5PM	36000	600	1,260,000	35	2,100
1-Feb-19	NO PUMP		0	0	-	-	-
2-Feb-19	NO PUMP		0	0	-	-	-
3-Feb-19	NO PUMP		0	0	-	-	-
4-Feb-19	NO PUMP		0	0	-	-	-
5-Feb-19	NO PUMP		0	0	-	-	-
6-Feb-19	7AM	5PM	36000	600	1,260,000	35	2,100
7-Feb-19	NO PUMP		0	0	-	-	-
8-Feb-19	NO PUMP		0	0	-	-	-
9-Feb-19	NO PUMP		0	0	-	-	-
10-Feb-19	NO PUMP		0	0	-	-	-
11-Feb-19	9AM	5PM	28800	480	1,008,000	35	2,100
12-Feb-19	NO PUMP		0	0	-	-	-

Table 6: 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**
13-Feb-19	NO PUMP		0	0	-	-	-
14-Feb-19	8AM	5PM	32400	540	1,134,000	35	2,100
15-Feb-19	NO PUMP		0	0	-	-	-
16-Feb-19	NO PUMP		0	0	-	-	-
17-Feb-19	NO PUMP		0	0	-	-	-
18-Feb-19	NO PUMP		0	0	-	-	-
19-Feb-19	NO PUMP		0	0	-	-	-
20-Feb-19	7AM	5PM	36000	600	1,260,000	35	2,100
21-Feb-19	NO PUMP		0	0	-	-	-
22-Feb-19	7AM	3PM	28800	480	1,008,000	35	2,100
23-Feb-19	NO PUMP		0	0	-	-	-
24-Feb-19	NO PUMP		0	0	-	-	-
25-Feb-19	NO PUMP		0	0	-	-	-
26-Feb-19	NO PUMP		0	0	-	-	-
27-Feb-19	NO PUMP		0	0	-	-	-
28-Feb-19	NO PUMP		0	0	-	-	-
1-Mar-19	7AM	5PM	36000	600	1,260,000	35	2,100
2-Mar-19	7AM	5PM	36000	600	1,260,000	35	2,100
3-Mar-19	NO PUMP		0	0	-	-	-
4-Mar-19	7AM	5PM	36000	600	1,260,000	35	2,100
5-Mar-19	NO PUMP		0	0	-	-	-
6-Mar-19	NO PUMP		0	0	-	-	-
7-Mar-19	7AM	5PM	36000	600	1,260,000	35	2,100
8-Mar-19	7AM	4PM	32400	540	1,134,000	35	2,100
9-Mar-19	7AM	3PM	28800	480	1,008,000	35	2,100
10-Mar-19	NO PUMP		0	0	-	-	-
11-Mar-19	7AM	5PM	36000	600	1,260,000	35	2,100
12-Mar-19	7AM	5PM	36000	600	1,260,000	35	2,100
13-Mar-19	7AM	5PM	36000	600	1,260,000	35	2,100
14-Mar-19	NO PUMP		0	0	-	-	-
15-Mar-19	7AM	5PM	36000	600	1,260,000	35	2,100
16-Mar-19	7AM	3PM	28800	480	1,008,000	35	2,100
17-Mar-19	NO PUMP		0	0	-	-	-
18-Mar-19	7AM	5PM	36000	600	1,260,000	35	2,100
19-Mar-19	7AM	5PM	36000	600	1,260,000	35	2,100
20-Mar-19	7AM	5PM	36000	600	1,260,000	35	2,100
21-Mar-19	7AM	5PM	36000	600	1,260,000	35	2,100
22-Mar-19	7AM	3PM	28800	480	1,008,000	35	2,100
23-Mar-19	NO PUMP		0	0	-	-	-
24-Mar-19	NO PUMP		0	0	-	-	-
25-Mar-19	7AM	4PM	32400	540	1,134,000	35	2,100
26-Mar-19	7AM	5PM	36000	600	1,260,000	35	2,100
27-Mar-19	7AM	5PM	36000	600	1,260,000	35	2,100

Table 6: 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**
28-Mar-19	7AM	5PM	36000	600	1,260,000	35	2,100
29-Mar-19	7AM	5PM	36000	600	1,260,000	35	2,100
30-Mar-19	NO PUMP		0	0	-	-	-
31-Mar-19	NO PUMP		0	0	-	-	-
1-Apr-19	NO PUMP		0	0	-	-	-
2-Apr-19	NO PUMP		0	0	-	-	-
3-Apr-19	7AM	5PM	36000	600	1,260,000	35	2,100
4-Apr-19	7AM	5PM	36000	600	1,260,000	35	2,100
5-Apr-19	7AM	5PM	36000	600	1,260,000	35	2,100
6-Apr-19	7AM	5PM	36000	600	1,260,000	35	2,100
7-Apr-19	NO PUMP		0	0	-	-	-
8-Apr-19	NO PUMP		0	0	-	-	-
9-Apr-19	7AM	5PM	36000	600	1,260,000	35	2,100
10-Apr-19	NO PUMP		0	0	-	-	-
11-Apr-19	7AM	5PM	36000	600	1,260,000	35	2,100
12-Apr-19	7AM	5PM	36000	600	1,260,000	35	2,100
13-Apr-19	NO PUMP		0	0	-	-	-
14-Apr-19	NO PUMP		0	0	-	-	-
15-Apr-19	7AM	5PM	36000	600	1,260,000	35	2,100
16-Apr-19	7AM	5PM	36000	600	1,260,000	35	2,100
17-Apr-19	7AM	5PM	36000	600	1,260,000	35	2,100
18-Apr-19	7AM	5PM	36000	600	1,260,000	35	2,100
19-Apr-19	7AM	6PM	39600	660	1,386,000	35	2,100
20-Apr-19	7AM	5PM	36000	600	1,260,000	35	2,100
21-Apr-19	NO PUMP		0	0	-	-	-
22-Apr-19	NO PUMP		0	0	-	-	-
23-Apr-19	7AM	5PM	36000	600	-	-	-
24-Apr-19	7AM	5PM	36000	600	1,260,000	35	2,100
25-Apr-19	7AM	5PM	36000	600	1,260,000	35	2,100
26-Apr-19	7AM	5PM	36000	600	1,260,000	35	2,100
27-Apr-19	7AM	4PM	32400	540	1,134,000	35	2,100
28-Apr-19	NO PUMP		0	0	-	-	-
29-Apr-19	7AM	5PM	36000	600	1,260,000	35	2,100
30-Apr-19	7AM	5PM	36000	600	1,260,000	35	2,100
1-May-19	7AM	5PM	36000	600	1,260,000	35	2,100
2-May-19	7AM	5PM	36000	600	1,260,000	35	2,100
3-May-19	7AM	5PM	36000	600	1,260,000	35	2,100
4-May-19	NO PUMP		0	0	-	-	-
5-May-19	NO PUMP		0	0	-	-	-
6-May-19	7AM	5PM	36000	600	1,260,000	35	2,100
7-May-19	7AM	5PM	36000	600	1,260,000	35	2,100
8-May-19	7AM	5PM	36000	600	1,260,000	35	2,100
9-May-19	7AM	5PM	36000	600	1,260,000	35	2,100

Table 6: 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**
10-May-19	7AM	3PM	28800	480	1,008,000	35	2,100
11-May-19	7AM	12PM	18000	300	630,000	35	2,100
12-May-19	NO PUMP		0	0	-	-	-
13-May-19	7AM	5PM	36000	600	1,260,000	35	2,100
14-May-19	7AM	5PM	36000	600	1,260,000	35	2,100
15-May-19	7AM	5PM	36000	600	1,260,000	35	2,100
16-May-19	10AM	3PM	18000	300	630,000	35	2,100
17-May-19	7AM	1PM	21600	360	756,000	35	2,100
18-May-19	NO PUMP		0	0	-	-	-
19-May-19	NO PUMP		0	0	-	-	-
20-May-19	NO PUMP		0	0	-	-	-
21-May-19	7AM	5PM	36000	600	1,260,000	35	2,100
22-May-19	7AM	5PM	36000	600	1,260,000	35	2,100
23-May-19	7AM	5PM	36000	600	1,260,000	35	2,100
24-May-19	7AM	2PM	25200	420	882,000	35	2,100
25-May-19	NO PUMP		0	0	-	-	-
26-May-19	NO PUMP		0	0	-	-	-
27-May-19	7AM	5PM	36000	600	1,260,000	35	2,100
28-May-19	7AM	5PM	36000	600	1,260,000	35	2,100
29-May-19	7AM	5PM	36000	600	1,260,000	35	2,100
30-May-19	7AM	5PM	36000	600	1,260,000	35	2,100
31-May-19	7AM	5PM	36000	600	1,260,000	35	2,100
1-Jun-19	7AM	1PM	21600	360	756,000	35	2,100
2-Jun-19	NO PUMP		0	0	-	-	-
3-Jun-19	7AM	5PM	36000	600	1,260,000	35	2,100
4-Jun-19	7AM	5PM	36000	600	1,260,000	35	2,100
5-Jun-19	7AM	5PM	36000	600	1,260,000	35	2,100
6-Jun-19	7AM	5PM	36000	600	1,260,000	35	2,100
7-Jun-19	7AM	5PM	36000	600	1,260,000	35	2,100
8-Jun-19	NO PUMP		0	0	-	-	-
9-Jun-19	NO PUMP		0	0	-	-	-
10-Jun-19	7AM	5PM	36000	600	1,260,000	35	2,100
11-Jun-19	7AM	5PM	36000	600	1,260,000	35	2,100
12-Jun-19	7AM	5PM	36000	600	1,260,000	35	2,100
13-Jun-19	7AM	5PM	36000	600	1,260,000	35	2,100
14-Jun-19	7AM	5PM	36000	600	1,260,000	35	2,100
15-Jun-19	7AM	12PM	18000	300	630,000	35	2,100
16-Jun-19	NO PUMP		0	0	-	-	-
17-Jun-19	7AM	1PM	21600	360	756,000	35	2,100
18-Jun-19	7AM	5PM	36000	600	1,260,000	35	2,100

Table 6: 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**
19-Jun-19	7AM	5PM	36000	600	1,260,000	35	2,100
20-Jun-19	7AM	5PM	36000	600	1,260,000	35	2,100
21-Jun-19	7AM	5PM	36000	600	1,260,000	35	2,100
22-Jun-19	7AM	1PM	21600	360	756,000	35	2,100
23-Jun-19	NO PUMP		0	0	-	-	-
24-Jun-19	7AM	5PM	36000	600	1,260,000	35	2,100
25-Jun-19	7AM	5PM	36000	600	1,260,000	35	2,100
26-Jun-19	7AM	5PM	36000	600	1,260,000	35	2,100
27-Jun-19	7AM	5PM	36000	600	1,260,000	35	2,100
28-Jun-19	7AM	5PM	36000	600	1,260,000	35	2,100
29-Jun-19	7AM	2PM	25200	420	882,000	35	2,100
30-Jun-19	NO PUMP		0	0	-	-	-
1-Jul-19	NO PUMP		0	0	-	-	-
2-Jul-19	7AM	5PM	36000	600	1,260,000	35	2,100
3-Jul-19	NO PUMP		0	0	-	-	-
4-Jul-19	7AM	12PM	18000	300	630,000	35	2,100
5-Jul-19	12PM	5PM	18000	300	630,000	35	2,100
6-Jul-19	7AM	12PM	18000	300	630,000	35	2,100
7-Jul-19	NO PUMP		0	0	-	-	-
8-Jul-19	7AM	2PM	25200	420	882,000	35	2,100
9-Jul-19	7AM	5PM	36000	600	1,260,000	35	2,100
10-Jul-19	NO PUMP		0	0	-	-	-
11-Jul-19	NO PUMP		0	0	-	-	-
12-Jul-19	NO PUMP		0	0	-	-	-
13-Jul-19	7AM	12PM	18000	300	630,000	35	2,100
14-Jul-19	NO PUMP		0	0	-	-	-
15-Jul-19	1PM	5PM	14400	240	504,000	35	2,100
16-Jul-19	NO PUMP		0	0	-	-	-
17-Jul-19	NO PUMP		0	0	-	-	-
18-Jul-19	NO PUMP		0	0	-	-	-
19-Jul-19	7AM	12PM	18000	300	630,000	35	2,100
20-Jul-19	7AM	11AM	14400	240	504,000	35	2,100
21-Jul-19	NO PUMP		0	0	-	-	-
22-Jul-19	NO PUMP		0	0	-	-	-
23-Jul-19	NO PUMP		0	0	-	-	-
24-Jul-19	NO PUMP		0	0	-	-	-
25-Jul-19	NO PUMP		0	0	-	-	-
26-Jul-19	NO PUMP		0	0	-	-	-
27-Jul-19	NO PUMP		0	0	-	-	-
28-Jul-19	NO PUMP		0	0	-	-	-
29-Jul-19	NO PUMP		0	0	-	-	-
30-Jul-19	NO PUMP		0	0	-	-	-
31-Jul-19	NO PUMP		0	0	-	-	-

Table 6: 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-19	NO PUMP		0	0	-	-	-
2-Aug-19	NO PUMP		0	0	-	-	-
3-Aug-19	NO PUMP		0	0	-	-	-
4-Aug-19	NO PUMP		0	0	-	-	-
5-Aug-19	NO PUMP		0	0	-	-	-
6-Aug-19	NO PUMP		0	0	-	-	-
7-Aug-19	NO PUMP		0	0	-	-	-
8-Aug-19	NO PUMP		0	0	-	-	-
9-Aug-19	NO PUMP		0	0	-	-	-
10-Aug-19	NO PUMP		0	0	-	-	-
11-Aug-19	NO PUMP		0	0	-	-	-
12-Aug-19	NO PUMP		0	0	-	-	-
13-Aug-19	NO PUMP		0	0	-	-	-
14-Aug-19	NO PUMP		0	0	-	-	-
15-Aug-19	NO PUMP		0	0	-	-	-
16-Aug-19	NO PUMP		0	0	-	-	-
17-Aug-19	NO PUMP		0	0	-	-	-
18-Aug-19	NO PUMP		0	0	-	-	-
19-Aug-19	NO PUMP		0	0	-	-	-
20-Aug-19	NO PUMP		0	0	-	-	-
21-Aug-19	NO PUMP		0	0	-	-	-
22-Aug-19	NO PUMP		0	0	-	-	-
23-Aug-19	NO PUMP		0	0	-	-	-
24-Aug-19	NO PUMP		0	0	-	-	-
25-Aug-19	NO PUMP		0	0	-	-	-
26-Aug-19	NO PUMP		0	0	-	-	-
27-Aug-19	NO PUMP		0	0	-	-	-
28-Aug-19	NO PUMP		0	0	-	-	-
29-Aug-19	NO PUMP		0	0	-	-	-
30-Aug-19	NO PUMP		0	0	-	-	-
31-Aug-19	NO PUMP		0	0	-	-	-
1-Sep-19	NO PUMP		0	0	-	-	-
2-Sep-19	NO PUMP		0	0	-	-	-
3-Sep-19	NO PUMP		0	0	-	-	-
4-Sep-19	NO PUMP		0	0	-	-	-
5-Sep-19	NO PUMP		0	0	-	-	-
6-Sep-19	NO PUMP		0	0	-	-	-
7-Sep-19	NO PUMP		0	0	-	-	-
8-Sep-19	NO PUMP		0	0	-	-	-
9-Sep-19	NO PUMP		0	0	-	-	-
10-Sep-19	NO PUMP		0	0	-	-	-
11-Sep-19	7AM	5PM	36000	600	720,000	20	1,200
12-Sep-19	NO PUMP		0	0	-	-	-

Table 6: 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**
13-Sep-19	NO PUMP		0	0	-	-	-
14-Sep-19	NO PUMP		0	0	-	-	-
15-Sep-19	NO PUMP		0	0	-	-	-
16-Sep-19	NO PUMP		0	0	-	-	-
17-Sep-19	NO PUMP		0	0	-	-	-
18-Sep-19	NO PUMP		0	0	-	-	-
19-Sep-19	NO PUMP		0	0	-	-	-
20-Sep-19	7AM	5PM	36000	600	720,000	20	1,200
21-Sep-19	NO PUMP		0	0	-	-	-
22-Sep-19	NO PUMP		0	0	-	-	-
23-Sep-19	NO PUMP		0	0	-	-	-
24-Sep-19	NO PUMP		0	0	-	-	-
25-Sep-19	NO PUMP		0	0	-	-	-
26-Sep-19	NO PUMP		0	0	-	-	-
27-Sep-19	NO PUMP		0	0	-	-	-
28-Sep-19	NO PUMP		0	0	-	-	-
29-Sep-19	NO PUMP		0	0	-	-	-
30-Sep-19	NO PUMP		0	0	-	-	-
1-Oct-19	NO PUMP		0	0	-	-	-
2-Oct-19	NO PUMP		0	0	-	-	-
3-Oct-19	7AM	5PM	36000	600	720,000	20	1,200
4-Oct-19	7AM	5PM	36000	600	720,000	20	1,200
5-Oct-19	NO PUMP		0	0	-	-	-
6-Oct-19	NO PUMP		0	0	-	-	-
7-Oct-19	7AM	5PM	36000	600	720,000	20	1,200
8-Oct-19	7AM	5PM	36000	600	720,000	20	1,200
9-Oct-19	7AM	5PM	36000	600	720,000	20	1,200
10-Oct-19	7AM	5PM	36000	600	720,000	20	1,200
11-Oct-19	7AM	5PM	36000	600	720,000	20	1,200
12-Oct-19	NO PUMP		0	0	-	-	-
13-Oct-19	NO PUMP		0	0	-	-	-
14-Oct-19	7AM	5PM	36000	600	720,000	20	1,200
15-Oct-19	7AM	5PM	36000	600	720,000	20	1,200
16-Oct-19	7AM	5PM	36000	600	720,000	20	1,200
17-Oct-19	7AM	5PM	36000	600	720,000	20	1,200
18-Oct-19	7AM	5PM	36000	600	720,000	20	1,200
19-Oct-19	NO PUMP		0	0	-	-	-
20-Oct-19	NO PUMP		0	0	-	-	-
21-Oct-19	7AM	5PM	36000	600	720,000	20	1,200
22-Oct-19	7AM	5PM	36000	600	720,000	20	1,200
23-Oct-19	7AM	5PM	36000	600	720,000	20	1,200
24-Oct-19	7AM	5PM	36000	600	720,000	20	1,200
25-Oct-19	7AM	5PM	36000	600	720,000	20	1,200

Table 6: 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**
26-Oct-19	NO PUMP		0	0	-	-	-
27-Oct-19	NO PUMP		0	0	-	-	-
28-Oct-19	7AM	5PM	36000	600	720,000	20	1,200
29-Oct-19	7AM	5PM	36000	600	720,000	20	1,200
30-Oct-19	7AM	5PM	36000	600	720,000	20	1,200
31-Oct-19	7AM	5PM	36000	600	720,000	20	1,200
1-Nov-19	7AM	5PM	36000	600	720,000	20	1,200
2-Nov-19	NO PUMP		0	0	-	-	-
3-Nov-19	NO PUMP		0	0	-	-	-
4-Nov-19	7AM	5PM	36000	600	720,000	20	1,200
5-Nov-19	7AM	5PM	36000	600	720,000	20	1,200
6-Nov-19	7AM	5PM	36000	600	720,000	20	1,200
7-Nov-19	7AM	5PM	36000	600	720,000	20	1,200
8-Nov-19	7AM	5PM	36000	600	720,000	20	1,200
9-Nov-19	NO PUMP		0	0	-	-	-
10-Nov-19	NO PUMP		0	0	-	-	-
11-Nov-19	7AM	5PM	36000	600	720,000	20	1,200
12-Nov-19	7AM	5PM	36000	600	720,000	20	1,200
13-Nov-19	7AM	5PM	36000	600	720,000	20	1,200
14-Nov-19	7AM	5PM	36000	600	720,000	20	1,200
15-Nov-19	7AM	5PM	36000	600	720,000	20	1,200
16-Nov-19	NO PUMP		0	0	-	-	-
17-Nov-19	NO PUMP		0	0	-	-	-
18-Nov-19	7AM	5PM	36000	600	720,000	20	1,200
19-Nov-19	7AM	5PM	36000	600	720,000	20	1,200
20-Nov-19	7AM	5PM	36000	600	720,000	20	1,200
21-Nov-19	7AM	5PM	36000	600	720,000	20	1,200
22-Nov-19	7AM	4PM	32400	540	648,000	20	1,200
23-Nov-19	NO PUMP		0	0	-	-	-
24-Nov-19	NO PUMP		0	0	-	-	-
25-Nov-19	7AM	5PM	36000	600	720,000	20	1,200
26-Nov-19	7AM	5PM	36000	600	720,000	20	1,200
27-Nov-19	7AM	5PM	36000	600	720,000	20	1,200
28-Nov-19	7AM	5PM	36000	600	720,000	20	1,200
29-Nov-19	7AM	3PM	28800	480	576,000	20	1,200
30-Nov-19	NO PUMP		0	0	-	-	-
1-Dec-19	NO PUMP		0	0	-	-	-
2-Dec-19	7AM	5PM	36000	600	720,000	20	1,200
3-Dec-19	7AM	5PM	36000	600	720,000	20	1,200
4-Dec-19	7AM	5PM	36000	600	720,000	20	1,200
5-Dec-19	7AM	5PM	36000	600	720,000	20	1,200
6-Dec-19	7AM	4PM	32400	540	648,000	20	1,200
7-Dec-19	NO PUMP		0	0	-	-	-

Table 6: 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-Dec-19	NO PUMP		0	0	-	-	-
9-Dec-19	7AM	5PM	36000	600	720,000	20	1,200
10-Dec-19	7AM	5PM	36000	600	720,000	20	1,200
11-Dec-19	7AM	5PM	36000	600	720,000	20	1,200
12-Dec-19	7AM	5PM	36000	600	720,000	20	1,200
13-Dec-19	7AM	5PM	36000	600	720,000	20	1,200
14-Dec-19	NO PUMP		0	0	-	-	-
15-Dec-19	NO PUMP		0	0	-	-	-
16-Dec-19	7AM	5PM	36000	600	720,000	20	1,200
17-Dec-19	7AM	5PM	36000	600	720,000	20	1,200
18-Dec-19	7AM	5PM	36000	600	720,000	20	1,200
19-Dec-19	7AM	5PM	36000	600	720,000	20	1,200
20-Dec-19	7AM	5PM	36000	600	720,000	20	1,200
21-Dec-19	NO PUMP		0	0	-	-	-
22-Dec-19	NO PUMP		0	0	-	-	-
23-Dec-19	NO PUMP		0	0	-	-	-
24-Dec-19	NO PUMP		0	0	-	-	-
25-Dec-19	NO PUMP		0	0	-	-	-
26-Dec-19	NO PUMP		0	0	-	-	-
27-Dec-19	NO PUMP		0	0	-	-	-
28-Dec-19	NO PUMP		0	0	-	-	-
29-Dec-19	NO PUMP		0	0	-	-	-
30-Dec-19	NO PUMP		0	0	-	-	-
31-Dec-19	NO PUMP		0	0	-	-	-
			Totals		170,334,000		171

APPENDIX A

PTTW No. 7818-9QJNL4

PTTW No. 1603-BKTPQH

Ontario

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

PERMIT TO TAKE WATER

Ground Water

NUMBER 7818-9QJNL4

Pursuant to Section 34 of the Ontario Water Resources Act, R.S.O. 1990 this Permit To Take Water is hereby issued to:

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

For the water taking from: Quarry Sump, McCarthy Quarry

Located at: Lot 1, Concession 1, Geographic Township of Mara
Ramara, County of Simcoe

For the purposes of this Permit, and the terms and conditions specified below, the following definitions apply:

DEFINITIONS

(a) "Director" means any person appointed in writing as a Director pursuant to section 5 of the OWRA for the purposes of section 34, OWRA.

(b) "Provincial Officer" means any person designated in writing by the Minister as a Provincial Officer pursuant to section 5 of the OWRA.

(c) "Ministry" means Ontario Ministry of the Environment and Climate Change.

(d) "District Office" means the Barrie District Office.

(e) "Permit" means this Permit to Take Water No. 7818-9QJNL4 including its Schedules, if any, issued in accordance with Section 34 of the OWRA.

(f) "Permit Holder" means QBJR Aggregates Inc..

(g) "OWRA " means the *Ontario Water Resources Act,* R.S.O. 1990, c. O. 40, as amended.

You are hereby notified that this Permit is issued subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. Compliance with Permit

1.1 Except where modified by this Permit, the water taking shall be in accordance with the application for this Permit To Take Water, dated October 7, 2014 and signed by Jenny Coco, and all Schedules included in this Permit.

1.2 The Permit Holder shall ensure that any person authorized by the Permit Holder to take water under this Permit is provided with a copy of this Permit and shall take all reasonable measures to ensure that any such person complies with the conditions of this Permit.

1.3 Any person authorized by the Permit Holder to take water under this Permit shall comply with the conditions of this Permit.

1.4 This Permit is not transferable to another person.

1.5 This Permit provides the Permit Holder with permission to take water in accordance with the conditions of this Permit, up to the date of the expiry of this Permit. This Permit does not constitute a legal right, vested or otherwise, to a water allocation, and the issuance of this Permit does not guarantee that, upon its expiry, it will be renewed.

1.6 The Permit Holder shall keep this Permit available at all times at or near the site of the taking, and shall produce this Permit immediately for inspection by a Provincial Officer upon his or her request.

1.7 The Permit Holder shall report any changes of address to the Director within thirty days of any such change. The Permit Holder shall report any change of ownership of the property for which this Permit is issued within thirty days of any such change. A change in ownership in the property shall cause this Permit to be cancelled.

2. General Conditions and Interpretation

2.1 Inspections

The Permit Holder must forthwith, upon presentation of credentials, permit a Provincial Officer to carry out any and all inspections authorized by the OWRA, the *Environmental Protection Act* , R.S.O. 1990, the *Pesticides Act* , R.S.O. 1990, or the *Safe Drinking Water Act,* S. O. 2002.

2.2 Other Approvals

The issuance of, and compliance with this Permit, does not:

(a) relieve the Permit Holder or any other person from any obligation to comply with any other applicable legal requirements, including the provisions of the *Ontario Water Resources Act* , and the *Environmental Protection Act* , and any regulations made thereunder; or

(b) limit in any way any authority of the Ministry, a Director, or a Provincial Officer, including the authority to require certain steps be taken or to require the Permit Holder to furnish any further information related to this Permit.

2.3 Information

The receipt of any information by the Ministry, the failure of the Ministry to take any action or require any person to take any action in relation to the information, or the failure of a Provincial Officer to prosecute any person in relation to the information, shall not be construed as:

(a) an approval, waiver or justification by the Ministry of any act or omission of any person that contravenes this Permit or other legal requirement; or

(b) acceptance by the Ministry of the information's completeness or accuracy.

2.4 Rights of Action

The issuance of, and compliance with this Permit shall not be construed as precluding or limiting any legal claims or rights of action that any person, including the Crown in right of Ontario or any agency thereof, has or may have against the Permit Holder, its officers, employees, agents, and contractors.

2.5 Severability

The requirements of this Permit are severable. If any requirements of this Permit, or the application of any requirements of this Permit to any circumstance, is held invalid or unenforceable, the application of such requirements to other circumstances and the remainder of this Permit shall not be affected thereby.

2.6 Conflicts

Where there is a conflict between a provision of any submitted document referred to in this Permit, including its Schedules, and the conditions of this Permit, the conditions in this Permit shall take precedence.

3. Water Takings Authorized by This Permit

3.1 **Expiry**

This Permit expires on **December 31, 2019**. No water shall be taken under authority of this Permit after the expiry date.

3.2 Amounts of Taking Permitted

The Permit Holder shall only take water from the source, during the periods and at the rates and amounts of taking specified in Table A. Water takings are authorized only for the purposes specified in Table A.

Table A

	Source Name / Description:	Source: Type:	Taking Specific Purpose:	Taking Major Category:	Max. Taken per Minute (litres):	Max. Num. of Hrs Taken per Day:	Max. Taken per Day (litres):	Max. Num. of Days Taken per Year:	Zone/ Easting/ Northing:
1	Quarry Sump	Pond Connected	Pits and Quarries	Dewatering	4,545	24	6,544,800	150	17 650950 4933500
						Total Taking:	6,544,800		

3.3 There is an additional water taking limitation per year for Source 1 described as Quarry Sump within Table A. The maximum taking per year from the Quarry Sump is 196,500,000 litres.

4. Monitoring

4.1 The Permit Holder shall not lower the water in the quarry below an elevation of 232.0 metres above sea level.

4.2 The Permit Holder shall establish and maintain a weather station within 1 km of the McCarthy Quarry property that collects and records, at a minimum, the following climatic data on a daily basis:

a) Precipitation (rain and/or snow); and
b) Temperature (maximum and minimum).

4.3 The Permit Holder shall conduct daily water level monitoring with the use of pressure transducers and data loggers at:

a) The residential well known by the MOE Water Well Record Number 5727662 and identified as well DW3 on Figure 2 in Item 2 of Schedule A of this Permit, if granted permission by the property owner.
b) The monitoring wells named OW4-1, OW4-2, OW5-1, OW6-1, OW6-2, OW9-1, OW9-2, and Bored Well (shown on Figure 2, in Item 2 of Schedule A of this Permit).
c) The City of Kwartha Lakes monitoring well CKL-1, if granted permission by the property owner .

These pressure transducers and data loggers shall be inspected and downloaded at least every 6 months.

4.4 The Permit Holder shall conduct monthly water level monitoring with the use of a manual water level meter at:

a) The residential well known by the MOE Water Well Record Number 5727662 and identified as well DW3 on Figure 2 in Item 2 of Schedule A of this Permit, if granted permission by the property owner.
b) The residential wells named DW1, DW2, and DW4, if granted permission by the property owner (shown on Figure 2, in Item 2 of Schedule A of this Permit).

c) The monitoring wells named AM1b, AMx, TW1-1, OW4-1, OW4-2, OW5-1, OW5-2, OW5-3, OW6-1, OW6-2, OW6-3, OW7-1, OW7-2, OW7-3, OW8-1, OW8-2, OW8-3, OW9-1, OW9-2, and Bored Well (shown on Figure 2 in Item 2 of Schedule A of this Permit).

d) The City of Kwartha Lakes monitoring wells CKL-1 and CKL-2, if granted permission by the property owner .

The Permit Holder may suspend monthly water level monitoring under Condition 4.4 for the months of January and/or February if no water is taken from the quarry on those months.

4.5 The Permit Holder shall, if granted permission by the property owner, measure and record static water levels in the residential wells named DW5, DW6, DW7, and DW8, as shown on Figure 2 in Item 2 of Schedule A of this Permit, at least once in every two (2) month period during which water is taken from the quarry. The Permit Holder may suspend monthly water level monitoring under Condition 4.5 for the months of January and/or February if no water is taken from the quarry on those months.

4.6 The Permit Holder shall, if granted permission by the property owner, on a semi-annual basis collect raw water samples from the residential wells named DW1, DW2, and the well identified in condition 4.3(a). Each sample shall be tested, at a minimum, for the parameters listed in Table 1 below:

Table 1: Water Quality Parameters for Residential Wells

pH	Sulphate	DOC	Copper
Alkalinity (CaCO3)	Magnesium	Colour	Iron
Bicarbonate	Calcium	Turbidity	Lead
Conductivity	Sodium	Aluminium	Manganese
Fluoride	Potassium	Arsenic	Selenium
Chloride	Ammonia (N)	Barium	Zinc
Nitrate	Phosphate	Boron	Hardness (CaCO3)
Nitrite	Phosphorus	Cadmium	TDS (iron sum calc.)
Chromium	Anion Sum	Ion Ratio	Langelier Index
Tannins	Cation Sum	% Difference	

The Permit Holder shall immediately report to the respective well owner, the Director, and District Office any sampling result that exceeds the Ontario Drinking Water Quality Standards as prescribed by O.Reg. 169/03, as amended.

4.7 The Permit Holder shall on a semi-annual basis conduct the groundwater quality monitoring from the on-site groundwater monitors listed in Table 2. Each sample shall be tested, at a minimum, for the parameters listed in Table 3.

Table 2: On-Site Groundwater Monitors for Water Quality Sampling

AM1b	OW4-I	OW5-III	OW8-I
AMx	OW4-II	OW6-II	OW8-II
TW1-1	OW5-I	OW7-I	OW9-I
Bored Well	OW5-II	OW7-II	OW9-II

Table 3: Water Quality Parameters for On-Site Groundwater Monitors

pH	Magnesium	Sulphate	Conductivity
Alkalinity	Calcium	Nitrate	DOC
Bicarbonate	Sodium	Nitrite	Colour
Fluoride	Potassium	Phosphate	TDS
Chloride	Ammonia	Phosphorus	Hardness

4.8 Monitoring well AMx is within the quarry extraction area and will be mined out as the quarry face advances to the south. The Permit Holder shall continue to monitor AMx as listed in Conditions 4.4 and 4.7 until such monitoring is either deemed unsafe or the monitoring is not possible due to damage to AMx. Once monitoring of AMx is not possible under Conditions 4.4 and/or 4.7, then a replacement monitoring well must be established along the western property boundary between the quarry face and OW4. This replacement well shall be monitored as per Conditions 4.4 and 4.7 instead of AMx.

4.9 The Permit Holder shall notify the Director, in writing, within 30 days if the groundwater level or groundwater quality monitoring of any well listed under conditions 4.3, 4.4, 4.5, 4.6, and 4.7 is not possible, including being denied access to a private well. In the event of damage or loss of any monitoring well, monitoring devices or related equipment, the Permit Holder shall be allowed 30 calendar days from the date of discovery of the occurrence to repair or replace equipment. If a well is too damaged to be repaired or monitored, or if the well is deemed unsafe to be monitored, then the Director will decide if a replacement well is required and will modify the appropriate monitoring conditions in a written letter to the Permit Holder.

4.10 The Permit Holder shall maintain a record of all water takings. This record shall include the dates and times of water takings, and the total measured or calculated amounts for water pumped per day for each day that water is taken under the authorization of this Permit.

4.11 The Permit Holder shall keep all required records up to date and available at or near the site of the taking and shall produce the records immediately for inspection by a Provincial Officer upon his or her request.

4.12 The Permit Holder shall provide to the Director an annual monitoring report no

later than March 1 each year during the life of this Permit. The annual monitoring report shall be prepared by an individual with P.Geo. or equivalent qualifications and shall include, at a minimum:

a) The review and assessment of all monitoring data required by this Permit.
b) An up-date of the quarry operations and predicted quarrying and dewatering for the next twelve (12) months.
c) An assessment of the groundwater trends using the on-site on off-site monitoring data. This analysis should state the actual impact area of quarry dewatering and determine the potential for off-site impacts. If any impacts are predicted then a detailed mitigation plan shall be included within this report.
d) Analysis that includes amount of water pumped, precipitation data, and an estimate of how much groundwater was pumped versus surface water.
e) Figures that include site maps with current quarry depths, groundwater contour maps, impact area of quarry dewatering, groundwater elevation graphs, and geological cross-sections.
f) Any groundwater interference complaints.
g) Description of all communication with the public.
h) Conclusions and recommendations, if any, to improve the monitoring and reporting at the site.

An electronic copy of the data collected must also accompany the report.

4.13 The Permit Holder shall make available on a publicly-accessible site on the internet the water quality and quantity data that it is required to monitor and record under this Permit and O.Reg. 387/04, as amended, and a copy of every report that is required to be prepared under this Permit. For greater clarity, the Permit Holder shall not publish any personal information as defined by the *Freedom of Information and Protection of Privacy Act,* R.S.O. 1990, c. F.31, as amended.

4.14 The Permit Holder shall maintain a Public Liaison Committee ("PLC") comprised of not more than seven (7) members that will meet at least once every four (4) months, unless the majority of the PLC decide that more or less frequent meetings are required. The PLC shall be comprised of: two (2) members appointed by the Permit Holder - one of whom shall act as Chairperson; one (1) member from each of the Township and the County, if they wish to have representatives; and three (3) members appointed by the public, if they wish to have representatives, who must be permanent residents within a 3 kilometre radius of the quarry property. The PLC shall serve in an advisory / community liaison role and shall have no powers to direct the Permit Holder or the Ministry.

4.15 Any request for an amendment or renewal of this Permit must be accompanied by a report prepared by an individual with P.Geo. or equivalent qualifications and shall include, at a minimum:

a) The review and assessment of all monitoring data required by this Permit.
b) An up-date of the quarry operations and predicted quarrying and dewatering for the duration of the requested permit.
c) An assessment of the groundwater trends using the on-site on off-site monitoring

data. This analysis should state the actual impact area of quarry dewatering and determine the potential for off-site impacts. If any impacts are predicted then a detailed mitigation plan shall be included within this report.

d) Analysis that includes amount of water pumped, precipitation data, and an estimate of how much groundwater was pumped versus surface water.

e) Figures that include site maps with current quarry depths, groundwater contour maps, impact area of quarry dewatering, groundwater elevation graphs, and geological cross-sections.

f) Any groundwater interference complaints.

g) Description of all communication with the public.

h) Conclusions and recommendations, if any, to improve the monitoring and reporting at the site.

An electronic copy of the data collected must also accompany the report. Any application for renewal of this Permit must be submitted to the Ministry at least ninety (90) days prior to the expiry of this Permit.

4.16 The Permit Holder shall, as directed by the Ministry, participate in a cumulative impact assessment for the Carden Plain Area with other quarry operators who have been issued a permit to take water in this area.

5. Impacts of the Water Taking

5.1 Notification

The Permit Holder shall immediately notify the local District Office of any complaint arising from the taking of water authorized under this Permit and shall report any action which has been taken or is proposed with regard to such complaint. The Permit Holder shall immediately notify the local District Office if the taking of water is observed to have any significant impact on the surrounding waters. After hours, calls shall be directed to the Ministry's Spills Action Centre at 1-800-268-6060.

5.2 For Groundwater Takings

If the taking of water is observed to cause any negative impact to other water supplies obtained from any adequate sources that were in use prior to initial issuance of a Permit for this water taking, the Permit Holder shall take such action necessary to make available to those affected, a supply of water equivalent in quantity and quality to their normal takings, or shall compensate such persons for their reasonable costs of so doing, or shall reduce the rate and amount of taking to prevent or alleviate the observed negative impact. Pending permanent restoration of the affected supplies, the Permit Holder shall provide, to those affected, temporary water supplies adequate to meet their normal requirements, or shall compensate such persons for their reasonable costs of doing so.

If permanent interference is caused by the water taking, the Permit Holder shall restore the water supplies of those permanently affected.

5.2.1 Where the water supply provided by the well known by MOE Water Well Record Number 5727662 is restored in accordance with Condition 5.2, the Permit Holder shall

restore the supply in a manner satisfactory to the Director, taking into account the residential needs, requirements and preferences of the persons serviced by the well.

5.3 Upon the receipt of a groundwater interference complaint, the Permit Holder shall:

a) Implement the McCarthy Quarry Complaint Resolution Process as described in Item 3 of Schedule A of this Permit.

b) In addition, appropriate notification and actions must be taken as described in conditions 5.1 and 5.2 of this Permit. The provisions of conditions 5.1 and 5.2 shall take precedence over the provisions of condition 5.3(a) if there is a conflict.

6. Director May Amend Permit

The Director may amend this Permit by letter requiring the Permit Holder to suspend or reduce the taking to an amount or threshold specified by the Director in the letter. The suspension or reduction in taking shall be effective immediately and may be revoked at any time upon notification by the Director. This condition does not affect your right to appeal the suspension or reduction in taking to the Environmental Review Tribunal under the *Ontario Water Resources Act* , Section 100 (4).

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is included to ensure that the conditions in this Permit are complied with and can be enforced.

2. Condition 2 is included to clarify the legal interpretation of aspects of this Permit.

3. Conditions 3 through 6 are included to protect the quality of the natural environment so as to safeguard the ecosystem and human health and foster efficient use and conservation of waters. These conditions allow for the beneficial use of waters while ensuring the fair sharing, conservation and sustainable use of the waters of Ontario. The conditions also specify the water takings that are authorized by this Permit and the scope of this Permit.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, you may by written notice served upon me, the Environmental Review Tribunal and the Environmental Commissioner, ***Environmental Bill of Rights****, R.S.O. 1993, Chapter 28, within 15 days after receipt of this Notice, require a hearing by the Tribunal. The Environmental Commissioner will place notice of your appeal on the Environmental Registry. Section 101 of the Ontario Water Resources Act, as amended provides that the Notice requiring a hearing shall state:*

1. The portions of the Permit or each term or condition in the Permit 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.

In addition to these legal requirements, the Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Permit to Take Water number;
6. The date of the Permit to Take Water;
7. The name of the Director;
8. The municipality within which the works are located;

This notice must be served upon:

The Secretary
Environmental Review Tribunal
655 Bay Street, 15th Floor
Toronto ON
M5G 1E5
Fax: (416) 314-4506
Email:
ERTTribunalsecretary@ontario.ca

AND

The Environmental Commissioner
1075 Bay Street
6th Floor, Suite 605
Toronto, Ontario M5S 2W5

AND

The Director, Section 34,
Ministry of the Environment and Climate Change
8th Floor
5775 Yonge St
Toronto ON M2M 4J1
Fax: (416) 325-6347

Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal:

by telephone at (416) 314-4600 ***by fax at (416) 314-4506*** ***by e-mail at www.ert.gov.on.ca***

This instrument is subject to Section 38 of the ***Environmental Bill of Rights*** *that allows residents of Ontario to seek leave to appeal the decision on this instrument. Residents of Ontario may seek to appeal for 15 days from the date this decision is placed on the Environmental Registry. By accessing the Environmental Registry, you can determine when the leave to appeal period ends.*

This Permit cancels and replaces Permit Number 8271-8VQJGU, issued on 2012/07/11.

Dated at Toronto this 30th day of December, 2014.

H. Zhang

Helen Zhang, P.Eng.
Director, Section 34
Ontario Water Resources Act , R.S.O. 1990

Schedule A

This Schedule "A" forms part of Permit To Take Water 7818-9QJNL4, dated December 30, 2014.

1. Permit To Take Water Application, signed by Jenny Coco, October 7, 2014.

2. Permit To Take Water Application - Renewal Application for McCarthy Quarry, Township of Ramara. Golder Associates Ltd. October 2014.

3. McCarthy Quarry Complaint Resolution Process, Golder Associates Ltd. November 2014.

4. Further Changes to PTTW No. 8271-8VQJGU. Golder Associates Ltd. November 11, 2014.

PERMIT TO TAKE WATER
Ground Water
NUMBER 1603-BKTPQH

Pursuant to Section 34.1 of the Ontario Water Resources Act, R.S.O. 1990 this Permit To Take Water is hereby issued to:

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

For the water taking from: Quarry Sump, McCarthy Quarry

Located at: Lot 1, Concession 1, Geographic Township of Mara
Ramara, County of Simcoe

For the purposes of this Permit, and the terms and conditions specified below, the following definitions apply:

DEFINITIONS

(a) "Director" means any person appointed in writing as a Director pursuant to section 5 of the OWRA for the purposes of section 34.1, OWRA.

(b) "Provincial Officer" means any person designated in writing by the Minister as a Provincial Officer pursuant to section 5 of the OWRA.

(c) "Ministry" means Ontario Ministry of the Environment, Conservation and Parks.

(d) "District Office" means the Barrie District Office.

(e) "Permit" means this Permit to Take Water No. 1603-BKTPQH including its Schedules, if any, issued in accordance with Section 34.1 of the OWRA.

(f) "Permit Holder" means QBJR Aggregates Inc..

(g) "OWRA " means the *Ontario Water Resources Act,* R.S.O. 1990, c. O. 40, as amended.

You are hereby notified that this Permit is issued subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. Compliance with Permit

1.1 Except where modified by this Permit, the water taking shall be in accordance with the application for this Permit To Take Water, dated October 23, 2019 and signed by Jenny Coco, CEO, and all Schedules included in this Permit.

1.2 The Permit Holder shall ensure that any person authorized by the Permit Holder to take water under this Permit is provided with a copy of this Permit and shall take all reasonable measures to ensure that any such person complies with the conditions of this Permit.

1.3 Any person authorized by the Permit Holder to take water under this Permit shall comply with the conditions of this Permit.

1.4 This Permit is not transferable to another person.

1.5 This Permit provides the Permit Holder with permission to take water in accordance with the conditions of this Permit, up to the date of the expiry of this Permit. This Permit does not constitute a legal right, vested or otherwise, to a water allocation, and the issuance of this Permit does not guarantee that, upon its expiry, it will be renewed.

1.6 The Permit Holder shall keep this Permit available at all times at or near the site of the taking, and shall produce this Permit immediately for inspection by a Provincial Officer upon his or her request.

1.7 The Permit Holder shall report any changes of address to the Director within thirty days of any such change. The Permit Holder shall report any change of ownership of the property for which this Permit is issued within thirty days of any such change. A change in ownership in the property shall cause this Permit to be cancelled.

2. General Conditions and Interpretation

2.1 Inspections

The Permit Holder must forthwith, upon presentation of credentials, permit a Provincial Officer to carry out any and all inspections authorized by the OWRA, the *Environmental Protection Act*, R.S.O. 1990, the *Pesticides Act*, R.S.O. 1990, or the *Safe Drinking Water Act,* S. O. 2002.

2.2 Other Approvals

The issuance of, and compliance with this Permit, does not:

(a) relieve the Permit Holder or any other person from any obligation to comply with any other applicable legal requirements, including the provisions of the *Ontario Water Resources Act*, and

the *Environmental Protection Act* , and any regulations made thereunder; or

(b) limit in any way any authority of the Ministry, a Director, or a Provincial Officer, including the authority to require certain steps be taken or to require the Permit Holder to furnish any further information related to this Permit.

2.3 Information

The receipt of any information by the Ministry, the failure of the Ministry to take any action or require any person to take any action in relation to the information, or the failure of a Provincial Officer to prosecute any person in relation to the information, shall not be construed as:

(a) an approval, waiver or justification by the Ministry of any act or omission of any person that contravenes this Permit or other legal requirement; or

(b) acceptance by the Ministry of the information's completeness or accuracy.

2.4 Rights of Action

The issuance of, and compliance with this Permit shall not be construed as precluding or limiting any legal claims or rights of action that any person, including the Crown in right of Ontario or any agency thereof, has or may have against the Permit Holder, its officers, employees, agents, and contractors.

2.5 Severability

The requirements of this Permit are severable. If any requirements of this Permit, or the application of any requirements of this Permit to any circumstance, is held invalid or unenforceable, the application of such requirements to other circumstances and the remainder of this Permit shall not be affected thereby.

2.6 Conflicts

Where there is a conflict between a provision of any submitted document referred to in this Permit, including its Schedules, and the conditions of this Permit, the conditions in this Permit shall take precedence.

3. Water Takings Authorized by This Permit

3.1 **Expiry**

This Permit expires on **January 31, 2025**. No water shall be taken under authority of this Permit after the expiry date.

3.2 Amounts of Taking Permitted

The Permit Holder shall only take water from the source, during the periods and at the rates and amounts of taking specified in Table A. Water takings are authorized only for the purposes specified in Table A.

Table A

	Source Name / Description:	Source: Type:	Taking Specific Purpose:	Taking Major Category:	Max. Taken per Minute (litres):	Max. Num. of Hrs Taken per Day:	Max. Taken per Day (litres):	Max. Num. of Days Taken per Year:	Zone/ Easting/ Northing:
1	Quarry Sump	Pond Connected	Pits and Quarries	Dewatering	4,545	24	6,544,800	250	17 650950 4933500
						Total Taking:	6,544,800		

3.3 There is an additional water taking limitation per year for Source 1 described as Quarry Sump within Table A. The maximum taking per year from the Quarry Sump is 196,500,000 litres.

4. Monitoring

4.1 The Permit Holder shall not lower the water in the quarry below an elevation of 232.0 metres above sea level.

4.2 The Permit Holder shall conduct daily water level monitoring with the use of pressure transducers and data loggers at:

a) The residential well known by the MOE Water Well Record Number 5727662 and identified as well DW3 on Figure 2 in Item 2 of Schedule A of this Permit, if granted permission by the property owner.

b) The monitoring wells named OW4-1, OW4-2, OW5-1, OW6-1, OW6-2, OW8-3, OW9-2, and Bored Well (shown on Figure 2, in Item 2 of Schedule A of this Permit).

c) The City of Kwartha Lakes monitoring well CKL-1, if granted permission by the property owner .

These pressure transducers and data loggers shall be inspected and downloaded at least every 6 months.

4.3 The Permit Holder shall conduct monthly water level monitoring with the use of a manual water level meter at:

a) The residential well known by the MOE Water Well Record Number 5727662 and identified as well DW3 on Figure 2 in Item 2 of Schedule A of this Permit, if granted permission by the property owner.

b) The residential wells named DW1, DW2, and DW4, if granted permission by the property owner (shown on Figure 2, in Item 2 of Schedule A of this Permit).

c) The monitoring wells named AM1b, AMX-R, TW1-1, OW4-1, OW4-2, OW5-1, OW5-2, OW5-3, OW6-1, OW6-2, OW6-3, OW7-1, OW7-2, OW7-3, OW8-1, OW8-2, OW8-3, OW9-1, OW9-2, and Bored Well (shown on Figure 2 in Item 2 of Schedule A of this Permit).

d) The City of Kwartha Lakes monitoring wells CKL-1 and CKL-2, if granted permission by the property owner .

The Permit Holder may suspend monthly water level monitoring under Condition 4.3 for the months of January and/or February if no water is taken from the quarry on those months.

4.4 The Permit Holder shall, if granted permission by the property owner, measure and record static water levels in the residential wells named DW6, DW7, and DW8, as shown on Figure 2 in Item 2 of Schedule A of this Permit, at least once in every two (2) month period during which water is taken from the quarry. The Permit Holder may suspend monthly water level monitoring under Condition 4.4 for the months of January and/or February if no water is taken from the quarry on those months.

4.5 The Permit Holder shall, if granted permission by the property owner, on a semi-annual basis collect raw water samples from the residential wells named DW1, DW2, and the well identified in condition 4.2(a). Each sample shall be tested, at a minimum, for the parameters listed in Table 1 below:

Table 1: Water Quality Parameters for Residential Wells

pH	Sulphate	DOC	Copper
Alkalinity (CaCO3)	Magnesium	Colour	Iron
Bicarbonate	Calcium	Turbidity	Lead
Conductivity	Sodium	Aluminium	Manganese
Fluoride	Potassium	Arsenic	Selenium
Chloride	Ammonia (N)	Barium	Zinc
Nitrate	Phosphate	Boron	Hardness (CaCO3)
Nitrite	Phosphorus	Cadmium	TDS (iron sum calc.)
Chromium	Anion Sum	Ion Ratio	Langelier Index
Tannins	Cation Sum	% Difference	

The Permit Holder shall immediately report to the respective well owner, the Director, and District Office any sampling result that exceeds the Ontario Drinking Water Quality Standards as prescribed by O.Reg. 169/03, as amended.

4.6 The Permit Holder shall on a semi-annual basis conduct the groundwater quality monitoring from the on-site groundwater monitors listed in Table 2. Each sample shall be tested, at a minimum, for the parameters listed in Table 3.

Table 2: On-Site Groundwater Monitors for Water Quality Sampling

AM1b	OW4-I	OW5-III	OW8-I
AMX-R	OW4-II	OW6-II	OW8-II
TW1-1	OW5-I	OW7-I	OW9-I
Bored Well	OW5-II	OW7-II	OW9-II

Table 3: Water Quality Parameters for On-Site Groundwater Monitors

pH	Magnesium	Sulphate	Conductivity
Alkalinity	Calcium	Nitrate	DOC
Bicarbonate	Sodium	Nitrite	Colour
Fluoride	Potassium	Phosphate	TDS
Chloride	Ammonia	Phosphorus	Hardness

4.7 The Permit Holder shall notify the Director, in writing, within 30 days if the groundwater level or groundwater quality monitoring of any well listed under conditions 4.2, 4.3, 4.4, 4.5, and 4.6 is not possible, including being denied access to a private well. In the event of damage or loss of any monitoring well, monitoring devices or related equipment, the Permit Holder shall be allowed 30 calendar days from the date of discovery of the occurrence to repair or replace equipment. If a well is too damaged to be repaired or monitored, or if the well is deemed unsafe to be monitored, then the Director will decide if a replacement well is required and will modify the appropriate monitoring conditions in a written letter to the Permit Holder.

4.8 The Permit Holder shall maintain a record of all water takings. This record shall include the dates and times of water takings, and the total measured or calculated amounts for water pumped per day for each day that water is taken under the authorization of this Permit.

4.9 The Permit Holder shall keep all required records up to date and available at or near the site of the taking and shall produce the records immediately for inspection by a Provincial Officer upon his or her request.

4.10 The Permit Holder shall provide to the Director an annual monitoring report no later than March 1 each year during the life of this Permit. The annual monitoring report shall be prepared by an individual with P.Geo. or equivalent qualifications and shall include, at a minimum:

a) The review and assessment of all monitoring data required by this Permit.
b) An up-date of the quarry operations and predicted quarrying and dewatering for the next twelve (12) months.

c) An assessment of the groundwater trends using the on-site on off-site monitoring data. This analysis should state the actual impact area of quarry dewatering and determine the potential for off-site impacts. If any impacts are predicted then a detailed mitigation plan shall be included within this report.
d) Analysis that includes amount of water pumped, precipitation data, and an estimate of how much groundwater was pumped versus surface water.
e) Figures that include site maps with current quarry depths, groundwater contour maps, impact area of quarry dewatering, groundwater elevation graphs, and geological cross-sections.
f) Any groundwater interference complaints.
g) Description of all communication with the public.
h) Conclusions and recommendations, if any, to improve the monitoring and reporting at the site.

An electronic copy of the data collected must also accompany the report.

4.11 The Permit Holder shall make available on a publicly-accessible site on the internet the water quality and quantity data that it is required to monitor and record under this Permit and O.Reg. 387/04, as amended, and a copy of every report that is required to be prepared under this Permit. For greater clarity, the Permit Holder shall not publish any personal information as defined by the *Freedom of Information and Protection of Privacy Act,* R.S.O. 1990, c. F.31, as amended.

4.12 The Permit Holder shall maintain a Public Liaison Committee ("PLC") comprised of not more than seven (7) members that will meet at least once every four (4) months, unless the majority of the PLC decide that more or less frequent meetings are required. The PLC shall be comprised of: two (2) members appointed by the Permit Holder - one of whom shall act as Chairperson; one (1) member from each of the Township and the County, if they wish to have representatives; and three (3) members appointed by the public, if they wish to have representatives, who must be permanent residents within a 3 kilometre radius of the quarry property. The PLC shall serve in an advisory / community liaison role and shall have no powers to direct the Permit Holder or the Ministry.

4.13 Any request for an amendment or renewal of this Permit must be accompanied by a report prepared by an individual with P.Geo. or equivalent qualifications and shall include, at a minimum:

a) The review and assessment of all monitoring data required by this Permit.
b) An up-date of the quarry operations and predicted quarrying and dewatering for the duration of the requested permit.
c) An assessment of the groundwater trends using the on-site on off-site monitoring data. This analysis should state the actual impact area of quarry dewatering and determine the potential for off-site impacts. If any impacts are predicted then a detailed mitigation plan shall be included within this report.
d) Analysis that includes amount of water pumped, precipitation data, and an estimate of how much groundwater was pumped versus surface water.

e) Figures that include site maps with current quarry depths, groundwater contour maps, impact area of quarry dewatering, groundwater elevation graphs, and geological cross-sections.
f) Any groundwater interference complaints.
g) Description of all communication with the public.
h) Conclusions and recommendations, if any, to improve the monitoring and reporting at the site.

An electronic copy of the data collected must also accompany the report. Any application for renewal of this Permit must be submitted to the Ministry at least ninety (90) days prior to the expiry of this Permit.

4.14 The Permit Holder shall, as directed by the Ministry, participate in a cumulative impact assessment for the Carden Plain Area with other quarry operators who have been issued a permit to take water in this area.

5. Impacts of the Water Taking

5.1 Notification

The Permit Holder shall immediately notify the local District Office of any complaint arising from the taking of water authorized under this Permit and shall report any action which has been taken or is proposed with regard to such complaint. The Permit Holder shall immediately notify the local District Office if the taking of water is observed to have any significant impact on the surrounding waters. After hours, calls shall be directed to the Ministry's Spills Action Centre at 1-800-268-6060.

5.2 For Groundwater Takings

If the taking of water is observed to cause any negative impact to other water supplies obtained from any adequate sources that were in use prior to initial issuance of a Permit for this water taking, the Permit Holder shall take such action necessary to make available to those affected, a supply of water equivalent in quantity and quality to their normal takings, or shall compensate such persons for their reasonable costs of so doing, or shall reduce the rate and amount of taking to prevent or alleviate the observed negative impact. Pending permanent restoration of the affected supplies, the Permit Holder shall provide, to those affected, temporary water supplies adequate to meet their normal requirements, or shall compensate such persons for their reasonable costs of doing so.

If permanent interference is caused by the water taking, the Permit Holder shall restore the water supplies of those permanently affected.

5.2.1 Where the water supply provided by the well known by MOE Water Well Record Number 5727662 is restored in accordance with Condition 5.2, the Permit Holder shall restore the supply in a manner satisfactory to the Director, taking into account the residential needs, requirements and preferences of the persons serviced by the well.

5.3 Upon the receipt of a groundwater interference complaint, the Permit Holder shall:

a) Implement the McCarthy Quarry Complaint Resolution Process as described in Item 3 of Schedule A of this Permit.

b) In addition, appropriate notification and actions must be taken as described in conditions 5.1 and 5.2 of this Permit. The provisions of conditions 5.1 and 5.2 shall take precedence over the provisions of condition 5.3(a) if there is a conflict.

6. Director May Amend Permit

The Director may amend this Permit by letter requiring the Permit Holder to suspend or reduce the taking to an amount or threshold specified by the Director in the letter. The suspension or reduction in taking shall be effective immediately and may be revoked at any time upon notification by the Director. This condition does not affect your right to appeal the suspension or reduction in taking to the Environmental Review Tribunal under the *Ontario Water Resources Act* , Section 100 (4).

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is included to ensure that the conditions in this Permit are complied with and can be enforced.

2. Condition 2 is included to clarify the legal interpretation of aspects of this Permit.

3. Conditions 3 through 6 are included to protect the quality of the natural environment so as to safeguard the ecosystem and human health and foster efficient use and conservation of waters. These conditions allow for the beneficial use of waters while ensuring the fair sharing, conservation and sustainable use of the waters of Ontario. The conditions also specify the water takings that are authorized by this Permit and the scope of this Permit.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, you may by written notice served upon me, the Environmental Review Tribunal and the Minister of the Environment, Conservation and Parks, within 15 days after receipt of this Notice, require a hearing by the Tribunal. The Minister of the Environment, Conservation and Parks will place notice of your appeal on the Environmental Registry. Section 101 of the Ontario Water Resources Act, as amended provides that the Notice requiring a hearing shall state:

1. The portions of the Permit or each term or condition in the Permit 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.

In addition to these legal requirements, the Notice should also include:

a. The name of the appellant;
b. The address of the appellant;
c. The Permit to Take Water number;
d. The date of the Permit to Take Water;
e. The name of the Director;
f. The municipality within which the works are located;

This notice must be served upon:

The Secretary
Environmental Review Tribunal
655 Bay Street, 15th Floor
Toronto ON
M5G 1E5
Fax: (416) 326-5370
Email:
ERTTribunalsecretary@ontario.ca

AND

The Minister of the Environment,
Conservation and Parks
777 Bay Street, 5th Floor
Toronto, Ontario
M7J 2J3

AND

The Director, Section 34.1,
Ministry of the Environment,
Conservation and Parks
8th Floor
5775 Yonge St
Toronto ON M2M 4J1
Fax: (416) 325-6347

Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal:

by Telephone at	by Fax at	by e-mail at
(416) 212-6349	(416) 326-5370	www.ert.gov.on.ca
Toll Free 1(866) 448-2248	Toll Free 1(844) 213-3474	

This instrument is subject to Section 38 of the ***Environmental Bill of Rights*** *that allows residents of Ontario to seek leave to appeal the decision on this instrument. Residents of Ontario may seek to appeal for 15 days from the date this decision is placed on the Environmental Registry. By accessing the Environmental Registry, you can determine when the leave to appeal period ends.*

This Permit cancels and replaces Permit Number 7818-9QJNL4, issued on 2014/12/30.

Dated at Toronto this 31st day of January, 2020.

Ellen Klupfel
Director, Section 34.1
Ontario Water Resources Act , R.S.O. 1990

Schedule A

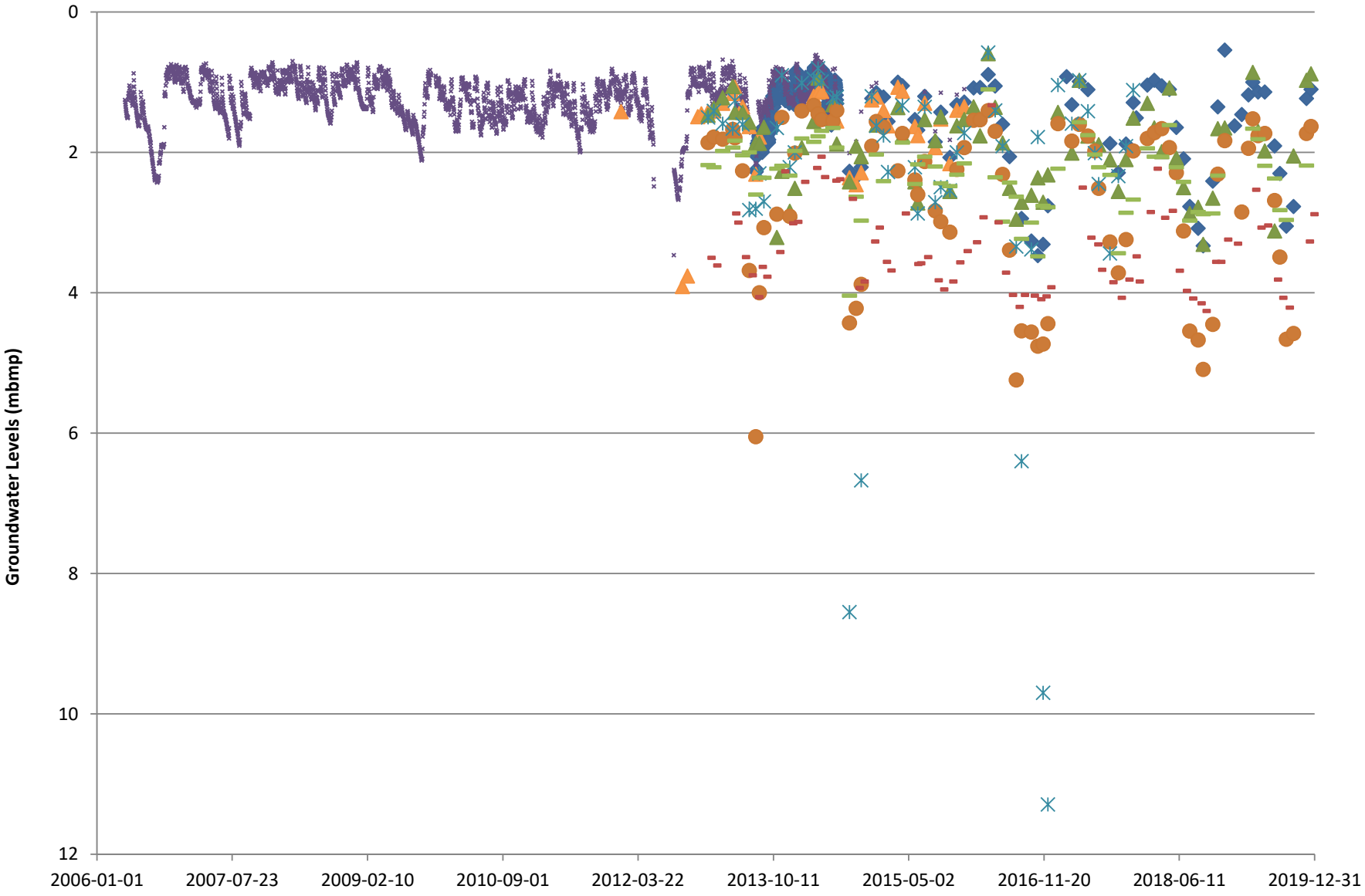
This Schedule "A" forms part of Permit To Take Water 1603-BKTPQH, dated January 31, 2020.

1. Permit to Take Water Application, dated October 23, 2019 and signed by Jenny Coco.

2. Golder Associates Ltd. (November 1, 2019). Hydrogeological Assessment, Permit to Take Water Renewal, McCarthy Quarry.

APPENDIX B

Hydrographs



◆ Bored	× OW5-1	▲ AM1b	
▲ DW1	● DW2	✳ DW5	
— DW6	- DW8		

GOLDER

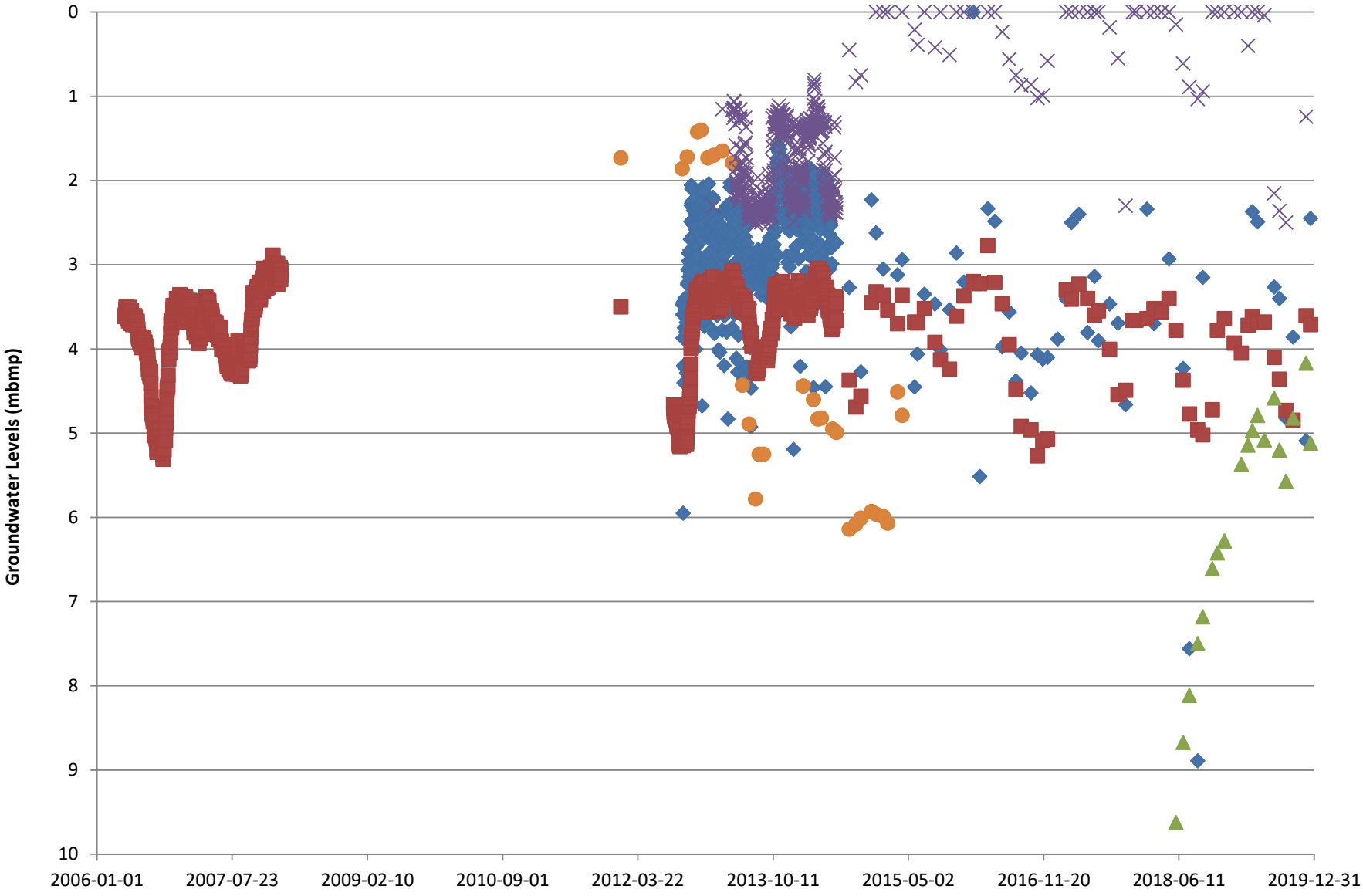
FILE No.		TEST:	
PROJECT No.	1407634	REVIEW:	JAE

SCALE:	NTS
DATE:	29-Jan-20
CAD:	JEB

McCarthy Quarry
Overburden Monitoring Wells
GroundwaterLevel

QBJR/Coco Aggregates Inc.
PTTW Renewal Application

FIGURE No
B-1



DW3 OW4-1

AMx Amx-R

CLK-1

GOLDER

SCALE:	NTS
DATE:	29-Jan-20
CAD:	JEB
TEST:	
REVIEW:	JAE

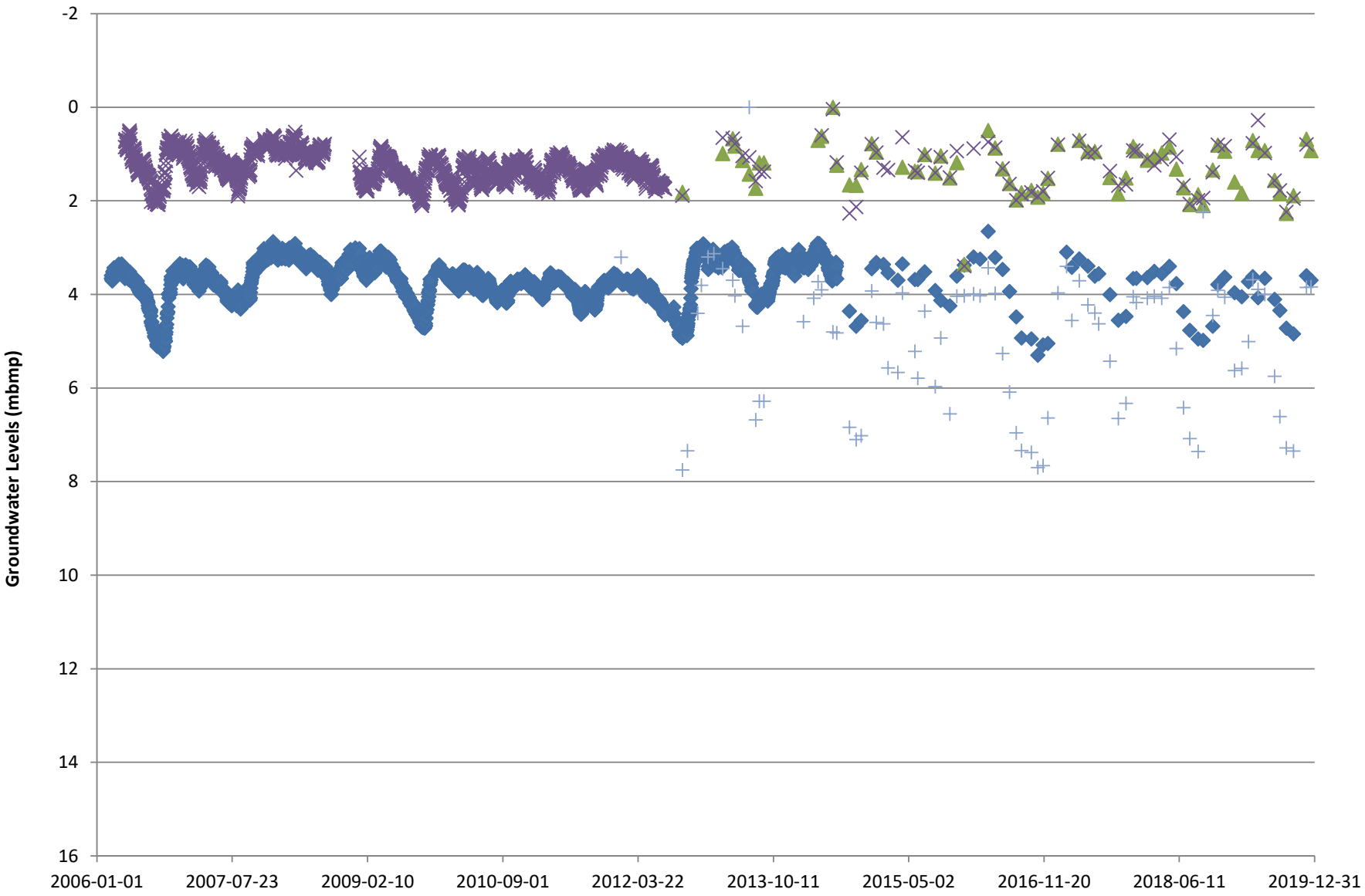
FILE No.

PROJECT No. 1407634

McCarthy Quarry
Verulam Monitoring Wells
Groundwater Level

QBJR/Coco Aggregates Inc.
PTTW Renewal Application

FIGURE No
B-2



◆ OW4-2 ▲ OW5-2 × OW5-3 + TW1-1

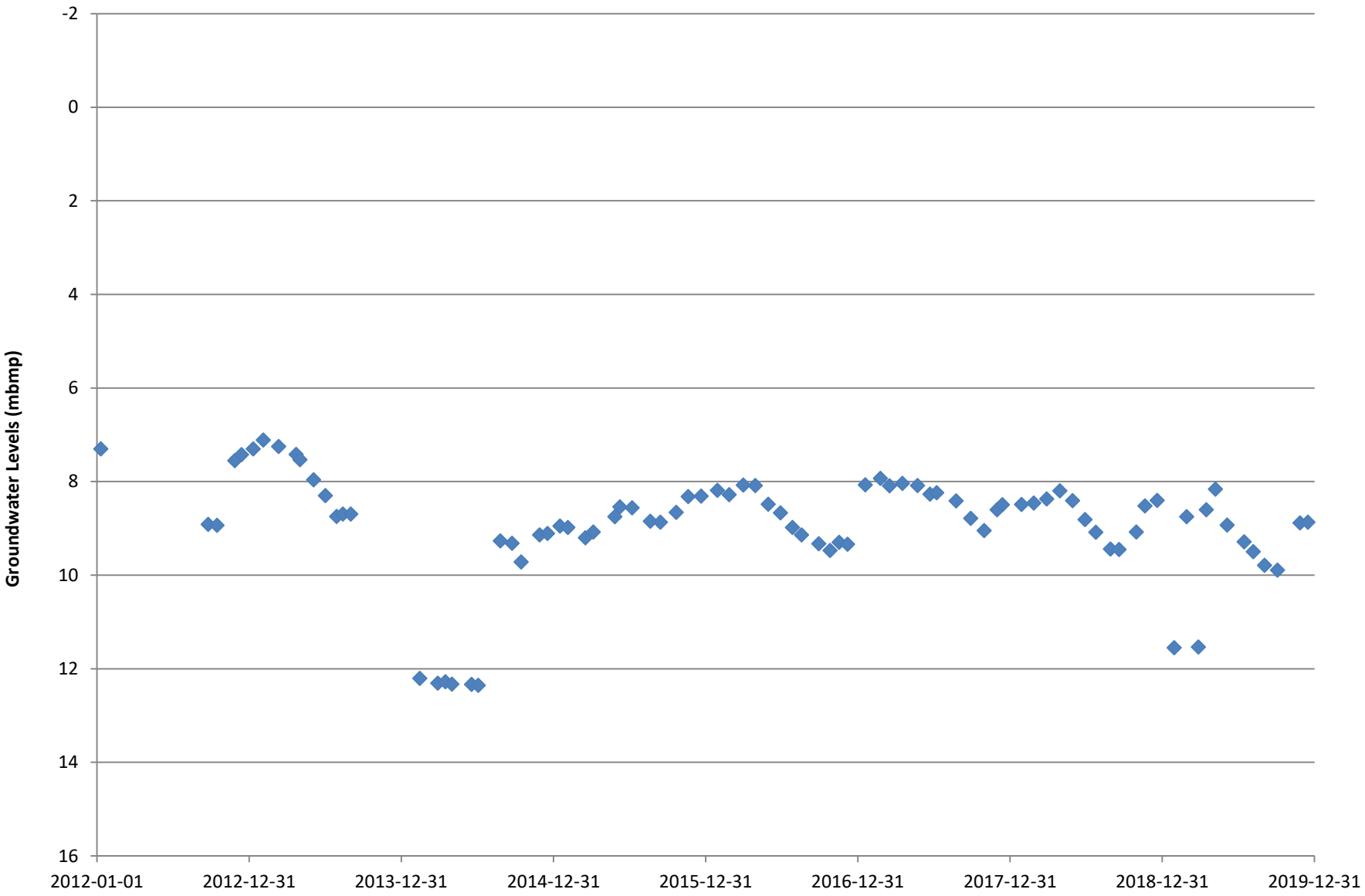
GOLDER

SCALE:	NTS
DATE:	29-Jan-20
CAD:	JEB
FILE No.	
TEST:	
PROJECT No.	1407634
REVIEW:	JAE

McCarthy Quarry
Bobcaygeon Monitoring Wells
Groundwater Level

QBJR/Coco Aggregates Inc.
PTTW Renewal Application

FIGURE No
B-3



GOLDER	SCALE: NTS	McCarthy Quarry Precambrian Monitoring Wells Groundwater Level	
	DATE: 29-Jan-20		
	CAD: JEB		
FILE No.	TEST:	QBJR/Coco Aggregates Inc. PTTW Renewal Application	FIGURE No B-4
PROJECT No. 1407634	REVIEW: JAE		

APPENDIX C

Laboratory Certificates of Analysis

Maxxam
A Bureau Veritas Group Company

Your Project #: 1407634
Site Location: MCCARTHY
Your C.O.C. #: 715652-01-01

Attention: Jamie Bonany

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

Report Date: 2019/05/16
Report #: R5713536
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B9C5207
Received: 2019/05/10, 08:51

Sample Matrix: Water
Samples Received: 17

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Alkalinity	17	N/A	2019/05/13	CAM SOP-00448	SM 23 2320 B m
Carbonate, Bicarbonate and Hydroxide	17	N/A	2019/05/14	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	17	N/A	2019/05/14	CAM SOP-00463	SM 4500-Cl E m
Colour	17	N/A	2019/05/15	CAM SOP-00412	SM 23 2120C m
Conductivity	17	N/A	2019/05/13	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1)	17	N/A	2019/05/13	CAM SOP-00446	SM 23 5310 B m
Fluoride	17	2019/05/13	2019/05/13	CAM SOP-00449	SM 23 4500-F C m
Hardness (calculated as CaCO3)	17	N/A	2019/05/15	CAM SOP 00102/00408/00447	SM 2340 B
Dissolved Metals by ICPMS	13	N/A	2019/05/14	CAM SOP-00447	EPA 6020B m
Dissolved Metals by ICPMS	4	N/A	2019/05/15	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	17	N/A	2019/05/14	CAM SOP-00441	EPA GS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (2)	17	N/A	2019/05/14	CAM SOP-00440	SM 23 4500-NO3I/NO2B
pH	17	2019/05/13	2019/05/13	CAM SOP-00413	SM 4500H+ B m
Orthophosphate	17	N/A	2019/05/14	CAM SOP-00461	EPA 365.1 m
Sulphate by Automated Colourimetry	17	N/A	2019/05/14	CAM SOP-00464	EPA 375.4 m
Total Dissolved Solids (TDS calc)	17	N/A	2019/05/15		

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025 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.

Maxxam
A Bureau Veritas Group Company

Your Project #: 1407634
Site Location: MCCARTHY
Your C.O.C. #: 715652-01-01

Attention: Jamie Bonany

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

Report Date: 2019/05/16
Report #: R5713536
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B9C5207
Received: 2019/05/10, 08:51

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.

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.

Maxxam Job #: B9C5207
Report Date: 2019/05/16

Golder Associates Ltd
Client Project #: 1407634
Site Location: MCCARTHY
Sampler Initials: SDP

RESULTS OF ANALYSES OF WATER

Maxxam ID				JRH558			JRH558		
Sampling Date				2019/05/08 05:15			2019/05/08 05:15		
COC Number				715652-01-01			715652-01-01		
	UNITS	MAC	A/O	AM1B	RDL	QC Batch	AM1B Lab-Dup	RDL	QC Batch
Calculated Parameters									
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	230	1.0	6115001			
Calculated TDS	mg/L	-	500	340	1.0	6115387			
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	2.0	1.0	6115001			
Hardness (CaCO3)	mg/L	-	80:100	**340**	1.0	6116711			
Inorganics									
Total Ammonia-N	mg/L	-	-	0.11	0.050	6119278			
Colour	TCU	-	5	<2	2	6120994			
Conductivity	umho/cm	-	-	480	1.0	6118149	480	1.0	6118149
Fluoride (F-)	mg/L	1.5	-	0.23	0.10	6118150	0.22	0.10	6118150
Dissolved Organic Carbon	mg/L	-	5	0.71	0.50	6118337			
Orthophosphate (P)	mg/L	-	-	<0.010	0.010	6118171	<0.010	0.010	6118171
pH	pH	-	6.5:8.5	7.98		6118152	7.99		6118152
Dissolved Sulphate (SO4)	mg/L	-	500	44	1.0	6118169	44	1.0	6118169
Alkalinity (Total as CaCO3)	mg/L	-	30:500	230	1.0	6118146	230	1.0	6118146
Dissolved Chloride (Cl-)	mg/L	-	250	2.0	1.0	6118167	2.2	1.0	6118167
Nitrite (N)	mg/L	1	-	0.011	0.010	6118157			
Nitrate (N)	mg/L	10	-	<0.10	0.10	6118157			
Nitrate + Nitrite (N)	mg/L	10	-	<0.10	0.10	6118157			

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B9C5207
Report Date: 2019/05/16

Golder Associates Ltd
Client Project #: 1407634
Site Location: MCCARTHY
Sampler Initials: SDP

RESULTS OF ANALYSES OF WATER

Maxxam ID				JRH559		JRH560		JRH561		
Sampling Date				2019/05/08 12:30		2019/05/08 04:45		2019/05/08 04:45		
COC Number				715652-01-01		715652-01-01		715652-01-01		
	UNITS	MAC	A/O	TW1-1	RDL	BORED	RDL	OW4-1	RDL	QC Batch
Calculated Parameters										
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	280	1.0	260	1.0	210	1.0	6115001
Calculated TDS	mg/L	-	500	**1000**	1.0	320	1.0	**630**	1.0	6115387
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	1.6	1.0	3.3	1.0	5.0	1.0	6115001
Hardness (CaCO3)	mg/L	-	80:100	**490**	1.0	**270**	1.0	**140**	1.0	6116711
Inorganics										
Total Ammonia-N	mg/L	-	-	0.68	0.050	<0.050	0.050	1.0	0.050	6119278
Colour	TCU	-	5	<2	2	<2	2	<2	2	6120994
Conductivity	umho/cm	-	-	1900	1.0	550	1.0	1300	1.0	6118149
Fluoride (F-)	mg/L	1.5	-	0.51	0.10	0.13	0.10	1.0	0.10	6118150
Dissolved Organic Carbon	mg/L	-	5	1.6	0.50	0.88	0.50	2.4	0.50	6118337
Orthophosphate (P)	mg/L	-	-	<0.010	0.010	<0.010	0.010	<0.010	0.010	6118171
pH	pH	-	6.5:8.5	7.78		8.12		8.40		6118152
Dissolved Sulphate (SO4)	mg/L	-	500	28	1.0	28	1.0	2.9	1.0	6118169
Alkalinity (Total as CaCO3)	mg/L	-	30:500	280	1.0	270	1.0	220	1.0	6118146
Dissolved Chloride (Cl-)	mg/L	-	250	**420**	5.0	2.1	1.0	250	3.0	6118167
Nitrite (N)	mg/L	1	-	<0.010	0.010	<0.010	0.010	<0.010	0.010	6118157
Nitrate (N)	mg/L	10	-	0.18	0.10	0.30	0.10	<0.10	0.10	6118157
Nitrate + Nitrite (N)	mg/L	10	-	0.18	0.10	0.30	0.10	<0.10	0.10	6118157

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

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Maxxam Job #: B9C5207
Report Date: 2019/05/16

Golder Associates Ltd
Client Project #: 1407634
Site Location: MCCARTHY
Sampler Initials: SDP

RESULTS OF ANALYSES OF WATER

Maxxam ID				JRH562			JRH562		
Sampling Date				2019/05/08 05:00			2019/05/08 05:00		
COC Number				715652-01-01			715652-01-01		
	UNITS	MAC	A/O	OW4-2	RDL	QC Batch	OW4-2 Lab-Dup	RDL	QC Batch
Calculated Parameters									
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	230	1.0	6115001			
Calculated TDS	mg/L	-	500	**840**	1.0	6115387			
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	2.4	1.0	6115001			
Hardness (CaCO3)	mg/L	-	80:100	**230**	1.0	6116711			
Inorganics									
Total Ammonia-N	mg/L	-	-	1.2	0.050	6119278			
Colour	TCU	-	5	<2	2	6120994			
Conductivity	umho/cm	-	-	1600	1.0	6118149			
Fluoride (F-)	mg/L	1.5	-	0.96	0.10	6118150			
Dissolved Organic Carbon	mg/L	-	5	1.0	0.50	6118337			
Orthophosphate (P)	mg/L	-	-	<0.010	0.010	6118171			
pH	pH	-	6.5:8.5	8.03		6118152			
Dissolved Sulphate (SO4)	mg/L	-	500	<1.0	1.0	6118169			
Alkalinity (Total as CaCO3)	mg/L	-	30:500	240	1.0	6118146			
Dissolved Chloride (Cl-)	mg/L	-	250	**350**	5.0	6118167			
Nitrite (N)	mg/L	1	-	<0.010	0.010	6118157	<0.010	0.010	6118157
Nitrate (N)	mg/L	10	-	<0.10	0.10	6118157	<0.10	0.10	6118157
Nitrate + Nitrite (N)	mg/L	10	-	<0.10	0.10	6118157	<0.10	0.10	6118157

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

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Maxxam Job #: B9C5207
Report Date: 2019/05/16

Golder Associates Ltd
Client Project #: 1407634
Site Location: MCCARTHY
Sampler Initials: SDP

RESULTS OF ANALYSES OF WATER

Maxxam ID				JRH563		JRH564	JRH565		JRH566		
Sampling Date				2019/05/08 01:40		2019/05/08 02:00	2019/05/08 01:45		2019/05/08 04:15		
COC Number				715652-01-01		715652-01-01	715652-01-01		715652-01-01		
	UNITS	MAC	A/O	OW5-1	RDL	OW5-2	OW5-3	RDL	OW6-2	RDL	QC Batch
Calculated Parameters											
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	270	1.0	110	110	1.0	140	1.0	6115001
Calculated TDS	mg/L	-	500	460	1.0	**16000**	**17000**	1.0	**4000**	1.0	6115387
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	2.4	1.0	<1.0	<1.0	1.0	<1.0	1.0	6115001
Hardness (CaCO3)	mg/L	-	80:100	**330**	1.0	**6000**	**6700**	1.0	**1600**	1.0	6116711
Inorganics											
Total Ammonia-N	mg/L	-	-	0.54	0.050	8.6	9.7	0.050	<0.050	0.050	6119278
Colour	TCU	-	5	<2	2	<2	<2	2	<2	2	6120994
Conductivity	umho/cm	-	-	740	1.0	27000	29000	1.0	6500	1.0	6118149
Fluoride (F-)	mg/L	1.5	-	0.56	0.10	0.40	0.40	0.10	0.62	0.10	6118150
Dissolved Organic Carbon	mg/L	-	5	1.2	0.50	0.57	0.99	0.50	0.58	0.50	6118337
Orthophosphate (P)	mg/L	-	-	<0.010	0.010	<0.010	<0.010	0.010	<0.010	0.010	6118171
pH	pH	-	6.5:8.5	7.97		7.35	7.39		7.69		6118152
Dissolved Sulphate (SO4)	mg/L	-	500	44	1.0	5.3	34	1.0	**960**	5.0	6118169
Alkalinity (Total as CaCO3)	mg/L	-	30:500	270	1.0	110	110	1.0	140	1.0	6118146
Dissolved Chloride (Cl-)	mg/L	-	250	52	1.0	**10000**	**10000**	120	**1500**	25	6118167
Nitrite (N)	mg/L	1	-	<0.010	0.010	<0.010	<0.010	0.010	<0.010	0.010	6118157
Nitrate (N)	mg/L	10	-	0.59	0.10	<0.10	<0.10	0.10	0.95	0.10	6118157
Nitrate + Nitrite (N)	mg/L	10	-	0.59	0.10	<0.10	<0.10	0.10	0.95	0.10	6118157

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B9C5207
Report Date: 2019/05/16

Golder Associates Ltd
Client Project #: 1407634
Site Location: MCCARTHY
Sampler Initials: SDP

RESULTS OF ANALYSES OF WATER

Maxxam ID				JRH567		JRH568		JRH569		
Sampling Date				2019/05/08 03:15		2019/05/08 05:00		2019/05/08 03:10		
COC Number				715652-01-01		715652-01-01		715652-01-01		
	UNITS	MAC	A/O	OW7-1	RDL	OW4-2-D	RDL	OW7-2	RDL	QC Batch
Calculated Parameters										
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	290	1.0	230	1.0	290	1.0	6115001
Calculated TDS	mg/L	-	500	**3500**	1.0	**850**	1.0	**3400**	1.0	6115387
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	1.8	1.0	2.5	1.0	2.1	1.0	6115001
Hardness (CaCO3)	mg/L	-	80:100	**910**	1.0	**230**	1.0	**830**	1.0	6116711
Inorganics										
Total Ammonia-N	mg/L	-	-	2.0	0.050	1.1	0.050	2.4	0.050	6119278
Colour	TCU	-	5	<2	2	<2	2	<2	2	6120994
Conductivity	umho/cm	-	-	6400	1.0	1600	1.0	6200	1.0	6118149
Fluoride (F-)	mg/L	1.5	-	**2.1**	0.10	0.98	0.10	**2.1**	0.10	6118150
Dissolved Organic Carbon	mg/L	-	5	0.84	0.50	1.1	0.50	0.77	0.50	6118337
Orthophosphate (P)	mg/L	-	-	<0.010	0.010	<0.010	0.010	<0.050 (1)	0.050	6118171
pH	pH	-	6.5:8.5	7.83		8.05		7.89		6118152
Dissolved Sulphate (SO4)	mg/L	-	500	25	1.0	<1.0	1.0	20	1.0	6118169
Alkalinity (Total as CaCO3)	mg/L	-	30:500	290	1.0	240	1.0	300	1.0	6118146
Dissolved Chloride (Cl-)	mg/L	-	250	**1900**	20	**370**	5.0	**1900**	20	6118167
Nitrite (N)	mg/L	1	-	<0.010	0.010	<0.010	0.010	<0.010	0.010	6118157
Nitrate (N)	mg/L	10	-	<0.10	0.10	<0.10	0.10	<0.10	0.10	6118157
Nitrate + Nitrite (N)	mg/L	10	-	<0.10	0.10	<0.10	0.10	<0.10	0.10	6118157

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)
(1) Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B9C5207
Report Date: 2019/05/16

Golder Associates Ltd
Client Project #: 1407634
Site Location: MCCARTHY
Sampler Initials: SDP

RESULTS OF ANALYSES OF WATER

Maxxam ID				JRH569			JRH570	JRH571		
Sampling Date				2019/05/08 03:10			2019/05/08 02:40	2019/05/08 02:30		
COC Number				715652-01-01			715652-01-01	715652-01-01		
	UNITS	MAC	A/O	OW7-2 Lab-Dup	RDL	QC Batch	OW8-1	OW8-2	RDL	QC Batch
Calculated Parameters										
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-				300	300	1.0	6115001
Calculated TDS	mg/L	-	500				450	440	1.0	6115387
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-				1.8	2.0	1.0	6115001
Hardness (CaCO3)	mg/L	-	80:100				**290**	**300**	1.0	6116711
Inorganics										
Total Ammonia-N	mg/L	-	-				0.43	0.39	0.050	6119278
Colour	TCU	-	5	<2	2	6120994	<2	<2	2	6120994
Conductivity	umho/cm	-	-				770	760	1.0	6118149
Fluoride (F-)	mg/L	1.5	-				0.69	0.60	0.10	6118150
Dissolved Organic Carbon	mg/L	-	5				1.5	1.7	0.50	6118337
Orthophosphate (P)	mg/L	-	-				<0.010	<0.010	0.010	6118171
pH	pH	-	6.5:8.5				7.81	7.85		6118152
Dissolved Sulphate (SO4)	mg/L	-	500				54	51	1.0	6118169
Alkalinity (Total as CaCO3)	mg/L	-	30:500				300	300	1.0	6118146
Dissolved Chloride (Cl-)	mg/L	-	250				36	33	1.0	6118167
Nitrite (N)	mg/L	1	-				<0.010	<0.010	0.010	6118157
Nitrate (N)	mg/L	10	-				<0.10	<0.10	0.10	6118157
Nitrate + Nitrite (N)	mg/L	10	-				<0.10	<0.10	0.10	6118157

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B9C5207
Report Date: 2019/05/16

Golder Associates Ltd
Client Project #: 1407634
Site Location: MCCARTHY
Sampler Initials: SDP

RESULTS OF ANALYSES OF WATER

Maxxam ID				JRH572		JRH573		JRH574		
Sampling Date				2019/05/08 11:00		2019/05/08 05:30		2019/05/08 12:30		
COC Number				715652-01-01		715652-01-01		715652-01-01		
	UNITS	MAC	A/O	OW9-2	RDL	NEW WELL	RDL	TW1-1-D	RDL	QC Batch
Calculated Parameters										
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	170	1.0	66	1.0	280	1.0	6115001
Calculated TDS	mg/L	-	500	**23000**	1.0	**11000**	1.0	**1000**	1.0	6115387
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	<1.0	1.0	<1.0	1.0	1.6	1.0	6115001
Hardness (CaCO3)	mg/L	-	80:100	**12000**	1.0	**4800**	1.0	**480**	1.0	6116711
Inorganics										
Total Ammonia-N	mg/L	-	-	0.11	0.050	6.0	0.050	0.74	0.050	6119278
Colour	TCU	-	5	3	2	<2	2	<2	2	6120994
Conductivity	umho/cm	-	-	39000	1.0	20000	1.0	1900	1.0	6118149
Fluoride (F-)	mg/L	1.5	-	<0.10	0.10	0.58	0.10	0.52	0.10	6118150
Dissolved Organic Carbon	mg/L	-	5	**7.8**	0.50	2.7	0.50	1.7	0.50	6118337
Orthophosphate (P)	mg/L	-	-	<0.010	0.010	<0.010	0.010	<0.010	0.010	6118171
pH	pH	-	6.5:8.5	7.09		7.13		7.78		6118152
Dissolved Sulphate (SO4)	mg/L	-	500	**880**	5.0	29	1.0	29	1.0	6118169
Alkalinity (Total as CaCO3)	mg/L	-	30:500	170	1.0	67	1.0	280	1.0	6118146
Dissolved Chloride (Cl-)	mg/L	-	250	**13000**	120	**7200**	80	**420**	5.0	6118167
Nitrite (N)	mg/L	1	-	0.013	0.010	<0.010	0.010	<0.010	0.010	6118157
Nitrate (N)	mg/L	10	-	0.51	0.10	<0.10	0.10	0.19	0.10	6118157
Nitrate + Nitrite (N)	mg/L	10	-	0.52	0.10	<0.10	0.10	0.19	0.10	6118157

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

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Maxxam Job #: B9C5207
Report Date: 2019/05/16

Golder Associates Ltd
Client Project #: 1407634
Site Location: MCCARTHY
Sampler Initials: SDP

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID			JRH558		JRH559		JRH560	JRH561	JRH562		
Sampling Date			2019/05/08 05:15		2019/05/08 12:30		2019/05/08 04:45	2019/05/08 04:45	2019/05/08 05:00		
COC Number			715652-01-01		715652-01-01		715652-01-01	715652-01-01	715652-01-01		
	UNITS	A/O	AM1B	RDL	TW1-1	RDL	BORED	OW4-1	OW4-2	RDL	QC Batch
Metals											
Dissolved Calcium (Ca)	ug/L	-	84000	200	110000	400	64000	27000	43000	200	6118996
Dissolved Magnesium (Mg)	ug/L	-	32000	50	52000	50	28000	18000	30000	50	6118996
Dissolved Phosphorus (P)	ug/L	-	130	100	<100	100	<100	<100	<100	100	6118996
Dissolved Potassium (K)	ug/L	-	2400	200	8600	200	6000	6400	9700	200	6118996
Dissolved Sodium (Na)	ug/L	200000	6800	100	**210000**	100	14000	180000	**250000**	100	6118996

No Fill — No Exceedance
Grey — Exceeds 1 criteria policy/level
Black — Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

Maxxam ID			JRH563		JRH564		JRH565		JRH566		
Sampling Date			2019/05/08 01:40		2019/05/08 02:00		2019/05/08 01:45		2019/05/08 04:15		
COC Number			715652-01-01		715652-01-01		715652-01-01		715652-01-01		
	UNITS	A/O	OW5-1	RDL	OW5-2	RDL	OW5-3	RDL	OW6-2	RDL	QC Batch
Metals											
Dissolved Calcium (Ca)	ug/L	-	84000	200	1200000	5000	1400000	4000	340000	1000	6118996
Dissolved Magnesium (Mg)	ug/L	-	29000	50	720000	250	770000	500	190000	50	6118996
Dissolved Phosphorus (P)	ug/L	-	170	100	<500	500	<1000	1000	<100	100	6118996
Dissolved Potassium (K)	ug/L	-	6600	200	66000	1000	68000	2000	18000	200	6118996
Dissolved Sodium (Na)	ug/L	200000	66000	100	**3400000**	1000	**4000000**	1000	**810000**	500	6118996

No Fill — No Exceedance
Grey — Exceeds 1 criteria policy/level
Black — Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

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Maxxam Job #: B9C5207
Report Date: 2019/05/16

Golder Associates Ltd
Client Project #: 1407634
Site Location: MCCARTHY
Sampler Initials: SDP

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID			JRH567		JRH568		JRH569		JRH570		
Sampling Date			2019/05/08 03:15		2019/05/08 05:00		2019/05/08 03:10		2019/05/08 02:40		
COC Number			715652-01-01		715652-01-01		715652-01-01		715652-01-01		
	UNITS	A/O	OW7-1	RDL	OW4-2-D	RDL	OW7-2	RDL	OW8-1	RDL	QC Batch
Metals											
Dissolved Calcium (Ca)	ug/L	-	190000	1000	44000	200	180000	1000	86000	200	6118996
Dissolved Magnesium (Mg)	ug/L	-	100000	50	29000	50	95000	50	18000	50	6118996
Dissolved Phosphorus (P)	ug/L	-	<100	100	<100	100	<100	100	<100	100	6118996
Dissolved Potassium (K)	ug/L	-	16000	200	9700	200	15000	200	4300	200	6118996
Dissolved Sodium (Na)	ug/L	200000	**1000000**	500	**250000**	100	**960000**	500	57000	100	6118996

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

Maxxam ID			JRH571		JRH572		JRH573		JRH574		
Sampling Date			2019/05/08 02:30		2019/05/08 11:00		2019/05/08 05:30		2019/05/08 12:30		
COC Number			715652-01-01		715652-01-01		715652-01-01		715652-01-01		
	UNITS	A/O	OW8-2	RDL	OW9-2	RDL	NEW WELL	RDL	TW1-1-D	RDL	QC Batch
Metals											
Dissolved Calcium (Ca)	ug/L	-	89000	200	2900000	4000	920000	5000	110000	200	6118996
Dissolved Magnesium (Mg)	ug/L	-	18000	50	1200000	500	610000	250	51000	50	6118996
Dissolved Phosphorus (P)	ug/L	-	<100	100	<1000	1000	<500	500	<100	100	6118996
Dissolved Potassium (K)	ug/L	-	4000	200	69000	2000	49000	1000	8400	200	6118996
Dissolved Sodium (Na)	ug/L	200000	51000	100	**4200000**	1000	**2600000**	500	200000	100	6118996

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

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Maxxam Job #: B9C5207
Report Date: 2019/05/16

Golder Associates Ltd
Client Project #: 1407634
Site Location: MCCARTHY
Sampler Initials: SDP

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID			JRH574		
Sampling Date			2019/05/08 12:30		
COC Number			715652-01-01		
	UNITS	A/O	TW1-1-D Lab-Dup	RDL	QC Batch
Metals					
Dissolved Calcium (Ca)	ug/L	-	110000	400	6118996
Dissolved Magnesium (Mg)	ug/L	-	53000	50	6118996
Dissolved Phosphorus (P)	ug/L	-	<100	100	6118996
Dissolved Potassium (K)	ug/L	-	8500	200	6118996
Dissolved Sodium (Na)	ug/L	200000	**210000**	100	6118996

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
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Maxxam Job #: B9C5207
Report Date: 2019/05/16

Golder Associates Ltd
Client Project #: 1407634
Site Location: MCCARTHY
Sampler Initials: SDP

TEST SUMMARY

Maxxam ID: JRH558
Sample ID: AM1B
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6118146	N/A	2019/05/13	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6115001	N/A	2019/05/14	Automated Statchk
Chloride by Automated Colourimetry	KONE	6118167	N/A	2019/05/14	Alina Dobreanu
Colour	SPEC	6120994	N/A	2019/05/15	Christine Pham
Conductivity	AT	6118149	N/A	2019/05/13	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6118337	N/A	2019/05/13	Mandeep Kaur
Fluoride	ISE	6118150	2019/05/13	2019/05/13	Surinder Rai
Hardness (calculated as CaCO3)		6116711	N/A	2019/05/15	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6118996	N/A	2019/05/14	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6119278	N/A	2019/05/14	Bernard Antwi
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6118157	N/A	2019/05/14	Chandra Nandlal
pH	AT	6118152	2019/05/13	2019/05/13	Surinder Rai
Orthophosphate	KONE	6118171	N/A	2019/05/14	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6118169	N/A	2019/05/14	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6115387	N/A	2019/05/15	Automated Statchk

Maxxam ID: JRH558 Dup
Sample ID: AM1B
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6118146	N/A	2019/05/13	Surinder Rai
Chloride by Automated Colourimetry	KONE	6118167	N/A	2019/05/14	Alina Dobreanu
Conductivity	AT	6118149	N/A	2019/05/13	Surinder Rai
Fluoride	ISE	6118150	2019/05/13	2019/05/13	Surinder Rai
pH	AT	6118152	2019/05/13	2019/05/13	Surinder Rai
Orthophosphate	KONE	6118171	N/A	2019/05/14	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6118169	N/A	2019/05/14	Alina Dobreanu

Maxxam ID: JRH559
Sample ID: TW1-1
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6118146	N/A	2019/05/13	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6115001	N/A	2019/05/14	Automated Statchk
Chloride by Automated Colourimetry	KONE	6118167	N/A	2019/05/14	Alina Dobreanu
Colour	SPEC	6120994	N/A	2019/05/15	Christine Pham
Conductivity	AT	6118149	N/A	2019/05/13	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6118337	N/A	2019/05/13	Mandeep Kaur
Fluoride	ISE	6118150	2019/05/13	2019/05/13	Surinder Rai
Hardness (calculated as CaCO3)		6116711	N/A	2019/05/15	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6118996	N/A	2019/05/14	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6119278	N/A	2019/05/14	Bernard Antwi
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6118157	N/A	2019/05/14	Chandra Nandlal

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Maxxam Job #: B9C5207
Report Date: 2019/05/16

Golder Associates Ltd
Client Project #: 1407634
Site Location: MCCARTHY
Sampler Initials: SDP

TEST SUMMARY

Maxxam ID: JRH559
Sample ID: TW1-1
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
pH	AT	6118152	2019/05/13	2019/05/13	Surinder Rai
Orthophosphate	KONE	6118171	N/A	2019/05/14	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6118169	N/A	2019/05/14	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6115387	N/A	2019/05/15	Automated Statchk

Maxxam ID: JRH560
Sample ID: BORED
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6118146	N/A	2019/05/13	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6115001	N/A	2019/05/14	Automated Statchk
Chloride by Automated Colourimetry	KONE	6118167	N/A	2019/05/14	Alina Dobreanu
Colour	SPEC	6120994	N/A	2019/05/15	Christine Pham
Conductivity	AT	6118149	N/A	2019/05/13	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6118337	N/A	2019/05/13	Mandeep Kaur
Fluoride	ISE	6118150	2019/05/13	2019/05/13	Surinder Rai
Hardness (calculated as CaCO3)		6116711	N/A	2019/05/15	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6118996	N/A	2019/05/14	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6119278	N/A	2019/05/14	Bernard Antwi
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6118157	N/A	2019/05/14	Chandra Nandlal
pH	AT	6118152	2019/05/13	2019/05/13	Surinder Rai
Orthophosphate	KONE	6118171	N/A	2019/05/14	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6118169	N/A	2019/05/14	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6115387	N/A	2019/05/15	Automated Statchk

Maxxam ID: JRH561
Sample ID: OW4-1
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6118146	N/A	2019/05/13	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6115001	N/A	2019/05/14	Automated Statchk
Chloride by Automated Colourimetry	KONE	6118167	N/A	2019/05/14	Alina Dobreanu
Colour	SPEC	6120994	N/A	2019/05/15	Christine Pham
Conductivity	AT	6118149	N/A	2019/05/13	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6118337	N/A	2019/05/13	Mandeep Kaur
Fluoride	ISE	6118150	2019/05/13	2019/05/13	Surinder Rai
Hardness (calculated as CaCO3)		6116711	N/A	2019/05/15	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6118996	N/A	2019/05/14	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6119278	N/A	2019/05/14	Bernard Antwi
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6118157	N/A	2019/05/14	Chandra Nandlal
pH	AT	6118152	2019/05/13	2019/05/13	Surinder Rai
Orthophosphate	KONE	6118171	N/A	2019/05/14	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6118169	N/A	2019/05/14	Alina Dobreanu

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Maxxam Job #: B9C5207
Report Date: 2019/05/16

Golder Associates Ltd
Client Project #: 1407634
Site Location: MCCARTHY
Sampler Initials: SDP

TEST SUMMARY

Maxxam ID: JRH561
Sample ID: OW4-1
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Dissolved Solids (TDS calc)	CALC	6115387	N/A	2019/05/15	Automated Statchk

Maxxam ID: JRH562
Sample ID: OW4-2
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6118146	N/A	2019/05/13	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6115001	N/A	2019/05/14	Automated Statchk
Chloride by Automated Colourimetry	KONE	6118167	N/A	2019/05/14	Alina Dobreanu
Colour	SPEC	6120994	N/A	2019/05/15	Christine Pham
Conductivity	AT	6118149	N/A	2019/05/13	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6118337	N/A	2019/05/13	Mandeep Kaur
Fluoride	ISE	6118150	2019/05/13	2019/05/13	Surinder Rai
Hardness (calculated as CaCO3)		6116711	N/A	2019/05/15	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6118996	N/A	2019/05/14	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6119278	N/A	2019/05/14	Bernard Antwi
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6118157	N/A	2019/05/14	Chandra Nandlal
pH	AT	6118152	2019/05/13	2019/05/13	Surinder Rai
Orthophosphate	KONE	6118171	N/A	2019/05/14	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6118169	N/A	2019/05/14	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6115387	N/A	2019/05/15	Automated Statchk

Maxxam ID: JRH562 Dup
Sample ID: OW4-2
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6118157	N/A	2019/05/14	Chandra Nandlal

Maxxam ID: JRH563
Sample ID: OW5-1
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6118146	N/A	2019/05/13	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6115001	N/A	2019/05/14	Automated Statchk
Chloride by Automated Colourimetry	KONE	6118167	N/A	2019/05/14	Alina Dobreanu
Colour	SPEC	6120994	N/A	2019/05/15	Christine Pham
Conductivity	AT	6118149	N/A	2019/05/13	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6118337	N/A	2019/05/13	Mandeep Kaur
Fluoride	ISE	6118150	2019/05/13	2019/05/13	Surinder Rai
Hardness (calculated as CaCO3)		6116711	N/A	2019/05/15	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6118996	N/A	2019/05/14	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6119278	N/A	2019/05/14	Bernard Antwi

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Maxxam Job #: B9C5207
Report Date: 2019/05/16

Golder Associates Ltd
Client Project #: 1407634
Site Location: MCCARTHY
Sampler Initials: SDP

TEST SUMMARY

Maxxam ID: JRH563
Sample ID: OW5-1
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6118157	N/A	2019/05/14	Chandra Nandlal
pH	AT	6118152	2019/05/13	2019/05/13	Surinder Rai
Orthophosphate	KONE	6118171	N/A	2019/05/14	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6118169	N/A	2019/05/14	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6115387	N/A	2019/05/15	Automated Statchk

Maxxam ID: JRH564
Sample ID: OW5-2
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6118146	N/A	2019/05/13	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6115001	N/A	2019/05/14	Automated Statchk
Chloride by Automated Colourimetry	KONE	6118167	N/A	2019/05/14	Alina Dobreanu
Colour	SPEC	6120994	N/A	2019/05/15	Christine Pham
Conductivity	AT	6118149	N/A	2019/05/13	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6118337	N/A	2019/05/13	Mandeep Kaur
Fluoride	ISE	6118150	2019/05/13	2019/05/13	Surinder Rai
Hardness (calculated as CaCO3)		6116711	N/A	2019/05/15	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6118996	N/A	2019/05/15	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6119278	N/A	2019/05/14	Bernard Antwi
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6118157	N/A	2019/05/14	Chandra Nandlal
pH	AT	6118152	2019/05/13	2019/05/13	Surinder Rai
Orthophosphate	KONE	6118171	N/A	2019/05/14	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6118169	N/A	2019/05/14	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6115387	N/A	2019/05/15	Automated Statchk

Maxxam ID: JRH565
Sample ID: OW5-3
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6118146	N/A	2019/05/13	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6115001	N/A	2019/05/14	Automated Statchk
Chloride by Automated Colourimetry	KONE	6118167	N/A	2019/05/14	Alina Dobreanu
Colour	SPEC	6120994	N/A	2019/05/15	Christine Pham
Conductivity	AT	6118149	N/A	2019/05/13	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6118337	N/A	2019/05/13	Mandeep Kaur
Fluoride	ISE	6118150	2019/05/13	2019/05/13	Surinder Rai
Hardness (calculated as CaCO3)		6116711	N/A	2019/05/15	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6118996	N/A	2019/05/14	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6119278	N/A	2019/05/14	Bernard Antwi
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6118157	N/A	2019/05/14	Chandra Nandlal
pH	AT	6118152	2019/05/13	2019/05/13	Surinder Rai
Orthophosphate	KONE	6118171	N/A	2019/05/14	Alina Dobreanu

Maxxam Job #: B9C5207
Report Date: 2019/05/16

Golder Associates Ltd
Client Project #: 1407634
Site Location: MCCARTHY
Sampler Initials: SDP

TEST SUMMARY

Maxxam ID: JRH565
Sample ID: OW5-3
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sulphate by Automated Colourimetry	KONE	6118169	N/A	2019/05/14	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6115387	N/A	2019/05/15	Automated Statchk

Maxxam ID: JRH566
Sample ID: OW6-2
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6118146	N/A	2019/05/13	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6115001	N/A	2019/05/14	Automated Statchk
Chloride by Automated Colourimetry	KONE	6118167	N/A	2019/05/14	Alina Dobreanu
Colour	SPEC	6120994	N/A	2019/05/15	Christine Pham
Conductivity	AT	6118149	N/A	2019/05/13	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6118337	N/A	2019/05/13	Mandeep Kaur
Fluoride	ISE	6118150	2019/05/13	2019/05/13	Surinder Rai
Hardness (calculated as CaCO3)		6116711	N/A	2019/05/15	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6118996	N/A	2019/05/15	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6119278	N/A	2019/05/14	Bernard Antwi
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6118157	N/A	2019/05/14	Chandra Nandlal
pH	AT	6118152	2019/05/13	2019/05/13	Surinder Rai
Orthophosphate	KONE	6118171	N/A	2019/05/14	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6118169	N/A	2019/05/14	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6115387	N/A	2019/05/15	Automated Statchk

Maxxam ID: JRH567
Sample ID: OW7-1
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6118146	N/A	2019/05/13	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6115001	N/A	2019/05/14	Automated Statchk
Chloride by Automated Colourimetry	KONE	6118167	N/A	2019/05/14	Alina Dobreanu
Colour	SPEC	6120994	N/A	2019/05/15	Christine Pham
Conductivity	AT	6118149	N/A	2019/05/13	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6118337	N/A	2019/05/13	Mandeep Kaur
Fluoride	ISE	6118150	2019/05/13	2019/05/13	Surinder Rai
Hardness (calculated as CaCO3)		6116711	N/A	2019/05/15	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6118996	N/A	2019/05/15	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6119278	N/A	2019/05/14	Bernard Antwi
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6118157	N/A	2019/05/14	Chandra Nandlal
pH	AT	6118152	2019/05/13	2019/05/13	Surinder Rai
Orthophosphate	KONE	6118171	N/A	2019/05/14	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6118169	N/A	2019/05/14	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6115387	N/A	2019/05/15	Automated Statchk

Maxxam Job #: B9C5207
Report Date: 2019/05/16

Golder Associates Ltd
Client Project #: 1407634
Site Location: MCCARTHY
Sampler Initials: SDP

TEST SUMMARY

Maxxam ID: JRH568
Sample ID: OW4-2-D
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6118146	N/A	2019/05/13	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6115001	N/A	2019/05/14	Automated Statchk
Chloride by Automated Colourimetry	KONE	6118167	N/A	2019/05/14	Alina Dobreanu
Colour	SPEC	6120994	N/A	2019/05/15	Christine Pham
Conductivity	AT	6118149	N/A	2019/05/13	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6118337	N/A	2019/05/13	Mandeep Kaur
Fluoride	ISE	6118150	2019/05/13	2019/05/13	Surinder Rai
Hardness (calculated as CaCO3)		6116711	N/A	2019/05/15	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6118996	N/A	2019/05/14	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6119278	N/A	2019/05/14	Bernard Antwi
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6118157	N/A	2019/05/14	Chandra Nandlal
pH	AT	6118152	2019/05/13	2019/05/13	Surinder Rai
Orthophosphate	KONE	6118171	N/A	2019/05/14	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6118169	N/A	2019/05/14	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6115387	N/A	2019/05/15	Automated Statchk

Maxxam ID: JRH569
Sample ID: OW7-2
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6118146	N/A	2019/05/13	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6115001	N/A	2019/05/14	Automated Statchk
Chloride by Automated Colourimetry	KONE	6118167	N/A	2019/05/14	Alina Dobreanu
Colour	SPEC	6120994	N/A	2019/05/15	Christine Pham
Conductivity	AT	6118149	N/A	2019/05/13	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6118337	N/A	2019/05/13	Mandeep Kaur
Fluoride	ISE	6118150	2019/05/13	2019/05/13	Surinder Rai
Hardness (calculated as CaCO3)		6116711	N/A	2019/05/15	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6118996	N/A	2019/05/15	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6119278	N/A	2019/05/14	Bernard Antwi
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6118157	N/A	2019/05/14	Chandra Nandlal
pH	AT	6118152	2019/05/13	2019/05/13	Surinder Rai
Orthophosphate	KONE	6118171	N/A	2019/05/14	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6118169	N/A	2019/05/14	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6115387	N/A	2019/05/15	Automated Statchk

Maxxam ID: JRH569 Dup
Sample ID: OW7-2
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Colour	SPEC	6120994	N/A	2019/05/15	Christine Pham

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Maxxam Job #: B9C5207
Report Date: 2019/05/16

Golder Associates Ltd
Client Project #: 1407634
Site Location: MCCARTHY
Sampler Initials: SDP

TEST SUMMARY

Maxxam ID: JRH570
Sample ID: OW8-1
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6118146	N/A	2019/05/13	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6115001	N/A	2019/05/14	Automated Statchk
Chloride by Automated Colourimetry	KONE	6118167	N/A	2019/05/14	Alina Dobreanu
Colour	SPEC	6120994	N/A	2019/05/15	Christine Pham
Conductivity	AT	6118149	N/A	2019/05/13	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6118337	N/A	2019/05/13	Mandeep Kaur
Fluoride	ISE	6118150	2019/05/13	2019/05/13	Surinder Rai
Hardness (calculated as CaCO3)		6116711	N/A	2019/05/15	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6118996	N/A	2019/05/14	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6119278	N/A	2019/05/14	Bernard Antwi
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6118157	N/A	2019/05/14	Chandra Nandlal
pH	AT	6118152	2019/05/13	2019/05/13	Surinder Rai
Orthophosphate	KONE	6118171	N/A	2019/05/14	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6118169	N/A	2019/05/14	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6115387	N/A	2019/05/15	Automated Statchk

Maxxam ID: JRH571
Sample ID: OW8-2
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6118146	N/A	2019/05/13	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6115001	N/A	2019/05/14	Automated Statchk
Chloride by Automated Colourimetry	KONE	6118167	N/A	2019/05/14	Alina Dobreanu
Colour	SPEC	6120994	N/A	2019/05/15	Christine Pham
Conductivity	AT	6118149	N/A	2019/05/13	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6118337	N/A	2019/05/13	Mandeep Kaur
Fluoride	ISE	6118150	2019/05/13	2019/05/13	Surinder Rai
Hardness (calculated as CaCO3)		6116711	N/A	2019/05/15	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6118996	N/A	2019/05/14	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6119278	N/A	2019/05/14	Bernard Antwi
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6118157	N/A	2019/05/14	Chandra Nandlal
pH	AT	6118152	2019/05/13	2019/05/13	Surinder Rai
Orthophosphate	KONE	6118171	N/A	2019/05/14	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6118169	N/A	2019/05/14	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6115387	N/A	2019/05/15	Automated Statchk

Maxxam ID: JRH572
Sample ID: OW9-2
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6118146	N/A	2019/05/13	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6115001	N/A	2019/05/14	Automated Statchk
Chloride by Automated Colourimetry	KONE	6118167	N/A	2019/05/14	Alina Dobreanu

Maxxam Job #: B9C5207
Report Date: 2019/05/16

Golder Associates Ltd
Client Project #: 1407634
Site Location: MCCARTHY
Sampler Initials: SDP

TEST SUMMARY

Maxxam ID: JRH572
Sample ID: OW9-2
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Colour	SPEC	6120994	N/A	2019/05/15	Christine Pham
Conductivity	AT	6118149	N/A	2019/05/13	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6118337	N/A	2019/05/13	Mandeep Kaur
Fluoride	ISE	6118150	2019/05/13	2019/05/13	Surinder Rai
Hardness (calculated as CaCO3)		6116711	N/A	2019/05/15	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6118996	N/A	2019/05/14	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6119278	N/A	2019/05/14	Bernard Antwi
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6118157	N/A	2019/05/14	Chandra Nandlal
pH	AT	6118152	2019/05/13	2019/05/13	Surinder Rai
Orthophosphate	KONE	6118171	N/A	2019/05/14	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6118169	N/A	2019/05/14	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6115387	N/A	2019/05/15	Automated Statchk

Maxxam ID: JRH573
Sample ID: NEW WELL
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6118146	N/A	2019/05/13	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6115001	N/A	2019/05/14	Automated Statchk
Chloride by Automated Colourimetry	KONE	6118167	N/A	2019/05/14	Alina Dobreanu
Colour	SPEC	6120994	N/A	2019/05/15	Christine Pham
Conductivity	AT	6118149	N/A	2019/05/13	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6118337	N/A	2019/05/13	Mandeep Kaur
Fluoride	ISE	6118150	2019/05/13	2019/05/13	Surinder Rai
Hardness (calculated as CaCO3)		6116711	N/A	2019/05/15	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6118996	N/A	2019/05/14	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6119278	N/A	2019/05/14	Bernard Antwi
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6118157	N/A	2019/05/14	Chandra Nandlal
pH	AT	6118152	2019/05/13	2019/05/13	Surinder Rai
Orthophosphate	KONE	6118171	N/A	2019/05/14	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6118169	N/A	2019/05/14	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6115387	N/A	2019/05/15	Automated Statchk

Maxxam ID: JRH574
Sample ID: TW1-1-D
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6118146	N/A	2019/05/13	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6115001	N/A	2019/05/14	Automated Statchk
Chloride by Automated Colourimetry	KONE	6118167	N/A	2019/05/14	Alina Dobreanu
Colour	SPEC	6120994	N/A	2019/05/15	Christine Pham
Conductivity	AT	6118149	N/A	2019/05/13	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6118337	N/A	2019/05/13	Mandeep Kaur

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Maxxam Job #: B9C5207
Report Date: 2019/05/16

Golder Associates Ltd
Client Project #: 1407634
Site Location: MCCARTHY
Sampler Initials: SDP

TEST SUMMARY

Maxxam ID: JRH574
Sample ID: TW1-1-D
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Fluoride	ISE	6118150	2019/05/13	2019/05/13	Surinder Rai
Hardness (calculated as CaCO3)		6116711	N/A	2019/05/15	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6118996	N/A	2019/05/14	Arefa Dabhad
Total Ammonia-N	LACH/NH4	6119278	N/A	2019/05/14	Bernard Antwi
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6118157	N/A	2019/05/14	Chandra Nandlal
pH	AT	6118152	2019/05/13	2019/05/13	Surinder Rai
Orthophosphate	KONE	6118171	N/A	2019/05/14	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6118169	N/A	2019/05/14	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6115387	N/A	2019/05/15	Automated Statchk

Maxxam ID: JRH574 Dup
Sample ID: TW1-1-D
Matrix: Water

Collected: 2019/05/08
Shipped:
Received: 2019/05/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Metals by ICPMS	ICP/MS	6118996	N/A	2019/05/14	Arefa Dabhad

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Maxxam Job #: B9C5207
Report Date: 2019/05/16

Golder Associates Ltd
Client Project #: 1407634
Site Location: MCCARTHY
Sampler Initials: SDP

GENERAL COMMENTS

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

Package 1	6.7°C
Package 2	8.0°C
Package 3	8.0°C

Sample JRH564 [OW5-2] : Metals Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Sample JRH565 [OW5-3] : Metals Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Sample JRH572 [OW9-2] : Metals Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Sample JRH573 [NEW WELL] : Metals Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

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Maxxam Job #: B9C5207
Report Date: 2019/05/16

Golder Associates Ltd
Client Project #: 1407634
Site Location: MCCARTHY
Sampler Initials: SDP

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6118146	SAU	Spiked Blank	Alkalinity (Total as CaCO3)	2019/05/13		96	%	85 - 115
6118146	SAU	Method Blank	Alkalinity (Total as CaCO3)	2019/05/13	<1.0		mg/L	
6118146	SAU	RPD [JRH558-01]	Alkalinity (Total as CaCO3)	2019/05/13	1.6		%	20
6118149	SAU	Spiked Blank	Conductivity	2019/05/13		102	%	85 - 115
6118149	SAU	Method Blank	Conductivity	2019/05/13	<1.0		umho/cm	
6118149	SAU	RPD [JRH558-01]	Conductivity	2019/05/13	0		%	25
6118150	SAU	Matrix Spike [JRH558-01]	Fluoride (F-)	2019/05/13		96	%	80 - 120
6118150	SAU	Spiked Blank	Fluoride (F-)	2019/05/13		100	%	80 - 120
6118150	SAU	Method Blank	Fluoride (F-)	2019/05/13	<0.10		mg/L	
6118150	SAU	RPD [JRH558-01]	Fluoride (F-)	2019/05/13	2.8		%	20
6118152	SAU	Spiked Blank	pH	2019/05/13		102	%	98 - 103
6118152	SAU	RPD [JRH558-01]	pH	2019/05/13	0.13		%	N/A
6118157	C_N	Matrix Spike [JRH562-01]	Nitrite (N)	2019/05/14		111	%	80 - 120
			Nitrate (N)	2019/05/14		103	%	80 - 120
6118157	C_N	Spiked Blank	Nitrite (N)	2019/05/14		99	%	80 - 120
			Nitrate (N)	2019/05/14		96	%	80 - 120
6118157	C_N	Method Blank	Nitrite (N)	2019/05/14	<0.010		mg/L	
			Nitrate (N)	2019/05/14	<0.10		mg/L	
6118157	C_N	RPD [JRH562-01]	Nitrite (N)	2019/05/14	NC		%	20
			Nitrate (N)	2019/05/14	NC		%	20
6118167	ADB	Matrix Spike [JRH558-01]	Dissolved Chloride (Cl-)	2019/05/14		113	%	80 - 120
6118167	ADB	Spiked Blank	Dissolved Chloride (Cl-)	2019/05/14		102	%	80 - 120
6118167	ADB	Method Blank	Dissolved Chloride (Cl-)	2019/05/14	<1.0		mg/L	
6118167	ADB	RPD [JRH558-01]	Dissolved Chloride (Cl-)	2019/05/14	7.2		%	20
6118169	ADB	Matrix Spike [JRH558-01]	Dissolved Sulphate (SO4)	2019/05/14		NC	%	75 - 125
6118169	ADB	Spiked Blank	Dissolved Sulphate (SO4)	2019/05/14		103	%	80 - 120
6118169	ADB	Method Blank	Dissolved Sulphate (SO4)	2019/05/14	<1.0		mg/L	
6118169	ADB	RPD [JRH558-01]	Dissolved Sulphate (SO4)	2019/05/14	0.34		%	20
6118171	ADB	Matrix Spike [JRH558-01]	Orthophosphate (P)	2019/05/14		104	%	75 - 125
6118171	ADB	Spiked Blank	Orthophosphate (P)	2019/05/14		100	%	80 - 120
6118171	ADB	Method Blank	Orthophosphate (P)	2019/05/14	<0.010		mg/L	
6118171	ADB	RPD [JRH558-01]	Orthophosphate (P)	2019/05/14	NC		%	25
6118337	KRM	Matrix Spike	Dissolved Organic Carbon	2019/05/13		93	%	80 - 120
6118337	KRM	Spiked Blank	Dissolved Organic Carbon	2019/05/13		97	%	80 - 120
6118337	KRM	Method Blank	Dissolved Organic Carbon	2019/05/13	<0.50		mg/L	
6118337	KRM	RPD	Dissolved Organic Carbon	2019/05/13	1.5		%	20
6118996	ADA	Matrix Spike [JRH574-02]	Dissolved Calcium (Ca)	2019/05/14		NC	%	80 - 120
			Dissolved Magnesium (Mg)	2019/05/14		NC	%	80 - 120
			Dissolved Phosphorus (P)	2019/05/14		108	%	80 - 120
			Dissolved Potassium (K)	2019/05/14		107	%	80 - 120
			Dissolved Sodium (Na)	2019/05/14		NC	%	80 - 120
6118996	ADA	Spiked Blank	Dissolved Calcium (Ca)	2019/05/14		100	%	80 - 120
			Dissolved Magnesium (Mg)	2019/05/14		101	%	80 - 120
			Dissolved Phosphorus (P)	2019/05/14		109	%	80 - 120
			Dissolved Potassium (K)	2019/05/14		102	%	80 - 120
			Dissolved Sodium (Na)	2019/05/14		100	%	80 - 120
6118996	ADA	Method Blank	Dissolved Calcium (Ca)	2019/05/14	<200		ug/L	
			Dissolved Magnesium (Mg)	2019/05/14	<50		ug/L	
			Dissolved Phosphorus (P)	2019/05/14	<100		ug/L	
			Dissolved Potassium (K)	2019/05/14	<200		ug/L	
			Dissolved Sodium (Na)	2019/05/14	<100		ug/L	
6118996	ADA	RPD [JRH574-02]	Dissolved Calcium (Ca)	2019/05/14	2.2		%	20
			Dissolved Magnesium (Mg)	2019/05/14	2.6		%	20

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Maxxam Job #: B9C5207
Report Date: 2019/05/16

Golder Associates Ltd
Client Project #: 1407634
Site Location: MCCARTHY
Sampler Initials: SDP

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Phosphorus (P)	2019/05/14	NC		%	20
			Dissolved Potassium (K)	2019/05/14	1.9		%	20
			Dissolved Sodium (Na)	2019/05/14	2.8		%	20
6119278	BA	Matrix Spike	Total Ammonia-N	2019/05/14		NC	%	75 - 125
6119278	BA	Spiked Blank	Total Ammonia-N	2019/05/14		100	%	80 - 120
6119278	BA	Method Blank	Total Ammonia-N	2019/05/14	<0.050		mg/L	
6119278	BA	RPD	Total Ammonia-N	2019/05/14	0.53 (1)		%	20
6120994	CP	Spiked Blank	Colour	2019/05/15		99	%	80 - 120
6120994	CP	Method Blank	Colour	2019/05/15	<2		TCU	
6120994	CP	RPD [JRH569-01]	Colour	2019/05/15	NC		%	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.

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

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

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

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

(1) TKN < NH4: Both values fall within acceptable RPD limits for duplicates and are likely equivalent.

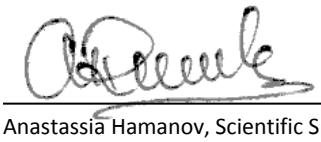
Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B9C5207
Report Date: 2019/05/16

Golder Associates Ltd
Client Project #: 1407634
Site Location: MCCARTHY
Sampler Initials: SDP

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

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Maxxam Job #: B9C5207
Report Date: 2019/05/16

Golder Associates Ltd
Client Project #: 1407634
Site Location: MCCARTHY
Sampler Initials: SDP

Exceedence Summary Table – ODWS (2002)

Result Exceedences

Sample ID	Maxxam ID	Parameter	Criteria	Result	DL	Units
OW7-1	JRH567-01	Fluoride (F-)	1.5	2.1	0.10	mg/L
OW7-2	JRH569-01	Fluoride (F-)	1.5	2.1	0.10	mg/L

The exceedence summary table is for information purposes only and should not be considered a comprehensive listing or statement of conformance to applicable regulatory guidelines.

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Maxxam
A Bureau Veritas Group Company

Your Project #: 1407634
Your C.O.C. #: 715651-01-01

Attention: Jamie Bonany

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

Report Date: 2019/05/17
Report #: R5715669
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B9C6856
Received: 2019/05/13, 09:27

Sample Matrix: Water
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Alkalinity	3	N/A	2019/05/15	CAM SOP-00448	SM 23 2320 B m
Carbonate, Bicarbonate and Hydroxide	3	N/A	2019/05/15	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	3	N/A	2019/05/15	CAM SOP-00463	SM 4500-Cl E m
Colour	3	N/A	2019/05/14	CAM SOP-00412	SM 23 2120C m
Conductivity	3	N/A	2019/05/15	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1)	3	N/A	2019/05/14	CAM SOP-00446	SM 23 5310 B m
Fluoride	3	2019/05/14	2019/05/15	CAM SOP-00449	SM 23 4500-F C m
Hardness (calculated as CaCO3)	3	N/A	2019/05/15	CAM SOP 00102/00408/00447	SM 2340 B
Dissolved Metals by ICPMS	3	N/A	2019/05/15	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	3	N/A	2019/05/16		
Anion and Cation Sum	3	N/A	2019/05/15		
Total Ammonia-N	3	N/A	2019/05/14	CAM SOP-00441	EPA GS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (2)	3	N/A	2019/05/15	CAM SOP-00440	SM 23 4500-NO3I/NO2B
pH	3	2019/05/14	2019/05/15	CAM SOP-00413	SM 4500H+ B m
Orthophosphate	3	N/A	2019/05/15	CAM SOP-00461	EPA 365.1 m
Sat. pH and Langelier Index (@ 20C)	3	N/A	2019/05/16		
Sat. pH and Langelier Index (@ 4C)	3	N/A	2019/05/16		
Sulphate by Automated Colourimetry	3	N/A	2019/05/15	CAM SOP-00464	EPA 375.4 m
Tannins & Lignins	3	N/A	2019/05/14	CAM SOP-00410	SM 23 5550 B m
Total Dissolved Solids (TDS calc)	3	N/A	2019/05/16		
Turbidity	3	N/A	2019/05/14	CAM SOP-00417	SM 23 2130 B m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025 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
Your C.O.C. #: 715651-01-01

Attention: Jamie Bonany

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

Report Date: 2019/05/17
Report #: R5715669
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B9C6856
Received: 2019/05/13, 09:27

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.

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.

Maxxam Job #: B9C6856
Report Date: 2019/05/17

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: JDV

RCAP - COMPREHENSIVE (WATER)

Maxxam ID				JRS548		JRS549		JRS550		
Sampling Date				2019/05/09 03:10		2019/05/09 02:45		2019/05/09 04:00		
COC Number				715651-01-01		715651-01-01		715651-01-01		
	UNITS	MAC	A/O	DW1	QC Batch	DW2	RDL	DW3	RDL	QC Batch
Calculated Parameters										
Anion Sum	me/L	-	-	10.7	6119515	7.59	N/A	8.73	N/A	6119515
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	340	6119513	320	1.0	220	1.0	6119513
Calculated TDS	mg/L	-	500	**570**	6119518	390	1.0	480	1.0	6119518
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	1.5	6119513	1.9	1.0	1.8	1.0	6119513
Cation Sum	me/L	-	-	10.8	6119515	7.11	N/A	8.97	N/A	6119515
Hardness (CaCO3)	mg/L	-	80:100	**470**	6118054	**330**	1.0	**200**	1.0	6118054
Ion Balance (% Difference)	%	-	-	0.440	6118055	3.24	N/A	1.33	N/A	6118055
Langelier Index (@ 20C)	N/A	-	-	0.874	6119516	0.920		0.358		6119516
Langelier Index (@ 4C)	N/A	-	-	0.627	6119517	0.671		0.110		6119517
Saturation pH (@ 20C)	N/A	-	-	6.81	6119516	6.87		7.57		6119516
Saturation pH (@ 4C)	N/A	-	-	7.05	6119517	7.12		7.82		6119517
Inorganics										
Total Ammonia-N	mg/L	-	-	<0.050	6120787	<0.050	0.050	<0.050	0.050	6120802
Conductivity	umho/cm	-	-	1000	6121543	720	1.0	930	1.0	6121543
Dissolved Organic Carbon	mg/L	-	5	2.0	6120354	3.2	0.50	0.50	0.50	6120354
Orthophosphate (P)	mg/L	-	-	<0.010	6121104	<0.010	0.010	<0.010	0.010	6121104
pH	pH	-	6.5:8.5	7.68	6121514	7.79		7.93		6121514
Dissolved Sulphate (SO4)	mg/L	-	500	20	6121095	19	1.0	7.3	1.0	6121095
Alkalinity (Total as CaCO3)	mg/L	-	30:500	340	6121509	320	1.0	230	1.0	6121509
Dissolved Chloride (Cl-)	mg/L	-	250	120	6121078	26	1.0	140	2.0	6121078
Nitrite (N)	mg/L	1	-	<0.010	6120981	<0.010	0.010	<0.010	0.010	6120981
Nitrate (N)	mg/L	10	-	0.83	6120981	0.13	0.10	<0.10	0.10	6120981
Nitrate + Nitrite (N)	mg/L	10	-	0.83	6120981	0.13	0.10	<0.10	0.10	6120981
Metals										
Dissolved Aluminum (Al)	ug/L	-	100	<5.0	6120615	<5.0	5.0	<5.0	5.0	6120615
Dissolved Antimony (Sb)	ug/L	6	-	<0.50	6120615	<0.50	0.50	<0.50	0.50	6120615
Dissolved Arsenic (As)	ug/L	10	-	<1.0	6120615	<1.0	1.0	<1.0	1.0	6120615
Dissolved Barium (Ba)	ug/L	1000	-	150	6120615	50	2.0	200	2.0	6120615

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)
N/A = Not Applicable

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Maxxam Job #: B9C6856
Report Date: 2019/05/17

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: JDV

RCAP - COMPREHENSIVE (WATER)

Maxxam ID				JRS548		JRS549		JRS550		
Sampling Date				2019/05/09 03:10		2019/05/09 02:45		2019/05/09 04:00		
COC Number				715651-01-01		715651-01-01		715651-01-01		
	UNITS	MAC	A/O	DW1	QC Batch	DW2	RDL	DW3	RDL	QC Batch
Dissolved Beryllium (Be)	ug/L	-	-	<0.50	6120615	<0.50	0.50	<0.50	0.50	6120615
Dissolved Boron (B)	ug/L	5000	-	27	6120615	55	10	840	10	6120615
Dissolved Cadmium (Cd)	ug/L	5	-	<0.10	6120615	<0.10	0.10	<0.10	0.10	6120615
Dissolved Calcium (Ca)	ug/L	-	-	140000	6120615	110000	200	34000	200	6120615
Dissolved Chromium (Cr)	ug/L	50	-	<5.0	6120615	<5.0	5.0	<5.0	5.0	6120615
Dissolved Cobalt (Co)	ug/L	-	-	<0.50	6120615	<0.50	0.50	<0.50	0.50	6120615
Dissolved Copper (Cu)	ug/L	-	1000	69	6120615	3.5	1.0	13	1.0	6120615
Dissolved Iron (Fe)	ug/L	-	300	<100	6120615	<100	100	<100	100	6120615
Dissolved Lead (Pb)	ug/L	10	-	<0.50	6120615	<0.50	0.50	<0.50	0.50	6120615
Dissolved Magnesium (Mg)	ug/L	-	-	28000	6120615	9700	50	27000	50	6120615
Dissolved Manganese (Mn)	ug/L	-	50	<2.0	6120615	<2.0	2.0	<2.0	2.0	6120615
Dissolved Molybdenum (Mo)	ug/L	-	-	<0.50	6120615	<0.50	0.50	<0.50	0.50	6120615
Dissolved Nickel (Ni)	ug/L	-	-	<1.0	6120615	<1.0	1.0	<1.0	1.0	6120615
Dissolved Phosphorus (P)	ug/L	-	-	<100	6120615	<100	100	<100	100	6120615
Dissolved Potassium (K)	ug/L	-	-	1600	6120615	5200	200	7100	200	6120615
Dissolved Selenium (Se)	ug/L	50	-	<2.0	6120615	<2.0	2.0	<2.0	2.0	6120615
Dissolved Silicon (Si)	ug/L	-	-	7200	6120615	3400	50	5600	50	6120615
Dissolved Silver (Ag)	ug/L	-	-	<0.10	6120615	<0.10	0.10	<0.10	0.10	6120615
Dissolved Sodium (Na)	ug/L	-	200000	33000	6120615	11000	100	110000	100	6120615
Dissolved Strontium (Sr)	ug/L	-	-	510	6120615	270	1.0	2500	1.0	6120615
Dissolved Thallium (Tl)	ug/L	-	-	<0.050	6120615	<0.050	0.050	<0.050	0.050	6120615
Dissolved Titanium (Ti)	ug/L	-	-	<5.0	6120615	<5.0	5.0	<5.0	5.0	6120615
Dissolved Uranium (U)	ug/L	20	-	1.3	6120615	0.28	0.10	<0.10	0.10	6120615
Dissolved Vanadium (V)	ug/L	-	-	<0.50	6120615	<0.50	0.50	<0.50	0.50	6120615
Dissolved Zinc (Zn)	ug/L	-	5000	5.6	6120615	<5.0	5.0	130	5.0	6120615

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

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Maxxam Job #: B9C6856
Report Date: 2019/05/17

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: JDV

RCAP - COMPREHENSIVE (WATER)

Maxxam ID				JRS550		
Sampling Date				2019/05/09 04:00		
COC Number				715651-01-01		
	UNITS	MAC	A/O	DW3 Lab-Dup	RDL	QC Batch
Inorganics						
Orthophosphate (P)	mg/L	-	-	<0.010	0.010	6121104
Dissolved Sulphate (SO4)	mg/L	-	500	7.3	1.0	6121095
Dissolved Chloride (Cl-)	mg/L	-	250	140	2.0	6121078
Metals						
Dissolved Aluminum (Al)	ug/L	-	100	<5.0	5.0	6120615
Dissolved Antimony (Sb)	ug/L	6	-	<0.50	0.50	6120615
Dissolved Arsenic (As)	ug/L	10	-	<1.0	1.0	6120615
Dissolved Barium (Ba)	ug/L	1000	-	200	2.0	6120615
Dissolved Beryllium (Be)	ug/L	-	-	<0.50	0.50	6120615
Dissolved Boron (B)	ug/L	5000	-	850	10	6120615
Dissolved Cadmium (Cd)	ug/L	5	-	<0.10	0.10	6120615
Dissolved Calcium (Ca)	ug/L	-	-	34000	200	6120615
Dissolved Chromium (Cr)	ug/L	50	-	<5.0	5.0	6120615
Dissolved Cobalt (Co)	ug/L	-	-	<0.50	0.50	6120615
Dissolved Copper (Cu)	ug/L	-	1000	12	1.0	6120615
Dissolved Iron (Fe)	ug/L	-	300	<100	100	6120615
Dissolved Lead (Pb)	ug/L	10	-	<0.50	0.50	6120615
Dissolved Magnesium (Mg)	ug/L	-	-	27000	50	6120615
Dissolved Manganese (Mn)	ug/L	-	50	<2.0	2.0	6120615
Dissolved Molybdenum (Mo)	ug/L	-	-	<0.50	0.50	6120615
Dissolved Nickel (Ni)	ug/L	-	-	<1.0	1.0	6120615
Dissolved Phosphorus (P)	ug/L	-	-	<100	100	6120615
Dissolved Potassium (K)	ug/L	-	-	7100	200	6120615
Dissolved Selenium (Se)	ug/L	50	-	<2.0	2.0	6120615
Dissolved Silicon (Si)	ug/L	-	-	5700	50	6120615
Dissolved Silver (Ag)	ug/L	-	-	<0.10	0.10	6120615

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively (Made under the Ontario Safe Drinking Water Act, 2002)

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Maxxam Job #: B9C6856
Report Date: 2019/05/17

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: JDV

RCAP - COMPREHENSIVE (WATER)

Maxxam ID				JRS550		
Sampling Date				2019/05/09 04:00		
COC Number				715651-01-01		
	UNITS	MAC	A/O	DW3 Lab-Dup	RDL	QC Batch
Dissolved Sodium (Na)	ug/L	-	200000	110000	100	6120615
Dissolved Strontium (Sr)	ug/L	-	-	2500	1.0	6120615
Dissolved Thallium (Tl)	ug/L	-	-	<0.050	0.050	6120615
Dissolved Titanium (Ti)	ug/L	-	-	<5.0	5.0	6120615
Dissolved Uranium (U)	ug/L	20	-	<0.10	0.10	6120615
Dissolved Vanadium (V)	ug/L	-	-	<0.50	0.50	6120615
Dissolved Zinc (Zn)	ug/L	-	5000	130	5.0	6120615

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
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Maxxam Job #: B9C6856
Report Date: 2019/05/17

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: JDV

RESULTS OF ANALYSES OF WATER

Maxxam ID				JRS548			JRS548			JRS549		
Sampling Date				2019/05/09 03:10			2019/05/09 03:10			2019/05/09 02:45		
COC Number				715651-01-01			715651-01-01			715651-01-01		
	UNITS	MAC	A/O	DW1	RDL	QC Batch	DW1 Lab-Dup	RDL	QC Batch	DW2	RDL	QC Batch
Inorganics												
Colour	TCU	-	5	2	2	6120047				4	2	6120047
Fluoride (F-)	mg/L	1.5	-	<0.10	0.10	6121526				<0.10	0.10	6121526
Tannins & Lignins	mg/L	-	-	<0.2	0.2	6119902	<0.2	0.2	6119902	<0.2	0.2	6119902
Turbidity	NTU	-	5	<0.1	0.1	6120433				<0.1	0.1	6120433

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

Maxxam ID				JRS550			JRS550		
Sampling Date				2019/05/09 04:00			2019/05/09 04:00		
COC Number				715651-01-01			715651-01-01		
	UNITS	MAC	A/O	DW3	RDL	QC Batch	DW3 Lab-Dup	RDL	QC Batch
Inorganics									
Colour	TCU	-	5	<2	2	6120047	<2	2	6120047
Fluoride (F-)	mg/L	1.5	-	0.71	0.10	6121526			
Tannins & Lignins	mg/L	-	-	<0.2	0.2	6119902			
Turbidity	NTU	-	5	<0.1	0.1	6120433			

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

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Maxxam Job #: B9C6856
Report Date: 2019/05/17

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: JDV

TEST SUMMARY

Maxxam ID: JRS548
Sample ID: DW1
Matrix: Water

Collected: 2019/05/09
Shipped:
Received: 2019/05/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6121509	N/A	2019/05/15	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6119513	N/A	2019/05/15	Automated Statchk
Chloride by Automated Colourimetry	KONE	6121078	N/A	2019/05/15	Deonarine Ramnarine
Colour	SPEC	6120047	N/A	2019/05/14	Christine Pham
Conductivity	AT	6121543	N/A	2019/05/15	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6120354	N/A	2019/05/14	Mandeep Kaur
Fluoride	ISE	6121526	2019/05/14	2019/05/15	Surinder Rai
Hardness (calculated as CaCO3)		6118054	N/A	2019/05/15	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6120615	N/A	2019/05/15	Arefa Dabhad
Ion Balance (% Difference)	CALC	6118055	N/A	2019/05/16	Automated Statchk
Anion and Cation Sum	CALC	6119515	N/A	2019/05/15	Automated Statchk
Total Ammonia-N	LACH/NH4	6120787	N/A	2019/05/14	Chandra Nandlal
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6120981	N/A	2019/05/15	Chandra Nandlal
pH	AT	6121514	2019/05/14	2019/05/15	Surinder Rai
Orthophosphate	KONE	6121104	N/A	2019/05/15	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	6119516	N/A	2019/05/16	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	6119517	N/A	2019/05/16	Automated Statchk
Sulphate by Automated Colourimetry	KONE	6121095	N/A	2019/05/15	Alina Dobreanu
Tannins & Lignins	SPEC	6119902	N/A	2019/05/14	Christine Pham
Total Dissolved Solids (TDS calc)	CALC	6119518	N/A	2019/05/16	Automated Statchk
Turbidity	AT	6120433	N/A	2019/05/14	Kazzandra Adeva

Maxxam ID: JRS548 Dup
Sample ID: DW1
Matrix: Water

Collected: 2019/05/09
Shipped:
Received: 2019/05/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Tannins & Lignins	SPEC	6119902	N/A	2019/05/14	Christine Pham

Maxxam ID: JRS549
Sample ID: DW2
Matrix: Water

Collected: 2019/05/09
Shipped:
Received: 2019/05/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6121509	N/A	2019/05/15	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6119513	N/A	2019/05/15	Automated Statchk
Chloride by Automated Colourimetry	KONE	6121078	N/A	2019/05/15	Deonarine Ramnarine
Colour	SPEC	6120047	N/A	2019/05/14	Christine Pham
Conductivity	AT	6121543	N/A	2019/05/15	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6120354	N/A	2019/05/14	Mandeep Kaur
Fluoride	ISE	6121526	2019/05/14	2019/05/15	Surinder Rai
Hardness (calculated as CaCO3)		6118054	N/A	2019/05/15	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6120615	N/A	2019/05/15	Arefa Dabhad
Ion Balance (% Difference)	CALC	6118055	N/A	2019/05/16	Automated Statchk
Anion and Cation Sum	CALC	6119515	N/A	2019/05/15	Automated Statchk
Total Ammonia-N	LACH/NH4	6120802	N/A	2019/05/14	Bernard Antwi

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Maxxam Job #: B9C6856
Report Date: 2019/05/17

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: JDV

TEST SUMMARY

Maxxam ID: JRS549
Sample ID: DW2
Matrix: Water

Collected: 2019/05/09
Shipped:
Received: 2019/05/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6120981	N/A	2019/05/15	Chandra Nandlal
pH	AT	6121514	2019/05/14	2019/05/15	Surinder Rai
Orthophosphate	KONE	6121104	N/A	2019/05/15	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	6119516	N/A	2019/05/16	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	6119517	N/A	2019/05/16	Automated Statchk
Sulphate by Automated Colourimetry	KONE	6121095	N/A	2019/05/15	Alina Dobreanu
Tannins & Lignins	SPEC	6119902	N/A	2019/05/14	Christine Pham
Total Dissolved Solids (TDS calc)	CALC	6119518	N/A	2019/05/16	Automated Statchk
Turbidity	AT	6120433	N/A	2019/05/14	Kazzandra Adeva

Maxxam ID: JRS550
Sample ID: DW3
Matrix: Water

Collected: 2019/05/09
Shipped:
Received: 2019/05/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6121509	N/A	2019/05/15	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6119513	N/A	2019/05/15	Automated Statchk
Chloride by Automated Colourimetry	KONE	6121078	N/A	2019/05/15	Deonarine Ramnarine
Colour	SPEC	6120047	N/A	2019/05/14	Christine Pham
Conductivity	AT	6121543	N/A	2019/05/15	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6120354	N/A	2019/05/14	Mandeep Kaur
Fluoride	ISE	6121526	2019/05/14	2019/05/15	Surinder Rai
Hardness (calculated as CaCO3)		6118054	N/A	2019/05/15	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6120615	N/A	2019/05/15	Arefa Dabhad
Ion Balance (% Difference)	CALC	6118055	N/A	2019/05/16	Automated Statchk
Anion and Cation Sum	CALC	6119515	N/A	2019/05/15	Automated Statchk
Total Ammonia-N	LACH/NH4	6120802	N/A	2019/05/14	Bernard Antwi
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6120981	N/A	2019/05/15	Chandra Nandlal
pH	AT	6121514	2019/05/14	2019/05/15	Surinder Rai
Orthophosphate	KONE	6121104	N/A	2019/05/15	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	6119516	N/A	2019/05/16	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	6119517	N/A	2019/05/16	Automated Statchk
Sulphate by Automated Colourimetry	KONE	6121095	N/A	2019/05/15	Alina Dobreanu
Tannins & Lignins	SPEC	6119902	N/A	2019/05/14	Christine Pham
Total Dissolved Solids (TDS calc)	CALC	6119518	N/A	2019/05/16	Automated Statchk
Turbidity	AT	6120433	N/A	2019/05/14	Kazzandra Adeva

Maxxam ID: JRS550 Dup
Sample ID: DW3
Matrix: Water

Collected: 2019/05/09
Shipped:
Received: 2019/05/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride by Automated Colourimetry	KONE	6121078	N/A	2019/05/15	Deonarine Ramnarine
Colour	SPEC	6120047	N/A	2019/05/14	Christine Pham
Dissolved Metals by ICPMS	ICP/MS	6120615	N/A	2019/05/15	Arefa Dabhad
Orthophosphate	KONE	6121104	N/A	2019/05/15	Alina Dobreanu

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Maxxam Job #: B9C6856
Report Date: 2019/05/17

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: JDV

TEST SUMMARY

Maxxam ID: JRS550 Dup
Sample ID: DW3
Matrix: Water

Collected: 2019/05/09
Shipped:
Received: 2019/05/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sulphate by Automated Colourimetry	KONE	6121095	N/A	2019/05/15	Alina Dobreanu

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Maxxam Job #: B9C6856
Report Date: 2019/05/17

Golder Associates Ltd
Client Project #: 1407634
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GENERAL COMMENTS

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

Package 1	7.3°C

Turbidity analysis completed past the recommended hold time.

Results relate only to the items tested.

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Maxxam Job #: B9C6856
Report Date: 2019/05/17

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: JDV

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6119902	CP	Matrix Spike [JRS548-01]	Tannins & Lignins	2019/05/14		98	%	80 - 120
6119902	CP	Spiked Blank	Tannins & Lignins	2019/05/14		99	%	80 - 120
6119902	CP	Method Blank	Tannins & Lignins	2019/05/14	<0.2		mg/L	
6119902	CP	RPD [JRS548-01]	Tannins & Lignins	2019/05/14	NC		%	20
6120047	CP	Spiked Blank	Colour	2019/05/14		99	%	80 - 120
6120047	CP	Method Blank	Colour	2019/05/14	<2		TCU	
6120047	CP	RPD [JRS550-01]	Colour	2019/05/14	NC		%	25
6120354	KRM	Matrix Spike	Dissolved Organic Carbon	2019/05/14		95	%	80 - 120
6120354	KRM	Spiked Blank	Dissolved Organic Carbon	2019/05/14		98	%	80 - 120
6120354	KRM	Method Blank	Dissolved Organic Carbon	2019/05/14	<0.50		mg/L	
6120354	KRM	RPD	Dissolved Organic Carbon	2019/05/14	0.080		%	20
6120433	KAD	Spiked Blank	Turbidity	2019/05/14		97	%	85 - 115
6120433	KAD	Method Blank	Turbidity	2019/05/14	<0.1		NTU	
6120433	KAD	RPD	Turbidity	2019/05/14	6.8		%	20
6120615	ADA	Matrix Spike [JRS550-04]	Dissolved Aluminum (Al)	2019/05/15		106	%	80 - 120
			Dissolved Antimony (Sb)	2019/05/15		110	%	80 - 120
			Dissolved Arsenic (As)	2019/05/15		105	%	80 - 120
			Dissolved Barium (Ba)	2019/05/15		104	%	80 - 120
			Dissolved Beryllium (Be)	2019/05/15		107	%	80 - 120
			Dissolved Boron (B)	2019/05/15		NC	%	80 - 120
			Dissolved Cadmium (Cd)	2019/05/15		107	%	80 - 120
			Dissolved Calcium (Ca)	2019/05/15		NC	%	80 - 120
			Dissolved Chromium (Cr)	2019/05/15		100	%	80 - 120
			Dissolved Cobalt (Co)	2019/05/15		102	%	80 - 120
			Dissolved Copper (Cu)	2019/05/15		109	%	80 - 120
			Dissolved Iron (Fe)	2019/05/15		104	%	80 - 120
			Dissolved Lead (Pb)	2019/05/15		103	%	80 - 120
			Dissolved Magnesium (Mg)	2019/05/15		NC	%	80 - 120
			Dissolved Manganese (Mn)	2019/05/15		104	%	80 - 120
			Dissolved Molybdenum (Mo)	2019/05/15		104	%	80 - 120
			Dissolved Nickel (Ni)	2019/05/15		100	%	80 - 120
			Dissolved Phosphorus (P)	2019/05/15		106	%	80 - 120
			Dissolved Potassium (K)	2019/05/15		109	%	80 - 120
			Dissolved Selenium (Se)	2019/05/15		104	%	80 - 120
			Dissolved Silicon (Si)	2019/05/15		105	%	80 - 120
			Dissolved Silver (Ag)	2019/05/15		102	%	80 - 120
			Dissolved Sodium (Na)	2019/05/15		NC	%	80 - 120
			Dissolved Strontium (Sr)	2019/05/15		NC	%	80 - 120
			Dissolved Thallium (Tl)	2019/05/15		107	%	80 - 120
			Dissolved Titanium (Ti)	2019/05/15		106	%	80 - 120
			Dissolved Uranium (U)	2019/05/15		107	%	80 - 120
			Dissolved Vanadium (V)	2019/05/15		103	%	80 - 120
			Dissolved Zinc (Zn)	2019/05/15		105	%	80 - 120
6120615	ADA	Spiked Blank	Dissolved Aluminum (Al)	2019/05/15		103	%	80 - 120
			Dissolved Antimony (Sb)	2019/05/15		100	%	80 - 120
			Dissolved Arsenic (As)	2019/05/15		100	%	80 - 120
			Dissolved Barium (Ba)	2019/05/15		98	%	80 - 120
			Dissolved Beryllium (Be)	2019/05/15		103	%	80 - 120
			Dissolved Boron (B)	2019/05/15		94	%	80 - 120
			Dissolved Cadmium (Cd)	2019/05/15		102	%	80 - 120
			Dissolved Calcium (Ca)	2019/05/15		98	%	80 - 120
			Dissolved Chromium (Cr)	2019/05/15		96	%	80 - 120
			Dissolved Cobalt (Co)	2019/05/15		98	%	80 - 120
			Dissolved Copper (Cu)	2019/05/15		101	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Iron (Fe)	2019/05/15		100	%	80 - 120
			Dissolved Lead (Pb)	2019/05/15		100	%	80 - 120
			Dissolved Magnesium (Mg)	2019/05/15		102	%	80 - 120
			Dissolved Manganese (Mn)	2019/05/15		99	%	80 - 120
			Dissolved Molybdenum (Mo)	2019/05/15		96	%	80 - 120
			Dissolved Nickel (Ni)	2019/05/15		99	%	80 - 120
			Dissolved Phosphorus (P)	2019/05/15		102	%	80 - 120
			Dissolved Potassium (K)	2019/05/15		100	%	80 - 120
			Dissolved Selenium (Se)	2019/05/15		102	%	80 - 120
			Dissolved Silicon (Si)	2019/05/15		99	%	80 - 120
			Dissolved Silver (Ag)	2019/05/15		98	%	80 - 120
			Dissolved Sodium (Na)	2019/05/15		101	%	80 - 120
			Dissolved Strontium (Sr)	2019/05/15		99	%	80 - 120
			Dissolved Thallium (Tl)	2019/05/15		99	%	80 - 120
			Dissolved Titanium (Ti)	2019/05/15		100	%	80 - 120
			Dissolved Uranium (U)	2019/05/15		102	%	80 - 120
			Dissolved Vanadium (V)	2019/05/15		97	%	80 - 120
			Dissolved Zinc (Zn)	2019/05/15		99	%	80 - 120
6120615	ADA	Method Blank	Dissolved Aluminum (Al)	2019/05/15	<5.0		ug/L	
			Dissolved Antimony (Sb)	2019/05/15	<0.50		ug/L	
			Dissolved Arsenic (As)	2019/05/15	<1.0		ug/L	
			Dissolved Barium (Ba)	2019/05/15	<2.0		ug/L	
			Dissolved Beryllium (Be)	2019/05/15	<0.50		ug/L	
			Dissolved Boron (B)	2019/05/15	<10		ug/L	
			Dissolved Cadmium (Cd)	2019/05/15	<0.10		ug/L	
			Dissolved Calcium (Ca)	2019/05/15	<200		ug/L	
			Dissolved Chromium (Cr)	2019/05/15	<5.0		ug/L	
			Dissolved Cobalt (Co)	2019/05/15	<0.50		ug/L	
			Dissolved Copper (Cu)	2019/05/15	<1.0		ug/L	
			Dissolved Iron (Fe)	2019/05/15	<100		ug/L	
			Dissolved Lead (Pb)	2019/05/15	<0.50		ug/L	
			Dissolved Magnesium (Mg)	2019/05/15	<50		ug/L	
			Dissolved Manganese (Mn)	2019/05/15	<2.0		ug/L	
			Dissolved Molybdenum (Mo)	2019/05/15	<0.50		ug/L	
			Dissolved Nickel (Ni)	2019/05/15	<1.0		ug/L	
			Dissolved Phosphorus (P)	2019/05/15	<100		ug/L	
			Dissolved Potassium (K)	2019/05/15	<200		ug/L	
			Dissolved Selenium (Se)	2019/05/15	<2.0		ug/L	
			Dissolved Silicon (Si)	2019/05/15	<50		ug/L	
			Dissolved Silver (Ag)	2019/05/15	<0.10		ug/L	
			Dissolved Sodium (Na)	2019/05/15	<100		ug/L	
			Dissolved Strontium (Sr)	2019/05/15	<1.0		ug/L	
			Dissolved Thallium (Tl)	2019/05/15	<0.050		ug/L	
			Dissolved Titanium (Ti)	2019/05/15	<5.0		ug/L	
			Dissolved Uranium (U)	2019/05/15	<0.10		ug/L	
			Dissolved Vanadium (V)	2019/05/15	<0.50		ug/L	
			Dissolved Zinc (Zn)	2019/05/15	<5.0		ug/L	
6120615	ADA	RPD [JRS550-04]	Dissolved Aluminum (Al)	2019/05/15	NC		%	20
			Dissolved Antimony (Sb)	2019/05/15	NC		%	20
			Dissolved Arsenic (As)	2019/05/15	NC		%	20
			Dissolved Barium (Ba)	2019/05/15	0.024		%	20
			Dissolved Beryllium (Be)	2019/05/15	NC		%	20
			Dissolved Boron (B)	2019/05/15	1.3		%	20
			Dissolved Cadmium (Cd)	2019/05/15	NC		%	20

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Calcium (Ca)	2019/05/15	0.68		%	20
			Dissolved Chromium (Cr)	2019/05/15	NC		%	20
			Dissolved Cobalt (Co)	2019/05/15	NC		%	20
			Dissolved Copper (Cu)	2019/05/15	3.2		%	20
			Dissolved Iron (Fe)	2019/05/15	NC		%	20
			Dissolved Lead (Pb)	2019/05/15	NC		%	20
			Dissolved Magnesium (Mg)	2019/05/15	0.43		%	20
			Dissolved Manganese (Mn)	2019/05/15	NC		%	20
			Dissolved Molybdenum (Mo)	2019/05/15	NC		%	20
			Dissolved Nickel (Ni)	2019/05/15	NC		%	20
			Dissolved Phosphorus (P)	2019/05/15	NC		%	20
			Dissolved Potassium (K)	2019/05/15	1.1		%	20
			Dissolved Selenium (Se)	2019/05/15	NC		%	20
			Dissolved Silicon (Si)	2019/05/15	1.2		%	20
			Dissolved Silver (Ag)	2019/05/15	NC		%	20
			Dissolved Sodium (Na)	2019/05/15	1.3		%	20
			Dissolved Strontium (Sr)	2019/05/15	1.4		%	20
			Dissolved Thallium (Tl)	2019/05/15	NC		%	20
			Dissolved Titanium (Ti)	2019/05/15	NC		%	20
			Dissolved Uranium (U)	2019/05/15	NC		%	20
			Dissolved Vanadium (V)	2019/05/15	NC		%	20
			Dissolved Zinc (Zn)	2019/05/15	1.8		%	20
6120787	C_N	Matrix Spike	Total Ammonia-N	2019/05/14		98	%	75 - 125
6120787	C_N	Spiked Blank	Total Ammonia-N	2019/05/14		100	%	80 - 120
6120787	C_N	Method Blank	Total Ammonia-N	2019/05/14	<0.050		mg/L	
6120787	C_N	RPD	Total Ammonia-N	2019/05/14	12		%	20
6120802	BA	Matrix Spike	Total Ammonia-N	2019/05/14		97	%	75 - 125
6120802	BA	Spiked Blank	Total Ammonia-N	2019/05/14		99	%	80 - 120
6120802	BA	Method Blank	Total Ammonia-N	2019/05/14	<0.050		mg/L	
6120802	BA	RPD	Total Ammonia-N	2019/05/14	NC		%	20
6120981	C_N	Matrix Spike	Nitrite (N)	2019/05/15		NC	%	80 - 120
			Nitrate (N)	2019/05/15		NC	%	80 - 120
6120981	C_N	Spiked Blank	Nitrite (N)	2019/05/15		104	%	80 - 120
			Nitrate (N)	2019/05/15		92	%	80 - 120
6120981	C_N	Method Blank	Nitrite (N)	2019/05/15	<0.010		mg/L	
			Nitrate (N)	2019/05/15	<0.10		mg/L	
6120981	C_N	RPD	Nitrite (N)	2019/05/15	1.2		%	20
			Nitrate (N)	2019/05/15	0.19		%	20
6121078	DRM	Matrix Spike [JRS550-01]	Dissolved Chloride (Cl-)	2019/05/15		NC	%	80 - 120
6121078	DRM	Spiked Blank	Dissolved Chloride (Cl-)	2019/05/15		104	%	80 - 120
6121078	DRM	Method Blank	Dissolved Chloride (Cl-)	2019/05/15	<1.0		mg/L	
6121078	DRM	RPD [JRS550-01]	Dissolved Chloride (Cl-)	2019/05/15	1.5		%	20
6121095	ADB	Matrix Spike [JRS550-01]	Dissolved Sulphate (SO4)	2019/05/15		111	%	75 - 125
6121095	ADB	Spiked Blank	Dissolved Sulphate (SO4)	2019/05/15		105	%	80 - 120
6121095	ADB	Method Blank	Dissolved Sulphate (SO4)	2019/05/15	<1.0		mg/L	
6121095	ADB	RPD [JRS550-01]	Dissolved Sulphate (SO4)	2019/05/15	0.040		%	20
6121104	ADB	Matrix Spike [JRS550-01]	Orthophosphate (P)	2019/05/15		108	%	75 - 125
6121104	ADB	Spiked Blank	Orthophosphate (P)	2019/05/15		100	%	80 - 120
6121104	ADB	Method Blank	Orthophosphate (P)	2019/05/15	<0.010		mg/L	
6121104	ADB	RPD [JRS550-01]	Orthophosphate (P)	2019/05/15	NC		%	25
6121509	SAU	Spiked Blank	Alkalinity (Total as CaCO3)	2019/05/15		95	%	85 - 115
6121509	SAU	Method Blank	Alkalinity (Total as CaCO3)	2019/05/15	<1.0		mg/L	
6121509	SAU	RPD	Alkalinity (Total as CaCO3)	2019/05/15	1.4		%	20
6121514	SAU	Spiked Blank	pH	2019/05/15		102	%	98 - 103

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Maxxam Job #: B9C6856
Report Date: 2019/05/17

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: JDV

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6121514	SAU	RPD	pH	2019/05/15	0.11		%	N/A
6121526	SAU	Matrix Spike	Fluoride (F-)	2019/05/15		101	%	80 - 120
6121526	SAU	Spiked Blank	Fluoride (F-)	2019/05/15		101	%	80 - 120
6121526	SAU	Method Blank	Fluoride (F-)	2019/05/15	<0.10		mg/L	
6121526	SAU	RPD	Fluoride (F-)	2019/05/15	9.8		%	20
6121543	SAU	Spiked Blank	Conductivity	2019/05/15		102	%	85 - 115
6121543	SAU	Method Blank	Conductivity	2019/05/15	<1.0		umho/cm	
6121543	SAU	RPD	Conductivity	2019/05/15	0.12		%	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.

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).

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Maxxam Job #: B9C6856
Report Date: 2019/05/17

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: JDV

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

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.

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Exceedence Summary Table – ODWS (2002)

Result Exceedences

Sample ID	Maxxam ID	Parameter	Criteria	Result	DL	Units
No Exceedences						

The exceedence summary table is for information purposes only and should not be considered a comprehensive listing or statement of conformance to applicable regulatory guidelines.

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Your Project #: 1407634
Your C.O.C. #: 740180-01-01

Attention: Jamie Bonany

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

Report Date: 2019/10/11
Report #: R5918021
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9S0292
Received: 2019/10/05, 10:15

Sample Matrix: Water
Samples Received: 17

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Alkalinity	17	N/A	2019/10/09	CAM SOP-00448	SM 23 2320 B m
Carbonate, Bicarbonate and Hydroxide	16	N/A	2019/10/09	CAM SOP-00102	APHA 4500-CO2 D
Carbonate, Bicarbonate and Hydroxide	1	N/A	2019/10/10	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	16	N/A	2019/10/09	CAM SOP-00463	SM 23 4500-Cl E m
Chloride by Automated Colourimetry	1	N/A	2019/10/10	CAM SOP-00463	SM 23 4500-Cl E m
Colour	17	N/A	2019/10/09	CAM SOP-00412	SM 23 2120C m
Conductivity	17	N/A	2019/10/09	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1)	17	N/A	2019/10/08	CAM SOP-00446	SM 23 5310 B m
Fluoride	17	2019/10/08	2019/10/09	CAM SOP-00449	SM 23 4500-F C m
Hardness (calculated as CaCO3)	17	N/A	2019/10/11	CAM SOP 00102/00408/00447	SM 2340 B
Dissolved Metals by ICPMS	17	N/A	2019/10/11	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	16	N/A	2019/10/08	CAM SOP-00441	USGS I-2522-90 m
Total Ammonia-N	1	N/A	2019/10/09	CAM SOP-00441	USGS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (2)	17	N/A	2019/10/09	CAM SOP-00440	SM 23 4500-NO3I/NO2B
pH	17	2019/10/08	2019/10/09	CAM SOP-00413	SM 4500H+ B m
Orthophosphate	16	N/A	2019/10/09	CAM SOP-00461	EPA 365.1 m
Orthophosphate	1	N/A	2019/10/10	CAM SOP-00461	EPA 365.1 m
Sulphate by Automated Colourimetry	16	N/A	2019/10/09	CAM SOP-00464	EPA 375.4 m
Sulphate by Automated Colourimetry	1	N/A	2019/10/10	CAM SOP-00464	EPA 375.4 m
Total Dissolved Solids (TDS calc)	17	N/A	2019/10/11		

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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
Your C.O.C. #: 740180-01-01

Attention: Jamie Bonany

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

Report Date: 2019/10/11
Report #: R5918021
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9S0292
Received: 2019/10/05, 10:15

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs 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 BV Labs, results relate to the supplied samples tested.

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: Ema.Gitej@bvlabs.com
Phone# (905)817-5829
==========
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BV Labs Job #: B9S0292
Report Date: 2019/10/11

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: CD

RESULTS OF ANALYSES OF WATER

BV Labs ID				KYV039			KYV040		
Sampling Date				2019/10/04 04:45			2019/10/04 11:00		
COC Number				740180-01-01			740180-01-01		
	UNITS	MAC	A/O	AM1B	RDL	QC Batch	TW1-1	RDL	QC Batch
Calculated Parameters									
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	250	1.0	6373428	280	1.0	6373428
Calculated TDS	mg/L	-	500	300	1.0	6373433	**1700**	1.0	6373433
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	2.9	1.0	6373428	2.5	1.0	6373428
Hardness (CaCO3)	mg/L	-	80:100	**260**	1.0	6373035	**830**	1.0	6373035
Inorganics									
Total Ammonia-N	mg/L	-	-	0.12	0.050	6375355	1.2	0.050	6375355
Colour	TCU	-	5	<2	2	6376047	<2	2	6376047
Conductivity	umho/cm	-	-	510	1.0	6375829	3100	1.0	6375829
Fluoride (F-)	mg/L	1.5	-	0.22	0.10	6375782	0.50	0.10	6375782
Dissolved Organic Carbon	mg/L	-	5	0.69	0.50	6375167	1.6	0.50	6375167
Orthophosphate (P)	mg/L	-	-	<0.010	0.010	6375675	<0.010	0.010	6379145
pH	pH	-	6.5:8.5	8.09		6375836	7.99		6375836
Dissolved Sulphate (SO4)	mg/L	-	500	32	1.0	6375673	33	1.0	6379144
Alkalinity (Total as CaCO3)	mg/L	-	30:500	250	1.0	6375787	280	1.0	6375787
Dissolved Chloride (Cl-)	mg/L	-	250	1.9	1.0	6375670	**830**	10	6379138
Nitrite (N)	mg/L	1	-	<0.010	0.010	6375677	0.030	0.010	6375677
Nitrate (N)	mg/L	10	-	<0.10	0.10	6375677	0.14	0.10	6375677
Nitrate + Nitrite (N)	mg/L	10	-	<0.10	0.10	6375677	0.17	0.10	6375677

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

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BV Labs Job #: B9S0292
Report Date: 2019/10/11

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: CD

RESULTS OF ANALYSES OF WATER

BV Labs ID				KYV040			KYV041		
Sampling Date				2019/10/04 11:00			2019/10/04 04:15		
COC Number				740180-01-01			740180-01-01		
	UNITS	MAC	A/O	TW1-1 Lab-Dup	RDL	QC Batch	BORED	RDL	QC Batch
Calculated Parameters									
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-				250	1.0	6373428
Calculated TDS	mg/L	-	500				310	1.0	6373433
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-				4.4	1.0	6373428
Hardness (CaCO3)	mg/L	-	80:100				**240**	1.0	6373035
Inorganics									
Total Ammonia-N	mg/L	-	-				<0.050	0.050	6375355
Colour	TCU	-	5				<2	2	6376047
Conductivity	umho/cm	-	-				520	1.0	6375829
Fluoride (F-)	mg/L	1.5	-				0.13	0.10	6375782
Dissolved Organic Carbon	mg/L	-	5				1.0	0.50	6375167
Orthophosphate (P)	mg/L	-	-	<0.010	0.010	6379145	<0.010	0.010	6375675
pH	pH	-	6.5:8.5				8.26		6375836
Dissolved Sulphate (SO4)	mg/L	-	500	33	1.0	6379144	26	1.0	6375673
Alkalinity (Total as CaCO3)	mg/L	-	30:500				260	1.0	6375787
Dissolved Chloride (Cl-)	mg/L	-	250	**800**	10	6379138	1.7	1.0	6375670
Nitrite (N)	mg/L	1	-				<0.010	0.010	6375677
Nitrate (N)	mg/L	10	-				0.32	0.10	6375677
Nitrate + Nitrite (N)	mg/L	10	-				0.32	0.10	6375677

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
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BV Labs Job #: B9S0292
Report Date: 2019/10/11

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: CD

RESULTS OF ANALYSES OF WATER

BV Labs ID				KYV042		KYV043			KYV043		
Sampling Date				2019/10/04 04:40		2019/10/04 04:30			2019/10/04 04:30		
COC Number				740180-01-01		740180-01-01			740180-01-01		
	UNITS	MAC	A/O	OW4-1	RDL	OW4-2	RDL	QC Batch	OW4-2 Lab-Dup	RDL	QC Batch
Calculated Parameters											
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	230	1.0	230	1.0	6373428			
Calculated TDS	mg/L	-	500	**680**	1.0	**920**	1.0	6373433			
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	5.3	1.0	3.5	1.0	6373428			
Hardness (CaCO3)	mg/L	-	80:100	**140**	1.0	**260**	1.0	6373035			
Inorganics											
Total Ammonia-N	mg/L	-	-	1.4	0.050	1.2	0.050	6375355			
Colour	TCU	-	5	<2	2	<2	2	6376047			
Conductivity	umho/cm	-	-	1400	1.0	1800	1.0	6375829			
Fluoride (F-)	mg/L	1.5	-	0.99	0.10	0.88	0.10	6375782			
Dissolved Organic Carbon	mg/L	-	5	1.8	0.50	1.1	0.50	6375167			
Orthophosphate (P)	mg/L	-	-	<0.010	0.010	<0.010	0.010	6376167	<0.010	0.010	6376167
pH	pH	-	6.5:8.5	8.39		8.21		6375836			
Dissolved Sulphate (SO4)	mg/L	-	500	6.9	1.0	<1.0	1.0	6376168	<1.0	1.0	6376168
Alkalinity (Total as CaCO3)	mg/L	-	30:500	240	1.0	230	1.0	6375787			
Dissolved Chloride (Cl-)	mg/L	-	250	**260**	4.0	**400**	5.0	6376161	**410**	5.0	6376161
Nitrite (N)	mg/L	1	-	0.010	0.010	<0.010	0.010	6375677			
Nitrate (N)	mg/L	10	-	<0.10	0.10	<0.10	0.10	6375677			
Nitrate + Nitrite (N)	mg/L	10	-	<0.10	0.10	<0.10	0.10	6375677			

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: B9S0292
Report Date: 2019/10/11

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: CD

RESULTS OF ANALYSES OF WATER

BV Labs ID				KYV044			KYV044		
Sampling Date				2019/10/04 01:15			2019/10/04 01:15		
COC Number				740180-01-01			740180-01-01		
	UNITS	MAC	A/O	OW5-1	RDL	QC Batch	OW5-1 Lab-Dup	RDL	QC Batch
Calculated Parameters									
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	260	1.0	6373428			
Calculated TDS	mg/L	-	500	360	1.0	6373433			
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	3.8	1.0	6373428			
Hardness (CaCO3)	mg/L	-	80:100	**190**	1.0	6373035			
Inorganics									
Total Ammonia-N	mg/L	-	-	0.62	0.050	6375946			
Colour	TCU	-	5	<2	2	6376047			
Conductivity	umho/cm	-	-	620	1.0	6375829			
Fluoride (F-)	mg/L	1.5	-	0.70	0.10	6375782			
Dissolved Organic Carbon	mg/L	-	5	1.5	0.50	6375167	1.5	0.50	6375167
Orthophosphate (P)	mg/L	-	-	<0.010	0.010	6375675			
pH	pH	-	6.5:8.5	8.20		6375836			
Dissolved Sulphate (SO4)	mg/L	-	500	36	1.0	6375673			
Alkalinity (Total as CaCO3)	mg/L	-	30:500	260	1.0	6375787			
Dissolved Chloride (Cl-)	mg/L	-	250	26	1.0	6375670			
Nitrite (N)	mg/L	1	-	0.046	0.010	6375677			
Nitrate (N)	mg/L	10	-	0.26	0.10	6375677			
Nitrate + Nitrite (N)	mg/L	10	-	0.31	0.10	6375677			

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
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BV Labs Job #: B9S0292
Report Date: 2019/10/11

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: CD

RESULTS OF ANALYSES OF WATER

BV Labs ID				KYV045	KYV046		KYV047		KYV048		
Sampling Date				2019/10/04 01:20	2019/10/04 01:25		2019/10/04 03:50		2019/10/04 02:20		
COC Number				740180-01-01	740180-01-01		740180-01-01		740180-01-01		
	UNITS	MAC	A/O	OW5-2	OW5-3	RDL	OW6-2	RDL	OW7-1	RDL	QC Batch
Calculated Parameters											
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	120	110	1.0	150	1.0	210	1.0	6373428
Calculated TDS	mg/L	-	500	**15000**	**16000**	1.0	**4000**	1.0	430	1.0	6373433
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	<1.0	<1.0	1.0	1.0	1.0	2.2	1.0	6373428
Hardness (CaCO3)	mg/L	-	80:100	**5800**	**6200**	1.0	**1700**	1.0	**320**	1.0	6374551
Inorganics											
Total Ammonia-N	mg/L	-	-	9.1	9.5	0.050	1.4	0.050	1.8	0.050	6375355
Colour	TCU	-	5	**12**	4	2	<2	2	**17**	2	6376047
Conductivity	umho/cm	-	-	26000	28000	1.0	6400	1.0	720	1.0	6375829
Fluoride (F-)	mg/L	1.5	-	0.41	0.39	0.10	0.63	0.10	0.46	0.10	6375782
Dissolved Organic Carbon	mg/L	-	5	<0.50	0.79	0.50	0.57	0.50	1.9	0.50	6375167
Orthophosphate (P)	mg/L	-	-	<0.010	<0.010	0.010	<0.010	0.010	<0.010	0.010	6375675
pH	pH	-	6.5:8.5	7.58	7.53		7.86		8.05		6375836
Dissolved Sulphate (SO4)	mg/L	-	500	5.3	11	1.0	**930**	5.0	73	1.0	6375673
Alkalinity (Total as CaCO3)	mg/L	-	30:500	120	110	1.0	150	1.0	210	1.0	6375787
Dissolved Chloride (Cl-)	mg/L	-	250	**9400**	**10000**	120	**1600**	15	47	1.0	6375670
Nitrite (N)	mg/L	1	-	<0.010	<0.010	0.010	0.072	0.010	<0.010	0.010	6375677
Nitrate (N)	mg/L	10	-	<0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	6375677
Nitrate + Nitrite (N)	mg/L	10	-	<0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	6375677

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively

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BV Labs Job #: B9S0292
Report Date: 2019/10/11

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: CD

RESULTS OF ANALYSES OF WATER

BV Labs ID				KYV049			KYV049		
Sampling Date				2019/10/04 02:15			2019/10/04 02:15		
COC Number				740180-01-01			740180-01-01		
	UNITS	MAC	A/O	OW7-2	RDL	QC Batch	OW7-2 Lab-Dup	RDL	QC Batch
Calculated Parameters									
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	270	1.0	6373428			
Calculated TDS	mg/L	-	500	**1100**	1.0	6373433			
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	3.0	1.0	6373428			
Hardness (CaCO3)	mg/L	-	80:100	**500**	1.0	6374551			
Inorganics									
Total Ammonia-N	mg/L	-	-	1.6	0.050	6375355			
Colour	TCU	-	5	<2	2	6376047			
Conductivity	umho/cm	-	-	2200	1.0	6375829			
Fluoride (F-)	mg/L	1.5	-	0.75	0.10	6375782			
Dissolved Organic Carbon	mg/L	-	5	2.4	0.50	6375167			
Orthophosphate (P)	mg/L	-	-	<0.010	0.010	6376167			
pH	pH	-	6.5:8.5	8.07		6375836			
Dissolved Sulphate (SO4)	mg/L	-	500	43	1.0	6376168			
Alkalinity (Total as CaCO3)	mg/L	-	30:500	270	1.0	6375787			
Dissolved Chloride (Cl-)	mg/L	-	250	**490**	5.0	6376161			
Nitrite (N)	mg/L	1	-	0.012	0.010	6375676	<0.010	0.010	6375676
Nitrate (N)	mg/L	10	-	<0.10	0.10	6375676	<0.10	0.10	6375676
Nitrate + Nitrite (N)	mg/L	10	-	<0.10	0.10	6375676	<0.10	0.10	6375676

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
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BV Labs Job #: B9S0292
Report Date: 2019/10/11

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: CD

RESULTS OF ANALYSES OF WATER

BV Labs ID				KYV050			KYV051	KYV052		
Sampling Date				2019/10/04 02:40			2019/10/04 02:45	2019/10/04 04:30		
COC Number				740180-01-01			740180-01-01	740180-01-01		
	UNITS	MAC	A/O	OW8-1	RDL	QC Batch	OW8-2	OW4-2-D	RDL	QC Batch
Calculated Parameters										
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	300	1.0	6373428	310	230	1.0	6373428
Calculated TDS	mg/L	-	500	**880**	1.0	6373433	**1100**	**910**	1.0	6373433
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	2.7	1.0	6373428	2.8	3.4	1.0	6373428
Hardness (CaCO3)	mg/L	-	80:100	**390**	1.0	6374551	**430**	**250**	1.0	6374551
Inorganics										
Total Ammonia-N	mg/L	-	-	0.84	0.050	6375355	0.87	1.1	0.050	6375355
Colour	TCU	-	5	<2	2	6376047	<2	<2	2	6376047
Conductivity	umho/cm	-	-	1600	1.0	6375829	2100	1800	1.0	6375829
Fluoride (F-)	mg/L	1.5	-	0.86	0.10	6375782	0.94	0.88	0.10	6375782
Dissolved Organic Carbon	mg/L	-	5	1.5	0.50	6375167	1.4	1.1	0.50	6375167
Orthophosphate (P)	mg/L	-	-	<0.010	0.010	6376167	<0.010	<0.010	0.010	6375675
pH	pH	-	6.5:8.5	7.98		6375836	7.99	8.20		6375836
Dissolved Sulphate (SO4)	mg/L	-	500	38	1.0	6376168	22	<1.0	1.0	6375673
Alkalinity (Total as CaCO3)	mg/L	-	30:500	300	1.0	6375787	310	230	1.0	6375787
Dissolved Chloride (Cl-)	mg/L	-	250	**310**	4.0	6376161	**460**	**410**	5.0	6375670
Nitrite (N)	mg/L	1	-	<0.010	0.010	6375677	<0.010	<0.010	0.010	6375677
Nitrate (N)	mg/L	10	-	<0.10	0.10	6375677	<0.10	<0.10	0.10	6375677
Nitrate + Nitrite (N)	mg/L	10	-	<0.10	0.10	6375677	<0.10	<0.10	0.10	6375677

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
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BV Labs Job #: B9S0292
Report Date: 2019/10/11

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: CD

RESULTS OF ANALYSES OF WATER

BV Labs ID				KYV053			KYV054		
Sampling Date				2019/10/04 01:20			2019/10/04 03:50		
COC Number				740180-01-01			740180-01-01		
	UNITS	MAC	A/O	OW5-2-D	RDL	QC Batch	OW6-2-D	RDL	QC Batch
Calculated Parameters									
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	120	1.0	6373428	150	1.0	6373428
Calculated TDS	mg/L	-	500	**16000**	1.0	6373433	**4000**	1.0	6373433
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	<1.0	1.0	6373428	<1.0	1.0	6373428
Hardness (CaCO3)	mg/L	-	80:100	**5900**	1.0	6374551	**1600**	1.0	6374551
Inorganics									
Total Ammonia-N	mg/L	-	-	9.1	0.050	6375355	1.4	0.050	6375355
Colour	TCU	-	5	**9**	2	6376047	<2	2	6376047
Conductivity	umho/cm	-	-	26000	1.0	6375829	6500	1.0	6376328
Fluoride (F-)	mg/L	1.5	-	0.41	0.10	6375782	0.59	0.10	6376803
Dissolved Organic Carbon	mg/L	-	5	<0.50	0.50	6375167	0.56	0.50	6375167
Orthophosphate (P)	mg/L	-	-	<0.010	0.010	6375675	<0.010	0.010	6376167
pH	pH	-	6.5:8.5	7.61		6375836	7.68		6376804
Dissolved Sulphate (SO4)	mg/L	-	500	5.1	1.0	6375673	**940**	5.0	6376168
Alkalinity (Total as CaCO3)	mg/L	-	30:500	120	1.0	6375787	150	1.0	6376325
Dissolved Chloride (Cl-)	mg/L	-	250	**9800**	100	6375670	**1600**	20	6376161
Nitrite (N)	mg/L	1	-	<0.010	0.010	6375677	0.070	0.010	6375676
Nitrate (N)	mg/L	10	-	<0.10	0.10	6375677	<0.10	0.10	6375676
Nitrate + Nitrite (N)	mg/L	10	-	<0.10	0.10	6375677	<0.10	0.10	6375676

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
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BV Labs Job #: B9S0292
Report Date: 2019/10/11

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: CD

RESULTS OF ANALYSES OF WATER

BV Labs ID				KYV054			KYV055		
Sampling Date				2019/10/04 03:50			2019/10/04 05:00		
COC Number				740180-01-01			740180-01-01		
	UNITS	MAC	A/O	OW6-2-D Lab-Dup	RDL	QC Batch	NEW WELL	RDL	QC Batch
Calculated Parameters									
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-				39	1.0	6373428
Calculated TDS	mg/L	-	500				**12000**	1.0	6373433
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-				<1.0	1.0	6373428
Hardness (CaCO3)	mg/L	-	80:100				**4700**	1.0	6374551
Inorganics									
Total Ammonia-N	mg/L	-	-				5.8	0.050	6375355
Colour	TCU	-	5	<2	2	6376047	**18**	2	6376047
Conductivity	umho/cm	-	-	6500	1.0	6376328	21000	1.0	6375829
Fluoride (F-)	mg/L	1.5	-	0.58	0.10	6376803	0.57	0.10	6375782
Dissolved Organic Carbon	mg/L	-	5				2.6	0.50	6375167
Orthophosphate (P)	mg/L	-	-				<0.010	0.010	6375675
pH	pH	-	6.5:8.5	7.75		6376804	7.12		6375836
Dissolved Sulphate (SO4)	mg/L	-	500				37	1.0	6375673
Alkalinity (Total as CaCO3)	mg/L	-	30:500	150	1.0	6376325	39	1.0	6375787
Dissolved Chloride (Cl-)	mg/L	-	250				**7800**	100	6375670
Nitrite (N)	mg/L	1	-				<0.010	0.010	6375677
Nitrate (N)	mg/L	10	-				<0.10	0.10	6375677
Nitrate + Nitrite (N)	mg/L	10	-				<0.10	0.10	6375677

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
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BV Labs Job #: B9S0292
Report Date: 2019/10/11

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: CD

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID			KYV039		KYV040		KYV041	KYV042	KYV043		
Sampling Date			2019/10/04 04:45		2019/10/04 11:00		2019/10/04 04:15	2019/10/04 04:40	2019/10/04 04:30		
COC Number			740180-01-01		740180-01-01		740180-01-01	740180-01-01	740180-01-01		
	UNITS	A/O	AM1B	RDL	TW1-1	RDL	BORED	OW4-1	OW4-2	RDL	QC Batch
Metals											
Dissolved Calcium (Ca)	ug/L	-	52000	200	180000	400	54000	27000	49000	200	6376010
Dissolved Magnesium (Mg)	ug/L	-	32000	50	91000	50	25000	18000	34000	50	6376010
Dissolved Phosphorus (P)	ug/L	-	120	100	110	100	110	130	130	100	6376010
Dissolved Potassium (K)	ug/L	-	2200	200	13000	200	7600	6800	11000	200	6376010
Dissolved Sodium (Na)	ug/L	200000	6200	100	**400000**	100	19000	200000	**270000**	100	6376010

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

BV Labs ID			KYV044		KYV045	KYV046		KYV047		
Sampling Date			2019/10/04 01:15		2019/10/04 01:20	2019/10/04 01:25		2019/10/04 03:50		
COC Number			740180-01-01		740180-01-01	740180-01-01		740180-01-01		
	UNITS	A/O	OW5-1	RDL	OW5-2	OW5-3	RDL	OW6-2	RDL	QC Batch
Metals										
Dissolved Calcium (Ca)	ug/L	-	33000	200	1200000	1300000	5000	330000	1000	6376010
Dissolved Magnesium (Mg)	ug/L	-	25000	50	690000	730000	250	200000	50	6376010
Dissolved Phosphorus (P)	ug/L	-	120	100	560	620	500	100	100	6376010
Dissolved Potassium (K)	ug/L	-	6800	200	67000	68000	1000	19000	200	6376010
Dissolved Sodium (Na)	ug/L	200000	59000	100	**3800000**	**3800000**	1000	**800000**	500	6376010

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
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ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID			KYV048		KYV049		KYV050	KYV051	KYV051		
Sampling Date			2019/10/04 02:20		2019/10/04 02:15		2019/10/04 02:40	2019/10/04 02:45	2019/10/04 02:45		
COC Number			740180-01-01		740180-01-01		740180-01-01	740180-01-01	740180-01-01		
	UNITS	A/O	OW7-1	RDL	OW7-2	RDL	OW8-1	OW8-2	OW8-2 Lab-Dup	RDL	QC Batch
Metals											
Dissolved Calcium (Ca)	ug/L	-	63000	200	100000	400	100000	110000	110000	200	6376010
Dissolved Magnesium (Mg)	ug/L	-	39000	50	60000	50	34000	38000	39000	50	6376010
Dissolved Phosphorus (P)	ug/L	-	100	100	100	100	130	110	130	100	6376010
Dissolved Potassium (K)	ug/L	-	13000	200	12000	200	7000	7200	7300	200	6376010
Dissolved Sodium (Na)	ug/L	200000	50000	100	**250000**	100	200000	**250000**	**250000**	100	6376010

No Fill — No Exceedance
Grey — Exceeds 1 criteria policy/level
Black — Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

BV Labs ID			KYV052		KYV053		KYV054		KYV055		
Sampling Date			2019/10/04 04:30		2019/10/04 01:20		2019/10/04 03:50		2019/10/04 05:00		
COC Number			740180-01-01		740180-01-01		740180-01-01		740180-01-01		
	UNITS	A/O	OW4-2-D	RDL	OW5-2-D	RDL	OW6-2-D	RDL	NEW WELL	RDL	QC Batch
Metals											
Dissolved Calcium (Ca)	ug/L	-	47000	200	1200000	5000	330000	1000	910000	5000	6376010
Dissolved Magnesium (Mg)	ug/L	-	33000	50	700000	250	200000	50	600000	250	6376010
Dissolved Phosphorus (P)	ug/L	-	120	100	560	500	100	100	640	500	6376010
Dissolved Potassium (K)	ug/L	-	10000	200	69000	1000	18000	200	50000	1000	6376010
Dissolved Sodium (Na)	ug/L	200000	**260000**	100	**3600000**	1000	**800000**	500	**2600000**	500	6376010

No Fill — No Exceedance
Grey — Exceeds 1 criteria policy/level
Black — Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

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TEST SUMMARY

BV Labs ID: KYV039
Sample ID: AM1B
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6375787	N/A	2019/10/09	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6373428	N/A	2019/10/09	Automated Statchk
Chloride by Automated Colourimetry	KONE	6375670	N/A	2019/10/09	Deonarine Ramnarine
Colour	SPEC	6376047	N/A	2019/10/09	Christine Pham
Conductivity	AT	6375829	N/A	2019/10/09	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6375167	N/A	2019/10/08	Mandeep Kaur
Fluoride	ISE	6375782	2019/10/08	2019/10/09	Surinder Rai
Hardness (calculated as CaCO3)		6373035	N/A	2019/10/11	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6376010	N/A	2019/10/11	Prempal Bhatti
Total Ammonia-N	LACH/NH4	6375355	N/A	2019/10/08	Mazin Wakai
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6375677	N/A	2019/10/09	Mazin Wakai
pH	AT	6375836	2019/10/08	2019/10/09	Surinder Rai
Orthophosphate	KONE	6375675	N/A	2019/10/09	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6375673	N/A	2019/10/09	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6373433	N/A	2019/10/11	Automated Statchk

BV Labs ID: KYV040
Sample ID: TW1-1
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6375787	N/A	2019/10/09	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6373428	N/A	2019/10/09	Automated Statchk
Chloride by Automated Colourimetry	KONE	6379138	N/A	2019/10/10	Deonarine Ramnarine
Colour	SPEC	6376047	N/A	2019/10/09	Christine Pham
Conductivity	AT	6375829	N/A	2019/10/09	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6375167	N/A	2019/10/08	Mandeep Kaur
Fluoride	ISE	6375782	2019/10/08	2019/10/09	Surinder Rai
Hardness (calculated as CaCO3)		6373035	N/A	2019/10/11	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6376010	N/A	2019/10/11	Prempal Bhatti
Total Ammonia-N	LACH/NH4	6375355	N/A	2019/10/08	Mazin Wakai
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6375677	N/A	2019/10/09	Mazin Wakai
pH	AT	6375836	2019/10/08	2019/10/09	Surinder Rai
Orthophosphate	KONE	6379145	N/A	2019/10/10	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6379144	N/A	2019/10/10	Deonarine Ramnarine
Total Dissolved Solids (TDS calc)	CALC	6373433	N/A	2019/10/11	Automated Statchk

BV Labs ID: KYV040 Dup
Sample ID: TW1-1
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride by Automated Colourimetry	KONE	6379138	N/A	2019/10/10	Deonarine Ramnarine
Orthophosphate	KONE	6379145	N/A	2019/10/10	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6379144	N/A	2019/10/10	Deonarine Ramnarine

TEST SUMMARY

BV Labs ID: KYV041
Sample ID: BORED
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6375787	N/A	2019/10/09	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6373428	N/A	2019/10/09	Automated Statchk
Chloride by Automated Colourimetry	KONE	6375670	N/A	2019/10/09	Deonarine Ramnarine
Colour	SPEC	6376047	N/A	2019/10/09	Christine Pham
Conductivity	AT	6375829	N/A	2019/10/09	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6375167	N/A	2019/10/08	Mandeep Kaur
Fluoride	ISE	6375782	2019/10/08	2019/10/09	Surinder Rai
Hardness (calculated as CaCO3)		6373035	N/A	2019/10/11	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6376010	N/A	2019/10/11	Prempal Bhatti
Total Ammonia-N	LACH/NH4	6375355	N/A	2019/10/08	Mazin Wakai
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6375677	N/A	2019/10/09	Mazin Wakai
pH	AT	6375836	2019/10/08	2019/10/09	Surinder Rai
Orthophosphate	KONE	6375675	N/A	2019/10/09	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6375673	N/A	2019/10/09	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6373433	N/A	2019/10/11	Automated Statchk

BV Labs ID: KYV042
Sample ID: OW4-1
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6375787	N/A	2019/10/09	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6373428	N/A	2019/10/09	Automated Statchk
Chloride by Automated Colourimetry	KONE	6376161	N/A	2019/10/09	Alina Dobreanu
Colour	SPEC	6376047	N/A	2019/10/09	Christine Pham
Conductivity	AT	6375829	N/A	2019/10/09	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6375167	N/A	2019/10/08	Mandeep Kaur
Fluoride	ISE	6375782	2019/10/08	2019/10/09	Surinder Rai
Hardness (calculated as CaCO3)		6373035	N/A	2019/10/11	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6376010	N/A	2019/10/11	Prempal Bhatti
Total Ammonia-N	LACH/NH4	6375355	N/A	2019/10/08	Mazin Wakai
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6375677	N/A	2019/10/09	Mazin Wakai
pH	AT	6375836	2019/10/08	2019/10/09	Surinder Rai
Orthophosphate	KONE	6376167	N/A	2019/10/09	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6376168	N/A	2019/10/09	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6373433	N/A	2019/10/11	Automated Statchk

BV Labs ID: KYV043
Sample ID: OW4-2
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6375787	N/A	2019/10/09	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6373428	N/A	2019/10/09	Automated Statchk
Chloride by Automated Colourimetry	KONE	6376161	N/A	2019/10/09	Alina Dobreanu

TEST SUMMARY

BV Labs ID: KYV043
Sample ID: OW4-2
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Colour	SPEC	6376047	N/A	2019/10/09	Christine Pham
Conductivity	AT	6375829	N/A	2019/10/09	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6375167	N/A	2019/10/08	Mandeep Kaur
Fluoride	ISE	6375782	2019/10/08	2019/10/09	Surinder Rai
Hardness (calculated as CaCO3)		6373035	N/A	2019/10/11	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6376010	N/A	2019/10/11	Prempal Bhatti
Total Ammonia-N	LACH/NH4	6375355	N/A	2019/10/08	Mazin Wakai
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6375677	N/A	2019/10/09	Mazin Wakai
pH	AT	6375836	2019/10/08	2019/10/09	Surinder Rai
Orthophosphate	KONE	6376167	N/A	2019/10/09	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6376168	N/A	2019/10/09	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6373433	N/A	2019/10/11	Automated Statchk

BV Labs ID: KYV043 Dup
Sample ID: OW4-2
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride by Automated Colourimetry	KONE	6376161	N/A	2019/10/09	Alina Dobreanu
Orthophosphate	KONE	6376167	N/A	2019/10/09	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6376168	N/A	2019/10/09	Alina Dobreanu

BV Labs ID: KYV044
Sample ID: OW5-1
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6375787	N/A	2019/10/09	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6373428	N/A	2019/10/09	Automated Statchk
Chloride by Automated Colourimetry	KONE	6375670	N/A	2019/10/09	Deonarine Ramnarine
Colour	SPEC	6376047	N/A	2019/10/09	Christine Pham
Conductivity	AT	6375829	N/A	2019/10/09	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6375167	N/A	2019/10/08	Mandeep Kaur
Fluoride	ISE	6375782	2019/10/08	2019/10/09	Surinder Rai
Hardness (calculated as CaCO3)		6373035	N/A	2019/10/11	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6376010	N/A	2019/10/11	Prempal Bhatti
Total Ammonia-N	LACH/NH4	6375946	N/A	2019/10/09	Mazin Wakai
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6375677	N/A	2019/10/09	Mazin Wakai
pH	AT	6375836	2019/10/08	2019/10/09	Surinder Rai
Orthophosphate	KONE	6375675	N/A	2019/10/09	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6375673	N/A	2019/10/09	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6373433	N/A	2019/10/11	Automated Statchk

TEST SUMMARY

BV Labs ID: KYV044 Dup
Sample ID: OW5-1
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6375167	N/A	2019/10/08	Mandeep Kaur

BV Labs ID: KYV045
Sample ID: OW5-2
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6375787	N/A	2019/10/09	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6373428	N/A	2019/10/09	Automated Statchk
Chloride by Automated Colourimetry	KONE	6375670	N/A	2019/10/09	Deonarine Ramnarine
Colour	SPEC	6376047	N/A	2019/10/09	Christine Pham
Conductivity	AT	6375829	N/A	2019/10/09	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6375167	N/A	2019/10/08	Mandeep Kaur
Fluoride	ISE	6375782	2019/10/08	2019/10/09	Surinder Rai
Hardness (calculated as CaCO3)		6374551	N/A	2019/10/11	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6376010	N/A	2019/10/11	Prempal Bhatti
Total Ammonia-N	LACH/NH4	6375355	N/A	2019/10/08	Mazin Wakai
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6375677	N/A	2019/10/09	Mazin Wakai
pH	AT	6375836	2019/10/08	2019/10/09	Surinder Rai
Orthophosphate	KONE	6375675	N/A	2019/10/09	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6375673	N/A	2019/10/09	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6373433	N/A	2019/10/11	Automated Statchk

BV Labs ID: KYV046
Sample ID: OW5-3
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6375787	N/A	2019/10/09	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6373428	N/A	2019/10/09	Automated Statchk
Chloride by Automated Colourimetry	KONE	6375670	N/A	2019/10/09	Deonarine Ramnarine
Colour	SPEC	6376047	N/A	2019/10/09	Christine Pham
Conductivity	AT	6375829	N/A	2019/10/09	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6375167	N/A	2019/10/08	Mandeep Kaur
Fluoride	ISE	6375782	2019/10/08	2019/10/09	Surinder Rai
Hardness (calculated as CaCO3)		6374551	N/A	2019/10/11	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6376010	N/A	2019/10/11	Prempal Bhatti
Total Ammonia-N	LACH/NH4	6375355	N/A	2019/10/08	Mazin Wakai
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6375677	N/A	2019/10/09	Mazin Wakai
pH	AT	6375836	2019/10/08	2019/10/09	Surinder Rai
Orthophosphate	KONE	6375675	N/A	2019/10/09	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6375673	N/A	2019/10/09	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6373433	N/A	2019/10/11	Automated Statchk

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TEST SUMMARY

BV Labs ID: KYV047
Sample ID: OW6-2
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6375787	N/A	2019/10/09	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6373428	N/A	2019/10/09	Automated Statchk
Chloride by Automated Colourimetry	KONE	6375670	N/A	2019/10/09	Deonarine Ramnarine
Colour	SPEC	6376047	N/A	2019/10/09	Christine Pham
Conductivity	AT	6375829	N/A	2019/10/09	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6375167	N/A	2019/10/08	Mandeep Kaur
Fluoride	ISE	6375782	2019/10/08	2019/10/09	Surinder Rai
Hardness (calculated as CaCO3)		6374551	N/A	2019/10/11	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6376010	N/A	2019/10/11	Prempal Bhatti
Total Ammonia-N	LACH/NH4	6375355	N/A	2019/10/08	Mazin Wakai
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6375677	N/A	2019/10/09	Mazin Wakai
pH	AT	6375836	2019/10/08	2019/10/09	Surinder Rai
Orthophosphate	KONE	6375675	N/A	2019/10/09	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6375673	N/A	2019/10/09	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6373433	N/A	2019/10/11	Automated Statchk

BV Labs ID: KYV048
Sample ID: OW7-1
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6375787	N/A	2019/10/09	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6373428	N/A	2019/10/09	Automated Statchk
Chloride by Automated Colourimetry	KONE	6375670	N/A	2019/10/09	Deonarine Ramnarine
Colour	SPEC	6376047	N/A	2019/10/09	Christine Pham
Conductivity	AT	6375829	N/A	2019/10/09	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6375167	N/A	2019/10/08	Mandeep Kaur
Fluoride	ISE	6375782	2019/10/08	2019/10/09	Surinder Rai
Hardness (calculated as CaCO3)		6374551	N/A	2019/10/11	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6376010	N/A	2019/10/11	Prempal Bhatti
Total Ammonia-N	LACH/NH4	6375355	N/A	2019/10/08	Mazin Wakai
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6375677	N/A	2019/10/09	Mazin Wakai
pH	AT	6375836	2019/10/08	2019/10/09	Surinder Rai
Orthophosphate	KONE	6375675	N/A	2019/10/09	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6375673	N/A	2019/10/09	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6373433	N/A	2019/10/11	Automated Statchk

BV Labs ID: KYV049
Sample ID: OW7-2
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6375787	N/A	2019/10/09	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6373428	N/A	2019/10/09	Automated Statchk
Chloride by Automated Colourimetry	KONE	6376161	N/A	2019/10/09	Alina Dobreanu

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TEST SUMMARY

BV Labs ID: KYV049
Sample ID: OW7-2
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Colour	SPEC	6376047	N/A	2019/10/09	Christine Pham
Conductivity	AT	6375829	N/A	2019/10/09	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6375167	N/A	2019/10/08	Mandeep Kaur
Fluoride	ISE	6375782	2019/10/08	2019/10/09	Surinder Rai
Hardness (calculated as CaCO3)		6374551	N/A	2019/10/11	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6376010	N/A	2019/10/11	Prempal Bhatti
Total Ammonia-N	LACH/NH4	6375355	N/A	2019/10/08	Mazin Wakai
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6375676	N/A	2019/10/09	Mazin Wakai
pH	AT	6375836	2019/10/08	2019/10/09	Surinder Rai
Orthophosphate	KONE	6376167	N/A	2019/10/09	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6376168	N/A	2019/10/09	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6373433	N/A	2019/10/11	Automated Statchk

BV Labs ID: KYV049 Dup
Sample ID: OW7-2
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6375676	N/A	2019/10/09	Mazin Wakai

BV Labs ID: KYV050
Sample ID: OW8-1
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6375787	N/A	2019/10/09	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6373428	N/A	2019/10/09	Automated Statchk
Chloride by Automated Colourimetry	KONE	6376161	N/A	2019/10/09	Alina Dobreanu
Colour	SPEC	6376047	N/A	2019/10/09	Christine Pham
Conductivity	AT	6375829	N/A	2019/10/09	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6375167	N/A	2019/10/08	Mandeep Kaur
Fluoride	ISE	6375782	2019/10/08	2019/10/09	Surinder Rai
Hardness (calculated as CaCO3)		6374551	N/A	2019/10/11	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6376010	N/A	2019/10/11	Prempal Bhatti
Total Ammonia-N	LACH/NH4	6375355	N/A	2019/10/08	Mazin Wakai
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6375677	N/A	2019/10/09	Mazin Wakai
pH	AT	6375836	2019/10/08	2019/10/09	Surinder Rai
Orthophosphate	KONE	6376167	N/A	2019/10/09	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6376168	N/A	2019/10/09	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6373433	N/A	2019/10/11	Automated Statchk

TEST SUMMARY

BV Labs ID: KYV051
Sample ID: OW8-2
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6375787	N/A	2019/10/09	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6373428	N/A	2019/10/09	Automated Statchk
Chloride by Automated Colourimetry	KONE	6375670	N/A	2019/10/09	Deonarine Ramnarine
Colour	SPEC	6376047	N/A	2019/10/09	Christine Pham
Conductivity	AT	6375829	N/A	2019/10/09	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6375167	N/A	2019/10/08	Mandeep Kaur
Fluoride	ISE	6375782	2019/10/08	2019/10/09	Surinder Rai
Hardness (calculated as CaCO3)		6374551	N/A	2019/10/11	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6376010	N/A	2019/10/11	Prempal Bhatti
Total Ammonia-N	LACH/NH4	6375355	N/A	2019/10/08	Mazin Wakai
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6375677	N/A	2019/10/09	Mazin Wakai
pH	AT	6375836	2019/10/08	2019/10/09	Surinder Rai
Orthophosphate	KONE	6375675	N/A	2019/10/09	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6375673	N/A	2019/10/09	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6373433	N/A	2019/10/11	Automated Statchk

BV Labs ID: KYV051 Dup
Sample ID: OW8-2
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Metals by ICPMS	ICP/MS	6376010	N/A	2019/10/11	Prempal Bhatti

BV Labs ID: KYV052
Sample ID: OW4-2-D
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6375787	N/A	2019/10/09	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6373428	N/A	2019/10/09	Automated Statchk
Chloride by Automated Colourimetry	KONE	6375670	N/A	2019/10/09	Deonarine Ramnarine
Colour	SPEC	6376047	N/A	2019/10/09	Christine Pham
Conductivity	AT	6375829	N/A	2019/10/09	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6375167	N/A	2019/10/08	Mandeep Kaur
Fluoride	ISE	6375782	2019/10/08	2019/10/09	Surinder Rai
Hardness (calculated as CaCO3)		6374551	N/A	2019/10/11	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6376010	N/A	2019/10/11	Prempal Bhatti
Total Ammonia-N	LACH/NH4	6375355	N/A	2019/10/08	Mazin Wakai
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6375677	N/A	2019/10/09	Mazin Wakai
pH	AT	6375836	2019/10/08	2019/10/09	Surinder Rai
Orthophosphate	KONE	6375675	N/A	2019/10/09	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6375673	N/A	2019/10/09	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6373433	N/A	2019/10/11	Automated Statchk

TEST SUMMARY

BV Labs ID: KYV053
Sample ID: OW5-2-D
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6375787	N/A	2019/10/09	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6373428	N/A	2019/10/09	Automated Statchk
Chloride by Automated Colourimetry	KONE	6375670	N/A	2019/10/09	Deonarine Ramnarine
Colour	SPEC	6376047	N/A	2019/10/09	Christine Pham
Conductivity	AT	6375829	N/A	2019/10/09	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6375167	N/A	2019/10/08	Mandeep Kaur
Fluoride	ISE	6375782	2019/10/08	2019/10/09	Surinder Rai
Hardness (calculated as CaCO3)		6374551	N/A	2019/10/11	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6376010	N/A	2019/10/11	Prempal Bhatti
Total Ammonia-N	LACH/NH4	6375355	N/A	2019/10/08	Mazin Wakai
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6375677	N/A	2019/10/09	Mazin Wakai
pH	AT	6375836	2019/10/08	2019/10/09	Surinder Rai
Orthophosphate	KONE	6375675	N/A	2019/10/09	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6375673	N/A	2019/10/09	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6373433	N/A	2019/10/11	Automated Statchk

BV Labs ID: KYV054
Sample ID: OW6-2-D
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6376325	N/A	2019/10/09	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6373428	N/A	2019/10/10	Automated Statchk
Chloride by Automated Colourimetry	KONE	6376161	N/A	2019/10/09	Alina Dobreanu
Colour	SPEC	6376047	N/A	2019/10/09	Christine Pham
Conductivity	AT	6376328	N/A	2019/10/09	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6375167	N/A	2019/10/08	Mandeep Kaur
Fluoride	ISE	6376803	2019/10/08	2019/10/09	Surinder Rai
Hardness (calculated as CaCO3)		6374551	N/A	2019/10/11	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6376010	N/A	2019/10/11	Prempal Bhatti
Total Ammonia-N	LACH/NH4	6375355	N/A	2019/10/08	Mazin Wakai
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6375676	N/A	2019/10/09	Mazin Wakai
pH	AT	6376804	2019/10/08	2019/10/09	Surinder Rai
Orthophosphate	KONE	6376167	N/A	2019/10/09	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6376168	N/A	2019/10/09	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6373433	N/A	2019/10/11	Automated Statchk

BV Labs ID: KYV054 Dup
Sample ID: OW6-2-D
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6376325	N/A	2019/10/09	Surinder Rai
Colour	SPEC	6376047	N/A	2019/10/09	Christine Pham
Conductivity	AT	6376328	N/A	2019/10/09	Surinder Rai

TEST SUMMARY

BV Labs ID: KYV054 Dup
Sample ID: OW6-2-D
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Fluoride	ISE	6376803	2019/10/08	2019/10/09	Surinder Rai
pH	AT	6376804	2019/10/08	2019/10/09	Surinder Rai

BV Labs ID: KYV055
Sample ID: NEW WELL
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6375787	N/A	2019/10/09	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6373428	N/A	2019/10/09	Automated Statchk
Chloride by Automated Colourimetry	KONE	6375670	N/A	2019/10/09	Deonarine Ramnarine
Colour	SPEC	6376047	N/A	2019/10/09	Christine Pham
Conductivity	AT	6375829	N/A	2019/10/09	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6375167	N/A	2019/10/08	Mandeep Kaur
Fluoride	ISE	6375782	2019/10/08	2019/10/09	Surinder Rai
Hardness (calculated as CaCO3)		6374551	N/A	2019/10/11	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6376010	N/A	2019/10/11	Prempal Bhatti
Total Ammonia-N	LACH/NH4	6375355	N/A	2019/10/08	Mazin Wakai
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6375677	N/A	2019/10/09	Mazin Wakai
pH	AT	6375836	2019/10/08	2019/10/09	Surinder Rai
Orthophosphate	KONE	6375675	N/A	2019/10/09	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	6375673	N/A	2019/10/09	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6373433	N/A	2019/10/11	Automated Statchk

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GENERAL COMMENTS

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

Package 1	6.3°C
Package 2	7.3°C

Sample KYV045 [OW5-2] : Metals Analysis: Due to the sample matrix, the sample required dilution. Detection limits were adjusted accordingly.

Sample KYV046 [OW5-3] : Metals Analysis: Due to the sample matrix, the sample required dilution. Detection limits were adjusted accordingly.

Sample KYV053 [OW5-2-D] : Metals Analysis: Due to the sample matrix, the sample required dilution. Detection limits were adjusted accordingly.

Sample KYV055 [NEW WELL] : Metals Analysis: Due to the sample matrix, the sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6375167	KRM	Matrix Spike [KYV044-03]	Dissolved Organic Carbon	2019/10/08		92	%	80 - 120
6375167	KRM	Spiked Blank	Dissolved Organic Carbon	2019/10/08		99	%	80 - 120
6375167	KRM	Method Blank	Dissolved Organic Carbon	2019/10/08	<0.50		mg/L	
6375167	KRM	RPD [KYV044-03]	Dissolved Organic Carbon	2019/10/08	1.6		%	20
6375355	MT4	Matrix Spike	Total Ammonia-N	2019/10/08		96	%	75 - 125
6375355	MT4	Spiked Blank	Total Ammonia-N	2019/10/08		96	%	80 - 120
6375355	MT4	Method Blank	Total Ammonia-N	2019/10/08	<0.050		mg/L	
6375355	MT4	RPD	Total Ammonia-N	2019/10/08	14		%	20
6375670	DRM	Matrix Spike	Dissolved Chloride (Cl-)	2019/10/09		NC	%	80 - 120
6375670	DRM	Spiked Blank	Dissolved Chloride (Cl-)	2019/10/09		104	%	80 - 120
6375670	DRM	Method Blank	Dissolved Chloride (Cl-)	2019/10/09	<1.0		mg/L	
6375670	DRM	RPD	Dissolved Chloride (Cl-)	2019/10/09	7.6		%	20
6375673	ADB	Matrix Spike	Dissolved Sulphate (SO4)	2019/10/09		102	%	75 - 125
6375673	ADB	Spiked Blank	Dissolved Sulphate (SO4)	2019/10/09		99	%	80 - 120
6375673	ADB	Method Blank	Dissolved Sulphate (SO4)	2019/10/09	<1.0		mg/L	
6375673	ADB	RPD	Dissolved Sulphate (SO4)	2019/10/09	NC		%	20
6375675	ADB	Matrix Spike	Orthophosphate (P)	2019/10/09		NC	%	75 - 125
6375675	ADB	Spiked Blank	Orthophosphate (P)	2019/10/09		99	%	80 - 120
6375675	ADB	Method Blank	Orthophosphate (P)	2019/10/09	<0.010		mg/L	
6375675	ADB	RPD	Orthophosphate (P)	2019/10/09	9.9		%	25
6375676	MT4	Matrix Spike [KYV049-01]	Nitrite (N)	2019/10/09		107	%	80 - 120
			Nitrate (N)	2019/10/09		94	%	80 - 120
6375676	MT4	Spiked Blank	Nitrite (N)	2019/10/09		110	%	80 - 120
			Nitrate (N)	2019/10/09		97	%	80 - 120
6375676	MT4	Method Blank	Nitrite (N)	2019/10/09	<0.010		mg/L	
			Nitrate (N)	2019/10/09	<0.10		mg/L	
6375676	MT4	RPD [KYV049-01]	Nitrite (N)	2019/10/09	NC		%	20
			Nitrate (N)	2019/10/09	NC		%	20
6375677	MT4	Matrix Spike	Nitrite (N)	2019/10/09		106	%	80 - 120
			Nitrate (N)	2019/10/09		100	%	80 - 120
6375677	MT4	Spiked Blank	Nitrite (N)	2019/10/09		106	%	80 - 120
			Nitrate (N)	2019/10/09		95	%	80 - 120
6375677	MT4	Method Blank	Nitrite (N)	2019/10/09	<0.010		mg/L	
			Nitrate (N)	2019/10/09	<0.10		mg/L	
6375677	MT4	RPD	Nitrite (N)	2019/10/09	7.1		%	20
			Nitrate (N)	2019/10/09	NC		%	20
6375782	SAU	Matrix Spike	Fluoride (F-)	2019/10/09		102	%	80 - 120
6375782	SAU	Spiked Blank	Fluoride (F-)	2019/10/09		102	%	80 - 120
6375782	SAU	Method Blank	Fluoride (F-)	2019/10/09	<0.10		mg/L	
6375782	SAU	RPD	Fluoride (F-)	2019/10/09	9.3		%	20
6375787	SAU	Spiked Blank	Alkalinity (Total as CaCO3)	2019/10/09		94	%	85 - 115
6375787	SAU	Method Blank	Alkalinity (Total as CaCO3)	2019/10/09	<1.0		mg/L	
6375787	SAU	RPD	Alkalinity (Total as CaCO3)	2019/10/09	1.1		%	20
6375829	SAU	Spiked Blank	Conductivity	2019/10/09		102	%	85 - 115
6375829	SAU	Method Blank	Conductivity	2019/10/09	<1.0		umho/cm	
6375829	SAU	RPD	Conductivity	2019/10/09	0.14		%	25
6375836	SAU	Spiked Blank	pH	2019/10/09		102	%	98 - 103
6375836	SAU	RPD	pH	2019/10/09	0.23		%	N/A
6375946	MT4	Matrix Spike	Total Ammonia-N	2019/10/09		100	%	75 - 125
6375946	MT4	Spiked Blank	Total Ammonia-N	2019/10/09		102	%	80 - 120
6375946	MT4	Method Blank	Total Ammonia-N	2019/10/09	<0.050		mg/L	
6375946	MT4	RPD	Total Ammonia-N	2019/10/09	NC		%	20

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6376010	PBA	Matrix Spike [KYV051-02]	Dissolved Calcium (Ca)	2019/10/11		NC	%	80 - 120
			Dissolved Magnesium (Mg)	2019/10/11		NC	%	80 - 120
			Dissolved Phosphorus (P)	2019/10/11		106	%	80 - 120
			Dissolved Potassium (K)	2019/10/11		105	%	80 - 120
			Dissolved Sodium (Na)	2019/10/11		NC	%	80 - 120
6376010	PBA	Spiked Blank	Dissolved Calcium (Ca)	2019/10/11		102	%	80 - 120
			Dissolved Magnesium (Mg)	2019/10/11		101	%	80 - 120
			Dissolved Phosphorus (P)	2019/10/11		112	%	80 - 120
			Dissolved Potassium (K)	2019/10/11		100	%	80 - 120
			Dissolved Sodium (Na)	2019/10/11		100	%	80 - 120
6376010	PBA	Method Blank	Dissolved Calcium (Ca)	2019/10/11	<200		ug/L	
			Dissolved Magnesium (Mg)	2019/10/11	<50		ug/L	
			Dissolved Phosphorus (P)	2019/10/11	<100		ug/L	
			Dissolved Potassium (K)	2019/10/11	<200		ug/L	
			Dissolved Sodium (Na)	2019/10/11	140, RDL=100		ug/L	
6376010	PBA	RPD [KYV051-02]	Dissolved Calcium (Ca)	2019/10/11	1.4		%	20
			Dissolved Magnesium (Mg)	2019/10/11	1.7		%	20
			Dissolved Phosphorus (P)	2019/10/11	11		%	20
			Dissolved Potassium (K)	2019/10/11	1.2		%	20
			Dissolved Sodium (Na)	2019/10/11	0.68		%	20
6376047	CP	Spiked Blank	Colour	2019/10/09		99	%	80 - 120
6376047	CP	Method Blank	Colour	2019/10/09	<2		TCU	
6376047	CP	RPD [KYV054-01]	Colour	2019/10/09	NC		%	25
6376161	ADB	Matrix Spike [KYV043-01]	Dissolved Chloride (Cl-)	2019/10/09		NC	%	80 - 120
6376161	ADB	Spiked Blank	Dissolved Chloride (Cl-)	2019/10/09		103	%	80 - 120
6376161	ADB	Method Blank	Dissolved Chloride (Cl-)	2019/10/09	<1.0		mg/L	
6376161	ADB	RPD [KYV043-01]	Dissolved Chloride (Cl-)	2019/10/09	1.9		%	20
6376167	ADB	Matrix Spike [KYV043-01]	Orthophosphate (P)	2019/10/09		101	%	75 - 125
6376167	ADB	Spiked Blank	Orthophosphate (P)	2019/10/09		100	%	80 - 120
6376167	ADB	Method Blank	Orthophosphate (P)	2019/10/09	<0.010		mg/L	
6376167	ADB	RPD [KYV043-01]	Orthophosphate (P)	2019/10/09	NC		%	25
6376168	ADB	Matrix Spike [KYV043-01]	Dissolved Sulphate (SO4)	2019/10/09		99	%	75 - 125
6376168	ADB	Spiked Blank	Dissolved Sulphate (SO4)	2019/10/09		101	%	80 - 120
6376168	ADB	Method Blank	Dissolved Sulphate (SO4)	2019/10/09	<1.0		mg/L	
6376168	ADB	RPD [KYV043-01]	Dissolved Sulphate (SO4)	2019/10/09	NC		%	20
6376325	SAU	Spiked Blank	Alkalinity (Total as CaCO3)	2019/10/09		98	%	85 - 115
6376325	SAU	Method Blank	Alkalinity (Total as CaCO3)	2019/10/09	<1.0		mg/L	
6376325	SAU	RPD [KYV054-01]	Alkalinity (Total as CaCO3)	2019/10/09	0.85		%	20
6376328	SAU	Spiked Blank	Conductivity	2019/10/09		101	%	85 - 115
6376328	SAU	Method Blank	Conductivity	2019/10/09	<1.0		umho/cm	
6376328	SAU	RPD [KYV054-01]	Conductivity	2019/10/09	0.16		%	25
6376803	SAU	Matrix Spike [KYV054-01]	Fluoride (F-)	2019/10/09		83	%	80 - 120
6376803	SAU	Spiked Blank	Fluoride (F-)	2019/10/09		94	%	80 - 120
6376803	SAU	Method Blank	Fluoride (F-)	2019/10/09	<0.10		mg/L	
6376803	SAU	RPD [KYV054-01]	Fluoride (F-)	2019/10/09	1.9		%	20
6376804	SAU	Spiked Blank	pH	2019/10/09		102	%	98 - 103
6376804	SAU	RPD [KYV054-01]	pH	2019/10/09	0.87		%	N/A
6379138	DRM	Matrix Spike [KYV040-01]	Dissolved Chloride (Cl-)	2019/10/10		NC	%	80 - 120
6379138	DRM	Spiked Blank	Dissolved Chloride (Cl-)	2019/10/10		102	%	80 - 120
6379138	DRM	Method Blank	Dissolved Chloride (Cl-)	2019/10/10	<1.0		mg/L	
6379138	DRM	RPD [KYV040-01]	Dissolved Chloride (Cl-)	2019/10/10	2.8		%	20

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6379144	DRM	Matrix Spike [KYV040-01]	Dissolved Sulphate (SO4)	2019/10/10		NC	%	75 - 125
6379144	DRM	Spiked Blank	Dissolved Sulphate (SO4)	2019/10/10		105	%	80 - 120
6379144	DRM	Method Blank	Dissolved Sulphate (SO4)	2019/10/10	<1.0		mg/L	
6379144	DRM	RPD [KYV040-01]	Dissolved Sulphate (SO4)	2019/10/10	0.68		%	20
6379145	ADB	Matrix Spike [KYV040-01]	Orthophosphate (P)	2019/10/10		98	%	75 - 125
6379145	ADB	Spiked Blank	Orthophosphate (P)	2019/10/10		99	%	80 - 120
6379145	ADB	Method Blank	Orthophosphate (P)	2019/10/10	<0.010		mg/L	
6379145	ADB	RPD [KYV040-01]	Orthophosphate (P)	2019/10/10	NC		%	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.

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).

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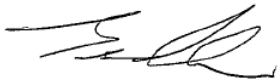
VALIDATION SIGNATURE PAGE

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



Brad Newman, Scientific Service Specialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

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Exceedence Summary Table – ODWS (2002)

Result Exceedences

Sample ID	BV Labs ID	Parameter	Criteria	Result	DL	Units
No Exceedences						

The exceedence summary table is for information purposes only and should not be considered a comprehensive listing or statement of conformance to applicable regulatory guidelines.

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Your Project #: 1407634
Your C.O.C. #: 740181-01-01

Attention: Jamie Bonany

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

Report Date: 2019/10/10
Report #: R5916511
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9S0293
Received: 2019/10/05, 10:15

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Alkalinity	2	N/A	2019/10/07	CAM SOP-00448	SM 23 2320 B m
Carbonate, Bicarbonate and Hydroxide	2	N/A	2019/10/08	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	2	N/A	2019/10/09	CAM SOP-00463	SM 23 4500-Cl E m
Colour	2	N/A	2019/10/09	CAM SOP-00412	SM 23 2120C m
Conductivity	2	N/A	2019/10/07	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1)	2	N/A	2019/10/08	CAM SOP-00446	SM 23 5310 B m
Fluoride	2	2019/10/05	2019/10/07	CAM SOP-00449	SM 23 4500-F C m
Hardness (calculated as CaCO3)	2	N/A	2019/10/10	CAM SOP 00102/00408/00447	SM 2340 B
Dissolved Metals by ICPMS	2	N/A	2019/10/10	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	2	N/A	2019/10/10		
Anion and Cation Sum	2	N/A	2019/10/10		
Total Ammonia-N	2	N/A	2019/10/09	CAM SOP-00441	USGS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (2)	2	N/A	2019/10/08	CAM SOP-00440	SM 23 4500-NO3I/NO2B
pH	2	2019/10/05	2019/10/07	CAM SOP-00413	SM 4500H+ B m
Orthophosphate	2	N/A	2019/10/09	CAM SOP-00461	EPA 365.1 m
Sat. pH and Langelier Index (@ 20C)	2	N/A	2019/10/10		
Sat. pH and Langelier Index (@ 4C)	2	N/A	2019/10/10		
Sulphate by Automated Colourimetry	2	N/A	2019/10/09	CAM SOP-00464	EPA 375.4 m
Tannins & Lignins	2	N/A	2019/10/08	CAM SOP-00410	SM 23 5550 B m
Total Dissolved Solids (TDS calc)	2	N/A	2019/10/10		
Turbidity	2	N/A	2019/10/07	CAM SOP-00417	SM 23 2130 B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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

Your Project #: 1407634
Your C.O.C. #: 740181-01-01

Attention: Jamie Bonany

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

Report Date: 2019/10/10
Report #: R5916511
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9S0293
Received: 2019/10/05, 10:15

accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs 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 BV Labs, results relate to the supplied samples tested.

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: Ema.Gitej@bvlabs.com
Phone# (905)817-5829
==========
This report has been generated and distributed using a secure automated process.
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BV Labs Job #: B9S0293
Report Date: 2019/10/10

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: SDP

RCAP - COMPREHENSIVE (WATER)

BV Labs ID				KYV056			KYV056		
Sampling Date				2019/10/04 12:05			2019/10/04 12:05		
COC Number				740181-01-01			740181-01-01		
	UNITS	MAC	A/O	DW1	RDL	QC Batch	DW1 Lab-Dup	RDL	QC Batch
Calculated Parameters									
Anion Sum	me/L	-	-	12.6	N/A	6371870			
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	320	1.0	6371867			
Calculated TDS	mg/L	-	500	**690**	1.0	6371866			
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	1.3	1.0	6371867			
Cation Sum	me/L	-	-	13.2	N/A	6371870			
Hardness (CaCO3)	mg/L	-	80:100	**550**	1.0	6371868			
Ion Balance (% Difference)	%	-	-	2.31	N/A	6371869			
Langelier Index (@ 20C)	N/A	-	-	0.847		6371871			
Langelier Index (@ 4C)	N/A	-	-	0.600		6371872			
Saturation pH (@ 20C)	N/A	-	-	6.79		6371871			
Saturation pH (@ 4C)	N/A	-	-	7.04		6371872			
Inorganics									
Total Ammonia-N	mg/L	-	-	<0.050	0.050	6375987			
Conductivity	umho/cm	-	-	1300	1.0	6372178			
Dissolved Organic Carbon	mg/L	-	5	1.0	0.50	6373258			
Orthophosphate (P)	mg/L	-	-	<0.010	0.010	6375675			
pH	pH	-	6.5:8.5	7.64		6372180			
Dissolved Sulphate (SO4)	mg/L	-	500	33	1.0	6375673			
Alkalinity (Total as CaCO3)	mg/L	-	30:500	320	1.0	6372177			
Dissolved Chloride (Cl-)	mg/L	-	250	200	2.0	6375670			
Nitrite (N)	mg/L	1	-	0.025	0.010	6372394	0.025	0.010	6372394
Nitrate (N)	mg/L	10	-	<0.10	0.10	6372394	<0.10	0.10	6372394
Nitrate + Nitrite (N)	mg/L	10	-	0.12	0.10	6372394	0.12	0.10	6372394
Metals									
Dissolved Aluminum (Al)	ug/L	-	100	<5.0	5.0	6373481			
Dissolved Antimony (Sb)	ug/L	6	-	<0.50	0.50	6373481			
Dissolved Arsenic (As)	ug/L	10	-	<1.0	1.0	6373481			

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
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N/A = Not Applicable

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RCAP - COMPREHENSIVE (WATER)

BV Labs ID				KYV056			KYV056		
Sampling Date				2019/10/04 12:05			2019/10/04 12:05		
COC Number				740181-01-01			740181-01-01		
	UNITS	MAC	A/O	DW1	RDL	QC Batch	DW1 Lab-Dup	RDL	QC Batch
Dissolved Barium (Ba)	ug/L	1000	-	190	2.0	6373481			
Dissolved Beryllium (Be)	ug/L	-	-	<0.50	0.50	6373481			
Dissolved Boron (B)	ug/L	5000	-	37	10	6373481			
Dissolved Cadmium (Cd)	ug/L	5	-	<0.10	0.10	6373481			
Dissolved Calcium (Ca)	ug/L	-	-	160000	200	6373481			
Dissolved Chromium (Cr)	ug/L	50	-	<5.0	5.0	6373481			
Dissolved Cobalt (Co)	ug/L	-	-	<0.50	0.50	6373481			
Dissolved Copper (Cu)	ug/L	-	1000	42	1.0	6373481			
Dissolved Iron (Fe)	ug/L	-	300	<100	100	6373481			
Dissolved Lead (Pb)	ug/L	10	-	<0.50	0.50	6373481			
Dissolved Magnesium (Mg)	ug/L	-	-	37000	50	6373481			
Dissolved Manganese (Mn)	ug/L	-	50	31	2.0	6373481			
Dissolved Molybdenum (Mo)	ug/L	-	-	0.60	0.50	6373481			
Dissolved Nickel (Ni)	ug/L	-	-	<1.0	1.0	6373481			
Dissolved Phosphorus (P)	ug/L	-	-	<100	100	6373481			
Dissolved Potassium (K)	ug/L	-	-	2300	200	6373481			
Dissolved Selenium (Se)	ug/L	50	-	<2.0	2.0	6373481			
Dissolved Silicon (Si)	ug/L	-	-	8700	50	6373481			
Dissolved Silver (Ag)	ug/L	-	-	<0.10	0.10	6373481			
Dissolved Sodium (Na)	ug/L	-	200000	48000	100	6373481			
Dissolved Strontium (Sr)	ug/L	-	-	620	1.0	6373481			
Dissolved Thallium (Tl)	ug/L	-	-	<0.050	0.050	6373481			
Dissolved Titanium (Ti)	ug/L	-	-	<5.0	5.0	6373481			
Dissolved Uranium (U)	ug/L	20	-	1.6	0.10	6373481			
Dissolved Vanadium (V)	ug/L	-	-	<0.50	0.50	6373481			
Dissolved Zinc (Zn)	ug/L	-	5000	7.7	5.0	6373481			

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
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RCAP - COMPREHENSIVE (WATER)

BV Labs ID				KYV057		
Sampling Date				2019/10/04 11:50		
COC Number				740181-01-01		
	UNITS	MAC	A/O	DW2	RDL	QC Batch
Calculated Parameters						
Anion Sum	me/L	-	-	11.2	N/A	6371870
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	310	1.0	6371867
Calculated TDS	mg/L	-	500	**590**	1.0	6371866
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	1.8	1.0	6371867
Cation Sum	me/L	-	-	11.4	N/A	6371870
Hardness (CaCO3)	mg/L	-	80:100	**490**	1.0	6371868
Ion Balance (% Difference)	%	-	-	1.02	N/A	6371869
Langelier Index (@ 20C)	N/A	-	-	0.821		6371871
Langelier Index (@ 4C)	N/A	-	-	0.574		6372872
Saturation pH (@ 20C)	N/A	-	-	6.98		6371871
Saturation pH (@ 4C)	N/A	-	-	7.22		6371872
Inorganics						
Total Ammonia-N	mg/L	-	-	<0.050	0.050	6375987
Conductivity	umho/cm	-	-	1100	1.0	6372178
Dissolved Organic Carbon	mg/L	-	5	1.6	0.50	6373258
Orthophosphate (P)	mg/L	-	-	<0.010	0.010	6375675
pH	pH	-	6.5:8.5	7.80		6372180
Dissolved Sulphate (SO4)	mg/L	-	500	40	1.0	6375673
Alkalinity (Total as CaCO3)	mg/L	-	30:500	310	1.0	6372177
Dissolved Chloride (Cl-)	mg/L	-	250	140	2.0	6375670
Nitrite (N)	mg/L	1	-	<0.010	0.010	6372394
Nitrate (N)	mg/L	10	-	1.77	0.10	6372394
Nitrate + Nitrite (N)	mg/L	10	-	1.77	0.10	6372394
Metals						
Dissolved Aluminum (Al)	ug/L	-	100	5.6	5.0	6373481
Dissolved Antimony (Sb)	ug/L	6	-	<0.50	0.50	6373481
Dissolved Arsenic (As)	ug/L	10	-	<1.0	1.0	6373481

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively (Made under the Ontario Safe Drinking Water Act, 2002)

N/A = Not Applicable

RCAP - COMPREHENSIVE (WATER)

BV Labs ID				KYV057		
Sampling Date				2019/10/04 11:50		
COC Number				740181-01-01		
	UNITS	MAC	A/O	DW2	RDL	QC Batch
Dissolved Barium (Ba)	ug/L	1000	-	230	2.0	6373481
Dissolved Beryllium (Be)	ug/L	-	-	<0.50	0.50	6373481
Dissolved Boron (B)	ug/L	5000	-	26	10	6373481
Dissolved Cadmium (Cd)	ug/L	5	-	<0.10	0.10	6373481
Dissolved Calcium (Ca)	ug/L	-	-	100000	200	6373481
Dissolved Chromium (Cr)	ug/L	50	-	<5.0	5.0	6373481
Dissolved Cobalt (Co)	ug/L	-	-	<0.50	0.50	6373481
Dissolved Copper (Cu)	ug/L	-	1000	1.5	1.0	6373481
Dissolved Iron (Fe)	ug/L	-	300	<100	100	6373481
Dissolved Lead (Pb)	ug/L	10	-	<0.50	0.50	6373481
Dissolved Magnesium (Mg)	ug/L	-	-	56000	50	6373481
Dissolved Manganese (Mn)	ug/L	-	50	7.7	2.0	6373481
Dissolved Molybdenum (Mo)	ug/L	-	-	1.0	0.50	6373481
Dissolved Nickel (Ni)	ug/L	-	-	<1.0	1.0	6373481
Dissolved Phosphorus (P)	ug/L	-	-	<100	100	6373481
Dissolved Potassium (K)	ug/L	-	-	3200	200	6373481
Dissolved Selenium (Se)	ug/L	50	-	<2.0	2.0	6373481
Dissolved Silicon (Si)	ug/L	-	-	9400	50	6373481
Dissolved Silver (Ag)	ug/L	-	-	<0.10	0.10	6373481
Dissolved Sodium (Na)	ug/L	-	200000	35000	100	6373481
Dissolved Strontium (Sr)	ug/L	-	-	580	1.0	6373481
Dissolved Thallium (Tl)	ug/L	-	-	<0.050	0.050	6373481
Dissolved Titanium (Ti)	ug/L	-	-	<5.0	5.0	6373481
Dissolved Uranium (U)	ug/L	20	-	2.5	0.10	6373481
Dissolved Vanadium (V)	ug/L	-	-	0.64	0.50	6373481
Dissolved Zinc (Zn)	ug/L	-	5000	<5.0	5.0	6373481

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
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BV Labs Job #: B9S0293
Report Date: 2019/10/10

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: SDP

RESULTS OF ANALYSES OF WATER

BV Labs ID				KYV056	KYV057			KYV057		
Sampling Date				2019/10/04 12:05	2019/10/04 11:50			2019/10/04 11:50		
COC Number				740181-01-01	740181-01-01			740181-01-01		
	UNITS	MAC	A/O	DW1	DW2	RDL	QC Batch	DW2 Lab-Dup	RDL	QC Batch
Inorganics										
Colour	TCU	-	5	<2	<2	2	6374077	<2	2	6374077
Fluoride (F-)	mg/L	1.5	-	<0.10	0.13	0.10	6372179			
Tannins & Lignins	mg/L	-	-	<0.2	<0.2	0.2	6374878			
Turbidity	NTU	-	5	<0.1	2.3	0.1	6372176			

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
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Lab-Dup = Laboratory Initiated Duplicate
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
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TEST SUMMARY

BV Labs ID: KYV056
Sample ID: DW1
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6372177	N/A	2019/10/07	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6371867	N/A	2019/10/08	Automated Statchk
Chloride by Automated Colourimetry	KONE	6375670	N/A	2019/10/09	Deonarine Ramnarine
Colour	SPEC	6374077	N/A	2019/10/09	Christine Pham
Conductivity	AT	6372178	N/A	2019/10/07	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6373258	N/A	2019/10/08	Mandeep Kaur
Fluoride	ISE	6372179	2019/10/05	2019/10/07	Surinder Rai
Hardness (calculated as CaCO3)		6371868	N/A	2019/10/10	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6373481	N/A	2019/10/10	Arefa Dabhad
Ion Balance (% Difference)	CALC	6371869	N/A	2019/10/10	Automated Statchk
Anion and Cation Sum	CALC	6371870	N/A	2019/10/10	Automated Statchk
Total Ammonia-N	LACH/NH4	6375987	N/A	2019/10/09	Mazin Wakai
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6372394	N/A	2019/10/08	Chandra Nandlal
pH	AT	6372180	2019/10/05	2019/10/07	Surinder Rai
Orthophosphate	KONE	6375675	N/A	2019/10/09	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	6371871	N/A	2019/10/10	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	6371872	N/A	2019/10/10	Automated Statchk
Sulphate by Automated Colourimetry	KONE	6375673	N/A	2019/10/09	Alina Dobreanu
Tannins & Lignins	SPEC	6374878	N/A	2019/10/08	Viorica Rotaru
Total Dissolved Solids (TDS calc)	CALC	6371866	N/A	2019/10/10	Automated Statchk
Turbidity	AT	6372176	N/A	2019/10/07	Kazzandra Adeva

BV Labs ID: KYV056 Dup
Sample ID: DW1
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6372394	N/A	2019/10/08	Chandra Nandlal

BV Labs ID: KYV057
Sample ID: DW2
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6372177	N/A	2019/10/07	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6371867	N/A	2019/10/08	Automated Statchk
Chloride by Automated Colourimetry	KONE	6375670	N/A	2019/10/09	Deonarine Ramnarine
Colour	SPEC	6374077	N/A	2019/10/09	Christine Pham
Conductivity	AT	6372178	N/A	2019/10/07	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6373258	N/A	2019/10/08	Mandeep Kaur
Fluoride	ISE	6372179	2019/10/05	2019/10/07	Surinder Rai
Hardness (calculated as CaCO3)		6371868	N/A	2019/10/10	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6373481	N/A	2019/10/10	Arefa Dabhad
Ion Balance (% Difference)	CALC	6371869	N/A	2019/10/10	Automated Statchk
Anion and Cation Sum	CALC	6371870	N/A	2019/10/10	Automated Statchk

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BV Labs Job #: B9S0293
Report Date: 2019/10/10

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: SDP

TEST SUMMARY

BV Labs ID: KYV057
Sample ID: DW2
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Ammonia-N	LACH/NH4	6375987	N/A	2019/10/09	Mazin Wakai
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6372394	N/A	2019/10/08	Chandra Nandlal
pH	AT	6372180	2019/10/05	2019/10/07	Surinder Rai
Orthophosphate	KONE	6375675	N/A	2019/10/09	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	6371871	N/A	2019/10/10	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	6371872	N/A	2019/10/10	Automated Statchk
Sulphate by Automated Colourimetry	KONE	6375673	N/A	2019/10/09	Alina Dobreanu
Tannins & Lignins	SPEC	6374878	N/A	2019/10/08	Viorica Rotaru
Total Dissolved Solids (TDS calc)	CALC	6371866	N/A	2019/10/10	Automated Statchk
Turbidity	AT	6372176	N/A	2019/10/07	Kazzandra Adeva

BV Labs ID: KYV057 Dup
Sample ID: DW2
Matrix: Water

Collected: 2019/10/04
Shipped:
Received: 2019/10/05

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Colour	SPEC	6374077	N/A	2019/10/09	Christine Pham

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BV Labs Job #: B9S0293
Report Date: 2019/10/10

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: SDP

GENERAL COMMENTS

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

Package 1	6.7°C
Package 2	7.3°C

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6372176	KAD	Spiked Blank	Turbidity	2019/10/07		100	%	85 - 115
6372176	KAD	Method Blank	Turbidity	2019/10/07	<0.1		NTU	
6372176	KAD	RPD	Turbidity	2019/10/07	4.3		%	20
6372177	SAU	Spiked Blank	Alkalinity (Total as CaCO3)	2019/10/07		97	%	85 - 115
6372177	SAU	Method Blank	Alkalinity (Total as CaCO3)	2019/10/07	<1.0		mg/L	
6372177	SAU	RPD	Alkalinity (Total as CaCO3)	2019/10/07	7.1		%	20
6372178	SAU	Spiked Blank	Conductivity	2019/10/07		102	%	85 - 115
6372178	SAU	Method Blank	Conductivity	2019/10/07	<1.0		umho/cm	
6372178	SAU	RPD	Conductivity	2019/10/07	6.1		%	25
6372179	SAU	Matrix Spike	Fluoride (F-)	2019/10/07		97	%	80 - 120
6372179	SAU	Spiked Blank	Fluoride (F-)	2019/10/07		93	%	80 - 120
6372179	SAU	Method Blank	Fluoride (F-)	2019/10/07	<0.10		mg/L	
6372179	SAU	RPD	Fluoride (F-)	2019/10/07	NC		%	20
6372180	SAU	Spiked Blank	pH	2019/10/07		102	%	98 - 103
6372180	SAU	RPD	pH	2019/10/07	0.77		%	N/A
6372394	C_N	Matrix Spike [KYV056-01]	Nitrite (N)	2019/10/08		104	%	80 - 120
			Nitrate (N)	2019/10/08		95	%	80 - 120
6372394	C_N	Spiked Blank	Nitrite (N)	2019/10/08		107	%	80 - 120
			Nitrate (N)	2019/10/08		95	%	80 - 120
6372394	C_N	Method Blank	Nitrite (N)	2019/10/08	<0.010		mg/L	
			Nitrate (N)	2019/10/08	<0.10		mg/L	
6372394	C_N	RPD [KYV056-01]	Nitrite (N)	2019/10/08	1.6		%	20
			Nitrate (N)	2019/10/08	NC		%	20
6373258	KRM	Matrix Spike	Dissolved Organic Carbon	2019/10/08		93	%	80 - 120
6373258	KRM	Spiked Blank	Dissolved Organic Carbon	2019/10/08		98	%	80 - 120
6373258	KRM	Method Blank	Dissolved Organic Carbon	2019/10/08	<0.50		mg/L	
6373258	KRM	RPD	Dissolved Organic Carbon	2019/10/08	3.5		%	20
6373481	ADA	Matrix Spike	Dissolved Aluminum (Al)	2019/10/10		103	%	80 - 120
			Dissolved Antimony (Sb)	2019/10/10		109	%	80 - 120
			Dissolved Arsenic (As)	2019/10/10		105	%	80 - 120
			Dissolved Barium (Ba)	2019/10/10		106	%	80 - 120
			Dissolved Beryllium (Be)	2019/10/10		98	%	80 - 120
			Dissolved Boron (B)	2019/10/10		98	%	80 - 120
			Dissolved Cadmium (Cd)	2019/10/10		105	%	80 - 120
			Dissolved Calcium (Ca)	2019/10/10		NC	%	80 - 120
			Dissolved Chromium (Cr)	2019/10/10		102	%	80 - 120
			Dissolved Cobalt (Co)	2019/10/10		98	%	80 - 120
			Dissolved Copper (Cu)	2019/10/10		100	%	80 - 120
			Dissolved Iron (Fe)	2019/10/10		101	%	80 - 120
			Dissolved Lead (Pb)	2019/10/10		96	%	80 - 120
			Dissolved Magnesium (Mg)	2019/10/10		99	%	80 - 120
			Dissolved Manganese (Mn)	2019/10/10		102	%	80 - 120
			Dissolved Molybdenum (Mo)	2019/10/10		105	%	80 - 120
			Dissolved Nickel (Ni)	2019/10/10		99	%	80 - 120
			Dissolved Phosphorus (P)	2019/10/10		109	%	80 - 120
			Dissolved Potassium (K)	2019/10/10		107	%	80 - 120
			Dissolved Selenium (Se)	2019/10/10		104	%	80 - 120
			Dissolved Silicon (Si)	2019/10/10		102	%	80 - 120
			Dissolved Silver (Ag)	2019/10/10		100	%	80 - 120
			Dissolved Sodium (Na)	2019/10/10		100	%	80 - 120
			Dissolved Strontium (Sr)	2019/10/10		104	%	80 - 120
			Dissolved Thallium (Tl)	2019/10/10		101	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Titanium (Ti)	2019/10/10		104	%	80 - 120
			Dissolved Uranium (U)	2019/10/10		102	%	80 - 120
			Dissolved Vanadium (V)	2019/10/10		106	%	80 - 120
			Dissolved Zinc (Zn)	2019/10/10		102	%	80 - 120
6373481	ADA	Spiked Blank	Dissolved Aluminum (Al)	2019/10/10		100	%	80 - 120
			Dissolved Antimony (Sb)	2019/10/10		101	%	80 - 120
			Dissolved Arsenic (As)	2019/10/10		101	%	80 - 120
			Dissolved Barium (Ba)	2019/10/10		104	%	80 - 120
			Dissolved Beryllium (Be)	2019/10/10		98	%	80 - 120
			Dissolved Boron (B)	2019/10/10		97	%	80 - 120
			Dissolved Cadmium (Cd)	2019/10/10		101	%	80 - 120
			Dissolved Calcium (Ca)	2019/10/10		99	%	80 - 120
			Dissolved Chromium (Cr)	2019/10/10		98	%	80 - 120
			Dissolved Cobalt (Co)	2019/10/10		97	%	80 - 120
			Dissolved Copper (Cu)	2019/10/10		97	%	80 - 120
			Dissolved Iron (Fe)	2019/10/10		97	%	80 - 120
			Dissolved Lead (Pb)	2019/10/10		95	%	80 - 120
			Dissolved Magnesium (Mg)	2019/10/10		101	%	80 - 120
			Dissolved Manganese (Mn)	2019/10/10		100	%	80 - 120
			Dissolved Molybdenum (Mo)	2019/10/10		99	%	80 - 120
			Dissolved Nickel (Ni)	2019/10/10		96	%	80 - 120
			Dissolved Phosphorus (P)	2019/10/10		117	%	80 - 120
			Dissolved Potassium (K)	2019/10/10		98	%	80 - 120
			Dissolved Selenium (Se)	2019/10/10		99	%	80 - 120
			Dissolved Silicon (Si)	2019/10/10		97	%	80 - 120
			Dissolved Silver (Ag)	2019/10/10		96	%	80 - 120
			Dissolved Sodium (Na)	2019/10/10		98	%	80 - 120
			Dissolved Strontium (Sr)	2019/10/10		100	%	80 - 120
			Dissolved Thallium (Tl)	2019/10/10		98	%	80 - 120
			Dissolved Titanium (Ti)	2019/10/10		99	%	80 - 120
			Dissolved Uranium (U)	2019/10/10		101	%	80 - 120
			Dissolved Vanadium (V)	2019/10/10		101	%	80 - 120
			Dissolved Zinc (Zn)	2019/10/10		98	%	80 - 120
6373481	ADA	Method Blank	Dissolved Aluminum (Al)	2019/10/10	<5.0		ug/L	
			Dissolved Antimony (Sb)	2019/10/10	<0.50		ug/L	
			Dissolved Arsenic (As)	2019/10/10	<1.0		ug/L	
			Dissolved Barium (Ba)	2019/10/10	<2.0		ug/L	
			Dissolved Beryllium (Be)	2019/10/10	<0.50		ug/L	
			Dissolved Boron (B)	2019/10/10	<10		ug/L	
			Dissolved Cadmium (Cd)	2019/10/10	<0.10		ug/L	
			Dissolved Calcium (Ca)	2019/10/10	<200		ug/L	
			Dissolved Chromium (Cr)	2019/10/10	<5.0		ug/L	
			Dissolved Cobalt (Co)	2019/10/10	<0.50		ug/L	
			Dissolved Copper (Cu)	2019/10/10	<1.0		ug/L	
			Dissolved Iron (Fe)	2019/10/10	<100		ug/L	
			Dissolved Lead (Pb)	2019/10/10	<0.50		ug/L	
			Dissolved Magnesium (Mg)	2019/10/10	<50		ug/L	
			Dissolved Manganese (Mn)	2019/10/10	<2.0		ug/L	
			Dissolved Molybdenum (Mo)	2019/10/10	<0.50		ug/L	
			Dissolved Nickel (Ni)	2019/10/10	<1.0		ug/L	
			Dissolved Phosphorus (P)	2019/10/10	<100		ug/L	
			Dissolved Potassium (K)	2019/10/10	<200		ug/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Selenium (Se)	2019/10/10	<2.0		ug/L	
			Dissolved Silicon (Si)	2019/10/10	<50		ug/L	
			Dissolved Silver (Ag)	2019/10/10	<0.10		ug/L	
			Dissolved Sodium (Na)	2019/10/10	<100		ug/L	
			Dissolved Strontium (Sr)	2019/10/10	<1.0		ug/L	
			Dissolved Thallium (Tl)	2019/10/10	<0.050		ug/L	
			Dissolved Titanium (Ti)	2019/10/10	<5.0		ug/L	
			Dissolved Uranium (U)	2019/10/10	<0.10		ug/L	
			Dissolved Vanadium (V)	2019/10/10	<0.50		ug/L	
			Dissolved Zinc (Zn)	2019/10/10	<5.0		ug/L	
6373481	ADA	RPD	Dissolved Antimony (Sb)	2019/10/10	NC		%	20
			Dissolved Arsenic (As)	2019/10/10	NC		%	20
			Dissolved Barium (Ba)	2019/10/10	2.0		%	20
			Dissolved Beryllium (Be)	2019/10/10	NC		%	20
			Dissolved Boron (B)	2019/10/10	1.7		%	20
			Dissolved Cadmium (Cd)	2019/10/10	NC		%	20
			Dissolved Chromium (Cr)	2019/10/10	NC		%	20
			Dissolved Cobalt (Co)	2019/10/10	NC		%	20
			Dissolved Copper (Cu)	2019/10/10	0		%	20
			Dissolved Lead (Pb)	2019/10/10	NC		%	20
			Dissolved Molybdenum (Mo)	2019/10/10	NC		%	20
			Dissolved Nickel (Ni)	2019/10/10	NC		%	20
			Dissolved Selenium (Se)	2019/10/10	2.2		%	20
			Dissolved Silver (Ag)	2019/10/10	NC		%	20
			Dissolved Thallium (Tl)	2019/10/10	NC		%	20
			Dissolved Uranium (U)	2019/10/10	5.0		%	20
			Dissolved Vanadium (V)	2019/10/10	NC		%	20
			Dissolved Zinc (Zn)	2019/10/10	NC		%	20
6374077	CP	Spiked Blank	Colour	2019/10/09		100	%	80 - 120
6374077	CP	Method Blank	Colour	2019/10/09	<2		TCU	
6374077	CP	RPD [KYV057-01]	Colour	2019/10/09	NC		%	25
6374878	VRO	Matrix Spike	Tannins & Lignins	2019/10/08		96	%	80 - 120
6374878	VRO	Spiked Blank	Tannins & Lignins	2019/10/08		96	%	80 - 120
6374878	VRO	Method Blank	Tannins & Lignins	2019/10/08	<0.2		mg/L	
6374878	VRO	RPD	Tannins & Lignins	2019/10/08	NC		%	20
6375670	DRM	Matrix Spike	Dissolved Chloride (Cl-)	2019/10/09		NC	%	80 - 120
6375670	DRM	Spiked Blank	Dissolved Chloride (Cl-)	2019/10/09		104	%	80 - 120
6375670	DRM	Method Blank	Dissolved Chloride (Cl-)	2019/10/09	<1.0		mg/L	
6375670	DRM	RPD	Dissolved Chloride (Cl-)	2019/10/09	7.6		%	20
6375673	ADB	Matrix Spike	Dissolved Sulphate (SO4)	2019/10/09		102	%	75 - 125
6375673	ADB	Spiked Blank	Dissolved Sulphate (SO4)	2019/10/09		99	%	80 - 120
6375673	ADB	Method Blank	Dissolved Sulphate (SO4)	2019/10/09	<1.0		mg/L	
6375673	ADB	RPD	Dissolved Sulphate (SO4)	2019/10/09	NC		%	20
6375675	ADB	Matrix Spike	Orthophosphate (P)	2019/10/09		NC	%	75 - 125
6375675	ADB	Spiked Blank	Orthophosphate (P)	2019/10/09		99	%	80 - 120
6375675	ADB	Method Blank	Orthophosphate (P)	2019/10/09	<0.010		mg/L	
6375675	ADB	RPD	Orthophosphate (P)	2019/10/09	9.9		%	25
6375987	MT4	Matrix Spike	Total Ammonia-N	2019/10/09		100	%	75 - 125
6375987	MT4	Spiked Blank	Total Ammonia-N	2019/10/09		101	%	80 - 120
6375987	MT4	Method Blank	Total Ammonia-N	2019/10/09	<0.050		mg/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6375987	MT4	RPD	Total Ammonia-N	2019/10/09	7.3		%	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.

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).

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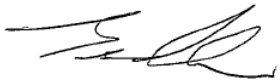
VALIDATION SIGNATURE PAGE

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



Brad Newman, Scientific Service Specialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Exceedence Summary Table – ODWS (2002)

Result Exceedences

Sample ID	BV Labs ID	Parameter	Criteria	Result	DL	Units
No Exceedences						

The exceedence summary table is for information purposes only and should not be considered a comprehensive listing or statement of conformance to applicable regulatory guidelines.

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Your Project #: 1407634
Your C.O.C. #: 740180-03-01

Attention: Jamie Bonany

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

Report Date: 2019/10/16
Report #: R5922779
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9S3543
Received: 2019/10/09, 09:49

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Alkalinity	1	N/A	2019/10/10	CAM SOP-00448	SM 23 2320 B m
Carbonate, Bicarbonate and Hydroxide	1	N/A	2019/10/11	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	1	N/A	2019/10/10	CAM SOP-00463	SM 23 4500-Cl E m
Colour	1	N/A	2019/10/15	CAM SOP-00412	SM 23 2120C m
Conductivity	1	N/A	2019/10/10	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1)	1	N/A	2019/10/10	CAM SOP-00446	SM 23 5310 B m
Fluoride	1	2019/10/09	2019/10/10	CAM SOP-00449	SM 23 4500-F C m
Hardness (calculated as CaCO3)	1	N/A	2019/10/16	CAM SOP 00102/00408/00447	SM 2340 B
Metals Analysis by ICPMS (as received) (2)	1	N/A	2019/10/15	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	1	N/A	2019/10/16		
Anion and Cation Sum	1	N/A	2019/10/16		
Total Ammonia-N	1	N/A	2019/10/10	CAM SOP-00441	USGS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (3)	1	N/A	2019/10/12	CAM SOP-00440	SM 23 4500-NO3I/NO2B
pH	1	2019/10/09	2019/10/10	CAM SOP-00413	SM 4500H+ B m
Orthophosphate	1	N/A	2019/10/10	CAM SOP-00461	EPA 365.1 m
Sat. pH and Langelier Index (@ 20C)	1	N/A	2019/10/16		
Sat. pH and Langelier Index (@ 4C)	1	N/A	2019/10/16		
Sulphate by Automated Colourimetry	1	N/A	2019/10/10	CAM SOP-00464	EPA 375.4 m
Tannins & Lignins	1	N/A	2019/10/11	CAM SOP-00410	SM 23 5550 B m
Total Dissolved Solids (TDS calc)	1	N/A	2019/10/16		
Turbidity	1	N/A	2019/10/09	CAM SOP-00417	SM 23 2130 B m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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

Your Project #: 1407634
Your C.O.C. #: 740180-03-01

Attention: Jamie Bonany

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121 Commerce Park Drive
Unit L
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CANADA L4N 8X1

Report Date: 2019/10/16
Report #: R5922779
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B9S3543
Received: 2019/10/09, 09:49

accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs 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 BV Labs, results relate to the supplied samples tested.

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) Metals analysis was performed on the sample 'as received'.
(3) 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: Ema.Gitej@bvlabs.com
Phone# (905)817-5829
==========
This report has been generated and distributed using a secure automated process.
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BV Labs Job #: B9S3543
Report Date: 2019/10/16

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: JC

RCAP - COMPREHENSIVE (DRINKING WATER)

BV Labs ID				KZN578			KZN578		
Sampling Date				2019/10/08 14:00			2019/10/08 14:00		
COC Number				740180-03-01			740180-03-01		
	UNITS	MAC	A/O	DW3	RDL	QC Batch	DW3 Lab-Dup	RDL	QC Batch
Calculated Parameters									
Anion Sum	me/L	-	-	9.01	N/A	6378061			
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	220	1.0	6378058			
Calculated TDS	mg/L	-	500	490	1.0	6378064			
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	2.6	1.0	6378058			
Cation Sum	me/L	-	-	8.86	N/A	6378061			
Hardness (CaCO3)	mg/L	-	80:100	**190**	1.0	6378041			
Ion Balance (% Difference)	%	-	-	0.820	N/A	6378060			
Langelier Index (@ 20C)	N/A	-	-	0.512		6378062			
Langelier Index (@ 4C)	N/A	-	-	0.264		6378063			
Saturation pH (@ 20C)	N/A	-	-	7.59		6378062			
Saturation pH (@ 4C)	N/A	-	-	7.84		6378063			
Inorganics									
Total Ammonia-N	mg/L	-	-	0.33	0.050	6380190	0.32	0.050	6380190
Conductivity	umho/cm	-	-	970	1.0	6378637			
Dissolved Organic Carbon	mg/L	-	5	0.69	0.50	6379099	0.65	0.50	6379099
Orthophosphate (P)	mg/L	-	-	<0.010	0.010	6379153			
pH	pH	-	6.5:8.5	8.10		6378643			
Dissolved Sulphate (SO4)	mg/L	-	500	1.2	1.0	6379150			
Alkalinity (Total as CaCO3)	mg/L	-	30:500	220	1.0	6378629			
Dissolved Chloride (Cl-)	mg/L	-	250	160	2.0	6379146			
Nitrite (N)	mg/L	1	-	<0.010	0.010	6379116			
Nitrate (N)	mg/L	10	-	<0.10	0.10	6379116			
Metals									
. Aluminum (Al)	ug/L	-	100	<5.0	5.0	6381663			
. Antimony (Sb)	ug/L	6	-	<0.50	0.50	6381663			
. Arsenic (As)	ug/L	10	-	<1.0	1.0	6381663			
. Barium (Ba)	ug/L	1000	-	220	2.0	6381663			

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)
N/A = Not Applicable

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BV Labs Job #: B9S3543
Report Date: 2019/10/16

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: JC

RCAP - COMPREHENSIVE (DRINKING WATER)

BV Labs ID				KZN578			KZN578		
Sampling Date				2019/10/08 14:00			2019/10/08 14:00		
COC Number				740180-03-01			740180-03-01		
	UNITS	MAC	A/O	DW3	RDL	QC Batch	DW3 Lab-Dup	RDL	QC Batch
. Beryllium (Be)	ug/L	-	-	<0.50	0.50	6381663			
. Boron (B)	ug/L	5000	-	730	10	6381663			
. Cadmium (Cd)	ug/L	5	-	<0.10	0.10	6381663			
. Calcium (Ca)	ug/L	-	-	34000	200	6381663			
. Chromium (Cr)	ug/L	50	-	<5.0	5.0	6381663			
. Cobalt (Co)	ug/L	-	-	<0.50	0.50	6381663			
. Copper (Cu)	ug/L	-	1000	23	1.0	6381663			
. Iron (Fe)	ug/L	-	300	<100	100	6381663			
. Lead (Pb)	ug/L	10	-	1.1	0.50	6381663			
. Lithium (Li)	ug/L	-	-	83	5.0	6381663			
. Magnesium (Mg)	ug/L	-	-	25000	50	6381663			
. Manganese (Mn)	ug/L	-	50	3.3	2.0	6381663			
. Molybdenum (Mo)	ug/L	-	-	<0.50	0.50	6381663			
. Nickel (Ni)	ug/L	-	-	<1.0	1.0	6381663			
. Phosphorus (P)	ug/L	-	-	<100	100	6381663			
. Potassium (K)	ug/L	-	-	7100	200	6381663			
. Selenium (Se)	ug/L	50	-	<2.0	2.0	6381663			
. Silicon (Si)	ug/L	-	-	4800	50	6381663			
. Silver (Ag)	ug/L	-	-	<0.10	0.10	6381663			
. Sodium (Na)	ug/L	-	200000	110000	100	6381663			
. Strontium (Sr)	ug/L	-	-	2600	1.0	6381663			
. Thallium (Tl)	ug/L	-	-	<0.050	0.050	6381663			
. Titanium (Ti)	ug/L	-	-	<5.0	5.0	6381663			
. Uranium (U)	ug/L	20	-	<0.10	0.10	6381663			
. Vanadium (V)	ug/L	-	-	<0.50	0.50	6381663			
. Zinc (Zn)	ug/L	-	5000	170	5.0	6381663			

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

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BV Labs Job #: B9S3543
Report Date: 2019/10/16

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: JC

RESULTS OF ANALYSES OF WATER

BV Labs ID				KZN578		
Sampling Date				2019/10/08 14:00		
COC Number				740180-03-01		
	UNITS	MAC	A/O	DW3	RDL	QC Batch
Inorganics						
Colour	TCU	-	5	<2	2	6381332
Fluoride (F-)	mg/L	1.5	-	0.69	0.10	6378625
Tannins & Lignins	mg/L	-	-	<0.2	0.2	6380603
Turbidity	NTU	-	5	0.2	0.1	6378621

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

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BV Labs Job #: B9S3543
Report Date: 2019/10/16

Golder Associates Ltd
Client Project #: 1407634
Sampler Initials: JC

TEST SUMMARY

BV Labs ID: KZN578
Sample ID: DW3
Matrix: Water

Collected: 2019/10/08
Shipped:
Received: 2019/10/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6378629	N/A	2019/10/10	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6378058	N/A	2019/10/11	Automated Statchk
Chloride by Automated Colourimetry	KONE	6379146	N/A	2019/10/10	Deonarine Ramnarine
Colour	SPEC	6381332	N/A	2019/10/15	Christine Pham
Conductivity	AT	6378637	N/A	2019/10/10	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6379099	N/A	2019/10/10	Mandeep Kaur
Fluoride	ISE	6378625	2019/10/09	2019/10/10	Surinder Rai
Hardness (calculated as CaCO3)		6378041	N/A	2019/10/16	Automated Statchk
Metals Analysis by ICPMS (as received)	ICP/MS	6381663	N/A	2019/10/15	Arefa Dabhad
Ion Balance (% Difference)	CALC	6378060	N/A	2019/10/16	Automated Statchk
Anion and Cation Sum	CALC	6378061	N/A	2019/10/16	Automated Statchk
Total Ammonia-N	LACH/NH4	6380190	N/A	2019/10/10	Mazin Wakai
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6379116	N/A	2019/10/12	Amanpreet Sappal
pH	AT	6378643	2019/10/09	2019/10/10	Surinder Rai
Orthophosphate	KONE	6379153	N/A	2019/10/10	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	6378062	N/A	2019/10/16	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	6378063	N/A	2019/10/16	Automated Statchk
Sulphate by Automated Colourimetry	KONE	6379150	N/A	2019/10/10	Alina Dobreanu
Tannins & Lignins	SPEC	6380603	N/A	2019/10/11	Viorica Rotaru
Total Dissolved Solids (TDS calc)	CALC	6378064	N/A	2019/10/16	Automated Statchk
Turbidity	AT	6378621	N/A	2019/10/09	Kazzandra Adeva

BV Labs ID: KZN578 Dup
Sample ID: DW3
Matrix: Water

Collected: 2019/10/08
Shipped:
Received: 2019/10/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6379099	N/A	2019/10/10	Mandeep Kaur
Total Ammonia-N	LACH/NH4	6380190	N/A	2019/10/10	Mazin Wakai

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GENERAL COMMENTS

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

Package 1	1.0°C

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6378621	KAD	Spiked Blank	Turbidity	2019/10/09		97	%	85 - 115
6378621	KAD	Method Blank	Turbidity	2019/10/09	<0.1		NTU	
6378621	KAD	RPD	Turbidity	2019/10/09	NC		%	20
6378625	SAU	Matrix Spike	Fluoride (F-)	2019/10/10		96	%	80 - 120
6378625	SAU	Spiked Blank	Fluoride (F-)	2019/10/10		102	%	80 - 120
6378625	SAU	Method Blank	Fluoride (F-)	2019/10/10	<0.10		mg/L	
6378625	SAU	RPD	Fluoride (F-)	2019/10/10	NC		%	20
6378629	SAU	Spiked Blank	Alkalinity (Total as CaCO3)	2019/10/10		98	%	85 - 115
6378629	SAU	Method Blank	Alkalinity (Total as CaCO3)	2019/10/10	<1.0		mg/L	
6378629	SAU	RPD	Alkalinity (Total as CaCO3)	2019/10/10	20		%	20
6378637	SAU	Spiked Blank	Conductivity	2019/10/10		101	%	85 - 115
6378637	SAU	Method Blank	Conductivity	2019/10/10	<1.0		umho/cm	
6378637	SAU	RPD	Conductivity	2019/10/10	0.53		%	25
6378643	SAU	Spiked Blank	pH	2019/10/10		102	%	98 - 103
6378643	SAU	RPD	pH	2019/10/10	0.86		%	N/A
6379099	KRM	Matrix Spike [KZN578-03]	Dissolved Organic Carbon	2019/10/10		92	%	80 - 120
6379099	KRM	Spiked Blank	Dissolved Organic Carbon	2019/10/10		94	%	80 - 120
6379099	KRM	Method Blank	Dissolved Organic Carbon	2019/10/10	<0.50		mg/L	
6379099	KRM	RPD [KZN578-03]	Dissolved Organic Carbon	2019/10/10	5.6		%	20
6379116	ASP	Matrix Spike	Nitrite (N)	2019/10/12		NC	%	80 - 120
			Nitrate (N)	2019/10/12		NC	%	80 - 120
6379116	ASP	Spiked Blank	Nitrite (N)	2019/10/12		103	%	80 - 120
			Nitrate (N)	2019/10/12		99	%	80 - 120
6379116	ASP	Method Blank	Nitrite (N)	2019/10/12	<0.010		mg/L	
			Nitrate (N)	2019/10/12	<0.10		mg/L	
6379116	ASP	RPD	Nitrite (N)	2019/10/12	0.16		%	20
			Nitrate (N)	2019/10/12	1.1		%	20
6379146	DRM	Matrix Spike	Dissolved Chloride (Cl-)	2019/10/10		NC	%	80 - 120
6379146	DRM	Spiked Blank	Dissolved Chloride (Cl-)	2019/10/10		102	%	80 - 120
6379146	DRM	Method Blank	Dissolved Chloride (Cl-)	2019/10/10	<1.0		mg/L	
6379146	DRM	RPD	Dissolved Chloride (Cl-)	2019/10/10	0.19		%	20
6379150	ADB	Matrix Spike	Dissolved Sulphate (SO4)	2019/10/10		145 (1)	%	75 - 125
6379150	ADB	Spiked Blank	Dissolved Sulphate (SO4)	2019/10/10		105	%	80 - 120
6379150	ADB	Method Blank	Dissolved Sulphate (SO4)	2019/10/10	<1.0		mg/L	
6379150	ADB	RPD	Dissolved Sulphate (SO4)	2019/10/10	1.3		%	20
6379153	ADB	Matrix Spike	Orthophosphate (P)	2019/10/10		102	%	75 - 125
6379153	ADB	Spiked Blank	Orthophosphate (P)	2019/10/10		99	%	80 - 120
6379153	ADB	Method Blank	Orthophosphate (P)	2019/10/10	<0.010		mg/L	
6379153	ADB	RPD	Orthophosphate (P)	2019/10/10	NC		%	25
6380190	MT4	Matrix Spike [KZN578-05]	Total Ammonia-N	2019/10/10		97	%	75 - 125
6380190	MT4	Spiked Blank	Total Ammonia-N	2019/10/10		99	%	80 - 120
6380190	MT4	Method Blank	Total Ammonia-N	2019/10/10	<0.050		mg/L	
6380190	MT4	RPD [KZN578-05]	Total Ammonia-N	2019/10/10	5.5		%	20
6380603	VRO	Matrix Spike	Tannins & Lignins	2019/10/11		101	%	80 - 120
6380603	VRO	Spiked Blank	Tannins & Lignins	2019/10/11		100	%	80 - 120
6380603	VRO	Method Blank	Tannins & Lignins	2019/10/11	<0.2		mg/L	
6380603	VRO	RPD	Tannins & Lignins	2019/10/11	NC		%	20
6381332	CP	Spiked Blank	Colour	2019/10/15		102	%	80 - 120
6381332	CP	Method Blank	Colour	2019/10/15	<2		TCU	
6381332	CP	RPD	Colour	2019/10/15	NC		%	25
6381663	ADA	Matrix Spike	. Aluminum (Al)	2019/10/15		104	%	80 - 120
			. Antimony (Sb)	2019/10/15		104	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			. Arsenic (As)	2019/10/15		101	%	80 - 120
			. Barium (Ba)	2019/10/15		103	%	80 - 120
			. Beryllium (Be)	2019/10/15		92	%	80 - 120
			. Boron (B)	2019/10/15		91	%	80 - 120
			. Cadmium (Cd)	2019/10/15		102	%	80 - 120
			. Calcium (Ca)	2019/10/15		NC	%	80 - 120
			. Chromium (Cr)	2019/10/15		96	%	80 - 120
			. Cobalt (Co)	2019/10/15		94	%	80 - 120
			. Copper (Cu)	2019/10/15		99	%	80 - 120
			. Iron (Fe)	2019/10/15		97	%	80 - 120
			. Lead (Pb)	2019/10/15		94	%	80 - 120
			. Lithium (Li)	2019/10/15		105	%	80 - 120
			. Magnesium (Mg)	2019/10/15		104	%	80 - 120
			. Manganese (Mn)	2019/10/15		98	%	80 - 120
			. Molybdenum (Mo)	2019/10/15		101	%	80 - 120
			. Nickel (Ni)	2019/10/15		96	%	80 - 120
			. Phosphorus (P)	2019/10/15		NC	%	80 - 120
			. Potassium (K)	2019/10/15		105	%	80 - 120
			. Selenium (Se)	2019/10/15		101	%	80 - 120
			. Silicon (Si)	2019/10/15		99	%	80 - 120
			. Silver (Ag)	2019/10/15		95	%	80 - 120
			. Sodium (Na)	2019/10/15		104	%	80 - 120
			. Strontium (Sr)	2019/10/15		98	%	80 - 120
			. Thallium (Tl)	2019/10/15		99	%	80 - 120
			. Titanium (Ti)	2019/10/15		103	%	80 - 120
			. Uranium (U)	2019/10/15		98	%	80 - 120
			. Vanadium (V)	2019/10/15		100	%	80 - 120
			. Zinc (Zn)	2019/10/15		97	%	80 - 120
6381663	ADA	Spiked Blank	. Aluminum (Al)	2019/10/15		100	%	80 - 120
			. Antimony (Sb)	2019/10/15		97	%	80 - 120
			. Arsenic (As)	2019/10/15		96	%	80 - 120
			. Barium (Ba)	2019/10/15		99	%	80 - 120
			. Beryllium (Be)	2019/10/15		90	%	80 - 120
			. Boron (B)	2019/10/15		88	%	80 - 120
			. Cadmium (Cd)	2019/10/15		95	%	80 - 120
			. Calcium (Ca)	2019/10/15		100	%	80 - 120
			. Chromium (Cr)	2019/10/15		94	%	80 - 120
			. Cobalt (Co)	2019/10/15		90	%	80 - 120
			. Copper (Cu)	2019/10/15		95	%	80 - 120
			. Iron (Fe)	2019/10/15		94	%	80 - 120
			. Lead (Pb)	2019/10/15		91	%	80 - 120
			. Lithium (Li)	2019/10/15		103	%	80 - 120
			. Magnesium (Mg)	2019/10/15		100	%	80 - 120
			. Manganese (Mn)	2019/10/15		94	%	80 - 120
			. Molybdenum (Mo)	2019/10/15		97	%	80 - 120
			. Nickel (Ni)	2019/10/15		92	%	80 - 120
			. Phosphorus (P)	2019/10/15		116	%	80 - 120
			. Potassium (K)	2019/10/15		99	%	80 - 120
			. Selenium (Se)	2019/10/15		96	%	80 - 120
			. Silicon (Si)	2019/10/15		94	%	80 - 120
			. Silver (Ag)	2019/10/15		91	%	80 - 120
			. Sodium (Na)	2019/10/15		97	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			. Strontium (Sr)	2019/10/15		95	%	80 - 120
			. Thallium (Tl)	2019/10/15		93	%	80 - 120
			. Titanium (Ti)	2019/10/15		95	%	80 - 120
			. Uranium (U)	2019/10/15		93	%	80 - 120
			. Vanadium (V)	2019/10/15		95	%	80 - 120
			. Zinc (Zn)	2019/10/15		93	%	80 - 120
6381663	ADA	Method Blank	. Aluminum (Al)	2019/10/15	<5.0		ug/L	
			. Antimony (Sb)	2019/10/15	<0.50		ug/L	
			. Arsenic (As)	2019/10/15	<1.0		ug/L	
			. Barium (Ba)	2019/10/15	<2.0		ug/L	
			. Beryllium (Be)	2019/10/15	<0.50		ug/L	
			. Boron (B)	2019/10/15	<10		ug/L	
			. Cadmium (Cd)	2019/10/15	<0.10		ug/L	
			. Calcium (Ca)	2019/10/15	<200		ug/L	
			. Chromium (Cr)	2019/10/15	<5.0		ug/L	
			. Cobalt (Co)	2019/10/15	<0.50		ug/L	
			. Copper (Cu)	2019/10/15	<1.0		ug/L	
			. Iron (Fe)	2019/10/15	<100		ug/L	
			. Lead (Pb)	2019/10/15	<0.50		ug/L	
			. Lithium (Li)	2019/10/15	<5.0		ug/L	
			. Magnesium (Mg)	2019/10/15	<50		ug/L	
			. Manganese (Mn)	2019/10/15	<2.0		ug/L	
			. Molybdenum (Mo)	2019/10/15	<0.50		ug/L	
			. Nickel (Ni)	2019/10/15	<1.0		ug/L	
			. Phosphorus (P)	2019/10/15	<100		ug/L	
			. Potassium (K)	2019/10/15	<200		ug/L	
			. Selenium (Se)	2019/10/15	<2.0		ug/L	
			. Silicon (Si)	2019/10/15	<50		ug/L	
			. Silver (Ag)	2019/10/15	<0.10		ug/L	
			. Sodium (Na)	2019/10/15	<100		ug/L	
			. Strontium (Sr)	2019/10/15	<1.0		ug/L	
			. Thallium (Tl)	2019/10/15	<0.050		ug/L	
			. Titanium (Ti)	2019/10/15	<5.0		ug/L	
			. Uranium (U)	2019/10/15	<0.10		ug/L	
			. Vanadium (V)	2019/10/15	<0.50		ug/L	
			. Zinc (Zn)	2019/10/15	<5.0		ug/L	
6381663	ADA	RPD	. Aluminum (Al)	2019/10/15	1.4		%	20
			. Antimony (Sb)	2019/10/15	NC		%	20
			. Arsenic (As)	2019/10/15	NC		%	20
			. Barium (Ba)	2019/10/15	0.029		%	20
			. Beryllium (Be)	2019/10/15	NC		%	20
			. Boron (B)	2019/10/15	4.5		%	20
			. Cadmium (Cd)	2019/10/15	NC		%	20
			. Calcium (Ca)	2019/10/15	0.86		%	20
			. Chromium (Cr)	2019/10/15	NC		%	20
			. Cobalt (Co)	2019/10/15	NC		%	20
			. Copper (Cu)	2019/10/15	0.72		%	20
			. Iron (Fe)	2019/10/15	NC		%	20
			. Lead (Pb)	2019/10/15	2.5		%	20
			. Lithium (Li)	2019/10/15	NC		%	20
			. Magnesium (Mg)	2019/10/15	0.25		%	20
			. Manganese (Mn)	2019/10/15	NC		%	20

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			. Molybdenum (Mo)	2019/10/15	4.8		%	20
			. Nickel (Ni)	2019/10/15	NC		%	20
			. Phosphorus (P)	2019/10/15	2.1		%	20
			. Potassium (K)	2019/10/15	2.3		%	20
			. Selenium (Se)	2019/10/15	NC		%	20
			. Silicon (Si)	2019/10/15	1.5		%	20
			. Silver (Ag)	2019/10/15	NC		%	20
			. Sodium (Na)	2019/10/15	0.61		%	20
			. Strontium (Sr)	2019/10/15	0.83		%	20
			. Thallium (Tl)	2019/10/15	NC		%	20
			. Titanium (Ti)	2019/10/15	NC		%	20
			. Uranium (U)	2019/10/15	3.3		%	20
			. Vanadium (V)	2019/10/15	NC		%	20
			. Zinc (Zn)	2019/10/15	1.1		%	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.

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

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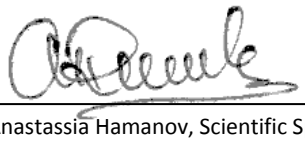
VALIDATION SIGNATURE PAGE

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



Anastassia Hamanov, Scientific Specialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Exceedence Summary Table – ODWS (2002)

Result Exceedences

Sample ID	BV Labs ID	Parameter	Criteria	Result	DL	Units
No Exceedences						

The exceedence summary table is for information purposes only and should not be considered a comprehensive listing or statement of conformance to applicable regulatory guidelines.

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