



# Hydrogeological Assessment Report – Matheson and Rosedale Subdivision, Part Lot 20 Concession 3, Montague, Ontario

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## 1.0 Introduction

Cambium Inc. (Cambium) was retained by Smart Homes Ottawa Inc. (the Client) to undertake a hydrogeological assessment for a proposed subdivision development located on Part Lot 20 Concession 3, Montague, at the southeast corner of Matheson Drive and Rosedale Road South in the Township of Montague, Ontario (the Site). The regional location of the Site is outlined on Figure 1 and a Site plan is outlined on Figure 2.

The total area of the Site is approximately 23.53 ha (58.15 acres) and is currently comprised of undeveloped agricultural land. It is proposed that the Site will be developed into 41 new residential lots with minimum areas of 0.4 ha (1 acre). A conceptual site plan of the proposed development is included in Appendix A. There are no municipal water or wastewater services available near the property and therefore, the Site has to be privately serviced.

As such, a hydrogeological assessment was undertaken for the required on-site wastewater services and water supply, in accordance with the Ministry of the Environment Guidelines D-5-4 and D-5-5 (Ministry of the Environment, 1996a; 1996b).

The suitability of the development area for on-site disposal of wastewater was determined by identifying and characterizing the native soils and bedrock, the location of the shallow water table, and surficial slopes across the Site. Additionally, a predictive assessment of the attenuation capacity of Site for the potential nitrate contamination from on-site wastewater systems was conducted.

The water supply assessment included the installation and hydraulic testing of test wells and water quality testing of the aquifer to determine the sustainability of on-site groundwater resources. As per D-5-5 guidelines, for a property with a developable area of more than 15 ha and up to 25 ha, a total of four test wells are required to characterize the water supply aquifer at the Site.

Cambium used the results of the wastewater and water supply assessments to calculate the maximum number of residential lots for the Site considering its specific conditions (i.e., soil type, bedrock depth, terrain, and groundwater characteristics).



## 2.0 Environmental Features

To assess environmental features, databases maintained by the MECP, Rideau Valley Conservation Authority (RVCA), and Ministry of Natural Resources and Forestry (MNR) were reviewed.

Based on this information, the Site is situated within the Rideau River tertiary watershed within the Rideau Valley Source Protection Area, under the jurisdiction of the RVCA (Ministry of the Environment, Conservation and Parks, 2023a).

According to the Regulation Map published by the RVCA (2023), the Site does not contain a regulated area per O.Reg. 41/24 (Prohibited Activities, Exemptions and Permits).

The Site is also not located within any Areas of Environmental Significance or Areas of Natural and Scientific Interests identified by the Natural Heritage System database published by the MNR (2023a). A woodland area is identified in the northeastern portion of the Site (Appendix A).

As per the Source Water Protection Information Atlas published by the MECP (2023a), the Site is situated within a Well Head Protection Area D (WHPA-D) with a vulnerability score of 2, and a Highly Vulnerable Aquifer (HVA) with a vulnerability score of 6 (Appendix A).

Wellhead protection areas are the areas of land surrounding a municipal well which are categorized based on the time it takes for groundwater to travel to the well. Within WHPA-D, contaminated groundwater would take between 5 years and 25 years to reach the protected well (SGBLS, 2015). A vulnerability score of 2 (the second lowest risk category) indicates the area does not pose a significant risk of source water contamination.

HVAs are aquifers that are more sensitive to contamination. In general, a HVA consists of granular materials (e.g., sand and/or gravel) or fractured rock that has a high permeability and is near the surface of the ground. By default, all HVA's have a vulnerability score of 6. Based on test pit results (Section 4.1), soil thickness is less than 1 m across most of the Site, which indicates that the default vulnerability score is appropriate for the property.



### **3.0 Physical Setting**

#### **3.1 Topography and Drainage**

Topography at the Site gently slopes from the eastern corner to the western corner of the property (Appendix A). Elevations range from 127 meters above sea level (masl) to 118 masl. Rosedale Creek is located approximately 200 m west of the Site.

Surface runoff at the Site is assumed to follow Site topography and flow west into Rosedale Creek, ultimately discharging into the Rideau River approximately 4 km from Site.

#### **3.2 Physiography**

The Site is located in the physiographic region known as the Smiths Falls Limestone Plain. The Plain is described as the largest and most continuous tract of shallow soil over limestone in Southern Ontario and covers an area of approximately 3,626 km<sup>2</sup>. Notable features of the region include old marine beach deposits in areas of higher relief, low drumlins and scattered till, and deep clay deposits (Chapman & Putnam, 1984).

#### **3.3 Overburden Geology**

According to Miscellaneous Release – Data 128 from the Ontario Geological Survey (2010), a portion of the western border of the Site consists of silt and clay, minor sand and gravel, and fine-textured glaciomarine deposits. The remainder of the Site consists of a minimal surficial veneer comprised of topsoil overlaying Paleozoic bedrock.

#### **3.4 Bedrock Geology**

According to Miscellaneous Release – Data 219 from the Ontario Geological Survey (2007), the Site is underlain by bedrock of the March Formation, part of the Beekmantown Group. The bedrock of the March Formation is described as sandstone, dolomitic sandstone and dolostone.



## 4.0 Test Pit Investigation

Cambium staff completed a test pit investigation at the Site on January 4<sup>th</sup>, 2024, to assess subsurface conditions at the Site. A total of 18 test pits, designated as TP01-24 and TP18-24, were advanced on the Site to a predetermined depth of 2 meters below ground surface (mbgs) or when refusal was encountered (Table 1). Test pit locations are shown in Figure 3 and test pit logs are included in Appendix B.

**Table 1 Test Pit Termination Depths**

Test Pit	Termination Depth (mbgs)	Termination Material
TP01-24	0.42	Bedrock
TP02-24	2.00	Clay
TP03-24	0.93	Bedrock
TP04-24	0.32	Bedrock
TP05-24	0.14	Bedrock
TP06-24	0.48	Bedrock
TP07-24	0.22	Bedrock
TP08-24	0.34	Bedrock
TP09-24	0.84	Bedrock
TP10-24	0.48	Bedrock
TP11-24	0.64	Bedrock
TP12-24	0.18	Bedrock
TP13-24	1.74	Bedrock
TP14-24	1.08	Bedrock
TP15-24	0.20	Bedrock
TP16-24	0.30	Bedrock
TP17-24	0.27	Bedrock
TP18-24	0.41	Bedrock



## 4.1 Test Pit Logs

Eight test pits consisted of topsoil underlain by bedrock, nine test pits encountered subsurface soils prior to terminating on bedrock, and one test pit was terminated at the predetermined depth of 2 mbgs.

A summary of general lithological details obtained from the investigation is presented below.

### Topsoil

Topsoil material was encountered in all test pits, ranging in thickness of 0.12 to 0.48 m, with an average of 0.23 m. The material was described as a dark brown, silty sand with frequent rootlets.

### Subsurface Soils

In ten test pits, subsurface soils were encountered below the topsoil which consisted of brown, moist, sand and silt to silty sand with some clay and gravel and trace boulders, ranging in thickness of 0.02 to 0.81 m with an average thickness of 0.24 m. In TP02-24, TP09-24, TP11-24, TP13-24, and TP14-24, the previous subsurface soil was underlain by grey, wet, silty sand with some clay and trace gravel and boulders, ranging in thickness of 0.10 to 1.24 m with an average thickness of 0.28 m. In the remaining eight test pits, subsurface soils were absent beneath the topsoil.

### Bedrock

Bedrock was encountered in all test pits except TP02-24 that was ended at the predetermined termination depth. The bedrock at TP10-24 was fractured and large slabs were removed during excavation before refusal at 0.48 mbgs.

### Groundwater

The groundwater conditions at the Site generally consisted of dry to moist soils throughout the entire depth, except for TP02-24, TP06-24, and TP14-24, where wet soils were encountered at depths ranging from 0.45 mbgs to 1.90 mbgs. Water seeping into the pits and pooling at the base was observed during the investigation at TP06-24, TP13-24, and TP14-24.



Cambium notes that groundwater levels at the Site may fluctuate seasonally and in response to climatic events.

## 4.2 Physical Laboratory Testing

Physical laboratory testing, including grain size distribution analysis, was completed on three soil samples to confirm textural classification identified during field logging and obtain percolation rate estimates. Analysis results are based on the Unified Soil Classification System scale. A summary of results is provided in Table 2. Complete laboratory analysis reports are provided in Appendix C.

**Table 2 Grain Size Distribution Analysis Results**

Test Pit	Depth (mbgs)	Description	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	T-time (min/cm)
TP02-24 GS1	0.25 – 1.0	Silt and Sand some Clay trace Gravel	2	38	46	14	35
TP09-24 GS 1	0.22 – 0.65	Sand and Silt some Clay trace Gravel	3	43	39	15	35
TP13-24 GS2	0.5 – 1.74	Silty Sand some Clay some Gravel	13	44	32	11	30



## 5.0 On-Site Sewage Assessment – Subdivision

As per Guideline D-5-4 (Technical Guideline for Individual On-Site Sewage Systems: Water Quality Risk Assessment) an assessment was completed to determine the feasibility of utilizing on-site sewage disposal for the development.

Guideline D-5-4 indicates that the concentration of nitrate in the effluent plume at the Site boundary must be less the Ontario Drinking Water Quality Standard (ODWQS) of 10 mg/L to prevent contamination of adjacent properties (Ministry of the Environment, 2006). Although natural processes and soil interaction can result in nitrate being attenuated in the receiving aquifer system, the procedure within Guideline D-5-4 states that only dilution can be used as the attenuation mechanism to predict future nitrate concentrations. As such, a mass balance calculation was used to determine the impact of the proposed development at the Site.

The results obtained for the wastewater assessment are discussed in the following subsections.

### 5.1 Available Dilution

The total available dilution for the Site is estimated by the following equation:

$$Q_i = A \times S \times I$$

Where:

$Q_i$  – Volume of Available dilution water

$A$  – Area of the Site

$S$  – Water surplus

$I$  – Infiltration factor

To calculate the water surplus the thirty-year climate normal data collected between 1981 and 2010 at the Drummond Center weather station was used. The data was accessed through the Environment Canada website (Environment Canada, 2023). The total yearly precipitation, on average, was 876 mm.



The Thornthwaite method was used to determine the amount of evapotranspiration that will occur at the Site (Dingman, 2008). The calculated depth of evapotranspiration was 520 mm/yr. The water balance calculations are attached in Appendix D. Given these calculations, the water surplus for the Site was determined to be 356 mm/yr.

To determine the fraction of surplus water that infiltrates into the soils on-site, the volume of surplus water is multiplied by an infiltration factor. The infiltration factor varies between 0 and 1 and is estimated based on topography, soils and cover (as per the Stormwater Management Planning and Design Manual (Ministry of the Environment, 2006)). Site specific values are summarized in Table 3.

In addition to calculating the infiltration factor, the area of the proposed development was identified (based on the proposed development plan provided in Appendix A), to determine the total volume of available dilution water generated on the Site. From the development plan, the total area is 235,300 m<sup>2</sup>.

For road areas, water was assumed to run-off towards the permeable areas of the Site. The proposed roofed area was included in the permeable area as it is assumed that roof leaders will direct any roof runoff to landscaped areas as is typical in rural subdivisions and therefore will not contribute to a post-development recharge deficit. The calculations used to determine the available dilution water are summarized in Table 3.

**Table 3 Available Dilution Calculations – All Lots**

<b>Infiltration Factor</b>	
Topography	Hilly to rolling land = 0.15
Soil	Silty Sand = 0.3
Cover	Cultivated land = 0.1
<b>Infiltration Factor (I)</b>	<b>0.55</b>
<b>Volume of Precipitation Water</b>	
Land Area (A) (m <sup>2</sup> )	235,300
Surplus (S) (m/day)	9.94 x 10 <sup>-4</sup>
<b>Volume of Surplus Water Per Day (AxS)</b>	<b>233.81 m<sup>3</sup>/day (233,806 L/day)</b>
<b>Volume of Available Dilution Water Per Day ((AxS)xI)</b>	<b>128.59 m<sup>3</sup>/day (128,593 L/day)</b>
<b>Volume of Runoff Water Per Day ((AxS)x(1-I))</b>	<b>105.21 m<sup>3</sup>/day (105,213 L/day)</b>





## 5.2 Predictive Assessment

Based on Procedure D-5-4, a proposed lot is anticipated to generate an average discharge of 1,000 L/day of sewage effluent. Total nitrogen (all species) ultimately converts to nitrate through the wastewater treatment process. Nitrate is considered to be the critical contaminant in sewage effluent. A nitrate loading of 40 grams/lot/day is required to be used to determine the effluent loading from conventional septic systems on the receiving groundwater system.

To determine if the lot size is adequate for the Site, a mass balance calculation is used to determine the sewage loading for nitrate on the property boundary. The mass balance calculations employed is:

$$Q_t C_t = Q_e C_e + Q_i C_i$$

Where:

- $Q_t$  = Total volume ( $Q_e + Q_i$ )
- $C_t$  = Total concentration of nitrate at the property boundary
- $Q_e$  = Volume of septic effluent
- $C_e$  = Concentration of nitrate in effluent (40 mg/L)
- $Q_i$  = Volume of available dilution water
- $C_i$  = Concentration of nitrate in infiltration water (0.1 mg/L)

To determine the concentration of nitrate at the property boundary ( $C_t$ ), the above mass balance equation is rearranged as:

$$C_t = \frac{Q_e C_e + Q_i C_i}{Q_t}$$

This equation was used to calculate the predicted nitrate concentration at the lot boundary. Calculation results are detailed in Appendix D and summarized in Table 4.

Surplus water which infiltrates into the soils on-site will also provide groundwater recharge. Although nitrate is not present in atmospheric precipitation, a value of 0.4 mg/L was used in the calculation for the concentration of nitrate in the infiltration water. This value simulates the



long-term contributions of residual agricultural nitrate from historical activities on the Site, and was based on the average groundwater nitrate concentrations measured in the test wells on the undeveloped portions of the Site ( $Q_i$ , Section 6.4).

**Table 4 Predictive Assessment of Nitrate Concentration – All Lots**

Variable	Value
Number of Lots	41
$Q_e$ (L/day)	41000
$C_e$ (mg/L)	40
$Q_i$ (L/day)	128,593
$C_i$ (mg/L)	0.4
$Q_t$ (L/day)	169593
$C_t$ (mg/L)	9.97

Based on the predictive assessment detailed above, the proposed 41 lots would result in a nitrate concentration of 9.97 mg/L, which is less than the ODWQS nitrate concentration limit of 10 mg/L at the property boundary, as required by guideline D-5-4. The proposed development is therefore expected to maintain acceptable nitrate concentration thresholds at property boundaries.

### 5.3 Conceptual Wastewater System Design

Section 8 of the *Ontario Building Code* (OBC) details the design, construction, operation, and maintenance of sewage systems. No proposed lot specific development information is available at this time. As such, the following assumptions were used in the conceptual on-site sewage system design:

- Four-bedroom dwelling.
- Percolation rate of >50 min/cm (accounts for worst-case soils)
- Minimum lot area of 4,048 m<sup>2</sup>



According to Table 8.2.1.3.A of the OBC, a four-bedroom dwelling has a daily sewage design flow volume of 2,000 L/day. Based on the design flow for residential occupancy, the proposed septic tank capacity was calculated as follows in accordance with section 8.2.2.3. of the OBC:

$$\text{Volume (V): } V = 2 * Q$$

$$V = 2 * 2,000 \text{ L}$$

$$V = 4,000 \text{ L}$$

A single two compartment septic tank with capacity of 4,500 L would be suitable to achieve the minimal capacity requirements.

The estimated percolation times from the soil samples for the proposed lots across the Site were between 30 and 35. However, bedrock was observed in 17 of 18 test pits, several directly under the topsoil layer, ranging from depths of 0.14 to 1.74 mbgs. As such, a percolation rate of 50 min/cm was considered as a worst case. A conventional leaching bed will require a minimum vertical separation of 0.9 m between the bedrock contact as per the OBC; as such, the proposed leaching beds may be required to be either partly or fully raised.

Considering worst-case conditions ( $T > 50$  min/cm, bedrock at the surface, and the smallest proposed lot of 4,048 m<sup>2</sup>), a conceptual sewage system design using a raised filter bed was explored. The total required footprint is determined by the allowable sewage loading rate based on Table 8.7.4.1. of the OBC. Using a soil percolation time of 50 min/cm, the maximum loading rate is 4 L/m<sup>2</sup>/day, the following calculations described the required footprint of the conceptual filter bed components:

$$\text{Effective Filter Area: } A = Q / 75$$

$$A = (2,000 \text{ L/d}) / 75$$

$$A = 26.7 \text{ m}^2$$

$$\text{Loading Area: } A = Q / \text{LR}$$

$$A = (2,000 \text{ L/d}) / (4)$$

$$A = 500 \text{ m}^2$$



Based on a daily sewage design flow of 2,000 L/day, the loading area (total footprint) of the proposed raised leaching bed needs to be a minimum of 500 m<sup>2</sup>. Considering worst-case percolation rates for soils and the lot with the smallest area, 3,548 m<sup>2</sup> would remain for the development of a residential dwelling.

The large area of the Site will provide adequate space for the installation of on-site wastewater treatment systems and should be able meet the required setback distances (i.e., structures, property lines, wells etc.) outlined in OBC Tables 8.2.1.6.A and 8.2.1.6.B. However, each lot should be considered and evaluated independently for each Site-specific sewage system design. The Site conditions appear feasible to install on-site wastewater systems.



## 6.0 Water Supply Assessment

The results obtained for the water supply assessment are discussed in the following subsections.

### 6.1 Well Inventory Survey

#### 6.1.1 MECP Well Records Assessment

Cambium accessed the MECP Water Well Information System to review water well records within 500 m of the Site (Ministry of the Environment, Conservation and Parks, 2023b). A total of 58 records were identified, all of which describe wells installed into bedrock. The records identified one abandoned water supply well, one recharge well, and the remaining wells were all water supply wells. The bedrock lithology for all records were described as limestone or sandstone overlain by clay or sand. The locations of wells records identified within 500 m of the Site are illustrated in Figure 4. A summary of water well information, including total depth, static water level, and recommended pumping rate, is presented in Table 5. Further details are provided Appendix E.

**Table 5 MECP Water Well Information Summary**

		Depth (mbgs)	Depth Water Found (mbgs)	Static Water Level (mbgs)	Recommended Pumping Rate (L/min)
Bedrock Wells Count = 58	Minimum	12.80	7.62	1.00	12.00
	Maximum	29.87	28.96	14.00	482.00
	Average	21.71	18.57	6.30	63.16

#### 6.1.2 Door-to-Door Well Survey

A door-to-door survey of all accessible properties within 500 m of the property was conducted by Cambium staff on February 9<sup>th</sup>, 2024, to confirm details in the public record and to identify any wells not included in the MECP records assessment. Thirty properties were visited, and in-person interviews were conducted with available homeowners regarding the condition and



details of their water supply well(s), including the method of construction, water level, pump intake, well, and water level depths, water use, and general water quality and well yield.

If a homeowner was unavailable, a letter was left either with an additional resident of the home, or in the mailbox with a pre-paid return envelope. The letter explained the nature of the proposed project and the survey and provided direct contact information for Cambium's project manager.

Details and responses from the well use survey are provided in Appendix E. Generally, survey results indicate that the water supply for the surrounding residences is of good quality, except for hardness. No water quantity issues were noted. No homeowners expressed willingness to have their wells monitored during the pumping test for the proposed development. One residential well completed on a lot previously severed from the Site was included in the water supply investigation, however, which is detailed in the following section.

## **6.2 Water Supply Well Installation**

Three test wells, denoted as TW1, TW2, and TW3, were installed at the Site by AirRock Drilling in January 2024. Pumping tests were completed at all three wells, as well as a residential well (RW1) which was installed at the residential property severed from the northwestern edge of the Site (987 Matheson Drive), to characterize the aquifer as per Guideline D-5-5 .

Well records for the test wells and residential well indicate sandstone bedrock was encountered during drilling, with little to no overburden noted. This is consistent with available geological mapping (Section 3.4), as well as the shallow depth to bedrock encountered during the subsurface investigation at the Site (Section 4.1). Well construction details for the four wells are summarized in Table 6 and well records are included in Appendix E.



**Table 6 Test Well Construction Details**

Well ID	Well Tag Number	Well Diameter (m)	Depth (mbgs)	Casing Stick-up (mags*)	Water Level (mbgs)
TW1	A395660	0.152	24.58	0.52	8.82
TW2	A395658	0.152	25.17	0.60	9.70
TW3	A395659	0.152	31.80	0.55	11.93
RW1	A378942	0.152	22.47	0.68	7.14

\*mags = meters above ground surface

### 6.3 Hydraulic Pumping Tests

Hydraulic pumping tests were completed by Cambium staff at the four identified wells between February 26<sup>th</sup> and March 8<sup>th</sup>, 2024. Prior to the first test, Solinst Levelloggers (loggers) were installed in all wells for the duration of the pumping tests to monitor water levels before, during, and after all tests. Manual measurements were also recorded during the pumping tests to mitigate the possibility of equipment failure.

The test wells were chlorinated on February 9<sup>th</sup>, 2023, to ensure adequate disinfection within each well. A disinfected submersible pump was then installed in each well prior to testing. Following pump installation, the water level in the test well was allowed to recover to static conditions before pumping began. The pumping rate for each test was controlled by a valve connected to a digital flow meter and water was discharged in a downslope direction approximately 15 m from each test well.

The pumping test at RW1 was completed with the pump previously existing in the well. Pumping was achieved by opening an outside garden tap, with water discharging through a garden hose directed away from the well head area.

Specific details pertaining to each pumping test are described in the following subsections.

#### 6.3.1 TW1 Pumping Test

The pumping test for TW1 was completed by Cambium staff on February 28<sup>th</sup>, 2024. Well water levels measured during TW1 pumping test activities are provided in Appendix F.



The static water level in TW1 was 7.95 mbgs prior to commencing the pumping test. The pump was installed at a depth of approximately 19.5 mbgs. The available drawdown in the well was therefore approximately 11.6 m (height of static water level above pump).

Hydraulic testing began at 9:21 am and ran for a duration of six hours. A pumping rate of 14 L/min was maintained for the majority of the test. The total volume of water discharged from TW1 during the pumping test was approximately 5,000 L.

Water levels in TW1 initially decreased 9 cm during the first 11 minutes of the test, however after this time water levels rose, and were 6 cm higher than static water level at 3:31 pm, the time of pumping cessation. Similar trends of increasing water levels were measured in the other wells monitored during the test (TW2, TW3, RW1), which indicates the presence of background water levels trends that are of greater influence than potential effects from TW1 pumping.

The approximate 5,000 L that was discharged from TW1 during the pumping test is greater than daily demand of 2,000 L/day for a typical four-bedroom residence estimated by Part 8 of the Ontario Building Code (O Reg. 332/12). Additionally, the pumping rate of 14 L/min is greater than the typical peak demand rate for a 4-bedroom residence at 13.7 L/min as per MECP Procedure D-5-5 (Ministry of the Environment, 1996b). These results, along with the absence of observable water level responses due to TW1 pumping in the other wells monitored during testing activities, indicate that TW1 is anticipated to provide sufficient yield for a residential dwelling without detrimental effect to surrounding water users.

### **6.3.2 TW2 Pumping Test**

The pumping test for TW2 was completed by Cambium staff on February 27<sup>th</sup>, 2024. Well water levels measured during TW2 pumping test activities are provided in Appendix F.

The static water level in TW2 was 9.26 mbgs prior to commencing the pumping test. The pump was installed at a depth of approximately 19.5 mbgs. The available drawdown in the well was therefore approximately 10.2 m (height of static water level above pump).





Hydraulic testing began at 9:20 am, at a pumping rate of 14 L/min. At 56 minutes into the test, a rupture in the discharge line occurred down the well and pumping activities ceased. The issue was resolved, and testing resumed at 11:40 am. Pumping continued for 5 hours at a continuous rate of 14 L/m, and then ceased at 4:40 pm. The total volume of water discharged from TW2 during the pumping test was approximately 5,000 L.

Water levels in TW2 initially decreased to a maximum drawdown of 3 cm at 1:07 pm, however after this time water levels rose, achieving pre-test water level conditions by the time of pumping cessation. Similar trends of increasing water levels were measured in the other wells monitored during the test (TW1, TW3, RW1), which indicates the presence of background water levels trends that are of greater influence than potential effects from TW2 pumping.

The approximate 5,000 L that was discharged from TW2 during the pumping test is greater than daily demand of 2,000 L/day for a typical four-bedroom residence estimated by Part 8 of the Ontario Building Code (O Reg. 332/12). Additionally, the pumping rate of 14 L/min is greater than the typical peak demand rate for a 4-bedroom residence at 13.7 L/min as per MECP Procedure D-5-5 (Ministry of the Environment, 1996b). These results, along with the absence of observable water level responses due to TW2 pumping in the other wells monitored during testing activities, indicate that TW2 is anticipated to provide sufficient yield for a residential dwelling without detrimental effect to surrounding water users.

### **6.3.3 TW3 Pumping Test**

The pumping test for TW3 was completed by Cambium staff on February 26<sup>th</sup>, 2024. Well water levels measured during TW3 pumping test activities are provided in Appendix F.

The static water level in TW3 was 11.46 mbgs prior to commencing the pumping test. The pump was installed at a depth of approximately 24.5 mbgs. The available drawdown in the well was therefore approximately 13.0 m (height of static water level above pump).

Hydraulic testing began at 1:52 pm and ran for a duration of six hours at a continuous pumping rate of 14 L/min. Pumping ceased at 8 pm. The total volume of water discharged from TW3 during the pumping test was approximately 5,000 L.



Water levels in TW3 decreased to a maximum drawdown of 2 cm at the time of pumping cessation. A similar trend of 2 cm drawdown was measured in the other wells monitored during the test (TW1, TW2, RW1). Following pumping cessation, water levels rose to 1 cm above pre-test water levels conditions within 8 minutes. No water level changes were noted in the monitoring wells. These results, in combination with the background trends noted during the TW1 and TW2 pumping tests, indicate the presence of background water levels trends that are of greater influence than potential effects from TW3 pumping.

The approximate 5,000 L that was discharged from TW3 during the pumping test is greater than daily demand of 2,000 L/day for a typical four-bedroom residence estimated by Part 8 of the Ontario Building Code (O Reg. 332/12). Additionally, the pumping rate of 14 L/min is greater than the typical peak demand rate for a 4-bedroom residence at 13.7 L/min as per MECP Procedure D-5-5 (Ministry of the Environment, 1996b). These results, along with the absence of observable water level responses due to TW3 pumping in the other wells monitored during testing activities, indicate that TW3 is anticipated to provide sufficient yield for a residential dwelling without detrimental effect to surrounding water users.

#### **6.3.4 RW1 Pumping Test**

The pumping test for RW1 was completed by Cambium staff on March 8<sup>th</sup>, 2024. Well water levels measured during RW1 pumping test activities are provided in Appendix F.

The static water level in RW1 was 5.81 mbgs prior to commencing the pumping test. The depth of the pump previously installed in the well is unknown but presumed to be approximately 19.5 mbgs. Given this depth, the available drawdown in the well would be approximately 13.7 m (height of static water level above pump).

Hydraulic testing began at 10:14 pm and ran for a duration of six hours. Pumping rates during the test were variable, ranging from approximately 10 to 14 L/min for the first hour, and 18 to 20 L/min for the remaining 5 hours. The total volume of water discharged from RW1 during the pumping test was approximately 6,000 L.



Water levels in RW1 decreased to a maximum drawdown of 10 cm at the time of pumping cessation (4:14 pm), which represents approximately less than 1% of the total drawdown available in the well. Following pumping cessation, water levels in RW1 recovered to pre-test conditions within 23 minutes. A maximum drawdown of 4 cm was also measured in TW1 which was monitored during the test. TW1 water levels regained pre-test conditions within 1 hour following pumping cessation.

The approximate 6,000 L that was discharged from RW1 during the pumping test is greater than daily demand of 2,000 L/day for a typical four-bedroom residence estimated by Part 8 of the Ontario Building Code (O Reg. 332/12). Additionally, the dominant pumping rate of 18 L/min is greater than the typical peak demand rate for a 4-bedroom residence at 13.7 L/min as per MECP Procedure D-5-5 (Ministry of the Environment, 1996b). These results, along with the absence of observable water level responses due to RW1 pumping in the other wells monitored during testing activities, indicate that RW1 is anticipated to provide sufficient yield for a residential dwelling without detrimental effect to surrounding water users.

#### **6.4 Groundwater Quality Analysis**

Unfiltered groundwater samples were collected from TW1, TW2, TW3, and RW1 during the last 30 minutes of the pumping test conducted on each well. Residual chlorine concentrations in the wells were measured to be less than 0.01 mg/L prior to sampling. All samples were submitted for analysis of general organic and inorganic chemistry to Bureau Veritas in Mississauga, Ontario, which is accredited by the Canadian Association for Laboratory Accreditation Inc. Samples were stored at a temperature between 0 and 10 °C prior to and during transport.

Water quality results were compared against the ODWQS criteria for parameters outlined in Guideline D-5-5 Tables 1, 2, and 3 (Ministry of the Environment, 1996b). A complete summary of water quality results and certificates of lab analyses are provided in Appendix G. Parameters reported at concentrations exceeding ODWQS criteria are outlined in Table 7.



**Table 7 Summary of ODWQS Exceedances**

Parameter	Units	ODWQS Criteria	TW1	TW2	TW3	RW1
Hardness (as CaCO <sub>3</sub> )	mg/L	80-100 (aesthetic/operation guideline)	190	210	300	260
Total Coliforms	CFU/100 ml	0	27	0	0	0

Hardness was the only parameter with measured concentrations exceeding ODWQS criteria in all wells. Hardness is an aesthetic/operational parameter which is typically elevated in limestone bedrock aquifers and is readily amenable with a conventional water softening unit.

Total Coliforms were also elevated above ODWQS guidelines in TW1. The reason for the exceedance is unknown at this time. It is possible that sampling error may have occurred (i.e. inadequate disinfection of the well after installation or contamination of sample during collection). Local aquifer contamination from septic system systems is ruled out as a cause for elevated total coliforms due the undeveloped nature of the property and lack of measurable E.coli in the sample. Lack of detectable Total Coliforms in the other tested wells also indicate that the issue is not systemic across the Site. Shock chlorination and resampling is recommended prior to use of the well. Should they persist, elevated total coliforms can be effectively treated with a residential water disinfection system (i.e. UV treatment or chlorination).

Nitrate concentrations in groundwater samples from test wells on the undeveloped portions of the Site were 0.26 mg/L (TW1), 0.30 mg/L (TW2), and 0.64 mg/L (TW3). The nitrate concentration in the groundwater sample from the well at 987 Matheson Drive was 1.79 mg/L. This is consistent with nitrate results obtained for other lots on the perimeter of the Site reported by Macintosh Perry (2022), which reported a nitrate concentration of <0.1 mg/L in the water supply well at 999 Matheson Drive, and 1.9 mg/L at 862 Rosedale Road.

All wells are completed at similar depths within the local bedrock aquifer. Detectable nitrate in most wells suggests that there is incomplete hydraulic separation between the surface and the water supply aquifer.



Low nitrate concentrations observed in the on-site test wells are inferred to be the result of historical agricultural land use at the Site. Change in land use at the Site will remove this agricultural nitrate source and groundwater concentrations are anticipated to decline to the rainwater/snow melt nitrate concentration of <0.1 mg/L. To simulate the long-term mobilization of residual agricultural nitrate by water infiltrating through the unsaturated zone, a background concentration equal to the average nitrate concentration of the on-site test wells (0.4 mg/L) was used in the nitrate attenuation predictive assessment (Section 5.2).

Elevated concentrations in the groundwater samples from water supply wells tested at the existing residential properties along the perimeter of the Site suggest that nitrate will increase in the water supply aquifer following installation of septic systems. Results suggest the long-term concentration under lots with on-site septic beds is <2 mg/L.



## 7.0 Conclusions and Recommendations

Cambium was retained by the Client to complete a hydrogeological assessment for a proposed rural subdivision in the Township of Montague, Ontario, to demonstrate whether water and wastewater services for the facility can be provided in accordance with the D-5-4 and D-5-5 Guidelines without adversely impacting existing development in the surrounding area.

### 7.1 Wastewater Assessment

A soils investigation completed at the Site indicates the subsurface consists of a thin layer of sand and silt to silty sand which is underlain by shallow bedrock. Soil sample analysis indicates the sand and silt/silty sand has estimated percolation times (T times) ranging from 30 to 35 min/cm, which reflects moderate capacity for water to infiltrate into the shallow subsurface environment.

A nitrate impact assessment given an average daily septic flow of 1,000 L/day for each lot predicts that 41 lots within the 23.53 ha developable area will result in nitrate concentrations of 9.97 mg/L at property boundaries, which is less than the required ODWQS limit of 10 mg/L.

The conceptual wastewater design indicates that shallow soils at the Site may require raised filter beds as part of the private wastewater systems. The required footprint for a raised filter bed was calculated to be 500 m<sup>2</sup>, leaving at minimum 3,548 m<sup>2</sup> of available area for development (estimated using the smallest proposed lot). Each lot should be considered and evaluated independently for each site-specific sewage system design. The Site conditions appear feasible to install on-site wastewater systems.

### 7.2 Water Supply Assessment

Hydraulic testing of the three on-site wells (TW1, TW2, and TW3) and one residential well (RW1) located on the adjacent severed parcel was completed between February 26<sup>th</sup> and March 8<sup>th</sup>, 2024. A minimum discharge rate of approximately 14 L/min was maintained for 6 hours, during all tests, which resulted in a minimum of approximately 5,000 L being pumped



from each well. Water level drawdown was negligible (i.e. < 0.1 m) in all test and observation wells.

Water quality samples collected from all four wells indicate water from the supply aquifer is of good quality, with only hardness exceeding ODWQS guidelines in all wells. This parameter is readily amendable with standard water treatment systems.

Total Coliforms were measured to be elevated above ODWQS guidelines in TW1. The reason for the exceedance is unknown at this time, however local aquifer contamination from septic system systems is ruled out as a cause for elevated total coliforms due the undeveloped nature of the property and lack of measurable E. coli in the sample. Shock chlorination and resampling is recommended prior to use of the well. Should they persist, elevated total coliforms can be effectively treated with a residential water disinfection system (i.e. UV treatment or chlorination).

Based on the pumping test and water quality results, it is anticipated that all test wells can sustainably provide a sufficient quantity of potable water to meet the daily demand for a residential dwelling without detrimental effect to surrounding water users.




## 8.0 Closing


We trust that the information in this submission meets your current requirements. If you have any questions regarding the contents of this report, please contact the undersigned.

Respectfully submitted,

### Cambium Inc.

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CC6796E7624B485...

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Technician – Junior Hydrogeologist

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Natasha Augustine, M.Sc.  
Coordinator – Environmental Scientist

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Kyle Horner, Ph.D., P.Geol.  
Senior Project Manager – Senior Hydrogeologist

Signed by:  
  
2024-12-02

\\cambiumincstorage.file.core.windows.net\projects\19300 to 19399\19387-001 Smart Homes - W&WW - Matheson & Rosedale Subdiv\Deliverables\REPORT - HydroG\Final\2024-12-02 RPT HydroG SHOI Matheson Subdivision r4.docx





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## 10.0 Standard Limitations

### Limited Warranty

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A site assessment is created using data and information collected during the investigation of a site and based on conditions encountered at the time and particular locations at which fieldwork is conducted. The information, sample results and data collected represent the conditions only at the specific times at which and at those specific locations from which the information, samples and data were obtained and the information, sample results and data may vary at other locations and times. To the extent that Cambium's work or report considers any locations or times other than those from which information, sample results and data was specifically received, the work or report is based on a reasonable extrapolation from such information, sample results and data but the actual conditions encountered may vary from those extrapolations.

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## Appended Figures

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**HYDROGEOLOGICAL  
ASSESSMENT REPORT**  
SMART HOMES OTTAWA INC.  
Part Lot 20 Concession 3  
Montague, Ontario

**LEGEND**

-  Highway
-  Major Road
-  Minor Road
-  Railway
-  Watercourse
-  Water Area
-  First Nations Reserve
-  Provincial Park
-  Wooded Area
-  Built Up Area

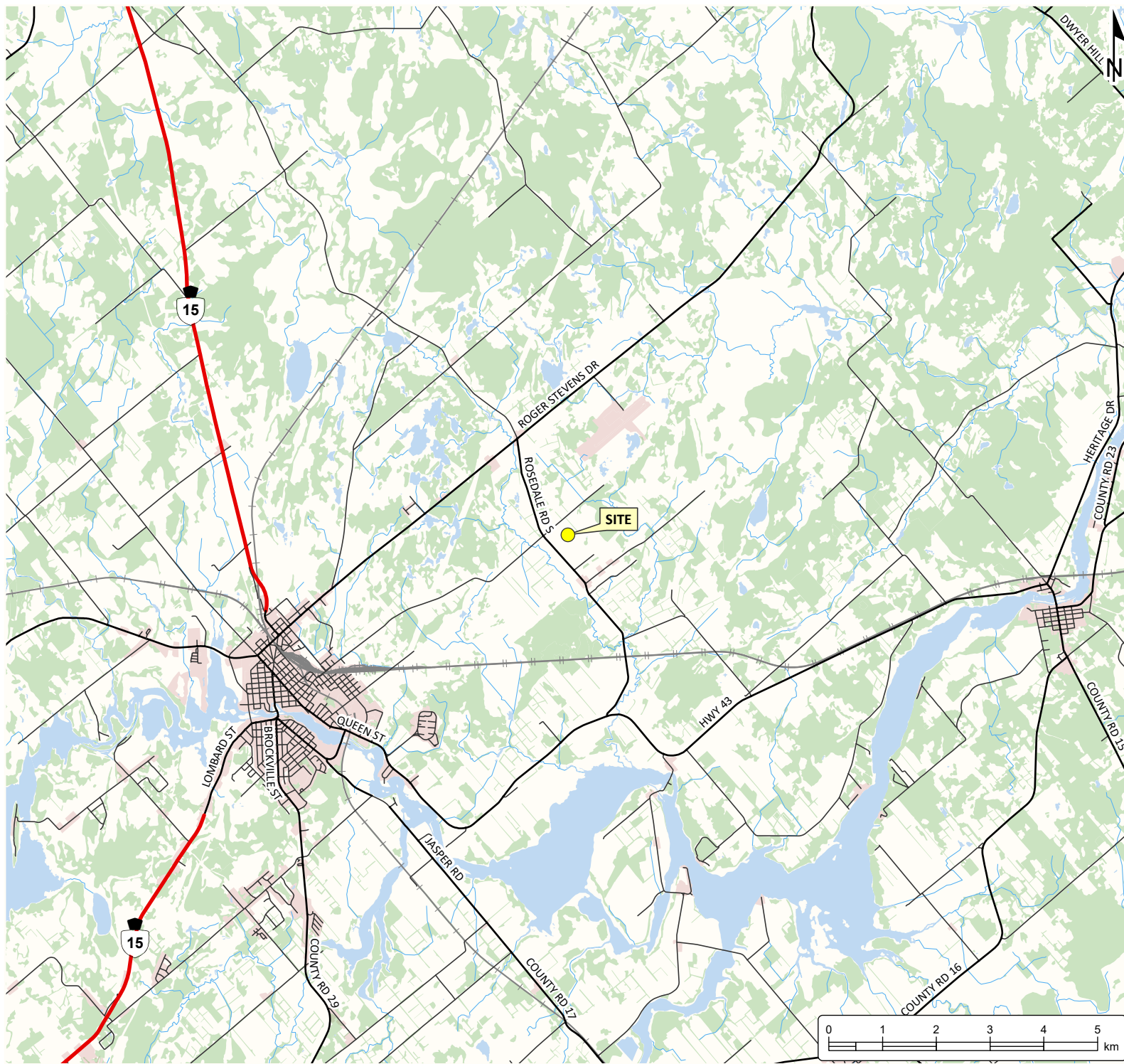
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**SITE LOCATION PLAN**

Project No.: 19387-001	Date: July 2024
Scale: 1:100,000	Projection: NAD 1983 UTM Zone 18N
Created by: DBB	Checked by: KH
Figure: <b>1</b>	







**HYDROGEOLOGICAL  
ASSESSMENT REPORT**  
SMART HOMES OTTAWA INC.  
Part Lot 20 Concession 3  
Montague, Ontario

**LEGEND**

Site (approximate)

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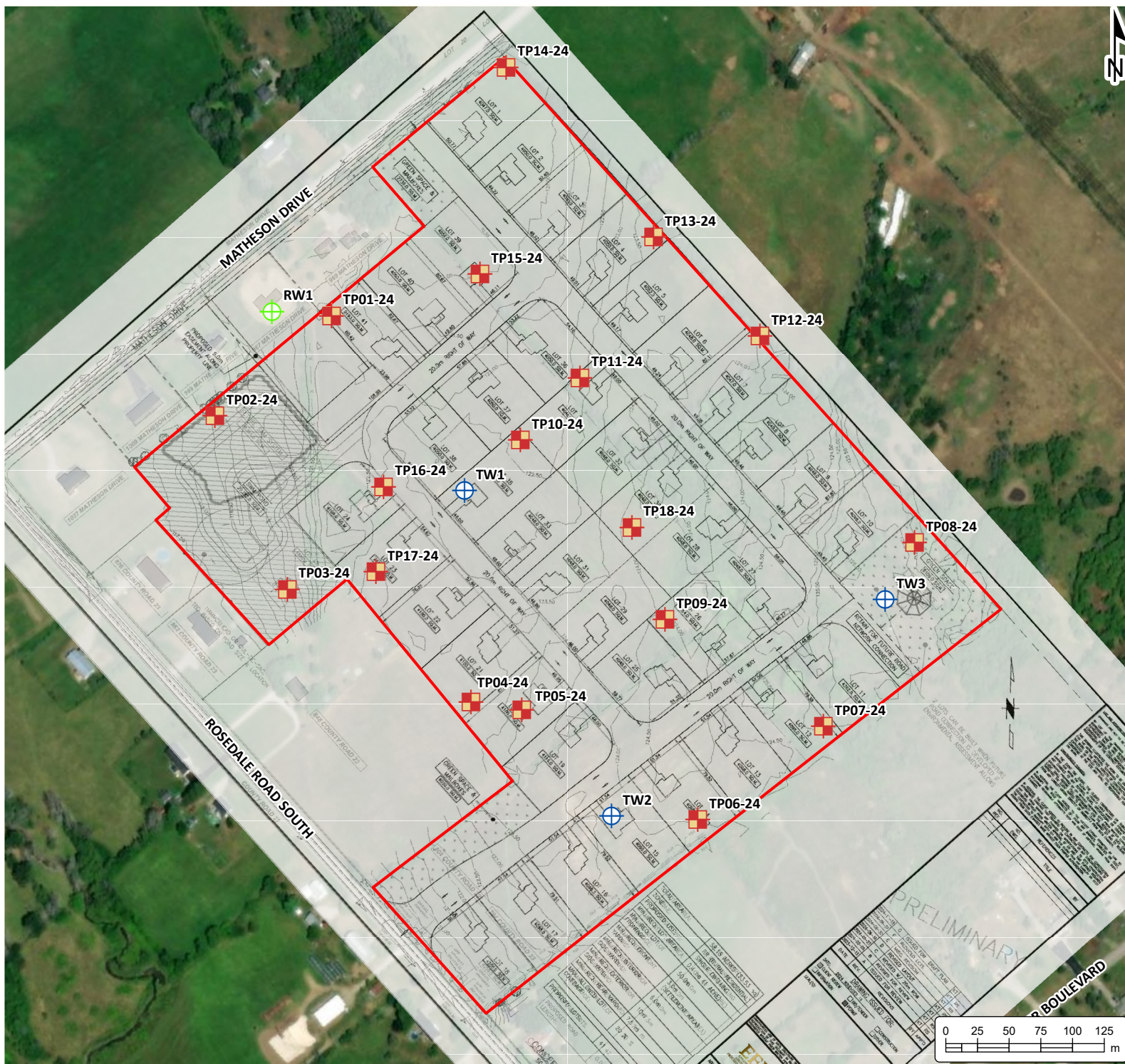


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**SITE PLAN**

Project No.: 19387-001	Date: December 2024
Scale: 1:4,250	Projection: NAD 1983 UTM Zone 18N
Created by: DBB	Checked by: KH
Figure: <b>2</b>	





**HYDROGEOLOGICAL  
ASSESSMENT REPORT**  
SMART HOMES OTTAWA INC.  
Part Lot 20 Concession 3  
Montague, Ontario

**LEGEND**

- Test Well
- Residential Well
- Test Pit
- Site (approximate)

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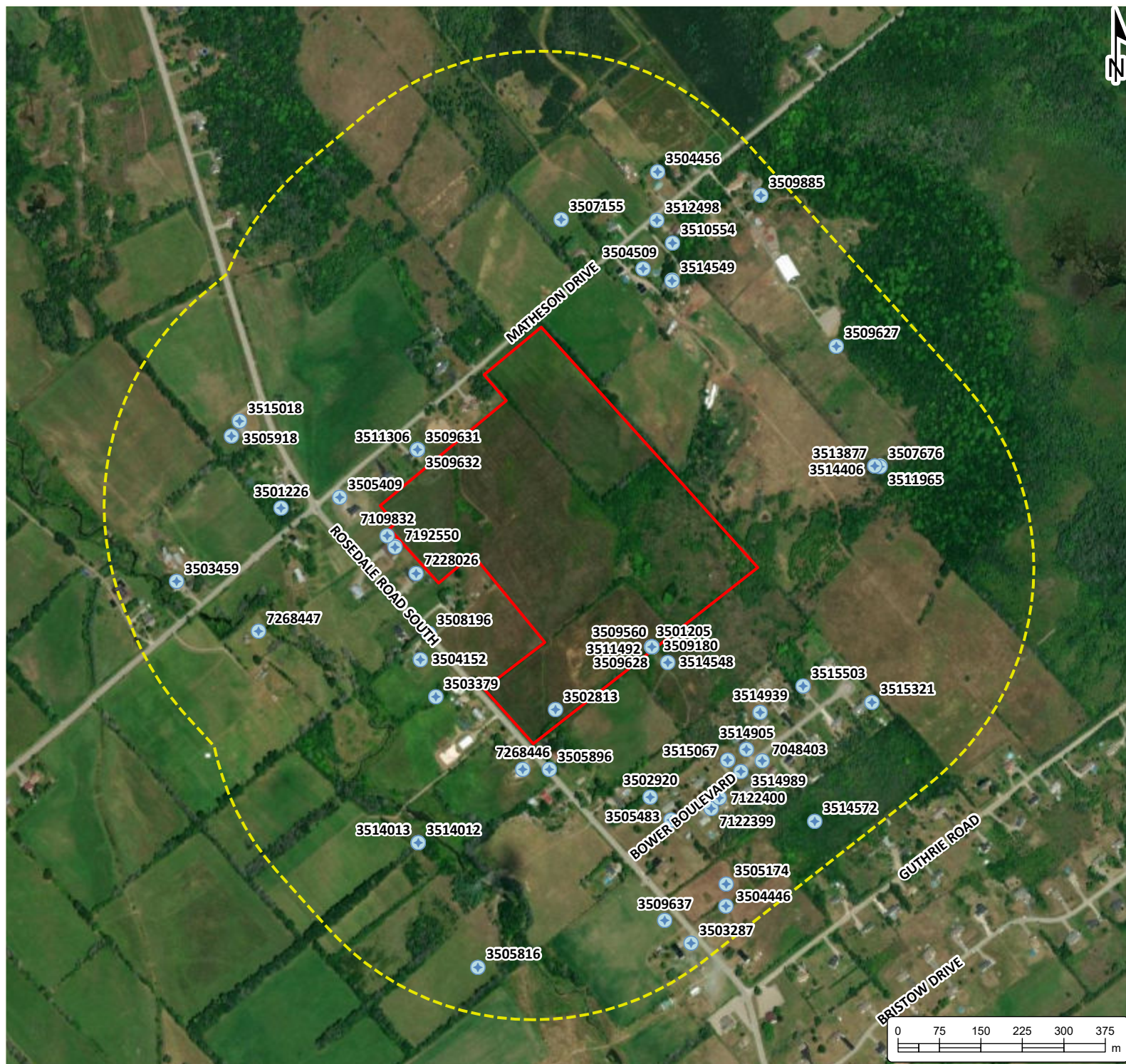


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**TEST PIT AND  
TEST WELL LOCATION PLAN**

Project No.: 19387-001	Date: December 2024
Scale: 1:4,250	Rev.: Rev.
Created by: DBB	Checked by: KH
Projection: NAD 1983 UTM Zone 18N	Figure: <b>3</b>





**HYDROGEOLOGICAL  
ASSESSMENT REPORT**  
SMART HOMES OTTAWA INC.  
Part Lot 20 Concession 3  
Montague, Ontario

**LEGEND**

- Water Well Record
- Study Area (500m)
- Site (approximate)

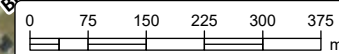
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**MECP WELL RECORDS  
WITHIN 500m**

Project No.: 19387-001	Date: July 2024
Scale: 1:9,750	Rev.: KH
Created by: DBB	Checked by: KH
Projection: NAD 1983 UTM Zone 18N	Figure: <b>4</b>



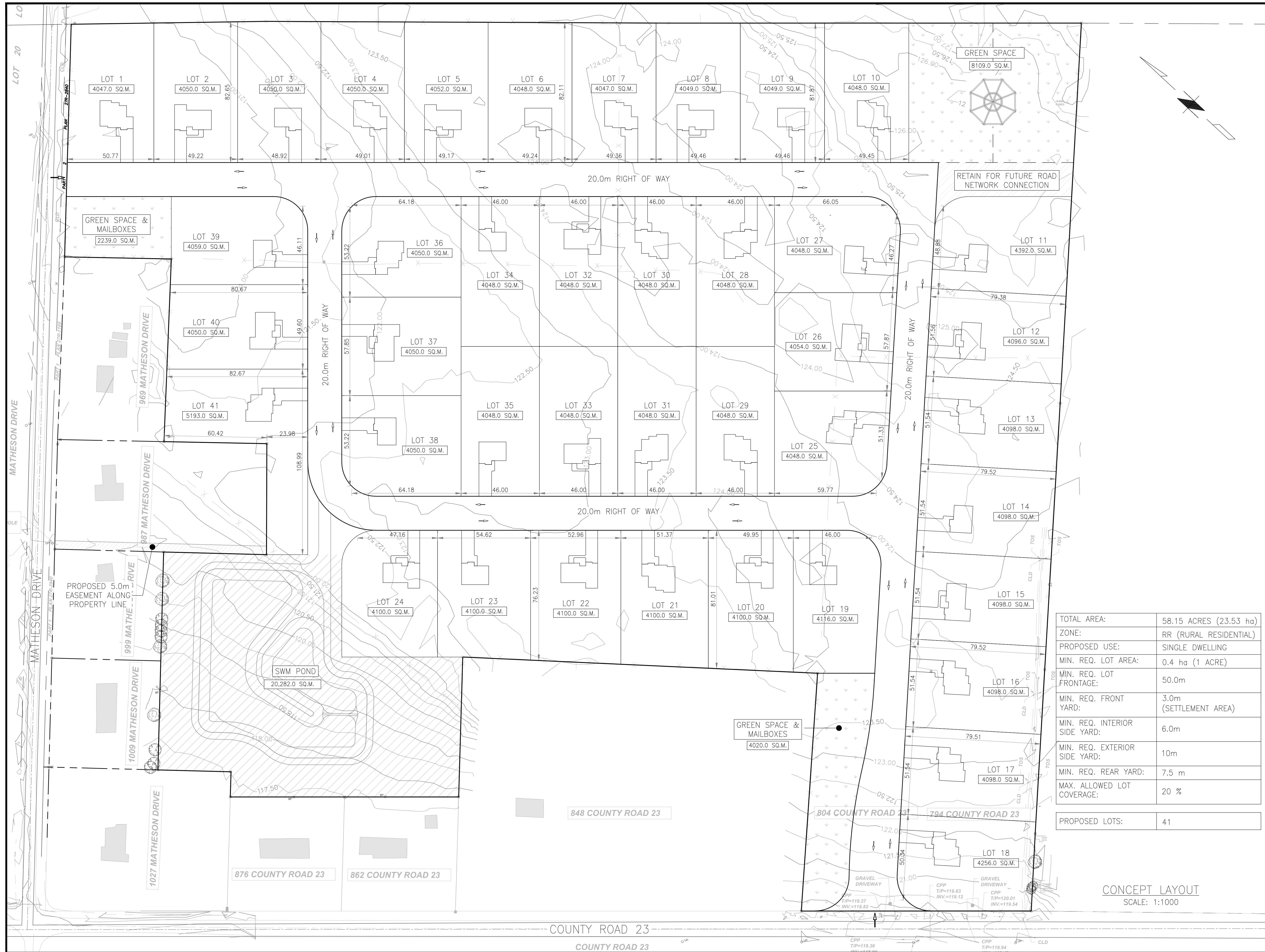




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**Appendix A**  
**Property and Land Information**

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TOTAL AREA:	58.15 ACRES (23.53 ha)
ZONE:	RR (RURAL RESIDENTIAL)
PROPOSED USE:	SINGLE DWELLING
MIN. REQ. LOT AREA:	0.4 ha (1 ACRE)
MIN. REQ. LOT FRONTAGE:	50.0m
MIN. REQ. FRONT YARD:	3.0m (SETTLEMENT AREA)
MIN. REQ. INTERIOR SIDE YARD:	6.0m
MIN. REQ. EXTERIOR SIDE YARD:	10m
MIN. REQ. REAR YARD:	7.5 m
MAX. ALLOWED LOT COVERAGE:	20 %
PROPOSED LOTS:	41

CONCEPT LAYOUT  
SCALE: 1:1000

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REFERENCES

NO. REF.	NO. DWG.	TITLE	BY
1			

DATE	REV.	REVISIONS	BY	APP'D
2024-11-18	G	ISSUED FOR DRAFT PLAN	KT	
2024-09-27	F	REDUCED LOTS	KT	RS
2024-08-30	E	MISC. REVISION	KT	RS
2024-06-10	D	REVISED LAYOUT	KT	RS
2024-05-23	C	REVISED W/ 20m ROW	KT	RS
2024-02-05	B	REVISED FOR REVIEW	KT	RS
2023-12-15	A	ISSUED FOR REVIEW	KT	RS

**DRAWING ISSUED FOR:**  
DATE: 2024 NOVEMBER 18  
 CLIENT REVIEW  BID/TENDER  CONSTRUCTION  
 INFORMATION  PERMIT  OTHER

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ARCHITECT:

CLIENT: SMART HOMES OTTAWA  
6610 FOURTH LINE RD,  
NORTH GOWER, ON  
K0A 0B5

SITE: ROSEDALE DR SOUTH/ MATHESON DR

TITLE: SUBDIVISION  
CONCEPT LAYOUT PLAN

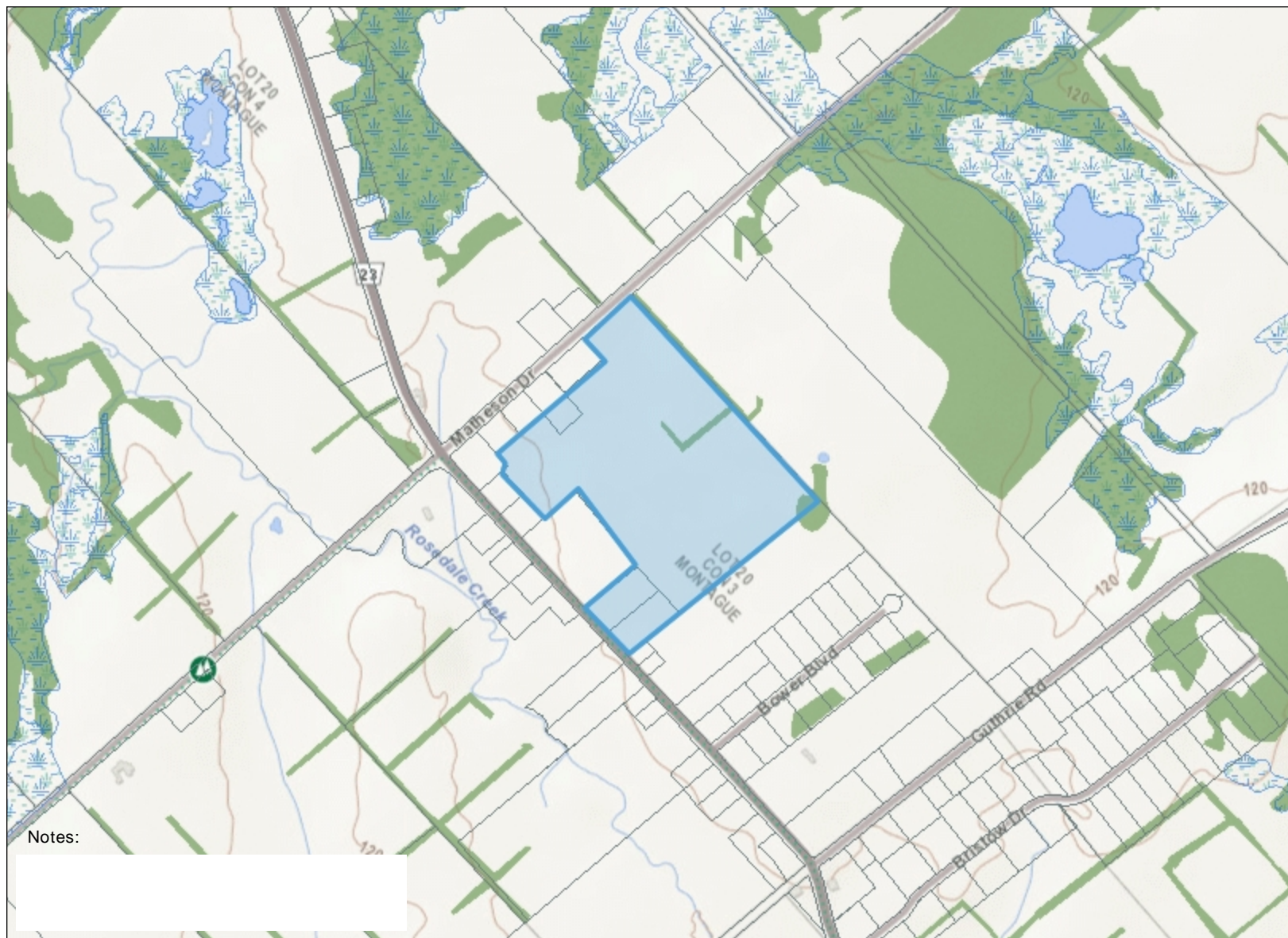
SCALE:	DATE:	DRAWN:	CHECKED:
AS SHOWN	2023/12/08	KT	RS

PROJECT NO:	DRAWING NO:	REVISION:
23-7213	1	G



# Natural Heritage Areas Map

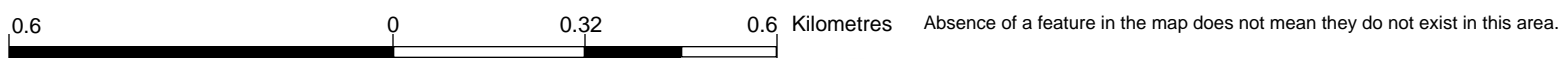
Map created:1/11/2024



### Legend

- Assessment Parcel
- ANSI**
- Earth Science Provincially Significant/sciences de la terre d'importance provinciale
- Earth Science Regionally Significant/sciences de la terre d'importance régionale
- Life Science Provincially Significant/sciences de la vie d'importance provinciale
- Life Science Regionally Significant/sciences de la vie d'importance régionale
- Evaluated Wetland
- Provincially Significant/considérée d'importance provinciale
- Non-Provincially Significant/non considérée d'importance provinciale
- Unevaluated Wetland
- Woodland
- Natural Heritage System

Notes:



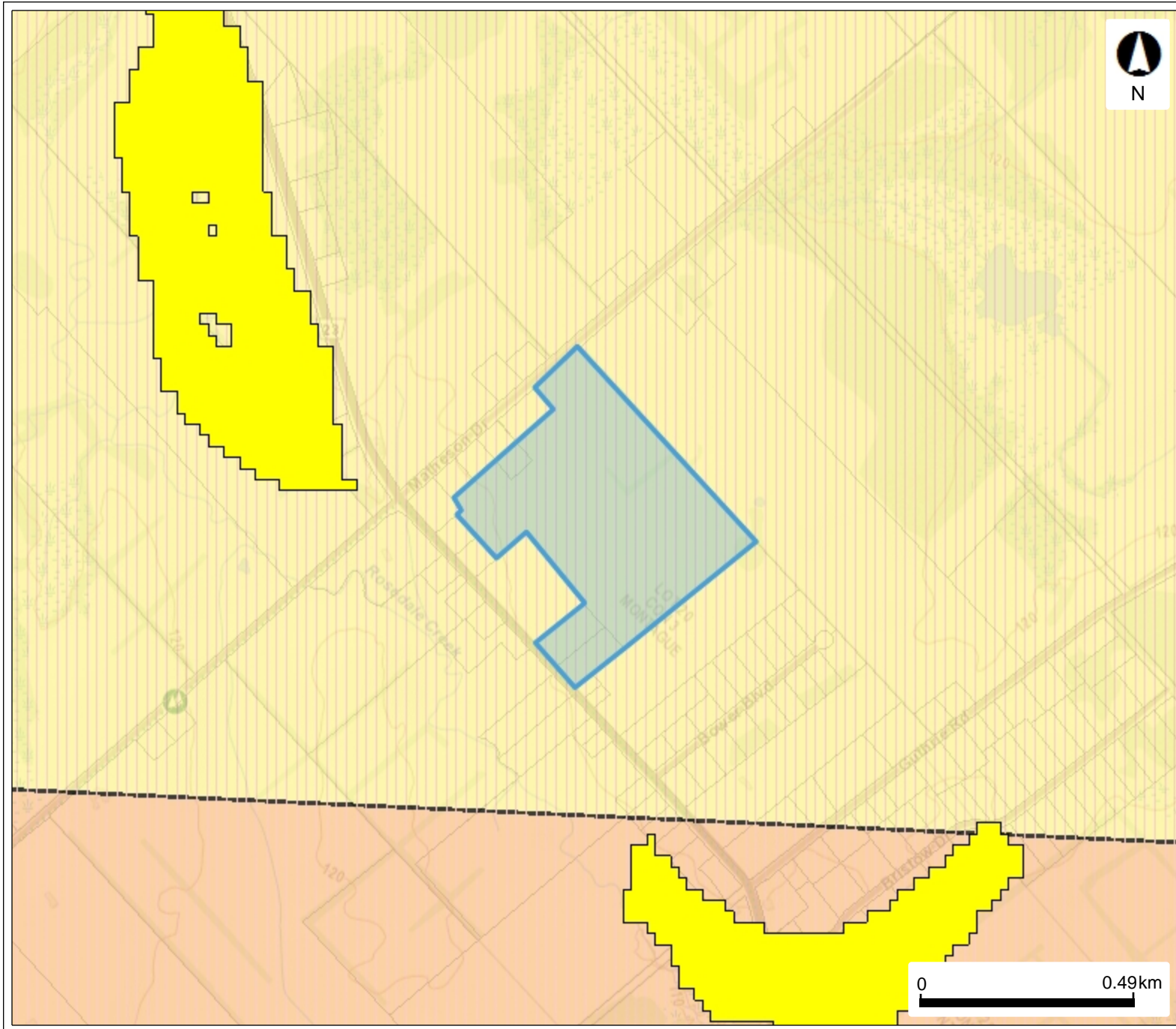
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# Source Protection Information Atlas Map



## Legend

- Significant Groundwater Recharge Area
  - N/A
  - 0
  - 2
  - 4
  - 6
- Highly Vulnerable Aquifers
- Wellhead Protection Area
  - A
  - B
  - C
  - C1
  - D
  - F
- Assessment Parcel

This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Ontario Ministry of Environment, Conservation and Parks (MECP) shall not be liable in any way for the use or any information on this map. of, or reliance upon, this map.



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**Appendix B**  
**Test Pit Logs**

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Cambium Reference # 19387-001

Date: Jan. 04. 2024  
 Weather: Sunny, windy, -10 °C  
 Logged by: MC

Test Pit ID	Depth (mbgs <sup>1</sup> )	Material	Sample
TP01-24	0.00-0.15	Topsoil	
	0.15-0.42	Brown silty sand, some gravel, trace boulders, moist, rootlets, loose	GS1
18T			
424661		Ended on bedrock at 0.42mbgs	
4975427			
TP02-24	0.00-0.25	Topsoil	
	0.25-1.00	Brown silt and sand, some clay, trace gravel, moist, rootlets, loose	GS1
18T	1.00-1.90	Brown silty sand mixed with grey clay, moist, compact	
424569	1.90-2.00	Grey silty sand, some clay, trace gravel, trace boulders, compact, wet	GS2
4975343		Ended at target depth of 2mbgs	
TP03-24	0.00-0.12	Topsoil	
	0.12-0.93	Brown silty sand, medium to coarse sand, some gravel, trace boulders, rootlets, dry, loose	GS1
18T			
424626		Ended on bedrock at 0.93mbgs	
4975211			
TP04-24	0.00-0.32	Topsoil	
18T		Ended on bedrock at 0.32mbgs	
424771			
4975122			
TP05-24	0.00-0.14	Topsoil	
18T		Ended on bedrock at 0.14mbgs	
424511			
4975116			
TP06-24	0.00-0.26	Topsoil	
	0.26-0.45	Brown sand and silt, trace gravel, wet, dense	GS1
18T			
424950		Water trickling in around bottom of TP, pooling in bottom of TP	
4975029		Ended on bedrock at 0.45mbgs	
TP07-24	0.00-0.22	Topsoil	
18T		Ended on bedrock at 0.22	
425049			
4975108			
TP08-24	0.00-0.32	Topsoil	
	0.32-0.34	Brown silty sand, moist, loose	*
18T			
425121		Ended on bedrock at 0.34mbgs	
4975246			
		* Did not sample due to hard to isolate	
Notes:			

<sup>1</sup>meters below ground surface





Cambium Reference # 19287-001

Date: Jan. 04. 2024

Weather: Sunny, windy, -10 °C

Logged by: MC

Test Pit ID	Depth (mbgs <sup>1</sup> )	Material	Sample
TP09-24	0.00-0.22	Topsoil	
	0.22-0.65	Brown sand and silt, some clay, trace gravel, moist, dense	GS1
18T	0.65-0.84	Grey clay, trace gravel, moist, dense	GS2
424924			
4975187		Ended on bedrock at 0.84mbgs	
TP10-24	0.00-0.48	Topsoil	
	0.23-0.48	Large slabs of fractured bedrock	
18T			
424810			
4975329		Ended on bedrock at 0.48mbgs	
TP11-24	0.00-0.22	Topsoil	
	0.22-0.53	Brown silts and sand, moist, loose	GS1
18T	0.53-0.64	Grey silty sand, some clay, moist, dense	GS2
424857			
4975378		Ended on bedrock at 0.64mbgs	
TP12-24	0.00-0.18	Topsoil	
		Ended on bedrock at 0.18mbgs	
18T			
424999			
4975411			
TP13-24	0.00-0.25	Topsoil	
	0.28-0.50	Brown silt and sand, trace gravel, moist, dense	GS1
18T	0.50-1.74	Grey silty sand, some clay, some gravel, trace boulder, moist, dense	GS2
424915			
4975489		Water trickling in at approximately 0.05m above bottom	
		Ended on bedrock at 1.74mbgs	
TP14-24	0.00-0.30	Topsoil	
	0.30-0.46	Orangy brown silty sand, dense, wet, slumping into hole	GS1
18T	0.46-1.08	Grey silty sand, some clay, trace gravel, wet, slumping into hole	GS2
424803			
4975628	0.5	Water trickling in and pooling around in the bottom	
		Ended on bedrock at 1.08mbgs	
TP15-24	0.00-0.20	Topsoil	
		Ended on bedrock at 0.2mbgs	
18T			
424778			
4975460			
TP16-24	0.00-0.30	Topsoil	
		Ended on bedrock at 0.3mbgs	
18T			
424702			
4975292			
Notes:			

<sup>1</sup>meters below ground surface



Cambium Reference # 19287-001

Date: Jan. 04. 2024

Weather: Sunny, windy, -10 °C

Logged by: MC

Test Pit ID	Depth (mbgs <sup>1</sup> )	Material	Sample
TP17-24	0.00-0.27	Topsoil	GS1
18T		Ended on bedrock at 0.27mbgs	
424696			
4975225			
TP18-24	0.00-0.22	Topsoil	
	0.22-0.41	Brown silt and sand, moist, dense	GS1
18T		Ended on bedrock at 0.41mbgs	
424862			
4975227			

Notes:

<sup>1</sup>meters below ground surface





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**Appendix C**  
**Grainsize Analysis Results**

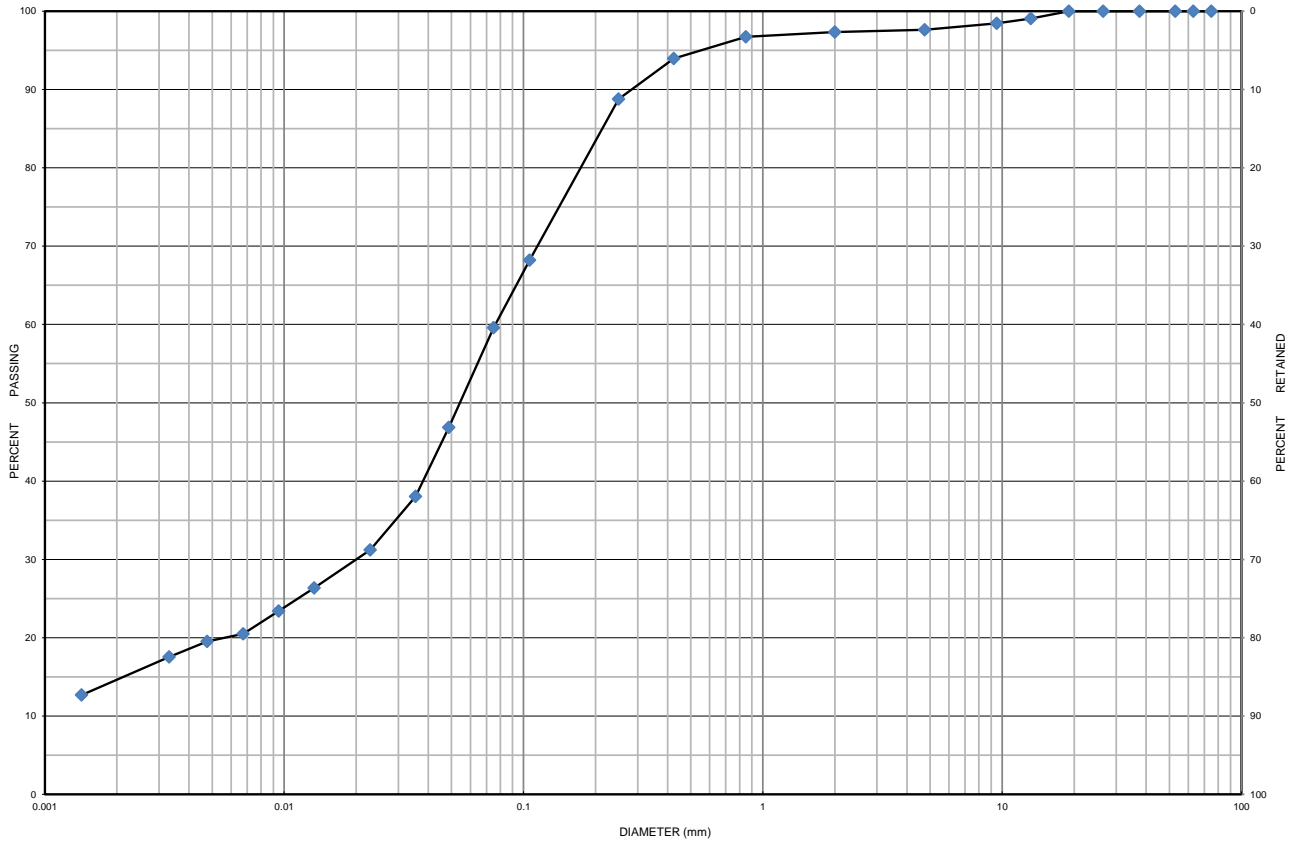
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# Grain Size Distribution Chart

**Project Number:** 19387-001      **Client:** EFI Engineering  
**Project Name:** Matheson and Rosedale Subdivision  
**Sample Date:** January 4, 2024      **Sampled By:** Maren Catt - Cambium Inc.  
**Location:** TP 02-24 GS 1      **Depth:** 0.25 m to 1.0 m      **Lab Sample No:** S-24-0118

UNIFIED SOIL CLASSIFICATION SYSTEM					
CLAY & SILT (<0.075 mm)	SAND (<4.75 mm to 0.075 mm)			GRAVEL (>4.75 mm)	
	FINE	MEDIUM	COARSE	FINE	COARSE



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
TP 02-24	GS 1	0.25 m to 1.0 m	2	38	46	14	19.4
Description		Classification	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
Silt and Sand some Clay trace Gravel		ML	0.077	0.020	-	-	-

Additional information available upon request

Issued By: *John Baird*  
 (Senior Project Manager)

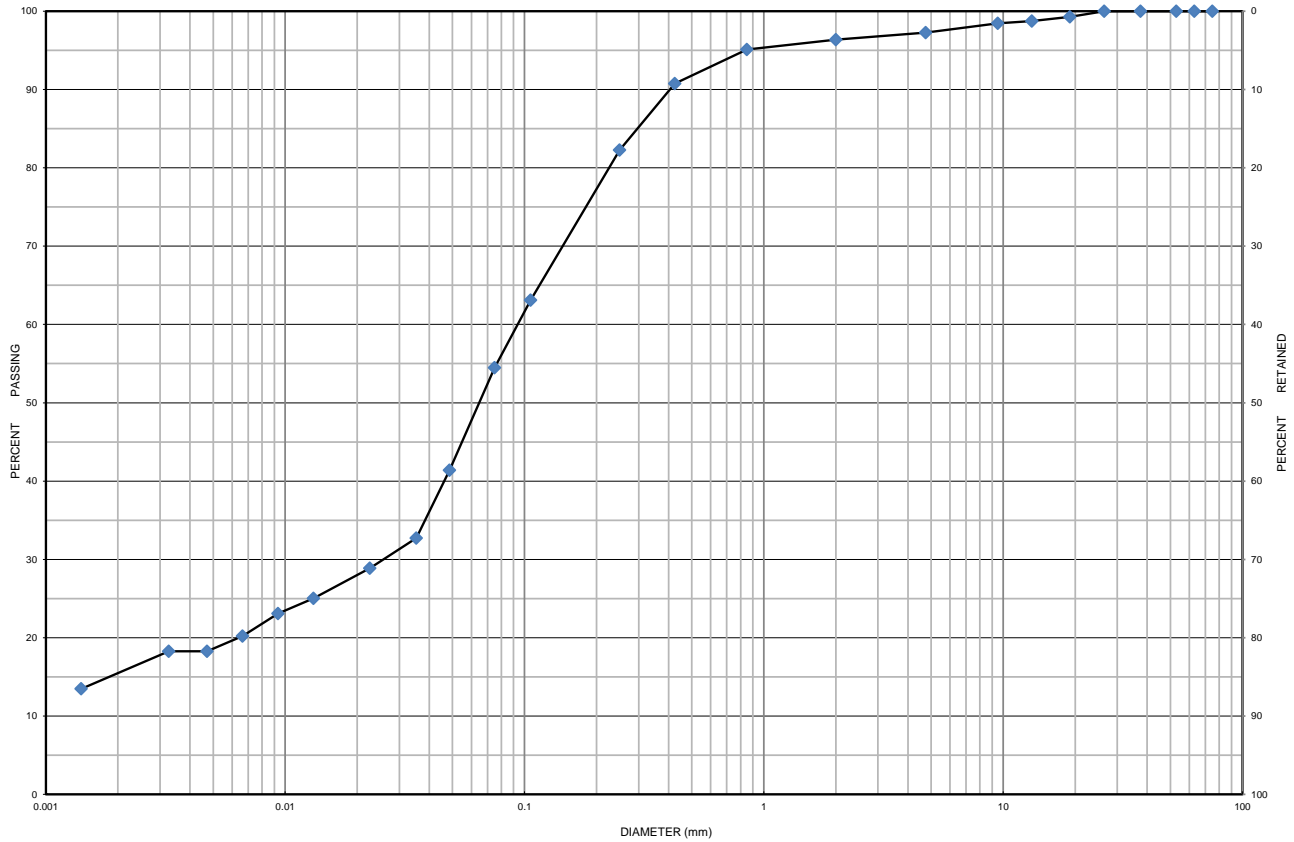
Date Issued: January 24, 2024



# Grain Size Distribution Chart

**Project Number:** 19387-001      **Client:** EFI Engineering  
**Project Name:** Matheson and Rosedale Subdivision  
**Sample Date:** January 4, 2024      **Sampled By:** Maren Catt - Cambium Inc.  
**Location:** TP 09-24 GS 1      **Depth:** 0.22 m to 0.65 m      **Lab Sample No:** S-24-0119

UNIFIED SOIL CLASSIFICATION SYSTEM					
CLAY & SILT (<0.075 mm)	SAND (<4.75 mm to 0.075 mm)			GRAVEL (>4.75 mm)	
	FINE	MEDIUM	COARSE	FINE	COARSE



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
TP 09-24	GS 1	0.22 m to 0.65 m	3	43	39	15	17.1
Description		Classification	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
Sand and Silt some Clay trace Gravel		ML	0.093	0.026	-	-	-

Additional information available upon request

Issued By: *[Signature]*  
 (Senior Project Manager)

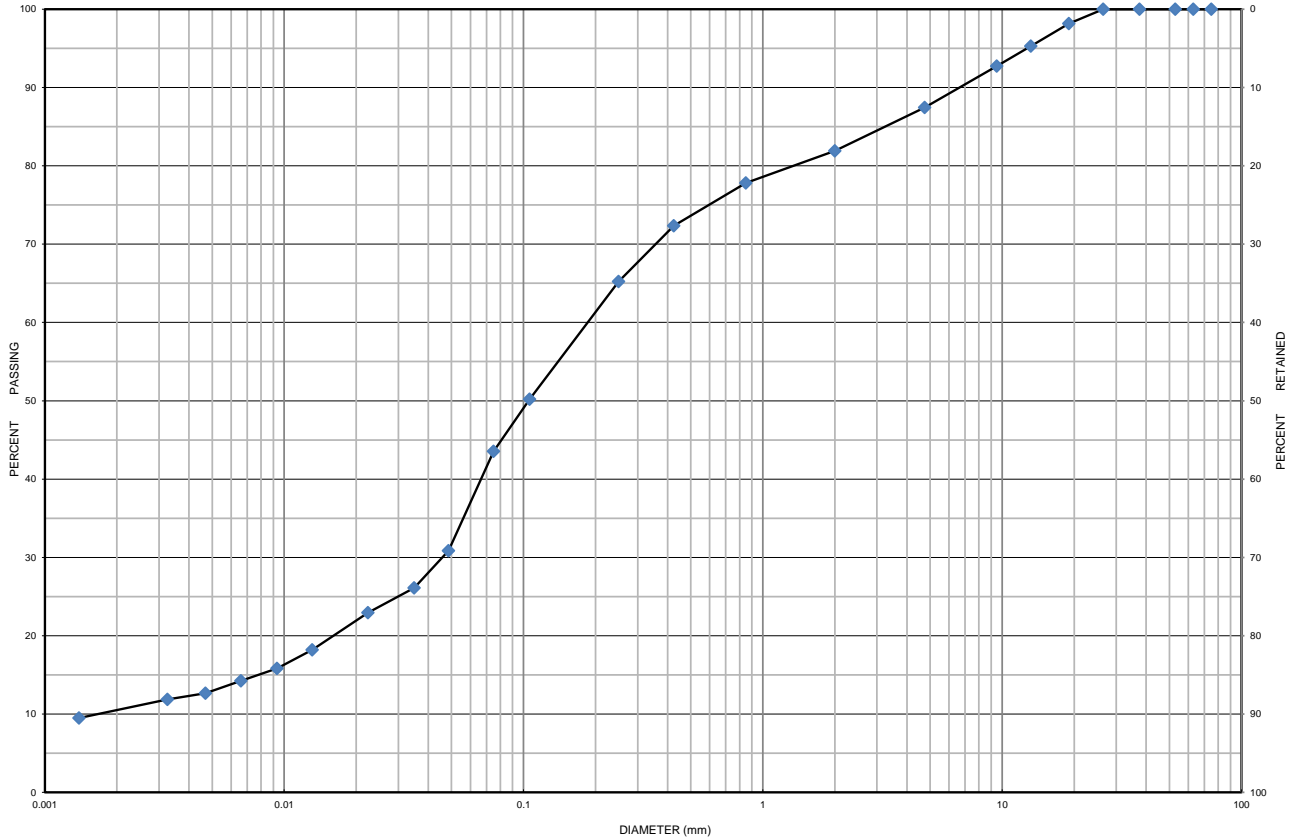
Date Issued: January 24, 2024



# Grain Size Distribution Chart

**Project Number:** 19387-001      **Client:** EFI Engineering  
**Project Name:** Matheson and Rosedale Subdivision  
**Sample Date:** January 4, 2024      **Sampled By:** Maren Catt - Cambium Inc.  
**Location:** TP 13-24 GS 2      **Depth:** 0.5 m to 1.74 m      **Lab Sample No:** S-24-0120

UNIFIED SOIL CLASSIFICATION SYSTEM					
CLAY & SILT (<0.075 mm)	SAND (<4.75 mm to 0.075 mm)			GRAVEL (>4.75 mm)	
	FINE	MEDIUM	COARSE	FINE	COARSE



MIT SOIL CLASSIFICATION SYSTEM									
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS	
		SAND			GRAVEL				

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
TP 13-24	GS 2	0.5 m to 1.74 m	13	44	32	11	9.4
Description		Classification	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	C <sub>u</sub>	C <sub>c</sub>
Silty Sand some Gravel some Clay		SM	0.1800	0.0400	0.0017	105.88	5.23

Additional information available upon request

Issued By: *John Baird*  
 (Senior Project Manager)

Date Issued: January 24, 2024



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**Appendix D**  
**Water Balance Calculations**

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# Water Balance Calculations

THORNTHWAITE-TYPE MONTHLY WATER-BALANCE MODEL												
<i>modified from Dingman 2015: Box 6-8 (pg 299) using ET model of Hamon (1963)</i>												
	Input Data					Computed Values						
											Surplus	363 mm/yr
Weather Station Location:	Drummond, ON					Latitude:	45.0 degree					
Solar Declination (degree)	-20.6	-12.6	-1.5	10.0	19.0	23.1	21.0	13.4	2.6	-9.0	-18.5	-23.0
DayLength (hr)*	9.1	10.3	11.8	13.4	14.7	15.4	15.0	13.8	12.3	10.8	9.4	8.7
Available Water Storage Capacity	0.14 m/m					Root Depth	460 mm			SOILmax	64.4 mm	

MONTHLY WATER BALANCE DATA													
Temperatures in C, water-balance terms in mm.													
Month:	J	F	M	A	M	J	J	A	S	O	N	D	Year
TEMPERATURE (T)	-9.8	-8.5	-2.0	6.0	12.7	17.8	20.3	19.1	14.4	7.8	1.6	-5.8	
PRECIPITATION (P)	67.7	51.3	55.1	64.2	77.0	82.4	83.5	75.3	91.8	78.5	83.6	65.9	876
RAIN	24.1	15.9	28.6	53.0	76.9	82.4	83.5	75.3	91.8	76.3	67.8	26.7	702
SNOW	44	35	27	11	0	0	0	0	0	2	16	39	174
MELT FACTOR (F)	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.27	0.00	
PACK	94	130	156	0	0	0	0	0	0	0	12	51	
MELT	0	0	0	167	0	0	0	0	0	2	4	0	174
INPUT (W)	24	16	29	220	77	82	84	75	92	79	72	27	876
POTENTIAL ET (PET)	0	0	0	40	70	96	113	97	63	38	21	0	538
NET INPUT (ΔW)	24	16	29	180	7	-14	-29	-22	29	41	51	27	
SOIL MOISTURE (SOIL)	64	64	64	64	64	52	33	23	52	64	64	64	
ΔSOIL	0	0	0	0	0	-13	-19	-9	29	12	0	0	
ET	0	0	0	40	70	95	102	85	63	38	21	0	514
SURPLUS=W-ET-DSOIL	24	16	29	180	7	0	0	0	0	29	51	27	363

Notes:

Precipitation, Rain, Temperature, and Latitude are inputted parameters

SOILmax = available water storage capacity \* root depth

m = month

D = Day length (hrs) =  $2 * \cos^{-1}(-\tan(\text{Latitude}) * \tan(\text{Declination}))/0.2618$  [calculation is in radians]

$SNOW_m = P_m - RAIN_m$

$F_m = 0$  if  $T_m \leq 0^\circ C$ ;  $F_m = 0.167 * T_m$  if  $0^\circ C < T_m < 6^\circ C$ ;  $F_m = 1$  if  $T_m \geq 6^\circ C$

$PACK_m = (1 - F_m) * (SNOW_m + PACK_{m-1})$

$MELT = F_m * (SNOW_m + PACK_{m-1})$

$W_m = RAIN_m + MELT_m$

PET = 0 if  $T_m < 0$ ; otherwise PET =  $2.98 * 0.611 * \exp(17.3 * T_m / (T_m + 237)) / (T_m + 237.2) * \text{Number of days in month}$  [Hamon ET model (1963)]

$\Delta W_m = W_m - PET_m$

SOIL =  $\min\{\Delta W_m + SOIL_{m-1}, SOIL_{max}\}$ , if  $\Delta W_m > 0$ ; otherwise SOIL =  $SOIL_{m-1} * \exp(\Delta W / SOIL_{max})$

$\Delta SOIL = SOIL_{m-1} - SOIL_m$

ET = PET if  $W_m > PET$ ; otherwise, ET =  $W_m - \Delta SOIL$



## Nitrate Attenuation

### Calculations for Subdivision Development - 41 Lots

#### Input Data

#### Computed Values

#### Areas

#### Total

LOT AREA (m <sup>2</sup> )	235300
BLDG FOOTPRINT (m <sup>2</sup> )	0
ROAD AREA (m <sup>2</sup> )	0
Available Infiltration Area (m <sup>2</sup> )	235300

#### Surplus water

0.363 m/yr
9.94E-04 m/day
233.8056 m <sup>3</sup> /day

#### Infiltration Factor

Hilly to Rolling land	0.15
Silty Sand	0.3
Cultivated land	0.1
Total	0.55

#### Infiltrated water

0.000547 m/day
128.5931 m <sup>3</sup> /day

Runoff 105.2125 m<sup>3</sup>/day

### PREDICTED NITRATE CONCENTRATIONS

41 lots

Qe	41000
Ce	40
Qi	128593.1
Ci	0.4
Qt	169593.1

**mg/L 9.97**



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**Appendix E**  
**Water Well Survey Results**

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Ministry of the Environment, Conservation and Parks

We Tag#: **A395660** (nt Below)  
**A395660**

**Well Record**

Regulation 903 Ontario Water Resources Act

Measurements recorded in:  Metric  Imperial

Page      of     

**Well Owner's Information**

First Name: \_\_\_\_\_ Last Name/Organization: **Smart Homes Ottawa Inc** E-mail Address: \_\_\_\_\_  Well Constructed by Well Owner

Mailing Address (Street Number/Name): **6610 Fourth Line Road** Municipality: **North Gower** Province: **ON** Postal Code: **K0A 2T0** Telephone No. (inc. area code): \_\_\_\_\_

**Well Location**

Address of Well Location (Street Number/Name): **Rosedale Road South (No civic)** Township: **Montague** Lot: **19** Concession: **4**

County/District/Municipality: **Lanark** City/Town/Village: **Smith Falls** Province: **Ontario** Postal Code: \_\_\_\_\_

UTM Coordinates: Zone: **18** Easting: **424769** Northing: **4975272** Municipal Plan and Sublot Number: \_\_\_\_\_ Other: **TW#1/3**

**Overburden and Bedrock Materials/Abandonment Sealing Record** (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
	Top Soil			0'	2'
Brown	Sandstone			2'	18'
Grey	Sandstone			18'	68'
Grey	Sandstone			68'	74'
Grey	Sandstone			74'	80'

\* Test Well # 1 / 3 \*

**Annular Space**

Depth Set at (m/ft) From: **20'** To: **0'** Type of Sealant Used (Material and Type): **Neat cement** Volume Placed (m³/ft³): **7.80**

**Method of Construction**

Cable Tool  Diamond  Public  Commercial  Not used  
 Rotary (Conventional)  Jetting  Domestic  Municipal  Dewatering  
 Rotary (Reverse)  Driving  Livestock  Test Hole  Monitoring  
 Boring  Digging  Irrigation  Cooling & Air Conditioning  
 Air percussion  Industrial  Other, specify \_\_\_\_\_  
 Other, specify \_\_\_\_\_

**Construction Record - Casing**

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
<b>6 1/4"</b>	<b>Steel</b>	<b>.188</b>	<b>+2'</b>	<b>20'</b>
<b>6"</b>	<b>Open Hole</b>		<b>20'</b>	<b>80'</b>

**Status of Well**

Water Supply  Replacement Well  Test Hole  Recharge Well  Dewatering Well  Observation and/or Monitoring Hole  Alteration (Construction)  Abandoned, Insufficient Supply  Abandoned, Poor Water Quality  Abandoned, other, specify \_\_\_\_\_  Other, specify \_\_\_\_\_

**Construction Record - Screen**

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To

**Water Details**

Water found at Depth: **68 88** (m/ft) Kind of Water:  Fresh  Untested  Gas  Other, specify \_\_\_\_\_

Water found at Depth: **74** (m/ft) Kind of Water:  Fresh  Untested  Gas  Other, specify \_\_\_\_\_

Water found at Depth: **74** (m/ft) Kind of Water:  Fresh  Untested  Gas  Other, specify \_\_\_\_\_

**Well Contractor and Well Technician Information**

Business Name of Well Contractor: **Air Rock Drilling Co. Ltd.** Well Contractor's Licence No.: **C7881**

Business Address (Street Number/Name): **6609 Franktown Road** Municipality: **Richmond**

Province: **ON** Postal Code: **K0A 2Z0** Business E-mail Address: **air-rock@sympatico.ca**

Bus. Telephone No. (inc. area code): **6138882170** Name of Well Technician (Last Name, First Name): **Hanna, Jeremy**

Well Technician's Licence No.: **T3632** Signature of Technician and/or Contractor: \_\_\_\_\_ Date: **2024 02 29**

**Results of Well Yield Testing**

After test of well yield, water was:  Clear and sand free  Other, specify **Not tested**

If pumping discontinued, give reason:  \_\_\_\_\_

Pump intake set at (m/ft): **70**

Pumping rate (l/min/GPM): **20**

Duration of pumping: **1 hrs + 0 min**

Final water level end of pumping (m/ft): **32.8"**

If flowing give rate (l/min/GPM):  \_\_\_\_\_

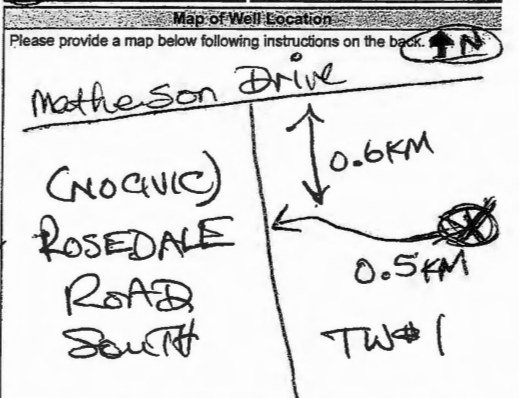
Time (min)	Draw Down		Recovery	
	Water Level (m/ft)	Time (min)	Water Level (m/ft)	Time (min)
Static Level	<b>31.8"</b>		<b>32.8"</b>	
1	<b>32.2</b>	1	<b>31.8</b>	
2	<b>32.4</b>	2	<b>31.8</b>	
3	<b>32.5</b>	3	<b>31.8</b>	
4	<b>32.6</b>	4	<b>31.8</b>	
5	<b>32.6</b>	5	<b>31.8</b>	
10	<b>32.7</b>	10	<b>31.8</b>	
15	<b>32.7</b>	15	<b>31.8</b>	
20	<b>32.8</b>	20	<b>31.8</b>	
25	<b>32.8</b>	25	<b>31.8</b>	
30	<b>32.8</b>	30	<b>31.8</b>	
40	<b>32.8</b>	40	<b>31.8</b>	
50	<b>32.8</b>	50	<b>31.8</b>	
60	<b>32.8</b>	60	<b>31.8</b>	

Recommended pump depth (m/ft): **70'**

Recommended pump rate (l/min/GPM): **10**

Well production (l/min/GPM): **20**

Disinfected?  Yes  No



Comments: **1/2 HR 10 GPM @ 70 FF**

Well owner's information package delivered:  Yes  No

Date Package Delivered: **2024 01 23**

Ministry Use Only: Audit No.: **2408031**

Received: \_\_\_\_\_



Ministry of the Environment, Conservation and Parks

W Tag#: A395659 (Print Below) A395659

Well Record Regulation 903 Ontario Water Resources Act

Measurements recorded in:  Metric  Imperial

Page \_\_\_ of \_\_\_

Well Owner's Information

First Name, Last Name/Organization (Smart Homes Ottawa Inc), E-mail Address, Mailing Address (6610 Fourth Line Road), Municipality (North Gower), Province (ON), Postal Code (K0A1ZT0), Telephone No.

Well Location

Address of Well Location (Rosedale Road South), Township (Montague), Lot (19), Concession (4), County/District/Municipality (Lanark), City/Town/Village (Smith Falls), Province (Ontario), UTM Coordinates, Municipal Plan and Sublot Number, Other (TW#2/3)

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

Table with columns: General Colour, Most Common Material, Other Materials, General Description, Depth (m/ft) From, To. Includes handwritten note: \* Test well #2 / 3 \*

Annular Space table with columns: Depth Set at (m/ft) From, To; Type of Sealant Used; Volume Placed (m³/G)

Method of Construction and Well Use checkboxes: Cable Tool, Rotary, Boring, Air percussion, etc.

Construction Record - Casing table with columns: Inside Diameter, Open Hole OR Material, Wall Thickness, Depth (m/ft) From, To

Construction Record - Screen table with columns: Outside Diameter, Material, Slot No., Depth (m/ft) From, To

Water Details and Hole Diameter tables with columns for water depth, kind of water, and hole dimensions

Well Contractor and Well Technician Information: Business Name (Air Rock Drilling Co. Ltd.), Well Contractor's Licence No. (C7881), Business Address (3030 Franktown Road), Province (ON), Postal Code (K0A1Z20), Business E-mail Address (air-rock@sympatico.ca), Name of Well Technician (Hanna, Jeremy), Signature, Date Submitted (2024 02 29)

Results of Well Yield Testing table with columns: After test of well yield, water was; Draw Down (Time, Water Level, Recovery); Pumping rate; Duration of pumping; Final water level end of pumping; If flowing give rate; Recommended pump depth; Recommended pump rate; Well production

Map of Well Location: Includes handwritten map showing location relative to Rosedale Road South, with distances of 0.6km and 0.7km, and well identifier TW#2. Comments: 1/2 HP - 10 GPM @ 80 FT



Ministry of the Environment, Conservation and Parks

W Tag#: A395658 (Print Below)

Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in:  Metric  Imperial

A395658

Page \_\_\_ of \_\_\_

Well Owner's Information

First Name, Last Name/Organization (Smart Homes Ottawa Inc), E-mail Address, Mailing Address (6610 Fourth Line Road), Municipality (North Gower), Province (ON), Postal Code (K0A 2T0), Telephone No.

Well Location

Address of Well Location (Rosedale Road South), Township (Montague), Lot (19), Concession (4), County/District (Lanark), City/Town/Village (Smith Falls), Province (Ontario), UTM Coordinates, Municipal Plan and Sublot Number, Other (TW#3/3)

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

Table with columns: General Colour, Most Common Material, Other Materials, General Description, Depth From, Depth To. Includes handwritten notes like 'w/ Black Limestone mix' and 'Test well # 3 / 3'.

Annular Space section: Depth Set at (20' to 0'), Type of Sealant Used (Neat cement), Volume Placed (7.80).

Method of Construction and Well-Use section: Includes checkboxes for Cable Tool, Rotary, Boring, etc., and Public, Commercial, Domestic, etc.

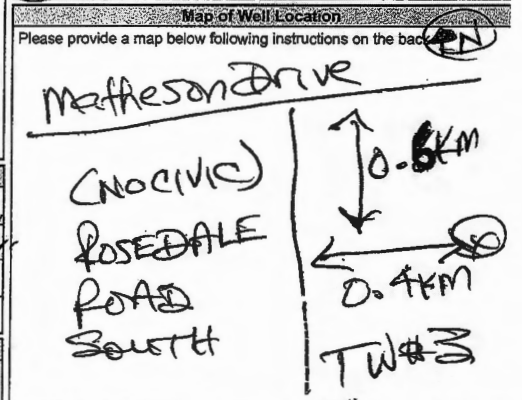
Construction Record - Casing section: Inside Diameter (6 1/4"), Open Hole OR Material (Steel), Wall Thickness (.188), Depth (20' to 82').

Construction Record - Screen section: Outside Diameter, Material, Slot No., Depth (From/To).

Water Details and Hole Diameter section: Water found at Depth (76.78 m), Kind of Water, Hole Diameter (20' to 82').

Well Contractor and Well Technician Information section: Business Name (Air Rock Drilling Co. Ltd.), Well Contractor's Licence No. (C7881), Business Address (8859 Franktown Road), Province (ON), Postal Code (K0A 2Z0), Business E-mail Address (air-rock@sympatico.ca), Bus. Telephone No. (613-882-1170), Name of Well Technician (Hanna, Jeremy), Well Technician's Licence No. (T3632), Signature, Date Submitted (2024/02/29).

Results of Well Yield Testing table: After test of well yield, water was: Clear and sand free, Other, specify Not tested. Draw Down and Recovery data table with columns: Time (min), Water Level (m/ft), Time (min), Water Level (m/ft).



Comments: 1/2 HP - 10 GPM @ 70 FT. Well owner's information package delivered (Yes/No), Date Package Delivered (2024/02/29), Ministry Use Only (Audit No. 2408033, Received).



Measurements recorded in:  Metric  Imperial

Page \_\_\_ of \_\_\_

Well Owner's Information

First Name: Last Name/Organization: Smart Homes Ottawa Inc E-mail Address:  Well Constructed by Well Owner

Mailing Address (Street Number/Name): 6610 Fourth Line Road Municipality: North Gower Province: ON Postal Code: K0A 2T0 Telephone No. (inc. area code):

Well Location

Address of Well Location (Street Number/Name): 987 Matheson Drive Township: Montague Lot: 20 Concession: 3

County/District/Municipality: Lanark City/Town/Village: Smiths Falls Province: Ontario Postal Code:

UTM Coordinates: Zone: Easting: Northing: Municipal Plan and Sublot Number: Other:

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

Table with columns: General Colour, Most Common Material, Other Materials, General Description, Depth (m/ft) From, To. Includes handwritten entry: Broken Rock.

Annular Space table with columns: Depth Set at (m/ft) From, To; Type of Sealant Used (Material and Type); Volume Placed (m³/G).

Method of Construction and Well Use table with checkboxes for Cable Tool, Rotary, Boring, etc.

Construction Record - Casing table with columns: Inside Diameter (cm/ft), Open Hole OR Material, Wall Thickness (cm/ft), Depth (m/ft) From, To.

Construction Record - Screen table with columns: Outside Diameter (cm/in), Material, Slot No., Depth (m/ft) From, To.

Water Details and Hole Diameter table with columns: Water found at Depth (m/ft), Kind of Water, Hole Diameter (m/ft) From, To.

Well Contractor and Well Technician Information: Business Name of Well Contractor: Air Rock Drilling Co. Ltd.

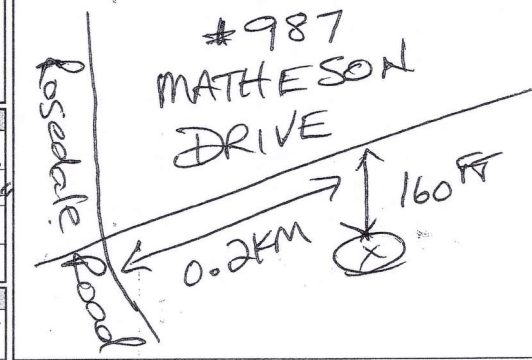
Province: ON Postal Code: K0A 2Z0 Business E-mail Address: air-rock@sympatico.ca

Bus. Telephone No. (inc. area code): 6138382170 Name of Well Technician (Last Name, First Name): Hanna, Jeremy

Well Technician's Licence No.: 13632 Signature of Technician and/or Contractor: Date Spooled: 10 31

Results of Well Yield Testing table with columns: Draw Down (Time, Water Level), Recovery (Time, Water Level).

Map of Well Location



Comments: 1/2HP-10GPM Set @ 70 FT

Well owner's information package delivered (Yes/No) and Ministry Use Only (Audit No. 2407946) section.

# Water Well Records Summary Report

Produced by Cambium Inc. using MOECP Water Well Information System (WWIS)

All units in meters unless otherwise specified



<b>Well ID:</b> 3501204	<b>Easting:</b> 425346	<b>UTM Zone</b> 18		
<b>Construction Date:</b> 1952-06-20	<b>Northing:</b> 4974622	<b>Positional Accuracy:</b> unknown UTM		
<b>Well Depth:</b> 18.3	<b>Water Kind</b> FRESH	<b>Pump Rate (LPM):</b> 59		
<b>Well Diameter (cm):</b> 15.2	<b>Final Status</b> Water Supply	<b>Recommended Pump Rate:</b>		
<b>Water First Found:</b> 18.3	<b>Primary Water Use:</b> Livestock	<b>Pumping Duration (h:m):</b> 2 : 0		
<b>Static Level:</b> 6				
<b>Layer:</b>	<b>Driller's Description:</b>	<b>Top:</b>	<b>Bottom:</b>	
1	LIMESTONE	0	18.3	

<b>Well ID:</b> 3501205	<b>Easting:</b> 424991	<b>UTM Zone</b> 18		
<b>Construction Date:</b> 1967-09-20	<b>Northing:</b> 4975034	<b>Positional Accuracy:</b> unknown UTM		
<b>Well Depth:</b> 15.2	<b>Water Kind</b> FRESH	<b>Pump Rate (LPM):</b> 32		
<b>Well Diameter (cm):</b> 15.2	<b>Final Status</b> Water Supply	<b>Recommended Pump Rate:</b> 23		
<b>Water First Found:</b> 14.3	<b>Primary Water Use:</b> Domestic	<b>Pumping Duration (h:m):</b> 1 : 0		
<b>Static Level:</b> 6				
<b>Layer:</b>	<b>Driller's Description:</b>	<b>Top:</b>	<b>Bottom:</b>	
1	CLAY	0	1.22	
2	LIMESTONE	1.22	15.2	

<b>Well ID:</b> 3501206	<b>Easting:</b> 425370	<b>UTM Zone</b> 18		
<b>Construction Date:</b> 1953-02-03	<b>Northing:</b> 4974622	<b>Positional Accuracy:</b> unknown UTM		
<b>Well Depth:</b> 14.3	<b>Water Kind</b> FRESH	<b>Pump Rate (LPM):</b> 36		
<b>Well Diameter (cm):</b> 15.2	<b>Final Status</b> Water Supply	<b>Recommended Pump Rate:</b>		
<b>Water First Found:</b> 12.2	<b>Primary Water Use:</b> Livestock	<b>Pumping Duration (h:m):</b> 1 : 0		
<b>Static Level:</b> 7				
<b>Layer:</b>	<b>Driller's Description:</b>	<b>Top:</b>	<b>Bottom:</b>	
1	TOPSOIL	0	1.83	
2	SANDSTONE	1.83	14.3	

<b>Well ID:</b> 3501226	<b>Easting:</b> 424326	<b>UTM Zone</b> 18		
<b>Construction Date:</b> 1962-01-22	<b>Northing:</b> 4975302	<b>Positional Accuracy:</b> margin of error : 100 m - 300 m		
<b>Well Depth:</b> 19.8	<b>Water Kind</b> FRESH	<b>Pump Rate (LPM):</b> 23		
<b>Well Diameter (cm):</b> 10.2	<b>Final Status</b> Water Supply	<b>Recommended Pump Rate:</b> 23		
<b>Water First Found:</b> 16.8	<b>Primary Water Use:</b> Livestock	<b>Pumping Duration (h:m):</b> 1 : 0		
<b>Static Level:</b> 6				
<b>Layer:</b>	<b>Driller's Description:</b>	<b>Top:</b>	<b>Bottom:</b>	
1	TOPSOIL	0	6.1	
2	LIMESTONE	6.1	19.8	

**Well ID:** 3502813      **Easting:** 424821      **UTM Zone** 18  
**Construction Date:** 1971-08-06      **Northing:** 4974942      **Positional Accuracy:** margin of error : 30 m - 100 m

**Well Depth:** 19.8      **Water Kind** FRESH      **Pump Rate (LPM):** 36  
**Well Diameter (cm):** 15.2      **Final Status** Water Supply      **Recommended Pump Rate:** 36  
**Water First Found:** 18.9      **Primary Water Use:** Domestic      **Pumping Duration (h:m):** 1 : 0  
**Static Level:** 8

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.30
2	CLAY	0.30	1.22
3	SANDSTONE	1.22	19.8

**Well ID:** 3502920      **Easting:** 424991      **UTM Zone** 18  
**Construction Date:** 1972-01-20      **Northing:** 4974762      **Positional Accuracy:** margin of error : 30 m - 100 m

**Well Depth:** 23.2      **Water Kind** FRESH      **Pump Rate (LPM):** 55  
**Well Diameter (cm):** 15.2      **Final Status** Water Supply      **Recommended Pump Rate:** 55  
**Water First Found:** 18.3      **Primary Water Use:** Domestic      **Pumping Duration (h:m):** 0 : 30  
**Static Level:** 13

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.30
2	SANDSTONE	0.30	23.2

**Well ID:** 3503379      **Easting:** 424609      **UTM Zone** 18  
**Construction Date:** 1973-09-13      **Northing:** 4974956      **Positional Accuracy:** margin of error : 30 m - 100 m

**Well Depth:** 25      **Water Kind** Not stated      **Pump Rate (LPM):** 91  
**Well Diameter (cm):** 15.2      **Final Status** Water Supply      **Recommended Pump Rate:** 91  
**Water First Found:** 23.8      **Primary Water Use:** Domestic      **Pumping Duration (h:m):** 0 : 30  
**Static Level:** 11

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.61
2	LIMESTONE	0.61	10.4
3	SANDSTONE	10.4	23.5
4	SANDSTONE	23.5	24.1
5	SANDSTONE	24.1	25

**Well ID:** 3504152      **Easting:** 424581      **UTM Zone** 18  
**Construction Date:** 1975-12-11      **Northing:** 4975022      **Positional Accuracy:** margin of error : 100 m - 300 m

**Well Depth:** 20.4      **Water Kind** FRESH      **Pump Rate (LPM):** 73  
**Well Diameter (cm):** 15.2      **Final Status** Water Supply      **Recommended Pump Rate:** 73  
**Water First Found:** 18.9      **Primary Water Use:** Domestic      **Pumping Duration (h:m):** 0 : 30  
**Static Level:** 9

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	2.13
2	LIMESTONE	2.13	9.14
3	SANDSTONE	9.14	20.4

<b>Well ID:</b> 3504446	<b>Easting:</b> 425131	<b>UTM Zone</b> 18		
<b>Construction Date:</b> 1976-09-28	<b>Northing:</b> 4974572	<b>Positional Accuracy:</b> margin of error : 100 m - 300 m		
<b>Well Depth:</b> 23.2	<b>Water Kind:</b> FRESH	<b>Pump Rate (LPM):</b> 50		
<b>Well Diameter (cm):</b> 15.2	<b>Final Status:</b> Water Supply	<b>Recommended Pump Rate:</b> 50		
<b>Water First Found:</b> 21.6	<b>Primary Water Use:</b> Domestic	<b>Pumping Duration (h:m):</b> 0 : 30		
<b>Static Level:</b> 12				
<b>Layer: Driller's Description: Top: Bottom:</b>				
1	TOPSOIL	0	0.30	
2	SANDSTONE	0.30	23.2	

<b>Well ID:</b> 3504456	<b>Easting:</b> 425006	<b>UTM Zone</b> 18		
<b>Construction Date:</b> 1976-10-01	<b>Northing:</b> 4975897	<b>Positional Accuracy:</b> margin of error : 100 m - 300 m		
<b>Well Depth:</b> 24.4	<b>Water Kind:</b> FRESH	<b>Pump Rate (LPM):</b> 273		
<b>Well Diameter (cm):</b> 15.2	<b>Final Status:</b> Water Supply	<b>Recommended Pump Rate:</b> 227		
<b>Water First Found:</b> 22.3	<b>Primary Water Use:</b> Domestic	<b>Pumping Duration (h:m):</b> 1 : 0		
<b>Static Level:</b> 4				
<b>Layer: Driller's Description: Top: Bottom:</b>				
1	SANDSTONE	0	24.4	

<b>Well ID:</b> 3504509	<b>Easting:</b> 424981	<b>UTM Zone</b> 18		
<b>Construction Date:</b> 1976-12-09	<b>Northing:</b> 4975722	<b>Positional Accuracy:</b> margin of error : 100 m - 300 m		
<b>Well Depth:</b> 25.3	<b>Water Kind:</b> Not stated	<b>Pump Rate (LPM):</b> 64		
<b>Well Diameter (cm):</b> 15.2	<b>Final Status:</b> Water Supply	<b>Recommended Pump Rate:</b> 45		
<b>Water First Found:</b> 25.3	<b>Primary Water Use:</b> Livestock	<b>Pumping Duration (h:m):</b> 1 : 20		
<b>Static Level:</b> 11				
<b>Layer: Driller's Description: Top: Bottom:</b>				
1	CLAY	0	0.30	
1	CLAY	0	0.30	
1	CLAY	0	0.30	
1	CLAY	0	0.30	
2	LIMESTONE	0.30	25.3	
2	LIMESTONE	0.30	25.3	
2	LIMESTONE	0.30	25.3	
2	LIMESTONE	0.30	25.3	

<b>Well ID:</b> 3505174	<b>Easting:</b> 425131	<b>UTM Zone</b> 18		
<b>Construction Date:</b> 1978-09-16	<b>Northing:</b> 4974622	<b>Positional Accuracy:</b> margin of error : 100 m - 300 m		
<b>Well Depth:</b> 19.5	<b>Water Kind:</b> FRESH	<b>Pump Rate (LPM):</b> 55		
<b>Well Diameter (cm):</b> 15.2	<b>Final Status:</b> Water Supply	<b>Recommended Pump Rate:</b> 55		
<b>Water First Found:</b> 18.3	<b>Primary Water Use:</b> Domestic	<b>Pumping Duration (h:m):</b> 0 : 30		
<b>Static Level:</b> 14				
<b>Layer: Driller's Description: Top: Bottom:</b>				
1	SANDSTONE	0	19.5	

**Well ID:** 3505409  
**Construction Date:** 1979-05-25

**Eastings:** 424430  
**Northings:** 4975321

**UTM Zone** 18  
**Positional Accuracy:** margin of error : 100 m - 300 m

**Well Depth:** 19.8  
**Well Diameter (cm):** 15.2  
**Water First Found:** 16.8  
**Static Level:** 5

**Water Kind** FRESH  
**Final Status** Water Supply  
**Primary Water Use:** Domestic

**Pump Rate (LPM):** 136  
**Recommended Pump Rate:** 136  
**Pumping Duration (h:m):** 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	FILL	0	0.91
1	FILL	0	0.91
1	FILL	0	0.91
2	SANDSTONE	0.91	19.8
2	SANDSTONE	0.91	19.8
2	SANDSTONE	0.91	19.8

**Well ID:** 3505483  
**Construction Date:** 1979-08-27

**Eastings:** 425030  
**Northings:** 4974721

**UTM Zone** 18  
**Positional Accuracy:** margin of error : 100 m - 300 m

**Well Depth:** 23.5  
**Well Diameter (cm):** 15.2  
**Water First Found:** 22.3  
**Static Level:** 6

**Water Kind** FRESH  
**Final Status** Water Supply  
**Primary Water Use:** Domestic

**Pump Rate (LPM):** 45  
**Recommended Pump Rate:** 45  
**Pumping Duration (h:m):** 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.61
1	TOPSOIL	0	0.61
2	LIMESTONE	0.61	12.2
2	LIMESTONE	0.61	12.2
3	SANDSTONE	12.2	23.5
3	SANDSTONE	12.2	23.5

**Well ID:** 3505713  
**Construction Date:** 1980-03-03

**Eastings:** 425430  
**Northings:** 4974721

**UTM Zone** 18  
**Positional Accuracy:** margin of error : 100 m - 300 m

**Well Depth:** 23.5  
**Well Diameter (cm):** 15.2  
**Water First Found:** 16.8  
**Static Level:** 9

**Water Kind** FRESH  
**Final Status** Water Supply  
**Primary Water Use:** Domestic

**Pump Rate (LPM):** 91  
**Recommended Pump Rate:** 91  
**Pumping Duration (h:m):** 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.30
1	TOPSOIL	0	0.30
2	LIMESTONE	0.30	16.8
2	LIMESTONE	0.30	16.8
3	SANDSTONE	16.8	23.5
3	SANDSTONE	16.8	23.5



**Well ID:** 3505896      **Easting:** 424806      **UTM Zone** 18  
**Construction Date:** 1980-10-16      **Northing:** 4974812      **Positional Accuracy:** margin of error : 10 - 30 m

**Well Depth:** 21.3      **Water Kind** FRESH      **Pump Rate (LPM):** 91  
**Well Diameter (cm):** 15.2      **Final Status** Water Supply      **Recommended Pump Rate:** 91  
**Water First Found:** 19.8      **Primary Water Use:** Domestic      **Pumping Duration (h:m):** :30  
**Static Level:** 11

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	2.13
2	LIMESTONE	2.13	7.62
3	SANDSTONE	7.62	21.3

**Well ID:** 3505918      **Easting:** 424230      **UTM Zone** 18  
**Construction Date:** 1980-11-25      **Northing:** 4975421      **Positional Accuracy:** margin of error : 100 m - 300 m

**Well Depth:** 18.9      **Water Kind** FRESH      **Pump Rate (LPM):** 36  
**Well Diameter (cm):** 15.2      **Final Status** Water Supply      **Recommended Pump Rate:** 36  
**Water First Found:** 17.7      **Primary Water Use:** Domestic      **Pumping Duration (h:m):** 1 : 0  
**Static Level:** 2

Layer:	Driller's Description:	Top:	Bottom:
1	SANDSTONE	0	18.9

**Well ID:** 3507155      **Easting:** 424830      **UTM Zone** 18  
**Construction Date:** 1976-08-09      **Northing:** 4975821      **Positional Accuracy:** margin of error : 100 m - 300 m

**Well Depth:** 19.5      **Water Kind** Not stated      **Pump Rate (LPM):** 45  
**Well Diameter (cm):** 12.7      **Final Status** Water Supply      **Recommended Pump Rate:** 45  
**Water First Found:** 18.9      **Primary Water Use:** Domestic      **Pumping Duration (h:m):** 1 : 10  
**Static Level:** 6

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	1.22
1	CLAY	0	1.22
1	CLAY	0	1.22
1	CLAY	0	1.22
2	SANDSTONE	1.22	19.5
2	SANDSTONE	1.22	19.5
2	SANDSTONE	1.22	19.5
2	SANDSTONE	1.22	19.5

**Well ID:** 3507676      **Easting:** 425405      **UTM Zone** 18  
**Construction Date:** 1987-01-06      **Northing:** 4975374      **Positional Accuracy:** unknown UTM

**Well Depth:** 19.5      **Water Kind** FRESH      **Pump Rate (LPM):** 91  
**Well Diameter (cm):** 15.2      **Final Status** Water Supply      **Recommended Pump Rate:** 91  
**Water First Found:** 18.3      **Primary Water Use:** Domestic      **Pumping Duration (h:m):** 1 : 0  
**Static Level:** 5

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0	1.83
1	SAND	0	1.83
2	SANDSTONE	1.83	19.5
2	SANDSTONE	1.83	19.5

**Well ID:** 3508196      **Eastings:** 424595      **UTM Zone** 18  
**Construction Date:** 1988-01-08      **Northing:** 4975062      **Positional Accuracy:** margin of error : 10 - 30 m

**Well Depth:** 12.8      **Water Kind** FRESH      **Pump Rate (LPM):** 68  
**Well Diameter (cm):** 15.2      **Final Status** Water Supply      **Recommended Pump Rate:** 68  
**Water First Found:** 11.6      **Primary Water Use:** Domestic      **Pumping Duration (h:m):** 1 : 0  
**Static Level:** 2

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	2.13
2	SANDSTONE	2.13	12.8

**Well ID:** 3509180      **Eastings:** 424991      **UTM Zone** 18  
**Construction Date:** 1990-02-22      **Northing:** 4975034      **Positional Accuracy:** unknown UTM

**Well Depth:** 19.8      **Water Kind** FRESH      **Pump Rate (LPM):** 182  
**Well Diameter (cm):** 15.2      **Final Status** Water Supply      **Recommended Pump Rate:** 182  
**Water First Found:** 18.3      **Primary Water Use:** Livestock      **Pumping Duration (h:m):** 1 : 0  
**Static Level:** 6

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.61
1	TOPSOIL	0	0.61
2	LIMESTONE	0.61	7.62
2	LIMESTONE	0.61	7.62
3	SANDSTONE	7.62	19.8
3	SANDSTONE	7.62	19.8

**Well ID:** 3509560      **Eastings:** 424991      **UTM Zone** 18  
**Construction Date:** 1990-12-11      **Northing:** 4975034      **Positional Accuracy:** unknown UTM

**Well Depth:** 22      **Water Kind** FRESH      **Pump Rate (LPM):** 159  
**Well Diameter (cm):** 15.2      **Final Status** Water Supply      **Recommended Pump Rate:** 45  
**Water First Found:** 17.7      **Primary Water Use:** Domestic      **Pumping Duration (h:m):** 1 : 0  
**Static Level:** 6

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0	0.61
1	SAND	0	0.61
2	CLAY	0.61	2.13
2	CLAY	0.61	2.13
3	LIMESTONE	2.13	6.1
3	LIMESTONE	2.13	6.1
4	SANDSTONE	6.1	22
4	SANDSTONE	6.1	22

**Well ID:** 3509627      **Eastings:** 425333      **UTM Zone** 18  
**Construction Date:** 1991-01-18      **Northing:** 4975590      **Positional Accuracy:** margin of error : 10 - 30 m

**Well Depth:** 27.4      **Water Kind** FRESH      **Pump Rate (LPM):** 55  
**Well Diameter (cm):** 15.2      **Final Status** Water Supply      **Recommended Pump Rate:** 55  
**Water First Found:** 25      **Primary Water Use:** Cooling And A      **Pumping Duration (h:m):** 1 : 0  
**Static Level:** 13

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	9.14

**Well ID:** 3509628      **Easting:** 424991      **UTM Zone** 18  
**Construction Date:** 1991-01-18      **Northing:** 4975034      **Positional Accuracy:** unknown UTM

**Well Depth:** 24.7      **Water Kind** FRESH      **Pump Rate (LPM):** 68  
**Well Diameter (cm):** 15.2      **Final Status** Water Supply      **Recommended Pump Rate:** 68  
**Water First Found:** 17.1      **Primary Water Use:** Cooling And A      **Pumping Duration (h:m):** 1 : 0  
**Static Level:** 12

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.91
1	TOPSOIL	0	0.91
1	TOPSOIL	0	0.91
2	SANDSTONE	0.91	24.7
2	SANDSTONE	0.91	24.7
2	SANDSTONE	0.91	24.7

**Well ID:** 3509631      **Easting:** 424565      **UTM Zone** 18  
**Construction Date:** 1991-01-18      **Northing:** 4975403      **Positional Accuracy:** margin of error : 10 - 30 m

**Well Depth:** 24.4      **Water Kind** FRESH      **Pump Rate (LPM):** 227  
**Well Diameter (cm):** 15.2      **Final Status** Water Supply      **Recommended Pump Rate:** 227  
**Water First Found:** 16.5      **Primary Water Use:** Domestic      **Pumping Duration (h:m):** 1 :  
**Static Level:** 8

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	2.44
1	CLAY	0	2.44
2	SANDSTONE	2.44	24.4
2	SANDSTONE	2.44	24.4

**Well ID:** 3509632      **Easting:** 424564      **UTM Zone** 18  
**Construction Date:** 1991-01-18      **Northing:** 4975404      **Positional Accuracy:** margin of error : 10 - 30 m

**Well Depth:** 24.4      **Water Kind** FRESH      **Pump Rate (LPM):** 227  
**Well Diameter (cm):** 15.2      **Final Status** Recharge Well      **Recommended Pump Rate:** 227  
**Water First Found:** 18      **Primary Water Use:** Domestic      **Pumping Duration (h:m):** 1 : 0  
**Static Level:** 9

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	1.83
1	CLAY	0	1.83
2	SANDSTONE	1.83	24.4
2	SANDSTONE	1.83	24.4

**Well ID:** 3509885      **Easting:** 425191      **UTM Zone** 18  
**Construction Date:** 1991-07-05      **Northing:** 4975865      **Positional Accuracy:** margin of error : 10 - 30 m

**Well Depth:** 24.4      **Water Kind** FRESH      **Pump Rate (LPM):** 45  
**Well Diameter (cm):** 12.7      **Final Status** Water Supply      **Recommended Pump Rate:** 23  
**Water First Found:** 22.9      **Primary Water Use:** Domestic      **Pumping Duration (h:m):** 1 : 0  
**Static Level:** 5

Layer:	Driller's Description:	Top:	Bottom:
1	TILL	0	0.91
2	SANDSTONE	0.91	24.4

**Well ID:** 3510554  
**Construction Date:** 1992-12-03

**Eastings:** 425036  
**Northings:** 4975782

**UTM Zone** 18  
**Positional Accuracy:** margin of error : 10 - 30 m

**Well Depth:** 21.3  
**Well Diameter (cm):** 15.2  
**Water First Found:** 9.75  
**Static Level:** 8

**Water Kind** FRESH  
**Final Status** Water Supply  
**Primary Water Use:** Domestic

**Pump Rate (LPM):** 136  
**Recommended Pump Rate:** 91  
**Pumping Duration (h:m):** 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	1.52
1	TOPSOIL	0	1.52
1	TOPSOIL	0	1.52
2	LIMESTONE	1.52	21.3
2	LIMESTONE	1.52	21.3
2	LIMESTONE	1.52	21.3

**Well ID:** 3511174  
**Construction Date:** 1994-08-12

**Eastings:** 424991  
**Northings:** 4975034

**UTM Zone** 18  
**Positional Accuracy:** unknown UTM

**Well Depth:** 29.6  
**Well Diameter (cm):** 15.2  
**Water First Found:** 29  
**Static Level:** 11

**Water Kind** FRESH  
**Final Status** Water Supply  
**Primary Water Use:** Domestic

**Pump Rate (LPM):** 91  
**Recommended Pump Rate:** 45  
**Pumping Duration (h:m):** 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.61
2	SANDSTONE	0.61	29.6

**Well ID:** 3511306  
**Construction Date:** 1994-11-14

**Eastings:** 424571  
**Northings:** 4975400

**UTM Zone** 18  
**Positional Accuracy:** margin of error : 10 - 30 m

**Well Depth:** 18.9  
**Well Diameter (cm):** 15.2  
**Water First Found:** 15.9  
**Static Level:** 8

**Water Kind** Not stated  
**Final Status** Water Supply  
**Primary Water Use:** Domestic

**Pump Rate (LPM):** 68  
**Recommended Pump Rate:** 68  
**Pumping Duration (h:m):** 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	2.74
1	CLAY	0	2.74
1	CLAY	0	2.74
1	CLAY	0	2.74
2	LIMESTONE	2.74	8.84
2	LIMESTONE	2.74	8.84
2	LIMESTONE	2.74	8.84
2	LIMESTONE	2.74	8.84
3	SANDSTONE	8.84	18.9
3	SANDSTONE	8.84	18.9
3	SANDSTONE	8.84	18.9
3	SANDSTONE	8.84	18.9

**Well ID:** 3511492  
**Construction Date:** 1995-07-25

**Eastings:** 424991  
**Northings:** 4975034

**UTM Zone** 18  
**Positional Accuracy:** unknown UTM

**Well Depth:** 18.3  
**Well Diameter (cm):** 15.2  
**Water First Found:** 16.1  
**Static Level:** 5

**Water Kind** Not stated  
**Final Status** Water Supply  
**Primary Water Use:** Domestic

**Pump Rate (LPM):** 68  
**Recommended Pump Rate:** 68  
**Pumping Duration (h:m):** 11 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0	0.91
1	SAND	0	0.91
1	SAND	0	0.91
1	SAND	0	0.91
2	LIMESTONE	0.91	11.6
2	LIMESTONE	0.91	11.6
2	LIMESTONE	0.91	11.6
2	LIMESTONE	0.91	11.6
3	SANDSTONE	11.6	18.3
3	SANDSTONE	11.6	18.3
3	SANDSTONE	11.6	18.3
3	SANDSTONE	11.6	18.3

**Well ID:** 3511965  
**Construction Date:** 1997-02-21

**Eastings:** 425405  
**Northings:** 4975374

**UTM Zone** 18  
**Positional Accuracy:** unknown UTM

**Well Depth:** 28.7  
**Well Diameter (cm):** 15.2  
**Water First Found:** 27.7  
**Static Level:** 1

**Water Kind** FRESH  
**Final Status** Water Supply  
**Primary Water Use:** Livestock

**Pump Rate (LPM):** 91  
**Recommended Pump Rate:** 45  
**Pumping Duration (h:m):** 1 : 15

Layer:	Driller's Description:	Top:	Bottom:
1	GRAVEL	0	1.22
1	GRAVEL	0	1.22
1	GRAVEL	0	1.22
2	LIMESTONE	1.22	28.6
2	LIMESTONE	1.22	28.6
2	LIMESTONE	1.22	28.6

**Well ID:** 3512062  
**Construction Date:** 1997-06-17

**Eastings:** 424991  
**Northings:** 4975034

**UTM Zone** 18  
**Positional Accuracy:** unknown UTM

**Well Depth:** 22.6  
**Well Diameter (cm):** 15.2  
**Water First Found:** 12.8  
**Static Level:** 9

**Water Kind** FRESH  
**Final Status** Water Supply  
**Primary Water Use:** Domestic

**Pump Rate (LPM):** 91  
**Recommended Pump Rate:** 45  
**Pumping Duration (h:m):** 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0	0.61
1	SAND	0	0.61
2	LIMESTONE	0.61	4.57
2	LIMESTONE	0.61	4.57
3	LIMESTONE	4.57	22.6

**Well ID:** 3512116      **Easting:** 424991      **UTM Zone** 18  
**Construction Date:** 1997-08-28      **Northing:** 4975034      **Positional Accuracy:** unknown UTM

**Well Depth:** 22.6      **Water Kind** FRESH      **Pump Rate (LPM):** 86  
**Well Diameter (cm):** 15.2      **Final Status** Water Supply      **Recommended Pump Rate:** 86  
**Water First Found:** 20.7      **Primary Water Use:** Domestic      **Pumping Duration (h:m):** 1 : 0  
**Static Level:** 9

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	0.61
1	CLAY	0	0.61
1	CLAY	0	0.61
1	CLAY	0	0.61
2	LIMESTONE	0.61	22.6
2	LIMESTONE	0.61	22.6
2	LIMESTONE	0.61	22.6
2	LIMESTONE	0.61	22.6

**Well ID:** 3512498      **Easting:** 425009      **UTM Zone** 18  
**Construction Date:** 1998-11-24      **Northing:** 4975828      **Positional Accuracy:** margin of error : 10 - 30 m

**Well Depth:** 28.0      **Water Kind** FRESH      **Pump Rate (LPM):** 45  
**Well Diameter (cm):** 15.2      **Final Status** Water Supply      **Recommended Pump Rate:** 45  
**Water First Found:** 26.8      **Primary Water Use:** Domestic      **Pumping Duration (h:m):** 1 : 0  
**Static Level:** 8

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0	0.61
1	SAND	0	0.61
1	SAND	0	0.61
1	SAND	0	0.61
2	LIMESTONE	0.61	20.1
2	LIMESTONE	0.61	20.1
2	LIMESTONE	0.61	20.1
2	LIMESTONE	0.61	20.1
3	SANDSTONE	20.1	28.0
3	SANDSTONE	20.1	28.0
3	SANDSTONE	20.1	28.0
3	SANDSTONE	20.1	28.0

**Well ID:** 3512846      **Easting:** 424181      **UTM Zone** 18  
**Construction Date:** 1999-12-17      **Northing:** 4975942      **Positional Accuracy:** margin of error : 10 - 30 m

**Well Depth:** 24.4      **Water Kind** FRESH      **Pump Rate (LPM):** 114  
**Well Diameter (cm):** 15.2      **Final Status** Water Supply      **Recommended Pump Rate:** 114  
**Water First Found:** 18      **Primary Water Use:** Domestic      **Pumping Duration (h:m):** 1 :  
**Static Level:** 11

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0	1.83
1	SAND	0	1.83

1	SAND	0	1.83
1	SAND	0	1.83
2	SANDSTONE	1.83	24.4
2	SANDSTONE	1.83	24.4
2	SANDSTONE	1.83	24.4
2	SANDSTONE	1.83	24.4

**Well ID:** 3513877  
**Construction Date:** 2002-10-10

**Easting:** 425401  
**Northing:** 4975374

**UTM Zone** 18  
**Positional Accuracy:** unknown UTM

**Well Depth:** 24.4  
**Well Diameter (cm):** 15.2  
**Water First Found:** 23.2  
**Static Level:** 5

**Water Kind** Not stated  
**Final Status** Water Supply  
**Primary Water Use:** Domestic

**Pump Rate (LPM):** 136  
**Recommended Pump Rate:** 136  
**Pumping Duration (h:m):** 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.61
1	TOPSOIL	0	0.61
2	LIMESTONE	0.61	24.4
2	LIMESTONE	0.61	24.4

**Well ID:** 3514012  
**Construction Date:** 2003-01-07

**Easting:** 424571  
**Northing:** 4974688

**UTM Zone** 18  
**Positional Accuracy:** margin of error : 1 km - 3 km

**Well Depth:** 15.9  
**Well Diameter (cm):** 15.2  
**Water First Found:** 12.8  
**Static Level:** 4

**Water Kind** FRESH  
**Final Status** Water Supply  
**Primary Water Use:** Domestic

**Pump Rate (LPM):** 136  
**Recommended Pump Rate:** 45  
**Pumping Duration (h:m):** 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.61
1	TOPSOIL	0	0.61
2	SAND	0.61	1.52
2	SAND	0.61	1.52
3	CLAY	1.52	3.05
3	CLAY	1.52	3.05
4	GRAVEL	3.05	3.96
4	GRAVEL	3.05	3.96
5	SANDSTONE	3.96	15.9
5	SANDSTONE	3.96	15.9

**Well ID:** 3514013  
**Construction Date:** 2003-01-07

**Easting:** 424571  
**Northing:** 4974688

**UTM Zone** 18  
**Positional Accuracy:** margin of error : 1 km - 3 km

**Well Depth:** 15.2  
**Well Diameter (cm):** 15.2  
**Water First Found:** 7.92  
**Static Level:** 2

**Water Kind** FRESH  
**Final Status** Water Supply  
**Primary Water Use:** Domestic

**Pump Rate (LPM):** 227  
**Recommended Pump Rate:** 45  
**Pumping Duration (h:m):** 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	2.44
1	TOPSOIL	0	2.44
2	HARDPAN	2.44	3.66

2	HARDPAN	2.44	3.66
3	LIMESTONE	3.66	15.2
3	LIMESTONE	3.66	15.2

**Well ID:** 3514406      **Easting:** 425401      **UTM Zone** 18  
**Construction Date:** 2004-01-29      **Northing:** 4975375      **Positional Accuracy:** unknown UTM

**Well Depth:** 22.6      **Water Kind** FRESH      **Pump Rate (LPM):** 45  
**Well Diameter (cm):** 15.2      **Final Status** Water Supply      **Recommended Pump Rate:** 45  
**Water First Found:** 21.3      **Primary Water Use:** Domestic      **Pumping Duration (h:m):** 1 : 0  
**Static Level:** 8

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	1.83
2	LIMESTONE	1.83	22.6

**Well ID:** 3514548      **Easting:** 425025      **UTM Zone** 18  
**Construction Date:** 2004-06-24      **Northing:** 4975008      **Positional Accuracy:** margin of error : 100 m - 300 m

**Well Depth:**      **Water Kind**      **Pump Rate (LPM):**  
**Well Diameter (cm):**      **Final Status** Abandoned-Qu      **Recommended Pump Rate:**  
**Water First Found:**      **Primary Water Use:** Domestic      **Pumping Duration (h:m):**  
**Static Level:**

Layer:	Driller's Description:	Top:	Bottom:
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**Well ID:** 3514549      **Easting:** 425031      **UTM Zone** 18  
**Construction Date:** 2004-06-24      **Northing:** 4975706      **Positional Accuracy:** margin of error : 100 m - 300 m

**Well Depth:** 23.2      **Water Kind** FRESH      **Pump Rate (LPM):** 482  
**Well Diameter (cm):** 15.2      **Final Status** Water Supply      **Recommended Pump Rate:** 482  
**Water First Found:** 20.7      **Primary Water Use:** Domestic      **Pumping Duration (h:m):** 2 :  
**Static Level:** 5

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.30
1	TOPSOIL	0	0.30
1	TOPSOIL	0	0.30
1	TOPSOIL	0	0.30
2	LIMESTONE	0.30	23.2
2	LIMESTONE	0.30	23.2
2	LIMESTONE	0.30	23.2
2	LIMESTONE	0.30	23.2

**Well ID:** 3514572      **Easting:** 425295      **UTM Zone** 18  
**Construction Date:** 2004-07-09      **Northing:** 4974720      **Positional Accuracy:** margin of error : 10 - 30 m

**Well Depth:** 24.4      **Water Kind**      **Pump Rate (LPM):** 57  
**Well Diameter (cm):** 15.2      **Final Status** Water Supply      **Recommended Pump Rate:** 32  
**Water First Found:** 23.5      **Primary Water Use:** Domestic      **Pumping Duration (h:m):** 1 :  
**Static Level:**

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	0.91
1	CLAY	0	0.91
1	CLAY	0	0.91



1	CLAY	0	0.91
2	SANDSTONE	0.91	21.6
2	SANDSTONE	0.91	21.6
2	SANDSTONE	0.91	21.6
2	SANDSTONE	0.91	21.6
3	SANDSTONE	21.6	23.5
3	SANDSTONE	21.6	23.5
3	SANDSTONE	21.6	23.5
3	SANDSTONE	21.6	23.5
4	SANDSTONE	23.5	24.4
4	SANDSTONE	23.5	24.4
4	SANDSTONE	23.5	24.4
4	SANDSTONE	23.5	24.4

**Well ID:** 3514905

**Easting:** 425167

**UTM Zone** 18

**Construction Date:** 2005-05-18

**Northing:** 4974871

**Positional Accuracy:** margin of error : 30 m - 100 m

**Well Depth:** 24.4

**Water Kind**

**Pump Rate (LPM):** 50

**Well Diameter (cm):** 15.2

**Final Status**

Water Supply

**Recommended Pump Rate:** 30

**Water First Found:** 16.5

**Primary Water Use:** Domestic

**Pumping Duration (h:m):** 1 :

**Static Level:**

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	0.91
1	CLAY	0	0.91
1	CLAY	0	0.91
1	CLAY	0	0.91
1	CLAY	0	0.91
1	CLAY	0	0.91
2	SANDSTONE	0.91	16.5
2	SANDSTONE	0.91	16.5
2	SANDSTONE	0.91	16.5
2	SANDSTONE	0.91	16.5
2	SANDSTONE	0.91	16.5
2	SANDSTONE	0.91	16.5
3	SANDSTONE	16.5	16.8
3	SANDSTONE	16.5	16.8
3	SANDSTONE	16.5	16.8
3	SANDSTONE	16.5	16.8
3	SANDSTONE	16.5	16.8
3	SANDSTONE	16.5	16.8
4	SANDSTONE	16.8	21.3
4	SANDSTONE	16.8	21.3
4	SANDSTONE	16.8	21.3
4	SANDSTONE	16.8	21.3

4	SANDSTONE	16.8	21.3
4	SANDSTONE	16.8	21.3
5	SANDSTONE	21.3	22.9
5	SANDSTONE	21.3	22.9
5	SANDSTONE	21.3	22.9
5	SANDSTONE	21.3	22.9
5	SANDSTONE	21.3	22.9
5	SANDSTONE	21.3	22.9
6	SANDSTONE	22.9	24.4
6	SANDSTONE	22.9	24.4
6	SANDSTONE	22.9	24.4
6	SANDSTONE	22.9	24.4
6	SANDSTONE	22.9	24.4
6	SANDSTONE	22.9	24.4

**Well ID:** 3514939  
**Construction Date:** 2005-06-14

**Easting:** 425194  
**Northing:** 4974918

**UTM Zone** 18  
**Positional Accuracy:** margin of error : 30 m - 100 m

**Well Depth:** 25.9  
**Well Diameter (cm):**  
**Water First Found:** 24.4  
**Static Level:**

**Water Kind**  
**Final Status** Water Supply  
**Primary Water Use:** Domestic

**Pump Rate (LPM):** 45  
**Recommended Pump Rate:** 30  
**Pumping Duration (h:m):** 1 :

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.79
1	TOPSOIL	0	0.79
2	SANDSTONE	0.79	16.8
2	SANDSTONE	0.79	16.8
3	SANDSTONE	16.8	17.1
3	SANDSTONE	16.8	17.1
4	SANDSTONE	17.1	24.1
4	SANDSTONE	17.1	24.1
5	SANDSTONE	24.1	24.7
5	SANDSTONE	24.1	24.7
6	SANDSTONE	24.7	25.9
6	SANDSTONE	24.7	25.9

**Well ID:** 3514989  
**Construction Date:** 2005-07-11

**Easting:** 425160  
**Northing:** 4974808

**UTM Zone** 18  
**Positional Accuracy:** margin of error : 30 m - 100 m

**Well Depth:** 24.4  
**Well Diameter (cm):** 15.2  
**Water First Found:** 22.6  
**Static Level:**

**Water Kind**  
**Final Status** Water Supply  
**Primary Water Use:** Domestic

**Pump Rate (LPM):** 52  
**Recommended Pump Rate:** 30  
**Pumping Duration (h:m):** 1 :

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.30
1	TOPSOIL	0	0.30
1	TOPSOIL	0	0.30

1	TOPSOIL	0	0.30
2	SANDSTONE	0.30	21.3
2	SANDSTONE	0.30	21.3
2	SANDSTONE	0.30	21.3
2	SANDSTONE	0.30	21.3
3	SANDSTONE	21.3	22.6
3	SANDSTONE	21.3	22.6
3	SANDSTONE	21.3	22.6
3	SANDSTONE	21.3	22.6
4	SANDSTONE	22.6	24.4
4	SANDSTONE	22.6	24.4
4	SANDSTONE	22.6	24.4
4	SANDSTONE	22.6	24.4

**Well ID:** 3515018  
**Construction Date:** 2005-07-28

**Easting:** 424248  
**Northing:** 4975444

**UTM Zone** 18  
**Positional Accuracy:** margin of error : 30 m - 100 m

**Well Depth:** 13.7  
**Well Diameter (cm):**  
**Water First Found:** 8.23  
**Static Level:** 2

**Water Kind** FRESH  
**Final Status** Water Supply  
**Primary Water Use:** Domestic

**Pump Rate (LPM):** 159  
**Recommended Pump Rate:** 45  
**Pumping Duration (h:m):** 2 :

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	3.05
1	TOPSOIL	0	3.05
1	TOPSOIL	0	3.05
1	TOPSOIL	0	3.05
2	LIMESTONE	3.05	13.7
2	LIMESTONE	3.05	13.7
2	LIMESTONE	3.05	13.7
2	LIMESTONE	3.05	13.7

**Well ID:** 3515067  
**Construction Date:** 2005-09-07

**Easting:** 425136  
**Northing:** 4974837

**UTM Zone** 18  
**Positional Accuracy:** margin of error : 30 m - 100 m

**Well Depth:** 24.4  
**Well Diameter (cm):**  
**Water First Found:** 22  
**Static Level:**

**Water Kind**  
**Final Status** Water Supply  
**Primary Water Use:** Domestic

**Pump Rate (LPM):** 45  
**Recommended Pump Rate:** 30  
**Pumping Duration (h:m):** 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	0.91
1	CLAY	0	0.91
1	CLAY	0	0.91
1	CLAY	0	0.91
1	CLAY	0	0.91
1	CLAY	0	0.91
2	SANDSTONE	0.91	21.3
2	SANDSTONE	0.91	21.3

2	SANDSTONE	0.91	21.3
2	SANDSTONE	0.91	21.3
2	SANDSTONE	0.91	21.3
2	SANDSTONE	0.91	21.3
3	SANDSTONE	21.3	24.4
3	SANDSTONE	21.3	24.4
3	SANDSTONE	21.3	24.4
3	SANDSTONE	21.3	24.4
3	SANDSTONE	21.3	24.4
3	SANDSTONE	21.3	24.4

**Well ID:** 3515321  
**Construction Date:** 2006-05-12

**Easting:** 425391  
**Northing:** 4974943

**UTM Zone** 18  
**Positional Accuracy:** margin of error : 10 - 30 m

**Well Depth:** 24.4      **Water Kind:** FRESH      **Pump Rate (LPM):** 45  
**Well Diameter (cm):**      **Final Status:** Water Supply      **Recommended Pump Rate:** 45  
**Water First Found:** 12.2      **Primary Water Use:** Domestic      **Pumping Duration (h:m):** 2 :  
**Static Level:** 12

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.91
1	TOPSOIL	0	0.91
1	TOPSOIL	0	0.91
1	TOPSOIL	0	0.91
2	LIMESTONE	0.91	24.4
2	LIMESTONE	0.91	24.4
2	LIMESTONE	0.91	24.4
2	LIMESTONE	0.91	24.4

**Well ID:** 3515503  
**Construction Date:** 2006-11-17

**Easting:** 425268  
**Northing:** 4974973

**UTM Zone** 18  
**Positional Accuracy:** margin of error : 10 - 30 m

**Well Depth:** 24.4      **Water Kind:**      **Pump Rate (LPM):** 87  
**Well Diameter (cm):** 15.2      **Final Status:** Water Supply      **Recommended Pump Rate:** 12  
**Water First Found:** 16.5      **Primary Water Use:** Domestic      **Pumping Duration (h:m):** 1 : 0  
**Static Level:**

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0	0.91
1	SAND	0	0.91
1	SAND	0	0.91
1	SAND	0	0.91
2	SANDSTONE	0.91	15.2
2	SANDSTONE	0.91	15.2
2	SANDSTONE	0.91	15.2
2	SANDSTONE	0.91	15.2
3	SANDSTONE	15.2	16.8
3	SANDSTONE	15.2	16.8
3	SANDSTONE	15.2	16.8

3	SANDSTONE	15.2	16.8
4	SANDSTONE	16.8	23.8
4	SANDSTONE	16.8	23.8
4	SANDSTONE	16.8	23.8
4	SANDSTONE	16.8	23.8
5	SANDSTONE	23.8	24.4
5	SANDSTONE	23.8	24.4
5	SANDSTONE	23.8	24.4
5	SANDSTONE	23.8	24.4

**Well ID:** 7048403

**Easting:** 425200

**UTM Zone** 18

**Construction Date:** 2007-08-17

**Northing:** 4974843

**Positional Accuracy:** margin of error : 10 - 30 m

**Well Depth:** 24.4

**Water Kind**

**Pump Rate (LPM):** 80

**Well Diameter (cm):**

**Final Status**

Water Supply

**Recommended Pump Rate:** 35

**Water First Found:** 22.9

**Primary Water Use:**

Domestic

**Pumping Duration (h:m):** 1 : 0

**Static Level:**

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	
1	CLAY	0	
2	SANDSTONE		0.61
2	SANDSTONE		0.61
3	SANDSTONE	0.61	2.43
3	SANDSTONE	0.61	2.43
4	SANDSTONE	2.43	22.9
4	SANDSTONE	2.43	22.9
5	SANDSTONE	22.9	23.2
5	SANDSTONE	22.9	23.2
6		23.2	24.4
6		23.2	24.4

**Well ID:** 7109832

**Easting:** 424516

**UTM Zone** 18

**Construction Date:** 2008-08-14

**Northing:** 4975241

**Positional Accuracy:** margin of error : 10 - 30 m

**Well Depth:** 18.3

**Water Kind**

Untested

**Pump Rate (LPM):** 414

**Well Diameter (cm):** 15.2

**Final Status**

Water Supply

**Recommended Pump Rate:** 414

**Water First Found:** 15.9

**Primary Water Use:**

Domestic

**Pumping Duration (h:m):** 1 :

**Static Level:** 4

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	2.44
1	CLAY	0	2.44
1	CLAY	0	2.44
1	CLAY	0	2.44
1	CLAY	0	2.44
1	CLAY	0	2.44
2	SANDSTONE	2.44	18.3
2	SANDSTONE	2.44	18.3

2	SANDSTONE	2.44	18.3
2	SANDSTONE	2.44	18.3
2	SANDSTONE	2.44	18.3
2	SANDSTONE	2.44	18.3

**Well ID:** 7122399  
**Construction Date:** 2009-04-28

**Easting:** 425098  
**Northing:** 4974747

**UTM Zone** 18  
**Positional Accuracy:** margin of error : 30 m - 100 m

**Well Depth:** 24.4      **Water Kind**      Untested      **Pump Rate (LPM):** 68  
**Well Diameter (cm):** 38.1      **Final Status**      Water Supply      **Recommended Pump Rate:** 68  
**Water First Found:** 22.9      **Primary Water Use:** Domestic      **Pumping Duration (h:m):** 1 : 0  
**Static Level:**

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	1.22
2	SANDSTONE	1.22	22.3
3	SANDSTONE	22.3	22.9
4	SANDSTONE	22.9	24.4

**Well ID:** 7122400  
**Construction Date:** 2009-04-28

**Easting:** 425117  
**Northing:** 4974777

**UTM Zone** 18  
**Positional Accuracy:** margin of error : 30 m - 100 m

**Well Depth:** 24.4      **Water Kind**      Untested      **Pump Rate (LPM):** 68  
**Well Diameter (cm):** 15      **Final Status**      Water Supply      **Recommended Pump Rate:** 68  
**Water First Found:** 22.3      **Primary Water Use:** Domestic      **Pumping Duration (h:m):** 1 : 0  
**Static Level:**

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	0.76
1	CLAY	0	0.76
2	SANDSTONE	0.76	22.3
2	SANDSTONE	0.76	22.3
3	SANDSTONE	22.3	22.9
3	SANDSTONE	22.3	22.9
4	SANDSTONE	22.9	24.4
4	SANDSTONE	22.9	24.4

**Well ID:** 7192550  
**Construction Date:** 2012-12-04

**Easting:** 424533  
**Northing:** 4975223

**UTM Zone** 18  
**Positional Accuracy:** margin of error : 30 m - 100 m

**Well Depth:** 18.3      **Water Kind**      Untested      **Pump Rate (LPM):** 91  
**Well Diameter (cm):** 15.9      **Final Status**      Water Supply      **Recommended Pump Rate:** 91  
**Water First Found:** 14.6      **Primary Water Use:** Domestic      **Pumping Duration (h:m):** 1 :  
**Static Level:** 6

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	1.22
1	CLAY	0	1.22
1	CLAY	0	1.22
1	CLAY	0	1.22
1	CLAY	0	1.22
1	CLAY	0	1.22
2	SAND	1.22	12.2

2	SAND	1.22	12.2
2	SAND	1.22	12.2
2	SAND	1.22	12.2
2	SAND	1.22	12.2
2	SAND	1.22	12.2
3	SANDSTONE	12.2	14.6
3	SANDSTONE	12.2	14.6
3	SANDSTONE	12.2	14.6
3	SANDSTONE	12.2	14.6
3	SANDSTONE	12.2	14.6
3	SANDSTONE	12.2	14.6
4	SANDSTONE	14.6	16.5
4	SANDSTONE	14.6	16.5
4	SANDSTONE	14.6	16.5
4	SANDSTONE	14.6	16.5
4	SANDSTONE	14.6	16.5
4	SANDSTONE	14.6	16.5
4	SANDSTONE	14.6	16.5
5	SANDSTONE	16.5	18.3
5	SANDSTONE	16.5	18.3
5	SANDSTONE	16.5	18.3
5	SANDSTONE	16.5	18.3
5	SANDSTONE	16.5	18.3
5	SANDSTONE	16.5	18.3

**Well ID:** 7228026  
**Construction Date:** 2014-09-22

**Easting:** 424567  
**Northing:** 4975187

**UTM Zone** 18  
**Positional Accuracy:** margin of error : 30 m - 100 m

**Well Depth:** 18.6  
**Well Diameter (cm):** 14.9  
**Water First Found:** 16.1  
**Static Level:** 3

**Water Kind** Untested  
**Final Status** Water Supply  
**Primary Water Use:** Domestic

**Pump Rate (LPM):** 91  
**Recommended Pump Rate:** 91  
**Pumping Duration (h:m):** 1 :

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0	0.61
1	SAND	0	0.61
1	SAND	0	0.61
1	SAND	0	0.61
1	SAND	0	0.61
1	SAND	0	0.61
2	SAND	0.61	13.7
2	SAND	0.61	13.7
2	SAND	0.61	13.7
2	SAND	0.61	13.7
2	SAND	0.61	13.7
2	SAND	0.61	13.7

3	SANDSTONE	13.7	16.1
3	SANDSTONE	13.7	16.1
3	SANDSTONE	13.7	16.1
3	SANDSTONE	13.7	16.1
3	SANDSTONE	13.7	16.1
3	SANDSTONE	13.7	16.1
4	SANDSTONE	16.1	16.5
4	SANDSTONE	16.1	16.5
4	SANDSTONE	16.1	16.5
4	SANDSTONE	16.1	16.5
4	SANDSTONE	16.1	16.5
4	SANDSTONE	16.1	16.5
4	SANDSTONE	16.1	16.5
5	SANDSTONE	16.5	18.6
5	SANDSTONE	16.5	18.6
5	SANDSTONE	16.5	18.6
5	SANDSTONE	16.5	18.6
5	SANDSTONE	16.5	18.6
5	SANDSTONE	16.5	18.6

**Well ID:** 7268446  
**Construction Date:** 2016-08-10

**Easting:** 424760  
**Northing:** 4974829

**UTM Zone** 18  
**Positional Accuracy:** margin of error : 30 m - 100 m

**Well Depth:** 24.4  
**Well Diameter (cm):** 15.9  
**Water First Found:** 17.7  
**Static Level:** 7

**Water Kind** Untested  
**Final Status** Water Supply  
**Primary Water Use:** Domestic

**Pump Rate (LPM):** 91  
**Recommended Pump Rate:** 91  
**Pumping Duration (h:m):** 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0	1.22
1	SAND	0	1.22
1	SAND	0	1.22
1	SAND	0	1.22
2	SANDSTONE	1.22	17.7
2	SANDSTONE	1.22	17.7
2	SANDSTONE	1.22	17.7
2	SANDSTONE	1.22	17.7
3	SANDSTONE	17.7	22.6
3	SANDSTONE	17.7	22.6
3	SANDSTONE	17.7	22.6
3	SANDSTONE	17.7	22.6
4	SANDSTONE	22.6	24.4
4	SANDSTONE	22.6	24.4
4	SANDSTONE	22.6	24.4
4	SANDSTONE	22.6	24.4



**Well ID:** 7268447

**Easting:** 424277

**UTM Zone** 18

**Construction Date:** 2016-08-10

**Northing:** 4975064

**Positional Accuracy:** margin of error : 30 m - 100 m

**Well Depth:** 29.9

**Water Kind** Untested

**Pump Rate (LPM):** 91

**Well Diameter (cm):** 15.6

**Final Status** Water Supply

**Recommended Pump Rate:** 91

**Water First Found:** 27.4

**Primary Water Use:** Domestic

**Pumping Duration (h:m):** 1 : 0

**Static Level:** 6

Layer:	Driller's Description:	Top:	Bottom:
1	SANDSTONE	0	18.9
1	SANDSTONE	0	18.9
1	SANDSTONE	0	18.9
1	SANDSTONE	0	18.9
2	SAND	18.9	27.4
2	SAND	18.9	27.4
2	SAND	18.9	27.4
2	SAND	18.9	27.4
3	SANDSTONE	27.4	28.0
3	SANDSTONE	27.4	28.0
3	SANDSTONE	27.4	28.0
3	SANDSTONE	27.4	28.0
4	SANDSTONE	28.0	29.9
4	SANDSTONE	28.0	29.9
4	SANDSTONE	28.0	29.9
4	SANDSTONE	28.0	29.9



Environmental

Geotechnical

Building Sciences

Construction Quality  
Verification

**Telephone**

(866) 217.7900  
(705) 742.7900

**Website**

cambium-inc.com

**Mailing Address**

P.O. Box 325,  
Peterborough, Ontario  
Canada, K9J 6Z3

**Locations**

Peterborough  
Kingston  
Barrie  
Oshawa

**Laboratory**

Peterborough



February 9, 2024

Dear property owner,

Cambium is conducting a groundwater study for the proposed subdivision located southeast of the intersection of Matheson Drive and Rosedale Road South. As part of the assessment, we are taking inventory of private groundwater users located adjacent to the work area. The purpose of the inventory is to identify nearby water supply wells that may be sensitive to the development and to catalogue the existing groundwater conditions, water levels, yields, water quality, etc.

If a supply well is located on your property, we are requesting that you please review and complete the attached questionnaire. Complete as much information as possible and scan the document (or take a photograph) and email to [kyle.horner@cambium-inc.com](mailto:kyle.horner@cambium-inc.com). Please note, Cambium Inc. may contact you at a later date to request permission to monitor the water level in your well in the future.

You are not obligated to complete this form, your participation is voluntary, and all results regarding your well will be confidential. If you choose to provide a response to this letter, please do so before Friday, February 23, 2024.

If you have any questions regarding this project, please contact Kyle Horner at 613 876 4516.

Best regards,

Kyle Horner, Ph.D., P.Geol.  
Senior Hydrogeologist / Senior Project  
Manager, Cambium Inc.

*KH/kh*

*Attached: Water Well Survey Questionnaire*



## Well Use Survey Summary Report

Number	Street	Spoke to owner	Participated in program	Comments	Water Level (mtop)	Depth (mtop)	Well Record #	UTM	
								mE	mN
100	Bower Boulevard	Yes	No	Gave letter to homeowner					
105	Bower Boulevard	No	-	Left letter in mailbox					
115	Bower Boulevard	No	-	Left letter in mailbox					
116	Bower Boulevard	Yes	No	Gave letter to homeowner					
125	Bower Boulevard	Yes	No	Gave letter to homeowner					
126	Bower Boulevard	No	-	Left letter in mailbox					
135	Bower Boulevard	No	-	Left letter in mailbox					
136	Bower Boulevard	No	-	Left letter in mailbox					
146	Bower Boulevard	No	-	Left letter in mailbox					
147	Bower Boulevard	Yes	No	Gave letter to homeowner - emailed in response - indicated water was hard	-	24.38	A051443	425200	4974843
151	Bower Boulevard	Yes	No	Gave letter to homeowner					
156	Bower Boulevard	Yes	No	Gave letter to homeowner					
166	Bower Boulevard	Yes	No	Gave letter to homeowner					
167	Bower Boulevard	No	-	Left letter in mailbox					
173	Bower Boulevard	No	-	Left letter in mailbox					
182	Bower Boulevard	No	-	Left letter in mailbox					
746	Rosedal Rd South	No	-	Left letter in mailbox					
760	Rosedal Rd South	No	-	Left letter in mailbox					
765	Rosedal Rd South	No	-	Left letter in mailbox					
771	Rosedal Rd South	No	-	Left letter in mailbox					
780	Rosedal Rd South	Yes	No	Gave letter to homeowner					
782	Rosedal Rd South	No	-	Left letter in mailbox					
785	Rosedal Rd South	No	-	Left letter in mailbox					
795	Rosedal Rd South	Yes	No	Gave letter to homeowner - emailed in response - indicated water was hard	-	~30	-	-	-
805	Rosedal Rd South	Yes	No	Gave letter to homeowner - emailed in response - indicated water was hard	-	24.4	A360999	424701	4974928
815	Rosedal Rd South	No	-	Left letter in mailbox					
843	Rosedal Rd South	No	-	Left letter in mailbox					
845	Rosedal Rd South	No	-	Left letter in mailbox					
862	Rosedal Rd South	Yes	No	Gave letter to homeowner					





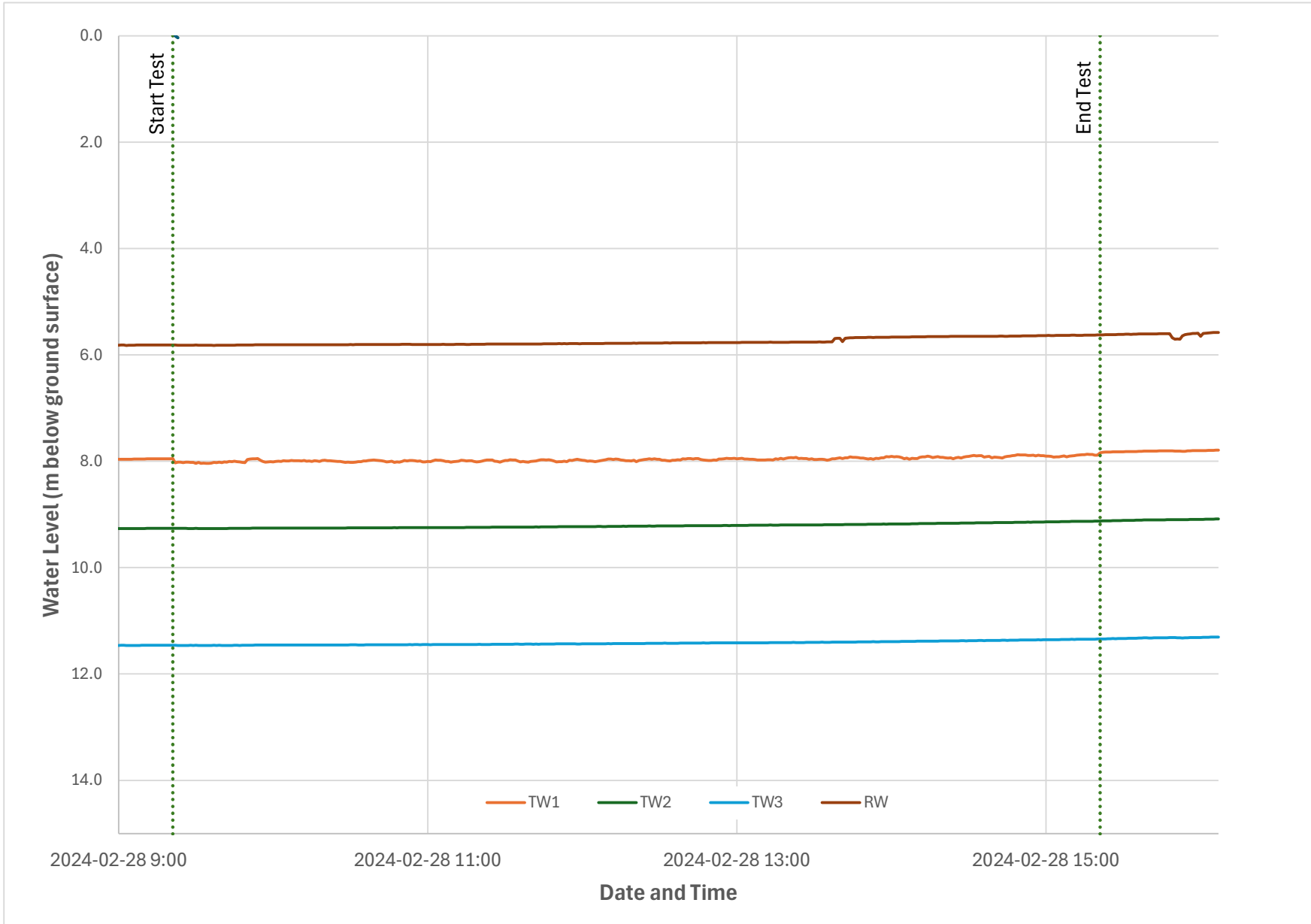




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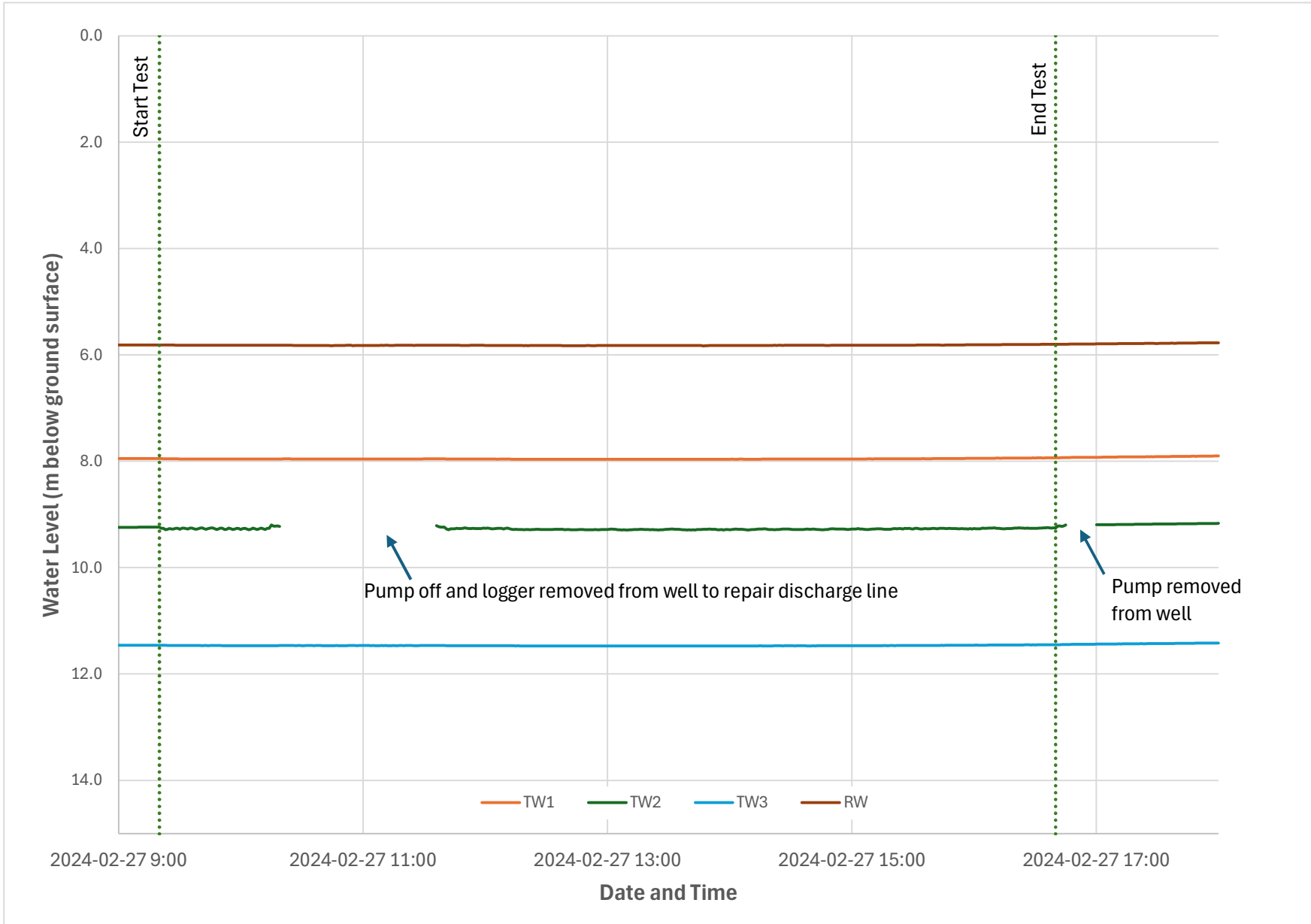
**Appendix F**  
**Hydraulic Pumping Test Results**

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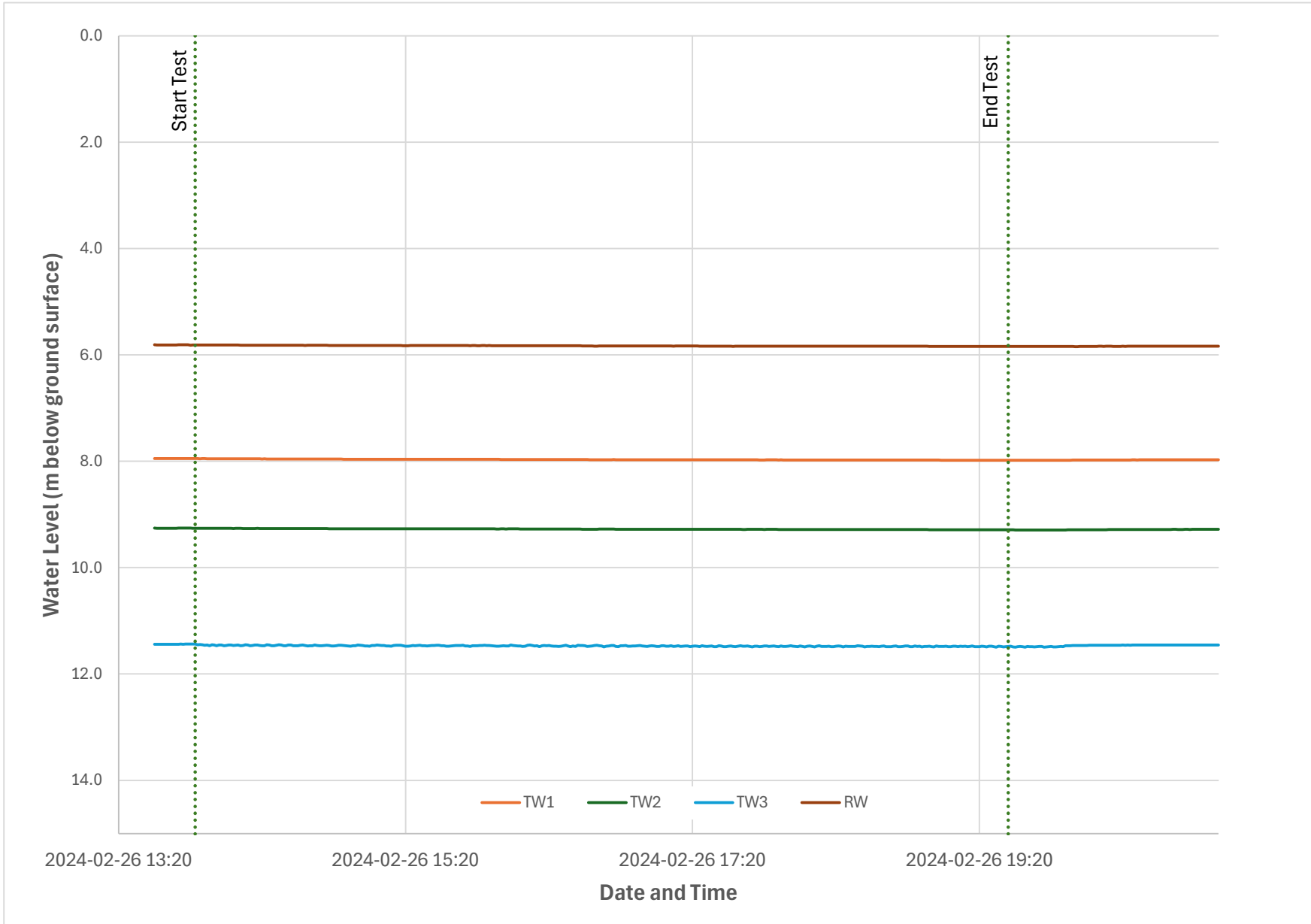


**Measured Water Levels for TW1 Pumping Test**

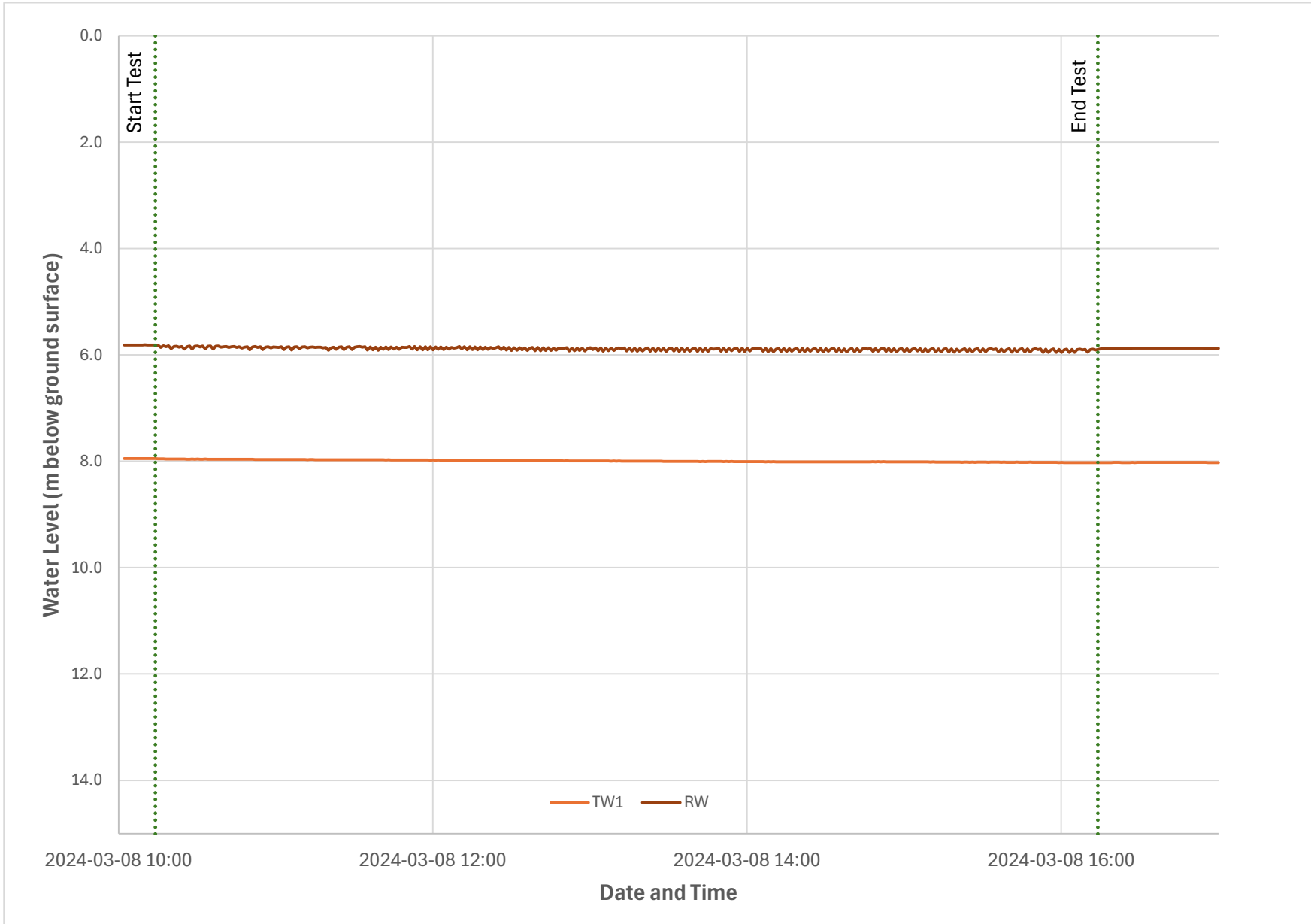




Measured Water Levels for TW2 Pumping Test



Measured Water Levels for TW3 Pumping Test



**Measured Water Levels for RW1 Pumping Test**



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**Appendix G**  
**Water Quality Results**

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Your Project #: 19387-001  
 Your C.O.C. #: 977413-03-01

**Attention: Kyle Horner**

Cambium Environmental Inc  
 31 Hyperion Court, Suite 102  
 Kingston, ON  
 Canada K7P 7G3

**Report Date: 2024/03/06**  
 Report #: R8055255  
 Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BUREAU VERITAS JOB #: C462310**

**Received: 2024/03/01, 08:51**

Sample Matrix: Water  
 # Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Alkalinity	1	N/A	2024/03/05	CAM SOP-00448	SM 24 2320 B m
Carbonate, Bicarbonate and Hydroxide	1	N/A	2024/03/04	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	1	N/A	2024/03/04	CAM SOP-00463	SM 24 4500-Cl E m
Conductivity	1	N/A	2024/03/02	CAM SOP-00414	SM 24 2510 m
Dissolved Organic Carbon (DOC) (1)	1	N/A	2024/03/01	CAM SOP-00446	SM 24 5310 B m
Hardness (calculated as CaCO3)	1	N/A	2024/03/05	CAM SOP 00102/00408/00447	SM 2340 B
Metals Analysis by ICPMS (as received) (2)	1	N/A	2024/03/04	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	1	N/A	2024/03/05		
Anion and Cation Sum	1	N/A	2024/03/05		
Total Coliforms/ E. coli, CFU/100mL	1	N/A	2024/03/01	CAM SOP-00551	MECP-E3407
Fecal coliform, (CFU/100mL)	1	N/A	2024/03/01	CAM SOP-00552	
Total Ammonia-N	1	N/A	2024/03/05	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (3)	1	N/A	2024/03/04	CAM SOP-00440	SM 24 4500-NO3I/NO2B
pH	1	2024/03/02	2024/03/02	CAM SOP-00413	SM 24th - 4500H+ B
Orthophosphate	1	N/A	2024/03/04	CAM SOP-00461	SM 24 4500-P E
Sat. pH and Langelier Index (@ 20C)	1	N/A	2024/03/05		Auto Calc
Sat. pH and Langelier Index (@ 4C)	1	N/A	2024/03/05		Auto Calc
Sulphate by Automated Turbidimetry	1	N/A	2024/03/04	CAM SOP-00464	SM 24 4500-SO42- E m
Total Dissolved Solids (TDS calc)	1	N/A	2024/03/05		Auto Calc
Turbidity	1	N/A	2024/03/01	CAM SOP-00417	SM 24 2130 B

**Remarks:**

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

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.



Your Project #: 19387-001  
Your C.O.C. #: 977413-03-01

**Attention: Kyle Horner**

Cambium Environmental Inc  
31 Hyperion Court, Suite 102  
Kingston, ON  
Canada K7P 7G3

**Report Date: 2024/03/06**  
Report #: R8055255  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BUREAU VERITAS JOB #: C462310**

**Received: 2024/03/01, 08:51**

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.

(2) Metals analysis was performed on the sample 'as received'.

(3) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to:

Christine Gripton, Senior Project Manager  
Email: Christine.Gripton@bureauveritas.com  
Phone# (519)652-9444

=====

This report has been generated and distributed using a secure automated process.

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.



BUREAU  
VERITAS

Bureau Veritas Job #: C462310  
Report Date: 2024/03/06

Cambium Environmental Inc  
Client Project #: 19387-001  
Sampler Initials: MC

**RCAP - COMPREHENSIVE (DRINKING WATER)**

<b>Bureau Veritas ID</b>		YNA332			YNA332		
<b>Sampling Date</b>		2024/02/28 14:50			2024/02/28 14:50		
<b>COC Number</b>		977413-03-01			977413-03-01		
	<b>UNITS</b>	<b>TW1</b>	<b>RDL</b>	<b>QC Batch</b>	<b>TW1 Lab-Dup</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Calculated Parameters</b>							
Anion Sum	me/L	3.75	N/A	9250424			
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	180	1.0	9250087			
Calculated TDS	mg/L	180	1.0	9250422			
Carb. Alkalinity (calc. as CaCO3)	mg/L	1.5	1.0	9250087			
Cation Sum	me/L	3.92	N/A	9250424			
Hardness (CaCO3)	mg/L	190	1.0	9250421			
Ion Balance (% Difference)	%	2.21	N/A	9250423			
Langelier Index (@ 20C)	N/A	0.482		9250426			
Langelier Index (@ 4C)	N/A	0.232		9250427			
Saturation pH (@ 20C)	N/A	7.46		9250426			
Saturation pH (@ 4C)	N/A	7.71		9250427			
<b>Inorganics</b>							
Total Ammonia-N	mg/L	<0.050	0.050	9253581			
Conductivity	umho/cm	360	1.0	9252632			
Dissolved Organic Carbon	mg/L	1.6	0.40	9248281			
Orthophosphate (P)	mg/L	<0.010	0.010	9251735	<0.010	0.010	9251735
pH	pH	7.94		9252633			
Dissolved Sulphate (SO4)	mg/L	3.5	1.0	9251733	3.4	1.0	9251733
Alkalinity (Total as CaCO3)	mg/L	180	1.0	9252631			
Dissolved Chloride (Cl-)	mg/L	<1.0	1.0	9251730	<1.0	1.0	9251730
Nitrite (N)	mg/L	<0.010	0.010	9250717			
Nitrate (N)	mg/L	0.26	0.10	9250717			
<b>Metals</b>							
Aluminum (Al)	ug/L	<4.9	4.9	9247907			
Antimony (Sb)	ug/L	<0.50	0.50	9247907			
Arsenic (As)	ug/L	<1.0	1.0	9247907			
Barium (Ba)	ug/L	27	2.0	9247907			
Beryllium (Be)	ug/L	<0.40	0.40	9247907			
Boron (B)	ug/L	<10	10	9247907			
Cadmium (Cd)	ug/L	<0.090	0.090	9247907			
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable							



**BUREAU  
VERITAS**

Bureau Veritas Job #: C462310  
Report Date: 2024/03/06

Cambium Environmental Inc  
Client Project #: 19387-001  
Sampler Initials: MC

**RCAP - COMPREHENSIVE (DRINKING WATER)**

<b>Bureau Veritas ID</b>		YNA332			YNA332		
<b>Sampling Date</b>		2024/02/28 14:50			2024/02/28 14:50		
<b>COC Number</b>		977413-03-01			977413-03-01		
	<b>UNITS</b>	<b>TW1</b>	<b>RDL</b>	<b>QC Batch</b>	<b>TW1 Lab-Dup</b>	<b>RDL</b>	<b>QC Batch</b>
Calcium (Ca)	ug/L	46000	200	9247907			
Chromium (Cr)	ug/L	<5.0	5.0	9247907			
Cobalt (Co)	ug/L	<0.50	0.50	9247907			
Copper (Cu)	ug/L	<0.90	0.90	9247907			
Iron (Fe)	ug/L	<100	100	9247907			
Lead (Pb)	ug/L	<0.50	0.50	9247907			
Lithium (Li)	ug/L	<5.0	5.0	9247907			
Magnesium (Mg)	ug/L	19000	50	9247907			
Manganese (Mn)	ug/L	<2.0	2.0	9247907			
Molybdenum (Mo)	ug/L	<0.50	0.50	9247907			
Nickel (Ni)	ug/L	<1.0	1.0	9247907			
Phosphorus (P)	ug/L	<100	100	9247907			
Potassium (K)	ug/L	650	200	9247907			
Selenium (Se)	ug/L	<2.0	2.0	9247907			
Silicon (Si)	ug/L	1600	50	9247907			
Silver (Ag)	ug/L	<0.090	0.090	9247907			
Sodium (Na)	ug/L	750	100	9247907			
Strontium (Sr)	ug/L	31	1.0	9247907			
Thallium (Tl)	ug/L	<0.050	0.050	9247907			
Titanium (Ti)	ug/L	<5.0	5.0	9247907			
Uranium (U)	ug/L	0.41	0.10	9247907			
Vanadium (V)	ug/L	<0.50	0.50	9247907			
Zinc (Zn)	ug/L	17	5.0	9247907			
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate							





**BUREAU  
VERITAS**

Bureau Veritas Job #: C462310  
Report Date: 2024/03/06

Cambium Environmental Inc  
Client Project #: 19387-001  
Sampler Initials: MC

**RESULTS OF ANALYSES OF WATER**

<b>Bureau Veritas ID</b>		YNA332		
<b>Sampling Date</b>		2024/02/28 14:50		
<b>COC Number</b>		977413-03-01		
	<b>UNITS</b>	<b>TW1</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Inorganics</b>				
Turbidity	NTU	<0.1	0.1	9251388
RDL = Reportable Detection Limit QC Batch = Quality Control Batch				



**BUREAU  
VERITAS**

Bureau Veritas Job #: C462310

Report Date: 2024/03/06

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

**MICROBIOLOGY (WATER)**

<b>Bureau Veritas ID</b>		YNA332	
<b>Sampling Date</b>		2024/02/28 14:50	
<b>COC Number</b>		977413-03-01	
	<b>UNITS</b>	<b>TW1</b>	<b>QC Batch</b>
<b>Microbiological</b>			
Fecal coliform	CFU/100mL	0	9250958
Background	CFU/100mL	220	9250895
Total Coliforms	CFU/100mL	27	9250895
Escherichia coli	CFU/100mL	0	9250895
QC Batch = Quality Control Batch			



**BUREAU  
VERITAS**

Bureau Veritas Job #: C462310  
Report Date: 2024/03/06

Cambium Environmental Inc  
Client Project #: 19387-001  
Sampler Initials: MC

**TEST SUMMARY**

**Bureau Veritas ID:** YNA332  
**Sample ID:** TW1  
**Matrix:** Water

**Collected:** 2024/02/28  
**Shipped:**  
**Received:** 2024/03/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9252631	N/A	2024/03/05	Nachiketa Gohil
Carbonate, Bicarbonate and Hydroxide	CALC	9250087	N/A	2024/03/04	Automated Statchk
Chloride by Automated Colourimetry	SKAL	9251730	N/A	2024/03/04	Alina Dobreanu
Conductivity	AT	9252632	N/A	2024/03/02	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9248281	N/A	2024/03/01	Gyulshen Idriz
Hardness (calculated as CaCO3)		9250421	N/A	2024/03/05	Automated Statchk
Metals Analysis by ICPMS (as received)	ICP/MS	9247907	N/A	2024/03/04	Prempal Bhatti
Ion Balance (% Difference)	CALC	9250423	N/A	2024/03/05	Automated Statchk
Anion and Cation Sum	CALC	9250424	N/A	2024/03/05	Automated Statchk
Total Coliforms/ E. coli, CFU/100mL	PL	9250895	N/A	2024/03/01	Aayushi Patel
Fecal coliform, (CFU/100mL)	PL	9250958	N/A	2024/03/01	Aayushi Patel
Total Ammonia-N	LACH/NH4	9253581	N/A	2024/03/05	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	9250717	N/A	2024/03/04	Chandra Nandlal
pH	AT	9252633	2024/03/02	2024/03/02	Nachiketa Gohil
Orthophosphate	KONE	9251735	N/A	2024/03/04	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	9250426	N/A	2024/03/05	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	9250427	N/A	2024/03/05	Automated Statchk
Sulphate by Automated Turbidimetry	SKAL	9251733	N/A	2024/03/04	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	9250422	N/A	2024/03/05	Automated Statchk
Turbidity	AT	9251388	N/A	2024/03/01	Leily Karimi

**Bureau Veritas ID:** YNA332 Dup  
**Sample ID:** TW1  
**Matrix:** Water

**Collected:** 2024/02/28  
**Shipped:**  
**Received:** 2024/03/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride by Automated Colourimetry	SKAL	9251730	N/A	2024/03/04	Alina Dobreanu
Orthophosphate	KONE	9251735	N/A	2024/03/04	Alina Dobreanu
Sulphate by Automated Turbidimetry	SKAL	9251733	N/A	2024/03/04	Alina Dobreanu



**BUREAU  
VERITAS**

Bureau Veritas Job #: C462310

Report Date: 2024/03/06

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

### GENERAL COMMENTS

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

Package 1	5.7°C
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**Results relate only to the items tested.**



**BUREAU  
VERITAS**

Bureau Veritas Job #: C462310

Report Date: 2024/03/06

### QUALITY ASSURANCE REPORT

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9247907	Aluminum (Al)	2024/03/04	101	80 - 120	101	80 - 120	<4.9	ug/L	NC	20
9247907	Antimony (Sb)	2024/03/04	105	80 - 120	104	80 - 120	<0.50	ug/L	NC	20
9247907	Arsenic (As)	2024/03/04	101	80 - 120	99	80 - 120	<1.0	ug/L	NC	20
9247907	Barium (Ba)	2024/03/04	97	80 - 120	101	80 - 120	<2.0	ug/L	1.1	20
9247907	Beryllium (Be)	2024/03/04	101	80 - 120	102	80 - 120	<0.40	ug/L	NC	20
9247907	Boron (B)	2024/03/04	98	80 - 120	97	80 - 120	<10	ug/L	7.0	20
9247907	Cadmium (Cd)	2024/03/04	101	80 - 120	101	80 - 120	<0.090	ug/L	NC	20
9247907	Calcium (Ca)	2024/03/04	NC	80 - 120	103	80 - 120	<200	ug/L	0.89	20
9247907	Chromium (Cr)	2024/03/04	99	80 - 120	98	80 - 120	<5.0	ug/L	NC	20
9247907	Cobalt (Co)	2024/03/04	99	80 - 120	99	80 - 120	<0.50	ug/L	NC	20
9247907	Copper (Cu)	2024/03/04	101	80 - 120	102	80 - 120	<0.90	ug/L	3.5	20
9247907	Iron (Fe)	2024/03/04	102	80 - 120	102	80 - 120	<100	ug/L	NC	20
9247907	Lead (Pb)	2024/03/04	100	80 - 120	101	80 - 120	<0.50	ug/L	NC	20
9247907	Lithium (Li)	2024/03/04	105	80 - 120	105	80 - 120	<5.0	ug/L	NC	20
9247907	Magnesium (Mg)	2024/03/04	NC	80 - 120	100	80 - 120	<50	ug/L	0.53	20
9247907	Manganese (Mn)	2024/03/04	98	80 - 120	98	80 - 120	<2.0	ug/L	4.7	20
9247907	Molybdenum (Mo)	2024/03/04	105	80 - 120	104	80 - 120	<0.50	ug/L	2.4	20
9247907	Nickel (Ni)	2024/03/04	98	80 - 120	97	80 - 120	<1.0	ug/L	NC	20
9247907	Phosphorus (P)	2024/03/04	107	80 - 120	103	80 - 120	<100	ug/L	NC	20
9247907	Potassium (K)	2024/03/04	100	80 - 120	101	80 - 120	<200	ug/L	0.23	20
9247907	Selenium (Se)	2024/03/04	102	80 - 120	101	80 - 120	<2.0	ug/L	NC	20
9247907	Silicon (Si)	2024/03/04	105	80 - 120	103	80 - 120	<50	ug/L	2.5	20
9247907	Silver (Ag)	2024/03/04	103	80 - 120	103	80 - 120	<0.090	ug/L	NC	20
9247907	Sodium (Na)	2024/03/04	101	80 - 120	101	80 - 120	<100	ug/L	0.73	20
9247907	Strontium (Sr)	2024/03/04	101	80 - 120	101	80 - 120	<1.0	ug/L	0.82	20
9247907	Thallium (Tl)	2024/03/04	102	80 - 120	103	80 - 120	<0.050	ug/L	NC	20
9247907	Titanium (Ti)	2024/03/04	101	80 - 120	102	80 - 120	<5.0	ug/L	NC	20
9247907	Uranium (U)	2024/03/04	103	80 - 120	103	80 - 120	<0.10	ug/L	0.22	20
9247907	Vanadium (V)	2024/03/04	101	80 - 120	100	80 - 120	<0.50	ug/L	NC	20
9247907	Zinc (Zn)	2024/03/04	100	80 - 120	100	80 - 120	<5.0	ug/L	1.3	20
9248281	Dissolved Organic Carbon	2024/03/01	NC	80 - 120	97	80 - 120	<0.40	mg/L	0.81	20



**BUREAU  
VERITAS**

Bureau Veritas Job #: C462310

Report Date: 2024/03/06

**QUALITY ASSURANCE REPORT(CONT'D)**

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9250717	Nitrate (N)	2024/03/04	97	80 - 120	98	80 - 120	<0.10	mg/L	1.2	20
9250717	Nitrite (N)	2024/03/04	101	80 - 120	104	80 - 120	<0.010	mg/L	2.1	20
9251388	Turbidity	2024/03/01			100	80 - 120	<0.1	NTU	NC	20
9251730	Dissolved Chloride (Cl-)	2024/03/04	94	80 - 120	94	80 - 120	<1.0	mg/L	NC	20
9251733	Dissolved Sulphate (SO4)	2024/03/04	92	75 - 125	93	80 - 120	<1.0	mg/L	0.86	20
9251735	Orthophosphate (P)	2024/03/04	94	75 - 125	92	80 - 120	<0.010	mg/L	NC	20
9252631	Alkalinity (Total as CaCO3)	2024/03/05			94	85 - 115	<1.0	mg/L	0.96	20
9252632	Conductivity	2024/03/02			103	85 - 115	<1.0	umho/cm	0.33	10
9252633	pH	2024/03/02			102	98 - 103			0.71	N/A
9253581	Total Ammonia-N	2024/03/05	NC	75 - 125	103	80 - 120	<0.050	mg/L	0.54	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

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

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

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

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



BUREAU  
VERITAS

Bureau Veritas Job #: C462310

Report Date: 2024/03/06

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

A handwritten signature in black ink, appearing to read 'Anastassia Hamanov', written over a horizontal line.

Anastassia Hamanov, Scientific Specialist

A handwritten signature in black ink, appearing to read 'Aayushi Patel', written over a horizontal line.

Aayushi Patel, B.sc in Biotechnology, Lab Technician

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Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.





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

CHAIN (



NONT-2024-03-008

Page of

<b>INVOICE TO:</b>		<b>REPORT TO:</b>		<b>PROJECT INFORMATION:</b>	
Company Name: #17950 Cambium Environmental Inc	Company Name: #26906 Cambium Environmental Inc	Quotation #: C26318	Order #:	13	
Attention: ACCOUNTS PAYABLE	Attention: Kyle Horner	P.O. #:	19387-001.		
Address: 194 Sophia Street PO Box 325 Peterborough ON K9H 1E5	Address: 31 Hyperion Court, Suite 102 Kingston ON K7P 7G3	Project Name:	COC #:		
Tel: (705) 742-7900 Fax: (705) 742-7907	Tel: (613) 389-2323 Fax:	Site #:	C#977413-03-01		
Email: accounting@cambium-inc.com	Email: kyle.horner@cambium-inc.com, maren.catt@cambium-i	Sampled By: Maren Catt	Manager: Christine Gripton		

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY						ANALYSIS REQUESTED (PLEASE BE SPECIFIC)										Turnaround Time (TAT) Required: Please provide advance notice for rush projects							
Regulation 153 (2011)			Other Regulations			Special Instructions	Field Filtered (please circle): Metals / Hg / Cr VI	Total Coliforms/ E. coli, CFU/100mL	Fecal coliform, (CFU/100mL)	Turbidity	RCAP - Comprehensive (Drinking Water)											Regular (Standard) TAT: (will be applied if Rush TAT is not specified): Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.	<input checked="" type="checkbox"/>
Table 1	Res/Park	Medium/Fine	CCME	Sanitary Sewer Bylaw		# of Bottles																	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																			
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																			
Include Criteria on Certificate of Analysis (Y/N)?																							
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix																			
1	TW1	Feb. 28, 2024	2:50pm	GW			✓	✓	✓	✓											5	pH: 7.07 Temp: 11.7°C	
2																							
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							

* RELINQUISHED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	# Jars used and not submitted	Laboratory Use Only			
Maren Catt		24/02/28	7:30pm	Guan Sawani		2024/03/01	08:51		Time Sensitive	Temperature (°C) on Recept	Custody Seal Present	Yes / No
										5/5/17	Intact	✓ /

\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COO-TERMS-AND-CONDITIONS.

\* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

\*\* SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/CHAIN-CUSTODY-FORMS-COCS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

White: Bureau Veritas Yellow: Client



Your Project #: 19387-001.  
Your C.O.C. #: 977413-02-01

**Attention: Kyle Horner**

Cambium Environmental Inc  
31 Hyperion Court, Suite 102  
Kingston, ON  
Canada K7P 7G3

**Report Date: 2024/03/06**  
Report #: R8055485  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BUREAU VERITAS JOB #: C460880**

**Received: 2024/02/29, 10:34**

Sample Matrix: Ground Water  
# Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Alkalinity (1)	1	N/A	2024/03/05	CAM SOP-00448	SM 24 2320 B m
Carbonate, Bicarbonate and Hydroxide (1)	1	N/A	2024/03/04	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry (1)	1	N/A	2024/03/01	CAM SOP-00463	SM 24 4500-Cl E m
Conductivity (1)	1	N/A	2024/03/02	CAM SOP-00414	SM 24 2510 m
Dissolved Organic Carbon (DOC) (1, 2)	1	N/A	2024/03/01	CAM SOP-00446	SM 24 5310 B m
Hardness (calculated as CaCO3) (1)	1	N/A	2024/03/05	CAM SOP 00102/00408/00447	SM 2340 B
Metals Analysis by ICPMS (as received) (1, 3)	1	N/A	2024/03/04	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference) (1)	1	N/A	2024/03/05		
Anion and Cation Sum (1)	1	N/A	2024/03/05		
Total Coliforms/ E. coli, CFU/100mL (1)	1	N/A	2024/02/29	CAM SOP-00551	MECP-E3407
Fecal coliform, (CFU/100mL) (1)	1	N/A	2024/02/29	CAM SOP-00552	
Total Ammonia-N (1)	1	N/A	2024/03/01	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (1, 4)	1	N/A	2024/03/01	CAM SOP-00440	SM 24 4500-NO3I/NO2B
pH (1)	1	2024/03/02	2024/03/02	CAM SOP-00413	SM 24th - 4500H+ B
Orthophosphate (1)	1	N/A	2024/02/29	CAM SOP-00461	SM 24 4500-P E
Sat. pH and Langelier Index (@ 20C) (1)	1	N/A	2024/03/05		Auto Calc
Sat. pH and Langelier Index (@ 4C) (1)	1	N/A	2024/03/05		Auto Calc
Sulphate by Automated Turbidimetry (1)	1	N/A	2024/03/01	CAM SOP-00464	SM 24 4500-SO42- E m
Total Dissolved Solids (TDS calc) (1)	1	N/A	2024/03/05		Auto Calc
Turbidity (1)	1	N/A	2024/02/29	CAM SOP-00417	SM 24 2130 B

**Remarks:**

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

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or



Your Project #: 19387-001.  
Your C.O.C. #: 977413-02-01

**Attention: Kyle Horner**

Cambium Environmental Inc  
31 Hyperion Court, Suite 102  
Kingston, ON  
Canada K7P 7G3

**Report Date: 2024/03/06**  
Report #: R8055485  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BUREAU VERITAS JOB #: C460880**

**Received: 2024/02/29, 10:34**

implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

- (1) This test was performed by Bureau Veritas Mississauga, 6740 Campobello Rd , Mississauga, ON, L5N 2L8
- (2) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
- (3) Metals analysis was performed on the sample 'as received'.
- (4) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to:

Christine Gripton, Senior Project Manager  
Email: Christine.Gripton@bureauveritas.com  
Phone# (519)652-9444

=====

This report has been generated and distributed using a secure automated process.

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.



BUREAU  
VERITAS

Bureau Veritas Job #: C460880  
Report Date: 2024/03/06

Cambium Environmental Inc  
Client Project #: 19387-001.  
Sampler Initials: MC

**RCAP - COMPREHENSIVE (DRINKING WATER)**

<b>Bureau Veritas ID</b>		YMT605		
<b>Sampling Date</b>		2024/02/27 16:10		
<b>COC Number</b>		977413-02-01		
	<b>UNITS</b>	<b>TW2</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Calculated Parameters</b>				
Anion Sum	me/L	4.38	N/A	9247937
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	200	1.0	9247934
Calculated TDS	mg/L	230	1.0	9247933
Carb. Alkalinity (calc. as CaCO3)	mg/L	1.4	1.0	9247934
Cation Sum	me/L	4.63	N/A	9247937
Hardness (CaCO3)	mg/L	210	1.0	9247935
Ion Balance (% Difference)	%	2.82	N/A	9247936
Langelier Index (@ 20C)	N/A	0.506		9247938
Langelier Index (@ 4C)	N/A	0.256		9247939
Saturation pH (@ 20C)	N/A	7.36		9247938
Saturation pH (@ 4C)	N/A	7.61		9247939
<b>Inorganics</b>				
Total Ammonia-N	mg/L	<0.050	0.050	9248977
Conductivity	umho/cm	420	1.0	9252632
Dissolved Organic Carbon	mg/L	1.5	0.40	9248281
Orthophosphate (P)	mg/L	<0.010	0.010	9248304
pH	pH	7.87		9252633
Dissolved Sulphate (SO4)	mg/L	6.8	1.0	9248305
Alkalinity (Total as CaCO3)	mg/L	200	1.0	9252631
Dissolved Chloride (Cl-)	mg/L	8.2	1.0	9248307
Nitrite (N)	mg/L	<0.010	0.010	9248650
Nitrate (N)	mg/L	0.30	0.10	9248650
<b>Metals</b>				
Aluminum (Al)	ug/L	8.5	4.9	9247907
Antimony (Sb)	ug/L	<0.50	0.50	9247907
Arsenic (As)	ug/L	<1.0	1.0	9247907
Barium (Ba)	ug/L	240	2.0	9247907
Beryllium (Be)	ug/L	<0.40	0.40	9247907
Boron (B)	ug/L	<10	10	9247907
Cadmium (Cd)	ug/L	<0.090	0.090	9247907
Calcium (Ca)	ug/L	54000	200	9247907
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable				



**BUREAU  
VERITAS**

Bureau Veritas Job #: C460880  
Report Date: 2024/03/06

Cambium Environmental Inc  
Client Project #: 19387-001.  
Sampler Initials: MC

**RCAP - COMPREHENSIVE (DRINKING WATER)**

<b>Bureau Veritas ID</b>		YMT605		
<b>Sampling Date</b>		2024/02/27 16:10		
<b>COC Number</b>		977413-02-01		
	<b>UNITS</b>	<b>TW2</b>	<b>RDL</b>	<b>QC Batch</b>
Chromium (Cr)	ug/L	<5.0	5.0	9247907
Cobalt (Co)	ug/L	<0.50	0.50	9247907
Copper (Cu)	ug/L	1.5	0.90	9247907
Iron (Fe)	ug/L	<100	100	9247907
Lead (Pb)	ug/L	<0.50	0.50	9247907
Lithium (Li)	ug/L	<5.0	5.0	9247907
Magnesium (Mg)	ug/L	18000	50	9247907
Manganese (Mn)	ug/L	2.2	2.0	9247907
Molybdenum (Mo)	ug/L	0.59	0.50	9247907
Nickel (Ni)	ug/L	<1.0	1.0	9247907
Phosphorus (P)	ug/L	<100	100	9247907
Potassium (K)	ug/L	1400	200	9247907
Selenium (Se)	ug/L	<2.0	2.0	9247907
Silicon (Si)	ug/L	2800	50	9247907
Silver (Ag)	ug/L	<0.090	0.090	9247907
Sodium (Na)	ug/L	9800	100	9247907
Strontium (Sr)	ug/L	64	1.0	9247907
Thallium (Tl)	ug/L	<0.050	0.050	9247907
Titanium (Ti)	ug/L	<5.0	5.0	9247907
Uranium (U)	ug/L	1.1	0.10	9247907
Vanadium (V)	ug/L	<0.50	0.50	9247907
Zinc (Zn)	ug/L	22	5.0	9247907
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



**BUREAU  
VERITAS**

Bureau Veritas Job #: C460880

Report Date: 2024/03/06

Cambium Environmental Inc

Client Project #: 19387-001.

Sampler Initials: MC

**RESULTS OF ANALYSES OF GROUND WATER**

<b>Bureau Veritas ID</b>		YMT605		
<b>Sampling Date</b>		2024/02/27 16:10		
<b>COC Number</b>		977413-02-01		
	<b>UNITS</b>	<b>TW2</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Inorganics</b>				
Turbidity	NTU	0.4	0.1	9248975
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



**BUREAU  
VERITAS**

Bureau Veritas Job #: C460880  
Report Date: 2024/03/06

Cambium Environmental Inc  
Client Project #: 19387-001.  
Sampler Initials: MC

**MICROBIOLOGY (GROUND WATER)**

<b>Bureau Veritas ID</b>		YMT605	
<b>Sampling Date</b>		2024/02/27 16:10	
<b>COC Number</b>		977413-02-01	
	<b>UNITS</b>	<b>TW2</b>	<b>QC Batch</b>
<b>Microbiological</b>			
Fecal coliform	CFU/100mL	0	9248235
Background	CFU/100mL	610	9248199
Total Coliforms	CFU/100mL	0	9248199
Escherichia coli	CFU/100mL	0	9248199
QC Batch = Quality Control Batch			





**BUREAU  
VERITAS**

Bureau Veritas Job #: C460880

Report Date: 2024/03/06

Cambium Environmental Inc

Client Project #: 19387-001.

Sampler Initials: MC

### TEST SUMMARY

**Bureau Veritas ID:** YMT605  
**Sample ID:** TW2  
**Matrix:** Ground Water

**Collected:** 2024/02/27  
**Shipped:**  
**Received:** 2024/02/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9252631	N/A	2024/03/05	Nachiketa Gohil
Carbonate, Bicarbonate and Hydroxide	CALC	9247934	N/A	2024/03/04	Automated Statchk
Chloride by Automated Colourimetry	SKAL	9248307	N/A	2024/03/01	Alina Dobreanu
Conductivity	AT	9252632	N/A	2024/03/02	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9248281	N/A	2024/03/01	Gyulshen Idriz
Hardness (calculated as CaCO3)		9247935	N/A	2024/03/05	Automated Statchk
Metals Analysis by ICPMS (as received)	ICP/MS	9247907	N/A	2024/03/04	Prempal Bhatti
Ion Balance (% Difference)	CALC	9247936	N/A	2024/03/05	Automated Statchk
Anion and Cation Sum	CALC	9247937	N/A	2024/03/05	Automated Statchk
Total Coliforms/ E. coli, CFU/100mL	PL	9248199	N/A	2024/02/29	Paramjit Paramjit
Fecal coliform, (CFU/100mL)	PL	9248235	N/A	2024/02/29	Paramjit Paramjit
Total Ammonia-N	LACH/NH4	9248977	N/A	2024/03/01	Chandra Nandlal
Nitrate & Nitrite as Nitrogen in Water	LACH	9248650	N/A	2024/03/01	Jinal Chavda
pH	AT	9252633	2024/03/02	2024/03/02	Nachiketa Gohil
Orthophosphate	KONE	9248304	N/A	2024/02/29	Massarat Jan
Sat. pH and Langelier Index (@ 20C)	CALC	9247938	N/A	2024/03/05	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	9247939	N/A	2024/03/05	Automated Statchk
Sulphate by Automated Turbidimetry	SKAL	9248305	N/A	2024/03/01	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	9247933	N/A	2024/03/05	Automated Statchk
Turbidity	AT	9248975	N/A	2024/02/29	Leily Karimi



**BUREAU  
VERITAS**

Bureau Veritas Job #: C460880

Report Date: 2024/03/06

Cambium Environmental Inc

Client Project #: 19387-001.

Sampler Initials: MC

### GENERAL COMMENTS

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

Package 1	2.7°C
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**Results relate only to the items tested.**



BUREAU  
VERITAS

Bureau Veritas Job #: C460880

Report Date: 2024/03/06

### QUALITY ASSURANCE REPORT

Cambium Environmental Inc

Client Project #: 19387-001.

Sampler Initials: MC

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9247907	Aluminum (Al)	2024/03/04	101	80 - 120	101	80 - 120	<4.9	ug/L	NC	20
9247907	Antimony (Sb)	2024/03/04	105	80 - 120	104	80 - 120	<0.50	ug/L	NC	20
9247907	Arsenic (As)	2024/03/04	101	80 - 120	99	80 - 120	<1.0	ug/L	NC	20
9247907	Barium (Ba)	2024/03/04	97	80 - 120	101	80 - 120	<2.0	ug/L	1.1	20
9247907	Beryllium (Be)	2024/03/04	101	80 - 120	102	80 - 120	<0.40	ug/L	NC	20
9247907	Boron (B)	2024/03/04	98	80 - 120	97	80 - 120	<10	ug/L	7.0	20
9247907	Cadmium (Cd)	2024/03/04	101	80 - 120	101	80 - 120	<0.090	ug/L	NC	20
9247907	Calcium (Ca)	2024/03/04	NC	80 - 120	103	80 - 120	<200	ug/L	0.89	20
9247907	Chromium (Cr)	2024/03/04	99	80 - 120	98	80 - 120	<5.0	ug/L	NC	20
9247907	Cobalt (Co)	2024/03/04	99	80 - 120	99	80 - 120	<0.50	ug/L	NC	20
9247907	Copper (Cu)	2024/03/04	101	80 - 120	102	80 - 120	<0.90	ug/L	3.5	20
9247907	Iron (Fe)	2024/03/04	102	80 - 120	102	80 - 120	<100	ug/L	NC	20
9247907	Lead (Pb)	2024/03/04	100	80 - 120	101	80 - 120	<0.50	ug/L	NC	20
9247907	Lithium (Li)	2024/03/04	105	80 - 120	105	80 - 120	<5.0	ug/L	NC	20
9247907	Magnesium (Mg)	2024/03/04	NC	80 - 120	100	80 - 120	<50	ug/L	0.53	20
9247907	Manganese (Mn)	2024/03/04	98	80 - 120	98	80 - 120	<2.0	ug/L	4.7	20
9247907	Molybdenum (Mo)	2024/03/04	105	80 - 120	104	80 - 120	<0.50	ug/L	2.4	20
9247907	Nickel (Ni)	2024/03/04	98	80 - 120	97	80 - 120	<1.0	ug/L	NC	20
9247907	Phosphorus (P)	2024/03/04	107	80 - 120	103	80 - 120	<100	ug/L	NC	20
9247907	Potassium (K)	2024/03/04	100	80 - 120	101	80 - 120	<200	ug/L	0.23	20
9247907	Selenium (Se)	2024/03/04	102	80 - 120	101	80 - 120	<2.0	ug/L	NC	20
9247907	Silicon (Si)	2024/03/04	105	80 - 120	103	80 - 120	<50	ug/L	2.5	20
9247907	Silver (Ag)	2024/03/04	103	80 - 120	103	80 - 120	<0.090	ug/L	NC	20
9247907	Sodium (Na)	2024/03/04	101	80 - 120	101	80 - 120	<100	ug/L	0.73	20
9247907	Strontium (Sr)	2024/03/04	101	80 - 120	101	80 - 120	<1.0	ug/L	0.82	20
9247907	Thallium (Tl)	2024/03/04	102	80 - 120	103	80 - 120	<0.050	ug/L	NC	20
9247907	Titanium (Ti)	2024/03/04	101	80 - 120	102	80 - 120	<5.0	ug/L	NC	20
9247907	Uranium (U)	2024/03/04	103	80 - 120	103	80 - 120	<0.10	ug/L	0.22	20
9247907	Vanadium (V)	2024/03/04	101	80 - 120	100	80 - 120	<0.50	ug/L	NC	20
9247907	Zinc (Zn)	2024/03/04	100	80 - 120	100	80 - 120	<5.0	ug/L	1.3	20
9248281	Dissolved Organic Carbon	2024/03/01	NC	80 - 120	97	80 - 120	<0.40	mg/L	0.81	20
9248304	Orthophosphate (P)	2024/02/29	95	75 - 125	91	80 - 120	<0.010	mg/L	NC	20



**BUREAU  
VERITAS**

Bureau Veritas Job #: C460880

Report Date: 2024/03/06

**QUALITY ASSURANCE REPORT(CONT'D)**

Cambium Environmental Inc

Client Project #: 19387-001.

Sampler Initials: MC

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9248305	Dissolved Sulphate (SO4)	2024/03/01	94	75 - 125	97	80 - 120	<1.0	mg/L	6.3	20
9248307	Dissolved Chloride (Cl-)	2024/03/01	98	80 - 120	95	80 - 120	<1.0	mg/L	NC	20
9248650	Nitrate (N)	2024/03/01	105	80 - 120	100	80 - 120	<0.10	mg/L	NC	20
9248650	Nitrite (N)	2024/03/01	106	80 - 120	103	80 - 120	<0.010	mg/L	1.9	20
9248975	Turbidity	2024/02/29			100	80 - 120	<0.1	NTU	1.7	20
9248977	Total Ammonia-N	2024/03/01	100	75 - 125	100	80 - 120	<0.050	mg/L	NC	20
9252631	Alkalinity (Total as CaCO3)	2024/03/05			94	85 - 115	<1.0	mg/L	0.96	20
9252632	Conductivity	2024/03/02			103	85 - 115	<1.0	umho/cm	0.33	10
9252633	pH	2024/03/02			102	98 - 103			0.71	N/A

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

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

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

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

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



BUREAU  
VERITAS

Bureau Veritas Job #: C460880  
Report Date: 2024/03/06

Cambium Environmental Inc  
Client Project #: 19387-001.  
Sampler Initials: MC

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

A handwritten signature in black ink, appearing to read "Anastassia Hamanov".

---

Anastassia Hamanov, Scientific Specialist


A handwritten signature in black ink, appearing to read "Paramjit".

---

Paramjit Paramjit, Analyst I

---

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.



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

Received in Ottawa

CHAIN

29-Feb-24 10:34  
Christine Gripton  
C460880

AN4 ENV-1241

Order #: 413  
Project Manager: Christine Gripton

---

**INVOICE TO:**

Company Name: #17950 Cambium Environmental Inc  
Attention: ACCOUNTS PAYABLE  
Address: 194 Sophia Street PO Box 325 Peterborough ON K9H 1E5  
Tel: (705) 742-7900 Fax: (705) 742-7907  
Email: accounting@cambium-inc.com

**REPORT TO:**

Company Name: #26906 Cambium Environmental Inc  
Attention: Kyle Horner  
Address: 31 Hyperion Court, Suite 102 Kingston ON K7P 7G3  
Tel: (613) 389-2323 Fax: (613) 389-2323  
Email: kyle.horner@cambium-inc.com, maren.catt@cambium-i

**PROJECT INFORMATION:**

Quotation #: C26318  
P.O. #: 19387-001  
Project: 19387-001  
Project Name:  
Site #: Maren Catt  
Sampled By:

---

**MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY**

Regulation 153 (2011)	Other Regulations	Special Instructions
<input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Medium/Fine <input type="checkbox"/> Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse <input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/Other <input type="checkbox"/> For RSC <input type="checkbox"/> Table _____	<input type="checkbox"/> CCME <input type="checkbox"/> Sanitary Sewer Bylaw <input type="checkbox"/> Reg 558 <input type="checkbox"/> Storm Sewer Bylaw <input type="checkbox"/> MISA   Municipality _____ <input checked="" type="checkbox"/> PWQO <input type="checkbox"/> Reg 406 Table _____ <input type="checkbox"/> Other _____	

**Include Criteria on Certificate of Analysis (Y/N)?**

**ANALYSIS REQUESTED (PLEASE BE SPECIFIC)**

Field Filtered (please circle): Metals / Hg / Cr / V	Total Coliforms/ E. coli, CFU/100mL	Fecal coliform, (CFU/100mL)	Turbidity	RCAP - Comprehensive (Drinking Water)
✓	✓	✓	✓	✓

**Turnaround Time (TAT) Required:**  
Please provide advance notice for rush projects

**Regular (Standard) TAT:**  
(will be applied if Rush TAT is not specified):   
Standard TAT = 5-7 Working days for most tests.  
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

**Job Specific Rush TAT (if applies to entire submission)**  
Date Required: \_\_\_\_\_ Time Required: \_\_\_\_\_  
Rush Confirmation Number: \_\_\_\_\_ (call lab for #)

---

Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr / V	Total Coliforms/ E. coli, CFU/100mL	Fecal coliform, (CFU/100mL)	Turbidity	RCAP - Comprehensive (Drinking Water)
1	TW2	Feb 27, 2024		GW	✓	✓	✓	✓	✓
2									
3									
4									
5									
6									
7									
8									
9									
10									

---

* RELINQUISHED BY: (Signature/Print) <u>Maren Catt</u>	Date: (YY/MM/DD) <u>2024/02/27</u>	Time <u>5:54pm</u>	RECEIVED BY: (Signature/Print) <u>Samuel Durand and Maren Catt</u>	Date: (YY/MM/DD) <u>2024/02/28</u>	Time <u>10:34</u>	# Jars used and not submitted <u>3</u>	Laboratory Use Only Time Sensitive <u>3,3,2</u>	Temperature (°C) on Recept <u>3,3,2</u>	Custody Seal Present Intact <input checked="" type="checkbox"/>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
---	---------------------------------------	-----------------------	---	---------------------------------------	----------------------	---	---	--	--	--	--------------------------------

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\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COCS-TERMS-AND-CONDITIONS.

\* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

\*\* SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/CHAIN-CUSTODY-FORMS-COCS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

White: Bureau Veritas Yellow: Client

01110  
onice



Your Project #: 19387-001  
 Your C.O.C. #: C#977413-01-01

**Attention: Kyle Horner**

Cambium Environmental Inc  
 31 Hyperion Court, Suite 102  
 Kingston, ON  
 Canada K7P 7G3

**Report Date: 2024/03/05**  
 Report #: R8054238  
 Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BUREAU VERITAS JOB #: C459276**

**Received: 2024/02/27, 09:19**

Sample Matrix: Ground Water  
 # Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Alkalinity (1)	1	N/A	2024/03/05	CAM SOP-00448	SM 24 2320 B m
Carbonate, Bicarbonate and Hydroxide (1)	1	N/A	2024/03/04	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry (1)	1	N/A	2024/02/29	CAM SOP-00463	SM 24 4500-Cl E m
Conductivity (1)	1	N/A	2024/03/02	CAM SOP-00414	SM 24 2510 m
Dissolved Organic Carbon (DOC) (1, 2)	1	N/A	2024/03/01	CAM SOP-00446	SM 24 5310 B m
Hardness (calculated as CaCO3) (1)	1	N/A	2024/03/05	CAM SOP 00102/00408/00447	SM 2340 B
Metals Analysis by ICPMS (as received) (1, 3)	1	N/A	2024/03/04	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference) (1)	1	N/A	2024/03/05		
Anion and Cation Sum (1)	1	N/A	2024/03/05		
Total Coliforms/ E. coli, CFU/100mL (1)	1	N/A	2024/02/28	CAM SOP-00551	MECP-E3407
Fecal coliform, (CFU/100mL) (1)	1	N/A	2024/02/28	CAM SOP-00552	
Total Ammonia-N (1)	1	N/A	2024/03/01	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (1, 4)	1	N/A	2024/02/29	CAM SOP-00440	SM 24 4500-NO3I/NO2B
pH (1)	1	2024/03/02	2024/03/02	CAM SOP-00413	SM 24th - 4500H+ B
Orthophosphate (1)	1	N/A	2024/02/29	CAM SOP-00461	SM 24 4500-P E
Sat. pH and Langelier Index (@ 20C) (1)	1	N/A	2024/03/05		Auto Calc
Sat. pH and Langelier Index (@ 4C) (1)	1	N/A	2024/03/05		Auto Calc
Sulphate by Automated Turbidimetry (1)	1	N/A	2024/02/29	CAM SOP-00464	SM 24 4500-SO42- E m
Total Dissolved Solids (TDS calc) (1)	1	N/A	2024/03/05		Auto Calc
Turbidity (1)	1	N/A	2024/02/28	CAM SOP-00417	SM 24 2130 B

**Remarks:**

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

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or





Your Project #: 19387-001  
Your C.O.C. #: C#977413-01-01

**Attention: Kyle Horner**

Cambium Environmental Inc  
31 Hyperion Court, Suite 102  
Kingston, ON  
Canada K7P 7G3

**Report Date: 2024/03/05**  
Report #: R8054238  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BUREAU VERITAS JOB #: C459276**

**Received: 2024/02/27, 09:19**

implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested. This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

- (1) This test was performed by Bureau Veritas Mississauga, 6740 Campobello Rd , Mississauga, ON, L5N 2L8
- (2) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
- (3) Metals analysis was performed on the sample 'as received'.
- (4) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to:

Christine Gripton, Senior Project Manager  
Email: Christine.Gripton@bureauveritas.com  
Phone# (519)652-9444

=====  
This report has been generated and distributed using a secure automated process.

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.



BUREAU  
VERITAS

Bureau Veritas Job #: C459276  
Report Date: 2024/03/05

Cambium Environmental Inc  
Client Project #: 19387-001  
Sampler Initials: MC

**RCAP - COMPREHENSIVE (DRINKING WATER)**

Bureau Veritas ID		YMK942			YMK942		
Sampling Date		2024/02/26 19:30			2024/02/26 19:30		
COC Number		C#977413-01-01			C#977413-01-01		
	UNITS	TW3	RDL	QC Batch	TW3 Lab-Dup	RDL	QC Batch
<b>Calculated Parameters</b>							
Anion Sum	me/L	6.19	N/A	9245116			
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	270	1.0	9245030			
Calculated TDS	mg/L	320	1.0	9245119			
Carb. Alkalinity (calc. as CaCO3)	mg/L	1.4	1.0	9245030			
Cation Sum	me/L	6.43	N/A	9245116			
Hardness (CaCO3)	mg/L	300	1.0	9245031			
Ion Balance (% Difference)	%	1.86	N/A	9245115			
Langelier Index (@ 20C)	N/A	0.608		9245117			
Langelier Index (@ 4C)	N/A	0.359		9245118			
Saturation pH (@ 20C)	N/A	7.14		9245117			
Saturation pH (@ 4C)	N/A	7.39		9245118			
<b>Inorganics</b>							
Total Ammonia-N	mg/L	<0.050	0.050	9248977			
Conductivity	umho/cm	590	1.0	9252632	600	1.0	9252632
Dissolved Organic Carbon	mg/L	1.7	0.40	9248281			
Orthophosphate (P)	mg/L	<0.010	0.010	9246263	<0.010	0.010	9246263
pH	pH	7.75		9252633	7.80		9252633
Dissolved Sulphate (SO4)	mg/L	16	1.0	9246264	15	1.0	9246264
Alkalinity (Total as CaCO3)	mg/L	270	1.0	9252631	270	1.0	9252631
Dissolved Chloride (Cl-)	mg/L	15	1.0	9246265	15	1.0	9246265
Nitrite (N)	mg/L	<0.010	0.010	9246466			
Nitrate (N)	mg/L	0.64	0.10	9246466			
<b>Metals</b>							
Aluminum (Al)	ug/L	<4.9	4.9	9247907	<4.9	4.9	9247907
Antimony (Sb)	ug/L	<0.50	0.50	9247907	<0.50	0.50	9247907
Arsenic (As)	ug/L	<1.0	1.0	9247907	<1.0	1.0	9247907
Barium (Ba)	ug/L	460	2.0	9247907	450	2.0	9247907
Beryllium (Be)	ug/L	<0.40	0.40	9247907	<0.40	0.40	9247907
Boron (B)	ug/L	11	10	9247907	10	10	9247907
Cadmium (Cd)	ug/L	<0.090	0.090	9247907	<0.090	0.090	9247907
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable							



BUREAU  
VERITAS

Bureau Veritas Job #: C459276  
Report Date: 2024/03/05

Cambium Environmental Inc  
Client Project #: 19387-001  
Sampler Initials: MC

**RCAP - COMPREHENSIVE (DRINKING WATER)**

Bureau Veritas ID		YMK942			YMK942		
Sampling Date		2024/02/26 19:30			2024/02/26 19:30		
COC Number		C#977413-01-01			C#977413-01-01		
	UNITS	TW3	RDL	QC Batch	TW3 Lab-Dup	RDL	QC Batch
Calcium (Ca)	ug/L	72000	200	9247907	72000	200	9247907
Chromium (Cr)	ug/L	<5.0	5.0	9247907	<5.0	5.0	9247907
Cobalt (Co)	ug/L	<0.50	0.50	9247907	<0.50	0.50	9247907
Copper (Cu)	ug/L	1.6	0.90	9247907	1.7	0.90	9247907
Iron (Fe)	ug/L	<100	100	9247907	<100	100	9247907
Lead (Pb)	ug/L	<0.50	0.50	9247907	<0.50	0.50	9247907
Lithium (Li)	ug/L	<5.0	5.0	9247907	<5.0	5.0	9247907
Magnesium (Mg)	ug/L	29000	50	9247907	29000	50	9247907
Manganese (Mn)	ug/L	4.1	2.0	9247907	4.3	2.0	9247907
Molybdenum (Mo)	ug/L	0.85	0.50	9247907	0.83	0.50	9247907
Nickel (Ni)	ug/L	<1.0	1.0	9247907	<1.0	1.0	9247907
Phosphorus (P)	ug/L	<100	100	9247907	<100	100	9247907
Potassium (K)	ug/L	6700	200	9247907	6700	200	9247907
Selenium (Se)	ug/L	<2.0	2.0	9247907	<2.0	2.0	9247907
Silicon (Si)	ug/L	2600	50	9247907	2700	50	9247907
Silver (Ag)	ug/L	<0.090	0.090	9247907	<0.090	0.090	9247907
Sodium (Na)	ug/L	7100	100	9247907	7100	100	9247907
Strontium (Sr)	ug/L	130	1.0	9247907	130	1.0	9247907
Thallium (Tl)	ug/L	0.15	0.050	9247907	0.11	0.050	9247907
Titanium (Ti)	ug/L	<5.0	5.0	9247907	<5.0	5.0	9247907
Uranium (U)	ug/L	1.8	0.10	9247907	1.8	0.10	9247907
Vanadium (V)	ug/L	<0.50	0.50	9247907	<0.50	0.50	9247907
Zinc (Zn)	ug/L	38	5.0	9247907	37	5.0	9247907
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate							



**BUREAU  
VERITAS**

Bureau Veritas Job #: C459276

Report Date: 2024/03/05

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

**RESULTS OF ANALYSES OF GROUND WATER**

<b>Bureau Veritas ID</b>		YMK942		
<b>Sampling Date</b>		2024/02/26 19:30		
<b>COC Number</b>		C#977413-01-01		
	<b>UNITS</b>	<b>TW3</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Inorganics</b>				
Turbidity	NTU	0.3	0.1	9245519
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



**BUREAU  
VERITAS**

Bureau Veritas Job #: C459276

Report Date: 2024/03/05

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

**MICROBIOLOGY (GROUND WATER)**

<b>Bureau Veritas ID</b>		YMK942	
<b>Sampling Date</b>		2024/02/26 19:30	
<b>COC Number</b>		C#977413-01-01	
	<b>UNITS</b>	<b>TW3</b>	<b>QC Batch</b>
<b>Microbiological</b>			
Fecal coliform	CFU/100mL	0	9245734
Background	CFU/100mL	70	9245714
Total Coliforms	CFU/100mL	0	9245714
Escherichia coli	CFU/100mL	0	9245714
QC Batch = Quality Control Batch			



**BUREAU  
VERITAS**

Bureau Veritas Job #: C459276  
Report Date: 2024/03/05

Cambium Environmental Inc  
Client Project #: 19387-001  
Sampler Initials: MC

**TEST SUMMARY**

**Bureau Veritas ID:** YMK942  
**Sample ID:** TW3  
**Matrix:** Ground Water

**Collected:** 2024/02/26  
**Shipped:**  
**Received:** 2024/02/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9252631	N/A	2024/03/05	Nachiketa Gohil
Carbonate, Bicarbonate and Hydroxide	CALC	9245030	N/A	2024/03/04	Automated Statchk
Chloride by Automated Colourimetry	SKAL	9246265	N/A	2024/02/29	Alina Dobreanu
Conductivity	AT	9252632	N/A	2024/03/02	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9248281	N/A	2024/03/01	Gyulshen Idriz
Hardness (calculated as CaCO3)		9245031	N/A	2024/03/05	Automated Statchk
Metals Analysis by ICPMS (as received)	ICP/MS	9247907	N/A	2024/03/04	Prempal Bhatti
Ion Balance (% Difference)	CALC	9245115	N/A	2024/03/05	Automated Statchk
Anion and Cation Sum	CALC	9245116	N/A	2024/03/05	Automated Statchk
Total Coliforms/ E. coli, CFU/100mL	PL	9245714	N/A	2024/02/28	Paramjit Paramjit
Fecal coliform, (CFU/100mL)	PL	9245734	N/A	2024/02/28	Paramjit Paramjit
Total Ammonia-N	LACH/NH4	9248977	N/A	2024/03/01	Chandra Nandlal
Nitrate & Nitrite as Nitrogen in Water	LACH	9246466	N/A	2024/02/29	Jinal Chavda
pH	AT	9252633	2024/03/02	2024/03/02	Nachiketa Gohil
Orthophosphate	KONE	9246263	N/A	2024/02/29	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	9245117	N/A	2024/03/05	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	9245118	N/A	2024/03/05	Automated Statchk
Sulphate by Automated Turbidimetry	SKAL	9246264	N/A	2024/02/29	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	9245119	N/A	2024/03/05	Automated Statchk
Turbidity	AT	9245519	N/A	2024/02/28	Vidhi Khatri

**Bureau Veritas ID:** YMK942 Dup  
**Sample ID:** TW3  
**Matrix:** Ground Water

**Collected:** 2024/02/26  
**Shipped:**  
**Received:** 2024/02/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9252631	N/A	2024/03/05	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9246265	N/A	2024/02/29	Alina Dobreanu
Conductivity	AT	9252632	N/A	2024/03/02	Nachiketa Gohil
Metals Analysis by ICPMS (as received)	ICP/MS	9247907	N/A	2024/03/04	Prempal Bhatti
pH	AT	9252633	2024/03/02	2024/03/02	Nachiketa Gohil
Orthophosphate	KONE	9246263	N/A	2024/02/29	Alina Dobreanu
Sulphate by Automated Turbidimetry	SKAL	9246264	N/A	2024/02/29	Alina Dobreanu



**BUREAU  
VERITAS**

Bureau Veritas Job #: C459276

Report Date: 2024/03/05

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

### GENERAL COMMENTS

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

Package 1	2.0°C
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**Results relate only to the items tested.**





**BUREAU  
VERITAS**

Bureau Veritas Job #: C459276

Report Date: 2024/03/05

**QUALITY ASSURANCE REPORT**

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9245519	Turbidity	2024/02/28			101	80 - 120	<0.1	NTU	0.30	20
9246263	Orthophosphate (P)	2024/02/29	101	75 - 125	95	80 - 120	<0.010	mg/L	NC	20
9246264	Dissolved Sulphate (SO4)	2024/02/29	94	75 - 125	97	80 - 120	<1.0	mg/L	0.85	20
9246265	Dissolved Chloride (Cl-)	2024/02/29	89	80 - 120	97	80 - 120	<1.0	mg/L	1.1	20
9246466	Nitrate (N)	2024/02/29	93	80 - 120	92	80 - 120	<0.10	mg/L	NC	20
9246466	Nitrite (N)	2024/02/29	101	80 - 120	100	80 - 120	<0.010	mg/L	NC	20
9247907	Aluminum (Al)	2024/03/04	101	80 - 120	101	80 - 120	<4.9	ug/L	NC	20
9247907	Antimony (Sb)	2024/03/04	105	80 - 120	104	80 - 120	<0.50	ug/L	NC	20
9247907	Arsenic (As)	2024/03/04	101	80 - 120	99	80 - 120	<1.0	ug/L	NC	20
9247907	Barium (Ba)	2024/03/04	97	80 - 120	101	80 - 120	<2.0	ug/L	1.1	20
9247907	Beryllium (Be)	2024/03/04	101	80 - 120	102	80 - 120	<0.40	ug/L	NC	20
9247907	Boron (B)	2024/03/04	98	80 - 120	97	80 - 120	<10	ug/L	7.0	20
9247907	Cadmium (Cd)	2024/03/04	101	80 - 120	101	80 - 120	<0.090	ug/L	NC	20
9247907	Calcium (Ca)	2024/03/04	NC	80 - 120	103	80 - 120	<200	ug/L	0.89	20
9247907	Chromium (Cr)	2024/03/04	99	80 - 120	98	80 - 120	<5.0	ug/L	NC	20
9247907	Cobalt (Co)	2024/03/04	99	80 - 120	99	80 - 120	<0.50	ug/L	NC	20
9247907	Copper (Cu)	2024/03/04	101	80 - 120	102	80 - 120	<0.90	ug/L	3.5	20
9247907	Iron (Fe)	2024/03/04	102	80 - 120	102	80 - 120	<100	ug/L	NC	20
9247907	Lead (Pb)	2024/03/04	100	80 - 120	101	80 - 120	<0.50	ug/L	NC	20
9247907	Lithium (Li)	2024/03/04	105	80 - 120	105	80 - 120	<5.0	ug/L	NC	20
9247907	Magnesium (Mg)	2024/03/04	NC	80 - 120	100	80 - 120	<50	ug/L	0.53	20
9247907	Manganese (Mn)	2024/03/04	98	80 - 120	98	80 - 120	<2.0	ug/L	4.7	20
9247907	Molybdenum (Mo)	2024/03/04	105	80 - 120	104	80 - 120	<0.50	ug/L	2.4	20
9247907	Nickel (Ni)	2024/03/04	98	80 - 120	97	80 - 120	<1.0	ug/L	NC	20
9247907	Phosphorus (P)	2024/03/04	107	80 - 120	103	80 - 120	<100	ug/L	NC	20
9247907	Potassium (K)	2024/03/04	100	80 - 120	101	80 - 120	<200	ug/L	0.23	20
9247907	Selenium (Se)	2024/03/04	102	80 - 120	101	80 - 120	<2.0	ug/L	NC	20
9247907	Silicon (Si)	2024/03/04	105	80 - 120	103	80 - 120	<50	ug/L	2.5	20
9247907	Silver (Ag)	2024/03/04	103	80 - 120	103	80 - 120	<0.090	ug/L	NC	20
9247907	Sodium (Na)	2024/03/04	101	80 - 120	101	80 - 120	<100	ug/L	0.73	20
9247907	Strontium (Sr)	2024/03/04	101	80 - 120	101	80 - 120	<1.0	ug/L	0.82	20
9247907	Thallium (Tl)	2024/03/04	102	80 - 120	103	80 - 120	<0.050	ug/L	NC	20



BUREAU  
VERITAS

Bureau Veritas Job #: C459276

Report Date: 2024/03/05

**QUALITY ASSURANCE REPORT(CONT'D)**

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9247907	Titanium (Ti)	2024/03/04	101	80 - 120	102	80 - 120	<5.0	ug/L	NC	20
9247907	Uranium (U)	2024/03/04	103	80 - 120	103	80 - 120	<0.10	ug/L	0.22	20
9247907	Vanadium (V)	2024/03/04	101	80 - 120	100	80 - 120	<0.50	ug/L	NC	20
9247907	Zinc (Zn)	2024/03/04	100	80 - 120	100	80 - 120	<5.0	ug/L	1.3	20
9248281	Dissolved Organic Carbon	2024/03/01	NC	80 - 120	97	80 - 120	<0.40	mg/L	0.81	20
9248977	Total Ammonia-N	2024/03/01	100	75 - 125	100	80 - 120	<0.050	mg/L	NC	20
9252631	Alkalinity (Total as CaCO3)	2024/03/05			94	85 - 115	<1.0	mg/L	0.96	20
9252632	Conductivity	2024/03/02			103	85 - 115	<1.0	umho/cm	0.33	10
9252633	pH	2024/03/02			102	98 - 103			0.71	N/A

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

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

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

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

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



BUREAU  
VERITAS

Bureau Veritas Job #: C459276  
Report Date: 2024/03/05

Cambium Environmental Inc  
Client Project #: 19387-001  
Sampler Initials: MC

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

A handwritten signature in black ink, appearing to read "Anastassia Hamanov".

---

Anastassia Hamanov, Scientific Specialist

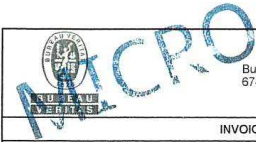
A handwritten signature in black ink, appearing to read "Paramjit".

---

Paramjit Paramjit, Analyst I

---

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

Received in Ottawa

MICRO

Page of



NONT-2024-02-2021

<b>INVOICE TO:</b>		<b>REPORT TO:</b>		<b>PROJECT INFORMATION:</b>	
Company Name: #17950 Cambium Environmental Inc	Company Name: #26906 Cambium Environmental Inc	Quotation #: C26318	Bottle Order #: 977413		
Attention: ACCOUNTS PAYABLE	Attention: Kyle Horner	P.O. #:	Project Manager: Christine Gripton		
Address: 194 Sophia Street PO Box 325 Peterborough ON K9H 1E5	Address: 31 Hyperion Court, Suite 102 Kingston ON K7P 7G3	Project: 19387-001.	COC #: [Barcode]		
Tel: (705) 742-7900 Fax: (705) 742-7907	Tel: (613) 389-2323 Fax:	Site #:	C#977413-01-01		
Email: accounting@cambium-inc.com	Email: kyle.horner@cambium-inc.com, maren.catt@cambium-i	Sampled By: Maren Catt	[Barcode]		

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY						ANALYSIS REQUESTED (PLEASE BE SPECIFIC)										Turnaround Time (TAT) Required: Please provide advance notice for rush projects										
Regulation 153 (2011)		Other Regulations		Special Instructions		Field Filtered (please circle): (Metals/ Hg / Cr-VI)	Total Coliforms/ E. coli, CFU/100mL	Fecal coliform, (CFU/100mL)	Turbidity	RCAP - Comprehensive (Drinking Water)	Regular (Standard) TAT: (will be applied if Rush TAT is not specified): Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.										Job Specific Rush TAT (if applies to entire submission) Date Required: _____ Time Required: _____ Rush Confirmation Number: _____ (call lab for #)					
Include Criteria on Certificate of Analysis (Y/N)?											# of Bottles										Comments					
Table 1	Res/Park	Medium/Fine	CCME	Sanitary Sewer Bylaw																						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																						
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																						
1		TW3	2024/02/26	7:30	GW		✓	✓	✓	✓														5	pH: Temp:	
2																										
3																										
4																										
5																										
6																										
7																										
8																										
9																										
10																										

* RELINQUISHED BY: (Signature/Print) Maren Catt	Date: (YY/MM/DD) 2024/02/26	Time 9:00pm	RECEIVED BY: (Signature/Print) Samuel Durand	Date: (YY/MM/DD) 2024/02/27	Time 09:19	# jars used and not submitted	100 marks	Laboratory Use Only					
								Time Sensitive	Temperature (°C) on Recept 1, 2, 3	Custody Seal Present	Intact	Yes	No

\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.

\* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

\*\* SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/CHAIN-CUSTODY-FORMS-COCS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

White: Bureau Veritas Yellow: Client  
signature  
initials

3/4/23

026 108



Your Project #: 19387-001  
 Your C.O.C. #: C#977413-04-01

**Attention: Kyle Horner**

Cambium Environmental Inc  
 31 Hyperion Court, Suite 102  
 Kingston, ON  
 Canada K7P 7G3

**Report Date: 2024/03/18**  
 Report #: R8070487  
 Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BUREAU VERITAS JOB #: C471497**

**Received: 2024/03/09, 08:29**

Sample Matrix: Water  
 # Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Alkalinity	1	N/A	2024/03/09	CAM SOP-00448	SM 24 2320 B m
Carbonate, Bicarbonate and Hydroxide	1	N/A	2024/03/11	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	1	N/A	2024/03/11	CAM SOP-00463	SM 24 4500-Cl E m
Conductivity	1	N/A	2024/03/09	CAM SOP-00414	SM 24 2510 m
Dissolved Organic Carbon (DOC) (1)	1	N/A	2024/03/12	CAM SOP-00446	SM 24 5310 B m
Hardness (calculated as CaCO3)	1	N/A	2024/03/12	CAM SOP 00102/00408/00447	SM 2340 B
Metals Analysis by ICPMS (as received) (2)	1	N/A	2024/03/12	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	1	N/A	2024/03/12		
Anion and Cation Sum	1	N/A	2024/03/12		
Total Coliforms/ E. coli, CFU/100mL	1	N/A	2024/03/09	CAM SOP-00551	MECP-E3407
Fecal coliform, (CFU/100mL)	1	N/A	2024/03/09	CAM SOP-00552	
Total Ammonia-N	1	N/A	2024/03/14	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (3)	1	N/A	2024/03/11	CAM SOP-00440	SM 24 4500-NO3I/NO2B
pH	1	2024/03/09	2024/03/09	CAM SOP-00413	SM 24th - 4500H+ B
Orthophosphate	1	N/A	2024/03/11	CAM SOP-00461	SM 24 4500-P E
Sat. pH and Langelier Index (@ 20C)	1	N/A	2024/03/12		Auto Calc
Sat. pH and Langelier Index (@ 4C)	1	N/A	2024/03/12		Auto Calc
Sulphate by Automated Turbidimetry	1	N/A	2024/03/11	CAM SOP-00464	SM 24 4500-SO42- E m
Total Dissolved Solids (TDS calc)	1	N/A	2024/03/12		Auto Calc
Turbidity	1	N/A	2024/03/09	CAM SOP-00417	SM 24 2130 B

**Remarks:**

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

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.



Your Project #: 19387-001  
Your C.O.C. #: C#977413-04-01

**Attention: Kyle Horner**

Cambium Environmental Inc  
31 Hyperion Court, Suite 102  
Kingston, ON  
Canada K7P 7G3

**Report Date: 2024/03/18**  
Report #: R8070487  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BUREAU VERITAS JOB #: C471497**

**Received: 2024/03/09, 08:29**

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.

(2) Metals analysis was performed on the sample 'as received'.

(3) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to:

Christine Gripton, Senior Project Manager  
Email: Christine.Gripton@bureauveritas.com  
Phone# (519)652-9444

=====  
This report has been generated and distributed using a secure automated process.

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.



BUREAU  
VERITAS

Bureau Veritas Job #: C471497  
Report Date: 2024/03/18

Cambium Environmental Inc  
Client Project #: 19387-001  
Sampler Initials: MC

**RCAP - COMPREHENSIVE (DRINKING WATER)**

Bureau Veritas ID		YOW510			YOW510		
Sampling Date		2024/03/08 03:45			2024/03/08 03:45		
COC Number		C#977413-04-01			C#977413-04-01		
	UNITS	RW1	RDL	QC Batch	RW1 Lab-Dup	RDL	QC Batch
<b>Calculated Parameters</b>							
Anion Sum	me/L	5.33	N/A	9265376			
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	210	1.0	9265372			
Calculated TDS	mg/L	280	1.0	9265371			
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	9265372			
Cation Sum	me/L	5.69	N/A	9265376			
Hardness (CaCO3)	mg/L	260	1.0	9265374			
Ion Balance (% Difference)	%	3.23	N/A	9265375			
Langelier Index (@ 20C)	N/A	0.387		9265377			
Langelier Index (@ 4C)	N/A	0.137		9265378			
Saturation pH (@ 20C)	N/A	7.28		9265377			
Saturation pH (@ 4C)	N/A	7.53		9265378			
<b>Inorganics</b>							
Total Ammonia-N	mg/L	<0.050	0.050	9268916			
Conductivity	umho/cm	540	1.0	9265752	540	1.0	9265752
Dissolved Organic Carbon	mg/L	1.5	0.40	9265829			
Orthophosphate (P)	mg/L	<0.010	0.010	9265797			
pH	pH	7.66		9265753	7.72		9265753
Dissolved Sulphate (SO4)	mg/L	14	1.0	9265796			
Alkalinity (Total as CaCO3)	mg/L	210	1.0	9265745	220	1.0	9265745
Dissolved Chloride (Cl-)	mg/L	22	1.0	9265795			
Nitrite (N)	mg/L	<0.010	0.010	9265766			
Nitrate (N)	mg/L	1.79	0.10	9265766			
<b>Metals</b>							
Aluminum (Al)	ug/L	<4.9	4.9	9267670			
Antimony (Sb)	ug/L	<0.50	0.50	9267670			
Arsenic (As)	ug/L	<1.0	1.0	9267670			
Barium (Ba)	ug/L	220	2.0	9267670			
Beryllium (Be)	ug/L	<0.40	0.40	9267670			
Boron (B)	ug/L	16	10	9267670			
Cadmium (Cd)	ug/L	<0.090	0.090	9267670			
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable							





**BUREAU  
VERITAS**

Bureau Veritas Job #: C471497  
Report Date: 2024/03/18

Cambium Environmental Inc  
Client Project #: 19387-001  
Sampler Initials: MC

**RCAP - COMPREHENSIVE (DRINKING WATER)**

Bureau Veritas ID		YOW510			YOW510		
Sampling Date		2024/03/08 03:45			2024/03/08 03:45		
COC Number		C#977413-04-01			C#977413-04-01		
	UNITS	RW1	RDL	QC Batch	RW1 Lab-Dup	RDL	QC Batch
Calcium (Ca)	ug/L	64000	200	9267670			
Chromium (Cr)	ug/L	<5.0	5.0	9267670			
Cobalt (Co)	ug/L	<0.50	0.50	9267670			
Copper (Cu)	ug/L	2.8	0.90	9267670			
Iron (Fe)	ug/L	<100	100	9267670			
Lead (Pb)	ug/L	<0.50	0.50	9267670			
Lithium (Li)	ug/L	<5.0	5.0	9267670			
Magnesium (Mg)	ug/L	23000	50	9267670			
Manganese (Mn)	ug/L	3.0	2.0	9267670			
Molybdenum (Mo)	ug/L	0.83	0.50	9267670			
Nickel (Ni)	ug/L	<1.0	1.0	9267670			
Phosphorus (P)	ug/L	<100	100	9267670			
Potassium (K)	ug/L	1400	200	9267670			
Selenium (Se)	ug/L	<2.0	2.0	9267670			
Silicon (Si)	ug/L	2500	50	9267670			
Silver (Ag)	ug/L	<0.090	0.090	9267670			
Sodium (Na)	ug/L	12000	100	9267670			
Strontium (Sr)	ug/L	72	1.0	9267670			
Thallium (Tl)	ug/L	<0.050	0.050	9267670			
Titanium (Ti)	ug/L	<5.0	5.0	9267670			
Uranium (U)	ug/L	1.6	0.10	9267670			
Vanadium (V)	ug/L	<0.50	0.50	9267670			
Zinc (Zn)	ug/L	5.5	5.0	9267670			
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate							



**BUREAU  
VERITAS**

Bureau Veritas Job #: C471497  
Report Date: 2024/03/18

Cambium Environmental Inc  
Client Project #: 19387-001  
Sampler Initials: MC

**RESULTS OF ANALYSES OF WATER**

<b>Bureau Veritas ID</b>		YOW510		
<b>Sampling Date</b>		2024/03/08 03:45		
<b>COC Number</b>		C#977413-04-01		
	<b>UNITS</b>	<b>RW1</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Inorganics</b>				
Turbidity	NTU	0.2	0.1	9264888
RDL = Reportable Detection Limit QC Batch = Quality Control Batch				



**BUREAU  
VERITAS**

Bureau Veritas Job #: C471497

Report Date: 2024/03/18

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

**MICROBIOLOGY (WATER)**

<b>Bureau Veritas ID</b>		YOW510	
<b>Sampling Date</b>		2024/03/08 03:45	
<b>COC Number</b>		C#977413-04-01	
	<b>UNITS</b>	<b>RW1</b>	<b>QC Batch</b>
<b>Microbiological</b>			
Fecal coliform	CFU/100mL	0	9265968
Background	CFU/100mL	1300	9265967
Total Coliforms	CFU/100mL	0	9265967
Escherichia coli	CFU/100mL	0	9265967
QC Batch = Quality Control Batch			



**BUREAU  
VERITAS**

Bureau Veritas Job #: C471497

Report Date: 2024/03/18

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

**TEST SUMMARY**

**Bureau Veritas ID:** YOW510  
**Sample ID:** RW1  
**Matrix:** Water

**Collected:** 2024/03/08  
**Shipped:**  
**Received:** 2024/03/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9265745	N/A	2024/03/09	Nachiketa Gohil
Carbonate, Bicarbonate and Hydroxide	CALC	9265372	N/A	2024/03/11	Automated Statchk
Chloride by Automated Colourimetry	SKAL	9265795	N/A	2024/03/11	Alina Dobreanu
Conductivity	AT	9265752	N/A	2024/03/09	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9265829	N/A	2024/03/12	Gyulshen Idriz
Hardness (calculated as CaCO3)		9265374	N/A	2024/03/12	Automated Statchk
Metals Analysis by ICPMS (as received)	ICP/MS	9267670	N/A	2024/03/12	Azita Fazaeli
Ion Balance (% Difference)	CALC	9265375	N/A	2024/03/12	Automated Statchk
Anion and Cation Sum	CALC	9265376	N/A	2024/03/12	Automated Statchk
Total Coliforms/ E. coli, CFU/100mL	PL	9265967	N/A	2024/03/09	Farhana Rahman
Fecal coliform, (CFU/100mL)	PL	9265968	N/A	2024/03/09	Farhana Rahman
Total Ammonia-N	LACH/NH4	9268916	N/A	2024/03/14	Prabhjot Kaur
Nitrate & Nitrite as Nitrogen in Water	LACH	9265766	N/A	2024/03/11	Chandra Nandlal
pH	AT	9265753	2024/03/09	2024/03/09	Nachiketa Gohil
Orthophosphate	KONE	9265797	N/A	2024/03/11	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	9265377	N/A	2024/03/12	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	9265378	N/A	2024/03/12	Automated Statchk
Sulphate by Automated Turbidimetry	SKAL	9265796	N/A	2024/03/11	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	9265371	N/A	2024/03/12	Automated Statchk
Turbidity	AT	9264888	N/A	2024/03/09	Vidhi Khatri

**Bureau Veritas ID:** YOW510 Dup  
**Sample ID:** RW1  
**Matrix:** Water

**Collected:** 2024/03/08  
**Shipped:**  
**Received:** 2024/03/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9265745	N/A	2024/03/09	Nachiketa Gohil
Conductivity	AT	9265752	N/A	2024/03/09	Nachiketa Gohil
pH	AT	9265753	2024/03/09	2024/03/09	Nachiketa Gohil



**BUREAU  
VERITAS**

Bureau Veritas Job #: C471497

Report Date: 2024/03/18

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

### GENERAL COMMENTS

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

Package 1	4.0°C
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**Results relate only to the items tested.**



**BUREAU  
VERITAS**

Bureau Veritas Job #: C471497

Report Date: 2024/03/18

### QUALITY ASSURANCE REPORT

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9264888	Turbidity	2024/03/09			101	80 - 120	<0.1	NTU	0.64	20
9265745	Alkalinity (Total as CaCO3)	2024/03/09			94	85 - 115	<1.0	mg/L	3.1	20
9265752	Conductivity	2024/03/09			103	85 - 115	<1.0	umho/cm	0.55	10
9265753	pH	2024/03/09			102	98 - 103			0.77	N/A
9265766	Nitrate (N)	2024/03/11	100	80 - 120	96	80 - 120	<0.10	mg/L	NC	20
9265766	Nitrite (N)	2024/03/11	73 (1)	80 - 120	100	80 - 120	<0.010	mg/L	NC	20
9265795	Dissolved Chloride (Cl-)	2024/03/11	NC	80 - 120	90	80 - 120	<1.0	mg/L	1.6	20
9265796	Dissolved Sulphate (SO4)	2024/03/08	NC	75 - 125	93	80 - 120	<1.0	mg/L	1.3	20
9265797	Orthophosphate (P)	2024/03/11	95	75 - 125	94	80 - 120	<0.010	mg/L	NC	20
9265829	Dissolved Organic Carbon	2024/03/12	119	80 - 120	96	80 - 120	<0.40	mg/L	1.3	20
9267670	Aluminum (Al)	2024/03/12	103	80 - 120	100	80 - 120	<4.9	ug/L		
9267670	Antimony (Sb)	2024/03/12	111	80 - 120	104	80 - 120	<0.50	ug/L		
9267670	Arsenic (As)	2024/03/12	103	80 - 120	100	80 - 120	<1.0	ug/L		
9267670	Barium (Ba)	2024/03/12	102	80 - 120	95	80 - 120	<2.0	ug/L		
9267670	Beryllium (Be)	2024/03/12	105	80 - 120	99	80 - 120	<0.40	ug/L		
9267670	Boron (B)	2024/03/12	106	80 - 120	100	80 - 120	<10	ug/L		
9267670	Cadmium (Cd)	2024/03/12	105	80 - 120	99	80 - 120	<0.090	ug/L		
9267670	Calcium (Ca)	2024/03/12	NC	80 - 120	101	80 - 120	<200	ug/L		
9267670	Chromium (Cr)	2024/03/12	101	80 - 120	97	80 - 120	<5.0	ug/L		
9267670	Cobalt (Co)	2024/03/12	100	80 - 120	97	80 - 120	<0.50	ug/L		
9267670	Copper (Cu)	2024/03/12	100	80 - 120	97	80 - 120	<0.90	ug/L		
9267670	Iron (Fe)	2024/03/12	104	80 - 120	99	80 - 120	<100	ug/L		
9267670	Lead (Pb)	2024/03/12	103	80 - 120	98	80 - 120	<0.50	ug/L	NC	20
9267670	Lithium (Li)	2024/03/12	107	80 - 120	101	80 - 120	<5.0	ug/L		
9267670	Magnesium (Mg)	2024/03/12	102	80 - 120	99	80 - 120	<50	ug/L		
9267670	Manganese (Mn)	2024/03/12	101	80 - 120	98	80 - 120	<2.0	ug/L		
9267670	Molybdenum (Mo)	2024/03/12	107	80 - 120	100	80 - 120	<0.50	ug/L		
9267670	Nickel (Ni)	2024/03/12	100	80 - 120	97	80 - 120	<1.0	ug/L		
9267670	Phosphorus (P)	2024/03/12	104	80 - 120	100	80 - 120	<100	ug/L		
9267670	Potassium (K)	2024/03/12	102	80 - 120	99	80 - 120	<200	ug/L		
9267670	Selenium (Se)	2024/03/12	104	80 - 120	101	80 - 120	<2.0	ug/L		



**BUREAU  
VERITAS**

Bureau Veritas Job #: C471497

Report Date: 2024/03/18

**QUALITY ASSURANCE REPORT(CONT'D)**

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9267670	Silicon (Si)	2024/03/12	104	80 - 120	100	80 - 120	<50	ug/L		
9267670	Silver (Ag)	2024/03/12	104	80 - 120	99	80 - 120	<0.090	ug/L		
9267670	Sodium (Na)	2024/03/12	100	80 - 120	100	80 - 120	<100	ug/L		
9267670	Strontium (Sr)	2024/03/12	101	80 - 120	99	80 - 120	<1.0	ug/L		
9267670	Thallium (Tl)	2024/03/12	103	80 - 120	98	80 - 120	<0.050	ug/L		
9267670	Titanium (Ti)	2024/03/12	103	80 - 120	101	80 - 120	<5.0	ug/L		
9267670	Uranium (U)	2024/03/12	108	80 - 120	102	80 - 120	<0.10	ug/L		
9267670	Vanadium (V)	2024/03/12	103	80 - 120	98	80 - 120	<0.50	ug/L		
9267670	Zinc (Zn)	2024/03/12	103	80 - 120	100	80 - 120	<5.0	ug/L		
9268916	Total Ammonia-N	2024/03/14	97	75 - 125	101	80 - 120	<0.050	mg/L	20	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

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

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

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

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

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



BUREAU  
VERITAS

Bureau Veritas Job #: C471497

Report Date: 2024/03/18

Cambium Environmental Inc

Client Project #: 19387-001

Sampler Initials: MC

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

A handwritten signature in black ink, appearing to read 'Anastassia Hamanov', written over a horizontal line.

Anastassia Hamanov, Scientific Specialist


A handwritten signature in black ink, appearing to read 'Farhana Rahman', written over a horizontal line.

Farhana Rahman, Senior Analyst

---

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.





Bureau Veritas  
6740 Campbell Road, Mississauga, Ontario Canada L5N 2L8 Tel: (905) 817-5700 Toll-free 800-563-6266 Fax: (905) 817-5777 www.bvna.com

CHAIN OF CUSTODY RECORD

Page of

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**INVOICE TO:**

Company Name: #17950 Cambium Environmental Inc  
 Attention: ACCOUNTS PAYABLE  
 Address: 194 Sophia Street PO Box 325  
 Peterborough ON K9H 1E5  
 Tel: (705) 742-7900 Fax: (705) 742-7907  
 Email: accounting@cambium-inc.com

**REPORT TO:**

Company Name: #26906 Cambium Environmental Inc  
 Attention: Kyle Horner  
 Address: 31 Hyperion Court, Suite 102  
 Kingston ON K7P 7G3  
 Tel: (613) 389-2323 Fax: \_\_\_\_\_  
 Email: kyle.horner@cambium-inc.com, maren.catt@cambium-i

**PROJECT INFORMATION:**

Quotation #: C26318  
 P.O. #: \_\_\_\_\_  
 Project: 19387-001  
 Project Name: \_\_\_\_\_  
 Site #: \_\_\_\_\_  
 Sampled By: *Maren Catt*

**Laboratory Use Only:**

Bureau Veritas Job #: \_\_\_\_\_  
 Bottle Order #: \_\_\_\_\_  
 COC #: \_\_\_\_\_  
 Project Manager: Christine Gripton

---

**MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY**

**ANALYSIS REQUESTED (PLEASE BE SPECIFIC)**

**Turnaround Time (TAT) Required:**  
Please provide advance notice for rush projects

**Regulation 153 (2011)**

Table 1  Res/Park  Medium/Fine  
 Table 2  Ind/Comm  Coarse  
 Table 3  Agri/Other  For RSC  
 Table  \_\_\_\_\_

**Other Regulations**

CCME  Sanitary Sewer Bylaw  
 Reg 558  Storm Sewer Bylaw  
 MISA  Municipality \_\_\_\_\_  
 PWQO  Reg 406 Table \_\_\_\_\_  
 Other  \_\_\_\_\_

**Special Instructions**

**Field Filtered (please circle):**  
Metals / Hg / Cr / V

Total Coliforms/ E. coli, CFU/100mL

Fecal coliform, (CFU/100mL)

Turbidity

RCAp - Comprehensive (Drinking Water)

**Regular (Standard) TAT:**  
(will be applied if Rush TAT is not specified)  
Standard TAT = 5-7 Working days for most tests.  
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

**Job Specific Rush TAT (if applies to entire submission)**  
Date Required: \_\_\_\_\_ Time Required: \_\_\_\_\_  
Rush Confirmation Number: \_\_\_\_\_ (call lab for #)

Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr / V	Total Coliforms/ E. coli, CFU/100mL	Fecal coliform, (CFU/100mL)	Turbidity	RCAp - Comprehensive (Drinking Water)
1	RW1	March 8, 2014	3:45	GW		✓	✓	✓	✓
2									
3									
4									
5									
6									
7									
8									
9									
10									

# of Bottles: 5  
Comments: PH: 7.11 Temp: 10 = 20C

09-Mar-24 08:29  
Christine Gripton  
C471497  
VIY ENV-919

**\* RELINQUISHED BY: (Signature/Print)** *Maren Catt* **Date: (YY/MM/DD)** 24/03/08 **Time** 7:20pm

**RECEIVED BY: (Signature/Print)** *VIY VIYUSHTE PATEL* **Date: (YY/MM/DD)** 2024/03/09 **Time** 09:29

**# jars used and not submitted**

**Laboratory Use Only**

Time Sensitive: 4/4/4  
 Temperature (°C) on Recei: \_\_\_\_\_  
 Custody Seal Present:   
 Intact:

\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.

\*\* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

\*\* SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/CHAIN-CUSTODY-FORMS-COCS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

White: Bureau Veritas Yellow: Client  
*ON FILE*

Bureau Veritas Canada (2019) Inc.