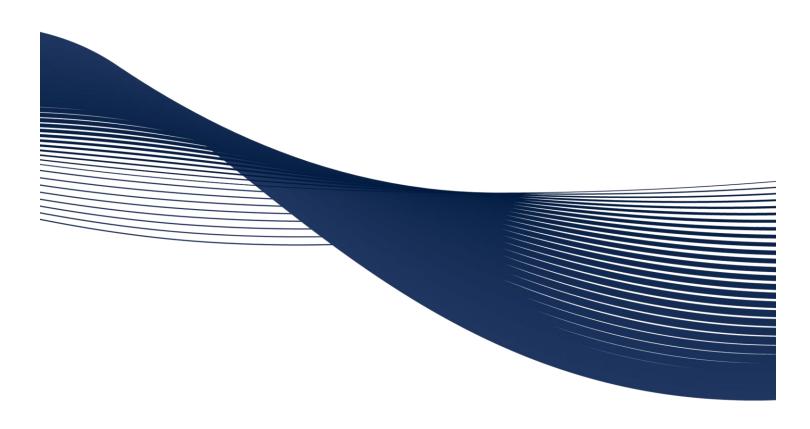
# MANORS OF BELFOUNTAIN CORP

# HYDROGEOLOGICAL INVESTIGATION REPORT

Manors of Belfountain, Caledon, ON

COLE Reference No. 2017-0646





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February 13, 2018 Reference No. 2017-0646

Manors of Belfountain Corp 55 Blue Willow Drive Woodbridge, ON L4L 9EB

Attention: John Spina

Re: Manors of Belfountain, Caledon, ON Hydrogeological Investigation Report

Dear Mr. Spina,

Cole Engineering Group Ltd. (COLE) is pleased to submit the enclosed hydrogeological investigation report for the development Lot 9, Concession 5 in Caledon, ON. The investigation includes a review of existing hydrogeological information for the study area, characterization of the geological and hydrogeological setting, an assessment of potential impacts due to development, and potential mitigation measures. The findings of our study are summarized in the following report.

Should you have any questions or comments, please do not hesitate to contact the undersigned.

Best Regards,

**COLE ENGINEERING GROUP LTD.** 

Steve Davies, M.Sc., P.Geo. Senior Hydrogeologist

/th/cc



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# **Issues and Revisions Registry**

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# **Table of Contents**

Transmittal Letter Table of Contents

Exec	cutive S	Summary	i
1	Intro	oduction	1
	1.1	Project Description	1
	1.2	Objectives	1
	1.3	Applicable Regulations and Agencies	1
2	Regi	ional Geological and Hydrogeological Understanding	4
	2.1	Topography and Drainage	4
	2.2	Physiography	4
	2.3	Regional Geology and Hydrogeology	
		2.3.1 Groundwater Takings	
	2.4	Source Protection Plan Considerations	9
3	Natu	ural Heritage	9
	3.1	Water Courses	9
	3.2	Wetlands	9
4	Site	Investigations	10
	4.1	Previous Investigations	
		4.1.1 Terraprobe	
		4.1.2 W.B. Beatty & Associates	11
		4.1.3 R.J. Burnside	
	4.0	4.1.4 Geotechnical Investigations	
	4.2	COLE Investigations	
5	Loca	l Geological and Hydrogeological Conditions	
	5.1	Topography and Physiography	13
	5.2	Geology	13
		5.2.1 Overburden Geology	
	<b>5</b> 2	5.2.2 Bedrock Geology	
	5.3	Hydraulic Conductivity	
	5.4	Infiltration Rates	
	5.5	Groundwater Levels	
	5.6	Groundwater Flow and Hydraulic Gradients	
	5.7	Groundwater Quality	
	5.8	Groundwater – Surface Water Interactions	
		5.8.1 Water Courses	
	5.9	MOECC Well Records	
_			
6	•	act Assessment	
	6.1	Water Balance	15

	6.1.1 Background	d	15
	6.1.2 Methodolo	gy	16
		Balance	
c <b>2</b>		nce Analysis Results	
6.2	•		
		S	
		Iding Resultsher Nitrate Concentrations	
6.3	_	ner muate concentrations	
0.5		ply Analysis	
		, in any sis	
		nfluence	
	6.3.4 Radius of C	Contribution	22
7 Rec	ptors and Impacts.		23
7.1	Surrounding Grou	ndwater Users	23
7.2	Natural Features .		24
	7.2.1 On-Site We	etland Features	24
	7.2.2 Off-Site We	etland Features	24
		sed Water Balance	
		rses	
		ires	
	-		
9 Rec	mmendations		27
10 Refe	rences		28
LIST OF TA	BLES		
Table 2.1	Orangeville Gro	oundwater Takings (Town of Orangeville, 2016)	7
Table 2.2	_	water Takings (Town of Orangeville, 2017)	
Table 2.3		iter Takings (Town of Erin, 2017)	
Table 2.4		undwater Takings (Town of Erin, 2017)	
Table 2.5	-	e Groundwater Takings (Regional Municipality of Peel, 2015)	
Table 2.6	Alton Groundw	vater Takings (Regional Municipality of Peel, 2015)	8
Table 4.1		ell Details	
Table 5.1	Summary of Ge	eologic Units at the Site	13
Table 5.2	Estimated Tran	nsmissivity and Hydraulic Conductivity	15
Table 5.3	Infiltration Test	t Results	15
Table 5.4	Groundwater L	evel Measurements (October 2017)	16
Table 5.5		water Quality Results from March 10, 2017	
Table 5.6	Select Groundy	water Quality Results from March 10, 2017 Continued	18
Table 5.7		trations on Site	
Table 5.8	Summary of M	OECC Well Records within a 500 m Radius Around the Site	15
Table 6.1	Summary of In	filtration Factors and Soil Moisture Capacity	17
Table 6.2		er Balance Analysis for 1981 to 2010	
Table 6.3		Results and Estimated Long Term Drawdown	
Table 7.1	Distance from	Receptors to Closest on-Site Supply Well	24

# **LIST OF FIGURES**

Site Location
Regional Topography
Physiography
Overburden Geology
Bedrock Geology
Boreholes, Wells, and Other Monitoring Locations
Cross-Section Plan
Cross-Section A
Cross-Section B
Depth to Groundwater
Groundwater Elevation Contours
Average 2017 Nitrate Concentrations
MOECC Wells
Line of Higher Nitrate Concentrations

# **APPENDICES**

Appendix A	Draft Plan of Subdivision
Appendix B	Borehole Logs
Appendix C	Drawdown-time Curves
Appendix D	Infiltration Data
Appendix E	Hydrographs
Appendix F	Groundwater Quality
Appendix G	Certificates of Analysis
Appendix H	MOECC Well Records Search
Appendix I	Water Balance Analysis
Appendix J	Pumping Test Data
Appendix K	Long-term Drawdown Analysis
Appendix L	Radius of Influence Analysis
Appendix M	Typical Water and Wastewater Treatment Systems

# **Executive Summary**

Cole Engineering Group Ltd. (COLE) was retained by Manors of Belfountain Corporation (Manors of Belfountain) to undertake a hydrogeological study at part of Lot 9, Concession 5 in Caledon, ON (the "Site"). The Site is approximately 70.28 hectares (ha) in area and is currently used for agricultural purposes. It is generally bounded by Bush Street to the north, Shaws Creek Road to the west, Mississauga Road to the east, and vacant lands to the south. The Belfountain Public School and several existing residential properties are located northwest of the Site. The Site is located within the jurisdiction of the Credit Valley Conservation Authority and partially within a regulated area. Based on the Draft Plan of Subdivision 21T-91015C dated December 5, 2017, prepared by Glen Schnarr & Associates Inc., the development will include 67 rural estate lots with an average lot size of 0.63 ha. Water supply will be provided by private wells and waste water servicing will be provided by individual septic systems with tertiary (Level IV) treatment. The stormwater management plan for the Site will rely on retention and infiltration to closely match existing conditions.

Previous Site investigations date back to 1988 and include work done by Terraprobe, W.B. Beatty & Associates Limited, and R.J. Burnside. These investigations include drilling of monitoring wells, pumping tests, a water supply and wastewater servicing review, groundwater level monitoring and sampling, infiltration tests, and a well survey of nearby properties. Since October 2017, COLE conducted a hydrogeological investigation consisting of groundwater level measurements, groundwater sampling, water balance analysis, nitrate loading assessment, and the assessment of water taking rates and analysis of pumping tests.

The Site is located within the West Credit River Subwatershed and is considered to be within the Horseshoe Moraine physiographic region due to the sand content and hummocky nature of the topography. Geology at the Site consists of approximately 10 meters (m) to 20 m of sandy overburden overlying the Guelph / Amabel dolostone aquifer, which overlies the Cabot Head shale aquitard. Hydraulic conductivity estimates of the dolostone bedrock aquifer range from  $4.7 \times 10^{-6}$  m/s to  $2.9 \times 10^{-4}$  m/s with an average of  $3.6 \times 10^{-5}$  m/s. Based on testing completed at the Site by R.J. Burnside, infiltration rates for the overburden range from 29 mm/hr to 420 mm/hr with an average of approximately 152 mm/hr.

Water levels measured in October 2017 indicate that groundwater across the Site is typically 10 to 20 m below ground surface (mbgs) with the exception of the on-Site wetland features (SWT3-2 and MAS3-1) where groundwater is typically between 0 to 1 mbgs. Seasonal groundwater fluctuations across the Site are typically not greater than 3 m, with decreasing water levels in the summer and fall months. In general, groundwater elevations are higher in the south and groundwater movement is approximately south to north across the Site.

Groundwater discharge is expected to occur at the West Credit River and the off-Site wetland features (SWM1-1 and MAM3-1). However, no on-Site water courses or wetland features (SWT3-2 and MAS3-1) were interpreted to receive groundwater discharge.

A pre-development Site water balance analysis was completed and results indicate that infiltration comprises approximately 32% of the total precipitation across the Site, runoff comprises approximately 9% of total precipitation, and evapotranspiration comprises more than half (59%) of total precipitation. The water balance analysis shows a significant amount of infiltration, which is to be expected due to the closed depressions within the hummocky topography and sandy overburden materials. It is understood that infiltration measures will be utilized to maintain pre-development infiltration on-Site in post-development conditions, with essentially no runoff leaving the Site up to the 100 year storm capacity.

Groundwater quality analysis was conducted at twelve (12) on-Site wells and results indicate no exceedances of health-related Ontario Drinking Water Standards (ODWS), while there were some exceedances in total hardness, total dissolved solids, sulphate, turbidity, and iron. These parameters, with the exception of hardness, are considered aesthetic parameters that affect the taste, odour or colour of water but do not directly affect the safety of the water supply. Water hardness at the Site and aesthetic parameters can be controlled with water treatment systems for each property.

Nitrate concentrations in groundwater at the Site meet the ODWS of 10 mg/L. Nitrate concentrations generally increase from south to north across the Site, with the existing nitrate concentrations likely due to agricultural activities both on and off-Site. Development of the Site will result in a reduction of the agricultural areas suspected of contributing to the on-Site nitrate concentrations by approximately 67%. Thus, development of the Site is expected to lead to a long-term decrease in nitrate concentrations.

A nitrate loading analysis was completed in compliance with MOECC Procedure D-5-4 in order to evaluate the potential impact of the individual on-Site septic systems. Results indicate that a nitrate loading concentration of approximately 2.17 mg/L is expected at the Site boundary. This concentration is lower than the CCME guideline for NO<sub>3</sub>-as-N of 3 mg/L for protection of sensitive surface water habitat, which has also been adopted by CVC. As on-Site wetland features (SWT3-2 and MAS3-1) are essentially at the Site boundary, and any groundwater seepage locations appear to be beyond the Site boundary, the CCME / CVC guideline is therefore met at all downgradient natural features that may receive even minimal groundwater discharge.

Although existing on-Site nitrate concentrations in groundwater are consistently below the ODWS, as a precautionary approach it is recommended that supply wells should not be installed in the northernmost portion of the Site where the highest on-Site nitrate concentration were identified. It is therefore recommended that supply wells not be placed north of an identified line of higher nitrate concentrations (i.e., > 7 mg/L) and that any wells be located a minimum of 7 m south (upgradient) of this line, based on a zone of contribution analysis. Review of the Draft Plan for the Site confirms that there is sufficient room to locate supply wells on every lot in compliance with this recommendation.

Pumping tests to assess the supply of groundwater available at the Site were completed at the Site by R.J. Burnside and are considered to demonstrate water supply compliance with MOECC Procedure D-5-5. Water supply analysis based on the pumping test results indicate that all tested wells can sustainably support continuous pumping at the expected average pumping rate of 1.56 L/min/house for a duration of 50 years. In addition, a more conservative analysis indicates that most tested wells can sustainably support continuous pumping at the peak pumping rate of 18.75 L/min/house for a duration of 50 years. The total water takings expected at the Site, based on an average pumping rate of 1.56 L/min/house and 67 houses, is 150,750 L/day, which is a small portion of the estimated recharge across the Site (549,474 L/day).

Based on the estimated long term average pumping rate of 1.56 L/min/house and the effect of recharge on groundwater quantity, the expected radius of influence for each well is estimated to be approximately 30 m (or 0.27 ha in area). As the average lot size is approximately 0.63 ha in area, minimal supply interference is expected between lots.

On-Site wells be placed a minimum of 30 m apart. Since the radius of influence of each well is expected to be 30 m, if wells are placed 30 m apart minor superposition of drawdown may occur where the radii intersect. The maximum superposition of drawdown is expected to occur at the midpoint between wells (15 m). However, interference between supply wells spaced 30 m apart will be negligible.

Potential long-term impacts to the closest groundwater users are expected to be minimal as nitrate loading at the Site boundary is low, the radius of influence of individual supply wells is not expected to

extend beyond the Site, and total water takings are small compared to total input of horizontal groundwater flux and recharge at the Site.

Potential long-term impacts to natural features are also expected to be minimal as on-Site features do not rely on groundwater contributions. For off-Site features that do rely on groundwater contributions, impacts are also expected to be minimal as total nitrate loadings at the property boundary are expected to be lower than the CCME and CVC guideline for NO<sub>3</sub>-as-N of 3 mg/L, infiltration is expected to be maintained post-development, and total groundwater taking on-Site are small. Therefore, feature based water balance analysis for on-Site and off-Site wetland features is not recommended.

Based on the results of the various groundwater investigations completed at the Site and the review of groundwater receptors and potential impacts from development of the Site from changes to groundwater quality and quantity, there does not appear to be a significant potential for impacts to groundwater users or natural features from the proposed development of the Site. This assessment assumes that mitigation measures, such as maintain infiltration and implementation of tertiary (Level IV) septic systems will be implemented across the proposed development.

# 1 Introduction

Cole Engineering Group Ltd. (COLE) was retained by Manors of Belfountain Corporation (Manors of Belfountain) to undertake a hydrogeological study at part of Lot 9, Concession 5 in Caledon, ON (the "Site"). The Site is located near the intersection of Bush Street and Mississauga Road in Caledon, Ontario. The location of the Site is shown on **Figure 1**.

# 1.1 Project Description

The Site is approximately 70.28 hectares (ha) in area and is currently used for agricultural purposes. It is approximately bounded by Bush Street to the north, Shaws Creek Road to the west, Mississauga Road to the east, and vacant lands to the south. Belfountain Public School and several existing residential properties are located northwest of the Site. The Site is located within the jurisdiction of the Credit Valley Conservation (CVC) and partially within a regulated area. Based on the Draft Plan of Subdivision 21T-91015C dated December 5, 2017, prepared by Glen Schnarr & Associates Inc., the proposed development will include 67 rural estate lots with an average lot size of 0.63 ha. Water supply will be provided by private wells and waste water servicing will be provided by individual septic systems with tertiary (Level IV) treatment. The stormwater management plan for the Site will rely on retention and infiltration to closely match existing conditions. Site servicing is described in detail in the functional servicing report prepared by COLE and submitted under separate cover.

The Draft Plan of Subdivision is included as **Appendix A**.

# 1.2 Objectives

The objectives of this hydrogeological investigation are:

- Characterize the existing geological and hydrogeological setting;
- Identify environmentally sensitive features and groundwater receptors on or near the Site;
- Estimate the water balance parameters for the Site, particularly groundwater recharge;
- Estimate the potential water supply demand for the development and assess the results of pumping tests completed at on-Site test wells;
- Review groundwater quality results for the Site and compare to Ontario Drinking Water Quality Standards;
- Estimate the potential nitrate loading to the groundwater system from the private septic systems;
- Assess the potential impacts to the natural environment and other groundwater users as a result of the development, including the planned private wells and septic systems; and
- Provide recommendations on management and mitigation measures.

# 1.3 Applicable Regulations and Agencies

Environmental regulations and policies that may be relevant for this hydrogeological investigation are briefly discussed below.

## **Provincial Policy Statement (2014)**

The Provincial Policy Statement provides direction to regional and local municipalities regarding planning policies for the protection and management of natural heritage features and water resources. According to the Provincial Policy Statement, development and Site alteration shall not be permitted in:

- Significant habitat of endangered species or threatened species;
- Significant wetlands within specific Ecoregions (as per schedule in the Provincial Policy Statement);
- Significant coastal wetlands (as per schedule in the Provincial Policy Statement);
- Significant woodlands and valleylands within specific Ecoregions (as per schedule in the Provincial Policy Statement);
- Significant areas of natural and scientific interest;
- Within or near sensitive surface water and sensitive groundwater features; and
- Fish habitat except in accordance with provincial and federal requirements.

Similarly, for lands adjacent to the natural heritage features as defined above, it needs to be demonstrated that the development will not result in negative impacts on natural features or ecological functions. Typically, significant natural features are identified through an Environmental Impact Study (EIS) and significant wetlands are identified by the Ministry of Natural Resources and Forestry (MNRF). Endangered or threatened species habitat is identified through ecological studies, such as an EIS, and regulated by the MNRF. Fish habitat is under the jurisdiction of Fisheries and Oceans Canada (DFO) with support from Conservation Authorities. Identification and regulation of woodlands, valleylands, Areas of Natural and Scientific Interest (ANSI), and wildlife habitats are typically the responsibility of the municipality or other planning authority.

Restrictions to development and alterations should be implemented to protect all municipal drinking water supplies and designated vulnerable areas. Development and alterations are to be restricted in or near sensitive surface water features and sensitive groundwater features such that their hydrologic function will be protected, restored, or improved.

## Niagara Escarpment Plan (2017)

The Niagara Escarpment Plan (NEP), last amended in 2017, seeks to protect the geologic feature of the Niagara Escarpment and lands within the vicinity by allowing only developments compatible with the natural environment. The objectives of the NEP are:

- To protect unique ecologic and historic areas;
- To maintain and enhance the quality and character of natural streams and water supplies;
- To provide adequate opportunities for outdoor recreation;
- To maintain and enhance the open landscape character of the Niagara Escarpment in so far as
  possible, by such means as compatible farming or forestry and by preserving the natural
  scenery:
- To ensure that all new development is compatible with the purpose of the Plan;
- To provide for adequate public access to the Niagara Escarpment; and
- To support municipalities within the Niagara Escarpment Plan Area in their exercise of the planning functions conferred upon them by the Planning Act.

Based on the NEP, the Site is located within the Minor Urban centre of Belfountain and is designated "Escarpment Rural Area", "Escarpment Protection Area" and "Escarpment Natural Area".

## Region of Peel Official Plan (2016)

The Region of Peel Official Plan is a public document that outlines the long-term policy framework for decision making related to protection of the environment, management of resources, directing growth and sets the basis for providing Regional services. The Region of Peel recognizes the importance of preserving and protecting natural environment and ecosystems. The Site is within the Region's "Rural System" and the northeastern portion is within the Core Areas of the Greenlands System.

## **Town of Caledon Official Plan (2016)**

The Town of Caledon Official Plan is a document that outlines the principles, goals, objectives, and policies intended to guide future land use, physical development, effects on the social, economic, and natural environment within the Town of Caledon. It was initially adopted in 1979 but has been consolidated in 2016. According to the Town of Caledon Official Plan, the Site is situated within the settlement area (Hamlet) of Belfountain.

## Permit to Take Water – Section 34 of the Ontario Water Resources Act (1990)

Based on recent regulatory changes, a Permit to Take Water (PTTW) is required under Section 34 of the Ontario Water Resources Act (OWRA) for water takings greater than 50,000 L/day, and for construction water takings greater than 400,000 L/day. Construction water takings between 50,000 L/day and 400,000 L/day require registration on the Environmental Activity and Sector Registry (EASR). Water taking permit applications are not anticipated for either construction dewatering or for water supply purposes.

# Credit Valley Conservation Authority (O.Reg. 160/06)

Under Section 28 of the Conservation Authorities Act, the local Conservation Authorities are mandated to protect the health and integrity of the regional greenspace system and to maintain or improve the hydrological and ecological functions performed by valley and stream corridors. CVC, through its regulatory mandate, is responsible for issuing permits under O.Reg. 160/06, Development, Interference with Wetlands and Alterations to Shorelines and Watercourses for development applications or Site alteration works within regulated areas.

## The Endangered Species Act – Ministry of Natural Resources and Forestry

The MNRF has jurisdiction to administer the Endangered Species Act (2007) to protect species at risk (SAR) and their habitat. Where works may occur in or near a protected habitat, SAR are on or near the Site, and/or the works may harm / harass the species or damage / destroy the protected habitat, a confirmation of notice of activity, a permit or a Letter of Authorization or Advice will be required.

## The Clean Water Act, 2006 – Ontario Ministry of the Environment and Climate Change

The Ministry of the Environment and Climate Change (MOECC) mandates the protection of existing and future sources of drinking water under the Clean Water Act, 2006 (CWA). Initiatives under the CWA include the delineation of Wellhead Protection Areas (WHPAs), significant groundwater recharge areas (SGRAs) and Highly Vulnerable Aquifers (HVAs) as well as the assessment of drinking water quality and quantity threats within Source Protection Regions. Source Protection Plans are developed under the CWA and include the restriction and prohibition of certain types of activities and land uses within WHPAs. Based on mapping completed by the CVC, the Site appears to border a WHPA-E of Peel Region's Inglewood Well 2.

# 2 Regional Geological and Hydrogeological Understanding

A conceptual understanding of the geological and hydrogeological system was developed through review of existing reports and available geological information. This included:

- Chapman, L.J. and Putnam, D.F. (1984) The Physiography of Southern Ontario, 3rd Edition. Ontario Geologic Survey, Special Volume 2, 270 p.;
- Cowan, W.R. (1976) Quaternary Geology of the Orangeville Area Southern Ontario. Ontario Division of Mines, Report 141, 98 p.;
- Credit Valley Conservation (1998) West Credit Subwatershed Study: Characterization Report.
- Davies, S. and Holysh, S. (2007) Groundwater Resources Study of the Credit River Watershed.
   Ontario Geological Survey; and,
- AquaResources Inc. (2009) Integrated Water Budget Report Tier 2: Credit Valley Source Protection Area. Credit Valley Conservation Authority.

# 2.1 Topography and Drainage

The Site lies within the West Credit River Subwatershed under the jurisdiction of the CVC. The West Credit River drains into the main branch of the Credit River east of Belfountain, below the Niagara Escarpment at the Forks of the Credit. The West Credit Subwatershed is an important groundwater recharge area due to the local presence of coarse-grained soils and hummocky topography. Significant groundwater discharge occurs along the West Credit River and, as a result, it is mapped as coldwater fish habitat. The West Credit Subwatershed includes the Town of Erin, the Town of Caledon, and the community of Belfountain.

Topography of the West Credit River Subwatershed varies from between approximately 375 m above sea level (masl) to approximately 475 masl. Topography within this area reflects glacial processes that deposited landforms such as streamlined hills (drumlins), topographic ridges (moraines), and high-relief hummocky topography with closed depressions. As noted above, recharge within the subwatershed is relatively high, due to extensive high permeable sediments, and is amplified in areas with hummocky topography compared to areas covered by relatively flat till plains.

Regional topography is shown on Figure 2.

## 2.2 Physiography

Several physiographic regions have been mapped (Chapman and Putnam, 1984) within the West Credit River Subwatershed as follows:

- Niagara Escarpment;
- Horseshoe Moraine;
- Guelph Drumlin Field; and,
- Hillsburgh Sandhills (Orangeville Moraine)

The majority of the subwatershed is comprised of the Guelph Drumlin Field and the Horseshoe Moraines regions.

A summary of each physiographic region is provided below.

**Niagara Escarpment:** The Niagara Escarpment is a major topographic change in the bedrock of Southern Ontario that results from differential weathering of the underlying dolostone and shale. Bedrock only outcrops within the West Credit River Subwatershed at the Niagara Escarpment and within river valleys.

The vast majority of the subwatershed is above the Escarpment where ground surface elevations are higher.

**Horseshoe Moraine:** The Horseshoe moraine includes the Paris, Galt, and Singhampton moraines and is described as a kame moraine deposited by ice-contact processes.

Within the subwatershed, the Paris Moraine is the dominant moraine feature and occurs in the southern portion of the study area. The Horseshoe moraine is considered a hummocky deposit primarily composed of sand to sandy silt till that is commonly referred to as the Wentworth Till. The sandy silt till results in lower infiltration rates that may be increased by the hummocky topography and closed depressions of the moraine. Sandy interbeds may be found within the Horseshoe moraine and where present may also increase permeability.

**Guelph Drumlin Field:** The drumlins of the Guelph drumlin field are typically composed of sandy silt till commonly referred to as the Port Stanley Till. The sandy silt till results in lower infiltration rates and do not likely contain sand and gravel interbeds. Between the streamlined drumlin hills are relatively flat meltwater channels composed of glaciofluvial sand and gravel that may extend to bedrock. Significant outwash deposits associated with the Caledon Meltwater channel occur in the subwatershed from the Niagara Escarpment west towards Erin.

Hillsburgh Sandhills (Orangeville Moraine): The Hillsburgh Sandhills / Orangeville Moraine are primarily ice contact sand and gravel. In addition to the sandy nature of this deposit, the high-relief and hummocky topography promotes increased recharge in the area. As a result, the Hillsburgh Sandhills are an important recharge area within the West Credit River Subwatershed.

Bedrock topography of the area is gently sloping towards the south / southwest and is relatively flat with local relief commonly ranging from 2 m to 6 m. An exception to the relatively flat bedrock topography is the existence of buried bedrock valleys and the steep change in elevation at the Niagara Escarpment. Specifically, within the West Credit River Subwatershed, there is a buried valley that follows the current West Credit River from Erin to Belfountain. In this location overburden materials are thicker and top of bedrock elevations are lower. In general, the bedrock surface represents a regional unconformity affected by erosion from glacial and fluvial processes.

A map of the regional physiography is shown on Figure 3.

# 2.3 Regional Geology and Hydrogeology

A conceptual understanding of the geological and hydrogeological system was developed through review of existing reports and available geological information primarily from work conducted by the Ontario Geological Survey (OGS) and reports completed for the CVC. From these resources, the West Credit River Subwatershed stratigraphy was interpreted to consist of the following units (youngest to oldest):

- Recent deposits (Overburden);
- Wentworth Till (Overburden);
- Glaciofluvial deposits / Orangeville Moraine (Overburden);
- Port Stanley Till (Overburden);
- Guelph Formation Dolostone (Bedrock);
- Amabel Formation Dolostone (a.k.a., Gasport Formation; Bedrock);
- Fossil Hill Formation Dolostone (Bedrock);
- Cabot Head Formation Shale (Bedrock);
- Manitoulin Formation Dolostone (Bedrock);

- Whirlpool Formation Sandstone (Bedrock); and,
- Queenston Formation Shale (Bedrock).

The following section provides a detailed summary of each overburden and bedrock unit.

#### **Overburden Units**

**Recent Deposits:** The most recent deposits consist of a mixture of gravel, sand, silt, and clay that commonly occurs along streams. Recent deposits in the area also consist of organic deposits in areas with poor drainage.

**Wentworth Till:** The Wentworth Till is described predominantly as a sandy silt to silty sand till and displays variable thickness, with its thickest portion found within the Paris Moraine of the Horseshoe Moraine physiographic element. The sandy silt till results in lower infiltration rates that may be increased due to the hummocky topography and closed depressions common in the Horseshoe Moraine physiographic element.

**Glaciofluvial/Orangeville Moraine:** The glaciofluvial / Orangeville Moraine sediments are dominated by sand and gravel. Specifically, the Orangeville Moraine is considered an ice contact kame moraine dominated by sand and gravel sediments. The coarse sediments result in higher infiltration but may be locally absent between local till units.

**Port Stanley Till:** The Port Stanley till is a stoney sandy silt till with low plasticity that is commonly considered the basal till unit existing above bedrock. This till is texturally similar to the Wentworth Till although it may have a greater total carbonate content. Similar to the Wentworth Till, the sandy silt till of the Port Stanley Till results in lower infiltration rates and may act as a confining unit.

Overburden geology is shown on Figure 4.

#### **Bedrock Units**

**Guelph Formation:** The Guelph Formation is a light brown crystalline dolostone similar to the Amabel Formation. This Formation acts as an aquifer, but is only found in the western parts of the Credit River Watershed and where found it is commonly thin and difficult to distinguish from the Amabel Formation.

**Amabel Formation (a.k.a. Gasport Formation):** The Amabel Formation is a light grey, crystalline dolostone with thick beds and abundant fossils and reefal structures. The Amabel Formation is regionally extensive and is considered a significant aquifer due to its high primary and secondary porosity, common fractures, and possible karstic features. Above the Niagara Escarpment the Amabel Formation is the primary surficial bedrock unit and is considered the cap rock of the escarpment.

**Fossil Hill Formation:** The Fossil Hill Formation of the Clinton group is a fossiliferous dolostone. This unit is commonly thin within the Credit River Watershed, with maximum thickness of approximately 3 m.

**Cabot Head Formation:** The Cabot Head Formation is described as a greenish grey and red silty shale that is considered a regional aquitard. This formation contains thin sandstone and limestone interbeds and abundant fossils (fossiliferous).

**Manitoulin Formation:** The Manitoulin Formation is a thin to medium bedded dolostone with abundant fossils and shale beds.

**Whirlpool Formation:** The Whirlpool Formation is a grey to reddish grey / brown fine grained quartzose sandstone.

**Queenston Formation:** The Queenston Formation consists of thin to thick beds of red shale and may contain interbeds of grey-green shale, limestone, or siltstone. Although the Queenston Formation is commonly considered an aquitard, when weathered its aguitard characteristics are diminished.

Bedrock geology is shown on **Figure 5**.

# 2.3.1 Groundwater Takings

In the upper Credit River Watershed, most municipal water supplies are sourced from groundwater and several municipal wells take significant amounts of water from the Guelph-Amabel regional bedrock aquifer, which also is the main aquifer underlying the Site.

The following tables summarize the details of the municipal supply wells in the upper Credit River Watershed, including the well depth below ground surface, permitted rate of water taking and average rate of water taking in 2016 as reported by the municipalities. The municipal groundwater takings indicate that the Guelph-Amabel bedrock aquifer is generally capable of supporting large groundwater takings for drinking water systems.

The closest municipal takings to this Site are the Erin municipal wells, which are approximately 4.3 Km away from the Site. The cumulative total of the Erin municipal takings were 768,031 L/day in 2016. **Table 2.1** to **Table 2.6** demonstrates that the Guelph-Amabel formations are regionally very transmissive aquifers.

Table 2.1 Orangeville Groundwater Takings (Town of Orangeville, 2016)

Table 2.1 Stangevine Groundwater Takings (Town or Grangevine, 2010)				
Supply Well	Screened Layer	Depth (mbgs)	Permitted Water Taking Rate (L/day)	2016 Average Water Taking Rate (L/day)
2A	Guelph-Amabel	38.7	1,309,000	435,156
5/5A	Overburden	17.7	5,282,000	2,259,976
6	Guelph-Amabel	48.8	3,600,000	2,183,077
7	Guelph-Amabel	47.2	1,310,000	950,991
8C, 8C	Guelph-Amabel	79.2 76.2	654,000	311,145
9A/9B	Guelph-Amabel	17.4 17.4	878,000	679,890
10	Overburden	60.9	1,245,000	957,830
11	Guelph-Amabel	54.8	1,309,000	837,862
12	Guelph-Amabel	49.4	1,309,000	25,677

Table 2.2 Mono Groundwater Takings (Town of Orangeville, 2017)

Supply Well	Screened Layer	Depth (mbgs)	Permitted Water Taking Rate (L/day)	2016 Average Water Taking Rate (L/day)
MW-1	Guelph-Amabel	60	820,000	20,252

Table 2.2 Mono Groundwater Takings (Town of Orangeville, 2017)

Supply Well	Screened Layer	Depth (mbgs)	Permitted Water Taking Rate (L/day)	2016 Average Water Taking Rate (L/day)
MW-3	Guelph-Amabel	55	1,571,000	322,158
MW-4	Guelph-Amabel	36	751,000	21,238
Island Lake TW1	Overburden	57.3	3,932,640	300,986
Island Lake PW1	Overburden	58.8		
Island PW2-06	Overburden	50.3		
PW1	Guelph-Amabel	25.1	655 300	150 214
PW2	Guelph-Amabel	25.1	655,200	150,214

Table 2.3 Erin Groundwater Takings (Town of Erin, 2017)

Supply Well	Screened Layer	Depth (mbgs)	Permitted Water Taking Rate (L/day)	2016 Average Water Taking Rate (L/day)
E7	Guelph-Amabel	42	2,159,998	335,342
E8	Guelph-Amabel	46	1,967,998	432,689

Table 2.4 Hillsburgh Groundwater Takings (Town of Erin, 2017)

14400 = 11 14400   1440					
Supply Well	Screened Layer	Depth (mbgs)	Permitted Water Taking Rate (L/day)	2016 Average Water Taking Rate (L/day)	
H2	Guelph-Amabel	88	454,000	76 140	
Н3	Guelph-Amabel	58	682,000	76,149	

Table 2.5 Caledon Village Groundwater Takings (Regional Municipality of Peel, 2015)

Supply Well	Screened Layer	Depth (mbgs)	Permitted Water Taking Rate (L/day)	2016 Average Water Taking Rate (L/day)
Caledon Village 3	Overburden	36.1	1,964,000	-
Caledon Village 3B	Overburden	34.7	1,309,000	-
Caledon Village 4	Overburden	75.9	3,273,000	-

Table 2.6 Alton Groundwater Takings (Regional Municipality of Peel, 2015)

Supply Well	Screened Layer	Depth (mbgs)	Permitted Water Taking Rate (L/day)	2016 Average Water Taking Rate (L/day)
Alton 3	Guelph-Amabel	22	1,047,398	-

Supply Well	Screened Layer	Depth (mbgs)	Permitted Water Taking Rate (L/day)	2016 Average Water Taking Rate (L/day)
Alton 4	Guelph-Amabel	25	1,047,398	-

Table 2.6 Alton Groundwater Takings (Regional Municipality of Peel, 2015)

#### 2.4 Source Protection Plan Considerations

As per the Clean Water Act, delineation of Wellhead Protection Areas (WHPA), Significant Groundwater Recharge Areas (SGRA) and Highly Vulnerable Aquifers (HVA) must be completed for the protection of existing and future drinking water sources.

Based on the Credit Valley Source Protection Area Assessment Report, the Site is located within a SGRA and partially within a HVA. The Site also borders a WHPA-E of Peel Region's Inglewood Well 2. The WHPA-E is an area associated with wells that may be Groundwater Under Direct Influence (GUDI) of surface water.

The portion of the Site that borders the WHPA-E and is within the HVA is an open space feature that will continue to be open space post-development. Therefore, no influence or impact within the WHPA-E or HVA from development of the Site is anticipated. As discussed later in this report, groundwater recharge will be maintained post-development, which fulfills the requirement for development within a SGRA.

# 3 Natural Heritage

#### 3.1 Water Courses

The West Credit River is managed as a cold-water fish habitat. In the main and middle tributaries, it is home to cold-water fish such as brook trout and brown trout. The lower portion of the West Credit River supports a migratory cold water fishery, including Chinook salmon, rainbow trout and brown trout (CVC, 2009). The cold-water habitat is supported by groundwater discharge, which supports baseflow. Baseflow within the West Credit River has been estimated to be approximately 330 L/s (Davies and Holysh 2007). By comparison, an assumed groundwater taking of approximately 1.7 L/s is expected at the Site (150,750 L/day) (~ 0.5% of the total baseflow of the West Credit River). There are no other watercourses that traverse the Site. There is an intermittent drainage feature that flows onto the Site from the property to the south, and the source of the flow is considered to be wetland drainage. The drainage feature was observed to be dry during COLE site visits in fall 2017, and it appears that any flow in this feature infiltrates into the overburden in a depression and provides recharge to the groundwater system.

# 3.2 Wetlands

The on-Site wetlands (SWT3-2 and MAS3-1), located in the northern area of the Site, are a diverse habitat consisting of at least two organic soil vegetation types; Cattail Marsh (MAS3-1) and Willow Thicket Swamp (SWT3-2) (Savanta 2018). The Cattail Marsh is classified as a shallow marsh with the tall herb layer formed of broad-leaved cattail, blue-joint grass and reed-canary grass, while the medium layer is dominated by beaked sedge. The marsh has been confirmed as a breeding habitat for the endangered Jefferson Salamander, and is dominated by Broad-leaved Cattail (*Typha latifolia*), Reed-canary Grass (*Phalaris arundinacea*) and Blue-joint Grass (*Calamagrostis canadensis; Savanta 2018*). The Willow Thicket Swamp occurs in shallow water on an almost floating organic mat. The willow is accompanied by red-osier dogwood and bitter nightshade. Beneath the canopy of shrubs grow tall grasses – blue joint and reed

canary. The swamp is dominated by the locally rare (CVC) plant species Autumn Willow (Salix serissima), and is accompanied by Red-Osier Dogwood (Cornus sericea) and Bitter Nightshade (Solanum dulcamara; Savanta 2018).

The off-Site wetlands (SWM1-1 and MAM3-1), located just north of the Site, consist of a White Cedar-Hardwood Mineral Mixed Treed Swamp (SWM1-1) and a Blue-Joint Organic Meadow Marsh (MAM3-1). The EIS determined that there is no significant amphibian breeding habitat on the Site or the off-Site wetlands (Savanta 2018).

The wetland locations identified above can be seen on **Figure 6**.

# 4 Site Investigations

# 4.1 Previous Investigations

The following are summaries of previous hydrogeological investigations at the Site conducted by other consultants.

# 4.1.1 Terraprobe

Terraprobe conducted a hydrogeological investigation at the Site between 1988 and 1989. There were a total of 30 boreholes completed with standpipes drilled to approximately three (3) mbgs and an additional nine (9) boreholes completed with standpipes ranging between 3.6 mbgs to 18.7 mbgs in 1989. A layer of fine sand to silt material was noted at depths of up to approximately 1.4 mbgs at locations 88-2, 88-4, 88-6, 88-7, 88-13, 88-14, 88-17 and 88-18. Outwash materials were encountered at depths of approximately 2.1 mbgs at the northeast portion of the Site in the vicinity of OW-1 and approximately 15 mbgs in the vicinity of OW-2 south of the Site. Glacial till extended from close to ground surface to the base of boreholes at 88-13, 88-21 to 88-30 and OW-2.

Aquifer performance tests were conducted during the hydrogeological investigation. In 1988, a step-drawdown test was conducted at PW-1 at rates of 1 gpm (0.08 L/s), 2.5 gpm (0.18 L/s) and 4 gpm (0.30 L/s). At PW-2, the pumping rates were set to 10 gpm (0.76 L/s), 20 gpm (1.52 L/s), 30 gpm (2.27 L/s) and 35 gpm (2.65 L/s). In 1989, a 24 hour pumping test was conducted at PW-3 at a rate of 25 gpm (1.89 L/s). Two pumping tests were performed at PW-4 at a rate of 1 gpm (0.08 L/s). Based on Terraprobe's report, the test results demonstrated that there is sufficient water supply for the proposed development at the Site.

Terraprobe conducted a private residential well survey at 63 residences in the Belfountain area in 1988 and contact was made with 13 residents. An additional private well survey was conducted by Terraprobe in 1989 at 81 residences and 31 responses were received. A third survey was conducted at select residences in 1990 in the Caledon Mountain Estates. Based on the findings from the private well surveys, Terraprobe identified that water supply from shallow dug wells had generally poor quality and quantity in contrast to drilled wells.

Based on the completed investigation, Terraprobe concluded that the proposed development of 73 lots (at that time) could be supported by groundwater supply and that conventional septic systems would be appropriate for the development. Terraprobe concluded that the development could proceed with minimal potential for impact to natural features or groundwater users.

#### 4.1.2 W.B. Beatty & Associates

In June 2002, W.B. Beatty & Associates Limited (W.B. Beatty) conducted an assessment of water supply and wastewater servicing at the Site through a review of previously completed reports, including hydrogeological studies by Terraprobe from 1988 to 1992. W.B. Beatty commented that the sand and gravel aquifer and dolostone aquifer along the western boundary of the Site would be the most promising areas for water quantity and that water supply wells located within this area would also minimize potential interference with nearby wetlands and ponds. It was suggested that average day water supply demand could be met by a single well in the dolostone aquifer.

#### 4.1.3 R.J. Burnside

Between June 2014 and June 2017, R.J. Burnside monitored groundwater elevations in 29 wells which included four (4) piezometers on-site and three (3) nearby residential wells. Groundwater samples were collected from monitoring wells TW1 to TW12 for water quality analysis and comparison to ODWS between December 2014 and May 2017.

R.J. Burnside completed five (5) infiltration tests at five (5) separate locations using a Turf-Tec Infiltrometer. The analyses from these infiltration tests are provided in **Section 5.4**.

Six (6) pumping tests were conducted between June 2014 and August 2014 and two (2) additional pumping tests were conducted between March 2016 and April 2016. The results are presented in **Section 5.4.** R.J. Burnside provided the data, analyses and drawings from their investigation to Manors of Belfountain for use by COLE.

## 4.1.4 Geotechnical Investigations

In June 2014, *exp* conducted a geotechnical investigation that involved drilling four (4) boreholes at the Site to depths ranging from 4.9 mbgs to 12 mbgs. From Boreholes 1 to 3, sand and gravel to sand and silt were found beneath a thin layer of ploughed material. A very dense sandy silt layer was encountered approximately 7 mbgs at Borehole 3 towards the southeast of the Site. It was suspected that the dolostone bedrock was found at approximately 3.2 mbgs at Borehole 4 located near the north boundary of the Site.

An additional seven (7) boreholes were drilled at the Site in August 2017 ranging from 4.6 mbgs to 8.2 mbgs. A topsoil layer approximately 20 cm to 50 cm in thickness was encountered during drilling at all boreholes. Below the layer of topsoil was a layer of reworked materials consisting of dark brown to brown silty sand mixed with trace clay to clayey, trace to some gravel, trace rootlets, and occasional boulder fragments at all boreholes from approximately 0.6 mbgs to 1.4 mbgs. Sand and gravel were encountered until termination at 8.2 mbgs.

# 4.2 **COLE Investigations**

Starting in October 2017, COLE conducted a hydrogeological investigation consisting of the following:

- Groundwater level measurements;
- Groundwater sampling;
- Review of existing geologic and hydrogeological information;
- · Water balance analysis;
- Nitrate loading assessment; and
- Assessment of water taking rates and analysis of pumping test results.

Findings from the investigation are discussed further below. Boreholes, wells, and other monitoring locations shown on **Figure 6**. Monitoring wells used in the current hydrogeological investigation are outlined in **Table 4.1**. Borehole logs for monitoring wells are included as **Appendix B**.

**Table 4.1** Monitoring Well Details

Well ID	Easting	Northing	Ground Elevation (masl)	Consultant	Well Stick up (m)	Well Elevation Top of Pipe (masl)	Screen Material	Depth to Bottom (mbtop)	Depth to Bottom (masl)	Depth to Bedrock (mbtop)
TW1	579485	4848275	412.7	R.J. Burnside	1.1	413.8	limestone and shale	55	54	29
TW1-09	579078	4848671	403.0	Beatty	0.69	403.7	limestone	35	34	22
TW2	579799	4848770	402.1		0.60	402.7	limestone and shale	21	20	12
TW3	579615	4848765	402.3		0.55	402.9	limestone and shale	37	36	19
TW4	579633	4849059	404.5		0.60	405.1	limestone and shale	26	36	17
TW5	579982	4849204	405.1		0.54	405.7	limestone and shale	33	32	13
TW6	580018	4849204	405.9	R.J. Burnside	0.52	406.4	limestone and shale	32	31	13
TW7	580089	4849093	405.0		0.58	405.6	limestone	23	23	7.9
TW8	579760	4849152	405.9		0.66	406.5	limestone and shale	35	35	19
TW9	579973	4848950	404.7		0.59	405.3	limestone and shale	36	35	9.8
TW10	579766	4848879	402.6		0.80	403.4	limestone	31	30	15
TW11	579655	4849078	406.1		0.70	406.8	limestone	32	37	15
TW12	579433	4848647	402.1		0.73	402.9	limestone and shale	37	37	23

**Table 4.1** Monitoring Well Details

Well ID	Easting	Northing	Ground Elevation (masl)	Consultant	Well Stick up (m)	Well Elevation Top of Pipe (masl)	Screen Material	Depth to Bottom (mbtop)	Depth to Bottom (masl)	Depth to Bedrock (mbtop)
MW1- 14D	579813	4848758	400.6		0.70	401.3	clay and stones	12	12	N/A
MW1- 14S	579812.90	4848758.30	400.6		0.70	401.3	clay and stones	8.2	7.5	N/A
OW1	579792.70	4849322.10	390.0	R.J. Burnside	0.77	390.8	dolostone	5.9	5.1	2.1
PW3	579257.58	4848934.12	401.3		0.44	401.8	dolostone and shale	35	35	24
PW4	579547.70	4849264.70	383.9		1.2	385.1	shale	27	26	-
PZ2-14	579557.10	4849228.50	389.5	-	0.87	390.3	-	1.7	0.80	-
BH 105	579640.16	4849029.99	405.0	ехр	0.85	405.8	-	-	-	-
BH 107	579996.10	4849206.50	405.3	ехр	-	-	-	-	-	-

# Note:

- Indicates unavailable data

# 5 Local Geological and Hydrogeological Conditions

# 5.1 Topography and Physiography

Topography at the Site is predominantly hummocky with closed depressions allowing for increased groundwater recharge. The Site is considered to be primarily within the Horseshoe Moraine physiographic region due to the sand content and hummocky nature of the topography. Specifically, the Site is in close proximity to Paris Moraine sediments but overlies meltwater channel glaciofluvial sediments. In the north / northeast portion of the Site there is a steep slope towards the West Credit River that likely represents the proximity of the Niagara Escarpment physiographic region.

# 5.2 Geology

In order to characterize the hydrogeological setting on Site, COLE developed two geologic cross-sections. The cross-sections were developed based on Site logs for boreholes completed during previous hydrogeological studies. **Figure 7** presents a plan view of the Site and location of the cross-sections. **Figure 8** and **Figure 9** present a cross-section geological understanding of the Site.

Table 5.1 Summary of Geologic Units at the Site

Formation	Geology	Material
Recent Deposits	Overburden	Mix of gravel, sand, silt and clay along streams and organic deposits in wetlands
Wentworth Till (aquitard)	Overburden	Sandy silt to silty sand till
Glaciofluvial / Orangeville Moraine (aquifer)	Overburden	Sand and gravel sediments
Port Stanley Till (aquitard)	Overburden	Stoney sandy silt till
Guelph Formation (aquifer)	Bedrock	Light brown crystalline dolostone
Amabel Formation (aquifer)	Bedrock	Light grey, crystalline, fossiliferous dolostone
Cabot Head Formation (aquitard)	Bedrock	Greenish grey and red silty shale
Manitoulin / Whirlpool Formation (confined aquifer)	Bedrock	Medium bedded dolostone with shaley interbeds; Grey to reddish quartzose sandstone
Queenston Formation (aquitard)	Bedrock	Red shale

# 5.2.1 Overburden Geology

Recent deposits at the Site are primarily located within the wetlands to the north of the Site (SWT3-1 and MAS3-1). Based on borehole logs, the overburden materials within the Site are dominated by sand and gravel deposits interpreted to be glaciofluvial deposits. As a result of the prevalence of sand and gravel encountered at surface, it is interpreted that the Wentworth Till is limited in extent across the Site. The glaciofluvial sand and gravel deposits are sometimes found underlying the Wentworth Till, where the till is present.

Based on the regional stratigraphy, Port Stanley Till is expected to be the basal till occurring above bedrock at the Site. Although, based on borehole logs, a sandy silt till is not defined above bedrock across the entire Site, it is possible that the clay materials above bedrock and possibly some of the sandy silt / silty sand described above bedrock may be the Port Stanley Till.

# 5.2.2 Bedrock Geology

Based on borehole logs at the Site, bedrock is dominated by limestone and dolostone deposits. Although borehole logs do not differentiate the limestone and dolostone bedrock units, it is likely that they are primarily composed of the Guelph-Amabel Formation dolostone aquifer and possibly contain a thin unit of the Fossil Hill Formation.

Based on available OGS mapping, there is the potential for karst in the Belfountain area (Brunton and Dodge, 2008). Karst expressions at the surface may act as points of focused recharge. However, identifying Karst within the area is difficult as the significant overburden thickness reduces the ability to identify individual karst features. Focused recharge within thick overburden deposits may be a result of other features within the sediment, such as closed depressions, or a buried tile bed. Due to the relatively thick overburden at the Site, it will be difficult to confirm the presence of any potential karst features.

The limestone and dolostone deposits of the Guelph and Amabel Formations are underlain by shale interpreted to be the Cabot Head Formation, which acts as a regional aquitard. Borehole logs on Site do not extend deep enough to characterize the lower bedrock units and the presence / absence and thickness of the Manitoulin / Whirlpool and Queenston formations. However, off-Site boreholes and MOECC water well records indicate that the Cabot Head Formation shales are underlain by the Manitoulin / Whirlpool Formation Aquifer, followed by the Queenston Formation shale aquitard.

# 5.3 Hydraulic Conductivity

Six (6) different 6-hour pumping tests were conducted by R.J. Burnside in select wells (TW1 to TW6) in order to obtain an understanding of the in-situ hydraulic properties of the dolostone unit across the Site. Tests were conducted in late spring or summer month when generally drier conditions would be expected, including on June 11, 2014, July 8, 2014, July 15, 2014, August 26, 2014, and August 28, 2014.

For each test, a known pumping rate was used and drawdown and recovery were measured manually and/or with a data logger until a minimum of 95% recovery was achieved. Transmissivity estimates were subsequently obtained from the Cooper-Jacob non-equilibrium equation below.

$$T = \frac{0.183Q}{\Lambda s}$$

Where,

T transmissivity (m<sup>2</sup>/day)

Q pumping rate (m<sup>3</sup>/day)

 $\Delta s$  Slope of the time-drawdown graph expressed as a change in drawdown between any two times on the log scale whose ratio is 10 (one log cycle).

Hydraulic conductivity was then calculated using the equation below.

$$K = \frac{T}{h}$$

Where,

- K hydraulic conductivity (m/day)
- B thickness of saturated aquifer (m)

Distance-time curves used to estimate  $\Delta s$  for the above equation are shown in **Appendix C. Table 5.2** summarizes the transmissivity and hydraulic conductivity estimates obtained by R.J. Burnside using the Cooper-Jacob method. Further discussion of the pumping test results are presented in **Section 6**.

Table 5.2 Estimated Transmissivity and Hydraulic Conductivity

Well ID	Pumping Rate (L/min)	Aquifer Thickness (m)	Transmissivity (m²/day)	Hydraulic Conductivity (m/s)
TW1	45	23.2	9.37	4.7x10 <sup>-6</sup>
TW2	11.34	6.04	14.94	2.86x10 <sup>-5</sup>
TW3	96.6	16.12	84.85	6.1x10 <sup>-5</sup>
TW4	30.6	16.12	403.19	2.9x10 <sup>-4</sup>
TW5	75.6	16.88	26.60	1.83x10 <sup>-5</sup>
TW6	68.4	17.18	72.10	4.86x10 <sup>-5</sup>

#### 5.4 Infiltration Rates

R.J. Burnside completed five (5) infiltration tests using a Turf-Tec Infiltrometer and two (2) infiltration tests were completed using test pits. The test results are summarized in the following table. The location of infiltration tests are shown on **Figure 6**.

Review of the infiltration test results by COLE indicates that the results seem reasonable and accurate with the exception of the some of the surface material descriptions. Surface materials at the Site are expected to be primarily sandy with some till. The higher infiltration rates seen in **Table 5.3** agree with the expected sandy sediments on Site. Raw data and graphs by R.J. Burnside are provided in **Appendix D**.

**Table 5.3** Infiltration Test Results

Location	Depth (m)	Materials	Stable Infiltration Rate (mm/hr)
IT1	0.33	Silt, some sand, trace clay	171
IT2	0.32	Sandy silt, firm, moist, trace clay, bobbles	29
IT4	0.36	Silty clay, some sand, cobbles	327
IT5	0.33	Clayey silt, till, soft, wet, some sand, cobbles, boulders	90
IP1	0.50	Silt, dark brown, some sand, trace clay	200
IP2	0.50	clay silt, soft with coarse gravel	420

The infiltration rate values estimated by R.J. Burnside are generally quite high and reflect the high content of sand and gravel in the shallow deposits at the Site. As described in **Section 6**, the water balance for the Site indicates that groundwater recharge is generally high, reflecting the coarse grained soils and hummocky topography at the Site. As noted in the discussion of groundwater levels below, the overburden is largely unsaturated across most of the Site, which further enhances groundwater recharge.

#### 5.5 Groundwater Levels

Historical groundwater level monitoring on Site was completed by R.J. Burnside between June 2014 and June 2017. COLE began monitoring in October 2017. Water levels from October 2017 for on-Site wells are provided in **Table 5.4** and hydrographs for wells historically monitored by R.J. Burnside are provided in **Appendix E**.

Table 5.4 Groundwater Level Measurements (October 2017)

	Table 5.4 Groundwa	ater Level Measurements	(October 2017)	
Well ID	Monitoring Point Elevation (masl)	Ground Elevation (masl)	Water Level (mbgs)	Water Level (masl)
TW1	413.80	412.74	18.16	394.59
TW1-09	403.69	403.00	15.63	387.37
TW2	402.67	402.07	11.53	390.54
TW3	402.87	402.32	16.15	386.17
TW4	405.11	404.51	19.01	385.50
TW5	405.67	405.13	16.02	389.11
TW6	406.52	405.90	14.56	391.34
TW7	405.55	404.97	12.79	392.17
TW8	406.54	405.88	20.41	385.47
TW9	405.29	404.70	14.17	390.53
TW10	403.38	402.58	15.03	387.54
TW11	406.77	406.07	20.50	385.57
TW12	402.78	402.05	14.09	387.96
MW1-14S	401.33	400.63	Dry	Dry
MW1-14D	401.33	400.63	11.26	389.37
OW1	390.78	390.01	Dry	Dry
PW3	401.77	401.33	16.12	385.22
PZ2-14	390.33	389.46	0.83	388.60

Most wells on Site are screened within limestone and shale bedrock units (Amabel and Cabot Head Formations) and thus are considered to be representative of the bedrock groundwater flow system. A depth to groundwater map based on on-Site wells is illustrated on **Figure 10**.

Groundwater across the Site is typically 10 to 20 m below ground surface (mbgs). Near the on-Site wetland features (SWT3-2 and MAS3-1), groundwater is typically between 0 to 1 mbgs. Groundwater near the off-Site wetland features (SWM1-1 and MAM3-1) is also expected to be near ground surface; although, contours on **Figure 10** suggest that groundwater may be deeper near the off-Site wetland features. The deeper groundwater levels shown on **Figure 10** may be due to the lack of available data to constrain the contours in the vicinity of the off-Site wetland features.

In general, groundwater elevations mirrors the ground surface topography. Groundwater is typically found at greater depths in topographic highs and closer to surface in topographic lows. As a result, the depth to groundwater in the west of the Site generally decreases from south to north, with water levels closest to the surface near the wetlands in the North of the Site. In the east of the Site the depth to groundwater increases from south to north before decreasing again where elevation changes sharply.

Seasonal groundwater fluctuations are seen in the hydrographs (**Appendix E**) and indicate a general trend of decreasing water levels in the summer and fall and increasing water levels in the winter and spring. On average across the Site, seasonal water level changes are not greater than 3 m, with the exception of TW2 which seems to experience larger seasonal groundwater changes up to approximately 6 m.

# 5.6 Groundwater Flow and Hydraulic Gradients

Groundwater elevation contours based on on-Site wells and topographic elevations at the West Credit River can be seen on **Figure 11**.

Groundwater elevations on-Site range from approximately 385 masl to approximately 395 masl, with the water table found typically close to the bedrock / overburden interface. In general, groundwater elevations are higher in the south and lower in the north of the Site, mimicking the Site topography. Groundwater contours indicate horizontal groundwater flow within the bedrock is approximately south to north on Site, towards the West Credit River.

There have been anecdotal references to a "disappearing stream" and "underground stream" at the Site and, based on available mapping, there is the potential for karst in the Belfountain area. However, the significant overburden thickness at the Site suggests that the headwater drainage feature is a losing reach and is unlikely to be the result of local karst features. The loss of flow in the headwater drainage feature is interpreted to be the result of a losing reach once the stream crosses onto the highly permeable outwash deposits from the lower permeability Wentworth Till units to the south.

Vertical hydraulic gradients were not determined since nested monitoring wells were not installed on the Site. Regardless, based on regional mapping (Davies and Holysh, 2007), downward gradients are expected across the site. Upward gradients associated with groundwater discharge to surface is expected to occur in the West Credit River valley.

# 5.7 Groundwater Quality

Groundwater quality samples were collected by R.J. Burnside from twelve (12) on-Site wells between 2015 and 2017 and two (2) off-Site wells in 2015. The collected groundwater samples were sent to AGAT Laboratories for analysis of general inorganics, metals and total suspended solids to characterize the baseline groundwater quality at the Site. Results were compared to the Ontario Drinking Water Standards (ODWS) to identify potential exceedances of water quality parameters. Results for select parameters from the twelve (12) on-Site wells from March 3, 2017 are outlined in **Table 5.5** and **Table 5.6**. For full analytical results and certificates of analysis, please refer to **Appendices F** and **G**.

Review of the water quality results indicate that there were no exceedances of health-related ODWS. Results of the analysis do show exceedances of some aesthetic and operational ODWS for some samples (**Table 5.5** and **Table 5.6**). Parameters with exceedances of ODWS include total hardness, total dissolved solids, sulphate, turbidity, and iron. These parameters, with the exception of hardness, are considered aesthetic guidelines that are established for parameters that impair the taste, odour or colour of water but do not directly affect the safety of the water supply.

The water hardness at the Site and other aesthetic parameters (turbidity, sulphate, total dissolved solids, and iron) can be improved with water treatment systems for each property, including a water softener.

Information about a commonly employed residential water quality treatment unit is provided in **Appendix M** as an example for reference purposes. This example and many other residential water quality treatment systems are also capable of reducing concentrations of health-related parameters (such as nitrate); although, as noted above, there have been no exceedances of health-related ODWS from water quality results from the Site.

Table 5.5 Select Groundwater Quality Results from March 10, 2017

Water		OD	WS							
Quality Parameter	Units	OG	AG	RDL TW1		TW2	TW3	TW4	TW5	TW6
Total Hardness (as CaCO3)	mg/L	80- 100	ı	0.5	<mark>361</mark>	<mark>181</mark>	<mark>433</mark>	<mark>275</mark>	<mark>288</mark>	<mark>288</mark>
Total Dissolved Solids	mg/L	ı	500	20	396	198	484	284	306	308
Nitrate as N	mg/L	10	1	0.1	<0.05	1.16	0.62	3.43	6.76	8.52
Nitrite as N	mg/L	1	ı	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L	-	500	0.2	105.0	13.8	193.0	18.9	14.1	13.5
Turbidity	NTU	ı	5	0.5	<mark>135.0</mark>	3.3	<mark>15.3</mark>	0.6	1.9	<0.5
Iron	mg/L	1	0.3	0.01	0.167	<0.010	0.032	<0.010	<0.010	<0.010

1.7 Sample exceeded ODWS OG or AG RDL Reportable Detection Limit

- No value available

ODWS Ontario Drinking Water Standard

OG Operational Guideline AG Aesthetic Guideline

Table 5.6 Select Groundwater Quality Results from March 10, 2017 Continued

Water Quality Parameter	Units	OD OG	WS AG	RDL	TW7	TW8	TW9	TW10	TW11	TW12
Total Hardness (as CaCO3)	mg/L	80- 100	-	0.5	<mark>291</mark>	<mark>301</mark>	<mark>310</mark>	<mark>202</mark>	<mark>278</mark>	1020

Table 5.6 Select Groundwater Quality Results from March 10, 2017 Continued

Water		OD	WS							
Quality Parameter	Units	OG	AG	RDL	TW7	TW8	TW9	TW10	TW11	TW12
Total Dissolved Solids	mg/L	ı	500	20	306	312	326	216	286	<mark>1400</mark>
Nitrate as N	mg/L	10	-	0.1	5.77	6.68	2.68	1.68	3.94	<0.25
Nitrite as N	mg/L	1	-	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.25
Sulphate	mg/L	-	500	0.2	14.4	31.1	50.1	14.3	19.1	<mark>896</mark>
Turbidity	NTU	-	5	0.5	1.8	<mark>113</mark>	2.0	<mark>64.8</mark>	<mark>7.4</mark>	<mark>8.6</mark>
Iron	mg/L	-	0.3	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<mark>0.665</mark>

1.7 Sample exceeded ODWS OG or AG

RDL Reportable Detection Limit

No value available

ODWS Ontario Drinking Water Standard

OG Operational Guideline AG Aesthetic Guideline

In addition to the general groundwater quality results discussed above, groundwater samples were collected from twelve (12) on Site wells (TW1 to TW12) by R.J. Burnside between July 2014 and May 2017 and by COLE in October 2017 and analyzed for nitrate and nitrite. Nitrate concentration results are provided in in **Table 5.7**.

Water samples obtained by COLE were collected using a submersible pump. Prior to collecting samples, the monitoring wells were purged by removing three (3) well volumes from each well. The purging process removes stagnant water from the well, thereby ensuring the groundwater samples are representative of the groundwater in the formation adjacent to the screen. In addition, groundwater parameters including pH, temperature, conductivity, and turbidity were monitored and samples were collected after all parameters had stabilized.

The collected groundwater samples went to Maxxam Analytics Inc. Mississauga, for laboratory analysis of nitrate and nitrite. Results were compared to ODWS for nitrate-nitrogen, 10 mg/L, to identify potential exceedances. Results of the analysis showed no exceedances of the ODWS for nitrate for any samples. Higher concentrations (>5 mg/L) were observed within the northern portion of the Site in five (5) wells (TW5, TW6, TW7, TW8 and TW11). Average nitrate concentrations across the Site from all sampling results can be seen in **Figure 12**.

The on-Site areas with higher nitrate concentrations are likely a result of the historical and current agricultural activities occurring both on-Site and up gradient of the Site. Development of the Site will result in a reduction of the agricultural areas suspected of contributing to the on-Site nitrate concentrations by approximately 67%. Thus, development of the Site is expected to lead to a long term decrease in nitrate concentration on-Site.

**Table 5.7 Nitrate Concentrations on Site** 

	Nitrate Concentrations (mg/L)												
Well ID	Apr 2015	Jun 2015	Sept 2015	Nov 2015	Feb 2016	Mar 2016	Apr 2016	June 2016	Sept 2016	Dec 2016	Mar 2017	May 2017	Oct 2017
TW1	-	-	-		-	-	-	-	-	-	<0.05	<0.05	<0.10
TW2	0.84	0.70	1.00	0.62	-	0.58	-	1.18	0.82	0.67	1.16	1.90	1.01
TW3	1	-	1	-	-	0.54	1	-	-	1	0.62	0.58	0.21
TW4	ı	-	1	-	-	3.0	1	-	-	1	3.43	3.22	1.95
TW5	6.31	8.28	7.77	7.09	-	7.80	ı	6.72	7.18	6.34	6.76	7.99	8.41
TW6	7.80	8.20	7.30	1	-	-	8.23	-	-	ı	8.52	9.08	7.87
TW7	1	-	ı	1	8.52	7.27	ı	6.32	6.97	5.97	5.77	6.87	8.13
TW8	-	-	-	-	8.25	7.76	-	5.35	7.85	7.41	6.68	5.15	6.47
TW9	-	-	-	-	3.65	3.41	-	2.99	2.17	1.51	2.68	3.02	2.81
TW10	-	-	-	-	2.41	-	-	-	-	-	1.68	0.85	1.63
TW11	-	-	-	-	4.61	5.03	-	3.00	4.08	3.58	3.94	3.00	3.41
TW12	-	-	-	-	-	<0.25	-	-	-	-	<0.25	<0.10	<0.10

# Note:

- Indicates no sample collected

## 5.8 Groundwater – Surface Water Interactions

## 5.8.1 Water Courses

A small headwater drainage feature flows from off-Site near PZ1-14 onto the Site from the south near TW2 and MW1-14, where it appears to infiltrate through a depression into the thick coarse-grained (outwash) overburden. Although this feature has been anecdotally referred to as a "disappearing stream" or "underground stream" associated with karst, the relatively thick overburden at the Site reduces the possibility of this feature being a result of local karst features. This feature is interpreted to lose flow and infiltrate as it moves from less permeable Wentworth Till in the south onto the more permeable sandy outwash sediments on-Site. Water that infiltrates across the Site is interpreted to infiltrate vertically through the coarse-grained unsaturated zone to the water table where horizontal groundwater flow is generally towards the north. The on-Site portion of the small headwater drainage feature was observed by COLE staff to be dry during a Site visit in October 2017. Therefore, this feature is interpreted to be an ephemeral feature contributing groundwater recharge after precipitation, snowmelt and freshet events.

Groundwater levels at PZ1-14, near the headwater drainage feature, are consistently below ground surface by approximately 1 m. Similarly, groundwater levels at TW2 and MW1-14 are consistently below ground surface during all times of year when data was collected indicating that this feature is not supported locally by groundwater discharge but provides a groundwater recharge function (i.e., is a losing reach). Due to the higher water table at PZ1-14 compared to TW2, MW1-14, and the rest of the Site, it is interpreted that this high water table represents a local perched water table system. The hydrograph for PZ1-14, which is provided in **Appendix E**, shows that this piezometer frequently goes dry further supporting the interpretation of a localized perched system.

No other water courses are seen on Site. Off-Site, the West Credit River likely receives groundwater contributions that maintain the base flow of this cold water fish habitat.

# 5.8.2 Wetlands

One piezometer, PZ2-14, was installed to a depth of approximately 1 mbgs in one of the on-Site wetland units (SWT3-2). A hydrograph illustrating water level fluctuations relative to ground surface for PZ2-14 is provided in **Appendix E**.

Examination of the water levels in PZ2-14 shows variable groundwater levels that are consistently below ground surface with the exception of very wet spring conditions when groundwater levels are only slightly above ground surface (maximum of 4 cm above ground surface). As a result, groundwater contributions to SWT3-2 are estimated to be negligible.

Although, there is no direct groundwater monitoring data for wetland unit MAS3-1 on Site, the ground elevation (as indicated by cross-section A-A' on **Figure 8**) is very similar to SWT3-2 and thus groundwater is expected to be at a similar elevation as STW3-2, or slightly deeper, as it declines towards the West Credit River. Observations made during a Site visit on November 8, 2017 confirm that groundwater is approximately 0.86 mbgs within SWT3-2 and no standing water was visible within MAS3-1.

The two off-Site wetland units (SWM1-1 / MAM3-1) do not have groundwater level monitoring data, thus, groundwater contributions cannot be accurately quantified. Based on a Site visit on November 8, 2017, SWM1-1 was observed to have standing water and wet soils. Therefore, groundwater contributions to SWM1-1 appear to be present. Although groundwater contributions to the off-Site wetlands are not quantified, they are not within the radius of influence or the radius of contribution of the closest potential on-Site supply well and the proposed development will maintain pre-development infiltration rates thus,

no groundwater impacts to the off-Site wetlands are anticipated. Additional discussion of the potential impacts to the off-Site wetland features are described in **Section 7.2.2**.

#### 5.9 MOECC Well Records

A MOECC well records search was conducted for a 500 m radius around the Site. A total of 145 wells were identified within a 500 m radius of the Site. Based on the MOECC well records, the majority (81%) of the nearby wells were identified as water supply wells. The search results are provided in **Appendix H** and are summarized in **Table 5.8** below. The locations of nearby MOECC well records are shown on **Figure 13**.

Table 5.8	Summary	of MOECC W	ell Records	within a	500 m	Radius	Around the Site
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Well Use	Number of Wells	Percent of Wells	
Water Supply	118	81.38	
Abandoned	11	7.59	
Monitoring/Test Hole	8	5.52	
Observation	7	4.82	
Unfinished	1	0.69	
Total	145	100	

A search of permitted water takers within a 500 m radius around the Site was conducted in December 2017 through the MOECC digital data request process. No active permitted groundwater takers were identified.

As noted in **Section 4.1**, a private residential well survey at 63 residences in the Belfountain area was conducted by Terraprobe in 1988 and contact was made with 13 residents. An additional private well survey was conducted by Terraprobe in 1989 at 81 residences and 31 responses were received. A third survey was conducted at select residences in 1990 in the Caledon Mountain Estates. Based on the findings from the private well surveys, Terraprobe found that water supply from shallow dug wells had generally poor quality and quantity in contrast to drilled wells.

It should be noted that results from these surveys may now be outdated, and an updated well survey for the area surrounding the Site would be helpful towards understanding current groundwater usage and quality in the area.

# 6 Impact Assessment

## 6.1 Water Balance

As part of the hydrogeological investigation a water balance analysis was completed to determine predevelopment recharge and runoff conditions at the Site.

# 6.1.1 Background

For any system with defined boundaries, a water balance can be used to estimate the individual components of the hydrologic cycle. This exercise consists of an accounting of the transfer of water across the system's boundaries over a certain period of time whereby any difference between inflows to the system and outflows from the system is balanced by a change of storage within the system.

In order to understand the components of the hydrologic cycle under existing conditions, a water balance analysis was conducted for the Site. The discussion below provides details on the methodology used and the results obtained from the analysis. A summary of the calculations is provided in **Appendix I**.

# 6.1.2 Methodology

A Site scale water balance analysis was completed in order to estimate the components of the hydrologic cycle for the Site, and was modelled using the following equation:

$$P = \Delta GS + ET + R + I$$

#### Where:

P = Precipitation, which represents the sum of all rainfall and snowfall

 $\triangle GS$  = Change in groundwater storage

ET = Evapotranspiration

R = Runoff
I = Infiltration

The water balance for the Site was developed using the Thornthwaite and Mather (1955) methodology as outlined in Chapter 3 of MOECC's SWM Planning & Design Manual (MOECC, 2003). The methodology roughly estimates yearly evapotranspiration, infiltration and runoff volumes based on soil types, ground cover, topography, and annual precipitation.

Monthly mean temperature and monthly precipitation data were used in the Thornthwaite Equation to estimate the monthly potential evapotranspiration. The estimated monthly potential evapotranspiration was adjusted using a daylight correction factor to account for varying length of daylight throughout the year based on latitude. The actual evapotranspiration was then determined by accounting for a change in soil moisture storage.

The monthly water surplus (amount of water available to infiltrate or runoff) was estimated by calculating the difference between monthly precipitation and actual evapotranspiration. Infiltration was estimated by multiplying a set of infiltration factors (dependent on the topography, soil type, and land cover) to the estimated water surplus. Runoff was considered to be the remainder of the water surplus that was not infiltrated.

#### 6.1.3 Site Water Balance

Site specific parameters used to calculate the Site water balance as described in **Section 6.1.2** were determined as follows.

Precipitation and temperature data were obtained from the Environment Canada Orangeville Weather station (Climate ID: 6155790). Climate normal data (1981-2010) were used in the water balance analysis to provide a general understanding of the climate on Site, while averaging out the effects of wet and dry years.

The Site was divided and classified according to agricultural areas and wooded areas. Infiltration factors were selected for each area from Table 3.1 in the MOECC's Stormwater Management Planning and Design Manual (MOECC, 2003). Ground cover and topography infiltration factors were informed from Site visits and using aerial photographs. Agricultural areas were considered flat lands due to closed depressions whereas wooded areas were considered hilly lands based on topographic slope.

Surficial soil infiltration factors were informed from Site borehole logs and determined to be predominantly sand. Soil moisture capacities were also determined from the MOECC 2003 document and informed by ground cover and soil type. Infiltration factors and soil moisture capacities for the different areas are summarized in **Table 6.1**.

Table 6.1 Summary of Infiltration Factors and Soil Moisture Capacity

Area	Area (ha)	Infiltration Factor (Topography)	Infiltration Factor (Soil)	Infiltration Factor (Cover)	Soil Moisture Capacity (mm)
Agricultural	50.27	0.30	0.40	0.10	75
Wooded	20.01	0.10	0.40	0.20	200

## 6.1.4 Water Balance Analysis Results

The results of the Site-wide pre-development water balance are summarized in **Table 6.2**. The time period used for the analysis was the 30 year climate normal period from 1981 to 2010 to allow for an understanding of average magnitudes of the components of the hydrologic cycle.

Table 6.2 Results of Water Balance Analysis for 1981 to 2010

	Hydrologic Cycle Component	Agricultural Lands		Wooded Areas	
		(mm/year)	(m³/year)	(mm/year)	(m³/year)
Inputs	Precipitation	901.6	453,234	901.6	180,410
	Total inputs		453,234		180,410
Outputs	Evapotranspiration	526	264,422	548	109,684
	Change in soil storage	0	0	0	0
	Runoff	75	37,762	106	21,218
	Infiltration	300	151,050	247	49,508
	Totals outputs		453,234		180,410

Based on the water balance analysis for pre-development conditions, infiltration comprises approximately 32% of the total precipitation across the entire Site, runoff comprises approximately 9% of total precipitation, and evapotranspiration comprises more than half (59%) of total precipitation. The water balance analysis shows a significant amount of infiltration on the Site. This is expected due to the closed depressions within the hummocky topography and sandy overburden materials. Details of the water balance analysis are presented in **Appendix I**.

The Thornthwaite and Mather water balance methodology provides a simplified approximation of the water balance for a given Site. The methodology does not account for yearly changes in groundwater elevations. As such, it is important to note that the evapotranspiration, runoff, and infiltration values estimated using the water balance analysis are understood to be approximations. A more detailed analysis of Site grading and potential for runoff is presented in the Functional Servicing Report prepared by COLE and submitted under separate cover.

Potential impacts to the Site water balance from the proposed development are discussed in **Section 7**. It is currently understood that infiltration measures will be utilized to maintain pre-development infiltration on Site in post-development conditions, with essentially no runoff leaving the Site up to the 100-year storm event. The stormwater management approach as well as a detailed discussion of the post-development water balance is described in the Functional Servicing Report, prepared by COLE and submitted under separate cover.

#### 6.2 Nitrate Loading

#### 6.2.1 Calculations

Nitrate loading analysis was completed in order to evaluate the potential impact of individual on-Site septic systems in compliance with MOECC Procedure D-5-4 and as informed through consultation with CVC. This procedure is outlined below, and assumes that every lot will have a tertiary (Level IV) treatment system such as the Waterloo Biofilter Systems Inc. standard system shown in **Appendix M** that successfully reduces total nitrogen concentrations in effluent by 50-65%.

The equation applied to estimate the influence of the septic systems on nitrate concentrations in groundwater is:

$$n_r = \frac{n_w * V_w}{V_T}$$

Where  $n_r$  is the resulting nitrate concentration at the property boundary (mg/L),  $n_w$  is the nitrate concentration in the effluent (mg/L),  $V_w$  is the volume of effluent (m³/year), and  $V_T$  is the total dilution volume (m³/year), which is a sum of annual recharge volume (as determined from the Site water balance analysis **Section 6**, assuming infiltration post-development is maintained) and effluent volume ( $V_w$ ).

Nitrate loading calculations for the Site assume an effluent discharge of 1000 L/lot/day from the 67 proposed lots. It was also assumed that implementation of tertiary (Level IV) treatment systems will be applied across all 67 on-Site septic systems, resulting in a nitrate loading of 20 g/lot/day, which is half the expected concentration of 40 g/lot/day from traditional septic systems. In addition, it is understood that the planned septic systems will only produce nitrate and conversion of ammonia to nitrate (nitrification) is assumed to be complete in these systems. Therefore, it is not necessary to estimate groundwater concentrations for nitrite or un-ionized ammonia, which is also consistent with CVC review of potential septic system impacts. The analysis of nitrate loading at the property boundary is shown below and assumes an annual dilution volume from recharge of 200,558 m³/year as described in Section 6.1:

$$n_r = \frac{\left(20 \frac{g}{lot.day} * 1,000 \frac{mg}{g} * \frac{1}{1000 \frac{L}{lot.day}}\right) \left(1,000 \frac{L}{lot.day} * 67 lots * 365 \frac{day}{year} * \frac{m^3}{1000 L}\right)}{\left(1,000 \frac{L}{lot.day} * 67 lots * 365 \frac{day}{year} * \frac{m^3}{1000 L}\right) + \left(200,558 \frac{m^3}{year}\right)}$$

$$n_r = \frac{(20 \, mg. \, L^{-1})(24,455 \, m^3. \, year^{-1})}{227,564.2 \, m^3. \, year^{-1}} = 2.17 \, mg. \, L^{-1}$$

It is also important to note that the nitrate loading analysis outlined in the MOECC guidance does not consider the complex spatial and temporal variability of nitrate concentrations. Therefore, the nitrate loading concentration determined for the Site is an estimate of the average nitrate concentration expected across the entire Site.

#### **6.2.2** Nitrate Loading Results

From the nitrate loading analysis, which was completed in compliance with MOECC Procedure D-5-4 and consistent with CVC's review approach, a nitrate loading concentration of approximately 2.17 mg/L is estimated at the Site boundary. This concentration is below the ODWS for nitrate of 10 mg/L and also lower than the CCME guideline for NO<sub>3</sub>-as-N of 3 mg/L, which has been adopted by CVC. As on-Site wetland features (SWT3-2 and MAS3-1) are essentially at the Site boundary, and any groundwater seepage locations appear to be beyond the Site boundary, the CCME / CVC guideline is met at all downgradient natural features that may receive even minimal groundwater discharge.

The existing nitrate concentrations at the Site (as discussed in **Section 5.7**) are interpreted to reflect nitrate loading from on-Site and adjacent agricultural activities. With development of the Site, the area interpreted to contribute to nitrate loading from agricultural activities will be reduced by approximately 67%. As a result, it is anticipated that long-term background nitrate concentrations will decline over time.

#### **6.2.3** Line of Higher Nitrate Concentrations

All available groundwater quality results for on-Site wells indicate that existing on-Site nitrate concentrations are below the ODWS, and long-term nitrate concentrations are anticipated to decrease due to the reduction in agricultural activity on the site. However, as a precautionary approach it is recommended that supply wells should not be installed in the northernmost portion of the Site where the highest on-Site nitrate concentration are identified. Specifically, it is recommended that supply wells not be placed north of an estimated line of higher nitrate concentrations (i.e., > 7 mg/L). The line of higher nitrate concentrations is shown on **Figure 14** and is located based on the average nitrate concentrations at test wells TW8 and TW7 of slightly less than 7 mg/L.

To identify if any additional setback distance may be required between supply wells and the line of higher nitrate concentrations, a zone of contribution analysis was completed and is discussed in **Section 6.3.4.** As discussed in **Section 6.3.4**, the zone of contribution analysis suggests that an additional setback of 7 m from the line of higher nitrate concentrations, shown as the 7 m setback line in **Figure 14**, is warranted in recognition of the estimated area from which groundwater contributes to the supply wells. Therefore, supply wells located at least 7 m upgradient (south) of the line of higher nitrate concentrations are not expected to draw groundwater from the area with higher nitrate concentrations. Review of the lot locations and dimensions on the Draft Plan indicates that there is a minimum of 9 m between the road right-of-way and the 7 m setback line where wells can be located, or a minimum of 16 m between the road right-of-way and the higher nitrate line. Therefore, supply wells can be located on all proposed lots in compliance with the 7 m setback recommendation. The lot layout, line of higher nitrate concentrations, and the 7 m setback line can be found in **Figure 14**. Well locations in relation to the line of higher nitrate concentrations are provided in the FSR.

#### 6.3 Water Supply

#### 6.3.1 Water Supply Analysis

As noted in **Section 2.3.1**, the main aquifer underlying the Site is the Guelph-Amabel Formation, which provides water sufficient for several large municipal groundwater takings across the Upper Credit River

Watershed. As described below, the aquifer is considered to be capable of providing sufficient water supply for the proposed development based on the analysis completed following the MOECC Procedure D-5-5. An assessment of potential impacts from the water taking is provided in **Section 7.0**. These results are generally consistent with previous assessments of water supply at the Site (Terraprobe 1990).

Peak pumping rates expected per lot at the Site were determined based on the MOECC Procedure D-5-5 with the assumption of a peak pumping rate of 3.75 L/min/person in a four bedroom house (i.e., five people). This results in a peak pumping rate of 18.75 L/min/house. The estimated peak pumping rate is conservative as peak flow rates are only expected to last for only 120 minutes/day. In addition, private wells are typically pumped intermittently, putting less stress and demand on the aquifer. As a result, the expected long-term average pumping rate is estimated to be approximately 1.56 L/min/house (2,250 L/day/house) as outlined in the MOECC Procedure D-5-5.

To investigate the safe well yield on Site, R.J. Burnside conducted six (6) pumping tests between June 11, 2014 and August 29, 2014, which would be expected to generally reflect dry conditions when lower amounts of recharge would occur. The pumping tests lasted for approximately 6 hours with pumping rates ranging from 11.34 L/min to 96.6 L/min and recovery monitored until approximately 95% recovery, as required by the MOECC Procedure D-5-5. Although one of the six pumping tests had a pumping rate less than the maximum rate indicated by MOECC guidelines outlined in Procedure D-5-5, two (2) additional 26 hour pumping tests were conducted in March and April 2016 on TW6 and TW11 at a pumping rate of 60 L/min in compliance with Procedure D-5-5. Raw data for all pumping tests is provided in **Appendix J**.

Transmissivity was estimated from pumping test results using the modified non-equilibrium equation developed by Cooper and Jacob (1946) as outlined in Driscoll (1986) and shown below:

$$T = \frac{0.183Q}{\Delta s}$$

Where,

 $T = \text{transmissivity (m}^2/\text{day)}$  $Q = \text{pumping rate (m}^3/\text{day)}$ 

 $\Delta s$  = slope of the time-drawdown graph expressed as a change in drawdown between two times on log scale whose ratio is 10 (one log cycle). Time-drawdown curves can be found in **Appendix C**.

Transmissivity was then used to estimate drawdown after 20 years and 50 years based on the Theis (1935) solution.

$$s = \frac{Q}{4\pi T}W(u)$$

Where.

s = drawdown (m)

Q = pumping rate (m³/day) T = transmissivity (m²/day)

And  $u = \frac{r^2 S}{4Tt}$ , where r = distance from centre of pumping well to drawdown location (m), S is coefficient of storage (dimensionless), and t is time since pumping started (days)

If calculated drawdown after 20 and 50 years is less than the available drawdown within the pumping well then the well is considered to have adequate water supply. The available drawdown is considered to be the distance from the static water level to the middle of the open borehole.

#### 6.3.2 Results

Resulting estimated transmissivity values and calculated 20 year and 50 year drawdowns for the six pumping tests, completed in 2014, are provided in **Table 6.3** and calculations are provided in **Appendix K**.

Table 6.3 Pumping Test Results and Estimated Long Term Drawdown

			Peak Pum (18.75 L/m	•	Average Pumping Rate (1.56 L/min/house)		
Well ID	Estimated Transmissivity (m²/day)	Transmissivity Drawdown Drawdown after Drawdown after		Calculated Drawdown after 50 years (m)			
TW1	9.40	23	3.5	3.8	0.32		
TW2	14.9	2.2	2.3	2.4	0.20		
TW3	84.9	14	0.40	0.50	0.040		
TW4	403	7.1	0.10	0.10	0.010		
TW5	26.6	7.5	1.3	1.4	0.12		
TW6	72.1	8.2	0.50	0.60	0.050		

Based on conservative available drawdown calculations, pumping tests results indicate that most wells can safely support 50 years of continuous pumping at the peak pumping rate of 18.75 L/min/house. This pumping rate exceeds the peak pumping rate likely to be realistically experienced by each well. This peak rate is only expected to occur for a total of 120 min/day and therefore results presented in **Table 6.2** represent a very conservative approximation of the drawdown that would occur after 20 and 50 years of pumping.

Based on the conservative calculations of available drawdown, TW2 was estimated to slightly exceed the available drawdown after 20 years and 50 years. This is not expected to be an issue as continuous pumping at the peak pumping rate is a significant over estimation of a likely pumping rate, which should be closer to 1.56 L/min/house of transient, not continuous, pumping. In addition, the available drawdown within TW2 represents a conservative estimate of the actual water available for drawdown. Given the expected long-term average pumping rate of 1.56 L/min/house, TW2 is only expected to experience 0.2 m of drawdown after 50 years of continuous pumping; significantly less than the available drawdown. Therefore, based on the comparison of predicted versus available drawdown in **Table 6.3**, the completed testing of the on-Site test wells is considered to confirm adequate water supply per MOECC Procedure D-5-5.

The combined water takings expected at the Site, based on an average pumping rate of 2,250 L/day/house and 67 houses, is 150,750 L/day. This is only a portion of the expected recharge which will occur on the Site (549,474 L/day), as calculated from the water balance (**Section 6.1, Appendix I**). In addition, when groundwater flow into the Site is considered (approximately 262,722 L/day), the total water takings at the

Site represent approximately 18% of the total water coming into the Site, much of which will be returned as treated effluent via septic systems.

#### 6.3.3 Radius of Influence

Based on the calculated 50 year drawdown expected within TW1 and observation well PW1 at a pumping rate of 18.75 L/min/house, the radius of influence, beyond which no drawdown is expected to occur, was estimated. The radius of influence was estimated as per Driscoll (1986) using distance-drawdown plots to estimate the distance where zero drawdown would occur and found to be approximately 300 m, not considering recharge. However, given the more realistic pumping rate of 1.56 L/min/house, a radius of influence of approximately 100 m is calculated by this method, which does not consider the effect of recharge.

For comparison, TW4 was also used to estimate the radius of influence based on the drawdown expected after 50 years pumping at 1.56 L/min/house. Results from the analysis with TW4 also indicate a radius of influence of approximately 100 m at the Site. However, the results should be considered approximate as there are no observation wells within the radius of influence to confirm drawdown. The results of this analysis are provided in **Appendix L**. Results from the analysis of TW1 and TW4 were assumed to be representative of the expected radius of influence at the Site as they were calculated to have the largest and smallest transmissivity values (see **Table 6.3**) and therefore bracket the range of transmissivities expected at the Site.

The method described above and shown in **Appendix L** provides a conservative estimate of the radius of influence as it does not consider the influence of recharge on the calculations. Recharge on Site will significantly decrease the radius of influence since the drawdown cone is expected to expand until the recharge rate is equal to the pumping rate. Therefore, an approximate radius of influence can also be estimated from the interpreted recharge rates. Assuming a recharge rate of 300 mm/year (or 8.219x10<sup>-4</sup> m/day; as determined in **Section 6.1**) and an average pumping rate of 1.56 L/min/house, the radius of influence would be approximately 29.5 m, resulting in an area of 2,738 m² (or 0.27 ha). Based on this analysis and an average lot size of approximately 0.64 ha, there is expected to be negligible supply interference between lots. Regardless of the calculated radius of influence, drawdown within the wells is estimated to be a maximum of 0.32 m after 50 years of continuous pumping at an average rate of 1.56 L/min/house (see **Table 6.3**). Therefore, drawdown within the radius of influence is expected to be very small.

Based on the FSR, wells on-Site will be placed a minimum of 30 m apart. Since the radius of influence of is conservatively expected to be 30 m at most, if wells are placed 30 m apart minor superposition of drawdown may occur where the radii intersect. The maximum superposition of drawdown is expected to occur at the midpoint between wells (15 m). However, interference between supply wells spaced 30 m apart will be negligible. The maximum drawdown from one well at this intersection point was conservatively calculated to be 0.11 m (Appendix L), which is significantly less than the available drawdown (0.5% of the available drawdown at TW1). Locations of wells on-Site are provided in the FSR.

#### 6.3.4 Radius of Contribution

The zone of contribution is different than the zone of influence calculated above. The zone of influence discussed above outlines the distance at which there is nearly zero drawdown and therefore represents the drawdown cone of a supply well. In contrast, the zone of contribution is the area where groundwater and recharge are contributing to the supply well, and this concept is similar to well head protection areas (WHPA). This zone of contribution extends further upgradient than downgradient due to the effect of

groundwater flow direction and gradient, unlike the zone of influence, which is typically more simplistically depicted as a uniform radius around the well.

The downgradient distance from the supply well to the edge of the zone of contribution is called the stagnation or null point and can be calculated using the following equation (US EPA 1987; Fileccia 2015).

$$x = \frac{Q}{2\pi Ti}$$

Where x is the distance from the well to the stagnation point (m), Q is the pumping rate (m<sup>3</sup>/day), T is the transmissivity (m<sup>2</sup>/day), and i is the horizontal hydraulic gradient (dimensionless).

By estimating the downgradient area contributing water to the supply well (distance to the stagnation point), a minimum separation distance can be determined for placing supply wells at the Site an appropriate distance from the approximated line of higher nitrate concentrations (**Figure 14**).

Based on an average pumping rate of 1.56 L/min (2.25 m³/day), a transmissivity of 9.4 m²/day, and an estimated minimum hydraulic gradient at the Site of 0.0055, the distance to the stagnation point can be calculated as below.

$$x = \frac{2.25}{2\pi(9.4)(0.0055)} = 6.9 \, m$$

Based on this analysis, a separation distance of at least 7 m should be maintained between the supply well and the line of higher nitrate concentrations. As noted above, review of the lot locations and dimensions on the Draft Plan indicates that supply wells can be located on all proposed lots in compliance with this recommendation.

#### 7 Receptors and Impacts

#### 7.1 Surrounding Groundwater Users

Potential long-term impacts to surrounding groundwater users outlined in **Section 5.9** are usually related to changes in groundwater quality and quantity. As the nitrate loading concentration at the Site boundary is only expected to be 2.17 mg/L, which is less than the ODWS of 10 mg/L, negative impacts to groundwater quality for surrounding groundwater users are not anticipated.

Potential long-term impacts to surrounding groundwater users related to groundwater quantity are also expected to be minimal as the radius of influence of on-Site water supply wells is not expected to be larger than 30 m (when recharge is considered), and total groundwater takings are small compared to the total input of groundwater and recharge at the Site. In addition, a large portion of the extracted groundwater will be reintroduced to the groundwater system via septic systems, further reducing impacts to surrounding groundwater users.

Based on the lot configurations shown in **Appendix A**, and the MOECC well record locations shown on **Figure 13**, the closest neighbouring well is approximately 145 m from the closest potential on-Site supply well (**Table 7.1**). As this is considerably larger than the estimated conservative radius of influence of 30 m, when recharge is considered, no significant impacts to water quantity at neighbouring wells are anticipated. In addition, residential wells in Belfountain are commonly completed in the dolostone / sandstone units associated with the Manitoulin and Whirlpool Formations, which underlie the Amabel Formation and Cabot Head Formation shales. Since on-Site supply wells will be screened in the Amabel

Formation, interference between on-Site wells and water supply wells in Belfountain are further reduced since these wells are not interpreted to obtain water from the same aquifer.

Table 7.1 Distance from Receptors to Closest on-Site Supply Well

Receptor	Approximate Minimum Distance to Potential on-Site Supply Well (m)	Zone of Influence of Supply Well (m)	Approximate Separation Between Zone of Influence and Receptor (m)			
Surrounding Groundwater Users	145 (lot 21)	30	115			
On-Site Wetland Features	185 (lot 20)	30	155			
Off-Site Wetland Features	164 (lot 49)	30	134			
West Credit River	370 (lot 49)	30	340			

#### 7.2 Natural Features

#### 7.2.1 On-Site Wetland Features

Potential long-term impacts to wetland features are usually related to changes in groundwater contributions to the feature and groundwater quality. As existing groundwater contributions to on-Site wetland features (SWT3-2 and MAS3-1) are considered negligible, no long-term impacts to these features are expected. Similarly, as groundwater contributions to these on-Site features are considered negligible, no negative impacts are expected from groundwater quality changes, and groundwater nitrate loadings at the on-Site wetland features are expected to be lower than the CCME / CVC guideline for NO<sub>3</sub>-as-N of 3 mg/L.

In addition, based on zone of influence analysis and the lot layout shown in **Appendix A**, the closest potential on-Site supply well is approximately 185 m from the on-Site wetland features (**Table 7.1**). As this is considerably larger than the estimated radius of influence, no significant impacts to water quantity is anticipated.

#### 7.2.2 Off-Site Wetland Features

Potential long-term impacts to off-Site wetland features will also be related to groundwater contributions and groundwater quality. Although, groundwater contributions to off-Site wetland features (SWM1-1 and MAM3-1) are expected, negative impacts are not anticipated as it is understood that infiltration measures will be utilized to maintain that pre-development infiltration on Site will be maintained post-development.

Groundwater takings from on-Site water supply wells are also not expected to have significant impacts on off-Site wetland features as total groundwater takings are small compared to the total input of groundwater and recharge at the Site. In addition, a large portion of the extracted groundwater will be reintroduced to the groundwater system through tertiary treated septic systems, further reducing impacts to natural features.

Similarly, on-Site water supply wells are not expected to directly impact off-Site wetland features as the shortest distance between the closest potential on-Site supply well and the off-Site wetland features is

approximately 164 m, which is greater than the radius of influence of approximately 30 m, when recharge is considered (**Table 7.1**). Please refer to **Appendix A** for lot locations.

In addition, supply wells primarily obtain water in the upgradient direction whereas the off-Site wetland features are downgradient of the Site. Based on radius of contribution calculations (**Section 6.3.4**), water supply wells on-Site are interpreted to draw in groundwater from approximately 7 m in the downgradient direction. This is significantly less than the distance between the closest potential on-Site supply well and the off-Site wetland features. As a result, impacts to groundwater contributions to off-Site wetland features are expected to be minimal.

Potential long-term impacts to off-Site natural features from changes in groundwater quality are also expected to be negligible as groundwater nitrate loadings at the property boundary are expected to be lower than the CCME / CVC guideline for NO<sub>3</sub>-as-N of 3 mg/L.

#### 7.2.3 Feature Based Water Balance

Based on the potential long-term impacts to on- and off-Site wetland features discussed in **Section 7.2.1** and **Section 7.2.2** above, a feature based water balance is not recommended.

A feature based water balance is not recommended for the on-Site wetland features (SWT3-2 and MAS3-1) as these features receive negligible groundwater contributions; furthermore, groundwater recharge on-Site will be maintained to minimize negative impacts. In addition, based on long-term pumping at the average annual pumping rate, the radius of influence from supply wells are not estimated to reach these features and will not impact the on-Site wetlands.

A feature based water balance is not recommended for the off-Site wetland features (SWM1-1 and MAM3-1) as groundwater recharge on-Site will be maintained with infiltration measures to sustain groundwater contributions to these wetlands. These features will also not be impacted by groundwater takings from on-Site supply wells as they are outside the predicted zone of influence. In addition, nitrate loadings at the Site boundary are below the CCME / CVC guideline and not expected to impact off-Site wetlands. Finally, as outlined in the Functional Service Report (FSR), essentially all runoff from the Site up to the 100 year storm event will be contained to the Site, which is consistent with existing Site conditions, and therefore no change in hydrological conditions at off-Site wetland features from the development is anticipated.

#### 7.2.4 Water Courses

Potential long-term impacts to the West Credit River will be related to groundwater contributions and groundwater quality. As infiltration is expected to be maintained post-development, the West Credit River is outside the zone of influence (approximate minimum distance to potential on-Site supply well is 370 m), and total groundwater takings on-Site are small and only 0.5% of the West Credit River baseflow, no changes to groundwater contributions to the West Credit River are anticipated. Similarly, long-term impacts to the West Credit River from changes in groundwater quality are expected to be minimal as groundwater nitrate loadings at the property boundary are expected to be lower than the CCME / CVC guideline for NO<sub>3</sub>-as-N of 3 mg/L.

#### 7.2.5 Karst Features

Karst features have not been identified at the Site; however, the OGS has indicated that there is the potential for karst features in the local area. Potential long-term impacts to karst features will be related to a reduction of recharge to these features or changes to water quality. As infiltration is expected to be

maintained post-development, total groundwater takings on-Site are small, and site grading requirements are expected to be kept to a minimum, negative impacts to the function of any karst features that may be present are expected to be negligible. In addition, long-term impacts to karst features from changes in groundwater quality are expected to be minimal as the nitrate loading analysis demonstrates that nitrate loading from the septic systems would be small, and long-term nitrate concentrations at the Site are expected to decrease due the overall decrease in on-Site agricultural activity.

#### 8 Summary

A summary of the hydrogeological investigation is provided below:

- The Site is located within West Credit River Subwatershed and is primarily within the Horseshoe Moraine physiographic region;
- Investigations at the Site have been completed by Terraprobe, Beatty, R.J. Burnside and COLE;
- Based on borehole logs and regional stratigraphy, the Site is generally underlain by Wentworth
  Till, glaciofluvial sediments, and Port Stanley Till. Bedrock units under the Site are the Guelph
  Formation and Amabel Formation dolostones, Cabot Head Formation shale, Manitoulin
  Formation dolostone, Whirlpool Formation sandstone, and Queenston Formation shale;
- Hydraulic conductivity estimates of the dolostone bedrock aquifer range from 4.7x10<sup>-6</sup> m/s to 2.9x10<sup>-4</sup> m/s with an average of 3.6x10<sup>-5</sup> m/s. Infiltration rates of the overburden range from 420 mm/hr to 29 mm/hr with an average of approximately 152 mm/hr;
- Groundwater levels across the Site are typically 10 to 20 mbgs with the exception of shallower
  groundwater at the on-Site wetland features (SWT3-2 and MAS3-1) where it is typically 0 to
  1 mbgs. In general, groundwater flow is primarily horizontal from south to north across the Site
  towards the West Credit River;
- On-Site groundwater quality meets the health-related ODWS for all tested parameters. Nitrate
  concentrations are below ODWS and generally increase from south to north across the Site. OnSite nitrate concentrations are attributed to on-Site and nearby agricultural activity;
- General groundwater quality on Site was found to have exceedances in total hardness and
  occasionally exceedances in turbidity with some occurrences of exceedances of aesthetic
  parameters such as total dissolved solids, sulphate, and iron. Water treatment systems are
  recommended to manage hard water and aesthetic water quality parameters;
- The one on-Site headwater drainage feature quickly infiltrates into the sandy overburden in the south of the Site. Groundwater is expected to discharge to the nearby West Credit River in support of base flow to the cold water fish habitat;
- Groundwater contributions to on-Site wetland features (SWT3-2 / MAS3-1) are estimated to be negligible. Qualitative investigations indicate that groundwater contributions to off-Site wetland features (SWM1-1 / MAM3-1) appear to be present;
- Water balance analysis indicates significant amounts of infiltration on the Site, which results
  from closed depressions within the hummocky topography and sandy overburden materials.
  Pre-development infiltration rates will be maintained post-development with no water leaving
  the Site up to the 100-year storm event;
- Nitrate loading analysis was completed in compliance with MOECC Procedure D-5-4. Nitrate loading from the 67 on-Site septic systems is expected to be 2.17 mg/L at the property

boundary, which is less than the CCME / CVC guideline for NO<sub>3</sub>-as-N of 3 mg/L. This is provided that tertiary (Level IV) treatment systems such as the Waterloo Biofilter System Inc. standard the system that is able to reduce total nitrogen by 50-65% are installed at each house;

- CCME / CVC guideline for nitrate loading is met at all downgradient natural features that may
  receive even minimal groundwater discharge, provided tertiary (Level IV) treatment systems are
  installed at each house;
- Water quality results for the Site indicate nitrate concentrations meet the ODWS; however, it is
  noted that nitrate concentrations are generally higher in the northern portion of the Site.
  Although the reduction in agricultural activity with the development of the Site is expected to
  lead to long-term reductions in nitrate concentrations, it is recommended that future supply
  wells be located in areas where existing nitrate concentrations are less than 7 mg/L. Therefore,
  no supply wells will be located north of the line of higher nitrate concentrations, with a setback
  of at least 7 m of this line, as determined by a zone of contribution analysis. Review of the lot
  locations and dimensions on the Draft Plan indicates that supply wells can be located on all
  proposed lots in compliance with this recommendation as there is a minimum of 9 m between
  the road right-of-way and the 7 m setback line where wells can be located;
- A peak pumping rate of 18.75 L/min/house and average pumping rates of 1.56 L/min/house are expected, based on MOECC procedure D-5-5;
- Completed pumping tests, by R.J. Burnside, adequately demonstrate compliance with MOECC Procedure D-5-5;
- Long-term drawdown over 50 years at the average pumping rate is much less than available drawdown at all wells analyzed;
- The radius of influence of each well, based on average pumping rate, is expected to be approximately 100 m. However, this radius does not consider the influence of recharge. Therefore, the radius of influence of each well, based on average pumping rate and recharge analysis, is expected to be approximately 29.5 m, or a 0.27 ha area, which is less than the expected average lot size. Therefore, minimal supply interference is expected between private wells;
- Supply wells on-Site will be placed a minimum of 30 m apart. Since the radius of influence of each well is expected to be 30 m, if wells are placed 30 m apart minor superposition of drawdown may occur where the radii intersect. The maximum superposition of drawdown is expected to occur at the midpoint between wells (15 m). However, interference between supply wells spaced 30 m apart will be negligible;
- Overall, minimal to negligible long-term impacts are expected to surrounding groundwater users and natural features; and,
- Feature based water balances for on-Site and off-Site wetlands are not recommended, as groundwater and surface water contributions, if any, to natural features will be maintained.

#### 9 Recommendations

Based on the presented hydrogeological investigations, the following recommendations for the development and future work are provided:

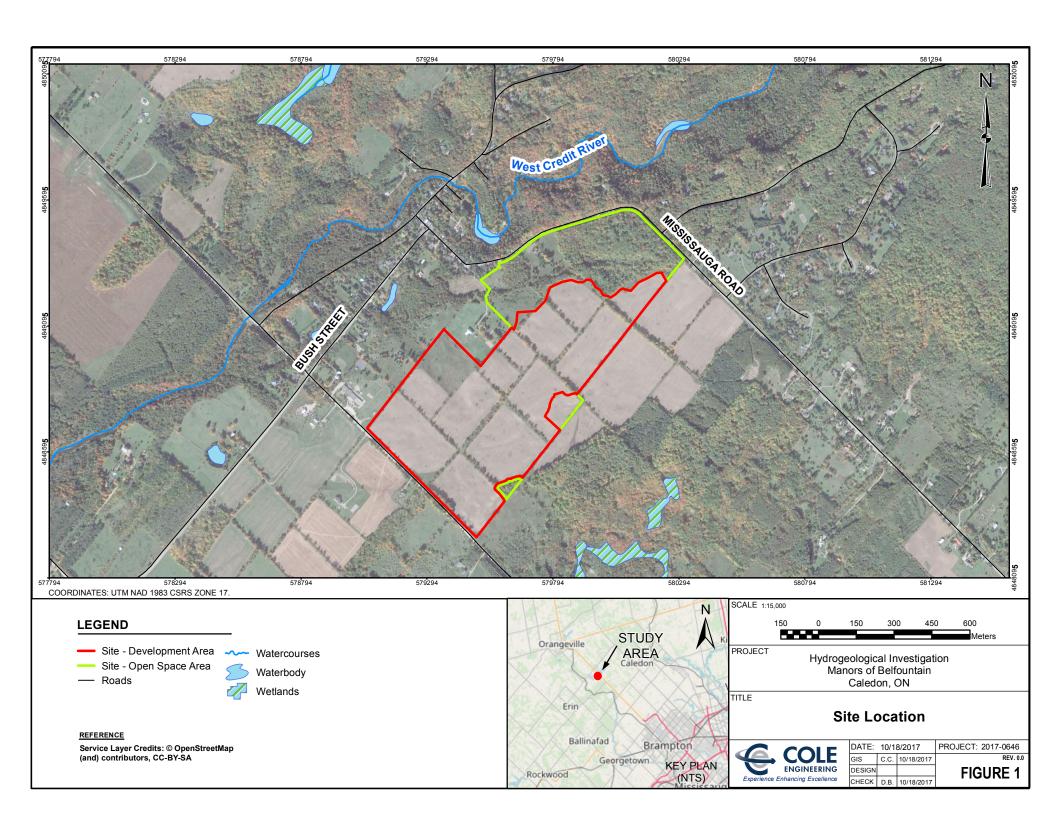
- The development can be supported by private wells based on an assessment of groundwater quality and quantity at the Site consistent with MOECC Procedure D-5-4 and D-5-5;
- The Site has appropriate subsurface conditions to support subsurface waste water disposal, and
  waste water servicing can be provided by private septic systems at each lot provided that
  tertiary (level IV) treatment systems such as the Waterloo Biofilter System Inc. standard system
  are installed;
- Based on nitrate concentrations, nitrate loading calculations, and radius of contribution
  calculations, supply wells within the Site should not be placed north of the line of higher nitrate
  concentrations, or within 7 m of this line to the south. Review of the lot locations and
  dimensions on the Draft Plan indicates that supply wells can be located on all proposed lots in
  compliance with this recommendation;
- The Site stormwater management plan should include implementation of LIDs to promote infiltration and maintain the Site water balance. Additional infiltration tests should be carried out at the Site to further quantify overburden infiltration rates in support of the detailed design of infiltration measures; and,
- An updated survey of private wells within 500 m of the Site may be beneficial to establish baseline conditions at those private wells prior to Site development.

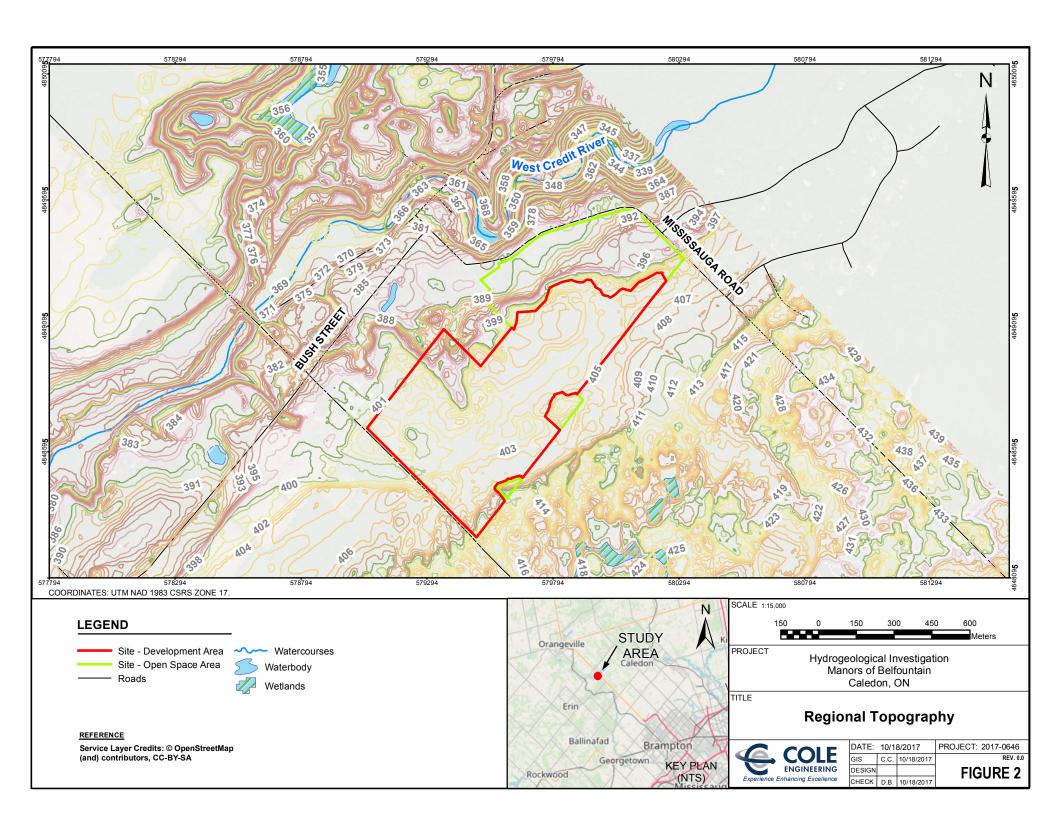
#### 10 References

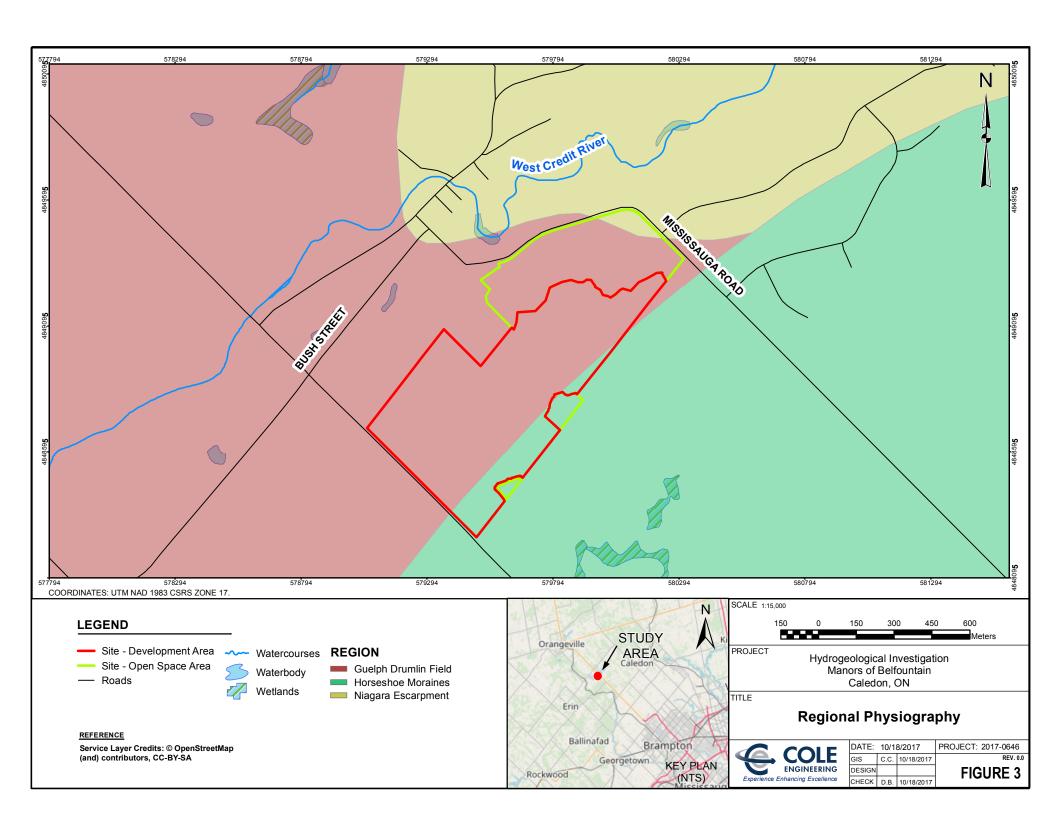
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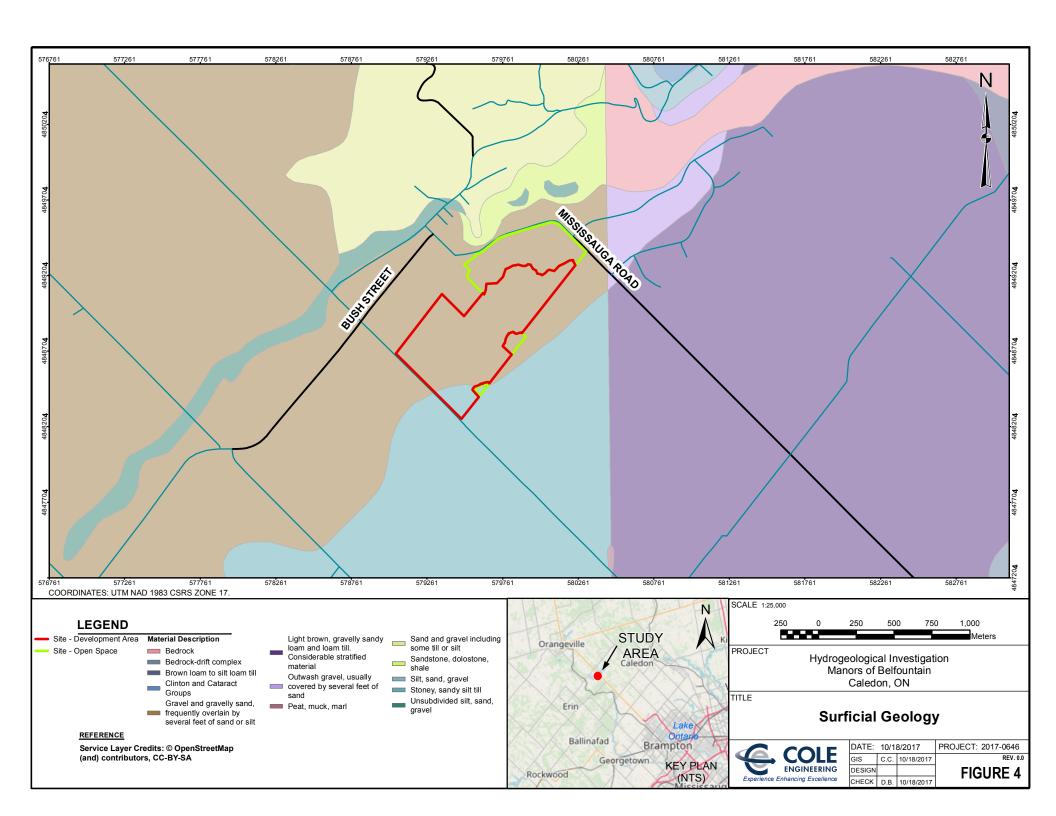
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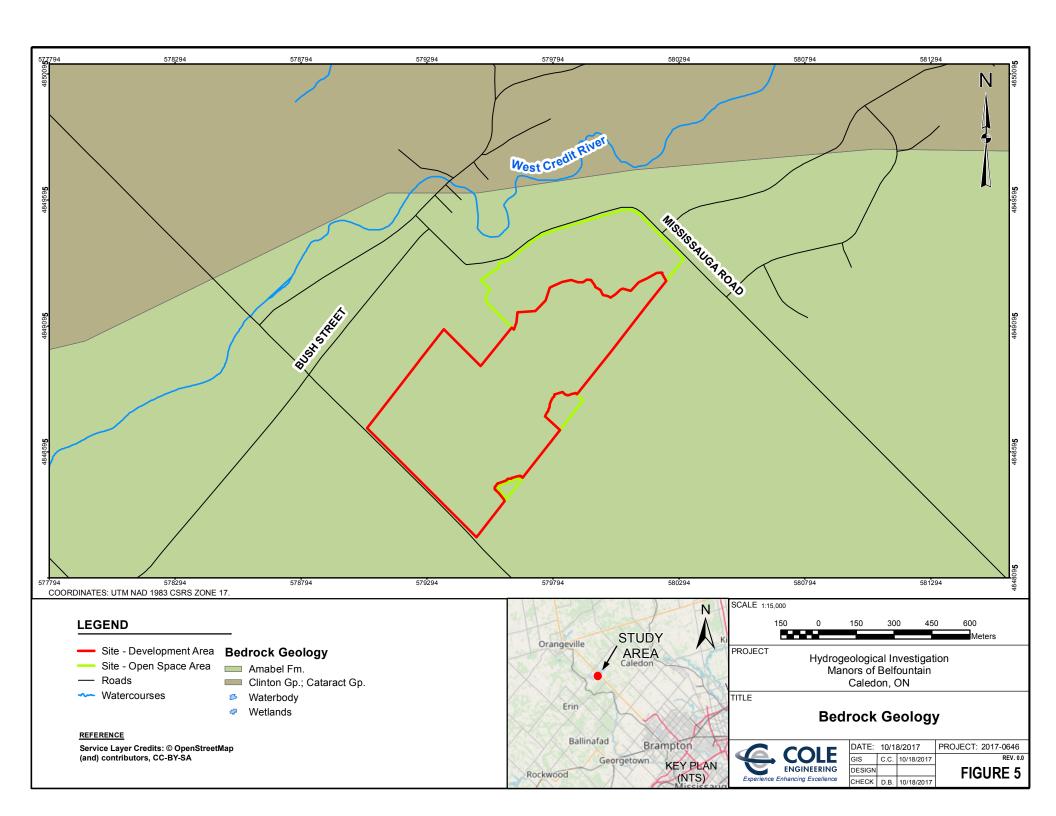
# **Figures**

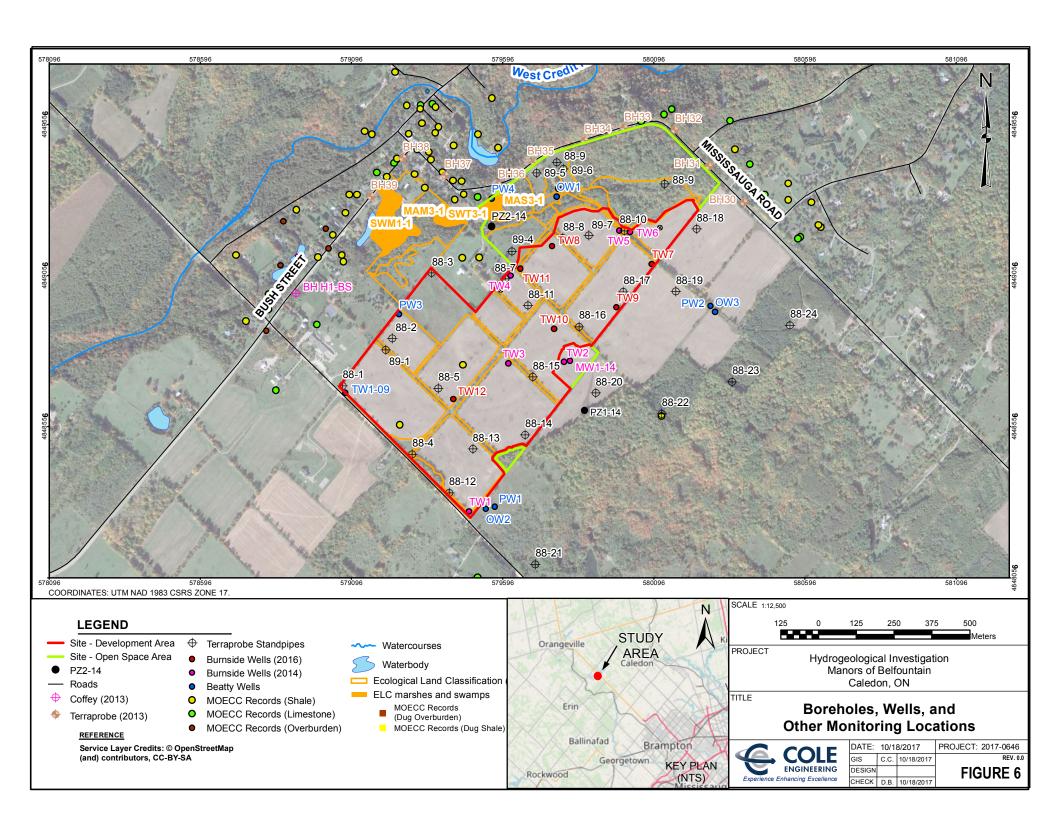


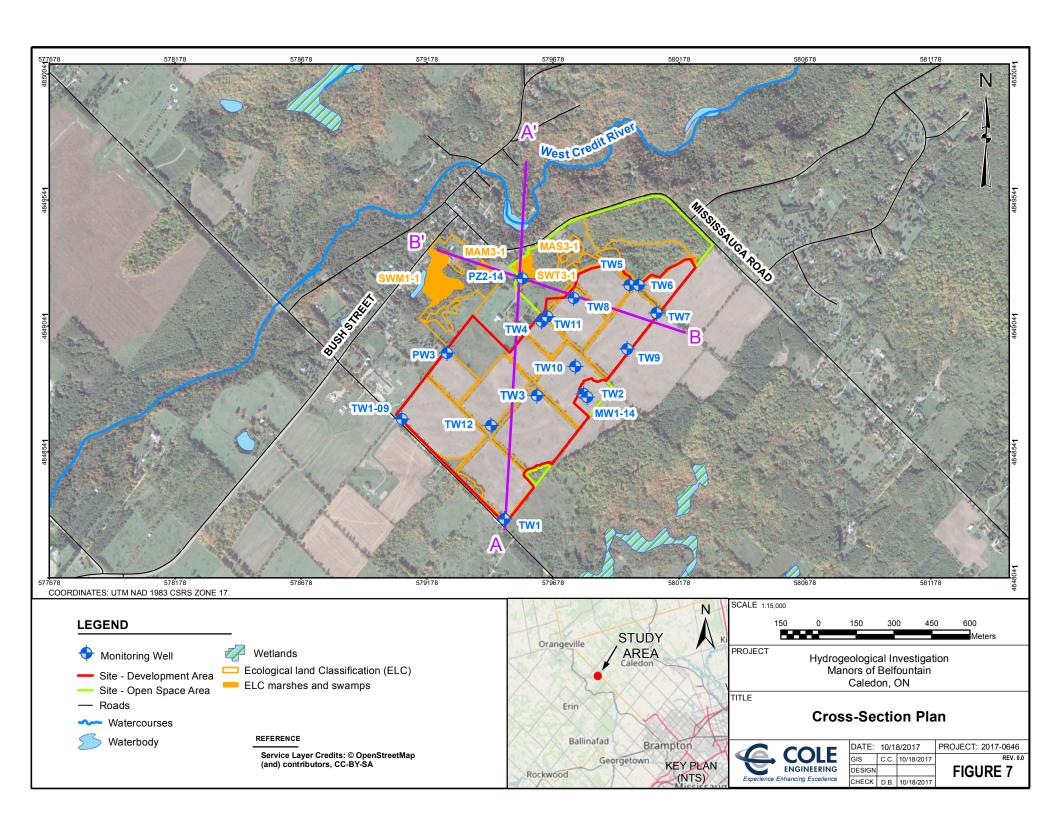


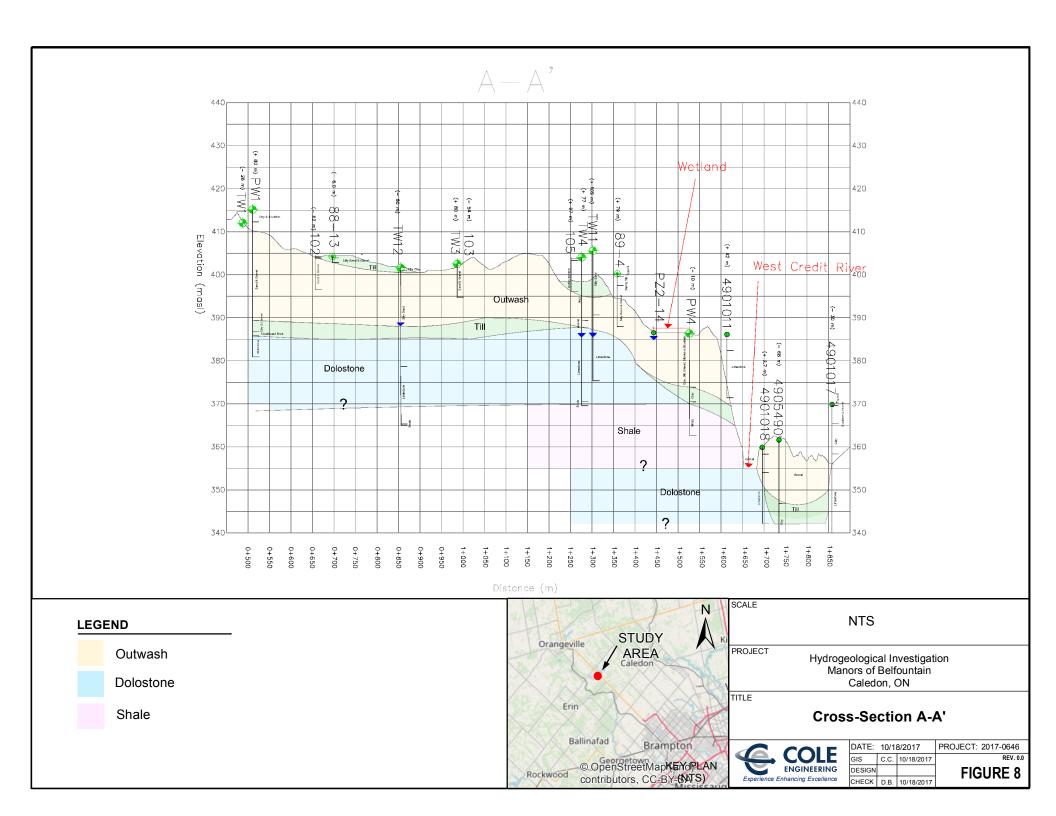


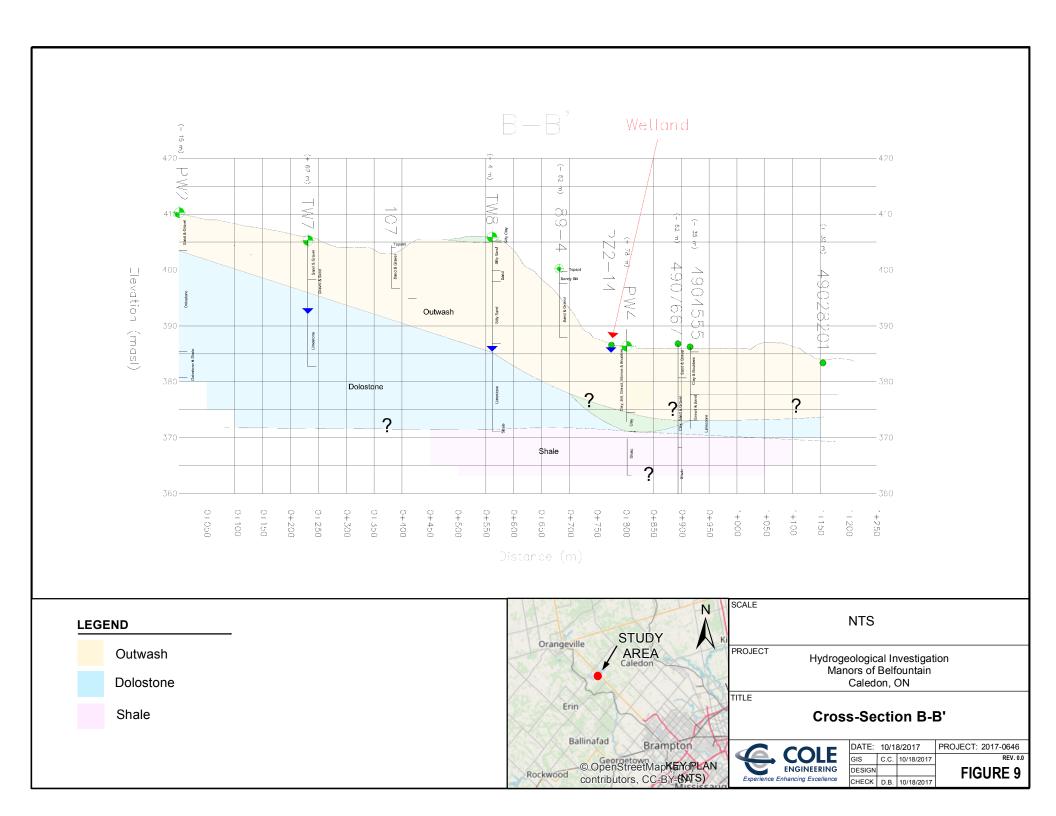


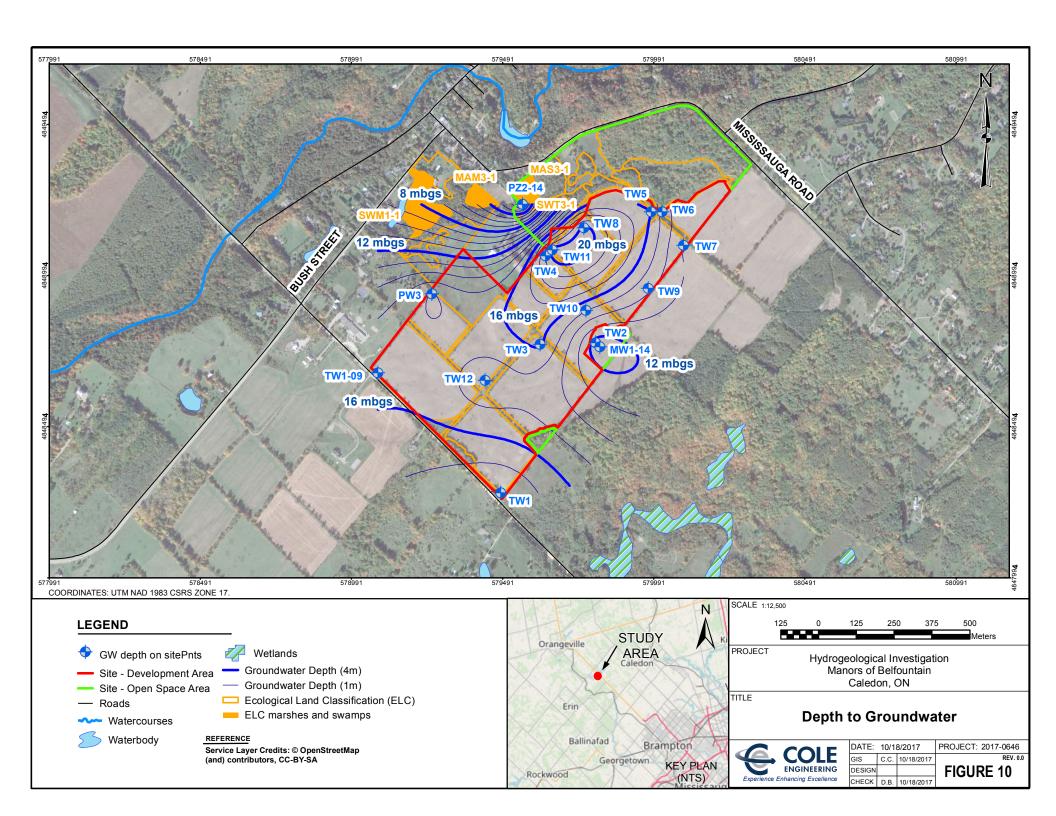


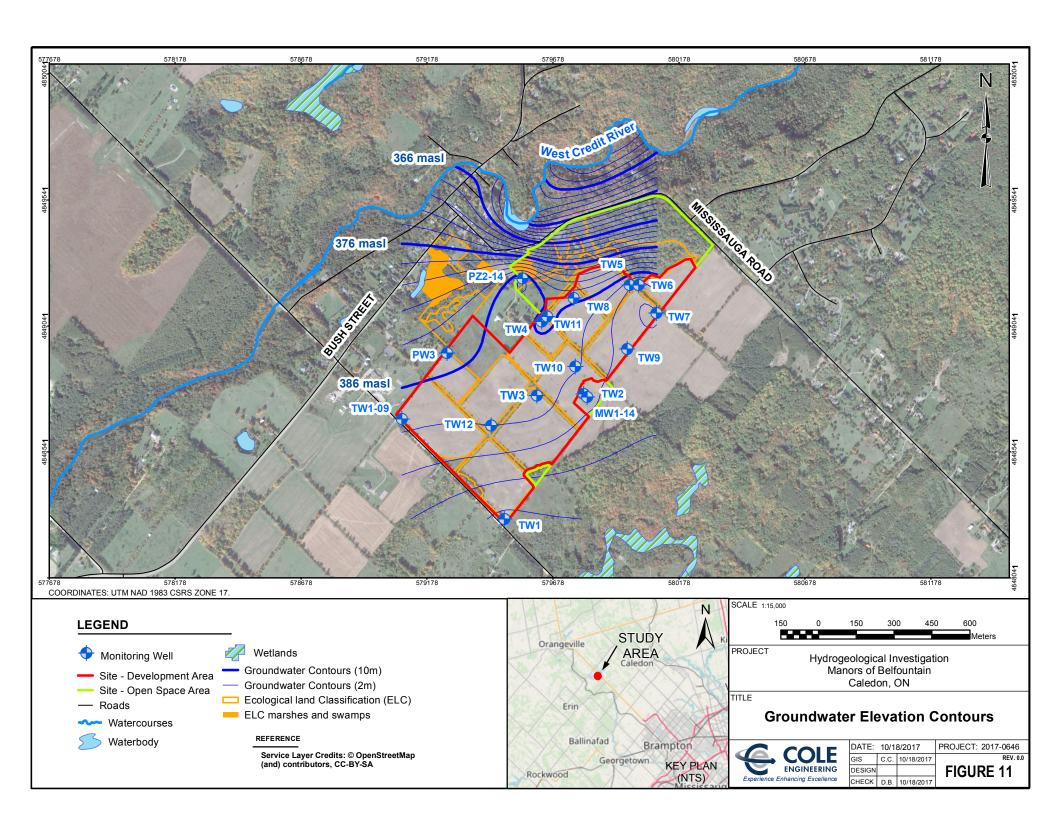


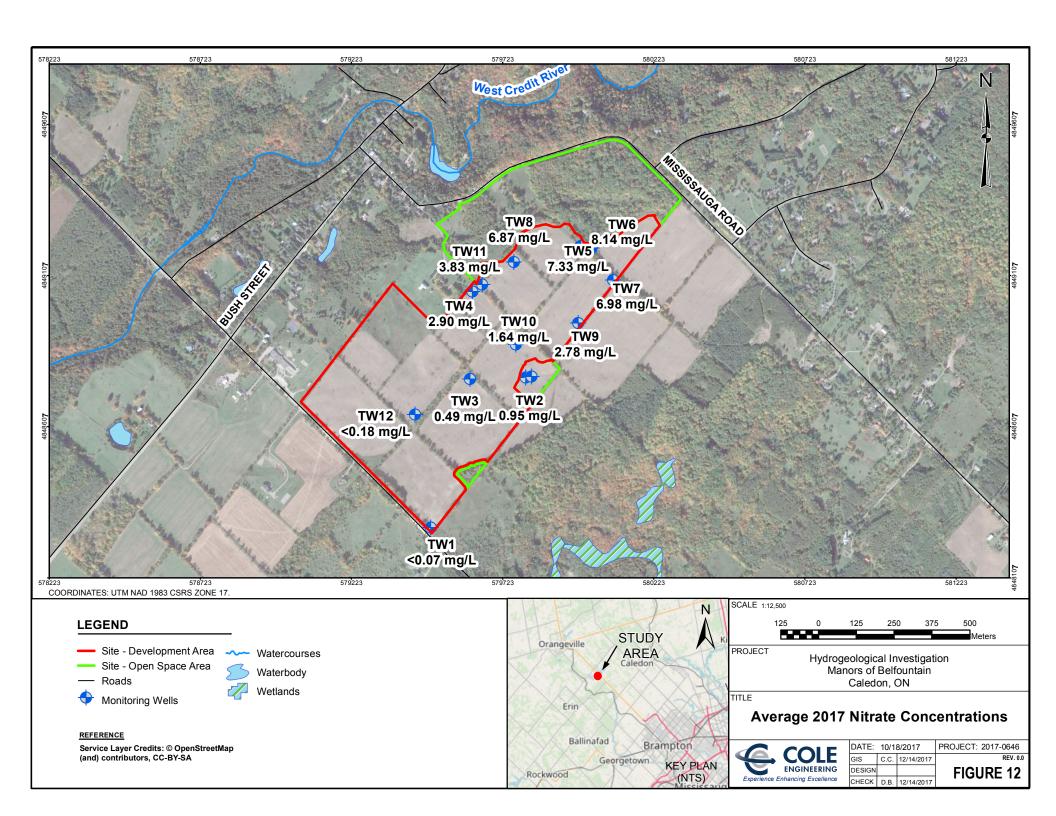


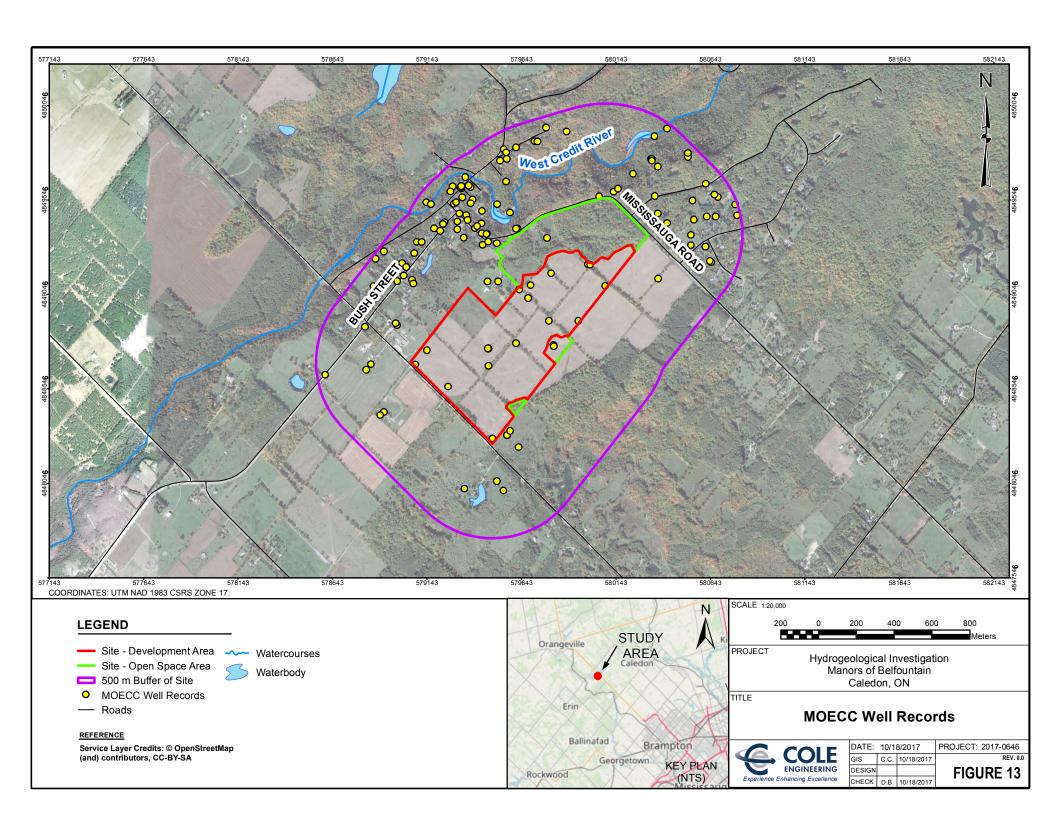


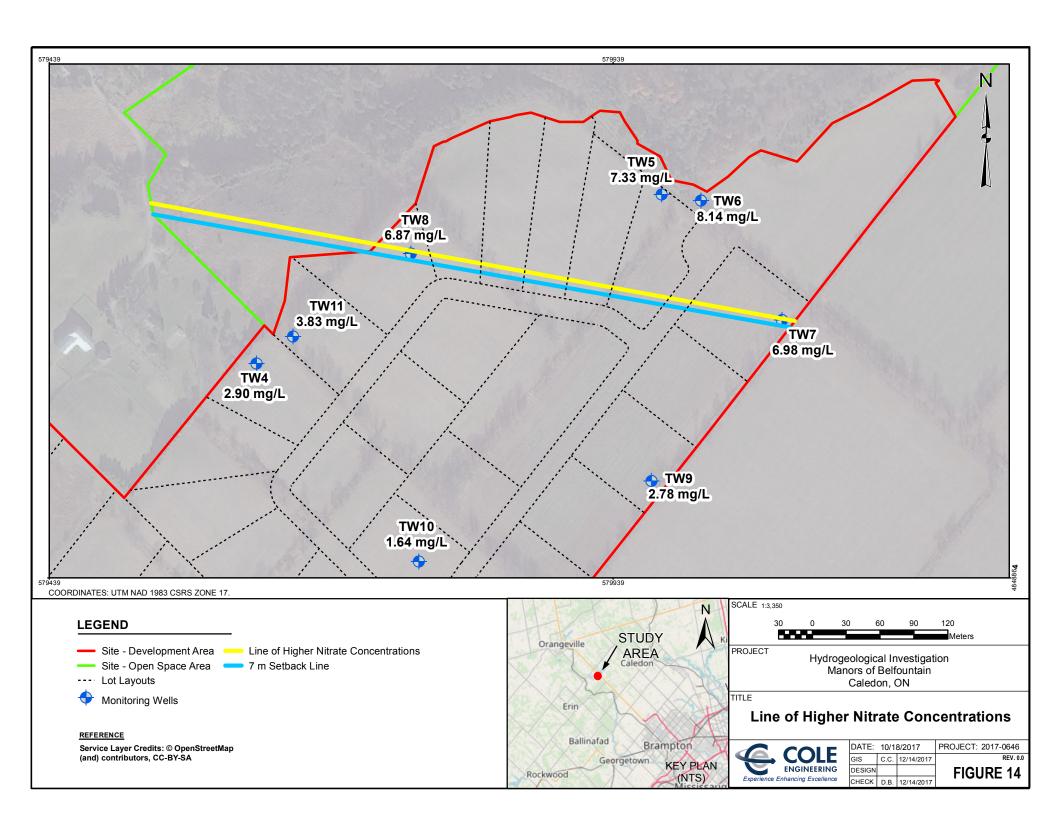




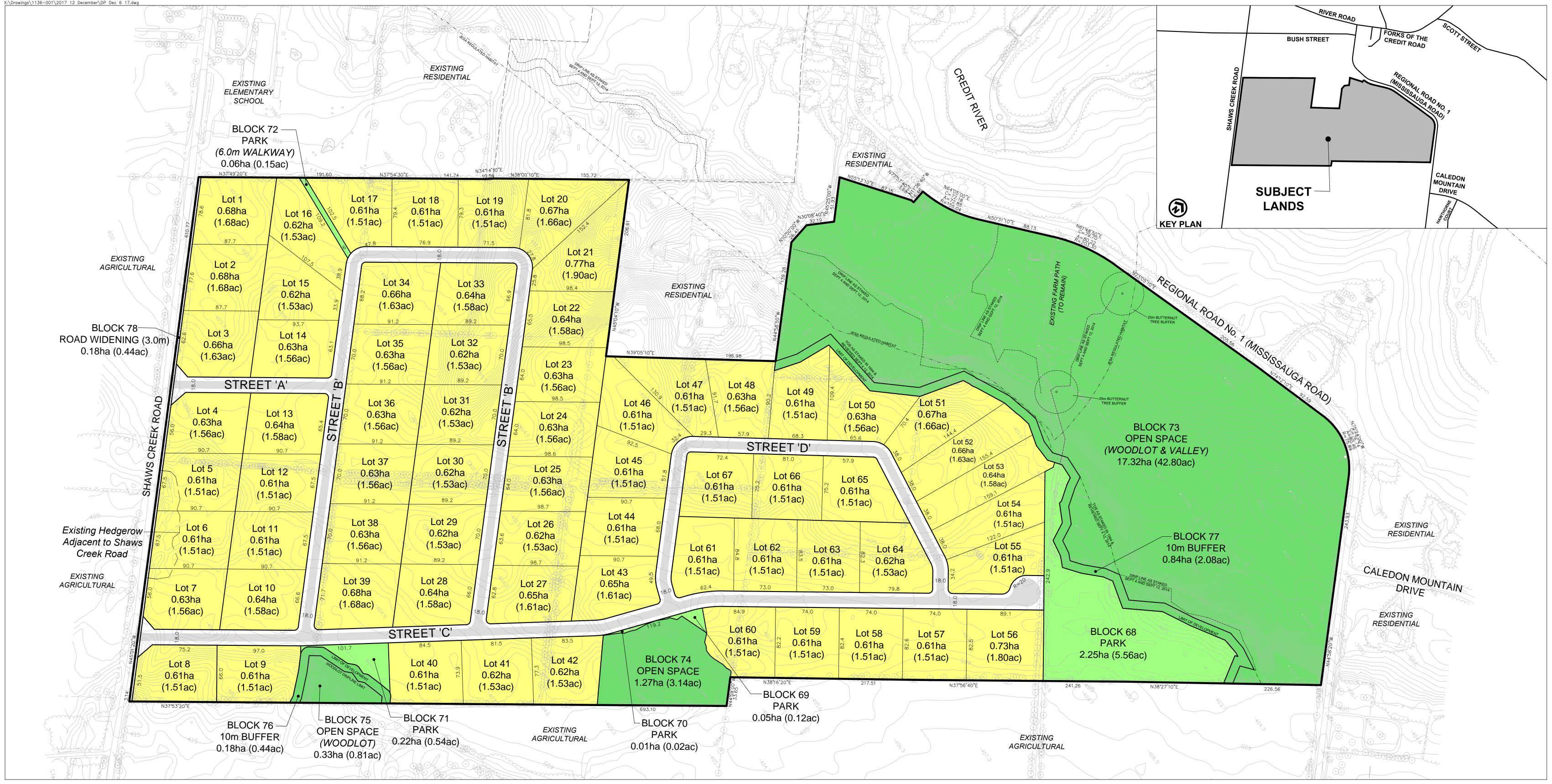








# Appendix A Draft Plan of Subdivision



# DRAFT PLAN OF SUBDIVISION MANORS OF BELFOUNTAIN CORP.

FILE # 21T-91015C

PART OF EAST HALF AND WEST HALF LOT 9, CONCESSION 5, W.H.S. (HAMLET OF BELFOUNTAIN), TOWN OF CALEDON REGIONAL MUNICIPALITY OF PEEL

## **OWNERS CERTIFICATE**

I HEREBY AUTHORIZE GLEN SCHNARR & ASSOCIATES INC. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE TOWN OF CALEDON FOR APPROVAL.

SIGNED \_\_\_\_\_\_ DATE: \_\_\_\_\_

### **SURVEYORS CERTIFICATE**

MANORS OF BELFOUNTAIN CORP.

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AS SHOWN ON THIS PLAN AND THEIR RELATIONSHIP TO ADJACENT LANDS ARE CORRECTLY AND ACCURATELY SHOWN.

DATE:

SIGNED

ALISTER SANKEY, OLS
DAVID B. SEARLES SURVEYING LTD.
4255 SHERWOODTOWNE BLVD. SUITE 206
MISSISSAUGA, ON, L4Z 1Y5
PHONE: 905-273-6840
EMAIL: info@dbsearles.ca

### ADDITIONAL INFORMATION

(UNDER SECTION 51(17) OF THE PLANNING ACT) INFORMATION REQUIRED BY CLAUSES A,B,C,D,E,F,G, & J ARE SHOWN ON THE DRAFT AND KEY PLANS.

H) MUNICIPAL AND PIPED WATER TO BE PROVIDED

I) SANDY LOAM AND CLAY LOAM

K) SANITARY AND STORM SEWERS TO BE PROVIDED

## NOTES

- Local to local radii 5.0
- Streets 'A' & 'C' to Shaws Creek Rd. daylight triangles 15.0 x 15.0
- Pavement illustration is diagrammatic only

# LAND USE SCHEDULE

LAND USE	LOTS / BLOCKS	AREA (ha)	AREA (ac)	UNITS
STATE RESIDENTIAL	1-67	42.24	104.38	67
PARK	68-72	2.60	6.42	
OPEN SPACE	73-75	18.92	46.75	
0m BUFFER	76, 77	1.02	2.52	
ROAD WIDENING	78	0.18	0.44	
8.0m ROW - (2,886m LENGTH)		5.32	13.15	
TOTAL	. 78	70.28	173.67	67





Appendix B Borehole Logs



Ministry of the Environment

Well Tag No. (Place Sticker and/or Print Below)

**Well Record** 

Regulation 903 Ontario Water Resources Act

Measurements recorded in: Metric Imperial						ag#: A16	Regulation	Regulation 903 Ontario Water Resources Act Page of					
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UTM Coordin	nates Zone	. Easting	, No	rthing	N	unicipal Plan and Subl			Other	ario	Royle Market		
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				nment Sea		rd (see instructions on the		Description				Dept	th ( <i>m/ft</i> )
General Co	olour	Most Comm	on Material		Oth	er Materials	Ger	neral Description			. F	rom	8.53
Gray	(	104 4	sto	mes					-	7 1	0	GA .	0133
13100	-Chr3	Clay	8 57	one.	5						-	53	2987
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0100	1	1100057	one		-					400	57	64	53.0
13/4	<	Shale						1	-	<del>-</del>	5.	3,03	53.9
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			e R						-			a engle of	1
-	2 1 1										100		
									11 > 22				
Depth Se	et at (m/ft)		Annular Type of Sea			Volume Placed	After test of well yiel	Results of Wo		d Testi aw Dowi		Re	ecovery
From	То	3	(Material an			(m³/ffs³)	Clear and sand		Time (min)	Water L			Water Level (m/ft)
0	10	Bent	onite	600	2.7	.73	☐ Other, specify  If pumping disconting		Static	-	)	(min)	34.76
									Level	23.4	7	1	20/10
	President of the second	principal so	Name and the second	1			Pump intake set at	(m/ft)		-	11		20,045
						L CHECK	42.6		2	26.4	4	2	50.74
Meth	od of Co	nstruction			Well Us	e and a second and a second	Pumping rate (I/mir	i / GPM)	3	20.	10	3	29,10
Cable To		Diamond	_		Comme	A STATE OF THE PARTY OF THE PAR	Duration of pumpir	ng	4	30.3	29	4	17.68
Rotary (C		)	1	estock	☐ Municipation  Municipation  Municipation  Municipation	le  Monitoring	6 hrs + 0	_min	5	31.8	77	5	26.46
☐ Boring☐ Air percu	esion	Digging	☐ Irrig		☐ Cooling	& Air Conditioning	Final water level end		10	33.8	39	10	22.70
Other, sp				ner, specify _			If flowing give rate		15	341-2	3	15	21.25
		nstruction Re			( 956)	Status of Well			20	24.2	7	20	20.73
Inside Diameter	(Galvanize	e OR Material ed, Fibreglass,	Wall Thickness	From	( <i>mlft</i> ) To	<ul><li>☐ Water Supply</li><li>☐ Replacement Well</li></ul>	Recommended pu		25	24.2	7	25	20.50
(cm/in)		Plastic, Steel)	(cm/in)	Je		Test Hole Recharge Well	Recommended pu		30	24 4	2	30	20.36
15.9	310	nach nachtur	148	.85	30.78	Dewatering Well	(I/min / GPM)		40	Dur e	2		
15.4	gaen	hole		30.78	53.94	Observation and/or Monitoring Hole	Well production (I/I	min / GPM)		34.5	ules	40	20.36
2007	Tak a		h	lance in the		Alteration (Construction)	Disinfected?	- 171 - 171 - 1	50	34.5	with 15	50	20.19
						Abandoned, Insufficient Supply	Yes No		60	34.61	)	60	20.09
Outside	С	onstruction R	ecord - Scre		(	Abandoned, Poor	Please provide a m	Map of W			ho h	nok	
Diameter (cm/in)	(Plastic, Ga	laterial alvanized, Steel)	Slot No.	From	( <i>m/ft</i> )	Water Quality Abandoned, other,	I loase provided in	ap below following	, ir istruc	doris or i	LIC D		- 1
(4,11,1)		7578	F 148 W	2000	salu i -	specify	18/					16	1
	100	*		4.03		☐ Other, specify						1	1 33
		W-4 D-4	-11-								1	/	1/2/
Water foun	d at Depth	Water Det	5-5-N(3/7/2/10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Untested		th (m/ft) Diameter	R				1		1/2
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(m	n/ft) Gas	Other, spe	cify			The state of the s		XX					
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Business A	- 1	eet Number/Na	67	- 11	Mu	unicipality	Comments:	- N°		1/2			5 × * -
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17   9	7	7 Signature	or recrinicia	an and/of CC		te Submitted	∏ No I	الالهالياليان	n 400				

Ministry of the Environment

Well Tag No. (Place Sticker and/or Print Below)

Tag #: A165390

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0	. 2	R . 1.	ute 1	Browt			-	Other, spe		(min)	(m/ft)	(min)	(m/ft)
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Meth	od of Cor	nstruction			Well Us	se .	A.1 4	Pumping rate	(I/min / GPM)	1		+	
Cable Too		Diamond	Pt		Comme	_	lot used	Duration of pu	mping	4		4	
Rotary (C	•	) ☐ Jetting ☐ Driving		omestic vestock	☐ Municip  ✓ Test Ho		Dewatering Monitoring	hrs +_	min	5		5	
Boring		Digging Digging	l	igation	☐ Cooling	& Air Condition	ing	Final water leve	el end of pumping (m/ft	10		10	
☐ Air percus				dustrial ther, <i>specify</i> _				If flowing give	rate (I/min / GPM)	15	11 "	15	
	Cor	struction R	ecord - Ca	sing		Status o	of Well		rate (I/IIIII / GFIVI)	-	1	-	
Inside Diameter	Open Hole	e OR Material ed, Fibreglass,	Wall Thickness	Depti	n ( <i>m/ftt)</i>	☐ Water Su	, , ,	Recommende	d pump depth (m/ft)	20	1	20	-
(cm/in)	Concrete,	Plastic, Steel)	(cm/in)	From	То	Replacer  Replacer				25	1	25	range .
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. or . i		o f		12.49		Dewateri		Well production	n (I/min / GPM)	40		40	
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						☐ Alteration — (Constru		Disinfected?		60		-	- 11-
						☐ Abandon Insufficie	ed, nt Supply	Yes 🗌		ا		60	
Outside	<u> </u>	onstruction R	ecord - Scr		h ( <i>m/ft</i> )	☐ Abandon Water Qı	ed, Poor	Please provide	Map of V			nack	
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el.		Kind of Wate ☐ Other, spe		Untested	From	oth ( <i>m/ft</i> ) To	Diameter (cm/ifi)	Ⅱ			No.		18/
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#### Ministry of the Environment

Well Tag No. (Place Sticker and/or Print Below)

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Tag #: A165393

1W3	Well	Record
Regulation 903 Ontari	o Water R	esources Act

Page

of Well Owner's Information Last Name / Organization First Name E-mail Address ☐ Well Constructed by Well Owner 316 Mailing Address (Street Number/Name) Province Postal Code Telephone No. (inc. area code) 7 COK7 Address of Well Location (Street Number/Name) Lot Concession Township City/Town/Village Postal Code County/District/Municipality Province Ontario UTM Coordin Municipal Plan and Sublot Number Other 4849204 NAD | 8 | 3 Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form) Depth (m/ft) General Colour Most Common Material Other Materials General Description From 10.97 **Results of Well Yield Testing Annular Space** After test of well yield, water was: Depth Set at (m/ft) Type of Sealant Used Volume Placed Draw Down Recovery aterial and Type)  $(m^3/ft^3)$ Clear and sand free Time Water Level Water Level Time (min) (m/ft) Other, specify (m/ft) (min) 10 75 0 Statio If pumping discontinued, give reason: 9C Leve 1 1 Pump intake set at (m/ft) 4. 3 3 4 Pumping rate (I/min / GPM) Well Use **Method of Construction** 94 ☐ Cable Tool ☐ Diamond ☐ Public ☐ Commercial ☐ Not used 4 4 Duration of pumping Rotary (Conventional) ☐ Jetting ☐ Domestic ☐ Municipal □ Dewatering 6 hrs + 0 min 5 ☐ Driving ☐ Livestock ☐ Monitoring Rotary (Reverse) Test Hole ☐ Boring ☐ Irrigation Final water level end of pumping (m/ft) Digging ☐ Cooling & Air Conditioning 10 10 ☐ Air percussion ☐ Industrial 23.62 Other, specify Other, specify If flowing give rate (I/min / GPM) 15 15 **Construction Record - Casing** Status of Well 20 Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel) Wall Thicknes (cm/[n) Inside Depth (m/ft) ☐ Water Supply Recommended pump depth (m/ft) Replacement Well 25 31 25 (cm/lin) From To Test Hole Recommended pump rate 30 30 Recharge Well 15.9 MX (I/min /- GPM) - 48 22.8 □ Dewatering Well 46 40 40 Observation and/or 22.8 35.91 Well production (I/min / GPM) Monitoring Hole 50 50 ☐ Alteration Disinfected? (Construction) Yes No 60 60 Abandoned. Insufficient Supply Construction Record - Screen Map of Well Location Abandoned, Poor Outside Please provide a map below following instructions on the back. Depth (m/ft) Water Quality Material (Plastic, Galvanized, Steel) Diameter Abandoned, other, From (cm/in) specify Other, specify Water Details **Hole Diameter** Diameter (cm/in) Water found at Depth Kind of Water: Fresh Tuttested Depth (m/ft) 3410 From Other, specify (m/ft) Gas Water found at Depth Kind of Water: Fresh Untested 19.81 22.8 (m/ft) Gas Other, specify 9.81 35.96 15.60 Water found at Depth Kind of Water: Fresh Untested Other, specify Well Contractor and Well Technician Information Well Contractor's Licence No. Business Address (Street Number/Name) Municipality Comments: Rd Province Business E-mail Address
Name of Well Technician (Last Name, First Name) Postal Code -19 W3R4 Ministry Use Only Well owner's Date Package Delivered Audit No.Z 1 Bus.Telephone No. (inc. area code) Name of Well Technician (Last Name, First Name)

Well Technician's Licence No. Signature of Technician and/or Contractor Date Submitted information package delivered Y Y Y Y M M D D 888 Date Work Completed Yes ☐ No ONHOND W W

0	ntario Ministr	ry of vironment		ag No. (Place Sticker a		Regulation	n 903 C			Record
Measurem	ents recorded in: 🔎 N	letric 🗌 Impe	<sub>rial</sub> Ta	ng#: A165	392			Page		of
Well Owr First Name	ner's Information	ast Name / Orga	nization	e de la companya de l	E-mail Address				7 Well	Constructed
Mailing Ado	dress (Street Number/Nan	as erty	Coupo	Municipality	Province	Postal Code	April 1	Tolonhono	by W	ell Owner area code)
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General Co	olour Most Comm	on Material	C	other Materials	Gener	al Description		6 6 6	De From	pth ( <i>m/ft</i> ) To
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Depth Se	et at ( <i>m/ft</i> )	Annular Spa Type of Sealant		Volume Placed	After test of well yield,	Results of Wowater was:	7-1	d Testing aw Down	T	Recovery
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0	10 15e	Vonite	Growt	. 75	If pumping discontinue	d, give reason:	Static	A		19.71
a v		1 8 200 0			San I		1	19.68		19.59
	Mariana Maria		Control of the Contro	A Parameter Control	Pump intake set at (n	n/(ft)	2	19.69	2	19.58
Moth	nod of Construction		Well	lleo	Pumping rate (I/min /	GPM)	3	19.69	3	19.58
Cable To	pol Diamond		☐ Comr	mercial Not used	30 3 Duration of pumping	CONTRACT CONTRACTOR	4	19.69	4	19.58
☐ Rotary (F		☐ Domest	ck 📠 Test I	Hole	6 hrs + 0 n		5	19.69	5	19.58
☐ Boring ☐ Air percu		☐ Irrigatio☐ Industri		ng & Air Conditioning	Final water level end o	f pumping <i>(m/fit)</i>	10	19.69	10	19.575
Other, sp	Construction Re	Other,		C4-4 FWI-II	If flowing give rate (I/n	nin / GPM)	15	19.69	15	19.575
Inside	Open Hole OR Material	Wall	Depth (m/ft)	Status of Well  Water Supply	Recommended pump	depth (m/ft)	20	19.69	20	19.575
Diameter (cm/m)	(Galvanized, Fibreglass, Concrete, Plastic, Steel)	Thickness (cm/ln)	From To	Replacement Well Test Hole	Recommended pump	roto	25	19.695	25	19.575
15.9	Steel	.48 4.	60 176	Recharge Well Dewatering Well	(l/min / GPM)	Tale	30	19.695	30	19.575
15.4	open hole	17	67 35.6	Observation and/or Monitoring Hole	Well production (I/min	/ GPM)	40	19.695	40	19,575
				Alteration (Construction)	Disinfected?		50	19.90	50	14-57
				Abandoned, Insufficient Supply	Yes No		60	19.70	60	19.57
Outside Diameter	Construction R	Slot No.	Depth (m/ft)	Abandoned, Poor Water Quality	Please provide a map	Map of W below following			back.	
(cm/in)	(Plastic, Galvanized, Steel)	Siot No.	From To	Abandoned, other, specify	1/				131	/ /
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34K-1115 Well Record Well Tag No. (Place Sticker and/or Print Below) Ministry of the Environment Regulation 903 Ontario Water Resources Act Tag #: A165391 Imperial Page Metric surements recorded in: Well Owner's Information First Name Last Name / Organization E-mail Address ☐ Well Constructed by Well Owner Municipality Mailing Address (Street Number/Name) Province Postal Code Telephone No. (inc. area code) ON -7C0K7 Address of Well Location (Street Number/Name) Township County/District/Municipality City/Town/Village Postal Code Province Ontario UTM Coordinates Zone Easting Northing Municipal Plan and Sublot Number Other 517191 4848788 NAD 8 3 1 7 Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form) Depth (m/ft) General Colour Most Common Material Other Materials General Description From 0 48 1280 Annular Space **Results of Well Yield Testing** After test of well yield, water was: Depth Set at (m/ft) Volume Placed (m³/ft³) Type of Sealant Used Draw Down Recovery aterial and Type) Clear and sand free Time Water Level Water Level Time Other, specify (min) (m/ft) (min) (m/ft) 10 75 Statio If pumping discontinued, give reason: 7.12 Leve 97 1 1 Pump intake set at (m/ft) 2 2 27.5 20.25 3 3 Pumping rate (I/min / GPM) **Method of Construction** Well Use 20 Cable Tool ☐ Diamond ☐ Public ☐ Commercial ☐ Not used 4 4 Duration of pumping Rotary (Conventional) ☐ Jetting ☐ Domestic ☐ Municipal □ Dewatering ( hrs + () min 5 5 ☐ Driving Rotary (Reverse) ☐ Livestock Test Hole ☐ Monitoring Final water level end of pumping (m/ft) ☐ Boring □ Digging ☐ Irrigation ☐ Cooling & Air Conditioning 10 2.00 10 Air percussion ☐ Industrial 27.1 Other, specify Other, specify If flowing give rate (I/min / GPM) 15 15 Construction Record - Casing Status of Well 22.30 20 Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel) Wall Thicknes (cm/lijn) Depth (m/ft) Inside ☐ Water Supply Recommended pump depth (m/ft) Diamete (cm/in) Replacement Well 22.56 25 From 25 Test Hole Recommended pump rate (I/min / GPM) 30 Steel 15.9 ☐ Recharge Well 30 . 48 .60 13.4 ☐ Dewatering Well 2.8 40 16-66 32.30 Observation and/or 13,41 Well production (I/min / GPM) Monitoring Hole 2:99 50 50 ☐ Alteration Disinfected? (Construction) Ol Yes No 60 60 ☐ Abandoned, Insufficient Supply Construction Record - Screen Map of Well Location Abandoned, Poor Water Quality Please provide a map below following instructions on the back. Depth (m/ft) Slot No. Diamete (Plastic, Galvanized, Steel) Abandoned, other, From (cm/in) specify Other, specify **Water Details Hole Diameter** Diameter (cm/lin) Water found at Depth Kind of Water: Fresh Untested Depth (m/ft) From (m/ft) Gas Other, specify 0 Water found at Depth Kind of Water: Fresh Untested 22.8 13.41 (m/ft) Gas Other, specify 1.90 m 13.41

32.30 Water found at Depth Kind of Water: Fresh Untested Other, specify (m/ft) Gas Well Contractor and Well Technician Information Business Name of Well Contractor Well Contractor's Licence No.

Well Initiatives L 12 Business Address (Street Number/Name) Municipality

Province Business E-mail Address Postal Code

safe @well instratives.com

Bus.Telephone No. (inc. area code) Name of Well Technician (Last Name, First Name)

Well Technician's Licence No. Signature of Technician and/or Contractor Date Submitted Name of Well Technician (Last Name, First Name)

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☐ No

Comments:

Ministry Use Only Well owner's Date Package Delivered information package delivered Y Y Y Y M M D D Yes

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Date Work Completed OF HON BY

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Ministry of the Environment

Well Tag No. (Pi

Well Record
regulation 903 Ontario Water Resources Act

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SESSESSES	Cor	struction R	ecord - Cas	sina		Status	of Well	I I flowing give	rate (I/min / GPM)		- Contract		13.16
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Well Tag No. (Place Sticker and/or Print Below)

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Ministry of the Environment Well Well Record Tag#: A201495 and Climate Change Regulation 903 Ontario Water Resources Act てい 7~1*6* Measurements recorded in: ☑-Metric ☐<del>4mpada</del>l A201495 Page of\_ Well Owner's Information Last Name / Organization First Name E-mail Address ☐ Well Constructed PROPERTY CORP ORA by Well Owner Mailing Address (Street Number/Name) Municipality Province Postal Code Telephone No. (inc. area code) 9058380200 2121 OLDE BASELINE ROAD CALEDON 67COK7 Well Location Address of Well Location (Street Number/Name) Township Concession 16800 SHAWS CREEK KOAD County/District/Municipality 9 TOWN OF CALEDON 5h City/Town/Village Postal Code Province BELFOUNTAIN Ontario L7KOE8 UTM Coordinates Zone , Easting Municipal Plan and Sublot Number Northing NAD 8 3 1 7580086 4849091 Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form) Most Common Material Depth (m/f Other Materials General Description GRAVEC, SILT + ROCKS BROWN SANO 1,c 0 SANO 7-0 7.9 GRAVEL BROWN 7.9 22.6 DEATH - 74 FEET TOTAL Annular Space Results of Well Yield Testing After test of well yield, water was: Depth Set at (m/6 Recovery Type of Sealant Used Volume Placed Draw Down (Material and Type) (m<sup>3</sup>/#<sup>2</sup>) Clear and sand free Time Water Level Time Water Level (m/<del>ft)</del> (mAt)*。*3 Other, specify 9.8 BENTONITE HOLE RUG Static If pumping discontinued, give reason: 13.30 14.24 1 13.64 1384 Pump intake set at (m/ft) 2 1394 1350 18.3 in /60 3 3 14.04 13.46 Pumping rate (I/min / GPM) Method of Construction Well Use 68.16Pm/1805GAL 4 4 Cable Tool 13:44 Diamond ☐ Public Commercial ☐ Not used 14.67 Duration of pumping Rotary (Conventional) ☑ Domestic ☐ Dewatering Jetting Municipal 2 hrs + C min 13.42 Rotary (Reverse) ☐ Monitoring ☐ Driving Livestock ☑ Test Hole Boring Irrigation Final water level end of pumping (m/ft) Digaina Cooling & Air Conditioning 10 10 17.36 14.25m/46 14,14 Air percussion ☐ Industrial Other, specify Other, specify If flowing give rate (I/min / GPM) 15 15 13.33 14.17 Construction Record - Casing Status of Well 20 20 14:17 13.30 Open Hole OR Material Depth (m/种) Inside Wall ✓ Water Supply Recommended pump depth (m/ft) Diameter Thickness (Galvanized, Fibreglass, Concrete, Plastic, Steel) Replacement Well 18.3 in /60 25 25 14.20 13.30 (cm/in) (cm/sə ☐ Test Hole Recommended pump rate Recharge Well 30 30 14.20 (l/min / GPM) 16-0 STEEL 9.8 45.4LAM/12USEPIL Dewatering Well 14.20 Observation and/or Well production (I/min / GPM) Monitoring Hole 50 50 14,24 9.8 Alteration 15.6 22.6 Disinfected? (Construction) Yes No 60 60 Abandoned, Insufficient Supply Map of Well Location Construction Record - Screen Abandoned, Poor Please provide a map below following instructions on the back. Outside Depth (m/ft) Water Quality Material Slot No (Plastic, Galvanized, Steel) Abandoned, other, From specify Other, specify Water Details Hole Diameter Depth (m/ff) Water found at Depth Kind of Water: Fresh Huntested Diameter (cm/in) /7. 4 (m/ft) ☐ Gas ☐ Other, specify ☐ Water found at Depth Kind of Water: ☐ Fresh ☑ Untested 6.1 25.0 21.3 (m/#) Gas Other, specify 22, 2 9.8 Water found at Depth Kind of Water: Fresh Untested 9.8 (m/ft) Gas Other, specify 22.6 15.6 Well Contractor and Well Technician Information Business Name of Well Contractor WELL | NITIATILE 5
Business Address (Street Number/Name) Municipality Comments 15 TOCCHLINE CRANGEVILLA Business E-mail Addres Bus. Telephone No. (inc. area code) Name of Well into Quellinitiative so com Well Technician (Last Name, First Name) Ministry Use Only Well owner's Date Package Delivered information Audit No.**z** 2217 package delivered Well Technician's Licence No. Signature of Tech Date Work Completed Yes ⊠ No 20160305 20160219 © Queen's Printer for Ontario. 2014 Ministria Can

Tag#: A201497 Ministry of the Environment Well low) Well Record and Climate Change Regulation 903 Ontario Water Resources Act 100 Y - 16Measurements recorded in:  $\square$  Metric  $\square$  Imperial 1201497 Page 4 of Well Owner's Information First Name Last Name / Organization E-mail Address Mailing Address (Street Number/Name) ☐ Well Constructed CORP by Well Owner Municipality Province Postal Code Telephone No. (inc. area code) 2121 OLDE BASELINE 4700K79098380200 CALEDON OM Well Location Address of Well Location (Street Number/Name)
16860 SHAWS CREEK ROAD Township Concession 9 5W TOWN OF CALEDON County/District/Municipality City/Town/Village Postal Code Province PEEL BELFOUNTAIN Ontario L7KOE8 UTM Coordinates | Zone , Easting Northing Municipal Plan and Sublot Number Other NAD 8 3 1 7 5 7 9 8 0 1 4 8 4 9 1 5 7 Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form) Most Common Material Depth (m/g) Other Materials General Description ھے BROWN 16 SILTY CEAY STOMES SILTY SAND 5.8 ,6 5.8 7.9 10.7 14.9 10-1 14.9 18.9 18.9 GREEN SHALE 34.4 34.1 DEPTH-114 FEET TOTAL Annular Space Results of Well Yield Testing Type of Sealant Used After test of well yield, water was: Depth Set at (m/ft) Volume Placed Draw Down Recovery (m³.<del>46°</del>) Time Water Level Time Water Level (Material and Type) Clear and sand free (min) (m#) (m/2) Other, specify BENTONITE HOLEPLUS 3 Static If pumping discontinued, give reason: 26.73 21.08 Level .02 24.46 21.75 Pump intake set at (m/ft) 23-88 2 22,06 2 30.5m /100 Pumping rate (Virnin / GPM) 22.32 3 23.14 Well Use Method of Construction 11.46pm/305GPm 22,56 12.96 Cable Tool ☐ Diamond ☐ Public Commercial ☐ Not used Duration of pumping N Domestic ☐ Rotary (Conventional) ☐ Dewatering ☐ Monitoring Jetting ☐ Municipal 2 hrs +0 \_ min 5 5 22.60 22,80 Rotary (Reverse) ☐ Driving Livestock ☑ Test Hole Final water level end of pumping (m/ft) Boring Digging ☐ Irrigation Cooling & Air Conditioning 22.78 10 23.30 10 25.73m Air percussion ☐ Industrial Other, specify Other, specify 24.08 21,14 If flowing give rate (I/min / GPM) Construction Record - Casing Status of Well 21.11 24.58 20 20 Depth (m/te) Recommended pump depth (m/ft) Open Hole OR Material Water Supply Inside Wall (Galvanized, Fibreglass, Concrete, Plastic, Steel) Thickness (cm/in) Diamete Replacement Well 24.96 25 21.11 Τo (cm/in) From ☐ Test Hole Recommended pump rate 21.11 Recharge Well 25.22 to 6 16-0 . 5 19.5 (I/min / GPM) STEEL 11.4LPm/3US6Pm Well production (Irmin / GPM) Dewatering Well 40 29.29 40 21.11 Observation and/or Monitoring Hole 50 25.47 50 21.// Alteration (Construction) 19.5 34.7 156 CPEN HOLE Disinfected? ▼ Yes □ No 21.11 29.60 Abandoned, Insufficient Supply Map of Well Location Construction Record - Screen Abandoned, Poor Outside Water Quality Please provide a map below following instructions on the back. Depth (m/ft) Material (Plastic, Galvanized, Steel) Diameter (cm/in) Slot No. Abandoned, other, From BUSH STREET specify Other, specify m155155AUG Hole Diameter Water Details Water found at Depth Kind of Water: Fresh Kuntested Depth (m# Diameter From (m/# Gas Other, specify 25.0 Water found at Depth Kind of Water: Fresh Untested (m/ft) Gas Other, specify 19.5 22, 2 6.4 Water found at Depth Kind of Water: Fresh Untested 19.5 (m/ft) Gas Other, specify 15.6 Well Contractor and Well Technician Information Business Name of Well Contractor Well Contractor's Licence No WELL MITUATIVES
Business Address (Street Number/Name) 2 2 Municipality Comments 15 TOWNLINE CRANGELILLE Province Postal Code CN L9 23 R4 Mo & well at traffes, con Bus. Telephone No. (inc. area code) Name of Well Technician (Last Name First Name) Business F-mail Address Well owner's Ministry Use Only Date Package Delivered Audit No.Z 2 2 1 7 | v | | + | - a | Well Technician's Licence No. Signature of Technician and/or Contractor Date Submitted package delivered Date Work Completed Yes **⋈** No 0 3 7 20160223 20160305 0506E (2014/11) © Queen's Printer for Ontario, 2014 Ministry's Copy

Ministry of the Environment Tag#: A201496 Well Well Record and Climate Change Regulation 903 Ontario Water Resources Act TW9-16 Measurements recorded in: AMetric A201496 Well Owner's Information Last Name / Organization First Name E-mail Address ☐ Well Constructed PROPERTY CORP ORB by Well Owner Mailing Address (Street Number/Name)
2121 OLDE BASELINE Municipality Postal Code Telephone No. (inc. area code) Province 1700K79098380200 CALEDON Well Location Address of Well Location (Street Number/Name Township Lof Concession 16800 SHAWS CREEK KOAD City/Town/Village
BELFOONTHIM 5u CALEDON County/District/Municipality Province Postal Code REL Ontario L7KOE & Coordinates Zone Easting Municipal Plan and Sublot Number Northing Other 175499454848906 Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form) Most Common Material Other Materials General Description SILTY CLAY BROWN STONES 6 BROWN , 6 SILTY SAND 3-7 9.8 LIME STOKE 9.8 SHALE 35.1 REEN 35.4 TOTAL PEPTH 116 FEET Results of Well Yield Testing Annular Space Depth Set at (m/#) After test of well yield, water was: Type of Sealant Used Volume Placed Draw Down Recovery Time | Water Level (Material and Type)  $(m^3 A^6)$ Water Level ☑ Clear and sand free Time (min) (m/<del>Rt</del> (m/# Other, specify BENTONITE HOLEPLUG .24 Static If pumping discontinued, give reason: 16.84 14-70 Level 34.1 35.4 CUTTING'S 1 1 15-38 15.91 Pump intake set at (*m/ft*) 22.9 m / 75 15.60 15.71 15.86 15.56 Pumping rate (I/min / GPM) Well Use Method of Construction 56. ELPM /15056 PM Duration of pumping ☐ Diamond ☐ Jetting 4 15.98 4 15.47 Cable Tool Public Commercial ☐ Not used Rotary (Conventional) ☑ Domestic ☐ Municipal □ Dewatering 2 hrs + 0 min 16.06 15.40 Livestock  $\square$  Rotary (Reverse) ☐ Driving ∠ Test Hole ☐ Monitoring Cooling & Air Conditioning Boring Irrigation Final water level end of pumping (m/ft) □ Digging 16.31 15.23 ☐ Air percussion ☐ Industrial 16.84m Other, specify Other, specify 15 16.42 15 If flowing give rate (I/min / GPM) 15.16 Construction Record - Casing Status of Well 16.49 20 15.12 Wall Thickness (cm/i<del>ii)</del> Water Supply Depth (m/a) Inside Open Hole OR Material Recommended pump depth (m/ft) (Galvanized, Fibreglass, Concrete, Plastic, Steel) Replacement Well 22.9~ /75 16.53 15.09 From To Test Hole Recommended pump rate (I/min / GPM) 30 16.57 30 Recharge Well 1507 160 STEEL 05 11.6 45.4CPM/12096Pm Dewatering Well 40 16.62 40 15.03 10,1 34,1 Observation and/or Well production (I/min / GPM) 12.8 ASTIC Monitoring Hole 16.66 15.00 ☐ Alteration 341 35.4 OPEN HOLE 15.6 Disinfected? (Construction) 16.70 🔀 Yes 🗌 No 60 60 14,58 Abandoned Insufficient Supply Map of Well Location Construction Record - Screen Abandoned, Poor Water Quality Please provide a map below following instructions on the back. Outside Depth (m/ft) Diameter Slot No. Abandoned, other, (Plastic, Galvanized, Steel) From (cm/in) 13094 57 specify Other, specify Water Details Hole Diameter Depth (m#) Diameter Water found at Depth Kind of Water: Fresh Untested From (cm/in) (m/ft) Gas Other, specify Water found at Depth Kind of Water: Fresh Untested 25.0 0 C.4 (m/ft) Gas Other, specify 11.6 22.2 6-4 Water found at Depth Kind of Water: Fresh Untested 11.6 35.4 19.6 (m/ft) Gas Other, specify \_ Well Contractor and Well Technician Information Business Name of Well Contractor Well Contractor's Licence No. WELL / HIT IATIVES
Business Address (Street Number/Name) 722 Municipality Comments: From 12.8m 70 14.00 VOID TOWNLINE ORANGE VILLE PLASTIC LINER INSTALLED Bus. Telephone No. (inc. area code) Name of Well Technician (Last Name, First Name)

5198468289 BROMFOOT J. ...
Well Technician's Licence No. Sanata Province Ministry Use Only Date Package Delivered Audit No.Z 221733 information package delivered Date Work Completed Yes Yes Signature of Technician and/or Contractor Date Submitted 0370 X No 20160225 20160305

0506E (2014/11)

Ministry of the Environment Well Tag#: A201493 Well Record low) and Climate Change Regulation 903 Ontario Water Resources Act Tw 10 - 16 leasurements recorded in: A201493 Metric Imperial Page | of Well Owner's Information First Name Last Name / Organization E-mail Address ☐ Well Constructed PROPERTY ORB (ORP by Well Owner Mailing Address (Street Number/Name)
2121 OUDE DASELIME Municipality Province Telephone No. (inc. area code) 1700K79058380200 CALRDON ON Well Location Address of Well Location (Street Number/Name) Township Concession Town City/Town/Village 16800 SHAWS CREEK 9 5 W OF CALEDON County/District/Municipality Province Postal Code PEEL
UTM Coordinates | Zone | Easting BELFOUNTAIN
Municipal Plan and Sublot Number Ontario 17KOE8 Northing Other NAD 8 3 17 57 5 7 7 9 4 8 4 8 9 0 6 Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form) Depth (m/ Most Common Material Other Materials General Description From BROWN SILTY SAND .6 STONES SILTY SAND BROWN ,6 3.7 GRAVEL +SAND 3.7 9.4 12.8 LIMESTONE 14.9 30.2 DEPTH- 99 FEET TOTAL Results of Well Yield Testing Annular Space Depth Set at (ma After test of well yield, water was: Recovery Draw Down Type of Sealant Used Volume Placed (Material and Type) (m3/20) Clear and sand free Time Water Level Time Water Level (min) (m/h) (m/tt)Other, specify BENTONITE HOLEPLUC -24 11.0 Statio If pumping discontinued, give reason: 16-54 15.07 Level 1 15.50 1 15.17 Pump intake set at (*m/ft*) 22.9 m / 75 15.14 2 15.84 3 3 Pumping rate (I/min / GPM) 15.99 15-13 Method of Construction Well Use 113.6 LPm / 3005 GPin Duration of pumping 4 4 15.13 Cable Tool Diamond Public ☐ Commercial ☐ Not used 16-10 Rotary (Conventional) ☐ Jetting ☑ Domestic □ Dewatering ☐ Municipal 5 16.15 5 15.13 2 hrs + O min Rotary (Reverse) ☐ Driving Livestock ✓ Test Hole ☐ Monitoring Boring Final water level end of pumping (m/8) Digging ☐ Irrigation Cooling & Air Conditioning 10 10 15-12 16.26 16.54 ☐ Industrial ☐ Air percussion Other, specify Other, specify 15 16.33 15 If flowing give rate (I/min / GPM) 15.12 Construction Record - Casing Status of Well 20 20 16-38 15.12 Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel) Inside Depth (m典) Water Supply Wall Recommended pump depth (m/ft) Thickness 22.9m/75'
Recommended pump rate Replacement Well 25 25 15.12 From 16-40 (cmAz) (cm/in) Test Hole t. 78 30 16.42 30 Recharge Well 15-11 16.8 STEEL 16.0 /min / GPM) ☐ Dewatering Well Well production (I/min / GPM) 40 16.44 40 15.11 Observation and/or Monitoring Hole 50 50 16.45 15.10 Alteration 15.6 16.8 30.2 OPEN HOLE Disinfected? (Construction) 15.10 60 16.46 60 Yes No Abandoned, Insufficient Supply Map of Well Location Construction Record - Screen Abandoned, Poor Please provide a map below following instructions on the back. Outside Depth (m/ft) Water Quality Material Diameter Slot No Abandoned, other, STREET (Plastic, Galvanized, Steel) BUSH From (cm/in) specify 4 Other, specify MISSISS AUGA Water Details Hole Diameter Water found at Depth Kind of Water: Fresh XUntested Depth (m#) 755 m From (cm/m) 25.0 (m/ft) ☐ Gas ☐ Other, specify \_\_\_\_\_\_ Water found at Depth Kind of Water: ☐ Fresh K Untested 6.4 0 29.0 (m/€) ☐ Gas ☐ Other, specify 6.4 16.8 22.2 Water found at Depth Kind of Water: Fresh Z Untested 16.8 29\_0 (m/# Gas Other, specify 30.2 15.6 100 Well Contractor and Well Technician Information Business Name of Well Contractor Well Contractor's Licence No WELL HITIATIVES 7221 Business Address (Street Number Municipality Comments 15 TOWNLINE ORANGEVILLE Business E-mail Address Province ON 16 9 W 3 R 4 into B willing tratings. com nc. area code) Name of Well Technician (Last Name, First Name) Well owner's Date Package Delivered Ministry Use Only information Bus. Telephone No. (inc. area code) Name o Audit No. **z** 2217 package delivered YYYMMD Date Work Completed Yes Well Technician's Licence No. Contractor Date Submitted 0 3 7 0 Re 20160305 No 20160225 © Queen's Printer for Ontario. 2014 Miniatoria Ca

	- 16 ents record	ved in: bet	fletric ⊡15	<del>portal</del>		A2	0140	74			ge	of
Well Own	ner's Info		ast Name / C	rganization	Safetia de la			E-mail Address			40.0000	
OR	_	OPERT						E-mail Address			_	Constructed ell Owner
Mailing Add	dress (Stree	t Number/Nan	ne)			Municipality		Province	Postal Code		1	area code)
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Nell Local Address of		on (Street Nur	nber/Name)	<u> Karil</u> aa	ayer) ajjajo T	Township		<u>Disabitya 18 sati Yariya</u>	Lot	Conces	sion	
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	····			ment Sea				back of this form)	<u> </u>		Dei	oth (m##
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Depth Se From	et at (m##)		Type of Seal (Material and				e Placed <sup>9,<b>446</b>)</sup>	After test of well yield  Clear and sand		Draw Dow		Recovery Water Level
0	11-0	BENTO	NITE H	31 0 01	UG-	12	4	Other, specify		(min) (m4		(m/n <del>)</del>
Andrew Control of the						water the same of		If pumping discontinu	ed, give reason:	Static Level 20-8	-&-	21.25
										1 21.2	_/ 1	20.86
		-						Pump intake set at (		2 21.2	3 2	20.89
	<u> </u>							22-5cm /79 Pumping rate (1/min.)		3 21.2	<b>4</b> 3	20.89
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☐ Rotary (F ☐ Boring	Reverse)	☐ Driving☐ Digging ::	Live		Test H	ole g & Air Conditi	Monitoring	Final water level end				20.89
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Other, sp				er, specify _				If flowing give rate (I	/min / GPM)	15 21.2	2 <b>5</b> 15	20.87
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Business A  15 To  Province  ON  Bus.Telepho  5     9	F   L	Postal Code  9 w 3 R  area code) Na  F 2 8 9  No. Signature	4 into ame of Well T	echnician (I FOOT n and/or Co	Last Name	e, First Name)		information package delivered Date	Package Deliver	Audit N		e Only 1735

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	ner's	Information						TE NAJ	4.4			4.20	
First Name	ORG	3 PRO	ast Name / C	rganizat	ORP			E-mail Address					Constructed ell Owner
-		Street Number/Nam	me)	_	ĺ	Municipality  ALEDOM		Province O M	Postal Code	i	Felephone N		
Well Loca	ation												
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County/Dis	trict/Mu				(	City/Town/Village				Provin	ce	Postal	Code との点を
		Zone Easting	I No	rthing	1	BECFOUNT Municipal Plan and Sul	olot N	umber		Other		<u>~</u> /	KO S
		175790 Bedrock Materi				ord (see instructions on t	he bac	ck of this form)					n carano di
General Co	olour		non Material			ner Materials			ral Description			Dep From	th ( <i>m/<del>ft)</del></i> To
BROWN		51674 Ce					_					0	- 6
Brain		51678 S	440	1	-RAVE				AMERICAN STREET, STREE	***		, 6 2.7	7.6
BROW		SAND SICTY S	SAUD		FRAVE							1.6	11.6
BROWN	i	51617 S	•		SRAUF	2						1.6	17.4
Brown		51274 5			SREY (							17.4	
_		Lima 57					( p	TERMIXE					36.3
GAT		SHALETLIN	NE STO	NE		Tan. 6	<u>ا</u> م	T./ 17 2	E			36.3	36.6
September September 1981			Annular	Space	at La	TOTAL D	7		Results of We	II Yiel	d Testing	7769	
Depth Se	et at (m.		Type of Sea (Material and		1	Volume Placed (m³/♣²)	- 11	ter test of well yield.  Clear and sand f			aw Down Water Leve		ecovery Water Level
0	11	BENTE	ON ITK	Ho	LÆPLVG		- 11 -	Other, specify	d give recent	(min) Static	(m/s> 14.90	(min)	(m/f <del>t)</del> 27.72
***************************************								pumping discontinue	d, give reason.	Level 1		1	23.70
	124							ump intake set at (n		2	17-70	2	21.67
***************************************								30.5 m//c		3	19.86	-	20.23
Meth		f Construction  Diamone	d Dut	ilic	Well Us	<del></del>	-	45.42Pm/1.	,	4	20.08	4	19.56
Rotary (0		tional)	☑ Dor		☐ Municip <b>⊠</b> Test Ho		9	uration of pumping 2 hrs + 0 r	nin	5	20.27	5	19.03
☐ Boring ☐ Air percu	ussion	☐ Digging	☐ Irrig		Cooling	g & Air Conditioning	Fi	nal water level end o	f pumping (m <del>17)</del>	10	20.52	10	17.47
Other, s	pecify _	Construction R		er, specii	<u>y</u>	Status of Well		flowing give rate (I/r	min / GPM)	15	26.91	15	16.70
Inside Diameter		n Hole OR Material vanized, Fibreglass,	Wall Thickness		pth ( <i>m#</i> 0)	₩ Water Supply	H <sub>R</sub>	ecommended pump	o depth (m/ft)	20	27.20	20	<u>-</u>
(cm/ <del>in)</del>		crete, Plastic, Steel)	(cm/ <del>in</del> )	From	То	Replacement Well  Test Hole	i	30.5m //		25	27.25	25	15.99
16,0	50	rel	15	+,8	23.6	Recharge Well Dewatering Well		min / GPM) 45. 4 LPM //	2056Pm	30 40	27.40	30 40	15.79
						Observation and/or Monitoring Hole	W	/ell production (i/mir	ı / GPM)		27.52	-	15.47
15,6	OF	EN HOLE		23.6	36.6	Alteration (Construction) Abandoned.	- 11 -	isinfected? ∡Yes  No			27.58		15.08
1293.000		Construction F	Record - Scre	en		Insufficient Supply  Abandoned, Poor	- 1	Z 100 100	Map of W			jagagaran.	
Outside Diameter	(Plasti	Material ic, Galvanized, Steel)	Slot No.	De From	pth ( <i>m/ft</i> )	Water Quality  Abandoned, other	11	lease provide a map				ack.	
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						Other, specify		0					1
	<del></del>	Water De				Hole Diameter		Q)					/
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		f Well Contractor				/ell Contractor's Licence No	0.	2					
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Dun Talant	ono No	ļ				Atius - Com Prist Name)	in	formation	Package Delivere	ed	Minis	try Us	e Only
15/19	8 4	68289	BROAL	reod	or Je	u		ackage elivered Date V	Vork Completed			66	1130
Well Technic	cian's Li	cence No.  S <b>jg</b> natur	e of Technicia 15 page	n and/or	Contractor D	ate Submitted 上のり603の	5	Yes		01	Repaired	기년 기년 62	
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Ministry of the Environment

Well -A 075156

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Well Owner's									
First Name		ast Name / Orgai	ization 77 P		E-mail Address			_	Constructed ell Owner
Mailing Address (	Street Number/Nar		· Ve p	Municipality	Province	Postal Code	Telephon	_	area code)
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Well Location Address of Well L	ocation (Street Nu	nber/Name)		Township / I		Lot	Concess	ion	ALCOHOLOGICA VICES
	Shaws Gra			Calidon		9	5	HSU	
County/District/M	lunicipality	,		City/Town/Village			Province Ontario	Postal	Code
UTM Coordinates	Zone Easting	, Northin	g	<i>Bl Houn Tail</i> Municipal Plan and Sublo			Other		
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Depth Set at (m	1/ft)	Annular Spa Type of Sealant		Volume Placed	After test of well yield		ell Yield Testir	***************************************	ecovery
From T	0	(Material and Ty	oe)	(m³/ft³)	Clear and sand ☐ Other, specify	free	Time Water Le		Water Level (m/ft)
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				Maria / Maria in Rahimenter research	Pump intake set at (	m/ft)	0 / 0	2	700
					100		700.		18:0
Method o	of Construction		Well U	se	Pumping rate (Vmin )	(GPM)	3 //. 6		75.9
Cable Tool Rotary (Conven	☐ Diamono ntional) ☐ Jetting	Public Domesti	Comme   Comme	=	Duration of pumping		4 73.8	۱ ا م	73,6
Rotary (Reverse	e) Driving	Livestoc	k 💢 Test Ho	ole Monitoring	_2_hrs+_0_		5 75.6		71.7
☐ Boring ☐ Air percussion	☐ Digging	☐ Irrigatior ☐ Industria		g & Air Conditioning	Final water level end	or pumping ( <i>mit)</i>	10 8/. 4	10	65.3
Other, specify		Other, s	pecify		If flowing give rate (//	/min-/ GPM)	15 84.6	15	61-8
Inside Ope	Construction R  on Hole OR Material	ecord - Casing Wall	Depth (m/ft)	Status of Well  Water Supply	Recommended pur	n denth (m/ft)	20 86.4	20	59,6
Diameter (Gal	vanized, Fibreglass, crete, Plastic, Steel)	Thickness	rom To	Replacement Well	Transfer part	ib cobiii (iiiii)	25 87. 7	7 25	58. Z
6/1/	-L./		9 73	<b>∑</b> Test Hole ☐ Recharge Well	Recommended purr (I/min / GPM)	p rate	30 88. 9	/ 30	57.2
0/9 3	1101	1108 C		— ☐ Dewatering Well	40		40 89,0	_	55.8
				Observation and/or Monitoring Hole	Well production (I/m	in / GPM)	50 91.1		55.0
				Alteration (Construction)	Disinfected?		60 9/1	60	5 3.U
VARTEGO CARDINANA MENTALIDA PARA SANTI DE MANAGESTA CONTRA		Salvei mitavy pri romani 12. Varminovo nii intora k	HERIOTERIA STATE IN ACTION OF THE STATE OF T	Abandoned, Insufficient Supply	Yes No	csonesul - wasanin	1 1 1 7 5	- 100	<u> </u>
Outside	Construction R	ecord - Screen	Depth (m/ft)	Abandoned, Poor Water Quality	Please provide a maj		ell Location instructions on the	e back.	
Diameter (Plast	Material tic, Galvanized, Steel)	Slot No.	rom To	Abandoned, other, specify			0.1		Λ
					Fork of	Pord; +	Rd		W
				Other, specify			Λ		*
	Water De	ails		Hole Diameter			J		
A 1	epth Kind of Wate	r: Fresh 🎢 Ur		oth (m/ft) Diameter To (cm/in)			, _ ,	,	
	Gas Other, spe Depth Kind of Wate			73 8/2	2		1070		
97 (m/ft)	Gas Other, spe	ecify	72		[ ** ** ** ** ** ** ** ** ** ** ** ** **		,		
Water found at D	epth Kind of Wate	r: 🗌 Fresh 📈 Ur	itested 73	112 61/8	J. Crekk	:1		£.	
<u>/0 ← (m/ft)</u> □	Gas Other, spe		and and animality of a surface one		1	140	£		
Business Name o		or and Well Tec		ation ell Contractor's Licence No.					
FRED	CONSTABI	.E		1663		-			
	CONSTABI (Specison)			unicipality	Comments:				<u> </u>
Province 35	19 5TH COLE DEORD ON. 1	Business E-m	ail Address						
	1 1 1 1 1	1		First Niver of	Well owner's Date information	Package Delivere		nistry Use	Only
Bus.Telephone No	. (inc. area code) Na	ime of Well Techr イルックルかりか	lician (Last Name	, rirst Name)	package Y Y	MMYY		2 92	1130
Well Technician's Li	cence No. Signature	of Technician an	d/or Contractor Da	ate Submitted		Work Completed			
21/2	0		- X	00 9 MM 255	X No KO	0910	20 MAR		W10

## LOG OF BOREHOLE PW-1

PROJECT: Proposed Subdivision

LOCATION: Belfountain

CLIENT:

Enterac

**DATE:** May 27 to June 2, 1988

EQUIPMENT: -

**ELEVATION DATUM:** Geodetic

	STRATIGRAPHY			MPLE:				K., CM	CON		••••		OL TAIL		F INSTALLATION
ELEV. DEPTH	DESCRIPTION	STRAT.PLOT	NUMBER	TYPE	N' VALUES	RECOVERY	WAT PERC	ER C	ONTE	NT	L	ELEV. DEPTH	PW	J-1	
415.0	GROUND SURFACE		₹	F	ż	œ	<u> </u>	0 2	0 3	0 4	10	ļ		1	
412.3	CLAY AND BOULDERS	0/0													
2.7	SAND AND GRAVEL,				-							410			
	some boulders (OUTWASH)	0.0													
1		0										405			
403.8		°,0,													
11.2	SAND, GRAVEL, BOULDERS	0,0													
	-	0										400			
-397.6		10:							.			Н			
17.4	SAND AND GRAVEL	0.0													
		0										395			
		· · ·													-
389.4		.0.	.			ľ		-				390	)		
25.6		9/3										Н			
_ _386.8		0,	11		.										
28.2	Continued											385	5		
NOT		ļ 1						<u> </u>				П			d Supervisor

NOTES:

Water found at 29.2m

### Terraprobe

### LOG OF BOREHOLE PW-1

CON'T

PROJECT:

Proposed Sudivision

LOCATION:

Belfountain

CLIENT:

Enterac

DATE: May 27 to June 2, 1988

EQUIPMENT:

ELEVATION DATUM: Geodetic

Drawn by:\_

Checked by:

DESCRIPTION  TOTAL PROPERTY DESCRIPTION	STRAT. PLOT	35.8		S.	⋩		AULIC			o I	ELEV.			
THE STREET PACE	STRAT.P	SER.	1		177		•	1			DEPTH			
TOTATHEDED DOCK	STR	· 🐱	w	'N' VALUES	RECOVERY	WAT	ER CO	NTE	NT		DEC TIT			
the Amilian in DOCK	1 4, 1	NUMBER	TYPE	٠ بر	RE(		20	30	) 40	,				
	===											1 1	7	
WEATHERED ROCK	==												K	,
	==													
DOLOSTONE													K	
7 1 C D 1 1 1			-								380	1-1	<u>_V,</u>	
End of Borehole		ļ. ļ												
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	-										H			
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					1.						П			
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		End of Borehole		End of Borehole	End of Borehole	End of Borehole  End of Borehole	End of Borehole  I also be a second and a second a second and a second	End of Borehole	End of Borehole 380					

# Terrap

### Terraprobe

Proposed Sudivision

LOCATION:

Belfountain

CLIENT:

Enterac

# LOG OF BOREHOLE PW-2

DATE: June 3 to June 10, 1988

EQUIPMENT:

ELEVATION DATUM:

Geodetic

	STRATIGRAPHY:		SAN	MPLE:	5	· · · · · · · · · · · · · · · · · · ·	HYDF	AULK	CON	DUCT	IVITY		DETAILS	OF INSTALLATION
	RIPTION	STRAT. PLOT			ES	RECOVERY	1×1	o 1×	10 1	10 1	10 L	ELEV. DEPTH		
РТН		AT. P	BER	ш	ALU	Š	WAT	ER C	ONTE	NT		1		•
		STR/	NUMBER	TYPE	N' VALUES	REC	PERC	EN 1	0 3	50	40			
13.0		2, 1,	T											
												Ħ		
	SAND AND GRAVEL	. ,					1					H		
				1								410		
	(not Logged)	. ,					1							
		, ,												_200mm dia.
				1								П		steel
		0 .			i							H		casing.
06.1		<u>.</u>					1					<u> </u>	13	6.9m
6.9		= =										405		1/2
		==											A	
	DOLOSTONE	===										П	1 3	$\Rightarrow$
		=				,			-			H	12	K
	(Amabel Formation)	==				ŀ						H	1 2	
		==						,						<b>/</b> /
		=												1/1
	••	==	.								1	400	,   7/	$\rightarrow$
		===										H	1/2	
		=		1								Н		
		==		İ				1.						1/2
			-										1 (1)	K
	·	=					1							$\lambda'$
		==									İ	+39	5   /	<b>/</b> /
		==	-									$\mathbb{H}$		open ho
		=					٠.					Ц		in rock
		==	=    ·		ł				1.				12	(200mm)
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			-	1.			-					H 39	0   7	<b>X</b>
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388.1		=											1	$\langle \rangle$
24.9	DOLOSTONE AND	= =	-					.   '						$\langle \rangle$
	SHALE								.			Н		<i>\</i> \
	/3/	= =	-									H		
	(Manitoulin formation)	=======================================	_									14-38	5   게	
	TOTMISCION/	=	-				}						-1	$\searrow$
383.4		<u> </u>	-  -		_ -		_		4					17
29.6	End of Borehole					ľ						H		
												H		
		ــــــــــــــــــــــــــــــــــــــ	Ш_						L_		l_			
														Field Supervisor

### LOG OF BOREHOLE PW-3

PROJECT: Enterac Belfountain DATE: \_\_July 2, 1989 LOCATION: Belfountain EQUIPMENT: \_ CLIENT: Enterac ELEVATION DATUM: Geodetic FILE: 88164

ELEV T	STRATIGRAPHY	TE		SA	MPLE		m.	BLOV	TRAT10 vs/0.3 m		x		PERC	EH CC	ONTEN O	41
ELEV. DEPTH M.	DESCRIPTION	STŖAT. PLOT	S E	3ER	,	'N' VALUES	ELEVATION SCALE	SHE	AR ST	30 RENO	40 3TH.		} .	├ Vp		
		RAT.	GROUND WATER	NUMBER	TYPE	ı, va	SCA	3112	AN 31			NI U	1			10
1	Ground Surface	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	5-	7	·	<del></del> -	Ш									ÌП
402.1	TOPSOIL Brown	~ : •					402 -									
0.5		į`					402		·							
-	SAND AND GRAVEL AND STONES	0														
	SIONES	0.					401 _									
							401									
	(logged by Well	0 -														
	Drillers)	0.0														
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1		·O.	d				392-				1					
391.7		. , o											-			
	Brown	D									1.					
1	CLAY, GRAVEL AND	0	1													
	SILT	°					391 –	1.								
1																
390.2		.     0						.		-						
	Continued	_ -	<u> </u>	11-	1	<del> </del>	390-	1	1	1	T	+	1	1		1
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NOTES:			1	11			1		.1		<del>-</del>	<u>.i</u>		Ш	ــــــــــــــــــــــــــــــــــــــ	٠

- 1) Water encountered at  $24.4 \, \text{m}$  and  $33.5 \, \text{m}$  depth.
- 2) Water level at 385.5 m (elevation) on September 10, 1989.
  3) Hole logged by well driller.

### LOG OF BOREHOLE PW-3

PROJECT: Enterac Belfountain

LOCATION: Belfountain CLIENT: Enterac

EQUIPMENT: \_

DATE: July 2, 1989

ELEVATION DATUM: Geodetic FILE: 88164

ELEV.	STRATIGRAPHY DESCRIPTION	15		SA	MPLE		m.	BLOV	/S/0.3 m		STANCE	WATER C	O
DEPTH M.	DESCRIPTION	STRAT. PLOT	Q ac	8		N' VALUES	ELEVATION SCALE	SHE			40 ATH, kPa	<u> </u>	
		JAT.	GROUND WATER	NUMBER	TYPE	\ <u>₹</u>	SCA	SHE	MN 31	nem	1 1 11, KF a	Wp	
402.4	Ground Surface	ST	g.	Ž	<u> </u>	ŗ	교					10	20 30
402.1	TOPSOIL	25									- 1		
0.3	Brown	- :0					402 -	İ					
1	SAND AND GRAVEL AND												
1	STONES	0.											
-							401 _						
-													
_	(logged by Well												
	Drillers)							-					
							400 _						
7			İ										
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10.	7 Brown `	/	0										
_	CLAY, GRAVEL AND	0					391-						
	SILT												
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	2 Continued	- -	-	- -	1	1	390 -	+-	1	1			
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### NOTES:

- 1) Water encountered at 24.4 m and 33.5 m depth.
- 2) Water level at 385.5 m (elevation) on September 10, 1989.

### LOG OF BOREHOLE PW-3

CONT...

PROJECT: Enterac Belfountain

LOCATION: Belfountain
CLIENT: Enterac

\_\_\_ DATE: \_\_\_July 2, 1989 \_\_\_ EQUIPMENT: \_\_\_\_

ELEVATION DATUM: Geodetic

FILE: 88164

EI EV	STRATIGRAPHY	TEI		$\neg$	APLE:		111-	BLOW	/S/0.3 m		STANC	E	WATER	T O	TENT	
ELEV. DEPTH M.	DESCRIPTION	STRAT. PLOT	MAIER		,,	'N' VALUES	ELEVATION SCALE		AR ST		40 3TH, k	Pa	↓ Wp		 W1	
		ROU	¥   ¥		ТУРЕ	, V	SC/				1		10	20	30	
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	brown						390									-
	CLAY, GRAVEL			ł												
	& SILT	0														
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24. 378.	l grey-brown O <b>DOLOSTONE</b>	·			1		378									
24.	4 Continued				T											
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### LOG OF BOREHOLE PW-3

CONT...

PROJECT: Enterac Belfountain

LOCATION: Belfountain
CLIENT: Enterac

DATE: \_\_\_\_July 2, 1989

EQUIPMENT:

ELEVATION DATUM: Geodetic

FILE: 88164

	STRATIGRAPHY	<del>-   -   -</del>		SAI	MPLE		m.	BLOV	TRAT10 /8/0.3 m		t		PERC	ENT (	<b>изти</b> С	
ELEV. EPTH	DESCRIPTION	STŖAT. PLOT	ا ہے و	<b>E</b>		'N' VALUES	ELEVATION SCALE	10	20 AR ST	30	40	-D-		ļ		
m.		AT. F	GROUND WATER	NUMBER	TYPE	VAL	EVAT	SHE	AR ST	RENC	iTH, I	(Pa	٧.	/p	W	
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31.	4 grey		7													
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369.		/_	_												-	
32.	9 brown	Z	-		1:	1										
1	DOLOSTONE	H	7	1			369	4								
4	DOPOSTONE	Z														
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-		7	4				368									
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	SHALE	=	=		1											
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### LOG OF BOREHOLE PW-4

ROJECT:	Enterac - Belfountain	DATE: July 4, 1989
OCATION:	Belfountain	EQUIPMENT:
	Enterac	ELEVATION DATUM: Geodetic FILE: 88164

	CLIENT: Enterac						EVATION	סאוט							•	
	STRATIGRAPHY			SA	MPLE	s	m.	PENETI	RATION	RESI	STANCE	V P	ATER	T 0	ITENT	Γ
LEV. EPTH	DESCRIPTION	5		ac.		ES	ELEVATION SCALE	10	20	30						
m.		STŖAT. PLOT	GROUND WATER	NUMBER	TYPE	'N' VALUES	VATI	SHEA	RSTF	RENG	TH, kP	B	Wp		WI	
186 2	Ground Surface	T, A	GRO	Š	۲	'n.	ELE	Į.	1	Í	1		10	20	30	
385.9	TOPSOIL	1~~		1			386 -				7					
0 2	brown	0					500									
0.3	Drown															
	CLAY, SILT, GRAVEL,	10	l													
	STONES & BOULDERS	10					385-		-							
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	(logged by well driller)	00	1				383:_		}							
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12.	2 Continued						1									
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NOTES: 1) Water encountered at 26.2 m depth.
2) Water level at 374.5 m (elevation) on September 10, 1989.
3) Hole logged by well driller.



# LOG OF BOREHOLE PW-4 CONT...

PROJECT: _	Enterac - Belfountain	DATE: July 4, 1989
I OCATION:	Belfountain	EQUIPMENT:

LOCATION.	EGOIFMENT.			
CLIENT: Enterac	ELEVATION DATUM:	Geodetic	FILE:_	88164

	····	STRATIGRAPHY			SA	MPLE	s	m.		TRATIO		ISTAN ×	CE	WAT	ER CC	NTEN	Т
EL	LEV. PTH	DESCRIPTION	101		В		ES	Z O III	10	20	30	40	,	FERC		<i>.</i>	
ו ו	m.	. •	7. P	TER	NUMBER	TYPE	'N' VALUES	VATI	SHE	AR ST	RENC	зтн,	kPa	] w	/p	W	1,
	374.0		STŖAT. PLOT	GROUND	D.	ΤY	'n,	ELEVATION SCALE						1	0 2 I 1	0 30	)
П		brown	0					·									
П		CLAY, SILT, GRAVEL	0														
П		STONES & BOULDERS	0 0	7			- !										
П								373 <del>–</del>									
П			0														
H			0 0														
H			301					372 _									
Н				,				-									H
H	371.3		(°)														
H	14.9	blue	1											)			
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H		SHALE	= =														
H		SHALE	==														-
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# LOG OF BOREHOLE PW-4

July 4. 1989 CONT...

OJECT:	Enterac - Belfountain	DATE:	July 4,	1989
	Dolfaretain			

 LOCATION:
 Belfountain
 EQUIPMENT:

 CLIENT:
 Enterac
 ELEVATION DATUM:
 Geodetic
 FILE:
 8816

CI EV	STRATIGRAPHY			s	AMPLE		m.		TRATIC /S/0.3 m		ISTAN ×	CE	WAT	ER CO	ONTE	NT	
ELEV. DEPTH <b>m.</b>	DESCRIPTION	STRAT. PLOT	GROUND WATER	NUMBER	m	'N' VALUES	ELEVATION SCALE	SHE	AR ST		1			├ <b>/</b> p	v	VI.	
364.9		TRA	3ROI WAT	N S	TYPE	N. (<	SC			I	1	ı	ļ			30	
1	red	= =				-									_	-	Т
1	CHAI F	=															ŀ
-	SHALE	= =															-
-		=  = =					364 -										-
_		=															
363.3		= =															
22.9	Blue	=															-
1	SHALE	= =					363 -										
1	· · · · · · · · · · · · · · · · · · ·	= =															
-		=															
-		= =															
-		=					362 -										
		==					٠										
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		=															
		==					361~										
1		=															
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360.0		=		<u> </u>	<u> </u>		360				<u> </u>		ļ	ļ	ļ	ļ	
26.2	End of Borehole						•										
							359										
1	·						223										
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### LOG OF BOREHOLE OW-1

Drawn by: Checked by:

PROJECT: Proposed Sudivision

LOCATION: Belfountain

NOTES: Installations in separate holes.

CLIENT: Enterac

April 24 - 25, 1988 DATE:

**EQUIPMENT**: Mobile B-61 - rotary

ELEVATION DATUM: Geodetic

	STRATIGRAPHY	<del>,</del>	-	SAM	PLES	1		HYDF	RAULIC K., CM	CONI	DUCTI	VITY		DETAILS (	OF INSTALLATION
ELEV. DEPTH	DESCRIPTION  CROSSING CHREAGE	STRAT. PLOT	CHEN	Ziger S	TYPE	N' VALUES	RECOVERY	WAT PERC	O IX	ONTE	NT	10	ELEV. DEPTH	OW1-1	0W2-2
390.0 I			1	-	-	<u>,-</u>									1 14 140
	Dense SAND AND GRAVEL,	, °	$\coprod$										-	ΙИИ	
h07 0	numerous boulders	.,0	1	1	AS	-								1 121	1 1:44.1
387.9		==		1									П		1
2.1	Grey DOLOSTONE,	=	ΚT	2	AS								Н		+ 3.0
1	weakly fractured (Amabel Formation)				A.,								Ц	[]	
1		==	4	_	00							]	205		
<u>284.9</u>		<u> </u>	14	3	CS	_						├	285	1 1-1-	5.1
5.1	End of Borehole												Н.		
1				1											
-													H		
													Ц		
-										<u> </u>			1 280	1	
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	Concrete seal and pro		Ш			1				ــــــــــــــــــــــــــــــــــــــ		ــــــــــــــــــــــــــــــــــــــ			

### LOG OF BOREHOLE OW-2

PROJECT: Proposed Sudivision

OW2 - 1 and 2-2 in same hole.

002 - 3 and 2-4 in separate holes.

LOCATION: Belfountain

CLIENT: Enterac

DATE: March 24 - April 7, 1988 EQUIPMENT: Mobile B-G1 - rotary

ELEVATION DATUM:

Geodetic

Drawn by:\_\_\_\_ Checked by:\_\_

	STRATIGRAPHY		SA	MPLE	S		HYDF	RAULK	COND	UCTIVITY		DETAILS OF	INSTALLATION
ELEV. DEPTH 417.0	DESCRIPTION  GROUND SURFACE	STRAT. PLOT	NUMBER	ТҮРЕ	N' VALUES	RECOVERY	WAT PERC	ER C	ONTE		ELEV. DEPTH	QW2-1 OW2-2	OW2-3
417.0	Brown Dense											1444	
-	Drown Jensey							:				+	#
_	SAND AND GRAVEL,	0.									415		$\mathbb{H}_{[\cdot]}$
	(OUTWASH)	0											
	numerous cobbles and boulders.	.0	1	CS									
	Very difficult drilling.	3 , 5 0 0									410		
	6.8 to 8.8m	0.											9.1
	12.1 to 14.0m	. D	2	CS	1						H		
	loss of mud circulation at 8.0 to 9.5m and 12.1 to 15m.	· · · · · · · · · · · · · · · · · · ·									405		11.9
402.0 15.0		0.,	3	cs	-						H		15.1
	SAND, SILT, some gravel and cobbles (TILL)	3									400		
	water encountered	0'2	. 4	+ CS	-						395		22.2
391.	at 25m.		$\cdot      $										25.1
26.	O SAND AND GRAVEL, loss of mud circulation	0.0		5 CS	3						390		27.0
386		0.0	, 6	C	S						H		·
30.		1	1	+	+	1			1		H		
386.	circulation 27 to 29m. 7 3 Continued	. 0	, I o		S							Fleid S	

OW2 - 3 and 2-4 in separate holes.

### Terraprobe

### LOG OF BOREHOLE 0

ON'T

Checked by:\_

PROJECT: Proposed Sudivision

LOCATION: Belfountain

CLIENT: Enterac

DATE: March 24 - April 7, 1988 EQUIPMENT: Mobile B-G1 - rotary

ELEVATION DATUM: Geodetic

	STRATIGRAPHY		SAN	<b>NPLE</b>	S		HYDF	RAULK	CON	DUCT	IVITY		DETAILS OF INSTALLATION
ELEV.	DESCRIPTION	.o.			S	RY	[si	0 I	10 1	40 1	40	ELEV. DEPTH	
DEPTH		STRAT. PLOT	NUMBER	4.1	'N' VALUES	RECOVERY	WAT	ER C	ONTE	NT	· <b></b>	DEPTH	
		TRA	\$	TYPE	\$	SEC	PERC	ENT 0 2	0 3	0 4	40		
	Continued Grey		_ <del>z</del>	1-	72	uc.	<u> </u>		Ĭ		1-	<del>                                     </del>	31.0
] 30.3	Grey	=										Н	1171 1
	DOLOSTONE	==					1					385	1 1 1
	(Amabel Formation)	==											1 1/11 11
H	(Amabel Formation) loss of mud												34.0
883.0			-				<del> </del>				<del> </del>	<del>                                     </del>	111 11 34,0
34.0	End of Borehole											Ц	
Π													
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Н												H .	
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NOT	OW2 - 1 and 2-2 in $\frac{1}{2}$	same	nole	e. 11									Fleid Supervisor
			777 T A	no l									

### LOG OF BOREHOLE OW-3

PROJECT: Proposed Sudivision

LOCATION: Belfountain

CLIENT: Enterac DATE: April 7 - 11, 1988 .

Mobile B-61 - rotary EQUIPMENT:

**ELEVATION DATUM:** 

Geodetic

	STRATIGRAPHY			SAM	PLE:	5	·	HYD	RAULI	C CO	YDUC	TIVITY	1	DETAILS	OF INS	TALLATION
ELEV. DEPTH 413.0	DESCRIPTION	STRAT.PLOT	OBONI N	NO SECTION AND SEC	TYPE	N' VALUES	RECOVERY	WAT PERC	TER C	ONT	110		ELEV. DEPTH	_OW3-1	-0W3-2 -0W3-3	
	Brown Dense SAND AND GRAVEL, numerous boulders (OUTWASH)	0. o		1	CS	<u>.</u>							410			- 1.0 - 3.0
406.0				2	CS											- 4.0 - 7.0
7.0	DOLOSTONE  (Amabel Formation)  loss of mud			3	CS								405		+++++++++++++++++++++++++++++++++++++++	
	circulation below 9m; switch to air rotary, appears highly fractured												400			
	at 21m.			5_	CS								39!	5		
				6	cs								39		+	80.9
387.7 25.3 383.9	Black to Grey  DOLOSTONE AND  SHALE  (Manitoulin Formation)		-   }	7	CS								38	5		25.0
29.1		<del>-</del>														29.1
NOTE	s: Concrete seal and pro	otec in s	tiv ame	ze j	pipe	e at	grad	le.						C	Teld Supervirawn by:_ Checked by	

### LOG OF BOREHOLE OW-4

PROJECT:

Proposed Sudivision

LOCATION: CLIENT: Belfountain

Enterac

DATE: April 20 - 24, 1988

EQUIPMENT: Mobile B-61

ELEVATION DATUM: Geodetic

1	STRATIGRAPHY		1	SAN	1PLE	s		HYD	RAUL	IC CO	NOUC	TIVITY		DETAIL	s of	INSTALLATION
ELEV.	DESCRIPTION	10	İ			S	RY.			M/SE I¥IO			ELEV.		7	6 4
DEPTH		14 F	ا ا	Ĭ.	4.1	LUE	RECOVERY	WAT	ER (	CONT	ENT	_1	DEPTH	0W4-1	0W4-2	OW4-3 OW4-4
441.0		STRAT. PLOT		NOMBER	TYPE	N' VALUES	REC	PERC	ENT	20	30	40		107	10	10
11110	Brown Dense	<u> </u>	ΙŤ			ρ.				+	1	1	1	ĦπÌ	TT	
											1		440			
Н	SAND AND GRAVEL,							,					H			
H	numerous cobbles												H			
	and boulders					·						:	Н			4.1
H	(OUTWASH)		-										H .			
	(002)		1	1	CS								435			ИИИ
<b> </b>	—— increasing content							ŀ								6.4
	of fines below 7m.															Dry
				:												
	loss of mud															9.0
	circulation at		N	2	CS		-						430			
	8-9m, 15.1 to 16.2 30.1 to base at	2m								1			T 430			
П	hole			-									П			
H ·													Ħ			
426.0													H			14.2
15.0		-	H										Н			
H			H	3	CS			1					425			
-	SAND AND GRAVEL, SILT,												H			7.1
H	JILI,												Н			
	numerous cobbles															
Н	and boulders					ľ							Ц			
Ц	(TILL)		V	4	CS											
							·						420			
	·															
													П			
П													П			-
П			H	5	CS								Н			25
			$\parallel$							ļ.,			419			
H													H			
H													H		14	28.3
H													H			20.3
411.0	CAND AND CDARW	-	H							1.			H			30.3
438:9	SAND AND GRAVEL	-	14	6	CS								410	1144	/ /	31.1
408.0 33.0	AMABEL DOLOSTONE  End of Borehole	<u> </u>	Ш	7	CS	L	<u></u>	L	L				Ш	11.1.	· :1	33.0

33.0 NOTES:

NOTES: OW4-1 and 4-2 installed in same hole. OW4-3 and 4-4 installed in same hole. Concrete seal and protective pipe at grade.

Field Supervisor

Drawn by:

Checked by:



### LOG OF BOREHOLE 88-13

PROJECT: Proposed Sudivision	DATE: April 28, 1988
LOCATION: Belfountain	EQUIPMENT: CME 55
Enterac	FI EVATION DATUM: - FILE: 88164

	STRATIGRAPHY				SAI	MPLE	s	m.	PENETRATION RESISTANCE BLOWS/0.3 m ×				Ē	WATER CONTENT				
ELEV. DEPTH <b>M.</b>	DESCRIPTION	STRAT, PLOT	CND		NUMBER	m	N' VALUES	ELEVATION	10	20 \R ST	30 1	40	Pa	. L		<b>,</b> ——∳		
	Ground Surface	TRA	GROUND		∑ ⊃	TYPE	'n.	ELEV SC		ļ	1	ļ		10				
	TOPSOIL	~ ~~	di	1														
0.3	Brown Loose Damp																	
	SILT, trace sand				1	SS	8		X							- Armenia - Francis		
1.4	Brown Dense Damp	1 1			,													
	SILTY SAND AND GRAVEL,				2	SS	27				X							
	occasional cobbles	° · · ·											\ ,					
-	(TILL)		•	: \	3	SS	62						د					
	— thin layers clean sand	.   : . :			4	SS	82/	11"										
3.5	End of Borehole	0.,	,	+														
1 3.3	mid of Boronogo																	
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- 1. Borehole caving at 3.0m depth and dry on completion of drilling.
- 2. Standpipe dry on May 12, July 7, 1988.



## LOG OF BOREHOLE 89-4

PROJECT: Belfountain Subdivision

Belfountain LOCATION: \_

Enterac CLIENT:

DATE: August 22, 1989

EQUIPMENT: CME 55

**ELEVATION DATUM:**\_

Geodetic

FILE:88164

	STRATIGRAPHY				SAI	MPLE	s	m.	PENETRATION RESISTANCE BLOWS/0.3 m ×			CE	WATER CONTENT					
ELEV. DEPTH M.	DESCRIPTION	STRAT. PLOT	GROUND	2000	NOMBER	TYPE	N' VALUES	ELEVATION	19	AR ST	30	40			 ∤		-{ VI	
399.6	Ground Surface	STŖ	8≥	2	2	L	ż	급							10 2	0	30	
399.0	TOPSOIL	>						399 -										
0.0	Brown Dense to Moist Very Dense				1	SS	27	•			×				0			
	SANDY SILT,				2	C.C.	607	398 - 11										Н
	some clay, trace gravel	9			2	55	00/	LT.										
396.9	(TILL)			M	3	SS	47	397 <sup>-</sup>					×	0				
	Brown Very Moist Dense	'ø'.			4		83											-
	SAND AND GRAVEL,	 1		1	4	SS	03	396 <sup>-</sup>						0				
	some silt	.0																
		3000		Z	5	ss	100	/5" -						0	*		-	
	OUTWASH	3						394 -			-		in the state of th					
		.0			6	ss	85	393						0				
		4			7	SS	42	392					×	0				
390_5		0						391								-		
9.1	Continued																	

Borehole open and dry on completion of drilling.
 Standpipe dry at a 12.0m depth on September 10, 1989.



### LOG OF BOREHOLE 89-4

CON'T

PROJECT: Belfountain Subdivision

Belfountain

CLIENT: Enterac

LOCATION:

DATE: August 22, 1989

EQUIPMENT: CME 55

ELEVATION DATUM: Geodetic

FILE:<u>88164</u>

<u>.</u>	STRATIGRAPHY				SAMPLES					TRATIO /S/0.3 m		ISTANI K	CE	WAT PER	TER CO	TNC O	ENT	
ELEV. DEPTH	DESCRIPTION	STŖAT. PLOT	2 %	1	E -		UES.	ELEVATION SCALE	10 20 30 40 SHEAR STRENGTH, kPa									
m.		ŖAT.	GROUND		NUMBER	TYPE	N' VALUES	SCA	SHE	AH SI	HENC	i I H, I	KPa		<b>₩</b> p 10	20	30	
390.5	Continued	S	0	١,٠	_		<del></del>	ш						_	Ť	<del>-</del>	1-	_
9.1	Brown Very Mois	- 1	$N_{i}$	N									_	0		Ì	1	
	Dense		NK	1	8	SS	60											
		0	NN	$\prod$				390 -										
	SAND AND GRAVEL,	0	N	]												ļ		
		ò.		11			ļ											
	trace to some silt																	
		۱۰۵۱		1			ļ					:						
			9	H				389 -								1	1	
		0.	٠٠	M	9	SS	65							0				
		00.		H	-		-										-	
				П					1									
			; [] •	11										1				
	OUTWASH	.   •	0,   -					388 -	-									
	OUTWIND		·, [ ], :											1				
		. 0.	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	H	10	SS	100	/5"						4				
387.3				H					$\vdash$					$\vdash$	_	+	_	_
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OWRC COPY



WATER REGILIROES DIVISION

Elev. SR 11260 WATER WE	LL	REC		JROES COMMISSION	
Con V W. H-ST. Lot 9	Townshi	p, Village, 7	Γown or City,	7675	1611
Con V W. H-ST. Lot.	Date con	npleted	29 (day	March	/965 year)
OwnerCorner Sandstone Quaries Ltd.	Address.	Belf	ountain,	Ontario.	
Casing and Screen Record			-	ng Test	
Inside diameter of casing 5"					
Total length of casing 38 t					
Type of screen					
Length of screen				hrs.	
Depth to top of screen	Wat	er clear or c	loudy at end	of test clear	.,.,
Diameter of finished hole 5				e4	
	with	n pump setti	ing of	LOO feet belo	
Well Log					Record
Overburden and Bedrock Record		From ft.	To ft.	Depth(s) at which water(s) found	Kind of water (fresh, salty, sulphur)
Hardpan and boulders		0	25		
Gravel Red and blue shale		25 36	36 120	90-115	fresh
For what purpose(s) is the water to be used?		In diagr		n of Well ow distances of we	ll from
Is well on upland, in valley, or on hillside? upland		road an	d lot line. I	Indicate north by	arrow.
Mater Well Drilling  Address R. H. GADKE - PHONE 1233VI	······	3EL Fou	ATAIN _		
Licence Number	······			200	
Name of Driller or Borer Donald Goll				900	
Address Harriston, Ont		. 11	°//		1
Date // // Adh			9		M
(Signature of Incensed Drilling of Boring Contractor)		La.		•	
Form 7/15M-60-4138	`				

OTM 17 2 57 96 0 8 E			8	49 <b>N</b> º	1011
Elev. SR 4849117 THE Ontario Water Reso Basimty or District Charles on T	L	RECO	RD	CALE	Dow
Con. H.ST.W. Lot 9	ate co	mpleted	(day 7 <i>.3</i> G	LASCO W	110 27
Casing and Screen Record			Pumping		
Inside diameter of casing.  Total length of casing.  Type of screen  Length of screen.	Tes Pui Du	st-pumping ra mping level ration of test p	te 3 43 oumping	£	G.P.M.
Depth to top of screen	Wa	iter clear or cic	oudy at end of	2	CDM
Diameter of finished hole					G.P.M.
	WI	th pump settin	g oi -1		Record
Overburden and Bedrock Record		From ft.	To ft.	Depth(s) at which water(s) found	Kind of water (fresh, salty, sulphur)
DLD WELL		<u></u>	/ 2		
For what purpose(s) is the water to be used?  House  Is well on upland, in valley, or on hillside? Upland  Drilling or Boring Firm LADCO DRILLING  AND ENPLORATION CO  Address R. R. HILLS BURGH  Licence Number 1874  Name of Driller or Borer THOMAS LANG  Address HILLS BURGH, R. R.  Date Date Date Drilling or Boring Contractor)  Form 7 15M-60-4138		In diagram road and	lot line. In	of Well  distances of we dicate north by	arrow.
OWRC COPY				CSS.S8	

4MELY 4 2 15,7,9,5,47 E



484949 Contario Water Resources Commission Act

J40 9 N962 1017

GROUND WATER BRANCH

ONTARIO WATER
RESOURCES COMMISSION

Elewer | 1 | 2 | A | S |
dry Hole

### WATER WELL RECORD

dry Hole Basin Peel	*****	Township, Village,	Town or C	caledo	n
County or District  Con V W. H. ST.	Lot C	Date completed	10	May	1962
Con			onto O	month	year)

**Pumping Test** Casing and Screen Record Static level 64 inch Inside diameter of casing Test-pumping rate G.P.M. 22 ft Total length of casing. Pumping level none Type of screen Duration of test pumping none Length of screen.... Water clear or cloudy at end of test..... nil Depth to top of screen... Recommended pumping rate 61 inch Diameter of finished hole with pump setting of \_\_\_\_\_ feet below ground surface

Wall Law			Water	r Record
Well Log Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	Kind of water (fresh, salty, sulphur)
t	0	1	dry hol	e nil
top soil boulders gravel gray clay, gravel rock lt. gray	1	15		
	15	22		
	22	62		
red shale	62	100		
Total depth - 100 gt.				
	1			

For what purpose(s) is the water to be used?

domestic

Is well on upland, in valley, or on hillside? hillside

Drilling or Boring Firm

J L Graham Drilling Contractor

119 Renfield St. Guelph Ont.

Licence Number

Name of Driller or Borer

Address

Date

June 12th 1962.

J L Graham per

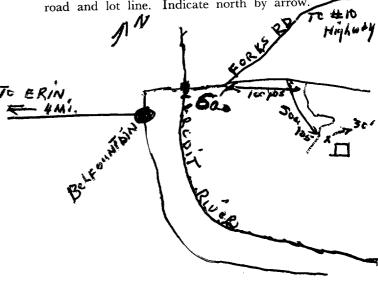
(Signature of Licensed Drilling or Boring Contractor)

Form 7 15M Sets 60-5930

OWRC COPY

### Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



38.88

UTM 12 7 57 9 56 7 E 18 49 356 N



Ontario Water Resources Commission Act

49UL No	1962/01
ONTARIO	WOMER
RESOURCES (	COMMISSION

GROUND WATER BRANCH

Elev $Q$ $R$	2.	
--------------	----	--

## WATER WELL RECORD

Basin 2		Pee	1	 Township, Village	Town or C	ity Caledo	n
County or D	11. 11.	27.	Lot	Date completed		May month	1962
				Toron	to Onta		

Casing and Screen Record	Pumping Test
Inside diameter of casing 6½ inch  Total length of casing 20 ft  Type of screen nil  Length of screen	Static level 50 ft  Test-pumping rate 1 G.P.M.  Pumping level 60 ft  Duration of test pumping 2 hrs.
Depth to top of screen  Diameter of finished hole  nil  6½ inch	Water clear or cloudy at end of test clear  Recommended pumping rate 1 G.P.M.  with pump setting of 70 ft feet below ground surface

Well Log			Water Record		
Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	Kind of water (fresh, salty, sulphur)	
gravel and stones	0	5	75 ft	fresh	
gravel gray clay	5	19			
light gray rock	19	58		-	
red shale	58	75			
				<u> </u>	

For what purpose(s) is the water to be used?... domestic Is well on upland, in valley, or on hillside? hillside Drilling or Boring Firm. J L Graham Drilling Contractor

Address 119 Renfield St. Guelph Ont.

481 Licence Number.....

Name of Driller or Borer Robert Graham Address 210 Waverley Drive Guelph Ont.

June 12th 1962

J L Graham per

(Signature of Licensed Drilling or Boring Contractor)

Form 7 15M Sets 60-5930

OWRC COPY

### Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow. BelfOUNTDIN

\_ 40 P/16 E

## WATER WELL RECORD

Ontario The O

4905490

49002 HS W

1 105

	2. CHECK 🗵 CORR	ECT BOX WHERE APPLICABLE	303430	10 14	
COUNTY OR DISTRICT		CALEDONE	(4)	CON., BLOCK, TRACT, SURVEY, ETC.	WHS Amal
F		s /	0/4		E COMPLETED 69-53
		us# ST. //	DELFO	BASIN CODE	
1 2	M 18' 12	349300 5	1175	5 24	47
	LC	OG OF OVERBURDEN AND BEDROCK	( MATERIALS	SEE INSTRUCTIONS)	
GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	C.	SENERAL DESCRIPTION	DEPTH - FEET FROM TO
BROWN	(GIRAVEL	- STONES - RO	OCKS		0 48
GREY	CLAY	STONES			48 80
GIREY	CLAY			SOFT	80 95
GREY	CLAY	GEREY ROCK			95 112
GREY	Rock	GREY-CLAY Rid	GES		112 143
REB	SHALE		7		143 180
					,
31) 004	860 III 21 I DOB	020512   bof15205195   b	1112205126	014322605	b:307117
32	14 15	32 4	<u> </u>	54	65 75 80
	TER RECORD	CASING & OPEN HOLE RE	CORD Z	SIZE(S) OF OPENING 31-33 (SCOT NO.)	DIAMETER 34-38 LENGTH 39-40
AT - FEET	KIND OF WATER	INSID WALL DEP AN MATERIAL THICKNESS INCHES FROM	10 C R	MATERIAL AND TYPE	DEPTH TO TOP 41-44 60 OF SCREEN
	FRESH 3 SULPHUR SALTY MINERAL	194 0-11 15 STEEL 12 188 0	0/19"		FEET
	] FRESH 3 □ SULPHUR <sup>19</sup> ] SALTY 4 □ MINERAL	3 CONCRETE 4 COPEN HOLE		DEPTH SET AT - FEET	SEALING RECORD
20-23 1	FRESH 3 SULPHUR 24 SALTY 4 MINERAL	17-18 1		FROM TO MATER	AL AND TYPE LEAD PACKER, ETC.)
25-28 1	FRESH 3 SULPHUR 29	04 3 CONCRETE 450 OPEN HOLE 1/9	10/80	10-13 14-17	
_ ,	] SALTY 4 [] MINERAL ] FRESH 3 [] SU⊾PHUR <sup>348</sup>	2 GALVANIZED 3 CONCRETE		26-29 30-33 80	the second secon
2 0	SALTY 4 MINERAL	4 OPEN HOLE	MANAGEMENT CONTRACTOR OF THE PROPERTY OF THE P		enderstade i verdet eksternede mener men en krisk krisk halt halt et selt ett sende et i halt ett sende et i i Benederstade krisk halt (i menerate krisk en krisk et sende et i de krisk sende et i halt et sende het i halt e
71 PUMPING TEST ME	THOD 10 PUMPING RAT	114 DURATION OF PUMPING  15-16 0 17-18  GPM 0 3 HOUR 0 MINS		LOCATION OF V	WELL
STATIC LEVEL	WATER LEVEL 25	LEVELS DURING  1 [] PUMPING 2 RECOVERY	IN DIAGRA	M BELOW SHOW DISTANCES OF INDICATE NORTH BY ARROW	WELL FROM ROAD AND
100 7 7 19-2	PUMPING 1 7 02-24 15 MINUTES 06 0 26-	1 30 MINUTES   45 MINUTES   60 MINUTES	$\mathcal{M}$		
		ET FEET FEET FEET	1/,	1	
FEE OF FLOWING. SIVE HATE  RECOMMENDED PU	GPM 90	7 1 1 CLEAR 2 □ CLOUDY	_ , \		
[ 7		PO 43-45 RECOMMENDED 5 46-49	16	Z Z	

	METHOD OF DRILLING	1 CABLE TOOL 2 ROTARY (CONVENTIONAL) 3 ROTARY (REVERSE) 4 ROTARY (AIR) 5 AIR PERCUSSION	6 BORING 7 DIAMOND B JETTING 9 DRIVING	c	DRILLERS RE	MARKS:	
RACTOR	ADDRESS	VELL DRIL	ling 2		DATA SOURCE DATE OF	INSPECTION	58 CONTRAC
CONT	Bucly signature of con	CARBOTZ	1 -	3 2 7 1 L	± Cha	naed T	faom

5 COMMERCIAL
6 MUNICIPAL
7 PUBLIC SUPPLY
8 COOLING OR AIR CONDITIONING
9 NOT USED

5 ABANDONED, INSUFFICIENT SUPPLY
6 ABANDONED POOR QUALITY
7 UNFINISHED

WATER SUPPLY
Description well
Test hole
RECHARGE WELL

OTHER

DOMESTIC

TO STOCK

IRRIGATION

INDUSTRIAL

MINISTRY OF THE ENVIRONMENT COPY

FINAL STATUS OF WELL

WATER USE

DATA SOURCE SE CONTRACT 30-62 DATE RECEIVE 102 7 83-68 40

DATE OF INSPECTION INSPECTOR

REMARKS:

P

Changed From 4405194

FORM 7 MOE 07-091

# The Ontario Water Resources Act WATER WELL RECORD

Ontario 78	1. PRINT ONLY IN	I SPACES PROVIDED	49066	573 MUNICIP	con	1 2 5
COUNTY OR DISTRICT		TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE		CON. BLOCK, TRACT, SURVE	Y ETC / UG	LOT 25-27
PeeL OWNER (SURNAME FI		CALE DON CAL	EDOAL)	Lune W Belfounte	THOATE COMPLETED	<b>X</b> -10
BEL FOUNTA		70	RR#ITE	PRA COTTA, ONT	DAY 0/9 NO 0	8_ vr87
2!	\$7.9	1334 [48,49 1,231	038	AC BASIA CODE		الم الما الما الما الما الما الما الما
	L	OG OF OVERBURDEN AND BEDR	OCK MATERIA	LS (SEE INSTRUCTIONS)		
GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS		GENERAL DESCRIPTION	DEPT FROM	H - FEET
BROWN	CLAY	SAND, STONES			0	35
Red	"	GRAVEL			35	45
GRey	"	"			45	60
BLUE	Shale				60	85
GRey	ROCK				85	105
Blue	Shake				105	120
Red	",				120	130
				TOTAL D	erTX 130	K.
	11:11:11					
31	<del>                                     </del>		-		<u>.                                     </u>	
1 2 10	TER RECORD	51 CASING & OPEN HOLE	BECORD	SIZE(S) OF OPENING 3	65 11-33 DIAMETER 34-38	75 80 LENGTH 39-40
WATER FOUND AT - FEET	KIND OF WATER	INSIDE WALL THICKNESS	DEPTH - FEET	MATERIAL AND TYPE	INCHES	FEET
	FRESH 3 SULPHUR 14 SALTY 4 MINERALS 6 GAS	INCHES INCHES F	ROM TO	SO	DEPTH TO TOP OF SCREEN	41-44 10
15-18 1 🔀	FRESH 3 SULPHUR 19	5   2 GALVANIZED 3 CONCRETE 4 OPEN HOLE 5 OPLASTIC	64	61 PLUGGING	& SEALING RECO	ORD
20-23 1	FRESH 3 SULPHUR 24	17-16 1 DSTEEL 19	20.23	DEPTH SET AT - FEET M.		ENT GROUT ACKER, ETC 1
	FRESH 3 SULPHUR 29	5 U PLASTIC	4 130	10-13 14-17		
<del></del>	SALTY 4 MINERALS 6 GAS  FRESH 3 SULPHUR 34 BO 4 MINERALS	24-25 1 DSTEEL 26 2 DGALVANIZED 3 DCANCRETS	27-30	10-27 22-25		
	SALTY 6 GAS	3 □ CONCRETE 4 □ OPEN HOLE 5 □ PLASTIC		26-29 30-33 80		
71 PUMPING TEST MET	1			LOCATION O	F WELL	
STATIC LEVEL	WATER LEVEL 25 END OF WATER L	EVELS DURING 1 DUMPING	IN DIA	GRAM BELOW SHOW DISTANCES	OF WELL FROM ROAD A	ND TV.
	PUMPING 22-24 15 MINUTES 26-2:	30 MINUTES 45 MINUTES 60 MINUTES 29-31 32-34 35-37				
ST FEET STEE	7/2 FEET FEE	7221		Village Belfounta	<u> </u>	
GIVE RATE	GPM	FEET 1 5 CLEAR 1 CLOUDY		130,400,000		
RECOMMENDED PUN	PUMP	25 FEET RATE 3 GPM		<b>-</b>	main ST.	
50-53			<del>\\ \\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\</del>	3ush 57.		
FINAL	1 WATER SUPPLY 2 OBSERVATION WEL	ABANDONED, INSUFFICIENT SUPPLY     B    ABANDONED POOR QUALITY	ERIN	8 <del>**</del>	20'	
STATUS OF WELL	3 TEST HOLE 4 RECHARGE WELL	7 UNFINISHED 9 DEWATERING		<del></del>		
	DOMESTIC 2 DOK	S COMMERCIAL  MUNICIPAL		Church.	. [	İ
WATER USE	3   IRRIGATION 4   INDUSTRIAL	7 PUBLIC SUPPLY  ■ COOLING OR AIR CONDITIONING				
	OTHER /	• NOT USED				* \
METHOD OF	CABLE TOOL ROTARY (CONVENT ROTARY (REVERSE)					
	N 4 ROTARY (REVERSE	) • DETTING • DRIVING • DIGGING • OTHER			1586	08
NAME OF WELL C	CONTRACTOR	WELL CONTRACTOR'S	DATA		ATE RECEIVED	63 68 80
E GRAHAM	n WELL DRILL	Ling LTD 2336	SOURCE DATE OF INSPEC			87
ADDRESS  ADD	h. ONT.		S.	TION INSPECTOR		
NAME OF WELL	VKINS	WELL TECHNICIAN'S LICENCE NUMBER	Luc			
SIGNATURE OF 1	TECHNICIAN/CONTRACTOR	SUBMISSION DATE	OFFICE			
ITELE	F THE ENVIRONM	DAY 030 MO 68 YR 87		- Contract of the Contract of	FORM NO. 0506 (1	



# The Ontario Water Resources Act WATER WELL RECORD

Ontario	1. PRINT ONLY IN		11	49076	67 49002	HS W 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
COUNTY OR DISTRICT	Z. CHECK A CORR	TOWNSHIP, BOROUGH, CIT	TOWN. HLLAGE	1	CON BLOCK, TRACT, SURVEY	15 LOT 25-27
		<u> </u>	CALCET		NOB	DATE COMPLETED 48-53 DAY 22 NO 07 YR 92
		10	RC RC	ELEVATION .	PC. BASIN CODE	DAYO MO O T YR TA
1 2	M 10 12	OG OF OVERBURDEN	AND REDDO	26 OCK MATERIA	30 31	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
GENERAL COLOUR	MOST	OTHER MAT		CRIVIATERIA	GENERAL DESCRIPTION	
2. 1	TOP SOIL					
<u>03000</u>	Saup + GRAVER					1 20
Bown	Cunt	Engo + Greace	C - ST.	ens 5		2061
Beo	CHALE					61 66
But	Sure					66 103
		,		The Control of the Co		
				****		- 103
					16746	- 103
			6" (	ASING	DRIJE SHOOT	
31	سا ليلبلنا	44444				
32 10 WA	TER RECORD	51 CASING & (	OPEN HOLE	RECORD	SIZE(S) OF OPENING 3	55 75 AO
WATER FOUND AT - FEET	KIND OF WATER	INSIDE MATERIAL	WALL	DEPTH - FEET	MATERIAL AND TYPE	INCHES FEET DEPTH TO TOP 41-44 30
	☐ FRESH 3 ☐ SULPHUR 14 ☐ SALTY 4 ☐ MINERALS 6 ☐ GAS	10-11 1 DESTEEL 12	inches	7 / 7	So	OF SCREEN FEET
	FRESH 3 DSULPHUR 19 D SALTY 6 DGAS	2' GALVANIZED 3 CONCRETE 4 OPEN HOLE 5 PLASTIC	100 C	62	61 PLUGGING	& SEALING RECORD
20-23 1	FRESH 3 SULPHUR 24 SALTY 6 GAS	17-18 1 STEEL 2 GALVANIZED 3 CONCRETE	6	2 103	FROM TO 10-13 14-17	ATERIAL AND TYPE (CEMENT GROUT LEAD PACKER ETC.)
	☐ FRESH 3 ☐ SULPHUR 29 ☐ SALTY 4 ☐ MINERALS ☐ SALTY 6 ☐ GAS	4 MOPEN HOLE 5 PLASTIC		27-30	18-21 22-25	2 55,500
	☐ FRESH 3 ☐ SÖLPHUR 34 34 4 ☐ MINERALS ☐ SALTY 6 ☐ GAS	2 □ GALVANIZED 3 □ CONCRETE 4 □ OPEN HOLE 5 □ PLASTIC			26-29 30-33 80	D. USE M.
71 PUMPING TEST ME		_ /			LOCATION O	F WELL
STATIC	BAILER  WATER LEVEL 25 END OF WATER		PUMPING	IN DI	AGRAM BELOW SHOW DISTANCES	
TENET 19-74	PUMPING	30 MINUTES 45 MINUTES	RECOVERY  50 MINUTES  35-37		(N)	
IF FLOWING	> ->	ET 537 ET 537 E	EET 53.7 FEET		*	
IF FLOWING. GIVE RATE  RECOMMENDED PI	GPM	FEET 1 CLEAR			•	1417-
☐ SHALLO	PUMP	43-45 RECOMMENDED PUMPING RATE	3 GPM	E	Zing T	Jewest 1
50-53	54		ELECTRIC CURREN	R		ian
FINAL STATUS	water supply observation we lead test hole	7 🗆 UNFINISHED		~	POB11	Trumster
OF WELL	4 ☐ RECHARGE WELL  55-56 1 Ø DOMESTIC	DEWATERING  COMMERCIAL			Be	
WATER	2 STOCK 3 RRIGATION	<ul> <li>■ MUNICIPAL</li> <li>↑ □ PUBLIC SUPPLY</li> <li>■ COOLING OR AIR COND</li> </ul>	ITIONING.			· into
USE	4   INDUSTRIAL   OTHER	POP IO		•		Lis'
METHOD	2 1 10111111 (001112)					四等"
CONSTRUCT	ION S CONTARY (REVERS	E) B   JETTING DIRECTION DIGGING	OTHER	DRILLERS REMAR	o ks	109397
NAME OF WELL		WELL	L CONTRACTOR'S			AUG 1 7 1992 ""
D ADDRESS	ON WELL DA	encine LTO. 6	2663	O DATE OF INSP		AUU 1 / 1334
NAME OF WE	ELL TECHNICIAN THE	DIY COUT.	657	S AEMARKS		
NAME OF WE	F TECHNICIAN CONTRACTOR	SUBMISSION DATE	-0590	OFFICE		
	THE	DAY C/ NO.	<u>08 92</u>	ō		FORM NO. 0506 (11/86) FORM 9
MINIST	RY OF THE ENVIR	ONMENT COPY				FURM NU. 0506 (11/86) FORM 9

# The Ontario Water Resources Act WATER WELL RECORD

Print only in spaces provided.

Mark correct box with a checkmark, where applicable.

4908201

Municipati	ty	Con.		
4900	2	HS	W	05
10	14	15		22 23 24

		1 2		10	14 15	-4-   -	27 23 24
County or District	0 *	Township/Borough/City/T	own/Village	Con	block tract survey,		10°
		Address			Date		48-53
		684 BU Northing	STY ST-	Elevation RC Basin	completed Code ;ii	da mo	onth <b>Y</b> yea <b>/</b>
21	M 10	Northing	HC	26 30 31			47
1 2	LO	G OF OVERBURDEN AND BEDI	ROCK MATERI	ALS (see instructions)		Dor	oth - feet
General colour	Most common material	Other materials		General descrip		From	То
BROWN	Clay	Bolders		DEHS	E	0	18
BROWN	clay	STONES		_ u -	-	18	46
BLUE	Clay	STONES		_ n		46	85
Blue	Clay			<u> </u>		85	99
G254	line stone			HARI	)	99	131
RED	Chale			HARL	)	131	168
					**************************************		
31							. L. ! l
32	<u> </u>				ــــــا لــــــــــــــــــــــــــــــ		75
10 14 41 <b>WAT</b> I	ER RECORD 51	CASING & OPEN HOLI		Sizes of opening (Slot No.)	31-33 Diameter	34-38 Leng	th 39-4
Water found at – feet	Kind of water		Depth - feet From To	— `. Iॼi		Depth at top	of screen 3
	Fresh 3 Sulphur 14 Minerals Salty 6 Gas	10-11 1 Steel 12 2 Galvanized				Deput at top	41-44 feet
	Fresh 3 Sulphur 19	3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic	0 10		GGING & SEALIN	G RECOP	
	Fresh 3 D Sulphur 24	17-18   Steel 19   2   Galvanized	_	20-23 X Annula		Abandonm	
	Salty Gas	Goncrete  Goncrete  Goncrete  Goncrete  Goncrete	102 16	Depth set at - feet From To	Material and type (Cer		entonite, etc.)
15-28 1 2	Fresh 3 Sulphur 29 Salty 4 Minerals Salty 5 Gas	24-25 I Steel 26		27.50 010-15 2017	Hole fle	ge o	ned
	Fresh <sup>3</sup> 🗍 Sulphur <sup>34</sup> <sup>60</sup>	2 Galvanized 3 Concrete 4 Open hole		26 29 30 ·33	80		
2 0	Salty 6 Gas	5 Plastic					
Pumping test me		GPM Duration of pumping  GPM Hours			N OF WELL		:
	ater level 25 Water levels during		In/di Indic	agram below show distan cate north by arrow.	ces of well from roa	ad and lot l	ine.
	27-24 15 minutes 30 min	26.72		À			
feet lf flowing give rate	7 leet leet	feet feet feet feet 42		1			
	GPM /20	feet 🔼 Clear 🗆 Cloudy		$\mathcal{N}$	•	2	
- 1	Recommended pump setting /25	numn sate		' <i>\</i> '		13	
50 53		ieet j GPM	3	W		0 2	
FINAL STATUS	ply 5 🔲 Abandoned, insuf	fficient supply 9		بالد	684	4/3	
Observatio Test hole Recharge	7 🔲 Abandoned (Othe			, we	μ1	5/2	
	55.56		2	2	<b>_</b>	is 4	-
WATER USE  Domestic  Stock			12	720.		100	
3   Irrigation	Public supply Cooling & air con			BUSH HS	(	I	
METHOD OF CO	ONSTRUCTION 57			4	900 FT.	->-	
, 🖺 Cable tool	∫ 5 ☐ Air percussion	9 Driving 10 Digging	\				_
3 ☐ Rotary (re	verse) 7 🗌 Diamond	11 Other			1	7329	35
Nome - NA-11 C	octor.	Well Contractor's Licence No.	Data	58 Connecto	↑ 59-62 Date rece	eived	63-68
Name of Well Contra	o Well Asillia	7 Ca 6650	Data source	58 Con 8 CC 5	O SHEET MAY		997
Address	_ /	e-Out. LOHICO	Late of ins	spection Inspect	or	- "	
P.O. BOX	ician	Well Technician's Licence No.	Remarks	·:			
MARK ( Signature of Technic		7-0278 Submission date	Remarks		,	700 °	
		day 24 mo 04 yr 97	115		(	CSS. S	_

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County or District

Print only in spaces provided.

Mark correct box with a checkmark, where appli

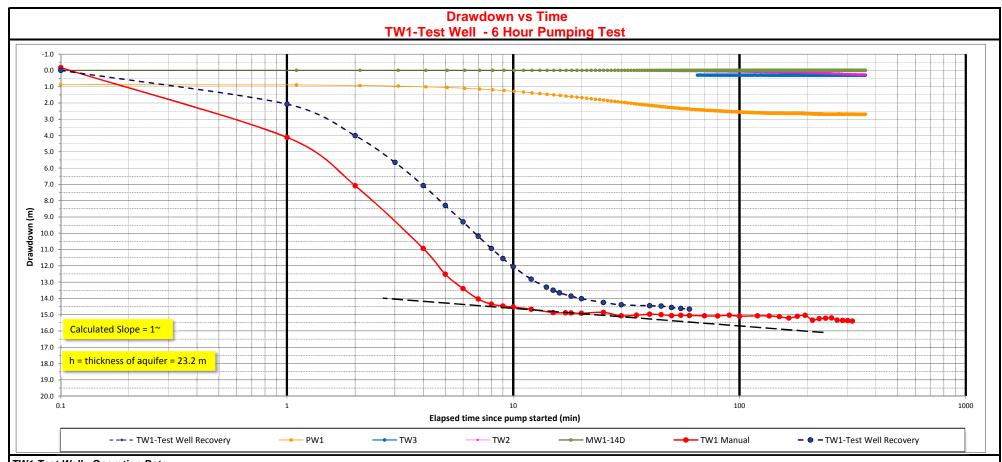
	<del>-</del> -			_	_
		Th	e Ontario Water I WATER WEL		
ica	ble. 11 2	4908259	Municipality Cor 49002 H	n. <b>5. W</b> . 1	22 23 24
	Township/Borough/City/To		Con block tract surv	• •	1 25-27 2// 10
	Address	MAIN ST BELFOUR	Date completed		48-53 9 9 7 onth year
12	Northing	RC Elevation RC			iv
		ROCK MATERIALS (see instru	ctions)		
	Other materials		ral description	De From	pth – feet To
				0	1
	ROCKS			1	15
	CLAY		,	15	42
	ROCKS			42	54
				54	63
				63	105
-				105	129
				129	142
				142	149
				149	151
				151	170

0506 (07/94) Front Form 9

General colour	Most common material	Other materials	General description	From To
	TOP SOIL			0 1
Brown	SAMDY GRAVEL	ROCKS		1 15
BROWN	GRAVEL	CLAY	,	15 42
GREY	CLAY	Rocks		42 54
RED	SHALE			54 63
GREEN	SHALE			63 105
GREY	LIMESTONE SHILE			105 129
LIGHT GREY	SANDSTONE			129 142
RED	SHALE			142 149
GREEN	SHALE			149 151
REA	SHALE			151 170
31				
32	14 15 21	32	43 54 Sizes of opening 31-33	65 75 80 Diameter 34-38 Length 39-40
Water found	TER RECORD 51 Inside		RECORD     Titles of opening	Diameter 34-38 Length 39-40 inches feet
at - feet	Kind of water diam inches		Depth - feet From To  13-16  13-16  70  Material and type	Depth at top of screen 41-44
115 2	☐ Salty 6 ☐ Gas	2 Galvanized 3 Concrete	7'6" 58'6" 0	feet
140 2	☐ Salty 6 ☐ Gas	5 Plastic	61 PLUGGING &	SEALING RECORD
20-23 1	Fresh <sup>3</sup> Sulphur <sup>24</sup>	2 Galvanized	Annular space	Abandonment
25-28 1	Gas Gas Sulphur Sulphu	4 ☐ Open hole 5 ☐ Plastic	From 10 10-13 14-17 12 - 14	TON ITE
2	☐ Salty 6 ☐ Gas	2 Galvanized	27-30 O 225 VIEW	7074 172
30-33	□ Fresh <sup>3</sup> □ Sulphur <sup>34</sup> <sup>60</sup> □ Minerals □ Salty <sub>6</sub> □ Gas	3	26-29 30-33 80	
Pumping test		Duration of pumping 17-18	LOCATION OF WE	
1 1 Pump 2	Bailer 25 G	PMi Hours	In diagram below show distances of wel	
Static level	end of pumping water levels during	Pumping 2 Recovery es 45 minutes 60 minutes	Indicate north by arrow.	
(c) -, ' (r)	163'3" 113'0" 132'	148'7" 163'3"	2	
1 feet If flowing give	rate 38-41 Pump intake set at	Water at end of test 42	1 BEL	FOUNITAIN
Recommende	tu pullip type   Neconimeraca	feet Clear Cloudy  43-45 Recommended 46-49	57	
☐ Shallow	Deep pump setting /65	pump rate feet 2 GPM	RGH'L RO II	
FINAL STATU	IS OF WELL 54		2	
□ Water st	upply 5 Abandoned, insuffic ation well 6 Abandoned, poor qu	ient supply <sup>9</sup>		
3 ☐ Test hol		~ "	main	
WATER USE	55-56		2 5	<del></del> γ,
1 Domesi 2 ☐ Stock 3 ☐ Irrigatio		9		20 
4 🗍 Industri		ioning	RGI	1'L RO 1
	CONSTRUCTION 57	g 🗆 Driving		
1 ☐ Cable t 2 ☐ Rotary 3 ☐ Rotary	(conventional) 6 🗌 Boring	9 ☐ Driving 10 ☐ Digging 11 ☐ Other		184518
4   Rotary	(air) 8  Jetting			
Name of Well Co		Well Contractor's Licence No.	Data 58 Contracctor 59-62 source	
MEADOUR	ANK DRILLING SERVICE ELORA ONT NOB 15 choiclan	5 6865	O Date of inspection Inspector	OCT 2 0 1997
Box 416	ELORA ONT NOB 15	30	NSE .	
Name of Well Tec	chnician ROAPFOO7	Well Technician's Licence No.	Remarks    Page	$\bowtie$
Signature of Tech	nnician/Contractor	Submission date		CSS,\$8

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# Appendix C Drawdown-Time Curves



#### TW1-Test Well - Operation Data

Well Depth = 53.94 m

Static Water Level = 19.19 m below mp

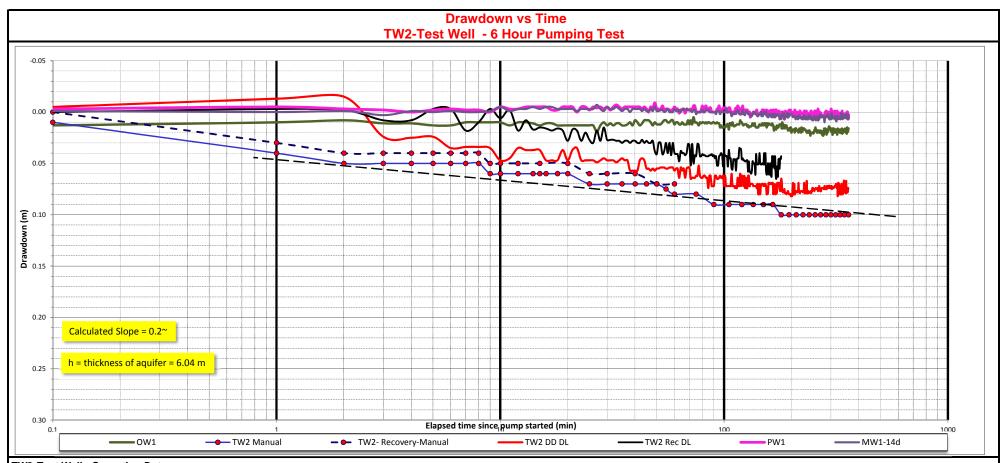
Pumping rate = 0.75 L/s = 45 L/min

Transmissivity (T) =  $0.183 \times Q/\Delta s = 9.37 \text{ m}^2/\text{day}$ 

Hydraulic Conductivity (k) = T/h = 54.7\*10<sup>-6</sup> m/sec

Drawdown vs. Time - TW1 Pumping Test
Hydrogeology Investigation

Manors of Belfountain



#### TW2-Test Well - Operation Data

Well Depth = 20.11 m

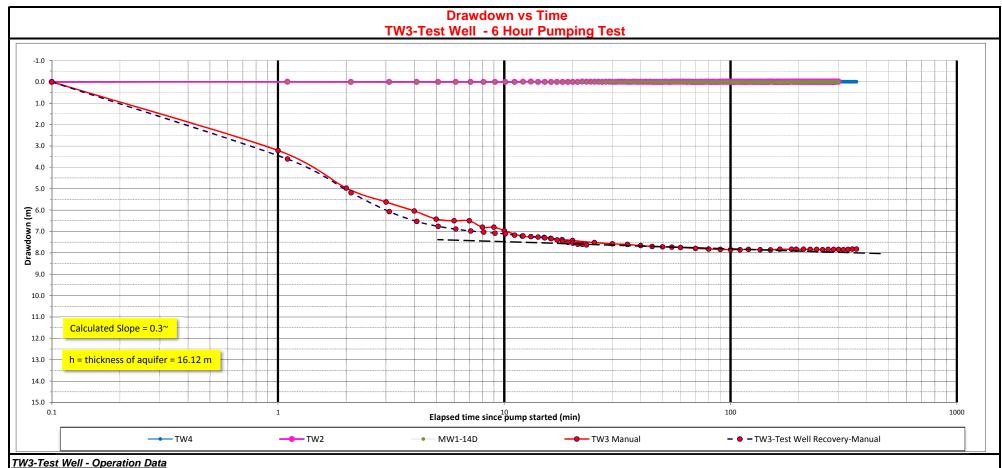
Static Water Level = 14.07 m below mp

Pumping rate = 0.189 L/s = 11.34 L/min

Transmissivity (T) =  $0.183 \text{ ^{+}Q/}\Delta s = 14.94 \text{ m}^2/\text{day}$ 

Hydraulic Conductivity (k) = T/h = <sup>2.86E-5</sup> m/sec

Drawdown vs. Time - TW2 Pumping Test
Hydrogeology Investigation
Belfountain



Well Depth = 35.96 m

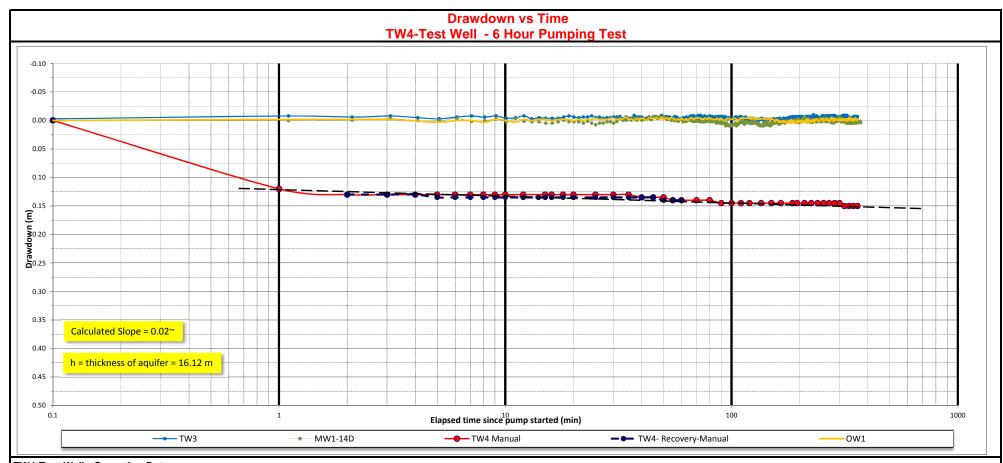
Static Water Level = 15.80 m below mp

Pumping rate = 1.61 L/s = 96.6 L/min

Transmissivity (T) =  $0.183*Q/\Delta s = 84.85 \text{ m}^2/\text{day}$ 

Hydraulic Conductivity (k) = T/h = 5.26 m/day = 6.1\*10<sup>-5</sup> m/sec

**Drawdown vs. Time - TW3 Pumping Test Hydrogeological Investigation** Belfountain



#### TW4-Test Well - Operation Data

Well Depth = 35.66 m

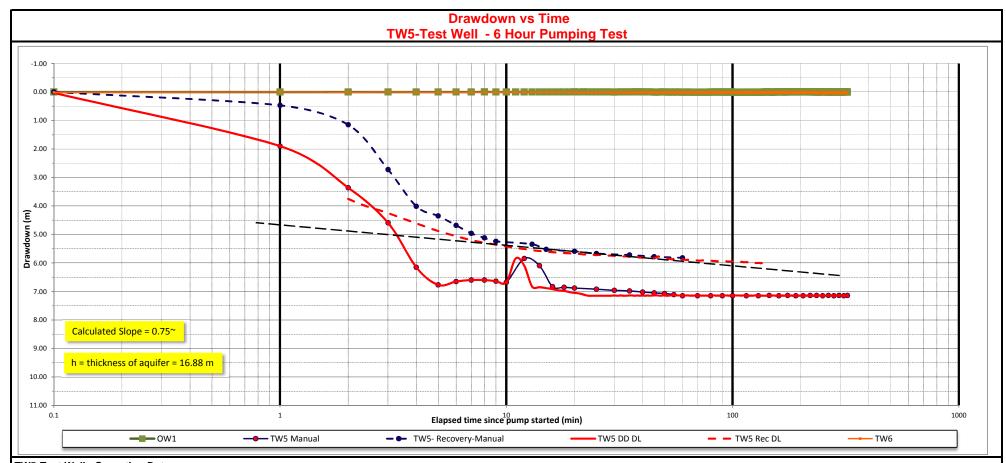
Static Water Level = 19.56 m below mp

Pumping rate = 0.5 L/s = 30 L/min

Transmissivity (T) =  $0.183*Q/\Delta s = 403 \text{ m}^2/\text{day}$ 

Hydraulic Conductivity (k) = T/h = 2.9\*10<sup>-4</sup> m/sec

Drawdown vs. Time - TW4 Pumping Test
Hydrogeological Investigation
Belfountain



#### TW5-Test Well - Operation Data

Well Depth = 32.3 m

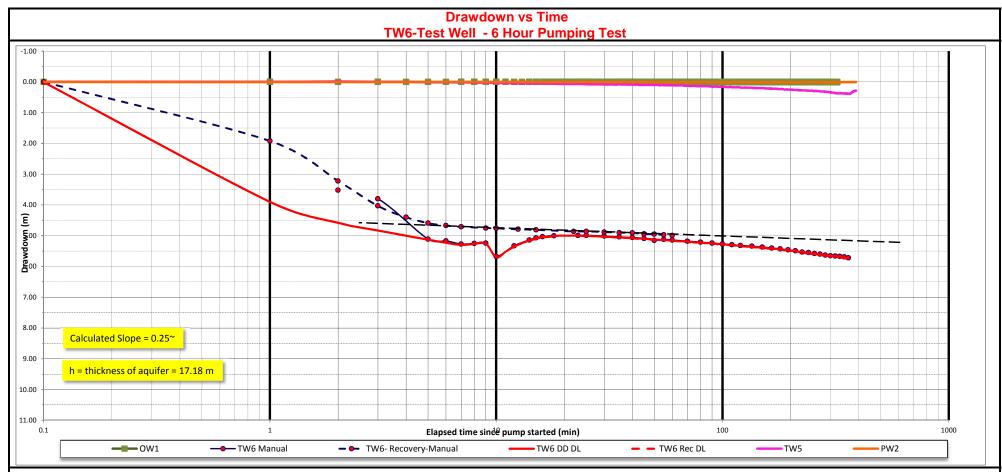
Static Water Level = 15.34 m below mp

Pumping rate = 1.26 L/s = 16.66 igpm

Transmissivity (T) =  $0.183 \text{ ^*Q/}\Delta \text{s} = 26.60 \text{ m}^2/\text{day}$ 

Hydraulic Conductivity (k) = T/h = 1.83\*10<sup>-5</sup> m/sec

Drawdown vs. Time - TW5 Pumping Test
Hydrogeological Investigation
Belfountain



#### TW6-Test Well - Operation Data

Well Depth = 32.3 m

Static Water Level = 14.69 m below mp

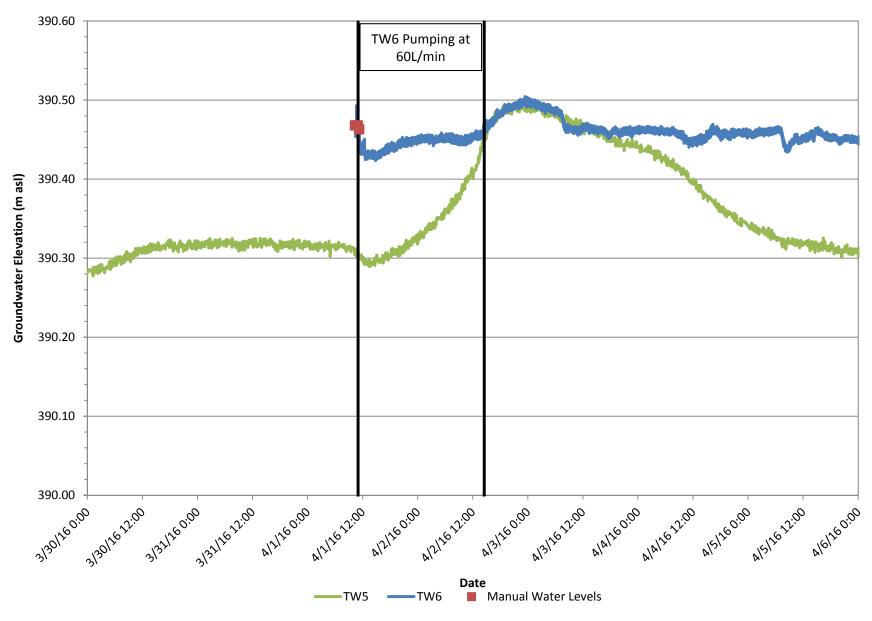
Pumping rate = 1.14 L/s = 68.4 L/min

Transmissivity (T) =  $0.183*Q/\Delta s = 72.10 \text{ m}^2/\text{day}$ 

Hydraulic Conductivity (k) = T/h = 4.86\*10<sup>-5</sup> m/sec

Drawdown vs. Time - TW6 Pumping Test
Hyrogeological Investigation
Belfountain

### TW5 and TW6 26 Hour Pumping Test Hydrographs

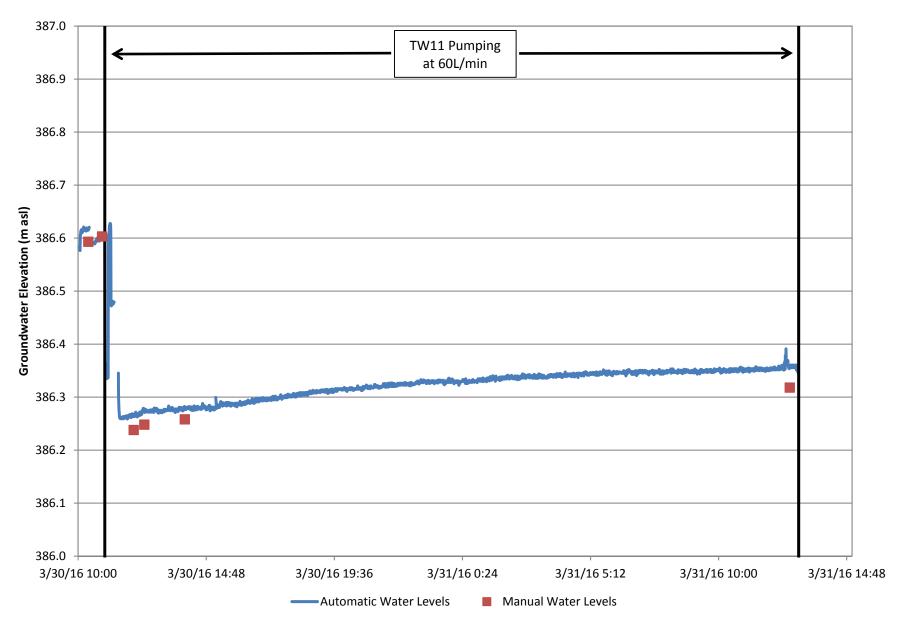




Prepared by: SQ Updated by: TH (COLE) December 19, 2017



TW11 26 Hour Pumping Test Hydrograph





Prepared by: SQ Updated by: TH (COLE) December 19, 2017



## Appendix D<br/>Infiltration Data

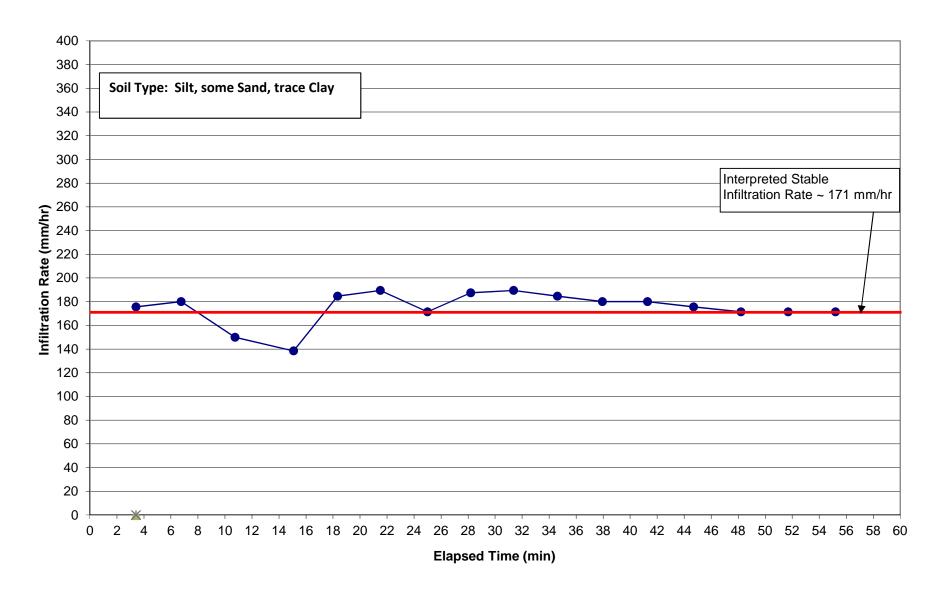
#### Infiltration Test - IT1

Soil Type: Silt, brown, soft, moist, some sand, trace clay

Depth: 0.33 m
Location: Belfountain

Elapsed Time	Interval Time	Interval Time	Interval Time	Readings	Infiltration Rate	Infiltration Rate
min	sec	min	hour	mm	mm/h	mm/day
3.42	205	3.42	0.06	10	176	4214.63
6.75	200	3.33	0.06	10	180	4320
10.75	240	4.00	0.07	10	150	3600
15.08	260	4.33	0.07	10	138	3323
18.33	195	3.25	0.05	10	185	4431
21.50	190	3.17	0.05	10	189	4547
25.00	210	3.50	0.06	10	171	4114
28.20	192	3.20	0.05	10	188	4500
31.37	190	3.17	0.05	10	189	4547
34.62	195	3.25	0.05	10	185	4431
37.95	200	3.33	0.06	10	180	4320
41.28	200	3.33	0.06	10	180	4320
44.70	205	3.42	0.06	10	176	4215
48.20	210	3.50	0.06	10	171	4114
51.70	210	3.50	0.06	10	171	4114
55.20	210	3.50	0.06	10	171	4114

#### **Infiltration Rate at IT1**



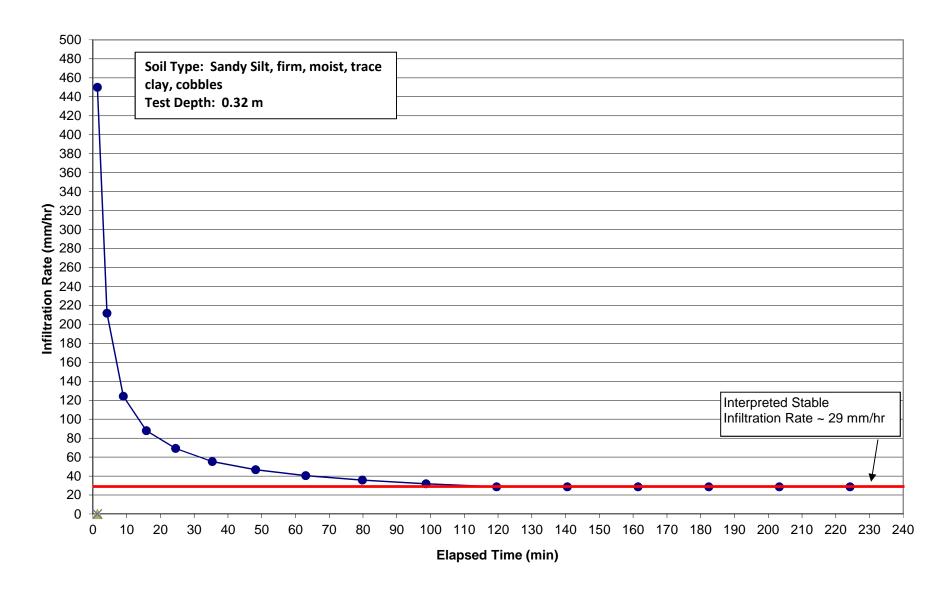
#### Infiltration Test - IT2

Soil Type: Sandy Silt, firm, moist, trace clay, cobbles

Depth: 0.32 m
Location: Belfountain

Elapsed Time min	Interval Time	Interval Time min	Interval Time	Readings	Infiltration Rate mm/h	Infiltration Rate mm/day
	sec		hour	mm	-	,
1.33	80	1.33	0.02	10	450	10800.00
4.17	170	2.83	0.05	10	212	5082
9.00	290	4.83	0.08	10	124	2979
15.83	410	6.83	0.11	10	88	2107
24.50	520	8.67	0.14	10	69	1662
35.33	650	10.83	0.18	10	55	1329
48.18	771	12.85	0.21	10	47	1121
63.02	890	14.83	0.25	10	40	971
79.82	1008	16.80	0.28	10	36	857
98.65	1130	18.83	0.31	10	32	765
119.57	1255	20.92	0.35	10	29	688
140.52	1257	20.95	0.35	10	29	687
161.47	1257	20.95	0.35	10	29	687
182.37	1254	20.90	0.35	10	29	689
203.30	1256	20.93	0.35	10	29	688
224.25	1257	20.95	0.35	10	29	687

#### **Infiltration Rate at IT2**



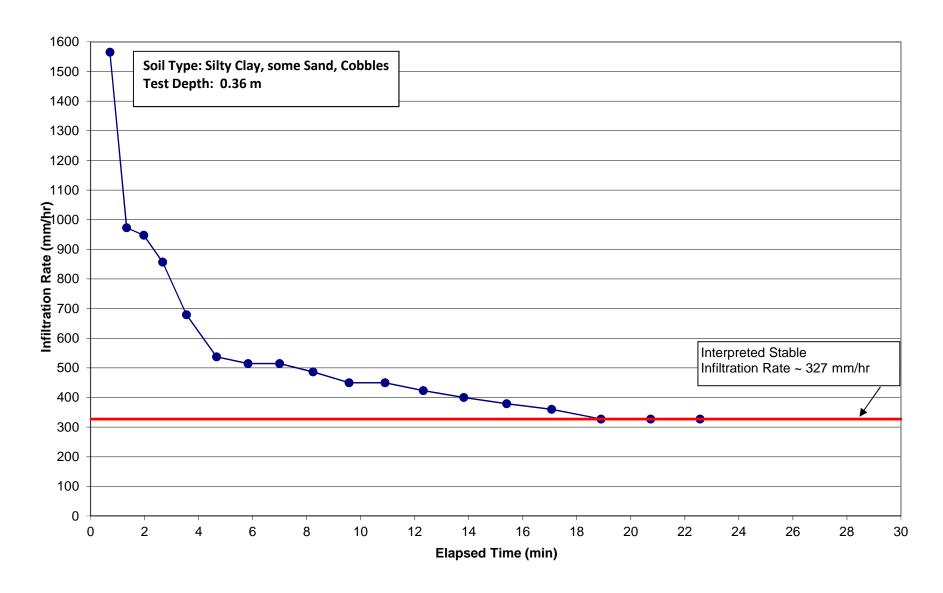
#### **Infiltration Test - IT4**

Soil Type: Silty Clay, some Sand, cobbles

Depth: 0.36 m Location: Belfountain

Elapsed Time	Interval Time	Interval Time	Interval Time	Readings	Infiltration Rate	Infiltration Rate
min	sec	min	hour	mm	mm/h	mm/day
0.33	20	0.33	0.01	10	1800	43200
0.72	23	0.38	0.01	10	1565	37565
1.33	37	0.62	0.01	10	973	23351
1.97	38	0.63	0.01	10	947	22737
2.67	42	0.70	0.01	10	857	20571
3.55	53	0.88	0.01	10	679	16302
4.67	67	1.12	0.02	10	537	12896
5.83	70	1.17	0.02	10	514	12343
7.00	70	1.17	0.02	10	514	12343
8.23	74	1.23	0.02	10	486	11676
9.57	80	1.33	0.02	10	450	10800
10.90	80	1.33	0.02	10	450	10800
12.32	85	1.42	0.02	10	424	10165
13.82	90	1.50	0.03	10	400	9600
15.40	95	1.58	0.03	10	379	9095
17.07	100	1.67	0.03	10	360	8640
18.90	110	1.83	0.03	10	327	7855
20.73	110	1.83	0.03	10	327	7855
22.57	110	1.83	0.03	10	327	7855

#### **Infiltration Rate at IT4**



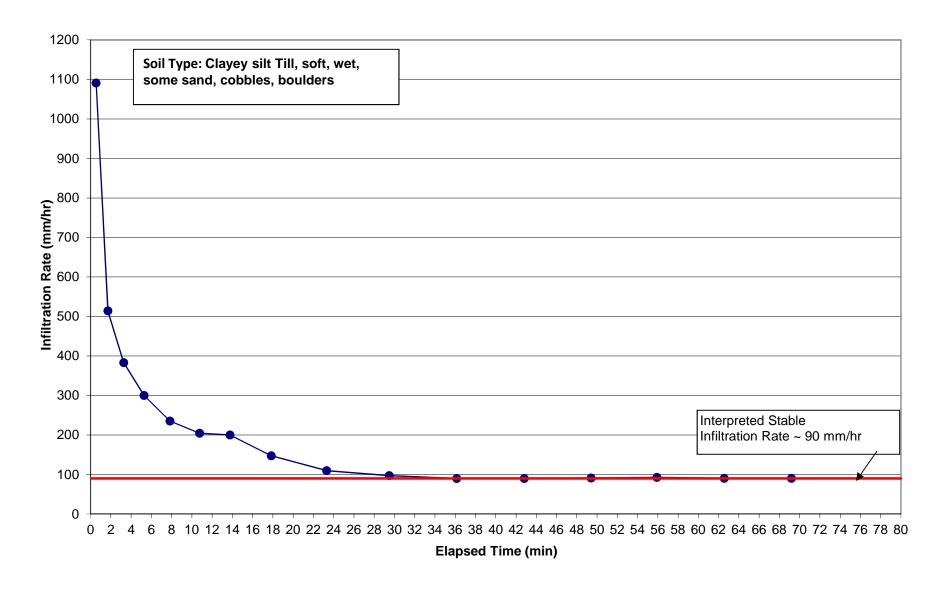
#### **Infiltration Test - IT5**

Soil Type: Clayey silt Till, soft, wet, some sand, cobbles, boulders

Depth: 0.38 m Location: Belfountain

Elapsed Time	Interval Time	Interval Time	Interval Time	Readings	Infiltration Rate	Infiltration Rate
min	sec	min	hour	mm	mm/h	mm/day
0.55	33	0.55	0.01	10	1091	26182
1.72	70	1.17	0.02	10	514	12343
3.28	94	1.57	0.03	10	383	9191
5.28	120	2.00	0.03	10	300	7200
7.83	153	2.55	0.04	10	235	5647
10.77	176	2.93	0.05	10	205	4909
13.77	180	3.00	0.05	10	200	4800
17.83	244	4.07	0.07	10	148	3541
23.30	328	5.47	0.09	10	110	2634
29.48	371	6.18	0.10	10	97	2329
36.15	400	6.67	0.11	10	90	2160
42.82	400	6.67	0.11	10	90	2160
49.42	396	6.60	0.11	10	91	2182
55.90	389	6.48	0.11	10	93	2221
62.55	399	6.65	0.11	10	90	2165
69.18	398	6.63	0.11	10	90	2171

#### **Infiltration Rate at IT5**



#### Infiltration Test - IP1

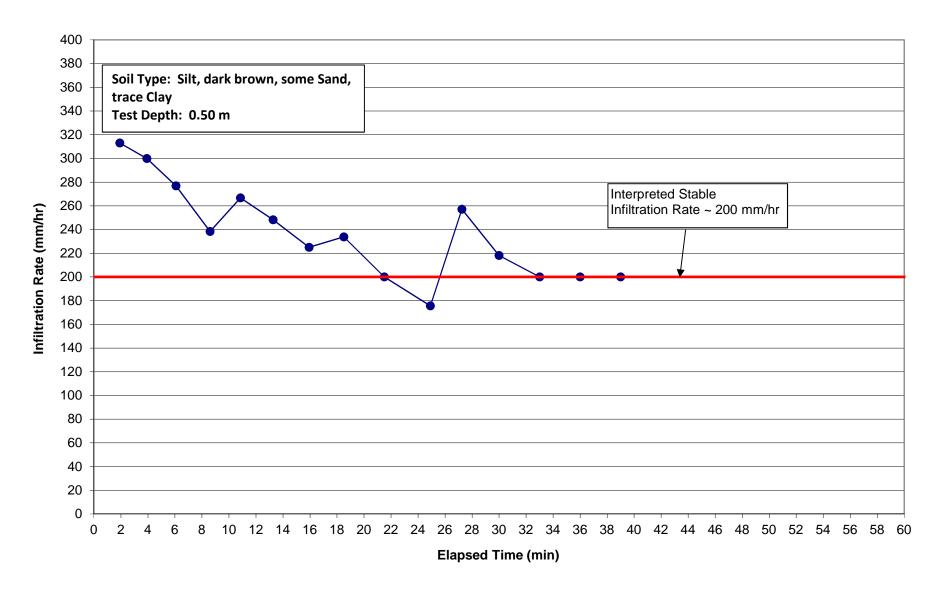
Soil Type: Silt, dark brown, soft, moist, some sand, trace clay

Pit Size: 0.60 m x 0.60 m x 0.50 m

Location: Belfountain

Elapsed Time	Interval Time	Interval Time	Interval Time	Readings	Infiltration Rate	Infiltration Rate
min	sec	min	hour	mm	mm/h	mm/day
		0.00				
1.92	115	1.92	0.03	10	313	7513
3.92	120	2.00	0.03	10	300	7200
6.08	130	2.17	0.04	10	277	6646
8.60	151	2.52	0.04	10	238	5722
10.85	135	2.25	0.04	10	267	6400
13.27	145	2.42	0.04	10	248	5959
15.93	160	2.67	0.04	10	225	5400
18.50	154	2.57	0.04	10	234	5610
21.50	180	3.00	0.05	10	200	4800
24.92	205	3.42	0.06	10	176	4215
27.25	140	2.33	0.04	10	257	6171
30.00	165	2.75	0.05	10	218	5236
33.00	180	3.00	0.05	10	200	4800
36.00	180	3.00	0.05	10	200	4800
39.00	180	3.00	0.05	10	200	4800

#### **Infiltration Rate at IP1**



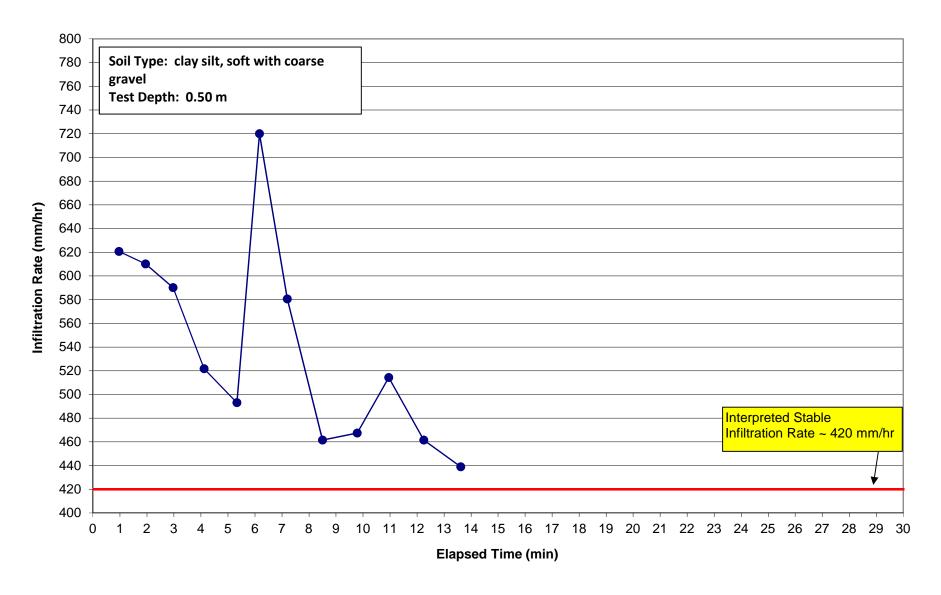
#### Infiltration Test - IP2

Soil Type: clay silt, soft with coarse gravel
Depth: 0.60 m x 0.60 m x 0.50 m

Location: Belfountain

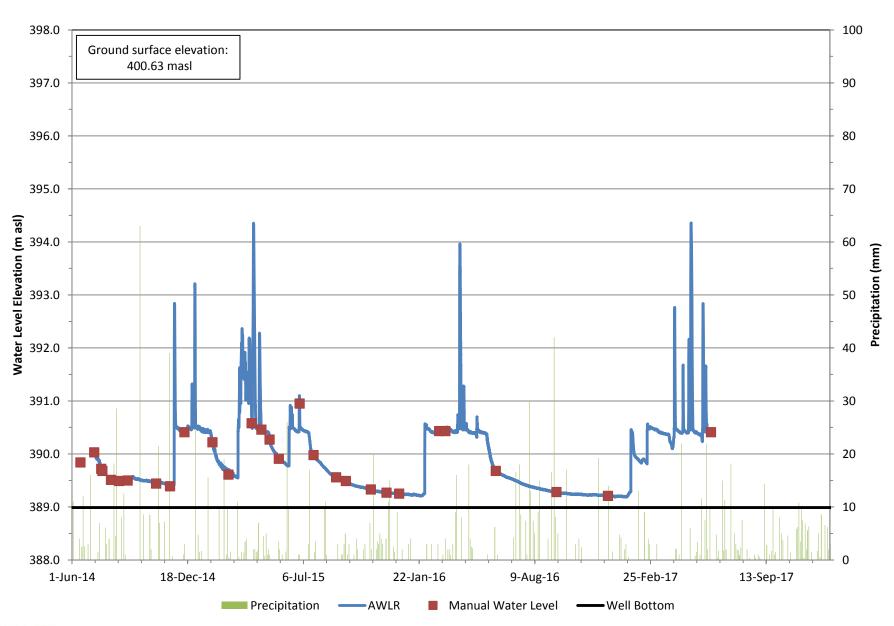
Elapsed Time	Interval Time	Interval Time	Interval Time	Readings	Infiltration Rate	Infiltration Rate
min	sec	min	hour	mm	mm/h	mm/day
		0.00				
0.97	58	0.97	0.02	10	621	14897
1.95	59	0.98	0.02	10	610	14644
2.97	61	1.02	0.02	10	590	14164
4.12	69	1.15	0.02	10	522	12522
5.33	73	1.22	0.02	10	493	11836
6.17	50	0.83	0.01	10	720	17280
7.20	62	1.03	0.02	10	581	13935
8.50	78	1.30	0.02	10	462	11077
9.78	77	1.28	0.02	10	468	11221
10.95	70	1.17	0.02	10	514	12343
12.25	78	1.30	0.02	10	462	11077
13.62	82	1.37	0.02	10	439	10537

#### **Infiltration Rate at IP2**



Appendix E Hydrographs

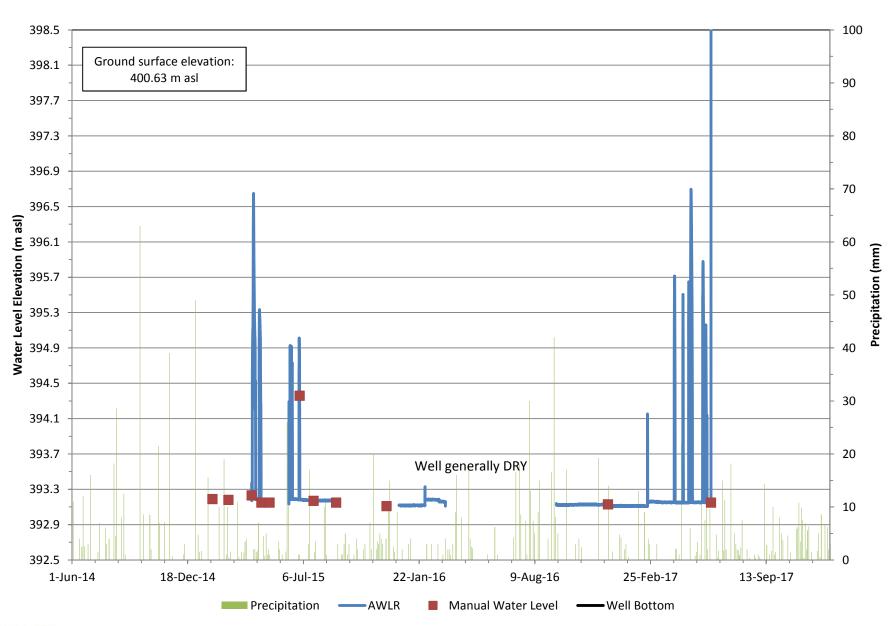
#### Manors of Belfountain Hydrogeological Investigation Groundwater Monitoirng MW1D-14 Hydrograph







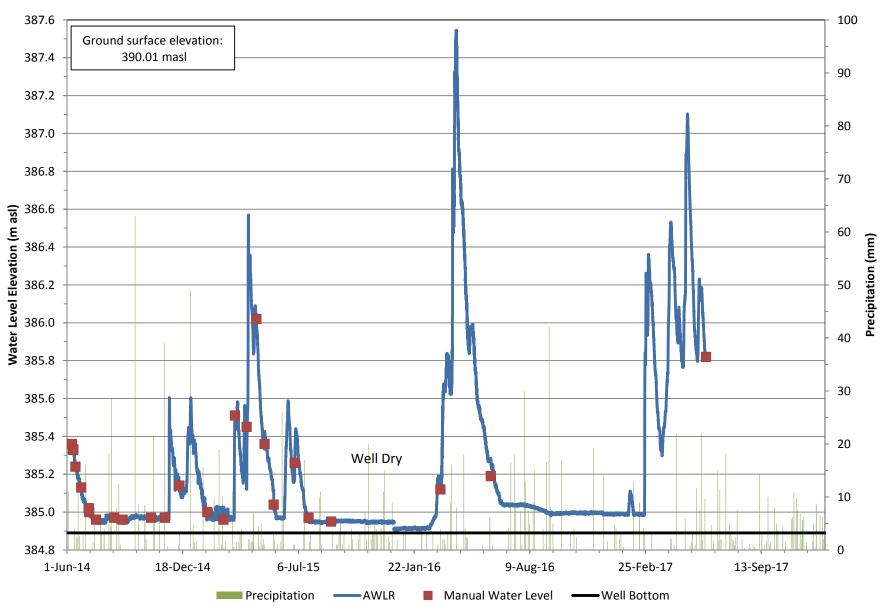
#### Manors of Belfountain Hydrogeological Investigation Groundwater Monitoirng MW1S-14 Hydrograph







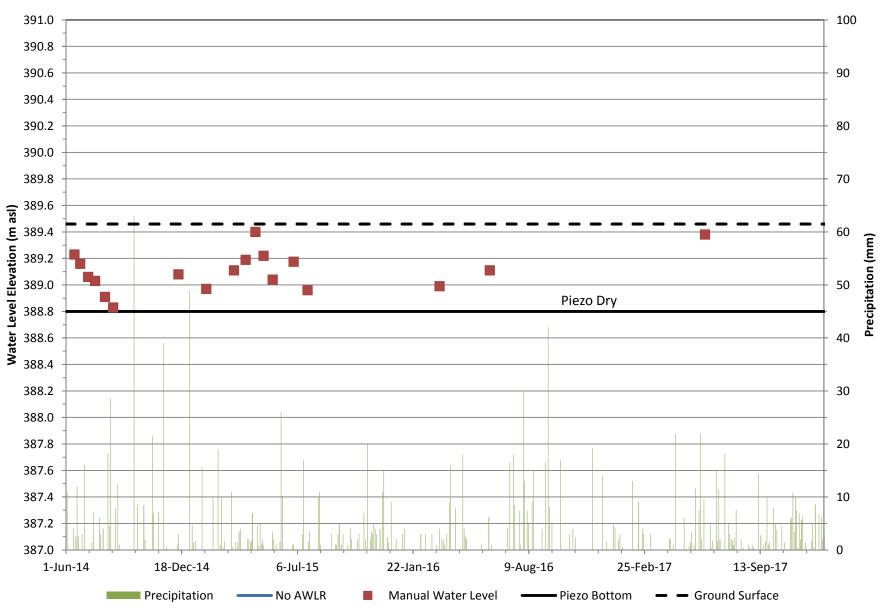
#### Manors of Belfountain Hydrogeological Investigation Groundwater Monitoirng OW1 Hydrograph







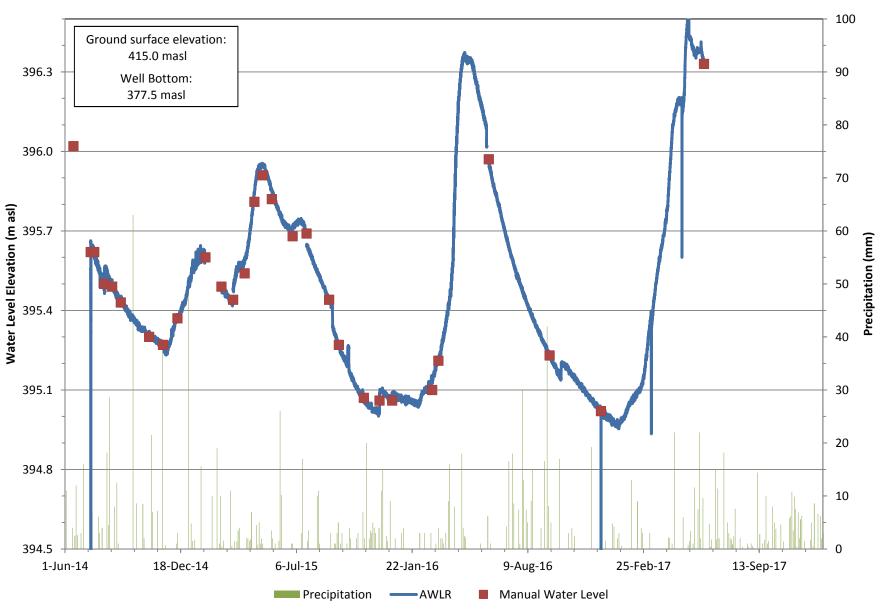
## Manors of Belfountain Hydrogeological Investigation Groundwater Monitoirng Piezo beside PZ2-14 Hydrograph







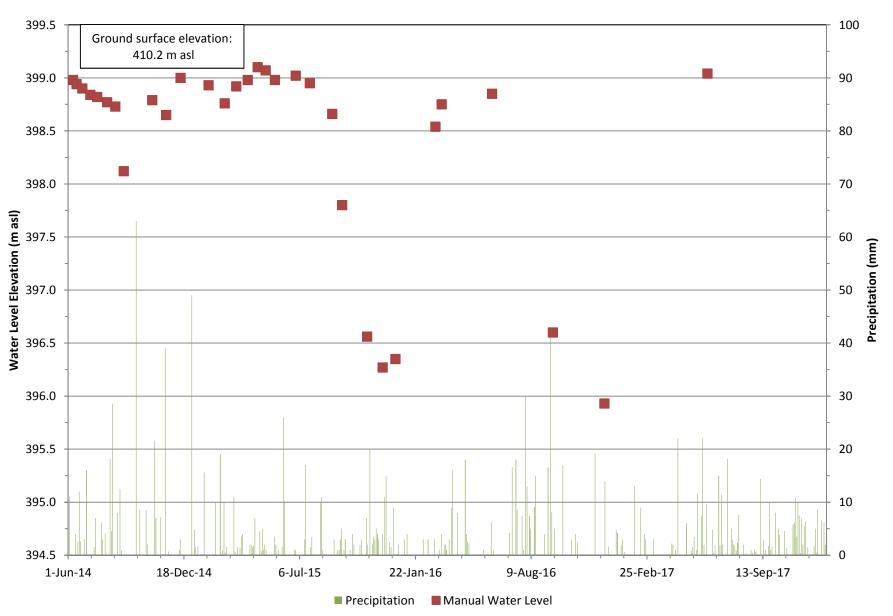
### Manors of Belfountain Hydrogeological Investigation Groundwater Monitoirng PW1 Hydrograph







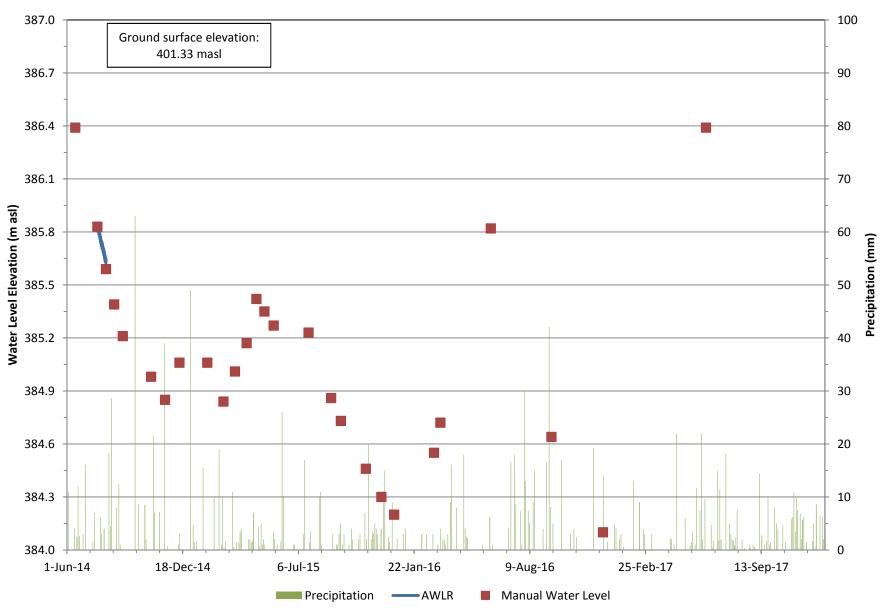
#### Manors of Belfountain Hydrogeological Investigation Groundwater Monitoirng PW2 Hydrograph







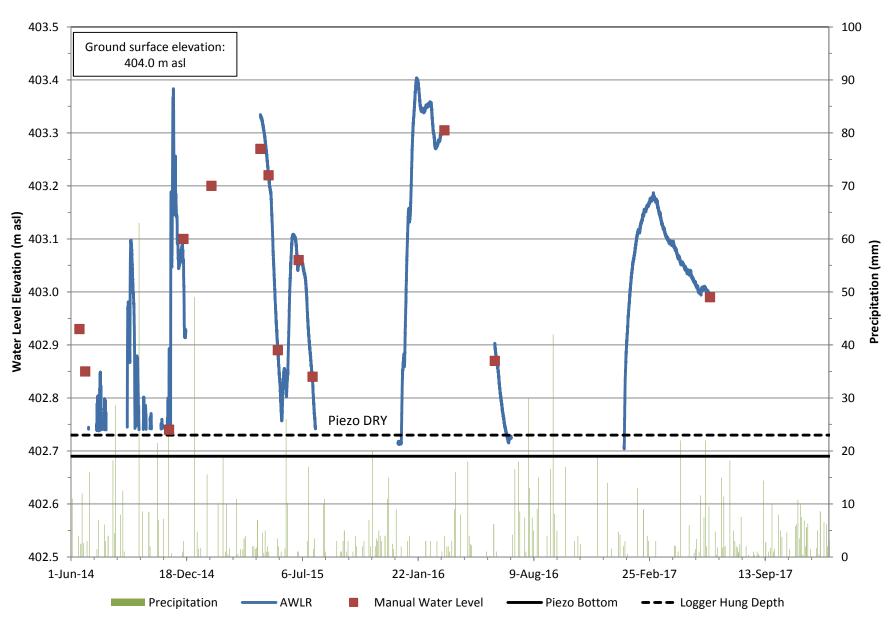
#### Manors of Belfountain Hydrogeological Investigation Groundwater Monitoirng PW3 Hydrograph







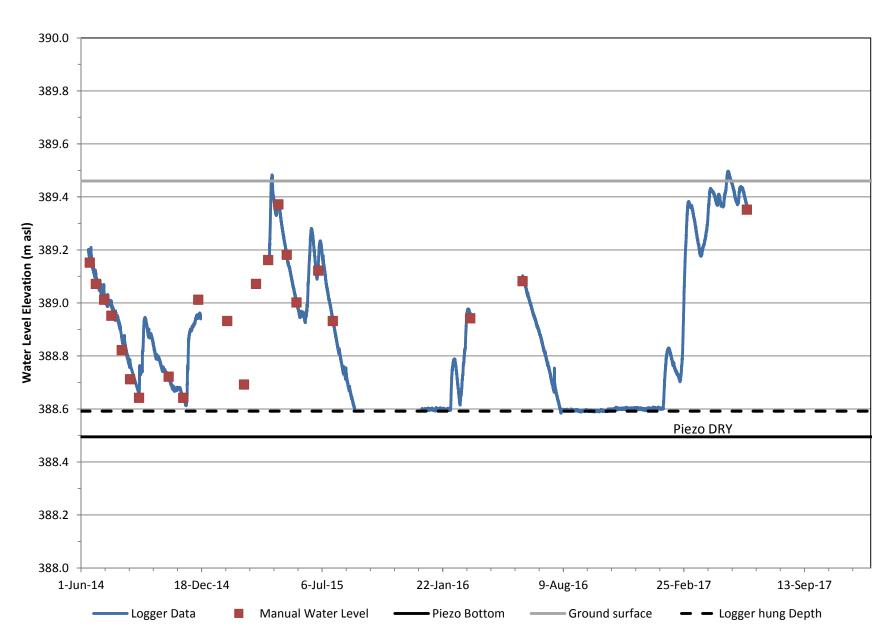
## Manors of Belfountain Hydrogeological Investigation Groundwater Monitoirng PZ1-14 Hydrograph







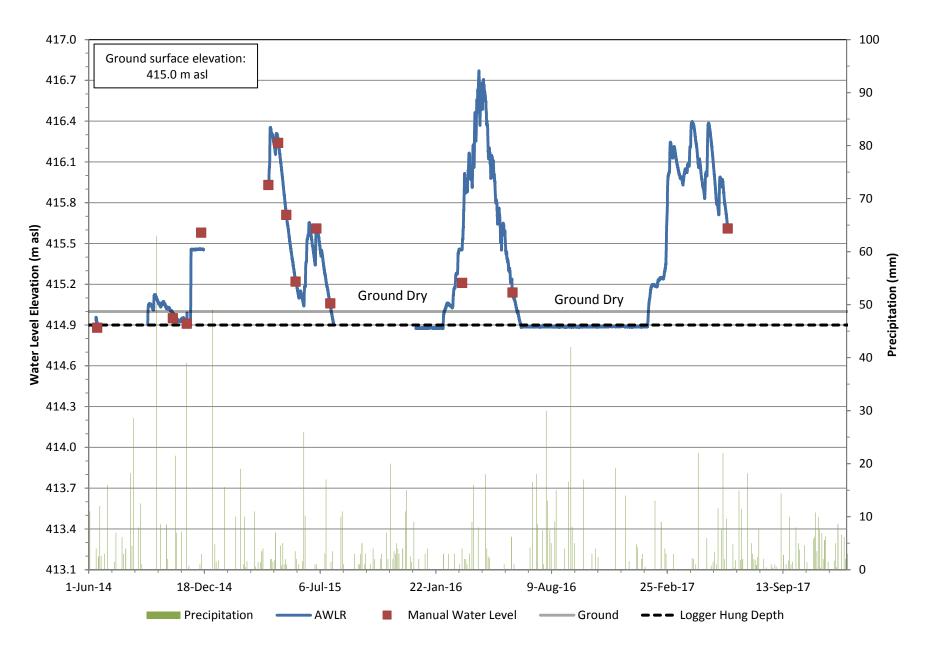
### Manors of Belfountain Hydrogeological Investigation Groundwater Monitoirng PZ2-14 Hydrograph (2)







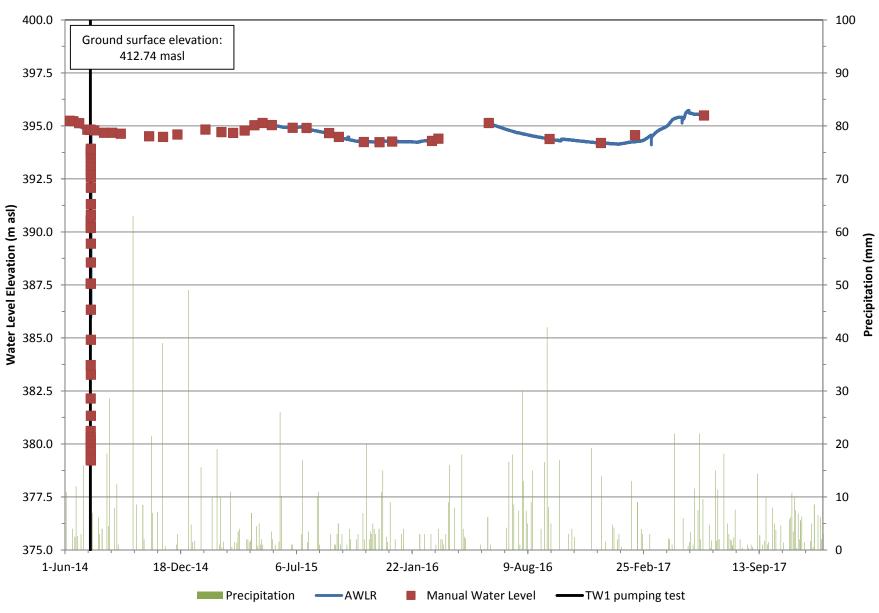
#### Manors of Belfountain Hydrogeological Investigation Groundwater Monitoirng SG1-14 Hydrograph







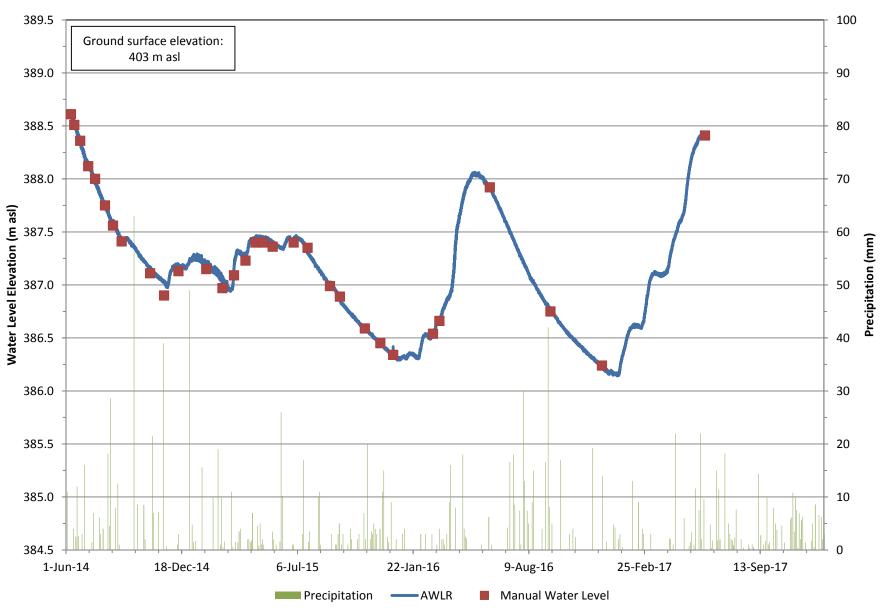
### Manors of Belfountain Hydrogeological Investigation Groundwater Monitoirng TW1 Hydrograph







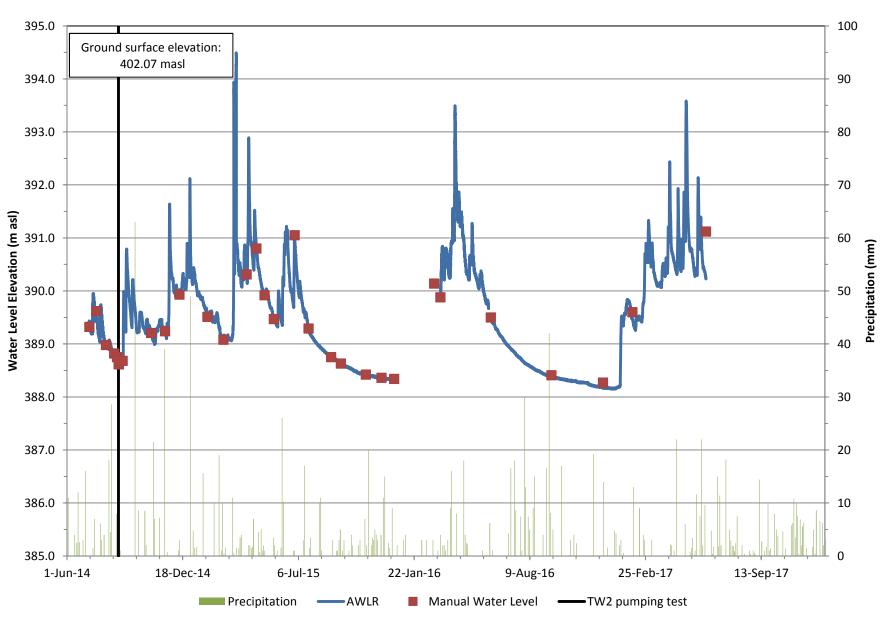
### Manors of Belfountain Hydrogeological Investigation Groundwater Monitoirng TW1-09 Hydrograph







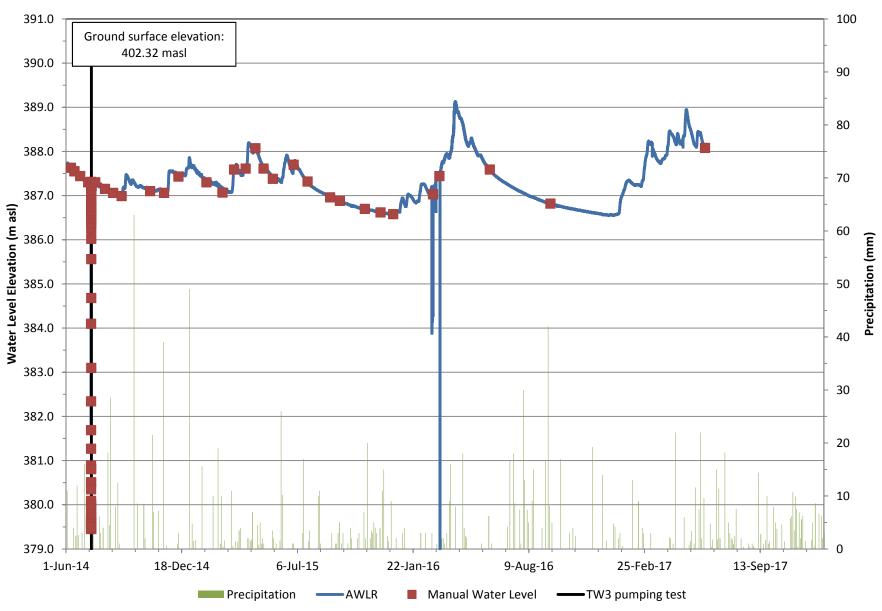
### Manors of Belfountain Hydrogeological Investigation Groundwater Monitoirng TW2 (A165390) Hydrograph







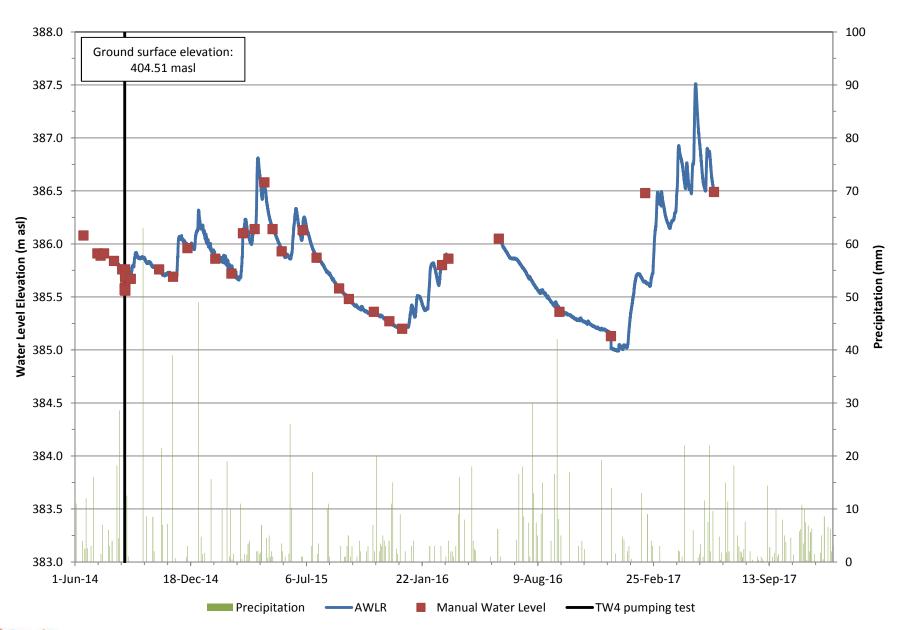
### Manors of Belfountain Hydrogeological Investigation Groundwater Monitoirng TW3 Hydrograph



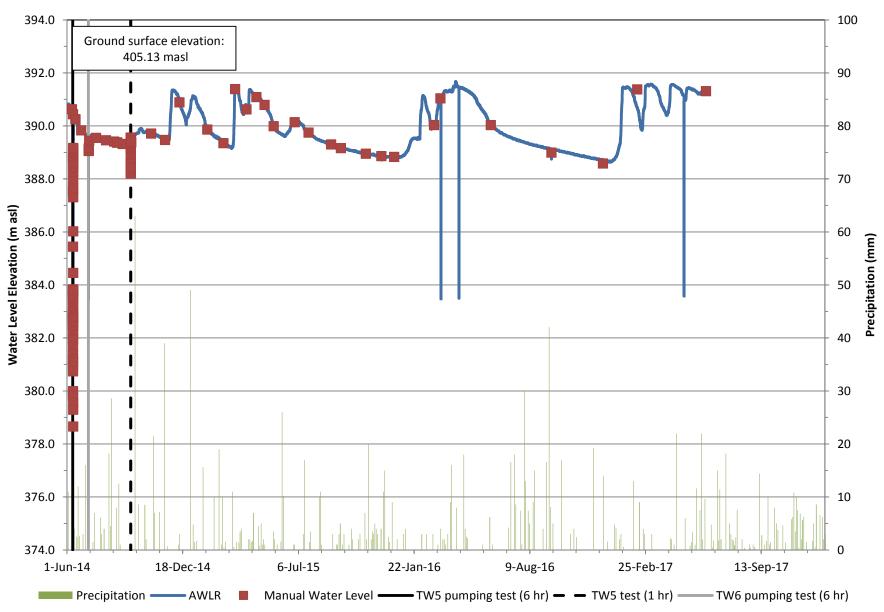




### Manors of Belfountain Hydrogeological Investigation Groundwater Monitoirng TW4 Hydrograph



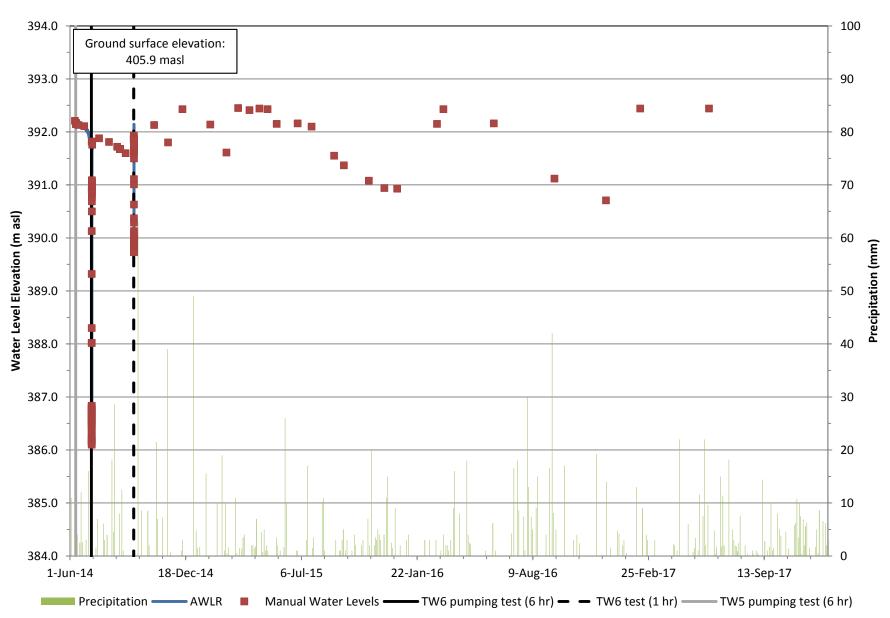
### Manors of Belfountain Hydrogeological Investigation Groundwater Monitoirng TW5 Hydrograph







### Manors of Belfountain Hydrogeological Investigation Groundwater Monitoirng TW6 Hydrograph







# Appendix F Groundwater Quality

			Well ID			PW2				OW1	
			ample Date	12/04/2014	04/07/2015	06/29/2015	09/17/2015	11/26/2015	12/04/2014	04/07/2015	06/29/2015
			sample ID	6152997	6430214	6701615	6988488	7237258	6153004	6430223	6701613
Sample Parameter	Unit	ODWS Criteria	RDL								
Electrical Conductivity	uS/cm		2	-	595	-	596	-	-	601	-
pH	pH Units	6.5 - 8.5	NA	-	7.92	-	8.16	-	-	8.1	-
Saturation pH				-	7.00	-	6.99	-	-	6.98	-
Langelier Index				-	0.92	-	1.17	-	-	1.12	-
Total Hardness (as CaCO3)	mg/L	80-100	0.5	-	281	-	295	-	-	265	-
Total Dissolved Solids	mg/L	500	20	-	304	-	330	-	-	294	-
Alkalinity (as CaCO3)	mg/L	30-500	5	-	259	-	251	-	-	265	-
Bicarbonate (as CaCO3)	mg/L	-	5	-	259	-	251	-	-	265	-
Carbonate (as CaCO3)	mg/L	-	5	-	<5	-	<5	-	-	<5	-
Hydroxide (as CaCO3)	mg/L	-	5	-	<5	-	<5	-	-	<5	-
Fluoride	mg/L	1.5	0.1	-	< 0.05	-	<0.25	-	-	< 0.05	-
Chloride	mg/L	250	0.2	-	22.3	-	22.9	-	-	3.48	-
Nitrate as N	mg/L	10	0.1	6.51	3.44	4.15	2.75	2.12	0.89	0.85	1.89
Nitrite as N	mg/L	1	0.1	-	< 0.05	-	<0.25	< 0.05	-	< 0.05	-
Bromide	mg/L	-	0.1	-	< 0.05	-	<0.25	-	-	< 0.05	-
Sulphate	mg/L	500	0.2	-	18.2	-	22.0	-	-	14	-
Ortho Phosphate as P	mg/L	-	0.2	-	<0.10	-	< 0.50	-	-	<0.10	-
Reactive Silica	mg/L	-	0.05	-	7.52	-	8.45	-	-	5.38	-
Ammonia as N	mg/L	-	0.02	-	0.3	-	< 0.02	-	-	0.08	-
Total Phosphorus	mg/L	-	0.05	-	< 0.05	-	< 0.05	-	-	0.17	-
Total Organic Carbon	mg/L	-	0.5	-	0.5	-	0.7	-	-	2	-
Colour	TČU	5	5	-	<5	-	<5	-	-	<5	-
Turbidity	NTU	5	0.5	-	4.6	-	1.2	-	-	269	-
Calcium	mg/L	-	0.05	-	73.6	-	77.6	-	-	71.9	-
Magnesium	mg/L		0.05	-	23.5	-	24.7	-	-	20.7	-
Sodium	mg/L	200	0.05	-	8.20	-	9.37	-	-	7.68	-
Potassium	mg/L	-	0.05	-	0.90	-	0.84	-	-	2.16	-
Aluminum	mg/L	0.1	0.004	-	< 0.004	-	< 0.004	-	-	< 0.004	-
Antimony	mg/L	0.006	0.003	-	< 0.003	-	< 0.003	-	-	< 0.003	-
Arsenic	mg/L	0.025	0.003	-	< 0.003	-	< 0.003	-	-	< 0.003	-
Barium	mg/L	1	0.002	-	0.056	-	0.050	-	-	0.048	-
Beryllium	mg/L	-	0.001	-	< 0.001	-	< 0.001	-	-	< 0.001	-
Boron	mg/L	5	0.01	-	< 0.010	-	< 0.010	-	-	< 0.010	-
Cadmium	mg/L	0.005	0.001	-	< 0.001	-	< 0.001	-	-	< 0.001	-
Chromium	mg/L	0.05	0.003	-	0.005	-	< 0.003	-	-	< 0.003	-
Cobalt	mg/L	-	0.001	-	< 0.001	-	< 0.001	-	-	< 0.001	-
Copper	mg/L	1	0.003	-	< 0.003	-	< 0.003	-	-	< 0.003	-
Iron	mg/L	0.3	0.01	-	< 0.010	-	< 0.010	-	-	< 0.010	-
Lead	mg/L	0.01	0.002	-	< 0.002	-	< 0.002	-	-	< 0.002	-
Manganese	mg/L	0.05	0.002	-	< 0.002	-	< 0.002	-	-	< 0.002	-
Mercury	mg/L	0.001	0.0001	-	< 0.0001	-	< 0.0001	-	-	<0.0001	-
Molybdenum	mg/L	-	0.002	-	< 0.002	-	< 0.002	-	-	< 0.002	-
Nickel	mg/L		0.003	-	< 0.003	-	0.004	-	-	< 0.003	-
Selenium	mg/L	0.01	0.004	-	< 0.004	-	< 0.004	-	-	< 0.004	-
Silver	mg/L		0.002	-	<0.002	-	<0.002	-	-	<0.002	-
Strontium	mg/L	-	0.005	-	0.126	-	0.126	-	-	0.102	-
Thallium	mg/L	-	0.006	-	<0.006	-	<0.006	-	-	<0.006	-
Tin	mg/L	-	0.002	-	<0.002	-	<0.002	-	-	<0.002	-
Titanium	mg/L	-	0.002	-	<0.002	-	<0.002	-	-	<0.002	-
Tungsten	mg/L	-	0.01	-	<0.010	-	<0.010	-	-	<0.010	-
Uranium	mg/L	0.02	0.002	-	<0.002	-	<0.002	-	-	<0.002	-
Vanadium	mg/L	-	0.002	-	<0.002	-	<0.002	-	-	<0.002	-
Zinc	mg/L	5	0.002	-	0.022	-	0.021	-	-	0.017	-
Zirconium	mg/L	-	0.003	-	<0.004	-	<0.004	-	-	<0.004	-
% Difference/ Ion Balance	%		NA		3.400	-	0.104	-	-	0.6	-
Notes:	/0		14/1		0.400	1	0.104	1		0.0	1

RDL = Reportable Detection Limit

-' = No value available

Indicates exceedance of ODWS criteria
Samples 7607710-7607739 required dilution prior to analysis for Anions due to the presence of non-target lons; the RDLs were adjusted to reflect the dilution.

	Well II Sample Dat Lab sample II			TV	W1					TV	N2				
				05/02/2017	03/10/2017	04/07/2015	06/29/2015	09/17/2015	11/26/2015	03/08/2016	06/02/2016	09/15/2016	12/13/2016	03/10/2017	05/02/2017
				8358383	8244996	6430142	6701611	6988471	7237258	7430218	7607710	7853176	8091589	8244997	8358385
Sample Parameter	Unit	ODWS Criteria	RDL												
Electrical Conductivity	uS/cm		2	-	705	478	-	561	-	-	526	575	-	392	-
рН	pH Units	6.5 - 8.5	NA	-	8.14	7.89	-	8.14	-	-	8.03	8.17	-	8.02	-
Saturation pH				-	6.89	7.15	-	6.96	-	-	6.97	6.96	-	7.36	-
Langelier Index				-	1.25	0.74	-	1.18	-	-	1.06	1.21	-	0.66	-
Total Hardness (as CaCO3)	mg/L	80-100	0.5	-	361	224	-	299	-	-	276	294	-	181	-
Total Dissolved Solids	mg/L	500	20	-	396	262	-	308	-	-	290	308	-	198	-
Alkalinity (as CaCO3)	mg/L	30-500	5	-	256	212	-	263	-	-	264	271	-	163	-
Bicarbonate (as CaCO3)	mg/L	-	5	-	256	212	-	263	-	-	264	271	-	163	-
Carbonate (as CaCO3)	mg/L	-	5	-	<5	<5	-	<5	-	-	<5	<5	-	<5	-
Hydroxide (as CaCO3)	mg/L	-	5	-	<5	<5	-	<5	-	-	<5	<5	-	<5	-
Fluoride	mg/L	1.5	0.1	-	0.19	< 0.05	-	<0.25	-	-	<0.10	< 0.05	-	< 0.05	-
Chloride	mg/L	250	0.2	-	14.30	18.80	-	6.85	-	-	5.59	5.96	-	16.70	-
Nitrate as N	mg/L	10	0.1	< 0.05	< 0.05	0.84	0.70	1.00	0.62	0.58	1.18	0.82	0.67	1.16	1.90
Nitrite as N	mg/L	1	0.1	< 0.05	< 0.05	< 0.05	-	<0.25	< 0.05	-	<0.10	< 0.05	-	< 0.05	< 0.05
Bromide	mg/L	-	0.1	-	< 0.05	< 0.05	-	<0.25	-	-	<0.10	< 0.05	-	< 0.05	-
Sulphate	mg/L	500	0.2	-	105.0	10.0	-	23.5	-	-	19.0	25.6	-	13.8	-
Ortho Phosphate as P	mg/L	-	0.2	-	<0.10	0.35	-	< 0.50	-	-	<0.20	<0.10	-	<0.10	-
Reactive Silica	mg/L	-	0.05	-	12.70	5.78	-	11.50	-	-	9.90	11.80	-	3.65	-
Ammonia as N	mg/L	-	0.02	-	< 0.02	<0.02	-	<0.02	-	-	<0.02	< 0.02	-	0.04	-
Total Phosphorus	mg/L		0.05	-	< 0.05	< 0.05	-	< 0.05	-	-	< 0.05	0.05	-	< 0.05	-
Total Organic Carbon	mg/L		0.5	-	1.3	1.7	-	1.1	-	-	0.7	1.1	-	2.4	-
Colour	TCU	5	5	-	<5	<5	-	<5	-	-	<5	<5	-	<5	-
Turbidity	NTU	5	0.5	-	135.0	2.7	-	4.3	-	-	6.4	110.0	-	3.3	-
Calcium	mg/L		0.05	-	97.9	60.9	-	79.5	-	-	73.3	77.6	-	48.8	-
Magnesium	mg/L	-	0.05	-	28.4	17.5	-	24.3	-	-	22.6	24.3	-	14.4	-
Sodium	mg/L	200	0.05	-	5.27	6.79	-	3.47	-	-	2.65	3.10	-	6.39	-
Potassium	mg/L		0.05	-	1.18	1.53	-	1.12	-	-	1.03	1.12	-	1.26	-
Aluminum	mg/L	0.1	0.004	-	0.006	< 0.004	-	< 0.004	-	-	0.006	0.014	-	0.017	-
Antimony	mg/L	0.006	0.003	-	< 0.003	< 0.003	-	< 0.003	-	-	< 0.003	< 0.003	-	< 0.003	-
Arsenic	mg/L	0.025	0.003	-	0.006	< 0.003	-	< 0.003	-	-	< 0.003	< 0.003	-	< 0.003	-
Barium	mg/L	1	0.002	-	0.073	0.042	-	0.088	-	-	0.063	0.092	-	0.030	-
Beryllium	mg/L		0.001	-	< 0.001	< 0.001	-	< 0.001	-	-	< 0.001	< 0.001	-	< 0.001	-
Boron	mg/L	5	0.01	-	0.016	0.010	-	< 0.010	-	-	0.012	< 0.010	-	< 0.010	-
Cadmium	mg/L	0.005	0.001	-	< 0.001	< 0.001	-	< 0.001	-	-	< 0.001	< 0.001	-	< 0.001	-
Chromium	mg/L	0.05	0.003	-	< 0.003	0.005	-	< 0.003	-	-	< 0.003	< 0.003	-	< 0.003	-
Cobalt	mg/L	-	0.001	-	<0.001	< 0.001	-	< 0.001	-	-	< 0.001	< 0.001	-	< 0.001	-
Copper	mg/L	1	0.003	-	< 0.003	< 0.003	-	< 0.003	-	-	< 0.003	< 0.003	-	< 0.003	-
Iron	mg/L	0.3	0.01	-	0.167	<0.010	-	<0.010	-	-	<0.010	<0.010	-	<0.010	-
Lead	mg/L	0.01	0.002	-	<0.002	< 0.002	-	< 0.002	-	-	< 0.002	< 0.002	-	<0.002	-
Manganese	mg/L	0.05	0.002	-	0.019	< 0.002	-	< 0.002	-	-	0.004	0.003	-	<0.002	-
Mercury	mg/L	0.001	0.0001	-	<0.0001	<0.0001	-	< 0.0001	-	-	<0.0001	<0.0001	-	<0.0001	-
Molybdenum	mg/L	-	0.002	-	<0.002	< 0.002	-	< 0.002	-	-	< 0.002	< 0.002	-	< 0.002	-
Nickel	mg/L	-	0.003	-	< 0.003	< 0.003	-	0.004	-	-	< 0.003	< 0.003	-	< 0.003	-
Selenium	mg/L	0.01	0.004	-	< 0.004	< 0.004	-	< 0.004	-	-	<0.004	< 0.004	-	<0.004	-
Silver	mg/L	-	0.002	-	<0.002	< 0.002	-	< 0.002	-	-	< 0.002	< 0.002	-	<0.002	-
Strontium	mg/L	-	0.005	-	0.588	0.087	-	0.128	-	-	0.122	0.134	-	0.078	-
Thallium	mg/L	-	0.006	-	<0.006	<0.006	-	<0.006	-	-	<0.006	< 0.006	-	<0.006	-
Tin	mg/L	-	0.002	-	<0.002	< 0.002	-	< 0.002	-	-	<0.002	< 0.002	-	<0.002	-
Titanium	mg/L	-	0.002	-	< 0.002	< 0.002	-	< 0.002	-	-	< 0.002	< 0.002	-	< 0.002	-
Tungsten	mg/L	-	0.01	-	<0.010	<0.010	-	<0.010	-	-	<0.010	<0.010	-	<0.010	-
Uranium	mg/L	0.02	0.002	-	< 0.002	< 0.002	-	< 0.002	-	-	< 0.002	< 0.002	-	< 0.002	
Vanadium	mg/L	-	0.002	-	<0.002	< 0.002	-	<0.002	-	-	<0.002	< 0.002	-	< 0.002	-
Zinc	mg/L	5	0.005	-	0.034	0.012	-	0.010	-	-	0.010	0.009	-	0.011	-
Zirconium	mg/L	-	0.004	-	<0.004	< 0.004	-	< 0.004	-	-	<0.004	< 0.004	-	< 0.004	-
% Difference/ Ion Balance	%	-	NA	-	1.56	2.30	-	1.09	-	-	2.23	1.18	-	2.09	-
Notes:															

RDL = Reportable Detection Limit

-' = No value available

			Well ID		TW3		τ\	N4
		Sa	ample Date	03/08/2016	03/10/2017	05/02/2017	03/10/2017	05/02/2017
			sample ID	7430216	8245003	8358386	8245009	8358387
Sample Parameter	Unit	ODWS Criteria	RDL			•		
Electrical Conductivity	uS/cm		2	-	802	-	558	-
pH	pH Units	6.5 - 8.5	NA	-	8.14	-	8.10	-
Saturation pH				-	6.83	-	6.99	-
Langelier Index				-	1.31	-	1.11	-
Total Hardness (as CaCO3)	mg/L	80-100	0.5	-	433	-	275	-
Total Dissolved Solids	mg/L	500	20	-	484	-	284	-
Alkalinity (as CaCO3)	mg/L	30-500	5	-	248	-	250	-
Bicarbonate (as CaCO3)	mg/L	-	5	-	248	-	250	-
Carbonate (as CaCO3)	mg/L	-	5	-	<5	-	<5	-
Hydroxide (as CaCO3)	mg/L	-	5	-	<5	-	<5	-
Fluoride	mg/L	1.5	0.1	-	0.1	-	< 0.05	-
Chloride	mg/L	250	0.2	-	3.41	-	12.60	-
Nitrate as N	mg/L	10	0.1	0.54	0.62	0.58	3.43	3.22
Nitrite as N	mg/L	1	0.1	-	< 0.05	< 0.05	< 0.05	< 0.05
Bromide	mg/L	-	0.1	-	< 0.05	-	< 0.05	-
Sulphate	mg/L	500	0.2	-	193.0	-	18.9	-
Ortho Phosphate as P	mg/L	-	0.2	-	<0.10	-	<0.10	-
Reactive Silica	mg/L	-	0.05	-	10.70	-	7.28	-
Ammonia as N	mg/L	-	0.02	-	0.14	-	< 0.02	-
Total Phosphorus	mg/L	-	0.05	-	< 0.05	-	< 0.05	-
Total Organic Carbon	mg/L	-	0.5	-	0.7	-	1.2	-
Colour	TČU	5	5	-	<5	-	<5	-
Turbidity	NTU	5	0.5	-	15.3	-	0.6	-
Calcium	mg/L	-	0.05	-	122.0	-	74.1	-
Magnesium	mg/L	-	0.05	-	31.1	-	21.8	-
Sodium	mg/L	200	0.05	-	3.42	-	5.36	-
Potassium	mg/L	-	0.05	-	1.28	-	1.01	-
Aluminum	mg/L	0.1	0.004	-	0.008	-	0.011	-
Antimony	mg/L	0.006	0.003	-	< 0.003	-	< 0.003	-
Arsenic	mg/L	0.025	0.003	-	< 0.003	-	< 0.003	-
Barium	mg/L	1	0.002	-	0.045	-	0.053	-
Beryllium	mg/L	-	0.001	-	< 0.001	-	< 0.001	-
Boron	mg/L	5	0.01	-	0.020	-	< 0.010	-
Cadmium	mg/L	0.005	0.001	-	< 0.001	-	< 0.001	-
Chromium	mg/L	0.05	0.003	-	< 0.003	-	< 0.003	-
Cobalt	mg/L	-	0.001	-	< 0.001	-	< 0.001	-
Copper	mg/L	1	0.003	-	< 0.003	-	< 0.003	-
Iron	mg/L	0.3	0.01	-	0.032	-	< 0.010	-
Lead	mg/L	0.01	0.002	-	< 0.002	-	< 0.002	-
Manganese	mg/L	0.05	0.002	-	0.005	-	< 0.002	-
Mercury	mg/L	0.001	0.0001	-	< 0.0001	-	< 0.0001	-
Molybdenum	mg/L	-	0.002	-	0.002	-	< 0.002	-
Nickel	mg/L	-	0.003	-	<0.003	-	<0.003	-
Selenium	mg/L	0.01	0.004	-	< 0.004	-	< 0.004	-
Silver	mg/L	-	0.002	-	<0.002	-	<0.002	-
Strontium	mg/L	-	0.005	-	0.916	-	0.121	-
Thallium	mg/L	-	0.006	-	<0.006	-	<0.006	-
Tin	mg/L	-	0.002	-	<0.002	-	<0.002	-
Titanium	mg/L	-	0.002	-	0.003	-	<0.002	-
Tungsten	mg/L		0.002	-	<0.010	-	<0.002	-
Uranium	mg/L	0.02	0.002	-	<0.002	-	<0.002	-
Vanadium	mg/L	-	0.002	-	<0.002	-	<0.002	-
Zinc	mg/L	5	0.002	-	0.032	_	0.013	-
Zirconium	mg/L	-	0.003	-	<0.004	-	<0.004	-
% Difference/ Ion Balance	%	-	NA	-	1.57	-	2.07	-
Notes:	,,						2.0.	

			Well ID					TV	W5				
		Sa	ample Date	04/07/2015	06/29/2015	09/17/2015	11/26/2015	03/08/2016	06/02/2016	09/15/2016	12/13/2016	03/10/2017	05/02/2017
		Lab	sample ID	6430199	6701614	6988482	7237247	7430208	7607719	7853172	8091594	8245015	8358388
Sample Parameter	Unit	ODWS Criteria	RDL										
Electrical Conductivity	uS/cm		2	592	-	655	-	-	606	667	-	604	-
рН	pH Units	6.5 - 8.5	NA	7.90	-	8.12	-	-	8.10	8.08	-	8.12	-
Saturation pH				7.02	-	7.01	-	-	6.99	7.04	-	7.00	-
Langelier Index				0.88	-	1.11	-	-	1.11	1.04	-	1.12	-
Total Hardness (as CaCO3)	mg/L	80-100	0.5	285	-	301	-	-	298	280	-	288	-
Total Dissolved Solids	mg/L	500	20	302	-	368	-	-	326	358	-	306	-
Alkalinity (as CaCO3)	mg/L	30-500	5	244	-	234	-	-	251	237	-	249	-
Bicarbonate (as CaCO3)	mg/L	-	5	244	-	234	-	-	251	237	-	249	-
Carbonate (as CaCO3)	mg/L	-	5	<5	-	<5	-	-	<5	<5	-	<5	-
Hydroxide (as CaCO3)	mg/L	-	5	<5	-	<5	-	-	<5	<5	-	<5	-
Fluoride	mg/L	1.5	0.1	< 0.05	-	<0.25	-	-	<0.10	<0.10	-	< 0.05	-
Chloride	mg/L	250	0.2	19.80	-	37.90	-	-	24.3	41.20	-	20.20	
Nitrate as N	mg/L	10	0.1	6.31	8.28	7.77	7.09	7.80	6.72	7.18	6.34	6.76	7.99
Nitrite as N	mg/L	1	0.1	< 0.05	-	<0.25	-	-	<0.10	<0.10	-	< 0.05	< 0.05
Bromide	mg/L	-	0.1	< 0.05	-	<0.25	-	-	<0.10	<0.10	-	< 0.05	-
Sulphate	mg/L	500	0.2	14.5	-	22.8	-	-	16.8	20.1	-	14.1	-
Ortho Phosphate as P	mg/L		0.2	<0.10	-	< 0.50	-	-	<0.20	<0.20	-	<0.10	-
Reactive Silica	mg/L		0.05	6.79	-	7.42	-	-	7.49	7.43	-	7.03	-
Ammonia as N	mg/L		0.02	< 0.02	-	< 0.02	-	-	<0.02	<0.02	-	< 0.02	-
Total Phosphorus	mg/L		0.05	< 0.05	-	< 0.05	-	-	< 0.05	< 0.05	-	< 0.05	-
Total Organic Carbon	mg/L		0.5	0.6	-	1.0	-	-	< 0.5	0.6	-	0.7	-
Colour	TCU	5	5	<5	-	<5	-	-	<5	<5	-	<5	-
Turbidity	NTU	5	0.5	1.5	-	8.2	-	-	2.5	1.7	-	1.9	-
Calcium	mg/L	-	0.05	80.2	-	83.4	-	-	81.5	76.6	-	79.3	-
Magnesium	mg/L	-	0.05	20.5	-	22.6	-	-	23.0	21.6	-	21.9	-
Sodium	mg/L	200	0.05	7.24	-	15.80	-	-	9.66	16.00	-	8.93	-
Potassium	mg/L		0.05	1.02	-	1.13	-	-	0.91	0.90	-	0.91	-
Aluminum	mg/L	0.1	0.004	< 0.004	-	< 0.004	-	-	0.006	0.010	-	0.013	-
Antimony	mg/L	0.006	0.003	< 0.003	-	< 0.003	-	-	< 0.003	< 0.003	-	< 0.003	-
Arsenic	mg/L	0.025	0.003	< 0.003	-	< 0.003	-	-	< 0.003	< 0.003	-	< 0.003	-
Barium	mg/L	1	0.002	0.110	-	0.110	-	-	0.112	0.112	-	0.110	-
Beryllium	mg/L	-	0.001	< 0.001	-	< 0.001	-	-	< 0.001	< 0.001	-	< 0.001	-
Boron	mg/L	5	0.01	0.011	-	< 0.010	-	-	0.011	< 0.010	-	< 0.010	-
Cadmium	mg/L	0.005	0.001	< 0.001	-	< 0.001	-	-	< 0.001	< 0.001	-	< 0.001	-
Chromium	mg/L	0.05	0.003	0.004	-	< 0.003	-	-	< 0.003	< 0.003	-	< 0.003	-
Cobalt	mg/L	-	0.001	< 0.001	-	< 0.001	-	-	< 0.001	< 0.001	-	< 0.001	-
Copper	mg/L	1	0.003	< 0.003	-	< 0.003	-	-	< 0.003	< 0.003	-	< 0.003	-
Iron	mg/L	0.3	0.01	< 0.010	-	< 0.010	-	-	< 0.010	< 0.010	-	< 0.010	-
Lead	mg/L	0.01	0.002	< 0.002	-	< 0.002	-	-	< 0.002	< 0.002	-	< 0.002	-
Manganese	mg/L	0.05	0.002	< 0.002	-	< 0.002	-	-	< 0.002	< 0.002	-	< 0.002	-
Mercury	mg/L	0.001	0.0001	< 0.0001	-	< 0.0001	-	-	< 0.0001	< 0.0001	-	< 0.0001	-
Molybdenum	mg/L	-	0.002	< 0.002	-	< 0.002	-	-	< 0.002	< 0.002	-	< 0.002	-
Nickel	mg/L		0.003	< 0.003	-	0.004	-	-	< 0.003	< 0.003	-	< 0.003	-
Selenium	mg/L	0.01	0.004	< 0.004	-	< 0.004	-	-	< 0.004	< 0.004	-	< 0.004	-
Silver	mg/L		0.002	< 0.002	-	< 0.002	-	-	< 0.002	< 0.002	-	< 0.002	-
Strontium	mg/L		0.005	0.154	-	0.184	-	-	0.153	0.155	-	0.162	-
Thallium	mg/L		0.006	<0.006	-	< 0.006	-	-	< 0.006	< 0.006	-	< 0.006	-
Tin	mg/L		0.002	< 0.002	-	< 0.002	-	-	< 0.002	< 0.002	-	< 0.002	-
Titanium	mg/L		0.002	< 0.002	-	< 0.002	-	-	< 0.002	< 0.002	-	< 0.002	-
Tungsten	mg/L		0.01	< 0.010	-	< 0.010	-	-	<0.010	< 0.010	-	< 0.010	-
Uranium	mg/L	0.02	0.002	< 0.002	-	< 0.002	-	-	< 0.002	< 0.002	-	< 0.002	-
Vanadium	mg/L		0.002	< 0.002	-	< 0.002	-	-	< 0.002	< 0.002	-	< 0.002	-
Zinc	mg/L	5	0.005	0.019	-	0.018	-	-	0.026	0.016	-	0.024	-
Zirconium	mg/L		0.004	< 0.004	-	< 0.004	-	-	< 0.004	< 0.004	-	< 0.004	-
% Difference/ Ion Balance	%	-	NA	1.30	-	0.30	-	-	1.02	3.91	-	1.24	-
Notes:													

RDL = Reportable Detection Limit

-' = No value available



			Well ID				TW6			
		Sa	ample Date	04/07/2015	06/29/2015	11/26/2015	04/01/2016	04/02/2016	03/10/2017	05/02/2017
		Lab	sample ID	6430206	6701612	7237256	7471115	7471117	8245021	8358389
Sample Parameter	Unit	ODWS Criteria	RDL							
Electrical Conductivity	uS/cm		2	602	-	-	-	-	612	-
pH	pH Units	6.5 - 8.5	NA	8.14	-	-	-	-	8.10	-
Saturation pH				7.02	-	-	-	-	7.01	-
Langelier Index				1.12	-	-	-	-	1.09	-
Total Hardness (as CaCO3)	mg/L	80-100	0.5	283	-	-		-	288	-
Total Dissolved Solids	mg/L	500	20	314	-	-	-	-	308	-
Alkalinity (as CaCO3)	mg/L	30-500	5	245	-	-	-	-	245	-
Bicarbonate (as CaCO3)	mg/L	-	5	245	-	-	-	-	245	-
Carbonate (as CaCO3)	mg/L	-	5	<5	-	-	-	-	<5	-
Hydroxide (as CaCO3)	mg/L	-	5	<5	-	-	-	-	<5	-
Fluoride	mg/L	1.5	0.1	< 0.05	-	-	-	-	<0.05	-
Chloride	mg/L	250	0.2	24.3	-	-	-	-	21.80	-
Nitrate as N	mg/L	10	0.1	7.80	8.20	7.30	7.89	8.23	8.52	9.08
Nitrite as N	mg/L	1	0.1	< 0.05	-	-	-	-	< 0.05	<0.10
Bromide	mg/L	-	0.1	<0.05	-	-	-	-	<0.05	-
Sulphate	mg/L	500	0.2	15.3	-	-	-	-	13.5	-
Ortho Phosphate as P	mg/L	-	0.2	<0.10	-	-	-	-	<0.10	-
Reactive Silica	mg/L	-	0.05	6.87	-	-	-	-	7.01	-
Ammonia as N	mg/L	-	0.02	<0.02	-	-	-	-	<0.02	-
Total Phosphorus	mg/L	-	0.05	<0.05	-	-	-	-	< 0.05	-
Total Organic Carbon	mg/L	-	0.5	0.6	-	-	-	-	0.7	-
Colour	TCU	5	5	<5	-	-	-	-	<5	-
Turbidity	NTU	5	0.5	6.8	-	-	-	-	< 0.5	-
Calcium	mg/L	-	0.05	79.7	-	-	-	-	79.9	-
Magnesium	mg/L		0.05	20.3	-	-	-	-	21.6	-
Sodium	mg/L	200	0.05	8.54	-	-	-	-	8.87	-
Potassium	mg/L	-	0.05	0.98	-	-	-	-	0.86	-
Aluminum	mg/L	0.1	0.004	<0.004	-	-	-	-	0.006 <0.003	-
Antimony	mg/L		0.003	<0.003				-		
Arsenic	mg/L	0.025	0.003	0.003	-	-	-	-	<0.003 0.105	-
Barium	mg/L		0.002	<0.001					<0.001	
Beryllium	mg/L	5	0.001	<0.001	-	-	-	-	<0.001	-
Boron Cadmium	mg/L	0.005	0.001	<0.010	-	-	-	-	<0.010	-
Chromium	mg/L ma/L	0.05	0.001	0.008	-	-	-	-	<0.001	-
Cobalt	mg/L	-	0.003	<0.001	-	-		-	<0.003	-
Copper	mg/L	1	0.001	<0.001	-	-	-	-	<0.001	-
Iron	mg/L	0.3	0.003	<0.003	-			-	<0.010	-
Lead	mg/L	0.01	0.002	<0.002	-	-			<0.002	
Manganese	mg/L	0.05	0.002	<0.002	-	-		-	<0.002	-
Mercury	mg/L	0.001	0.0001	<0.002	_	-	-	-	<0.002	_
Molybdenum	mg/L	-	0.002	<0.002	_	-	-	-	<0.002	_
Nickel	mg/L	-	0.002	<0.002	-	-	-	-	<0.002	-
Selenium	mg/L	0.01	0.004	<0.004	-	-	-	-	<0.004	-
Silver	mg/L	-	0.004	<0.004	-	-		-	<0.004	-
Strontium	mg/L	-	0.002	0.139	-	-	-	-	0.156	
Thallium	mg/L		0.005	<0.006	-	-		-	<0.006	-
Tin	mg/L	-	0.002	<0.002	-	-	-	-	<0.002	-
Titanium	mg/L		0.002	<0.002	-	-	-	-	<0.002	-
Tungsten	mg/L	-	0.002	<0.002	-	-	-	-	<0.002	-
Uranium	mg/L	0.02	0.002	<0.002	-	-	-	-	<0.002	-
Vanadium	mg/L	-	0.002	0.002	-	-	-	-	<0.002	-
Zinc	mg/L	5	0.002	0.003	-	-	-	-	0.017	-
Zirconium	mg/L	-	0.003	<0.004	-	-	-	-	<0.004	-
% Difference/ Ion Balance	%	-	NA	3.3	-	-	-	-	1.84	-
Notes:										

-' = No value available

			Well ID				T	W7			
		S	ample Date	02/19/2016	02/19/2016	03/08/2016	06/02/2016	09/15/2016	12/13/2016	03/10/2017	05/02/2017
		Lak	sample ID	7395659	7395664	7430212	7607713	7853182	8091592	8245027	8358390
Sample Parameter	Unit	ODWS Criteria	RDL		•	•		•	•	•	•
Electrical Conductivity	uS/cm		2	587	-	-	585	606	-	592	-
pH	pH Units	6.5 - 8.5	NA	7.88	-	-	8.07	8.14	-	8.11	-
Saturation pH				6.99	-	-	6.96	7.01	-	6.98	-
Langelier Index				0.89	-	-	1.11	1.13	-	1.13	-
Total Hardness (as CaCO3)	mg/L	80-100	0.5	280	-	-	303	284	-	291	-
Total Dissolved Solids	mg/L	500	20	354	-	-	326	334	-	306	-
Alkalinity (as CaCO3)	mg/L	30-500	5	262	-	-	261	247	-	260	-
Bicarbonate (as CaCO3)	mg/L	-	5	262	-	-	261	247	-	260	-
Carbonate (as CaCO3)	mg/L	-	5	<5	-	-	<5	<5	-	<5	-
Hydroxide (as CaCO3)	mg/L	-	5	<5	-	-	<5	<5	-	<5	-
Fluoride	mg/L	1.5	0.1	<0.25	-	-	<0.10	<0.10	-	<0.05	-
Chloride	mg/L	250	0.2	18.3	-	-	15.2	17.4		12.5	-
Nitrate as N	mg/L	10	0.1	8.52	8.00	7.27	6.32	6.97	5.96	5.77	6.87
Nitrite as N	mg/L	1	0.1	<0.25	-	-	<0.10	<0.10	-	<0.05	<0.05
Bromide	mg/L	-	0.1	<0.25	-	-	<0.10	<0.10	-	<0.05	-
Sulphate	mg/L	500	0.2	20.6	-	-	16.4	18.5	-	14.4	-
Ortho Phosphate as P	mg/L	-	0.2	<0.50	-	-	<0.20	<0.20	-	<0.10	-
Reactive Silica	mg/L	-	0.05	7.03	-	-	7.14	7.12	-	6.72	-
Ammonia as N	mg/L	-	0.02	0.1 <0.05	-	-	<0.02	<0.02	-	0.03 <0.05	-
Total Phosphorus	mg/L	-			-	-	<0.05	<0.05			-
Total Organic Carbon	mg/L TCU	- 5	0.5 5	0.6 <5	-	-	0.5 <5	1.0 <5	-	0.6 <5	-
Colour Turbidity	NTU	5	0.5	3.9	-	-	3.7	4.8	-	1.8	-
Calcium	mg/L	-	0.05	77.2		-	83.2	77.5	-	80.0	-
Magnesium	mg/L		0.05	21.2	-	-	23.1	21.9	-	22.2	-
Sodium	mg/L	200	0.05	5.60	-	-	5.15	6.44		4.86	-
Potassium	mg/L	200	0.05	1.00	-	-	0.89	0.87	-	0.92	-
Aluminum	mg/L	0.1	0.004	< 0.004	-	-	0.009	0.012	-	0.009	-
Antimony	mg/L	0.006	0.004	<0.003	-	-	<0.003	<0.003		<0.003	-
Arsenic	mg/L	0.025	0.003	<0.003	-	-	<0.003	<0.003	-	<0.003	-
Barium	mg/L	1	0.002	0.093	_	_	0.101	0.099	-	0.109	-
Beryllium	mg/L	-	0.001	<0.001	_	-	<0.001	<0.001	-	<0.001	-
Boron	mg/L	5	0.01	< 0.010	-	-	0.012	<0.010	-	0.010	-
Cadmium	mg/L	0.005	0.001	<0.001	-	-	<0.001	<0.001	-	<0.001	-
Chromium	mg/L	0.05	0.003	< 0.003	-	-	< 0.003	< 0.003	-	< 0.003	-
Cobalt	mg/L	-	0.001	< 0.001	-	-	< 0.001	< 0.001	-	< 0.001	-
Copper	mg/L	1	0.003	< 0.003	-	-	< 0.003	< 0.003	-	< 0.003	-
Iron	mg/L	0.3	0.01	< 0.010	-	-	< 0.010	< 0.010	-	< 0.010	-
Lead	mg/L	0.01	0.002	< 0.002	-	-	< 0.002	< 0.002	-	< 0.002	-
Manganese	mg/L	0.05	0.002	< 0.002	-	-	< 0.002	< 0.002	-	< 0.002	-
Mercury	mg/L	0.001	0.0001	< 0.0001	-	-	< 0.0001	< 0.0001	-	< 0.0001	-
Molybdenum	mg/L	-	0.002	< 0.002	-	-	< 0.002	< 0.002	-	< 0.002	-
Nickel	mg/L		0.003	< 0.003	-	-	< 0.003	< 0.003	-	< 0.003	-
Selenium	mg/L	0.01	0.004	< 0.004	-	-	< 0.004	< 0.004	-	< 0.004	-
Silver	mg/L	-	0.002	< 0.002	-	-	< 0.002	< 0.002	-	< 0.002	-
Strontium	mg/L	-	0.005	0.106	-	-	0.132	0.124	-	0.136	-
Thallium	mg/L	-	0.006	<0.006	-	-	<0.006	<0.006	-	<0.006	-
Tin	mg/L	-	0.002	<0.002	-	-	<0.002	<0.002	-	<0.002	-
Titanium	mg/L	-	0.002	<0.002	-	-	<0.002	<0.002	-	<0.002	-
Tungsten	mg/L	-	0.01	<0.010	-	-	<0.010	<0.010	-	<0.010	-
Uranium	mg/L	0.02	0.002	< 0.002	-	-	< 0.002	< 0.002	-	< 0.002	-
Vanadium	mg/L	-	0.002	<0.002	-	-	<0.002	< 0.002	-	<0.002	-
Zinc	mg/L	5	0.005	0.017	-	-	0.035	0.020	-	0.029	-
Zirconium	mg/L	-	0.004	<0.004	-	-	<0.004	<0.004	-	<0.004	-
% Difference/ Ion Balance Notes:	%	-	NA	7.26	-	-	1.11	2.78	-	1.69	-

-' = No value available

			Well ID				T	N8			
			Sample Date	02/23/2016	02/23/2016	03/07/2016	06/02/2016	09/15/2016	12/13/2016	03/10/2017	05/02/2017
			b sample ID	7401690	7401689	7426611	7607726	7853189	8091595	8245033	8358391
Sample Parameter	Unit	ODWS Criteria	RDL								
Electrical Conductivity	uS/cm		2	606	-	-	627	598	-	604	
рН	pH Units	6.5 - 8.5	NA	8.02	-	-	8.17	8.08	-	8.12	-
Saturation pH				6.96	-	-	6.95	7.01	-	6.98	-
Langelier Index				1.06	-	-	1.22	1.07	-	1.14	-
Total Hardness (as CaCO3)	mg/L	80-100	0.5	315	-	-	324	296	-	301	-
Total Dissolved Solids	mg/L	500	20	368	-	-	358	364	-	312	-
Alkalinity (as CaCO3)	mg/L	30-500	5	254	-	-	251	238	-	251	-
Bicarbonate (as CaCO3)	mg/L	-	5	254	-	-	251	238	-	251	-
Carbonate (as CaCO3)	mg/L	-	5	<5	-	-	<5	<5	-	<5	-
Hydroxide (as CaCO3)	mg/L	-	5	<5	-	-	<5	<5	-	<5	-
Fluoride	mg/L	1.5	0.1	<0.25	-	-	<0.10	<0.10	-	< 0.05	-
Chloride	mg/L	250	0.2	10.4	-	-	11.0	9.46		9.54	-
Nitrate as N	mg/L	10	0.1	8.25	7.93	7.76	5.35	7.85	7.41	6.68	5.15
Nitrite as N	mg/L	1	0.1	< 0.25	-	-	<0.10	<0.10	-	< 0.05	< 0.05
Bromide	mg/L	-	0.1	< 0.25	-	-	<0.10	<0.10	-	< 0.05	-
Sulphate	mg/L	500	0.2	49.1	-	-	58.0	43.5	-	31.1	-
Ortho Phosphate as P	mg/L	-	0.2	< 0.50	-	-	<0.20	<0.20	-	<0.10	-
Reactive Silica	mg/L	-	0.05	7.60	-	-	7.75	7.49	-	7.18	-
Ammonia as N	mg/L	-	0.02	< 0.02	-	-	< 0.02	< 0.02	-	0.15	-
Total Phosphorus	mg/L	-	0.05	< 0.05	-	-	0.05	0.06	-	0.08	-
Total Organic Carbon	mg/L	-	0.5	0.6	-	-	0.7	1.5	-	1.1	-
Colour	TCU	5	5	<5	-	-	<5	<5	-	<5	-
Turbidity	NTU	5	0.5	21.1	-	-	53.6	113	-	113	
Calcium	mg/L	-	0.05	85.6	-	-	88.3	80.6	-	81.6	-
Magnesium	mg/L	-	0.05	24.7	-	-	25.1	22.9	-	23.6	
Sodium	mg/L	200	0.05	4.69	-	-	4.72	3.22	-	3.67	-
Potassium	mg/L	-	0.05	1.30	-	-	1.34	1.17	-	1.12	
Aluminum	mg/L	0.1	0.004	< 0.004	-	-	0.011	0.011	-	< 0.004	-
Antimony	mg/L	0.006	0.003	< 0.003	-	-	< 0.003	< 0.003	-	< 0.003	-
Arsenic	mg/L	0.025	0.003	< 0.003	-	-	< 0.003	0.003	-	< 0.003	-
Barium	mg/L	1	0.002	0.110	-	-	0.087	0.085	-	0.099	
Beryllium	mg/L	-	0.001	< 0.001	-	-	< 0.001	< 0.001	-	< 0.001	-
Boron	mg/L	5	0.01	0.013	-	-	0.025	0.022	-	0.011	-
Cadmium	mg/L	0.005	0.001	< 0.001	-	-	< 0.001	< 0.001	-	< 0.001	-
Chromium	mg/L	0.05	0.003	< 0.003	-	-	< 0.003	< 0.003	-	< 0.003	-
Cobalt	mg/L	-	0.001	< 0.001	-	-	< 0.001	< 0.001	-	< 0.001	-
Copper	mg/L	1	0.003	< 0.003	-	-	< 0.003	< 0.003	-	< 0.003	-
Iron	mg/L	0.3	0.01	< 0.010	-	-	< 0.010	< 0.010	-	< 0.010	-
Lead	mg/L	0.01	0.002	< 0.002	-	-	< 0.002	< 0.002	-	< 0.002	-
Manganese	mg/L	0.05	0.002	0.007	-	-	0.005	0.005	-	0.002	-
Mercury	mg/L	0.001	0.0001	<0.0001	-	-	<0.0001	<0.0001	-	<0.0001	-
Molybdenum	mg/L	-	0.002	<0.002	-	-	<0.002	<0.002	-	<0.002	-
Nickel	mg/L	-	0.003	< 0.003	-	-	< 0.003	< 0.003	-	< 0.003	-
Selenium	mg/L	0.01	0.004	< 0.004	-	-	<0.004	<0.004	-	<0.004	-
Silver	mg/L	-	0.002	<0.002	-	-	<0.002	<0.002	-	<0.002	-
Strontium	mg/L	-	0.005	0.44	-	-	1.42	1.66	-	0.55	-
Thallium	mg/L	-	0.006	<0.006	-	-	<0.006	<0.006	-	<0.006	-
Tin	mg/L	-	0.002	<0.002	-	-	<0.002	<0.002	-	<0.002	-
Titanium	mg/L	_	0.002	<0.002	_	_	<0.002	<0.002	_	<0.002	_
Tungsten	mg/L	-	0.002	<0.010	-	-	<0.002	<0.002	-	<0.002	-
Uranium	mg/L	0.02	0.002	<0.002	_	-	<0.002	<0.002	-	<0.002	-
Vanadium	mg/L	-	0.002	<0.002	-	-	<0.002	<0.002	-	<0.002	-
Zinc	mg/L	5	0.002	0.016		-	0.023	0.024		0.017	-
Zirconium	mg/L	-	0.003	<0.004		-	< 0.023	<0.004	<del></del>	<0.004	
	//////////////////////////////////////		NA	3.27		-	1.52	3.31	-	1.59	-

-' = No value available

			Well ID				TW9					TW10	
		Sa	ample Date	02/26/2016	02/26/2016	03/08/2016	06/02/2016	09/15/2016	12/13/2016	03/10/2017	03/10/2017	02/25/2016	05/02/2017
			sample ID	7410959	7410958	7430214	7607733	7853195	8091593	8245039	8245045	7408001	8358393
Sample Parameter	Unit	ODWS Criteria	RDL										
Electrical Conductivity	uS/cm		2	610	-	-	601	594	-	620	430	-	-
pН	pH Units	6.5 - 8.5	NA	8.02	-	-	8.10	8.15	-	8.10	8.06	-	-
Saturation pH				6.94	-	-	6.95	7.00		6.90	7.26	-	-
Langelier Index				1.08	-	-	1.15	1.15	-	1.20	0.80	-	-
Total Hardness (as CaCO3)	mg/L	80-100	0.5	310	-	-	314	289	-	310	202	-	-
Total Dissolved Solids	mg/L	500	20	332	-	-	334	332	-	326	216	-	-
Alkalinity (as CaCO3)	mg/L	30-500	5	265	-	-	257	249	-	294	182	-	-
Bicarbonate (as CaCO3)	mg/L	-	5	265	-	-	257	249	-	294	182	-	-
Carbonate (as CaCO3)	mg/L	-	5	<5	-	-	<5	<5	-	<5	<5	-	-
Hydroxide (as CaCO3)	mg/L	-	5	<5	-	-	<5	<5	-	<5	<5	-	-
Fluoride	mg/L	1.5	0.1	< 0.05	-	-	<0.10	<0.05	-	< 0.05	< 0.05	-	-
Chloride	mg/L	250	0.2	9.37	-	-	9.32	9.76	-	8.84	14.40	-	-
Nitrate as N	mg/L	10	0.1	3.26	3.65	3.41	2.99	2.17	1.51	2.68	1.68	2.41	0.85
Nitrite as N	mg/L	1	0.1	< 0.05	-	-	<0.10	< 0.05	-	< 0.05	< 0.05	-	< 0.05
Bromide	mg/L	-	0.1	<0.05	-	-	<0.10	<0.05	-	<0.05	<0.05	-	-
Sulphate	mg/L	500	0.2	50.0	-	-	50.5	45.3	-	50.1	14.3	-	-
Ortho Phosphate as P	mg/L	-	0.2	<0.10	-	-	<0.20	<0.10	-	<0.10	<0.10	-	-
Reactive Silica	mg/L	-	0.05	8.72	-	-	8.60	8.77	-	8.42	4.56	-	-
Ammonia as N	mg/L	-	0.02	<0.02	-	-	<0.02	<0.02	-	0.09	0.03	-	-
Total Phosphorus	mg/L	-	0.05	<0.05	-	-	< 0.05	<0.05	-	<0.05	0.06	-	-
Total Organic Carbon	mg/L		0.5	0.6	-	-	0.6	0.9	-	0.8	2.1	-	-
Colour	TCU	5	5	<5	-	-	<5	<5	-	<5	<5	-	-
Turbidity	NTU	5	0.5	10.4	-	-	3.5	2.4	-	2.0	64.8	-	-
Calcium	mg/L	-	0.05	82.4	-	-	82.5	76.2	-	81.5	54.3	-	-
Magnesium	mg/L	-	0.05	25.4	-	-	26.2	23.9	-	25.8	16.2	-	-
Sodium	mg/L	200	0.05	3.99	-	-	3.91 0.98	4.03 0.89	-	4.17 0.99	5.76	-	-
Potassium	mg/L	0.1	0.05	1.19 <0.004	-	-	<0.004	0.89	-	0.009	1.21 0.014	-	
Aluminum	mg/L mg/L	0.006	0.004	<0.004	-	-	<0.004	<0.003	-	<0.003	<0.003	-	
Antimony Arsenic	mg/L	0.025	0.003	<0.003			<0.003	<0.003		<0.003	<0.003		<del></del>
Barium	mg/L	1	0.003	0.070	-	-	0.069	0.003		0.074	0.036	-	
Beryllium	mg/L	-	0.002	<0.001	-	-	<0.003	<0.001	-	<0.001	<0.001	-	
Boron	mg/L	5	0.001	0.014	-	-	0.013	0.010	-	0.012	<0.010	-	
Cadmium	mg/L	0.005	0.001	<0.001	-	-	<0.001	<0.001	-	<0.001	<0.001	-	-
Chromium	mg/L	0.05	0.003	0.005	-	-	<0.003	<0.003	_	<0.003	<0.003	-	
Cobalt	mg/L	-	0.001	<0.001	-	-	<0.001	<0.001	-	<0.001	<0.001	-	-
Copper	mg/L	1	0.003	<0.003	-	-	<0.003	<0.003	-	<0.003	<0.003	-	-
Iron	mg/L	0.3	0.01	< 0.010	_	-	<0.010	< 0.010	-	<0.010	<0.010	-	-
Lead	mg/L	0.01	0.002	<0.002	-	-	<0.002	<0.002	-	<0.002	<0.002	-	
Manganese	mg/L	0.05	0.002	< 0.002	-	-	<0.002	< 0.002	-	<0.002	0.009	-	
Mercury	mg/L	0.001	0.0001	< 0.0001	-	-	< 0.0001	< 0.0001	-	< 0.0001	<0.0001	-	
Molybdenum	mg/L	-	0.002	< 0.002	-	-	< 0.002	< 0.002	-	< 0.002	< 0.002	-	-
Nickel	mg/L		0.003	< 0.003	-	-	< 0.003	< 0.003	-	< 0.003	< 0.003	-	-
Selenium	mg/L	0.01	0.004	< 0.004	-	-	< 0.004	< 0.004		< 0.004	< 0.004	-	-
Silver	mg/L		0.002	< 0.002	-	-	< 0.002	< 0.002	-	< 0.002	< 0.002	-	-
Strontium	mg/L	-	0.005	0.320	-	-	0.296	0.279	-	0.339	0.083	-	-
Thallium	mg/L	-	0.006	<0.006	-	-	< 0.006	<0.006	-	<0.006	< 0.006	-	-
Tin	mg/L	-	0.002	< 0.002	-	-	< 0.002	<0.002	-	< 0.002	< 0.002	-	-
Titanium	mg/L		0.002	<0.002	-	-	< 0.002	<0.002	-	< 0.002	< 0.002	-	-
Tungsten	mg/L		0.01	< 0.010	-	-	<0.010	<0.010	-	< 0.010	< 0.010	-	-
Uranium	mg/L	0.02	0.002	< 0.002	-	-	< 0.002	< 0.002	-	< 0.002	< 0.002	-	-
Vanadium	mg/L		0.002	< 0.002	-	-	< 0.002	< 0.002	-	< 0.002	< 0.002	-	-
Zinc	mg/L	5	0.005	0.022	-	-	0.031	0.028	-	0.037	0.016	-	-
Zirconium	mg/L	-	0.004	< 0.004	-	-	<0.004	<0.004	-	<0.004	<0.004	-	-
% Difference/ Ion Balance	%	-	NA	3.26	-	-	1.52	3.13	-	6.98	1.56	-	-
Notes:													

RDL = Reportable Detection Limit

-' = No value available

			Well ID					TV	/11				
		Sa	ample Date	02/29/2016	02/29/2016	03/30/2016	03/07/2016	03/31/2016	06/02/2016	09/15/2016	12/13/2016	03/10/2017	05/02/2017
			sample ID	7413129	7413121	7471112	7426610	7471114	7607739	7853203	8091596	8245052	8358394
Sample Parameter	Unit	ODWS Criteria	RDL										
Electrical Conductivity	uS/cm		2	607	-	-	-	-	572	589	-	568	-
pН	pH Units	6.5 - 8.5	NA	8.00	-	-	-	-	8.08	8.20	-	8.16	-
Saturation pH				6.95	-	-	-	-	6.95	6.99	-	6.99	-
Langelier Index				1.05	-	-	-	-	1.13	1.21	-	1.17	-
Total Hardness (as CaCO3)	mg/L	80-100	0.5	303	-	-	-	-	289	286	-	278	-
Total Dissolved Solids	mg/L	500	20	326	-	-	-	-	300	314	-	286	-
Alkalinity (as CaCO3)	mg/L	30-500	5	267	-	-	-	-	262	258	-	249	-
Bicarbonate (as CaCO3)	mg/L	-	5	267	-	-	-	-	262	258	-	249	-
Carbonate (as CaCO3)	mg/L	-	5	<5	-	-	-	-	<5	<5	-	<5	-
Hydroxide (as CaCO3)	mg/L	-	5	<5	-	-	-	-	<5	<5	-	<5	-
Fluoride	mg/L	1.5	0.1	<0.10	-	-	-	-	<0.10	< 0.05	-	< 0.05	-
Chloride	mg/L	250	0.2	12.8	-	-	-	-	18.4	12.7	-	13.9	-
Nitrate as N	mg/L	10	0.1	4.58	4.61	3.46	5.03	3.37	3.00	4.08	3.58	3.94	3.00
Nitrite as N	mg/L	1	0.1	<0.10	-	-	-	-	<0.10	< 0.05	-	< 0.05	< 0.05
Bromide	mg/L	-	0.1	<0.10	-	-	-	-	<0.10	< 0.05	-	< 0.05	-
Sulphate	mg/L	500	0.2	21.3	-	-	-	-	17.3	21.3		19.1	-
Ortho Phosphate as P	mg/L		0.2	<0.20	-	-	-	-	<0.20	<0.10	-	<0.10	-
Reactive Silica	mg/L		0.05	8.05	-	-	-	-	7.67	7.88	-	7.19	-
Ammonia as N	mg/L		0.02	< 0.02	-	-	-		< 0.02	< 0.02		< 0.02	-
Total Phosphorus	mg/L		0.05	< 0.05	-	-	-	-	< 0.05	< 0.05	-	< 0.05	-
Total Organic Carbon	mg/L	-	0.5	0.7	-	-	-	-	1.1	0.8	-	1.6	-
Colour	TCU	5	5	<5	-	-	-	-	<5	<5	-	<5	-
Turbidity	NTU	5	0.5	2.9	-	-	-	-	10.2	4.9	-	7.4	-
Calcium	mg/L	-	0.05	81.7	-	-	-	-	78.3	77.5	-	75.0	-
Magnesium	mg/L	-	0.05	24.0	-	-	-	-	22.8	22.4	-	22.0	-
Sodium	mg/L	200	0.05	5.39	-	-	-	-	7.26	5.49	-	5.82	-
Potassium	mg/L	-	0.05	1.01	-	-	-	-	0.99	0.97	-	0.98	-
Aluminum	mg/L	0.1	0.004	< 0.004	-	-	-	-	< 0.004	0.013	-	0.011	-
Antimony	mg/L	0.006	0.003	< 0.003	-	-	-	-	< 0.003	< 0.003	-	< 0.003	-
Arsenic	mg/L	0.025	0.003	< 0.003	-	-	-	-	< 0.003	< 0.003	-	< 0.003	-
Barium	mg/L	1	0.002	0.060	-	-	-	-	0.056	0.059	-	0.061	-
Beryllium	mg/L	-	0.001	< 0.001	-	-	-	-	< 0.001	< 0.001	-	< 0.001	-
Boron	mg/L	5	0.01	< 0.010	-	-	-	-	0.010	< 0.010	-	0.010	-
Cadmium	mg/L	0.005	0.001	< 0.001	-	-	-	-	< 0.001	< 0.001	-	< 0.001	-
Chromium	mg/L	0.05	0.003	< 0.003	-	-	-	-	< 0.003	< 0.003	-	< 0.003	-
Cobalt	mg/L	-	0.001	< 0.001	-	-	-	-	< 0.001	< 0.001	-	< 0.001	-
Copper	mg/L	1	0.003	< 0.003	-	-	-	-	< 0.003	< 0.003	-	< 0.003	-
Iron	mg/L	0.3	0.01	< 0.010	-	-	-		<0.010	<0.010		<0.010	-
Lead	mg/L	0.01	0.002	< 0.002	-	-	-	-	< 0.002	< 0.002	-	< 0.002	-
Manganese	mg/L	0.05	0.002	< 0.002	-	-	-	-	< 0.002	< 0.002	-	< 0.002	-
Mercury	mg/L	0.001	0.0001	< 0.0001	-	-	-	-	< 0.0001	< 0.0001	-	< 0.0001	-
Molybdenum	mg/L	-	0.002	< 0.002	-	-	-	-	< 0.002	< 0.002	-	< 0.002	-
Nickel	mg/L		0.003	< 0.003	-	-	-		< 0.003	< 0.003		< 0.003	-
Selenium	mg/L	0.01	0.004	< 0.004	-	-	-	-	< 0.004	< 0.004	-	< 0.004	-
Silver	mg/L		0.002	< 0.002	-	-	-	-	< 0.002	<0.002	-	<0.002	-
Strontium	mg/L		0.005	0.132	-	-	-	-	0.123	0.128	-	0.129	-
Thallium	mg/L	-	0.006	< 0.006	-	-	-	-	< 0.006	< 0.006	-	< 0.006	-
Tin	mg/L		0.002	< 0.002	-	-	-		< 0.002	<0.002		< 0.002	-
Titanium	mg/L	-	0.002	< 0.002	-	-	-	-	< 0.002	< 0.002	-	< 0.002	-
Tungsten	mg/L		0.01	< 0.010	-	-	-		<0.010	<0.010		<0.010	-
Uranium	mg/L	0.02	0.002	< 0.002	-	-	-	-	< 0.002	< 0.002	-	< 0.002	-
Vanadium	mg/L	-	0.002	< 0.002	-	-	-	-	< 0.002	< 0.002	-	< 0.002	-
Zinc	mg/L	5	0.005	0.013	-	-	-	-	0.024	0.016	-	0.015	-
Zirconium	mg/L	-	0.004	< 0.004	-	-	-	-	< 0.004	< 0.004	-	< 0.004	-
% Difference/ Ion Balance	%	-	NA	1.24	-	-	-	-	1.67	2.28	-	1.85	-
Notes:	-												•

RDL = Reportable Detection Limit

-' = No value available

			Well ID		TV	W12	
		Sa	ample Date	03/01/2016	03/01/2016	03/10/2017	05/02/2017
		Lab	sample ID	7417874	7417866	8245058	8358397
Sample Parameter	Unit	ODWS Criteria	RDL				
Electrical Conductivity	uS/cm		2	1740	-	1730	-
pH	pH Units	6.5 - 8.5	NA	7.92	-	7.95	-
Saturation pH				6.6	-	6.61	-
Langelier Index				1.32	-	1.34	-
Total Hardness (as CaCO3)	mg/L	80-100	0.5	1010	-	1020	-
Total Dissolved Solids	mg/L	500	20	1480	-	1400	-
Alkalinity (as CaCO3)	mg/L	30-500	5	195	-	192	-
Bicarbonate (as CaCO3)	mg/L	-	5	195	-	192	-
Carbonate (as CaCO3)	mg/L	-	5	<5	-	<5	-
Hydroxide (as CaCO3)	mg/L	-	5	<5	-	<5	-
Fluoride	mg/L	1.5	0.1	< 0.25	-	< 0.25	-
Chloride	mg/L	250	0.2	2.3	-	2.11	-
Nitrate as N	mg/L	10	0.1	< 0.25	<0.25	< 0.25	<0.10
Nitrite as N	mg/L	1	0.1	< 0.25	-	< 0.25	<0.10
Bromide	mg/L	-	0.1	< 0.25	-	< 0.25	-
Sulphate	mg/L	500	0.2	875	-	896	-
Ortho Phosphate as P	mg/L	-	0.2	< 0.50	-	< 0.50	-
Reactive Silica	mg/L	-	0.05	14.2	-	13.1	-
Ammonia as N	mg/L	-	0.02	0.08	-	< 0.02	-
Total Phosphorus	mg/L		0.05	< 0.05	-	< 0.05	-
Total Organic Carbon	mg/L		0.5	<0.5	-	0.6	-
Colour	TCU	5	5	<5	-	<5	-
Turbidity	NTU	5	0.5	5	-	8.6	-
Calcium	mg/L	-	0.05	320	-	318	-
Magnesium	mg/L	-	0.05	51.6	-	54.3	-
Sodium	mg/L	200	0.05	7.51	-	8.43	-
Potassium	mg/L		0.05	1.91	-	1.95	-
Aluminum	mg/L	0.1	0.004	<0.004	-	0.008	-
Antimony	mg/L	0.006	0.003	< 0.003	-	< 0.003	-
Arsenic	mg/L	0.025	0.003	0.013	-	0.013	-
Barium	mg/L	1	0.002	0.005	-	0.012	-
Beryllium	mg/L	-	0.001	<0.001	_	<0.001	-
Boron	mg/L	5	0.01	0.055	-	0.058	-
Cadmium	mg/L	0.005	0.001	<0.001	-	<0.001	-
Chromium	mg/L	0.05	0.003	<0.003	_	<0.003	-
Cobalt	mg/L	-	0.001	<0.001	_	< 0.001	-
Copper	mg/L	1	0.003	< 0.003	-	< 0.003	-
Iron	mg/L	0.3	0.01	0.401	_	0.665	-
Lead	mg/L	0.01	0.002	<0.002	-	<0.002	-
Manganese	mg/L	0.05	0.002	0.026	_	0.030	-
Mercury	mg/L	0.001	0.0001	<0.0001	_	<0.0001	-
Molybdenum	mg/L		0.002	0.004	-	0.005	-
Nickel	mg/L	-	0.003	<0.003	_	< 0.003	-
Selenium	mg/L	0.01	0.004	<0.004	-	<0.004	-
Silver	mg/L	-	0.002	<0.002	-	<0.002	-
Strontium	mg/L	-	0.005	3.52	-	3.86	-
Thallium	mg/L		0.006	<0.006	-	<0.006	-
Tin	mg/L	-	0.002	<0.002	-	<0.002	-
Titanium	mg/L	-	0.002	0.012	-	0.013	-
Tungsten	mg/L		0.002	<0.012	-	<0.010	-
Uranium	mg/L	0.02	0.002	<0.002	-	<0.002	-
Vanadium	mg/L	-	0.002	<0.002		<0.002	-
Zinc	mg/L	5	0.002	0.036		0.046	-
Zirconium	mg/L	-	0.003	<0.004		<0.004	-

RDL = Reportable Detection Limit

-' = No value available

# Appendix G Certificates of Analysis



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
292 Speedvale Avenue West, Unit 7

Guelph, ON N1H1C4 (519) 823-4995

**ATTENTION TO: Dwight Smikle** 

PROJECT: 300033273

**AGAT WORK ORDER: 14W924797** 

WATER ANALYSIS REVIEWED BY: Mike Muneswar, BSc (Chem), Senior Inorganic Analyst

DATE REPORTED: Dec 08, 2014

PAGES (INCLUDING COVER): 4

**VERSION\*: 1** 

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

NOTES

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

**AGAT** Laboratories (V1)

\*NOTEO

Page 1 of 4



# **Certificate of Analysis**

**AGAT WORK ORDER: 14W924797** 

PROJECT: 300033273

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

**CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD** 

**SAMPLING SITE:** 

ATTENTION TO: Dwight Smikle SAMPLED BY:Sean Quinlan

O/						5/1111 122 2 1 100an Qannan
					Nitrate (Wa	ter)
DATE RECEIVED: 2014-12-05						DATE REPORTED: 2014-12-08
		SAMPLE DES	CRIPTION:	PW2	OW1	
		SAM	PLE TYPE:	Water	Water	
		DATE	SAMPLED:	12/4/2014	12/4/2014	
Parameter	Unit	G/S	RDL	6152997	6153004	
Nitrate as N	mg/L		0.05	6.51	0.89	

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

Certified By:

Mile Munemon



### **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 14W924797

PROJECT: 300033273 ATTENTION TO: Dwight Smikle SAMPLED BY:Sean Quinlan

	Water Analysis														
RPT Date: Dec 08, 2014			D	UPLICAT	E		REFEREN	ICE MA	TERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPI	KE
PARAMETER	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured	Acceptable Limits		Recovery	Acceptable Limits		Recovery		ptable nits	
		ld					Value	Lower	Upper		Lower	Upper		Lower	Upper

Nitrate (Water)

Nitrate as N 6150673 <0.5 <0.5 0.0% < 0.05 95% 90% 110% 99% 90% 110% 104% 80% 120%

Certified By:

Mile Muneman



# **Method Summary**

**CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD** 

PROJECT: 300033273

**SAMPLING SITE:** 

AGAT WORK ORDER: 14W924797
ATTENTION TO: Dwight Smikle
SAMPLED BY:Sean Quinlan

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH



Chain of Custody Record

Client Information

Phone:

823-4995 300033273

Address: Contact: Company:

Project:

AGAT Quotation #:

Please note, if quotation number is not prov



By (Print Name and Sign): Date:			+ Dec 14 11:15 6w	T H DEL 14 10:45 CM	Identification Date Time Sample Sampled Matrix		nt S Soil 2. Name:	<b>P</b> Paint	water o Oil 1. Name: Dwight		Same: Yes 🗹 No	ase note, if quotation number is not provided, client will be billed full price for analysis.	300033 4 /3 Po:	823-4995 Fax 836-547		DW16HT SMIKLE	rmation	f Custody Record			
Dam/Time Samples Racelved By (Print Name and Sign).					# of Comments Containers Site/Sample Information			Kle erjournside, com	reports to be sent to:	If "Yes", please use the Drinking Water Chain of Custody Form	No (potable water intended for human consumption)    Yes (No	Soil Texture (check one)  Coarse Fine	Agriculture	2   Ind/Com	Table Region	Regulation 153/04 Se	Regulatory Requirements		Lauoiatories www.	>	2012
Data/Time					☐ FOC ☐ NO <sub>3</sub>	Scan Custo Custo () B- ()NO2 nts: [	rmir om -HW Cr C	Metal:  WS  T+6- N-TT  P TH	s I CI-	ig □ pH TKN	ls this submission for a <b>Record of Site Condition?</b> ☐ Yes 🔏 No	None	Storm Prov. Water Quality Objectives (PWQ0)	Sanitary	ion CCME Come Other (specify)	Sewer Use Regulation 558		P: 905.712.5100 · F: 905.712.5122	www.agatlabs.com · webearth.agatlabs.com		5835 Coopers Avenue
Pink Copy - Client Page of			*		Chloro PCBs Organo TCLP N Sewer	ochlo //etal: Use	orine Is/II	e Pest norgar			Morning of Dec 8 th	OR  Data Dequired (Bush surpherdes may apply):	2 Working Days  1 Working Day	Rush Surcharges Apply  3 Working Days	Rush TAT (please provide prior notification)	Regular TAT  5 to 7 Working Days	Turnaround Time Required (TAT) Required*	Notes:	AGAT WO #: LHW 924797	Arrival Temperature: 7-1/27/2	Laboratory Use Only

SD Sediment

Sample Identification

30 424 SW Surface Water P Paint GW Ground Water 0 Oil Legend Matrix

Address: Contact: Company: Invoice To

Samples Relinquished By (Print Name and Sign):

300

Yellow Copy - AGAT White Copy- AGAT

Z .º

4623

かんら



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD 292 Speedvale Avenue West, Unit 7

Guelph, ON N1H1C4 (519) 823-4995

ATTENTION TO: Dwight Smikle

PROJECT: 300033273

AGAT WORK ORDER: 15T047356

WATER ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Coordinator

DATE REPORTED: Dec 04, 2015

PAGES (INCLUDING COVER): 5

VERSION\*: 1

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

NOTES

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

AGAT Laboratories (V1)

\*NOTEO

Page 1 of 5



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 15T047356

PROJECT: 300033273

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

ATTENTION TO: Dwight Smikle

SAMPLED BY:MV

Nitrata/Nitrita (Matar)

				N	litrate/Nitrit	e (Water)		
DATE RECEIVED: 2015-11-27								DATE REPORTED: 2015-12-04
		SAMPLE DES	CRIPTION:	TW5	TW6	PW2	TW2	
		SAM	PLE TYPE:	Water	Water	Water	Water	
		DATE	SAMPLED:	11/26/2015	11/26/2015	11/26/2015	11/26/2015	
Parameter	Unit	G/S	RDL	7237247	7237256	7237257	7237258	
Nitrate as N	mg/L		0.05	7.09	7.30	2.12	0.62	
Nitrite as N	mg/L		0.05	< 0.05	< 0.05	< 0.05	< 0.05	

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

Certified By:

Amanjot Bhela



### **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 15T047356

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLING SITE: SAMPLED BY:MV

5/ IIII = 11/0 5/ III															
	Water Analysis														
RPT Date: Dec 04, 2015				UPLICAT	E		REFEREN	ICE MA	TERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPI	KE
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured		ptable nits	Recovery	Lin	ptable nits	Recovery	Lin	eptable mits
		la la	'	,			Value	Lower	Upper	ĺ	Lower	Upper	ĺ	Lower	Upper
Nitrate/Nitrite (Water)															
Nitrate as N	7238301		< 0.25	< 0.25	NA	< 0.05	90%	90%	110%	92%	90%	110%	96%	80%	120%
Nitrite as N	7238301		<0.25	< 0.25	NA	< 0.05	NA	90%	110%	106%	90%	110%	91%	80%	120%

Comments: NA signifies Not Applicable.

Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By:

Amanjot Bhela



ION CHROMATOGRAPH

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

INOR-93-6004

AGAT WORK ORDER: 15T047356 ATTENTION TO: Dwight Smikle

PROJECT: 300033273

Nitrite as N

SAMPLED BY:MV

SAMPLING SITE:		SAMPLED BY:MV	
PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH

SM 4110 B

Supriges difficulational by (Print Norman Any Begin: 2005)	Samples Reinquished By (Print Name and Signit)  Oute. Time	Tu2 V 13:45 1 aw	600 1545 1 Cm	17:00	TWS 11/26/15 11:00 1 6W	Sample Identification  Date Time # of Sample Sampled Sampled Containers Matrix SI	Invoice Information:  Company: Contact: Address: Email:  Bill To Same: Yes \( \) No \( \) Gw  P  SD  SW	AGAT Quote #:  Please note:    qualitation number is not provided, client will be billed full price for analysis.	Project Information: 3233273 Project: Site Location: Sampled By:  WAT WAY WAY	smith smith we west unitro  202 speculose Ave west unitro  Suelph out NIH KY  519-823-4795 Fax:  Suelph seith of jourside con	Company:  Chain of Custody Record If this is a brinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)  Regulatory Requirements:   Regulatory Requirements:   Regulatory Requirements:   Regulatory Requirements:   Regulatory Requirements:   Regulatory Requirements:   Regulatory Requirements:   Regulatory Requirements:   Regulatory Requirements:   Regulatory Requirements:   Regulatory Requirements:   Regulatory Requirements:   Regulatory Regulatory Requirements:   Regulatory	AGG
Sambles Recoined By (Mint Name on	Sampled Reculous By (Print Name D					Comments/ Special Instructions	Biota Ground Water Oil Paint Soil Sediment Surface Water	Sample Matrix Legend	Is this submission for a Record of Site Condition?  Yes No	Regulation 153/04 Table	Drinking Water Chain of Custody Form  Regulatory Requirements:  (Please check all applicable boxes)	les
Pink Copy - Client I		;	× × - >	* *	\ \ \	Metal Hydric Client ORPs Cr6* Tota Nutrie No3	and Inorganics  Scan  e Forming Metals  Custom Metals  BHWS CI CN  EC FOC TONO, NO,  IN HIG PH SAR  INS: TP NH, TKN  NO, TRNO, NO,  Les: VOC BTEX THE	pplicab	Report Guideline on Certificate of Analysis  Peyes No	Sewer Use Regulation 558  Sanitary CCME  Storm Objectives (PWQO)  Indicate One Indicate One	its: No Regulatory Requirement	5835 Coopers Avenue Mississauga, Ontario L4Z 1Y2 Ph: 905,712 5100 Fax: 905.712.5122 webearth.agatlabs.com
Pink Copy - Client I Yellow Copy - AGAT   White Copy - AGAT   Date Second test	SALAHAN Page of of					Chlore PCBs Organ	ochlorine Pesticides  Metals/inorganics  Use		Please provide prior notification for rush TAT *TAT is exclusive of weekends and statutory holic	Turnaround Time (TAT) Required:  Regular TAT	Custody Seal Intact: □Yes □No Notes:	Work Order #: STOHTS &  Cooler Quantity: Quantity:  Arrival Temperatures: Quantity



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD 292 Speedvale Avenue West, Unit 7

Guelph, ON N1H1C4 (519) 823-4995

ATTENTION TO: Dwight Smikle

PROJECT: Belfountain

AGAT WORK ORDER: 15T990997

WATER ANALYSIS REVIEWED BY: Anthony Dapaah, PhD (Chem), Inorganic Lab Manager

DATE REPORTED: Jul 08, 2015

PAGES (INCLUDING COVER): 5

VERSION\*: 1

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

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

**AGAT** Laboratories (V1)

\*NOTEO

Page 1 of 5



Certificate of Analysis

AGAT WORK ORDER: 15T990997

PROJECT: Belfountain

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

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

ATTENTION TO: Dwight Smikle SAMPLED BY:Sean Quinlan

Nitrate (Water)										
DATE RECEIVED: 2015-06-30									DATE REPORTED: 2015-07-08	
		SAMPLE DES	CRIPTION:	TW2	TW6	OW1	TW5	PW2		
		SAM	PLE TYPE:	Water	Water	Water	Water	Water		
		DATE	SAMPLED:	6/29/2015	6/29/2015	6/29/2015	6/29/2015	6/29/2015		
Parameter	Unit	G/S	RDL	6701611	6701612	6701613	6701614	6701615		
Nitrate as N	mg/L		0.05	0.70	8.20	1.89	8.28	4.15		

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

CHEMIST OF CHEMIST



### **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 15T990997

PROJECT: Belfountain

SAMPLING SITE:

SAMPLED BY:Sean Quinlan

	Water Analysis														
RPT Date: Jul 08, 2015			С	UPLICAT	E		REFEREN	ICE MATE	RIAL	METHOD	BLANK	SPIKE	MAT	RIX SPII	KE
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured	Accepta Limit		Recovery	Lin	ptable nits	Recovery	Lin	ptable nits
		ld	- 1	., =	_		Value	Lower U	Jpper	,	Lower	Upper			Upper

Nitrate (Water)

Nitrate as N 6698272 14.4 14.3 0.7% < 0.05 96% 90% 110% 107% 90% 110% 106% 80% 120%



Certified By:



# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

PROJECT: Belfountain

SAMPLING SITE:

AGAT WORK ORDER: 15T990997 ATTENTION TO: Dwight Smikle SAMPLED BY:Sean Quinlan

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH

# Chain

Samples Relinquished By (Print Name and Sign):  SEAN ON INLAN SOLUTION Samples Relinquished By (Print Name and Sign):  Date  Time  Use  Time	Tw6  Owl  Pw2  Pw2  Pw2  Tw6  10:20  10:00  10:00  Tw6	PO: PO: Bill To Same: Yes \ No \  Bill To Same: Yes \ No \  Bill To Same: Yes \ No \  Bill To Sampled Containers Matrix	nformation: Selfountain 300033 273	eport Information:  BURNSIDE  Intract:  DINGHT SMIKCE  Idress:  Coe bh DN  B23 4995 Fax:  Email:  Divight Smikle esburnside com	ody Record
Salmates Rooaveed By (Primthington and Sign):  Day  Salmates Rooaveed By (Primt Juane and Sign):  Salmates Rooaveed By (Primt Juane and Sign):		Sample Matrix   Legend   Leg	□ Fine Indicate One Is this submission for a Report Guideline on Record of Site Condition? Certificate of Analysis □ Yes 🕱 No □ Yes 🕱 No	tory Requirements: No Regulator all applicable bases  ion 153/04 Sewer Use Regulator  marked One Storm Obje  e (Check One) Region Indicate One Obje  se	www.ags
Da 30 100 / 76 Page of Of 18		Chlorophenols PCBs Organochlorine Pesticides TCLP Metals/Inorganics Sewer Use	OR Date Required (Rush Surcharges May Apply):  Please provide prior notification for rush TAT  *TAT is exclusive of weekends and statutory holidays	Custody Seal Intact:	e Only 5 199 0997

Pink Copy - Client 1 Yellow Copy - AGAT 1 White Copy- AGAT



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 15W020701

PROJECT: Belfountain

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

ATTENTION TO: Dwight Smikle

SAMPLED BY:

### Water Quality Assessment

			vvai	er Quanty A	issessment		
DATE RECEIVED: 2015-09-18							DATE REPORTED: 2015-09-28
Parameter	S	AMPLE DESCRIPTION:  SAMPLE TYPE:  DATE SAMPLED:  G/S RDL	TW2 Water 9/17/2015 6988471	TW6 Water 9/17/2015 6988476	TW5 Water 9/17/2015 6988482	PW2 Water 9/17/2015 6988488	
Electrical Conductivity	uS/cm	2	561	661	655	596	
pH	pH Units	NA	8.14	8.11	8.12	8.16	
Saturation pH	,		6.96	7.01	7.01	6.99	
Langelier Index			1.18	1.10	1.11	1.17	
Total Hardness (as CaCO3)	mg/L	0.5	299	302	301	295	
Total Dissolved Solids	mg/L	20	308	356	368	330	
Alkalinity (as CaCO3)	mg/L	5	263	235	234	251	
Bicarbonate (as CaCO3)	mg/L	5	263	235	234	251	
Carbonate (as CaCO3)	mg/L	5	<5	<5	<5	<5	
Hydroxide (as CaCO3)	mg/L	5	<5	<5	<5	<5	
Fluoride	mg/L	0.25	< 0.25	<0.25	<0.25	<0.25	
Chloride	mg/L	0.50	6.85	38.1	37.9	22.9	
Nitrate as N	mg/L	0.25	1.00	7.48	7.77	2.75	
Nitrite as N	mg/L	0.25	<0.25	<0.25	<0.25	<0.25	
Bromide	mg/L	0.25	<0.25	<0.25	<0.25	<0.25	
Sulphate	mg/L	0.50	23.5	23.2	22.8	22.0	
Ortho Phosphate as P	mg/L	0.50	< 0.50	<0.50	<0.50	<0.50	
Reactive Silica	mg/L	0.05	11.5	7.07	7.42	8.45	
Ammonia as N	mg/L	0.02	< 0.02	<0.02	<0.02	<0.02	
Total Phosphorus	mg/L	0.05	< 0.05	<0.05	< 0.05	<0.05	
Total Organic Carbon	mg/L	0.5	1.1	0.6	1.0	0.7	
Colour	TCU	5	<5	<5	<5	<5	
Turbidity	NTU	0.5	4.3	1.1	8.2	1.2	
Calcium	mg/L	0.05	79.5	83.1	83.4	77.6	
Magnesium	mg/L	0.05	24.3	23.0	22.6	24.7	
Sodium	mg/L	0.05	3.47	16.5	15.8	9.37	
Potassium	mg/L	0.05	1.12	0.99	1.13	0.84	
Aluminum	mg/L	0.004	< 0.004	<0.004	<0.004	<0.004	
Antimony	mg/L	0.003	< 0.003	< 0.003	< 0.003	<0.003	
Arsenic	mg/L	0.003	< 0.003	< 0.003	< 0.003	< 0.003	

Certified By:





CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

# Certificate of Analysis

AGAT WORK ORDER: 15W020701

PROJECT: Belfountain

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

5835 COOPERS AVENUE

ATTENTION TO: Dwight Smikle

SAMPLED BY:

### Water Quality Assessment

			vval	er Quanty P	1226221116111	<u> </u>	
DATE RECEIVED: 2015-09-18							DATE REPORTED: 2015-09-28
		SAMPLE DESCRIPTION:	TW2	TW6	TW5	PW2	
		SAMPLE TYPE:	Water	Water	Water	Water	
		DATE SAMPLED:	9/17/2015	9/17/2015	9/17/2015	9/17/2015	
Parameter	Unit	G/S RDL	6988471	6988476	6988482	6988488	
Barium	mg/L	0.002	0.088	0.107	0.110	0.050	
Beryllium	mg/L	0.001	< 0.001	< 0.001	< 0.001	<0.001	
Boron	mg/L	0.010	<0.010	<0.010	<0.010	<0.010	
Cadmium	mg/L	0.001	< 0.001	< 0.001	<0.001	<0.001	
Chromium	mg/L	0.003	< 0.003	< 0.003	< 0.003	< 0.003	
Cobalt	mg/L	0.001	< 0.001	< 0.001	<0.001	<0.001	
Copper	mg/L	0.003	< 0.003	< 0.003	< 0.003	< 0.003	
Iron	mg/L	0.010	<0.010	< 0.010	<0.010	<0.010	
Lead	mg/L	0.002	< 0.002	< 0.002	<0.002	<0.002	
Manganese	mg/L	0.002	< 0.002	< 0.002	<0.002	<0.002	
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Molybdenum	mg/L	0.002	< 0.002	< 0.002	<0.002	<0.002	
Nickel	mg/L	0.003	0.004	0.004	0.004	0.004	
Selenium	mg/L	0.004	< 0.004	< 0.004	<0.004	<0.004	
Silver	mg/L	0.002	< 0.002	< 0.002	<0.002	<0.002	
Strontium	mg/L	0.005	0.128	0.193	0.184	0.126	
Thallium	mg/L	0.006	< 0.006	< 0.006	<0.006	<0.006	
Tin	mg/L	0.002	< 0.002	< 0.002	< 0.002	<0.002	
Titanium	mg/L	0.002	< 0.002	< 0.002	<0.002	<0.002	
Tungsten	mg/L	0.010	<0.010	< 0.010	<0.010	<0.010	
Uranium	mg/L	0.002	< 0.002	< 0.002	< 0.002	<0.002	
Vanadium	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	
Zinc	mg/L	0.005	0.010	0.018	0.018	0.021	
Zirconium	mg/L	0.004	< 0.004	<0.004	<0.004	<0.004	
% Difference/ Ion Balance	%	NA	1.09	0.0657	0.298	0.104	
ı							

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

Certified By:





PROJECT: Belfountain

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

ATTENTION TO: Dwight Smikle

# **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD AGAT WORK ORDER: 15W020701

SAMPLING SITE: SAMPLED BY:

SAMPLING SITE:							SAMPI	LED B	Y:						
			Wate	er Ar	nalys	is									
RPT Date: Sep 28, 2015		ı	DUPLICATE			REFEREN		ICE MATERIAL		METHOD BLANK SPIKE				IX SPIKE	
PARAMETER	Batch Sampl	e Dup #1	Dup #2	RPD	Method Blank	Measured Value		ptable nits	Recovery	Acceptable Limits		Recovery	Acceptable Limits		
							Lower	Upper		Lower	Upper		Lower	Uppe	
Water Quality Assessment															
Electrical Conductivity	6988394	576	577	0.2%	< 2	100%	80%	120%	NA			NA			
pH	6988394	8.14	8.07	0.9%	NA	99%	90%	110%	NA			NA			
Total Dissolved Solids	6993029	198	196	1.0%	< 20	100%	80%	120%	NA			NA			
Alkalinity (as CaCO3)	6988394	201	201	0.0%	< 5	96%	80%	120%	NA			NA			
Bicarbonate (as CaCO3)	6988394	201	201	0.0%	< 5	NA			NA			NA			
Carbonate (as CaCO3)	6988394	<5	<5	0.0%	< 5	NA			NA			NA			
Hydroxide (as CaCO3)	6988394	<5	<5	0.0%	< 5	NA			NA			NA			
Fluoride	6988476 6988476	<0.25	<0.25	0.0%	< 0.05	105%	90%	110%	107%	90%	110%	101%	80%	120%	
Chloride	6988476 6988476		39.3	3.1%	< 0.10	96%	90%	110%	103%	90%		104%	80%	120%	
Nitrate as N	6988476 6988476		7.63	2.0%	< 0.05	93%	90%	110%	104%	90%		105%	80%	1209	
Nitrita aa N	0000470 0000470	0.05	.0.05	0.00/	. 0. 05	NIA	000/	4400/	4000/	000/	4400/	000/	000/	1200	
Nitrite as N Bromide	6988476 6988476		<0.25	0.0%	< 0.05	NA 4000/	90%	110%	100%	90%	110%	98%	80%	1209	
	6988476 6988476		< 0.25	0.0%	< 0.05	109%	90%	110%	101%		110%	98%	80%	120%	
Sulphate	6988476 6988476		23.7	2.1%	< 0.10	108%	90%	110%	104%	90%		103%	80%	1209	
Ortho Phosphate as P	6988476 6988476		<0.50	0.0%	< 0.10	102%	90%	110%	96%	90%	110%	99%	80%	1209	
Reactive Silica	6970809	10.6	10.6	0.0%	< 0.05	98%	90%	110%	101%	90%	110%	89%	80%	120%	
Ammonia as N	6984408	< 0.02	< 0.02	0.0%	< 0.02	102%	90%	110%	103%	90%	110%	99%	80%	120%	
Total Phosphorus	6985416	0.98	1.00	2.0%	< 0.05	96%	80%	120%	93%	90%	110%	97%	70%	130%	
Total Organic Carbon	6985404	15.5	16.0	3.2%	< 0.5	93%	90%	110%	108%	90%	110%	83%	80%	120%	
Colour	6984708	126	126	0.0%	< 5	103%	90%	110%	NA			NA			
Turbidity	6988488 6988488	1.2	1.3	8.0%	< 0.5	94%	90%	110%	NA			NA			
Calcium	6985382	57.8	58.8	1.7%	< 0.05	105%	90%	110%	101%	90%	110%	103%	70%	130%	
Magnesium	6985382	31.4	31.8	1.3%	< 0.05	102%	90%	110%	98%	90%	110%	100%	70%	130%	
Sodium	6985382	14.8	14.7	0.7%	< 0.05	104%	90%	110%	101%	90%	110%	104%	70%	130%	
Potassium	6985382	5.51	5.60	1.6%	< 0.05	104%	90%	110%	101%	90%	110%	107%	70%	130%	
Aluminum	6987565	0.006	0.006	0.0%	< 0.004	103%	90%	110%	109%	90%	110%	103%	70%	130%	
Antimony	6987565	<0.003	<0.003	0.0%	< 0.003	108%	90%	110%	105%	90%	110%	106%	70%	130%	
Arsenic	6987565	<0.003	<0.003	0.0%	< 0.003	107%	90%	110%	110%	90%		113%	70%	130%	
Barium	6987565	0.120	0.121	0.8%	< 0.003	106%	90%	110%	107%	90%		104%	70%	130%	
Beryllium	6987565	<0.001	<0.001	0.0%	< 0.002	103%		110%	108%		110%	104%	70%	130%	
Boron	6987565	0.146	0.143	2.1%	< 0.010			110%	108%	90%	110%	100%	70%	130%	
Cadmium	6987565	<0.001	<0.001	0.0%	< 0.001	101%		110%	104%		110%	102%	70%	130%	
Chromium	6987565	< 0.003	<0.003	0.0%	< 0.003	103%		110%	109%		110%	100%	70%	1309	
Copper	6987565	<0.001	<0.001	0.0%	< 0.001	103%		110%	107%		110% 110%	102%	70%		
Copper Iron	6987565 6987565	<0.003 <0.010	<0.003	0.0% 0.0%	< 0.003 < 0.010	102% 102%		110% 110%	108% 100%		110%	93% 96%		130% 130%	
IIOII	0907000	<0.010	<0.010	0.0%	< 0.010	102%	90%	110%	100%	90%	110%	96%	10%	130%	
Lead	6987565	<0.002	<0.002	0.0%	< 0.002	104%	90%	110%	105%	90%	110%	105%	70%	130%	
Manganese	6987565	0.003	0.003	0.0%	< 0.002	100%	90%	110%	107%	90%	110%	87%	70%	1309	
Mercury	6985826	<0.0001	<0.0001	0.0%	< 0.0001	101%	90%	110%	98%		110%	96%	80%	120%	
Molybdenum	6987565	< 0.002	< 0.002	0.0%	< 0.002	96%	90%	110%	97%	90%	110%	98%	70%	1309	

AGAT QUALITY ASSURANCE REPORT (V1)

Page 3 of 8

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation.



# **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD AGAT WORK ORDER: 15W020701 PROJECT: Belfountain ATTENTION TO: Dwight Smikle

SAMPLING SITE: SAMPLED BY:

Water Analysis (Continued)															
RPT Date: Sep 28, 2015			С	UPLICATI	E		REFEREN	ICE MA	TERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPI	KE
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	1 1 1 1 1	ptable nits	Recovery	Acceptable Limits	
		ld						Lower	Upper	,	Lower	Upper		Lower	Upper
Nickel	6987565		0.006	0.006	0.0%	< 0.003	103%	90%	110%	107%	90%	110%	98%	70%	130%
Selenium	6987565		<0.004	<0.004	0.0%	< 0.004	98%	90%	110%	102%	90%	110%	114%	70%	130%
Silver	6987565		< 0.002	< 0.002	0.0%	< 0.002	100%	90%	110%	114%	90%	110%	86%	70%	130%
Strontium	6987565		0.179	0.178	0.6%	< 0.005	103%	90%	110%	105%	90%	110%	106%	70%	130%
Thallium	6987565		<0.006	< 0.006	0.0%	< 0.006	101%	90%	110%	102%	90%	110%	103%	70%	130%
Tin	6987565		<0.002	<0.002	0.0%	< 0.002	103%	90%	110%	105%	90%	110%	102%	70%	130%
Titanium	6987565		<0.002	<0.002	0.0%	< 0.002	104%	90%	110%	103%	90%	110%	99%	70%	130%
Tungsten	6987565		<0.010	<0.010	0.0%	< 0.010	107%	90%	110%	101%	90%	110%	105%	70%	130%
Uranium	6987565		< 0.002	< 0.002	0.0%	< 0.002	96%	90%	110%	95%	90%	110%	100%	70%	130%
Vanadium	6987565		< 0.002	< 0.002	0.0%	< 0.002	102%	90%	110%	108%	90%	110%	104%	70%	130%
Zinc	6987565		<0.005	<0.005	0.0%	< 0.005	101%	90%	110%	107%	90%	110%	105%	70%	130%
Zirconium	6987565		<0.004	<0.004	0.0%	< 0.004	93%	90%	110%	99%	90%	110%	96%	70%	130%

Comments: NA signifies Not Applicable QA Qualifier for Silver: In a multi-element scan up to 10% of analytes may exceed the quoted limits for lab control standards and matrix spike by up to 10% absolute and the spike is deemed acceptable.



Certified By:



### **QA** Violation

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 15W020701 PROJECT: Belfountain ATTENTION TO: Dwight Smikle

RPT Date: Sep 28, 2015	REFEREN	ICE MATERI	AL METHOD	METHOD BLANK SP			E MATRIX SPIKE			
PARAMETER	Sample Id	Sample Description	Measured	Acceptabl Limits	e Recovery	Acceptable Limits		Recovery	Lin	ptable nits
			Value	Lower Upp			Upper	,		Upper

Water Quality Assessment

TW2 Silver 100% 90% 110% 114% 90% 110% 86% 70% 130%

Comments: NA signifies Not Applicable

QA Qualifier for Silver: In a multi-element scan up to 10% of analytes may exceed the quoted limits for lab control standards and matrix spike by up to 10% absolute and the spike is deemed acceptable.

# **Method Summary**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

PROJECT: Belfountain

AGAT WORK ORDER: 15W020701

ATTENTION TO: Dwight Smikle

O/ (IVII EII VO OITE.		Ortim ELD D1.	
PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis		-	
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Saturation pH		SM 2320 B	CALCULATION
Langelier Index		SM 2330B	CALCULATION
Total Hardness (as CaCO3)	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Bicarbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Carbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Hydroxide (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Fluoride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Reactive Silica	INOR-93-6047	AQ2 EPA-122A & SM 4500 SiO2 D	AQ2 DISCRETE ANALYSER
Ammonia as N	INOR-93-6059	QuikChem 10-107-06-1-J & SM 4500 NH3-F	LACHAT FIA
Total Phosphorus	INOR-93-6057	QuikChem 10-115-01-3-A & SM 4500-P I	LACHAT FIA
Total Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310	SHIMADZU CARBON ANALYZER
Colour	INOR-93-6046	SM 2120 B	SPECTROPHOTOMETER
Turbidity	INOR-93-6044	SM 2130 B	NEPHELOMETER
Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Potassium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Aluminum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Antimony Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium			ICP-MS
	MET-93-6103 MET-93-6103	EPA SW-846 6020A & 200.8 EPA SW-846 6020A & 200.8	ICP-MS
Beryllium			ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8 EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103		
Chromium	MET-93-6103	EPA SW 846 6020A & 200.8	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Mercury	MET-93-6100	EPA SW 846 7470 & 245.1	CVAAS
Molybdenum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Selenium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Silver	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Strontium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Thallium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS



# **Method Summary**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

PROJECT: Belfountain

AGAT WORK ORDER: 15W020701

ATTENTION TO: Dwight Smikle

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Tin	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Titanium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Tungsten	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Uranium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zirconium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
% Difference/ Ion Balance		SM 1030 E	CALCULATION

### Chain of SEAS Site Location: Project Information: Email: Project: Report Information: Address: Contact: Company: Invoice Information: AGAT Quote #: Sampled By: Reports to be sent to: Contact: Address: . Email: Sample Identification **Custody Record** Durie Be Kountain W. Point Luislas Speedick Smille SAIKE 7500t 15 Sampled number is not provided, client Date 0 If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption) 10:00 Po: 54:0 Sampled Time 12:00 SS AVE Bunside, com Bill To Same: DUCAS ide Containers # of 0 0 aboratories Yes 3 M 30 Sample Matrix S 200 00.41 S T 0 Soil Texture (Check One) Regulation 153/04 **Regulatory Requirements:** Special Instructions Record of Site Condition? Sample Matrix Fine □Res/Park □Agriculture Coarse Table Indicate One Is this submission for a □Ind/Com Comments/ Paint <u>Q</u> Biota Surface Water Ground Water Yes Sediment Legend No Region Sewer Use Metals and Inorganics Storm Sanitary Indicate One Metal Scan WNo Regulatory Requirement Ph: 905.712.5100 Fax: 905.712.5122 Hydride Forming Metals Client Custom Metals Certificate of Analysis ☐ Yes Report Guideline on Mississauga, Ontario L4Z 1Y2 ORPs: B-HWS Cr CN Cr<sup>6+</sup> CC FOC NO<sub>3</sub>/NO<sub>2</sub> Total N Hg DH SAR (Check Applicable) Other CCME Prov. Water Quality Objectives (PWQO) Regulation 558 webearth.agatlabs.com 5835 Coopers Avenue Nutrients: ☐ TP ☐ NH<sub>3</sub> ☐ TKN ☐ NO<sub>3</sub> ☐ NO<sub>2</sub> ☐ NO<sub>2</sub>/NO<sub>2</sub> No No Volatiles: ☐ VOC ☐ BTEX ☐ THM Copy - Client | Yellow Copy - AGAT CCME Fractions 1 to 4 ABNs PAHs Chlorophenols Rush TAT (Rush Surcharges App Regular TAT Turnaround Time (TAT) Required: Work Order #: 15w020 Custody Seal Intact: Cooler Quantity: Laboratory Use Only Arrival Temperatures: Notes: 3 Business Days Organochlorine Pesticides \*TAT is exclusive of weakends and statutory holidays OR Date Required (Rush Surcharges May Apply): Please provide prior notification for rush TAT TCLP Metals/Inorganics 1 White Copy-Sewer Use K Z , ș Yes 0 Ind/ganics 2 Business Days 5 to 7 Business Days Page L W ယ ONO . 으 Day N 1 Business DNVA



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
292 Speedvale Avenue West, Unit 7

Guelph, ON N1H1C4 (519) 823-4995

ATTENTION TO: Dwight Smikle

PROJECT: 300033273

AGAT WORK ORDER: 15W960815

WATER ANALYSIS REVIEWED BY: Mike Muneswar, BSc (Chem), Senior Inorganic Analyst

DATE REPORTED: Apr 15, 2015

PAGES (INCLUDING COVER): 8

VERSION\*: 1

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

NOTES

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

**AGAT** Laboratories (V1)

\*NOTE O

Page 1 of 8



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

## Certificate of Analysis

AGAT WORK ORDER: 15W960815

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLED BY:

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

### Water Quality Assessment - Groundwater Samples

DATE RECEIVED: 2015-04-08								DATE REPORTED: 2015-04-15
	S	AMPLE DESCRIPTION:	TW2	TW5	TW6	PW2	OW1	
		SAMPLE TYPE:	Water	Water	Water	Water	Water	
		DATE SAMPLED:	4/7/2015	4/7/2015	4/7/2015	4/7/2015	4/7/2015	
Parameter	Unit	G/S RDL	6430142	6430199	6430206	6430214	6430223	
Electrical Conductivity	uS/cm	2	478	592	602	595	601	
рН	pH Units	NA	7.89	7.90	8.14	7.92	8.10	
Saturation pH			7.15	7.02	7.02	7.00	6.98	
Langelier Index			0.74	0.88	1.12	0.92	1.12	
Total Hardness (as CaCO3)	mg/L	0.5	224	285	283	281	265	
Total Dissolved Solids	mg/L	20	262	302	314	304	294	
Alkalinity (as CaCO3)	mg/L	5	212	244	245	259	265	
Bicarbonate (as CaCO3)	mg/L	5	212	244	245	259	265	
Carbonate (as CaCO3)	mg/L	5	<5	<5	<5	<5	<5	
Hydroxide (as CaCO3)	mg/L	5	<5	<5	<5	<5	<5	
Fluoride	mg/L	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
Chloride	mg/L	0.10	18.8	19.8	24.3	22.3	3.48	
Nitrate as N	mg/L	0.05	0.84	6.31	7.80	3.44	0.85	
Nitrite as N	mg/L	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
Bromide	mg/L	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
Sulphate	mg/L	0.10	9.96	14.5	15.3	18.2	14.0	
Ortho Phosphate as P	mg/L	0.10	0.35	<0.10	<0.10	<0.10	<0.10	
Reactive Silica	mg/L	0.05	5.78	6.79	6.87	7.52	5.38	
Ammonia as N	mg/L	0.02	<0.02	<0.02	<0.02	0.30	0.08	
Total Phosphorus	mg/L	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.17	
Total Organic Carbon	mg/L	0.5	1.7	0.6	0.6	0.5	2.0	
Colour	TCU	5	<5	<5	<5	<5	<5	
Turbidity	NTU	0.5	2.7	1.5	6.8	4.6	269	
Calcium	mg/L	0.05	60.9	80.2	79.7	73.6	71.9	
Magnesium	mg/L	0.05	17.5	20.5	20.3	23.5	20.7	
Sodium	mg/L	0.05	6.79	7.24	8.54	8.20	7.68	
Potassium	mg/L	0.05	1.53	1.02	0.98	0.90	2.16	
Aluminum	mg/L	0.004	< 0.004	< 0.004	<0.004	<0.004	< 0.004	
Antimony	mg/L	0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	
Arsenic	mg/L	0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	

Certified By:

Make Munemon



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

## Certificate of Analysis

AGAT WORK ORDER: 15W960815

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLED BY:

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

### Water Quality Assessment - Groundwater Samples

		vvator	Quality 71	000001110111	Croanawe	ator Campio		
DATE RECEIVED: 2015-04-08								DATE REPORTED: 2015-04-15
		SAMPLE DESCRIPTION:	TW2	TW5	TW6	PW2	OW1	
		SAMPLE TYPE:	Water	Water	Water	Water	Water	
		DATE SAMPLED:	4/7/2015	4/7/2015	4/7/2015	4/7/2015	4/7/2015	
Parameter	Unit	G/S RDL	6430142	6430199	6430206	6430214	6430223	
Barium	mg/L	0.002	0.042	0.110	0.088	0.056	0.048	
Beryllium	mg/L	0.001	<0.001	< 0.001	<0.001	<0.001	<0.001	
Boron	mg/L	0.010	0.010	0.011	<0.010	<0.010	<0.010	
Cadmium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Chromium	mg/L	0.003	0.005	0.004	800.0	0.005	< 0.003	
Cobalt	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper	mg/L	0.003	<0.003	< 0.003	<0.003	<0.003	< 0.003	
ron	mg/L	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
_ead	mg/L	0.002	<0.002	< 0.002	<0.002	<0.002	< 0.002	
Manganese	mg/L	0.002	<0.002	< 0.002	<0.002	<0.002	< 0.002	
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Molybdenum	mg/L	0.002	<0.002	< 0.002	<0.002	<0.002	< 0.002	
lickel	mg/L	0.003	<0.003	<0.003	<0.003	<0.003	< 0.003	
Selenium	mg/L	0.004	<0.004	< 0.004	<0.004	<0.004	< 0.004	
Silver	mg/L	0.002	<0.002	< 0.002	<0.002	<0.002	< 0.002	
Strontium	mg/L	0.005	0.087	0.154	0.139	0.126	0.102	
Γhallium	mg/L	0.006	<0.006	<0.006	<0.006	<0.006	<0.006	
Tin	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	
Γitanium	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	
Гungsten	mg/L	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Jranium	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Vanadium Vanadium	mg/L	0.002	<0.002	<0.002	0.003	<0.002	< 0.002	
Zinc	mg/L	0.005	0.012	0.019	0.014	0.022	0.017	
Zirconium	mg/L	0.004	<0.004	<0.004	< 0.004	<0.004	< 0.004	
% Difference/ Ion Balance		0.1	2.3	1.3	3.3	3.4	0.6	

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

Certified By:

Mile Munemon



# **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 15W960815

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLING SITE: SAMPLED BY:

SAMPLING SITE:	SAMPLED BY:													
			Wate	er Ar	nalys	is								
RPT Date: Apr 15, 2015			DUPLICATE			REFERENCE MATERIAL		METHOD BLANK SPIKE			МАТ	RIX SPI	KE	
PARAMETER	Batch Samp	le Dup #1	Dup #2	RPD	Method Blank	Measured Value		eptable mits	Recovery	1 13	eptable mits	Recovery	1 1 1	ptable mits
						value	Lower	Upper		Lower	Upper		Lower	Upper
Water Quality Assessment - 0	•													
Electrical Conductivity	6428305	6200	6200	0.0%	< 2	95%	80%	120%	NA			NA		
pH	6428305	7.71	7.43	3.7%	NA	100%	90%	110%	NA			NA		
Total Dissolved Solids	6430142 643014	2 262	262	0.0%	< 20	96%	80%	120%	NA			NA		
Alkalinity (as CaCO3)	6428305	518	524	1.2%	< 5	99%	80%	120%	NA			NA		
Bicarbonate (as CaCO3)	6428305	518	524	1.2%	< 5	NA			NA			NA		
Carbonate (as CaCO3)	6428305	<5	<5	0.0%	< 5	NA			NA			NA		
Hydroxide (as CaCO3)	6428305	<5	<5	0.0%	< 5	NA			NA			NA		
Fluoride	6430050	<0.25	<0.25	0.0%	< 0.05	108%	90%	110%	104%	90%	110%	99%	80%	120%
Chloride	6430050	172	167	2.9%	< 0.10	101%	90%	110%	105%	90%	110%	102%	80%	120%
Nitrate as N	6430050	<0.25	<0.25	0.0%	< 0.05	92%	90%	110%	102%	90%	110%	105%	80%	120%
Nitrito oo N	0420050	.0.05	.0.05	0.00/	. 0. 05	NIA	000/	4400/	000/	000/	4400/	000/	000/	1200
Nitrite as N	6430050	<0.25	<0.25	0.0%	< 0.05	NA	90%	110%	98%	90%	110%	92%	80%	120%
Bromide	6430050	< 0.25	<0.25	0.0%	< 0.05	110%	90%	110%	100%	90%	110%	100%	80%	120%
Sulphate	6430050	133	129	3.1%	< 0.10	99%	90%	110%	101%	90%	110%	102%	80%	120%
Ortho Phosphate as P	6430050	<0.50	<0.50	0.0%	< 0.10	104%	90%	110%	95%	90%	110%	102%	80%	120%
Reactive Silica	6432724	12.2	12.2	0.0%	< 0.05	96%	90%	110%	97%	90%	110%	96%	80%	120%
Ammonia as N	6429741	0.25	0.23	8.3%	< 0.02	107%	90%	110%	99%	90%	110%	104%	80%	120%
Total Phosphorus	6430142 643014	2 < 0.05	< 0.05	0.0%	< 0.05	100%	80%	120%	95%	90%	110%	102%	70%	130%
Total Organic Carbon	6430142 643014	2 1.7	1.8	5.7%	< 0.5	95%	90%	110%	102%	90%	110%	94%	80%	120%
Colour	6430142 643014	2 < 5	<5	0.0%	< 5	103%	90%	110%	NA			NA		
Turbidity	6430199 643019	1.5	1.4	6.9%	< 0.5	106%	90%	110%	NA			NA		
Calcium	6430214 643021	1 73.6	73.5	0.1%	< 0.05	100%	90%	110%	98%	90%	110%	93%	70%	130%
Magnesium	6430214 643021		23.6	0.4%	< 0.05	97%	90%	110%	94%	90%	110%	93%	70%	
Sodium	6430214 643021		8.23	0.4%	< 0.05	99%	90%	110%	97%	90%	110%	94%	70%	130%
Potassium	6430214 643021		0.90	0.0%	< 0.05	101%	90%	110%	99%	90%	110%	99%	70%	130%
Aluminum	6430223 643022		< 0.004	0.0%	< 0.004		90%	110%	107%	90%	110%	107%	70%	130%
														4000
Antimony	6430223 643022		< 0.003	0.0%	< 0.003		90%	110%	100%	90%	110%	96%	70%	130%
Arsenic	6430223 643022		< 0.003	0.0%	< 0.003		90%	110%	100%	90%	110%	98%	70%	130%
Barium	6430223 643022		0.048	0.0%	< 0.002		90%	110%	102%	90%	110%	104%	70%	130%
Beryllium	6430223 643022		< 0.001	0.0%	< 0.001		90%	110%	97%	90%	110%	116%		130%
Boron	6430223 643022	3 < 0.010	0.010	10.5%	< 0.010	97%	90%	110%	110%	90%	110%	109%	70%	130%
Cadmium	6430223 643022	3 < 0.001	< 0.001	0.0%	< 0.001	101%	90%	110%	104%	90%	110%	104%	70%	130%
Chromium	6430223 643022	3 < 0.003	< 0.003	0.0%	< 0.003	101%	90%	110%	107%	90%	110%	101%	70%	130%
Cobalt	6430223 643022	3 < 0.001	< 0.001	0.0%	< 0.001	98%	90%	110%	100%	90%	110%	101%	70%	130%
Copper	6430223 643022	3 < 0.003	< 0.003	0.0%	< 0.003	99%	90%	110%	98%	90%	110%	98%	70%	130%
Iron	6430223 643022	3 < 0.010	<0.010	0.0%	< 0.010	93%	90%	110%	110%	90%	110%	92%	70%	130%
Lead	6430223 643022	3 < 0.002	< 0.002	0.0%	< 0.002	103%	90%	110%	107%	90%	110%	104%	70%	130%
Manganese	6430223 643022		< 0.002	0.0%	< 0.002			110%	109%	90%		99%		130%
Mercury	6430142 643014		< 0.002	0.0%	< 0.002			110%	103%	90%				120%
Molybdenum	6430223 643022			0.0%	< 0.000			110%	100%		110%			130%
Morybuenum	0430223 043022	o < 0.002	< 0.002	0.0%	< 0.002	3170	90%	110%	100%	90%	110%	100%	10%	130%

AGAT QUALITY ASSURANCE REPORT (V1)

Page 4 of 8

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation.



### **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 15W960815

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLING SITE: SAMPLED BY:

	Water Analysis (Continued)														
RPT Date: Apr 15, 2015			D	UPLICATE	<b>.</b>		REFEREN	ICE MA	TERIAL	METHOD BLANK SPIKE			MATRIX SPIKE		KE
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
	Id Dup#1 Dup#2 NrD		Value	Lower	Upper			Upper	,		Upper				
Nickel	6430223	6430223	< 0.003	< 0.003	0.0%	< 0.003	103%	90%	110%	101%	90%	110%	100%	70%	130%
Selenium	6430223	6430223	< 0.004	< 0.004	0.0%	< 0.004	100%	90%	110%	104%	90%	110%	96%	70%	130%
Silver	6430223	6430223	< 0.002	< 0.002	0.0%	< 0.002	101%	90%	110%	110%	90%	110%	101%	70%	130%
Strontium	6430223	6430223	0.102	0.097	5.0%	< 0.005	101%	90%	110%	107%	90%	110%	103%	70%	130%
Thallium	6430223	6430223	< 0.006	< 0.006	0.0%	< 0.006	100%	90%	110%	105%	90%	110%	101%	70%	130%
Tin	6430223	6430223	< 0.002	< 0.002	0.0%	< 0.002	93%	90%	110%	102%	90%	110%	97%	70%	130%
Titanium	6430223	6430223	< 0.002	< 0.002	0.0%	< 0.002	98%	90%	110%	103%	90%	110%	99%	70%	130%
Tungsten	6430223	6430223	< 0.010	< 0.010	0.0%	< 0.010	97%	90%	110%	105%	90%	110%	101%	70%	130%
Uranium	6430223	6430223	< 0.002	< 0.002	0.0%	< 0.002	97%	90%	110%	108%	90%	110%	102%	70%	130%
Vanadium	6430223	6430223	0.003	0.003	0.0%	< 0.002	101%	90%	110%	105%	90%	110%	99%	70%	130%
Zinc	6430223	6430223	0.017	0.016	6.1%	< 0.005	102%	90%	110%	107%	90%	110%	101%	70%	130%
Zirconium	6430223	6430223	< 0.004	< 0.004	0.0%	< 0.004	100%	90%	110%	102%	90%	110%	100%	70%	130%

Comments: NA signifies Not Applicable

Certified By:

Mile Muneman

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 15W960815

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis	·		
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Saturation pH		SM 2320 B	CALCULATION
Langelier Index		SM 2330B	CALCULATION
Total Hardness (as CaCO3)	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Bicarbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Carbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Hydroxide (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Fluoride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Reactive Silica	INOR-93-6047	AQ2 EPA-122A & SM 4500 SiO2 D	AQ2 DISCRETE ANALYSER
Ammonia as N	INOR-93-6002	AQ2 EPA-103A & SM 4500 NH3-F	AQ-2 DISCRETE ANALYZER
Total Phosphorus	INOR-93-6057	QuikChem 10-115-01-3-A & SM 4500-P I	LACHAT FIA
Total Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310	SHIMADZU CARBON ANALYZER
Colour	INOR-93-6046	SM 2120 B	SPECTROPHOTOMETER
Turbidity	INOR-93-6044	SM 2130 B	NEPHELOMETER
Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Potassium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Aluminum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Antimony	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Mercury	MET-93-6100	EPA SW 846 7470 & 245.1	CVAAS
Molybdenum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Selenium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Silver	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Strontium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Thallium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Tin	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS



# **Method Summary**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 15W960815

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Titanium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Tungsten	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Uranium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zirconium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
% Difference/ Ion Balance		SM 1030 E	CALCULATION



### Chain of Custody Record SW Surface Water Client Information **GW** Ground Water **Legend Matrix** Contact: Company: Invoice To Contact: Company: Address: AGAT Quotation #: Address: Sediment TEL Relinquished By (Print Name and Sign): 5 pw2 TW2 Sample Identification Please note, if quotation number is not provided client will be billed full price for analysis v S 0 Paint 2 Soil Report Information - reports to be sent to: Date Sampled Apr. Name: Email: Email: Name: ) Fax: В Same: Yes 🖫 14:00 10:15 9:30 Sampled 00 1:00 Ime Smikle Cryburaside Sample Matrix Ch Date/Time No 🗆 April 15 \_aboratories Containers # Of **Regulatory Requirements** (potable water intended for human consumption) ☐ Yes XNo Drinking Water Chain of Custody Form is this a drinking water sample? Coarse Soil Texture (check one) Regulation 153/04 (reg. 511 Amend.) If "Yes", please use the Table Res/Park ☐ Ind/Com Site/Sample Information Agriculture 1 -Fine Comments Indicate one COM 1 www.agatlabs.com · webearth.agatlabs.com Sewer Use Metals and Inorganics Is this submission for a Record of Site Condition? Storm Sanitary Indicate one Metal Scan P: 905.712.5100 · F: 905.712.5122 Hydride Forming Metals Client Custom Metals ORPs: B-HWS CI- CN- DEC Yes FOC | Cr+6- | SAR | NO<sub>3</sub>/NO<sub>2</sub> | N-Total | Hg | pH X 5835 Coopers Avenue CCME Objectives (PWQO) Other (specify) Regulation 558 Prov. Water Quality Nutrients: ☐ TP □ NH<sub>3</sub> □ TKN Mississauga, ON □ NO₃ $\square$ NO<sub>2</sub> □ NO<sub>3</sub>/NO<sub>2</sub> 0-T-0 VOC: ☐ VOC ☐ THM BTEX L4Z 1Y2 CCME Fractions 1 to 4 ABNs PAHs Date Required (Rush surcharges may apply): Rush Surcharges Apply Rush TAT (please provide prior notification) Regular TAT Notes: SAICE Lab Temperature: AGAT WO #: Arrival Temperature: Laboratory Use Only Chlorophenois Turnaround Time Required (TAT) Required\* \*TAT is exclusive of weekends and statutory holidays ¥ 5 to 7 Working Days ☐ 1 Working Day ☐ 2 Working Days 3 Working Days Tellow Copy - AGAT **PCBs** Pink Copy - Client White Copy- AGAT Organochlorine Pestleides TCLP Metals/Inorganics Sewer Use WQA ( ( Z. 0 Page 5 ယ တ 00 $\infty$ $\infty$ 옄 Q



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD 292 Speedvale Avenue West, Unit 7 Guelph, ON N1H1C4

(519) 823-4995

ATTENTION TO: Jim Baxter

PROJECT: 3000 33273

AGAT WORK ORDER: 16T069988

WATER ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Coordinator

DATE REPORTED: Feb 22, 2016

PAGES (INCLUDING COVER): 9

VERSION\*: 1

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

NOTES
VERSION 1:Partial Report Issued Feb 22nd 2016.
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All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories (V1)

\*NOTE O

Page 1 of 9

Member of: Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA)

Western Enviro-Agricultural Laboratory Association (WEALA) Environmental Services Association of Alberta (ESAA) AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation.



Certificate of Analysis

AGAT WORK ORDER: 16T069988

PROJECT: 3000 33273

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

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

ATTENTION TO: Jim Baxter SAMPLED BY:

					Nitrate (Water)
DATE RECEIVED: 2016-02-19					DATE REPORTED: 2016-02-22
	;	SAMPLE DES	CRIPTION:	TW7 (12:50)	
		SAMI	PLE TYPE:	Water	
		DATE S	SAMPLED:	2/19/2016	
Parameter	Unit	G/S	RDL	7395664	
Nitrate as N	mg/L		0.25	8.00	

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

7395664 Elevated RDL indicates the degree of sample dilution prior to the analysis for anions in order to keep analyte within the calibration range of the instrument and to reduce matrix interference.

Certified By:



## Certificate of Analysis

AGAT WORK ORDER: 16T069988

PROJECT: 3000 33273

ATTENTION TO: Jim Baxter

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

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:	0.000	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		SAMPLED BY:
SAMPLING SITE.				
			Water Q	uality Assessment (mg/L)
DATE RECEIVED: 2016-02-19	9			DATE REPORTED: 2016-02-22
	S	AMPLE DESCRIPTION:	TW7	
		SAMPLE TYPE:	Water	
		DATE SAMPLED:	2/19/2016	
Parameter	Unit	G/S RDL	7395659	
Electrical Conductivity	uS/cm	2	587	
pH	pH Units	NA	7.88	
Saturation pH			6.99	
Langelier Index			0.89	
Total Hardness (as CaCO3)	mg/L	0.5	280	
Total Dissolved Solids	mg/L	20	354	
Alkalinity (as CaCO3)	mg/L	5	262	
Bicarbonate (as CaCO3)	mg/L	5	262	
Carbonate (as CaCO3)	mg/L	5	<5	
Hydroxide (as CaCO3)	mg/L	5	<5	
Fluoride	mg/L	0.25	<0.25	
Chloride	mg/L	0.50	18.3	
Nitrate as N	mg/L	0.25	8.52	
Nitrite as N	mg/L	0.25	<0.25	
Bromide	mg/L	0.25	<0.25	
Sulphate	mg/L	0.50	20.6	
Ortho Phosphate as P	mg/L	0.50	<0.50	
Reactive Silica	mg/L	0.05		
Ammonia as N	mg/L	0.02		
Total Phosphorus	mg/L	0.05	<0.05	
Total Organic Carbon	mg/L	0.5	0.6	
Colour	TCU	5	<5	
Turbidity	NTU	0.5	3.9	
Calcium	mg/L	0.05	77.2	
Magnesium	mg/L	0.05	21.2	
Sodium	mg/L	0.05	5.60	
Potassium	mg/L	0.05	1.00	
Aluminum	mg/L	0.004	< 0.004	
Antimony	mg/L	0.003	< 0.003	
Arsenic	mg/L	0.003	< 0.003	

Certified By:



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

### Certificate of Analysis

AGAT WORK ORDER: 16T069988

PROJECT: 3000 33273

5835 COOPERS AVENUE

MISSISSAUGA, ONTARIO CANADA L4Z 1Y2

http://www.agatlabs.com

TEL (905)712-5100 FAX (905)712-5122

ATTENTION TO: Jim Baxter

SAMPLED BY:

### Water Quality Assessment (mg/L) DATE RECEIVED: 2016-02-19 **DATE REPORTED: 2016-02-22** SAMPLE DESCRIPTION: TW7 SAMPLE TYPE: Water DATE SAMPLED: 2/19/2016 7395659 Parameter Unit G/S RDL Barium mg/L 0.002 0.093 Beryllium 0.001 < 0.001 mg/L Boron 0.010 mg/L < 0.010 Cadmium mg/L 0.001 < 0.001 Chromium mg/L 0.003 < 0.003 Cobalt mg/L 0.001 < 0.001 Copper mg/L 0.003 < 0.003 Iron mg/L 0.010 < 0.010 0.002 < 0.002 Lead mg/L Manganese mg/L 0.002 < 0.002 Mercury mg/L 0.0001 < 0.0001 Molybdenum 0.002 < 0.002 mg/L Nickel 0.003 < 0.003 mg/L Selenium mg/L 0.004 < 0.004 Silver mg/L 0.002 < 0.002 Strontium mg/L 0.005 0.106 Thallium mg/L 0.006 < 0.006 Tin 0.002 < 0.002 mg/L 0.002 Titanium mg/L < 0.002 Tungsten mg/L 0.010 < 0.010 Uranium mg/L 0.002 < 0.002 Vanadium mg/L 0.002 < 0.002 Zinc mg/L 0.005 0.017 Zirconium mg/L 0.004 < 0.004 % Difference/ Ion Balance NA 7.32

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

7395659 Elevated RDL indicates the degree of sample dilution prior to the analysis for anions in order to keep analyte within the calibration range of the instrument and to reduce matrix interference.

Certified By:



# **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD AGAT WORK ORDER: 16T069988

PROJECT: 3000 33273 ATTENTION TO: Jim Baxter

SAMPLING SITE: SAMPLED BY:

			vvalt	er Ar	iaiys	15								
RPT Date: Feb 22, 2016		С	UPLICATI	E		REFEREN	NCE MA	TERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPI	KE
PARAMETER	Batch Sample	Dup #1	Dup #2	RPD	Method Blank	Measured Value		ptable nits Upper	Recovery		ptable nits Upper	Recovery	Lir	eptable mits Upper
Water Quality Assessment (mg/l	L)													
Electrical Conductivity	7397209	1320	1320	0.0%	< 2	98%	80%	120%	NA			NA		
рН	7397209	8.11	8.02	1.1%	NA	99%	90%	110%	NA			NA		
Total Dissolved Solids	7393504	552	562	1.8%	< 20	96%	80%	120%	NA			NA		
Alkalinity (as CaCO3)	7397209	336	337	0.3%	< 5	102%	80%	120%	NA			NA		
Bicarbonate (as CaCO3)	7397209	336	337	0.3%	< 5	NA			NA			NA		
Carbonate (as CaCO3)	7397209	<5	<5	NA	< 5	NA			NA			NA		
Hydroxide (as CaCO3)	7397209	<5	<5	NA	< 5	NA			NA			NA		
Fluoride	7395664 7395664	< 0.25	< 0.25	NA	< 0.05	99%	90%	110%	93%	90%	110%	89%	80%	120%
Chloride	7395664 7395664	16.8	16.8	0.0%	< 0.10	105%	90%	110%	98%	90%	110%	96%	80%	120%
Nitrate as N	7395664 7395664	8.00	7.88	1.5%	< 0.05	98%	90%	110%	101%	90%	110%	113%	80%	120%
Nitrite as N	7395664 7395664	<0.25	<0.25	NA	< 0.05	NA	90%	110%	98%	90%	110%	113%	80%	120%
Bromide	7395664 7395664	< 0.25	< 0.25	NA	< 0.05	108%	90%	110%	104%	90%	110%	112%	80%	120%
Sulphate	7395664 7395664	18.9	18.4	2.7%	< 0.10	104%	90%	110%	95%	90%	110%	102%	80%	120%
Ortho Phosphate as P	7395664 7395664	< 0.50	< 0.50	NA	< 0.10	95%	90%	110%	90%	90%	110%	92%	80%	120%
Total Phosphorus	7396488	<0.05	<0.05	NA	< 0.05	102%	80%	120%	95%	90%	110%	102%	70%	130%
Total Organic Carbon	7396282	<0.5	<0.5	NA	< 0.5	96%	90%	110%	103%	90%	110%	99%	80%	120%
Colour	7396488	<5	<5	NA	< 5	102%	90%	110%	NA			NA		
Turbidity	7396488	<0.5	<0.5	NA	< 0.5	100%	90%	110%	NA			NA		
Calcium	7395659 7395659	77.2	76.9	0.4%	< 0.05	105%	90%	110%	104%	90%	110%	89%	70%	130%
Magnesium	7395659 7395659	21.2	21.6	1.9%	< 0.05	98%	90%	110%	98%	90%	110%	86%	70%	130%
Sodium	7395659 7395659	5.60	5.64	0.7%	< 0.05	101%	90%	110%	102%	90%	110%	95%	70%	130%
Potassium	7395659 7395659	1.00	1.02	2.0%	< 0.05	101%	90%	110%	102%	90%	110%	106%	70%	130%
Antimony	7394156	< 0.003	< 0.003	NA	< 0.003	94%	90%	110%	92%	90%	110%	97%	70%	130%
Arsenic	7394156	< 0.003	< 0.003	NA	< 0.003	98%	90%	110%	96%	90%	110%	114%	70%	130%
Barium	7394156	0.453	0.447	1.3%	< 0.002	96%	90%	110%	97%	90%	110%	92%	70%	130%
Beryllium	7394156	< 0.001	< 0.001	NA	< 0.001	91%	90%	110%	97%	90%	110%	98%	70%	130%
Boron	7394156	0.040	0.039	NA	< 0.010	100%	90%	110%	101%	90%	110%	106%	70%	130%
Cadmium	7394156	< 0.001	< 0.001	NA	< 0.001	94%	90%	110%	94%	90%	110%	99%	70%	130%
Chromium	7394156	0.009	0.009	NA	< 0.003	100%	90%	110%	101%	90%	110%	104%	70%	130%
Cobalt	7394156	< 0.001	< 0.001	NA	< 0.001	101%	90%	110%	102%	90%	110%	105%	70%	130%
Copper	7394156	< 0.003	< 0.003	NA	< 0.003	99%	90%	110%	101%	90%	110%	102%	70%	130%
Iron	7394156	7.79	7.51	3.7%	< 0.010			110%	101%	90%	110%	110%		130%
Lead	7394156	< 0.002	< 0.002	NA	< 0.002			110%	91%	90%	110%	91%		130%
Manganese	7394156	1.35	1.35	0.0%	< 0.002			110%	97%		110%	80%	70%	130%
Mercury	7395659 7395659	<0.0001	<0.0001	NA	< 0.0001			110%	98%		110%	99%		120%
Molybdenum	7394156	0.002	0.002	NA	< 0.002	94%	90%	110%	95%	90%	110%	101%	70%	130%
Nickel	7394156	< 0.003	< 0.003	NA	< 0.003			110%	106%		110%	108%	70%	130%
Selenium	7394156	< 0.004	< 0.004	NA	< 0.004		90%	110%	99%		110%	119%	70%	130%
Silver	7394156	< 0.002	< 0.002	NA	< 0.002			110%	105%		110%	102%		130%

AGAT QUALITY ASSURANCE REPORT (V1)

Page 5 of 9

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation.



### **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD AGAT WORK ORDER: 16T069988

PROJECT: 3000 33273 ATTENTION TO: Jim Baxter SAMPLING SITE: SAMPLED BY:

SAMI LING SITE.								וועורעכ		1.					
		V	Vater	Anal	lysis	(Cor	ntinu	ed)							
RPT Date: Feb 22, 2016				UPLICATE	<u> </u>		REFEREN	NCE MA	TERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPI	KE
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured		ptable nits	Recovery	1 1 1 1 1	ptable nits	Recovery	1 1 1 1 1	ptable nits
		Id		·			Value	Lower	Upper	,	Lower	Upper	,	Lower	Upper
Strontium	7394156		0.496	0.488	1.6%	< 0.005	94%	90%	110%	96%	90%	110%	95%	70%	130%
Thallium	7394156		< 0.006	< 0.006	NA	< 0.006	100%	90%	110%	100%	90%	110%	101%	70%	130%
Tin	7394156		< 0.002	< 0.002	NA	< 0.002	97%	90%	110%	92%	90%	110%	98%	70%	130%
Titanium	7394156		0.002	0.003	NA	< 0.002	97%	90%	110%	96%	90%	110%	104%	70%	130%
Tungsten	7394156		< 0.010	< 0.010	NA	< 0.010	96%	90%	110%	90%	90%	110%	101%	70%	130%
Uranium	7394156		< 0.002	< 0.002	NA	< 0.002	97%	90%	110%	91%	90%	110%	97%	70%	130%
Vanadium	7394156		< 0.002	< 0.002	NA	< 0.002	91%	90%	110%	95%	90%	110%	101%	70%	130%
Zinc	7394156		< 0.005	< 0.005	NA	< 0.005	97%	90%	110%	98%	90%	110%	101%	70%	130%
Zirconium	7394156		< 0.004	< 0.004	NA	< 0.004	101%	90%	110%	97%	90%	110%	108%	70%	130%

Comments: NA signifies Not Applicable.

Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By:

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16T069988
PROJECT: 3000 33273

ATTENTION TO: Jim Baxter

SAMPLING SITE.		SAMPLED BY.	
PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis	'		
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Saturation pH		SM 2320 B	CALCULATION
Langelier Index		SM 2330B	CALCULATION
Total Hardness (as CaCO3)	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Bicarbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Carbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Hydroxide (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Fluoride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Reactive Silica	INOR-93-6047	AQ2 EPA-122A & SM 4500 SiO2 D	AQ2 DISCRETE ANALYSER
Ammonia as N	INOR-93-6059	QuikChem 10-107-06-1-J & SM 4500 NH3-F	LACHAT FIA
Total Phosphorus	INOR-93-6057	QuikChem 10-115-01-3-A & SM 4500-P I	LACHAT FIA
Total Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310	SHIMADZU CARBON ANALYZER
Colour	INOR-93-6046	SM 2120 B	SPECTROPHOTOMETER
Turbidity	INOR-93-6044	SM 2130 B	NEPHELOMETER
Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Potassium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Aluminum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Antimony	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Mercury	MET-93-6100	EPA SW 846 7470 & 245.1	CVAAS
Molybdenum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Selenium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Silver	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Strontium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Thallium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Thamain	IVIL 1 -00-0 100	LI A OVV-070 0020A & 200.0	101 1/10



# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16T069988
PROJECT: 3000 33273

ATTENTION TO: Jim Baxter

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Tin	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Titanium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Tungsten	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Uranium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zirconium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
% Difference/ Ion Balance		SM 1030 E	CALCULATION



# Laboratories

Report Information: 27 6	ulasi	the +	Associa	atis lui	Regulatory Requirements:	ement	છ		No Regulatory Requirement	equ	irem	ent		Custoc Notes:	tody :	Seal	Custody Seal Intact:	4	□Yes	( es			J) No		THE STATE OF THE S	2
Address: 4 292	Specton	a CN	N. 11. 17	757	Regulation 153/04 Table Indicate One Indicate One Ind/Com Res/Park		Sewer Use	Use	Regulation 558	on 55	5 00			Turnaround Regular TAT	naro	' Z ŭ		me		<b>7) R</b>	Turnaround Time (TAT) Required:  Regular TAT	<b>ire</b>	<b>d:</b> Days			
Reports to be sent to:  1. Email:  2. Email:	xfer ?	ong to	30.36	o lon	□ Agroutture  Soil Texture (Check One)  □ Coarse  □ Fine	Region	Indicate One	One	Objectives (PWQO)  Other  Indicate One	ctives (PV r Indicate One	VQO)	1.6			Dω	3 Business Days	ness		3 Business 2	2 Bus Days	2 Business Days	27	X	1 Bus Day	1 Business Day	co.
ct Informa	227				Is this submission for a Record of Site Condition?	for a lition?	R A		Report Guideline on Certificate of Analysis	line Anal	on ysis					R Da	te Re	guire	× (R₁	S usr	urcha	arges	<b>oR</b> Date Required (Rush Surcharges May Apply):	Apply	) ;	
Site Location: Sampled By:	(+)				□ Yes Æ No	6		100	□ Yes	DN NO	o N				*7.	Plea AT is	exclu	rovia sive	l <b>e pri</b> i of we	or not ekent	tifica ds an	tion f	Please provide prior notification for rush TAT *TAT is exclusive of weekends and statutory holidays	h TA	<b>T</b> days	
AGAT Quote #:  Please note: If quotablish number is not providest, chient will be billight full price for analysis	P number is not provide	PO:	lled full price for a	raijais.	Sample Matrix Legend		0	0.0	(Check Applicable)	ble)															14	
Invoice Information: Company: Contact:		Bill To	Bill To Same: Yes □	No []	B Biota GW Ground Water O Oil Paint	os		tals	CI CN NO <sub>3</sub> /NO <sub>2</sub> pH CSAR	втех □тнм	4			1, 5, 1,	icides			(			5				<b>E</b>	
Address: Email:					S Soil SD Sediment SW Surface Water	and Inorga	Scan	Forming M	Custom Met  B-HWS  EC FO  N Hg [ hts: TP [ NO <sub>2</sub> ]		ractions 1		henols	2110113	chlorine Pe	letals/Inorg			to-D	QA	Write					
Sample Identification	Date Sampled :	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Metals	Metal 9	Hydride	ORPs: ☐ Cr <sup>6+</sup> ☐ Total			ABNs	PAHs	PCBs			Sewer	10	10	10)	11/	100				
This h	Eb 19/2.15	10:56	2	600																>						
TW7	Feb 19/2015 1	17:50	1	CW							-	-									>					
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Samples Relinquished By (Print Name and Sign); Samples Relinquished By (Print Name and Sign);		B	Dette Date	Time	Samples Received By (Print Name and Sign):  A  Samples Received By (Print Name and Sign):	turns and Sig	(S):	0		. 0	-61	Date	0	3	Time	S	4	4		<b>d</b> Page	- 5e		ું	5	7	

Decument ID: DIV 78.1511.010

Pink Copy - Client | Yellow Copy - AGAT | White Copy - AGAT

022761

Report Information: Regulatory Requir	Chain of Custody Record If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)	AGGAT Laboratories
Regulatory Requirements:   No Regulatory Requirement	sstody Form (potable water intended for human consumption)	5835 Coopers Avenue Mississauga, Ontario L42 1Y2 Ph: 905,712,5100 Fax: 905,712,5122 webearth.agatlabs.com
Custody Seal Intact: Yes	Arrival Temperatures:	Laboratory Use Only Work Order #: LGT Cooler Quantity:
□Yes □No	s. 8.2 9.7 9.5	6T 069 988



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD 292 Speedvale Avenue West, Unit 7 Guelph, ON N1H1C4 (519) 823-4995

ATTENTION TO: Jim Baxter

PROJECT: 3000 33273

AGAT WORK ORDER: 16T069988

WATER ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Coordinator

DATE REPORTED: Feb 23, 2016

PAGES (INCLUDING COVER): 9

VERSION\*: 2

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

<u>NOTES</u>	
ERSION 2:Full Report Issued Feb 22nd 2016.	

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

**AGAT** Laboratories (V2)

Page 1 of 9



Certificate of Analysis

AGAT WORK ORDER: 16T069988

PROJECT: 3000 33273

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

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

ATTENTION TO: Jim Baxter

SAMPLED BY:

					Nitrate (Water)
DATE RECEIVED: 2016-02-19	)				DATE REPORTED: 2016-02-23
		SAMPLE DES	CRIPTION:	TW7 (12:50)	
		SAMI	PLE TYPE:	Water	
		DATES	SAMPLED:	2/19/2016	
Parameter	Unit	G/S	RDL	7395664	
Nitrate as N	mg/L		0.25	8.00	

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

7395664 Elevated RDL indicates the degree of sample dilution prior to the analysis for anions in order to keep analyte within the calibration range of the instrument and to reduce matrix interference.

Certified By:



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

## Certificate of Analysis

AGAT WORK ORDER: 16T069988

PROJECT: 3000 33273

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

5835 COOPERS AVENUE

ATTENTION TO: Jim Baxter

SAMPLED BY:

SAMPLING SITE:				SAMPLED BY:
			Water Q	uality Assessment (mg/L)
DATE RECEIVED: 2016-02-19				DATE REPORTED: 2016-02-23
	S	AMPLE DESCRIPTION: SAMPLE TYPE: DATE SAMPLED:	TW7 Water 2/19/2016	
Parameter	Unit	G/S RDL	7395659	
Electrical Conductivity	uS/cm	2	587	
рН	pH Units	NA	7.88	
Saturation pH			6.99	
Langelier Index			0.89	
Total Hardness (as CaCO3)	mg/L	0.5	280	
Total Dissolved Solids	mg/L	20	354	
Alkalinity (as CaCO3)	mg/L	5	262	
Bicarbonate (as CaCO3)	mg/L	5	262	
Carbonate (as CaCO3)	mg/L	5	<5	
Hydroxide (as CaCO3)	mg/L	5	<5	
Fluoride	mg/L	0.25	<0.25	
Chloride	mg/L	0.50	18.3	
Nitrate as N	mg/L	0.25	8.52	
Nitrite as N	mg/L	0.25	<0.25	
Bromide	mg/L	0.25	<0.25	
Sulphate	mg/L	0.50	20.6	
Ortho Phosphate as P	mg/L	0.50	<0.50	
Reactive Silica	mg/L	0.05	7.03	
Ammonia as N	mg/L	0.02	0.10	
Total Phosphorus	mg/L	0.05	< 0.05	
Total Organic Carbon	mg/L	0.5	0.6	
Colour	TCU	5	<5	
Turbidity	NTU	0.5	3.9	
Calcium	mg/L	0.05	77.2	
Magnesium	mg/L	0.05	21.2	
Sodium	mg/L	0.05	5.60	
Potassium	mg/L	0.05	1.00	
Aluminum	mg/L	0.004	< 0.004	
Antimony	mg/L	0.003	< 0.003	
Arsenic	mg/L	0.003	< 0.003	

Certified By:



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

### Certificate of Analysis

AGAT WORK ORDER: 16T069988

PROJECT: 3000 33273

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

5835 COOPERS AVENUE

ATTENTION TO: Jim Baxter

SAMPLED BY:

### Water Quality Assessment (mg/L) DATE RECEIVED: 2016-02-19 **DATE REPORTED: 2016-02-23** SAMPLE DESCRIPTION: TW7 SAMPLE TYPE: Water DATE SAMPLED: 2/19/2016 7395659 Parameter Unit G/S RDL Barium mg/L 0.002 0.093 Beryllium 0.001 < 0.001 mg/L Boron 0.010 mg/L < 0.010 Cadmium mg/L 0.001 < 0.001 Chromium mg/L 0.003 < 0.003 Cobalt mg/L 0.001 < 0.001 Copper mg/L 0.003 < 0.003 Iron mg/L 0.010 < 0.010 0.002 < 0.002 Lead mg/L Manganese mg/L 0.002 < 0.002 Mercury mg/L 0.0001 < 0.0001 Molybdenum 0.002 < 0.002 mg/L Nickel 0.003 < 0.003 mg/L Selenium mg/L 0.004 < 0.004 Silver mg/L 0.002 < 0.002 Strontium mg/L 0.005 0.106 Thallium mg/L 0.006 < 0.006 Tin 0.002 < 0.002 mg/L 0.002 Titanium mg/L < 0.002 Tungsten mg/L 0.010 < 0.010 Uranium mg/L 0.002 < 0.002 Vanadium mg/L 0.002 < 0.002 Zinc mg/L 0.005 0.017 Zirconium mg/L 0.004 < 0.004 % Difference/ Ion Balance NA 7.26

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

7395659 Elevated RDL indicates the degree of sample dilution prior to the analysis for anions in order to keep analyte within the calibration range of the instrument and to reduce matrix interference.

Certified By:



# **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD AGAT WORK ORDER: 16T069988

PROJECT: 3000 33273 ATTENTION TO: Jim Baxter

SAMPLING SITE: SAMPLED BY:

SAMPLING SITE:							SAMP	LED B	Υ:					
			Wate	er Ar	nalys	is								
RPT Date: Feb 23, 2016		С	UPLICATE			REFEREN	NCE MA	TERIAL	METHOD	BLAN	K SPIKE	МАТ	RIX SPI	KE
PARAMETER	Batch Sample	Dup #1	Dup #2	RPD	Method Blank	Measured Value		ptable mits	Recovery	1 15	eptable mits	Recovery	Lie	ptable mits
						14.40	Lower	Upper		Lower	Upper		Lower	Uppei
Water Quality Assessment (m	ng/L)													
Electrical Conductivity	7397209	1320	1320	0.0%	< 2	98%	80%	120%	NA			NA		
рН	7397209	8.11	8.02	1.1%	NA	99%	90%	110%	NA			NA		
Total Dissolved Solids	7393504	552	562	1.8%	< 20	96%	80%	120%	NA			NA		
Alkalinity (as CaCO3)	7397209	336	337	0.3%	< 5	102%	80%	120%	NA			NA		
Bicarbonate (as CaCO3)	7397209	336	337	0.3%	< 5	NA			NA			NA		
Carbonate (as CaCO3)	7397209	<5	<5	NA	< 5	NA			NA			NA		
Hydroxide (as CaCO3)	7397209	<5	<5	NA	< 5	NA			NA			NA		
Fluoride	7395664 7395664	< 0.25	< 0.25	NA	< 0.05	99%	90%	110%	93%	90%	110%	89%	80%	120%
Chloride	7395664 7395664	16.8	16.8	0.0%	< 0.10	105%	90%	110%	98%	90%	110%	96%	80%	120%
Nitrate as N	7395664 7395664	8.00	7.88	1.5%	< 0.05	98%	90%	110%	101%	90%	110%	113%	80%	120%
Nitrite as N	7395664 7395664	<0.25	<0.25	NA	< 0.05	NA	90%	110%	98%	90%	110%	113%	80%	120%
Bromide	7395664 7395664	< 0.25	< 0.25	NA	< 0.05	108%	90%	110%	104%	90%	110%	112%	80%	120%
Sulphate	7395664 7395664	18.9	18.4	2.7%	< 0.10	104%	90%	110%	95%	90%	110%	102%	80%	120%
Ortho Phosphate as P	7395664 7395664	< 0.50	< 0.50	NA	< 0.10	95%	90%	110%	90%	90%	110%	92%	80%	120%
Reactive Silica	7395659 7395659	7.03	6.92	1.6%	< 0.05	98%	90%	110%	99%	90%	110%	89%	80%	120%
Ammonia as N	7395659 7395659	0.10	0.10	0.0%	< 0.02	94%	90%	110%	96%	90%	110%	85%	80%	120%
Total Phosphorus	7396488	< 0.05	< 0.05	NA	< 0.05	102%	80%	120%	95%	90%	110%	102%	70%	130%
Total Organic Carbon	7396282	<0.5	<0.5	NA	< 0.5	96%	90%	110%	103%	90%	110%	99%	80%	120%
Colour	7396488	<5	<5	NA	< 5	102%	90%	110%	NA			NA		
Turbidity	7396488	<0.5	<0.5	NA	< 0.5	100%	90%	110%	NA			NA		
Calcium	7395659 7395659	77.2	76.9	0.4%	< 0.05	105%	90%	110%	104%	90%	110%	89%	70%	130%
Magnesium	7395659 7395659	21.2	21.6	1.9%	< 0.05	98%	90%	110%	98%	90%	110%	86%	70%	130%
Sodium	7395659 7395659	5.60	5.64	0.7%	< 0.05	101%	90%	110%	102%	90%	110%	95%	70%	130%
Potassium	7395659 7395659	1.00	1.02	2.0%	< 0.05	101%	90%	110%	102%	90%	110%	106%	70%	130%
Antimony	7394156	< 0.003	< 0.003	NA	< 0.003	94%	90%	110%	92%	90%	110%	97%	70%	130%
Arsenic	7394156	< 0.003	< 0.003	NA	< 0.003	98%	90%	110%	96%	90%	110%	114%	70%	130%
Barium	7394156	0.453	0.447	1.3%	< 0.002	96%	90%	110%	97%	90%	110%	92%	70%	130%
Beryllium	7394156	< 0.001	< 0.001	NA	< 0.001	91%	90%	110%	97%	90%	110%	98%	70%	130%
Boron	7394156	0.040	0.039	NA	< 0.010	100%	90%	110%	101%	90%	110%	106%	70%	130%
Cadmium	7394156	< 0.001	< 0.001	NA	< 0.001	94%	90%	110%	94%	90%	110%	99%	70%	130%
Chromium	7394156	0.009	0.009	NA	< 0.003	100%	90%	110%	101%	90%	110%	104%	70%	130%
Cobalt	7394156	< 0.001	< 0.001	NA	< 0.001	101%	90%	110%	102%	90%	110%	105%	70%	130%
Copper	7394156	< 0.003	< 0.003	NA	< 0.003			110%	101%	90%	110%	102%		130%
Iron	7394156	7.79	7.51	3.7%	< 0.010	102%	90%	110%	101%	90%	110%	110%	70%	130%
Lead	7394156	< 0.002	< 0.002	NA	< 0.002	92%	90%	110%	91%	90%	110%	91%	70%	130%
Manganese	7394156	1.35	1.35	0.0%	< 0.002	97%	90%	110%	97%	90%	110%	80%	70%	130%
Mercury	7395659 7395659	<0.0001	<0.0001	NA	< 0.0001	1 99%	90%	110%	98%	90%	110%	99%	80%	120%
Molybdenum	7394156	0.002	0.002	NA	< 0.002	94%	90%	110%	95%	90%	110%	101%	70%	130%
Nickel	7394156	< 0.003	< 0.003	NA	< 0.003	106%	90%	110%	106%	90%	110%	108%	70%	130%

AGAT QUALITY ASSURANCE REPORT (V2)

Page 5 of 9

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation.



### **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16T069988
PROJECT: 3000 33273

ATTENTION TO: Jim Baxter

SAMPLING SITE: SAMPLED BY:

OAIMI EINO OITE.								J/ NIVII		1.					
		V	Vater	Ana	lysis	(Cor	ntinu	ed)							
RPT Date: Feb 23, 2016				UPLICATE	≣		REFEREN	NCE MA	TERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPI	KE
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value		ptable nits	Recovery	1 1 1 1 1	ptable nits	Recovery	Lie	ptable nits
		la la					value	Lower	Upper	·	Lower	Upper		Lower	Upper
Selenium	7394156		< 0.004	< 0.004	NA	< 0.004	102%	90%	110%	99%	90%	110%	119%	70%	130%
Silver	7394156		< 0.002	< 0.002	NA	< 0.002	95%	90%	110%	105%	90%	110%	102%	70%	130%
Strontium	7394156		0.496	0.488	1.6%	< 0.005	94%	90%	110%	96%	90%	110%	95%	70%	130%
Thallium	7394156		< 0.006	< 0.006	NA	< 0.006	100%	90%	110%	100%	90%	110%	101%	70%	130%
Tin	7394156		< 0.002	< 0.002	NA	< 0.002	97%	90%	110%	92%	90%	110%	98%	70%	130%
Titanium	7394156		0.002	0.003	NA	< 0.002	97%	90%	110%	96%	90%	110%	104%	70%	130%
Tungsten	7394156		< 0.010	< 0.010	NA	< 0.010	96%	90%	110%	90%	90%	110%	101%	70%	130%
Uranium	7394156		< 0.002	< 0.002	NA	< 0.002	97%	90%	110%	91%	90%	110%	97%	70%	130%
Vanadium	7394156		< 0.002	< 0.002	NA	< 0.002	91%	90%	110%	95%	90%	110%	101%	70%	130%
Zinc	7394156		< 0.005	< 0.005	NA	< 0.005	97%	90%	110%	98%	90%	110%	101%	70%	130%
Zirconium	7394156		< 0.004	< 0.004	NA	< 0.004	101%	90%	110%	97%	90%	110%	108%	70%	130%

Comments: NA signifies Not Applicable.

Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By:

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16T069988
PROJECT: 3000 33273

ATTENTION TO: Jim Baxter

SAMPLING SITE.		SAMPLED BY.	
PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis	'		
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Saturation pH		SM 2320 B	CALCULATION
Langelier Index		SM 2330B	CALCULATION
Total Hardness (as CaCO3)	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Bicarbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Carbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Hydroxide (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Fluoride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Reactive Silica	INOR-93-6047	AQ2 EPA-122A & SM 4500 SiO2 D	AQ2 DISCRETE ANALYSER
Ammonia as N	INOR-93-6059	QuikChem 10-107-06-1-J & SM 4500 NH3-F	LACHAT FIA
Total Phosphorus	INOR-93-6057	QuikChem 10-115-01-3-A & SM 4500-P I	LACHAT FIA
Total Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310	SHIMADZU CARBON ANALYZER
Colour	INOR-93-6046	SM 2120 B	SPECTROPHOTOMETER
Turbidity	INOR-93-6044	SM 2130 B	NEPHELOMETER
Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Potassium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Aluminum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Antimony	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Mercury	MET-93-6100	EPA SW 846 7470 & 245.1	CVAAS
Molybdenum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Selenium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Silver	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Strontium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Thallium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Thamain	IVIL 1 -00-0 100	LI A OVV-070 0020A & 200.0	101 1/10



# **Method Summary**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16T069988
PROJECT: 3000 33273

ATTENTION TO: Jim Baxter

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Tin	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Titanium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Tungsten	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Uranium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zirconium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
% Difference/ Ion Balance		SM 1030 E	CALCULATION



# Laboratories

Report Information: 27 6	il solu	the +	Associa	atis lui	Regulatory Requirements:	ement	છ		No Regulatory Requirement	equ	irem	ent		Custoc Notes:	tody :	Seal	Custody Seal Intact:	4	□Yes	( es			J) No		THE STATE OF THE S	2
Address: 4 292	Speed on	n ON	WH WE	757	Regulation 153/04 Table		Sewer Use	Use	Regulation 558	on 55	5 00			Turnaround Regular TAT	naro	' IZ ŏ		me		<b>7) R</b>	Turnaround Time (TAT) Required:  Regular TAT	<b>ire</b>	<b>d:</b> Days			
Reports to be sent to:  1. Email:  2. Email:	xfer ?	John State	33.55	o lon	□ Agriculture  Soil Texture (Check One)  □ Coarse □ Fine	Region	Indicate One	One	Objectives (PWQO)  Other  Indicate One	ctives (PV r Indicate One	VQO)	1.6			Dω	3 Business Days	ness		3 Business 2	2 Bus Days	2 Business Days		X	1 Bus Day	1 Business Day	co.
ct Informa	277				Is this submission for a Record of Site Condition?	for a lition?	R A		Report Guideline on Certificate of Analysis	line Anal	on ysis					R Da	te Re	guire	× (R₁	S usr	urcha	arges	<b>oR</b> Date Required (Rush Surcharges May Apply):	Apply	).	
Site Location: Sampled By:	(7)				□ Yes Æ No	Ó		1 2	□ Yes	DN NO	o N				*7.	Plea AT is	exclu	rovia sive	l <b>e pri</b> i of we	or not ekent	tifica ds an	tion f	Please provide prior notification for rush TAT *TAT is exclusive of weekends and statutory holidays	h TA	<b>T</b> days	
AGAT Quote #:  Please note: If quotablish number is not providest, chient will be billight full price for analysis	P number is not provide	PO:	likid full price for a	raijais.	Sample Matrix Legend		0	0.1	(Check Applicable)	ble)															14	
Invoice Information: Company: Contact:		Bill To	Bill To Same: Yes	Yes 🗆 No 🗆	B Biota GW Ground Water O Oil Paint	os		tals	CI CN NO <sub>3</sub> /NO <sub>2</sub> pH CSAR	втех □тнм	4				icides			(			5				<b>E</b>	
Address: Email:					SD Sediment SW Surface Water	and Inorga	Scan	Forming N	Custom Met  B-HWS  EC FO  N Hg [ hts: TP [ NO <sub>2</sub> ]		ractions 1		henols	711011010	chlorine Pe	letals/Inorg			to-D	QA	Write					
Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Metals	Metal 9	Hydride	ORPs: ☐ Cr <sup>6+</sup> ☐ Total			ABNs	PAHs	PCBs			Sewer	10	10	10)	11/	100				
Tu 2 h	Eb 19/2015	10:56	2	600																>						
TW7	Feb. 19/2015	12:50		CW								-									>					
								1811		32 1																
									9.																	
														7115									H			
									9	2																
Samples Relinquished By (Print, Name and Sign); Samples Relinquished By (Print, Name and Sign);		P)	Dette Date	Time	Samples Received by (Print Name and Sign):  A  Samples Received by (Print Name and Sign):	dime and Si	gn):	0		. 0	-61	Date	0	3	Time	S	4	4		<b>d</b> Page	- 5e		ું	5	7	

Decument ID: DIV 78.1511.010

Pink Copy - Client | Yellow Copy - AGAT | White Copy - AGAT

022761

Report Information: Regulatory Requir	Chain of Custody Record If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)	AGGAT Laboratories
Regulatory Requirements:   No Regulatory Requirement	sstody Form (potable water intended for human consumption)	5835 Coopers Avenue Mississauga, Ontario L42 1Y2 Ph: 905,712,5100 Fax: 905,712,5122 webearth.agatlabs.com
Custody Seal Intact: Yes	Arrival Temperatures:	Laboratory Use Only Work Order #: LGT Cooler Quantity:
□Yes □No	s. 8.2 9.7 9.5	6T 069 988



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD 292 Speedvale Avenue West, Unit 7

Guelph, ON N1H1C4 (519) 823-4995

ATTENTION TO: Dwight Smikle

PROJECT: 300033273

AGAT WORK ORDER: 16T070836

WATER ANALYSIS REVIEWED BY: Mike Muneswar, BSc (Chem), Senior Inorganic Analyst

DATE REPORTED: Feb 24, 2016

PAGES (INCLUDING COVER): 9

VERSION\*: 1

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

NOTES

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

**AGAT** Laboratories (V1)

\*NOTE O

Page 1 of 9



### Certificate of Analysis

AGAT WORK ORDER: 16T070836

PROJECT: 300033273

Nitrate (Water)

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

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

DATE RECEIVED: 2016-02-23

ATTENTION TO: Dwight Smikle

SAMPLED BY:

· · · · · · · · · · · · · · · · · · ·	
	DATE DEDODTED: 2016 02 24

| SAMPLE DESCRIPTION: TW8 - 10 min | SAMPLE TYPE: Water | DATE SAMPLED: 2/23/2016 | G / S | RDL | 7401689

 Parameter
 Unit
 G / S
 RDL
 7401689

 Nitrate as N
 mg/L
 0.25
 7.93

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

7401689 Sample required dilution prior to analysis in order to keep the analyte within the calibration range of the instrument and/or to minimize any matrix interferences; the RDL was adjusted accordingly.

Certified By:

Mile Munemen



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

### Certificate of Analysis

AGAT WORK ORDER: 16T070836

PROJECT: 300033273

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

5835 COOPERS AVENUE

ATTENTION TO: Dwight Smikle

SAMPLED BY:

### Water Quality Assessment - Groundwater Sample DATE RECEIVED: 2016-02-23 **DATE REPORTED: 2016-02-24** SAMPLE DESCRIPTION: TW8 SAMPLE TYPE: Water DATE SAMPLED: 2/23/2016 Unit G/S **RDL** 7401690 Parameter 2 Electrical Conductivity uS/cm 606 рН pH Units NA 8.02 Saturation pH 6.96 Langelier Index 1.06 Total Hardness (as CaCO3) mg/L 0.5 315 20 368 Total Dissolved Solids mg/L Alkalinity (as CaCO3) mg/L 254 Bicarbonate (as CaCO3) mg/L 5 254 Carbonate (as CaCO3) <5 mg/L Hydroxide (as CaCO3) mg/L 5 <5 0.25 Fluoride mg/L < 0.25 Chloride 0.50 10.4 mg/L Nitrate as N 0.25 8.25 mg/L Nitrite as N 0.25 < 0.25 mg/L Bromide mg/L 0.25 < 0.25 Sulphate mg/L 0.50 49.1 Ortho Phosphate as P mg/L 0.50 < 0.50 Reactive Silica mg/L 0.05 7.60 0.02 Ammonia as N mg/L < 0.02 Total Phosphorus mg/L 0.05 < 0.05 0.5 Total Organic Carbon mg/L 0.6 TCU Colour 5 <5 Turbidity NTU 0.5 21.1 Calcium mg/L 0.05 85.6 Magnesium mg/L 0.05 24.7 Sodium 0.05 4.69 mg/L Potassium mg/L 0.05 1.30 Aluminum mg/L 0.004 < 0.004 0.003 < 0.003 Antimony mg/L

Certified By:

Mile Munemen

mg/L

Arsenic

0.003

< 0.003



### Certificate of Analysis

ATTENTION TO: Dwight Smikle

AGAT WORK ORDER: 16T070836

PROJECT: 300033273

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

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE: SAMPLED BY:

### Water Quality Assessment - Groundwater Sample

			,	· ·
DATE RECEIVED: 2016-02-23	}			DATE REPORTED: 2016-02-24
	S	AMPLE DESCRIPTION:	TW8	
		SAMPLE TYPE:	Water	
		DATE SAMPLED:	2/23/2016	
Parameter	Unit	G/S RDL	7401690	
Barium	mg/L	0.002	0.110	
Beryllium	mg/L	0.001	<0.001	
Boron	mg/L	0.010	0.013	
Cadmium	mg/L	0.001	<0.001	
Chromium	mg/L	0.003	<0.003	
Cobalt	mg/L	0.001	<0.001	
Copper	mg/L	0.003	< 0.003	
Iron	mg/L	0.010	<0.010	
Lead	mg/L	0.002	<0.002	
Manganese	mg/L	0.002	0.007	
Mercury	mg/L	0.0001	<0.0001	
Molybdenum	mg/L	0.002	<0.002	
Nickel	mg/L	0.003	<0.003	
Selenium	mg/L	0.004	<0.004	
Silver	mg/L	0.002	<0.002	
Strontium	mg/L	0.005	0.437	
Thallium	mg/L	0.006	<0.006	
Tin	mg/L	0.002	<0.002	
Titanium	mg/L	0.002	<0.002	
Tungsten	mg/L	0.010	<0.010	
Uranium	mg/L	0.002	<0.002	
Vanadium	mg/L	0.002	< 0.002	
Zinc	mg/L	0.005	0.016	
Zirconium	mg/L	0.004	<0.004	
% Difference/ Ion Balance	%	NA	3.27	

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

7401690 Sample required dilution prior to analysis for Anions in order to keep the analytes within the calibration range of the instrument and/or to minimize any matrix interferences; the RDLs were adjusted

accordingly.

Certified By:

Make Muneman



# **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD AGAT WORK ORDER: 16T070836

PROJECT: 300033273 ATTENTION TO: Dwight Smikle

SAMPLING SITE: SAMPLED BY:

				Wate	er An	alysi	s								
RPT Date: Feb 24, 2016			D	UPLICATE			REFEREN	ICE MA	TERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPI	KE
PARAMETER	Batch S	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value		ptable nits	Recovery	Lin	ptable nits	Recovery	Lin	ptable nits
								Lower	Upper		Lower	Upper		Lower	Uppe
Water Quality Assessment - Gre	oundwater Sam	ple													
Electrical Conductivity	7401323		<2	<2	NA	< 2	101%	80%	120%	NA			NA		
рН	7401323		5.51	5.16	6.6%	NA	100%	90%	110%	NA			NA		
Total Dissolved Solids	7398229		232	238	2.6%	< 20	96%	80%	120%	NA			NA		
Alkalinity (as CaCO3)	7401323		<5	<5	NA	< 5	96%	80%	120%	NA			NA		
Bicarbonate (as CaCO3)	7401323		<5	<5	NA	< 5	NA			NA			NA		
Carbonate (as CaCO3)	7401323		<5	<5	NA	< 5	NA			NA			NA		
Hydroxide (as CaCO3)	7401323		<5	<5	NA	< 5	NA			NA			NA		
Fluoride	7401689 740	1689	< 0.05	< 0.05	NA	< 0.05	94%	90%	110%	94%	90%	110%	99%	80%	120%
Chloride	7401689 740	1689	12.7	12.3	3.2%	< 0.10	107%	90%	110%	98%	90%	110%	100%	80%	120%
Nitrate as N	7401689 740	1689	7.93	7.70	2.9%	< 0.05	100%	90%	110%	106%	90%	110%	106%	80%	120%
Nitrite as N	7401689 740	1689	< 0.05	< 0.05	NA	< 0.05	NA	90%	110%	108%	90%	110%	113%	80%	120%
Bromide	7401689 740	1689	< 0.05	< 0.05	NA	< 0.05	110%	90%	110%	96%	90%	110%	107%	80%	120%
Sulphate	7401689 740	1689	159	156	1.9%	< 0.10	90%	90%	110%	101%	90%	110%	96%	80%	120%
Ortho Phosphate as P	7401689 740	1689	< 0.10	< 0.10	NA	< 0.10	93%	90%	110%	92%	90%	110%	91%	80%	120%
Reactive Silica	7401690 740	1690	7.60	7.55	0.7%	< 0.05	95%	90%	110%	97%	90%	110%	87%	80%	120%
Ammonia as N	7399914		<0.02	<0.02	NA	< 0.02	95%	90%	110%	97%	90%	110%	96%	80%	120%
Total Phosphorus	7401323		<0.05	< 0.05	NA	< 0.05	103%	80%	120%	100%	90%	110%	101%	70%	130%
Total Organic Carbon	7401690 740	1690	0.6	0.6	NA	< 0.5	102%	90%	110%	99%		110%	97%	80%	120%
Colour	7401690 740	1690	< 5	<5	NA	< 5	102%	90%	110%	NA			NA		
Turbidity	7401690 740	1690	21.1	21.5	1.9%	< 0.5	101%	90%	110%	NA			NA		
Calcium	7401690 740	1690	85.6	85.2	0.5%	< 0.05	104%	90%	110%	102%	90%	110%	100%	70%	130%
Magnesium	7401690 740	1690	24.7	24.5	0.8%	< 0.05	98%	90%	110%	97%	90%	110%	100%	70%	130%
Sodium	7401690 740	1690	4.69	4.70	0.2%	< 0.05	100%	90%	110%	99%	90%	110%	101%	70%	130%
Potassium	7401690 740	1690	1.30	1.26	3.1%	< 0.05	100%	90%	110%	99%	90%	110%	105%	70%	130%
Aluminum	7401690 740	1690	< 0.004	<0.004	NA	< 0.004	109%	90%	110%	108%	90%	110%	102%	70%	130%
Antimony	7401690 740	1690	< 0.003	<0.003	NA	< 0.003	107%	90%	110%	97%	90%	110%	99%	70%	130%
Arsenic	7401690 740		< 0.003	< 0.003	NA	< 0.003	101%	90%	110%	100%	90%	110%	93%	70%	130%
Barium	7401690 740		0.110	0.106	3.7%	< 0.002	102%	90%	110%	100%	90%	110%	107%	70%	130%
Beryllium	7401690 740	1690	< 0.001	< 0.001	NA	< 0.001	106%	90%	110%	107%	90%	110%	97%	70%	130%
Boron	7401690 740	1690	0.013	0.013	NA	< 0.010	107%	90%	110%	101%	90%	110%	91%	70%	130%
Cadmium	7401690 740	1690	< 0.001	<0.001	NA	< 0.001	103%	90%	110%	106%	90%	110%	97%	70%	130%
Chromium	7401690 740		< 0.003	< 0.003	NA	< 0.003	103%		110%	103%	90%	110%	99%		130%
Cobalt	7401690 740		< 0.001	< 0.001	NA	< 0.001	106%		110%	104%		110%	98%		130%
Copper	7401690 740		< 0.003	< 0.003	NA	< 0.003	104%		110%	102%		110%	86%		130%
Iron	7401690 740		< 0.010	<0.010	NA	< 0.010	108%		110%	103%		110%	104%		130%
Lead	7401690 740	1690	< 0.002	<0.002	NA	< 0.002	103%	90%	110%	102%	90%	110%	93%	70%	130%
Manganese	7401690 740		0.002	0.007	NA	< 0.002		90%		102%	90%	110%	103%		130%
												/ 0			
Mercury	7401690 740		<0.0001	<0.0001	NA	< 0.0001			110%	103%	90%	110%	104%	80%	120%

AGAT QUALITY ASSURANCE REPORT (V1)

Page 5 of 9

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation.



### **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16T070836

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLING SITE: SAMPLED BY:

		V	Vater	Ana	lysis	(Cor	ntinu	ed)							
RPT Date: Feb 24, 2016			D	UPLICATI	<u> </u>		REFEREN	ICE MA	TERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPII	KE
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value		ptable nits	Recovery	Lin	ptable nits	Recovery	منا ا	ptable nits
		10	·	,			value	Lower	Upper		Lower	Upper		Lower	Upper
Nickel	7401690 7	401690	< 0.003	<0.003	NA	< 0.003	106%	90%	110%	105%	90%	110%	94%	70%	130%
Selenium	7401690 7	401690	< 0.004	<0.004	NA	< 0.004	103%	90%	110%	102%	90%	110%	101%	70%	130%
Silver	7401690 7	401690	< 0.002	< 0.002	NA	< 0.002	105%	90%	110%	108%	90%	110%	101%	70%	130%
Strontium	7401690 7	401690	0.437	0.428	2.1%	< 0.005	98%	90%	110%	99%	90%	110%	94%	70%	130%
Thallium	7401690 7	401690	< 0.006	< 0.006	NA	< 0.006	104%	90%	110%	99%	90%	110%	94%	70%	130%
Tin	7401690 7	401690	< 0.002	<0.002	NA	< 0.002	110%	90%	110%	100%	90%	110%	106%	70%	130%
Titanium	7401690 7	401690	< 0.002	<0.002	NA	< 0.002	107%	90%	110%	99%	90%	110%	103%	70%	130%
Tungsten	7401690 7	401690	< 0.010	< 0.010	NA	< 0.010	104%	90%	110%	96%	90%	110%	101%	70%	130%
Uranium	7401690 7	401690	< 0.002	< 0.002	NA	< 0.002	103%	90%	110%	99%	90%	110%	104%	70%	130%
Vanadium	7401690 7	401690	< 0.002	< 0.002	NA	< 0.002	102%	90%	110%	101%	90%	110%	103%	70%	130%
Zinc	7401690 7	401690	0.016	0.016	NA	< 0.005	103%	90%	110%	103%	90%	110%	83%	70%	130%
Zirconium	7401690 7	401690	< 0.004	<0.004	NA	< 0.004	96%	90%	110%	93%	90%	110%	104%	70%	130%

Comments: NA signifies Not Applicable.

Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By:

Mile Muneman

# **Method Summary**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16T070836

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLING SITE.		SAIVIPLED BY.	
PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Saturation pH		SM 2320 B	CALCULATION
Langelier Index		SM 2330B	CALCULATION
Total Hardness (as CaCO3)	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Bicarbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Carbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Hydroxide (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Fluoride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Reactive Silica	INOR-93-6047	AQ2 EPA-122A & SM 4500 SiO2 D	AQ2 DISCRETE ANALYSER
Ammonia as N	INOR-93-6059	QuikChem 10-107-06-1-J & SM 4500 NH3-F	LACHAT FIA
Total Phosphorus	INOR-93-6057	QuikChem 10-115-01-3-A & SM 4500-P I	LACHAT FIA
Total Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310	SHIMADZU CARBON ANALYZER
Colour	INOR-93-6046	SM 2120 B	SPECTROPHOTOMETER
Turbidity	INOR-93-6044	SM 2130 B	NEPHELOMETER
Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Potassium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Aluminum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Antimony	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Mercury	MET-93-6100	EPA SW 846 7470 & 245.1	CVAAS
Molybdenum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Selenium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Silver	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Strontium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Thallium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
mamam	IVIL 1-30-0103	LI A 377-040 0020A & 200.0	101 -1010



# **Method Summary**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16T070836

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLING SITE: SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Tin	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Titanium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Tungsten	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Uranium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zirconium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
% Difference/ Ion Balance		SM 1030 E	CALCULATION



# a GaT

ls: 🛚 🗓 No Regulatory Requirement	rm (potable water intended for human consumption)	webearth.agatlabs.com	Mississauga, Ontario L4Z 1Y2 Ph: 905.712.5100 Fax: 905.712.5122	5835 Coopers Avenue
Custody Seal Intact:	Arrival Temperatures:	Cooler Quantity:	work Order #: 161 6+0536	Laboratory Use Only
□Yes	2.6		16+	Only
□No	2.6 2.1 3.3		0000	9
Ð	CV.			

Time Page of	Date B.SO.	किठे अडे (Ve	and Sign)	Samples Received By (Print Name and Sign)	Date Time Time	Date 23 4	2	Samples Reinquished By (Print Name and Sign):  SCAN (D): In Sign):  Samples Reinquished By (Print Name and Sign):	R N R
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<					- 00 m	12:52	23FB 16	TW8-10 min	
PCBs Organ TCLP Sewer  N.H T Val M A M	CCME ABNs PAHs	Client  ORPs: □ Cr6+ □ Tota	Metal	Comments/ Special Instructions	# of Sample Containers Matrix	Time #	Date Sampled	Sample Identification	
ochlorin Metals/I	les: 🗆 v	Custom  B-HV  CUSTOM	s and Ind Scan le Formi	SW Surface Water				Email:	
Inorgan	ns 1 to	Metals						Address:	
nics	-	S CI [ DN pH [		O Oil				Contact:	_
	к □тнм	10 <sub>3</sub> /N0 <sub>2</sub> 3 SAR		>	ne: Yes 🚺 No 🗆	Bill To Same:		Invoice Information:	_
>50	1 3				price for analysis	Please nate: If quotation number is not provided, client will be billed full price for analysis	ation number is not provid	Please note: If quoti	1
h	ble)	(Check Applicable)		Sample Matrix		PO:		AGAT Quote #:	
101							,	Sampled By: 5 Quinland	10
*TAT is exclusive of weekends and seventy holidays	No	☐ Yes		☐ Yes ☐ No			E (	Site Location: Belfound	/-
Disease agaids price patification for such TAT	Analysis	Certificate of Analysis	on?	Record of Site Condition?			3273	Project 3000	_
OR Date Required (Rush Surcharges May Apply)	line on	Report Guldeline on	8	Is this submission for a				Project Information:	
	cate One	indi		Fine				2. Email:	
☐ 3 Business ☐ 2 Business ☐ 1 Business ☐ Days ☐ Days		e Other	Indicate One	Soil lexture (Check One) region.		Diviside, com		1. Email: Dwight Dw. Kee !	
charges App	Objectives (PWQO)	Objectiv	Committee			Fax:	-	Phone: 219 26-7	_
Regular TAT 5 to 7 Business Days				□Ind/Com □Res/Park				3	
a mine (min)		CCME	Sanitary	Table Indicate One				Address:	
Turnaround Time (TAT) Required	ion 558	e Regulation 558	Sewer Use	Regulation 153/04			SMIKLE	DV	
Custody Seal Intact: Yes	egulatory Requirement	No Regulatory		Regulatory Requirements:			20	Report Information:	
Arrival Temperatures:	an consumption)	ole water intended for hum	dy Form (potat	If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)	Water sample, please	f this is a Drinking		Chain of Custody Record	O
Cooler Quantity:	webearth,agatlabs.com	webearth			N N	1			720
	2.5100 Fax: 905,712.5122	Ph: 905.712.5100 Fax: 9	Ph:	ories	Laboratories	Ü			



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD 292 Speedvale Avenue West, Unit 7 Guelph, ON N1H1C4 (519) 823-4995

ATTENTION TO: Jim Baxter

PROJECT: Belfountain - 300033273

AGAT WORK ORDER: 16T071689

WATER ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Coordinator

DATE REPORTED: Feb 26, 2016

PAGES (INCLUDING COVER): 4

VERSION\*: 1

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

NOTES .	
ERSION 1:Partial Report Issued Feb 26th 2016 at 1:20pm	

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

**AGAT** Laboratories (V1)

Page 1 of 4



Certificate of Analysis

AGAT WORK ORDER: 16T071689 PROJECT: Belfountain - 300033273 5835 COOPERS AVENUE MISSISSAUGA, ONTARIO CANADA L4Z 1Y2 TEL (905)712-5100 FAX (905)712-5122 http://www.agatlabs.com

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

ATTENTION TO: Jim Baxter SAMPLED BY:

					Nitrate (Water)
DATE RECEIVED: 2016-02-25					DATE REPORTED: 2016-02-26
	S	AMPLE DES	CRIPTION:	TW10N	
		SAMI	PLE TYPE:	Water	
		DATES	SAMPLED:	2/25/2016	
Parameter	Unit	G/S	RDL	7408001	
Nitrate as N	mg/L		0.25	2.41	

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

7408001 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analyte within the calibration range of the instrument and to reduce matrix interference.

Certified By:

Amanjot Bhela



# **Method Summary**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

PROJECT: Belfountain - 300033273

**PARAMETER** 

AGAT WORK ORDER: 16T071689

ATTENTION TO: Jim Baxter

LITERATURE REFERENCE

SAMPLING SITE: SAMPLED BY:

AGAT S.O.P

ANALYTICAL TECHNIQUE

Water Analysis

Nitrate as N INOR-93-6004 SM 4110 B ION CHROMATOGRAPH

Document (D: D(v-78:1513.010)

Pink Copy - Client | Yellow Copy - AGAT | White Copy - AGAT

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d By (Print Name and Sign):  Ad By (Print Name and Sign):			ole Identification	Pease note: If quotation number is not provided, client will be billed full prior for analysis.  **Bill To Same: Yes	nformation: Be   Buck	5/9. 923-48	f Custody Record	7
A	100	- 6	Date Sampled	number is not provid	hin 30	23/1/2	2	3
		13:40	Time Sampled	po: dod. cilient will be bill Bill To	2332	Ave. Wes burnside	this is a Drinking Wa	
Date 3-16	(	2-	# of Containers	ill be billed full price for an	273		dng Water s امل ک	Lat
Time	8	36	Sample Matrix	nnalysia.		unit 20	ample, please	Laboratories
Samples Received By (Print Name and Sign):			Comments/ Special Instructions	Sample Matrix Legend B Biota GW Ground Water O Oii P Paint S Soil SD Sediment SW Surface Water	Is this submission for a Record of Site Condition?  Yes No	Regulation 153/04  Table	If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human Regulatory Requirements: \( \subseteq \limits \) No Regulatory Requirements: \( \subseteq \limits \) No Regulatory Re	ries
and Sign):			Metal		a on?	Sewer Use   Sanitary   Storm   Indicate One	ly Form (pota	P n
			Client  ORPs:  Cr6+ Tota  Nutrie NO <sub>3</sub> Volatil	Custom Metals  Custom Metals  B-HWS CI CN FEC FOC NOyNO2  N Hg pH SAR  Ints: TP NH3 TKN NO2 NO3/NO2  Les: VOC BTEX THM  Fractions 1 to 4	Report Guideline on Certificate of Analysis  ☐ Yes ☑ No	y   Regulation 558  y   CCME    Prov. Water Quality   Objectives (PWQO)   Indicate Onc	able water intended for human consumption)  No Regulatory Requirement	5835 Coopers Avenue Mississauga, Ontario L4Z 1Y2 Ph. 905,712,5100 Fax: 905,712,5122 webearth agatlabs.com
Date:			ABNs PAHs	phonois		1	nent	1Y2 1Y2
Time No: T D 24 4 5 0		*	PCBs Organ TCLP I	ochlorine Pesticides  Metals/Inorganics  Use  Late S  DQA	Please provide prior notification for rush TAT *TAT is exclusive of weekends and statutory holidays	Turnaround Time (TAT) Required:  Regular TAT	Arrival Temperatures:	Work Order #: 160 T O + 160 & O



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD 292 Speedvale Avenue West, Unit 7 Guelph, ON N1H1C4

(519) 823-4995

ATTENTION TO: Jim Baxter

PROJECT: 300033273

AGAT WORK ORDER: 16T072180

WATER ANALYSIS REVIEWED BY: Anthony Dapaah, PhD (Chem), Inorganic Lab Manager

DATE REPORTED: Mar 01, 2016

PAGES (INCLUDING COVER): 9

VERSION\*: 2

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

*NOTES
VERSION 2:Revised Report issued March 07th 2016. Reactive Silica Results corrected.

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

**AGAT** Laboratories (V2)

Page 1 of 9



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

Nitrate as N

Parameter

Certificate of Analysis

AGAT WORK ORDER: 16T072180

PROJECT: 300033273

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

ATTENTION TO: Jim Baxter

SAMPLED BY:MV

Nitrate (Water)

DATE RECEIVED: 2016-02-29 DATE REPORTED: 2016-03-01

SAMPLE DESCRIPTION: TW9N
SAMPLE TYPE: Water
DATE SAMPLED: 2/26/2016
G/S RDL 7410958
0.05 3.65

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

Unit

mg/L

CHARTERED CHARTERED CHEMIST



### Certificate of Analysis

AGAT WORK ORDER: 16T072180

PROJECT: 300033273

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

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

ATTENTION TO: Jim Baxter SAMPLED BY:MV

			Water (	Quality Assessment (mg/L)
DATE RECEIVED: 2016-02-29	)			DATE REPORTED: 2016-03-01
_		AMPLE DESCRIPTION: SAMPLE TYPE: DATE SAMPLED:	TW9 Water 2/26/2016	
Parameter	Unit uS/cm	G/S RDL 2	7410959 610	
Electrical Conductivity pH	pH Units	NA	8.02	
Saturation pH	prionis	INA	6.94	
Langelier Index			1.08	
Total Hardness (as CaCO3)	mg/L	0.5	310	
Total Dissolved Solids	mg/L	20	332	
Alkalinity (as CaCO3)	mg/L	5	265	
Bicarbonate (as CaCO3)	mg/L	5	265	
Carbonate (as CaCO3)	mg/L	5	<5	
Hydroxide (as CaCO3)	mg/L	5	<5	
Fluoride	mg/L	0.05	<0.05	
Chloride	mg/L	0.10	9.37	
Nitrate as N	mg/L	0.05	3.26	
Nitrite as N	mg/L	0.05	< 0.05	
Bromide	mg/L	0.05	< 0.05	
Sulphate	mg/L	0.10	50.0	
Ortho Phosphate as P	mg/L	0.10	<0.10	
Reactive Silica	mg/L	0.05	8.72	
Ammonia as N	mg/L	0.02	< 0.02	
Total Phosphorus	mg/L	0.05	< 0.05	
Total Organic Carbon	mg/L	0.5	0.6	
Colour	TCU	5	<5	
Turbidity	NTU	0.5	10.4	
Calcium	mg/L	0.05	82.4	
Magnesium	mg/L	0.05	25.4	
Sodium	mg/L	0.05	3.99	
Potassium	mg/L	0.05	1.19	
Aluminum	mg/L	0.004	<0.004	
Antimony	mg/L	0.003	<0.003	
Arsenic	mg/L	0.003	< 0.003	

CHEMIST OF CHEMIST

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 16T072180

PROJECT: 300033273

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

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

ATTENTION TO: Jim Baxter SAMPLED BY:MV

			Water Qu	uality Assessment (mg/L)
DATE RECEIVED: 2016-02-29				DATE REPORTED: 2016-03-01
	SA	AMPLE DESCRIPTION:	TW9	
		SAMPLE TYPE:	Water	
		DATE SAMPLED:	2/26/2016	
Parameter	Unit	G/S RDL	7410959	
Barium	mg/L	0.002	0.070	
Beryllium	mg/L	0.001	< 0.001	
Boron	mg/L	0.010	0.014	
Cadmium	mg/L	0.001	<0.001	
Chromium	mg/L	0.003	0.005	
Cobalt	mg/L	0.001	<0.001	
Copper	mg/L	0.003	< 0.003	
Iron	mg/L	0.010	< 0.010	
Lead	mg/L	0.002	<0.002	
Manganese	mg/L	0.002	< 0.002	
Mercury	mg/L	0.0001	<0.0001	
Molybdenum	mg/L	0.002	< 0.002	
Nickel	mg/L	0.003	<0.003	
Selenium	mg/L	0.004	<0.004	
Silver	mg/L	0.002	<0.002	
Strontium	mg/L	0.005	0.320	
Thallium	mg/L	0.006	<0.006	
Tin	mg/L	0.002	<0.002	
Titanium	mg/L	0.002	<0.002	
Tungsten	mg/L	0.010	<0.010	
Uranium	mg/L	0.002	<0.002	
Vanadium	mg/L	0.002	<0.002	
Zinc	mg/L	0.005	0.022	
Zirconium	mg/L	0.004	<0.004	
% Difference/ Ion Balance	%	NA	3.26	

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

7410959 Revised March 04, 2016.

Revision: This report replaces the Certificate of Analysis issued on March 01, 2016. The Certificate of analysis has been updated to correct the erroneous Reactive Silica value reported. The discrepancy

was due to sampling error during the analysis.



Certified By:

# **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD AGAT WORK ORDER: 16T072180

PROJECT: 300033273 ATTENTION TO: Jim Baxter
SAMPLING SITE: SAMPLED BY:MV

				Wate	er Ar	alys	is								
RPT Date: Mar 01, 2016				UPLICATE	<b>.</b>		REFEREN	ICE MA	TERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPI	KE
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Lir	ptable nits	Recovery	Lir	ptable nits	Recovery	Lir	ptable nits
								Lower	Upper		Lower	Upper		Lower	Uppe
Water Quality Assessment (mg	g/L)														
Electrical Conductivity	7410959 7		610	611	0.2%	< 2	102%	80%	120%	NA			NA		
pH	7410959 7	7410959	8.02	8.01	0.1%	NA	99%	90%	110%	NA			NA		
Total Dissolved Solids	7410971		436	430	1.4%	< 20	96%	80%	120%	NA			NA		
Alkalinity (as CaCO3)	7410959 7	7410959	265	263	0.8%	< 5	102%	80%	120%	NA			NA		
Bicarbonate (as CaCO3)	7410959 7	7410959	265	263	0.8%	< 5	NA			NA			NA		
Carbonate (as CaCO3)	7410959 7	7410959	<5	<5	NA	< 5	NA			NA			NA		
Hydroxide (as CaCO3)	7410959 7	7410959	<5	<5	NA	< 5	NA			NA			NA		
Fluoride	7411422		<0.5	<0.5	NA	< 0.05	96%	90%	110%	95%	90%	110%	89%	80%	120%
Chloride	7411422		247	248	0.4%	< 0.10	105%	90%	110%	109%	90%	110%	99%	80%	120%
Nitrate as N	7411422		1.2	1.1	8.7%	< 0.05	101%	90%	110%	110%	90%	110%	114%	80%	120%
Nitrite as N	7411422		<0.5	<0.5	NA	< 0.05	NA	90%	110%	109%	90%	110%	112%	80%	120%
Bromide	7411422		<0.5 <0.5		NA		108%	90%	110%	109%	90%	110%	109%	80%	120%
				< 0.5		< 0.05									120%
Sulphate	7411422		162	162	0.0%	< 0.10	101% 92%	90%	110%	108% 98%	90%	110%	105%	80%	
Ortho Phosphate as P Reactive Silica	7411422 7402270		<1.0 1.97	<1.0 2.00	NA 1.5%	< 0.10 < 0.05	92% 98%	90% 90%	110% 110%	96% 99%	90% 90%	110% 110%	88% 93%	80% 80%	120% 120%
Trodotivo Omod	7 102270		1.01	2.00	1.070	1 0.00	0070	0070	11070	0070	0070	11070	0070	0070	1207
Ammonia as N	7408819		4.81	4.80	0.2%	< 0.02	100%	90%	110%	103%	90%	110%	96%	80%	120%
Total Phosphorus	7410959 7	7410959	<0.05	<0.05	NA	< 0.05	102%	80%	120%	103%	90%	110%	102%	70%	130%
Total Organic Carbon	7410959 7	7410959	0.6	0.5	NA	< 0.5	98%	90%	110%	98%	90%	110%	94%	80%	120%
Colour	7410959 7	7410959	<5	<5	NA	< 5	100%	90%	110%	NA			NA		
Turbidity	7410852		948	1020	7.3%	< 0.5	101%	90%	110%	NA			NA		
Calcium	7410959 7	7410959	82.4	82.5	0.1%	< 0.05	105%	90%	110%	106%	90%	110%	98%	70%	130%
Magnesium	7410959 7	7410959	25.4	25.5	0.4%	< 0.05	98%	90%	110%	100%	90%	110%	97%	70%	130%
Sodium	7410959 7	7410959	3.99	3.97	0.5%	< 0.05	100%	90%	110%	102%	90%	110%	99%	70%	130%
Potassium	7410959 7	7410959	1.19	1.17	1.7%	< 0.05	101%	90%	110%	103%	90%	110%	101%	70%	130%
Aluminum	7410959 7	7410959	< 0.004	< 0.004	NA	< 0.004	102%	90%	110%	105%	90%	110%	117%	70%	130%
Antimony	7410959 7	7410050	< 0.003	< 0.003	NA	< 0.003	98%	90%	110%	96%	90%	110%	101%	70%	130%
Arsenic	7410959 7		< 0.003	< 0.003	NA	< 0.003		90%	110%	98%	90%	110%	107%	70%	130%
Barium	7410959 7		0.070	0.070	0.0%	< 0.003	99%	90%	110%	99%	90%	110%	110%	70%	130%
Beryllium	7410959 7		< 0.070	< 0.070	0.0% NA	< 0.002	94%	90%	110%	96%	90%	110%	98%	70%	130%
Boron	7410959 7		0.014	0.001	NA	< 0.001		90%	110%	109%		110%	111%	70%	130%
				•.•			, .	,-			/-			, .	
Cadmium	7410959 7	7410959	< 0.001	< 0.001	NA	< 0.001	100%	90%	110%	99%	90%	110%	119%		130%
Chromium	7410959 7		0.005	0.003	NA	< 0.003	100%		110%	104%		110%	109%		130%
Cobalt	7410959 7		< 0.001	< 0.001	NA	< 0.001	100%		110%	101%		110%	108%		130%
Copper	7410959 7		< 0.003	< 0.003	NA	< 0.003	99%		110%	102%		110%	109%	70%	130%
Lead	7410959 7	7410959	< 0.002	< 0.002	NA	< 0.002	98%	90%	110%	94%	90%	110%	104%	70%	130%
Manganese	7410959 7	7410959	< 0.002	< 0.002	NA	< 0.002	98%	90%	110%	98%	90%	110%	101%	70%	130%
Mercury	7410971		<0.0001	<0.0001	NA	< 0.0001			110%	102%		110%	102%		120%
Molybdenum	7410959 7	7/10050	< 0.002	< 0.002	NA	< 0.002			110%	99%		110%	108%	70%	130%
Morybuerium	1 4 10000	T10333													

AGAT QUALITY ASSURANCE REPORT (V2)

Page 5 of 9

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation.



#### **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16T072180

PROJECT: 300033273

ATTENTION TO: Jim Baxter

SAMPLING SITE: SAMPLED BY:MV

OAIVII EIIVO OITE.								J/ \IVII		1 . 101 0					
		١	Vater	Ana	lysis	(Cor	ntinu	ed)							
RPT Date: Mar 01, 2016			С	UPLICATE	Ē		REFEREN	NCE MA	TERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPI	iKE
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured Value		ptable nits	Recovery	Lie	ptable mits	Recovery	1 1 1 1 1	eptable mits
		la la		·			value	Lower	Upper		Lower	Upper		1	Upper
Selenium	7410959	7410959	< 0.004	< 0.004	NA	< 0.004	99%	90%	110%	99%	90%	110%	111%	70%	130%
Silver	7410959	7410959	< 0.002	< 0.002	NA	< 0.002	102%	90%	110%	107%	90%	110%	120%	70%	130%
Strontium	7410959	7410959	0.320	0.307	4.1%	< 0.005	100%	90%	110%	98%	90%	110%	109%	70%	130%
Thallium	7410959	7410959	< 0.006	< 0.006	NA	< 0.006	104%	90%	110%	102%	90%	110%	115%	70%	130%
Tin	7410959	7410959	< 0.002	< 0.002	NA	< 0.002	98%	90%	110%	97%	90%	110%	101%	70%	130%
Titanium	7410959	7410959	< 0.002	< 0.002	NA	< 0.002	102%	90%	110%	97%	90%	110%	105%	70%	130%
Tungsten	7410959	7410959	< 0.010	< 0.010	NA	< 0.010	95%	90%	110%	95%	90%	110%	94%	70%	130%
Uranium	7410959	7410959	< 0.002	< 0.002	NA	< 0.002	100%	90%	110%	95%	90%	110%	106%	70%	130%
Vanadium	7410959	7410959	< 0.002	< 0.002	NA	< 0.002	96%	90%	110%	95%	90%	110%	103%	70%	130%
Zinc	7410959	7410959	0.022	0.021	NA	< 0.005	100%	90%	110%	103%	90%	110%	112%	70%	130%
Zirconium	7410959	7410959	< 0.004	< 0.004	NA	< 0.004	93%	90%	110%	91%	90%	110%	93%	70%	130%

Comments: NA signifies Not Applicable.

Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.



Certified By:

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

PROJECT: 300033273

AGAT WORK ORDER: 16T072180

ATTENTION TO: Jim Baxter

SAMPLING SITE: SAMPLED BY:MV

O/ tivil Elito Off E.		OAMI LLD DT.MIV	
PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis	'		
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
рН	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Saturation pH		SM 2320 B	CALCULATION
Langelier Index		SM 2330B	CALCULATION
Total Hardness (as CaCO3)	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Bicarbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Carbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Hydroxide (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Fluoride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Reactive Silica	INOR-93-6047	AQ2 EPA-122A & SM 4500 SiO2 D	AQ2 DISCRETE ANALYSER
Reactive Silica	INOR-93-0047	QuikChem 10-107-06-1-J & SM 4500	
Ammonia as N	INOR-93-6059	NH3-F	LACHAT FIA
Total Phosphorus	INOR-93-6057	QuikChem 10-115-01-3-A & SM 4500-P I	LACHAT FIA
Total Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310	SHIMADZU CARBON ANALYZEF
Colour	INOR-93-6046	SM 2120 B	SPECTROPHOTOMETER
Turbidity	INOR-93-6044	SM 2130 B	NEPHELOMETER
Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Potassium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Aluminum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Antimony	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
•	MET-93-6100	EPA SW 846 7470 & 245.1	CVAAS
Mercury Molybdenum			ICP-MS
•	MET-93-6103	EPA SW 846 6020A & 200.8	
Nickel	MET-93-6103	EPA SW 846 6020A & 200.8	ICP-MS
Selenium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Silver	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Strontium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Thallium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS



# **Method Summary**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16T072180

PROJECT: 300033273

ATTENTION TO: Jim Baxter

SAMPLING SITE: SAMPLED BY:MV

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Tin	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Titanium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Tungsten	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Uranium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zirconium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
% Difference/ Ion Balance		SM 1030 E	CALCULATION

Samples Relinquished By (Print Name and Sign):	TWAN	Sample Identification	Invoice Information: Company: Contact: Address: Email:	Project Information: Project Site Location: Sampled By:	Phone: Reports to be sent to: 1. Email: 2. Email:	Report Information: Company: Contact: Address:  Address:  Guel	Chain of Cu
rint Name and Sign):  ((); A		tification	Please note: If quidition number is not provided, client will be billed full price for analysis ation:  Bill To Same: Yes	A 808	Jim. bax	Spece Spece	Custody Record
	56.26.26.26	Date Sampled	on number is not pro	Lahriok	Fer 36	Works and	acord
	05:6	Time Sampled	ided, client will be	3	fax:	ten que lu	If this is a Dri
The 26	0	# of Containers	ill be billed full price for a		· Lo. 10	Jest, W	Lat
Time	600	Sample Matrix	Yes \( \) No \( \)		3	Coldi	orat
Samples Received By IPH Simples Received By IPH		Comments/ Special Instructions	Legend  B Biota GW Ground Water O Oil P Paint S Soil SD Sediment SW Surface Water	Is this submission for a Record of Site Condition?  ☐ Yes ② No	□ Agriculture Soil Texture (Check One) □ Coarse □ Frine	Regulatory Requirements:  [Please check all applicable bases]  [Regulation 153/04]  [Table	Laboratories  Ph: 905.73  If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water
wed By (Print Name and Signed By (Print Name and Signed By Print Name and Signed By (Print Name		Metals	and Inorganics	sion for a Condition?  Di No		rements	Custody Forn
CA.		Metal Hydrid	Scan e Forming Metals		Indicate One	er U	Ph: 905,71
Sirgh	100	ORPs:	Custom Metals    B-HWS   CI   CN     EC   FOC   NO <sub>2</sub> /NO <sub>2</sub>     N   Hg   pH   SAR     nts:   TP   NH,   TKN     NO <sub>2</sub>   NO <sub>2</sub> /NO <sub>2</sub>     es:   VOC   BTEX   THM	Report Guideline on Certificate of Analysis	Objectiv Other	No Regulatory Requirement  Se Regulation 558  y CCME	ing 2.5
Date Date			es: UVOC BETEX THM	Analysis No	Objectives (PWQO) Other  Indicate One	lequiremen	5836 Coppers Avenue ISSAUGE, Ontpend 147 1Y2 3100 Fax: 905,712,5422 websarth.agattabs.com
26 Feb 2016	TR 8 3	PAHs Chloro	phenols		<u>z</u>		
		PCBs			RUSh IAI (Rush Surcharges Apply)  3 Business	Custody Seal Intact: Notes: Turnaround Tin Regular TAT	Work Order #:  Cooler Quantity:  Arrival Temperatures:
Time 2			ochlorine Pesticides  Metals/Inorganics	Ple *TAT is	3 Business Days OR Date Re	y Seal roun	rato rder #. Quanti [empe
7 2		Sewer		ase pi exclus	ness ate Re	Intact d Til	ty:
	K	iU	· Wate	ovide sive of	harges t	me (T	, ii
Page	X	Mu	Wate 10A	Please provide prior notification for rush TAT *TAT is exclusive of weekends and statutory holidays	Al (Rush Surcharges Apply)  3 Business 2 Business 1 Busi Days  Days  OR Date Required (Rush Surcharges May Apply):	Custody Seal Intact:   Tyes   DNC   Notes:   Turnaround Time (TAT) Required:  Regular TAT   5 to 7 Business D	
				ification is and s	iness	Nes □No  AT) Required:  5 to 7 Business Days	10 12
21 of				n for ru statuto	jes May	□No	7
of 1				ish TAT ry holic	1 Business Day	v	7 50 8
9				fays	iness	□ N/A	the last

HE RE DW. 75-1111-010

Pink Copy - Client | Yellow Copy - AGAT | White Copy AGAT



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD 292 Speedvale Avenue West, Unit 7 Guelph, ON N1H1C4

(519) 823-4995

ATTENTION TO: Jim Baxter

PROJECT: 300033273

AGAT WORK ORDER: 16T072717

WATER ANALYSIS REVIEWED BY: Anthony Dapaah, PhD (Chem), Inorganic Lab Manager

DATE REPORTED: Mar 01, 2016

PAGES (INCLUDING COVER): 9

VERSION\*: 2

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

VERSION 2:Revised Report: Reactive Silica results corrected.	

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

**AGAT** Laboratories (V2)

\*NOTES

Member of: Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA)

Western Enviro-Agricultural Laboratory Association (WEALA) Environmental Services Association of Alberta (ESAA)

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation.

Page 1 of 9



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

Nitrate as N

DATE RECEIVED: 2016-02-29

Parameter

Certificate of Analysis

AGAT WORK ORDER: 16T072717

PROJECT: 300033273

Nitrate (Water)

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

ATTENTION TO: Jim Baxter

SAMPLED BY:

Tittato (Trator)	
	DATE REPORTED: 2016-03-01

SAMPLE DESCRIPTION: TW11N SAMPLE TYPE: Water DATE SAMPLED: 2/29/2016 G/S RDL 7413121 mg/L 0.10 4.61

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

Unit

7413121 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analyte within the calibration range of the instrument and to reduce matrix interference.



### Certificate of Analysis

AGAT WORK ORDER: 16T072717

PROJECT: 300033273

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

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

ATTENTION TO: Jim Baxter SAMPLED BY:

			Wat	er Quality Assessment
DATE RECEIVED: 2016-02-29				DATE REPORTED: 2016-03-01
	S	AMPLE DESCRIPTION: SAMPLE TYPE: DATE SAMPLED:	TW11N Water 2/29/2016	
Parameter	Unit	G/S RDL	7413129	
Electrical Conductivity	uS/cm	2	607	
рН	pH Units	NA	8.00	
Saturation pH			6.95	
Langelier Index			1.05	
Total Hardness (as CaCO3)	mg/L	0.5	303	
Total Dissolved Solids	mg/L	20	326	
Alkalinity (as CaCO3)	mg/L	5	267	
Bicarbonate (as CaCO3)	mg/L	5	267	
Carbonate (as CaCO3)	mg/L	5	<5	
Hydroxide (as CaCO3)	mg/L	5	<5	
Fluoride	mg/L	0.10	<0.10	
Chloride	mg/L	0.20	12.8	
Nitrate as N	mg/L	0.10	4.58	
Nitrite as N	mg/L	0.10	<0.10	
Bromide	mg/L	0.10	<0.10	
Sulphate	mg/L	0.20	21.3	
Ortho Phosphate as P	mg/L	0.20	<0.20	
Reactive Silica	mg/L	0.10	8.05	
Ammonia as N	mg/L	0.02	< 0.02	
Total Phosphorus	mg/L	0.05	< 0.05	
Total Organic Carbon	mg/L	0.5	0.7	
Colour	TCU	5	<5	
Turbidity	NTU	0.5	2.9	
Calcium	mg/L	0.05	81.7	
Magnesium	mg/L	0.05	24.0	
Sodium	mg/L	0.05	5.39	
Potassium	mg/L	0.05	1.01	
Aluminum	mg/L	0.004	<0.004	
Antimony	mg/L	0.003	< 0.003	
Arsenic	mg/L	0.003	< 0.003	

CHARTERED CHEMIST

Certified By:



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

#### Certificate of Analysis

AGAT WORK ORDER: 16T072717

PROJECT: 300033273

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

ATTENTION TO: Jim Baxter

			SAMPLED BY:
		Water Quality	y Assessment
			DATE REPORTED: 2016-03-01
	SAMPLE TYPE: DATE SAMPLED:	TW11N Water 2/29/2016	
= = = = = = = = = = = = = = = = = = = =			
-			
mg/L	0.002		
mg/L	0.002		
mg/L	0.0001	<0.0001	
mg/L	0.002	<0.002	
mg/L	0.003	<0.003	
mg/L	0.004	<0.004	
mg/L	0.002	<0.002	
mg/L	0.005	0.132	
mg/L	0.006	<0.006	
mg/L	0.002	<0.002	
mg/L	0.002	<0.002	
mg/L	0.010	<0.010	
mg/L	0.002	<0.002	
mg/L	0.002	<0.002	
mg/L	0.005	0.013	
mg/L	0.004	<0.004	
%	NA	1.24	
	Unit mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L	DATE SAMPLED:   Unit   G / S   RDL     mg/L   0.002     mg/L   0.001     mg/L   0.001     mg/L   0.001     mg/L   0.003     mg/L   0.003     mg/L   0.003     mg/L   0.002     mg/L   0.002     mg/L   0.002     mg/L   0.002     mg/L   0.003     mg/L   0.002     mg/L   0.005     mg/L   0.005     mg/L   0.002     mg/L   0.002     mg/L   0.005     mg/L   0.002     mg/L   0.005     mg/L   0.006     mg/L   0.006     mg/L   0.005	SAMPLE DESCRIPTION: TW11N SAMPLE TYPE: Water DATE SAMPLED: 2/29/2016 Unit G / S RDL 7413129  mg/L 0.002 0.060 mg/L 0.001 <0.001 mg/L 0.001 <0.001 mg/L 0.001 <0.001 mg/L 0.003 <0.003 mg/L 0.001 <0.001 mg/L 0.003 <0.003 mg/L 0.010 <0.010 mg/L 0.001 <0.001 mg/L 0.002 <0.003 mg/L 0.010 <0.010 mg/L 0.001 <0.001 mg/L 0.002 <0.002 mg/L 0.002 <0.002 mg/L 0.0001 <0.0001 mg/L 0.0002 <0.002 mg/L 0.0001 <0.0001 mg/L 0.0002 <0.002 mg/L 0.0002 <0.002 mg/L 0.0003 <0.003 mg/L 0.0004 <0.004 mg/L 0.0004 <0.004 mg/L 0.0005 0.132 mg/L 0.0006 <0.0006 mg/L 0.0002 <0.0002 mg/L 0.0002 <0.0002 mg/L 0.0006 <0.0006 mg/L 0.0002 <0.0002 mg/L 0.0002 <0.0002 mg/L 0.0002 <0.0002 mg/L 0.0002 <0.0002 mg/L 0.0002 <0.0002 mg/L 0.0002 <0.0002 mg/L 0.0002 <0.0002 mg/L 0.0002 <0.0002 mg/L 0.0002 <0.0002 mg/L 0.0002 <0.0002 mg/L 0.0002 <0.0002 mg/L 0.0002 <0.0002 mg/L 0.0002 <0.0002 mg/L 0.0002 <0.0002 mg/L 0.0002 <0.0002 mg/L 0.0002 <0.0002 mg/L 0.0002 <0.0002 mg/L 0.0002 <0.0002 mg/L 0.0002 <0.0002 mg/L 0.0002 <0.0002 mg/L 0.0002 <0.0002 mg/L 0.0002 <0.0002 mg/L 0.0004 <0.0004

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

Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analyte within the calibration range of the instrument and to reduce matrix interference.

Revised March 04, 2016.

Revision: This report replaces the Certificate of Analysis issued on March 01, 2016. The Certificate of analysis has been updated to correct the erroneous Reactive Silica value reported. The discrepancy was due to sampling error during the analysis.

Certified By:



7413129



# **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD AGAT WORK ORDER: 16T072717

PROJECT: 300033273 ATTENTION TO: Jim Baxter

SAMPLING SITE: SAMPLED BY:

								AIVIP		• •					
				Wate	er Ar	alys	is								
RPT Date: Mar 01, 2016			DUPLICATE				REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2 RPD Method		Measured Value		ptable	Recovery	Lir	ptable	Recovery	Acceptabl Limits		
		lu lu					value	Lower	Upper		Lower	Upper		Lower	Uppe
Water Quality Assessment															
Electrical Conductivity	7412084		754	750	0.5%	< 2	102%	80%	120%	NA			NA		
рН	7412084		7.74	7.79	0.6%	NA	100%	90%	110%	NA			NA		
Total Dissolved Solids	7413129 7	7413129	326	324	0.6%	< 20	96%	80%	120%	NA			NA		
Alkalinity (as CaCO3)	7412084		103	103	0.0%	< 5	100%	80%	120%	NA			NA		
Bicarbonate (as CaCO3)	7412084		103	103	0.0%	< 5	NA			NA			NA		
Carbonate (as CaCO3)	7412084		<5	<5	NA	< 5	NA			NA			NA		
Hydroxide (as CaCO3)	7412084		<5	<5	NA	< 5	NA			NA			NA		
Fluoride	7413121 7	7413121	<0.10	<0.10	NA	< 0.05	106%	90%	110%	100%	90%	110%	104%	80%	120%
Chloride	7413121 7	7413121	12.9	13.1	1.5%	< 0.10	102%	90%	110%	107%	90%	110%	102%	80%	120%
Nitrate as N	7413121 7	7413121	4.61	4.67	1.3%	< 0.05	93%	90%	110%	104%	90%	110%	89%	80%	120%
Nitrite as N	7413121 7	7413121	<0.10	<0.10	NA	< 0.05	NA	90%	110%	107%	90%	110%	101%	80%	120%
Bromide	7413121 7	7413121	<0.10	<0.10	NA	< 0.05	102%	90%	110%	109%	90%	110%	100%	80%	120%
Sulphate	7413121 7	7413121	21.9	22.2	1.4%	< 0.10	94%	90%	110%	106%	90%	110%	94%	80%	120%
Ortho Phosphate as P	7413121 7	7413121	<0.20	<0.20	NA	< 0.10	93%	90%	110%	100%	90%	110%	100%	80%	120%
Reactive Silica	7402270		1.97	2.00	1.5%	< 0.05	98%	90%	110%	99%	90%	110%	93%	80%	120%
Ammonia as N	7413129 7	7413129	<0.02	<0.02	NA	< 0.02	92%	90%	110%	101%	90%	110%	89%	80%	120%
Total Phosphorus	7410959		< 0.05	< 0.05	NA	< 0.05	102%	80%	120%	103%	90%	110%	102%	70%	130%
Total Organic Carbon	7413129 7	7413129	0.7	0.7	NA	< 0.5	98%	90%	110%	98%	90%	110%	102%	80%	120%
Colour	7413129 7	7413129	<5	<5	NA	< 5	100%	90%	110%	NA			NA		
Turbidity	7413129 7	7413129	2.9	3.0	3.4%	< 0.5	101%	90%	110%	NA			NA		
Calcium	7413129 7	7413129	81.7	82.2	0.6%	< 0.05	103%	90%	110%	103%	90%	110%	101%	70%	130%
Magnesium	7413129 7	7413129	24.0	24.0	0.0%	< 0.05	98%	90%	110%	97%	90%	110%	100%	70%	130%
Sodium	7413129 7	7413129	5.39	5.28	2.1%	< 0.05	101%	90%	110%	100%	90%	110%	100%	70%	130%
Potassium	7413129 7	7413129	1.01	1.01	0.0%	< 0.05	100%	90%	110%	100%	90%	110%	100%	70%	130%
Aluminum	7413129 7	7413129	< 0.004	< 0.004	NA	< 0.004	100%	90%	110%	101%	90%	110%	103%	70%	130%
Antimony	7413129 7	7413129	< 0.003	< 0.003	NA	< 0.003	95%	90%	110%	95%	90%	110%	96%	70%	130%
Arsenic	7413129 7	7413129	< 0.003	< 0.003	NA	< 0.003	99%	90%	110%	97%	90%	110%	108%	70%	130%
Barium	7413129 7	7413129	0.060	0.058	3.4%	< 0.002	100%	90%	110%	103%	90%	110%	101%	70%	130%
Beryllium	7413129 7	7413129	< 0.001	< 0.001	NA	< 0.001	104%	90%	110%	105%	90%	110%	112%	70%	130%
Boron	7413129 7	7413129	< 0.010	< 0.010	NA	< 0.010	101%	90%	110%	101%	90%	110%	109%	70%	130%
Cadmium	7413129 7	7413129	< 0.001	< 0.001	NA	< 0.001	97%	90%	110%	93%	90%	110%	110%	70%	130%
Chromium	7413129 7	7413129	< 0.003	< 0.003	NA	< 0.003	100%	90%	110%	96%	90%	110%	101%	70%	130%
Cobalt	7413129 7	7413129	< 0.001	< 0.001	NA	< 0.001	96%	90%	110%	97%	90%	110%	98%	70%	130%
Copper	7413129 7	7413129	< 0.003	< 0.003	NA	< 0.003	99%	90%	110%	99%	90%	110%	98%	70%	130%
Lead	7413129 7	7413129	< 0.002	< 0.002	NA	< 0.002	99%	90%	110%	97%	90%	110%	96%	70%	130%
Manganese	7413129 7	7413129	< 0.002	< 0.002	NA	< 0.002	100%	90%	110%	97%	90%	110%	98%	70%	130%
Mercury	7413129 7			<0.0001	NA	< 0.0001			110%	103%	90%	110%	100%		120%
•															
Molybdenum	7413129 7	7413129	< 0.002	< 0.002	NA	< 0.002	96%	90%	110%	91%	90%	110%	98%	70%	130%

AGAT QUALITY ASSURANCE REPORT (V2)

Page 5 of 9

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation.



#### **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD AGAT WORK ORDER: 16T072717

PROJECT: 300033273 ATTENTION TO: Jim Baxter

SAMPLING SITE: SAMPLED BY:

OAMI LING OTTE.								J/ (IVII		1.					
		V	Vater	Ana	lysis	(Cor	ntinu	ed)							
RPT Date: Mar 01, 2016			С	UPLICATE	Ē		REFEREN	NCE MA	TERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPI	IKE
PARAMETER	PARAMETER Batch		Dup #1	Dup #2	RPD	Method Blank	Measured		ptable nits	Recovery	Lie	ptable mits	Recovery	1 1:	eptable mits
		ld					Value	Lower	Upper		Lower	Upper			Upper
Selenium	7413129	7413129	< 0.004	< 0.004	NA	< 0.004	97%	90%	110%	98%	90%	110%	111%	70%	130%
Silver	7413129	7413129	< 0.002	< 0.002	NA	< 0.002	99%	90%	110%	104%	90%	110%	111%	70%	130%
Strontium	7413129	7413129	0.132	0.130	1.5%	< 0.005	99%	90%	110%	96%	90%	110%	100%	70%	130%
Thallium	7413129	7413129	< 0.006	< 0.006	NA	< 0.006	103%	90%	110%	101%	90%	110%	100%	70%	130%
Tin	7413129	7413129	< 0.002	< 0.002	NA	< 0.002	100%	90%	110%	97%	90%	110%	95%	70%	130%
Titanium	7413129	7413129	< 0.002	< 0.002	NA	< 0.002	97%	90%	110%	93%	90%	110%	95%	70%	130%
Tungsten	7413129	7413129	< 0.010	< 0.010	NA	< 0.010	96%	90%	110%	92%	90%	110%	96%	70%	130%
Uranium	7413129	7413129	< 0.002	< 0.002	NA	< 0.002	99%	90%	110%	95%	90%	110%	92%	70%	130%
Vanadium	7413129	7413129	< 0.002	< 0.002	NA	< 0.002	93%	90%	110%	93%	90%	110%	94%	70%	130%
Zinc	7413129	7413129	0.013	0.012	NA	< 0.005	99%	90%	110%	99%	90%	110%	99%	70%	130%
Zirconium	7413129	7413129	< 0.004	< 0.004	NA	< 0.004	98%	90%	110%	94%	90%	110%	91%	70%	130%

Comments: NA signifies Not Applicable.

Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.



Certified By:

# **Method Summary**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16T072717

PROJECT: 300033273

ATTENTION TO: Jim Baxter

SAMPLING SITE: SAMPLED BY:

SAMPLING SITE.		SAMPLED BY.	
PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis	'		
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Saturation pH		SM 2320 B	CALCULATION
Langelier Index		SM 2330B	CALCULATION
Total Hardness (as CaCO3)	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Bicarbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Carbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Hydroxide (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Fluoride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Reactive Silica	INOR-93-6047	AQ2 EPA-122A & SM 4500 SiO2 D	AQ2 DISCRETE ANALYSER
Ammonia as N	INOR-93-6059	QuikChem 10-107-06-1-J & SM 4500 NH3-F	LACHAT FIA
Total Phosphorus	INOR-93-6057	QuikChem 10-115-01-3-A & SM 4500-P I	LACHAT FIA
Total Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310	SHIMADZU CARBON ANALYZER
Colour	INOR-93-6046	SM 2120 B	SPECTROPHOTOMETER
Turbidity	INOR-93-6044	SM 2130 B	NEPHELOMETER
Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Potassium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Aluminum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Antimony	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Mercury	MET-93-6100	EPA SW 846 7470 & 245.1	CVAAS
Molybdenum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Selenium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Silver	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Strontium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Thallium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Thamain	IVIL 1 -00-0 100	LI A OVV-070 0020A & 200.0	101 1/10



# **Method Summary**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16T072717

PROJECT: 300033273

ATTENTION TO: Jim Baxter

SAMPLING SITE: SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Tin	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Titanium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Tungsten	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Uranium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zirconium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
% Difference/ Ion Balance		SM 1030 E	CALCULATION



Chain



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

5835 Coopers Avenue Work Order #: Laboratory Use Only <u>e</u> 4 十一十二

Samples Balinquished By Print Name and Sign's	TW 11	Sample Identification	AGAT Quote #:  Invoice Information:  Company: Contact: Address: Email:	Project Information:  Project:  Site Location:  Sampled By:  Wexx	1. Email: 1. M. Daxter. 2. Email:	Address: 792 S  Phone: 519 92  Reports to be sent to:	t Information: $\mathcal{L}\mathcal{J}$	<b>Chain of Custody Record</b>	
	Teb. 29, 2016	Date Sampled	PO: Pleass note: If quotation number is not provided, client will be billed full price for analysis  On: Bill To Same: Yes	When is	when is C)	1849 1845	Buinsiel		1
	12:51	Time Sampled	PO: ideal, client will be Bill	7	burns.ch	Aue	1 13	If this is a Dr	
0000	6	# of Containers	ill be billed full price for			· West	Associates	Inking Water	
Time	6w	Sample Matrix	Yes \( \text{No} \( \text{No} \)		0.77	t, uni th	lul	sample, pleas	
Sequiples Revenued By (F)		Comments/ Special Instructions	Sample Matrix Legend B Biota GW Ground Water O Oil P Paint S Soil SD Sediment SW Surface Water	Record of Site Condition?  Yes No	Soil Texture (Check One)  Coarse  Fine		Regulatory Requirements:	If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)	
int Name and Sept			and Inorganics	ndition?	Region		ireme	f Custody For	
		Metal:	Scan Forming Metals	5 3 3	Indicate One	_Sewer Use Sanitary Storm		n (potable	
		ORPs: □ Cr <sup>6+</sup> □ Total	Custom Metals    B-HWS	Report Guideline on Certificate of Analysis  ☐ Yes ※ No	Other	CCME	☐ No Regulatory Requirement	water intended for hu	
		Volatil CCME ABNs	es: UVOC BTEX THM 6	Analysis No	Pr Indicate One	Regulation 558  CCME  Prov. Water Quality Objectives (PWQO)	Requirement	man consumption)	
	I I A	PAHs Chloro PCBs	phenois			Turnaround Regular TAT Rush TAT (Rus	Custod Notes:	Arriva	Coole
			chlorine Pesticides	*TAT	3 Business Days	Turnaround Regular TAT Rush TAT <sub>(Rush</sub>	y y	Arrival Temperatures:	Cooler Quantity:
		Sewer	letals/Inorganics	ease possible seasch	siness	Ser Ser Ser Ser Ser Ser Ser Ser Ser Ser	eal Intact	eratur	tity:
	X		Voite 5	Please provide prior notification for rush TAT *TAT is exclusive of weekends and statutory holidays	Days	Turnaround Time (TAT) Required: Regular TAT (Rush Surcharges Apply)	tt \ □Yes	1 × × × × × × × × × × × × × × × × × × ×	
Dan				tification	2 Business Days	equi		7	
				n for rush TA:	Day Day	ed:	No	0 0	
				T Idays	1 Business Day		□ N/A	ف	

Pink Copy - Client | Yellow Copy - AGAT | White Copy - AGAT

.431



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD 292 Speedvale Avenue West, Unit 7

Guelph, ON N1H1C4 (519) 823-4995

ATTENTION TO: Dwight Smikle

PROJECT: 300033273

AGAT WORK ORDER: 16T101841

WATER ANALYSIS REVIEWED BY: Mike Muneswar, BSc (Chem), Senior Inorganic Analyst

DATE REPORTED: Jun 17, 2016

PAGES (INCLUDING COVER): 8

VERSION\*: 1

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

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

**AGAT** Laboratories (V1)

\*NOTEO

Page 1 of 8



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

#### Certificate of Analysis

AGAT WORK ORDER: 16T101841

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLED BY:

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

#### Water Quality Assessment - Groundwater Samples

DATE RECEIVED: 2016-06-06	i							DATE REPORTED	: 2016-06-08
	SA	AMPLE DESCRIPTION: SAMPLE TYPE:	TW2 Water	TW6 Water	TW5 Water	TW8 Water	TW9 Water	TW11 Water	
Parameter	Unit	DATE SAMPLED: G/S RDL	6/2/2016 7607710	6/2/2016 7607713	6/2/2016 7607719	6/2/2016 7607726	6/2/2016 7607733	6/2/2016 7607739	
Electrical Conductivity	uS/cm	2	526	585	606	627	601	572	
pH	pH Units	NA	8.03	8.07	8.10	8.17	8.10	8.08	
Saturation pH	p		6.97	6.96	6.99	6.95	6.95	6.95	
Langelier Index			1.06	1.11	1.11	1.22	1.15	1.13	
Total Hardness (as CaCO3)	mg/L	0.5	276	303	298	324	314	289	
Total Dissolved Solids	mg/L	20	290	326	326	358	334	300	
Alkalinity (as CaCO3)	mg/L	5	264	261	251	251	257	262	
Bicarbonate (as CaCO3)	mg/L	5	264	261	251	251	257	262	
Carbonate (as CaCO3)	mg/L	5	<5	<5	<5	<5	<5	<5	
Hydroxide (as CaCO3)	mg/L	5	<5	<5	<5	<5	<5	<5	
Fluoride	mg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
Chloride	mg/L	0.20	5.59	15.2	24.3	11.0	9.32	18.4	
Nitrate as N	mg/L	0.10	1.18	6.32	6.72	5.35	2.99	3.00	
Nitrite as N	mg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
Bromide	mg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
Sulphate	mg/L	0.20	19.0	16.4	16.8	58.0	50.5	17.3	
Ortho Phosphate as P	mg/L	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	
Reactive Silica	mg/L	0.05	9.90	7.14	7.49	7.75	8.60	7.67	
Ammonia as N	mg/L	0.02	<0.02	<0.02	< 0.02	< 0.02	< 0.02	< 0.02	
Total Phosphorus	mg/L	0.05	< 0.05	<0.05	< 0.05	0.05	< 0.05	< 0.05	
Total Organic Carbon	mg/L	0.5	0.7	0.5	<0.5	0.7	0.6	1.1	
Colour	TCU	5	<5	<5	<5	<5	<5	<5	
Turbidity	NTU	0.5	6.4	3.7	2.5	53.6	3.5	10.2	
Calcium	mg/L	0.05	73.3	83.2	81.5	88.3	82.5	78.3	
Magnesium	mg/L	0.05	22.6	23.1	23.0	25.1	26.2	22.8	
Sodium	mg/L	0.05	2.65	5.15	9.66	4.72	3.91	7.26	
Potassium	mg/L	0.05	1.03	0.89	0.91	1.34	0.98	0.99	
Aluminum	mg/L	0.004	0.006	0.009	0.006	0.011	< 0.004	<0.004	
Antimony	mg/L	0.003	<0.003	<0.003	< 0.003	<0.003	< 0.003	<0.003	
Arsenic	mg/L	0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	

Certified By:

Wate Muneman



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

#### Certificate of Analysis

AGAT WORK ORDER: 16T101841

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLED BY:

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

Water Quality Assessment - Groundwater Samples

		· · · · · · · · · · · · · · · · · · ·	Quality 7		Ordanawa	ator Gampiot			
DATE RECEIVED: 2016-06-06								DATE REPORTED: 20	016-06-08
		SAMPLE DESCRIPTION:	TW2	TW6	TW5	TW8	TW9	TW11	
		SAMPLE TYPE:	Water	Water	Water	Water	Water	Water	
		DATE SAMPLED:	6/2/2016	6/2/2016	6/2/2016	6/2/2016	6/2/2016	6/2/2016	
Parameter	Unit	G/S RDL	7607710	7607713	7607719	7607726	7607733	7607739	
Barium	mg/L	0.002	0.063	0.101	0.112	0.087	0.069	0.056	
Beryllium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Boron	mg/L	0.010	0.012	0.012	0.011	0.025	0.013	0.010	
Cadmium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Chromium	mg/L	0.003	<0.003	< 0.003	< 0.003	<0.003	<0.003	< 0.003	
Cobalt	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper	mg/L	0.003	<0.003	< 0.003	< 0.003	<0.003	< 0.003	< 0.003	
Iron	mg/L	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Lead	mg/L	0.002	< 0.002	<0.002	<0.002	<0.002	< 0.002	<0.002	
Manganese	mg/L	0.002	0.004	<0.002	< 0.002	0.005	< 0.002	<0.002	
Mercury	mg/L	0.0001	< 0.0001	<0.0001	<0.0001	<0.0001	< 0.0001	<0.0001	
Molybdenum	mg/L	0.002	< 0.002	<0.002	<0.002	<0.002	< 0.002	<0.002	
Nickel	mg/L	0.003	<0.003	< 0.003	<0.003	<0.003	<0.003	< 0.003	
Selenium	mg/L	0.004	< 0.004	<0.004	<0.004	<0.004	< 0.004	<0.004	
Silver	mg/L	0.002	< 0.002	<0.002	<0.002	< 0.002	< 0.002	<0.002	
Strontium	mg/L	0.005	0.122	0.132	0.153	1.42	0.296	0.123	
Thallium	mg/L	0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	
Tin	mg/L	0.002	< 0.002	<0.002	<0.002	<0.002	< 0.002	<0.002	
Titanium	mg/L	0.002	< 0.002	<0.002	<0.002	<0.002	< 0.002	<0.002	
Tungsten	mg/L	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Jranium	mg/L	0.002	< 0.002	<0.002	<0.002	<0.002	< 0.002	<0.002	
Vanadium	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.002	
Zinc	mg/L	0.005	0.010	0.035	0.026	0.023	0.031	0.024	
Zirconium	mg/L	0.004	<0.004	<0.004	<0.004	<0.004	< 0.004	<0.004	
% Difference/ Ion Balance	%	NA	2.23	1.11	1.02	1.52	1.52	1.67	

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

7607710-7607739 Samples required dilution prior to analysis for Anions due to the presence of non-target lons; the RDLs were adjusted to reflect the dilution.

Certified By:

Mile Muneman



PROJECT: 300033273

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

ATTENTION TO: Dwight Smikle

# **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD AGAT WORK ORDER: 16T101841

SAMPLING SITE: SAMPLED BY:

SAMPLING SITE.							JAIVIP	LED D	1.					
			Wate	er Ar	nalys	is								
RPT Date:		1	DUPLICATE			REFEREN	REFERENCE MATERIAL		METHOD	BLAN	K SPIKE	MAT	RIX SPI	KE
PARAMETER	Batch Sampl	e Dup #1	Dup #2	RPD	Method Blank	Measured Value		eptable mits	Recovery	Acceptable Limits		Recovery	Liv	ptable
						1	Lower	Upper		Lower	Upper		Lower	Upper
Water Quality Assessment - G	Froundwater Samples													
Electrical Conductivity	7607726 7607726	627	630	0.5%	< 2	100%	80%	120%	NA			NA		
рН	7607726 7607726	8.17	8.11	0.7%	NA	100%	90%	110%	NA			NA		
Total Dissolved Solids	7606122	858	906	5.4%	< 20	114%	80%	120%	NA			NA		
Alkalinity (as CaCO3)	7607726 7607726	251	262	4.3%	< 5	102%	80%	120%	NA			NA		
Bicarbonate (as CaCO3)	7607726 7607726	251	262	4.3%	< 5	NA			NA			NA		
Carbonate (as CaCO3)	7607726 7607726	< 5	<5	NA	< 5	NA			NA			NA		
Hydroxide (as CaCO3)	7607726 7607726	< 5	<5	NA	< 5	NA			NA			NA		
Fluoride	7607427	<0.10	<0.10	NA	< 0.05	98%	90%	110%	97%	90%	110%	94%	80%	120%
Chloride	7607427	122	117	4.2%	< 0.10	91%	90%	110%	108%	90%	110%	NA	80%	120%
Nitrate as N	7607427	0.73	0.73	0.0%	< 0.05	92%	90%	110%	90%	90%	110%	95%	80%	120%
Nitrite as N	7607427	<0.10	<0.10	NA	< 0.05	NA	90%	110%	96%	90%	110%	85%	80%	120%
Bromide	7607427	<0.10	<0.10	NA	< 0.05	104%	90%	110%	104%	90%	110%	102%	80%	120%
Sulphate	7607427	28.2	28.2	0.0%	< 0.10	105%	90%	110%	100%	90%	110%	101%	80%	120%
Ortho Phosphate as P	7607427	< 0.20	<0.20	NA	< 0.10	107%	90%	110%	106%	90%	110%	116%	80%	120%
Ammonia as N	7605143	<0.02	<0.02	NA	< 0.02	90%	90%	110%	97%	90%	110%	95%	80%	120%
Total Phosphorus	7602935	0.44	0.43	2.3%	< 0.05	101%	80%	120%	95%	90%	110%	101%	70%	130%
Total Organic Carbon	7603116	2.7	2.6	3.8%	< 0.5	98%	90%	110%	92%	90%	110%	97%		120%
Colour	7595900	60	63	4.9%	< 5	101%	90%	110%	NA			NA		
Turbidity	7606359	<0.5	<0.5	NA	< 0.5	103%	90%	110%	NA			NA		
Calcium	7607710 7607710	73.3	74.7	1.9%	< 0.05	102%	90%	110%	101%	90%	110%	97%	70%	130%
Magnesium	7607710 7607710	22.6	23.0	1.8%	< 0.05	99%	90%	110%	97%	90%	110%	98%	70%	130%
Sodium	7607710 7607710	2.65	2.63	0.8%	< 0.05	96%	90%	110%	97%	90%	110%	94%	70%	130%
Potassium	7607710 7607710	1.03	1.02	1.0%	< 0.05	93%	90%	110%	94%	90%	110%	92%	70%	130%
Aluminum	7607710 7607710	0.006	0.009	NA	< 0.004	104%	90%	110%	98%	90%	110%	105%	70%	130%
Antimony	7607710 7607710	< 0.003	<0.003	NA	< 0.003	99%	90%	110%	93%	90%	110%	102%	70%	130%
Arsenic	7607710 7607710	< 0.003	<0.003	NA	< 0.003	104%	90%	110%	99%	90%	110%	107%	70%	130%
Barium	7607710 7607710	0.063	0.062	1.6%	< 0.002		90%	110%	99%	90%	110%	105%	70%	130%
Beryllium	7607710 7607710		<0.001	NA	< 0.001		90%	110%	100%	90%	110%	111%	70%	130%
Boron	7607710 7607710	0.012	0.011	NA	< 0.010	110%	90%	110%	103%	90%	110%	110%	70%	130%
Cadmium	7607710 7607710	< 0.001	<0.001	NA	< 0.001	100%	90%	110%	99%	90%	110%	118%	70%	130%
Chromium	7607710 7607710	< 0.003	<0.003	NA	< 0.003	104%	90%	110%	98%	90%	110%	105%	70%	130%
Cobalt	7607710 7607710		<0.001	NA	< 0.001			110%	99%	90%	110%	106%		130%
Copper	7607710 7607710		< 0.003	NA	< 0.003			110%	99%	90%	110%	105%		130%
Iron	7607710 7607710		<0.010	NA	< 0.010			110%	91%	90%	110%	94%		130%
Lead	7607710 7607710		<0.002	NA	< 0.002			110%	94%	90%	110%	98%		130%
Manganese	7607710 7607710	0.004	0.004	NA	< 0.002	104%	90%	110%	99%	90%	110%	108%	70%	130%
•														
•														
•														
Mercury Molybdenum Nickel	7607710 7607710 7607710 7607710 7607710 7607710	< 0.002	<0.0001 <0.002 <0.003	NA NA NA	< 0.000° < 0.002 < 0.003	101%	90%	110% 110% 110%	98% 94% 101%	90% 90% 90%	110% 110% 110%	101% 105% 107%	80% 70% 70%	

AGAT QUALITY ASSURANCE REPORT (V1)

Page 4 of 8

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation.



#### **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16T101841

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLING SITE: SAMPLED BY:

G. (17)1 220 51.												
Continued)												
REFERENCE MATERIAL METHOD BLANK SPIKE MATRIX SPIKE												
thod Measured Limits Recovery Recovery Recovery Recovery Recovery Recovery												
Lower Upper Lower Upper Lower Upper												
0.004 102% 90% 110% 97% 90% 110% 110% 70% 130%												
0.002 104% 90% 110% 109% 90% 110% 120% 70% 130%												
0.005 105% 90% 110% 97% 90% 110% 106% 70% 130%												
0.006 106% 90% 110% 106% 90% 110% 109% 70% 130%												
0.002 101% 90% 110% 97% 90% 110% 105% 70% 130%												
0.002 106% 90% 110% 95% 90% 110% 102% 70% 130%												
0.010 106% 90% 110% 100% 90% 110% 100% 70% 130%												
0.002 106% 90% 110% 92% 90% 110% 98% 70% 130%												
0.002 100% 90% 110% 95% 90% 110% 101% 70% 130%												
2005 4040/ 200/ 4400/ 200/ 4400/ 4000/ 700/ 4000/												
0.005 101% 90% 110% 96% 90% 110% 102% 70% 130%												
0.003 0.003 0.003 0.003 0.003 0.003												

Comments: NA signifies Not Applicable.

Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By:

Make Muneman

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16T101841

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLING SITE: SAMPLED BY:

SAMPLING SITE.		SAMPLED BY.	
PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis	•	,	
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Saturation pH		SM 2320 B	CALCULATION
Langelier Index		SM 2330B	CALCULATION
Total Hardness (as CaCO3)	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Bicarbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Carbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Hydroxide (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Fluoride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Reactive Silica	INOR-93-6047	AQ2 EPA-122A & SM 4500 SiO2 D	AQ2 DISCRETE ANALYSER
Ammonia as N	INOR-93-6059	QuikChem 10-107-06-1-J & SM 4500 NH3-F	LACHAT FIA
Total Phosphorus	INOR-93-6057	QuikChem 10-115-01-3-A & SM 4500-P I	LACHAT FIA
Total Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310	SHIMADZU CARBON ANALYZER
Colour	INOR-93-6046	SM 2120 B	SPECTROPHOTOMETER
Turbidity	INOR-93-6044	SM 2130 B	NEPHELOMETER
Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Potassium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Aluminum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Antimony	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
lron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Mercury	MET-93-6100	EPA SW 846 7470 & 245.1	CVAAS
Molybdenum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Selenium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Silver	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Strontium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Thallium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS



# **Method Summary**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16T101841

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLING SITE: SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Tin	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Titanium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Tungsten	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Uranium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zirconium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
% Difference/ Ion Balance		SM 1030 E	CALCULATION

□N/A



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
292 Speedvale Avenue West, Unit 7

Guelph, ON N1H1C4 (519) 823-4995

ATTENTION TO: Jim Baxter

PROJECT: 300033273

AGAT WORK ORDER: 16W073428

WATER ANALYSIS REVIEWED BY: Mike Muneswar, BSc (Chem), Senior Inorganic Analyst

DATE REPORTED: Mar 03, 2016

PAGES (INCLUDING COVER): 9

VERSION\*: 1

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

NOTES

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

AGAT Laboratories (V1)

\*NOTEO

Page 1 of 9

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CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

#### Certificate of Analysis

AGAT WORK ORDER: 16W073428

PROJECT: 300033273

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

ATTENTION TO: Jim Baxter

SAMPLED BY:

					Nitrate (Water)
DATE RECEIVED: 2016-03-02	) :				DATE REPORTED: 2016-03-03
		SAMPLE DES	CRIPTION:	TW12N	
		SAMI	PLE TYPE:	Water	
		DATE S	SAMPLED:	3/1/2016	
Parameter	Unit	G/S	RDL	7417866	
Nitrate as N	mg/L		0.25	<0.25	

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

7417866 Sample required dilution prior to analysis for Nitrate due to the presence of non-target Anions; the RDL was adjusted accordingly.

Certified By:





#### Certificate of Analysis

AGAT WORK ORDER: 16W073428

PROJECT: 300033273

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

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

ATTENTION TO: Jim Baxter SAMPLED BY:

			Wa	ter Quality Assessment
DATE RECEIVED: 2016-03-02				DATE REPORTED: 2016-03-03
		AMPLE DESCRIPTION: SAMPLE TYPE: DATE SAMPLED:	TW12 Water 3/1/2016	
Parameter	Unit	G/S RDL	7417874	
Electrical Conductivity	uS/cm	2	1740	
pH	pH Units	NA	7.92	
Saturation pH			6.60	
Langelier Index		0.5	1.32	
Total Hardness (as CaCO3)	mg/L	0.5	1010	
Total Dissolved Solids	mg/L	20	1480	
Alkalinity (as CaCO3)	mg/L	5	195	
Bicarbonate (as CaCO3)	mg/L	5	195	
Carbonate (as CaCO3)	mg/L	5	<b>&lt;</b> 5	
Hydroxide (as CaCO3)	mg/L	5	<5	
Fluoride	mg/L	0.25	<0.25	
Chloride	mg/L	0.50	2.30	
Nitrate as N	mg/L	0.25	<0.25	
Nitrite as N	mg/L	0.25	<0.25	
Bromide	mg/L	0.25	<0.25	
Sulphate	mg/L	2.0	875	
Ortho Phosphate as P	mg/L	0.50	<0.50	
Reactive Silica	mg/L	0.05	14.2	
Ammonia as N	mg/L	0.02	0.08	
Total Phosphorus	mg/L	0.05	<0.05	
Total Organic Carbon	mg/L	0.5	<0.5	
Colour	TCU	5	<5	
Turbidity	NTU	0.5	5.0	
Calcium	mg/L	0.10	320	
Magnesium	mg/L	0.10	51.6	
Sodium	mg/L	0.10	7.51	
Potassium	mg/L	0.10	1.91	
Aluminum	mg/L	0.004	< 0.004	
Antimony	mg/L	0.003	<0.003	
Arsenic	mg/L	0.003	0.013	

Certified By:

Mile Munemon



Certificate of Analysis

AGAT WORK ORDER: 16W073428

PROJECT: 300033273

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

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

ATTENTION TO: Jim Baxter

SAMPLED BY:

Water Quality Assessment

DATE REPORTED: 2016-03

DATE RECEIVED: 2016-03-02	2			DATE REPORTED: 2016-03-03
	S	SAMPLE DESCRIPTION:	TW12	
		SAMPLE TYPE:	Water	
		DATE SAMPLED:	3/1/2016	
Parameter	Unit	G/S RDL	7417874	
Barium	mg/L	0.002	0.005	
Beryllium	mg/L	0.001	< 0.001	
Boron	mg/L	0.010	0.055	
Cadmium	mg/L	0.001	<0.001	
Chromium	mg/L	0.003	< 0.003	
Cobalt	mg/L	0.001	< 0.001	
Copper	mg/L	0.003	< 0.003	
Iron	mg/L	0.010	0.401	
_ead	mg/L	0.002	< 0.002	
Manganese	mg/L	0.002	0.026	
Mercury	mg/L	0.0001	<0.0001	
Molybdenum	mg/L	0.002	0.004	
Nickel	mg/L	0.003	< 0.003	
Selenium	mg/L	0.004	< 0.004	
Silver	mg/L	0.002	< 0.002	
Strontium	mg/L	0.005	3.52	
Γhallium	mg/L	0.006	< 0.006	
Tin	mg/L	0.002	< 0.002	
Titanium	mg/L	0.002	0.012	
Tungsten	mg/L	0.010	<0.010	
Jranium	mg/L	0.002	< 0.002	
/anadium	mg/L	0.002	<0.002	
Zinc	mg/L	0.005	0.036	
Zirconium	mg/L	0.004	<0.004	
% Difference/ Ion Balance	%	NA	3.66	

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

7417874 Sample required dilution prior to analysis for Anions & Cations in order to keep the analytes within the calibration range of the instruments and/or to minimize any matrix interferences; the RDLs were

adjusted accordingly.

Certified By:

Make Muneman



## **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD AGAT WORK ORDER: 16W073428

PROJECT: 300033273 ATTENTION TO: Jim Baxter

SAMPLING SITE: SAMPLED BY:

SAMPLING SITE.								)/\IVIF	LED D	1.					
				Wate	er An	alys	is								
RPT Date: Mar 03, 2016			С	UPLICATE			REFEREN	NCE MA	TERIAL	METHOD	BLAN	K SPIKE	MAT	RIX SPI	KE
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Lir	eptable mits	Recovery	Lir	eptable mits	Recovery	Lir	ptable nits
								Lower	Upper		Lower	Upper		Lower	Upper
Water Quality Assessment															
Electrical Conductivity	7415208		751	751	0.0%	< 2	102%	80%	120%	NA			NA		
pH	7415208		7.85	7.87	0.3%	NA	100%	90%	110%	NA			NA		
Total Dissolved Solids	7417874 7	417874	1480	1270	15.3%	< 20	98%	80%	120%	NA			NA		
Alkalinity (as CaCO3)	7415208		102	104	1.9%	< 5	101%	80%	120%	NA			NA		
Bicarbonate (as CaCO3)	7415208		102	104	1.9%	< 5	NA			NA			NA		
Carbonate (as CaCO3)	7415208		<5	<5	NA	< 5	NA			NA			NA		
Hydroxide (as CaCO3)	7415208		<5	<5	NA	< 5	NA			NA			NA		
Fluoride	7411105		<0.5	< 0.5	NA	< 0.05	107%	90%	110%	109%	90%	110%	99%	80%	120%
Chloride	7411105		171	172	0.6%	< 0.10	102%	90%	110%	107%	90%	110%	95%	80%	120%
Nitrate as N	7411105		<0.5	<0.5	NA	< 0.05	93%	90%	110%	102%	90%	110%	105%	80%	120%
Nitrite as N	7411105		<0.5	<0.5	NA	. 0.05	NA	90%	110%	94%	90%	110%	90%	80%	120%
Bromide	7411105		<0.5	<0.5 <0.5	NA	< 0.05	109%	90%	110%	104%	90%	110%	89%	80%	120%
Sulphate	7411105		<1.0	<0.5 <1.0	NA	< 0.05	96%	90%	110%	104%	90%	110%	95%	80%	120%
Ortho Phosphate as P	7411105		<1.0 <1.0	<1.0 <1.0	NA NA	< 0.10 < 0.10	93%	90%	110%	100%	90%	110%	95% 94%	80%	120%
Reactive Silica	7411103		1.97	2.00	1.5%	< 0.10	98%	90%	110%	101%	90%	110%	93%	80%	
	022.0			2.00	1.070	10.00	0070	0070	,	.0.70	0070	,	0070	0070	0,0
Ammonia as N	7417865		0.06	0.06	NA	< 0.02	103%	90%	110%	102%	90%	110%	94%	80%	120%
Total Phosphorus	7417874 7	417874	< 0.05	<0.05	NA	< 0.05	103%	80%	120%	98%	90%	110%	101%	70%	130%
Total Organic Carbon	7417874 7		< 0.5	<0.5	NA	< 0.5	96%	90%		92%	90%	110%	99%	80%	120%
Colour	7417874 7		< 5	<5	NA	< 5	100%	90%	110%	NA			NA		
Turbidity	7417874 7	417874	5.0	4.8	4.1%	< 0.5	104%	90%	110%	NA			NA		
Calcium	7413138		17.0	16.7	1.8%	< 0.05	103%	90%	110%	105%	90%	110%	100%	70%	130%
Magnesium	7413138		3.77	3.75	0.5%	< 0.05	97%	90%	110%	99%	90%	110%	100%	70%	130%
Sodium	7413138		80.8	81.6	1.0%	< 0.05	101%	90%	110%	98%	90%	110%	97%	70%	130%
Potassium	7413138		0.79	0.79	0.0%	< 0.05	99%	90%	110%	98%	90%	110%	97%	70%	130%
Aluminum	7417874 7	417874	< 0.004	<0.004	NA	< 0.004	102%	90%	110%	110%	90%	110%	101%	70%	130%
Antimony	7417874 7	117071	< 0.003	<0.003	NA	< 0.003	102%	90%	110%	98%	90%	110%	96%	70%	130%
Arsenic	7417874 7		0.013	0.013	NA	< 0.003		90%	110%	103%	90%	110%	107%	70%	130%
Barium	7417874 7		0.013	0.013	NA	< 0.003		90%	110%	99%	90%	110%	94%	70%	130%
Beryllium	7417874 7		< 0.003	< 0.003	NA	< 0.002	103%	90%	110%	106%	90%	110%	106%	70%	130%
Boron	7417874 7		0.055	0.058	5.3%	< 0.001		90%		104%	90%	110%	101%	70%	
Cadmium	7417874 7			<0.001	NA	< 0.001	102%		110%	100%			103%		130%
Chromium	7417874 7	417874	< 0.003	<0.003	NA	< 0.003			110%	102%	90%	110%	97%		130%
Cobalt	7417874 7		< 0.001	<0.001	NA	< 0.001	107%		110%	102%	90%	110%	98%		130%
Copper	7417874 7		< 0.003	<0.003	NA	< 0.003			110%	102%	90%	110%	96%		130%
Iron	7417874 7	417874	0.401	0.400	0.2%	< 0.010	107%	90%	110%	102%	90%	110%	87%	70%	130%
Lead	7417874 7	417874	< 0.002	<0.002	NA	< 0.002	100%	90%	110%	97%	90%	110%	90%	70%	130%
Manganese	7417874 7	417874	0.026	0.025	3.9%	< 0.002			110%	103%	90%	110%	101%	70%	130%
Mercury	7417874 7	417874	<0.0001	<0.0001	NA	< 0.0001	l 99%		110%	101%	90%	110%	93%	80%	120%
Molybdenum	7417874 7		0.004	0.004	NA	< 0.002			110%	93%		110%	91%		130%
•		•	-												

AGAT QUALITY ASSURANCE REPORT (V1)

Page 5 of 9

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation.



## **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD AGAT WORK ORDER: 16W073428

PROJECT: 300033273 ATTENTION TO: Jim Baxter SAMPLING SITE: SAMPLED BY:

SAMI LING SITE.								ו וועוריע		1.					
		V	Vater	Ana	lysis	(Cor	ntinu	ed)							
RPT Date: Mar 03, 2016				UPLICATI		REFERENCE MATERIAL		METHOD	BLANK	SPIKE	MATRIX SPIKE				
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	1 1 1 1 1	ptable nits	Recovery	1 1 1 1 1	eptable mits
		ld					value	Lower	Upper		Lower	Upper		Lower	Upper
Nickel	7417874	7417874	< 0.003	<0.003	NA	< 0.003	105%	90%	110%	100%	90%	110%	95%	70%	130%
Selenium	7417874	7417874	< 0.004	<0.004	NA	< 0.004	104%	90%	110%	102%	90%	110%	112%	70%	130%
Silver	7417874	7417874	< 0.002	< 0.002	NA	< 0.002	104%	90%	110%	108%	90%	110%	110%	70%	130%
Strontium	7417874	7417874	3.52	3.55	0.8%	< 0.005	99%	90%	110%	97%	90%	110%	85%	70%	130%
Thallium	7417874	7417874	< 0.006	<0.006	NA	< 0.006	107%	90%	110%	106%	90%	110%	100%	70%	130%
Tin	7417874	7417874	< 0.002	<0.002	NA	< 0.002	99%	90%	110%	99%	90%	110%	95%	70%	130%
Titanium	7417874	7417874	0.012	0.012	0.0%	< 0.002	106%	90%	110%	103%	90%	110%	96%	70%	130%
Tungsten	7417874	7417874	< 0.010	<0.010	NA	< 0.010	93%	90%	110%	91%	90%	110%	91%	70%	130%
Uranium	7417874	7417874	< 0.002	< 0.002	NA	< 0.002	103%	90%	110%	97%	90%	110%	92%	70%	130%
Vanadium	7417874	7417874	< 0.002	< 0.002	NA	< 0.002	107%	90%	110%	103%	90%	110%	97%	70%	130%
Zinc	7417874	7417874	0.036	0.036	0.0%	< 0.005	105%	90%	110%	104%	90%	110%	110%	70%	130%
Zirconium	7417874	7417874	< 0.004	<0.004	NA	< 0.004	98%	90%	110%	94%	90%	110%	91%	70%	130%

Comments: NA signifies Not Applicable.

Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By:

Mile Muneman

# **Method Summary**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16W073428
PROJECT: 300033273

ATTENTION TO: Jim Baxter

SAMPLING SITE: SAMPLED BY:

SAMPLING SITE.		SAMPLED BY.	
PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis	'		
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Saturation pH		SM 2320 B	CALCULATION
Langelier Index		SM 2330B	CALCULATION
Total Hardness (as CaCO3)	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Bicarbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Carbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Hydroxide (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Fluoride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Reactive Silica	INOR-93-6047	AQ2 EPA-122A & SM 4500 SiO2 D	AQ2 DISCRETE ANALYSER
Ammonia as N	INOR-93-6059	QuikChem 10-107-06-1-J & SM 4500 NH3-F	LACHAT FIA
Total Phosphorus	INOR-93-6057	QuikChem 10-115-01-3-A & SM 4500-P I	LACHAT FIA
Total Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310	SHIMADZU CARBON ANALYZER
Colour	INOR-93-6046	SM 2120 B	SPECTROPHOTOMETER
Turbidity	INOR-93-6044	SM 2130 B	NEPHELOMETER
Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Potassium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Aluminum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Antimony	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Mercury	MET-93-6100	EPA SW 846 7470 & 245.1	CVAAS
Molybdenum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Selenium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Silver	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Strontium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Thallium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Thamain	IVIL 1 -00-0 100	LI A OVV-070 0020A & 200.0	101 1/10



## Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16W073428
PROJECT: 300033273

ATTENTION TO: Jim Baxter

SAMPLING SITE: SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Tin	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Titanium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Tungsten	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Uranium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zirconium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
% Difference/ Ion Balance		SM 1030 E	CALCULATION



Samples Relinquished By (Print Name and Sign):    Mark   M	Sample Identification  Sampled  Sampled  Sampled  Sampled  Containers  Match 1, 141.00  Match 1, 141.00  Containers	Invoice Information:  Company: Contact: Address: Email:	Project Information:  Project:	Company: Contact:  The Bursh Association  Address:  2945 Pleated Ave. WS +  Reports to be sent to:  1. Email:  2. Email:  Physical Association  The Bursh Association  The Bursh Association  The Bursh Association  Fex:  Phone:  Reports to be sent to:  1. Email:  The Bursh Association  Fex:  Phone:  Reports to be sent to:  The Bursh Association  Fex:	Chain of Custody Record If this is a Drinking water Report Information:
Time	s Matrix	Yes Ø No □	for analysis.	S bold	aboratories
Samples Received By (Print Name and Sign):  Samples Received By Print Name and Sign):  Samples Received By Print Name and Sign):	Meta Hydr Clier ORP □ Cr □ To Nutr □ Not Vola	Sediment  Sedime	ls this submission for a  Record of Site Condition?  ☐ Yes ☐ Yes ☐ No ☐ Yes ☐ No ☐ Certificate of Analysis ☐ No ☐ Yes ☐ (Check Applicable)	er Use nitary orm	Laboratories  Ph: 905/712,5100 Fax: 905/712,5122  webearth.agatlabs.com  If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)  Regulatory Requirements:  No Regulatory Requirement
Uare 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	PCB: Orga TCLF Sew	s prophenols	Please provide prior notification for rush TAT TAT is exclusive of weekends and statutory holidays	Notes: On Table Page Bouring (TAT) Required:  Regular TAT	Work Order #: 100000  Cooler Quantity: Arrival Temperatures: Custody Seal Intact:

Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
292 Speedvale Avenue West, Unit 7

Guelph, ON N1H1C4 (519) 823-4995

ATTENTION TO: Jim Baxter

PROJECT: 320033273

AGAT WORK ORDER: 16W074674

WATER ANALYSIS REVIEWED BY: Parvathi Malemath, Data Reviewer

DATE REPORTED: Mar 09, 2016

PAGES (INCLUDING COVER): 5

VERSION\*: 1

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

NOTES

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

**AGAT** Laboratories (V1)

\*NOTEO

Page 1 of 5



Certificate of Analysis

AGAT WORK ORDER: 16W074674

PROJECT: 320033273

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

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

ATTENTION TO: Jim Baxter SAMPLED BY:MV

					Nitrate (V	Vater)	
DATE RECEIVED: 2016-03-08							DATE REPORTED: 2016-03-09
		SAMPLE DES	CRIPTION:	TW4	TW11	TW8	
		SAM	PLE TYPE:	Water	Water	Water	
		DATE	SAMPLED:	3/7/2016	3/7/2016	3/7/2016	
Parameter	Unit	G/S	RDL	7426607	7426610	7426611	
Nitrate as N	mg/L				5.03	7.76	

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

CHARTERED OF CHARTERED OF CHEMIST



## **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD AGAT WORK ORDER: 16W074674

PROJECT: 320033273 ATTENTION TO: Jim Baxter SAMPLING SITE: SAMPLED BY:MV

	Water Analysis														
RPT Date: Mar 09, 2016			DUPLICATE				REFEREN	ICE MA	TERIAL	METHOD	BLANK	SPIKE	MATRIX SPIKE		
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured		otable nits	Recovery	Accep Lim		Recovery	Acceptable Limits	
	PARAMETER Batch   Dup #1   Dup #2				Value	Lower	Upper	,	Lower	Upper		Lower	Upper		

Nitrate (Water)

Nitrate as N 7427214 3.61 3.59 0.6% < 0.05 104% 90% 110% 109% 90% 110% 101% 80% 120%

CHEMIST OF CHEMIST

Certified By:



# **Method Summary**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16W074674

PROJECT: 320033273

ATTENTION TO: Jim Baxter

SAMPLING SITE:

SAMPLED BY:MV

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH



# A GAL

5835 Coopers Avenue Mississauga, Ontario L4Z 1Y2

Laboratory Use Only

Samples Relinquished By (Print, Name and Sign):  Mat Vo Wi St			Tu S	Twi	TWY	Sample Identification	Report Information: Company: Contact: Address: Phone: Reports to be sent to: 1. Email: 2. Email: Project Information: Project: Site Location: Sampled By: AGAT Quote #: Please Invoice Information: Company: Contact: Address: Email:	Chain of Cu	
Name and Signt:						tification	ation: NY B  A Jim but  Ludy Sta  Ludy Sta  Ludy Sta  Rease note: If quotatic  Please note: If quotatic	<b>Custody Record</b>	29
B			12	11	March. 7.16	Date Sampled	an number is not pro		5
						Time Sampled	Fax: PO: Bill	If this is a Dri	
Mark 1846						# of Containers	Bill To Same: Yes	nking Water s	Lal
Time			600	6w	600	Sample Matrix	t with toranalysis.  Yes   No	ample, please	orat
Samples Received By (Print Name app Sign)		4				Comments/ Special Instructions	Regulatory Requirements:    Regulatory Requirements:   Sew     Regulation 153/04   Sew     Table   Indicate One   Indicate One     Check One)   Region   Start     Check One)   Region   Indicate One     Soil Texture (Check One)   Region   Indicate One     Check One)   Region   Indicate One     Sample Matrix   Legend     B Biota   Legend     B Biota   Canada Water   Condition?     P Paint   Soil     P Paint   Soil     P Paint   Soil     SD Sediment   Canada Water     SB Soil   Soil     SB Soil   Sediment   Canada Water     Check One)   Region   Indicate One     Sample Matrix   Canada Water     Check One)   Indicate One     Sample Matrix   Canada Water     Check One)   Indicate One     Sample Matrix   Canada Water     Check One)   Indicate One     Sample Matrix   Canada Water     Sample Matrix   Canada Water     Check One)   Indicate One     Sample Matrix   Canada Water     Check One)   Indicate One     Sample Matrix   Canada Water     Check One)   Indicate One     Sample Matrix   Canada Water     Check One)   Indicate One     Sample Matrix   Canada Water     Check One)   Indicate One     Sample Matrix   Canada Water     Check One)   Indicate One     Sample Matrix   Canada Water     Check One)   Indicate One     Sample Matrix   Canada Water     Check One)   Indicate One     Sample Matrix   Canada Water     Sample Matrix   Canada Water     Check One)   Indicate One     Sample Matrix   Canada Water     Sample Matrix   Check One)     Sample Matrix   Canada Water     Sample Matrix   Check One)     Sample Matrix   Canada Water     Sample Matrix   Check One)     Sample Matrix   Check One)     Sample Matrix   Check One)     Sample Matrix   Check One)     Sample Matrix   Check One)     Sample Matrix   Check One)     Sample Matrix   Check One)     Sample Matrix   Check One)     Sample Matrix   Check One)     Sample Matrix   Check One)     Sample Matrix   Check One)     Sample Matrix   Check One)     Sample Matrix   Check One)     Sample Matrix   Check One)     Sample Matrix   Check One)     Sample Matrix   Check One)     S	If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water	aboratories
75						Metal	orm ita	tody Form (po	
Date Soll of Date						ORPs: Cr <sup>6+</sup> Tota Nutries NO <sub>3</sub> Volatili	No Regulatory Requirement    No Regulatory Requirement	table water intended for human consumption)	Mississauga, Ontario L4Z 1Y2 Ph: 905.712.5100 Fax: 905.712.5122 webearth.agatlabs.com
7 B Page of			×	×	×	Chloro PCBs Organo TCLP N Sewer	Custody Seal Intact;	Arrival Temperatures: 2.8 2.8 9	work Order #: 160074674

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2016/63/68 1.723 19/18

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13/8/



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD 292 Speedvale Avenue West, Unit 7 Guelph, ON N1H1C4

(519) 823-4995

ATTENTION TO: Jim Baxter

PROJECT: 300033273

AGAT WORK ORDER: 16W074853

WATER ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Coordinator

DATE REPORTED: Mar 10, 2016

PAGES (INCLUDING COVER): 5

VERSION\*: 1

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

NOTES

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

AGAT Laboratories (V1)

\*NOTEO

Page 1 of 5



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 16W074853

PROJECT: 300033273

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

ATTENTION TO: Jim Baxter

SAMPLED BY:

o o							· · · · · ·				
					Nitrate (V	Vater)					
DATE RECEIVED: 2016-03-09								D	ATE REPORT	ED: 2016-03-10	
		SAMPLE DES	CRIPTION:	TW5	TW7	TW9		TW3		TW2	
		SAMPLE DESCRIPTION: SAMPLE TYPE:			Water	Water		Water		Water	
		DATE	SAMPLED:	3/8/2016	3/8/2016	3/8/2016		3/8/2016		3/8/2016	
Parameter	Unit	G/S	RDL	7430208	7430212	7430214	RDL	7430216	RDL	7430218	
Nitrate as N	mg/L		0.05	7.80	7.27	3.41	0.25	0.54	0.05	0.58	

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

7430216 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analyte within the calibration range of the instrument and to reduce matrix interference.

Certified By:

Amanjot Bhela



ATTENTION TO: Jim Baxter

### **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD AGAT WORK ORDER: 16W074853

SAMPLING SITE: SAMPLED BY:

				Wate	er An	alysi	s								
RPT Date: Mar 10, 2016			D	UPLICAT	E		REFEREN	ICE MA	ΓERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPI	KE
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured	Accep Lim	ite	Recovery	Lin	ptable nits	Recovery	Lim	ptable nits
		ld	.,	.,			Value	Lower	Upper	,		Upper	,	Lower	Upper

Nitrate (Water)

PROJECT: 300033273

Nitrate as N 7430216 7430216 0.54 0.56 3.6% < 0.05 108% 90% 110% 108% 90% 110% 110% 80% 120%

Certified By:

Amanjot Bhela



PROJECT: 300033273

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

ATTENTION TO: Jim Baxter

# **Method Summary**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD AGAT WORK ORDER: 16W074853

SAMPLING SITE: SAMPLED BY:

PARAMETER AGAT S.O.P LITERATURE REFERENCE ANALYTICAL TECHNIQUE

Water Analysis

Nitrate as N INOR-93-6004 SM 4110 B ION CHROMATOGRAPH



5835 Coopers Avenue

Ph: 905\_712.5100 Fax: 905\_712\_5122 Mississauga, Ontario L4Z 1Y2 webearth, agatlabs, com

Report Information:	Kecord	If this is a Dr	inking Water	sample, please	If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (possble water intended for human consumption)  Regulatory Requirements:   No Regulatory Requirement	nent Custody Seal Intact □Yes □No □
Company:	1 Buins	ide	+ MSTecia	iles late		Notes: 600
Contact: J.M. Address: J.A.q.	Spakuch	Ave	West	unith	Regulation 153/04	Turnaround Time (TAT) Required:
Phone:	1	Fax:			□Res/Park □Storm □ Prov. Water Quality □Agriculture ○ Objectives (PWQO)	Rush TAT (Rusis Suitchelliges Apply)
Reports to be sent to:  1. Email:	baster &	( bul	35.6	C-COM	Soil Texture (Check One)  Region	3 Business 2 Business 1 Business Days Days
2. Email:					☐Fine Indicate One	
Project Information:					100	OR Date Required (Rush Surcharges May Apply):
2	2000 53 84	3			Necessary of the Continuous Continuous of Financial Principles	
Sampled By:	A Valeria	7			; ;	
7.5	PO: Pease note: If maration number is not provided, client will be billed full price for any value.	PO:	billed full priod for	andrists	Sample Matrix (Check Applicable)	
Invoice Information:		Bill	Bill To Same: Y	Yes ∰ No □	/NO <sub>2</sub> AR TKN	
Company:					P OE Districts  Inics	
Email:				į.	SW Sediment  Sw Surface Water  and Inorgation  Forming  Custom M  B-Hws  Custom M  Hg  tts:   TP  NO2   1  Ses:   Vo  Fractions	chlorine detals/Ind Use
Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Metal S Hydrid Client C ORPs: □ Cres □ Tota Nutriec □ NO <sub>3</sub> Volatil	PCBs Organo TCLP M Sewer
TWC	11 2 To 3 W.	10:40		600		×
Twit		11:15	-	600		*
rwg	1/1	11:50	-0	Gw		x
てある	7.	12:30	-	6w		×
ーしたシ	11	17.00	-	20		
Relinquished By (Print Na			Date	Time	Samples Received By (Print Name and Sign):	Date 3/8 11m2 10 Page of
Samples Relinquished By (Print Name and Sign):	Mall of	//	Date Single	Time	Samples Redelived By Print Name and Sign):	Date Time O'N TOA ASSOCI

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Cooler Quantity:

Page 5 of 5



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
292 Speedvale Avenue West, Unit 7

Guelph, ON N1H1C4 (519) 823-4995

ATTENTION TO: Dwight Smikle

PROJECT: Belfountain

AGAT WORK ORDER: 16W082447

WATER ANALYSIS REVIEWED BY: Sofka Pehlyova, Senior Analyst

DATE REPORTED: Apr 06, 2016

PAGES (INCLUDING COVER): 5

VERSION\*: 1

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

*NOTES

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

**AGAT** Laboratories (V1)

Page 1 of 5



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 16W082447

PROJECT: Belfountain

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

ATTENTION TO: Dwight Smikle

SAMPLED BY:

					Nitrate (W	/ater)		
DATE RECEIVED: 2016-04-05								DATE REPORTED: 2016-04-05
		SAMPLE DES	CRIPTION:	TW11-1 hr	TW11-26 hr	TW6-1 hr	TW6-26 hr	
		SAM	PLE TYPE:	Water	Water	Water	Water	
		DATE	SAMPLED:	3/30/2016	3/31/2016	4/1/2016	4/2/2016	
Parameter	Unit	G/S	RDL	7471112	7471114	7471115	7471117	
Nitrate as N	mg/L		0.05	3.46	3.37	7.89	8.23	

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

Certified By:

Sofiea Pehlyora



## **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16W082447

PROJECT: Belfountain

ATTENTION TO: Dwight Smikle

SAMPLING SITE: SAMPLED BY:

				Wate	er An	alysi	s								
RPT Date:			D	UPLICAT	E		REFEREN	ICE MA	TERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPI	KE
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured		otable nits	Recovery	Lin	ptable nits	Recovery		ptable nits
		Id	.,	.,			Value	Lower	Upper	,	Lower	Upper	,	Lower	Upper

Nitrate (Water)

Nitrate as N 7469191 1.99 1.92 3.6% < 0.05 99% 90% 110% 108% 90% 110% 106% 80% 120%

Certified By:

Sofia Pehlyna



## **Method Summary**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

PROJECT: Belfountain

AGAT WORK ORDER: 16W082447 ATTENTION TO: Dwight Smikle

ATTENTION TO: Dwight o

SAMPLING SITE: SAMPLED BY:

PARAMETER AGAT S.O.P LITERATURE REFERENCE

ANALYTICAL TECHNIQUE

Water Analysis

Nitrate as N INOR-93-6004 SM 4110 B ION CHROMATOGRAPH



	40 TO 00 TO								
No:	Date		Samples Received By (Print Name and Sign):	Samples Received B	Time	Date			Samples Relinquished By (Print Name and Sign):
rage	16/5/		1	Ŋ	-	To so			Samples Relinquished By (Print Name and Sign):
04 1. 20	50/0/00	2 Holl	1 NOOD	Sample Received by White National		4 April 16		1	Sean Quinlan
115	Date		y (Print Name and Sign):	Samples Received By (Print Name	Time	Date			Somples Bellouikkand By (Print/Nillie and Size)
									24 HR RUSH TAT REQUESTED
			1		G#	-	14:00)	2 Apr 16	TW6-26 1
			Z :		Carrier S		12.00	or rder r	1 W 0 - 1 III
			Z		GW		12:00	1 Amr 16	TW11 - 20 III
			Z		GW	-	13:00	31 Mar 16	TW11 76 b-
			Z		GW	1	12:30	30 Mar 16	TW11 - 1 hr
PCBs Organ TCLP Sewe	ORPs  Cre Nutric	Metal	Y/Z	Comments/ Special Instructions	Sample Matrix	# of Containers	Time Sampled	Date Sampled	Sample Identification
opheno	Custor Cu	s and li Scan de Form	Field I						Email:
ine	WS Hg ITP			7					Addless.
_	FOO								Address:
_	ICI [ C D N I pH [ NH <sub>3</sub> O <sub>3</sub> /NC			<b>p</b> Paint					Company:
es	IO <sub>3</sub> /NO <sub>2</sub> ⊒SAR □TKN		tals, Hg ircle)	>	Yes ຝ No □	Bill To Same: Ye	Bill		Invoice Information:
	or Oppingsoin		g, CrVI		analysis	billed full price for	ided, client will be l	n number is not pro	Please note: If quivalin number is not provided, client will be billed full price for analysis
	Obook Applicable)			Sample Matrix			P.O.		†
									٠
*TAT is exclusive of weekends and statutory holidays	No No	☐ Yes	No	☐ Yes ☐					ation:
Please provide prior notification for rush TAT	te of Ana	Certifica	ondition?	Record of Site Condition?					Project: Belfountain
On Date Leadings (small parollar Bos und schold)	Report Guideline on	Report	ion for a	Is this submission for a					Project Information:
OD Data Doctriced (Direk Surpharage May Apply)	Indicate One	_		□ Fine				urnside.com	2. Email: Sean.Quinlan@rjburnside.com
3 Business 2 Business 1 Business Days 1 Days	Other		RegionIndicate One	Soil Texture (check One)				burnside.com	Reports to be sent to: Dwight.Smikle@rjburnside.com  1. Email:
RUSh TAT (Rush Surcharges Apply)	Objectives (PWQO)		Storm	☐ Agriculture			Fax:		Phone: 519 823 4995
Regular TAT 5 to 7 Business Days			Sanitary	Ind/Com					weet in
Turnaround Time (IAI) Required:			, [	Table				West	
	Regulation 558		Sewer Use	Regulation 153/04	10				Contact: Dwight Smikle
Custody Seal Infact:   Notes:	Regulatory Requirement	A No Regula		Regulatory Requirements:					Report Information: Burnside
Arrival Temperatures: 7.5   4.7   5.6	for human consumption)	le water intended	of Custody Form (potab	If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)	ample, please u	ıking Water s	If this is a Drir	Record	Chain of Custody Re
Cooler Quantity:	webearth.agatlabs.com	we	60 600 000	ories **		Ld			
work order #: 16W082447	5835 Coopers Avenue Mississauga, Ontario L4Z 1Y2 Mississauga, Fax: 905.712.5122	5 Mississau				<u> </u>			90
I shoutony lies Only									



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD
292 Speedvale Avenue West, Unit 7

Guelph, ON N1H1C4 (519) 823-4995

ATTENTION TO: Dwight Smikle

PROJECT: 300033273

AGAT WORK ORDER: 16W138240

WATER ANALYSIS REVIEWED BY: Sofka Pehlyova, Senior Analyst

DATE REPORTED: Sep 26, 2016

PAGES (INCLUDING COVER): 12

VERSION\*: 1

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

NOTES

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

**AGAT** Laboratories (V1)

\*NOTEO

Page 1 of 12



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 16W138240

PROJECT: 300033273

http://www.agatlabs.com

5835 COOPERS AVENUE

MISSISSAUGA, ONTARIO CANADA L4Z 1Y2

TEL (905)712-5100 FAX (905)712-5122

ATTENTION TO: Dwight Smikle

SAMPLED BY:

#### Water Quality Assessment

DATE RECEIVED: 2016-09-16	6							DATE REPORTE	D: 2016-09-26	6
		AMPLE DESCRIPTION: SAMPLE TYPE: DATE SAMPLED:	TW5 Water 9/15/2016		TW2 Water 9/15/2016		TW7 Water 9/15/2016	TW8 Water 9/15/2016		TW9 Water 9/15/2016
Parameter	Unit	G/S RDL	7853172	RDL	7853176	RDL	7853182	7853189	RDL	7853195
Electrical Conductivity	uS/cm	2	667	2	575	2	606	598	2	594
pH	pH Units	NA	8.08	NA	8.17	NA	8.14	8.08	NA	8.15
Saturation pH			7.04		6.96		7.01	7.01		7.00
Langelier Index	,,		1.04		1.21		1.13	1.07		1.15
Total Hardness (as CaCO3)	mg/L	0.5	280	0.5	294	0.5	284	296	0.5	289
Total Dissolved Solids	mg/L	20	358	20	308	20	334	364	20	332
Alkalinity (as CaCO3)	mg/L	5	237	5	271	5	247	238	5	249
Bicarbonate (as CaCO3)	mg/L	5	237	5	271	5	247	238	5	249
Carbonate (as CaCO3)	mg/L	5	<5	5	<5	5	<5	<5	5	<5
Hydroxide (as CaCO3)	mg/L	5	<5	5	<5	5	<5	<5	5	<5
Fluoride	mg/L	0.10	<0.10	0.05	< 0.05	0.10	<0.10	<0.10	0.05	< 0.05
Chloride	mg/L	0.20	41.2	0.10	5.96	0.20	17.4	9.46	0.10	9.76
Nitrate as N	mg/L	0.10	7.18	0.05	0.82	0.10	6.97	7.85	0.05	2.17
Nitrite as N	mg/L	0.10	<0.10	0.05	< 0.05	0.10	<0.10	<0.10	0.05	< 0.05
Bromide	mg/L	0.10	<0.10	0.05	< 0.05	0.10	<0.10	<0.10	0.05	< 0.05
Sulphate	mg/L	0.20	20.1	0.10	25.6	0.20	18.5	43.5	0.10	45.3
Ortho Phosphate as P	mg/L	0.20	<0.20	0.10	<0.10	0.20	<0.20	<0.20	0.10	<0.10
Reactive Silica	mg/L	0.05	7.43	0.05	11.8	0.05	7.12	7.49	0.05	8.77
Ammonia as N	mg/L	0.02	< 0.02	0.02	< 0.02	0.02	<0.02	<0.02	0.02	< 0.02
Total Phosphorus	mg/L	0.05	< 0.05	0.05	0.05	0.05	< 0.05	0.06	0.05	< 0.05
Total Organic Carbon	mg/L	0.5	0.6	0.5	1.1	0.5	1.0	1.5	0.5	0.9
Colour	TCU	5	<5	5	<5	5	<5	<5	5	<5
Turbidity	NTU	0.5	1.7	0.5	110	0.5	4.8	113	0.5	2.4
Calcium	mg/L	0.05	76.6	0.05	77.6	0.05	77.5	80.6	0.05	76.2
Magnesium	mg/L	0.05	21.6	0.05	24.3	0.05	21.9	22.9	0.05	23.9
Sodium	mg/L	0.05	16.0	0.05	3.10	0.05	6.44	3.22	0.05	4.03
Potassium	mg/L	0.05	0.90	0.05	1.12	0.05	0.87	1.17	0.05	0.89
Aluminum	mg/L	0.004	0.010	0.004	0.014	0.004	0.012	0.011	0.004	0.010
Antimony	mg/L	0.003	<0.003	0.003	<0.003	0.003	< 0.003	<0.003	0.003	<0.003
Arsenic	mg/L	0.003	<0.003	0.003	< 0.003	0.003	< 0.003	0.003	0.003	<0.003

Certified By:

Sofra Pehlyora



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 16W138240

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLED BY:

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

#### Water Quality Assessment

DATE RECEIVED: 2016-09-16									DATE REPORTE	D: 2016-09-26	
	;	SAMPLE DESCRIPT	ION:	TW5		TW2		TW7	TW8		TW9
		SAMPLE T	YPE:	Water		Water		Water	Water		Water
		DATE SAMP	LED: 9/	/15/2016		9/15/2016		9/15/2016	9/15/2016		9/15/2016
Parameter	Unit	G/S RE	)L 7	7853172	RDL	7853176	RDL	7853182	7853189	RDL	7853195
Barium	mg/L	0.0	02	0.112	0.002	0.092	0.002	0.099	0.085	0.002	0.074
Beryllium	mg/L	0.0	01	<0.001	0.001	<0.001	0.001	<0.001	<0.001	0.001	<0.001
Boron	mg/L	0.0	10	<0.010	0.010	<0.010	0.010	<0.010	0.022	0.010	0.010
Cadmium	mg/L	0.0	01	<0.001	0.001	<0.001	0.001	<0.001	<0.001	0.001	<0.001
Chromium	mg/L	0.0	03	<0.003	0.003	< 0.003	0.003	< 0.003	< 0.003	0.003	< 0.003
Cobalt	mg/L	0.0	01	<0.001	0.001	< 0.001	0.001	< 0.001	<0.001	0.001	< 0.001
Copper	mg/L	0.0	03	<0.003	0.003	< 0.003	0.003	< 0.003	< 0.003	0.003	< 0.003
Iron	mg/L	0.0	10	<0.010	0.010	< 0.010	0.010	< 0.010	<0.010	0.010	< 0.010
Lead	mg/L	0.0	02	<0.002	0.002	< 0.002	0.002	< 0.002	< 0.002	0.002	< 0.002
Manganese	mg/L	0.0	02	<0.002	0.002	0.003	0.002	< 0.002	0.005	0.002	< 0.002
Mercury	mg/L	0.00	001 <	<0.0001	0.0001	< 0.0001	0.0001	< 0.0001	<0.0001	0.0001	< 0.0001
Molybdenum	mg/L	0.0	02	<0.002	0.002	< 0.002	0.002	< 0.002	< 0.002	0.002	< 0.002
Nickel	mg/L	0.0	03	<0.003	0.003	< 0.003	0.003	< 0.003	< 0.003	0.003	< 0.003
Selenium	mg/L	0.0	04	<0.004	0.004	< 0.004	0.004	< 0.004	< 0.004	0.004	< 0.004
Silver	mg/L	0.0	02	<0.002	0.002	< 0.002	0.002	< 0.002	< 0.002	0.002	< 0.002
Strontium	mg/L	0.0	05	0.155	0.005	0.134	0.005	0.124	1.66	0.005	0.279
Thallium	mg/L	0.0	06	<0.006	0.006	< 0.006	0.006	< 0.006	<0.006	0.006	< 0.006
Tin	mg/L	0.0	02	<0.002	0.002	< 0.002	0.002	< 0.002	< 0.002	0.002	< 0.002
Titanium	mg/L	0.0	02	<0.002	0.002	< 0.002	0.002	< 0.002	< 0.002	0.002	< 0.002
Tungsten	mg/L	0.0	10	<0.010	0.010	< 0.010	0.010	< 0.010	<0.010	0.010	< 0.010
Uranium	mg/L	0.0	02	<0.002	0.002	< 0.002	0.002	< 0.002	< 0.002	0.002	< 0.002
Vanadium	mg/L	0.0	02	<0.002	0.002	< 0.002	0.002	< 0.002	<0.002	0.002	< 0.002
Zinc	mg/L	0.0	05	0.016	0.005	0.009	0.005	0.020	0.024	0.005	0.028
Zirconium	mg/L	0.0	04	<0.004	0.004	<0.004	0.004	<0.004	< 0.004	0.004	< 0.004
% Difference/ Ion Balance	%	N	A	3.91	NA	1.18	NA	2.78	3.31	NA	3.13

Certified By:

Sofia Pehlyna



## Certificate of Analysis

AGAT WORK ORDER: 16W138240

PROJECT: 300033273

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

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

ATTENTION TO: Dwight Smikle

SAMPLED BY:

			Wa	ter Quality Assessment
DATE RECEIVED: 2016-09-16				DATE REPORTED: 2016-09-26
Davisantes		AMPLE DESCRIPTION: SAMPLE TYPE: DATE SAMPLED:	TW11 Water 9/15/2016	
Parameter Electrical Conductivity	Unit uS/cm	G/S RDL 2	7853203 589	
pH	pH Units	NA	8.20	
Saturation pH	pri onito	147	6.99	
Langelier Index			1.21	
Total Hardness (as CaCO3)	mg/L	0.5	286	
Total Dissolved Solids	mg/L	20	314	
Alkalinity (as CaCO3)	mg/L	5	258	
Bicarbonate (as CaCO3)	mg/L	5	258	
Carbonate (as CaCO3)	mg/L	5	<5	
Hydroxide (as CaCO3)	mg/L	5	<5	
Fluoride	mg/L	0.05	< 0.05	
Chloride	mg/L	0.10	12.7	
Nitrate as N	mg/L	0.05	4.08	
Nitrite as N	mg/L	0.05	< 0.05	
Bromide	mg/L	0.05	< 0.05	
Sulphate	mg/L	0.10	21.3	
Ortho Phosphate as P	mg/L	0.10	<0.10	
Reactive Silica	mg/L	0.05	7.88	
Ammonia as N	mg/L	0.02	<0.02	
Total Phosphorus	mg/L	0.05	<0.05	
Total Organic Carbon	mg/L	0.5	0.8	
Colour	TCU	5	<5	
Turbidity	NTU	0.5	4.9	
Calcium	mg/L	0.05	77.5	
Magnesium	mg/L	0.05	22.4	
Sodium	mg/L	0.05	5.49	
Potassium	mg/L	0.05	0.97	
Aluminum	mg/L	0.004	0.013	
Antimony	mg/L	0.003	< 0.003	
Arsenic	mg/L	0.003	<0.003	

Certified By:

Sofia Pehlyna



SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 16W138240

PROJECT: 300033273

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

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

ATTENTION TO: Dwight Smikle SAMPLED BY:

Water Quality Assessment

			Water	Quality Assessment
DATE RECEIVED: 2016-09-16				DATE REPORTED: 2016-09-26
	S	AMPLE DESCRIPTION:	TW11	
		SAMPLE TYPE:	Water	
		DATE SAMPLED:	9/15/2016	
Parameter	Unit	G/S RDL	7853203	
Barium	mg/L	0.002	0.059	
Beryllium	mg/L	0.001	<0.001	
Boron	mg/L	0.010	<0.010	
Cadmium	mg/L	0.001	<0.001	
Chromium	mg/L	0.003	<0.003	
Cobalt	mg/L	0.001	<0.001	
Copper	mg/L	0.003	< 0.003	
ron	mg/L	0.010	<0.010	
_ead	mg/L	0.002	<0.002	
Manganese	mg/L	0.002	<0.002	
Mercury	mg/L	0.0001	<0.0001	
Molybdenum	mg/L	0.002	<0.002	
Nickel	mg/L	0.003	< 0.003	
Selenium	mg/L	0.004	<0.004	
Silver	mg/L	0.002	<0.002	
Strontium	mg/L	0.005	0.128	
Γhallium	mg/L	0.006	<0.006	
Tin	mg/L	0.002	<0.002	
Titanium	mg/L	0.002	<0.002	
Гungsten	mg/L	0.010	<0.010	
Jranium	mg/L	0.002	<0.002	
/anadium	mg/L	0.002	<0.002	
Zinc	mg/L	0.005	0.016	
Zirconium	mg/L	0.004	<0.004	
% Difference/ Ion Balance	%	NA	2.28	

Certified By:

Sofra Pehlyora



Certificate of Analysis

AGAT WORK ORDER: 16W138240

PROJECT: 300033273

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

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

ATTENTION TO: Dwight Smikle

SAMPLED BY:

#### Water Quality Assessment

DATE RECEIVED: 2016-09-16 DATE REPORTED: 2016-09-26

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

7853172 Elevated RDLs for Anions indicate the degree of sample dilutions prior to analyses to keep analytes within the calibration range, reduce matrix interference and/or to avoid contaminating the instrument.

Turbidity Analysis: Hold time of 48 hours for this parameter was exceeded. Samples were received and analyzed past hold time. Review data with discretion.

7853182 Elevated RDLs for Anions indicate the degree of sample dilutions prior to analyses to keep analytes within the calibration range, reduce matrix interference and/or to avoid contaminating the instrument.

Turbidity Analysis: Hold time of 48 hours for this parameter was exceeded. Samples were received and analyzed past hold time. Review data with discretion.

Certified By:

Sofiea Pehlyora

## **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD AGAT WORK ORDER: 16W138240

PROJECT: 300033273 ATTENTION TO: Dwight Smikle

SAMPLING SITE: SAMPLED BY:

PARAMETER   Batch   Sample   Dup #1   Dup #2   RPD   Method   Blank   Measure   Lumits   Recovery   Acceptable   Recovery   Lumits   Recovery   Recovery   Lumits   Recovery   Recovery   Recovery   Lumits   Recovery   R		1.	LED B	MIVIEL								SAMPLING SITE.
PARAMETER    Batch   Sample Id   Dup #1   Dup #2   RPD   Mathod Blank   Measured Value   Lower   Upper   Recovery   Lower   Upper   Recovery   Lower   Upper   Recovery   Lower   Upper   Upper   Upp					is	alysi	r An	Wate				
PARAMETER	HOD BLANK SPIKE MATRIX SPIKE	METHOD	TERIAL	ICE MA	REFEREN		:	UPLICATE	D			RPT Date: Sep 26, 2016
Water Quality Assessment Electrical Conductivity 7854077 1770 1760 0.6% < 2 97% 80% 120% NA NA NA NA Total Dissolved Solids 7853217 364 360 1.1% NA 99% 90% 110% NA NA Alkalinity (as CaCO3) 7854077 777 784 0.9% < 20 96% 80% 120% NA NA Alkalinity (as CaCO3) 7854077 777 784 0.9% < 5 95% 80% 120% NA NA NA Alkalinity (as CaCO3) 7854077 777 784 0.9% < 5 95% 80% 120% NA NA NA Alkalinity (as CaCO3) 7854077 777 784 0.9% < 5 95% 80% 120% NA NA NA Halpity (as CaCO3) 7854077 777 784 0.9% < 5 NA NA NA Halpity (as CaCO3) 7854077 < 5 < 5 NA < 5 NA NA NA Halpity (as CaCO3) 7854077 < 5 < 5 NA < 5 NA NA NA Fluoride (as CaCO3) 7854077 < 5 < 5 NA < 5 NA NA NA NA Fluoride (as CaCO3) 7854077 < 5 < 5 NA < 5 NA NA NA NA NA Fluoride (as CaCO3) 7854077 < 5 < 5 NA < 5 NA NA NA NA NA NA NA NA NA NA NA NA NA N	very Limits Recovery Limits	Recovery	nits	Lin			RPD	Dup #2	Dup #1		Batch	PARAMETER
Electrical Conductivity 7854077 1770 1760 0.6% < 2 97% 80% 120% NA	Lower opper		Оррсі	LOWCI								Matan Ovality Assessment
PH 7854077 7.24 7.16 1.1% NA 99% 90% 110% NA NA NA NA NA NA NA NA NA NA NA NA NA	۸	NΙΛ	120%	Q00/	07%	- 2	0.6%	1760	1770		7854077	•
Total Dissolved Solids 7853217 364 360 1.1%												·
Alkalinity (as CaCO3) 7854077 777 784 0.9% < 5 95% 80% 120% NA NA NA NA Bicarbonate (as CaCO3) 7854077 777 784 0.9% < 5 NA NA NA NA NA NA NA NA NA NA NA NA NA												•
Bicarbonate (as CaCO3) 7854077 777 784 0.9% < 5 NA NA NA NA NA NA NA NA NA NA NA NA NA												
Hydroxide (as CaCO3)  7854077			12070	0070								
Hydroxide (as CaCO3)  7854077	Δ ΝΔ	NΔ			NΔ	<b>~</b> 5	ΝΔ	-5	-5		7854077	Carbonate (as CaCO3)
Fluoride 7857463												,
Chloride 7857463 129 129 0.0% < 0.10 95% 90% 110% 103% 90% 110% 102% 80 Nitrate as N 7857463 14.6 14.7 0.7% < 0.05 93% 90% 110% 103% 90% 110% 102% 80 Nitrite as N 7857463 < 0.25 < 0.25 NA < 0.05 NA 90% 110% 90% 90% 110% 93% 80 Nitrite as N 7857463 < 0.25 < 0.25 NA < 0.05 NA 90% 110% 90% 90% 110% 93% 80 Nitrite as N 7857463 < 0.25 < 0.25 NA < 0.05 NA 90% 110% 90% 90% 110% 103% 90% 110% 103% 80 Nitrite as N 7857463 35.4 35.4 0.0% < 0.10 98% 90% 110% 103% 90% 110% 103% 90% 110% 103% 80 Nitrite as N 7857463 35.4 35.4 0.0% < 0.10 98% 90% 110% 100% 90% 110% 103% 80 Nitrite as N 7857463 < 0.50 < 0.50 NA < 0.10 104% 90% 110% 100% 90% 110% 103% 80 Nitrite as N 7857463 < 0.50 < 0.50 NA < 0.10 104% 90% 110% 100% 90% 110% 100% 90% 110% 100% 80 Nitrite as N 7853203 Nitrite as N 7853203 < 0.02 < 0.02 NA < 0.05 100% 90% 110% 100% 90% 110% 100% 90% 110% 100% 80 Nitrite as N 7853203 Nitrite as N 7853203 < 0.05 < 0.05 NA < 0.05 99% 80% 120% 100% 90% 110% 90% 110% 98% 80 Nitrite as N 7853203 Nitrite as N 7853203 Nitrite as N 7853203 Nitrite as N 7853203 Nitrite as N 7853203 Nitrite as N 7853182 Nitrite as N 7853182 Nitrite as N 7853182 Nitrite as N 7853182 Nitrite as N 7853182 Nitrite as N 7853182 Nitrite as N 7853182 Nitrite as N 7853182 Nitrite as N 7853182 Nitrite as N 7853182 Nitrite as N 7853398 Nitrite			110%	00%								• • •
Nitrate as N 7857463 14.6 14.7 0.7% < 0.05 93% 90% 110% 103% 90% 110% 101% 80 Nitrite as N 7857463 < 0.25 < 0.25 NA < 0.05 NA 90% 110% 90% 90% 110% 93% 80 Bromide 7857463 < 0.25 < 0.25 NA < 0.05 106% 90% 110% 90% 110% 90% 110% 103% 90% 110% 103% 80 Ortho Phosphate as P 7857463 < 0.50 < 0.50 NA < 0.10 104% 90% 110% 90% 110% 103% 90% 110% 103% 80 Ortho Phosphate as P 7857463 < 0.50 < 0.50 NA < 0.10 104% 90% 110% 96% 90% 110% 102% 90% 110% 102% 80 Reactive Silica 7848788 18.3 18.3 0.0% < 0.05 100% 90% 110% 102% 90% 110% 100% 90% 110% 100% 80 NA < 0.05 100% 90% 110% 102% 90% 110% 100% 90% 110% 100% 90% 110% 100% 90% 110% 100% 90% 110% 100% 90% 110% 100% 90% 110% 100% 90% 110% 100% 90% 110% 100% 90% 110% 100% 90% 110% 90% 110% 90% 110% 91% 90% 100% 90% 110% 90% 110% 91% 90% 100% 90% 110% 90% 110% 91% 90% 110% 91% 90% 110% 91% 90% 110% 91% 90% 110% 91% 90% 110% 91% 90% 110% 91% 90% 110% 91% 90% 110% 91% 90% 110% 91% 90% 110% 91% 90% 110% 91% 90% 110% 91% 90% 110% 91% 90% 110% 91% 90% 110% 91% 90% 110% 91% 90% 110% 91% 91% 91% 91% 91% 91% 91% 91% 91% 91												
Nitrite as N 7857463												
Bromide 7857463 <0.25 <0.25 NA <0.05 106% 90% 110% 103% 90% 110% 107% 80 Sulphate 7857463 35.4 35.4 0.0% <0.10 98% 90% 110% 100% 90% 110% 102% 80 Ortho Phosphate as P 7857463 <0.50 <0.50 NA <0.10 104% 90% 110% 96% 90% 110% 102% 80 Reactive Silica 7848788 18.3 18.3 0.0% <0.05 100% 90% 110% 90% 110% 102% 90% 110% 100% 80 Ammonia as N 7853203 7853203 <0.02 <0.02 NA <0.02 110% 90% 110% 101% 90% 110% 90% 110% 90% 110% 90% 110% 90% 110% 90% 100% 90% 110% 90% 100% 90% 110% 90% 100% 90% 110% 90% 100%												
Sulphate         7857463         35.4         35.4         0.0%         < 0.10         98%         90%         110%         100%         90%         110%         100%         90%         110%         100%         90%         110%         100%         90%         110%         100%         90%         110%         100%         90%         110%         100%         90%         110%         100%         90%         110%         100%         90%         110%         100%         90%         110%         100%         90%         110%         100%         90%         110%         100%         90%         110%         100%         90%         110%         100%         90%         110%         100%         90%         110%         100%         90%         110%         100%         90%         110%         100%         90%         110%         90%         110%         90%         110%         90%         110%         90%         110%         90%         110%         90%         110%         90%         110%         90%         110%         90%         110%         90%         110%         90%         110%         90%         110%         90%         110%         90%         110												
Ortho Phosphate as P         7857463         <0.50         <0.50         NA         <0.10         104%         90%         110%         96%         90%         110%         102%         80           Reactive Silica         7848788         18.3         18.3         0.0%         <0.05												
Reactive Silica  7848788  18.3  18.3  18.3  0.0% < 0.05  100% 90% 110% 102% 90% 110% 100% 80% 100% 100% 100% 100% 100												•
Ammonia as N 7853203 7853203 <0.02 <0.02 NA <0.02 110% 90% 110% 101% 90% 110% 98% 80												•
Total Phosphorus 7853203 7853203 <0.05 <0.05 NA <0.05 99% 80% 120% 100% 90% 110% 98% 70 Total Organic Carbon 7853182 7853182 1.0 0.8 NA <0.5 100% 90% 110% 103% 90% 110% 98% 80 Colour 7853217 <5 <5 NA <5 100% 90% 110% NA NA NA Turbidity 7853172 7853172 1.7 1.5 NA <0.5 104% 90% 110% NA NA NA NA NA Turbidity 7853398 49.8 53.8 7.7% <0.05 104% 90% 110% 97% 90% 110% 99% 70 Magnesium 7853398 8.04 8.68 7.7% <0.05 98% 90% 110% 95% 90% 110% 96% 70 Sodium 7853398 3.17 3.42 7.6% <0.05 94% 90% 110% 92% 90% 110% 95% 70 Aluminum 7853172 7853172 0.010 0.010 NA <0.004 101% 90% 110% 99% 90% 110% 97% 70 Magnesium 7853172 7853172 <0.003 <0.003 NA <0.003 98% 90% 110% 90% 110% 90% 110% 97% 70 Magnesium 7853172 7853172 <0.003 <0.003 NA <0.003 98% 90% 110% 99% 90% 110% 90% 110% 97% 70 Magnesium 7853172 7853172 <0.010 0.010 NA <0.001 98% 90% 110% 99% 90% 110% 90% 110% 90% 110% 97% 70 Magnesium 7853172 7853172 <0.003 <0.003 NA <0.003 98% 90% 110% 99% 90% 110% 90% 110% 90% 110% 97% 70 Magnesium 7853172 7853172 <0.001 <0.001 NA <0.001 98% 90% 110% 90% 110% 90% 110% 90% 110% 98% 70 Magnesium 7853172 7853172 <0.001 <0.001 NA <0.001 98% 90% 110% 97% 90% 110% 90% 90% 110% 90% 110% 90% 90% 110% 90% 90% 110% 90% 90% 110% 90% 90% 90% 90% 90% 90% 90% 90% 90% 9	2% 90% 110% 100% 80% 12	102%	110%	90%	100%	< 0.05	0.0%	18.3	18.3		7848788	Reactive Silica
Total Organic Carbon 7853182 7853182 1.0 0.8 NA < 0.5 100% 90% 110% 103% 90% 110% 98% 80 Colour 7853217 < 5 < 5 NA < 5 100% 90% 110% NA NA NA NA Turbidity 7853172 7853172 1.7 1.5 NA < 0.5 104% 90% 110% NA NA NA NA NA NA NA NA NA NA NA NA NA	% 90% 110% 98% 80% 12	101%	110%	90%	110%	< 0.02	NA	<0.02	<0.02	7853203	7853203 7	Ammonia as N
Colour         7853217         <5         <5         NA         <5         100%         90%         110%         NA         NA           Turbidity         7853172 7853172         1.7         1.5         NA         < 0.5	0% 90% 110% 98% 70% 13	100%	120%	80%	99%	< 0.05	NA	< 0.05	< 0.05	7853203	7853203 7	Total Phosphorus
Turbidity 7853172 7853172 1.7 1.5 NA < 0.5 104% 90% 110% NA NA NA  Calcium 7853398 49.8 53.8 7.7% < 0.05 100% 90% 110% 97% 90% 110% 99% 70  Magnesium 7853398 8.04 8.68 7.7% < 0.05 98% 90% 110% 95% 90% 110% 96% 70  Sodium 7853398 7.45 8.07 8.0% < 0.05 94% 90% 110% 92% 90% 110% 95% 70  Potassium 7853398 3.17 3.42 7.6% < 0.05 99% 90% 110% 96% 90% 110% 97% 70  Aluminum 7853172 7853172 0.010 0.010 NA < 0.004 101% 90% 110% 102% 90% 110% 97% 70  Antimony 7853172 7853172 < 0.003 < 0.003 NA < 0.003 98% 90% 110% 91% 90% 110% 92% 70  Arsenic 7853172 7853172 < 0.003 < 0.003 NA < 0.003 104% 90% 110% 99% 90% 110% 100% 92% 70  Barium 7853172 7853172 < 0.011 0.110 1.8% < 0.002 105% 90% 110% 100% 90% 110% 98% 70  Beryllium 7853172 7853172 < 0.001 < 0.001 NA < 0.001 98% 90% 110% 100% 90% 110% 112% 70  Boron 7853172 7853172 < 0.010 < 0.010 NA < 0.010 98% 90% 110% 97% 90% 110% 97% 70	3%      90%     110%      98%        80%     12	103%	110%	90%	100%	< 0.5	NA	8.0	1.0	7853182	7853182 7	Total Organic Carbon
Calcium 7853398 49.8 53.8 7.7% < 0.05 100% 90% 110% 97% 90% 110% 99% 70 Magnesium 7853398 8.04 8.68 7.7% < 0.05 98% 90% 110% 95% 90% 110% 96% 70 Sodium 7853398 7.45 8.07 8.0% < 0.05 94% 90% 110% 92% 90% 110% 95% 70 Potassium 7853398 3.17 3.42 7.6% < 0.05 99% 90% 110% 96% 90% 110% 97% 70 Aluminum 7853172 7853172 0.010 0.010 NA < 0.004 101% 90% 110% 102% 90% 110% 97% 70 Arsenic 7853172 7853172 < 0.003 < 0.003 NA < 0.003 98% 90% 110% 99% 90% 110% 90% 110% 90% 110% 92% 70 Arsenic 7853172 7853172 < 0.003 < 0.003 NA < 0.003 104% 90% 110% 99% 90% 110% 100% 70 Barium 7853172 7853172 < 0.010 0.010 NA < 0.001 98% 90% 110% 100% 90% 110% 98% 70 Beryllium 7853172 7853172 < 0.001 < 0.001 NA < 0.001 98% 90% 110% 100% 90% 110% 112% 70 Boron 7853172 7853172 < 0.001 < 0.001 NA < 0.001 98% 90% 110% 97% 90% 110% 97% 70 TO TO TO TO TO TO TO TO TO TO TO TO TO	A NA	NA	110%	90%	100%	< 5	NA	<5	<5		7853217	Colour
Magnesium       7853398       8.04       8.68       7.7%       < 0.05	A NA	NA	110%	90%	104%	< 0.5	NA	1.5	1.7	7853172	7853172 7	Turbidity
Sodium         7853398         7.45         8.07         8.0%         < 0.05         94%         90%         110%         92%         90%         110%         95%         70           Potassium         7853398         3.17         3.42         7.6%         < 0.05	% 90% 110% 99% 70% 13	97%	110%	90%	100%	< 0.05	7.7%	53.8	49.8		7853398	Calcium
Potassium         7853398         3.17         3.42         7.6%         < 0.05         99%         90%         110%         96%         90%         110%         97%         70           Aluminum         7853172         7853172         0.010         0.010         NA         < 0.004	% 90% 110% 96% 70% 13	95%	110%	90%	98%	< 0.05	7.7%	8.68	8.04		7853398	Magnesium
Aluminum 7853172 7853172 0.010 0.010 NA < 0.004 101% 90% 110% 102% 90% 110% 97% 70   Antimony 7853172 7853172 < 0.003	% 90% 110% 95% 70% 13	92%	110%	90%	94%	< 0.05	8.0%	8.07	7.45		7853398	Sodium
Antimony 7853172 7853172 <0.003 <0.003 NA <0.003 98% 90% 110% 91% 90% 110% 92% 70 Arsenic 7853172 7853172 <0.003 <0.003 NA <0.003 104% 90% 110% 99% 90% 110% 100% 70 Barium 7853172 7853172 0.112 0.110 1.8% <0.002 105% 90% 110% 100% 90% 110% 98% 70 Beryllium 7853172 7853172 <0.001 <0.001 NA <0.001 99% 90% 110% 100% 90% 110% 112% 70 Boron 7853172 7853172 <0.010 <0.010 NA <0.010 98% 90% 110% 97% 90% 110% 97% 70 70 70 70 70 70 70 70 70 70 70 70 70	% 90% 110% 97% 70% 13	96%	110%	90%	99%	< 0.05	7.6%	3.42	3.17		7853398	Potassium
Arsenic       7853172 7853172 <0.003 <0.003 NA <0.003 104% 90% 110% 99% 90% 110% 100% 70	2% 90% 110% 97% 70% 13	102%	110%	90%	101%	< 0.004	NA	0.010	0.010	7853172	7853172	Aluminum
Barium       7853172 7853172 0.112 0.110 1.8% < 0.002 105% 90% 110% 100% 90% 110% 98% 70	% 90% 110% 92% 70% 13	91%	110%	90%	98%	< 0.003	NA	< 0.003	<0.003	7853172	7853172	Antimony
Beryllium 7853172 7853172 <0.001 <0.001 NA < 0.001 99% 90% 110% 100% 90% 110% 112% 70 8000   8000	% 90% 110% 100% 70% 13	99%	110%	90%	104%	< 0.003	NA	< 0.003	< 0.003	7853172	7853172	Arsenic
Boron 7853172 7853172 <0.010 <0.010 NA < 0.010 98% 90% 110% 97% 90% 110% 97% 70	)% 90% 110% 98% 70% 13	100%	110%	90%	105%	< 0.002	1.8%	0.110	0.112	7853172	7853172	Barium
	)% 90% 110% 112% 70% 13	100%	110%	90%	99%	< 0.001	NA	<0.001	< 0.001	7853172	7853172	Beryllium
Cadmium 7853172 7853172 <0.001 <0.001 NA < 0.001 100% 90% 110% 97% 90% 110% 95% 70	% 90% 110% 97% 70% 13	97%	110%	90%	98%	< 0.010	NA	<0.010	<0.010	7853172	7853172	Boron
	% 90% 110% 95% 70% 13	97%	110%	90%	100%	< 0.001	NA	<0.001	<0.001	7853172	7853172	Cadmium
Chromium 7853172 7853172 <0.003 <0.003 NA < 0.003 102% 90% 110% 101% 90% 110% 101% 70	% 90% 110% 101% 70% 13	101%	110%	90%	102%	< 0.003	NA	< 0.003	< 0.003	7853172	7853172 7	Chromium
Cobalt 7853172 7853172 <0.001 <0.001 NA < 0.001 102% 90% 110% 98% 90% 110% 98% 70	% 90% 110% 98% 70% 13	98%	110%	90%	102%	< 0.001	NA	<0.001	< 0.001	7853172	7853172 7	Cobalt
Copper 7853172 7853172 <0.003 <0.003 NA < 0.003 105% 90% 110% 104% 90% 110% 102% 70	l% 90% 110% 102% 70% 13	104%	110%	90%	105%	< 0.003	NA	< 0.003	< 0.003	7853172	7853172 7	Copper
Iron 7853172 7853172 <0.010 <0.010 NA < 0.010 107% 90% 110% 97% 90% 110% 94% 70	% 90% 110% 94% 70% 13	97%	110%	90%	107%	< 0.010	NA	<0.010	<0.010	7853172	7853172	Iron
Lead 7853172 7853172 <0.002 <0.002 NA < 0.002 100% 90% 110% 96% 90% 110% 95% 70	% 90% 110% 95% 70% 13	96%	110%	90%	100%	< 0.002	NA	<0.002	<0.002	7853172	7853172	Lead
												•
·												•

AGAT QUALITY ASSURANCE REPORT (V1)

Page 7 of 12

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation.



## **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16W138240

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLING SITE: SAMPLED BY:

O/ (IVII EII TO OIT E.								,, (1411		• •					
		٧	Vater	Ana	lysis	(Cor	ntinu	ed)							
RPT Date: Sep 26, 2016			D	UPLICATE			REFEREN	ICE MA	TERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPI	KE
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured		ptable nits	Recovery		ptable nits	Recovery	منا ا	ptable nits
		ld	·	·			Value	Lower	Upper	ĺ	Lower	Upper	ĺ	Lower	Upper
Nickel	7853172	7853172	<0.003	<0.003	NA	< 0.003	103%	90%	110%	100%	90%	110%	98%	70%	130%
Selenium	7853172	7853172	<0.004	<0.004	NA	< 0.004	96%	90%	110%	96%	90%	110%	100%	70%	130%
Silver	7853172	7853172	< 0.002	< 0.002	NA	< 0.002	102%	90%	110%	104%	90%	110%	107%	70%	130%
Strontium	7853172	7853172	0.155	0.153	1.3%	< 0.005	105%	90%	110%	97%	90%	110%	98%	70%	130%
Thallium	7853172	7853172	<0.006	< 0.006	NA	< 0.006	105%	90%	110%	104%	90%	110%	101%	70%	130%
Tin	7853172	7853172	<0.002	<0.002	NA	< 0.002	95%	90%	110%	97%	90%	110%	97%	70%	130%
Titanium	7853172	7853172	<0.002	<0.002	NA	< 0.002	97%	90%	110%	94%	90%	110%	94%	70%	130%
Tungsten	7853172	7853172	<0.010	< 0.010	NA	< 0.010	98%	90%	110%	101%	90%	110%	100%	70%	130%
Uranium	7853172	7853172	< 0.002	< 0.002	NA	< 0.002	100%	90%	110%	99%	90%	110%	97%	70%	130%
Vanadium	7853172	7853172	<0.002	< 0.002	NA	< 0.002	96%	90%	110%	94%	90%	110%	95%	70%	130%
Zinc	7853172	7853172	0.016	0.016	NA	< 0.005	104%	90%	110%	102%	90%	110%	103%	70%	130%
Zirconium	7853172	7853172	<0.004	<0.004	NA	< 0.004	96%	90%	110%	89%	90%	110%	86%	70%	130%

Comments: NA signifies Not Applicable.

Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

QA Qualifier for Zirconium: In a multi-element scan up to 10% of analytes may exceed the quoted limits for lab control standards and matrix spike by up to 10% absolute and the spike is deemed acceptable.

Certified By:

Sofra Pehlyna



#### **QA** Violation

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16W138240

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

RPT Date: Sep 26, 2016			REFEREN	ICE MAT	ΓERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPII	KE
PARAMETER	Sample Id	Sample Description	Measured	Accep Lim	ite	Recovery	Lin	ptable nits	Recovery	Lin	ptable nits
.,,,,,,,,,			Value	Lower				Upper	,		Upper

Water Quality Assessment

Zirconium 7853172 TW5 96% 90% 110% 89% 90% 110% 86% 70% 130%

Comments: NA signifies Not Applicable.

Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

QA Qualifier for Zirconium: In a multi-element scan up to 10% of analytes may exceed the quoted limits for lab control standards and matrix spike by up to 10% absolute and the spike is deemed acceptable.

# **Method Summary**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16W138240

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLING SITE: SAMPLED BY:

SAMPLING SITE.		SAMPLED BY.				
PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE			
Water Analysis	•	,				
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE			
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE			
Saturation pH		SM 2320 B	CALCULATION			
Langelier Index		SM 2330B	CALCULATION			
Total Hardness (as CaCO3)	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES			
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE			
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE			
Bicarbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE			
Carbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE			
Hydroxide (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE			
Fluoride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH			
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH			
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH			
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH			
Bromide	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH			
Sulphate	INOR-93-6004	SM 4110 B SM 4110 B	ION CHROMATOGRAPH			
Ortho Phosphate as P	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH			
Reactive Silica	INOR-93-6047	AQ2 EPA-122A & SM 4500 SiO2 D	AQ2 DISCRETE ANALYSER			
Ammonia as N	INOR-93-6059	QuikChem 10-107-06-1-J & SM 4500 NH3-F	LACHAT FIA			
Total Phosphorus	INOR-93-6057	QuikChem 10-115-01-3-A & SM 4500-P I	LACHAT FIA			
Total Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310	SHIMADZU CARBON ANALYZER			
Colour	INOR-93-6046	SM 2120 B	SPECTROPHOTOMETER			
Turbidity	INOR-93-6044	SM 2130 B	NEPHELOMETER			
Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES			
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES			
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES			
Potassium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES			
Aluminum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS			
Antimony	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS			
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS			
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS			
Beryllium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS			
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS			
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS			
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS			
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS			
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS			
lron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS			
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS			
Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS			
Mercury	MET-93-6100	EPA SW 846 7470 & 245.1	CVAAS			
Molybdenum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS			
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS			
Selenium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS			
Silver	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS			
Strontium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS			
Thallium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS			



## Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16W138240

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLING SITE: SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Tin	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Titanium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Tungsten	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Uranium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zirconium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
% Difference/ Ion Balance		SM 1030 E	CALCULATION

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×				2		GW .	0	8:30	Nov. 15:16	TWS
PCBs Organ TCLP N Sewer	□ NO <sub>3</sub> Volatil	Client  ORPs:	Metal	8/N	Comments/ Special Instructions	Sample Matrix	# of Containers	Time Sampled	Date Sampled	Sample Identification
	ents: Traction	Custom  Custom  B-HW  CEC  N		Fleld Fil	SW Surface Water					Email:
-	□ NO <sub>3</sub>	Metals S □ C		tered -	<b>S</b> Soil					Address:
-	/ÑO <sub>2</sub> BTEX			-						Contact:
3		O./NO.		Ircle)	B Biota GW Ground Water	Yes 🕅 No 🗆	Bill To Same: Yes	8111		Invoice Information:
	(Check Applicable)	(Check A		CrVI	Sample Matrix Legend	nal) ess	alled full price for a	PO: political bulled full price for enables	numbers	AGAT Quote #:  Please nate: If quistrition
*TAT is exclusive of weekends and statutory holidays	NO	res 🗆	E	NO.	□ res 🔊 No			8	C. Sider	Sampled By:
Please provide prior notification for rush TAT	dysis	e of Ana	2	litton?	ard of Site	273	0033	300	Roots	Project Information:
OR Date Required (Rush Surcharges May Apply):	ne	Indicate One	-							r. Kildii
☐ 3 Business ☐ 2 Business ☐ 1 Business ☐ Days ☐ Days		Other	ne	Region Indicate One	e (Check One) se	e-Con	mide	of bu	mille	0
Rush TAT (Rush Surcharges Apply)	Quality 9WQO)	Prov. Water Quality Objectives (PWQO)		□Storm	□Res/Park □Agriculture		)	Fax	5406 - 52	Phone: S/9 - 8
Turnaround Time (TAT) Required:  Regular TAT  5 to 7 Business Days	Č	CCME	ν (	Sanitary	Table Indicate One ☐Ind/Com	184	Ke. U	7	Specifical	Address: 292
Custody Seal Intact:	uirement	Regulatory Requirement	\$	2	Regulatory Requirements:  (Please check all applicable boxes)	Ĭ.	iles c	Associ	+ sn. k	Report Information: Company:  Contact:  Contac
Arrival Temperatures: 37   33   3,9	onsumption)	ter intended for human consumption)	able water int	ustody Form (pot	If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable wa	ample, please	nking Waters	If this is a Dri	Record	<b>Chain of Custody</b>
Work Order #: 16 138240	rs Avenue L4Z 1Y2 712.5122 tlabs.com	5835 Coopers Avenue Mississauga, Ontario L4Z 1Y2 .712.5100 Fax: 905.712.5122 webearth.agatlabs.com	Mis Ph: 905.712	-P	aboratories	orat	Lat		9	
I aleantem, Ilea Only										



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD 292 Speedvale Avenue West, Unit 7

Guelph, ON N1H1C4 (519) 823-4995

ATTENTION TO: Matt Valeriote

PROJECT: 300033273

AGAT WORK ORDER: 16W170996

WATER ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Coordinator

DATE REPORTED: Dec 15, 2016

PAGES (INCLUDING COVER): 5

VERSION\*: 1

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

NOTES

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

AGAT Laboratories (V1)

\*NOTEO

Page 1 of 5



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 16W170996

PROJECT: 300033273

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

ATTENTION TO: Matt Valeriote

SAMPLED BY:

					Nitrate (V	Vater)					
DATE RECEIVED: 2016-12-15								Γ	DATE REPORTE	ED: 2016-12-15	
		SAMPLE DES	CRIPTION:	TW2	TW7	TW9	TW5	TW8	TW11		
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water		
		DATE	SAMPLED:	2016-12-13	2016-12-13	2016-12-13	2016-12-13	2016-12-13	2016-12-13		
Parameter	Unit	G/S	RDL	8091589	8091592	8091593	8091594	8091595	8091596		
Nitrate as N	mg/L		0.05	0.67	5.96	1.51	6.34	7.41	3.58		

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

Certified By:

Amanjot Bhela



## **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16W170996

PROJECT: 300033273

ATTENTION TO: Matt Valeriote

SAMPLING SITE: SAMPLED BY:

				Wate	er Ar	alys	is								
RPT Date: Dec 15, 2016			С	UPLICAT	E		REFEREN	ICE MA	TERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPI	KE
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured		ptable nits	Recovery	Lir	ptable nits	Recovery	Lin	ptable nits
		ld	.,	.,			Value	Lower	Upper		Lower	Upper	,	Lower	Upper
Nitrato (Mator)															

willale (Walei)

Nitrate as N 8086759 <0.05 <0.05 NA <0.05 93% 90% 110% 99% 90% 110% 97% 80% 120%

Comments: NA signifies Not Applicable.

Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By:

Amanjot Bhela



# **Method Summary**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 16W170996 ATTENTION TO: Matt Valeriote

PROJECT: 300033273 SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH



Phone:

1. Email: 2. Email:

5835 Coopers Avenue Mississauga, Ontario L4Z 1Y: Ph: 905.712.5100 Fax: 905.712.5123 webearth.agatlabs.com

enue 1Y2			abo ork O			Use	0r		1-	10	90	2 N	o			
com		Co	Cooler Quantity:													
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Regulation/Custom Metals	□ TP □ NH <sub>3</sub> □ TKN NO <sub>2</sub> □ NO <sub>3</sub> +NO <sub>2</sub>	Volatiles: □ VOC □ BTEX □ THM	CCME Fractions 1 to 4			: 🗆 Total 🗎 Aroclors	Organochlorine Pesticides	TCLP: ☐ M&I ☐ VOCs ☐ ABNS ☐ B(a)P ☐ PCBS	Sewer Use							
Regulation/C	Nutrients:	Volatiles	CCME	ABNS	PAHs	PCBs: [	Orga	TCLP	Sewe				WA.			
Regulation/C	Nutrients:	Volatiles	CCME	ABNs	PAHS	PCBs	Orga	TCLP	Sewe				VA.			

Chain of	CUSTODY RECORD If this is a Drinking Water sample, pleas	e use Drinking Water Chain of C	<b>Custody Form</b> (po	table water	r intended for human consumptio
Report Inf	ormation: BURNSIDE	Regulatory Requi	rements:	<b>⊠</b> No l	Regulatory Requireme
Contact:	Matt Valeriote	Regulation 153/04	Sewer	Use	Regulation 558
Address:	1292 Speadale Are West	Table — Indicate One	∏Sanita	ary	ССМЕ

Matt. Valentake riburnside, com Reports to be sent to:

Project Info	rmation:
Project:	300033273
Site Location:	Beltountain
Sampled By:	Matt Valeriote
AGAT Quote #:	PO:

Invoice Information:	Bill To Same: Yes ☑ No □
Company:	
Address:	
Email:	

Regulatory Requ		ĭ No .	Regulato	ry Requirement	
Regulation 153/04	Sewei	Use	Reg	ulation 558	Ī
Table	□Sani	tary	CCM	1E	
☐ Res/Park ☐ Agriculture	Stori	Ti		v. Water Quality ectives (PWQO)	
Soil Texture (Check One)	Region	te One	Othe	ər	
Fine				Indicate One	
Is this submission Record of Site Co				ideline on of Analysis	
☐ Yes 🕱	No	0	] Yes	X No	
Sample Matrix Le	gend	5	0, Reg 15	3	Ì

Filtered - Metals, Hg, CrV

153 Metals (excl. Hydrides)

Invoice Information:  Company: Contact: Address: Email:		Bill To Same:	Yes X No	O P S SD SW	Oil Paint Soil Sediment	Field Filtered - Metals,	and Inorganics	tals 🗌 153 Metals (excl. H) e Metals	ORPs: DB-HWS DG: DCN Crt DEC DFOC DHg DpH DSAR	tals Scan	ustom Metals	TP CINH, C	s: □ voc □ BTEX □ TH	Fractions 1 to 4		Total □ Aroclors	rine Pesticides	M&I □ VOCs □ ABNs □ E	Use	- 2		
Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Y/N	Metals	☐ All Metals ☐ Hydride Me	ORPS:	Full Metals	Regula	Nutrients: D	Volatiles:	CCME	PAHS	PCBs:	Organo	TCLP: \$\text{M&I}\$	Sewer			VA 1-
TW2	13 DECIG	11:34	61	GW								V										
TW7	J	9:38	1	1								J	T								m - 1	
TW9		10:02	1			11 11 11						V	0									
TW5		9:08										~	T									
TW8		10:40				WEST						1										
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															4							
samples Relinquished By (Print Name and Sign):	60	Date	14,46	15,000 ne	Samples Received By (Print Name a					3	Date	L-0	ec )	S I		Ope	1					

Samules Received By (1-ip) anno and Sign):

Biota **Ground Water** 

Samples Relinquished By (Print Name and Sign):



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD 292 Speedvale Avenue West, Unit 7

Guelph, ON N1H1C4 (519) 823-4995

ATTENTION TO: Dwight Smikle

PROJECT: 300033273

AGAT WORK ORDER: 17T211486

WATER ANALYSIS REVIEWED BY: Sofka Pehlyova, Senior Analyst

DATE REPORTED: May 05, 2017

PAGES (INCLUDING COVER): 6

VERSION\*: 1

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

NOTES

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

AGAT Laboratories (V1)

\*NOTE O

Page 1 of 6

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)

Western Enviro-Agricultural Laboratory Association (WEALA) Environmental Services Association of Alberta (ESAA) AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation.



SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 17T211486

PROJECT: 300033273

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

ATTENTION TO: Dwight Smikle

SAMPLED BY:

### Nitrate/Nitrite (Water)

						o (Wator)					
DATE RECEIVED: 2017-05-03								D	ATE REPOR	TED: 2017-05-05	
		SAMPLE DES	CRIPTION:	TW1	TW2	TW3	TW4	TW5		TW6	
		SAM	PLE TYPE:	Water	Water	Water	Water	Water		Water	
		DATE	SAMPLED:	2017-05-02	2017-05-02	2017-05-02	2017-05-02	2017-05-02		2017-05-02	
Parameter	Unit	G/S	RDL	8358383	8358385	8358386	8358387	8358388	RDL	8358389	
Nitrate as N	mg/L		0.05	<0.05	1.90	0.58	3.22	7.99	0.10	9.08	
litrite as N	mg/L		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.10	<0.10	
		SAMPLE DES	CRIPTION:	TW7	TW8	TW9	TW10	TW11		TW12	
		SAM	PLE TYPE:	Water	Water	Water	Water	Water		Water	
		DATE	SAMPLED:	2017-05-02	2017-05-02	2017-05-02	2017-05-02	2017-05-02		2017-05-02	
Parameter	Unit	G/S	RDL	8358390	8358391	8358392	8358393	8358394	RDL	8358397	
Nitrate as N	mg/L		0.05	6.87	5.15	3.02	0.85	3.00	0.10	<0.10	
litrite as N	mg/L		0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.10	<0.10	

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

8358389 Elevated RDLs indicate the degree of sample dilutions prior to analyses to keep analytes within the calibration range, reduce matrix interference and to avoid contaminating the instrument.
8358397 Elevated RDLs indicate the degree of sample dilutions prior to analyses to keep analytes within the calibration range, reduce matrix interference and to avoid contaminating the instrument.

Certified By:

Sofra Pehlyona



# **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 17T211486
PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLING SITE: SAMPLED BY:

57 (IVII 21110 0112)	5/ Will 225 5 7.														
				Wate	er Ar	alys	is								
RPT Date: May 05, 2017				UPLICAT	E		REFEREN	NCE MA	TERIAL	METHOD	BLAN	SPIKE	MAT	RIX SPI	KE
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Acceptable Measured Limits		Recovery	Acceptable Limits		Recovery	Lin	eptable mits	
		ld		'			Value	Lower	Upper		Lower	Upper	,	Lower	Upper
Nitrate/Nitrite (Water)															
Nitrate as N	8358389	358389	9.08	9.02	0.7%	< 0.05	102%	90%	110%	107%	90%	110%	114%	80%	120%
Nitrite as N	8358389	8358389	< 0.10	< 0.10	NA	< 0.05	NA	90%	110%	103%	90%	110%	102%	80%	120%

Comments: NA signifies Not Applicable.

Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By:

Sofra Pehlyna

AGAT QUALITY ASSURANCE REPORT (V1)

Page 3 of 6



# **Method Summary**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 17T211486

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLING SITE: SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH





5835 Coopers Avenue Ph: 905.712

Regulation 558

Prov. Water Quality Objectives (PWQO)

Indicate One

☐ No

CCME

Other

O. Reg 153

☐ Yes

Report Guideline on Certificate of Analysis

i: 905.712.5100 Fax: 905.712.5122	Work Order #:
webearth.agatlabs.com	Cooler Quantity:
ble water consumed by humans)	Arrival Temperatures:
☐ No Regulatory Requirement	Custody Seal Intact:

Chain of Custody Record If this is a Drinking Water sample, please us	se Drinking Water Chain o	f Custody Form (pota	ble water co
Report Information: Company: Contact: Dwight Smike Address: 292 Speedvale Ave, W, unit +2 Guelph ON, NIH 109	Regulatory Requ		
Phone: Reports to be sent to:  1. Email:  2. Email:	☐ Res/Park ☐ Agriculture  Soil Texture (Check One) ☐ Coarse ☐ Fine	RegionIndicate Or	ne e
Project Information:  Project: Belfour Aria 3000 332 73  Site Location: Belfour Aria 3000 332 73  Sampled By: Mwt Valeriol 7	Is this submission Record of Site Co	672,235,	Cert

Burnside + Associates Etd.	Regulatory Requ		
Owight Smikle  92 Spechale Ave. W. uni+ +20  swelph ON. NIH ICY  Fax:  Wight Smikle & Cyburnside.com	Regulation 153/04  Table - Indicate One   Ind/Com   Res/Park   Agriculture  Soll Texture (Check One)   Coarse   Fine	Sewer  Sani  Storn  Region  Indicat	tary n
set fourten 300 33273	Is this submission Record of Site Co		
PO: Please note: If quotation number is not provided, client will be billed full price for analysis.	Sample Matrix Le	gend	1

Turnaround Tir	ne (TAT) Required:	
Regular TAT	5 to 7 Business Da	ays
Rush TAT (Rush Surch	arges Apply)	
3 Business Days	2 Business Days	Next Bus Day
OR Date Rec	uired (Rush Surcharges M	ay Apply):

Laboratory Use Only

Date

Sampled

Time

Sampled

# of

Containers

Date 2, 2017

	-		
-	San	nple Matrix Legend	1
=	В	Biota	
]	GW	Ground Water	3
	0	Oil	
	P	Paint	
-	S	Soil	
-	SD	Sediment	
	sw	Surface Water	L
San	nple	Comments/	

Special Instructions

Metals and Inorganics	☐ All Metals ☐ 153 Metals (excl. Hydric ☐ Hydride Metals ☐ 153 Metals (Incl. H	ORPs: □B-HWS □Cr □CN· □Cr* □Ec □FOC □Hg □ pH □SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH, ☐ TKN ☐ NO, ☐ NO, ☐ NO, ☐ NO, +NO,	Volatiles: □ voc □ BTEX □ THN	CCME Fractions 1 to 4	ABNS	PAHS	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☐ M&I ☐ VOCs ☐ ABNS ☐ B	Sewer Use	Nitrate + Nitrite			
														X			
		-				П								k		44.	
8														K			
		.0												X			
														1.0			

TWI	May 2,2017 10200 1	6,w		
TW2	10:30			
TW3	11:00		- CE SC	
TWY	11:30			
TWY				
TW 6	12130			
TW7 TW8	13:00			
TWE	13:30			
TW9	14:00			
TWIO	14:30			
Twl	15:00			(7)

Matrix

0	Sangues Received By Print Name and Sign):	2017/007	1	ne 2.15		2
	Samples Received By (Print Name and Sign):		Date	me	Page	_ of
	Samples Received By (Print Name and Sign):		Date	me	Nº: T 051	085

AGAT Quote #:

Sample Identification

K

x



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

Lab	oratory Use	Only		
Work	Order #:			
Coole	r Quantity:			
Arriva	l Temperatures:	3.2	13.3	3.5
Custo	dy Seal Intact:	∐Yes	□No	□N/
Turna	around Tim	e (TAT) Red	quired:	
	around Tim lar TAT		quired:	
Regu		5 to 7 Bi		
Regu	lar TAT	5 to 7 Bi	usiness Days	ext Busine

Chain	of	Custody	Record
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Chain of Custody Recor	'd If this is	a Drinki <b>ng W</b> ate	er sample, pl	lease u	se Drinking Water Chain o	f Custody Form (	potable	water co	nsumed	l by humans				rival T			es:	X	202	-1 5	2.0	4.	5
Report Information: Company: Buinside	1 A550	autos	111.		Regulatory Requirements:   No Regulatory Requirement (Please check all applicable boxes)					ent		istody otes:	Seal	Intac	:t:	□Yı	es	[	□No		]N/A		
Contact: Dwight S. Address: 292 Speedle	nikle Au	e. W.	( Init	#20	Regulation 153/04	Sewe	er Use	-		egulation 5	558		Tui	rnar	our	ıd T	ime	(TAT	Γ) <b>R</b> ε	equire	ed:		
Phone:	NIF IC	29			Table Indicate One Ind/Com Res/Park Agriculture	□San				CME rov. Water bjectives (l				gula sh T			charge	S Apply)	5 to 7 F	3usines	ss Days		
Reports to be sent to:  1. Email:  2. Email:	klean	burn	side .	an	Soil Texture (Check One)  ☐Coarse  ☐Fine	_	ate One	-	0	ther				Цι	B Bus Days				2 Busir Days		T	lext Bus	sines
Project Information:  Project: Bullouding 300 33273  Site Location: Bullouding  Sampled By: Mart Valerion					Is this submission for a Report Guideline on Record of Site Condition? Certificate of Analysis  Yes No Yes No					OR Date Required (Rush Surcharges May Apply):  Please provide prior notification for rush TAT  *TAT is exclusive of weekends and statutory holidays  For 'Same Day' analysis, please contact your AGAT CPM													
AGAT Quote #:  Please note: If quotation number	P0:	ill be billed full price i	for analysis		Sample Matrix Le	gend	crVI		rides) 0	153								B(a)P		- 5			
Invoice Information:  Company:  Contact:  Address:  Email:		Bill To Same:	Yes No		GW Ground Water O Oil P Paint S Soil SD Sediment SW Surface Water		Field Filtered - Metals, Hg, CrVI	Metals and Inorganics	☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (Incl. Hydric	S; □B-HWS □C: □CN- → □EC □FOC □Hg □SAR	Full Metals Scan Regulation/Custom Metals	TE: TP DNH, DTKN DNO, NO, NO, NO, NO, NO,	:s: □ voc □ втех □ тнм	CCME Fractions 1 to 4			☐ Total ☐ Aroclors	rine Pesticides		truck & Wibril			
Sample Identification	Date Sampled	Time Sampled	# of Containers	Sam			Y/0	Metals	☐ All Me ☐ Hydrid	ORPs:	Full Metals	Nutrients:	Volatiles:	CCME	ABNS	PAHS	PCBs: [	Organochlo	Sewer Use	2			
TWIZ	May 2, 2017	15:30		60	N															*			
													-										
Samples Relinquished by Print Name and Signi. What Var Ver io to 1926		Date	2017 Tim	16:	3 Saffilios Resulvey City (	Print Name and Signif	0		37	20) 7/	017	000		j	me 2	1/							
Samples Relinquished by Print Name and Sign):		Date	Tien	H	Samples Received By (I	Prior Name and Sign)				1 21	-	nte		Ti	mie.	,	R.		Pag	ge Z	of	2	
Samples Primarish to By Print Name and Signs	0.760	Date	Tiny	23	Samples Received By (	Print Name and Bign):					C	Notes:		D	me.			Nº:	1	15	101	36	



CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD 292 Speedvale Avenue West, Unit 7

Guelph, ON N1H1C4 (519) 823-4995

ATTENTION TO: Dwight Smikle

PROJECT: 300033273

AGAT WORK ORDER: 17W195195

WATER ANALYSIS REVIEWED BY: Mike Muneswar, BSc (Chem), Senior Inorganic Analyst

DATE REPORTED: Mar 22, 2017

PAGES (INCLUDING COVER): 11

VERSION\*: 1

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

NOTES

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

AGAT Laboratories (V1)

\*NOTE O

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Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)

Western Enviro-Agricultural Laboratory Association (WEALA) Environmental Services Association of Alberta (ESAA) AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation.



SAMPLING SITE:

## Certificate of Analysis

AGAT WORK ORDER: 17W195195

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLED BY:

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

## Water Quality Assessment - Groundwater Samples

DATE RECEIVED: 2017-03-10	)						D/	ATE REPORT	ED: 2017-03-22	
Davisation		AMPLE DESCRIPTION: SAMPLE TYPE: DATE SAMPLED:	TW1 Water 2017-03-10	DDI	TW2 Water 2017-03-10	DDI	TW3 Water 2017-03-10	DDI	TW4 Water 2017-03-10	TW5 Water 2017-03-10
Parameter Electrical Conductivity	Unit uS/cm	G/S RDL 2	8244996 705	RDL 2	8244997 392	RDL 2	8245003 802	RDL 2	8245009 558	8245015 604
pH	pH Units	NA	8.14	NA	8.02	NA	8.14	NA	8.10	8.12
Saturation pH	prionis	IVA	6.89	INA	7.36	INA	6.83	INA	6.99	7.00
Langelier Index			1.25		0.66		1.31		1.11	1.12
Total Hardness (as CaCO3)	mg/L	0.5	361	0.5	181	0.5	433	0.5	275	288
Total Dissolved Solids	mg/L	20	396	20	198	20	484	20	284	306
Alkalinity (as CaCO3)	mg/L	5	256	5	163	5	248	5	250	249
Bicarbonate (as CaCO3)	mg/L	5	256	5	163	5	248	5	250	249
Carbonate (as CaCO3)	mg/L	5	<5	5	<5	5	<5	5	<5	<5
Hydroxide (as CaCO3)	mg/L	5	<5	5	<5	5	<5	5	<5	<5
Fluoride	mg/L	0.05	0.19	0.05	<0.05	0.05	0.10	0.05	<0.05	<0.05
Chloride	mg/L	0.10	14.3	0.03	16.7	0.00	3.41	0.10	12.6	20.2
Nitrate as N	mg/L	0.05	<0.05	0.05	1.16	0.05	0.62	0.05	3.43	6.76
Nitrite as N	mg/L	0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05	<0.05
Bromide	mg/L	0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05	<0.05
Sulphate	mg/L	0.50	105	0.10	13.8	0.50	193	0.10	18.9	14.1
Ortho Phosphate as P	mg/L	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	<0.10
Reactive Silica	mg/L	0.05	12.7	0.05	3.65	0.05	10.7	0.05	7.28	7.03
Ammonia as N	mg/L	0.02	<0.02	0.02	0.04	0.02	0.14	0.02	<0.02	<0.02
Total Phosphorus	mg/L	0.05	< 0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05	< 0.05
Total Organic Carbon	mg/L	0.5	1.3	0.5	2.4	0.5	0.7	0.5	1.2	0.7
Colour	TCU	5	<5	5	<5	5	<5	5	<5	<5
Turbidity	NTU	0.5	135	0.5	3.3	0.5	15.3	0.5	0.6	1.9
Calcium	mg/L	0.05	97.9	0.05	48.8	0.05	122	0.05	74.1	79.3
Magnesium	mg/L	0.05	28.4	0.05	14.4	0.05	31.1	0.05	21.8	21.9
Sodium	mg/L	0.05	5.27	0.05	6.39	0.05	3.42	0.05	5.36	8.93
Potassium	mg/L	0.05	1.18	0.05	1.26	0.05	1.28	0.05	1.01	0.91
Aluminum	mg/L	0.004	0.006	0.004	0.017	0.004	0.008	0.004	0.011	0.013
Antimony	mg/L	0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003	< 0.003
Arsenic	mg/L	0.003	0.006	0.003	<0.003	0.003	<0.003	0.003	<0.003	<0.003

Certified By:

Make Muneman



## Certificate of Analysis

AGAT WORK ORDER: 17W195195

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLED BY:

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

SAMPLING SITE:

Or HVII EII VO OITE:						O/ (IVII LL				
		Wate	r Quality A	ssessment	- Groundwa	ter Sample	es			
DATE RECEIVED: 2017-03-10							D	ATE REPOR	ΓED: 2017-03-22	
Parameter	Unit	SAMPLE DESCRIPTION: SAMPLE TYPE: DATE SAMPLED: G/S RDL	TW1 Water 2017-03-10 8244996	RDL	TW2 Water 2017-03-10 8244997	RDL	TW3 Water 2017-03-10 8245003	RDL	TW4 Water 2017-03-10 8245009	TW5 Water 2017-03-10 8245015
Barium	mg/L	0.002	0.073	0.002	0.030	0.002	0.045	0.002	0.053	0.110
Beryllium	mg/L	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001
Boron	mg/L	0.010	0.016	0.010	<0.010	0.010	0.020	0.010	<0.010	<0.010
Cadmium	mg/L	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001
Chromium	mg/L	0.003	< 0.003	0.003	< 0.003	0.003	< 0.003	0.003	< 0.003	< 0.003
Cobalt	mg/L	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001
Copper	mg/L	0.003	< 0.003	0.003	< 0.003	0.003	< 0.003	0.003	< 0.003	< 0.003
Iron	mg/L	0.010	0.167	0.010	<0.010	0.010	0.032	0.010	<0.010	<0.010
Lead	mg/L	0.002	< 0.002	0.002	< 0.002	0.002	< 0.002	0.002	< 0.002	< 0.002
Manganese	mg/L	0.002	0.019	0.002	< 0.002	0.002	0.005	0.002	< 0.002	< 0.002
Mercury	mg/L	0.0001	< 0.0001	0.0001	<0.0001	0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001
Molybdenum	mg/L	0.002	< 0.002	0.002	<0.002	0.002	0.002	0.002	< 0.002	< 0.002
Nickel	mg/L	0.003	< 0.003	0.003	<0.003	0.003	< 0.003	0.003	<0.003	<0.003
Selenium	mg/L	0.004	< 0.004	0.004	<0.004	0.004	<0.004	0.004	<0.004	< 0.004
Silver	mg/L	0.002	< 0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002	< 0.002
Strontium	mg/L	0.005	0.588	0.005	0.078	0.005	0.916	0.005	0.121	0.162
Thallium	mg/L	0.006	<0.006	0.006	<0.006	0.006	<0.006	0.006	<0.006	<0.006
Tin	mg/L	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002
Titanium	mg/L	0.002	<0.002	0.002	<0.002	0.002	0.003	0.002	<0.002	<0.002
Tungsten	mg/L	0.010	<0.010	0.010	<0.010	0.010	<0.010	0.010	<0.010	<0.010
Uranium	mg/L	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002
Vanadium	mg/L	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002
Zinc	mg/L	0.005	0.034	0.005	0.011	0.005	0.032	0.005	0.013	0.024
Zirconium	mg/L	0.004	<0.004	0.004	<0.004	0.004	<0.004	0.004	<0.004	<0.004
% Difference/ Ion Balance	%	NA	1.56	NA	2.09	NA	1.57	NA	2.07	1.24

Certified By:

Mile Munemon



SAMPLING SITE:

## Certificate of Analysis

AGAT WORK ORDER: 17W195195

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLED BY:

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

## Water Quality Assessment - Groundwater Samples

			-							
DATE RECEIVED: 2017-03-10							[	DATE REPORTE	D: 2017-03-22	2
	S	AMPLE DESCRIPTION: SAMPLE TYPE:	TW6 Water	TW7 Water	TW8 Water	TW9 Water	TW10 Water	TW11 Water		TW12 Water
Description	Unit	DATE SAMPLED: G/S RDL	2017-03-10 8245021	2017-03-10 8245027	2017-03-10	2017-03-10	2017-03-10	2017-03-10	RDL	2017-03-10
Parameter Electrical Conductivity	uS/cm	G/S RDL 2	612	592	8245033 604	8245039 620	8245045 430	8245052 568	2 RDL	8245058 1730
pH	pH Units	NA	8.10	8.11	8.12	8.10	8.06	8.16	NA	7.95
Saturation pH	pn units	INA	7.01	6.98	6.98	6.90	7.26	6.99	INA	7.95 6.61
Langelier Index			1.09	1.13	1.14	1.20	0.80	1.17		1.34
Total Hardness (as CaCO3)	mg/L	0.5	288	291	301	310	202	278	0.5	1020
Total Dissolved Solids	<del>-</del>	20	308	306	312	326	216	286	20	1400
Alkalinity (as CaCO3)	mg/L	5	245	260	251	294	182	249	5	192
Bicarbonate (as CaCO3)	mg/L	5 5	245	260	251	294	182	249	5	192
Carbonate (as CaCO3)	mg/L mg/L	5	<5	<5	<5	294 <5	<5	<5	5	<5
Hydroxide (as CaCO3)	mg/L	5	<5 <5	<5 <5	<5 <5	<5 <5	<5 <5	<5 <5	5	<5 <5
Fluoride (as CaCO3)	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.25	<0.25
Chloride		0.03	21.8	12.5	9.54	8.84	14.4	13.9	0.23	2.11
Nitrate as N	mg/L	0.10	8.52	5.77	9.54 6.68	2.68	1.68	3.94	0.50	<0.25
Nitrite as N	mg/L	0.05	< 0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.25	<0.25
Bromide	mg/L mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.25	<0.25
Sulphate	<del>-</del>	0.05	13.5	<0.05 14.4	<0.05 31.1	<0.05 50.1	<0.05 14.3	<0.05 19.1	1.0	<0.25 896
Ortho Phosphate as P	mg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.50	< 0.50
Reactive Silica	mg/L mg/L	0.10	7.01	6.72	7.18	8.42	4.56	7.19	0.50	<0.50 13.1
Ammonia as N	mg/L	0.03	<0.02	0.03	0.15	0.09	0.03	<0.02	0.03	<0.02
Total Phosphorus	mg/L	0.02	<0.02	<0.05	0.13	<0.05	0.03	<0.02	0.02	<0.02
Total Organic Carbon	mg/L	0.5	0.7	0.6	1.1	0.8	2.1	1.6	0.03	0.6
Colour	TCU	5	0. <i>1</i> <5	<5	<5	0.6 <5	<5	<5	5	0.6 <5
Turbidity	NTU	0.5	<0.5	1.8	113	2.0	64.8	7.4	0.5	8.6
Calcium	mg/L	0.05	79.9	80.0	81.6	81.5	54.3	75.0	0.10	318
Magnesium	mg/L	0.05	21.6	22.2	23.6	25.8	16.2	22.0	0.10	54.3
Sodium	mg/L	0.05	8.87	4.86	3.67	4.17	5.76	5.82	0.10	8.43
Potassium	mg/L	0.05	0.86	0.92	1.12	0.99	1.21	0.98	0.10	1.95
Aluminum	mg/L	0.004	0.006	0.92	<0.004	0.99	0.014	0.98	0.10	0.008
Antimony	•	0.004	<0.008	<0.003	<0.004	<0.003	< 0.014	<0.003	0.004	<0.003
,	mg/L	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	0.013
Arsenic	mg/L	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	0.013

Certified By:

Mile Munemen



SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 17W195195

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLED BY:

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

## Water Quality Assessment - Groundwater Samples

DATE RECEIVED: 2017-03-10							[	DATE REPORTE	D: 2017-03-22	2
		SAMPLE DESCRIPTION:	TW6	TW7	TW8	TW9	TW10	TW11		TW12
		SAMPLE TYPE:	Water	Water	Water	Water	Water	Water		Water
		DATE SAMPLED:	2017-03-10	2017-03-10	2017-03-10	2017-03-10	2017-03-10	2017-03-10		2017-03-10
Parameter	Unit	G/S RDL	8245021	8245027	8245033	8245039	8245045	8245052	RDL	8245058
Barium	mg/L	0.002	0.105	0.109	0.099	0.074	0.036	0.061	0.002	0.012
Beryllium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	< 0.001
Boron	mg/L	0.010	<0.010	0.010	0.011	0.012	<0.010	0.010	0.010	0.058
Cadmium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	< 0.001
Chromium	mg/L	0.003	<0.003	< 0.003	< 0.003	< 0.003	< 0.003	<0.003	0.003	< 0.003
Cobalt	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	< 0.001
Copper	mg/L	0.003	<0.003	< 0.003	< 0.003	<0.003	< 0.003	<0.003	0.003	< 0.003
Iron	mg/L	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	0.665
Lead	mg/L	0.002	< 0.002	<0.002	< 0.002	<0.002	< 0.002	<0.002	0.002	< 0.002
Manganese	mg/L	0.002	<0.002	<0.002	0.002	<0.002	0.009	<0.002	0.002	0.030
Mercury	mg/L	0.0001	< 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	< 0.0001
Molybdenum	mg/L	0.002	< 0.002	< 0.002	< 0.002	<0.002	< 0.002	< 0.002	0.002	0.005
Nickel	mg/L	0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	<0.003	0.003	< 0.003
Selenium	mg/L	0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.004	< 0.004
Silver	mg/L	0.002	< 0.002	<0.002	< 0.002	<0.002	< 0.002	<0.002	0.002	< 0.002
Strontium	mg/L	0.005	0.156	0.136	0.545	0.339	0.083	0.129	0.005	3.86
Thallium	mg/L	0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.006	< 0.006
Tin	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	< 0.002
Titanium	mg/L	0.002	< 0.002	<0.002	< 0.002	<0.002	< 0.002	<0.002	0.002	0.013
Tungsten	mg/L	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	< 0.010
Jranium	mg/L	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.002	< 0.002
Vanadium	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	< 0.002	0.002	< 0.002
Zinc	mg/L	0.005	0.017	0.029	0.017	0.037	0.016	0.015	0.005	0.046
Zirconium	mg/L	0.004	<0.004	<0.004	<0.004	<0.004	<0.004	< 0.004	0.004	< 0.004
% Difference/ Ion Balance	%	NA	1.84	1.69	1.59	6.98	1.56	1.85	NA	4.11

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

8244996-8245058 Elevated RDLs indicate the degree of sample dilutions prior to analysis in order to keep the analytes within the calibration range of the instruments and to reduce matrix interferences.

Certified By:

Mile Muneman



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1.18

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< 0.003

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0.073

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0.167

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1.14

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3.4%

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1.4%

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NA

NA

NA

14.1%

NA

5.4%

NA

NA

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

## **Quality Assurance**

Water Analysis

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD AGAT WORK ORDER: 17W195195

PROJECT: 300033273 ATTENTION TO: Dwight Smikle SAMPLING SITE: SAMPLED BY:

**DUPLICATE** REFERENCE MATERIAL METHOD BLANK SPIKE RPT Date: Mar 22, 2017 MATRIX SPIKE Method Acceptable Acceptable Acceptable Sample Measured Blank Limits Limits Limits Dup #2 **PARAMETER** Batch Dup #1 RPD Recovery Recovery Value Lower Upper Lower Upper Lower Upper Water Quality Assessment - Groundwater Samples **Electrical Conductivity** 103% 8241738 1620 1610 0.6% < 2 80% NΑ NA 120% 8241738 7.91 7.92 0.1% NA 99% 90% 110% NA NA **Total Dissolved Solids** 8248350 754 800 5.9% < 20 96% 80% 120% NA NΑ Alkalinity (as CaCO3) 8241738 104 104 0.0% < 5 107% 80% 120% NA NΑ Bicarbonate (as CaCO3) 8241738 104 104 0.0% NA NA < 5 NA Carbonate (as CaCO3) 8241738 <5 <5 < 5 NA NA NA NA Hydroxide (as CaCO3) 8241738 <5 <5 NA < 5 NΑ NA NΑ Fluoride 8245009 8245009 < 0.05 < 0.05 NA < 0.05 98% 90% 110% 104% 90% 110% 105% 80% 120% Chloride 8245009 8245009 12.6 13.1 3.9% < 0.10 94% 90% 110% 104% 90% 110% 99% 80% 120% < 0.05 92% Nitrate as N 8245009 8245009 3.43 3.50 2.0% 95% 90% 110% 90% 110% 98% 80% 120% Nitrite as N < 0.05 89% 120% 8245009 8245009 < 0.05 NA < 0.05NA 90% 110% 96% 90% 110% 80% < 0.05 **Bromide** < 0.05 NA 109% 90% 98% 100% 80% 120% 8245009 8245009 < 0.05 110% 90% 110% < 0.10 120% Sulphate 8245009 8245009 18.9 19.1 1.1% 93% 90% 110% 97% 90% 110% 101% 80% < 0.10 Ortho Phosphate as P 8245009 8245009 < 0.10 < 0.10 NA 103% 90% 110% 107% 90% 110% 98% 80% 120% Reactive Silica 8244996 8244996 12.7 12.7 0.0% < 0.05 96% 90% 110% 98% 90% 110% 82% 80% 120% Ammonia as N 8249575 < 0.02 < 0.02 NA < 0.02 97% 90% 110% 91% 90% 110% 84% 80% 120% Total Phosphorus 8243025 0.06 0.06 NA < 0.05 98% 80% 120% 97% 90% 110% 98% 70% 130% **Total Organic Carbon** 8244996 8244996 1.3 1.4 NA < 0.5 109% 90% 110% NA 90% 110% 105% 80% 120% Colour 8244996 8244996 < 5 <5 NA < 5 106% 90% 110% NA NA Turbidity 8244996 8244996 135 135 0.0% 101% 90% 110% NA NA < 0.5Calcium 8244996 8244996 98.4 103% 102% 96% 70% 130% 97.9 0.5% < 0.05 90% 110% 90% 110% 8244996 8244996 28.1 100% 90% 100% 97% 70% 130% Magnesium 28 4 1.1% < 0.05110% 90% 110% 70% Sodium 8244996 8244996 5.22 130% 5.27 1.0% < 0.0599% 90% 110% 99% 90% 110% 99%

< 0.05

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AGAT QUALITY ASSURANCE REPORT (V1)

Potassium

Aluminum

Antimony

Arsenic

**Barium** 

Boron Cadmium

Beryllium

Chromium

Cobalt

Copper

Iron

Lead

Manganese

Molybdenum

Mercury

Page 6 of 11

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## **Quality Assurance**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

AGAT WORK ORDER: 17W195195

PROJECT: 300033273

ATTENTION TO: Dwight Smikle

SAMPLING SITE: SAMPLED BY:

		V	Vater	Anal	lysis	(Cor	ntinu	ed)							
RPT Date: Mar 22, 2017				UPLICATE	Ī		REFEREN	ICE MA	TERIAL	METHOD	BLANK	SPIKE	MAT	RIX SPI	KE
PARAMETER	Batch	Sample	Dup #1	Dup #2	RPD	Method Blank	Measured		ptable nits	Recovery	1 1 1 1 1	ptable nits	Recovery	1 1:0	ptable nits
		ld					Value	Lower	Upper	,	Lower	Upper	, , ,	Lower	Upper
Nickel	8244996	8244996	< 0.003	<0.003	NA	< 0.003	103%	90%	110%	109%	90%	110%	107%	70%	130%
Selenium	8244996	8244996	< 0.004	<0.004	NA	< 0.004	100%	90%	110%	102%	90%	110%	110%	70%	130%
Silver	8244996	8244996	< 0.002	< 0.002	NA	< 0.002	97%	90%	110%	108%	90%	110%	113%	70%	130%
Strontium	8244996	8244996	0.588	0.560	4.9%	< 0.005	106%	90%	110%	108%	90%	110%	112%	70%	130%
Thallium	8244996	8244996	< 0.006	<0.006	NA	< 0.006	104%	90%	110%	110%	90%	110%	108%	70%	130%
Tin	8244996	8244996	< 0.002	<0.002	NA	< 0.002	97%	90%	110%	102%	90%	110%	104%	70%	130%
Titanium	8244996	8244996	< 0.002	<0.002	NA	< 0.002	96%	90%	110%	100%	90%	110%	102%	70%	130%
Tungsten	8244996	8244996	< 0.010	<0.010	NA	< 0.010	94%	90%	110%	100%	90%	110%	98%	70%	130%
Uranium	8244996	8244996	< 0.002	< 0.002	NA	< 0.002	104%	90%	110%	108%	90%	110%	106%	70%	130%
Vanadium	8244996	8244996	< 0.002	< 0.002	NA	< 0.002	94%	90%	110%	102%	90%	110%	104%	70%	130%
Zinc	8244996	8244996	0.034	0.031	9.2%	< 0.005	102%	90%	110%	108%	90%	110%	110%	70%	130%
Zirconium	8244996	8244996	< 0.004	<0.004	NA	< 0.004	96%	90%	110%	96%	90%	110%	95%	70%	130%

Comments: NA signifies Not Applicable.

Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By:

Make Muneman

# Method Summary

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

PROJECT: 300033273

AGAT WORK ORDER: 17W195195

ATTENTION TO: Dwight Smikle

SAMPLING SITE: SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Saturation pH		SM 2320 B	CALCULATION
Langelier Index		SM 2330B	CALCULATION
Total Hardness (as CaCO3)	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Bicarbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Carbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Hydroxide (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Fluoride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Reactive Silica	INOR-93-6047	SmartChem Method SIL-001-A & SM 4500 Si-F 18 &19th	DISCRETE ANALYZER
Ammonia as N	INOR-93-6059	QuikChem 10-107-06-1-J & SM 4500 NH3-F	LACHAT FIA
Total Phosphorus	INOR-93-6057	QuikChem 10-115-01-3-A & SM 4500-P I	LACHAT FIA
Total Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310	SHIMADZU CARBON ANALYZER
Colour	INOR-93-6046	SM 2120 B	SPECTROPHOTOMETER
Turbidity	INOR-93-6044	SM 2130 B	NEPHELOMETER
Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Potassium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Aluminum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Antimony	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Mercury	MET-93-6100	EPA SW 846 7470 & 245.1	CVAAS
Molybdenum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Selenium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Silver	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Strontium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Thallium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS



# **Method Summary**

CLIENT NAME: R.J. BURNSIDE & ASSOCIATES LTD

PROJECT: 300033273

AGAT WORK ORDER: 17W195195

ATTENTION TO: Dwight Smikle

SAMPLING SITE: SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Tin	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Titanium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Tungsten	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Uranium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zirconium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
% Difference/ Ion Balance		SM 1030 E	CALCULATION



**Laboratory Use Only** 

Laboratoristert Holding Time: 905.712.5100 Fax: 905.712.5102 webearth.agatlabs.com Work Order #: 17 W 19 5 19 5 Cooler Quantity: Arrival Temperatures: **Chain of Custody Record** If this is a Drinking Water sample, please use Drinking water chain or Custody Form (potable water intended for human consumption) Regulatory Requirements: No Regulatory Requirement Report Information: (Please check all applicable boxes) Company: Notes: Dought smile 292 Specilvalle Ave. west unit 20 bulph, out Contact: Regulation 153/04 Sewer Use Regulation 558 **Turnaround Time (TAT) Required:** Address: Table Indicate One
☐ Ind/Com CCME ☐ Sanitary **Regular TAT** 5 to 7 Business Days Res/Park Storm Prov. Water Quality Rush TAT (Rush Surcharges Apply) Phone: Agriculture Objectives (PWQO) dwight. Smille > syburnside. com Reports to be sent to: Soil Texture (Check One) Other 2 Business 3 Business **Next Business** 1. Email: Indicate One Days Day Coarse matt. Valeriote > ribuinside. com OR Date Required (Rush Surcharges May Apply): 2. Email: □Fine Indicate One Is this submission for a Report Guideline on **Project Information:** Record of Site Condition? Please provide prior notification for rush TAT Certificate of Analysis 3000 3327 Project: \*TAT is exclusive of weekends and statutory holidays DNO Yes □ No Site Location: ☐ Yes For 'Same Day' analysis, please contact your AGAT CPM Sampled By: □PCBs O. Regt 153 AGAT Quote #: **Sample Matrix Legend** Please note: If quotation number is not provided, client will be billed full price for analysis □ B(a)P | D THM **Invoice Information:** Bill To Same: Yes 

No □ **Ground Water** Nutrients: ☐ TP ☐ NH ☐ TKN ☐ NO<sub>3</sub> ☐ NO<sub>3</sub> + NO<sub>2</sub> S S ☐ ABNs Regulation/Custom Metals Company: BTEX PCBs: □ Total □ Aroclors ORPs; DB-HWS DCI C DCI\*\* DEC DFOC DH DRH DSAR Contact: CCME Fractions 1 to 4 Field Filtered Soil Address: Metals and Inorga Volatiles: □ voc SD Sediment Full Metals Scan Email: S. L. Surface Water Sewer Use Time Comments/ Date # of Sample Sample Identification Sampled Sampled Containers Matrix Special Instructions Musch.10, 8.25 TW 10:00 TW 2 Y TW 3 3:45 TW 5 12:25 12:00 TN 7 Y TW 11:05 W Date Marchila Time

Samples Received By (Print Name and Sign)

Date

Time

Samples Holinquioned By (Print Name and Sign):



5835 Coopers Avenue Mississauga, Ontario 147 1Y2

	7	La	abora	ato	ories <b>Short Holding</b>	Ti	102.510	Fax: 905	712.6	122		work	Order	#: _							
Chain of Custody Reco					use Drinking Water Chain or Cuscody Form	_							er Qua al Tem	·	ures:	1	7.0	_1	6.5	15.	
Report Information: 2 J Bu	msile	1 Assa	cicil 5	W	Regulatory Requirements:	Y	lo Regula	atory Red	quire	ment		Custo	ody Se	eal Int	act:	C	]Yes		□No		□N/A
Report Information Company: Contact: Address:  Phone: Reports to be sent to: Email:  Matt Valor  Report Information  Aught Sau  Matt Valor	i hle 21	i burn	Side .	Can	☐ Agriculture  Soil Texture (Check One)  Region	ary		Regulation CCME Prov. Water Objectives Other	Quali (PWQ(		F	Regu	TAT	'AT (Rush S USINE: 'S	urchar SS	ges App	5 to by) 2 Bu Days	7 Bus usines	siness Da	Next Bu	ısines
Project Information: Project: Site Location: Sampled By:  Project Information: Bulfountain Bulfountain Bulfountain	H 3000	3327	3		Is this submission for a Record of Site Condition?  Yes No		Report Certifica			S		For	*TAT	is ex	clusiv	e of v	veekei	nds ar		rush TAT ory holidaj ır AGAT CF	
AGAT Quote #:  Please note: If quotation number  Invoice Information:  Company: Contact: Address: Email:	P0:		for analysis		Sample Matrix Legend B Biota GW Ground Water O Oil P Paint S Soil SD Sediment SW Surface Water	Field Filtered - Wetals, Kg CrVI	Metals and Inorganics  □ All Metals □ 153 Metals (exc). Hydrides)  □ Hydride Metals	ORPs: DBHWS DCI DCN CST CST DCN CST DEC DFOC DHg	Full Metals Scan	Regulation/Custom Metals  Nutrients: □TP □ NH, □TKN		Volatiles: UVOC UBTEX UTHM	3		PCBs: □ Total □ Aroclors	Organochlorine Pesticides	M&I □ VOCs □ ABNs □ B(a)P □PCBs	J. A. A. A. A. A. A. A. A. A. A. A. A. A.	T'S		
Sample Identification	Date Sampled	Time Sampled	# of Containers	Samı		N	Metals  All Me	ORPs:	Full Me	Regulat Nutrien	o N D	Volatiles:	ABNS	PAHs	PCBs: [	Organo	TCLP:□M&I	Sewer Use	3		
TWIZ	March 10, hold	9:00	6	GI	mercuy + Mitals	>												7	X		
Samples Relinquished By (Print Name and Sign):  Samples Relinquished By (Print Name and Sign):	De la companya della companya della companya de la companya della	Date Ma	old Tim		Samples Received By (Print Name and Sign): Samples Becanned By (Print Name and Sign):	رده	isng	6		Date Date	141	111	Time 0 3	7 39	OV	1	F	Page _	2 0	of 2	-
Samples Relinquished By (Print Name and Sign):		Date	Tim	ie	Samples Received By (Print Name and Sign):					Date	1		Time			- L	王	_	4.7	100	

**Laboratory Use Only** 

# Appendix H MOECC Well Records Search

Well ID	Zone	Easting	Northing	First Use	Second Use	Final Status
4908977	17	579679	4849026			Abandoned-Other
7226686	17	579410	4849408			Abandoned-Other
7226687	17	579458	4849364			Abandoned-Other
7227270	17	579267	4849590			Abandoned-Other
7244358	17	579305	4849431			Abandoned-Other
4900935	17	580130	4849589	Not Used		Abandoned-Supply
4901017	17	579561	4849643			Abandoned-Supply
4902928	17	580334	4849763			Abandoned-Supply
4902973	17	580414	4849923			Abandoned-Supply
7104809	17	579297	4849532	Domestic		Abandoned-Supply
7109610	17	579143	4848750	Not Used		Abandoned-Supply
7225052	17	579813	4848777	Monitoring and Test Hole		Monitoring and Test Hole
4906840	17	579466	4848761	Not Used		Observation Wells
4906842	17	579567	4848299	Not Used		Observation Wells
4906845	17	579466	4848759	Not Used		Observation Wells
4906846	17	579180	4849396	Not Used		Observation Wells
4906847	17	579567	4848301	Not Used		Observation Wells
4906848	17	579584	4848324	Not Used		Observation Wells
7225053	17	579814	4848771	Monitoring		Observation Wells
6712134	17	578800	4848946	Not Used		Test Hole
7140490	17	579080	4848673	Test Hole		Test Hole
7225054	17	579491	4848283	Test Hole		Test Hole
7225055	17	579995	4849204	Test Hole		Test Hole
7225056	17	579614	4848788	Test Hole		Test Hole
7225057	17	580008	4849203	Test Hole		Test Hole
7226632	17	579631	4849072	Test Hole		Test Hole
4906841	17	579469	4848760	Not Used		Unfinished
4900936	17	580155	4849605	Domestic		Water Supply
4900937	17	580329	4849762	Domestic		Water Supply
4900938	17	580347	4849883	Domestic		Water Supply
4901005	17	580366	4849130	Domestic		Water Supply
4901006	17	579779	4849344	Livestock	Domestic	Water Supply
4901007	17	579352	4849464	Domestic		Water Supply
4901008	17	579460	4849367	Domestic		Water Supply
4901009	17	578984	4848882	Public		Water Supply
4901010	17	579304	4849391	Domestic		Water Supply

4901011	17	579622	4849394	Domestic		Water Supply
4901012	17	579011	4849211	Domestic		Water Supply
4901016	17	579285	4849524	Domestic		Water Supply
4901018	17	579581	4849479	Domestic		Water Supply
4901020	17	579076	4849263	Domestic		Water Supply
4901021	17	578822	4848994	Domestic		Water Supply
4901022	17	579329	4849559	Domestic		Water Supply
4901023	17	578871	4849235	Domestic		Water Supply
4901025	17	579347	4849667	Domestic		Water Supply
4901048	17	578747	4848905	Domestic		Water Supply
4902929	17	580334	4849753	Domestic		Water Supply
4902940	17	580524	4849773	Domestic		Water Supply
4902941	17	580524	4849793	Domestic		Water Supply
4902947	17	580364	4849723	Domestic		Water Supply
4902948	17	580234	4849683	Domestic		Water Supply
4903143	17	579089	4849323	Domestic		Water Supply
4903144	17	579139	4849533	Domestic		Water Supply
4903703	17	579614	4849823	Domestic		Water Supply
4903832	17	579314	4849473	Domestic		Water Supply
4903893	17	579564	4849763	Domestic		Water Supply
4904041	17	579374	4849613	Domestic		Water Supply
4904255	17	579712	4849856	Livestock	Domestic	Water Supply
4904256	17	579882	4849907	Domestic		Water Supply
4904407	17	578846	4848676	Domestic		Water Supply
4904412	17	580774	4849521	Domestic		Water Supply
4904488	17	580349	4849567	Domestic		Water Supply
4904489	17	580624	4849458	Domestic		Water Supply
4904555	17	579438	4849307	Domestic		Water Supply
4904661	17	580509	4849246	Domestic		Water Supply
4904662	17	580648	4849216	Domestic		Water Supply
4904689	17	580618	4849631	Domestic		Water Supply
4904724	17	580682	4849561	Domestic		Water Supply
4904725	17	580580	4849183	Domestic		Water Supply
4904726	17	580541	4849306	Domestic		Water Supply
4904727	17	580640	4849222	Domestic		Water Supply
4904728	17	580555	4849441	Domestic		Water Supply
4904750	17	579384	4849547	Domestic		Water Supply
	_				-	

4904772	17	580617	4849298	Domestic	Water Supply
4904798	17	580670	4849458	Domestic	Water Supply
4904812	17	580541	4849360	Domestic	Water Supply
4904813	17	578861	4849089	Domestic	Water Supply
4904816	17	579434	4849486	Domestic	Water Supply
4904854	17	579373	4849527	Domestic	Water Supply
4904879	17	578914	4849123	Domestic	Water Supply
4904971	17	580464	4849323	Domestic	Water Supply
4904973	17	580664	4849573	Domestic	Water Supply
4905014	17	580549	4849543	Domestic	Water Supply
4905033	17	579164	4849523	Domestic	Water Supply
4905085	17	578914	4849273	Domestic	Water Supply
4905174	17	580414	4849423	Domestic	Water Supply
4905176	17	580784	4849463	Domestic	Water Supply
4905259	17	579114	4849323	Domestic	Water Supply
4905271	17	579364	4849623	Domestic	Water Supply
4905347	17	580364	4849473	Domestic	Water Supply
4905356	17	579064	4849123	Domestic	Water Supply
4905490	17	579514	4849523	Domestic	Water Supply
4905619	17	578914	4849273	Domestic	Water Supply
4905863	17	578864	4849023	Domestic	Water Supply
4905867	17	578814	4848873	Domestic	Water Supply
4906310	17	579338	4849346	Public	Water Supply
4906377	17	579397	4849397	Domestic	Water Supply
4906378	17	579513	4849315	Domestic	Water Supply
4906385	17	579728	4849854	Domestic	Water Supply
4906488	17	579324	4849607	Domestic	Water Supply
4906608	17	579325	4849619	Domestic	Water Supply
4906673	17	579338	4849346	Domestic	Water Supply
4906792	17	579549	4849813	Domestic	Water Supply
4906802	17	579320	4849612	Domestic	Water Supply
4906918	17	579035	4849190	Domestic	Water Supply
4906948	17	579627	4848237		Water Supply
4906996	17	579033	4849190	Domestic	Water Supply
4907142	17	579458	4849367	Domestic	Water Supply
4907143	17	579465	4848760	Domestic	Water Supply
4907305	17	579325	4849619	Domestic	Water Supply
	_				

4907450	17	579342	4848016	Domestic		Water Supply
4907527	17	579431	4849421	Domestic		Water Supply
4907566	17	579432	4849369	Domestic		Water Supply
4907588	17	579513	4848057	Domestic		Water Supply
4907667	17	579467	4849324	Domestic		Water Supply
4907835	17	580054	4849565	Domestic		Water Supply
4907914	17	579020	4849145	Domestic		Water Supply
4907937	17	578605	4848620	Domestic		Water Supply
4908028	17	579359	4849439	Domestic		Water Supply
4908046	17	579773	4849928	Domestic		Water Supply
4908201	17	579212	4849382	Domestic		Water Supply
4908259	17	579615	4849394	Domestic		Water Supply
4908260	17	579070	4849102	Domestic		Water Supply
4908261	17	578985	4849116	Domestic		Water Supply
4908300	17	579279	4849618	Domestic		Water Supply
4908348	17	579255	4848557	Domestic		Water Supply
4908409	17	579237	4849428	Domestic		Water Supply
4908458	17	579548	4848006	Domestic		Water Supply
4908511	17	580573	4849178	Domestic		Water Supply
4908686	17	579519	4849115	Domestic		Water Supply
4908830	17	579562	4849797	Domestic		Water Supply
4908979	17	579679	4849026	Domestic		Water Supply
4909426	17	579463	4849114	Domestic		Water Supply
4909875	17	578977	4848892	Public		Water Supply
7106064	17	578821	4848647	Domestic		Water Supply
7206790	17	578914	4848423	Domestic		Water Supply
7206791	17	578897	4848407	Domestic		Water Supply
7224239	17	579530	4849753	Domestic		Water Supply
7255729	17	579229	4849417	Domestic		Water Supply
7259263	17	580086	4849091	Domestic		Water Supply
7259264	17	579801	4849157	Domestic	Test Hole	Water Supply
7259265	17	579945	4848906	Domestic	Test Hole	Water Supply
7259266	17	579789	4848906	Domestic	Test Hole	Water Supply
7259267	17	579692	4849093	Domestic		Water Supply
7259268	17	579469	4848667	Domestic	Test Hole	Water Supply

# Appendix I Water Balance Analysis

## Monthly Water Balance Analysis - Thornthwaite and Mather model Existing conditions Belfountain (Pre-development)

Total

901.6

901.6

Total Site Area (ha)	70.28		
Land Description Factors	Area A (Agricultural)	Sub-Area B (Forest)	
Topography	0.30	0.10	
Soils	0.40	0.40	
Cover	0.10	0.20	
Sum (Infiltration Factor)	0.80	0.70	
Soil Moisture Capacity (mm)	75	200	
Site Area	50.27	20.01	
Percentage of Total Site Area	72%	28%	

100%

Total

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Climate Data (Data from Orangeville MOE sta	tion, Ontario via	Environment Ca	anada Websit	e - 1981-2010, Clima	ate ID: 6155790								
Average Daily Temperature (°C)	-7.5	-6.5	-2.1	5.3	11.7	16.9	19.4	18.4	14.3	7.8	2.0	-4.1	6.3
Precipitation (mm)	64.3	54.5	60.9	70.1	86.6	81.3	80.8	88.2	87.0	76.6	87.1	64.2	901.6
vapotranspiration Analysis (Sub-Area A)													
Heat Index	0.0	0.0	0.0	1.1	3.6	6.3	7.8	7.2	4.9	2.0	0.2	0.0	33
Jnadjusted Potential Evapotranspiration (mm)	0.0	0.0	0.0	25.9	58.1	84.7	97.5	92.4	71.4	38.4	9.5	0.0	478
Potential Evapotranspiration Adjusting Factor for	0.81	0.82	1.03	1.12	1.27	1.28	1.30	1.20	1.05	0.95	0.81	0.78	<del>[</del>
atitude	0.61	0.62	1.03	1.12	1.27	1.20	1.30	1.20	1.05	0.95	0.61	0.76	<u> </u>
Adjusted Potential Evapotranspiration (mm)	0	0	0	29	74	109	127	111	75	36	8	0	568
PET (Malstrom, 1969) (mm/month)	0	0	0	29	74	109	127	111	75	36	8	0	568
Precipitation - PET (mm)	64	55	61	41	13	-27	-46	-23	12	40	79	64	334
Accumulated Potential Water Loss (APWL)	0	0	0	0	0	-27	-73	-96	-61	-2	0	0	-260
Storage (S)	75	75	75	75	75	52	28	21	33	73	75	75	
Change in Storage	0	0	0	0	0	-23	-24	-7	12	40	2	0	0
Actual Evapotranspiration (mm)	0	0	0	29	74	104	105	96	75	36	8	0	526
Recharge/Runoff Analysis													
Vater Surplus (mm)	64	55	61	41	13	0	0	0	0	0	78	64	376
Potential Infiltration (I)	51	44	49	33	10	0	0	0	0	0	62	51	300
Potential Direct Surface Water Runoff (R)	13	11	12	8	3	0	0	0	0	0	16	13	75
Evapotranspiration (m <sup>3</sup> )	0	0	0	14,591	37,037	52,398	52,618	48,050	37,542	18,304	3,883	0	264,422
Runoff (m <sup>3</sup> )	6,465	5,479	6,123	4,130	1,299	0	0	0	0	0	7,812	6,455	37,762
nfiltration (m <sup>3</sup> )	25,859	21,918	24,492	16,518	5,198	0	0	0	0	0	31,246	25,819	151,050
vapotranspiration Analysis (Sub-Area B)													
Accumulated Potential Water Loss (APWL)	0	0	0	0	0	-27	-73	-96	-77	-25	0	0	
Storage (S)	200	200	200	200	200	174	139	124	136	176	200	200	
Change in Storage	0	0	0	0	0	-26	-36	-15	12	40	24	0	0
Actual Evapotranspiration (mm)	0	0	0	29	74	107	117	103	75	36	8	0	548
Recharge/Runoff Analysis													
Vater Surplus (mm)	64	55	61	41	13	0	0	0	0	0	56	64	353
Potential Infiltration (I)	45	38	43	29	9	0	0	0	0	0	39	45	247
Potential Direct Surface Water Runoff (R)	19	16	18	12	4	0	0	0	0	0	17	19	106
Evapotranspiration (m <sup>3</sup> )	0	0	0	5808	14742	21387	23339	20633	14944	7286	1546	0	109684
Runoff (m³)	3860	3272	3656	2466	776	0	0	0	0	0	3335	3854	21218
nfiltration (m3)	9007	7634	8530	5753	1810	0	0	0	0	0	7781	8992	49508
•													
Nater Balance Total	Inputs	Outputs		Water Balance	Inputs	Outputs							
Precipitation (mm)	901.6	<u> </u>		Precipitation (m <sup>^</sup>	633644.5								
Soil Storage (mm)		0.0		Soil Storage (m^3									
Evapotranspiration+Evaporation (mm)		532		Evapotranspiration	n (m^3)	374107							
nfiltration (mm)		285		Infiltration (m^3)		200558							
Runoff (mm)		84		Runoff (m^3)		58980							

633644.5

633644.5

Appendix J
Pumping Test Data

Belfountain
6 Hour Pupmping Test Results TW1 - Test Well
TW1 (fully penetrating)
Well depth (mbgs) 53.94 Open hole interval (mbgs) 30.78 to 53.94 standing water level (mbTOC) 19.19 stick up (m above gs) 1.1 19.19 1.1 Datalogger at (mbTOC)
Pumping Rate L/sec
Pumping Rate L/min 28.2 0.75 45

TW1 Pumping			TW1 Recovery		
F0			,		
	Water Level				
	Manual	Drawdown	Elapsed Time	Water Level	Drawdown
Elapsed Time Manual (min)	(mbTOC)	manual (m)	Manual (min)	Manual (mbTOC)	manual (m)
0.1	19.02	-0.17	0.1	34.58	0
1	23.3	4.11	1	32.51	2.07
2	26.27	7.08	2	30.57	4.01
4	30.12	10.93	3	28.93	5.65
5		12.51	4	27.51	7.07
6		13.4	5	26.29	8.29
7		14.04	6	25.28	9.3
8		14.35	7	24.39	10.19
9		14.47	8	23.65	10.93
10		14.53	9	23.03	11.55
12		14.67	10	22.53	12.05
15		14.87	12	21.76	12.82
17		14.88	14	21.27	13.31
18		14.89	15	21.08	13.5
20		14.91	16	20.92	13.66
25		14.86	18	20.72	13.86
30 35		15.07 15.03	20 25	20.56 20.33	14.02 14.25
40		14.97	30	20.33	14.25
45		14.97	40	20.19	14.39
50		15.06	45	20.13	14.45
55		15.04	50	20.11	14.56
60		15.05	55	19.96	14.62
70		15.07	60	19.92	14.66
80		15.08	00	15.52	14.00
90		15.03			
100		15.09			
120		15.07			
135	34.27	15.08			
150	34.31	15.12			
165	34.4	15.21			
180	34.29	15.1			
195	34.23	15.04			
210	34.52	15.33			
225	34.43	15.24			
240	34.41	15.22			
255		15.2			
270		15.33			
285		15.35			
300		15.36			
315		15.39			
330		15.39			
345		15.43			
360	34.59	15.4			

Belfountain 6 Hour Pupmping Test Results TW2 - Test Well  TW2 (partially penetrating)  Well depth (mbgs) 20.11 Open hole interval (mbgs) 12.49 to 20.11 Standing water level (mbTOC) stick up (m above gs)  Belfountain 6 Hour Pupmping Test Results TW3 - Test Well TW3 (fully penetrating)  Well depth (mbgs) Open hole interval (mbgs) 22.8  standing water level (mbTOC) stick up (m above gs)  Stick up (m above gs)	35.96 to 35.96 15.8 0.79 21.62 1.61 96.6		
TW2 (partially penetrating)       Well depth (mbgs)     20.11     Well depth (mbgs)       Open hole interval (mbgs)     12.49 to 20.11     Open hole interval (mbgs)     22.8       standing water level (mbTOC)     14.07     standing water level (mbTOC)	to 35.96 15.8 0.79 21.62 1.61		
Well depth (mbgs)  Open hole interval (mbgs)  12.49 to 20.11  Standing water level (mbTOC)  Well depth (mbgs)  Open hole interval (mbgs)  22.8  Standing water level (mbTOC)	to 35.96 15.8 0.79 21.62 1.61		
Open hole interval (mbgs) 12.49 to 20.11 Open hole interval (mbgs) 22.8 standing water level (mbTOC) 14.07 standing water level (mbTOC)	to 35.96 15.8 0.79 21.62 1.61		
standing water level (mbTOC) 14.07 standing water level (mbTOC)	15.8 0.79 21.62 1.61		
	0.79 21.62 1.61		
stick up (m above gs) 0.88   Stick up (m above gs)	21.62 1.61		
	1.61		
Datalogger at (mbTOC)  20  Datalogger at (mbTOC)			
Pumping Rate L/sec 0.189 Pumping Rate L/sec	96.6		
Pumping Rate L/min 11.34 Pumping Rate L/min			
TW2 Pumping TW2 Recovery TW3 Pumping TW	Recovery		
Elapsed Time Water Level   Water Level   Time Water Level   Water Level   Water Level   Time Water Level   Water		r I ovol	
Elapsed Time Manual n manual Manual Manual Drawdown Elapsed Time Manual Drawdown Manual Drawdo			Drawdown
Manual (min) (mbTOC) (m) (min) (mbTOC) manual (m) Manual (min) (mbTOC) manual (m) (min) (mbTOC)			manual (m)
0.1 14.07 0.01 0.1 14.16 0 0.1 15.8 0	0.1	23.62	0
1 14.1 0.04 1 14.13 0.03 1 19.01 3.21	1.1	20.01	3.61
2 14.11 0.05 2 14.12 0.04 2 20.77 4.97	2.1	18.43	5.19
3 14.11 0.05 3 14.12 0.04 3 21.42 5.62	3.1	17.55	6.07
4 14.11 0.05 4 14.12 0.04 4 21.84 6.04	4.1	17.09	6.53
5 14.11 0.05 5 14.12 0.04 5 22.22 6.42	5.1	16.86	6.76
6 14.11 0.05 6 14.12 0.04 6 22.3 6.5	6.1	16.73	6.89
7 14.11 0.05 7 14.12 0.04 7 22.3 6.5	7.1	16.64	6.98
8 14.11 0.05 8 14.12 0.04 8 22.6 6.8	8.1	16.59	7.03
9 14.12 0.06 9 14.11 0.05 9 22.6 6.8	9.1	16.54	7.03
10 14.12 0.06 10 14.11 0.05 10 22.76 6.96	10.1	16.54	7.11
12 14.12 0.06 12 14.11 0.05 12 22.70 0.30	11.1	16.45	7.17
12 14.12 0.06 12 14.11 0.05 12 23.02 7.22 14 14.12 0.06 15 14.11 0.05 15 23.08 7.28	12.1	16.43	7.17
			7.24
	13.1	16.38	7.24
	14.1	16.36	7.26
	15.1	16.32	
20 14.12 0.06 40 14.1 0.06 25 23.32 7.52	16.1	16.28	7.34
25 14.13 0.07 50 14.09 0.07 30 23.38 7.58	17.1	16.22	7.4
30 14.13 0.07 60 14.09 0.07 35 23.41 7.61	18.1	16.16	7.46
35 14.13 0.07 40 23.46 7.66	19.1	16.11	7.51
40 14.13 0.07 45 23.5 7.7	20.1	16.07	7.55
45 14.13 0.07 50 23.52 7.72	21.1	16.02	7.6
50 14.13 0.07 55 23.53 7.73	22.1	16.01	7.61
55 14.135 0.075 60 23.55 7.75	23.1	15.99	7.63
60 14.14 0.08 70 23.59 7.79			
75 14.14 0.08 80 23.62 7.82			
90 14.15 0.09 90 23.64 7.84			
105 14.15 0.09 100 23.65 7.85			
120 14.15 0.09 110 23.65 7.85			
135 14.15 0.09 120 23.64 7.84			
150 14.15 0.09 135 23.65 7.85			
165 14.15 0.09 150 23.66 7.86			
180 14.16 0.1 165 23.63 7.83			
195 14.16 0.1 186 23.63 7.83			
210 14.16 0.1 195 23.63 7.83			
225 14.16 0.1 210 23.63 7.83			
240 14.16 0.1 225 23.64 7.84			
255 14.16 0.1 240 23.64 7.84			
270 14.16 0.1 255 23.65 7.85			
285 14.16 0.1 270 23.64 7.84			
300 14.16 0.1 285 23.64 7.84			
315 14.16 0.1 300 23.64 7.84			
330 14.16 0.1 315 23.65 7.85			
345 14.16 0.1 330 23.64 7.84			
<u>360 14.16 0.1</u> 345 23.62 7.82			
360 23.62 7.82			



Belfountain						Belfountain								
	ing Test Result	TW4 - Test V	/ell			6 Hour Pupmping Test Results TW5 - Test Well								
TW4 (fully per	•					TW5 (fully penetrating)								
Well depth (m			35.66	5		Well depth (mbgs) 32.3								
Open hole inte			17.67 to 35.66			Open hole interval (mbgs) 13.41 to 32.30								
	r level (mbTOC)		19.56	5		open noie interval (mogs) 13.41 to 32.30 standing water level (mbTOC) 15.34								
stick up (m abo			0.94			standing water level (mo LOC) 15.34 stick up (m above gs) 0.83								
			27.72						30					
Datalogger at (			0.5			Datalogger at			1.26					
Pumping Rate						Pumping Rate								
Pumping Rate	L/min		30	J		Pumping Rate	e L/min		75.6					
TW4 Pumping			TW4 Recovery			TW5 Pumping	g		TW5 Recovery					
	Water Level			Water Level		Flancad Time	Water Level			Water Level				
Element Time		D	Element Time		D	Elapsed Time		D	Element Time		D			
Elapsed Time	Manual	Drawdown	Elapsed Time	Manual	Drawdown	Manual	Manual	Drawdown	Elapsed Time	Manual	Drawdown			
Manual (min)	(mbTOC)	manual (m		(mbTOC)	manual (m)	(min)	(mbTOC)	manual (m)	Manual (min)	(mbTOC)	manual (m)			
0.1			0 0.3		0	_			_					
1						1								
	2 19.			19.58	0.13	2								
	3 19.		-		0.13	3								
	4 19.	59 0.:			0.13	4								
5	5 19.0	59 0.:	.3	5 19.575	0.135	5	23.09	7.75	5	18.13	4.35			
	5 19.	59 0.:	.3	5 19.575	0.135	6	21.98	6.64	6	17.8	4.68			
1	7 19.	59 0.:	.3	7 19.575	0.135	7	21.95	6.61	7	17.52	4.96			
8	3 19.	59 0.:	.3	3 19.575	0.135	8	21.95	6.61	8	17.36	5.12			
9	9 19.	59 0.:	.3	9 19.575	0.135	9	21.97	6.63	9	17.24	5.24			
10	19.0	59 0.:	.3 10	19.575	0.135	10	22	6.66	13	17.14	5.34			
12	2 19.0	59 0.:	13 12	19.575	0.135	12	22.13	6.79	15	16.96	5.52			
15					0.135									
16					0.135									
18					0.135									
20					0.135									
25			-		0.135									
30			-		0.135					10.00	5.02			
35					0.135									
40			-		0.135									
45					0.135	45								
50					0.135									
55					0.133	55								
60 70					0.14	60 70								
				19.57	0.14									
80						80								
90						90								
100						100								
110						115								
120						130								
135						145								
150						160								
165						175								
186			-			190								
195						205								
210	0 19.70	0.14	15			220	24.67							
225		0.14	15			235								
240	0 19.70	0.14	15			250	25.04	9.7	1					
255	5 19.70	0.14	15			265	25.79	10.45						
270			15			280								
285						295								
300						310								
315						322								
330						322		21.70	1					



330

345

360

19.71

19.71

19.71

0.15

0.15

0.15

Belfountain	
6 Hour Pupmping Test Results TW6 - Test Well	
TW6 (fully penetrating)	
Well depth (mbgs)	32.39
Open hole interval (mbgs)	13.41 to 32.30
standing water level (mbTOC)	14.69
stick up (m above gs)	0.79
Datalogger at (mbTOC)	30
Pumping Rate L/sec	1.14
Pumping Rate L/min	68.4

TW6 Pumping				TW6 Recovery		
		Mater I			Mater Lauri	
Element Time		Water Level	D	Element Time	Water Level	D
Elapsed Time Manual (min)		Manual (mbTOC)	Drawdown manual (m)	Elapsed Time Manual (min)	Manual (mbTOC)	Drawdown manual (m)
ivialiuai (IIIIII)	0.1			0.1	20.41	0
	2	14.69 18.21	0 3.52	0.1	18.49	1.92
	3	18.49	3.8	2	17.19	3.22
	5	19.8	5.11	3	16.38	4.03
	6	19.86	5.17	4	16.01	4.03
	7	19.96	5.27	5	15.82	4.59
	8	19.94	5.25	6	15.74	4.67
	9	19.93	5.24	7	15.7	4.71
	10	20.36	5.67	9	15.66	4.75
	12	20.02	5.33	10	15.65	4.76
	14	19.83	5.14	12.5	15.62	4.79
	15	19.76	5.07	15	15.6	4.81
	16	19.72	5.03	22	15.55	4.86
	18	19.69	5	25	15.55	4.86
	23	19.68	4.99	30	15.53	4.88
	25	19.68	4.99	35	15.51	4.9
	30	19.7	5.01	40	15.5	4.91
	35	19.73	5.04	45	15.47	4.94
	40	19.75	5.06	50	15.46	4.95
	45	19.78	5.09	55	15.44	4.97
	50	19.84	5.15	60	15.42	4.99
	55	19.81	5.12			
	60	19.83	5.14			
	70	19.87	5.18			
	80	19.9	5.21			
	90	19.93	5.24			
	100	19.96	5.27			
	110	19.98	5.29			
	120	20.01	5.32			
	135	20.03	5.34			
	150	20.06	5.37			
	165	20.09	5.4			
	180	20.12	5.43			
	195 210	20.15 20.18	5.46 5.49			
	225	20.18	5.49			
	240	20.22	5.55			
	255	20.24	5.58			
	270	20.27	5.6			
	285	20.23	5.63			
	300	20.34	5.65			
	315	20.35	5.66			
	330	20.36	5.67			
	345	20.38	5.69			
	360	20.41	5.72			

Appendix K Long-term Drawdown Analysis

#### Long-term Drawdown Calculations (20 and 50 years)

Table 1 - Based on Peak Pumping Rates (27,000 L/day)

	Estimated					20 years			50 years			Available	Calculated Di	rawdown (m)
	Transmissivity	Pumping rate	Radius from		Time (days) 20			Time (days) 50			Static Water			
Well ID	(m^2/day)	(m^3/day)	pumping well (m)	Storage	years	u	W(u)	years	u	W(u)	Level (mbgs)	(m)	20 years	50 years
TW1	9.37	27	0.075	5	7300	1.0E-07	15.5409	18250	4.1E-08	16.4825	19.19	23.17	3.56	3.78
TW2	14.94	27	0.075	5	7300	6.4E-08	15.9872	18250	2.6E-08	16.888	14.07	2.23	2.30	2.43
TW3	84.85	27	0.075	5	7300	1.1E-08	17.7482	18250	4.5E-09	18.642	15.8	13.58	0.45	0.47
TW4	403.19	27	0.075	5	7300	2.4E-09	19.2706	18250	9.6E-10	20.1869	19.56	7.105	0.10	0.11
TW5	26.60	27	0.075	5	7300	3.6E-08	16.5625	18250	1.4E-08	17.507	15.34	7.515	1.34	1.41
TW6	72.10	27	0.075	5	7300	1.3E-08	17.5811	18250	5.3E-09	18.4783	14.69	8.165	0.52	0.55

Table 2 - Based on Average Pumping Rates (2,250 L/day)

	Estimated					20 years			50 years			Available	Calculated D	rawdown (m)
	Transmissivity	Pumping rate	Radius from		Time (days) 20			Time (days) 50			Static Water	Drawdown		
Well ID	(m^2/day)	(m^3/day)	pumping well (m)	Storage	years	u	W(u)	years	u	W(u)	Level (mbgs)	(m)	20 years	50 years
TW1	9.37	2.25	0.075	5	7300	1.0E-07	15.5409	18250	4.1E-08	16.4825	19.19	23.17	0.30	0.31
TW2	14.94	2.25	0.075	5	7300	6.4E-08	15.9872	18250	2.6E-08	16.888	14.07	2.23	0.19	0.20
TW3	84.85	2.25	0.075	5	7300	1.1E-08	17.7482	18250	4.5E-09	18.642	15.8	13.58	0.04	0.04
TW4	403.19	2.25	0.075	5	7300	2.4E-09	19.2706	18250	9.6E-10	20.1869	19.56	7.105	0.01	0.01
TW5	26.60	2.25	0.075	5	7300	3.6E-08	16.5625	18250	1.4E-08	17.507	15.34	7.515	0.11	0.12
TW6	72.10	2.25	0.075	5	7300	1.3E-08	17.5811	18250	5.3E-09	18.4783	14.69	8.165	0.04	0.05

Notes:

Where available drawdown is considered to be the distance between the static water level and the centre of the well screer



# Appendix L Radius of Influence Analysis

#### Radius of Influence for TW1

Observation Well = PW1

Variables	
Peak Pumping Rate (m^3/day)	27
Average Pumping Rate (m^3/day)	2.25
Transmissivity (m^2/day)	9.37
Storage for Limestone (dimensionless)	5
Time (days)	18250
Radius from pumping well (m) - TW1	0.075
Radius from pumping well (m) - PW1	87
Ro = radius of influence where drawdown is zero	_

#### TW1 - Peak Pumping Rate

u =	4.11E-08
W(u) =	16.4325
drawdown, s (m) =	3.77

#### TW1 - Average Pumping Rate

u =	4.11E-08
W(u) =	16.4325
drawdown, s (m) =	0.31

### PW1 - Peak Pumping Rate

u =	5.53E-02
W(u) =	2.3775
drawdown, s (m) =	0.54

#### PW1 - Average Pumping Rate

u =	5.53E-02
W(u) =	2.3775
drawdown, s (m) =	0.05

#### Radius of Influence

Therefore, pumping at peak pumping rate results in radius of infleunce of approximately 300 m after 50 years compared to a radius of influence of approximately 100 meters after 50 years for average pumping rate.

#### Theis (1935)

and,

$$s = \frac{Q}{4\pi T}W(u) \qquad (1)$$

$$u = \frac{r^2 S}{4Tt} \tag{2}$$

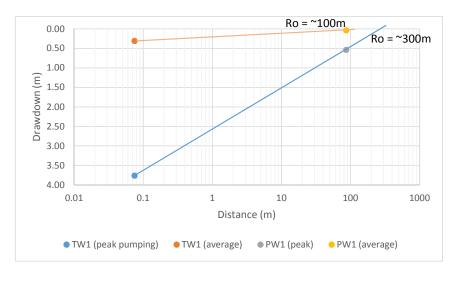
Where:

is drawdown (m)
is pumping rate (m³/d)
is transmissivity (m²/d)
V(u) is the well function
is is storativity (-)
is time (d)

r is the distance from the pumping well to the observation well or point of interest (m)

The assumptions that are implicit in the mathematics used in the Theis derivation include:

- The aquifer is uniform in character and the hydraulic conductivity is the same in all directions.
- b) The aquifer is uniform in thickness and infinite in areal extent.
- The aquifer receives no recharge from any source; all water removed from the well comes from aquifer storage.



## Radius of Influence for TW1 at 15 m

Observation Well = PW1

Variables	
Peak Pumping Rate (m^3/day)	27
Average Pumping Rate (m^3/day)	2.25
Transmissivity (m^2/day)	9.37
Storage for Limestone (dimensionless)	5
Time (days)	18250
Radius from pumping well (m) - TW1	0.075
Radius from pumping well (m)	15
Ro = radius of influence where drawdown is zero	

#### TW1 - Peak Pumping Rate

u =	4.11E-08
W(u) =	16.4325
drawdown, s (m) =	3.77

### TW1 - Average Pumping Rate

u =	4.11E-08
W(u) =	16.4325
drawdown, s (m) =	0.31

#### PW1 - Peak Pumping Rate

u =	1.64E-03
W(u) =	5.8621
drawdown, s (m) =	1.34

#### **PW1 - Average Pumping Rate**

u =	1.64E-03
W(u) =	5.8621
drawdown, s (m) =	0.11

### Radius of Influence

Therefore, pumping at peak pumping rate results in radius of influence of approximately 300 m after 50 years compared to a radius of influence of approximately 100 meters after 50 years for average pumping rate.

### Theis (1935)

nd

$$s = \frac{Q}{4\pi T}W(u) \qquad (1)$$

$$u = \frac{r^2 S}{4Tt} \tag{2}$$

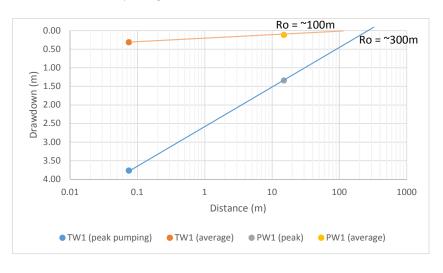
#### Where

s is drawdown (m)
Q is pumping rate (m³/d)
T is transmissivity (m²/d)
W(u) is the well function
S is storativity (-)
t is time (d)

r is the distance from the pumping well to the observation well or point of interest (m)

The assumptions that are implicit in the mathematics used in the Theis derivation include:

- The aquifer is uniform in character and the hydraulic conductivity is the same in all directions.
- b) The aquifer is uniform in thickness and infinite in areal extent.
- The aquifer receives no recharge from any source; all water removed from the well comes from aquifer storage.



#### Radius of Influence for TW4

Observation Well = immaginary at 87 m

Variables	
Peak Pumping Rate (m^3/day)	27
Average Pumping Rate (m^3/day)	2.25
Transmissivity (m^2/day)	403.20
Storage for Limestone (dimensionless)	5
Time (days)	18250
Radius from pumping well (m) - TW1	0.075
Radius from pumping well (m)	87
Ro = radius of influence where drawdown is zero	

#### TW4 - Peak Pumping Rate

u =	9.56E-10
W(u) =	20.1869
drawdown, s (m) =	0.11

#### TW4 - Average Pumping Rate

u =	9.56E-10
W(u) =	20.1869
drawdown, s (m) =	0.01

### **Obs well - Peak Pumping Rate**

u =	1.29E-03
W(u) =	6.0695
drawdown, s (m) =	0.03

#### **Obs Well - Average Pumping Rate**

u =	1.29E-03
W(u) =	6.0695
drawdown, s (m) =	0.00

#### Radius of Influence

Therefore, pumping at peak pumping rate results in radius of infleunce of approximately 1100 m after 50 years compared to a radius of influence of approximately 100 meters after 50 years for average pumping rate.

Theis (1935)

$$s = \frac{Q}{4\pi T}W(u) \qquad (1)$$

$$u = \frac{r^2 S}{4Tt} \tag{2}$$

Where:

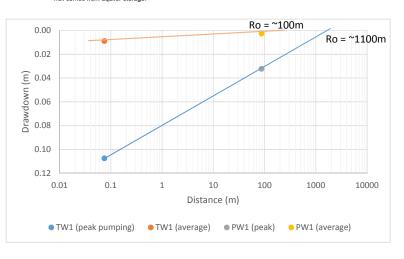
s is drawdown (m)
Q is pumping rate (m³/d)
T is transmissivity (m²/d)
W(u) is the well function
S is storativity (-)

t is time (d)

r is the distance from the pumping well to the observation well or point of interest (m)

The assumptions that are implicit in the mathematics used in the Theis derivation include:

- The aquifer is uniform in character and the hydraulic conductivity is the same in all directions.
- b) The aquifer is uniform in thickness and infinite in areal extent.
- The aquifer receives no recharge from any source; all water removed from the well comes from aquifer storage.



# Appendix M Typical Water and Wastewater Treatment Systems

# Advanced Septic Systems



The ideal solution for your **home** and **cottage** 

Environmentally Friendly and Sustainable



www.waterloo-biofilter.com

1-866-366-4329

info@waterloo-biofilter.com







# The Waterloo Advantage

Waterloo Biofilter Systems Inc. is a

Canadian-owned and operated company that has for over 20 years developed, designed, manufactured, and maintained advanced onsite wastewater treatment systems.

We are committed to helping protect the environment with technology focused on high quality treatment, low energy usage, and system robustness.



The patented Waterloo Biofilter system was developed at the University of Waterloo's Centre for Groundwater Research.



# Permanent Filter Medium

The key to the Waterloo Biofilter system is the absorbent foam filter medium that has been optimized to physically filter and biologically treat sewage. This filter medium is warrantied for 20 years and will likely last generations.

# A Waterloo is designed to perform on difficult sites







Bedrock or Clay Soils



High Watertable



Environmentally Sensitive Areas

The environmentally friendly choice



# Step 1

Wastewater is collected and distributed over the Waterloo foam filter medium.



# Step 2

Wastewater slowly trickles down through the foam pieces where natural occurring bacteria remove contaminants.



# Step 3

After passing through the foam, the treated water is put back into the environment.



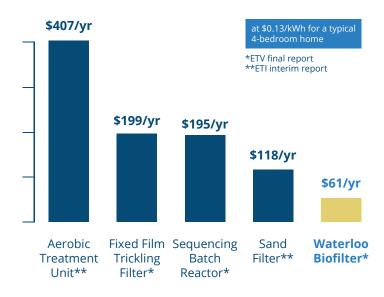


Waterloo Biofilters use very little energy; up to **85% less** power than aeration technologies using air compressors. In the long-term we have the lowest operating costs.

## Few moving parts

Less energy use

No noisy air compressor





# Nitrogen Removal

Standard Waterloo systems remove up to **50-65% total nitrogen**, helping to reduce nitrate levels in groundwater and protect surface waters. With the **WaterNOx-LS™** system add-on, up to **95% TN removal** can be achieved passively and cost-effectively.



# Phosphorous Removal

With the **Waterloo EC-P™** system add-on, greater than **95% total phosphorus** can be removed – helping protect surface waters from blue-green algae and lake eutrophication. Compact and low energy, the Waterloo EC-P™ permanently removes phosphorus without chemicals or additional sludge production.



# Small Footprint

A Waterloo is discrete and minimizes raised mounding and tree removal. A variety of product configurations are available to suit your unique site conditions and personal tastes.



# Seasonal Performance

Whether for seasonal or year-round use, the Waterloo is designed to withstand extreme cold temperatures and can easily handle variable flow rates.



Made in Canada Tough Enough for Canada

# **Residential Products**



**Waterloo Shed Biofilters** are spray foam insulated for winter operation, clad in attractive composite siding, and roofed with 50-year shingles. Shed Biofilters are compact and require only a single pump to operate.



**Waterloo Flat Bed Biofilters** are constructed of strong yet lightweight fibreglass shells. Flat Bed Biofilters easily blend in with landscaping and require only a single pump to operate.



**Waterloo Basket Biofilters** are constructed of a rigid steel mesh coated for corrosion protection. Basket Biofilters are placed in a below-ground concrete tank and are ideal for larger homes or increased nitrogen removal.



Waterloo HDPE Tank Biofilters are constructed using very durable below-ground high-density polyethylene tanks. HDPE Tank Biofilters are ideal for difficult access sites and increased nitrogen removal.

# **Proved and Approved**

The Waterloo Biofilter has been thoroughly tested and proven effective by numerous 3<sup>rd</sup> party verification programs. We pride ourselves on the high treatment levels our technology consistently demonstrates.

# Is yours a Waterloo?

#### **CAN/BNQ Certification**

	Median Concentration	Percent Removal
cBOD <sub>5</sub>	4 mg/L	98%
TSS	4 mg/L	> 98%
Fecal Coliforms	17,900 cfu/100mL	> 99%

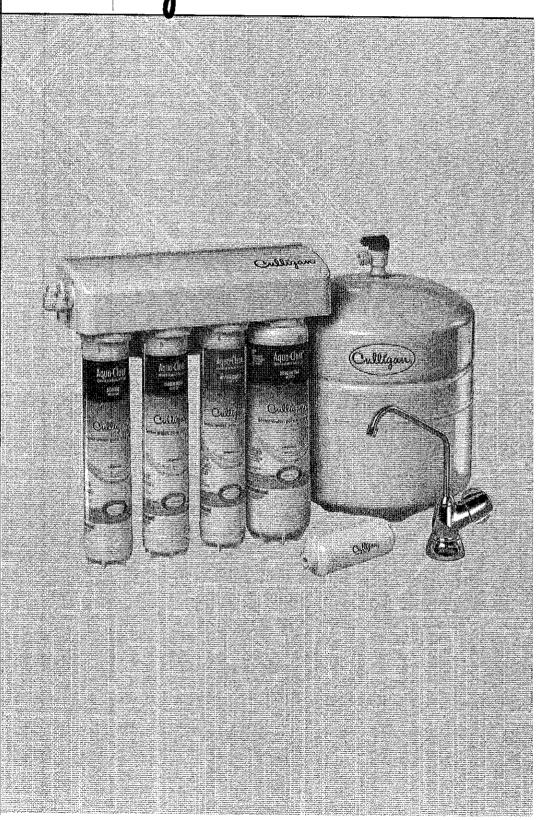
#### **ETV Verification**

	Median Concentration	Percent Removal
cBOD <sub>5</sub>	7 mg/L	96%
TSS	5 mg/L	97%
Total Nitrogen	13 mg/L	65%



# Culligan.

Culligan®
Aqua-Cleer®
Advanced
Drinking
Water
Systems
Owners
Guide





## About Your System

Thank you for choosing a Culligan Aqua-Cleer advanced drinking water system. Your new system is designed to bring you years of deliciously crystal-clear Culligan water. The best part is it comes right from the tap. No more lugging around bottles or waiting for pitchers to slowly fill up. With your continuous supply of great tasting water, not only can you get your 8 glasses a day but you can easily use it for cooking, coffee, juice, baby formula, ice cubes, anything you use water with.

The important thing to remember is to change out your filters on a regular basis. The quality of your water is only as good as the quality of your filters. Each filter is designed to last for 1,000 gallons (roughly 12 months). Membranes will last longer if used with pre-filtration. A flow monitor is available with your system to let you know when you have consumed 1,000 gallons of water through your system. If you did not purchase one with your system, you may consider asking your Culligan man about having one installed. Faucets with reminder lights are also available.

#### **System Specifications:**

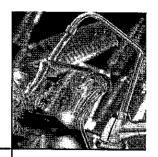
Dimensions	Filter Assembly Standard Storage Tank Medium Storage Tank Large Storage Tank	13.8" wide x 4.2" deep x 15.5" high 9" diameter x 14" high 11" diameter x 14" high 15.5: diameter x 24" high
Storage Tank Capacity	Standard Medium Large	2 gallons 3 gallons 9 gallons
Reverse Osmosis Efficiency Rating	Standard Medium Large	16.86% 16.86%
Reverse Osmosis Recovery Rating	Standard Medium Large	33.49% 33.49% 33.49%

#### **Filtration Options:**

Sequence of Filtration	Type of Filtration	Specification
		1
!	Sediment	2
Pre-Filtration		3
rte-rilliation		Block
	Carbon	Granulated Active Carbon
		Granulated Active Carbon - Large
	Reverse Osmosis	30 gpd
Membrane		50 gpd*
	Nano Filtration+	30 gpd

<sup>\*</sup> Cartridges not for sale in California.

<sup>†</sup> Cartridges not for sale in California or Iowa.



About Your System (con't)

Sequence of Filtration	Type of Filtration	Specification
-	Total Defense	Speciality Carbon Block
Advanced Filtration	Arsenic	Specialty Media
	Perchlorate*	Specialty Media
Post-Filtration	Carbon	Granulated Activated Carbon Block

<sup>\*</sup> Cartridges not for sale in California

#### Purpose of each level of filtration:

#### **Pre-Filtration:**

Pre-filtration for this system is used to reducing large contaminants from the water before they reach either the reverse osmosis or nano filtration membrane. The use of pre-filtration cartridges helps extent the membrane's life. There are two types of pre-filtration available with this system: sediment filtration and carbon filtration.

Sediment Filtration: Sediment is defined as sand, dirt, silt, fine sand and or coarse sand that can be found in many water supplies.

Carbon Filtration: Carbon is used to reduce chlorine taste and odor. Most people often describe this taste as being slightly chemical or they equate their drinking water to that of the local pool. Municipalities use chlorine to disinfect the water on the way to your home. This is a necessary step to delivering safe water to your home but depending on the level of chlorine by the time it reaches your home the taste of your water may be unpalatable.

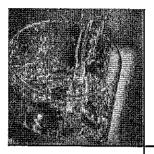
#### Membrane Technologies:

The Aqua-Cleer system can utilize two different membrane technologies; reverse osmosis and nano filtration. Each one of these technologies use a tightly woven membrane that acts as a barrier to contaminants. Water is pushed up against this membrane at pressure. Depending on the weave of the membrane only a certain percentage of contaminants can pass through. Reverse Osmosis can reduce up to 99% of contaminants. The reason you may choose nano filtration versus reverse osmosis is often a question of taste. Some of the things that give water its taste are minerals such as calcium and magnesium. A nano filtration membrane will leave more of those minerals in the water.

#### Advanced Filtration:

The advanced filtration cartridges are specifically designed to reduce contaminants that reverse osmosis membranes are not efficient in removing.

<sup>&</sup>lt;sup>1</sup> Specialty media cartridges must be installed after the RO membrane and system must have a Performance Indicator Device (PID) installed to track gallon usage.



# About Your System (con't)

# Total Defense: OPTIONAL S Stage system only.

The Total Defense cartridge should be added to your system to deal with lead, mercury, aesthetic chloramines, aesthetic chlorine taste and odor, cysts, Volatile Organic Compounds (VOC) and MTBE.

- Chloramines have a stronger taste and are more difficult to remove than chlorine.
- Mercury is a toxin that can cause kidney damage.
- Lead is a toxin that can cause kidney problems or high blood pressure in adults and developmental problems in children.
- Cysts are a common cause of health issues. They can be found in some municipal water sources but more often found in wells under the influence of surface water.
- VOC is a name given to a wide range of organic contaminants, some are known to be carcinogenic.
- MTBE was used in gasoline to reduce emissions and is considered harmful.

#### Perchlorate\*:

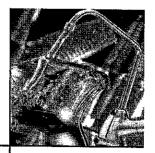
Perchlorate is a by-product of munitions manufacturing (common in solid rocket fuel, road flares, etc) that can be found in some water sources.

#### Arsenic:

Arsenic (As) is found naturally in some well water. Arsenic in water has no color, taste or odor. It must be measured by a lab test. Public water utilities must have their water tested for arsenic. You can get the result from your water utility. If you have your own well, you can have the water tested by an accredited lab. The local health department or the state environmental health agency can provide a list of certified labs. Culligan International is one such lab. For more information please contact your local Culligan dealer. For additional information about the arsenic in water can be found through the EPA's website at www.epa.gov/safewater/arsenic.html.

There are two forms of arsenic: pentavalent arsenic (As (V)) and trivalent arsenic (As (III)). Special sampling procedures are needed for a lab to determine what type and how much of each type of arsenic is in the water. In well water, arsenic may be pentavalent, trivalent, or a combination of both. Reverse osmosis membranes are effective at reducing pentavalent arsenic but not trivalent arsenic. The Arsenic specific cartridge was specifically designed to reduce trivalent arsenic.

<sup>\*</sup> Cartridges not for sale in California.



Performance Data Sheet (con't)

#### Carbon Block (CB)

The Carbon Block pre-filter has been tested according to NSF/ANSI 42 for the reduction of the substances listed below. The concentration of the indicated substances in the water entering the system was reduced to a concentration less than or equal to the permissible limit for water leaving the system, as specified in NSF/ANSI 42.

Substance	Influent Challenge Concentration	Maximum Permissible Product water Concentration	Reduction Requirements	Minimum Reduction	Average Reduction
Standard 42	The second secon			man a series for any and a series and a seri	
Aesthetic Chlorine	2.0 mg/L + 10%		>50%	97.6%	97.3%

#### **Granular Activated Carbon (GAC)**

The Granular Activated Carbon has been tested according to NSF/ANSI 42 for the reduction of the substances listed below. The concentration of the indicated substances in the water entering the system was reduced to a concentration less than or equal to the permissible limit for water leaving the system, as specified in NSF/ANSI 42.

Substance	Influent Challenge Concentration	Maximum Permissible Product water Concentration	Reduction Requirements	Minimum Reduction	Average Reduction
Standard 42		AND THE PROPERTY OF THE PROPER	The second secon		
Aesthetic Chlorine	2.0 mg/L + 10%		>50%	79.4%	64.4%

#### Granular Activated Carbon - Large (GAC-L)

The Granular Activated Carbon - Large has been tested according to NSF/ANSI 42 for the reduction of the substances listed below. The concentration of the indicated substances in the water entering the system was reduced to a concentration less than or equal to the permissible limit for water leaving the system, as specified in NSF/ANSI 42.

Substance	Influent Challenge Concentration	Maximum Permissible Product water Concentration	Reduction Requirements	Minimum Reduction	Average Reduction
Standard 42					The second secon
Aesthetic Chlorine	2.0 mg/L + 10%		>50%	86.1%	80.3%



## **Performance Data Sheet** (con't)

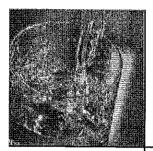
Stage Total Defense (TD)

The Total Defense has been tested according to NSF/ANSI 42 and 53 for the reduction of the substances listed below. The concentration of the indicated substances in the water entering the system was reduced to a concentration less than or equal to the permissible limit for water leaving the system, as specified in NSF/ANSI 42 and 53.

Substance	Influent Challenge Concentration	Maximum Permissible Product water Concentration	Reduction Requirements	Minimum Reduction	Average Reduction
Standard 42		The state of the s		The second secon	A significant process of the state of the st
Aesthetic Chlorine	2.0 mg/L + 10%		>50%	97.6%	98.0%
Aesthetic Chloramines	3.0 mg/L + 10%	0.5 mg/L		97.6%	98.0%
Particulate (0.5 - < um) Class I	At least 10,000 particles/mL		>85%	99.9%	99,9%
Standard 53			Edward San Darm Control VIII (19 July Control VIII)	The state of the s	The second secon
MTBE	0.015 + 20%	0.005 mg/L		74.6%	83.3%
Cyst <sup>t</sup>	Minimum 50,000/L		99.95%	99.99%	99.99%
Turbidity	11 mg/L + 1 NTU	0.5 NTU		96.6%	98.0%
Lead (pH 6.5)	0.15 mg/L + 10%	0.010 mg/L		99.3%	99.3%
Lead (pH 8.5)	0.15 mg/L + 10%	0.010 mg/L		99.3%	99.3%
Mercury (pH 6.5)	0.006 mg/L + 10%	0.002 mg/L		96.6%	96.6%
Mercury (pH 8.5)	0.006 mg/L + 10%	0.002 mg/L		72.4%	95.4%
Chloro- form (VOC surrogate chemical)	0.300 mg/L + 10%	0.015 mg/L		95.2%	91.0%

Flow Rate = 0.5 gpm (1.89 Lpm)

Capacity = 1,000 gallons (3786 L)
t Based on the use of microspheres or Cryptospordium parvum occysts
Testing was performed under standard laboratory conditions, actual performance may vary.



## Performance Data Sheet (con't)

#### RO30 with TD ·

These systems have been tested and certified by NSF International according to NSF/ANSI 42, 53, and 58 for the reduction of the substances listed below. The concentration of the indicated substances in water entering the system was reduced to a concentration less than or equal to the permissible limit for water leaving the system, as specified in NSF/ANSI 42, 53, and 58.

This system is acceptable for treatment of influent concentrations of no more than 27 mg/L nitrate and 3 mg/L nitrite in combination measured as N and is certified for nitrate/nitrite reduction only for water supplies with a pressure of 280 kPa (40 psig) or greater.

#### Substance Reduction<sup>1</sup>

Substance	Influent Challenge Concentration mg/L	Maximum Permissible Product water Con- centration mg/L	Reduction Require- ments	Minimum Reduction	Average Reduction
Arsenic (pentavalent)2	0.050 +/- 10%	0.01			97.4%
Barium	10.0 +/- 10%	2			98.3%
Cadmium	0.03 +/- 10%	0.005		<del></del>	98.7%
Hexavalent Chromium	0.30 +/- 10%	0.05			91.2%
Trivalent Chromium	0.30 +/- 10%	0.05			97.8%
Copper	3.00 +/- 10%	1.3			98,9%
Fluoride	8.0 +/- 10%	1.5			95.6%
Lead	0.15 +/- 10%	0.010			98.7%
Nitrate/Nitrite (both as N)	30 +/- 10%			83.1%	86.8%
Nitrate <sup>5</sup>	27.0 +/- 10%	10.0		83.4%	87.0%
Nitrite	3.0 +/- 10%	1.0		79.5%	84.8%
Radium 226/2283	25pCi/L +/- 10%	5pCi/L			80.0%
Selenium	0.10 +/- 10%	0.05			96.0%
Cyst <sup>4</sup>	>50,000/mL		99.95%	99.99%	99.99%
Turbidity	11 +/- 1 NTU	0.5 NTU			99.00%

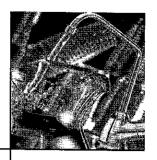
<sup>1</sup> While testing was performed under standard laboratory conditions, actual performance may vary depending on water pressure, temperatures and other substances, which may be found in your water.

This system has been tested for the treatment of water containing pentavalent arsenic (also known as As(V), As(+5) or arsenate) at concentrations of 0.050 mg/L or less. This system reduces pentavalent arsenic, but may not remove other forms of arsenic. This system is to be used on water supplies containing a detectable free chlorine residual at the system inlet or on water supplies that have been demonstrated to contain only pentavalent arsenic. Treatment with chloramines (combined chlorine) is not sufficient to ensure complete conversion of trivalent arsenic to pentavalent arsenic. Please see the Arsenic Facts Sheet for further information.

<sup>3</sup> Based upon testing methods using Barium as a surrogate. All concentrations in pCi/L pico curie/L,

<sup>4</sup> Includes Giardia lamblia, Entamoeba histolyca and Cryptosporidium.

<sup>5</sup> Units are not certified on water supplies with a pressure less than 40 psl (280 kPa). A booster pump is strongly recommended.



**Performance Data Sheet** (con't)

#### Total Defense (TD)

The Total Defense has been tested according to NSF/ANSI 42 and 53 for the reduction of the substances listed below. The concentration of the indicated substances in the water entering the system was reduced to a concentration less than or equal to the permissible limit for water leaving the system, as specified in NSF/ANSI 42 and 53.

#### Substance Reduction<sup>1</sup>

Substance	Influent Challenge Concentration mg/L	Maximum Permissible Product water Con- centration mg/L	Reduction Require- ments	Minimum Reduction	Average Reduction
Standard 42					
Aesthetic Chlorine	2.0 mg/L + 10%		>50%	97.6%	98.0%
Aesthetic Chloramines	3.0 mg/L + 10%	0.5 mg/L		97.6%	98.0%
Particulate (0.5 - < um) Class I	at least 10,000 particles/mL		>85%	99.9%	99.9%
Standard 53		2 P F P - 1			
MTBE	0.015 + 20%	0.005 mg/L		74.6%	83.3%
Cyst <sup>1</sup>	Minimum 50,000/L		99.95%	99.99%	99.99%
Turbidity	11 mg/L + 1 NTU	0.5 NTU		96.6%	98.0%
Lead (pH 6.5)	0.15 mg/L + 10%	0.010 mg/L		99.3%	99.3%
Lead (pH 8.5)	0.15 mg/L + 10%	0.010 mg/L		99.3%	99.3%
Mercury (pH 6.5)	0.006 mg/L + 10%	0.002 mg/L		96.6%	96.6%
Mercury (pH 8.5)	0.006 mg/L + 10%	0.002 mg/L		72.4%	95.4%
Chloroform (VOC surrogate chemical)	0.300 mg/L + 10%	0.015 mg/L		95.2%	91.0%

Flow Rate = 0.5 gpm (1.89 Lpm)

Capacity = 1,000 gallons (3786 L)
t Based on the use of microspheres or Cryptosporidium parvum occysts
Testing was performed under standard laboratory conditions, actual performance may vary
Organic Chemicals included in Surrogate Testing:
Applies to Total Defense (TD) only



## Performance Data Sheet (con't)

# 4 Stage

The Aqua-Cleer Advanced Drinking Water System with CB, GAC, or GAC-L cartridge has been tested and certified by NSF International against NSF/ANSI Standard 42 for the effective reduction of aesthetic Chlorine Taste and Odor, the TD cartridge for the effective reduction of aesthetic Chlorine Taste and Odor and Nominal Particulate Class 1 and against CSA B483.1.



5 Stage

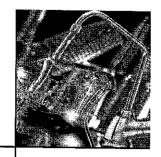
The Aqua-Cleer Advanced Drinking Water System with TD cartridge has been tested and certified by NSF International against NSF/ANSI Standard 53 for the effective reduction of Cyst, Lead, Mercury, VOC, MTBE and Turbidity and against CSA B483.1.

The Aqua-Cleer Advanced Drinking Water System with RO30 or RO50\* has been tested and certified by NSF International against NSF/ANSI Standard 58 for the effective reduction of TDS, pentavalent arsenic, barium, cadmium, hexavalent and trivalent chromium, copper, lead, nitrate/nitrite, radium 226/228 and selenium. The concentration of the indicated substances in water entering the system was reduced to a concentration less than or equal to the permissible limit for water leaving the system as specified in NSF/ANSI 58 and against CSA B483.1.

The Aqua-Cleer Advanced Drinking Water System with AS3 has been tested and certified by NSF International against NSF/ANSI Standard 53 for the effective reduction of arsenic (trivalent and pentavalent) when following an RO and against CSA B483.1.

Refer to your Installation and Operating Instructions and printed limited Warranties for more specific product information. To avoid contamination from improper handling and installation, your system should only be installed and serviced by your Culligan Man. Performance will vary based on local water conditions. The substances reduced by these systems are not necessarily in your water.

\*RO50 not for sale in California.



# Culligan Lifetime Limited Warranty

# Culligan Aqua-Cleer Advanced Drinking Water System

You have just purchased one of the finest drinking water systems made. As an expression of our confidence in Culligan products, your drinking water system is warranted to the original end-user, when installed in accordance with Culligan International Company specifications, against defects in material and workmanship from the date of original installation, as follows:

• For the LIFETIME of the original end-user

For a period of ONE YEAR

The entire reverse osmosis water conditioning unit, EXCLUDING THE EXPENDABLE FILTER CARTRIDGES AND REVERSE OSMOSIS MEMBRANE FILTER USED IN THE UNIT.
The Culligan brand reverse osmosis

If a part described above is found defective within the specified period, you should notify your independently operated Culligan dealer and arrange a time during normal business hours for the dealer to inspect the drinking water system on your premises. Any part found defective within the terms of this warranty will be repaired or replaced by the dealer. You pay only freight from our factory and local dealer charges.

membrane filter.

Damage caused by accident, fire, flood, freezing, Act of God, misuse, misapplication, neglect, alteration, installation or operation contrary to our printed instructions, or by the use of accessories or components which do not meet Culligan specifications, is not covered by this warranty.

Our product performance specifications are furnished with each drinking water system. TO THE EXTENT PERMITTED BY LAW, CULLIGAN DISCLAIMS ALL IMPLIED WARRANTIES INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE; TO THE EXTENT REQUIRED BY LAW, ANY SUCH IMPLIED WARRANTIES ARE LIMITED IN DURATION TO THE ONE-YEAR PERIOD SPECIFIED ABOVE FOR THE PARTS DESCRIBED IN THIS LIMITED WARRANTY. As manufacturer, we do not know the characteristics of your water supply or the purpose for which you are purchasing a drinking water system. Please understand that the quality of water supplies may vary seasonally or over a period of time, and that your water usage rate may vary as well. Water characteristics can also change considerably if your drinking water system is moved to a new location. For these reasons, we assume no liability for the determination of the proper equipment necessary to meet your requirements, and we do not authorize others to assume such obligations for us. Further, we assume no liability and extend no warranties, express or implied, for the use of this product on a non-potable water source. OUR OBLIGATIONS UNDER THIS WARRANTY ARE LIMITED TO THE REPAIR OR REPLACEMENT OF THE FAILED PARTS OF THE DRINKING WATER SYSTEM, AND WE ASSUME NO LIABILITY WHATSOEVER FOR DIRECT, INCIDENTAL, CONSEQUENTIAL, SPECIAL, GENERAL, OR OTHER DAMAGES, WHETHER FROM CORROSION OR OTHER CAUSES.

#### CONSUMERS:

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Similarly, some states do not allow the exclusion of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Consult your telephone directory for your local independently-operated Culligan dealer, or write Culligan International Company, for warranty and service information.

#### **Culligan International Company**

9399 W. Higgins Road, Suite 1100 Rosemont, Illinois 60018