

JUNE 14, 2022

PROJECT NO: 903-3780

SENT VIA: EMAIL

Municipality of Meaford
21 Trowbridge Street West
Meaford, ON N4L 1Y1

**Attention: Margaret Potter
Senior Planner**

**RE: HYDROGEOLOGICAL ASSESSMENT
LEITH-BAYSHORE ROAD – SEVERANCE APPLICATION
CONCESSION BF, PART LOT 23, R. PLAN 16R-4635, PART 2
MUNICIPALITY OF MEAFORD**

Dear Margaret,

C.F. Crozier and Associates (Crozier) was retained by Don and Daphne McCullough (Owner) to support a Severance Applications on a parcel of land located along the Bayshore Road (Roll # 42-10510-004-07110-000), located in the Municipality of Meaford, to create five (5) independently serviced and graded lots.

Crozier has completed a scoped hydrogeological assessment to investigate the feasibility of constructing new buildings and individual drinking water wells on each of the proposed lots.

Site Description

The site is approximately 4.91 hectares (12.13 acres) located on the southeast side of Bayshore Road across from Buckingham Lane in the Municipality of Meaford (Figure 1). The site boundary is located approximately 200m from the shore of Georgian Bay and 130m northeast of Sideroad 20.

The site is currently primarily open field with trees located along Bayshore Road at the front of the property. The adjacent properties on either side and across Bayshore Road are residential.

Physiography

The site is located in the physiographic region known as the Cape Rich Steps north of the Bruce Peninsula physiographic region. Chapman and Putnam (1984) describe the Cape Rich Steps as the area located between the Owen Sound and Nottawasaga Bay. It was the upland area located between two river valleys in preglacial times leading to a master stream that flowed down to the Georgian Bay depression. The area rises 150 m from Georgian Bay in a series of five "steps". They consider well water in the area to be scarce for the purposes of intensive farming practices but do not comment on the availability of groundwater for domestic purposes.

Surficial & Bedrock Geology

Published surficial geology mapping (OGS) indicates that the property is bisected by an area of coarse-textured lacustrine deposits of sand and gravel with minor silt and clay on the northwestern half of the property extending to Georgian Bay and fine textured glaciolacustrine deposits of silt and

clay with minor sand and gravel in the south eastern portion of the site extending south easterly to an area of sand poor sandy silt to silty sand textured till (Figure 2).

OGS mapping indicates the property lies entirely atop the Queenston Formation which is dominated by red and grey shales with thin siltstone, limestone and sandstone interlayers.

Source Protection

The site is located within the Grey Sauble Source Protection Area. A review of the Source Protection Information Atlas indicates that the property is located within a Highly Vulnerable Aquifer with a vulnerability score of 6.

The site is not located in a Wellhead Protection Area, nor is it located in an Intake Protection Zone and therefore there are no specific policies within the Grey Sauble Source Protection Plan that would apply to the lands. This should be confirmed with the municipality's Risk Management Official (RMO).

MECP Well Records

GSS Engineering Consultants Ltd (GSS) completed a review of well records in the area of the site based on data provided from the Ministry of Environment, Conservation and Parks (MECP) database. They identified eleven (11) wells located within 1.0 km of the site. Crozier has confirmed that no new well information has been entered into the MECP database since GSS completed their summary in 2018. These wells are shown on Figure 3 and summarized in Table 1 below;

Table 1: Summary of MECP Well Records

Well ID	Tag #	Diameter (cm)	SWL ¹ (m)	PWL ² (m)	Rate (L/min)	Use	Aquifer	Notes
2505270		12.7	6.10	21.3	22.7	Domestic	Shale	Mineralized
2510749		15.2	32.62	41.16	45.4	Domestic	Shale	
2510833		15.2	9.15	31.40	13.62	Domestic	Shale	
2512445		12.7	30.79	31.40	36.32	Domestic	Shale	
2512914		15.2						
2512915		15.2	17.07	18.60	18.16	Domestic	Shale	
2513165		15.2	14.30	28.96	4.54	Domestic	Shale	
2514186		15.2	25.91	50.30	22.7	Domestic	Shale	
7113391	A074411	15.2		34.45	22.7	Domestic	Shale	
7113392	A065331							
7147557	A092834	15.2	26.52	33.54	13.62	Domestic	Shale	

1. SWL – Static Water Level

2. PWL – Pumping Water Level

In general, a flow rate of 13.62 L/min is considered the minimum that the Canadian Mortgage Housing Council will accept in order to approve a mortgage loan. Although not applicable for this application, MECP Procedure D-5-5 (1996) specifies that a minimum peak demand flow rate of 13.7 L/min be utilized. For the purposes of discussion, we will consider the minimum well yield required to be 13.7 L/min.

Of the eleven (11) wells identified, there is one (1) (Well ID 2513165) where the reported yield was less than the minimum of 13.7 L/min. The remainder of the wells within the area produce water roughly equal to 13.7 L/min (Well ID 2510833 and 7147557).

Well ID 2505270 was reported to produce mineralized water. It is important to note that O.Reg. 903 does not define what “mineralized” water is, nor does it require testing to confirm the water quality. This is left to the discretion of the well contractor. The well contractor also noted under “Water Use” that the well was being used for domestic water supply so it should be inferred that whatever caused them to define the water as “mineralized” was not a concern in terms of human consumption and/or was overcome with treatment.

Site Specific Information

Well & Field Reconnaissance Surveys

A drinking water source survey was circulated to all dwellings in the immediate vicinity and down gradient of the proposed development to inventory sources of drinking water in the area including ponds, dug wells, shore wells and conventionally drilled wells. A total of twenty-six (26) letters were either hand-delivered or sent VIA post to all locations between September 26, 2022 and October 6, 2022.

Eight (8) responses were received, and various follow ups were conducted. One resident did not supply their address in the response, but indicated their home resided on Buckingham Lane. Another resident supplied their responses verbally during hand-delivery of the well survey questionnaire. A summary of the survey results can be found in Table 2 below:

Table 2: Summary of Well Survey

Address	Source	Drinking Water?	Quantity or Quality Issues?	Age of Source	Dug or Drilled	Well Depth	Records
Buckingham Lane	Shore Well	Yes	No	Unknown	Dug	Unknown	No
110 Buckingham Lane	Shore Well	Yes	No	< 5 Years	Dug	20 ft.	No
104 Buckingham Lane	Shore Well	Yes	No	~24 Years	Dug	16 ft.	No
350032 Bayshore Road	Pond	Yes	No	Unknown	N/A	N/A	No
350026 Bayshore Road	Pond	Yes	No	~ 10 Years	N/A	N/A	No
350041 Bayshore Road	Well	No	No	~ 20 Years	Drilled	> 80 ft.	No
128 Paradise Bay	Shore Well	Yes	No	Unknown	Dug	Unknown	No
125 Paradise Bay	Shore Well	Yes	Yes	Unknown	Unknown	Unknown	No

The letter, questionnaire, and the mailing list summary of the Well Survey are included within Appendix A.

During hand-delivery of the Well Survey, a field well reconnaissance survey was also completed to confirm the location of MECP documented wells and identify sources that were not identified on the MECP well records database or through resident responses. In part due to the rural, densely vegetated, and large setback distances characteristic of properties in the area, the well reconnaissance survey did not yield any supplemental results. The location of one (1) MECP well (ID 2505270) was confirmed visually. One (1) other MECP well location (ID 2514186) was determined to be inaccurate based on a desktop investigation, the confirmed location of the well at 350041 Bayshore Road is reflected in Figure 4.

As indicated by the results of the Well Survey, most drinking water sources downgradient or below the bluff rely on either shore wells or surface water sources. One response indicated the potential for a well to exist at 128 Paradise Bay, however, during a follow-up interview it was determined that the well was in fact a shore well. As such, the drinking water sources relying on shore wells are not considered to be at significant risk of changes in quantity or quality because the recharge is primarily dependent on Georgian Bay.

Two (2) downgradient surface water sources have the potential to be affected by activities on site. The surface water sources are in-line and connected to drainage that originates from atop the bluff. The proposed storm water management plan for the site will control the quantity of runoff to pre-development conditions and therefore changes in the quantity are not considered to be a threat to the surface water sources. However, alterations on site that have the potential to increase erosion could introduce an increased quantity of silt or other particulate matter into the runoff. The approved sediment and erosion control plan is recommended to focus efforts into reducing the amount of total suspended solids (TSS) in the runoff leaving site. The sediment and erosion control plan should implement treatment in a tiered manner first by preventing pollution and controlling sources, secondly by promoting settlement and infiltration on site by reducing the velocity of flows, and third by employing mitigative strategies such as filtration.

In addition, potentially contaminating activities have the potential to release pollutants which will migrate downstream to the surface water sources that exist on the west side of Bayshore Road. It follows that for the site, a best management practices approach to source water protection shall be taken on site to reduce the likelihood of sources downstream being affected. The best management practices approach will exclude all twenty-one (21) activities outlined in the Grey Sauble Source Protection Plan's List of Prescribed Drinking Water Threats, including storing snow and the application of road salts to the access road.

Drinking Water Source Testing

Following the results of the Well Survey, drinking water sources identified in the area that could act as proxies for well suitability on site or had the potential to be affected by alterations on site (including the installation of new supply wells) were contacted to offer a baseline test of both the quantity and quality of their source.

Three (3) residents agreed to the baseline testing, two (2) of which were the downgradient surface water source and the remaining one (1) was a drilled well (ID 2514186) directly adjacent to the site that was currently not in use.

Given that the two (2) downgradient drinking water sources are directly connected in series, a single water sample was collected from the pond closest to the site on April 4, 2022. The pond receives drainage from the region upgradient that includes the site. The source, located at 350032 Bayshore Road, included an exceedance in Total Coliforms (65 CFU/100 ml) when compared to Ontario's Drinking Water Quality Management Standards (DWQMS) and the local Grey Bruce Health Unit's guidelines. No other exceedances were reported. Following receipt of the analytical results on drinking water, the two (2) residents currently using the source were advised and it was confirmed that appropriate water treatment systems were in place.

The drilled well (ID 25114186) which exists adjacent to the site to the northeast at 350041 Bayshore Road was also tested for quality and quantity to determine the suitability of groundwater resources to support additional private supply wells. Gleaning the well record and speaking with the current owner of the well, it became apparent that the well had not been in use for at least 3 years and potentially longer. Additionally, the well record revealed that the source of water was entirely from the shale bedrock which is present at a depth of 24.08 m and greater, water was originally encountered within the shale at a depth between 38.10 m and 41.15 m. Accordingly, the well record for ID 25114186 indicated that the water was fresh and recommended the pump intake to be set at 41.15 m.

Though the well water was originally described as fresh during installation in 1999, the results of the quality tests collected in field on March 10, 2022, demonstrated exceedances in Boron (9.26 mg/L) and Sodium (1140 mg/L) relative to Ontario's DWQMS. No other exceedances were reported relative to Maximum Allowable Concentration (MAC) directives. Sources of Boron and Sodium in the area are likely natural as no significant upgradient source exists and both markers are typical of the Queenston Shale Formation. As mentioned above, the subject well had not been in use for several years as indicated by the owner. One potential reason for the elevated ionic characteristics in the well could be in part due to the progressive mineral dissolution over time combined with cation exchange.

The exceedance of both parameters is not considered to be an impediment to the use of the drilled well for drinking water purposes as reverse osmosis systems can be used to reduce the concentration of these parameters to below Ontario's MAC as dictated by the DWQMS. However, the concentration of Sodium should be further explored as it is not representative of concentrations related to water drawn from actively used shale bedrock aquifers. Quality results of the pond and well testing can be found in Appendix B.

The well located at 350041 Bayshore Road was also tested for quantity through a pumping test. The pumping test was conducted on March 10, 2022. Results of the pumping test indicated the well had sufficient capacity to maintain a flow rate of 15.6 L/min for 60 mins. Manual water levels within the well were taken during the pumping test with a standard water meter, however, a torque arrestor above the pump intake prevented water levels below 24.45 mbgs from being recorded accurately. The torque arrestor did not result in any issues with the test as the drawdown water levels generally plateaued just above this depth. With the manual drawdown data plotted on a semi-log graph, a strong linear drawdown correlation was present ($R^2 = 0.92$). Projecting the relationship out to one-year (525,600 mins), the drawdown water level is estimated to be 29.79 mbgs. With a total available depth of 50.29 mbgs, an 80% Safety Factor can be applied which suggests the well has up to 10.00 m of additional drawdown at the selected rate of 15.6 L/min. The Well Pumping Test: Drawdown chart can be found within Appendix B.

Following the manual pumping test, a continuous data logging device was installed slightly above the pump intake guard at a depth of 24.2 mbgs and used to record the recharge of the well. Data

for the week following the pumping test was plotted on a semi-log graph and the results indicated that 90% Recharge of the well occurred at 853 mins (14.22 hours). Given that typical domestic sources run wells in a periodic manner daily in which a reservoir is filled in response to normal use, drawdown on the magnitude of the 1-Hour Pumping Test is not considered to be normal daily use and likely in excess of usual domestic pumping. The Well Pumping Test: Recharge chart can be found within Appendix B.

Geotechnical Investigation

GM Blue Plan Engineering was retained as a subconsultant to establish the geotechnical conditions present at the site. On February 18, 2022, a total of twelve (12) test holes were completed across the development area. Samples were collected and submitted for particle size analysis to confirm the gradation of the soils.

In general, a surficial layer of topsoil and organics were found to extend between 0 mbgs and 0.4 mbgs. Underlying the surficial soil was a brown clayey silt fill with some gravel and evidence of grey mottling. The mottling within this unit is indicative of high seasonal groundwater levels which is consistent with the low permeability of the material. Due to the low capacity for infiltration of the clayey silt fill, this layer will also be susceptible to seasonally perched water.

Groundwater seepage was noted to occur within the clayey silt fill at depths between 1.0 mbgs and 1.6 mbgs. At the time when the test holes were completed, the geotechnical consultant on record attributed the seepage to the seasonal melt that was occurring in mid-February 2022. The test holes where seepage was noted extended across the site and the depths were dependent on topography suggesting that the elevation of groundwater for the development area is related closely to the elevation of the ground surface. As such, it is believed that the elevation of the shallow groundwater table falls from the northeast to the southwest corner. Ultimately the direction of shallow groundwater flow is towards the precipice of the bluff and down towards the shores of Georgian Bay.

A copy of the geotechnical report can be found within Appendix C.

Conclusions

A best management practices approach to source protection should be taken to ensure minimal effects on properties down gradient. This includes omitting all twenty-one (21) identified activities in the region's Source Protection Plan. The sediment and erosion control plan should prevent and control sources of pollution, promote settlement and infiltration on site, and employ mitigative strategies such as filtration.

Crozier is of the opinion that individual wells could be established for each of the proposed lots that would be capable of providing water of suitable quality and quantity for normal domestic supply without impacting existing water wells in the area. At the time of installation of new domestic supply wells, the first well installed should be sampled following development to further explore the elevated Sodium and Boron concentrations which were present in the drilled well at 350041 Bayshore Road (ID 25114186).

Seasonal shallow groundwater on the site is relatively high but will not present any issues to development should proper grading and engineering strategies be utilized to ensure that the underside of footings (USFs) maintain separation consistent with the Town of Meaford's Engineering Standards ($n > 0.30$ m).

Yours truly,

C.F. CROZIER & ASSOCIATES INC.



Chris Gerrits, M.Sc. P. Eng.
Senior Project Manager

EF/CG:

J:\900\903 - McCullough\3780 - Leith Bayshore Rd\Letters\3rd Submission\2022.06.14 Leith-Bayshore Hydrogeologic Assessment.docx

APPENDIX A

Well Survey Letter, Questionnaire & Mailing List

OCTOBER 6, 2021

PROJECT NO: 0903-3780

SENT VIA: MAIL

Attention: **Property Owner/Tenant**

RE: **DOOR TO DOOR WELL SURVEY**
CONCESSION BF, PART LOT 23, R. PLAN 16R-4635, PART 2
BAYSHORE ROAD, LEITH
MUNICIPALITY OF MEAFORD, GREY COUNTY, ONTARIO

To whom it may concern,

We have been retained by the Owner of a parcel of land located along Bayshore Road (Roll # 42-10510-004-07110-000), located in Leith of the Municipality of Meaford to assist with obtaining approvals for a proposed residential development. We are conducting a door to door well survey to determine the location and use of any private supply wells in the area. We would appreciate participation in this survey for our work.

Attached is a Questionnaire concerning your property and private well (if applicable). Please review and provide your responses via email to efinbow@cfcrozier.ca. Alternatively, please feel free to call our office to provide us with your Questionnaire responses. Rest assured, we will not share your contact information with any third parties.

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

Sincerely,

CROZIER CONSULTING ENGINEERS



Evan Finbow, GIT
Hydrogeology Intern
EF/

Enclosure

Door to Door Well Survey Questionnaire (1 Page)

Door to Door Well Survey Questionnaire

1. What is your address?
2. Do you have a private well on your property?
3. Does your well supply your drinking water?
4. Do you have an alternative source of water stored on your property (e.g. cistern, pond)?
5. What is the age of your well?
6. Is it a dug or drilled well?
7. How deep is your well?
8. Do you have any records for the well?
9. Have you had any quantity or quality issues with your well?

If you are willing, please provide your contact information for any follow up questions we may have:

Reminder: Your contact information will not be shared with any third parties.

If you do not use your well for drinking water, please consider decommissioning your well.

Well Survey Mailing List**Table 3: Verified¹ Canada Post Mailing List**

Key	Street No.	Street	Town	Province	Postal
1	122	Buckingham Lane	Annan	ON	N0H 1B0
2	125	Paradise Bay	Annan	ON	N0H 1B0
3	116	Paradise Bay	Annan	ON	N0H 1B0
4	120	Paradise Bay	Annan	ON	N0H 1B0
5	126	Paradise Bay	Annan	ON	N0H 1B0
6	128	Paradise Bay	Annan	ON	N0H 1B0

Table 4: Unverified² Canada Post Mailing List

Key	Street No.	Street	Town	Province	Postal
7	120	Buckingham Lane	Annan	ON	N0H 1B0
8	126	Buckingham Lane	Annan	ON	N0H 1B0
9	128	Buckingham Lane	Annan	ON	N0H 1B0
10	130	Buckingham Lane	Annan	ON	N0H 1B0
11	114	Paradise Bay	Annan	ON	N0H 1B0
12	124	Paradise Bay	Annan	ON	N0H 1B0
13	132	Paradise Bay	Annan	ON	N0H 1B0
14	136	Paradise Bay	Annan	ON	N0H 1B0
15	211	Paradise Bay	Annan	ON	N0H 1B0
16	350036	Bayshore Road	Annan	ON	N0H 1B0

Table 5: Hand-Delivered Mailing List

Key	Street No.	Street	Town	Province	Postal
17	102	Buckingham Lane	Annan	ON	N0H 1B0
18	104	Buckingham Lane	Annan	ON	N0H 1B0
19	108	Buckingham Lane	Annan	ON	N0H 1B0
20	110	Buckingham Lane	Annan	ON	N0H 1B0
21	116	Buckingham Lane	Annan	ON	N0H 1B0
22	350026	Bayshore Road	Annan	ON	N0H 1B0
23	350032	Bayshore Road	Annan	ON	N0H 1B0
24	350057	Bayshore Road	Annan	ON	N0H 1B0
25	350059	Bayshore Road	Annan	ON	N0H 1B0
26	350063	Bayshore Road	Annan	ON	N0H 1B0

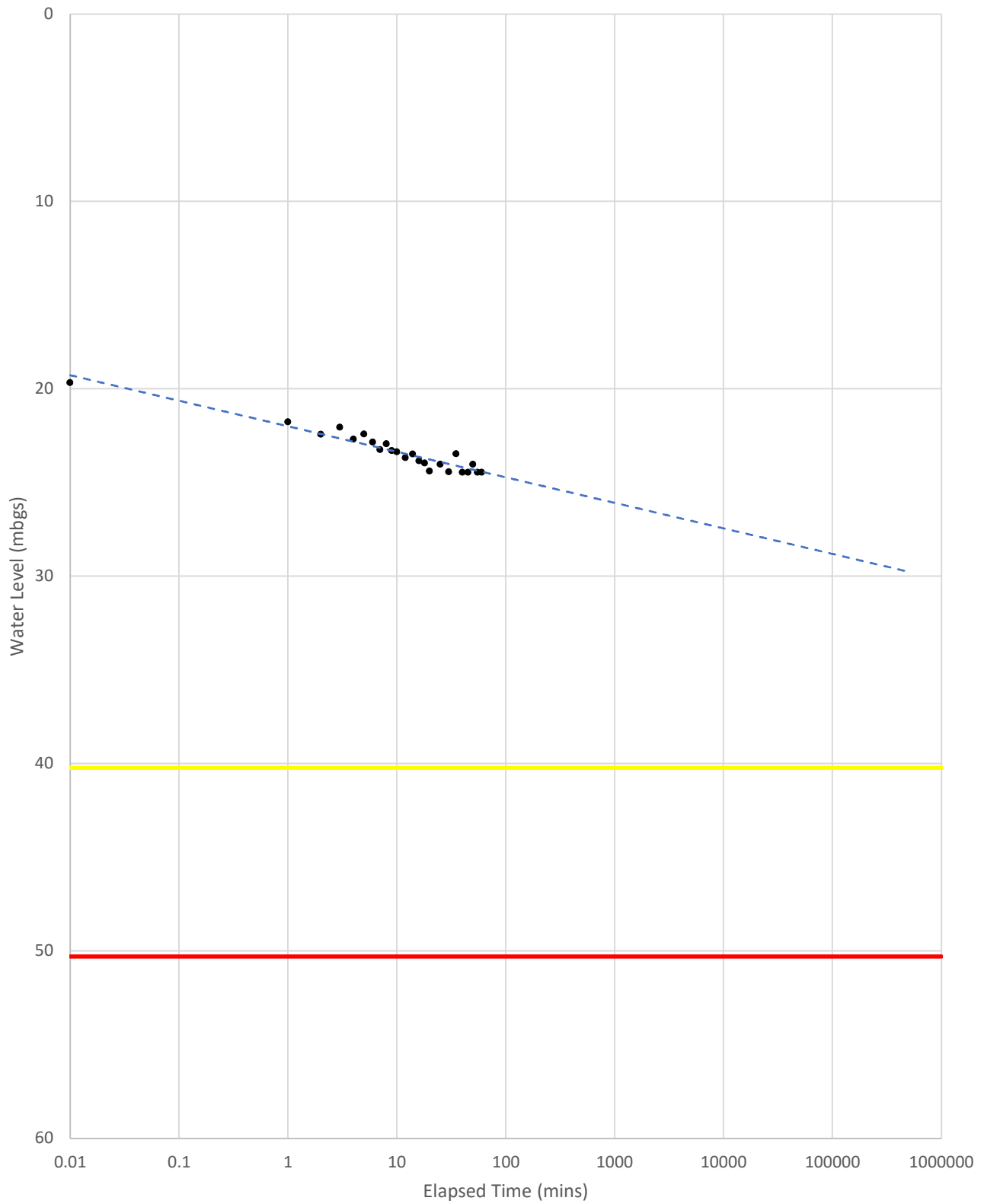
1. Verified Canada Post Address includes a reverse lookup location.

2. Unverified Canada Post Address cannot be looked up online, but the address exists and appears on Google Maps.

APPENDIX B

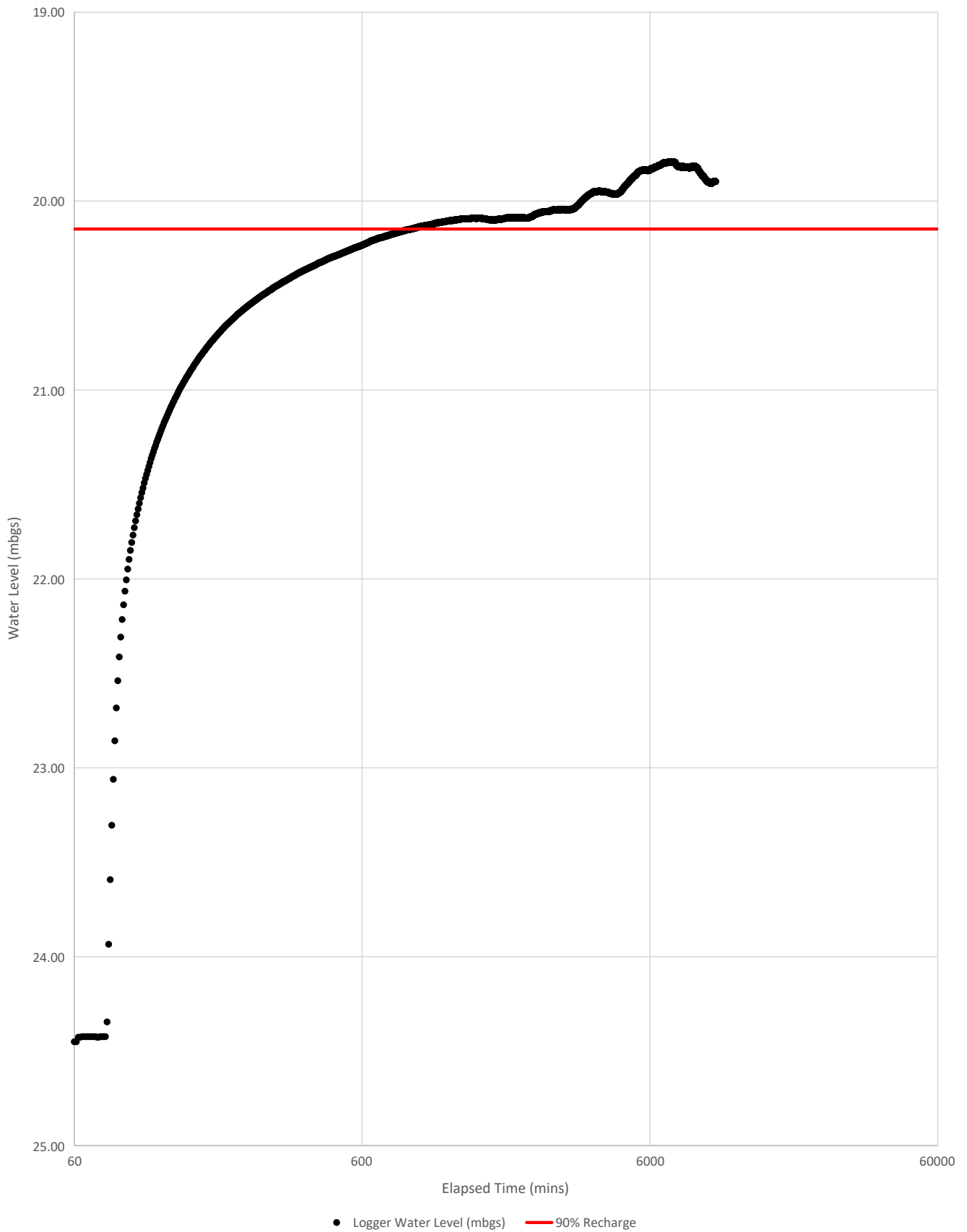
Well Testing Results

Well Pumping Test: Drawdown 350041 Bayshore Road (ID 2514186)



• Manual Water Level (mbgs) — Well Depth — 80% Safety Factor

Well Pumping Test: Recharge
350041 Bayshore Road (ID 2514186)





11

Municipality **25016** Con. **CON** **A**

County or District <i>Sumner</i>	Township/Borough/City/Town/Village <i>Sydney</i>	Con block tract survey, etc. <i>A</i>	Lot <i>22</i>
Address <i>RR #2</i>		Date completed <i>30</i> day <i>06</i> month <i>99</i> year	

[illegible]

41		WATER RECORD			
Water found at - feet		Kind of water			
10-13	1 ☒ Fresh 2 ☐ Salty	3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas	14		
15-18	1 ☐ Fresh 2 ☐ Salty	3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas	19		
20-23	1 ☐ Fresh 2 ☐ Salty	3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas	24		
25-28	1 ☐ Fresh 2 ☐ Salty	3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas	29		
30-33	1 ☐ Fresh 2 ☐ Salty	3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas	34		

51 CASING & OPEN HOLE RECORD					
Inside diam inches	Material	Wall thickness inches	Depth - feet		
			From	To	
10-11 6 1/4	1 ☒ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic	12 .188	0	13-18 83.7	
17-18 5"	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☒ Plastic	19	75	20-23 165	
24-25	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic	26		27-30	

SCREEN	Sizes of opening (Slot No.)	31-33	Diameter	34-38	Length	39-40
			inches		feet	
	Material and type			Depth at top of screen		30
				feet		

61		PLUGGING & SEALING RECORD	
☐ Annular space		☐ Abandonment	
Depth set at - feet		Material and type (Cement grout, bentonite, etc.)	
From	To		
10-13	14-17		
18-21	22-25		
26-29	30-33		
		80	

PUMPING TEST	71 Pumping test method ¹⁰ ☐ Pump <i>AIR</i> ☐ Bailor		Pumping rate ¹¹⁻¹⁴ <i>5+</i> GPM		Duration of pumping ¹⁷⁻¹⁸ <i>1</i> Hours <i>.....</i> Mins	
	Static level		Water level end of pumping		Water levels during ☐ Pumping ² ☒ Recovery	
	¹⁹⁻²¹ <i>85</i> feet	²²⁻²⁴ <i>165</i> feet	²⁵ 15 minutes ²⁶⁻²⁸ feet	30 minutes ²⁹⁻³¹ <i>85</i> feet	45 minutes ³²⁻³⁴ feet	60 minutes ³⁵⁻³⁷ ☒ feet
	If flowing give rate ³⁸⁻⁴¹ GPM		Pump intake set at <i>165 RAD5</i> feet		Water at end of test ⁴² ☒ Clear ☐ Cloudy	
	Recommended pump type ☐ Shallow ☒ Deep		Recommended pump setting ⁴³⁻⁴⁵ <i>135</i> feet		Recommended pump rate ⁴⁶⁻⁴⁹ <i>5</i> GPM	

FINAL STATUS OF WELL 54

1 ☒ Water supply	5 ☐ Abandoned, insufficient supply ⁹	☐ Unfinished
2 ☐ Observation well	6 ☐ Abandoned, poor quality	¹⁰ ☐ Replacement well
3 ☐ Test hole	7 ☐ Abandoned (Other)	
4 ☐ Recharge well	8 ☐ Dewatering	

WATER USE 55-56

1 ☒ Domestic	5 ☐ Commercial	9 ☐ Not used
2 ☐ Stock	6 ☐ Municipal	10 ☐ Other
3 ☐ Irrigation	7 ☐ Public supply	
4 ☐ Industrial	8 ☐ Cooling & air conditioning	

METHOD OF CONSTRUCTION ⁵⁷

1 ☐ Cable tool	5 ☐ Air percussion	9 ☐ Driving
2 ☐ Rotary (conventional)	6 ☐ Boring	10 ☐ Digging
3 ☐ Rotary (reverse)	7 ☐ Diamond	11 ☐ Other
4 ☒ Rotary (air)	8 ☐ Jetting	

LOCATION OF WELL

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

14

15

Lot line

202554

Name of Well Contractor	Well Contractor's Licence No.
Wm Wright Well Drillers Ltd	5587
Address	
Box 167 Hymanth Crest	
Name of Well Technician	Well Technician's Licence No.
Herb Wright	T-0148
Signature of Technician/Contractor	Submission date
Florence Wright	day mo yr

MINISTRY USE ONLY	Data source	58	Contractor	59-62	Date received	63-68	69
	5507		FEB 23 2000				
	Date of inspection	Inspector					
	Remarks						
	CSS.ES0						

CLIENT NAME: CROZIER & ASSOCIATES
301-40 HURON STREET
COLLINGWOOD, ON L9Y4R3
905-875-0026

ATTENTION TO: Evan Finbow

PROJECT: 903-3780

AGAT WORK ORDER: 22T872491

MICROBIOLOGY ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer

WATER ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer

DATE REPORTED: Mar 21, 2022

PAGES (INCLUDING COVER): 14

VERSION*: 1

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

***Notes**

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 22T872491

PROJECT: 903-3780

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

CLIENT NAME: CROZIER & ASSOCIATES

ATTENTION TO: Evan Finbow

SAMPLING SITE:

SAMPLED BY:

Heterotrophic Plate Count in Water

DATE RECEIVED: 2022-03-11

DATE REPORTED: 2022-03-21

SAMPLE DESCRIPTION: Well 1
SAMPLE TYPE: Water
DATE SAMPLED: 2022-03-10
11:30
3611440

Parameter	Unit	G / S	RDL	3611440
Heterotrophic Plate Count	CFU/1ml			0

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

3611440 Heterotrophic Plate Count RDL = 5 CFU/mL

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Nivine Basly



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 22T872491

PROJECT: 903-3780

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

CLIENT NAME: CROZIER & ASSOCIATES

ATTENTION TO: Evan Finbow

SAMPLING SITE:

SAMPLED BY:

Total Coliforms & E. Coli (Using MI Agar)

DATE RECEIVED: 2022-03-11

DATE REPORTED: 2022-03-21

SAMPLE DESCRIPTION: Well 1
SAMPLE TYPE: Water
DATE SAMPLED: 2022-03-10
11:30
3611440

Parameter	Unit	G / S	RDL	3611440
Escherichia coli	CFU/100mL			0
Total Coliforms	CFU/100mL			0

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

3611440 Escherichia coli, Total Coliforms RDL = 1 CFU/100mL.

Presence of sediments was observed upon receipt.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Nivine Basly



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 22T872491

PROJECT: 903-3780

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CLIENT NAME: CROZIER & ASSOCIATES

ATTENTION TO: Evan Finbow

SAMPLING SITE:

SAMPLED BY:

DRINKING WATER - Water Quality Assessment (mg/L)

DATE RECEIVED: 2022-03-11

DATE REPORTED: 2022-03-21

SAMPLE DESCRIPTION: Well 1
SAMPLE TYPE: Water
DATE SAMPLED: 2022-03-10
11:30
3611440

Parameter	Unit	G / S	RDL	3611440
Electrical Conductivity	µS/cm		2	8500
pH	pH Units		NA	7.20
Hardness (as CaCO ₃) (Calculated)	mg/L		0.5	2230
Total Dissolved Solids	mg/L		10	6550
Alkalinity (as CaCO ₃)	mg/L		5	56
Fluoride	mg/L		0.26	<0.26
Chloride	mg/L		2.4	2550
Nitrate as N	mg/L		0.7	<0.7
Nitrite as N	mg/L		0.5	<0.5
Bromide	mg/L		0.6	17.7
Sulphate	mg/L		1.9	1040
Ortho Phosphate as P	mg/L		1.3	<1.3
Ammonia as N	mg/L		0.04	6.54
Total Phosphorus	mg/L		0.02	<0.02
Total Organic Carbon	mg/L		0.5	<0.5
Apparent Colour	TCU		2.5	49.5
Turbidity	NTU		0.5	39.3
Total Calcium	mg/L		0.63	574
Total Magnesium	mg/L		0.68	194
Total Potassium	mg/L		2.30	94.9
Total Sodium	mg/L		0.90	1140
Total Aluminum	mg/L		0.010	0.147
Total Antimony	mg/L		0.003	<0.003
Total Arsenic	mg/L		0.003	<0.003
Total Barium	mg/L		0.002	0.018
Total Beryllium	mg/L		0.001	<0.001
Total Boron	mg/L		0.20	9.26
Total Cadmium	mg/L		0.001	<0.001
Total Chromium	mg/L		0.003	<0.003

Certified By:



Nivine Basly



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 22T872491

PROJECT: 903-3780

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TEL (905)712-5100
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<http://www.agatlabs.com>

CLIENT NAME: CROZIER & ASSOCIATES

ATTENTION TO: Evan Finbow

SAMPLING SITE:

SAMPLED BY:

DRINKING WATER - Water Quality Assessment (mg/L)

DATE RECEIVED: 2022-03-11

DATE REPORTED: 2022-03-21

SAMPLE DESCRIPTION: Well 1
SAMPLE TYPE: Water
DATE SAMPLED: 2022-03-10
11:30
3611440

Parameter	Unit	G / S	RDL	3611440
Total Cobalt	mg/L		0.001	<0.001
Total Copper	mg/L		0.003	0.066
Total Iron	mg/L		0.010	7.78
Total Lead	mg/L		0.001	0.001
Total Manganese	mg/L		0.002	0.190
Total Mercury	mg/L		0.0001	<0.0001
Total Molybdenum	mg/L		0.002	<0.002
Total Nickel	mg/L		0.003	<0.003
Total Selenium	mg/L		0.002	0.028
Total Silver	mg/L		0.002	<0.002
Total Strontium	mg/L		0.05	22.0
Total Thallium	mg/L		0.006	<0.006
Total Tin	mg/L		0.002	<0.002
Total Titanium	mg/L		0.010	<0.010
Total Tungsten	mg/L		0.010	<0.010
Total Uranium	mg/L		0.002	<0.002
Total Vanadium	mg/L		0.002	<0.002
Total Zinc	mg/L		0.020	<0.020
Total Zirconium	mg/L		0.004	<0.004

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

3611440 Dilution required, RDL has been increased accordingly.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Nivine Basly

Quality Assurance

CLIENT NAME: CROZIER & ASSOCIATES

PROJECT: 903-3780

SAMPLING SITE:

AGAT WORK ORDER: 22T872491

ATTENTION TO: Evan Finbow

SAMPLED BY:

Microbiology Analysis

RPT Date: Mar 21, 2022			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Total Coliforms & E. Coli (Using MI Agar)

Escherichia coli	3611440	3611440	0	0	NA
Total Coliforms	3611440	3611440	0	0	NA

Comments: NA - % RPD Not Applicable.

Heterotrophic Plate Count in Water

Heterotrophic Plate Count	3611440	3611440	0	0	NA
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Comments: NA - % RPD Not Applicable

Certified By:


Nivine Basily

Quality Assurance

CLIENT NAME: CROZIER & ASSOCIATES

PROJECT: 903-3780

SAMPLING SITE:

AGAT WORK ORDER: 22T872491

ATTENTION TO: Evan Finbow

SAMPLED BY:

Water Analysis															
RPT Date: Mar 21, 2022			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

DRINKING WATER - Water Quality Assessment (mg/L)

Electrical Conductivity	3611440	3611440	8500	8520	0.2%	< 2	97%	90%	110%						
pH	3611440	3611440	7.20	7.22	0.3%	NA	101%	90%	110%						
Total Dissolved Solids	3611440	3611440	6550	6540	0.2%	< 10	100%	80%	120%						
Alkalinity (as CaCO ₃)	3611440	3611440	56	57	1.8%	< 5	95%	80%	120%						
Fluoride	3606558		<0.05	<0.05	NA	< 0.05	102%	70%	130%	97%	80%	120%	108%	70%	130%
Chloride	3606558		161	160	0.6%	< 0.10	96%	70%	130%	103%	80%	120%	NA	70%	130%
Nitrate as N	3606558		2.75	2.74	0.4%	< 0.05	92%	70%	130%	100%	80%	120%	101%	70%	130%
Nitrite as N	3606558		0.19	0.21	NA	< 0.05	92%	70%	130%	95%	80%	120%	101%	70%	130%
Bromide	3606558		<0.05	<0.05	NA	< 0.05	100%	70%	130%	101%	80%	120%	99%	70%	130%
Sulphate	3606558		19.0	18.8	1.1%	< 0.10	94%	70%	130%	100%	80%	120%	100%	70%	130%
Ortho Phosphate as P	3606558		<0.10	<0.10	NA	< 0.10	96%	70%	130%	104%	80%	120%	100%	70%	130%
Ammonia as N	3616232		<0.02	<0.02	NA	< 0.02	106%	70%	130%	103%	80%	120%	94%	70%	130%
Total Phosphorus	3550449		7.62	7.75	1.7%	< 0.02	99%	70%	130%	98%	80%	120%	NA	70%	130%
Total Organic Carbon	3611440	3611440	<0.5	<0.5	NA	< 0.5	95%	90%	110%	101%	90%	110%	102%	80%	120%
Apparent Colour	3605347		<2.5	4.6	NA	< 2.5	100%	90%	110%						
Total Calcium	3618078		125	129	3.1%	< 0.10	100%	70%	130%	96%	80%	120%	97%	70%	130%
Total Magnesium	3618078		14.8	15.3	3.3%	< 0.10	102%	70%	130%	97%	80%	120%	98%	70%	130%
Total Potassium	3618078		8.74	9.34	6.6%	< 0.50	101%	70%	130%	95%	80%	120%	94%	70%	130%
Total Sodium	3618078		26.8	26.4	1.5%	< 0.10	100%	70%	130%	95%	80%	120%	96%	70%	130%
Total Aluminum	3611440	3611440	0.147	0.141	4.2%	< 0.010	94%	70%	130%	109%	80%	120%	98%	70%	130%
Total Antimony	3611440	3611440	<0.003	<0.003	NA	< 0.003	100%	70%	130%	103%	80%	120%	97%	70%	130%
Total Arsenic	3611440	3611440	<0.003	<0.003	NA	< 0.003	98%	70%	130%	109%	80%	120%	104%	70%	130%
Total Barium	3611440	3611440	0.018	0.017	5.7%	< 0.002	99%	70%	130%	103%	80%	120%	106%	70%	130%
Total Beryllium	3611440	3611440	<0.001	<0.001	NA	< 0.001	103%	70%	130%	110%	80%	120%	80%	70%	130%
Total Cadmium	3611440	3611440	<0.001	<0.001	NA	< 0.001	100%	70%	130%	106%	80%	120%	95%	70%	130%
Total Chromium	3611440	3611440	<0.003	<0.003	NA	< 0.003	102%	70%	130%	107%	80%	120%	108%	70%	130%
Total Cobalt	3611440	3611440	<0.001	<0.001	NA	< 0.001	101%	70%	130%	108%	80%	120%	100%	70%	130%
Total Copper	3611440	3611440	0.066	0.063	4.7%	< 0.003	100%	70%	130%	107%	80%	120%	87%	70%	130%
Total Iron	3611440	3611440	7.78	7.51	3.5%	< 0.010	98%	70%	130%	105%	80%	120%	119%	70%	130%
Total Lead	3611440	3611440	0.001	<0.001	NA	< 0.001	105%	70%	130%	102%	80%	120%	91%	70%	130%
Total Manganese	3611440	3611440	0.190	0.183	3.8%	< 0.002	106%	70%	130%	105%	80%	120%	97%	70%	130%
Total Mercury	3611440	3611440	<0.0001	<0.0001	NA	< 0.0001	102%	70%	130%	96%	80%	120%	96%	70%	130%
Total Molybdenum	3611440	3611440	<0.002	<0.002	NA	< 0.002	103%	70%	130%	110%	80%	120%	107%	70%	130%
Total Nickel	3611440	3611440	<0.003	<0.003	NA	< 0.003	100%	70%	130%	108%	80%	120%	90%	70%	130%
Total Selenium	3611440	3611440	0.028	0.024	17.8%	< 0.002	102%	70%	130%	105%	80%	120%	100%	70%	130%
Total Silver	3611440	3611440	<0.002	<0.002	NA	< 0.002	99%	70%	130%	104%	80%	120%	93%	70%	130%
Total Thallium	3611440	3611440	<0.006	<0.006	NA	< 0.006	101%	70%	130%	101%	80%	120%	90%	70%	130%
Total Tin	3611440	3611440	<0.002	<0.002	NA	< 0.002	104%	70%	130%	103%	80%	120%	106%	70%	130%
Total Titanium	3611440	3611440	<0.010	<0.010	NA	< 0.010	122%	70%	130%	88%	80%	120%	129%	70%	130%

AGAT QUALITY ASSURANCE REPORT (V1)

Page 7 of 14

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. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Results relate only to the items tested. Results apply to samples as received.

Quality Assurance

CLIENT NAME: CROZIER & ASSOCIATES

PROJECT: 903-3780

SAMPLING SITE:

AGAT WORK ORDER: 22T872491

ATTENTION TO: Evan Finbow

SAMPLED BY:

Water Analysis (Continued)

RPT Date: Mar 21, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Tungsten	3611440	3611440	<0.010	<0.010	NA	< 0.010	100%	70%	130%	90%	80%	120%	106%	70%	130%
Total Uranium	3611440	3611440	<0.002	<0.002	NA	< 0.002	104%	70%	130%	103%	80%	120%	104%	70%	130%
Total Vanadium	3611440	3611440	<0.002	<0.002	NA	< 0.002	97%	70%	130%	103%	80%	120%	106%	70%	130%
Total Zinc	3611440	3611440	<0.020	<0.020	NA	< 0.020	100%	70%	130%	108%	80%	120%	80%	70%	130%
Total Zirconium	3611440	3611440	<0.004	<0.004	NA	< 0.004	104%	70%	130%	108%	80%	120%	112%	70%	130%

Comments: NA Signifies Not Applicable

Duplicate NA: results are under 5X the RDL and will not be calculated.

Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

Certified By:


Nivine Basily

Method Summary

CLIENT NAME: CROZIER & ASSOCIATES

AGAT WORK ORDER: 22T872491

PROJECT: 903-3780

ATTENTION TO: Evan Finbow

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Microbiology Analysis			
Heterotrophic Plate Count	MIC-93- 7020	SM 9215 C	INCUBATOR
Escherichia coli	MIC-93-7010	EPA 1604	Membrane Filtration
Total Coliforms	MIC-93-7010	EPA 1604	Membrane Filtration

Method Summary

CLIENT NAME: CROZIER & ASSOCIATES
PROJECT: 903-3780
SAMPLING SITE:
AGAT WORK ORDER: 22T872491
ATTENTION TO: Evan Finbow
SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Electrical Conductivity	INOR-93-6000	modified from SM 2510 B	PC TITRATE
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
Hardness (as CaCO ₃) (Calculated)	MET-93-6105	modified from EPA SW-846 6010C & 200.7 & SM 2340 B	CALCULATION
Total Dissolved Solids	INOR-93-6028	modified from EPA 1684, ON MOECC E3139, SM 2540C, D	BALANCE
Alkalinity (as CaCO ₃)	INOR-93-6000	Modified from SM 2320 B	PC TITRATE
Fluoride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	modified from SM 4500-NH ₃ H	LACHAT FIA
Total Phosphorus	INOR-93-6022	modified from SM 4500-P B and SM 4500-P E	SPECTROPHOTOMETER
Total Organic Carbon	INOR-93-6049	modified from SM 5310 B	SHIMADZU CARBON ANALYZER
Apparent Colour	INOR-93-6074	modified from SM 2120 B	LACHAT FIA
Turbidity	INOR-93-6044	modified from SM 2130 B	NEPHELOMETER
Total Calcium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Magnesium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Potassium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Sodium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Aluminum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Antimony	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Arsenic	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Barium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Beryllium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Boron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cadmium	MET -93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Chromium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cobalt	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Copper	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Iron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Lead	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Manganese	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS

Method Summary

CLIENT NAME: CROZIER & ASSOCIATES

AGAT WORK ORDER: 22T872491

PROJECT: 903-3780

ATTENTION TO: Evan Finbow

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Molybdenum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Nickel	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Selenium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Silver	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Strontium	INOR-93-6003	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Thallium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tin	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Titanium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tungsten	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Uranium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Vanadium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zinc	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zirconium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS



AGAT

Laboratories

5835 Coopers Avenue
Mississauga, ON
L4Z 1Y2

Laboratory Use Only

Arrival Condition: ☐ Good ☐ Poor (complete notes)
Arrival Temperature: 8-6/9-1/9-2
AGAT Job Number: 22T872491
Notes: Ice Pack

Drinking Water Chain of Custody Record

P: 905.712.5100 • F: 905.712.5122 • TF: 1.800.856.6261

Client Information

Company: Crozier Consulting Engineers
Contact: Evan Finbow
Address: 1 First St, Suite 200
Coalingwood ON L9Y 1A1
Phone: 705 446 3510 Fax: _____
PO #: _____
Client Project #: 903-3780
AGAT Quotation #: _____

Report Information

1. Name: Evan Finbow
Email: efinbow@crozier.ca
2. Name: _____
Email: _____

Report Format

☒ Single Sample per page
☐ Multiple Samples per page

Facility Type (Check all that are applicable)

☐ Large OR ☒ Small
☒ Residential OR ☐ Non-Residential
☐ Municipal OR ☒ Non-Municipal

+ Water Type

(Specify in column below)
Raw (R), Treated (TR),
Distribution (D), Tap (TP)
Private Well (P)

Requirements (Check one)

☐ O. Regulation 170 ☐ Not Applicable
☐ O. Regulation 243 ☐ Federal
☐ O. Regulation 318/319 ☐ Other _____

IS THIS WATER BEING CONSUMED BY HUMANS?

☐ Yes ☐ No

DO THE RESULTS REQUIRE REPORTING TO THE MECP OR LOCAL PUBLIC HEALTH UNIT?

☐ Yes ☐ No

FOR RAW WATER (E.G. UNTREATED), IS THE SAMPLE COLLECTED FROM A POINT OF HUMAN CONSUMPTION?

☐ Yes ☐ No

CLIENT IS RESPONSIBLE TO COMPLETE AND SUBMIT LAB SERVICE NOTIFICATION (LSN) FORM TO THE MOECC/PHU. FAILURE TO DO SO MAY DELAY REPORTING.

"NOTIFICATION INFORMATION" MUST BE COMPLETE BELOW UPON SUBMISSION OF SAMPLES. LABORATORY ANALYSIS WILL NOT COMMENCE UNTIL ALL INFORMATION HAS BEEN PROVIDED.

SAMPLE IDENTIFICATION/LOCATION	DATE SAMPLED	TIME SAMPLED	WATER TYPE *	# OF CONTAINERS	CHLORINE RESIDUAL (incl. Units)	STANDING	FLUSHED	COMMENTS/STANDING TIME (IN MINUTES)	Inorganics (Sch. 23)	Organics (Sch. 24)	Lead	Fluoride	Sodium	Turbidity	Nitrate, Nitrite	Trihalomethanes / HAAs	E.coli, Total Coliforms	Water Quality Assessment Package	HPC
<u>Well 1</u>	<u>3/10/22</u>	<u>11:30</u>	<u>P</u>	<u>12</u>	<u>n/a</u>												<u>✓</u>	<u>✓</u>	<u>✓</u>
			AM																
			PM																
			AM																
			PM																
			AM																
			PM																
			AM																
			PM																

Samples Taken By (Print Name and Sign):

* TAT is exclusive of weekends and statutory holidays. Prior arrangements must be made with the laboratory in order to submit Microbiology samples on Fridays

NOTIFICATION INFORMATION - (required to report adverse results as per the Safe Drinking Water Act) - Laboratory analysis will not commence until all information is received.

INFORMATION FOR ADVERSE REPORTING

Waterworks Name: _____ Phone: _____ Fax: _____
MOECC# (ie: Waterworks #): _____ After Hours Phone: _____
Contact: _____ Address/Location (if different from client above): _____
Email: _____

MEDICAL OFFICER OF HEALTH (MOH)

Region: _____
PHU Contact: _____
Phone: _____ Fax: _____
Email: _____

Samples Relinquished By (Print Name and Sign):

Evan Finbow

3/10 @ 1:30 pm

Samples Received By (Print Name and Sign):

Anthony Dasilva

Date/Time:

Pink Copy - Client

Page 1 of 1

Samples Relinquished By (Print Name and Sign):

Date/Time:

Samples Received By (Print Name and Sign):

Date/Time:

Yellow/Golden Copy - AGAT

Nº: **DW 06589**

Samples Relinquished By (Print Name and Sign):

Date/Time:

Samples Received By (Print Name and Sign):

Date/Time:

White Copy - AGAT



Non-Reportable Drinking Water Sample Inquiry Form

This form is to ensure your water is tested and reported in accordance with Ontario Regulation 248/03 for testing of Drinking Water under the Safe Drinking Water Act. We require the information below to help uphold our high standard of regulatory compliance, for both AGAT as a laboratory and you, as our valued customer. Please ensure all information is filled out completely and accurately. If you have any questions, please do not hesitate to contact your AGAT Client Project Manager at 905-712-5100.

(1) What is the purpose for your testing? Please provide details below.

baseline well quality

(2) Please answer the following questions.

(a) Is there a request from a Public Health Inspector or a Ministry of Environment Drinking Water Inspector to complete this testing? ☐ Yes ☒ No

If Yes, please contact an AGAT Client Project Manager at 905-712-5100.

(b) Is there a provincial order in effect for your water system? ☐ Yes ☒ No

If Yes, please provide details below including limit for the test parameter if not listed with a standard under O.Reg. 169/03

(c) Does your facility have a drinking water system (DWS) number provided by either MECP or MOHLTC? ☐ Yes ☒ No

(i) If yes, why is the sample not reportable to either MECP or MOHLTC? Please provide details below.

(ii) If yes, is the test for sodium and/or fluoride? ☐ Yes ☐ No

• If the test is for sodium and/or fluoride, was sodium and/or fluoride testing completed and reported to the MECP in the last 57 months or MOHLTC in the last 60 months?

☐ Yes ☒ No

As per the SWDA, Sodium and fluoride (if required by DWS) are required to be tested every 5 years (60 months) by the operator. The sodium and/or fluoride adverse are not required to be reported if two samples are less than 5 years apart.



(d) Is the water collected from a Federally owned, operated or regulated property or water source? ☐ Yes ☒ No

If Yes, please indicate this on the COC under Requirements

(3) If you are private home owner looking to test your drinking water, please answer the following questions:

(i) Are you consuming this water from the point of sample collection? ☐ Yes ☒ No

(ii) Do you have a water treatment unit installed in your system? ☐ Yes ☒ No

(iii) Is your water collected before or after treatment?

☒ Before ☐ After ☐ Not Applicable

(iv) Are you testing your water due to concerns regarding your plumbing?

☐ Yes ☒ No

If Yes, have you done any improvements to your plumbing recently? Please provide details below.

For further assistance, please contact the MECP at the following phone and email:

(1) For inquiries related to O.Reg.170 or O.Reg.318/319

Email: waterforms@ontario.ca

Phone Number: 1-866-793-2588

(2) For inquiries related to O.Reg.243 (Schools and Daycares)

Phone Number: 1-855-515-1331.

Company Name: Crozier

DWCOC#: _____
(if applicable)

Name: Evan Pinbow
(please print name)

Date: 2022-03-10
(yyyy-mm-dd)

Signature: [Signature]

AGAT WorkOrder #: _____
(To be entered by AGAT CPM)

CLIENT NAME: CROZIER & ASSOCIATES
301-40 HURON STREET
COLLINGWOOD, ON L9Y4R3
905-875-0026

ATTENTION TO: Evan Finbow

PROJECT: 903-3780

AGAT WORK ORDER: 22T881886

MICROBIOLOGY ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer

WATER ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer

DATE REPORTED: Apr 18, 2022

PAGES (INCLUDING COVER): 14

VERSION*: 1

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

***Notes**

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 22T881886

PROJECT: 903-3780

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

CLIENT NAME: CROZIER & ASSOCIATES

ATTENTION TO: Evan Finbow

SAMPLING SITE:

SAMPLED BY:

Heterotrophic Plate Count in Water

DATE RECEIVED: 2022-04-07

DATE REPORTED: 2022-04-18

SAMPLE DESCRIPTION: Morris Pond

SAMPLE TYPE: Drinking Water

DATE SAMPLED: 2022-04-06
13:00

Parameter	Unit	G / S	RDL	3723443
Heterotrophic Plate Count	CFU/1ml			390

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

3723443 Heterotrophic Plate Count RDL = 5 CFU/mL

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Nivine Basly



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 22T881886

PROJECT: 903-3780

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

CLIENT NAME: CROZIER & ASSOCIATES

ATTENTION TO: Evan Finbow

SAMPLING SITE:

SAMPLED BY:

Total Coliforms & E. Coli (Using MI Agar)

DATE RECEIVED: 2022-04-07

DATE REPORTED: 2022-04-18

SAMPLE DESCRIPTION: Morris Pond

SAMPLE TYPE: Drinking Water

DATE SAMPLED: 2022-04-06
13:00

Parameter	Unit	G / S	RDL	3723443
Escherichia coli	CFU/100mL			0
Total Coliforms	CFU/100mL			65

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

3723443 Escherichia coli, Total Coliforms RDL = 1 CFU/100mL.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Nivine Basly



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 22T881886

PROJECT: 903-3780

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

CLIENT NAME: CROZIER & ASSOCIATES

ATTENTION TO: Evan Finbow

SAMPLING SITE:

SAMPLED BY:

DRINKING WATER - Water Quality Assessment (mg/L)

DATE RECEIVED: 2022-04-07

DATE REPORTED: 2022-04-18

SAMPLE DESCRIPTION: Morris Pond
SAMPLE TYPE: Drinking Water
DATE SAMPLED: 2022-04-06
13:00
3723443

Parameter	Unit	G / S	RDL	3723443
Electrical Conductivity	µS/cm		2	462
pH	pH Units		NA	7.88
Hardness (as CaCO ₃) (Calculated)	mg/L		0.5	250
Total Dissolved Solids	mg/L		10	248
Alkalinity (as CaCO ₃)	mg/L		5	238
Fluoride	mg/L		0.05	<0.05
Chloride	mg/L		0.10	5.32
Nitrate as N	mg/L		0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05
Bromide	mg/L		0.05	<0.05
Sulphate	mg/L		0.10	11.5
Ortho Phosphate as P	mg/L		0.10	<0.10
Ammonia as N	mg/L		0.02	<0.02
Total Phosphorus	mg/L		0.02	<0.02
Total Organic Carbon	mg/L		0.5	2.1
Apparent Colour	TCU		2.5	49.5
Turbidity	NTU		0.5	8.4
Total Calcium	mg/L		0.10	78.5
Total Magnesium	mg/L		0.10	13.1
Total Potassium	mg/L		0.50	0.96
Total Sodium	mg/L		0.10	2.93
Total Aluminum	mg/L		0.010	0.187
Total Antimony	mg/L		0.003	<0.003
Total Arsenic	mg/L		0.003	<0.003
Total Barium	mg/L		0.002	0.007
Total Beryllium	mg/L		0.001	<0.001
Total Boron	mg/L		0.010	0.014
Total Cadmium	mg/L		0.001	<0.001
Total Chromium	mg/L		0.003	<0.003

Certified By:



Evan Finbow



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 22T881886

PROJECT: 903-3780

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

CLIENT NAME: CROZIER & ASSOCIATES

ATTENTION TO: Evan Finbow

SAMPLING SITE:

SAMPLED BY:

DRINKING WATER - Water Quality Assessment (mg/L)

DATE RECEIVED: 2022-04-07

DATE REPORTED: 2022-04-18

SAMPLE DESCRIPTION: Morris Pond
SAMPLE TYPE: Drinking Water
DATE SAMPLED: 2022-04-06
13:00
3723443

Parameter	Unit	G / S	RDL	3723443
Total Cobalt	mg/L		0.001	<0.001
Total Copper	mg/L		0.003	<0.003
Total Iron	mg/L		0.010	0.200
Total Lead	mg/L		0.001	<0.001
Total Manganese	mg/L		0.002	0.017
Total Mercury	mg/L		0.0001	<0.0001
Total Molybdenum	mg/L		0.002	<0.002
Total Nickel	mg/L		0.003	<0.003
Total Selenium	mg/L		0.002	<0.002
Total Silver	mg/L		0.002	<0.002
Total Strontium	mg/L		0.005	0.132
Total Thallium	mg/L		0.006	<0.006
Total Tin	mg/L		0.002	<0.002
Total Titanium	mg/L		0.010	<0.010
Total Tungsten	mg/L		0.010	<0.010
Total Uranium	mg/L		0.002	<0.002
Total Vanadium	mg/L		0.002	<0.002
Total Zinc	mg/L		0.020	<0.020
Total Zirconium	mg/L		0.004	<0.004

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

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Nivine Basly

Quality Assurance

CLIENT NAME: CROZIER & ASSOCIATES

PROJECT: 903-3780

SAMPLING SITE:

AGAT WORK ORDER: 22T881886

ATTENTION TO: Evan Finbow

SAMPLED BY:

Microbiology Analysis

RPT Date: Apr 18, 2022			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Total Coliforms & E. Coli (Using MI Agar)

Escherichia coli	3723443	3723443	0	0	NA
Total Coliforms	3723443	3723443	65	63	3.1%

Comments: NA - % RPD Not Applicable.

Heterotrophic Plate Count in Water

Heterotrophic Plate Count	3723443	3723443	390	380	2.6%
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Comments: NA - % RPD Not Applicable

Certified By:


Nivine Basily

Quality Assurance

CLIENT NAME: CROZIER & ASSOCIATES

AGAT WORK ORDER: 22T881886

PROJECT: 903-3780

ATTENTION TO: Evan Finbow

SAMPLING SITE:

SAMPLED BY:

Water Analysis															
RPT Date: Apr 18, 2022			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

DRINKING WATER - Water Quality Assessment (mg/L)

Electrical Conductivity	3723443	3723443	462	463	0.2%	< 2	100%	90%	110%						
pH	3723443	3723443	7.88	7.93	0.6%	NA	101%	90%	110%						
Total Dissolved Solids	3709167		398	404	1.5%	< 10	102%	80%	120%						
Alkalinity (as CaCO3)	3723443	3723443	238	241	1.3%	< 5	96%	80%	120%						
Fluoride	3722767		<0.05	<0.05	NA	< 0.05	105%	70%	130%	98%	80%	120%	100%	70%	130%
Chloride	3722767		61.7	62.1	0.6%	< 0.10	101%	70%	130%	104%	80%	120%	115%	70%	130%
Nitrate as N	3722767		<0.05	<0.05	NA	< 0.05	100%	70%	130%	99%	80%	120%	111%	70%	130%
Nitrite as N	3722767		0.36	0.37	2.7%	< 0.05	97%	70%	130%	102%	80%	120%	108%	70%	130%
Bromide	3722767		<0.05	<0.05	NA	< 0.05	100%	70%	130%	100%	80%	120%	108%	70%	130%
Sulphate	3722767		25.9	25.9	0.0%	< 0.10	96%	70%	130%	96%	80%	120%	107%	70%	130%
Ortho Phosphate as P	3722767		<0.10	<0.10	NA	< 0.10	105%	70%	130%	104%	80%	120%	98%	70%	130%
Ammonia as N	3723443	3723443	<0.02	<0.02	NA	< 0.02	103%	70%	130%	101%	80%	120%	103%	70%	130%
Total Phosphorus	3725254		<0.02	<0.02	NA	< 0.02	103%	70%	130%	103%	80%	120%	89%	70%	130%
Total Organic Carbon	3723443	3723443	2.1	2.1	NA	< 0.5	104%	90%	110%	93%	90%	110%	88%	80%	120%
Apparent Colour	3698993		7.8	7.4	NA	< 2.5	106%	90%	110%						
Turbidity	3728772		10.7	10.7	0.0%	< 0.5	99%	80%	120%						
Total Calcium	3729732		58.4	60.7	3.9%	< 0.10	98%	70%	130%	94%	80%	120%	97%	70%	130%
Total Magnesium	3729732		64.6	67.6	4.5%	< 0.10	100%	70%	130%	96%	80%	120%	100%	70%	130%
Total Potassium	3729732		4.07	3.63	11.4%	< 0.50	97%	70%	130%	94%	80%	120%	96%	70%	130%
Total Sodium	3729732		23.6	24.7	4.6%	< 0.10	96%	70%	130%	92%	80%	120%	97%	70%	130%
Total Aluminum	3729733		0.023	0.020	NA	< 0.010	101%	70%	130%	96%	80%	120%	96%	70%	130%
Total Antimony	3729733		<0.003	<0.003	NA	< 0.003	101%	70%	130%	98%	80%	120%	99%	70%	130%
Total Arsenic	3729733		<0.003	<0.003	NA	< 0.003	94%	70%	130%	95%	80%	120%	91%	70%	130%
Total Barium	3729733		0.027	0.027	0.0%	< 0.002	102%	70%	130%	99%	80%	120%	97%	70%	130%
Total Beryllium	3729733		<0.001	<0.001	NA	< 0.001	98%	70%	130%	97%	80%	120%	98%	70%	130%
Total Boron	3729733		0.095	0.097	2.1%	< 0.010	98%	70%	130%	98%	80%	120%	99%	70%	130%
Total Cadmium	3729733		<0.001	<0.001	NA	< 0.001	100%	70%	130%	98%	80%	120%	96%	70%	130%
Total Chromium	3729733		0.114	0.113	0.9%	< 0.003	99%	70%	130%	94%	80%	120%	96%	70%	130%
Total Cobalt	3729733		<0.001	<0.001	NA	< 0.001	99%	70%	130%	95%	80%	120%	94%	70%	130%
Total Copper	3729733		0.011	0.010	NA	< 0.003	97%	70%	130%	95%	80%	120%	93%	70%	130%
Total Iron	3729733		0.017	0.019	NA	< 0.010	102%	70%	130%	98%	80%	120%	96%	70%	130%
Total Lead	3729733		<0.001	<0.001	NA	< 0.001	103%	70%	130%	95%	80%	120%	95%	70%	130%
Total Manganese	3729733		0.003	0.003	NA	< 0.002	98%	70%	130%	97%	80%	120%	95%	70%	130%
Total Mercury	3723443	3723443	<0.0001	<0.0001	NA	< 0.0001	103%	70%	130%	98%	80%	120%	94%	70%	130%
Total Molybdenum	3729733		0.010	0.011	9.5%	< 0.002	103%	70%	130%	98%	80%	120%	99%	70%	130%
Total Nickel	3729733		<0.003	<0.003	NA	< 0.003	98%	70%	130%	98%	80%	120%	94%	70%	130%
Total Selenium	3729733		<0.002	<0.002	NA	< 0.002	98%	70%	130%	98%	80%	120%	95%	70%	130%
Total Silver	3729733		<0.002	<0.002	NA	< 0.002	99%	70%	130%	96%	80%	120%	93%	70%	130%
Total Strontium	3729733		0.739	0.701	5.4%	< 0.005	98%	70%	130%	95%	80%	120%	96%	70%	130%

AGAT QUALITY ASSURANCE REPORT (V1)

Page 7 of 14

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. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Results relate only to the items tested. Results apply to samples as received.

Quality Assurance

CLIENT NAME: CROZIER & ASSOCIATES

PROJECT: 903-3780

SAMPLING SITE:

AGAT WORK ORDER: 22T881886

ATTENTION TO: Evan Finbow

SAMPLED BY:

Water Analysis (Continued)

RPT Date: Apr 18, 2022			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Thallium	3729733		<0.006	<0.006	NA	< 0.006	102%	70%	130%	96%	80%	120%	95%	70%	130%
Total Tin	3729733		<0.002	<0.002	NA	< 0.002	101%	70%	130%	97%	80%	120%	98%	70%	130%
Total Titanium	3729733		<0.010	<0.010	NA	< 0.010	103%	70%	130%	98%	80%	120%	96%	70%	130%
Total Tungsten	3729733		<0.010	<0.010	NA	< 0.010	94%	70%	130%	89%	80%	120%	85%	70%	130%
Total Uranium	3729733		<0.002	<0.002	NA	< 0.002	101%	70%	130%	96%	80%	120%	99%	70%	130%
Total Vanadium	3729733		0.003	0.002	NA	< 0.002	99%	70%	130%	94%	80%	120%	96%	70%	130%
Total Zinc	3729733		0.021	<0.020	NA	< 0.020	99%	70%	130%	97%	80%	120%	92%	70%	130%
Total Zirconium	3729733		<0.004	<0.004	NA	< 0.004	100%	70%	130%	93%	80%	120%	94%	70%	130%

Comments: NA Signifies Not Applicable

Duplicate NA: results are under 5X the RDL and will not be calculated.

Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

Certified By:


Nivine Basily

Method Summary

CLIENT NAME: CROZIER & ASSOCIATES

AGAT WORK ORDER: 22T881886

PROJECT: 903-3780

ATTENTION TO: Evan Finbow

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Microbiology Analysis			
Heterotrophic Plate Count	MIC-93- 7020	SM 9215 C	INCUBATOR
Escherichia coli	MIC-93-7010	EPA 1604	Membrane Filtration
Total Coliforms	MIC-93-7010	EPA 1604	Membrane Filtration

Method Summary

CLIENT NAME: CROZIER & ASSOCIATES
PROJECT: 903-3780
SAMPLING SITE:
AGAT WORK ORDER: 22T881886
ATTENTION TO: Evan Finbow
SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Electrical Conductivity	INOR-93-6000	modified from SM 2510 B	PC TITRATE
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
Hardness (as CaCO ₃) (Calculated)	MET-93-6105	modified from EPA SW-846 6010C & 200.7 & SM 2340 B	CALCULATION
Total Dissolved Solids	INOR-93-6028	modified from EPA 1684, ON MOECC E3139, SM 2540C,D	BALANCE
Alkalinity (as CaCO ₃)	INOR-93-6000	Modified from SM 2320 B	PC TITRATE
Fluoride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	modified from SM 4500-NH ₃ H	LACHAT FIA
Total Phosphorus	INOR-93-6022	modified from SM 4500-P B and SM 4500-P E	SPECTROPHOTOMETER
Total Organic Carbon	INOR-93-6049	modified from SM 5310 B	SHIMADZU CARBON ANALYZER
Apparent Colour	INOR-93-6074	modified from SM 2120 B	LACHAT FIA
Turbidity	INOR-93-6044	modified from SM 2130 B	NEPHELOMETER
Total Calcium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Magnesium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Potassium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Sodium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Aluminum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Antimony	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Arsenic	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Barium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Beryllium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Boron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cadmium	MET -93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Chromium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cobalt	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Copper	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Iron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Lead	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Manganese	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS

Method Summary

CLIENT NAME: CROZIER & ASSOCIATES

AGAT WORK ORDER: 22T881886

PROJECT: 903-3780

ATTENTION TO: Evan Finbow

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Molybdenum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Nickel	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Selenium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Silver	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Strontium	INOR-93-6003	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Thallium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tin	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Titanium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tungsten	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Uranium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Vanadium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zinc	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zirconium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS



Laboratory Use Only

Arrival Condition: ☐ Good ☐ Poor (complete notes)

Arrival Temperature: 22T881886

AGAT Job Number: _____

Notes: 1 Med Blue Circ pa
S-416-0163

P: 905.712.5100 • F: 905.712.5122 • TF: 1.800.856.6261

Report Format

☒ Single Sample
per page

☐ Multiple
Samples per
page

+ Water Type
(Specify in column below)
Raw (R), Treated (TR),
Distribution (D), Tap (TP)
Private Well (P)

Turnaround Time Required (TAT) *			
Regular TAT	7 to 14 business days	☐	Sch 23/24 only
	5 to 7 business days	☐	
	3 to 4 business days	☐	
Rush TAT (please provide prior notification)	3 to 4 business days	☐	Rush
	2 business days	☐	surcharges
	1 business days	☐	apply
Date Required (Rush surcharges may apply):			

IS THIS WATER BEING CONSUMED BY HUMANS?	☐ Yes	☐ No
DO THE RESULTS REQUIRE REPORTING TO THE MECP OR LOCAL PUBLIC HEALTH UNIT?	☐ Yes	☐ No
FOR <u>RAW WATER</u> (E.G. UNTREATED), IS THE SAMPLE COLLECTED FROM A POINT OF HUMAN CONSUMPTION?	☐ Yes	☐ No
CLIENT IS RESPONSIBLE TO COMPLETE AND SUBMIT LAB SERVICE NOTIFICATION (LSN) FORM TO THE MOECC/PHU. FAILURE TO DO SO MAY DELAY REPORTING.		
"NOTIFICATION INFORMATION" MUST BE COMPLETE BEFORE UPON SUBMISSION OF SAMPLES. LABORATORY ANALYSIS WILL NOT COMMENCE UNTIL ALL INFORMATION HAS BEEN PROVIDED.		

Samples Taken By (Print Name and Sign):		* TAT is exclusive of weekends and statutory holidays. Prior arrangements must be made with the laboratory in order to submit Microbiology samples on Fridays									
---	--	---	--	--	--	--	--	--	--	--	--

Document #: DIV-78-1512-011



Non-Reportable Drinking Water Sample Inquiry Form

This form is to ensure your water is tested and reported in accordance with Ontario Regulation 248/03 for testing of Drinking Water under the Safe Drinking Water Act. We require the information below to help uphold our high standard of regulatory compliance, for both AGAT as a laboratory and you, as our valued customer. Please ensure all information is filled out completely and accurately. If you have any questions, please do not hesitate to contact your AGAT Client Project Manager at 905-712-5100.

(1) What is the purpose for your testing? Please provide details below:

baseline quality

(2) Please answer the following questions.

(a) Is there a request from a Public Health Inspector or a Ministry of Environment Drinking Water Inspector to complete this testing? ☐ Yes ☒ No

If Yes, please contact an AGAT Client Project Manager at 905-712-5100.

(b) Is there a provincial order in effect for your water system? ☐ Yes ☒ No

If Yes, please provide details below including limit for the test parameter if not listed with a standard under O.Reg.169/03

N/A

(c) Does your facility have a drinking water system (DWS) number provided by either MECP or MOHLTC? ☐ Yes ☒ No

(i) If yes, why is the sample not reportable to either MECP or MOHLTC? Please provide details below.

N/A

(ii) If yes, is the test for sodium and/or fluoride? ☐ Yes ☐ No

- If the test is for sodium and/or fluoride, was sodium and/or fluoride testing completed and reported to the MECP in the last 57 months or MOHLTC in the last 60 months?

☐ Yes ☐ No

As per the SWDA, Sodium and fluoride (if required by DWS) are required to be tested every 5 years (60 months) by the operator. The sodium and/or fluoride adverse are not required to be reported if two samples are less than 5 years apart.



(d) Is the water collected from a Federally owned, operated or regulated property or water source? ☐ Yes ☒ No

If Yes, please indicate this on the COC under Requirements

(3) If you are private home owner looking to test your drinking water, please answer the following questions:

(i) Are you consuming this water from the point of sample collection? ☐ Yes ☐ No

(ii) Do you have a water treatment unit installed in your system? ☐ Yes ☐ No

(iii) Is your water collected before or after treatment?

☐ Before ☐ After ☐ Not Applicable

(iv) Are you testing your water due to concerns regarding your plumbing?

☐ Yes ☐ No

If Yes, have you done any improvements to your plumbing recently? Please provide details below.

For further assistance, please contact the MECP at the following phone and email:

(1) For inquiries related to O.Reg. 170 or O.Reg. 318/319

Email: waterforms@ontario.ca

Phone Number: 1-866-793-2588

(2) For inquiries related to O.Reg. 243 (Schools and Daycares)

Phone Number: 1-855-515-1331

Company Name: *Crozier Consulting*

DWCOC#: (if applicable)

Name: *Evan Finbow*
(please print name)

Date: *2022-04-06*
(yyyy-mm-dd)

Signature: *[Signature]*

AGAT WorkOrder #:

(To be entered by AGAT CPM)

APPENDIX C

Geotechnical Report

March 17, 2022
Our File: 222042

Via Email: gcooper@cfcrozier.ca

Don McCullough
53 Georgian Meadows Drive
Collingwood, ON L9y 5H4

C/o George Cooper – Crozier Consulting Engineers

Re: Initial Soils Investigation
Proposed Severances – Sideroad 23
343019 Side Road 23
Municipality of Meaford

Dear Mr. McCullough,

It is understood that you are proposing a residential development within the Municipality of Meaford. The site is located along Bayshore Road, north of the community of Leith.

The conceptual drawings provided from Crozier Consulting Engineers indicate the development will be comprised of five lots with individual drilled wells and sewage systems. The lots will be accessed by an internal street (McCullough Way) from Sideroad 23.

This letter report is to provide a summary of the soil conditions observed during the testhole excavation and recommendations with regards to the soil conditions for septic and infiltration features and the roadway construction and general comments on the foundation construction for the proposed residential development.

Site Setting

The site is located along Bayshore Road and will be accessed from Sideroad 23. An existing easement from Sideroad 23 exists and runs along the east side of 343011 Sideroad 23. Bayshore Road is considered to run in a north-south direction. Currently, the site is undeveloped and features a rolling terrain within the development area. Generally, the site slopes from east to west, from the open fields upgradient down towards Bayshore Road. The west side of the property is bordered with a treed area between the proposed development and Bayshore Road. Within the treed area there is a "bluff" and the grade changes rapidly towards Bayshore Road. There are four (4) existing drainage features that drain surface water from the upgradient lands to the east, through the site and west to the ditch that runs along the east side of Bayshore Road.

Site Investigation

A initial site visit was conducted on February 4, 2022 to layout the testholes and verify the access of the excavator to the site from the neighboring property. This testhole layout was provided to Crozier for review prior to conducting the site investigation. The excavation of the testholes was undertaken on February 18, 2022 and included twelve (12) testholes across the development area. A CAT 350 excavator provided and operated by R.F. King Excavating was utilized for the excavation of the testholes. The locations were selected to cover the general area of each proposed

septic bed area, infiltration feature and for general spatial coverage. The testhole locations were surveyed and tied into the site datum provided by Crozier and the locations are shown on the appended Figure No. 1.

The soil stratigraphy was observed, the overburden soils probed to infer the relative density, and the groundwater observations were noted. The testhole logs describing the soil stratigraphy are appended to this letter.

In general, the subsurface consisted of a surficial layer of topsoil and organic material, underlain by clayey silt till with some gravel. Some of the testholes intercepted a hard grey clay layer. In the area of TH-1, a sand with a little silt and gravel was encountered.

Foundation Loading

Since the proposed development is still in a conceptual phase, final floor elevations for the houses have not been finalized. Frost protected foundations are to be extended down to suitable inorganic bearing soil. For the Owen Sound area, frost penetration is considered to be 1.2 mbgs. Based on the anticipated lot grading, the houses are expected to be founded on the native undisturbed clayey silt till with sand and some gravel.

Conventional foundations governed by the Ontario Building Code are expected. Therefore, recommended design bearing capacities are 75 kPa at SLS and 100 kPa at ULS. The maximum total and differential settlements of footings which are designed based on the above noted capacities are expected to be less than 25mm and 15mm respectively

Slab-on-Grade Construction

Where a conventional slab-on-grade construction element is proposed, all topsoil and organics must be removed down to suitable underlying inorganic subgrade soils. The underlying clayey silt soils would generally be considered suitable. A proof-roll with compaction equipment can be performed to confirm suitability. A minimum 150mm lift of compacted Granular A, meeting the OPSS 1010 specifications and compacted to 100% of the material's SPMD, is to be placed below the proposed concrete slab-on-grade. Where greater depth of backfill is required, imported sand or Granular "B" is recommended with a minimum compaction of 95% SPMD.

Excavations and Dewatering

Excavations for the foundations will terminate in the native clayey silt soil. Temporary excavations must comply with Ontario Occupational Health and Safety Act for Construction Projects (O.Reg. 213/91). The overburden soils fall into the Type 2 as defined in the regulation and therefore, temporary side slopes in Type 2 soils must be sloped to 1.2 metres or less from its bottom at an inclination of 1 horizontal to 1 vertical (exclusive to groundwater effects).

During the excavation of the testholes, minor shallow groundwater infiltration was noted at some of the locations. The water was found to infiltrate between 1.0m to 1.6m below ground surface. These shallow ground water conditions can be attributed to the recent fluctuations in temperature causing snow melt. At the location of TH-10, towards the west end of infiltration trench #3, significant groundwater infiltration was noted at a depth of 1.4m.

Since there are predominately fine-grained soils located across the site, perched groundwater conditions are likely to develop during the wetter seasons. Temporary dewatering with conventional sump pumps at excavated low points may be necessary to control the seepage of water from the layers of till during construction.

Septic Design

The five lots are proposed to have their own individual septic systems located to the rear of the lots (west side) and typically downgradient of the dwelling. A testhole was excavated within each proposed septic bed area, with a subgrade soil being generally consistent for 4 of the 5 septic areas. For Lots 1, 2, 3, and 5, the encountered subgrade soils in the area of the septic bed was clayey silt till with sand and some to trace gravel. A representative sample collected from TH-6 was selected for grain-size analysis and yielded 21.4% gravel, 35.5% sand, 33.6% silt and 17.5% clay. Therefore, the estimated coefficient of permeability for this material is 1.6×10^{-7} cm/sec which translates to a "T" Time for the bed greater than 50 mins/cm. Based on this result, it is not feasible to construct "in-ground" septic beds for these lots, and the design should feature a raised bed constructed of approved imported material.

The excavation of TH-1, located within the proposed septic area for Lot 4, encountered below the till and at a depth of 1.0 m, a sandier soil with silt, gravel, and clay still present. A sample collected from TH-1 was analyzed for grain-size distribution and yielded 15.0% gravel, 63.9% sand, 16.6% silt and 4.5% clay. The estimated coefficient of permeability for this sample is 1.6×10^{-3} cm/sec and a "T" Time of 12 to 15 mins/cm. While this soil would be somewhat more conducive to a "in-ground" septic bed, the consistent clay and silt subgrade findings above and below the minor sandy layer in this testhole and the clay and silt from the other testholes would impact the performance of the septic bed and therefore raised beds are recommended. In addition, diverting surface water away from the raised system will be critical to reduce potential saturation of the imported sand, utilized to construct the onsite systems.

Stormwater Management

As shown on the conceptual design for the development, several infiltration trenches are included to manage the stormwater on site. There are four (4) existing drainage features identified on the site that drain surface water from the upgradient lands to the east, through the site west to the ditch that runs along the east side of Bayshore Road.

The proposed construction includes ditches on either side of McCullough Way, that direct the surface water towards infiltration trenches located along the existing drainage features. TH-4 was excavated within the area of infiltration trench #4 near drainage feature 1, located on Lot 2. TH-10 and TH-11 were located along the area of infiltration trench #3 located between Lots 4 and 5. TH-12 is located near infiltration trenches #1 and #2, near drainage feature 3. The fourth drainage feature is located towards the south end of McCullough Way.

The findings of the testholes at these areas was relatively consistent, with surficial topsoil and organics underlain by the clayey silt till with sand and some gravel. Samples from TH-4, TH-10 were selected for grain-size analysis to determine estimated infiltration rates of the soil. The sample collected from TH-4 yielded a grain-size distribution of 11.8% gravel, 37.1% sand, 33.6% silt and 17.5% clay. The sample collected from TH-10 yielded a grain-size distribution of 5.0% gravel, 41.5% sand, 40.4% silt and 13.1% clay. The estimated coefficient of permeability for the samples from TH-4 and TH-10 are 1.0×10^{-8} cm/sec and 1.6×10^{-7} cm/sec respectively.

During the excavation of the testholes, the inferred density of the material was estimated from probing the soils with a steel rod. The clayey silt till was noted to be stiff to very stiff when probed. Combining this with the low estimated coefficient of permeability and low infiltration rates, it is interpreted that the infiltration of stormwater would be very low and should be considered negligible as part of the stormwater design.

Roadway Construction

The five lots will front on McCullough Way, which will be a private roadway which is proposed to be constructed to connect the lots to Sideroad 23. The subgrade for the roadway will likely be the clayey silt till with sand and some gravel. Depending on the time of year, the moisture conditions at the time of construction, and the quality of the soils, surplus harvested materials may be able to be used as subgrade material.

It is recommended the final subgrade surface be proof rolled to determine any loose, soft, or unstable areas of the subgrade. Any areas which reveal unsuitable conditions should be sub-excavated and backfilled using suitable materials such as imported Granular "B" which must be compacted to at least 95% of the material's SPMD at the subgrade level. The recommended road structure is outlined in the table below.

Internal Roadways	Component Thickness (mm)	Specified Compaction (%)
OPSS Granular "A"	200	100% SPMD
OPSS Granular "B"	350	100% SPMD
Subgrade Fill	Varies	95 to 98% SPMD

STATEMENT OF LIMITATIONS

The discussion and recommendations in this report are based upon information gathered at the testhole locations and available geological and physiographical information of general nature for the area. Sub-surface and groundwater conditions are variable and will differ in area beyond the investigated testholes. As a result, conditions may become apparent during further investigation or construction, which would not be detected or anticipated at the time the site investigation was performed and when this report was prepared.

The information in this report is intended for the sole use of Mr. Don McCullough and his agents. GM BluePlan Engineering Limited accepts no liability for use of this information by third parties on the basis of the interpretation of the information provided in this preliminary report are made at the sole risk of the third parties.

The final shape and location of the proposed site developments have not been confirmed and therefore, comments made within this report are made in general only to assist the owner and designers involved with the project in question. Furthermore, the number of testholes may not be sufficient to determine all the factors that may affect the design, construction methods and costs. Additional investigation would be necessary to increase the confidence level. For this reason, Contractors bidding on this project or undertaking the construction should make their own interpretation of the factual information presented within this report and then draw their own conclusion on the sub-surface conditions and how it will affect the methods and cost of construction.

We recommend that we be retained to provide comment for the selected roadway design and during construction to ensure that all the necessary stripping, sub-grade preparation, and compaction requirements are met, and to be available to confirm that the soil conditions do not deviate from those presented within this report

Yours truly,

GM BLUEPLAN ENGINEERING LIMITED

Per:



Ethan C.J. Webb, P.Eng.
EW/md

Encl.

cc: File No. 222042

Reviewed by:

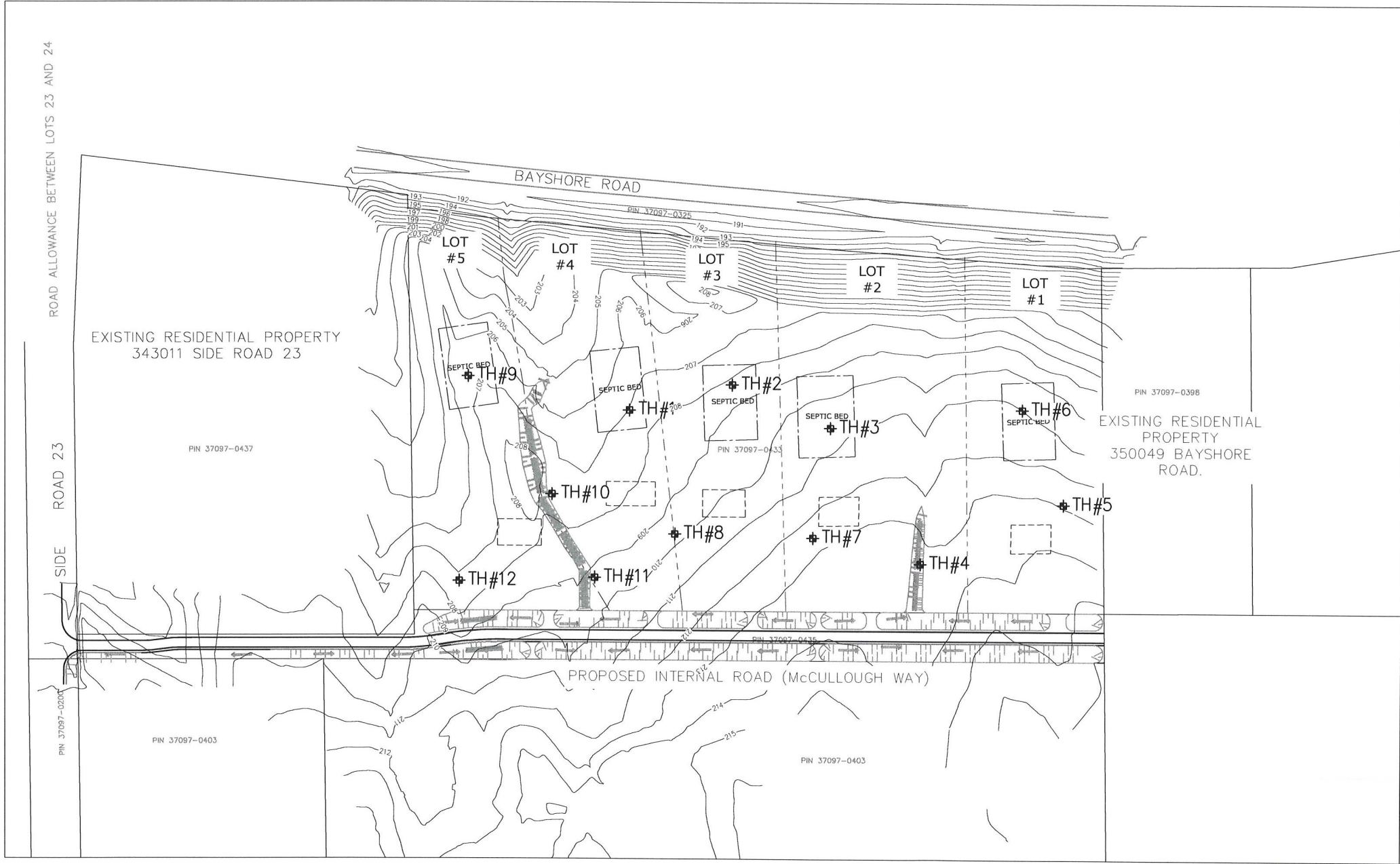


Wm. E. Dubeau, P.Eng.



FILE:W:\OwenSound\Owen Sound\2022\222042 Soils Investigation - Proposed Severance - Sideroad 23, Meaford\Survey Data\Temp\222042b.dwg LAYOUT:11X17
LAST SAVED BY: Tjahne, 3/9/2022 4:20:16 PM PLOTTED BY: Tyler Jahnke - GM BluePlan 3/10/2022 9:44:46 AM

222042
SOILS INVESTIGATION
PROPOSED SEVERANCE
SIDEROAD 23, MEAFORD



LEGEND

-  PROPOSED TESTHOLE
-  CONCEPTUAL LOCATION OF RESIDENCE
-  CONCEPTUAL LOCATION OF SEPTIC BED

SCALE = 1:2000
FEBRUARY 2022

TESTHOLE LOCATIONS

Mr. Don McCullough
Municipality of Meaford

Figure No. 1



Project No: 222042

Log of Testhole: 1

Project: Sideroad 23 - Severences

Excavation Date: February 18, 2022

Client: Mr. Don McCullough

Field Technician: E. Webb.

Location: Municipality of Meaford

Excavation Company: R.F. King Excavating

SUBSURFACE PROFILE				PROPERTIES	HYDROLOGY
Depth	Elevation	Symbol	Description	% Moisture 5 15 25	Ground Water and Sampling Details
0	206.96		Ground Surface		
1	206.56		Black topsoil and organics.		
2			Brown Clayey Silt Till with a some Gravel. Grey Mottled. Moist and Stiff when probed with a steel rod.		
3	205.96				
4			Silty Sand and Gravel. Moist and Compact when probed with a steel rod.		Minor Infiltration @ 1.1m
5					Sample Collected @ 1.4m
6					Minor Infiltration @ 1.6m
7	204.96				
8	204.76		Grey Clayey Silt Till. Moist and Hard from resistance in excavation.		
9					
10					
11					
12					
13					
14					
15					
16					

Notes:

GM BluePlan Engineering Limited
Guelph, Owen Sound, Listowel, Kitchener, Exeter, Hamilton, GTA
1260 Second Ave East, Unit 1, Owen Sound, ON N4K 2J3
519-376-1805 Fax 519-376-8977 www.gmbblueplan.ca



Equipment: CAT 350 Excavator

Project No: 222042

Log of Testhole: 2

Project: Sideroad 23 - Severences

Excavation Date: February 18, 2022

Client: Mr. Don McCullough

Field Technician: E. Webb.

Location: Municipality of Meaford

Excavation Company: R.F. King Excavating

SUBSURFACE PROFILE				PROPERTIES	HYDROLOGY
Depth	Elevation	Symbol	Description	% Moisture 5 15 25	Ground Water and Sampling Details
0	208.22		Ground Surface		
0	208.02		Black topsoil and organics.		
1			Brown Clayey Silt Till with a some Gravel. Grey Mottled. Moist and Stiff when probed with a steel rod.		
2					
3					
4					
5					
6					
7	206.12				
8	205.92		Grey Clayey Silt Till. Moist and Hard from resistance in excavation.		
9					
10					
11					
12					
13					
14					
15					
16					

Notes:

Equipment: CAT 350 Excavator

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Project No: 222042

Log of Testhole: 3

Project: Sideroad 23 - Severences

Excavation Date: February 18, 2022

Client: Mr. Don McCullough

Field Technician: E. Webb.

Location: Municipality of Meaford

Excavation Company: R.F. King Excavating

SUBSURFACE PROFILE				PROPERTIES	HYDROLOGY
Depth	Elevation	Symbol	Description	% Moisture 5 15 25	Ground Water and Sampling Details
0	210.52		Ground Surface		
0	210.32		Black topsoil and organics.		
1			Brown Clayey Silt Till with a some Gravel. Grey Mottled. Moist and Stiff when probed with a steel rod.		
2					
3					
4					
5					
6					
7	208.42				
8	208.22		Grey Clayey Silt Till. Moist and Hard from resistance in excavation.		
9					
10					
11					
12					
13					
14					
15					
16					

Notes:

Equipment: CAT 350 Excavator

GM BluePlan Engineering Limited
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519-376-1805 Fax 519-376-8977 www.gmblueplan.ca



Project No: 222042

Log of Testhole: 4

Project: Sideroad 23 - Severences

Excavation Date: February 18, 2022

Client: Mr. Don McCullough

Field Technician: E. Webb.

Location: Municipality of Meaford

Excavation Company: R.F. King Excavating

SUBSURFACE PROFILE				PROPERTIES	HYDROLOGY
Depth	Elevation	Symbol	Description	% Moisture 5 15 25	Ground Water and Sampling Details
0 ft m	213.27		Ground Surface		
0	213.07		Black topsoil and organics.		
1			Brown Clayey Silt Till with a some Gravel. Grey Mottled. Moist and Stiff when probed with a steel rod.		
2					
3					
4					
5					
6					
7					
8	210.97				
9					
10					
11					
12					
13					
14					
15					
16					

Notes:

Equipment: CAT 350 Excavator

GM BluePlan Engineering Limited
Guelph, Owen Sound, Listowel, Kitchener, Exeter, Hamilton, GTA
1260 Second Ave East, Unit 1, Owen Sound, ON N4K 2J3
519-376-1805 Fax 519-376-8977 www.gmblueplan.ca



Project No: 222042

Log of Testhole: 5

Project: Sideroad 23 - Severences

Excavation Date: February 18, 2022

Client: Mr. Don McCullough

Field Technician: E. Webb.

Location: Municipality of Meaford

Excavation Company: R.F. King Excavating

SUBSURFACE PROFILE				PROPERTIES	HYDROLOGY
Depth	Elevation	Symbol	Description	% Moisture 5 15 25	Ground Water and Sampling Details
0	217.87		Ground Surface		
0	217.67		Black topsoil and organics.		
1			Brown Clayey Silt Till with a some Gravel. Grey Mottled. Moist and Stiff when probed with a steel rod.		
2					
3					
4					
5					
6	215.97				
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

Notes:

Equipment: CAT 350 Excavator

GM BluePlan Engineering Limited
Guelph, Owen Sound, Listowel, Kitchener, Exeter, Hamilton, GTA
1260 Second Ave East, Unit 1, Owen Sound, ON N4K 2J3
519-376-1805 Fax 519-376-8977 www.gmblueplan.ca



Project No: 222042

Log of Testhole: 6

Project: Sideroad 23 - Severences

Excavation Date: February 18, 2022

Client: Mr. Don McCullough

Field Technician: E. Webb.

Location: Municipality of Meaford

Excavation Company: R.F. King Excavating

SUBSURFACE PROFILE				PROPERTIES	HYDROLOGY
Depth	Elevation	Symbol	Description	% Moisture 5 15 25	Ground Water and Sampling Details
ft m	210.97		Ground Surface		
0	210.77		Black topsoil and organics.		
1			Brown Clayey Silt Till with a some Gravel. Grey Mottled. Moist and Stiff when probed with a steel rod.		
2					
3					
4					
5					
6					
7					
8	208.67				
9					
10					
11					
12					
13					
14					
15					
16					

Notes:

Equipment: CAT 350 Excavator

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519-376-1805 Fax 519-376-8977 www.gmblueplan.ca



Project No: 222042

Log of Testhole: 7

Project: Sideroad 23 - Severences

Excavation Date: February 18, 2022

Client: Mr. Don McCullough

Field Technician: E. Webb.

Location: Municipality of Meaford

Excavation Company: R.F. King Excavating

SUBSURFACE PROFILE				PROPERTIES	HYDROLOGY
Depth	Elevation	Symbol	Description	% Moisture 5 15 25	Ground Water and Sampling Details
ft m	210.97		Ground Surface		
0	210.82		Black topsoil and organics.		
1			Brown Clayey Silt Till with a some Gravel. Grey Mottled. Moist and Stiff when probed with a steel rod.		
2					
3					
4					
5					
6					
7					
8	208.47				
9	208.17		Grey Clayey Silt Till. Moist and Hard from resistance in excavation.		
10					
11					
12					
13					
14					
15					
16					

Notes:

GM BluePlan Engineering Limited
Guelph, Owen Sound, Listowel, Kitchener, Exeter, Hamilton, GTA
1260 Second Ave East, Unit 1, Owen Sound, ON N4K 2J3
519-376-1805 Fax 519-376-8977 www.gmblueplan.ca



Equipment: CAT 350 Excavator

Project No: 222042

Log of Testhole: 8

Project: Sideroad 23 - Severences

Excavation Date: February 18, 2022

Client: Mr. Don McCullough

Field Technician: E. Webb.

Location: Municipality of Meaford

Excavation Company: R.F. King Excavating

SUBSURFACE PROFILE				PROPERTIES	HYDROLOGY
Depth	Elevation	Symbol	Description	% Moisture 5 15 25	Ground Water and Sampling Details
0	209.62		Ground Surface		
1	209.32		Black topsoil and organics.		
2			Brown Clayey Silt Till with a some Gravel. Grey Mottled. Moist and Stiff when probed with a steel rod.		
3					
4					
5					
6					
7	207.32				
8					
9					
10					
11					
12					
13					
14					
15					
16					

Notes:

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1260 Second Ave East, Unit 1, Owen Sound, ON N4K 2J3
519-376-1805 Fax 519-376-8977 www.gmblueplan.ca



Equipment: CAT 350 Excavator

Project No: 222042

Log of Testhole: 9

Project: Sideroad 23 - Severences

Excavation Date: February 18, 2022

Client: Mr. Don McCullough

Field Technician: E. Webb.

Location: Municipality of Meaford

Excavation Company: R.F. King Excavating

SUBSURFACE PROFILE				PROPERTIES	HYDROLOGY
Depth	Elevation	Symbol	Description	% Moisture 5 15 25	Ground Water and Sampling Details
0	206.81		Ground Surface		
0	206.66		Black topsoil and organics.		
1			Brown Clayey Silt Till with a some Gravel. Grey Mottled. Moist and Stiff when probed with a steel rod.		
2					
3					
4					
5					
6					
7					
8					
9	204.11				
10	203.91		Grey Clayey Silt Till. Moist and Hard from resistance in excavation.		
11					
12					
13					
14					
15					
16					

Notes:

GM BluePlan Engineering Limited
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1260 Second Ave East, Unit 1, Owen Sound, ON N4K 2J3
519-376-1805 Fax 519-376-8977 www.gmblueplan.ca



Equipment: CAT 350 Excavator

Project No: 222042

Log of Testhole: 10

Project: Sideroad 23 - Severences

Excavation Date: February 18, 2022

Client: Mr. Don McCullough

Field Technician: E. Webb.

Location: Municipality of Meaford

Excavation Company: R.F. King Excavating

SUBSURFACE PROFILE				PROPERTIES	HYDROLOGY
Depth	Elevation	Symbol	Description	% Moisture 5 15 25	Ground Water and Sampling Details
0	207.80		Ground Surface		
1	207.40		Black topsoil and organics.		
2			Sandy Silt with a little Clay. Moist and Loose to Compact when probed with a steel rod.		Sample Collected @ 1.0m
3					Major Infiltration @ 1.4m
4	205.70				
5					
6					
7	205.40		Grey Clayey Silt Till. Moist and Hard from resistance in excavation.		
8					
9					
10					
11					
12					
13					
14					
15					
16					

Notes:

Equipment: CAT 350 Excavator

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Project No: 222042

Log of Testhole: 11

Project: Sideroad 23 - Severences

Excavation Date: February 18, 2022

Client: Mr. Don McCullough

Field Technician: E. Webb.

Location: Municipality of Meaford

Excavation Company: R.F. King Excavating

SUBSURFACE PROFILE				PROPERTIES	HYDROLOGY
Depth	Elevation	Symbol	Description	% Moisture 5 15 25	Ground Water and Sampling Details
0	209.17		Ground Surface		
0			Black topsoil and organics.		
1			Brown Clayey Silt Till with a some Gravel. Grey Mottled. Moist and Stiff when probed with a steel rod.		
2					
3					
4					
5					
6					
7	207.07				
8					
9					
10					
11					
12					
13					
14					
15					
16					

Major Infiltration @ 1.4m

Notes:

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1260 Second Ave East, Unit 1, Owen Sound, ON N4K 2J3
519-376-1805 Fax 519-376-8977 www.gmblueplan.ca



Equipment: CAT 350 Excavator

Project No: 222042

Log of Testhole: 12

Project: Sideroad 23 - Severences

Excavation Date: February 18, 2022

Client: Mr. Don McCullough

Field Technician: E. Webb.

Location: Municipality of Meaford

Excavation Company: R.F. King Excavating

SUBSURFACE PROFILE				PROPERTIES	HYDROLOGY
Depth	Elevation	Symbol	Description	% Moisture 5 15 25	Ground Water and Sampling Details
0	207.20		Ground Surface		
1	206.85		Black topsoil and organics.		
2			Brown Clayey Silt Till with a some Gravel. Grey Mottled. Moist and Stiff when probed with a steel rod.		
3	206.10				Minor Infiltration @ 1.0m
4	205.90		Grey Clayey Silt Till. Moist and Hard from resistance in excavation.		
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

Notes:

GM BluePlan Engineering Limited
Guelph, Owen Sound, Listowel, Kitchener, Exeter, Hamilton, GTA
1260 Second Ave East, Unit 1, Owen Sound, ON N4K 2J3
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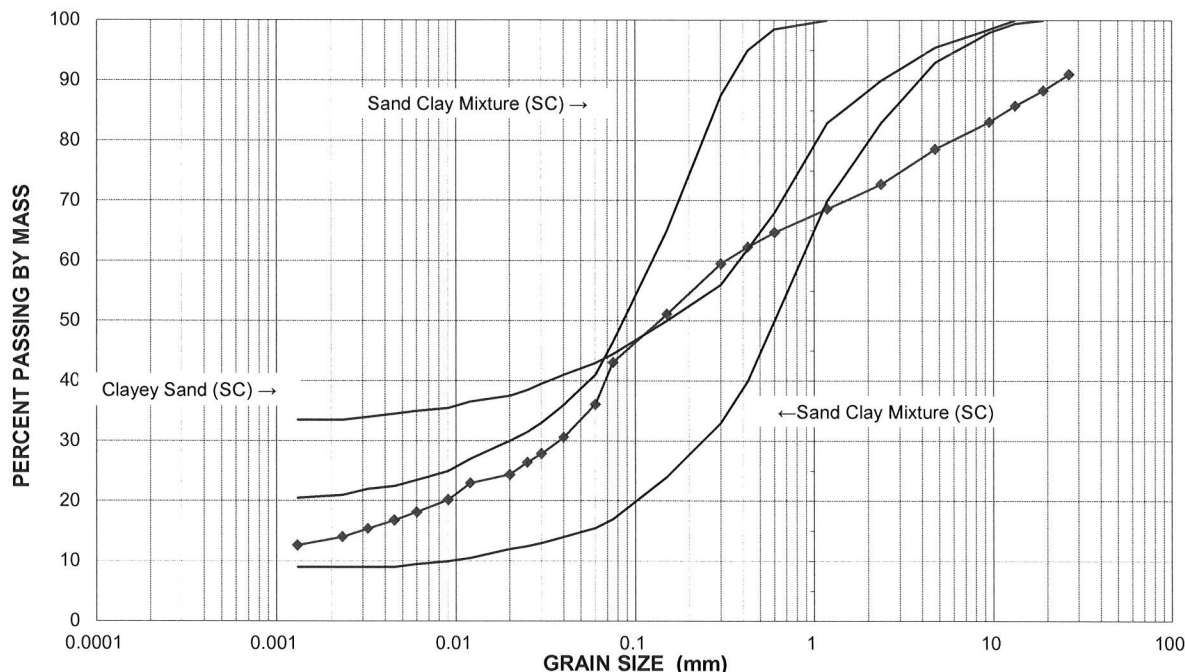
Equipment: CAT 350 Excavator

PARTICLE SIZE ANALYSIS

PROJECT: Soils Investigation - Proposed Severance - Sideroad 23
LOCATION: Municipality of Meaford
CLIENT: Don McCullough
SOIL TYPE: Clayey Silt with Sand and some Gravel
GRAPH #: 8 - Clayey Sands, Sand-Clay Mixtures

FILE NO.: 222042
LAB SAMPLE NO.: S-4445 (RCVD Feb 18)
SAMPLE DATE: February 18, 2022
SAMPLED BY: EW
SOURCE: TH-6 @ 1.2m

PARTICLE SIZE DISTRIBUTION



←		FINE	MEDIUM	COARSE	FINE	COARSE
CLAY		SILT		SAND		GRAVEL
SIEVE SIZE PARTICLE DIA. (mm)	PERCENT PASSING SAMPLE	HYDROMETER PARTICLE DIA. (mm)		PERCENT PASSING SAMPLE		
26.5	91.0	0.0600		36.1		
19	88.4	0.0400		30.6		
13.2	85.8	0.0300		27.8		
9.5	83.1	0.0250		26.4		
4.75	78.6	0.0200		24.4		
2.36	72.7	0.0120		23.0		
1.180	68.6	0.0090		20.2		
0.600	64.7	0.0060		18.2		
0.425	62.4	0.0045		16.8		
0.300	59.5	0.0032		15.4		
0.150	51.1	0.0023		14.0		
0.075	43.1	0.0013		12.6		

D₁₀ : 0.0004 mm **D₆₀ :** 0.32 mm **Cu :** 800

Coefficient of Permeability: 1.6×10^{-7} cm/sec **"T" Time :** > 50 mins/cm

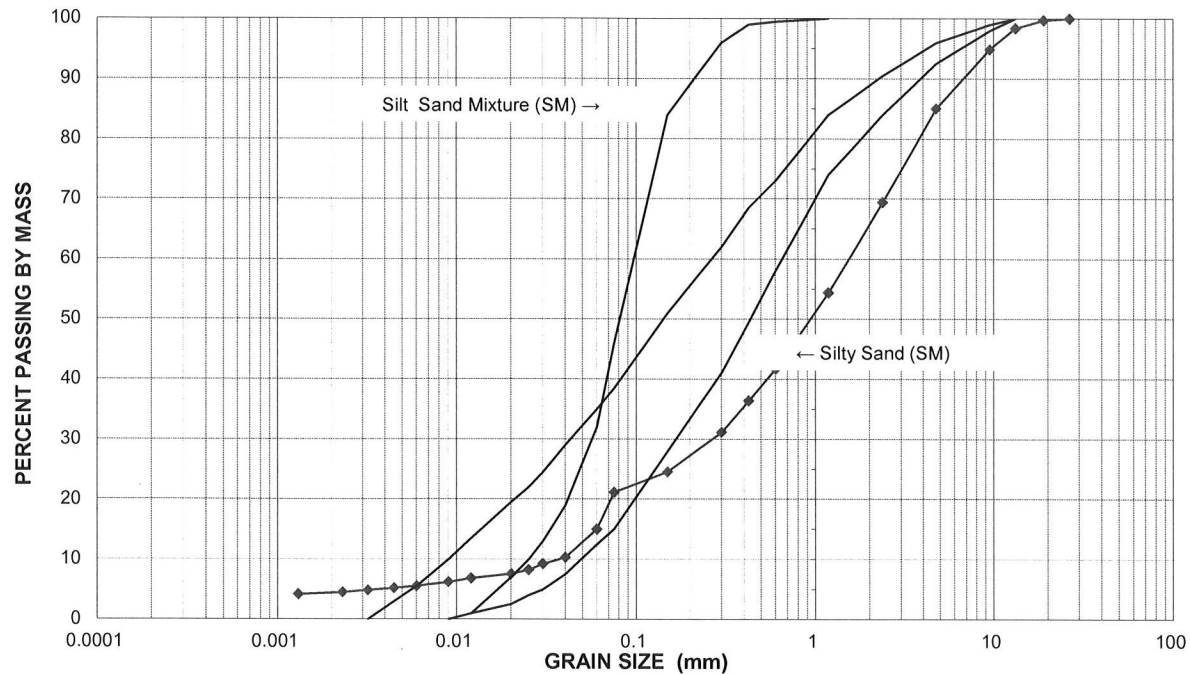
Comments: D10 is extrapolated.

PARTICLE SIZE ANALYSIS

PROJECT: Soils Investigation - Propose Severance - Sideroad 23
LOCATION: Municipality of Meaford
CLIENT : Don McCullough
SOIL TYPE: Sand with a little Silt and Gravel and a trace of Clay
GRAPH # : 7 - Silty Sands, Sand-Silt Mixture

FILE NO.: 222042
LAB SAMPLE NO.: S-4446 (RCVD Feb 18)
SAMPLE DATE: February 18, 2022
SAMPLED BY: EW
SOURCE: TH-1 @ 1.4m

PARTICLE SIZE DISTRIBUTION



←		FINE		MEDIUM	COARSE	FINE		COARSE
CLAY		SILT		SAND		GRAVEL		
SIEVE SIZE PARTICLE DIA. (mm)	PERCENT PASSING SAMPLE	HYDROMETER PARTICLE DIA. (mm)		PERCENT PASSING SAMPLE				
26.5	100.0	0.0600		15.0				
19	99.7	0.0400		10.3				
13.2	98.4	0.0300		9.2				
9.5	94.9	0.0250		8.2				
4.75	85.0	0.0200		7.6				
2.36	69.4	0.0120		6.9				
1.180	54.4	0.0090		6.2				
0.600	41.7	0.0060		5.5				
0.425	36.4	0.0045		5.2				
0.300	31.1	0.0032		4.8				
0.150	24.6	0.0023		4.5				
0.075	21.1	0.0013		4.2				

D₁₀ : 0.04 mm **D₆₀ :** 1.62 mm **Cu :** 40.5

Coefficient of Permeability: 1.6 x 10⁻³ cm/sec **"T" Time :** 12 to 15 mins/cm

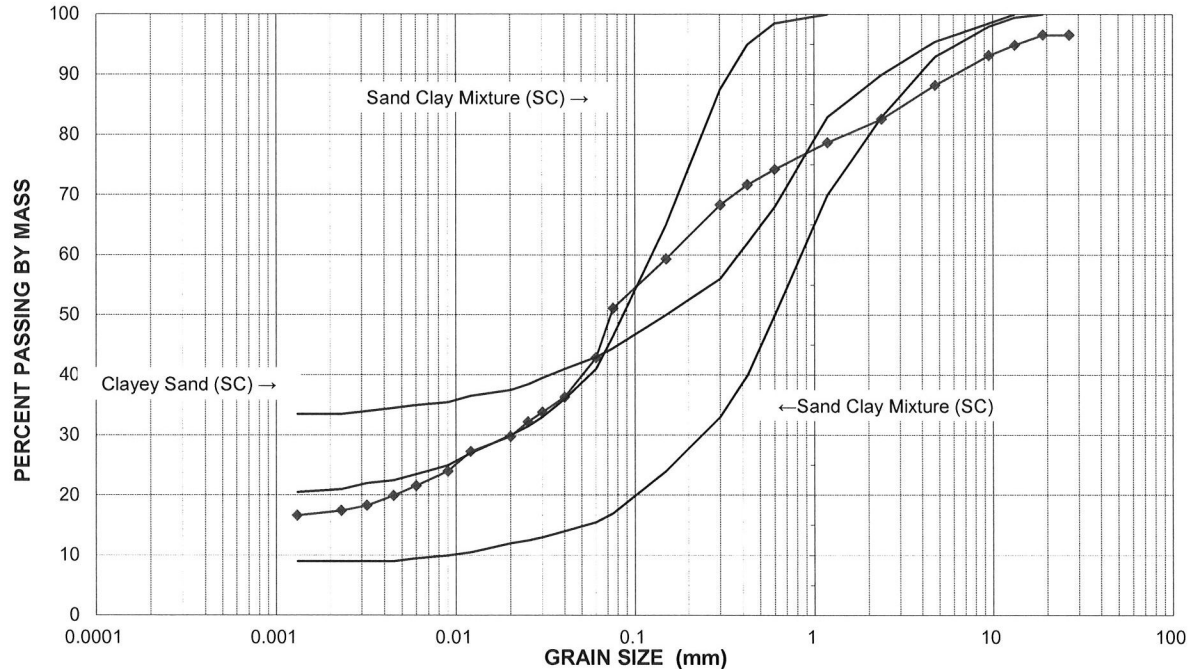
Comments:

PARTICLE SIZE ANALYSIS

PROJECT: Soils Investigation - Proposed Severance - Sideroad 23
LOCATION: Municipality of Meaford
CLIENT : Don McCullough
SOIL TYPE: Clayey Silt with Sand and a little Gravel
GRAPH # : 8 - Clayey Sands, Sand-Clay Mixtures

FILE NO.: 222042
LAB SAMPLE NO.: S-4447 (RCVD Feb 18)
SAMPLE DATE: February 18, 2022
SAMPLED BY: EW
SOURCE: TH-4 @ 1.2m

PARTICLE SIZE DISTRIBUTION



←		FINE		MEDIUM	COARSE	FINE		COARSE
CLAY		SILT		SAND		GRAVEL		
SIEVE SIZE PARTICLE DIA. (mm)	PERCENT PASSING		HYDROMETER PARTICLE DIA. (mm)		PERCENT PASSING			
	SAMPLE				SAMPLE			
26.5	96.6		0.0600		42.9			
19	96.6		0.0400		36.3			
13.2	94.9		0.0300		33.9			
9.5	93.2		0.0250		32.2			
4.75	88.2		0.0200		29.8			
2.36	82.6		0.0120		27.3			
1.180	78.7		0.0090		24.0			
0.600	74.2		0.0060		21.6			
0.425	71.7		0.0045		19.9			
0.300	68.3		0.0032		18.3			
0.150	59.3		0.0023		17.5			
0.075	51.1		0.0013		16.6			

D₁₀ : 0.0001 mm **D₆₀ :** 0.16 mm **Cu :** 1600

Coefficient of Permeability: 1.0 x 10⁻⁸ cm/sec **"T" Time :** > 50 mins/cm

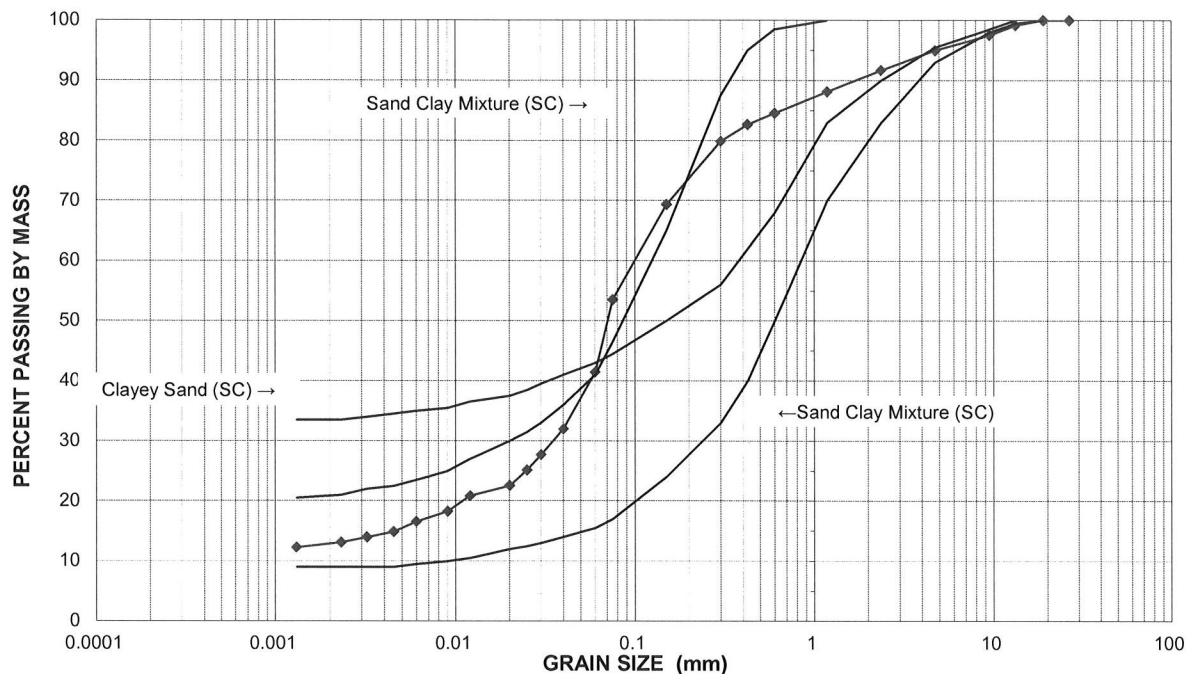
Comments: D10 is extrapolated.

PARTICLE SIZE ANALYSIS

PROJECT: Soils Investigation - Proposed Severance - Sideroad 23
LOCATION: Municipality of Meaford
CLIENT : Don McCullough
SOIL TYPE: Silty Sand with a little Clay and trace of Gravel
GRAPH # : 8 - Clayey Sands, Sand-Clay Mixtures

FILE NO.: 222042
LAB SAMPLE NO.: S-4448 (RCVD Feb 18)
SAMPLE DATE: February 18, 2022
SAMPLED BY: EW
SOURCE: TH-10 @ 1.0m

PARTICLE SIZE DISTRIBUTION



←		FINE	MEDIUM	COARSE	FINE	COARSE
CLAY		SILT		SAND		GRAVEL
SIEVE SIZE PARTICLE DIA. (mm)	PERCENT PASSING SAMPLE	HYDROMETER PARTICLE DIA. (mm)		PERCENT PASSING SAMPLE		
26.5	100.0	0.0600		41.5		
19	100.0	0.0400		32.0		
13.2	99.2	0.0300		27.7		
9.5	97.5	0.0250		25.1		
4.75	95.0	0.0200		22.6		
2.36	91.7	0.0120		20.9		
1.180	88.2	0.0090		18.3		
0.600	84.6	0.0060		16.6		
0.425	82.7	0.0045		14.8		
0.300	79.9	0.0032		14.0		
0.150	69.4	0.0023		13.1		
0.075	53.5	0.0013		12.3		

D₁₀ : 0.0004 mm

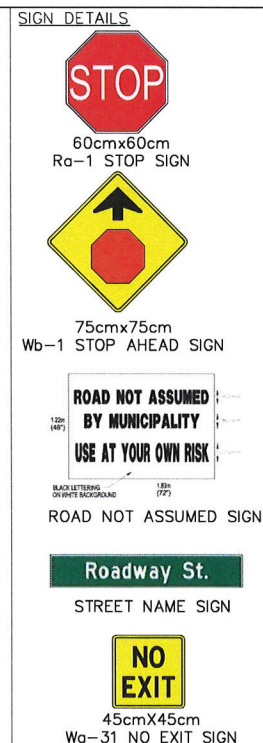
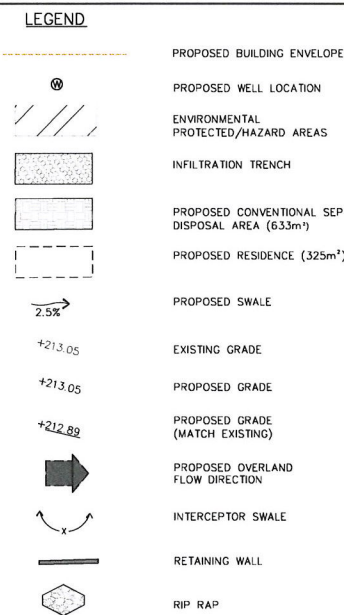
D₆₀ : 0.11 mm

Cu : 275

Coefficient of Permeability: 1.6×10^{-7} cm/sec

"T" Time : > 50 mins/cm

Comments: D10 is extrapolated.



GENERAL GRADING NOTES

1. REFER TO DRAWING C102 FOR CROSS-SECTION DETAILS
2. PROPOSED INFILTRATION TRENCHES HAVE BEEN DESIGNED TO PROVIDE THE REQUIRED QUANTITY CONTROLS FOR FULL BUILD-OUT OF THE DEVELOPMENT AND QUALITY FOR THE PROPOSED ROADWAY. QUALITY CONTROLS FOR INDIVIDUAL LOTS TO BE DESIGNED BY OTHERS AT BUILDING PERMIT STAGE (IF REQUIRED)
3. 150mmØ RIP RAP (300mm DEEP) TO BE PROVIDED IN DITCHES THAT EXCEED A SLOPE OF 5.0%

GENERAL SERVICING NOTES:

1. DETAILED SEPTIC DESIGN AND LOCATION, AND WELL LOCATION TO BE CONFIRMED AT TIME OF DETAILED LOT DESIGN/BUILDING PERMIT.
2. SEPTIC BEDS TO MAINTAIN MINIMUM 15m SEPARATION FROM PROPOSED WELLS AND INFILTRATION FACILITIES.
3. SEPTIC BEDS TO MAINTAIN MINIMUM 3m SEPARATION FROM PROPERTY LINES.

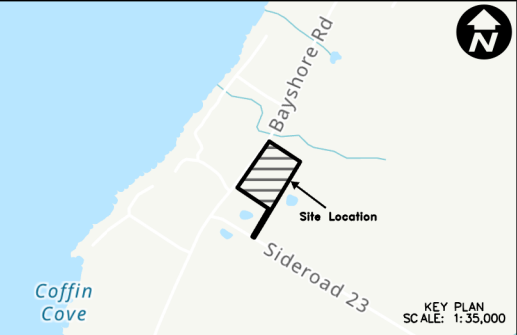
LEITH-BAYSHORE ROAD
MUNICIPALITY OF MEAFORD

MASTER SERVICING & GRADING PLAN



Drawn By	N.L.	Design By	N.L./G.C.	Project	903-3780
Check By	G.C.	Check By	R.A.	Scale 1:750	Drawing C101

FIGURES



DRAWING NOTES:

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ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

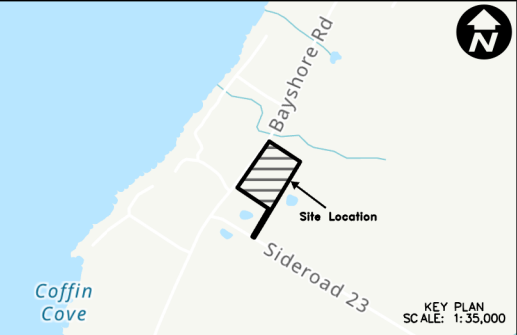
Project
**BAYSHORE ROAD SEVERANCE
MUNICIPALITY OF MEAFORD**

Drawing
SITE LOCATION

 **CROZIER**
CONSULTING ENGINEERS

40 Huron Street
Suite 301
Collingwood, ON L9Y 4R3
705-446-3510 T
705-446-3520 F
www.cfcrozier.ca

Drawn	K.O.	Design	C.G.	Project No.	903-3780
Date	2020-07-24	Projection	EPSG:26917	Scale	1:50,000
				Dwg.	FIG. 1



LEGEND

Property Limits

Surficial Geology

- 5b: Stone-poor, sandy silt to silty-sand textured till on Paleozoic terrain
- 14b: Coarse-textured lacustrine deposits (littoral)
- 14c: Coarse-textured lacustrine deposits (foreshore and basal)
- 8a: Fine-textured glaciolacustrine deposits (massive to well laminated)
- 9b: Coarse-textured glaciolacustrine deposits (littoral)

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ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

Project
**BAYSHORE ROAD SEVERANCE
MUNICIPALITY OF MEAFORD**

Drawing
SURFICIAL GEOLOGY



CROZIER
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Drawn	K.O.	Design	C.G.	Project No.	903-3780
Date	2020-07-24	Projection	EPSG:26917	Scale	1:5,000
				Dwg.	FIG. 2



Basemap Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community. Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



LEGEND

- Property Limits
- Existing Wells

Well ID	Lat	Lon
2505270	44.65805392N	080.84734370W
2510749	44.66826739N	080.83767880W
2510833	44.66734938N	080.83784536W
2512445	44.66782702N	080.83820987W
2512914	44.66196398N	080.84290595W
2512915	44.66295776N	080.84547655W
2513165	44.66006364N	080.83592319W
2514186	44.65948951N	080.83733751W
7113391	44.66779937N	080.83775580W
7113392	44.66828748N	080.83915474W
7147557	44.66697032N	080.83717782W

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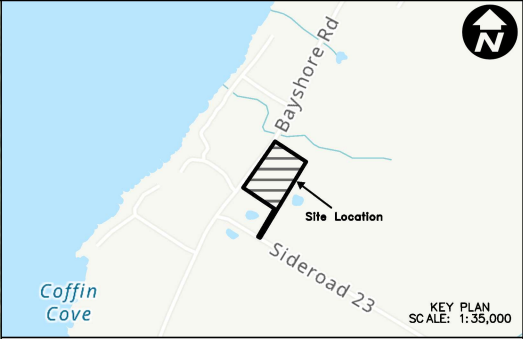
ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

Project
**BAYSHORE ROAD SEVERANCE
MUNICIPALITY OF MEAFORD**

Drawing
WELL LOCATION PLAN

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705-446-3520 F
www.cfcrozier.ca

Drawn	K.O.	Design	C.G.	Project No.	903-3780
Date	2020-07-24	Projection	EPSG:26917	Scale	1:9,000
				Dwg.	FIG. 3



LEGEND

- Property Limits
- Private Water Sources

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THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT. DO NOT SCALE THIS DRAWING.

ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

Project
**BAYSHORE ROAD SEVERANCE
MUNICIPALITY OF MEAFORD**

Drawing
WELL SURVEY



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705-446-3520 F
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Drawn	E.F.	Design	C.G.	Project No.	903-3780
Date	2022-06-01	Projection	EPSG:26917	Scale	1:4,000
				Dwg.	FIG. 4