HYDROGEOLOGICAL INVESTIGATION REPORT

15441 MOUNT PLEASANT ROAD

TOWN OF CALEDON
REGION OF PEEL

PREPARED FOR:

2818963 ONTARIO INC.

PREPARED BY:

C.F. CROZIER & ASSOCIATES INC.
2800 HIGH POINT DRIVE, SUITE 100
MILTON, ON L9T 6P4

JULY 2024

CFCA FILE NO. 2227-6259

CROZIER

Revision Number	Date	Comments
Rev.0	July 5, 2024	Issued for First Submission.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

LIST OF FIGURES

1.0 Introduction

C.F. Crozier & Associates Inc. (Crozier) has been retained by Design Plan Services Inc. to prepare a comprehensive Hydrogeological Investigation Report to support the proposed residential development located at 15441 Mount Pleasant Road in the Town of Caledon. The following report has been prepared to summarize existing conditions, characterize the hydrogeological system, and describe hydrogeological driven constraints for the development. The scope of this report was designed to meet the relevant Town of Caledon (Town), Region of Peel, and Toronto and Region Conservation Authority (TRCA) criteria.

Located at 15441 Mount Pleasant Road, in the Town of Caledon, Region of Peel, the development site (herein referred to as the Site) currently consists of trees, greenspace, ponds, and landscaped/forested areas (**Figure 1**). The Site is approximately 22.9 ha and is bounded by Mount Pleasant Road to the west, residential estate properties to the north and south, and wetlands to the east. The surrounding area consists mostly of rural residential lands.

According to the Draft Plan of Subdivision prepared by Design Plan Services Inc. dated April 12, 2024, the key elements envisioned for this development include:

- Five (5) estate residential lots.
- An internal roadway with Site access from Mount Pleasant Road.

2.0 Geology

The following sections below outline the existing conditions of the Study area based on literature review and field observations.

2.1 Physiography, Topography & Drainage

As shown in **Figure 2**, the Site is in the Oak Ridges Moraine physiographic region according to Chapman and Putnam (1984). The Oak Ridges Moraine extends from the Niagara Escarpment in the west to the Trent River in the East. The Oak Ridges Moraine is bounded by the South Slope in the south and covers an area of approximately 1295 km^2. The Oak Ridges Moraine is characterized as a hilly terrain that predominantly consists of sand and gravel soils.

The Site area is situated in the Black Creek – Humber River Outlet watershed. Surface drainage is interpreted to follow topography and drain roughly southeast. The nearest surface water feature to the Site is a tributary of the Humber River, which flows towards the main branch of the Humber River and ultimately, reaches Lake Ontario.

2.2 Regional Geology

According to Ontario Geological Survey (OGS) Mapping, the Site sits atop a bedrock basement of the Georgian Bay Formation. The Georgian Bay Formation is characterized as grey to green shale, siltstone, and limestone. Across the Site area, depth to bedrock is estimated to be approximately 70.3 meters below ground surface (mbgs) to 135.34 mbgs. Bedrock is overlain by clay to silt-textured till, derived from glaciolacustrine deposits or shale. North of the Site sandy, gravelly material is mapped where the Oak Ridges Moraine is located.

The bedrock and surficial geology of the Study Area are displayed in **Figures 3** and **4**, respectively.

2.3 Local Geology

A Geotechnical Investigation was completed on the Site to characterize the existing geological conditions and determine design constraints by AllRock Consulting Ltd. (AllRock). In November of 2023, ten (10) boreholes were advanced, and three (3) were converted into monitoring wells across the Site. In general, the following stratigraphy was encountered:

- 0 – 0.1 m dark brown sandy silt/silty sand topsoil
- 0.1 – 4.6 m brown to grey clayey silt with traces of sand and some gravel

According to nearby MECP well records, the primary overburden materials encountered near the Site include clay and sandy clay. The results of the geotechnical investigation performed by AllRock are consistent with MECP well records. For further details regarding the geotechnical investigation, please refer to the Geotechnical Investigation prepared by AllRock, submitted under separate cover. The borehole logs are appended to this report as Appendix A.

2.4 Source Water Protection Information

According to the Ministry of Environment, Conservation and Parks (MECP) Source Protection Information Atlas, the Site is located within the Toronto Source Protection Area and is governed by the CTC (Credit Valley-Toronto and Region-Central Lake Ontario) Source Protection Plan under the Clean Water Act (2006).

The Site Area is located atop of Highly Vulnerable Aquifer (HVA). The HVA below the Site area is noted to have a vulnerability score of 6. No significant drinking water threats and source protection policies related to the HVA are identified for the Site area under the Clean Drinking Water Act (2006).

Despite no ***significant*** drinking water threats being identified for the Site area, a number of low to moderate drinking water threats are identified for the future use of the property, including the following:

1) The application of road salt
2) The handling and storage of road salt.
3) The storage of snow.
4) An activity that reduces the recharge of an aquifer.

Best management strategies should be employed such that the prescribed low to moderate drinking water threats above will not become significant drinking water threats in the future.

3.0 Hydrogeology

The following sections below detail the existing hydrogeological conditions of the Site area based on regional studies, local studies, and relevant background information.

3.1 MECP Well Records

A review of the MECP well record database was completed for wells within 500 m of the Site area boundary (**Figure 5**). There are 19 identified well records within 500 m of the Site and the records are be summarized below.

- In stratigraphic order, the majority of well records encountered brown to grey clay, sand, grey to blue clay and shale.

- Of the nineteen (19) well records, thirteen (13) were identified for domestic use, two (2) were constructed for monitoring/observational purposes, one (1) abandoned and three (3) had an unspecified use.

- Of the fourteen (14) wells where pumping test were completed in, there was a maximum reported pumping rate of 75.71 litres per minute (LPM), and a minimum reported pumping rate of 0.95 LPM. The average pumping rate was 17.24 LPM.

- Static water levels range from 1.52 mbgs to 12.19 mbgs.

A summary table of the well records has been appended to this report as Appendix B.

3.2 Hydrostratigraphy

The hydrostratigraphic framework of the Humber River Watershed has been outlined in the Humber River Watershed, Scenario Modelling and Analysis Report prepared by the TRCA. There are eight (8) hydrostratigraphic units in the Humber River Watershed. The hydrostratigraphic units are summarized in Table 1 below.

Table 1: Hydrostratigraphy of the Humber River Watershed (TRCA, 2008)

Unit	Hydrostratigraphic Unit Name	Function	System
Youngest – 1	Halton Aquitard	Aquitard	Overburden
2	Oak Ridges Aquifer	Aquifer	Overburden
3	Newmarket Aquitard	Aquitard	Overburden
4	Meltwater Channel Aquifers	Aquifer	Overburden
5	Thorncliffe Aquifer	Aquifer	Overburden
6	Sunnybrook Aquitard	Aquitard	Overburden
7	Scarborough Aquifer	Aquifer	Overburden
8	Upper Bedrock Aquitard	Aquitard	Bedrock Contact Zone

As shown in **Figure 4**, the edge of the Oak Ridges Moraine aquifer is located in the northern portion of the Site. The Oak Ridges Moraine is primarily sand and gravel and provides localized domestic water supplies in the community. The southern portion of the Site is overlain by silty clay to clayey silt glacial till defined as the Halton Till. The Halton Till is a regionally extensive aquitard however, sandy lens may provide water to local water users.

3.3 Groundwater Levels

Regional shallow and deep groundwater flow direction is interpreted to follow surface and bedrock topography and flow south towards the Humber River and Lake Ontario. According to the Oak Ridges Moraine Groundwater Program Mapping, regional groundwater elevations range approximately from 300 meters above sea level (masl) at Old Church Road to 250 at the Humber River branch to the south.

3.4 Groundwater Quality

Groundwater quality within the Humber River Watershed is obtained from monitoring wells within the Provincial Groundwater Monitoring Network (PGMN) and municipal data. Groundwater sampling results are compared to the Ontario Drinking Water Quality Standards (ODWQS) and any exceedances are flagged and investigated to determine the potential source and impact of the exceedance. According to the Humber River Watershed Report Card (2018), groundwater quality within the Humber River Watershed received an overall grading of "C" meaning the groundwater quality is fair. In general, exceedance of the guideline for chloride is noted in areas where excessive road salt application is occurring.

Localized groundwater quality sampling was conducted on the property and results are presented in Section 6.0 below.

4.0 Field Work

The following section outlines the field investigation conducted by Crozier staff and others to characterize the hydrogeologic regime and define hydrogeologic constraints for development.

4.1 Monitoring Well Installation

On November 24th – 28th 2023, ten (10) boreholes were advanced across the property to depths of approximately 8.5 mbgs to 9.1 mbgs. Soil sampling was conducted at regular intervals during drilling to classify the soils. Three (3) boreholes were converted into monitoring wells for hydrogeological purposes. A summary of the monitoring wells is provided in Table 2.

Table 2: Monitoring Well Details

Monitoring Well Name	Total Depth (mbgs)	Screened Interval (mbgs)	Screened Material
MW 23-3	9.14	6.14 – 9.14	Grey silt, with traces of sand and clay.
MW 23-5	9.14	6.14 – 9.14	Grey to brown silt, with traces of sand and clay.
MW 23-10	9.14	6.14 – 9.14	Grey to brown silt, with traces of sand and clay.

All monitoring wells were completed as 50 mm PVC pipe wells with 3.0 m, No.18 slotted well screen. The wells were installed to a total depth of 9.14 mbgs within the first water bearing unit encountered during drilling. Please refer to Appendix A for detailed borehole logs and **Figure 6** for a map of the monitoring well locations.

4.2 Groundwater Monitoring

Manual groundwater measurements were collected using an electronic water level meter and automatic level loggers were deployed in select monitoring wells across the Site. The water level loggers were set to measure water levels on an hourly basis to collect a more comprehensive dataset for a greater understanding of the shallow groundwater system. Results of groundwater monitoring to date is covered in Section 6.0 below.

4.3 Groundwater Quality Sampling

Groundwater quality sampling was conducted on May 30, 2024, within one (1) monitoring well, (MW 23-3). Three (3) well volumes were removed prior to sampling using hand purging methods. The raw, unfiltered sample was sent to a third-party laboratory for analysis. The resultant concentrations were compared to Provincial Water Quality Objectives (PWQO). Results are presented in Appendix C.

4.4 Hydraulic Conductivity Testing

In-situ hydraulic conductivity testing was performed at select monitoring wells to estimate the shallow infiltration rates of the soils. A falling head test was conducted at MW 23 - 3 and MW 23 – 10 and results were analyzed using Aqtesolv – Aquifer Test Analysis Software. A discussion of the results is presented in Section 5.3 below.

4.5 Door-to-Door Survey

As per the Region of Peel guidelines, a door-to-door well survey was conducted to evaluate the condition of and location of water supply wells nearby the Site. The survey was conducted in May 2024 via hand delivery to properties within 500 m of the Site boundary. The questionnaire was used to address the following about the wells on adjacent properties:

- Property address
- Existence of a well on the property
- Well use, age, depth
- History of water quantity and quality

A copy of the questionnaire and obtained responses are included in Appendix E. A map of the properties visited is included as **Figure 6.**

5.0 Results

5.1 Groundwater Levels

Two (2) manual groundwater measurements have been collected to date and are summarized in Table 3 below. Note that groundwater monitoring is ongoing on the property and additional results can be provided following additional monitoring.

Table 3: Groundwater Levels (April 2024 – June 2024)

Monitoring Well	Tag ID	Water Level (mbgs)		
		April 4, 2024	May 30, 2024	June 28, 2024
MW 23-3	A394140	5.66	5.36	6.09
MW 23-5	A394125	5.75	5.10	5.29
MW 23-10	A394139	6.55	5.83	5.89

Automatic level loggers were deployed in each monitoring well to capture continuous water levels. Hydrographs of the water level within each monitoring well are presented in Appendix F.

As shown in Appendix F, water levels have ranged from 6.69 mbgs to 5.10 mbgs. Minor fluctuations in water level appear to occur following precipitation events. MW 23 - 3 appears to respond more than MW 23 – 5 and MW 23 -10 to precipitation events; following rainfall, water level gradually increases over a few hours. Water level subsequently decreases gradually.

The monitoring wells are installed within a grey silt unit located 4.57 m below ground surface. This unit is representative of a leaky confined unit as demonstrated by the minor fluctuations recorded by the automatic level loggers. Therefore, the water bearing silt unit is slightly responsive to seasonal change. It is interpreted that the water level recorded in April 2024 is representative of seasonally high-water levels (**Figure 7**). It is anticipated that water levels will drop into the drier season and rise again next spring.

5.2 Groundwater Quality

As noted above, one (1) representative groundwater sample was collected from MW 23-3 and submitted to ALS Laboratories for analysis. Resultant concentrations were compared to Provincial Water Quality Objectives (PWQO) to determine if raw groundwater on the Site meets the provincial objectives. The detailed laboratory results are provided in Appendix C.

In summary, the following exceedances of the PWQO were reported:

- E. coli: <10 mg/L
- Total Coliforms: <1000 mg/L
- Total Aluminium: 90.1 mg/L
- Total Cadmium: 0.000852 mg/L
- Total Cobalt: 0.0898 mg/L
- Total Copper: 0.214 mg/L
- Total Iron: 171 mg/L
- Total Lead: 0.0925 mg/L
- Total Nickel: 0.164 mg/L
- Total Phosphorus: 9.81 mg/L
- Total Silver: 0.000368 mg/L
- Total Thallium: 0.000951 mg/L
- Total Uranium: 0.00724 mg/L
- Total Vanadium: 0.159 mg/L
- Total Zinc: 0.414 mg/L

Based on the results, filtration is recommended to meet the PWQO. Please note that design of treatment systems is beyond the scope of this report.

The laboratory results mention that the sample submitted contained a high concentration of solids and dilution was required. The elevated presence of solids is expected with the method of sampling used. Hand purging methods can stir settled sediments at the base of a monitoring well and/or pull in additional sediments through the screen. Crozier recommends additional sampling to occur prior to dewatering (if required) to determine if filtration and/or treatment is required prior to discharge Low flow sampling methods are suggested to eliminate potential high concentrations of solids within the groundwater sample.

5.3 Hydraulic Conductivity Testing

In-situ hydraulic conductivity testing was conducted at MW 23 - 3 and MW 23 - 10. A falling head test was performed at each location using a 3-ft standard slug. Water levels were monitored manually and automatically using a level logger.

It should be noted that both MW 23 - 3 and MW 23 - 10 were screened from 6.10 – 9.15 m (20 - 30 ft) in silt with traces of sand and clay.

The data was analyzed using Hvorslev and Bouwer-Rice methods. The Hvorslev method is used to analyze data within unconfined or confined aquifers, assuming quasi-steady-state flow conditions and neglecting aquifer storativity. Similarly, the Bouwer-Rice method assumes the same conditions as Hvorslev and is used to analyze data within unconfined conditions or leaky confined conditions.

The summary of the analysis results is presented below in Table 4 and calculations are provided in Appendix D.

Table 4: In-Situ Hydraulic Conductivity Testing Results

Equation	MW 23 - 3	MW 23 - 10
Hvorslev	5.56×10^{-3}	4.96×10^{-3}
Bouwer-Rice	5.56×10^{-3}	4.96×10^{-3}
Geometric Mean		5.26×10^{-3}

The measured hydraulic conductivity values ranged from 4.96×10^{-3} to 5.26×10^{-3} m/s with a geometric mean of 5.26×10^{-3} m/s. These values are considered high compared to literature values for silts however, this is likely due to the traces of sand mentioned within the geotechnical investigation. It should be noted that the results of the hydraulic conductivity testing are representative of the hydraulic conductivity of the soils immediately around the well screen, approximately 6 meters below surface.

A hydraulic conductivity of 5.26×10^{-3} m/s corresponds to an infiltration rate of roughly 75 mm/hr based on Table C1 in the Low Impact Development Stormwater Management Planning and Design Guide. This is a reasonable estimate of infiltration rate given the large quantities of sand in the shallow surface material. Note that it is recommended that in-situ infiltration testing (using a Guelph permeameter) be completed in the areas of proposed infiltration features prior to construction to ensure any low impact development features function as designed.

5.4 Door-to-Door Survey Results

At the time of this report, only one (1) response has been received. The response shared has been appended to this report as Appendix E.

The resident indicated that they have a dug well onsite, installed at a depth of approximately 30 feet. The well is estimated to be roughly 50 years old. No water quantity or quality issues have been reported. The homeowner has a water softener treatment system in place.

It is not anticipated that the development will have an impact on any water supply wells within 500 m of the property. The proposed development is residential and only minimal dewatering may be required for construction purposes. Any temporary dewatering will occur within the upper silt unit and not within the domestic water supply unit. It is not anticipated that permanent dewatering will be required as long as the buildings are constructed above the water table.

6.0 Design Considerations

6.1 Water Balance

A water balance assessment was conducted to assess potential impacts of the proposed development on the local groundwater conditions. The water balance was conducted under existing (pre-development) and proposed (post-development) conditions. The water balance assessment was conducted in accordance with accepted site condition values from Table 6.3 of the Urban Storm Drainage Criteria Manual: Volume 1 (Urban Drainage and Flood Control District, 2016) and Table 3.1 of the MECP Stormwater Management Planning and Design Manual (MECP, 2003). The appropriate reference tables are provided in Appendix G.

The results of the water balance assessment are presented in Table 5 below.

Table 5: Summary of Water Balance Analysis

Pre-Development Infiltration (mm/yr)	**Post-Development Infiltration without Mitigation** (mm/yr)	**Infiltration Deficit** (mm/yr)
175.64	158.64	17.01

6.1.1 Methodology

The water balance on a site can be estimated from the following equation described in Thornthwaite and Mather 1957:

$$P = S + R + I + ET$$

Where: P = precipitation

S = change in groundwater storage

R = surface water runoff

I = infiltration

ET = evapotranspiration/evaporation

The components of the water balance equation can be estimated using field observations of drainage conditions, land cover, soil types, groundwater conditions and local climate records.

6.1.2 Precipitation (P)

The nearest climate station to the Site is located approximately 5.79 km southwest of the Site and is known as Albion Field Centre Climate Station Number 6150103 (43°55'00.000" N, 79°50'00.000" W, elevation of 281.90 masl). Monthly average precipitation and climate data from 1981 – 2010 was used to complete the water balance calculations for the Site. The long-term monthly average for precipitation and climate is shown in Table 6 below.

Table 6: Climate Data (1981 – 2010) for Albion Field Centre Climate Station

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Precipitation (mm)	60.4	50.2	50.3	67	76.1	75.5	81.8	77.4	75.0	68.3	81.7	57.7	**821.4**[1]
Temperature (°C)	-7.0	-5.9	-1.4	6.1	12.4	17.3	19.9	19.1	14.3	8.1	2.1	-3.9	**6.7**[2]

1. Total average annual precipitation from 1981-2010
2. Average annual temperature from 1981-2010

Therefore, based on the data above, the long-term annual average precipitation for the area is 821.4 mm/year and the long-term average temperature for the Site area is 6.7 °C.

6.1.3 Storage (S)

Long-term groundwater storage (S) is assumed to be negligible as no evidence of groundwater impact on significant groundwater pumping or withdrawal is noted in regional studies of the area. The seasonal changes in water levels are expected to balance annually.

6.1.4 Evapotranspiration (ET)

The rate of evapotranspiration is a function of the water holding capacity of the soil, soil and vegetation type and land cover. Through the Thornthwaite and Mather method or a soil moisture balance approach and local climate data, the Potential Evapotranspiration (PET) and the Actual Evapotranspiration (AET) can be calculated (see Appendix G) using the following equations:

$$PET = 16 \times \left(\frac{10Ta}{H_i}\right)^{a}$$

Where: Ta = average daily temperature, 0 degrees for negative temperature months

Hi = heat index value, assuming 12 hours per day, 30 days a month of daylight

The average heat index value is estimated using the following equation:

$$Hi = \sum_{i=1}^{12} \left(\frac{10Ta}{5}\right)^{1.514}$$

The evapotranspiration factor (α) is determined using the following equation:

$$\alpha = 0.49 + (0.0179 \times H_i) - (0.0000771 \times H_i^2) + (0.000000675 \times H_i^3)$$

PET is adjusted to account for the average number of hours of daylight per month for a given location. The adjustment factor is dependent on the subject property's latitude and is presented in Appendix D (Thornthwaite and Mather, 1957). The PET is multiplied by the adjustment factor per month to determine the Adjusted Potential Evapotranspiration (PET_{adj}).

The Actual Evapotranspiration (AET) is determined using the following equation:

$$AET = PET_{adj} - \Delta S$$

The Change in Soil Storage (ΔS) is depended on the types of soil on the property and the Accumulated Potential Water Loss (APWL) per month. The Change in Soil Storage and Accumulated Potential Water Loss can be calculated using the following equations:

$$\Delta S = S_{mc}\,\mathrm{x}$$

Where: S_{mc} = soil moisture capacity

APWL = accumulated potential water loss

For ΔP < 0: $APWL = -\Sigma_{i=0}^{12} PET_i$

For ΔP < 0: $APWL = \frac{ln\left(\frac{|AET-PET|}{S_{mc}}\right)}{S_{mc}}$

According to the Ministry of Agricultural, Food and Rural Affairs (OMAFRA), AgMaps mapping tool, the soil type on the property was identified as silt loam known as Type C Soil. Using the Ministry Environment, Conservation and Parks (MECP) Stormwater Management and Design Manual Table 3.1. (2003), the soil moisture capacity was estimated to be 200 mm for Soil Type B/C, under pasture and shrubs landscape conditions.

Therefore, based on local climate conditions the Actual Evapotranspiration (AET) is calculated to be 581.5 mm/year.

6.1.5 Water Surplus (R + I)

The difference between mean annual P and mean annual ET outputs the amount of water surplus for the Site. The water surplus either infiltrates (I) into the soil or travels across the site as runoff I.

The distribution of water that infiltrates into the soil is a function of an infiltration factor as described in Table 3.1 of the MECP Stormwater Management Planning and Design Manual (MECP, 2003). The infiltration factor for the Site is assumed to be 0.70 based on topographic factor of 0.3 flat land, a soils factor of 0.3 was for a Soil Type B/C, and a land cover factor of 0.1 for open area.

The calculated water surplus available for infiltration or runoff is 240 mm/year. Using MECP methodology, the water balance components, independent of temperature, infiltration and runoff are calculated to be 168 mm/year and 72 mm/year respectively.

The water balance components were used to estimate the pre-development and post-development water balance scenarios. Detailed water balance calculations for the subject property can be seen in Appendix G.

6.1.6 Pre-Development Infiltration

The pre-development water balance calculations are presented in Appendix G. Under existing conditions, the infiltration for the Site is calculated to be 175.64 mm/yr.

6.1.7 Post-Development Infiltration

To complete the post-development infiltration calculation, the proposed development was separated by land use and assigned a percent imperviousness. Based on the water balance components, the calculated post-development infiltration volumes are estimated to be 158.64 mm/yr. In comparing the pre and post development infiltration volumes, the proposed development has the potential to decrease by 9%.

6.1.8 Water Balance Impact Assessment

Based on the results of the water balance, the proposed development has the potential to decrease infiltration by 17.01 mm/yr. Low impact development features should be designed to infiltrate 17.01 mm/yr to achieve water balance.

6.2 Short-Term & Long Term Dewatering

Discussion on the potential for future dewatering below is based on the interaction between the groundwater surface and proposed design elements for the Site.

If proposed building footings are to be extended below the reported seasonally high groundwater conditions, it can be expected that short-term and/or long-term groundwater dewatering will be required. It should be noted that dependent on the required discharge volumes during and post-construction, additional permitting requirements may apply. If construction volumes are expected to fall between 50,000 L/day and 400,000 L/day registration with the MECP Environmental Activity Sector Register is required. If construction dewatering volumes are to exceed 400,000 L/day, a Permit to Take Water will be required. Similarly, if daily permanent dewatering volumes are to exceed 50,000 L/day post-construction, an additional Permit to Take Water will be required for the groundwater discharge. Local permitting will also likely be required prior to any groundwater discharge.

It is presumed that groundwater dewatering volumes will be low is due to the deep groundwater conditions found on Site. However, groundwater dewatering volumes should be evaluated once final footings for the proposed buildings are determined.

6.3 Contingency Plan for Well Complaints

In the event of any well complaints from private water supply wells within 500 m of the Site, the following steps will be implemented to ensure a continued oversight of groundwater quantity and quality in the area during and following construction.

Based on the Hydrogeological Study requirements outlined in the Public Works Design, Specifications & Procedures Manual prepared by the Region of Peel (Region of Peel, 2009), Crozier recommends the Owner to conduct monitoring throughout construction, and one (1) year after the completion of construction. Given the assumption that groundwater flows in the southeastern direction, Crozier suggests the Owner to monitor MW 23-10, as it is the most down gradient monitoring well on Site and has the highest potential of being impacted by future On-Site activities.

As mentioned in Section 6.3 a raw groundwater sample was taken to establish baseline conditions for groundwater quality within the Site area. Within the monitoring period, yearly groundwater samples should be taken to ensure no interference with groundwater quality and that no exceedances of the PWQO have occurred.

Residences within 500 m of the Site area will be provided contact information (by the Owner) to address any well complaints. On site activities must be stopped and immediate Site investigation will be launched to address and resolve any negatively influencing factors on neighboring properties.

7.0 Conclusions & Recommendations

Based on the information presented above, Crozier is prepared to make the following conclusions and recommendations:

- The shallow surficial soils are primarily sandy silt atop clayey silt with trace sand and gravel. The Site is situated at the edge of the Oak Ridges Moraine and variable amounts of sand is expected to be encountered across the Site.
- Water levels have ranged from 5.10 mbgs to 7.35 mbgs within the shallow water bearing unit. Seasonally high groundwater elevations were captured in Spring 2024 and range from 260.96 masl at MW23-10 to 265.99 masl at MW23-5.
- The water bearing unit can be characterized as leaky confined and minor fluctuations in water level can be expected due to seasonal change and precipitation.
- According to the MECP Source Protection Information Atlas, the Site atop a highly vulnerable aquifer, however, no significant drinking water threats and source protection policies are identified for the Site Area.
- In-situ hydraulic conductivity testing was completed at 2 of the 3 onsite wells and a geometric mean of 5.26 x 10-3 m/s was estimated for the shallow soils. This corresponds to an infiltration rate of approximately 75 mm/hr.
- Note that it is recommended that localized Guelph Permeameter testing be completed prior to implementation of any LID infrastructure to confirm LIDs will function as designed.
- A site wide water balance was completed for the site. Using 175.64 mm/yr and post-development infiltration was determined to be 158.64 mm/yr. Therefore, the infiltration deficit is calculated to be 17.01 mm/yr.
- Groundwater monitoring is ongoing, note that results and conclusions will be updated following the completion of the monitoring period.

Respectfully submitted,

C.F. CROZIER & ASSOCIATES INC.

Victoria Mazur, Engineering Intern
Hydrogeology, Land Development
/stm

C.F. CROZIER & ASSOCIATES INC.

Chris Gerrits, M.Sc., P.Eng.
Manager, Hydrogeology

J:\2200\2227- 2818963 Ontario Inc\6259- 15441 Mount Pleasant Rd\Reports\Hydrogeology\2024.07.05_6259_Hydrogeological Investigation Report.docx

8.0 References

Chapman, L.J. and D.F. Putnam. 1984. The Physiography of Southern Ontario, 3rd Edition. Ontario Geological Survey, Special Volume 2.

Ontario Geological Survey. 1990. Bedrock Topography. Retrieved from: http://www.mndm.gov.on.ca/en/mines-and-minerals/applications/ogsearth

Ontario Ministry of Environment, Conservation and Parks. April 2024. Source Protection Information Atlas. Retrieved from: https://www.gisapplication.lrc.gov.on.ca/SourceWaterProtection/Index.html?viewer=SourceWaterProtection.SWPViewer&locale=en-US

Toronto and Region Conservation Authority. 2008. Humber River Watershed, Scenario Modelling and Analysis Report. Retrieved from: 1 (trcaca.s3.ca-central-1.amazonaws.com)

APPENDIX A

Monitoring Well Logs

AllRock Consulting Ltd
24 Brydon Drive, Unit #5
Toronto, ON M9W 5R6
1-844-440-7625
www.allrockconsulting.com

APPENDIX A

Borehole Location Plan

FIGURE TITLE:	KEY MAP
PROJECT:	GEOTECHNICAL INVESTIGATION
CLIENT:	2818963 ONTARIO INC.
ADDRESS:	15441 MT. PLEASANT ROAD, CALEDON, ON
PROJECT NO:	23265
APPROXIMATE SCALE:	NTS

AllRock Consulting Ltd

DATE: DEC. 2023	FIGURE NO.: 1
DRAWN BY: ES	CHECKED BY: GD

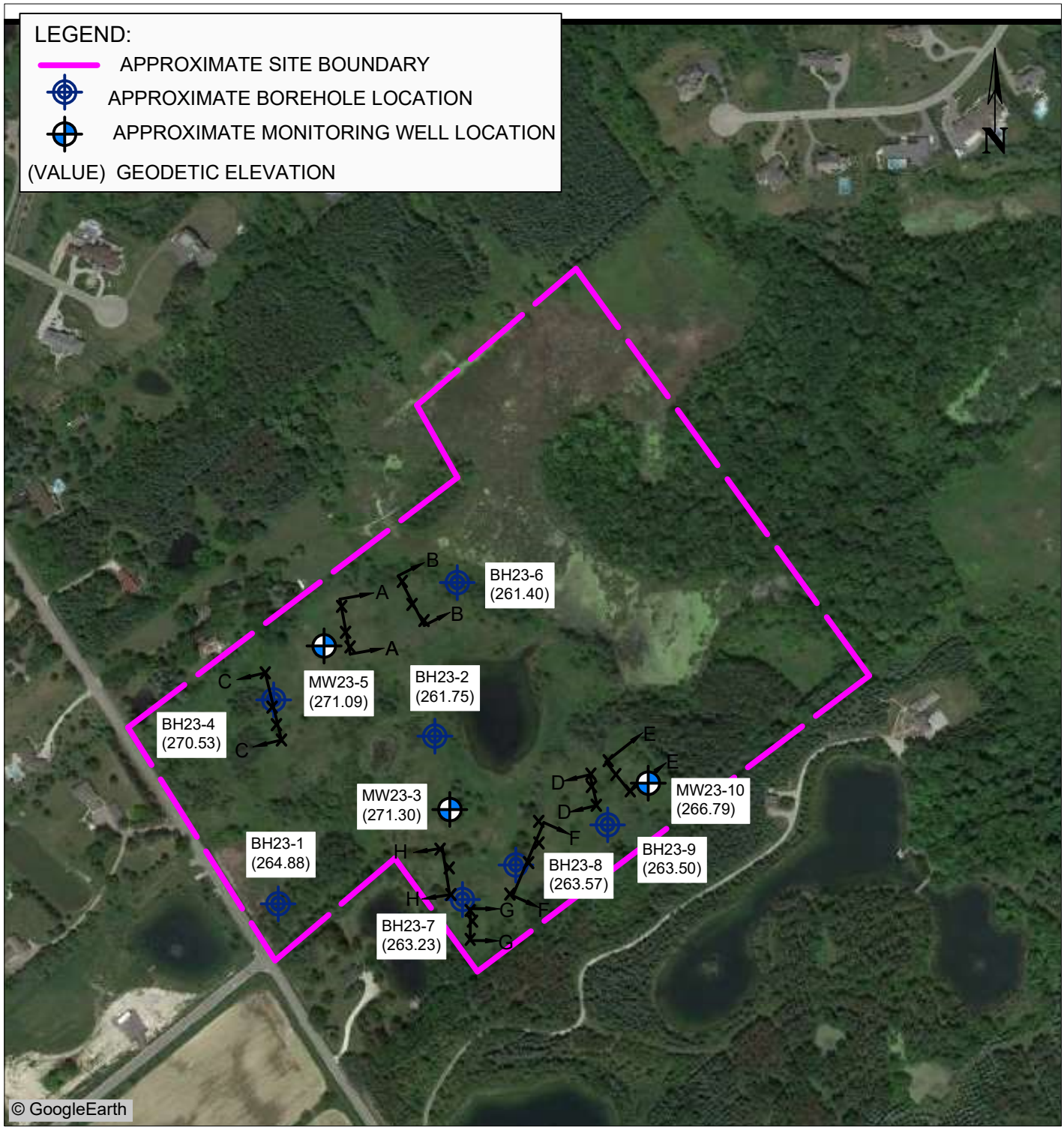


FIGURE TITLE:	BOREHOLE LOCATION PLAN
PROJECT:	GEOTECHNICAL INVESTIGATION
CLIENT:	2818963 ONTARIO INC.
ADDRESS:	15441 MT. PLEASANT ROAD, CALEDON, ON
PROJECT NO:	23265
APPROXIMATE SCALE:	NTS

AllRock Consulting Ltd

DATE: DEC. 2023	FIGURE NO.: 2
DRAWN BY: ES	CHECKED BY: GD

AllRock Consulting Ltd
24 Brydon Drive, Unit #5
Toronto, ON M9W 5R6
1-844-440-7625
www.allrockconsulting.com

APPENDIX B

Borehole Logs

BORING NUMBER BH23-1

AllRock Consulting

CLIENT 2818963 Ontario Inc.
PROJECT NAME Geotechnical Investigation
PROJECT NUMBER 23265
PROJECT LOCATION 15441 Mt. Pleasant Road, Caledon, ON
DATE STARTED 23-11-27 **COMPLETED** 23-11-27
GROUND ELEVATION 264.88 m **HOLE SIZE** 150mm
DRILLING CONTRACTOR Terra Firma
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING ---
LOGGED BY E. Syed **CHECKED BY** G. Davidson
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	GRAPHIC LOG	MATERIAL DESCRIPTION
	SS 1	41	1-2-2-3 (4)		0.10 Dark Brown sandy silt,trace gravel, contains organic(TOPSOIL) 264.78 Brown CLAYEY SILT, some sand, trace gravel -Sample becomes wet at 1.5m
	SS 2	41	2-3-3-4 (6)		
2	SS 3	54	2-3-3-3 (6)		2.29 262.59
	SS 4	49	3-3-5-5 (8)		Grey SILT, some clay, trace sand
	SS 5	57	4-7-7-10 (14)		
4					
	SS 6	82	5-7-8-10 (15)		
6					
	SS 7	54	9-11-11-17 (22)		
8					
	SS 8	62	8-11-12-13 (23)		
	SS 9	79	10-14-19-31 (33)		8.54 256.34 End of Borehole -Auger Refusal Bottom of hole at 8.54 m.

BORING NUMBER BH23-2

AllRock Consulting

CLIENT 2818963 Ontario Inc.
PROJECT NAME Geotechnical Investigation
PROJECT NUMBER 23265
PROJECT LOCATION 15441 Mt. Pleasant Road, Caledon, ON
DATE STARTED 23-11-27 **COMPLETED** 23-11-27
GROUND ELEVATION 261.75 m **HOLE SIZE** 150mm
DRILLING CONTRACTOR Terra Firma
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING ---
LOGGED BY E. Syed **CHECKED BY** G. Davidson
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	GRAPHIC LOG	MATERIAL DESCRIPTION
					0.10 Dark Brown sandy silt,trace gravel, contains organic(TOPSOIL) 261.65
	1	98	1-2-3-6 (5)		Brown CLAYEY SILT, some sand, trace gravel -Sample becomes wet at 1.5m
	2	98	3-5-8-11 (13)		
2	3	98	5-6-7-10 (13)		
	4	90	5-7-7-9 (14)		
	5	98	5-7-7-9 (14)		
4					4.47 257.28
	6	90	4-4-5-6 (9)		Grey SILT, some clay, trace sand
6					
	7	90	11-16-19-20 (35)		
8	8	98	3-3-3-5 (6)		
	9	79	3-3-7-8 (10)		9.15 252.60
					End of Borehole Bottom of hole at 9.14 m.

WELL NUMBER MW23-3

AllRock Consulting

CLIENT 2818963 Ontario Inc.
PROJECT NAME Geotechnical Investigation
PROJECT NUMBER 23265
PROJECT LOCATION 15441 Mt. Pleasant Road, Caledon, ON
DATE STARTED 23-11-28 **COMPLETED** 23-11-28
GROUND ELEVATION 271.3 m **HOLE SIZE** 150mm
DRILLING CONTRACTOR Terra Firma
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING ---
LOGGED BY E. Syed **CHECKED BY** G. Davidson
AT END OF DRILLING ---
NOTES
AFTER DRILLING 7.46 m / Elev 263.84 m

DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
	1	74	2-2-3-4 (5)		0.10 Dark Brown sandy silt,trace gravel, contains organic (TOPSOIL) 271.20 Brown SANDY SILT -Samples become wet at 4.57	Flushmount Cap
	2	84	2-2-3-4 (5)			
2	3	66	2-3-2-4 (5)			
	4	98	4-6-9-11 (15)			Backfill with Auger Cuttings 50 mm diameter pvc riser
	5	41	3-4-9-13 (13)			
4						
	6	98	6-9-11-13 (20)			Bentonite Seal
6					6.10 265.20 Grey SILT, trace sand and clay	
	7	90	7-12-12-15 (24)			
						Filter Sand 50 mm diameter pvc screen
8	8	33	8-11-7-9 (18)			
	9	41	4-7-10-11 (17)		9.15 262.15 End of Borehole Bottom of hole at 9.14 m.	

GENERAL BH / TP / WELL GINT LOGS-ERUMSYED-GREGDAVIDSON.GPJ GINT STD CANADA LAB.GDT 23-12-21

BORING NUMBER BH23-4

AllRock Consulting

CLIENT 2818963 Ontario Inc. **PROJECT NAME** Geotechnical Investigation

PROJECT NUMBER 23265 **PROJECT LOCATION** 15441 Mt. Pleasant Road, Caledon, ON

DATE STARTED 23-11-28 **COMPLETED** 23-11-28 **GROUND ELEVATION** 270.53 m **HOLE SIZE** 150mm

DRILLING CONTRACTOR Terra Firma **GROUND WATER LEVELS:**

DRILLING METHOD Solid Stem Auger **AT TIME OF DRILLING** ---

LOGGED BY E. Syed **CHECKED BY** G. Davidson **AT END OF DRILLING** ---

NOTES **AFTER DRILLING** ---

DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	GRAPHIC LOG	MATERIAL DESCRIPTION	
	1	98	3-3-5-6 (8)		0.10 Dark Brown sandy silt,trace gravel, contains organic(TOPSOIL)	270.43
					Brown SANDY SILT	
	2	98	2-3-3-3 (6)			
2	3	98	3-3-3-2 (6)			
	4	90	3-4-10-12 (14)		3.05	267.48
	5	98	4-11-11-13 (22)		Grey to brown SILT, trace sand and clay -Samples become wet at 4.57	
4						
	6	90	7-20-22-48 (42)			
6						
	7	98	10-11-11-11 (22)			
8	8	98	9-11-13-14 (24)			
	9	98	10-10-17-20 (27)		9.15	261.38
					End of Borehole	
					Bottom of hole at 9.14 m.	

WELL NUMBER MW23-5

AllRock Consulting

CLIENT 2818963 Ontario Inc. **PROJECT NAME** Geotechnical Investigation

PROJECT NUMBER 23265 **PROJECT LOCATION** 15441 Mt. Pleasant Road, Caledon, ON

DATE STARTED 23-11-24 **COMPLETED** 23-11-24 **GROUND ELEVATION** 271.09 m **HOLE SIZE** 150mm

DRILLING CONTRACTOR Terra Firma **GROUND WATER LEVELS:**

DRILLING METHOD Solid Stem Auger **AT TIME OF DRILLING** ---

LOGGED BY E. Syed **CHECKED BY** G. Davidson **AT END OF DRILLING** ---

NOTES **AFTER DRILLING** 6.50 m / Elev 264.59 m

DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
	1	98	1-1-3-4 (4)		0.10 Dark Brown sandy silt,trace gravel, contains organic (TOPSOIL) 270.99 Brown SANDY SILT -Samples become wet at 4.57	Flushmount Cap
	2	98	2-3-3-5 (6)			
2	3	90	2-3-3-6 (6)			
	4	90	5-6-7-14 (13)			Backfill with Auger Cuttings 50 mm diameter pvc riser
	5	90	9-10-11-20 (21)			
4					4.57 266.52 Grey to brown SILT, trace sand and clay	
	6	90	9-12-16-23 (28)			Bentonite Seal
6						
	7	98	10-12-14-25 (26)			
						Filter Sand 50 mm diameter pvc screen
8	8	98	18-26-39-35 (65)			
	9	98	10-30-20-18 (50)		9.15 261.94 End of Borehole Bottom of hole at 9.14 m.	

BORING NUMBER BH23-6

AllRock Consulting

CLIENT 2818963 Ontario Inc. **PROJECT NAME** Geotechnical Investigation

PROJECT NUMBER 23265 **PROJECT LOCATION** 15441 Mt. Pleasant Road, Caledon, ON

DATE STARTED 23-11-24 **COMPLETED** 23-11-24 **GROUND ELEVATION** 261.4 m **HOLE SIZE** 150mm

DRILLING CONTRACTOR Terra Firma **GROUND WATER LEVELS:**

DRILLING METHOD Solid Stem Auger **AT TIME OF DRILLING** ---

LOGGED BY E. Syed **CHECKED BY** G. Davidson **AT END OF DRILLING** ---

NOTES **AFTER DRILLING** ---

DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	GRAPHIC LOG	MATERIAL DESCRIPTION
					0.10 Dark brown silty sand, trace gravel (TOPSOIL) 261.30
	1	82	1-1-2-4 (3)		Brown SAND and SILT -Samples become wet at 4.57
	2	82	1-2-2-3 (4)		
2	3	74	3-3-2-3 (5)		
	4	82	5-5-6-7 (11)		
	5	82	3-4-6-7 (10)		
4					
	6	90	2-2-2-3 (4)		
6					
	7	98	2-2-4-3 (6)		
8	8	98	2-4-6-6 (10)		
	9	98	6-6-9-8 (15)		
					End of Borehole 9.50 251.90

Bottom of hole at 9.14 m.

BORING NUMBER BH23-7

AllRock Consulting

CLIENT 2818963 Ontario Inc. **PROJECT NAME** Geotechnical Investigation

PROJECT NUMBER 23265 **PROJECT LOCATION** 15441 Mt. Pleasant Road, Caledon, ON

DATE STARTED 23-11-24 **COMPLETED** 23-11-24 **GROUND ELEVATION** 263.23 m **HOLE SIZE** 150mm

DRILLING CONTRACTOR Terra Firma **GROUND WATER LEVELS:**

DRILLING METHOD Solid Stem Auger **AT TIME OF DRILLING** ---

LOGGED BY E. Syed **CHECKED BY** G. Davidson **AT END OF DRILLING** ---

NOTES **AFTER DRILLING** ---

DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	GRAPHIC LOG	MATERIAL DESCRIPTION
	1	74	1-1-2-2 (3)		0.10 Brown sand, trace gravel (TOPSOIL) 263.13 Brown fine to coarse grained sand, trace gravel
	2	84	1-2-2-1 (4)		1.52 261.71
2	3	66	1-1-2-4 (3)		Grey SAND and SILT, trace clay -Samples become wet at 3.05m
	4	98	4-5-5-7 (10)		
	5	41	4-6-6-10 (12)		
4					
	6	98	4-7-9-11 (16)		
6					
	7	90	11-11-11-18 (22)		
8	8	33	6-9-10-12 (19)		
	9	41	16-34-29-28 (63)		9.15 254.08
					End of Borehole Bottom of hole at 9.14 m.

BORING NUMBER BH23-8

AllRock Consulting

CLIENT 2818963 Ontario Inc.
PROJECT NAME Geotechnical Investigation
PROJECT NUMBER 23265
PROJECT LOCATION 15441 Mt. Pleasant Road, Caledon, ON
DATE STARTED 23-11-28 **COMPLETED** 23-11-28
GROUND ELEVATION 263.57 m **HOLE SIZE** 150mm
DRILLING CONTRACTOR Terra Firma
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING ---
LOGGED BY E. Syed **CHECKED BY** G. Davidson
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	GRAPHIC LOG	MATERIAL DESCRIPTION
	1	98	1-2-3-4 (5)		0.10 Brown sandy silt,trace gravel, contains organic(TOPSOIL 263.47 Brown CLAYEY SILT, some garvel, travel sand -Sample sbecome wet at 3.05m
	2	98	3-3-3-4 (6)		
2	3	90	3-3-4-5 (7)		
	4	98	3-6-6-9 (12)		
	5	98	4-8-10-13 (18)		
4					4.57 259.00 Grey to brown SILT, tarce sand and clay
	6	98	7-8-11-15 (19)		
6					
	8	98	8-14-10-15 (24)		
	7	90	8-10-11-12 (21)		
8					
	9	98	4-7-9-11 (16)		9.15 254.42 End of Borehole Bottom of hole at 9.14 m.

BORING NUMBER BH23-9

AllRock Consulting

CLIENT 2818963 Ontario Inc. **PROJECT NAME** Geotechnical Investigation

PROJECT NUMBER 23265 **PROJECT LOCATION** 15441 Mt. Pleasant Road, Caledon, ON

DATE STARTED 23-11-28 **COMPLETED** 23-11-28 **GROUND ELEVATION** 263.5 m **HOLE SIZE** 150mm

DRILLING CONTRACTOR Terra Firma **GROUND WATER LEVELS:**

DRILLING METHOD Solid Stem Auger **AT TIME OF DRILLING** ---

LOGGED BY E. Syed **CHECKED BY** G. Davidson **AT END OF DRILLING** ---

NOTES **AFTER DRILLING** ---

DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	GRAPHIC LOG	MATERIAL DESCRIPTION	
	1	98	1-2-3-3 (5)		0.10 Dark Brown sandy silt,trace gravel, contains organic (TOPSOIL)	263.40
					Brown SANDY SILT, trace gravel	
	2	98	2-4-6-8 (10)			
2	3	90	3-8-11-14 (19)		2.29	261.21
					Brown to grey silt, trace sand and clay (GLACIAL TILL)	
	4	98	6-7-5-7 (12)			
	5	98	3-9-10-10 (19)			
4						
	6	98	10-16-18-18 (34)			
6						
	8	98	9-14-16-20 (30)			
	7	90	8-5-14-20 (19)			
8						
	9	98	12-17-16-22 (33)		9.15	254.35
					End of Borehole	
					Bottom of hole at 9.14 m.	

WELL NUMBER MW23-10

AllRock Consulting

CLIENT 2818963 Ontario Inc. **PROJECT NAME** Geotechnical Investigation

PROJECT NUMBER 23265 **PROJECT LOCATION** 15441 Mt. Pleasant Road, Caledon, ON

DATE STARTED 23-11-27 **COMPLETED** 23-11-27 **GROUND ELEVATION** 266.79 m **HOLE SIZE** 150mm

DRILLING CONTRACTOR Terra Firma **GROUND WATER LEVELS:**

DRILLING METHOD Solid Stem Auger **AT TIME OF DRILLING** ---

LOGGED BY E. Syed **CHECKED BY** G. Davidson **AT END OF DRILLING** ---

NOTES **AFTER DRILLING** 7.00 m / Elev 259.79 m

DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
	1	90	1-3-3-6 (6)		0.10 Dark Brown sandy silt,trace gravel, contains organic (TOPSOIL) 266.69 Brown SAND and SILT	Flushmount Cap
	2	62	4-5-7-8 (12)			
2	3	82	4-6-7-9 (13)			
	4	70	4-5-6-8 (11)		3.05 263.74 Grey to brown SILT, trace sand and clay	Backfill with Auger Cuttings 50 mm diameter pvc riser
	5	66	5-6-8-13 (14)			
4						
	6	82	8-12-16-24 (28)			
6						Bentonite Seal
	8	98	6-18-20-32 (38)			
	7	98	12-12-14-28 (26)			Filter Sand 50 mm diameter pvc screen
8						
	9	98	8-9-9-12 (18)		9.15 257.64 End of Borehole Bottom of hole at 9.14 m.	

AllRock Consulting Ltd
24 Brydon Drive, Unit #5
Toronto, ON M9W 5R6
1-844-440-7625
www.allrockconsulting.com

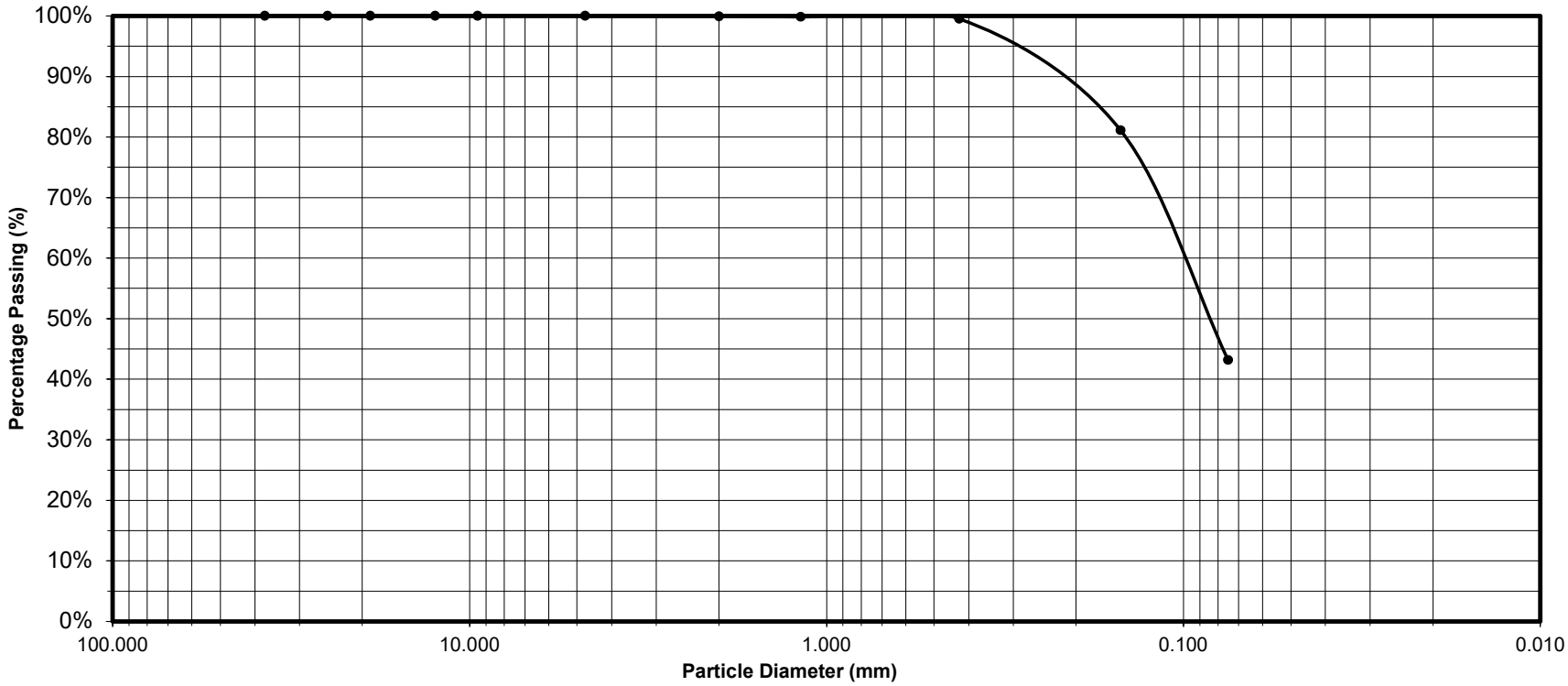
APPENDIX C

Laboratory Testing Results

Sieve Analysis
LS-602

AllRock Consulting Ltd
24 Brydon Drive, Unit #5
M9W 5R6, Toronto, Ont.

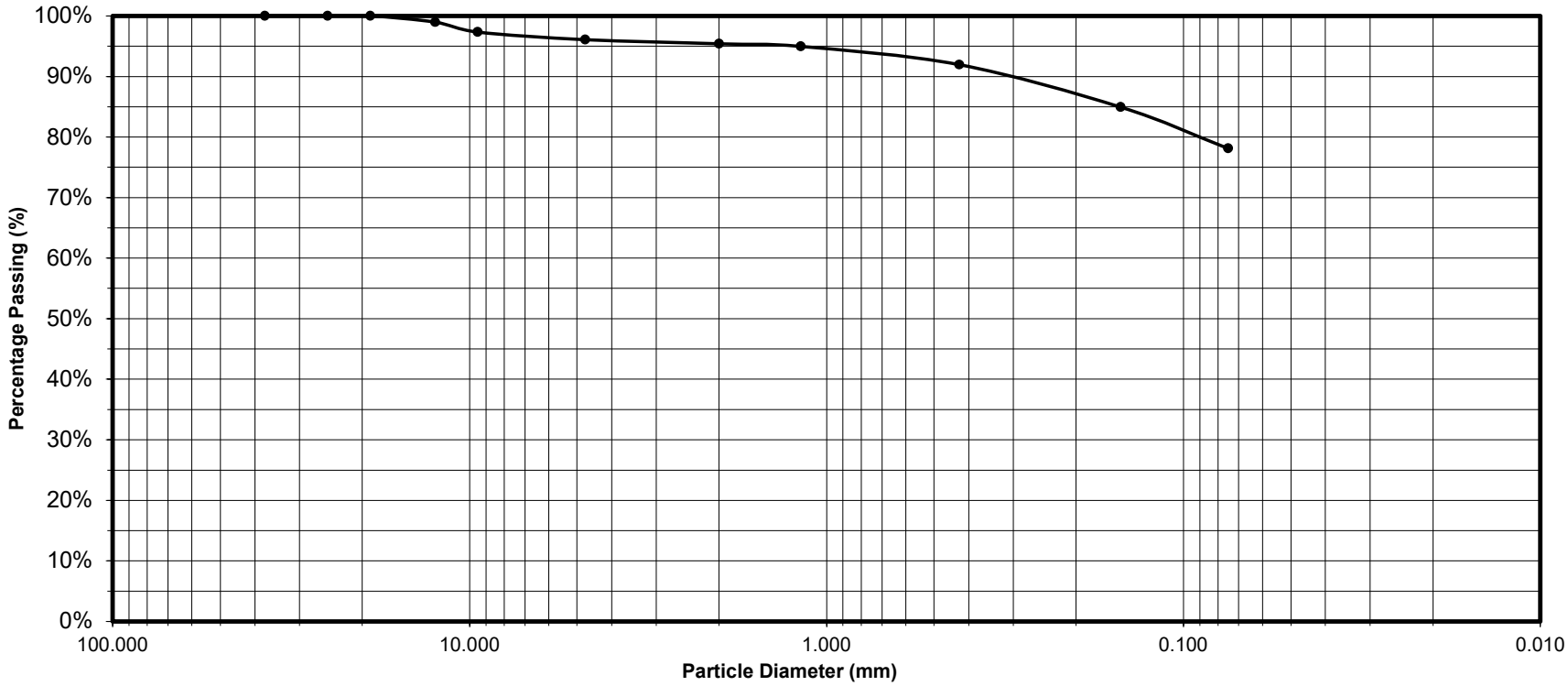
Project:	Geotechnical Investigation and Slope Stability Assessment	**Project Number**	23265
Client:	2818963 Ontario Inc.	**Sample Classification:**	
Sample No.	SS3	**Sample Depth**	1.52-2.13
Date Sampled	November 24, 2023	**Date Tested:**	December 7, 2023
		Moisture Content:	18.8%



Sieve Analysis
LS-602

AllRock Consulting Ltd
24 Brydon Drive, Unit #5
M9W 5R6, Toronto, Ont.

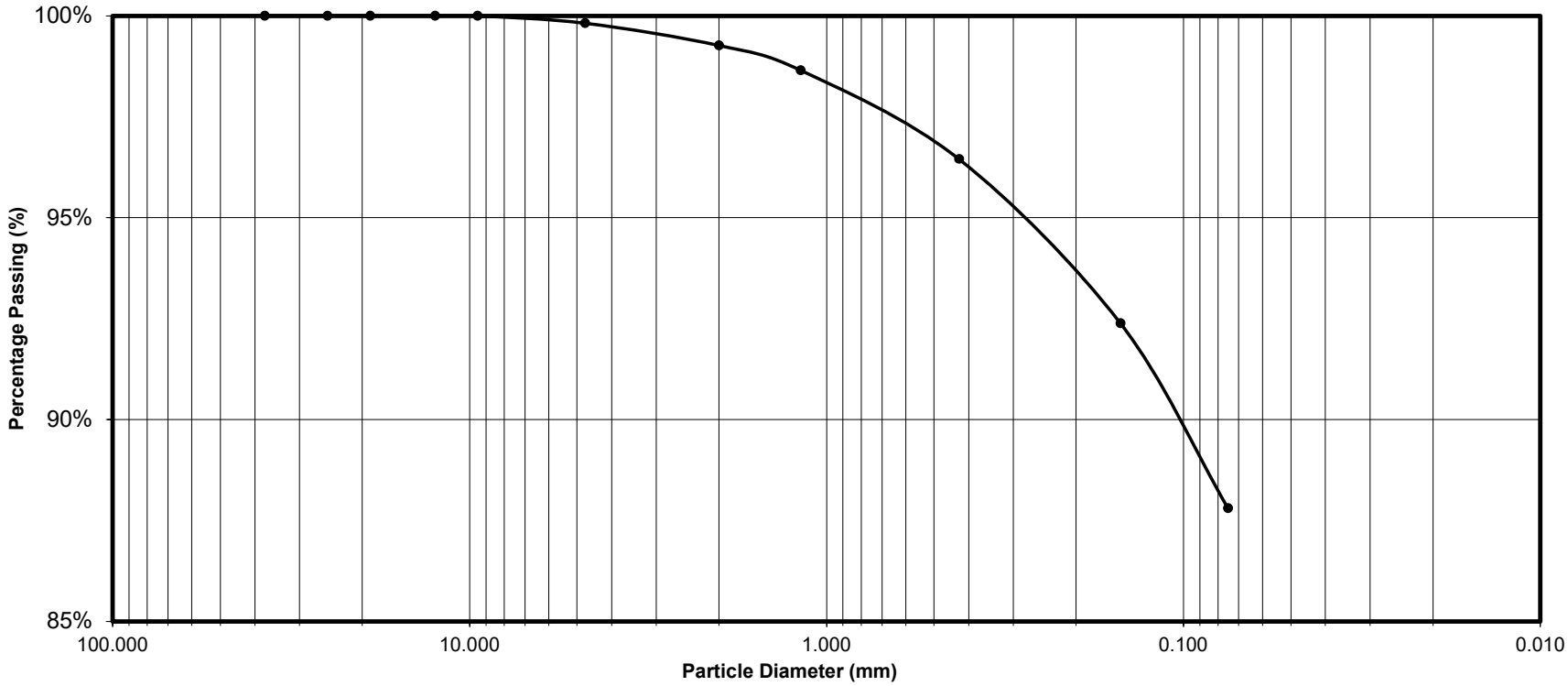
Project:	Geotechnical Investigation and Slope Stability Assessment	**Project Number**	23265
Client:	2818963 Ontario Inc.	**Sample Classification:**	
Sample No.	SS6	**Sample Depth**	4.57-5.33
Date Sampled	November 28, 2023	**Date Tested:**	December 7, 2023
		Moisture Content:	15.4%



Sieve Analysis
LS-602

AllRock Consulting Ltd
24 Brydon Drive, Unit #5
M9W 5R6, Toronto, Ont.

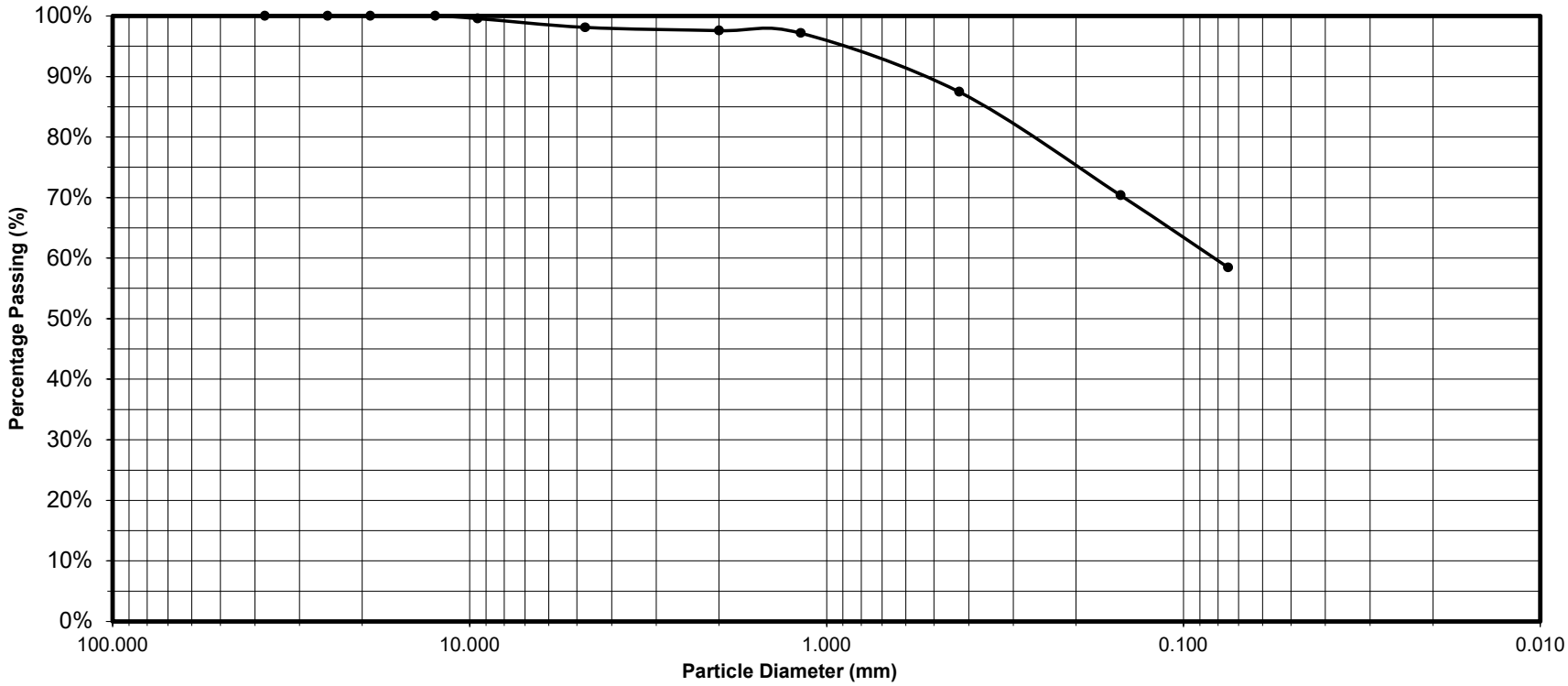
Project:	Geotechnical Investigation and Slope Stability Assessment	**Project Number**	23265
Client:	2818963 Ontario Inc.	**Sample Classification:**	
Sample No.	SS2	**Sample Depth**	0.76-1.37
Date Sampled	November 28, 2023	**Date Tested:**	December 7, 2023
		Moisture Content:	18.1%



Sieve Analysis
LS-602

AllRock Consulting Ltd
24 Brydon Drive, Unit #5
M9W 5R6, Toronto, Ont.

Project:	Geotechnical Investigation and Slope Stability Assessment	**Project Number**	23265
Client:	2818963 Ontario Inc.	**Sample Classification:**	
Sample No.	SS1	**Sample Depth**	0-0.61
Date Sampled	November 27, 2023	**Date Tested:**	December 7, 2023
		Moisture Content:	20.3%



AllRock Consulting Ltd

GRAIN SIZE ANALYSIS AND HYDROMETER TEST REPORT MTO LS-602, 702, AND 703/704

AllRock Consulting Ltd
24 Brydon Drive, Unit #5
Etobicoke, ON. M9W 5R6

Project Information	
Project Name:	Geotechnical Investigation and Slope Stability Assessment
Project No.:	23265
Client:	2818963 Ontario Inc.
Borehole / Test Pit No.:	BH23-2
Sample Depth:	7.62-8.23
Sample No.:	SS8
Sampled By:	E.Syed
Sample Description:	
Sample Natural M/C %:	16.2%
Date Sampled:	Monday, November 27, 2023
Tested By:	A. Patel
Date Tested:	Friday, December 15, 2023
Reviewed By:	G.Davidson

Grain Size Analysis		Hydrometer Analysis	
Sieve Size (mm)	% Passing	Diameter (mm)	% Passing
75.0	100%	0.036091286	75.8%
63.0	100%	0.026149327	72.6%
53.0	100%	0.017011827	68.7%
37.5	100%	0.010241705	62.4%
26.5	100%	0.007527205	56.2%
19.0	100%	0.005445489	52.2%
13.2	100%	0.002807541	42.8%
9.5	99%	0.001237513	31.2%
4.8	99%	ATTERBERG LIMITS, %	
2.0	99%	Plastic Limit	-
0.850	98%	Liquid Limit	-
0.425	98%	Plastic Index	-
0.250	97%		
0.106	91%		
0.075	87%		

PARTICLE SIZE DISTRIBUTION, MTO LS-702

AllRock Consulting Ltd

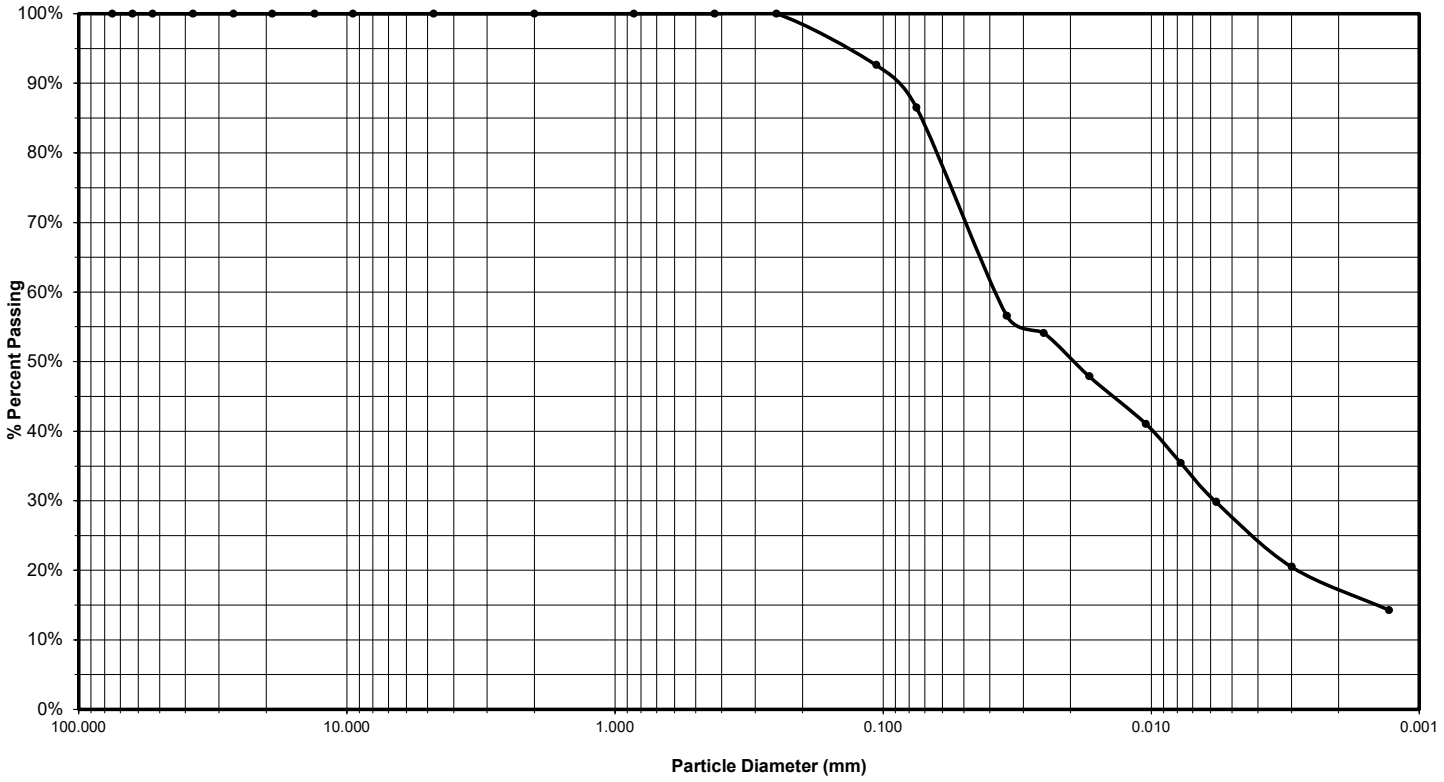
GRAIN SIZE ANALYSIS AND HYDROMETER TEST REPORT MTO LS-602, 702, AND 703/704

AllRock Consulting Ltd
24 Brydon Drive, Unit #5
Etobicoke, ON. M9W 5R6

Project Information	
Project Name:	Geotechnical Investigation and Slope Stability Assessment
Project No.:	23265
Client:	2818963 Ontario Inc.
Borehole / Test Pit No.:	BH23-3
Sample Depth:	8.38-8.99
Sample No.:	SS9
Sampled By:	E.Syed
Sample Description:	
Sample Natural M/C %:	21.5%
Date Sampled:	Tuesday, November 28, 2023
Tested By:	A. Patel
Date Tested:	Monday, December 11, 2023
Reviewed By:	G.Davidson

Grain Size Analysis		Hydrometer Analysis	
Sieve Size (mm)	% Passing	Diameter (mm)	% Passing
75.0	100%	0.034558041	56.6%
63.0	100%	0.025164195	54.1%
53.0	100%	0.017011827	47.9%
37.5	100%	0.010474104	41.0%
26.5	100%	0.007763348	35.4%
19.0	100%	0.005730868	29.8%
13.2	100%	0.002994247	20.5%
9.5	100%	0.001296876	14.3%
4.8	100%	ATTERBERG LIMITS, %	
2.0	100%	Plastic Limit	-
0.850	100%	Liquid Limit	-
0.425	100%	Plastic Index	-
0.250	100%		
0.106	93%		
0.075	87%		

PARTICLE SIZE DISTRIBUTION, MTO LS-702



AllRock Consulting Ltd

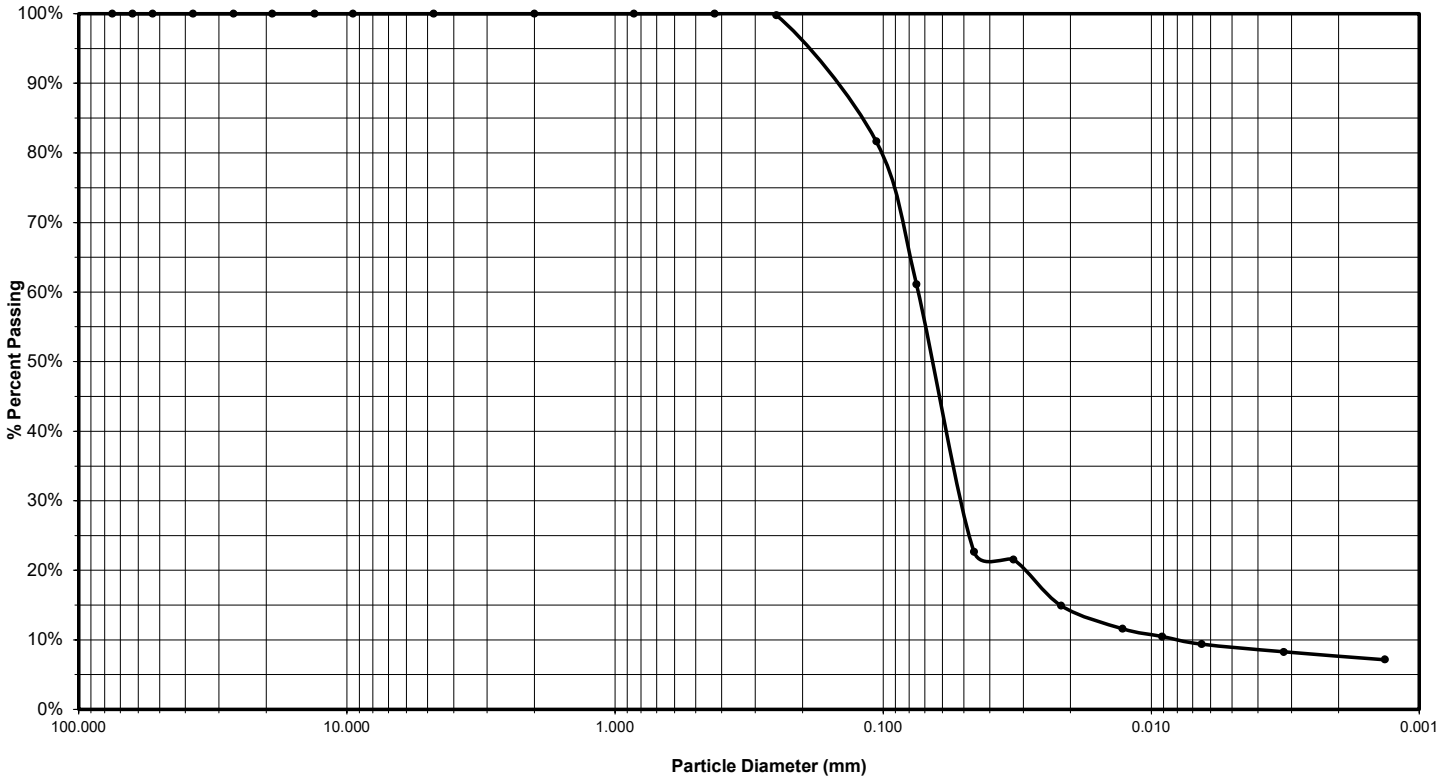
GRAIN SIZE ANALYSIS AND HYDROMETER TEST REPORT MTO LS-602, 702, AND 703/704

AllRock Consulting Ltd
24 Brydon Drive, Unit #5
Etobicoke, ON. M9W 5R6

Project Information	
Project Name:	Geotechnical Investigation and Slope Stability Assessment
Project No.:	23265
Client:	2818963 Ontario Inc.
Borehole / Test Pit No.:	BH23-7
Sample Depth:	3.05-3.66
Sample No.:	SS5
Sampled By:	E.Syed
Sample Description:	
Sample Natural M/C %:	22.6%
Date Sampled:	Friday, November 24, 2023
Tested By:	A. Patel
Date Tested:	Wednesday, December 13, 2023
Reviewed By:	G.Davidson

Grain Size Analysis		Hydrometer Analysis	
Sieve Size (mm)	% Passing	Diameter (mm)	% Passing
75.0	100%	0.045792442	22.6%
63.0	100%	0.032657735	21.5%
53.0	100%	0.021678103	14.9%
37.5	100%	0.012801103	11.6%
26.5	100%	0.009117988	10.5%
19.0	100%	0.006493893	9.4%
13.2	100%	0.003203964	8.3%
9.5	100%	0.001344344	7.2%
4.8	100%	ATTERBERG LIMITS, %	
2.0	100%	Plastic Limit	-
0.850	100%	Liquid Limit	-
0.425	100%	Plastic Index	-
0.250	100%		
0.106	82%		
0.075	61%		

PARTICLE SIZE DISTRIBUTION, MTO LS-702



AllRock Consulting Ltd

GRAIN SIZE ANALYSIS AND HYDROMETER TEST REPORT MTO LS-602, 702, AND 703/704

AllRock Consulting Ltd
24 Brydon Drive, Unit #5
Etobicoke, ON. M9W 5R6

Project Information	
Project Name:	Geotechnical Investigation and Slope Stability Assessment
Project No.:	23265
Client:	2818963 Ontario Inc.
Borehole / Test Pit No.:	BH23-8
Sample Depth:	7.38-7.99
Sample No.:	SS7
Sampled By:	E.Syed
Sample Description:	
Sample Natural M/C %:	16.6%
Date Sampled:	Monday, November 27, 2023
Tested By:	A. Patel
Date Tested:	Sunday, December 10, 2023
Reviewed By:	G.Davidson

Grain Size Analysis		Hydrometer Analysis	
Sieve Size (mm)	% Passing	Diameter (mm)	% Passing
75.0	100%	0.039892876	42.9%
63.0	100%	0.028841435	40.4%
53.0	100%	0.01920518	34.2%
37.5	100%	0.011638883	27.7%
26.5	100%	0.008432191	24.2%
19.0	100%	0.00611198	20.5%
13.2	100%	0.00312408	13.7%
9.5	100%	0.001334985	9.3%
4.8	100%	ATTERBERG LIMITS, %	
2.0	100%	Plastic Limit	-
0.850	100%	Liquid Limit	-
0.425	100%	Plastic Index	-
0.250	99%		
0.106	97%		
0.075	95%		

PARTICLE SIZE DISTRIBUTION, MTO LS-702

APPENDIX B

MECP Well Summary

MECP WATER WELL RECORDS

Project Number: 2227-6259
Prepared by: VM
Address: 15441 Mount Pleasant Rd
Date completed: 01/03/2024

WELL ID	Diameter (cm)	Depth (m)	Static Level (m)	Quantity (Lpm)	Quality	Materials	Aquifer	Use	Date Completed
4900480	10.16	96.32	-	-	-	Soft Grey Clay	OB	Farm	01/29/1964
4900481	91.44	11.58	4.88	7.57	Cloudy	Quick Sand	OB	Farm	06/25/1965
4900482	12.70	61.87	4.27	15.14	Clear/Fresh	Fine Sand	OB	Domestic/Farm	01/04/1964
4900483	76.20	17.68	12.19	1.89	Clear/Fresh	Fine Grey Sand & Water	OB	House	05/20/1965
4903021	76.20	12.19	4.57	15.14	Clear/Fresh	Blue Clay	OB	House	04/27/1968
4903059	91.44	12.19	8.53	0.95	Cloudy/Fresh	Blue Clay	OB	House	07/26/1968
4903310	76.20	12.19	6.10	15.14	Fresh	Brown Sand	OB	Domestic	07/20/1969
4903698	91.44	12.80	6.71	7.57	-	Grey Sand	OB	Domestic	10/07/1971
4904243	76.20	10.67	2.44	7.57	Fresh	Blue Clay	OB	Domestic	10/19/1973
4905241	76.20	17.53	1.52	3.79	-	Grey Sand	OB	Domestic	11/25/1977
4905547	91.44	11.58	4.57	7.57	-	Blue Clay & Sand	OB	Water Supply	10/10/1979
4905562	-	-	-	-	-	-	-	-	09/28/1979
4905606	15.24	70.71	7.92	75.71	-	Brown Sand (Medium)	OB	Water Supply/Test Hole	05/29/1979
4905627	15.24	148.44	-	-	Salty	Blue Shale	BR	-	05/01/1979
4905855	76.20	18.28	9.75	7.57	-	Grey Sand	OB	Domestic	01/26/1982
4905996	15.24	17.37	11.58	3.78	-	Blue Clay	OB	Domestic	03/16/1983
4906291	76.20	21.95	3.05	7.57	-	Grey Clay	OB	Domestic	06/20/1984
4908090		72.54	3.65	37.85	-	Blue Clay	OB	Domestic	03/18/1996
4908344	76.20	23.16	1.83	18.93	Fresh	Grey Hard Packed Sand & Clay	OB	Domestic	05/26/1998
7109485	15.88	61.87	7.92	56.78	-	Sand/Clay	OB	Domestic	06/04/2008
7119440	-	5.44	-	-	-	Grey Clay	OB	-	02/09/2009
7214203	15.24	132.89	9.35	15.14	-	Grey Sand	OB	Domestic	01/06/2014
7285427	-	-	-	-	-	-	-	Decomission	04/03/2017

APPENDIX C

Groundwater Quality Results

CERTIFICATE OF ANALYSIS

Work Order	: **WT2414011**	Page	: 1 of 7
Client	: **CF Crozier & Associates**	Laboratory	: ALS Environmental - Waterloo
Contact	: Victoria Mazur	Account Manager	: Andrew Martin
Address	: 2800 High Point Drive Milton ON Canada L9T 6P4	Address	: 60 Northland Road, Unit 1 Waterloo ON Canada N2V 2B8
Telephone	: (548) 708-0039	Telephone	: +1 519 886 6910
Project	: 2227-69259	Date Samples Received	: 30-May-2024 13:20
PO	: ----	Date Analysis Commenced	: 31-May-2024
C-O-C number	: 23-1096606	Issue Date	: 06-Jun-2024 20:11
Sampler	: Victoria Mazur		
Site	: ----		
Quote number	: 2024 SOA		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Nik Perkio	Senior Analyst	Inorganics, Waterloo, Ontario
Nik Perkio	Senior Analyst	Metals, Waterloo, Ontario
Zeba Patel	Analyst	Microbiology, Waterloo, Ontario

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
µS/cm	microsiemens per centimetre
CFU/100mL	colony forming units per hundred millilitres
CU	colour units (1 cu = 1 mg/l pt)
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Workorder Comments

<1 or Not Detected with LOR of 1 equals Zero (0).

Not Detected = Absent; Detected = Present.

Qualifiers

Qualifier	*Description*
DLDS	*Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.*
DLHC	*Detection Limit Raised: Dilution required due to high concentration of test analyte(s).*
DLM	*Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).*

LPMB	*Lab-Preserved for Total Metals. Sample received with pH > 2 and preserved at the lab. Total Metals results may be biased low.*
TMV	*Turbidity exceeded upper limit of the nephelometric method. Minimum value reported.*

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID: MW 23-3	----	----	----	----
					Client sampling date / time: 30-May-2024 12:00	----	----	----	----
					WT2414011-001	--------	--------	--------	--------
					Result	----	----	----	----
Physical Tests									
Alkalinity, total (as CaCO3)	----	E290/WT	1.0	mg/L	2960 DLHC	----	----	----	----
Colour, apparent	----	E330/WT	2.0	CU	19500 DLHC, DLM	----	----	----	----
Conductivity	----	E100/WT	1.0	µS/cm	726	----	----	----	----
Hardness (as CaCO3), dissolved	----	EC100/WT	0.50	mg/L	440	----	----	----	----
pH	----	E108/WT	0.10	pH units	7.57	----	----	----	----
Solids, total dissolved [TDS]	----	E162/WT	10	mg/L	473 DLDS	----	----	----	----
Turbidity	----	E121/WT	0.10	NTU	>4000 TMV	----	----	----	----
Anions and Nutrients									
Ammonia, total (as N)	7664-41-7	E298/WT	0.0050	mg/L	0.0176	----	----	----	----
Chloride	16887-00-6	E235.Cl/WT	0.50	mg/L	<0.50	----	----	----	----
Fluoride	16984-48-8	E235.F/WT	0.020	mg/L	0.070	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3/WT	0.020	mg/L	0.207	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2/WT	0.010	mg/L	<0.010	----	----	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/WT	0.0010	mg/L	<0.0010	----	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/WT	0.30	mg/L	28.4	----	----	----	----
Microbiological Tests									
Coliforms, Escherichia coli [E. coli]	----	E012A.EC/WT	1	CFU/100mL	Not Detected DLM	----	----	----	----
Coliforms, total	----	E012.TC/WT	1	CFU/100mL	Not Detected DLM	----	----	----	----
Total Metals									
Aluminum, total	7429-90-5	E420/WT	0.0030	mg/L	90.1 DLHC, LPMB	----	----	----	----
Antimony, total	7440-36-0	E420/WT	0.00010	mg/L	<0.00100 DLHC, LPMB	----	----	----	----
Arsenic, total	7440-38-2	E420/WT	0.00010	mg/L	0.0331 DLHC, LPMB	----	----	----	----
Barium, total	7440-39-3	E420/WT	0.00010	mg/L	0.508 DLHC, LPMB	----	----	----	----
Beryllium, total	7440-41-7	E420/WT	0.000020	mg/L	0.00416 DLHC, LPMB	----	----	----	----
Bismuth, total	7440-69-9	E420/WT	0.000050	mg/L	0.00118 DLHC, LPMB	----	----	----	----
Boron, total	7440-42-8	E420/WT	0.010	mg/L	<0.100 DLHC, LPMB	----	----	----	----
Cadmium, total	7440-43-9	E420/WT	0.0000050	mg/L	0.000852 DLHC, LPMB	----	----	----	----
Calcium, total	7440-70-2	E420/WT	0.050	mg/L	1590 DLHC, LPMB	----	----	----	----
Cesium, total	7440-46-2	E420/WT	0.000010	mg/L	0.00656 DLHC, LPMB	----	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW 23-3	----	----	----	----
					Client sampling date / time	30-May-2024 12:00	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		WT2414011-001	--------	--------	--------	--------
						Result	----	----	----	----
Total Metals										
Chromium, total	7440-47-3	E420/WT	0.00050	mg/L		0.153 DLHC, LPMB	----	----	----	----
Cobalt, total	7440-48-4	E420/WT	0.00010	mg/L		0.0898 DLHC, LPMB	----	----	----	----
Copper, total	7440-50-8	E420/WT	0.00050	mg/L		0.214 DLHC, LPMB	----	----	----	----
Iron, total	7439-89-6	E420/WT	0.010	mg/L		171 DLHC, LPMB	----	----	----	----
Lead, total	7439-92-1	E420/WT	0.000050	mg/L		0.0925 DLHC, LPMB	----	----	----	----
Lithium, total	7439-93-2	E420/WT	0.0010	mg/L		0.173 DLHC, LPMB	----	----	----	----
Magnesium, total	7439-95-4	E420/WT	0.0050	mg/L		206 DLHC, LPMB	----	----	----	----
Manganese, total	7439-96-5	E420/WT	0.00010	mg/L		7.39 DLHC, LPMB	----	----	----	----
Molybdenum, total	7439-98-7	E420/WT	0.000050	mg/L		0.00103 DLHC, LPMB	----	----	----	----
Nickel, total	7440-02-0	E420/WT	0.00050	mg/L		0.164 DLHC, LPMB	----	----	----	----
Phosphorus, total	7723-14-0	E420/WT	0.050	mg/L		9.81 DLHC, LPMB	----	----	----	----
Potassium, total	7440-09-7	E420/WT	0.050	mg/L		10.6 DLHC, LPMB	----	----	----	----
Rubidium, total	7440-17-7	E420/WT	0.00020	mg/L		0.0877 DLHC, LPMB	----	----	----	----
Selenium, total	7782-49-2	E420/WT	0.000050	mg/L		0.000947 DLHC, LPMB	----	----	----	----
Silicon, total	7440-21-3	E420/WT	0.10	mg/L		96.3 DLHC, LPMB	----	----	----	----
Silver, total	7440-22-4	E420/WT	0.000010	mg/L		0.000368 DLHC, LPMB	----	----	----	----
Sodium, total	7440-23-5	E420/WT	0.050	mg/L		14.4 DLHC, LPMB	----	----	----	----
Strontium, total	7440-24-6	E420/WT	0.00020	mg/L		2.62 DLHC, LPMB	----	----	----	----
Sulfur, total	7704-34-9	E420/WT	0.50	mg/L		19.2 DLHC, LPMB	----	----	----	----
Tellurium, total	13494-80-9	E420/WT	0.00020	mg/L		<0.00200 DLHC, LPMB	----	----	----	----
Thallium, total	7440-28-0	E420/WT	0.000010	mg/L		0.000951 DLHC, LPMB	----	----	----	----
Thorium, total	7440-29-1	E420/WT	0.00010	mg/L		0.0376 DLHC, LPMB	----	----	----	----
Tin, total	7440-31-5	E420/WT	0.00010	mg/L		0.00268 DLHC, LPMB	----	----	----	----
Titanium, total	7440-32-6	E420/WT	0.00030	mg/L		1.19 DLHC, LPMB	----	----	----	----
Tungsten, total	7440-33-7	E420/WT	0.00010	mg/L		<0.00100 DLHC, LPMB	----	----	----	----
Uranium, total	7440-61-1	E420/WT	0.000010	mg/L		0.00724 DLHC, LPMB	----	----	----	----
Vanadium, total	7440-62-2	E420/WT	0.00050	mg/L		0.159 DLHC, LPMB	----	----	----	----
Zinc, total	7440-66-6	E420/WT	0.0030	mg/L		0.414 DLHC, LPMB	----	----	----	----
Zirconium, total	7440-67-7	E420/WT	0.00020	mg/L		<0.00200 DLHC, LPMB	----	----	----	----
Dissolved Metals										

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MW 23-3	----	----	----	----
					Client sampling date / time	30-May-2024 12:00	----	----	----	----
					WT2414011-001	--------	--------	--------	--------	--------
					Result	----	----	----	----	----
Dissolved Metals										
Aluminum, dissolved	7429-90-5	E421/WT	0.0010	mg/L		0.0017	----	----	----	----
Antimony, dissolved	7440-36-0	E421/WT	0.00010	mg/L		<0.00010	----	----	----	----
Arsenic, dissolved	7440-38-2	E421/WT	0.00010	mg/L		0.00017	----	----	----	----
Barium, dissolved	7440-39-3	E421/WT	0.00010	mg/L		0.0596	----	----	----	----
Beryllium, dissolved	7440-41-7	E421/WT	0.000020	mg/L		<0.000020	----	----	----	----
Bismuth, dissolved	7440-69-9	E421/WT	0.000050	mg/L		<0.000050	----	----	----	----
Boron, dissolved	7440-42-8	E421/WT	0.010	mg/L		<0.010	----	----	----	----
Cadmium, dissolved	7440-43-9	E421/WT	0.0000050	mg/L		<0.0000050	----	----	----	----
Calcium, dissolved	7440-70-2	E421/WT	0.050	mg/L		138	----	----	----	----
Cesium, dissolved	7440-46-2	E421/WT	0.000010	mg/L		<0.000010	----	----	----	----
Chromium, dissolved	7440-47-3	E421/WT	0.00050	mg/L		0.00148	----	----	----	----
Cobalt, dissolved	7440-48-4	E421/WT	0.00010	mg/L		0.00012	----	----	----	----
Copper, dissolved	7440-50-8	E421/WT	0.00020	mg/L		0.00122	----	----	----	----
Iron, dissolved	7439-89-6	E421/WT	0.010	mg/L		<0.010	----	----	----	----
Lead, dissolved	7439-92-1	E421/WT	0.000050	mg/L		<0.000050	----	----	----	----
Lithium, dissolved	7439-93-2	E421/WT	0.0010	mg/L		0.0099	----	----	----	----
Magnesium, dissolved	7439-95-4	E421/WT	0.0050	mg/L		23.3	----	----	----	----
Manganese, dissolved	7439-96-5	E421/WT	0.00010	mg/L		0.0104	----	----	----	----
Molybdenum, dissolved	7439-98-7	E421/WT	0.000050	mg/L		0.000226	----	----	----	----
Nickel, dissolved	7440-02-0	E421/WT	0.00050	mg/L		0.00060	----	----	----	----
Phosphorus, dissolved	7723-14-0	E421/WT	0.050	mg/L		<0.050	----	----	----	----
Potassium, dissolved	7440-09-7	E421/WT	0.050	mg/L		0.798	----	----	----	----
Rubidium, dissolved	7440-17-7	E421/WT	0.00020	mg/L		0.00106	----	----	----	----
Selenium, dissolved	7782-49-2	E421/WT	0.000050	mg/L		0.000394	----	----	----	----
Silicon, dissolved	7440-21-3	E421/WT	0.050	mg/L		8.94	----	----	----	----
Silver, dissolved	7440-22-4	E421/WT	0.000010	mg/L		<0.000010	----	----	----	----
Sodium, dissolved	7440-23-5	E421/WT	0.050	mg/L		10.1	----	----	----	----
Strontium, dissolved	7440-24-6	E421/WT	0.00020	mg/L		0.308	----	----	----	----
Sulfur, dissolved	7704-34-9	E421/WT	0.50	mg/L		10.5	----	----	----	----
Tellurium, dissolved	13494-80-9	E421/WT	0.00020	mg/L		<0.00020	----	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW 23-3	----	----	----	----
					Client sampling date / time	30-May-2024 12:00	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		WT2414011-001	--------	--------	--------	--------
						Result	----	----	----	----
Dissolved Metals										
Thallium, dissolved	7440-28-0	E421/WT	0.000010	mg/L		0.000010	----	----	----	----
Thorium, dissolved	7440-29-1	E421/WT	0.00010	mg/L		<0.00010	----	----	----	----
Tin, dissolved	7440-31-5	E421/WT	0.00010	mg/L		<0.00010	----	----	----	----
Titanium, dissolved	7440-32-6	E421/WT	0.00030	mg/L		<0.00030	----	----	----	----
Tungsten, dissolved	7440-33-7	E421/WT	0.00010	mg/L		<0.00010	----	----	----	----
Uranium, dissolved	7440-61-1	E421/WT	0.000010	mg/L		0.000688	----	----	----	----
Vanadium, dissolved	7440-62-2	E421/WT	0.00050	mg/L		<0.00050	----	----	----	----
Zinc, dissolved	7440-66-6	E421/WT	0.0010	mg/L		<0.0010	----	----	----	----
Zirconium, dissolved	7440-67-7	E421/WT	0.00030	mg/L		<0.00030	----	----	----	----
Dissolved metals filtration location	----	EP421/WT	-	-		Laboratory	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

QUALITY CONTROL REPORT

Work Order	: **WT2414011**	Page	: 1 of 17
Client	: CF Crozier & Associates	Laboratory	: ALS Environmental - Waterloo
Contact	: Victoria Mazur	Account Manager	: Andrew Martin
Address	: 2800 High Point Drive Milton ON Canada L9T 6P4	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: (548) 708-0039	Telephone	: +1 519 886 6910
Project	: 2227-69259	Date Samples Received	: 30-May-2024 13:20
PO	: ----	Date Analysis Commenced	: 31-May-2024
C-O-C number	: 23-1096606	Issue Date	: 06-Jun-2024 20:11
Sampler	: Victoria Mazur		
Site	: ----		
Quote number	: 2024 SOA		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Nik Perkio	Senior Analyst	Waterloo Inorganics, Waterloo, Ontario
Nik Perkio	Senior Analyst	Waterloo Metals, Waterloo, Ontario
Zeba Patel	Analyst	Waterloo Microbiology, Waterloo, Ontario

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 1468699)											
WT2413918-006	Anonymous	Turbidity	----	E121	0.10	NTU	89.8	90.8	0.997%	15%	----
Physical Tests (QC Lot: 1469701)											
HA2401222-001	Anonymous	Colour, apparent	----	E330	2.0	CU	19.4	16.4	3.0	Diff <2x LOR	----
Physical Tests (QC Lot: 1472923)											
WT2413896-002	Anonymous	pH	----	E108	0.10	pH units	8.17	7.92	3.11%	4%	----
Physical Tests (QC Lot: 1472924)											
WT2413896-002	Anonymous	Alkalinity, total (as CaCO3)	----	E290	10.0	mg/L	254	255	0.260%	20%	----
Physical Tests (QC Lot: 1472925)											
WT2413896-002	Anonymous	Conductivity	----	E100	3.0	µS/cm	624	631	1.12%	10%	----
Physical Tests (QC Lot: 1476573)											
WT2413918-007	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	262	259	1.15%	20%	----
Anions and Nutrients (QC Lot: 1470994)											
HA2401203-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0315	0.0317	0.0002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1472926)											
WT2414099-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1472927)											
WT2414099-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1472928)											
WT2414099-001	Anonymous	Chloride	16887-00-6	E235.Cl	2.50	mg/L	27.8	27.7	0.337%	20%	----
Anions and Nutrients (QC Lot: 1472929)											
WT2414099-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	627	626	0.179%	20%	----
Anions and Nutrients (QC Lot: 1472930)											
WT2414099-001	Anonymous	Fluoride	16984-48-8	E235.F	0.100	mg/L	1.91	1.90	0.372%	20%	----
Anions and Nutrients (QC Lot: 1472940)											
WT2413896-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1469285)											
WT2414060-001	Anonymous	Coliforms, Escherichia coli [E. coli]	----	E012A.EC	1	CFU/100mL	2	1	1	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1469287)											
WT2414059-001	Anonymous	Coliforms, total	----	E012.TC	100	CFU/100mL	<100	<100	0	Diff <2x LOR	----
Total Metals (QC Lot: 1468238)											

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 1468238) - continued											
BF2400040-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0300	mg/L	0.546	0.542	0.557%	20%	----
		Antimony, total	7440-36-0	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00100	mg/L	0.0151	0.0150	0.524%	20%	----
		Beryllium, total	7440-41-7	E420	0.000200	mg/L	<0.000200	<0.000200	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000500	mg/L	<0.000500	<0.000500	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000500	mg/L	0.000266	0.000272	0.0000059	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.500	mg/L	30.4	31.0	1.94%	20%	----
		Cesium, total	7440-46-2	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00500	mg/L	<0.00500	<0.00500	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00100	mg/L	0.0290	0.0282	2.59%	20%	----
		Copper, total	7440-50-8	E420	0.00500	mg/L	<0.00500	<0.00500	0	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.100	mg/L	1.36	1.42	4.17%	20%	----
		Lead, total	7439-92-1	E420	0.000500	mg/L	<0.000500	<0.000500	0	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0100	mg/L	0.0563	0.0588	0.0025	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.0500	mg/L	130	128	1.42%	20%	----
		Manganese, total	7439-96-5	E420	0.00100	mg/L	10.8	10.7	1.15%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000500	mg/L	0.000940	0.000836	0.000104	Diff <2x LOR	----
		Nickel, total	7440-02-0	E420	0.00500	mg/L	0.0190	0.0184	0.00068	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.500	mg/L	<0.500	<0.500	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.500	mg/L	5.22	5.17	0.908%	20%	----
		Rubidium, total	7440-17-7	E420	0.00200	mg/L	0.00938	0.00918	0.00020	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000500	mg/L	0.00219	0.00219	0.0000003	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	1.00	mg/L	1.75	1.78	0.03	Diff <2x LOR	----
		Silver, total	7440-22-4	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.500	mg/L	44.8	42.9	4.46%	20%	----
		Strontium, total	7440-24-6	E420	0.00200	mg/L	0.0764	0.0784	2.62%	20%	----
		Sulfur, total	7704-34-9	E420	5.00	mg/L	182	186	2.30%	20%	----
		Tellurium, total	13494-80-9	E420	0.00200	mg/L	<0.00200	<0.00200	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000100	mg/L	0.000181	0.000168	0.000013	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00540	mg/L	<0.00540	<0.00540	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 1468238) - continued											
BF2400040-001	Anonymous	Tungsten, total	7440-33-7	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Vanadium, total	7440-62-2	E420	0.00500	mg/L	<0.00500	<0.00500	0	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0300	mg/L	<0.0300	<0.0300	0	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00200	mg/L	<0.00200	<0.00200	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1469428)											
WT2413774-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0100	mg/L	0.0656	0.0643	0.0013	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00100	mg/L	0.00132	0.00131	0.00001	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00100	mg/L	0.0178	0.0176	0.814%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000200	mg/L	<0.000200	<0.000200	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000500	mg/L	<0.000500	<0.000500	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000500	mg/L	<0.0000500	<0.0000500	0	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.500	mg/L	29.5	30.5	3.27%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.00500	mg/L	<0.00500	<0.00500	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00200	mg/L	0.0155	0.0156	0.00009	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000500	mg/L	0.00539	0.00542	0.497%	20%	----
		Lithium, dissolved	7439-93-2	E421	0.0100	mg/L	<0.0100	<0.0100	0	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0500	mg/L	5.72	5.79	1.09%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00100	mg/L	0.00237	0.00255	0.00018	Diff <2x LOR	----
		Molybdenum, dissolved	7439-98-7	E421	0.000500	mg/L	0.00284	0.00283	0.000006	Diff <2x LOR	----
		Nickel, dissolved	7440-02-0	E421	0.00500	mg/L	<0.00500	<0.00500	0	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.500	mg/L	<0.500	<0.500	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.500	mg/L	29.9	30.2	0.752%	20%	----
		Rubidium, dissolved	7440-17-7	E421	0.00200	mg/L	0.0176	0.0182	0.00060	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000500	mg/L	<0.000500	<0.000500	0	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.500	mg/L	2.56	2.60	0.042	Diff <2x LOR	----
		Silver, dissolved	7440-22-4	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.500	mg/L	23.6	24.3	2.88%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00200	mg/L	0.348	0.353	1.28%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Dissolved Metals (QC Lot: 1469428) - continued											
WT2413774-002	Anonymous	Sulfur, dissolved	7704-34-9	E421	5.00	mg/L	16.0	15.1	0.93	Diff <2x LOR	----
		Tellurium, dissolved	13494-80-9	E421	0.00200	mg/L	<0.00200	<0.00200	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00300	mg/L	<0.00300	<0.00300	0	Diff <2x LOR	----
		Tungsten, dissolved	7440-33-7	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000100	mg/L	0.000587	0.000577	0.000011	Diff <2x LOR	----
		Vanadium, dissolved	7440-62-2	E421	0.00500	mg/L	<0.00500	<0.00500	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0100	mg/L	0.174	0.181	4.29%	20%	----
		Zirconium, dissolved	7440-67-7	E421	0.00300	mg/L	<0.00300	<0.00300	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1468699)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 1469701)						
Colour, apparent	----	E330	2	CU	<2.0	----
Physical Tests (QCLot: 1472924)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1472925)						
Conductivity	----	E100	1	µS/cm	1.3	----
Physical Tests (QCLot: 1476573)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 1470994)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1472926)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1472927)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 1472928)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1472929)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1472930)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1472940)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Microbiological Tests (QCLot: 1469285)						
Coliforms, Escherichia coli [E. coli]	----	E012A.EC	1	CFU/100mL	<1	----
Microbiological Tests (QCLot: 1469287)						
Coliforms, total	----	E012.TC	1	CFU/100mL	<1	----
Total Metals (QCLot: 1468238)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1468238) - continued						
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1469428)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1469428) - continued						
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1468699)									
Turbidity	----	E121	0.1	NTU	200 NTU	102	85.0	115	----
Physical Tests (QCLot: 1469701)									
Colour, apparent	----	E330	2	CU	25 CU	101	70.0	130	----
Physical Tests (QCLot: 1472923)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1472924)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	150 mg/L	95.6	85.0	115	----
Physical Tests (QCLot: 1472925)									
Conductivity	----	E100	1	µS/cm	1410 µS/cm	99.8	90.0	110	----
Physical Tests (QCLot: 1476573)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	104	85.0	115	----
Anions and Nutrients (QCLot: 1470994)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	99.5	85.0	115	----
Anions and Nutrients (QCLot: 1472926)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	99.6	90.0	110	----
Anions and Nutrients (QCLot: 1472927)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	99.0	90.0	110	----
Anions and Nutrients (QCLot: 1472928)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1472929)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1472930)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1472940)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.031 mg/L	97.3	80.0	120	----
Total Metals (QCLot: 1468238)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	0.1 mg/L	107	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	0.05 mg/L	108	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	0.05 mg/L	109	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.012 mg/L	103	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 1468238) - continued									
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.005 mg/L	110	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	0.05 mg/L	106	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	0.05 mg/L	102	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.005 mg/L	98.3	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	2.5 mg/L	104	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.002 mg/L	108	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.012 mg/L	104	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.012 mg/L	103	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.012 mg/L	101	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	0.05 mg/L	102	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.025 mg/L	106	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.012 mg/L	105	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	2.5 mg/L	110	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.012 mg/L	104	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.012 mg/L	105	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.025 mg/L	102	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	0.5 mg/L	110	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	2.5 mg/L	101	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.005 mg/L	107	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	0.05 mg/L	103	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	0.5 mg/L	98.2	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.005 mg/L	103	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	2.5 mg/L	104	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.012 mg/L	109	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	2.5 mg/L	102	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.005 mg/L	102	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	0.05 mg/L	102	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.005 mg/L	94.6	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.025 mg/L	101	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.012 mg/L	102	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.005 mg/L	104	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0 mg/L	107	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.025 mg/L	105	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.025 mg/L	115	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.005 mg/L	101	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 1469428)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	0.1 mg/L	109	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	0.05 mg/L	103	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	0.05 mg/L	112	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.012 mg/L	108	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.005 mg/L	106	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	0.05 mg/L	109	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	0.05 mg/L	99.2	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.005 mg/L	104	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	2.5 mg/L	104	80.0	120	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.002 mg/L	112	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.012 mg/L	104	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.012 mg/L	103	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.012 mg/L	102	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	0.05 mg/L	104	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.025 mg/L	107	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.012 mg/L	98.0	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	2.5 mg/L	114	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.012 mg/L	109	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.012 mg/L	108	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.025 mg/L	102	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	0.5 mg/L	110	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	2.5 mg/L	105	80.0	120	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.005 mg/L	116	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	0.05 mg/L	106	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	0.5 mg/L	98.7	60.0	140	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.005 mg/L	106	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	2.5 mg/L	104	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.012 mg/L	111	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	2.5 mg/L	103	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.005 mg/L	104	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	0.05 mg/L	105	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.005 mg/L	99.9	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.025 mg/L	108	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.012 mg/L	105	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.005 mg/L	107	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0 mg/L	107	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike: Target Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Dissolved Metals (QCLot: 1469428) - continued									
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.025 mg/L	106	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.025 mg/L	107	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.005 mg/L	106	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1470994)										
HA2401203-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0916 mg/L	0.1 mg/L	91.6	75.0	125	----
Anions and Nutrients (QCLot: 1472926)										
WT2414099-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	12.0 mg/L	12.5 mg/L	96.4	75.0	125	----
Anions and Nutrients (QCLot: 1472927)										
WT2414099-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	2.53 mg/L	2.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1472928)										
WT2414099-001	Anonymous	Chloride	16887-00-6	E235.Cl	496 mg/L	500 mg/L	99.2	75.0	125	----
Anions and Nutrients (QCLot: 1472929)										
WT2414099-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1472930)										
WT2414099-001	Anonymous	Fluoride	16984-48-8	E235.F	5.25 mg/L	5 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 1472940)										
WT2413896-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0230 mg/L	0.02 mg/L	118	70.0	130	----
Total Metals (QCLot: 1468238)										
BF2400040-002	Anonymous	Aluminum, total	7429-90-5	E420	0.104 mg/L	0.1 mg/L	104	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0532 mg/L	0.05 mg/L	106	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0532 mg/L	0.05 mg/L	106	70.0	130	----
		Barium, total	7440-39-3	E420	0.0120 mg/L	0.012 mg/L	96.3	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.00457 mg/L	0.005 mg/L	91.4	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.0475 mg/L	0.05 mg/L	95.1	70.0	130	----
		Boron, total	7440-42-8	E420	0.047 mg/L	0.05 mg/L	93.7	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00507 mg/L	0.005 mg/L	101	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	----	ND	70.0	130	----
		Cesium, total	7440-46-2	E420	0.00260 mg/L	0.002 mg/L	104	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0129 mg/L	0.012 mg/L	103	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0122 mg/L	0.012 mg/L	97.7	70.0	130	----
		Copper, total	7440-50-8	E420	0.0126 mg/L	0.012 mg/L	101	70.0	130	----
		Iron, total	7439-89-6	E420	ND mg/L	----	ND	70.0	130	----
		Lead, total	7439-92-1	E420	0.0239 mg/L	0.025 mg/L	95.7	70.0	130	----
		Lithium, total	7439-93-2	E420	0.0111 mg/L	0.012 mg/L	89.1	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	----	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	ND mg/L	----	ND	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0129 mg/L	0.012 mg/L	103	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0237 mg/L	0.025 mg/L	94.6	70.0	130	----
		Phosphorus, total	7723-14-0	E420	0.542 mg/L	0.5 mg/L	108	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 1468238) - continued										
BF2400040-002	Anonymous	Potassium, total	7440-09-7	E420	2.31 mg/L	2.5 mg/L	92.3	70.0	130	----
		Rubidium, total	7440-17-7	E420	0.00515 mg/L	0.005 mg/L	103	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0509 mg/L	0.05 mg/L	102	70.0	130	----
		Silicon, total	7440-21-3	E420	0.46 mg/L	0.5 mg/L	92.6	70.0	130	----
		Silver, total	7440-22-4	E420	0.00497 mg/L	0.005 mg/L	99.4	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	----	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	----	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	ND mg/L	----	ND	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.00492 mg/L	0.005 mg/L	98.5	70.0	130	----
		Thallium, total	7440-28-0	E420	0.0477 mg/L	0.05 mg/L	95.4	70.0	130	----
		Thorium, total	7440-29-1	E420	0.00474 mg/L	0.005 mg/L	94.8	70.0	130	----
		Tin, total	7440-31-5	E420	0.0259 mg/L	0.025 mg/L	104	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0118 mg/L	0.012 mg/L	94.9	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.00515 mg/L	0.005 mg/L	103	70.0	130	----
		Uranium, total	7440-61-1	E420	0.000254 mg/L	0 mg/L	102	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.0259 mg/L	0.025 mg/L	104	70.0	130	----
		Zinc, total	7440-66-6	E420	0.0258 mg/L	0.025 mg/L	103	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.00520 mg/L	0.005 mg/L	104	70.0	130	----
Dissolved Metals (QCLot: 1469428)										
WT2413852-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.110 mg/L	0.1 mg/L	110	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0510 mg/L	0.05 mg/L	102	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0578 mg/L	0.05 mg/L	116	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	----	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.00568 mg/L	0.005 mg/L	114	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.0481 mg/L	0.05 mg/L	96.2	70.0	130	----
		Boron, dissolved	7440-42-8	E421	ND mg/L	----	ND	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00487 mg/L	0.005 mg/L	97.4	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	----	ND	70.0	130	----
		Cesium, dissolved	7440-46-2	E421	0.00273 mg/L	0.002 mg/L	109	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0130 mg/L	0.012 mg/L	104	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0124 mg/L	0.012 mg/L	98.8	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0118 mg/L	0.012 mg/L	94.5	70.0	130	----
		Iron, dissolved	7439-89-6	E421	ND mg/L	----	ND	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0246 mg/L	0.025 mg/L	98.4	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0137 mg/L	0.012 mg/L	110	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	----	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	----	ND	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0136 mg/L	0.012 mg/L	109	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0237 mg/L	0.025 mg/L	94.9	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	0.590 mg/L	0.5 mg/L	118	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	ND mg/L	----	ND	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.00566 mg/L	0.005 mg/L	113	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0535 mg/L	0.05 mg/L	107	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	ND mg/L	----	ND	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 1469428) - continued										
WT2413852-001	Anonymous	Silver, dissolved	7440-22-4	E421	0.00292 mg/L	0.005 mg/L	58.3	70.0	130	MS-Ag
		Sodium, dissolved	7440-23-5	E421	ND mg/L	----	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	----	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	2.84 mg/L	2.5 mg/L	114	70.0	130	----
		Tellurium, dissolved	13494-80-9	E421	0.00487 mg/L	0.005 mg/L	97.4	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.0487 mg/L	0.05 mg/L	97.4	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.00467 mg/L	0.005 mg/L	93.3	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0259 mg/L	0.025 mg/L	104	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0136 mg/L	0.012 mg/L	109	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.00525 mg/L	0.005 mg/L	105	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	ND mg/L	----	ND	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0274 mg/L	0.025 mg/L	110	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.0263 mg/L	0.025 mg/L	105	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.00549 mg/L	0.005 mg/L	110	70.0	130	----

Qualifiers

Qualifier	Description
MS-Ag	*MS-Ag: Matrix Spike recovery for silver was marginally below DQO (40 to <60%) due to its instability in the sample matrix. Silver was not detected. Reported result (< LOR) is reliable*

ALS Canada Ltd.

right solutions.
right partner.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **WT2414011**	Page	: 1 of 11
Client	: **CF Crozier & Associates**	Laboratory	: ALS Environmental - Waterloo
Contact	: Victoria Mazur	Account Manager	: Andrew Martin
Address	: 2800 High Point Drive Milton ON Canada L9T 6P4	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: (548) 708-0039	Telephone	: +1 519 886 6910
Project	: 2227-69259	Date Samples Received	: 30-May-2024 13:20
PO	: ----	Issue Date	: 06-Jun-2024 20:11
C-O-C number	: 23-1096606		
Sampler	: Victoria Mazur		
Site	: ----		
Quote number	: 2024 SOA		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- Matrix Spike outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Matrix Spike (MS) Recoveries								
Dissolved Metals	Anonymous	Anonymous	Silver, dissolved	7440-22-4	E421	58.3 % MS-Ag	70.0-130%	Recovery less than lower data quality objective

Result Qualifiers

Qualifier	Description
MS-Ag	*MS-Ag: Matrix Spike recovery for silver was marginally below DQO (40 to <60%) due to its instability in the sample matrix. Silver was not detected. Reported result (< LOR) is reliable*

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) [ON MECP]										
MW 23-3	E298	30-May-2024	01-Jun-2024	28 days	2 days	✓	03-Jun-2024	28 days	4 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP]										
MW 23-3	E235.Cl	30-May-2024	03-Jun-2024	28 days	4 days	✓	04-Jun-2024	28 days	5 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE [ON MECP]										
MW 23-3	E378-U	30-May-2024	03-Jun-2024	7 days	4 days	✓	05-Jun-2024	7 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP]										
MW 23-3	E235.F	30-May-2024	03-Jun-2024	28 days	4 days	✓	04-Jun-2024	28 days	5 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE [ON MECP]										
MW 23-3	E235.NO3	30-May-2024	03-Jun-2024	7 days	4 days	✓	04-Jun-2024	7 days	5 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE [ON MECP]										
MW 23-3	E235.NO2	30-May-2024	03-Jun-2024	7 days	4 days	✓	04-Jun-2024	7 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP]										
MW 23-3	E235.SO4	30-May-2024	03-Jun-2024	28 days	4 days	✓	04-Jun-2024	28 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE [ON MECP] MW 23-3	E421	30-May-2024	31-May-2024	0 hrs	27 hrs	× UCP	31-May-2024	0 hrs	27 hrs	× UCP
Microbiological Tests : E. coli (MF-mFC-BCIG)										
Sterile HDPE (Sodium thiosulphate) [ON MECP] MW 23-3	E012A.EC	30-May-2024	----	----	----		31-May-2024	48 hrs	24 hrs	✓
Microbiological Tests : Total Coliforms (MF-mEndo)										
Sterile HDPE (Sodium thiosulphate) [ON MECP] MW 23-3	E012.TC	30-May-2024	----	----	----		31-May-2024	48 hrs	24 hrs	✓
Physical Tests : Alkalinity Species by Titration										
HDPE [ON MECP] MW 23-3	E290	30-May-2024	03-Jun-2024	14 days	4 days	✓	05-Jun-2024	14 days	6 days	✓
Physical Tests : Colour (Apparent) by Spectrometer										
HDPE [ON MECP] MW 23-3	E330	30-May-2024	----	----	----		31-May-2024	48 hrs	27 hrs	✓
Physical Tests : Conductivity in Water										
HDPE [ON MECP] MW 23-3	E100	30-May-2024	03-Jun-2024	28 days	4 days	✓	05-Jun-2024	28 days	6 days	✓
Physical Tests : pH by Meter										
HDPE [ON MECP] MW 23-3	E108	30-May-2024	03-Jun-2024	14 days	4 days	✓	05-Jun-2024	14 days	6 days	✓
Physical Tests : TDS by Gravimetry										
HDPE [ON MECP] MW 23-3	E162	30-May-2024	----	----	----		05-Jun-2024	7 days	6 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE [ON MECP] MW 23-3	E121	30-May-2024	----	----	----		31-May-2024	48 hrs	21 hrs	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE [ON MECP]										
MW 23-3	E420	30-May-2024	31-May-2024	0 hrs	16 hrs	× UCP	31-May-2024	0 hrs	23 hrs	× UCP

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

UCP: Unsuitable Container and/or Preservative used (invalidates standard hold time). Maximum hold time of zero applied. Test results may be biased low / unreliable, and may not meet regulatory requirements.

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1472924	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	1470994	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1472928	1	20	5.0	5.0	✓
Colour (Apparent) by Spectrometer	E330	1469701	1	16	6.2	5.0	✓
Conductivity in Water	E100	1472925	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1469428	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1472940	1	19	5.2	5.0	✓
E. coli (MF-mFC-BCIG)	E012A.EC	1469285	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1472930	1	8	12.5	5.0	✓
Nitrate in Water by IC	E235.NO3	1472926	1	20	5.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1472927	1	20	5.0	5.0	✓
pH by Meter	E108	1472923	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1472929	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	1476573	1	20	5.0	5.0	✓
Total Coliforms (MF-mEndo)	E012.TC	1469287	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1468238	1	18	5.5	5.0	✓
Turbidity by Nephelometry	E121	1468699	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1472924	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	1470994	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1472928	1	20	5.0	5.0	✓
Colour (Apparent) by Spectrometer	E330	1469701	1	16	6.2	5.0	✓
Conductivity in Water	E100	1472925	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1469428	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1472940	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	1472930	1	8	12.5	5.0	✓
Nitrate in Water by IC	E235.NO3	1472926	1	20	5.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1472927	1	20	5.0	5.0	✓
pH by Meter	E108	1472923	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1472929	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	1476573	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1468238	1	18	5.5	5.0	✓
Turbidity by Nephelometry	E121	1468699	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1472924	1	20	5.0	5.0	✓

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Ammonia by Fluorescence	E298	1470994	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1472928	1	20	5.0	5.0	✓
Colour (Apparent) by Spectrometer	E330	1469701	1	16	6.2	5.0	✓
Conductivity in Water	E100	1472925	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1469428	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1472940	1	19	5.2	5.0	✓
E. coli (MF-mFC-BCIG)	E012A.EC	1469285	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1472930	1	8	12.5	5.0	✓
Nitrate in Water by IC	E235.NO3	1472926	1	20	5.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1472927	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1472929	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	1476573	1	20	5.0	5.0	✓
Total Coliforms (MF-mEndo)	E012.TC	1469287	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1468238	1	18	5.5	5.0	✓
Turbidity by Nephelometry	E121	1468699	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1470994	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1472928	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1469428	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1472940	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	1472930	1	8	12.5	5.0	✓
Nitrate in Water by IC	E235.NO3	1472926	1	20	5.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1472927	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1472929	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1468238	1	18	5.5	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Coliforms (MF-mEndo)	E012.TC ALS Environmental - Waterloo	Water	APHA 9222B (mod)	Following filtration (0.45 µm), and incubation at 35.0 ±0.5°C for 24 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
E. coli (MF-mFC-BCIG)	E012A.EC ALS Environmental - Waterloo	Water	ON E3433 (mod)	Following filtration (0.45 µm), and incubation at 44.5±0.2°C for 24 hours, colonies exhibiting characteristic morphology of the target organism are enumerated.
Conductivity in Water	E100 ALS Environmental - Waterloo	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Waterloo	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 ALS Environmental - Waterloo	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 ALS Environmental - Waterloo	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Sulfate in Water by IC	E235.SO4 ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Waterloo	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Waterloo	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Colour (Apparent) by Spectrometer	E330 ALS Environmental - Waterloo	Water	APHA 2120 C (mod)	Colour (Apparent) is measured in an unfiltered sample spectrophotometrically using the single wavelength method. The colour contribution of settleable solids are not included in the result. This method is intended for potable waters. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Waterloo	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Waterloo	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Waterloo	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Waterloo	Water	APHA 2340B	“Hardness (as CaCO3), dissolved” is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. “Total Hardness” refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Waterloo	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals Water Filtration	EP421 ALS Environmental - Waterloo	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

GC-059

MM-671 N-884

Chain of Custody (COC) / Analytical Request Form

COC Number: 23 - 1096606

Page of

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Environmental Division Waterloo
Work Order Reference
WT2414011

Telephone : +1 519 886 6910

Report To	Contact and company name below will appear on the final report
Company:	CF Crozier
Contact:	Victoria Mazur
Phone:	905-875-0026
Company address below will appear on the final report	
Street:	2800 High Point Drive
City/Province:	Milton, ON
Postal Code:	L9T 6P4
Invoice To	Same as Report To: NO
	Copy of Invoice with Report: YES
Company:	CF Crozier
Contact:	mhatt@cfcrozier.ca

Reports / Recipients

Select Report Format: PDF, EXCEL, EDD (DIGITAL)
Merge QC/QCI Reports with COA: NO
Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: EMAIL
Email 1 or Fax: vmazur@cfcrozier.ca
Email 2
Email 3

Invoice Recipients

Select Invoice Distribution: EMAIL
Email 1 or Fax
Email 2

Turnaround Time (TAT) Requested

- Routine [R] if received by 3pm M-F - no surcharges apply
- 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
- 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
- 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
- 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
- Same day [E2] if received by 10am M-S - 200% rush surcharge.

Additional fees may apply to rush requests on weekends

Date and Time Required for all E&P TATs:

For all tests with rush TATs requested, please co

Project Information

ALS Client Code / QUOTE #: [redacted] VM
Job / Project #: 2227-6259
PO / AFE:
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (ALS use only): WT2414011FA
ALS Contact:
Sampler: VM

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	VM	Provincial Water Quality Standards Total Dissolved Metals P	GENCHEM	Total Coliforms	E.Coli	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	MW 23-3	30/05/2024	12:00	GW	1	✓	✓	✓	✓	✓			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? NO
Are samples for human consumption/ use? NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: NONE, ICE, ICE PACKS, FROZEN, COOLING INITIATED
Cooler Custody Seals Intact: YES, N/A — Sample Custody Seals Intact: YES, N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
7.9				7.1			

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
Annie Crozier	May 30, 2024	1:20

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
Fahad M	30 May 2024	13:20

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
LJ	2024, May 30	15:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

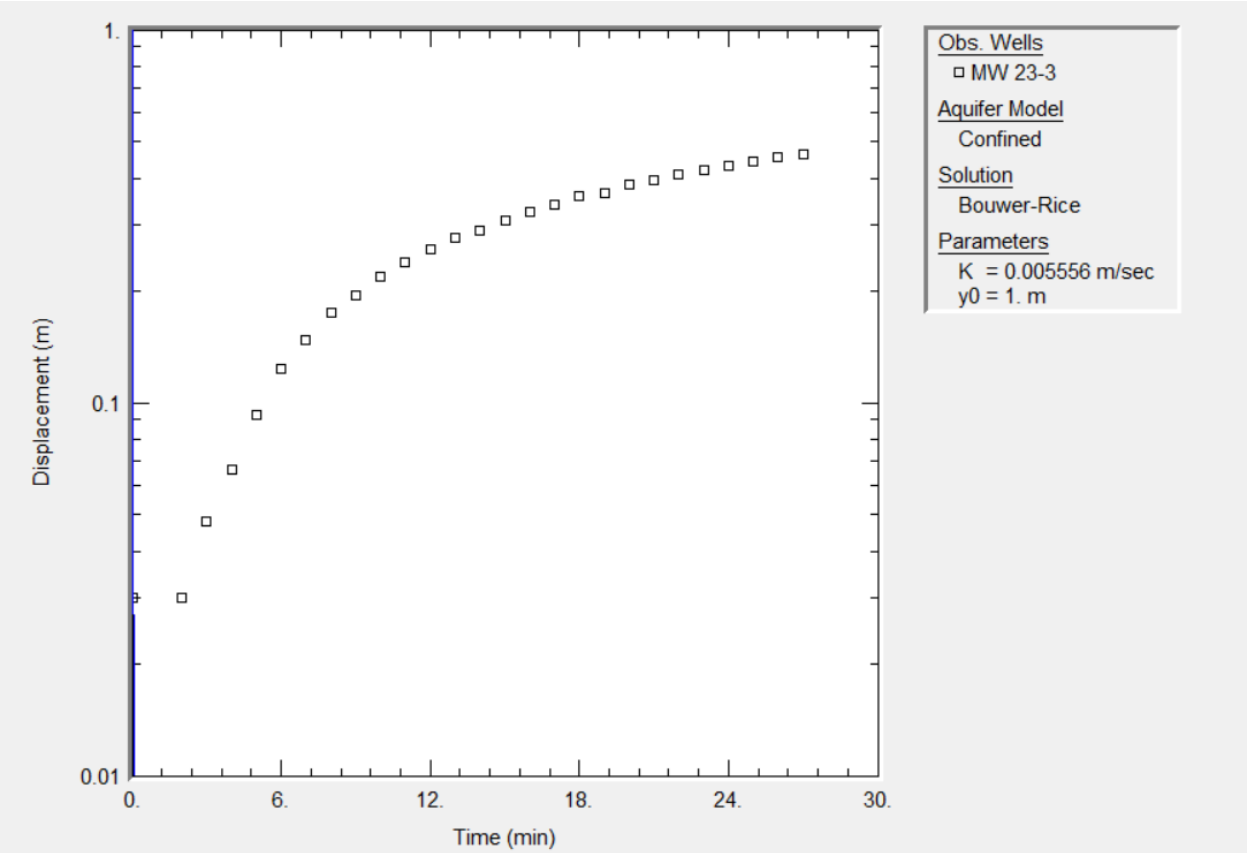
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

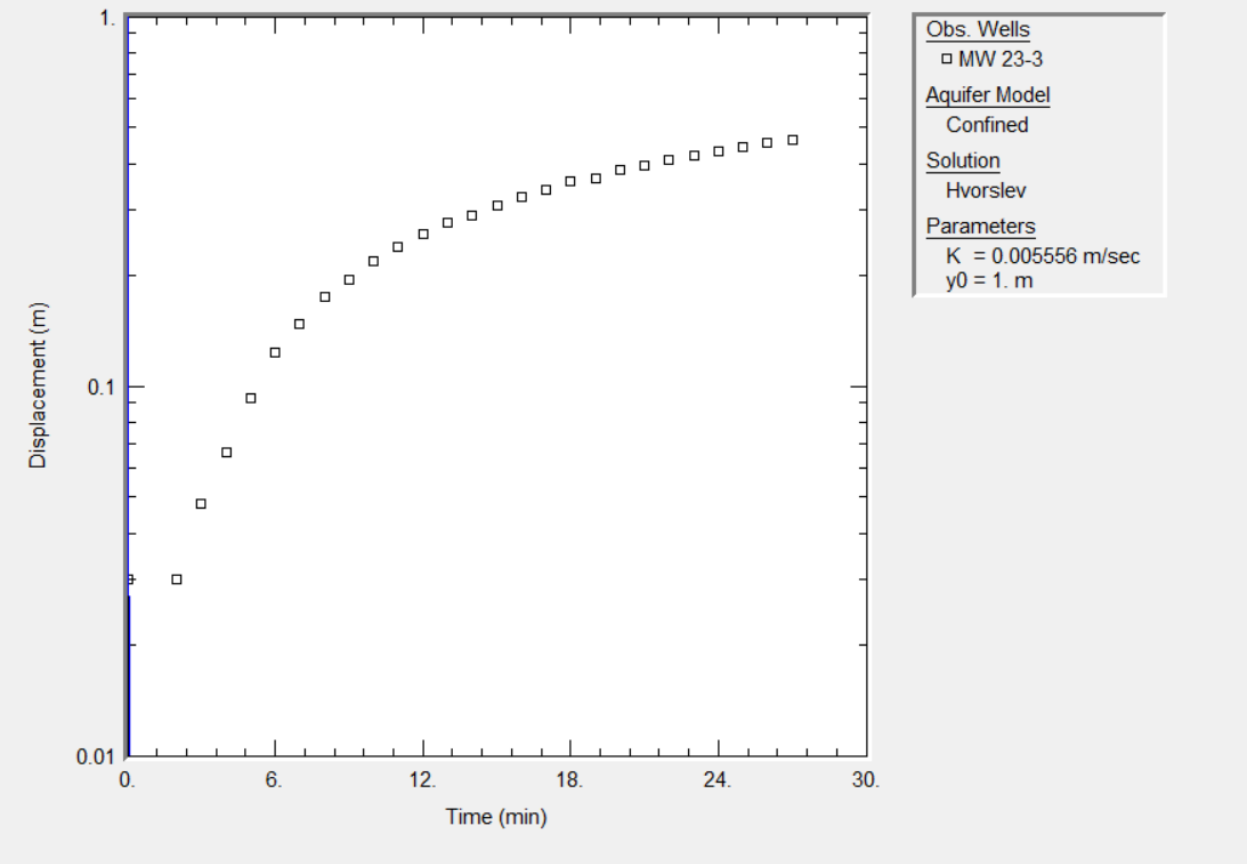
1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

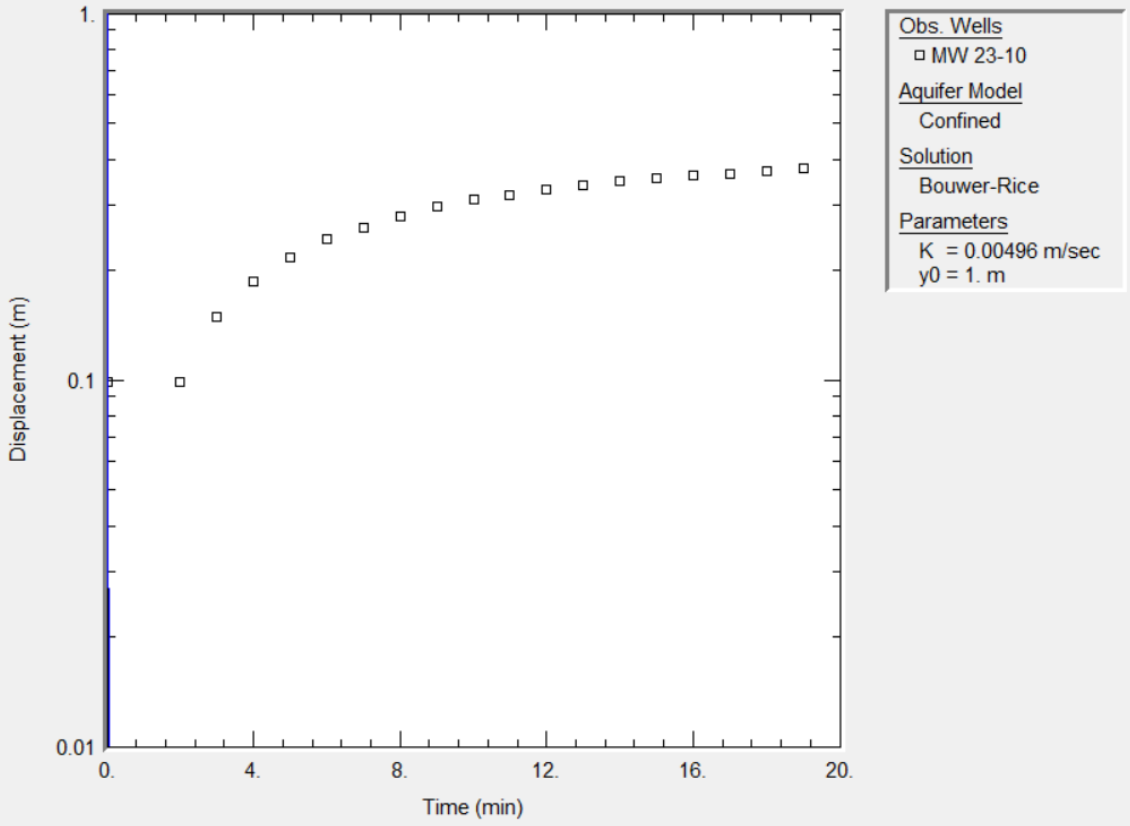
JAN 2023 FRONT

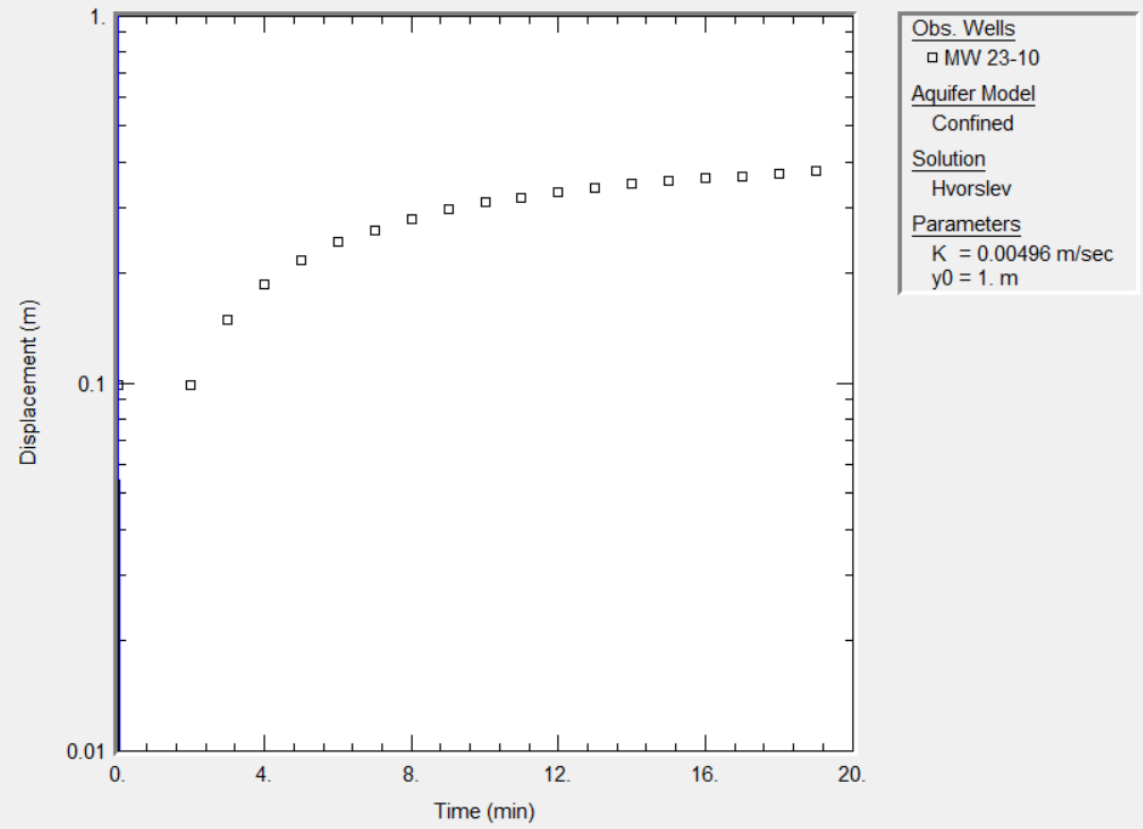
APPENDIX D

Hydraulic Conductivity Testing


Displacement (m)
1.
0.1
0.01
0.
6.
12.
18.
24.
30.
Time (min)
Obs. Wells
MW 23-3
Aquifer Model
Confined
Solution
Bouwer-Rice
Parameters
K = 0.005556 m/sec
y0 = 1. m


Displacement (m)
1.
0.1
0.01
0.
6.
12.
18.
24.
30.
Time (min)
Obs. Wells
MW 23-3
Aquifer Model
Confined
Solution
Hvorslev
Parameters
K = 0.005556 m/sec
y0 = 1. m


1.
0.1
0.01
Displacement (m)
0.
4.
8.
12.
16.
20.
Time (min)
Obs. Wells
MW 23-10
Aquifer Model
Confined
Solution
Bouwer-Rice
Parameters
K = 0.00496 m/sec
y0 = 1. m


1.
0.1
0.01
Displacement (m)
0.
4.
8.
12.
16.
20.
Time (min)
Obs. Wells
MW 23-10
Aquifer Model
Confined
Solution
Hvorslev
Parameters
K = 0.00496 m/sec
y0 = 1. m

APPENDIX E

Door-to-Door Survey

MAY 30, 2024

PROJECT NO: 2227-6259

SENT VIA: HAND DELIVERED

Attention: **Property Owner/Tenant**

RE: **DOOR TO DOOR WELL AND SEPTIC SURVEY QUESTIONNAIRE**
REGION OF PEEL, ONTARIO

To whom it may concern,

C.F. Crozier & Associates Inc. (Crozier) has been retained to complete a detailed study of the nearby area to assess groundwater conditions and potential impacts occurring to the shallow groundwater system. Hence, Crozier is conducting a door-to-door survey to determine the location of any water supply wells, cisterns and private sewage systems in your area. We would appreciate participation in this survey to assist us in our study.

Attached is a questionnaire concerning your property and private well, cistern and/orseptic system (if applicable). Please review and provide your responses using the forms located in the QR code below or via email to vmazur@cfcrozier.ca. Alternatively, please feel free to call our office to provide us with your questionnaire responses. Please provide your response by June 21st, 2024, if possible. Rest assured, we will not share your contact information with any third parties and the information provided in this questionnaire will only be used for the purposes of this study.

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

Scan QR Code below.

Sincerely,

CROZIER CONSULTING ENGINEERS

Victoria Mazur, EIT
Hydrogeology

2800 High Point Dr., Suite 100
Milton, ON L9T 6P4
T. 905.875.0026
F. 905.875.4915
cfcrozier.ca

CROZIER
CONSULTING ENGINEERS

Door to Door Well & Septic Survey Questionnaire

1. What is your address?

The following questions 2 – 8 pertain to private water supply wells. If you do not have a well on your property, you may skip to question 9.

2. Do you have a private well on your property?

3. Does your well supply your drinking water?

4. What is the age of your well?

5. Is it a dug or drilled well?

6. How deep is your well?

7. Have you had any quantity or quality issues with your well? Briefly describe any issues.

8. Would you be willing to allow us to collect a sample of your water for laboratory analysis at no cost to you? All results will be provided to you for your records.

The following questions 9 - 10 pertain to cisterns. If you do not have a cistern on your property, you may skip to question 11.

9. Do you have a cistern on your property?

10. Does the cistern supply your drinking water?

11. What size is your cistern? Is it external or internal?

12. Do you have a surface water intake on your property?

13. Do you have any water treatment systems (e.g., water softener, chlorinator etc.)?

14. Do you have a septic system on your property?

15. Where is your sewage system located (i.e., front of your home, side yard etc.)?

16. What type of sewage system is it (i.e., septic tan with a leaching bed or holding tank)?

17. What is the age of your septic system?

If you are willing, please provide your contact information for any follow up questions we may have. If you answered yes to question 8, please provide your preferred method of contact so we may coordinate sampling:

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

MAY 30, 2024

MAY 2 9 2024

PROJECT NO: 2227-6259

SENT VIA: HAND DELIVERED

Attention: **Property Owner/Tenant**

RE: **DOOR TO DOOR WELL AND SEPTIC SURVEY QUESTIONNAIRE**
REGION OF PEEL, ONTARIO

To whom it may concern,

C.F. Crozier & Associates Inc. (Crozier) has been retained to complete a detailed study of the nearby area to assess groundwater conditions and potential impacts occurring to the shallow groundwater system. Hence, Crozier is conducting a door-to-door survey to determine the location of any water supply wells, cisterns and private sewage systems in your area. We would appreciate participation in this survey to assist us in our study.

Attached is a questionnaire concerning your property and private well, cistern and/orseptic system (if applicable). Please review and provide your responses using the forms located in the QR code below or via email to vmazur@cfcrozier.ca. Alternatively, please feel free to call our office to provide us with your questionnaire responses. Please provide your response by June 21st, 2024, if possible. Rest assured, we will not share your contact information with any third parties and the information provided in this questionnaire will only be used for the purposes of this study.

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

Scan QR Code below.

Sincerely,

CROZIER CONSULTING ENGINEERS

Victoria Mazur, EIT
Hydrogeology

2800 High Point Dr., Suite 100
Milton, ON L9T 6P4
T. 905.875.0026
F. 905.875.4915

CROZIER
CONSULTING ENGINEERS

Door to Door Well & Septic Survey Questionnaire

1. What is your address?

   15486 Mount Pleasant Rd, Caledon L7E 3M4

The following questions 2 – 8 pertain to private water supply wells. If you do not have a well on your property, you may skip to question 9.

2. Do you have a private well on your property?

   Yes

3. Does your well supply your drinking water?

   Yes

4. What is the age of your well?

   1970 ? 50 + years

5. Is it a dug or drilled well?

   DuG

6. How deep is your well?

   30'

7. Have you had any quantity or quality issues with your well? Briefly describe any issues.

   No

8. Would you be willing to allow us to collect a sample of your water for laboratory analysis at no cost to you? All results will be provided to you for your records.

   Yes

The following questions 9 - 10 pertain to cisterns. If you do not have a cistern on your property, you may skip to question 11.

9. Do you have a cistern on your property?

   No

10. Does the cistern supply your drinking water?

    —

11. What size is your cistern? Is it external or internal?

—

12. Do you have a surface water intake on your property?

—

13. Do you have any water treatment systems (e.g., water softener, chlorinator etc.)?

R.O.

14. Do you have a septic system on your property?

Yes

15. Where is your sewage system located (i.e., front of your home, side yard etc.)?

BACK of home

16. What type of sewage system is it (i.e., septic tan with a leaching bed or holding tank)?

17. What is the age of your septic system?

1970 ?

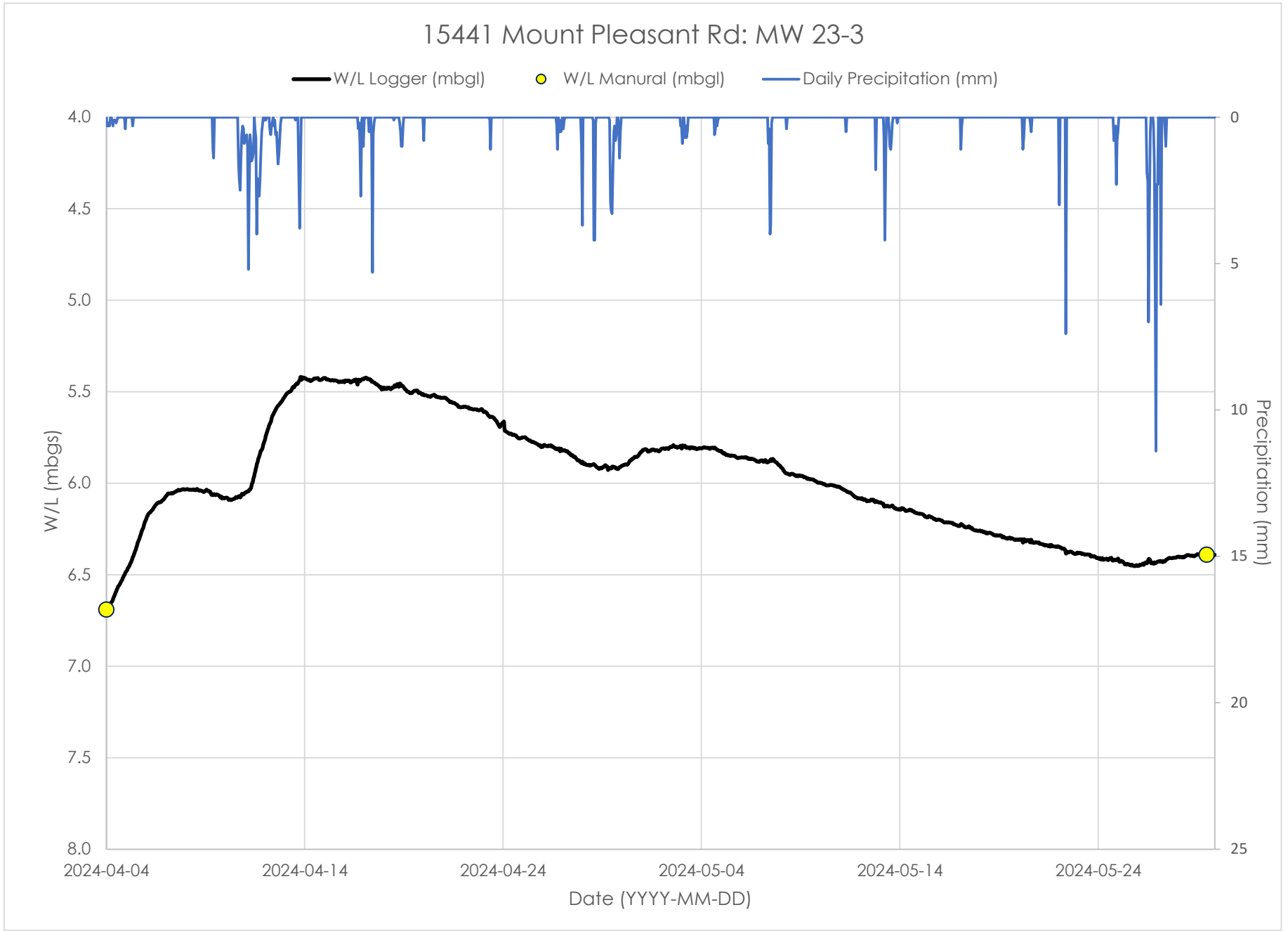
If you are willing, please provide your contact information for any follow up questions we may have. If you answered yes to question 8, please provide your preferred method of contact so we may coordinate sampling:

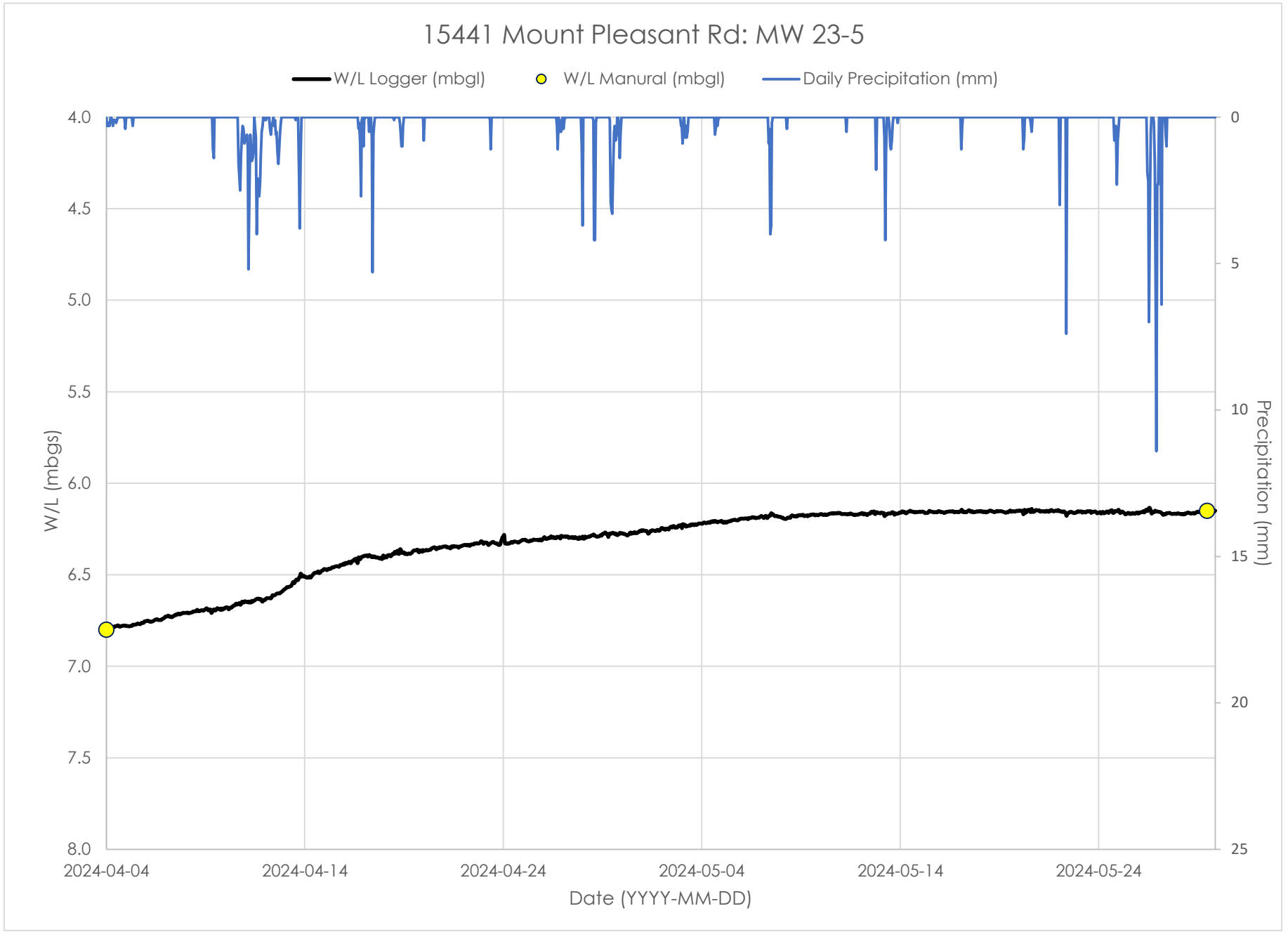
barbara.blair@brantas.com

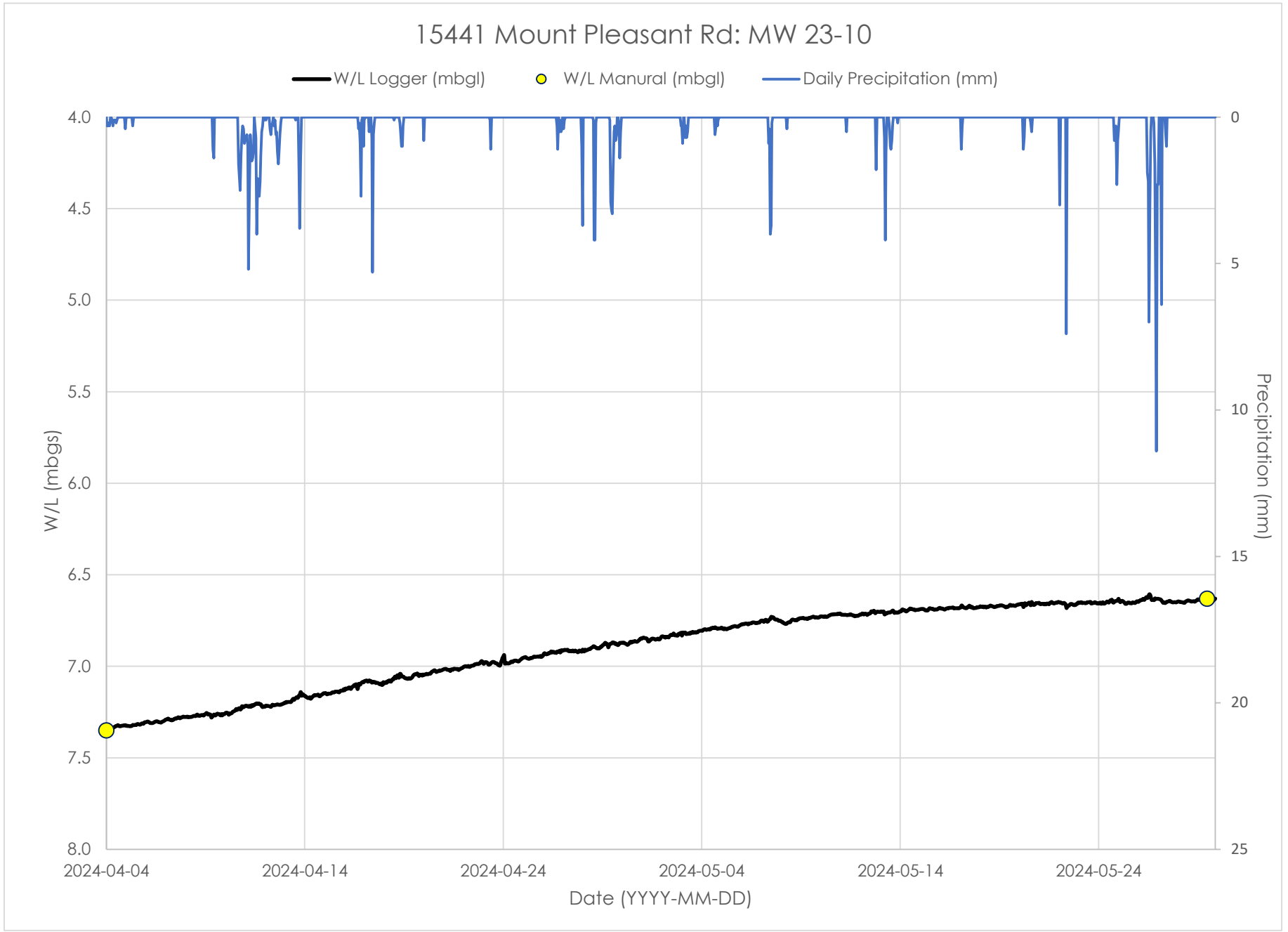
Reminder: Your contact information will not be shared with any third parties.

APPENDIX F

Hydrographs


15441 Mount Pleasant Rd: MW 23-3
W/L Logger (mbgl)
W/L Manural (mbgl)
Daily Precipitation (mm)
4.0
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
W/L (mbgs)
0
5
10
15
20
25
Precipitation (mm)
2024-04-04
2024-04-14
2024-04-24
2024-05-04
2024-05-14
2024-05-24
Date (YYYY-MM-DD)


15441 Mount Pleasant Rd: MW 23-5
W/L Logger (mbgl)
W/L Manural (mbgl)
Daily Precipitation (mm)
W/L (mbgs)
Precipitation (mm)
4.0
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
0
5
10
15
20
25
2024-04-04
2024-04-14
2024-04-24
2024-05-04
2024-05-14
2024-05-24
Date (YYYY-MM-DD)


15441 Mount Pleasant Rd: MW 23-10
W/L Logger (mbgl)
W/L Manural (mbgl)
Daily Precipitation (mm)
W/L (mbgs)
Precipitation (mm)
4.0
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
0
5
10
15
20
25
2024-04-04
2024-04-14
2024-04-24
2024-05-04
2024-05-14
2024-05-24
Date (YYYY-MM-DD)

APPENDIX G

Water Balance Assessment

CROZIER CONSULTING ENGINEERS

Water Balance Parameters

Thornthwaite & Mather Method

Project Name: 15441 Mount Pleasant Road
Project Number: 2227-6259
Created By: VM
Checked By: CM
Date: 2024-07-04

Project Name: **15441 Mount Pleasant Road**
Location: **Region of Peel**

Climate Station: *ALBION FIELD CENTRE*
Longitude: *79°50'00.000" W*
Latitude: *43°55'00.000" N*
Elevation: *281.9 m*
Station ID: *6150103*

DEGREES
LATITUDE **43**

Month	Mean Temperature (C°)[1]	Heat Index [i =(t/5)$^{1.514}$]	α	Potential Evapotranspiration (PET) (mm)	Correction Factor[2]	Adjusted Potential Evapotranspiration (APET) (mm)	Total Precipitation (P) (mm)[1]	P - APET (mm)	APET- P (mm)
January	-7	0.0000	0.4924	0.0000	0.81	0	60.4	60.4	0.0
February	-5.9	0.0000	0.4924	0.0000	0.82	0	50.2	50.2	0.0
March	-1.4	0.0000	0.4924	0.0000	1.02	0	50.3	50.3	0.0
April	6.1	1.3513	0.5165	28.8545	1.12	32	67	34.7	0.0
May	12.4	3.9555	0.5621	60.8270	1.26	77	76.1	0.0	0.5
June	17.3	6.5488	0.6066	86.3244	1.28	110	75.5	0.0	35.0
July	19.9	8.0951	0.6328	100.0131	1.29	129	81.8	0.0	47.2
August	19.1	7.6075	0.6246	95.7908	1.2	115	77.4	0.0	37.5
September	14.3	4.9084	0.5786	70.6617	1.04	73	75	1.5	0.0
October	8.1	2.0759	0.5293	38.8760	0.95	37	68.3	31.4	0.0
November	2.1	0.2689	0.4972	9.4052	0.81	8	81.7	74.1	0.0
December	-3.9	0.0000	0.4924	0.0000	0.77	0	57.7	57.7	0.0
TOTAL		**34.8**	**1.1**			**581.5**	**821.4**	**360.24**	**120.30**

TOTAL WATER DEFICIT = 120.30 mm
TOTAL WATER SURPLUS (SURPLUS - DEFICIT) = 239.94 mm

NOTES: 1. Precipitation and Temperature data from the ALBION FIELD CENTRE (Station No.6150103) Environment Canada Station Data
2. Latitude adjustment factors determined based on site latitude assuming 12 hours of sunlight per day for 30 days

CROZIER CONSULTING ENGINEERS

Pre-Development Water Balance

Thornthwaite & Mather Method

Project Name: 15441 Mount Pleasant Road
Project Number: 2227-6259
Created By: VM
Checked By: CM
Date: 2024-07-04

Project Name: **15441 Mount Pleasant Road**
Location: **Region of Peel**

Pre-Development Site Summary

TOTAL SITE AREA (m^2)	228,600												
Land Use	**Grass**	**Gravel**	**Pond**	**Woodlot**									
Topography - flat/rolling/hilly	0.30	0.30	0.30	0.30									
Soils	0.30	0.30	0.30	0.30									
Cover - cultivated/woodland	0.10	0.10	0.10	0.20									
Sum (Infiltration Factor)	0.70	0.70	0.70	0.80									
Soil Moisture Capacity (mm)	100	100	100	400									
Catchment Area (m^2)	102,256	950	45,521	79,873									
Percent Imperviousness (%)	0%	100%	0%	0%									
Land Use	**Grass**	**Gravel**	**103**	**104**									
Total Impervious Area (m^2)	0	950	0	0									
Percentage of Impervious Area (%)	0%	100%	0%	0%									
Total Pervious Area (m^2)	102,256	0	45,521	79,873									
Percentage of Pervious Area (%)	100%	0%	100%	100%									

Land Use	**Grass**												
Evapotranspiration/Evaporation Analysis													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Precipitation (P)	60	50	50	67	76	76	82	77	75	68	82	58	**821**
Adjusted Potential Evapotranspiration (APET)	0	0	0	32	77	110	129	115	73	37	8	0	581
P-APET	60	50	50	35	-1	-35	-47	-38	2	31	74	58	240
Change in Storage	0	0	0	0	-1	-35	-47	-38	2	31	74	13	120
Storage (S) (mm)	100	100	100	100	99	64	17	-20	-19	13	87	100	
Pervious Area Infiltration/Runoff Analysis													
Water Surplus (mm)	60	50	50	35	0	0	0	0	0	0	0	44	240
Potential Infiltration (I) (mm)	42	35	35	24	0	0	0	0	0	0	0	31	168
Potential Direct Surface Water Runoff (R) (mm)	18	15	15	10	0	0	0	0	0	0	0	13	72
Impervious Area Evapotranspiration/Evaporation/Runoff Analysis													
Impervious Evapotranspiration/Evaporation (mm)	0	0	0	10	11	11	12	12	11	10	12	0	90
Impervious Runoff (mm)	60	50	50	57	65	64	70	66	64	58	69	58	**731**
Combined Water Balance													
Pervious ET (m^3)	0	0	0	3305	7837	11299	13193	11754	7515	3777	779	0	**59458**
Impervious ET (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Pervious Runoff (m^3)	1853	1540	1543	1064	0	0	0	0	0	0	0	1361	**7361**
Impervious Runoff (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Pervious Infiltration (m^3)	4323	3593	3600	2483	0	0	0	0	0	0	0	3175	**17175**
Impervious Infiltration (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**

Land Use	**Gravel**												
Evapotranspiration/Evaporation Analysis													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Precipitation (P)	60	50	50	67	76	76	82	77	75	68	82	58	**821**
Adjusted Potential Evapotranspiration (APET)	0	0	0	32	77	110	129	115	73	37	8	0	581
P-APET	60	50	50	35	-1	-35	-47	-38	2	31	74	58	240
Change in Storage	0	0	0	0	-1	-35	-47	-38	2	31	74	13	120
Storage (S) (mm)	100	100	100	100	99	64	17	-20	-19	13	87	100	
Pervious Area Infiltration/Runoff Analysis													
Water Surplus (mm)	60	50	50	35	0	0	0	0	0	0	0	44	240
Potential Infiltration (I) (mm)	42	35	35	24	0	0	0	0	0	0	0	31	168
Potential Direct Surface Water Runoff (R) (mm)	18	15	15	10	0	0	0	0	0	0	0	13	72
Impervious Area Evapotranspiration/Evaporation/Runoff Analysis													
Impervious Evapotranspiration/Evaporation (mm)	0	0	0	10	11	11	12	12	11	10	12	0	90
Impervious Runoff (mm)	60	50	50	57	65	64	70	66	64	58	69	58	**731**
Combined Water Balance													
Pervious ET (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Impervious ET (m^3)	0	0	0	10	11	11	12	11	11	10	12	0	**86**
Pervious Runoff (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Impervious Runoff (m^3)	57	48	48	54	61	61	66	63	61	55	66	55	**694**
Pervious Infiltration (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Impervious Infiltration (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**

Land Use	**Pond**												
Evapotranspiration/Evaporation Analysis													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Precipitation (P)	60	50	50	67	76	76	82	77	75	68	82	58	**821**
Adjusted Potential Evapotranspiration (APET)	0	0	0	32	77	110	129	115	73	37	8	0	581
P-APET	60	50	50	35	-1	-35	-47	-38	2	31	74	58	240
Change in Storage	0	0	0	0	-1	-35	-47	-38	2	31	74	13	120
Storage (S) (mm)	100	100	100	100	99	64	17	-20	-19	13	87	100	
Pervious Area Infiltration/Runoff Analysis													
Water Surplus (mm)	60	50	50	35	0	0	0	0	0	0	0	44	240
Potential Infiltration (I) (mm)	42	35	35	24	0	0	0	0	0	0	0	31	168
Potential Direct Surface Water Runoff (R) (mm)	18	15	15	10	0	0	0	0	0	0	0	13	72
Impervious Area Evapotranspiration/Evaporation/Runoff Analysis													
Impervious Evapotranspiration/Evaporation (mm)	0	0	0	10	11	11	12	12	11	10	12	0	90
Impervious Runoff (mm)	60	50	50	57	65	64	70	66	64	58	69	58	**731**
Combined Water Balance													
Pervious ET (m^3)	0	0	0	1471	3489	5030	5873	5233	3345	1681	347	0	**26469**
Impervious ET (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Pervious Runoff (m^3)	825	686	687	474	0	0	0	0	0	0	0	606	**3277**
Impervious Runoff (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Pervious Infiltration (m^3)	1925	1600	1603	1105	0	0	0	0	0	0	0	1413	**7646**
Impervious Infiltration (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**

Catchment ID	**Woodlot**												
Evapotranspiration/Evaporation Analysis													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Precipitation (P)	60	50	50	67	76	76	82	77	75	68	82	58	**821**
Adjusted Potential Evapotranspiration (APET)	0	0	0	32	77	110	129	115	73	37	8	0	581
P-APET	60	50	50	35	-1	-35	-47	-38	2	31	74	58	240
Change in Storage	0	0	0	0	-1	-35	-47	-38	2	31	74	13	120
Storage (S) (mm)	400	400	400	400	399	364	317	280	281	313	387	400	
Pervious Area Infiltration/Runoff Analysis													
Water Surplus (mm)	60	50	50	35	0	0	0	0	0	0	0	44	240
Potential Infiltration (I) (mm)	48	40	40	28	0	0	0	0	0	0	0	35	192
Potential Direct Surface Water Runoff (R) (mm)	12	10	10	7	0	0	0	0	0	0	0	9	48
Impervious Area Evapotranspiration/Evaporation/Runoff Analysis													
Impervious Evapotranspiration/Evaporation (mm)	0	0	0	10	11	11	12	12	11	10	12	0	90
Impervious Runoff (mm)	60	50	50	57	65	64	70	66	64	58	69	58	**731**
Combined Water Balance													
Pervious ET (m^3)	0	0	0	2581	6122	8826	10305	9181	5870	2950	608	0	**46443**
Impervious ET (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Pervious Runoff (m^3)	965	802	804	554	0	0	0	0	0	0	0	709	**3833**
Impervious Runoff (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Pervious Infiltration (m^3)	3859	3208	3214	2216	0	0	0	0	0	0	0	2834	**15332**
Impervious Infiltration (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**

Pre-Development Water Balance Summary							
Pre-Development Infiltration	40152.3	m^3/yr	175.6	mm/yr			
Pre-Development Runoff	15164.7	m^3/yr	66.3	mm/yr			

NOTES: 1.Areas and percent imperviousness determined using Part 1 of Lot 18, Concession 9 dated April 2024 prepared by Design Plan Services Inc..
2.The infiltration factor is determined using the MECP Methodology outlined in Stormwater Drainage Manual 2003.
3. Additional assumptions:
> Surplus water is unavailable for runoff and recharge in months where water losses from AET exceed precipitation inputs.
> Runoff, infiltration and evapotranspiration do not occur when average temperature is below zero.
> Precipitation during winter months (Dec. through Mar. is assumed to be accumulated as snow.
> Soil Moisture Capacity is at a maximum in April.

CROZIER CONSULTING ENGINEERS

Post-Development Water Balance

Thornthwaite & Mather Method

Project Name: 15441 Mount Pleasant Road
Project Number: 2227-6259
Created By: VM
Checked By: CM
Date: 2024-07-04

Project Name: **15441 Mount Pleasant Road**
Location: **Region of Peel**

Post-Development Site Summary

TOTAL SITE AREA (m^2)	228,600												
Land Use	**Single Residential Homes**	**Streets**	**Grass**	**Pond**	**Woodlot**								
Topography - flat/rolling/hilly	0.3	0.3	0.3	0.3	0.3								
Soils	0.3	0.3	0.3	0.3	0.3								
Cover - cultivated/woodland	0.1	0.1	0.1	0.1	0.2								
Sum (Infiltration Factor)	0.7	0.7	0.7	0.7	0.8								
Soil Moisture Capacity (mm)	100	100	100	100	400								
Catchment Area (m^2)	25,000	10,350	67,856	45,521	79,873								
Percent Imperviousness (%)	50%	100%	0%	0%	0%								
Land Use	**Single Residential Homes**	**Streets**	**Grass**	**Pond**	**Woodlot**								
Total Impervious Area (m^2)	12500	10350	0	0	0								
Percentage of Impervious Area (%)	50%	100%	100%	0%	0%								
Total Pervious Area (m^2)	12,500	0	67,856	45,521	79,873								
Percentage of Pervious Area (%)	50%	0%	0%	100%	100%								

Land Use	**Residential Homes**												
Evapotranspiration/Evaporation Analysis													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Precipitation (P)	60	50	50	67	76	76	82	77	75	68	82	58	**821**
Adjusted Potential Evapotranspiration (APET)	0	0	0	32	77	110	129	115	73	37	8	0	581
P-APET	60	50	50	35	-1	-35	-47	-38	2	31	74	58	240
Change in Storage	0	0	0	0	-1	-35	-47	-38	2	31	74	13	
Storage (S) (mm)	100	100	100	100	99	64	17	-20	-19	13	87	100	
Pervious Area Infiltration/Runoff Analysis													
Water Surplus (mm)	60	50	50	35	0	0	0	0	0	0	0	44	240
Potential Infiltration (I) (mm)	42	35	35	24	0	0	0	0	0	0	0	31	168
Potential Direct Surface Water Runoff (R) (mm)	18	15	15	10	0	0	0	0	0	0	0	13	72
Impervious Area Evapotranspiration/Evaporation/Runoff Analysis													
Impervious Evapotranspiration/Evaporation (mm)	0	0	0	10	11	11	12	12	11	10	12	0	90
Impervious Runoff (mm)	60	50	50	57	65	64	70	66	64	58	69	58	**731**
Combined Water Balance													
Pervious ET (m^3)	0	0	0	404	958	1381	1613	1437	919	462	95	0	**7268**
Impervious ET (m^3)	0	0	0	126	143	142	153	145	141	128	153	0	**1130**
Pervious Runoff (m^3)	227	188	189	130	0	0	0	0	0	0	0	166	**900**
Impervious Runoff (m^3)	755	628	629	712	809	802	869	822	797	726	868	721	**9137**
Pervious Infiltration (m^3)	529	439	440	303	0	0	0	0	0	0	0	388	**2099**
Impervious Infiltration (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**

Land Use	**Streets**												
Evapotranspiration/Evaporation Analysis													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Precipitation (P)	60	50	50	67	76	76	82	77	75	68	82	58	**821**
Adjusted Potential Evapotranspiration (APET)	0	0	0	32	77	110	129	115	73	37	8	0	581
P-APET	60	50	50	35	-1	-35	-47	-38	2	31	74	58	240
Change in Storage	0	0	0	0	-1	-35	-47	-38	2	31	74	13	
Storage (S) (mm)	100	100	100	100	99	64	17	-20	-19	13	87	100	
Pervious Area Infiltration/Runoff Analysis													
Water Surplus (mm)	60	50	50	35	0	0	0	0	0	0	0	44	240
Potential Infiltration (I) (mm)	42	35	35	24	0	0	0	0	0	0	0	31	168
Potential Direct Surface Water Runoff (R) (mm)	18	15	15	10	0	0	0	0	0	0	0	13	72
Impervious Area Evapotranspiration/Evaporation/Runoff Analysis													
Impervious Evapotranspiration/Evaporation (mm)	0	0	0	10	11	11	12	12	11	10	12	0	90
Impervious Runoff (mm)	60	50	50	57	65	64	70	66	64	58	69	58	**731**
Combined Water Balance													
Pervious ET (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Impervious ET (m^3)	0	0	0	104	118	117	127	120	116	106	127	0	**936**
Pervious Runoff (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Impervious Runoff (m^3)	625	520	521	589	669	664	720	681	660	601	719	597	**7566**
Pervious Infiltration (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Impervious Infiltration (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**

Land Use	**Grass**												
Evapotranspiration/Evaporation Analysis													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Precipitation (P)	60	50	50	67	76	76	82	77	75	68	82	58	**821**
Adjusted Potential Evapotranspiration (APET)	0	0	0	32	77	110	129	115	73	37	8	0	581
P-APET	60	50	50	35	-1	-35	-47	-38	2	31	74	58	240
Change in Storage	0	0	0	0	-1	-35	-47	-38	2	31	74	13	
Storage (S) (mm)	100	100	100	100	99	64	17	-20	-19	13	87	100	
Pervious Area Infiltration/Runoff Analysis													
Water Surplus (mm)	60	50	50	35	0	0	0	0	0	0	0	44	240
Potential Infiltration (I) (mm)	42	35	35	24	0	0	0	0	0	0	0	31	168
Potential Direct Surface Water Runoff (R) (mm)	18	15	15	10	0	0	0	0	0	0	0	13	72
Impervious Area Evapotranspiration/Evaporation/Runoff Analysis													
Impervious Evapotranspiration/Evaporation (mm)	0	0	0	10	11	11	12	12	11	10	12	0	90
Impervious Runoff (mm)	60	50	50	57	65	64	70	66	64	58	69	58	**731**
Combined Water Balance													
Pervious ET (m^3)	0	0	0	2193	5201	7498	8755	7800	4987	2506	517	0	**39455**
Impervious ET (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Pervious Runoff (m^3)	1230	1022	1024	706	0	0	0	0	0	0	0	903	**4884**
Impervious Runoff (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Pervious Infiltration (m^3)	2869	2384	2389	1647	0	0	0	0	0	0	0	2107	**11397**
Impervious Infiltration (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**

Land Use	**Pond**												
Evapotranspiration/Evaporation Analysis													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Precipitation (P)	60	50	50	67	76	76	82	77	75	68	82	58	**821**
Adjusted Potential Evapotranspiration (APET)	0	0	0	32	77	110	129	115	73	37	8	0	581
P-APET	60	50	50	35	-1	-35	-47	-38	2	31	74	58	240
Change in Storage	0	0	0	0	-1	-35	-47	-38	2	31	74	13	
Storage (S) (mm)	100	100	100	100	99	64	17	-20	-19	13	87	100	
Pervious Area Infiltration/Runoff Analysis													
Water Surplus (mm)	60	50	50	35	0	0	0	0	0	0	0	44	240
Potential Infiltration (I) (mm)	42	35	35	24	0	0	0	0	0	0	0	31	168
Potential Direct Surface Water Runoff (R) (mm)	18	15	15	10	0	0	0	0	0	0	0	13	72
Impervious Area Evapotranspiration/Evaporation/Runoff Analysis													
Impervious Evapotranspiration/Evaporation (mm)	0	0	0	10	11	11	12	12	11	10	12	0	90
Impervious Runoff (mm)	60	50	50	57	65	64	70	66	64	58	69	58	**731**
Combined Water Balance													
Pervious ET (m^3)	0	0	0	1471	3489	5030	5873	5233	3345	1681	347	0	**26469**
Impervious ET (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Pervious Runoff (m^3)	825	686	687	474	0	0	0	0	0	0	0	606	**3277**
Impervious Runoff (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Pervious Infiltration (m^3)	1925	1600	1603	1105	0	0	0	0	0	0	0	1413	**7646**
Impervious Infiltration (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**

Land Use	**Woodlot**												
Evapotranspiration/Evaporation Analysis													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Precipitation (P)	60	50	50	67	76	76	82	77	75	68	82	58	**821**
Adjusted Potential Evapotranspiration (APET)	0	0	0	32	77	110	129	115	73	37	8	0	581
P-APET	60	50	50	35	-1	-35	-47	-38	2	31	74	58	240
Change in Storage	0	0	0	0	-1	-35	-47	-38	2	31	74	13	
Storage (S) (mm)	400	400	400	400	399	364	317	280	281	313	387	400	
Pervious Area Infiltration/Runoff Analysis													
Water Surplus (mm)	60	50	50	35	0	0	0	0	0	0	0	44	240
Potential Infiltration (I) (mm)	48	40	40	28	0	0	0	0	0	0	0	35	192
Potential Direct Surface Water Runoff (R) (mm)	12	10	10	7	0	0	0	0	0	0	0	9	48
Impervious Area Evapotranspiration/Evaporation/Runoff Analysis													
Impervious Evapotranspiration/Evaporation (mm)	0	0	0	10	11	11	12	12	11	10	12	0	90
Impervious Runoff (mm)	60	50	50	57	65	64	70	66	64	58	69	58	**731**
Combined Water Balance													
Pervious ET (m^3)	0	0	0	2581	6122	8826	10305	9181	5870	2950	608	0	**46443**
Impervious ET (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Pervious Runoff (m^3)	965	802	804	554	0	0	0	0	0	0	0	709	**3833**
Impervious Runoff (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Pervious Infiltration (m^3)	3859	3208	3214	2216	0	0	0	0	0	0	0	2834	**15332**
Impervious Infiltration (m^3)	0	0	0	0	0	0	0	0	0	0	0	0	**0**

Post-Development Water Balance Summary						
Post-Development Infiltration	36474.0	m^3/yr	159.6	mm/yr	0.0051	L/s
Post-Development Runoff	29596.8	m^3/yr	129.5	mm/yr	0.0041	L/s

NOTES: 1.Areas and percent imperviousness determined using Part 1 of Lot 18, Concession 9 dated April 2024 prepared by Design Plan Services Inc..
2.The infiltration factor is determined using the MECP Methodology outlined in SWM 2003 Manual.
3. Additional assumptions:
> Surplus water is unavailable for runoff and recharge in months where water losses from AET exceed precipitation inputs.
> Runoff, infiltration and evapotranspiration do not occur when average temperature is below zero.
> Precipitation during winter months (Dec. through Mar. is assumed to be accumulated as snow.
> Soil Moisture Capacity is at a maximum in April.

CROZIER
CONSULTING ENGINEERS

Water Balance Summary

Thornthwaite & Mather Method

Project Name: 15441 Mount Pleasant Road
Project Number: 2227-6259
Created By: VM
Checked By: CM
Date: 2024-07-04

Project Name: **15441 Mount Pleasant Road**
Location: **Region of Peel**

Characteristic	Pre-Development	Post-Development	% Change (Pre to Post)
Precipitation (mm/yr)	821.40	821.40	0%
Water Surplus (mm/yr)	239.94	239.94	0%
Evapotranspiration (mm/yr)	581.46	581.46	0%
Natural Infiltration (mm/yr)	175.64	159.55	-9%
Total Runoff (mm/yr)	66.34	129.47	95%

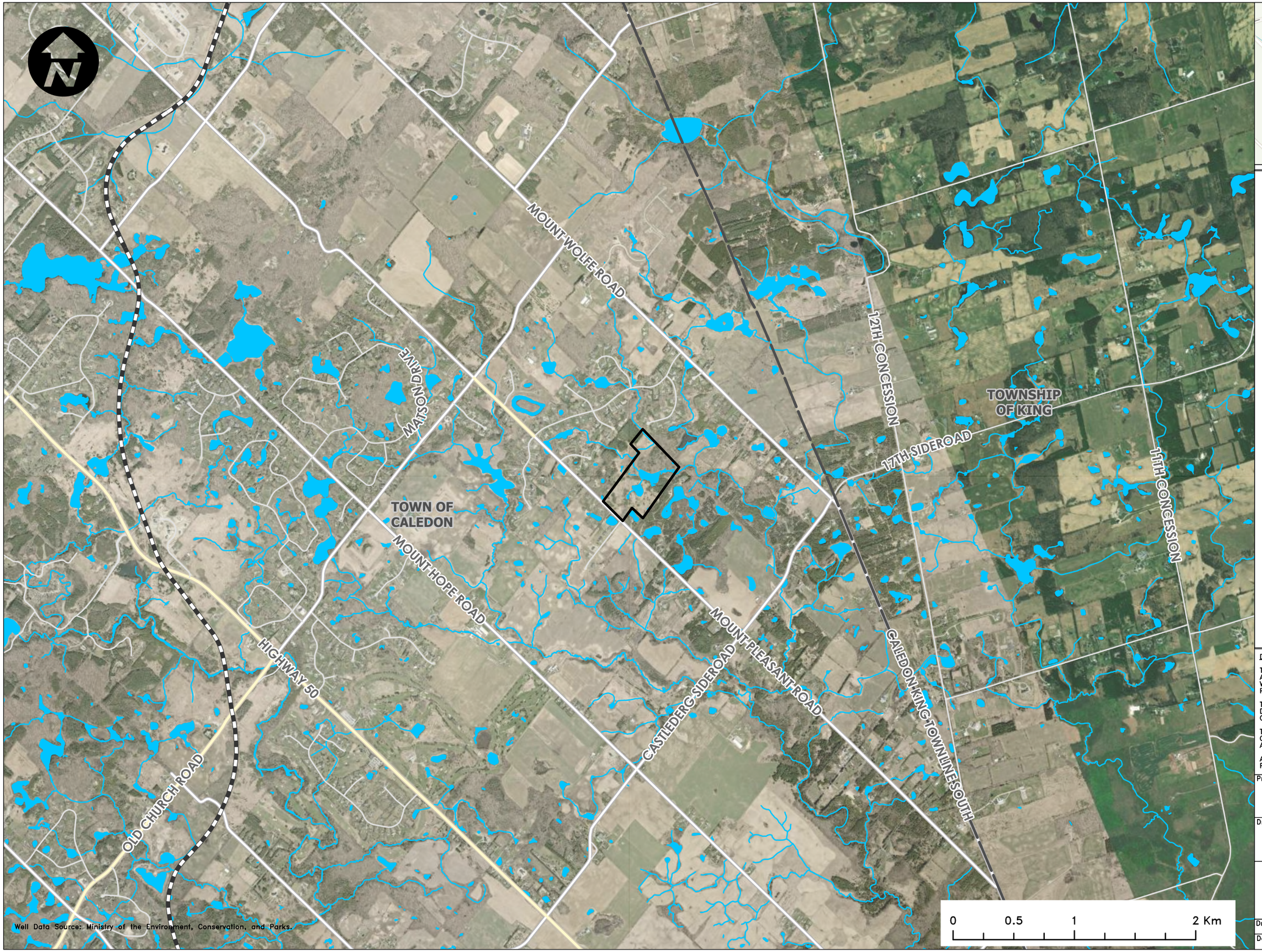
Infiltration Deficit (mm/yr)	16.09

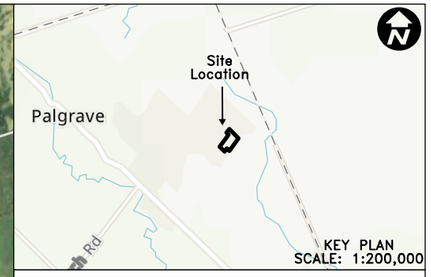
Adjustment Factors Based on Site Latitude Based on 12 hours of Sunlight per day for 30 days

Latitude °C	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
50	0.74	0.78	1.02	1.15	1.33	1.36	1.37	1.25	1.06	0.92	0.76	0.70
49	0.75	0.79	1.02	1.14	1.32	1.34	1.35	1.24	1.05	0.93	0.76	0.71
48	0.76	0.80	1.02	1.14	1.31	1.33	1.34	1.23	1.05	0.93	0.77	0.72
47	0.77	0.80	1.02	1.14	1.30	1.32	1.33	1.22	1.04	0.93	0.78	0.73
46	0.79	0.81	1.02	1.13	1.29	1.31	1.32	1.22	1.04	0.94	0.79	0.74
45	0.80	0.81	1.02	1.13	1.28	1.29	1.31	1.21	1.04	0.94	0.79	0.75
44	0.81	0.82	1.02	1.13	1.27	1.29	1.30	1.20	1.04	0.95	0.80	0.76
43	0.81	0.82	1.02	1.12	1.26	1.28	1.29	1.20	1.04	0.95	0.81	0.77
42	0.82	0.83	1.03	1.12	1.26	1.27	1.28	1.19	1.04	0.95	0.82	0.79
41	0.83	0.83	1.03	1.11	1.25	1.26	1.27	1.19	1.04	0.96	0.82	0.80
40	0.84	0.83	1.03	1.11	1.24	1.25	1.27	1.18	1.04	0.96	0.83	0.81
39	0.85	0.84	1.03	1.11	1.23	1.24	1.26	1.18	1.04	0.96	0.84	0.82
38	0.85	0.84	1.03	1.10	1.23	1.24	1.25	1.17	1.04	0.96	0.84	0.83
37	0.86	0.84	1.03	1.10	1.22	1.23	1.25	1.17	1.03	0.97	0.85	0.83
36	0.87	0.85	1.03	1.10	1.21	1.22	1.24	1.16	1.03	0.97	0.86	0.84
35	0.87	0.85	1.03	1.09	1.21	1.21	1.23	1.16	1.03	0.97	0.86	0.85
34	0.88	0.85	1.03	1.09	1.20	1.20	1.22	1.16	1.03	0.97	0.87	0.86
33	0.88	0.86	1.03	1.09	1.19	1.20	1.22	1.15	1.03	0.97	0.88	0.86
32	0.89	0.86	1.03	1.08	1.19	1.19	1.21	1.15	1.03	0.98	0.88	0.87
31	0.90	0.87	1.03	1.08	1.18	1.18	1.20	1.14	1.03	0.98	0.89	0.88
30	0.90	0.87	1.03	1.08	1.18	1.17	1.20	1.14	1.03	0.98	0.89	0.88
29	0.91	0.87	1.03	1.07	1.17	1.16	1.19	1.13	1.03	0.98	0.90	0.89
28	0.91	0.88	1.03	1.07	1.16	1.16	1.18	1.13	1.02	0.98	0.90	0.90
27	0.92	0.88	1.03	1.07	1.16	1.15	1.18	1.13	1.02	0.99	0.90	0.90
26	0.92	0.88	1.03	1.06	1.15	1.15	1.17	1.12	1.02	0.99	0.91	0.91
25	0.93	0.89	1.03	1.06	1.15	1.14	1.17	1.12	1.02	0.99	0.91	0.91
20	0.95	0.90	1.03	1.05	1.13	1.11	1.14	1.11	1.02	1.00	0.93	0.94
15	0.97	0.91	1.03	1.04	1.11	1.08	1.12	1.08	1.02	1.01	0.95	0.97
10	1.00	0.91	1.03	1.03	1.08	1.06	1.08	1.07	1.02	1.02	0.98	0.99
5	1.02	0.93	1.03	1.02	1.06	1.03	1.06	1.05	1.01	1.03	0.99	1.02
0	1.04	0.94	1.04	1.01	1.04	1.01	1.04	1.04	1.01	1.04	1.01	1.04
-5	1.06	0.91	1.04	1.00	1.02	0.99	1.02	1.03	1.00	1.05	1.03	1.06
-10	1.08	0.97	1.05	0.99	1.01	0.96	1.00	1.01	1.00	1.06	1.05	1.10
-15	1.12	0.98	1.05	0.98	0.98	0.94	0.97	1.00	1.00	1.07	1.07	1.12
-20	1.14	1.00	1.05	0.97	0.96	0.91	0.95	0.99	1.00	1.08	1.09	1.15
-25	1.17	1.01	1.05	0.96	0.94	0.88	0.93	0.98	1.00	1.10	1.11	1.18
-30	1.20	1.03	1.06	0.95	0.92	0.85	0.90	0.96	1.00	1.12	1.14	1.21
-35	1.23	1.04	1.06	0.94	0.89	0.82	0.87	0.94	1.00	1.13	1.17	1.25
-45	1.27	1.06	1.07	0.93	0.86	0.78	0.84	0.92	1.00	1.15	1.20	1.29
-42	1.28	1.07	1.07	0.92	0.85	0.76	0.82	0.92	1.00	1.16	1.22	1.31
-44	1.30	1.08	1.07	0.92	0.83	0.74	0.81	0.91	0.99	1.17	1.23	1.33
-46	1.32	1.10	1.07	0.91	0.82	0.72	0.79	0.90	0.99	1.17	1.25	1.35
-48	1.34	1.11	1.08	0.90	0.80	0.70	0.76	0.89	0.99	1.18	1.27	1.37
-50	1.37	1.12	1.08	0.89	0.77	0.67	0.74	0.88	0.99	1.19	1.29	1.41

Source: Dunne, T. and Leopold, L.B., 1978. Water in environmental planning, Freeman Publishers.

FIGURES





LEGEND

- Property Limits
- Waterbody
- Watercourse
- Municipal Boundary
- Railway

DRAWING NOTES:

THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE REPRODUCTION OF ANY PART OF IT WITHOUT PRIOR WRITTEN CONSENT OF THIS OFFICE IS STRICTLY PROHIBITED.

THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO THIS OFFICE PRIOR TO CONSTRUCTION.

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

15331 MOUNT PLEASANT RD
TOWN OF CALEDON

Drawing

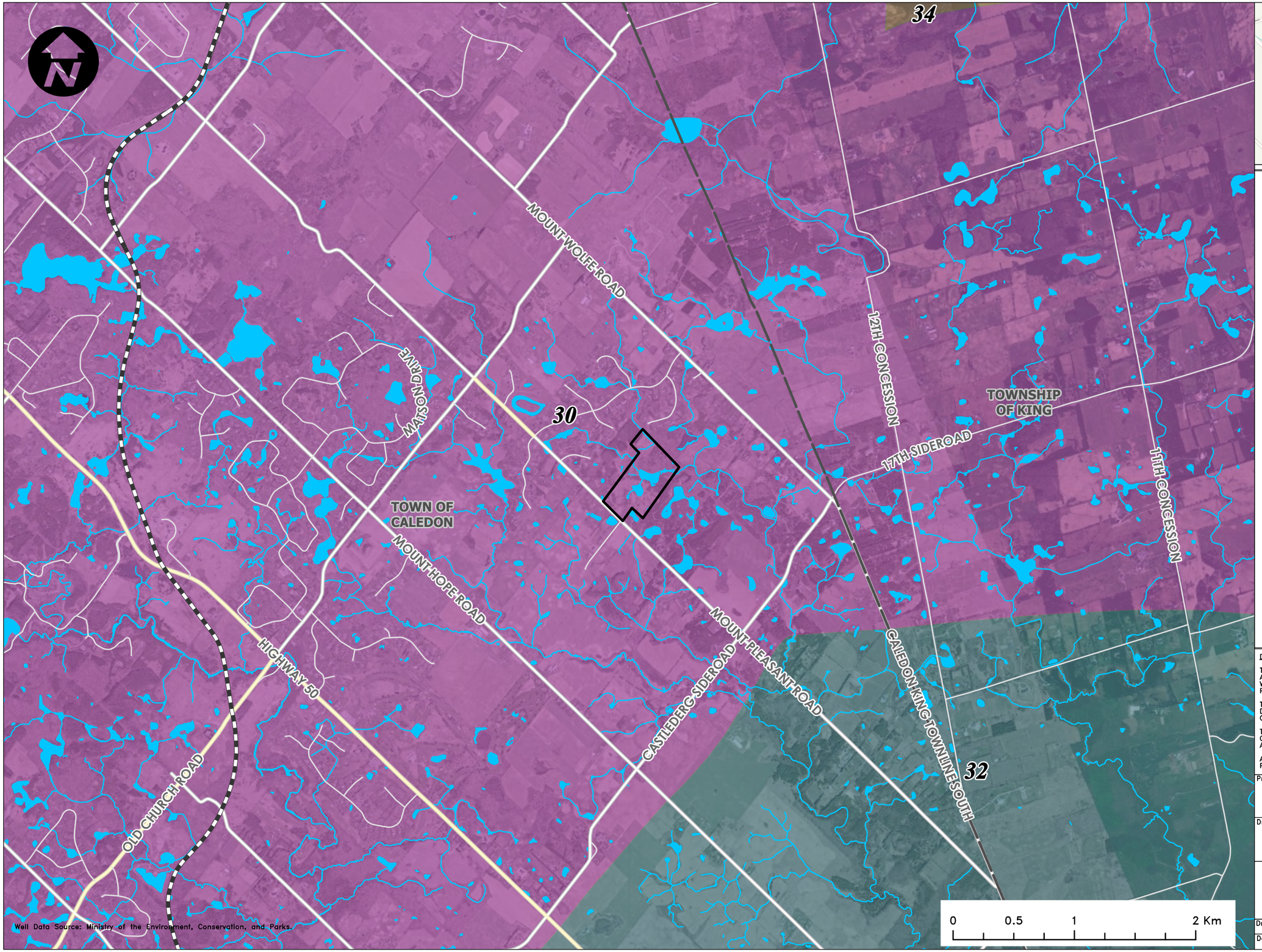
SITE LOCATION PLAN

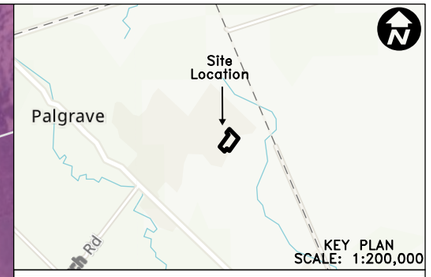
CROZIER
CONSULTING ENGINEERS
2800 High Point Drive
Suite 100
Milton, ON L9T 6P4
905-875-0026 T
905-875-4915 F
www.cfcrozier.ca

Drawn	Design	Project No.
C.M.	C.G.	2227-6259
Date	Projection	Scale
2024-07-03	EPSG:26917	1:30,000

Dwg. FIG. 01

J:\2200\2227- 2818963 Ontario Inc\6259- 15441 Mount Pleasant Rd\Design\GIS\APRXs\15441 Mount Pleasant Rd\15441 Mount Pleasant Rd.aprx





LEGEND

Physiographic Region

- 1: Niagara Escarpment
- 32: South Slope

- Property Limits
- Waterbody
- Watercourse
- Municipal Boundary
- Railway

DRAWING NOTES:

THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE REPRODUCTION OF ANY PART OF IT WITHOUT PRIOR WRITTEN CONSENT OF THIS OFFICE IS STRICTLY PROHIBITED.

THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO THIS OFFICE PRIOR TO CONSTRUCTION.

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

15331 MOUNT PLEASANT RD
TOWN OF CALEDON

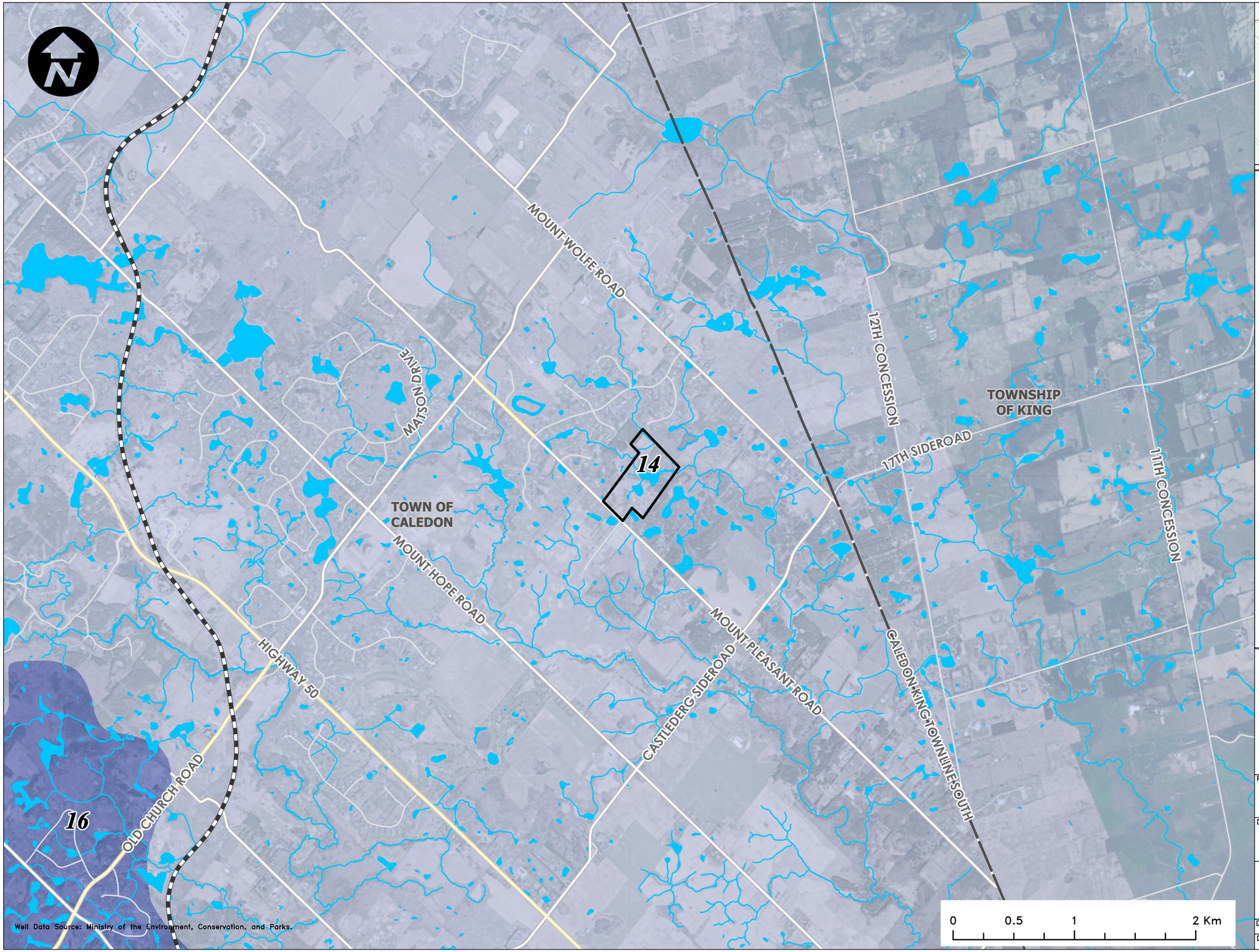
Drawing

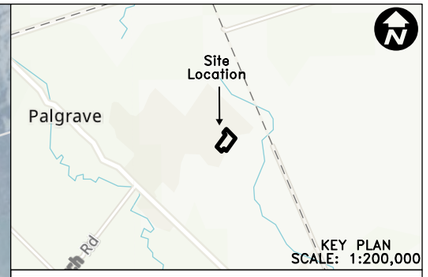
PHYSIOGRAPHY

CROZIER CONSULTING ENGINEERS
2800 High Point Drive
Suite 100
Milton, ON L9T 6P4
905-875-0026 T
905-875-4915 F
www.cfcrozier.ca

Drawn	Design	Project No.
C.M.	C.G.	2227-6259
Date	Projection	Scale / Dwg.
2024-07-03	EPSG:26917	1:30,000 / FIG. 02

J:\2200\2227- 2818963 Ontario Inc\6259- 15441 Mount Pleasant Rd\Design\GIS\APRXs\15441 Mount Pleasant Rd\15441 Mount Pleasant Rd.aprx





LEGEND

Bedrock Geology

- 16 Queenston Formation: red shale and siltstone, minor green shale and siltstone, and variable calcareous siltstone to sandstone and limestone interbeds
- 14 Georgian Bay Formation: interbedded grey-green to dark grey shale and fossiliferous calcareous siltstone to bioclastic limestone

- Property Limits
- Railway
- Municipal Boundary
- Waterbody
- Watercourse

DRAWING NOTES:

THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO THIS OFFICE PRIOR TO CONSTRUCTION.

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

15331 MOUNT PLEASANT RD
TOWN OF CALEDON

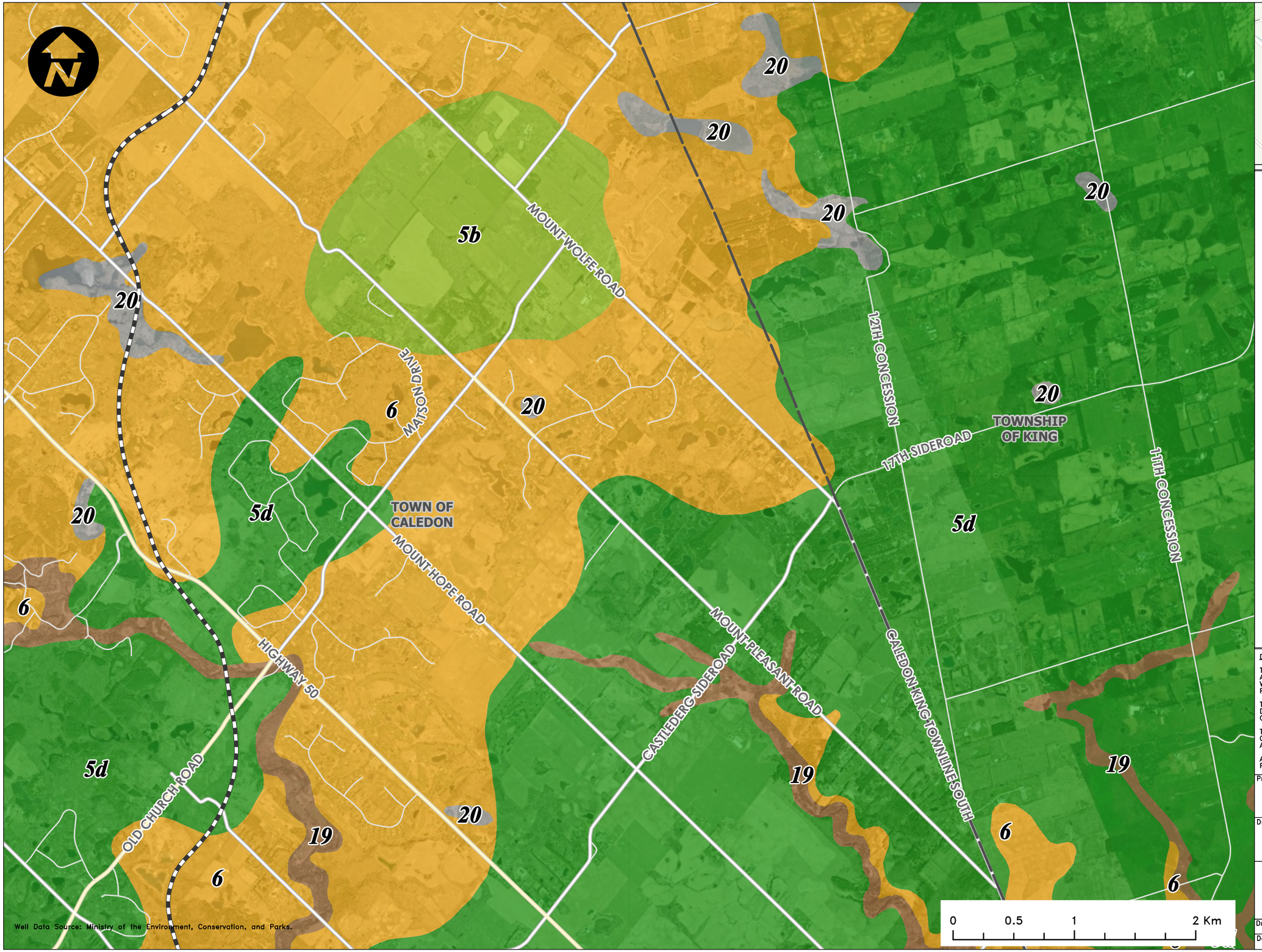
Drawing

BEDROCK GEOLOGY

CROZIER CONSULTING ENGINEERS
2800 High Point Drive
Suite 100
Milton, ON L9T 6P4
905-875-0026 T
905-875-4915 F
www.cfcrozier.ca

Drawn C.M.	Design C.G.	Project No.	2227-6259
Date 2024-07-03	Projection EPSG:26917	Scale 1:30,000	Dwg. FIG. 03

J:\2200\2227- 2818963 Ontario Inc\6259- 15441 Mount Pleasant Rd\Design\GIS\APRXs\15441 Mount Pleasant Rd\15441 Mount Pleasant Rd.aprx



LEGEND

Surficial Geology

- 20: Organic deposits
- 19: Modern alluvial deposits
- 6: Ice-contact stratified deposits
- 5b: Stone-poor, carbonate-derived silty to sandy till
- 5d: Glaciolacustrine-derived silty to clayey till
- Property Limits
- Railway
- Municipal Boundary
- Waterbody
- Watercourse

DRAWING NOTES:

THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO THIS OFFICE PRIOR TO CONSTRUCTION.

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

15331 MOUNT PLEASANT RD
TOWN OF CALEDON

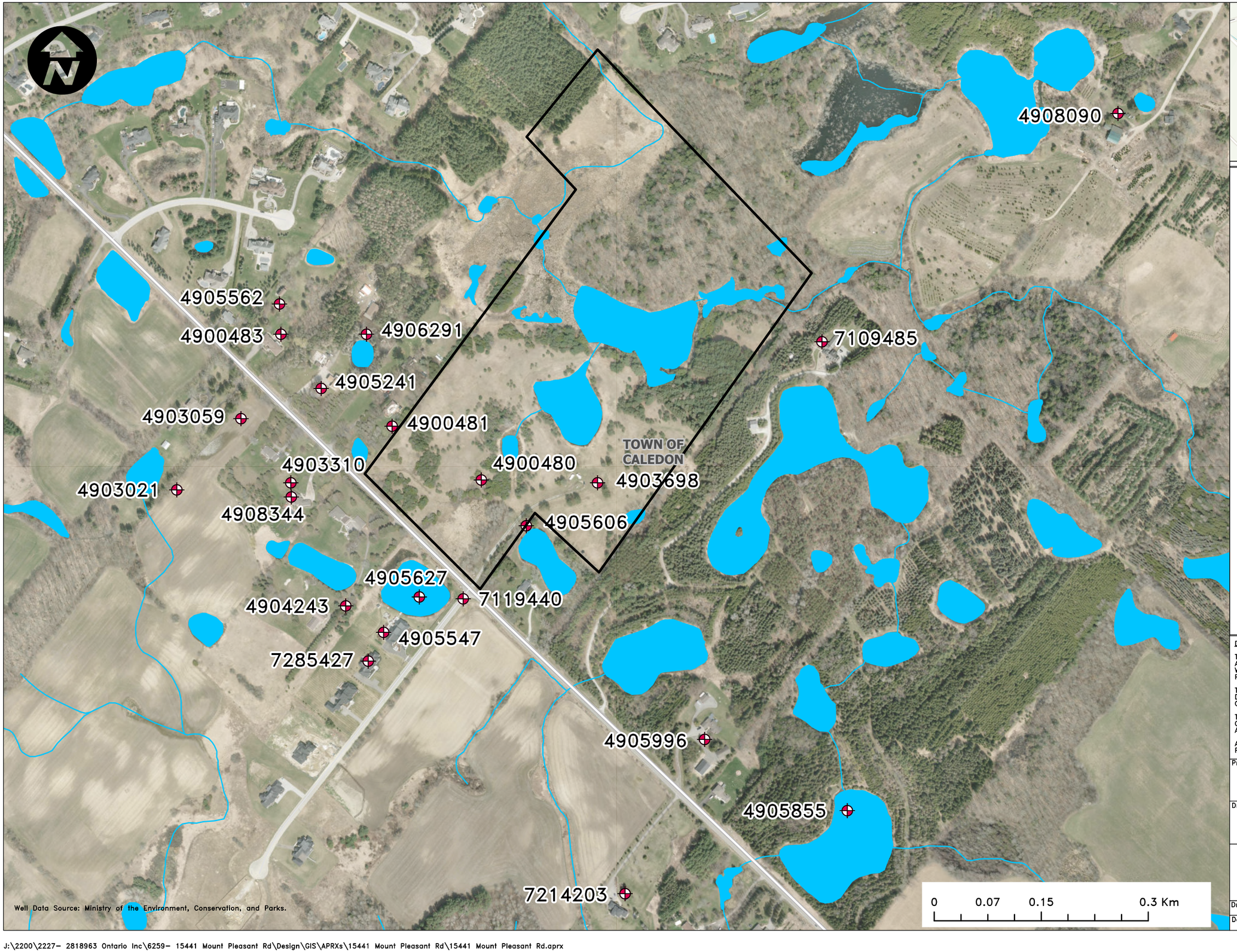
Drawing

SURFICIAL GEOLOGY

CROZIER
CONSULTING ENGINEERS
2800 High Point Drive
Suite 100
Milton, ON L9T 6P4
905-875-0026 T
905-875-4915 F
www.cfcrozier.ca

Drawn	Design	Project No.
C.M.	C.G.	2227-6259
Date	Projection	Scale / Dwg.
2024-07-03	EPSG:26917	1:30,000 / FIG. 04

J:\2200\2227- 2818963 Ontario Inc\6259- 15441 Mount Pleasant Rd\Design\GIS\APRXs\15441 Mount Pleasant Rd\15441 Mount Pleasant Rd.aprx



LEGEND

- Property Limits
- MECP Wells
- Railway
- Municipal Boundary
- Waterbody
- Watercourse

DRAWING NOTES:

THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO THIS OFFICE PRIOR TO CONSTRUCTION.

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

15331 MOUNT PLEASANT RD
TOWN OF CALEDON

Drawing

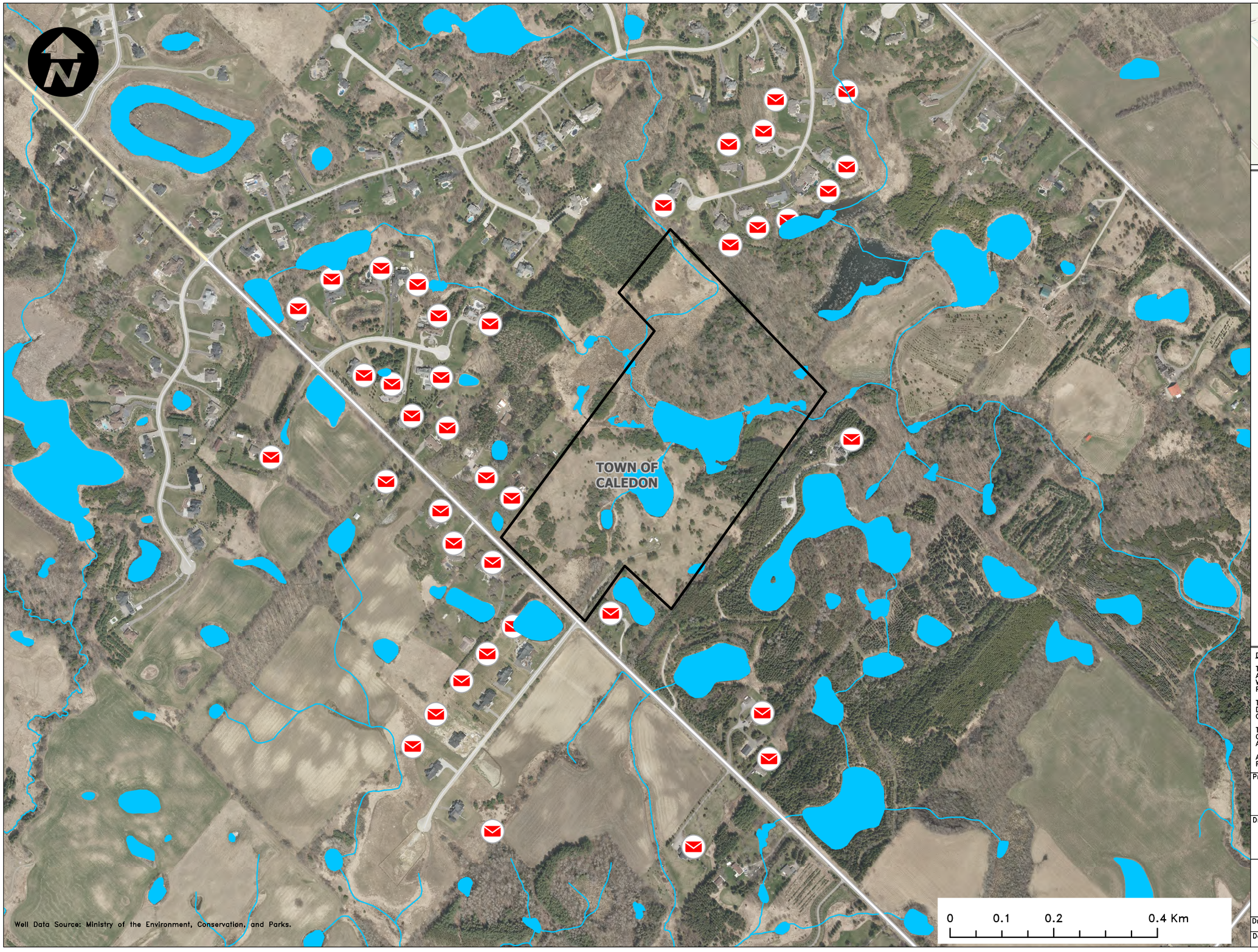
MECP WELL LOCATION PLAN

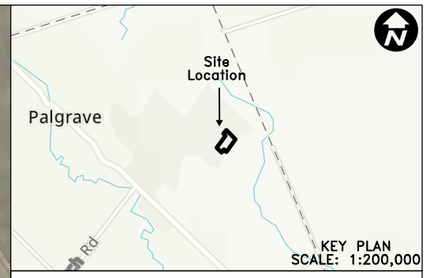
CROZIER CONSULTING ENGINEERS
2800 High Point Drive
Suite 100
Milton, ON L9T 6P4
905-875-0026 T
905-875-4915 F
www.cfcrozier.ca

Drawn	Design	Project No.
C.M.	C.G.	2227-6259
Date	Projection	Scale
2024-07-03	EPSG:26917	1:5,000

Dwg. FIG. 05

J:\2200\2227- 2818963 Ontario Inc\6259- 15441 Mount Pleasant Rd\Design\GIS\APRXs\15441 Mount Pleasant Rd\15441 Mount Pleasant Rd.aprx





LEGEND

- Property Limits
- Railway
- Municipal Boundary
- Waterbody
- Watercourse
- Door-to-Door Survey Location

DRAWING NOTES:

THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO THIS OFFICE PRIOR TO CONSTRUCTION.

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

15331 MOUNT PLEASANT RD
TOWN OF CALEDON

Drawing

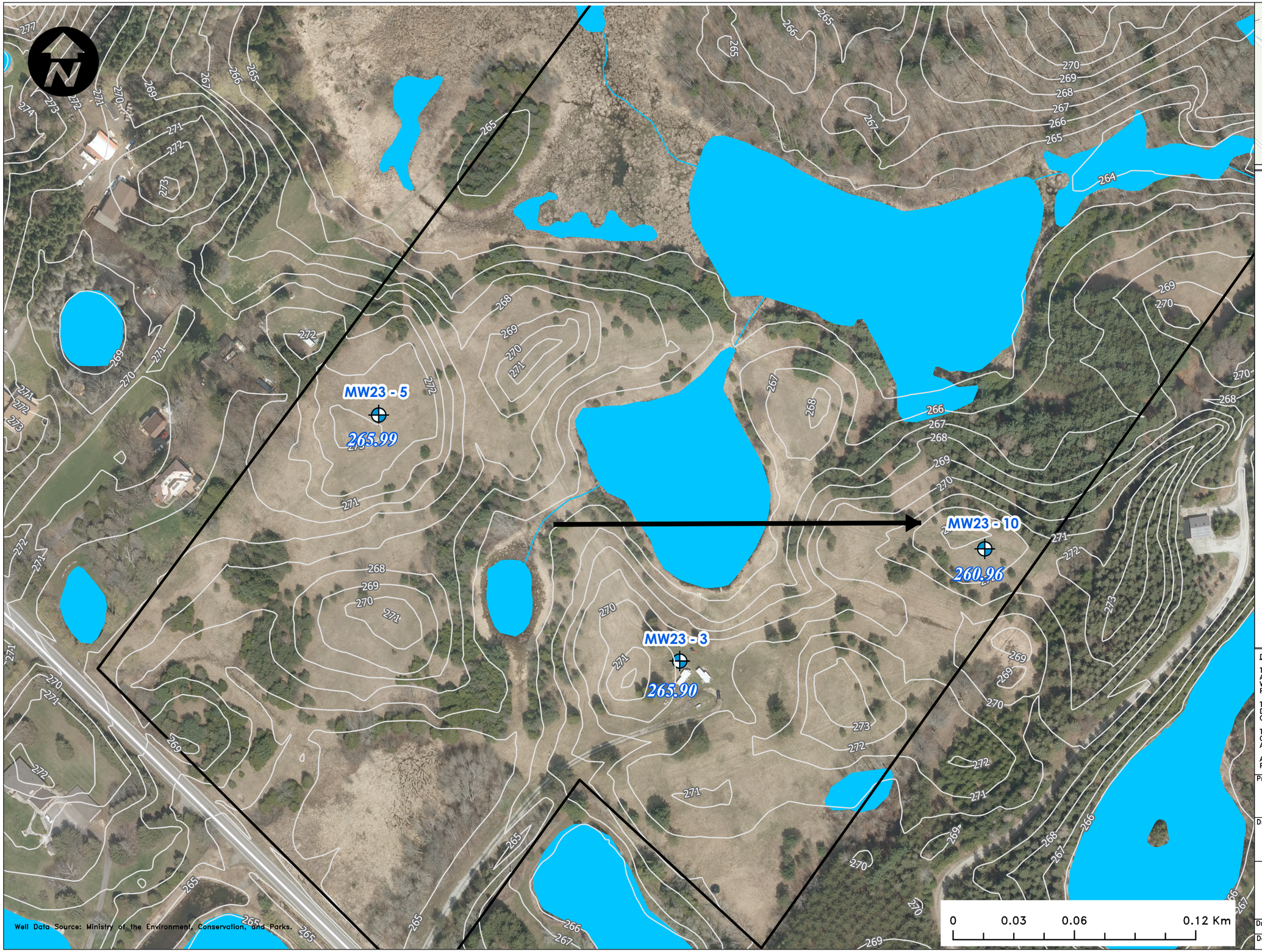
DOOR-TO-DOOR SURVEY LOCATION

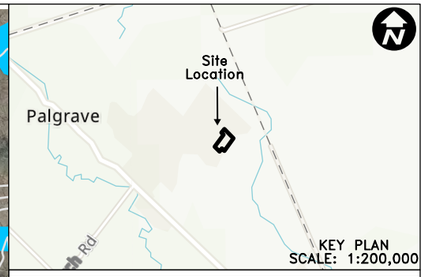
CROZIER
CONSULTING ENGINEERS

2800 High Point Drive
Suite 100
Milton, ON L9T 6P4
905-875-0026 T
905-875-4915 F
www.cfcrozier.ca

Drawn	Design	Project No.
C.M.	C.G.	2227-6259
Date	Projection	Scale / Dwg.
2024-07-03	EPSG:26917	1:7,000 / FIG. 06

J:\2200\2227- 2818963 Ontario Inc\6259- 15441 Mount Pleasant Rd\Design\GIS\APRXs\15441 Mount Pleasant Rd\15441 Mount Pleasant Rd.aprx





LEGEND

- Property Limits
- Railway
- Contours
- Waterbody
- Watercourse
- Monitoring Well
- 250 Seasonally High Groundwater Elevation in masl (March 2024)
- Interpreted Groundwater Flow Direction

DRAWING NOTES:

THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE REPRODUCTION OF ANY PART OF IT WITHOUT PRIOR WRITTEN CONSENT OF THIS OFFICE IS STRICTLY PROHIBITED.

THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO THIS OFFICE PRIOR TO CONSTRUCTION.

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

15331 MOUNT PLEASANT RD
TOWN OF CALEDON

Drawing

INTERPRETED GROUNDWATER FLOW DIRECTION

CROZIER CONSULTING ENGINEERS
2800 High Point Drive
Suite 100
Milton, ON L9T 6P4
905-875-0026 T
905-875-4915 F
www.cfcrozier.ca

Drawn	Design	Project No.
C.M.	C.G.	2227-6259
Date	Projection	Scale
2024-07-03	EPSG:26917	1:1,800

Dwg. FIG. 07

J:\2200\2227- 2818963 Ontario Inc\6259- 15441 Mount Pleasant Rd\Design\GIS\APRXs\15441 Mount Pleasant Rd\15441 Mount Pleasant Rd.aprx