Hydrogeological Assessment Report – 537086 Main Street, Horning's Mills, Ontario

July 3, 2024

Prepared for:
Angelo Carnevale

Cambium Reference: 17217-001

CAMBIUM INC.

866.217.7900

cambium-inc.com

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1.0 Introduction

Cambium Inc. (Cambium) was retained by Angelo Carnevale (Client) to complete a hydrogeological assessment in support of a proposed residential subdivision development located at 537086 Main Street in Horning's Mills, Township of Melancthon, Ontario (Site; Figure 1). The total area of the Site is approximately 10.2 ha.

The proposed development consists of 26 separate residential lots, accessed from Main Street by two new roadways. In the southeastern corner of the Site, near a tributary of Pine River, parkland is currently proposed.

Cambium understands there are no municipal services for water or wastewater available for the property; therefore, the Site will have to be privately serviced. As such, a hydrogeological assessment was undertaken for wastewater and water supply, in accordance with the Ministry of the Environment, Conservation and Parks (MECP) Guidelines D-5-4 and D-5-5.

The water supply assessment involved a review of MECP water well records located within 500 m of the Site and installation and hydraulic testing of test wells to ensure there is adequate water supply available that is of potable quality for the proposed development. As the area of the proposed residential development is less than 15 hectares, MECP D-5-5 procedures required a total of three test wells to be installed. Three monitoring wells were also installed to determine static groundwater levels and the direction of groundwater flow.

The wastewater assessment involved assessing the Site for its suitability for disposal of wastewater on-site by identifying and assessing the native soils, the position of the shallow water table, hydraulic testing of the native soils, identification of surficial slopes, and an assessment of the attenuation capacity of the soils. As per MECP D-5-4 procedures, nitrate dilution to a concentration of less than 10 mg/L is required at the property boundary.

It is noted that a Geotechnical Investigation and an Aggregate Resource Assessment are being completed at the Site concurrently by Cambium and will be provided under separate cover (Cambium, 2023; 2024). The data or information obtained in the current and former investigations has been incorporated into this hydrogeological assessment report.

1.1 Site Description

The Site is currently undeveloped agricultural land and covers an area of approximately 10.2 ha. It is bordered by Dufferin County Road 124 to the west, Main Street to the east, and vacant and residentially developed properties to the north and south. As per Schedule B of the Official Plan of the Township of Melancthon, the Site and most of the surrounding property is within a community land use area, the property to the south of the Site is in a light industrial land use area.

The regional location of the Site is outlined on Figure 1, the property and surrounding areas outlined on Figure 2 and the proposed development plan is included in Appendix A.

2.0 Methodology

This section describes the methodology undertaken to complete the hydrogeological assessment.

2.1 Background Information Review

To complete this water supply assessment, the following available information was thoroughly reviewed:

- Ontario Geological Survey 2010, Surficial Geology of Southern Ontario, available in digital format at 1:50,000 scale.
- Ontario Geological Survey, 2007. Paleozoic Geology of Southern Ontario, available in digital format at 1:50,000 scale.
- Ontario Geological Survey, 2007, Physiography of Southern Ontario, available in digital format at 1:50,000 scale.
- MECP Water Well Records database, available online and updated up to January 10, 2024.
- Source Protection Information Atlas, available online through the MECP.

2.2 Borehole Investigation

A total of seven boreholes, designated as BH101-23 to BH107-23, were advanced throughout the Site on May 11th and 12th, 2023, at predetermined locations confirmed with the Client and staked by Cambium during a site visit conducted on May 9th, 2023. The boreholes were terminated at depths ranging from 4.5 m below ground surface (mbgs) to 5.2 mbgs.

Boreholes BH101-23, BH104-23 and BH106-23 were outfitted with monitoring wells following completion of drilling to allow for subsequent groundwater level monitoring at the Site.

Borehole drilling and sampling were completed using a track-mounted drill rig operating under the supervision of a Cambium geotechnical analyst. The boreholes were advanced to the

sampling depths by means of continuous flight hollow and solid stem augers with 50 mm O.D. split spoon samplers.

Standard Penetration Test (SPT) N values were recorded for the sampled intervals as the number of blows required to drive a split spoon sampler 305 mm into the soil, using a 63.5 kg drop hammer falling 750 mm, as per ASTM D1586 procedures. The SPT N values are used in this report to assess the consistency of cohesive soils and relative density of non-cohesive materials. Soil samples were collected at approximately 0.75 m intervals in the upper 3.0 mbgs and at 1.5 m intervals below that depth.

The encountered soil units were logged in the field using visual and tactile methods, and samples were placed in labelled plastic bags for transport, future reference, laboratory testing, and storage. Borehole logs are provided in Appendix B and locations are identified in Figure 2.

2.3 Site Survey

The elevations and coordinates for all borehole and monitoring well locations were obtained during the geotechnical investigation using a handheld GPS-enabled device. The approximate borehole elevations were determined by interpolating between 0.25 m contour lines provided on a topographic survey of the property conducted by Van Harten Surveying Inc., provided in Appendix A.

2.4 Physical Laboratory Testing

Physical laboratory testing, including grain size distribution analysis, was completed on five selected soil samples to confirm textural classification identified during field logging and to obtain percolation rate estimates. Analysis results are based on the Unified Soil Classification System (USCS) scale. Copies of laboratory analysis reports for these samples are provided in Appendix C.

2.5 Test Well Installation

The residential component of the proposed development is less than 15 ha in size; therefore, three test wells (TW101-24, TW102-24, and TW103-24) were drilled at the Site to satisfy

Section 4.2 of MECP Guideline D-5-5 Technical Guideline for Private Wells: Water Supply Assessment. All three test wells were installed by Franklin Drilling Services Inc. on April 24 and 25, 2024. The locations of the wells are illustrated in Figure 2 and a well record for each test well is included in Appendix D.

Test well TW101-24 (Tag# A365984) was installed on April 24, 2024. Underlying black topsoil to 0.6 mbgs, overburden was described brown gravel with sand, cobbles, and clay to 6.1 mbgs, underlain by brown clay with gravel and sand to 17.4 mbgs. The overburden – bedrock contact was encountered at 17.4 mbgs, and bedrock was described as light grey limestone. The well was terminated at 24.4 mbgs. Water bearing units were encountered in the fractured limestone at 19.8 mbgs and 21.6 mbgs. TW101-24 was not equipped with a screen within the limestone aquifer but had steel casing installed from approximately 1.2 m above ground surface (mags) to 18.3 mbgs, approximately 1 m below the overburden-bedrock contact. A surface seal of bentonite grout was installed from surface to 6.1 mbgs. The static water level recorded after well drilling was 17.7 m below top of casing (mbTOC). The recommended pumping rate, based on a 1-hour pumping test, was 39 L/min (10 US gallons per minute (gpm)).

Test well TW102-24 (Tag# A365985) was installed on April 25, 2024. Underlying black topsoil to 0.6 mbgs, overburden was described brown gravel with sand, cobbles, and clay to 6.1 mbgs, underlain by brown clay with gravel and sand to the overburden – bedrock contact at 14.0 mbgs. Bedrock was described as brown limestone to 26.8 mbgs, underlain by grey limestone to 29.3 mbgs, followed by blue shale to 29.9 mbgs. The well was terminated at 29.9 mbgs. Water bearing units were encountered in the fractured limestone at 19.8 mbgs and 27.1 mbgs. TW102-24 was not equipped with a screen within the limestone / shale aquifer but had steel casing installed from approximately 0.9 mags to 15.8 mbgs, approximately 1.8 m below the overburden-bedrock contact. A surface seal of bentonite grout was installed from surface to 6.1 mbgs. The static water level recorded after well drilling was 16.1 mbTOC. The recommended pumping rate, based on a 1-hour pumping test, was 39 L/min (10 US gpm).

Test well TW103-24 (Tag# A365986) was installed on April 25, 2024. Underlying black topsoil to 0.3 mbgs, overburden was described brown gravel with sand, cobbles, and clay to

5.5 mbgs, underlain by brown clay with gravel and sand to 8.8 mbgs. The overburden – bedrock contact was encountered at 8.8 mbgs, and bedrock was described as brown limestone to 16.7 mbgs, underlain by grey limestone to 19.2 mbgs, followed by blue shale to 20.0 mbgs. The well was terminated at 20.0 mbgs. Water bearing units were encountered in the fractured limestone at 15.8 mbgs. TW102-24 was not equipped with a screen within the limestone / shale aquifer but had steel casing installed from approximately 0.9 mags to 10.8 mbgs, approximately 2 m below the overburden-bedrock contact. A surface seal of bentonite grout was installed from surface to 6.1 mbgs. The static water level recorded after well drilling was 9.1 mbTOC. The recommended pumping rate, based on a 1-hour pumping test, was 11 L/min (3 US gpm).

2.6 Hydraulic Pumping Tests

Three constant rate pumping tests, one for each test well, were completed at the Site from May 8 to May 10, 2024. The details of each test are presented below.

2.6.1 Test Well TW101-24

On May 10, 2024, Cambium staff completed the pumping test at TW101-24. Disinfectant chlorine was added to the well water prior to testing. A submersible pump was installed at a depth of approximately 24 mbTOC. A pressure transducer level logger was installed above this depth to measure water levels within the well. Water levels were also measured manually to mitigate against potential equipment failure.

Water levels were additionally measured in TW102-24 and TW103-24 with pressure transducers and manually during the pumping test at TW101-24. It is noted that there is an existing well that services the current single-family dwelling at the Site; however, this well was inaccessible during the Site visits due to being capped underground with a pitless adaptor and therefore could not be monitored.

The pumping test began at 9:35 am and continued for a total of 6 hours. The pumping rate was set at approximately 27 L/min initially but was increased to 38 L/min at the 7-minute mark and remained at this rate for the remainder of the test. The discharge outlet for the pump was

placed approximately 26 m from the well in a downslope direction to minimize potential groundwater recharge.

The pump was shut off at 3:35 pm. Water level recovery was monitored manually for 15 minutes upon the cessation of the pumping test at TW101-24, when water levels had regained approximately 67% of the total drawdown observed during the test. A total of approximately 13,576 L was discharged from TW101-24 during the pumping test.

2.6.2 Test Well TW102-24

On May 8, 2024, Cambium staff completed the pumping test at TW102-24. Disinfectant chlorine was added to the well water prior to testing. A disinfected submersible pump was installed at a depth of approximately 28 mbTOC. A pressure transducer level logger was installed above this depth to measure water levels within the well. Water levels were also measured manually to mitigate against potential equipment failure.

Water levels were additionally measured in TW101-24 and TW103-24 with pressure transducers and manually during the pumping test at TW102-24.

The pumping test began at 9:35 am and continued for a total of 6 hours. The pumping rate was set at approximately 20 L/min at the beginning of the test, and was subsequent increased to 25 L/min at the 50-minute mark and again to 30 L/min at the 60-minute mark; the remainder of the pumping test was completed at 30 L/min. The discharge outlet for the pump was placed approximately 22 m from the well in a downslope direction to minimize potential groundwater recharge. Groundwater was noted as being orange/rust coloured in the beginning of the test but cleared up significantly within the first couple hours of the pumping test; no odour was detected in the groundwater.

The pump was shut off at 3:35 pm. Water level recovery was monitored manually until TW102-24 had regained approximately 98% of the total drawdown observed during the test (which was achieved by the 23-minute mark). A total of approximately 9,020 L was discharged from TW102-24 during the pumping test.

2.6.3 Test Well TW103-24

On May 9, 2024, Cambium staff completed the pumping test at TW103-24. Disinfectant chlorine was added to the well water prior to testing. A disinfected submersible pump was installed at a depth of approximately 19 mbTOC. A pressure transducer level logger was installed above this depth to measure water levels within the well. Water levels were also measured manually to mitigate against potential equipment failure.

Water levels were additionally measured in TW101-24 and TW102-24 with pressure transducers and manually during the pumping test at TW103-24.

The pumping test began at 8:10 am and continued for a total of 6 hours. The pumping rate was set at approximately 11 L/min for the beginning of the test; however, rate was variable throughout the first 85 minutes of the test and was completed at 15 L/min from the 85-minute mark onwards until test termination. The discharge outlet for the pump was placed approximately 30 m from the well in a downslope direction to minimize potential groundwater recharge.

The pump was shut off at 2:10 pm. Water level recovery was monitored manually for 70 minutes when TW103-24 had regained approximately 84% of the total drawdown observed during the test. The water level recovery was further monitored via the datalogger, and a 95% recovery was achieved at 7:44 pm that evening (approximately 5.5 hours following the cessation of pumping). A total of approximately 4,955 L was discharged from TW103-24 during the pumping test.

2.7 Groundwater Quality Analysis

Groundwater quality samples were collected from the test wells during the last hour of each pumping test, once the wells were purged of residual chlorine from disinfection. Collected samples were submitted to SGS Canada Inc. (SGS) in Lakefield, Ontario for analysis of general organic and inorganic chemistry. SGS is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA). Samples were stored at a temperature between 0 and

10°C prior and during transport. The Certificates of Analysis for each sample are provided in Appendix E.

3.0 Geological and Hydrogeological Setting

A summary of local geology and hydrogeology in the area surrounding the Site is provided in the following subsections.

3.1 Topography and Drainage

According to the topographic map provided by Van Harten Land Surveyors-Engineers dated September 22nd, 2023 (Project No. 32159-23-DP), the Site slopes west to east with a maximum elevation of around 482 m above sea level (mASL) along the western property line and a minimum elevation around 458 mASL along the eastern property line (Appendix A).

The Site is located within the Pine River watershed under the Nottawasaga Valley Conservation Authority jurisdiction. Two small ponds linked by tributaries of Pine River are located less than 100 m east-northeast of the Site. It is assumed that all local drainage will follow the local surficial topography and flow to the east-northeast into the small ponds and ultimately discharge to the north into Pine River.

3.2 Physiography

The Site is located in the physiographic region known as Dundalk Till Plain. The Dundalk Till Plain covers an area of approximately 2,396 km^2. Key features of the region include undulating till plains, low drumlinized swells, and fluted till plains. Most of the region is characterized by a surficial deposit of silt; however, some of the plain is the work of the Lake Simcoe ice lobe which deposited ice-contact glacial till (Chapman & Putnam, 1984).

3.3 Overburden Geology

According to Miscellaneous Release – Data 128 from the Ontario Geological Survey (2010) the predominant overburden and soils located in the area of the Site are ice-contact stratified deposits consisting of sand and gravel, minor silt, clay and till.

3.4 Bedrock Geology

According to Miscellaneous Release – Data 219 from the Ontario Geological Survey (2007), the bedrock in the area of the Site consists of rocks from the Amabel Formation deposited in the Middle Silurian. The Amabel Formation is described as thick bedded, crinoidal, locally biohermal dolostone. In the region of the Site, the Amabel is described as buff to blue-grey, often mottled, fine- to coarse- crystalline dolostone which is commonly massive bedded.

It is noted that the contact for the Clinton-Cataract Group is located approximately 290 m northeast of the Site, and the contact for the Queenston Group is located approximately 950 m northeast of the Site, indicating a complex limestone geology in the area.

3.5 Vulnerable and Regulated Areas

As per the MECP Source Water Protection Information Atlas (SPIA), the Site is within the following areas:

- The entire Site is within a Significant Groundwater Recharge Area with a vulnerability score of 2.

The eastern boundary is located within a regulated area, as per the Nottawasaga Valley Conservation Authority (NVCA) and per Ont. Reg. 172/06 (Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses); the rest of the Site is not located within a regulated area. The SPIA and NVCA mapping is attached in Appendix A.

3.6 MECP Water Well Records

A review of available MECP water well records within 500 m of the proposed development Site was undertaken. The following is a summary of the well records. The MECP water well records are provided in Appendix F.

The water well database indicates that 37 water wells are located within 500 m of the Site (Figure 3). The following is a summary of these well records.

Table 1 Summary of MECP Water Well Record Review

Well Completion Material		Depth of the Wells (mbgs)	Water Found Depths (mbgs)	Static Water Level (mbgs)	Well Yield Testing Rates (L/min)
Overburden Wells: 7	Minimum	4.3	3.1	1.2	9
	Maximum	60.4	59.4	26.2	45
	Geometric Mean	23.5	24.3	7.8	25
Bedrock Wells: 28	Minimum	11.9	11.6	6.1	18
	Maximum	79.2	73.5	24.4	68
	Geometric Mean	37.8	31.9	16.6	35

Of these 37 records, 28 wells are completed in bedrock and 7 were completed in overburden, and 2 did not contain information.

The geometric mean depth of the overburden wells is 23.5 m, ranging between 4.3 and 60.4 mbgs. For overburden wells, the geometric mean depth to groundwater was at 24.3 mbgs, ranging between depths of 3.1 and 59.4 mbgs. Static water level or the potentiometric surface for the overburden aquifer has a geometric mean of 7.8 mbgs and varied between 1.2 mbgs to 26.2 mbgs. The geometric mean well yield in the overburden wells is 25 L/min and varied between 9 L/min to 45 L/min; it should be noted that at all but one of the well locations that presented pumping rate information, the recorded test pumping rates were less than 13.7 Lpm, the minimum required for MECP D-5-5 water supply assessment procedures. The material that groundwater was found within for the overburden well records was variable and described as clay, silt, sand, and gravel.

The geometric average depth of the bedrock wells is 37.8 m, ranging between 11.9 mbgs and 79.2 mbgs. The groundwater in general was found in the bedrock aquifer at a geometric mean depth of 31.9 mbgs, ranging between 11.6 mbgs and 73.5 mbgs. The geometric mean static water level in bedrock is 16.6 mbgs, ranging between 6.1 mbgs to 24.4 mbgs. The geometric mean well yield rate in the bedrock wells is 35 L/min and varied between 18 L/min to 91 L/min; all of the bedrock wells have pumping rates more than 13.7 L/min, which is the minimum

requirement for the MECP D-5-5 assessment procedures. Of the 28 well records completed in bedrock, 15 of the wells were completed within limestone, 11 of the wells were completed in shale, and 2 of the well records were completed in “rock” (i.e. not recorded whether it was shale or limestone).

The water quality encountered in both overburden and bedrock wells was generally described as “fresh”; however, two well records did identify water quality as “mineral”. One of the well records (no. 1701877) was from supply well installed in overburden and the other well record (no. 1700973) was from a supply well installed in rock (i.e. not specified whether shale or limestone) and the well driller specifically indicated that high iron concentrations were reported from water from this well. Water quality described as salt or gas were not identified or recorded in any of the MECP water well records examined.

Based off a review of the WWIS water well records, it is anticipated that there is a moderate yield within the bedrock aquifer(s) in the area of the Site, and that the bedrock aquifer(s) should be able to sufficiently meet the water yield demanded by the proposed development (assuming each of the 26 lots has its own water supply well). The feasibility of water supply via on-site private water wells was confirmed through on-site investigation following MECP D-5-5 procedures, with hydraulic pumping tests of three on-site supply wells (see Section 4.0).

3.7 Subsurface Conditions

Subsurface conditions encountered during the borehole investigation at the Site generally consisted of a layer of topsoil containing organics with a thickness ranging between 0.13 m and 0.15 m. In all boreholes the topsoil was underlain by a layer of brown silty sand, predominantly containing organics. The silty sand containing organics extended to a depth of about 0.8 mbgs and contained trace amounts of gravel and clay.

Below the surficial soils, non-cohesive soil deposits inferred to be native were generally encountered to the termination depths of the boreholes. The composition of the non-cohesive deposits ranged significantly from finer-grained non-cohesive soils (sand and silt, silty sand, sand with some silt) to coarser-grained non-cohesive soils (gravel and sand, gravelly sand, to gravelly silty sand). The soils were predominantly brown in colour.

A layer of predominantly cohesive soil was encountered in BH101-23 between depths of 1.5 and 2.3 mbgs. The soil was classified as a brown silt with some clay and some sand, and a trace amount of gravel.

Bedrock was not encountered in any of the boreholes advanced by Cambium at the Site. The boreholes were terminated at depths ranging between 4.5 mbgs and 5.2 mbgs, corresponding to elevations between 459.9 masl and 475.7 masl.

3.7.1 Grain Size Analysis

Results obtained from laboratory grain size analyses are summarized in Table 2. Complete soil analysis reports are provided in Appendix C.

Table 2 Grain Size Distribution Analysis Results

Borehole	Depth (mbgs)	Description	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	T-time (min/cm)
BH101-23 SS3	1.5 – 2.1	Silt, some Clay, some Sand, trace Gravel	1	11	74	14	30
BH102-23 SS4	2.3 – 2.9	Silty Gravel and Sand, trace Clay	36	36	21	7	12
BH103-23 SS3	1.5 – 2.1	Sand and Silt, trace Gravel, trace Clay	9	44	40	7	20
BH105-23 SS2	0.8 – 1.4	Sand and Gravel, some Silt, trace Clay	35	44	18	3	10
BH107-23 SS2	0.8 – 1.4	Silty Sand, trace Gravel, trace Clay	7	68	20	5	18

The soil percolation rates ranged from 10 to 30 min/cm. The geometric mean of the percolation rate was estimated at about 17 min/cm. These results indicate a moderate infiltration capacity of the shallow native soils.

3.8 Shallow Aquifer System

Soil encountered in the three boreholes advanced at the Site in May of 2023 varied and consisted of silt underlain by gravel at BH101-23, sand at BH104-23, and silty sand interbedded with sand at BH106-23. The soils were predominantly described as being dry to moist throughout the borehole investigation. Wet soils were encountered at a depth of approximately 4.6 mbgs in BH104-23, which was advanced near the lowest ground elevations at the Site. During subsequent monitoring events, BH101-23 was consistently reported as dry and BH106-23 was generally dry except for the May 8, 2024, monitoring event (i.e. spring conditions).

Water levels were measured during subsequent monitoring events on June 6 and August 8, 2023, and May 8, 2024 and are summarized in Table 3.

Table 3 Groundwater Observations During Monitoring Events

Date	Borehole	Ground Elevation (mASL)	Water Level in Monitoring Well (mbgs)	Water Level Elevation (mASL)	Bottom Elevation of Well (mASL)
June 6, 2023	BH101-23	480.25	Dry	-	475.68
	BH104-23	464.45	4.32	460.15	459.88
	BH106-23	474.35	Dry	-	469.85
August 8, 2023	BH101-23	480.25	Dry	-	475.68
	BH104-23	464.45	4.48	459.95	459.88
	BH106-23	474.35	Dry	-	469.85
May 8, 2024	BH101-23	480.25	Dry	-	475.68
	BH104-23	464.45	4.37	460.08	459.88
	BH106-23	474.35	4.04	470.31	469.85

Due to elevational differences between the wells and persistent dry conditions recorded at BH101-23, groundwater flow within the shallow unconfined aquifer could not be confirmed. However, as the shallow groundwater flow mimics the topography and due to the presence of

the two ponds and Pine River to the east-northeast of the Site, it is assumed that groundwater flow of the shallow unconfined aquifer will be to the east and northeast.

4.0 Water Supply Assessment

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

4.1 Hydraulic Pumping Tests

Results for pumping tests completed at TW101-24, TW102-24, and TW103-24 are discussed individually below.

4.1.1 Test Well TW101-24 Pumping Test

The static water level in TW101-24 was 17.38 mbTOC on May 10, 2024, prior to commencing the pumping test. The pump was installed at a depth of approximately 24 mbTOC. The available drawdown in the well was therefore approximately 6.6 m (height of static water level above pump).

The hydraulic testing began at 9:35 am and commenced for a duration of 6 hours. The pumping rate was set at approximately 27 L/min initially but was increased to 38 L/min at the 7-minute mark and remained at this rate for the remainder of the test. Approximate steady state conditions were achieved in TW101-24 within the first 20 minutes of the pumping test. The water level at the end of the test was 17.44 mbgs, which is equivalent to a total drawdown of 0.06 m and represents less than 1% of the total drawdown available in the well. No response to pumping at TW101-24 was observed in TW102-24 or TW103-24. Water levels measured during the TW101-24 pumping test are provided in Figure 4.

The pump in TW101-24 was shut off at 3:35 pm. Water level recovery was manually measured for 15 minutes; at which time, the test well had recovered to within 2 cm of pretest conditions. Further recovery monitoring could not be completed due to constraints on time; however, based on the minimal drawdown observed as well as the water level recovery within 15 minutes, it is expected that water levels would have fully recovered within 24 hours, as is required by MECP D-5-5 Guidelines.

The total volume of water discharged from TW101-24 during the pumping test was approximately 13,576 L. Based on the steady state conditions achieved during the test, as well as the rate of water level recovery after the test, it is expected that TW101-24 can sustainably provide a yield of 38 L/min (54,720 L/day).

4.1.2 Test Well TW102-24 Pumping Test

The static water level in TW102-24 was 15.94 mbTOC on May 8, 2024, prior to commencing the pumping test. The pump was installed at a depth of approximately 28 mbTOC. The available drawdown in the well was therefore approximately 12.1 m (height of static water level above pump).

The hydraulic testing began at 9:35 am and commenced for a duration of 6 hours. The pumping rate was set at approximately 20 L/min at the beginning of the test and was subsequent increased to 25 – 27 L/min at the 50-minute mark and again to 30 L/min at the 60-minute mark; the remainder of the pumping test was completed at 30 L/min. Approximate steady state conditions were achieved in TW102-24 within the first 30 minutes at a pumping rate of 20 L/min, and within 30 minutes of the pumping rate increase to 30 L/min. The water level at the end of the pumping test was 18.97 mbgs, which is equivalent to a total drawdown of 3.03 m and represents approximately 25% of the total drawdown available in the well. No response to pumping at TW102-24 was observed in TW101-24 or TW103-24 during the test. Water levels measured during the TW102-24 pumping test are provided in Figure 5.

The pump in TW102-24 was shut off at 3:35 pm. Water level recovery was manually measured for 23 minutes at which time the test well had recovered to 98% of pretest conditions.

The total volume of water discharged from TW102-24 during the pumping test was approximately 9,020 L. Based on the steady state conditions achieved during the test, as well as the rate of water level recovery after the test, it is expected that TW102-24 can sustainably provide a yield of 30 L/min (43,200 L/day).

4.1.3 Test Well TW103-24 Pumping Test

The static water level in TW103-24 was 8.64 mbtoc on May 9, 2024, prior to commencing the pumping test. The pump was installed at a depth of approximately 10 mbtoc. The available drawdown in the well was therefore approximately 10.4 m (height of static water level above pump).

The hydraulic testing began at 8:15 am and commenced for a duration of 6 hours. The pumping rate was set at approximately 8 – 11 L/min for the beginning of the test; however, the rate was variable throughout the first 85 minutes of the test and was completed at 15 L/min from the 85-minute mark onwards. Approximate steady state conditions were achieved in TW103-24 at the end of the pumping test. The water level in the well at this time was 16.72 mbgs, which is equivalent to a total drawdown of 8.08 m and represents approximately 78% of the total drawdown available in the well. No response to pumping at TW103-24 was observed in TW101-24 or TW102-24 during the test. Water levels measured during the TW103-24 pumping test are provided in Figure 6.

The pump in TW103-24 was shut off at 2:10 pm. Water level recovery was manually measured for 70 minutes; at which time, the test well had recovered to 84% of pretest conditions. The datalogger remained in TW103-24 overnight to continually monitor the recovery water levels, and 95% recovery was achieved at approximately 7:44 pm (5.5 hours after the cessation of the pumping test).

The total volume of water discharged from TW103-24 during the pumping test was approximately 4,955 L. Based on TW103-24 sustainably producing a pumping rate of 15 L/min over a 6-hour test (i.e. the MECP Guideline D-5-5 peak rate was achieved for 6 hours) and that water levels recovering within 24 hours of the cessation of pumping, it is interpreted that TW103-24 can sustainable supply the water needs for a typical residential dwelling.

4.1.4 Monitoring Well Response and Well Interference

During each of the pumping tests, there was no recorded response or interference in any of the other on-site test wells. Due to the lack of interference, a defined zone of influence around

each well could not be calculated. The closest two wells together are TW101-24 and TW102-24 (see Figure 2) which are approximately 180 m apart. As there was no interference at TW101-24 during the hydraulic testing of TW102-25 (and vice versa), it is known that the drawdown cone (or zone of influence) of these wells are less than 180 m. Therefore, there is not anticipated to be any drawdown impacts on neighbouring wells further than 180 m from the Site, and drawdown impacts (if any) are not anticipated to be significantly impact water quantity for any supply wells located within 180 m of the Site.

4.1.5 Well Specific Capacities

The specific capacity of a well is given by the pumping rate (yield) divided by the drawdown. Accordingly, the specific capacities were estimated for all three wells in Table 4, below.

Table 4 Well Specific Capacities based on Pumping Tests

Well	Pumping Rate (L/min)	Drawdown (m)	Specific Capacity (L/min/m of drawdown)
TW101-24	38	0.06	633.3
TW102-24	30	3.03	9.9
TW103-24	15	8.08	1.9

Based on the specific capacities calculated, TW103-24 can be described as a moderate-capacity well and TW101-24 and TW102-24 can be described as high to extremely high-capacity wells. Given the minimum peak rate required is only 13.7 L/min for a residential dwelling as per Guideline D-5-5, all of the test wells can be described as adequately yielding wells for a single residential dwelling.

4.2 Water Quality

Raw (unfiltered) groundwater samples were collected from TW101-24, TW102-24, and TW103-24 during the final hour of each pumping test. All samples were submitted to SGS in Lakefield for analysis of general organic and inorganic chemistry and bacterial analysis. Prior to sampling, field turbidity readings were completed and it was confirmed that chlorine levels were less than 0.05 mg/L. The field results are outlined in Table 5.

Table 5 Field Parameter Readings

TW101-24			TW102-24			TW103-24[2]		
Time	Turbidity (NTU)	Chlorine (mg/L)	Time	Turbidity (NTU)	Chlorine (mg/L)	Time	Turbidity (NTU)	Chlorine (mg/L)
10:05	-	0.04	09:44	34.1	6.4	08:32	-	0.1
10:20	2.32	-	10:10	-	6.5	08:55	-	0.03
10:35	2.26	0.06	10:35	6.5	6.6	10:10	-	0.03
11:35	1.32	ND[1]	11:11	-	0.5	12:10	-	0.02
12:35	0.62	0.04	11:35	2.03	0.01	13:40	2.05	0.03
13:35	0.56	0.05	12:46	1.56	ND	-	-	-
14:35	0.61	0.01	13:35	1.17	ND	-	-	-
-	-	-	14:35	1.28	ND	-	-	-

1. *ND = non-detect*
2. *Batteries on the field turbidity meter died during morning of May 9, 2024, and were replaced in the afternoon*

Water quality results were compared against the Ontario Drinking Water Quality Standards (ODWQS) (MOE, 2003). A complete summary of water quality results and certificates of lab analyses are provided in Appendix E. Parameters reported at concentrations exceeding ODWQS criteria are outlined in Table 6.

Table 6 Summary of Water Quality Results

Parameter	TW101-24	TW102-24	TW103-24	ODWQS Criteria
Hardness (as $CaCO_3$)(mg/L)	**316**	**291**	**281**	80-100
Sodium (mg/L)	**20.4**	15.0	6.17	20
Colour (TCU)	5	**12**	<3	5

Bolded and shaded values indicate an exceedance on ODWQS criteria

Hardness was reported in excess of ODWQS aesthetic objectives or operational guidelines in all three test wells in the samples collected. Hardness is a common parameter to exceed the guidelines in Ontario as a result of interactions with minerals in the ground (particularly calcium carbonate limestone and shale which is likely the parent material of the overburden materials) with the groundwater. Conventional water softeners can be used to reduce hardness if the user is concerned about scaling issues with fixtures and appliances. All hardness concentrations were below 500 mg/L and therefore are considered acceptable for domestic purposes.

Sodium is another parameter which is commonly elevated in limestone bedrock aquifers (as is what TW101-24 is installed within). The concentration of sodium is less than the aesthetic limit (200 mg/L) in all wells. The concentration in TW101-24 (20.4 mg/L) slightly exceeded the criteria at which results must be reported to public health (20.0 mg/L) but is still potable at the measured concentration.

It will be the Client's duty to notify purchasers of the proposed lots that sodium may be present in groundwater at concentrations greater than 20 mg/L which would affect individuals on sodium reduced diets. This notification should be added to the title deeds for each applicable property. Sodium concentrations should be confirmed for each water supply well installed on the proposed lots. If the homeowner wishes, sodium can be treated through a conventional treatment with a reverse osmosis (RO) system.

The colour value was reported greater than the ODWQS criteria for TW102-24, at 12 TCU (ODWQS criteria is 5 TCU). While this colour value may reduce upon further use/development of the supply well, it is readily treatable with a conventional carbon filtration system.

In general, good water quality was reported from each of the test wells, which were installed in limestone and/or shale. No health-related parameters were exceeded and all other exceedances to ODWQS are readily treatable through conventional systems.

5.0 Wastewater Assessment

As per Procedure D-5-4 Technical Guideline for Individual On-Site Sewage Systems: Water Quality Risk Assessment (MOE, 1996), an assessment was completed to determine the feasibility of utilizing on-site sewage disposal for the development.

The creation of proposed 26 new residential units will increase the potential of wastewater effluent loading on the receiving aquifer system (i.e. water table) located within the overburden soils in the area. Within the effluent, nitrate is considered the limiting contaminant due to the human health concerns. Procedure D-5-4 requires that the effluent plume at the Site boundary to be within the ODWQS limit of 10 mg/L for nitrate to prevent contamination of adjacent properties. Although natural processes and soil interaction can result in nitrate being attenuated in the receiving aquifer system, Procedure D-5-4 states that only dilution can be used as the principal attenuation mechanism to predict future nitrate concentrations. As such, a mass balance calculation is used to determine the impact of developing residential units on the Site.

The wastewater assessment employed a detailed water balance and pre- and post-development infiltration calculations to determine the volume of available dilution water at the Site. The volume of available dilution water was then utilized to provide a predictive assessment of nitrate attenuation based on the number of units for the proposed development. Detailed mass balance calculations are provided in Appendix G. An overview of calculations and results are discussed in the following subsections.

5.1 Available Dilution

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

$$Qi = A \times S \times I$$

Where: Qi – Volume of Available dilution water

A – Area of the Site

S – Water surplus

I – Infiltration factor

To calculate the water surplus, the climate normal data collected between 1981 and 2010 at the Ruskview weather station was used (Climate ID: 6147229). The data was accessed through the Environment Canada website (Environment Canada, 2022). The total yearly precipitation, on average, was 996 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 517 mm/year. Therefore, the water surplus calculated to be 479 mm per year.

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 (MOE, 2003)). As outlined in Table 7, an estimated infiltration factor of 0.70 was established for the Site.

In addition to calculating the infiltration factor, the developable area of the Site, as per the draft site plan provided in Appendix A, was considered to determine the total volume of dilution water available. The developable area was calculated as the total Site area (10.2 ha). Proposed roofed area was included in the developable area as it is assumed that roof leaders will direct any roof runoff to landscaped areas and therefore will contribute to on-site infiltration. Proposed paved area was included in the developable area as it was assumed that runoff from paved surfaces will be directed to roadside ditches and/or the stormwater management pond

and therefore will contribute to on-site infiltration. The total volume of available dilution water per day as rainfall onto landscape areas is 93.76 m^3/day. A summary of parameters and calculations used for available dilution water calculations are outlined in Table 7. Detailed calculations are given in Appendix G.

Table 7 Available Dilution Calculation Parameters

Infiltration Factor (I)	
Topography	Rolling land = 0.20
Soil	Sandy Loam = 0.40
Cover	Cultivated land = 0.1
Infiltration Factor (I)	0.70
Volume of Dilution Water	
Dilution Area (A) (m^2)	102,000
Surplus (S) (m/day)	0.001313
Total Volume of Surplus Water Available Per Day (AxS) (m^3/day)	133.94
Volume of Infiltrated Surplus Water Per Day {(AxS)xI} (m^3/day)	93.76

5.2 Predictive Assessment

Following Procedure D-5-4, each proposed unit 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/unit/day is required to be normally used to determine the effluent loading from conventional septic systems on the receiving groundwater system.

To evaluate the impact of a septic system on a groundwater resource, a reference point or value is established to assist in determining the extent of the impact, if any. In this respect, the quality of the groundwater that is not impacted by septic system on the Site (i.e. background water quality) should be used for comparison purposes. The concentration of nitrate is

assumed to be 0.01 mg/L in the surplus water infiltrating into the ground once the development is created.

To determine the adequate unit density for the Site, a mass balance calculation is used to determine the sewage loading for nitrate on the property boundary. The mass balance calculations are outlined below as:

$$Q_tC_t = Q_eC_e + Q_iC_i$$

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 dilution water (0.01 mg/L)

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

$$C_t = \frac{QeCe + QiCi}{Qt}$$

This equation was used for the developable portion of the Site. The results of the calculations are outlined in the table below:

Table 8 Predictive Assessment of Nitrate Concentrations

Variable	Value Based on Proposed Units
Number of Units	26
Volume of Sewage Effluent (Qe)	26,000
Concentration of nitrate in effluent Ce (mg/L)	40
Volume of available dilution water Qi (L/day)	93,755
Concentration of nitrate in dilution water Ci (mg/L)	0.1
Total Volume Qt (L/day)	119,755
Target Nitrate Concentration at the Property Boundary Ct (mg/L)	**8.76**

Based on the predictive assessment prepared, the proposed 26 units would result in a nitrate concentration of 8.76 mg/L. This value is less than the nitrate concentration limit of 10 mg/L at the property boundary. The proposed development is therefore expected to maintain acceptable nitrate concentration thresholds at property boundaries. It is expected that actual nitrate concentration at lot boundaries will be lower however, as D-5-4 guidelines neglect the effects of nitrate attenuation from natural soil processes.

6.0 Conclusions and Recommendations

Conclusions and recommendations based on the results presented in this preliminary hydrogeological assessment are summarized below.

- Topography at the Site slopes from west to east; local drainage will follow the local surficial topography and flow to the northeast-east into the small ponds and ultimately discharge to the north into Pine River.
- Dry well conditions were persistently recorded at BH101-23 and recorded at BH106-23 in the summer months. Groundwater levels within the shallow unconfined aquifer ranged from 4.04 to 4.48 mbgs during the spring and summer months. Due to the presence of the two ponds and Pine River to the east-northeast of the Site and groundwater flow mimics the topography, it is assumed that groundwater flow of the shallow unconfined aquifer will be the east-northeast.
- The water well database indicates that 37 water wells are located within a distance of 500 m of the Site. Seven of these wells were installed within overburden, and the remaining 28 records are for bedrock supply wells. The average well yield test pumping rate in the bedrock wells is 35 L/min and varied between 18 L/min to 91 L/min.
- Following the WWIS water well records review, it is anticipated that there are moderate yield aquifer(s) in the area of the Site. The proposed development area is therefore suitable for the development of a network of private water supply wells.
- Hydraulic testing of TW101-24, TW102-24, and TW103-24 indicate the wells will produce sustainable yields of 38 L/min, 30 L/min, and 15 L/min, respectively. These values are all greater than 13.7 L/min, which is the minimum requirement for the MECP D-5-5 assessment procedures. It is therefore expected that there are adequate water supply resources at the Site to support the proposed development.
- There was no recorded interference during any of the pumping tests on the monitored wells. Therefore, there is not anticipated to be any drawdown impacts on neighbouring

wells further than 180 m from the Site, and drawdown impacts (if any) are not anticipated to be significantly impact water quantity for any supply wells located within 180 m of the Site.

- Considering the calculated specific capacity for each test well, the wells can sustain the proposed residential demand with no need for the inclusion of a water storage system.
- Water quality results indicate the water from all three test wells is of generally good quality, with the exceptions of hardness in all wells, and sodium and colour in one of the test wells. None of the parameters analyzed exceeded health-related criteria, and all other measured concentrations which exceeded ODWQS guidelines are readily amendable with residential water treatment units.
- The wastewater assessment indicates that the proposed development of 26 units with single family homes would result in a nitrate concentration of 8.76 mg/L at the property boundary, which is less than the 10 mg/L permitted by D-5-4 guidelines. The proposed development is therefore expected to maintain acceptable nitrate concentration thresholds at property boundaries.

7.0 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.

DocuSigned by:
CC6796E7624B485...
Maren Catt, B.Sc. GIT
Environmental Technician

DocuSigned by:
6AAA0661AAA8459...
Nicole Latimer, M.Sc., GIT
Project Coordinator

DocuSigned by:
Sudhakar Kurli
3611EDDBEA134BF...
Sudhakar Kurli, M.Sc., P.Geo.
Project Manager/Hydrogeologist

PROFESSIONAL GEOSCIENTIST
SUDHAKAR KURLI
PRACTISING MEMBER
2794
ONTARIO
2024-07-03

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8.0 References

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9.0 Standard Limitations

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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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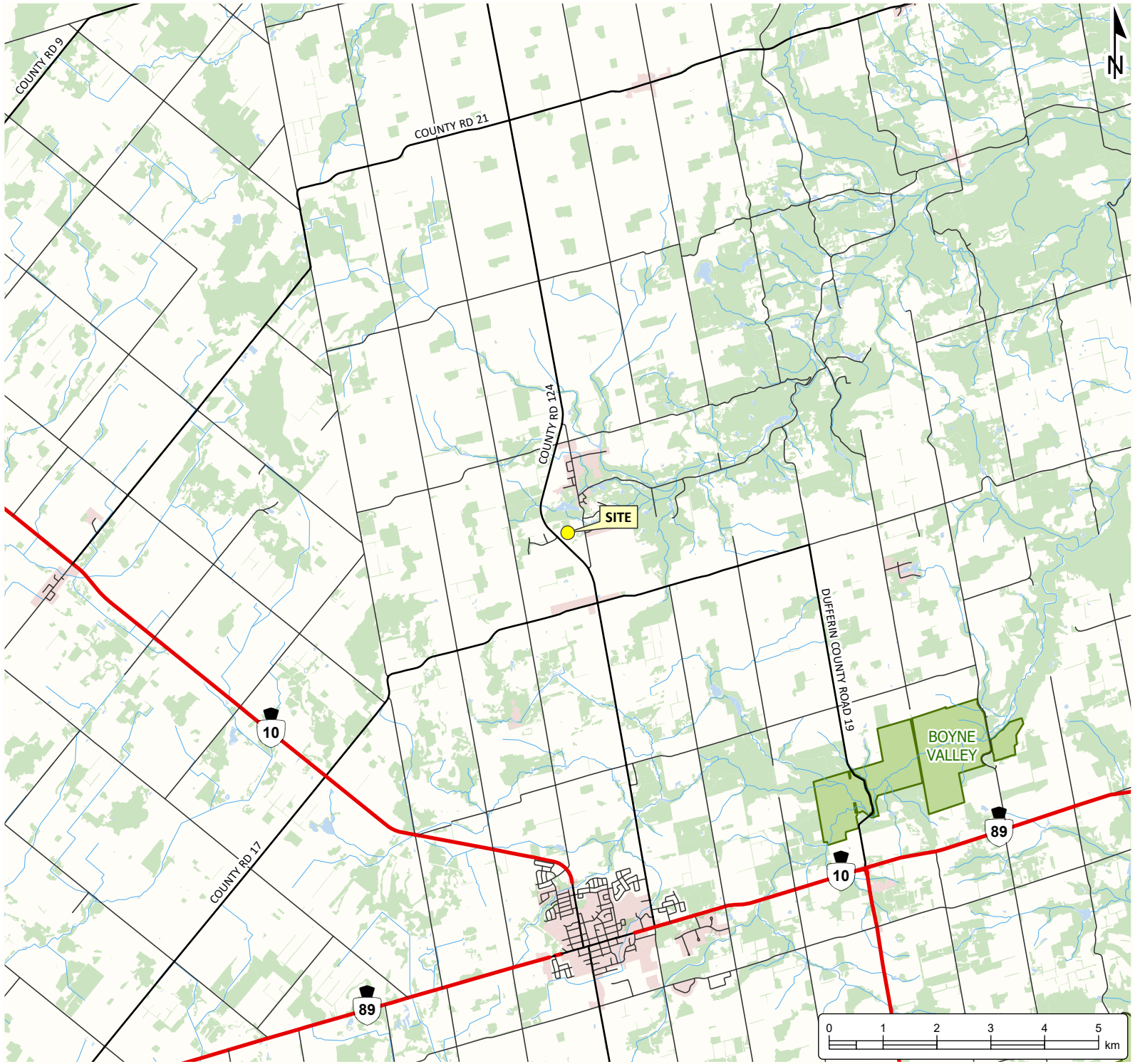
Appended Figures



PRELIMINARY HYDROGEOLOGICAL ASSESSMENT

ANGELO CARNEVALE
537086 Main Street Horning's Mills, 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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CAMBIUM
194 Sophia Street
Peterborough, Ontario, K9H 1E5
Tel: (705) 742.7900 Fax: (705) 742.7907
www.cambium-inc.com

SITE LOCATION PLAN

Project No.: 17217-001		Date: January 2024	
		Rev.:	
Scale: 1:100,000		Projection: NAD 1983 UTM Zone 17N	
Created by: DBB	Checked by: SK	Figure:	1

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WASTEWATER ASSESSMENT

ANGELO CARNEVALE
537086 Main Street
Horning's Mills, Ontario

LEGEND

- Borehole
- Monitoring Well
- Test Well
- Inferred Top of Bank (Cambium, May 2023)
- Site (approximate)

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SITE PLAN

Project No.: 17217-001		Date: June 2024 Rev.:	
Scale: 1:3,000		Projection: NAD 1983 UTM Zone 17N	
Created by: DBB	Checked by: SK	Figure:	2

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PRELIMINARY HYDROGEOLOGICAL ASSESSMENT

ANGELO CARNEVALE
537086 Main Street Horning's Mills, Ontario

LEGEND

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

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Peterborough, Ontario, K9H 1E5
Tel: (705) 742.7900 Fax: (705) 742.7907
www.cambium-inc.com

MECP WELL RECORDS WITHIN 500m

Project No.: 17217-001		Date: January 2024	Rev.:
Scale: 1:8,250		Projection: NAD 1983 UTM Zone 17N	
Created by: DBB	Checked by: SK	Figure: 3	

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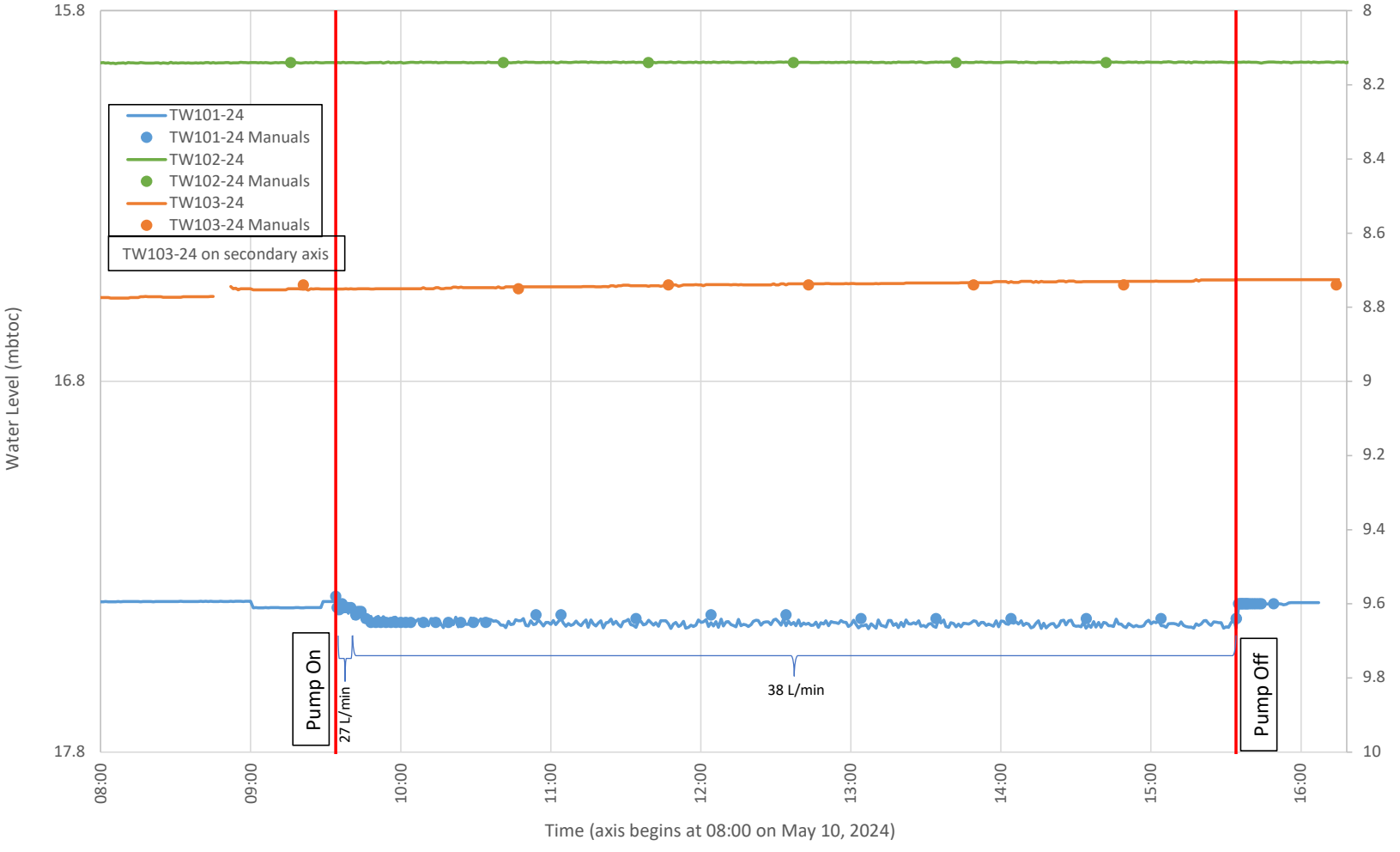


Figure 4. TW101-24 May 10, 2024 Pumping Test Hydrograph

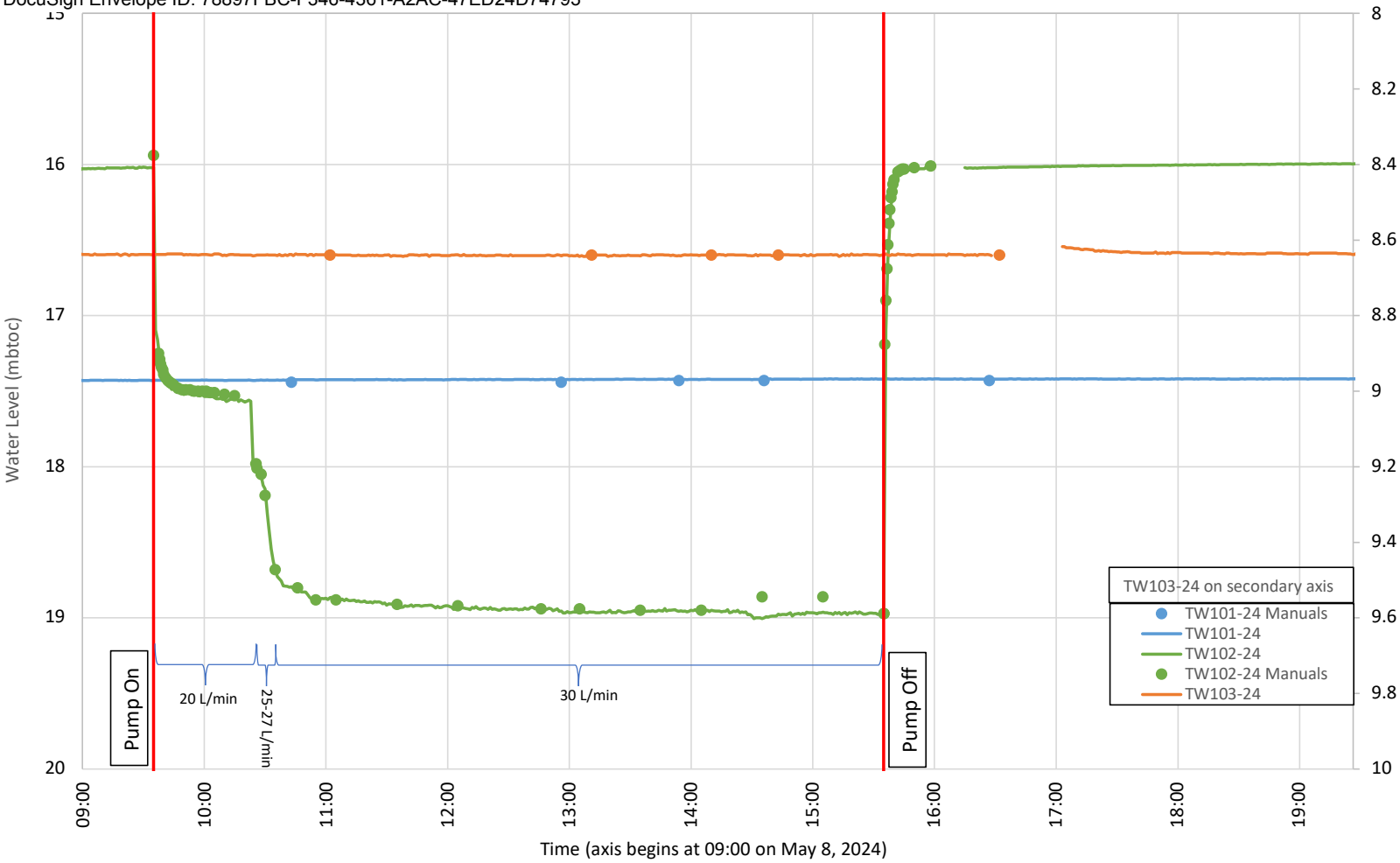


Figure 5. TW102-24 May 8, 2024 Pumping Test Hydrograph

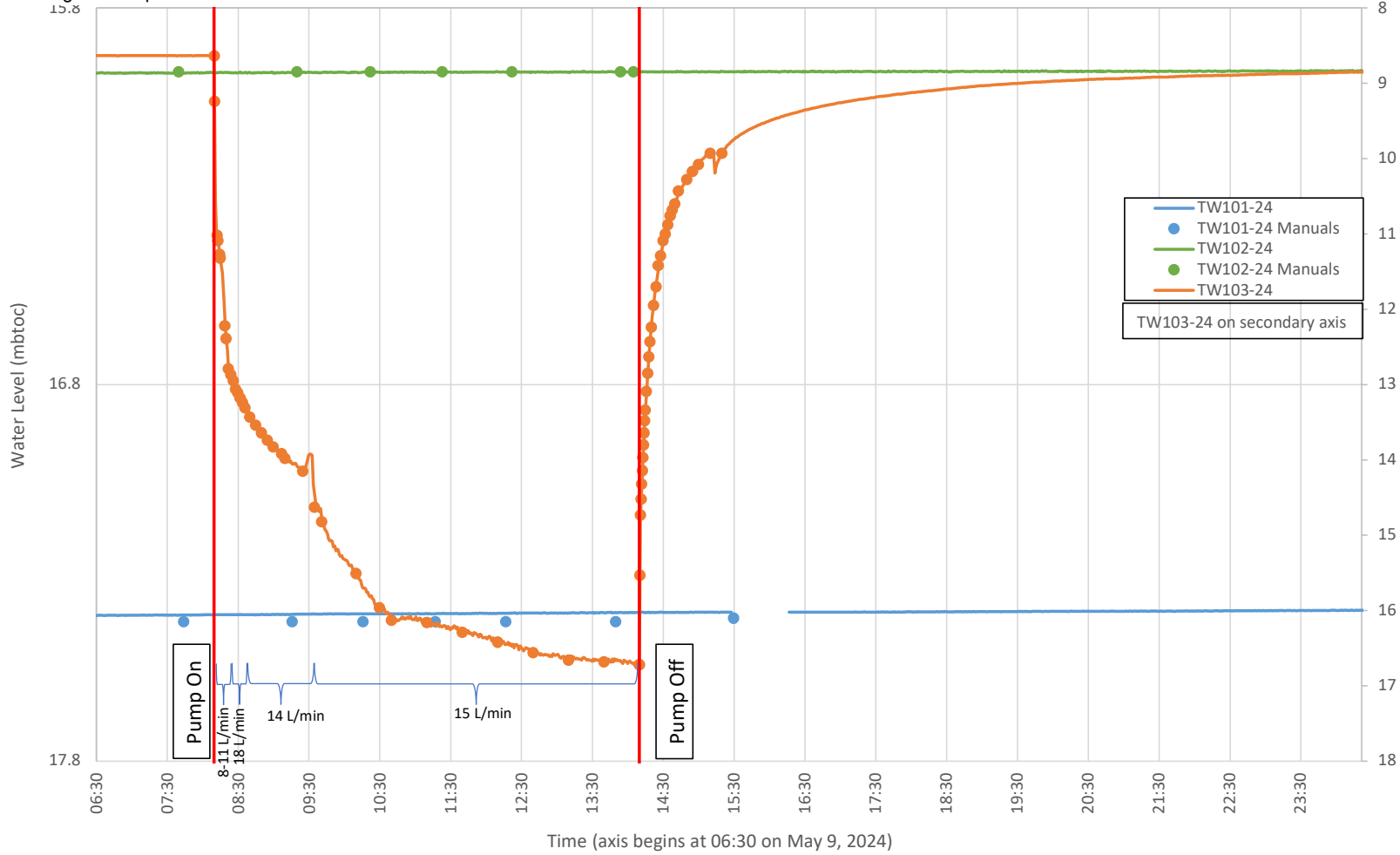


Figure 6. TW103-24 May 9, 2024 Pumping Test Hydrograph

Appendix A

Land Information and Proposed Development

DRAFT PLAN OF SUBDIVISION
DPS --/--
<NAME>

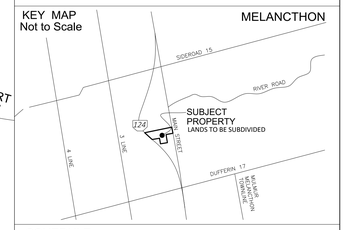
LEGAL DESCRIPTION

PART OF LOT 13
CONCESSION 2
OLD SURVEY
TOWNSHIP OF MELANCTHON
COUNTY OF DUFFERIN

SCALE 1 : 750
0 5 10 20 30 40 50 metres

VAN HARTEN SURVEYING INC.

KEY MAP
Not to Scale



SCHEDULE: RE: SECTION 51 - THE PLANNING ACT.

(a) AS SHOWN
(b) AS SHOWN
(c) AS SHOWN
(d) SINGLE DETACHED RESIDENTIAL WITH PARKLAND
(e) AS SHOWN
(f) AS SHOWN
(g) AS SHOWN
(h) DRILLED WELL (PROPOSED)
(i) SAND AND LOAM
(j) AS SHOWN
(k) NO MUNICIPAL SERVICES AVAILABLE
(l) SUBJECT TO EASEMENT AS IN INSTRUMENT No. MEL18578

LAND USE SCHEDULE

LAND USE	LOTS / BLOCKS	AREA (Ha)	Area (ac)	UNITS
SINGLE DETACHED RESIDENTIAL	LOTS 1 - 26	7.43	18.36	26
STORM WATER MANAGEMENT POND	BLOCK 1	0.56	1.39	
FUTURE PARK LOT	BLOCK 2	0.79	1.95	
EMERGENCY ACCESS	BLOCK 3	0.03	0.07	
0.3 RESERVE	BLOCKS 4 - 6	0.01	0.02	
STREET A		0.99	2.45	
STREE B		0.36	0.89	
TOTAL		10.17	25.13	

PROPERTY DESCRIPTION
ALL OF PIN 34139-0103
PART OF LOT 13
CONCESSION 2
OLD SURVEY
TOWNSHIP OF MELANCTHON
COUNTY OF DUFFERIN
SUBJECT TO EASEMENT AS IN INSTRUMENT No. MEL18578

SURVEYOR'S CERTIFICATE

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

DATE: _____
LUKE G. WILCOX, O.L.S.

OWNER'S CERTIFICATE

I AUTHORIZE VAN HARTEN SURVEYING INC. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE TOWN OF MELANCTHON.

OWNER: ANGELO CARNEVALE JR.

DATE: _____
<NAME>
I HAVE THE AUTHORITY TO BIND THE CORPORATION

Van Harten
LAND SURVEYORS - ENGINEERS
Kitchener/Waterloo Ph: 519-742-8371 | Guelph Ph: 519-821-2763 | Orangeville Ph: 519-940-4110
www.vanharten.com info@vanharten.com

DRAWN BY: FCF | CHECKED BY: LGW | PROJECT No. 32159-23-DP
Sep 22, 2023-12:17:54 PM
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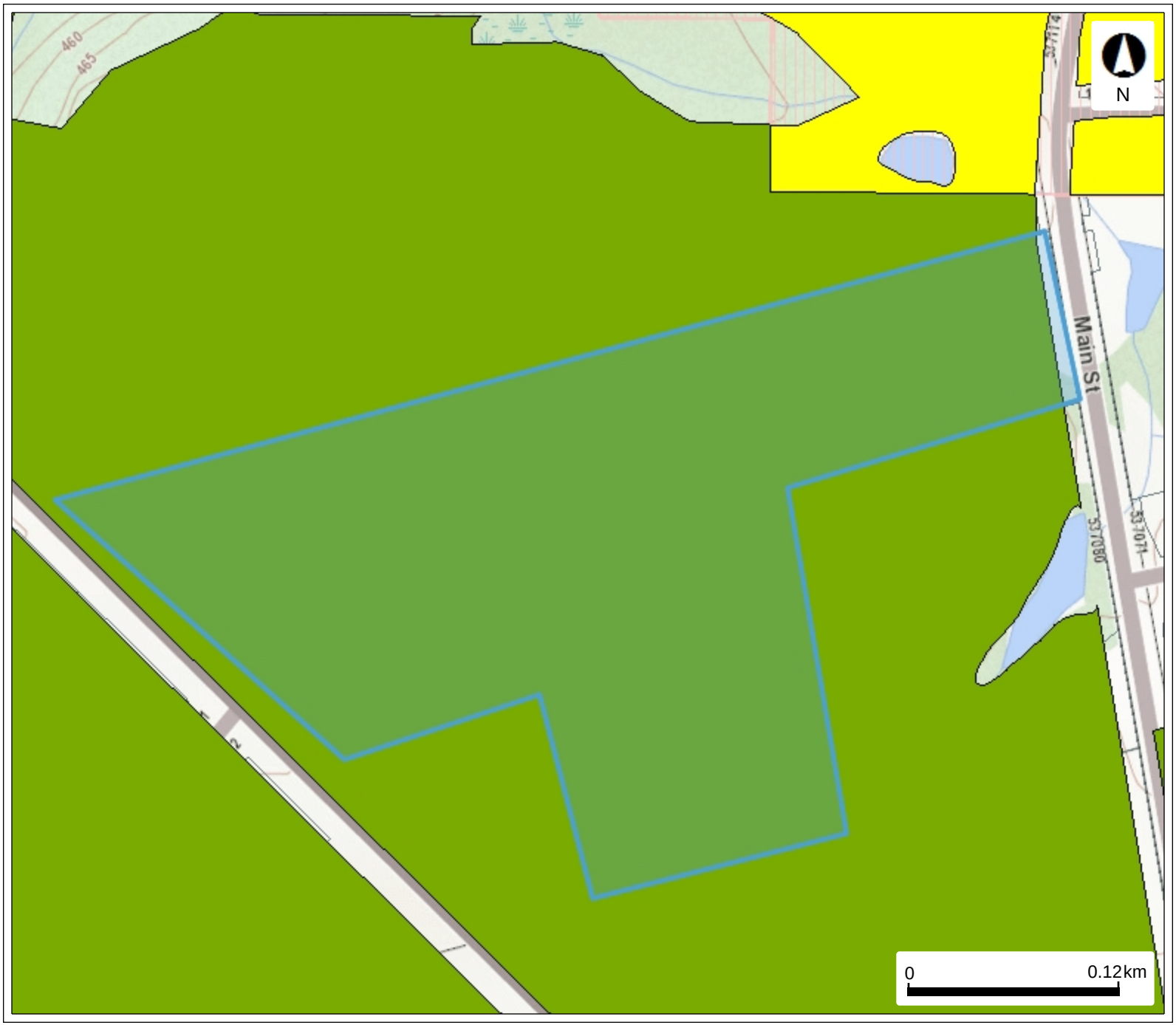
Source Protection Information Atlas - Map of 537080 Main Street, Horning's Mills, ON



Legend

Significant Groundwater Recharge Area

- N/A
- 0
- 2
- 4
- 6

Highly Vulnerable Aquifers

Source Protection Areas

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.

Map Created: 1/29/2024
Map Center: 44.14798 N, -80.2073 W

Nottawasaga Valley Conservation Authority

Property Screening Report

29-Jan-2024

Information Resources for Regulated Properties

Do I need a permit?

Submit a Property Inquiry

Google Driving Directions

Info Regarding Covid-19

Email the Regulations Department
permits@nvca.on.ca

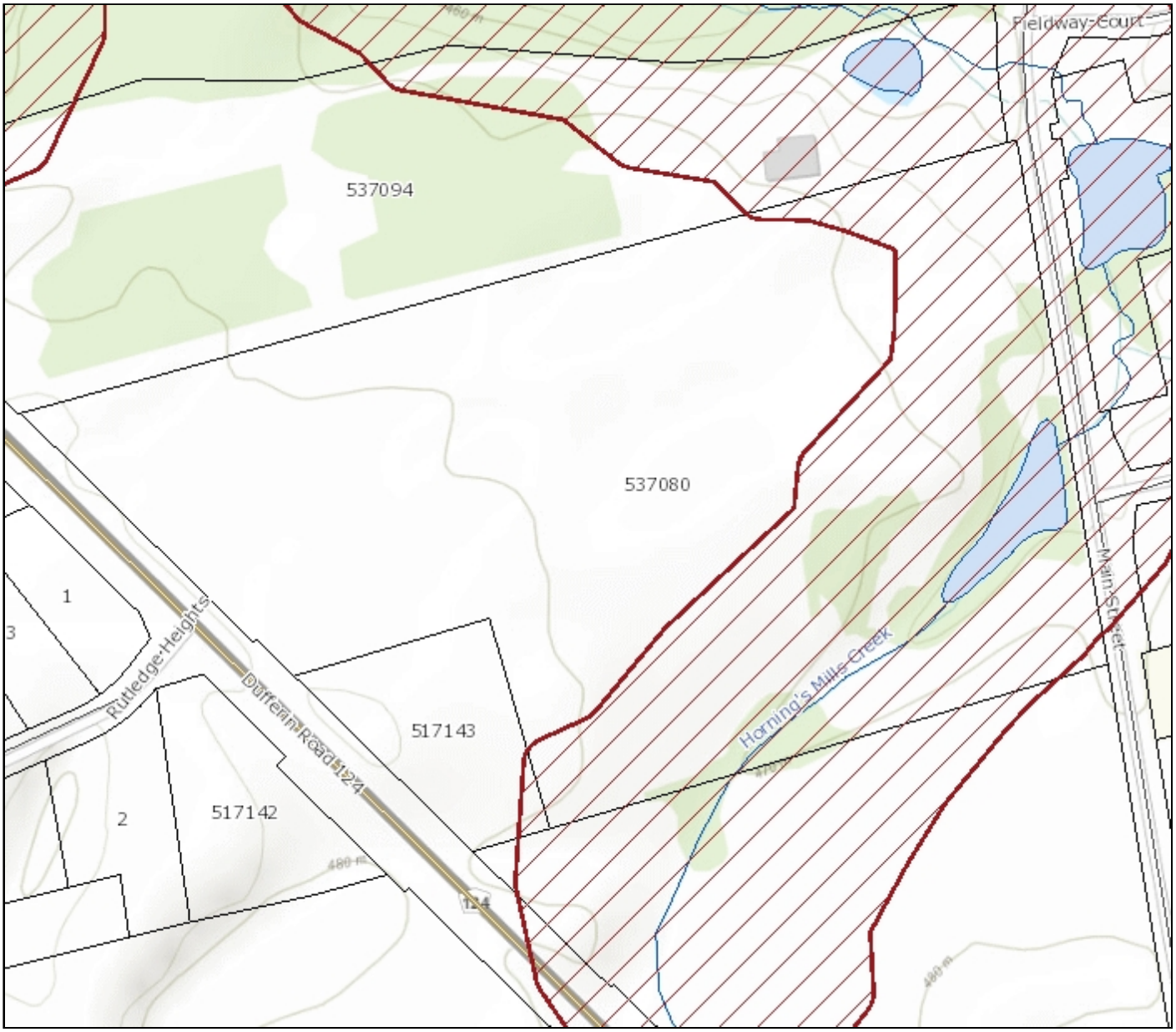
NVCA Contact Information

(705) 424-1479

8195 8th Line,
Utopia, ON L0M 1T0

www.nvca.on.ca

Monday to Friday
8:30 a.m. to 4:30 p.m.
except between 12:00 p.m. - 1:00 p.m.



Appendix B
Borehole Logs

CAMBIUM

Client: Angelo Carnevale
Contractor: Walker Drilling
Project No.: 17217-001
Location: 537090 Main Street

Project Name: 537090 Main Street, Horning's Mills, ON
Method: Track Mounted Hollow Stem Auger
Elevation: 480.25 mASL
UTM: 17 T **N:** 4888586 **E:** 563201

Log of Borehole: BH101-23
Page: 1 of 1
Date Completed: May 11, 2023

SUBSURFACE PROFILE				SAMPLE							
Elevation (m) / Depth	Lithology	Description	Elevation / Depth	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) LL PL PI; % Moisture 25 50 75	Shear Strength Cu, kPa (nat V., rem V.) 20 40 60 80; SPT (N) 20 40 60 80	Well Installation	Log Notes
480.2 / 0		**TOPSOIL:** (~125mm thick)	480.12 / 0.13	1A	SS			18.6%		Cap	Monitoring well dry when measured on June 6, 2023.
479.8 / 0.5		**(SM) SILTY SAND:** trace clay, trace gravel, trace organic matter; brown; non-cohesive, moist, loose	479.49	1B	SS	30	5	18.0%	5	Bentonite Plug	
479.2 / 1		**(SW) SAND:** some silt, trace gravel; brown; non-cohesive, moist, compact	0.76 / 478.73	2	SS	60	13	9.7%	13	Riser	
478.8 / 1.5		**(ML) SILT:** some clay, some sand, trace gravel; brown; cohesive, moist, hard	1.52 / 477.96	3	SS	60	36	22.3%	36		
478.2 / 2											
477.8 / 2.5		**(GW) GRAVEL:** AND SAND: trace silt; brown; non-cohesive, moist, very dense	2.29 / 475.68	4	SS	70	64	3.4%	64	Sand Pack	
477.2 / 3				5	SS	40	72	3.8%	72	PVC Screen	
476.8 / 3.5											
476.2 / 4											
475.8 / 4.5		**(SM) SILTY SAND:** some gravel; brown; non-cohesive, dry, compact	4.57 / 475.07	6	SS	70	20	3.5%	20	Cap	
475.2 / 5		Borehole terminated @ 5.2 mbgs due to target depth achieved.	5.18								
474.8 / 5.5											
474.2 / 6											
473.8 / 6.5											
473.2 / 7											
472.8											

GRAINSIZE DISTRIBUTION

SAMPLE	GRAVEL	SAND	SILT	CLAY
3	1	11	74	14

1m = 24 units

Logged By: WA **Input By:** WA

Peterborough, Barrie, Oshawa, Kingston, Ottawa

CAMBIUM

Client: Angelo Carnevale
Contractor: Walker Drilling
Project No.: 17217-001
Location: 537090 Main Street

Project Name: 537090 Main Street, Horning's Mills, ON
Method: Track Mounted Solid Stem Auger
Elevation: 478.2 mASL
UTM: 17 T **N:** 4888617 **E:** 563305

Log of Borehole: BH102-23
Page: 1 of 1
Date Completed: May 11, 2023

Elevation (m)	Depth	Description	Elevation / Depth	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) LL PL PI / % Moisture (25 50 75)	Shear Strength Cu, kPa (nat V. rem V.) / SPT (N) (20 40 60 80)	Well Installation	Log Notes
478.2	0	**TOPSOIL:** (~150mm thick)	478.05	1A	SS			24.0%			
		(SM) SILTY SAND: trace clay, trace gravel; brown; non-cohesive, moist, compact	0.15	1B	SS	60	12	10.6%	12		
477.7	0.5		477.44								
		(SW) SAND: some silt, some gravel; brown; non-cohesive, moist, very dense	0.76	2	SS	70	56	5.4%	56		
477.2	1		476.68								
476.7	1.5	**(GW) GRAVEL:** Silty GRAVEL and SAND, trace clay; trace organic matter; brown; non-cohesive, moist, very dense	1.52	3	SS	70	57	5.8%	57		
476.2	2										
475.7	2.5	- less to no organic matter		4	SS	70	71	4.4%	71		
475.2	3										
				5	SS	70	100	5.2%	100		
474.7	3.5										
474.2	4										
473.7	4.5		473.63								
		(SM) SILTY SAND: some gravel; brown; non-cohesive, moist to dry, very dense	4.57	6	SS	70	71	4.0%	71		
473.2	5		473.17								Borehole was open and dry upon completion of drilling
		Borehole terminated @ 5 mbgs due to target depth achieved.	5.03								
472.7	5.5										
472.2	6										
471.7	6.5										
471.2	7										
470.7											

1m = 24 units

GRAINSIZE DISTRIBUTION

SAMPLE	GRAVEL	SAND	SILT	CLAY
4	36	36	21	7

Logged By: WA **Input By:** WA

Peterborough, Barrie, Oshawa, Kingston, Ottawa

CAMBIUM

Client: Angelo Carnevale
Contractor: Walker Drilling
Project No.: 17217-001
Location: 537090 Main Street

Project Name: 537090 Main Street, Horning's Mills, ON
Method: Track Mounted Solid Stem Auger
Elevation: 470.05 mASL
UTM: 17 T **N:** 4888687 **E:** 563505

Log of Borehole: BH103-23
Page: 1 of 1
Date Completed: May 11, 2023

Elevation (m)	Depth	Description	Elevation / Depth	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) LL PL PI — 25 50 75 / % Moisture 25 50 75	Shear Strength Cu, kPa (nat V. ✦, rem V. ⊕) — 20 40 60 80 / SPT (N) 20 40 60 80	Well Installation	Log Notes
470	0	**TOPSOIL:** (~125mm thick)	469.92	1A	SS			21.0%			
469.6	0.5	**(SM) SILTY SAND:** trace clay, trace gravel, trace organic matter; brown; non-cohesive, moist, compact	0.13 469.29	1B	SS	60	11	15.3%	11		
469	1	**(SW) SAND:** and SILT, trace gravel, trace clay; brown; non-cohesive, moist to wet, loose	0.76	2	SS	70	8	17.2%	8		
468.6	1.5	- dense		3	SS	60	43	12.5%	43		
468	2		467.76								
467.6	2.5	**(SW) SAND:** some silt, some gravel; brown; non-cohesive, moist to dry, very dense	2.29 467	4	SS	60	58	7.6%	58		
467	3	**(SW) gravelly SAND:** some silt; brown; non-cohesive, moist to dry, very dense	3.05	5	SS	70	50	4.3%	50		
466.6	3.5										
466	4										
465.6	4.5		465.48								
		(SM) SILTY SAND: some gravel; brown; non-cohesive, moist to dry, very dense	4.57 465.33	6	SS	50	100	5.5%	100		Borehole was open and dry upon completion of drilling Spoon bouncing at depth of 4.7mbgs
465	5	Borehole terminated @ 4.7 mbgs due to SPT refusal encountered.	4.72								
464.6	5.5										
464	6										
463.6	6.5										
463	7										
462.6											

GRAINSIZE DISTRIBUTION

SAMPLE	GRAVEL	SAND	SILT	CLAY
3	9	44	40	7

1m = 24 units

Logged By: WA **Input By:** WA

Peterborough, Barrie, Oshawa, Kingston, Ottawa

CAMBIUM

Client: Angelo Carnevale
Contractor: Walker Drilling
Project No.: 17217-001
Location: 537090 Main Street

Project Name: 537090 Main Street, Horning's Mills, ON
Method: Track Mounted Solid Stem Auger
Elevation: 464.45 mASL
UTM: 17 T **N:** 4888732 **E:** 563621

Log of Borehole: BH104-23
Page: 1 of 1
Date Completed: May 11, 2023

SUBSURFACE PROFILE				SAMPLE							
Elevation (m) / Depth	Lithology	Description	Elevation / Depth	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) LL PL PI; % Moisture 25 50 75	Shear Strength Cu, kPa (nat V., rem V.) 20 40 60 80; SPT (N) 20 40 60 80	Well Installation	Log Notes
464.4 / 0		**TOPSOIL:** (~125mm thick)	464.32	1A	SS			23.3%		Cap	Water level measured within monitoring well at a depth of 4.3 mbgs (460.15 mASL) on June 6, 2023.
464 / 0.5		**(SM) SILTY SAND:** trace clay, trace organic matter; brown; non-cohesive, moist, compact	0.13 463.69	1B	SS	50	18	8.4%	18	Bentonite Plug	
463.4 / 1		**(SW) SAND:** some silt, trace gravel; brown; non-cohesive, moist, compact	0.76	2	SS	60	11	4.7%	11	Riser	
463 / 1.5		- some gravel; very dense		3	SS	70	61	8.9%	61		
462.4 / 2											
462 / 2.5				4	SS	50	50	7.1%	50	Sand Pack	
461.4 / 3		- trace gravel		5	SS	60	53	8.0%	53	PVC Screen	
461 / 3.5											
460.4 / 4											
460 / 4.5			459.88							Cap	
459.4 / 5		**(SM) gravelly SILTY SAND:** trace clay; brown; non-cohesive, wet, very dense	4.57 459.5	6	SS	70	100	10.3%	100		
459 / 5.5		Borehole terminated @ 5 mbgs due to target depth achieved.	4.95								
458.4 / 6											
458 / 6.5											
457.4 / 7											
457											

GRAINSIZE DISTRIBUTION: SAMPLE | GRAVEL | SAND | SILT | CLAY

1m = 24 units

Logged By: WA **Input By:** WA

CAMBIUM

Client: Angelo Carnevale
Contractor: Walker Drilling
Project No.: 17217-001
Location: 537090 Main Street

Project Name: 537090 Main Street, Horning's Mills, ON
Method: Track Mounted Solid Stem Auger
Elevation: 472.6 mASL
UTM: 17 T **N:** 4888533 **E:** 563517

Log of Borehole: BH105-23
Page: 1 of 1
Date Completed: May 12, 2023

SUBSURFACE PROFILE				SAMPLE							
Elevation (m) / Depth	Lithology	Description	Elevation / Depth	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) LL PL PI — 25 50 75 / % Moisture 25 50 75	Shear Strength Cu, kPa nat V. rem V. — 20 40 60 80 / SPT (N) 20 40 60 80	Well Installation	Log Notes
472.6 / 0		**TOPSOIL:** (~150mm thick)	472.45 / 0.15	1A	SS			22.2%			
472.1 / 0.5		**(SM) SILTY SAND:** trace clay, trace organic matter; brown; non-cohesive, moist, loose	471.84 / 0.76	1B	SS	60	8	21.1%	8		
471.6 / 1		**(SW) SAND:** and GRAVEL: some silt, trace clay; brown; non-cohesive, moist, compact		2	SS	70	25	6.2%	25		
471.1 / 1.5		- very dense		3	SS	60	100	5.6%	100		
470.6 / 2											
470.1 / 2.5		- moist to dry		4	SS	40	61	7.2%	61		Auger shaking at depth of 2.3mbgs to depth of 3.0mbgs
469.6 / 3			469.55 / 3.05								Spoon bouncing
469.1 / 3.5		**(SM) gravelly SILTY SAND:** brown; non-cohesive, moist to dry, very dense		5	SS	50	55	5.7%	55		
468.6 / 4											
468.1 / 4.5		Borehole terminated @ 4.5 mbgs due to SPT refusal encountered.	468.1 / 4.5	6	SS	20	50	4.7%	50		Spoon bouncing
467.6 / 5											Borehole caved to depth of 3.6mbgs and was dry upon completion of drilling
467.1 / 5.5											
466.6 / 6											
466.1 / 6.5											
465.6 / 7											
465.1											

GRAINSIZE DISTRIBUTION

SAMPLE	GRAVEL	SAND	SILT	CLAY
2	35	44	18	3

1m = 24 units

Logged By: WA **Input By:** WA

Peterborough, Barrie, Oshawa, Kingston, Ottawa

CAMBIUM

Client: Angelo Carnevale
Contractor: Walker Drilling
Project No.: 17217-001
Location: 537090 Main Street

Project Name: 537090 Main Street, Horning's Mills, ON
Method: Track Mounted Solid Stem Auger
Elevation: 474.35 mASL
UTM: 17 T **N:** 4888425 **E:** 563458

Log of Borehole: BH106-23
Page: 1 of 1
Date Completed: May 12, 2023

Elevation (m)	Depth	Description	Elevation / Depth	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) LL PL PI — 25 50 75 / % Moisture 25 50 75	Shear Strength Cu, kPa (nat V. rem V.) — 20 40 60 80 / SPT (N) 20 40 60 80	Well Installation	Log Notes
474.4	0	**TOPSOIL:** (~125mm thick)	474.22	1A	SS			25.4%		Cap	Monitoring well dry when measured on June 6, 2023.
		(SM) SILTY SAND: trace clay, trace gravel; trace organic matter; brown; non-cohesive, moist, compact	0.13	1B	SS	50	11	18.4%	11	Bentonite Plug	
473.8	0.5		473.59							Riser	
		(SM) SILTY SAND: trace gravel; brown; non-cohesive, moist, compact	0.76	2	SS	80	19	15.6%	19		
473.4	1										
472.8	1.5	- some gravel; dense		3	SS	60	33	8.8%	33		
472.4	2										
			471.91	4A	SS	70	100	4.2%			
471.8	2.5	**(SW) SAND:** trace gravel; light grey to white; transparent, moist to dry, very dense	2.44	4B	SS			2.8%	100	Sand Pack	
471.4	3		471.3								
		(SM) SILTY SAND: trace gravel; brown; non-cohesive, moist to dry, dense	3.05	5	SS	70	50	6.1%	50	PVC Screen	Spoon bouncing at depth of 3.2mbgs
470.8	3.5										
470.4	4		469.93								Auger shaking at depth of 3.2mbgs to depth of 4.4mbgs
469.8	4.5	**(GW) GRAVEL:** AND SAND: trace silt; brown; non-cohesive, moist to dry, dense	4.42	6	SS	40	50		50	Cap	Spoon bouncing at depth of 4.5mbgs.
			469.83								
469.4	5	Borehole terminated @ 4.5 mbgs due to SPT refusal encountered.	4.52								
468.8	5.5										
468.4	6										
467.8	6.5										
467.4	7										
466.8											

GRAINSIZE DISTRIBUTION: SAMPLE | GRAVEL | SAND | SILT | CLAY

1m = 24 units

Logged By: WA **Input By:** WA

Peterborough, Barrie, Oshawa, Kingston, Ottawa

CAMBIUM

Client: Angelo Carnevale
Contractor: Walker Drilling
Project No.: 17217-001
Location: 537090 Main Street

Project Name: 537090 Main Street, Horning's Mills, ON
Method: Track Mounted Solid Stem Auger
Elevation: 480.9 mASL
UTM: 17 T **N:** 4888538 **E:** 563305

Log of Borehole: BH107-23
Page: 1 of 1
Date Completed: May 12, 2023

Elevation (m)	Depth	Description	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) / % Moisture	Shear Strength Cu, kPa / SPT (N)	Well Installation	Log Notes
480.9	0	**TOPSOIL:** (~125mm thick) 480.77	1A	SS			25.4%			
		0.13 **(SM) SILTY SAND:** trace organic matter; brown; non-cohesive, moist, compact	1B	SS	50	13	19.3%	13		
480.4	0.5	480.14								
		0.76 **(SM) SILTY SAND:** trace gravel, trace clay; brown; non-cohesive, moist, compact	2	SS	80	25	6.6%	25		
479.9	1									
		- very dense	3	SS	50	100	6.5%	100		
479.4	1.5									
478.9	2	478.61								
		2.29 **(SW) SAND:** some gravel, some silt, brown; non-cohesive, moist to dry, very dense	4	SS	70	89	3.6%	89		Spoon bouncing at depth of 2.6mbgs
478.4	2.5									
477.9	3		5	SS	60	50	4.7%	50		Spoon bouncing at depth of 3.2mbgs
477.4	3.5									
476.9	4									
476.4	4.5		6	SS	70	65	3.2%	65		
475.9	5	475.85								Spoon bouncing ad depth of 5.0mbgs
		5.05 Borehole terminated @ 5.1 mbgs due to SPT refusal encountered.								Borehole caved to depth of 3.9mbgs and was dry upon completion of drilling
475.4	5.5									
474.9	6									
474.4	6.5									
473.9	7									
473.4										

Atterberg Limits (%): LL, PL, PI — 25 50 75
% Moisture: 25 50 75
Shear Strength Cu, kPa: nat V., rem V. — 20 40 60 80
SPT (N): 20 40 60 80

GRAINSIZE DISTRIBUTION

SAMPLE	GRAVEL	SAND	SILT	CLAY
2	7	68	20	5

1m = 24 units

Logged By: WA **Input By:** WA

Peterborough, Barrie, Oshawa, Kingston, Ottawa

Appendix C

Grain Size Analysis Results

Grain Size Distribution Chart

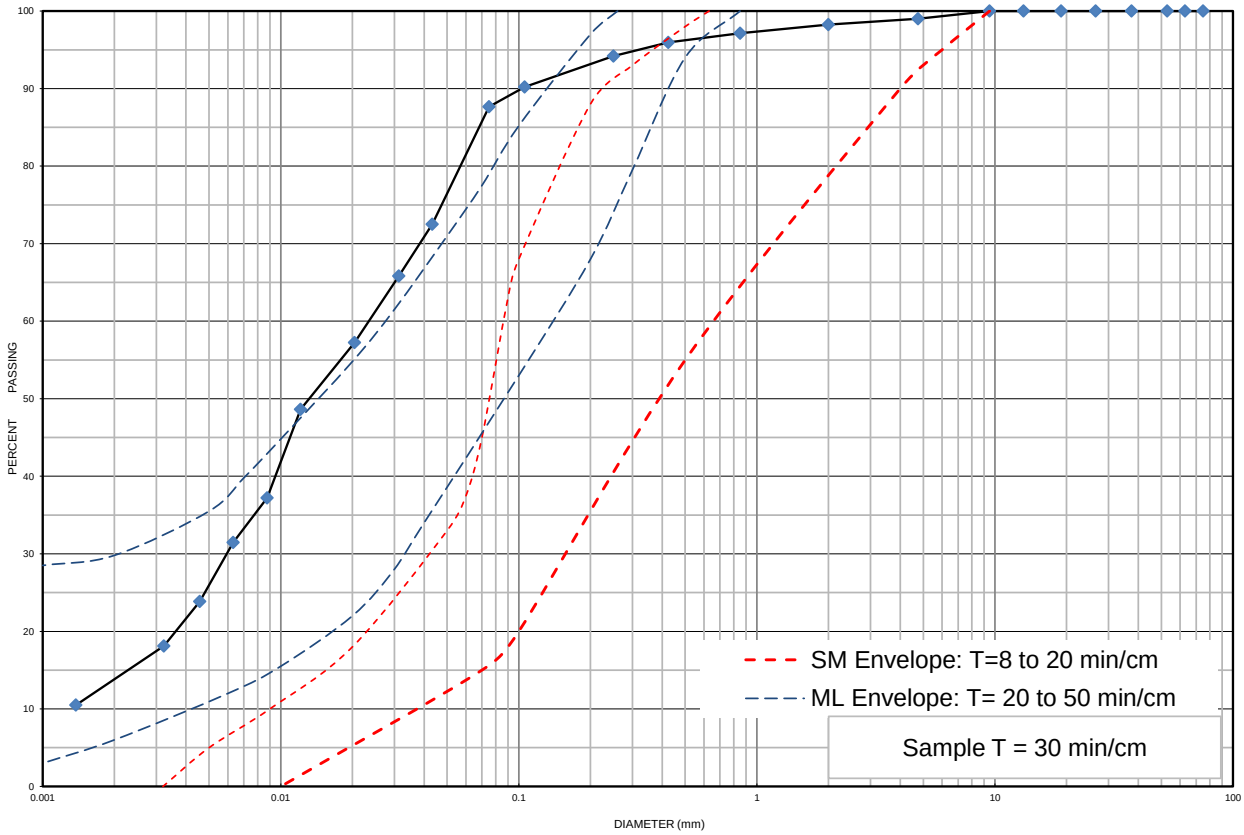
Project Number: *17217-001* **Client:** *Angelo Carnevale*

Project Name: *537090 Main Street Horning's Mills*

Sample Date: *May 11-12, 2023* **Sampled By:** *Waleed El-Taweel - Cambium Inc.*

Location: *BH 101-23 SS 3* **Depth:** *1.5 m to 2.1 m* **Lab Sample No:** *S-23-0825*

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
BH 101-23	SS 3	1.5 m to 2.1 m	1	11	74	14	22.3

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Silt some Clay some Sand trace Gravel	ML	0.0240	0.0059	-	-	-

Additional information availabe upon request

Issued By: _____ *Date Issued:* *May 24, 2023*

(Senior Project Manager)

Cambium Inc. (Laboratory)
866.217.7900 | cambium-inc.com
194 Sophia St. | Peterborough | ON | K9H 1E5

Grain Size Distribution Chart

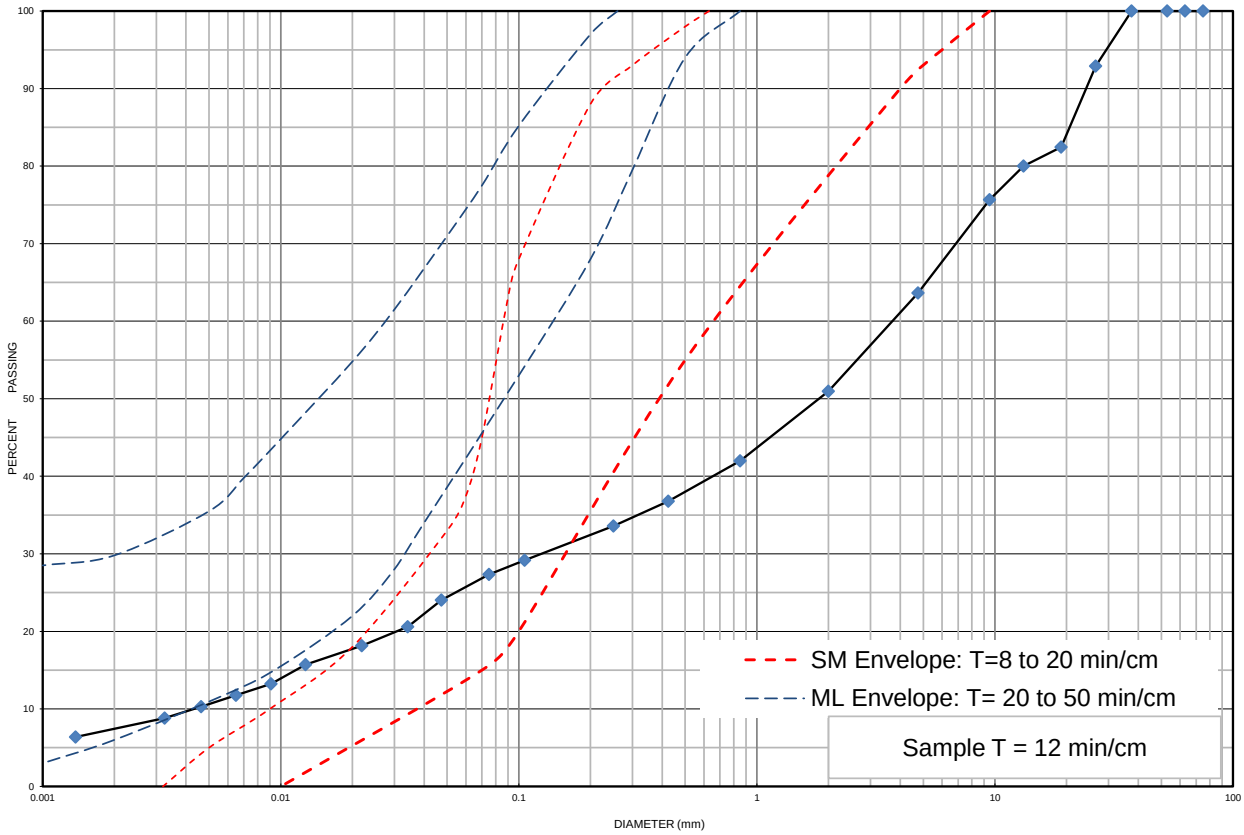
Project Number: *17217-001* **Client:** *Angelo Carnevale*

Project Name: *537090 Main Street Horning's Mills*

Sample Date: *May 11-12, 2023* **Sampled By:** *Waleed El-Taweel - Cambium Inc.*

Location: *BH 102-23 SS 4* **Depth:** *2.3 m to 2.9 m* **Lab Sample No:** *S-23-0826*

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
BH 102-23	SS 4	2.3 m to 2.9 m	36	36	21	7	4.4

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Silty Gravel and Sand trace Clay	SM	3.7000	0.1300	0.0042	880.95	1.09

Additional information availabe upon request

Issued By: _____ *Date Issued:* *May 24, 2023*

(Senior Project Manager)

Cambium Inc. (Laboratory)
866.217.7900 | cambium-inc.com
194 Sophia St. | Peterborough | ON | K9H 1E5

Grain Size Distribution Chart

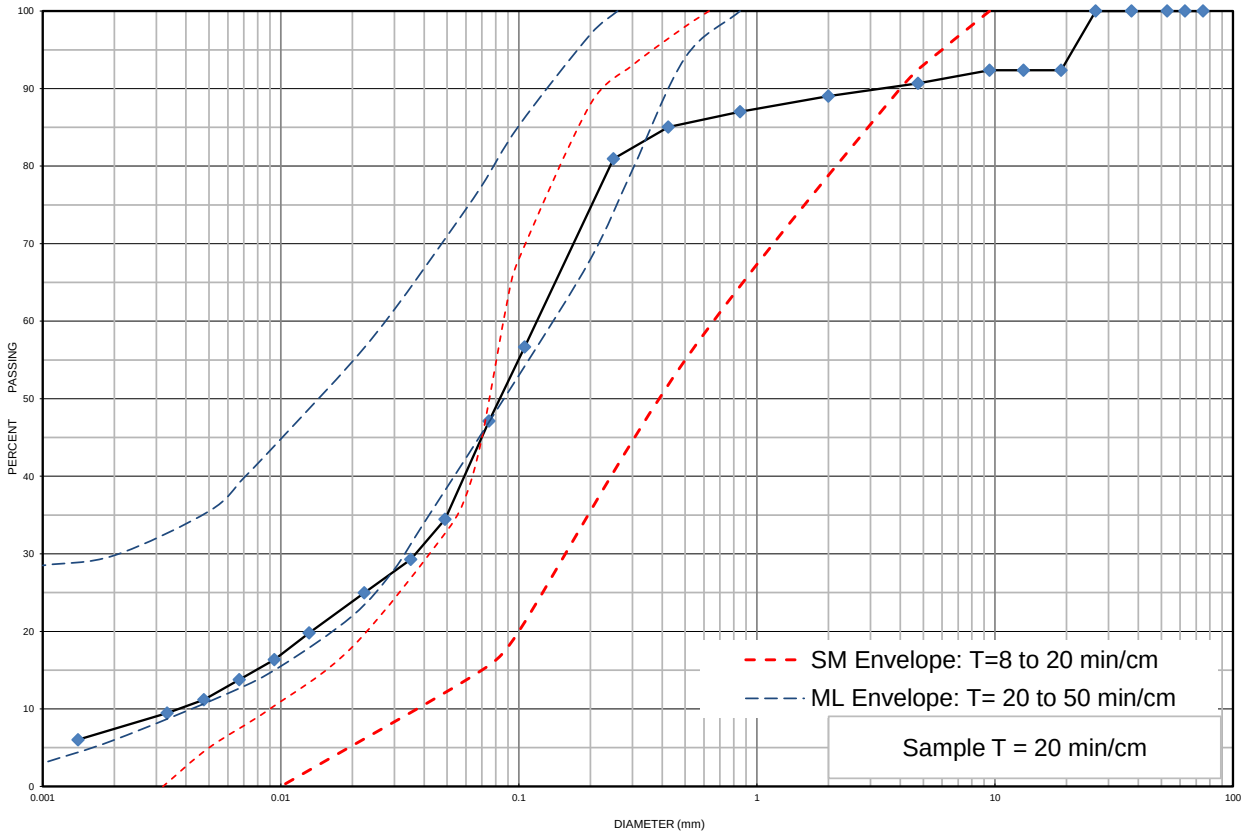
Project Number: *17217-001* **Client:** *Angelo Carnevale*

Project Name: *537090 Main Street Horning's Mills*

Sample Date: *May 11-12, 2023* **Sampled By:** *Waleed El-Taweel - Cambium Inc.*

Location: *BH 103-23 SS 3* **Depth:** *1.5 m to 2.1 m* **Lab Sample No:** *S-23-0827*

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
BH 103-23	SS 3	1.5 m to 2.1 m	9	44	40	7	12.5

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Sand and Silt trace Gravel trace Clay	SM	0.1300	0.0370	0.0038	34.21	2.77

Additional information availabe upon request

Issued By: _____ *Date Issued:* *May 24, 2023*

(Senior Project Manager)

Cambium Inc. (Laboratory)
866.217.7900 | cambium-inc.com
194 Sophia St. | Peterborough | ON | K9H 1E5

Grain Size Distribution Chart

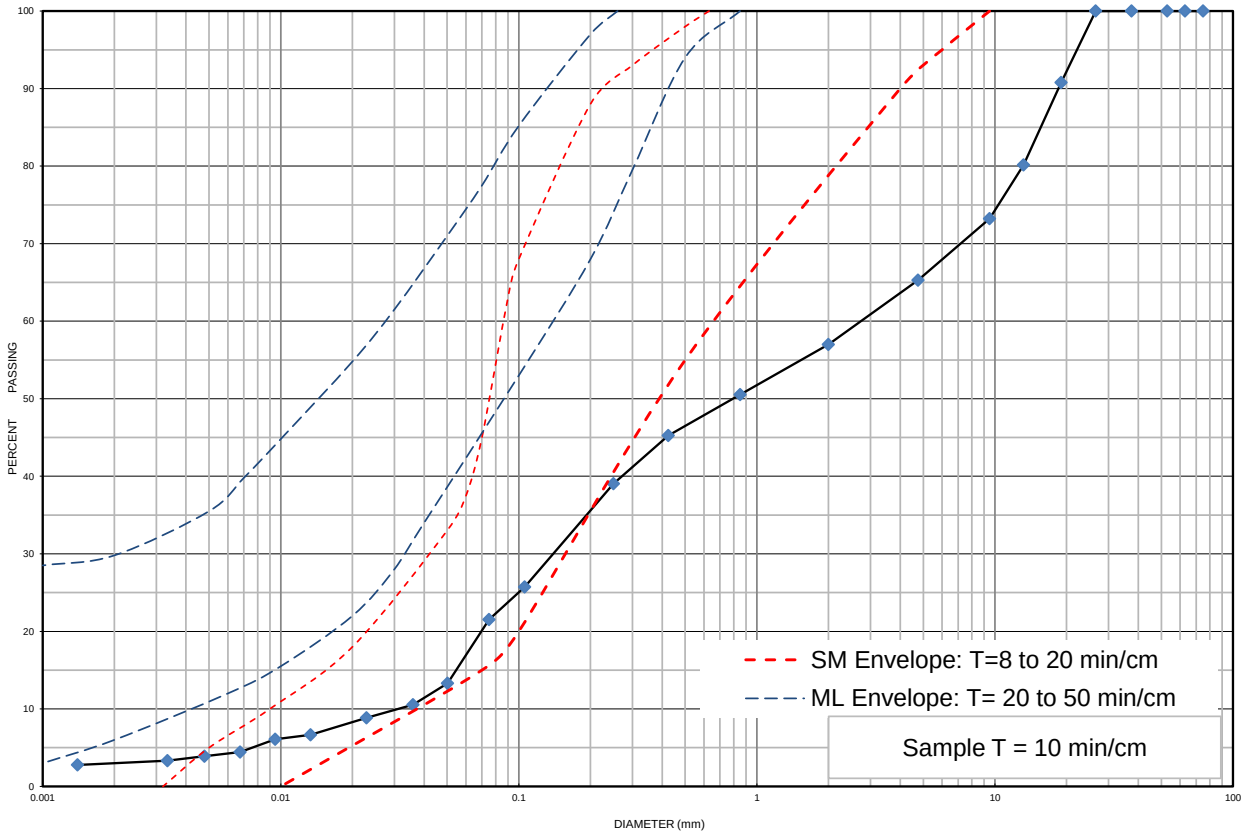
Project Number: *17217-001* **Client:** *Angelo Carnevale*

Project Name: *537090 Main Street Horning's Mills*

Sample Date: *May 11-12, 2023* **Sampled By:** *Waleed El-Taweel - Cambium Inc.*

Location: *BH 105-23 SS 2* **Depth:** *0.8 m to 1.4 m* **Lab Sample No:** *S-23-0828*

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
BH 105-23	SS 2	0.8 m to 1.4 m	35	44	18	3	6.2

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Sand and Gravel some Silt trace Clay	SM	2.700	0.145	0.030	90.00	0.26

Additional information availabe upon request

Issued By: _____ *Date Issued:* *May 24, 2023*

(Senior Project Manager)

Cambium Inc. (Laboratory)
866.217.7900 | cambium-inc.com
194 Sophia St. | Peterborough | ON | K9H 1E5

Grain Size Distribution Chart

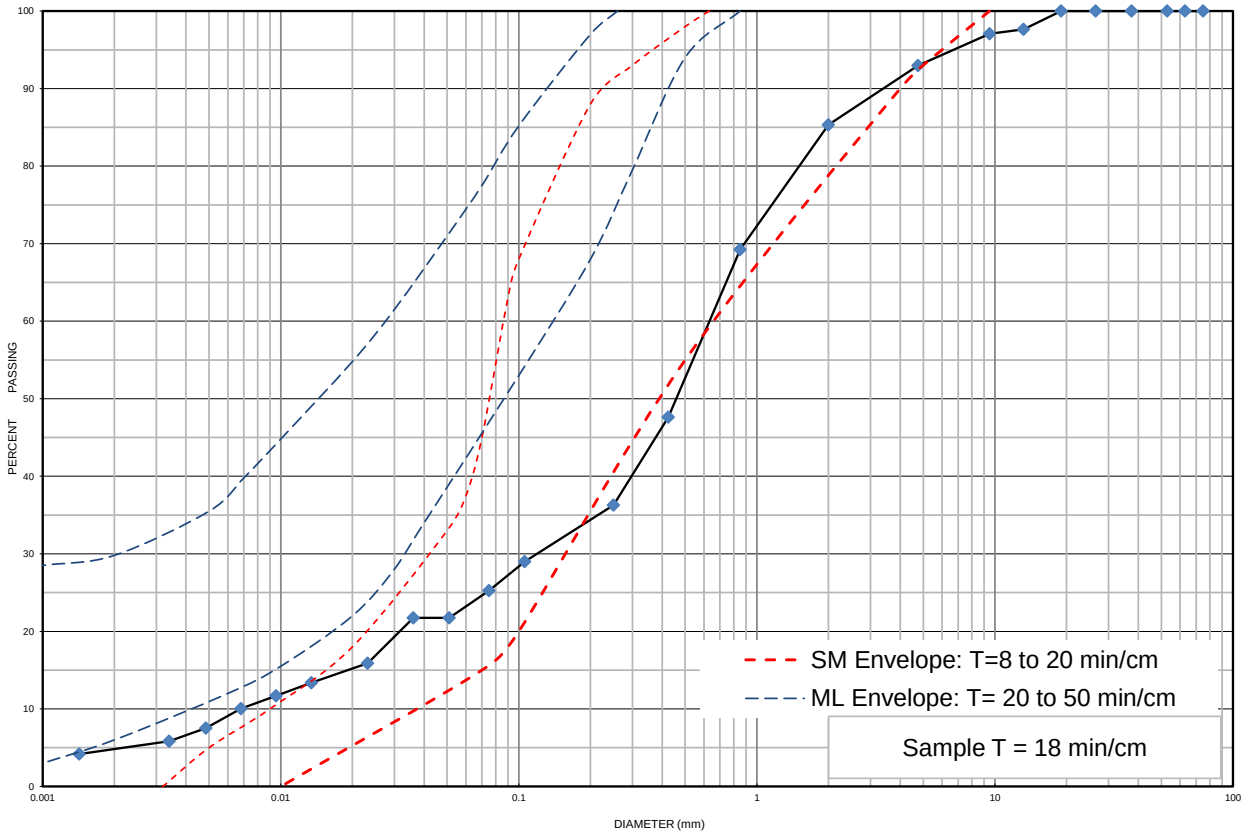
Project Number: *17217-001* **Client:** *Angelo Carnevale*

Project Name: *537090 Main Street Horning's Mills*

Sample Date: *May 11-12, 2023* **Sampled By:** *Waleed El-Taweel - Cambium Inc.*

Location: *BH 107-23 SS 2* **Depth:** *0.8 m to 1.4 m* **Lab Sample No:** *S-23-0829*

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
BH 107-23	SS 2	0.8 m to 1.4 m	7	68	20	5	6.6

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Silty Sand trace Gravel trace Clay	SM	0.6400	0.1250	0.0068	94.12	3.59

Additional information availabe upon request

Issued By: _____ *Date Issued:* *May 24, 2023*

(Senior Project Manager)

Cambium Inc. (Laboratory)
866.217.7900 | cambium-inc.com
194 Sophia St. | Peterborough | ON | K9H 1E5

Appendix D

Test Well Records

Ontario — Ministry of the Environment, Conservation and Parks

TW1

Measurements recorded in: ☐ Metric ☒ Imperial

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

Tag#:A365984 A365984

Well Record

Regulation 903 Ontario Water Resources Act

Well Owner's Information

First Name	Last Name/Organization	E-mail Address	☐ Well Constructed by Well Owner
Angelo	Carnevale		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
537086 Main St	Melancthon	ON	L9V1X6	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
537086 Main St	Melancthon	13	2

County/District/Municipality	City/Town/Village	Province	Postal Code
Dufferin	Hornings Mills	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	563284	4888629		

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	To
Brown	Topsoil			0	2
Brown	Gravel	Sand, Cobbles, Clay		2	20
Brown	Clay	Gravel, Sand		20	57
Lt. Grey	Limestone		Med Bedrock	57	80

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
0	20	Bentonite	7.1

Method of Construction

☐ Cable Tool ☐ Diamond
☒ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☒ Air percussion
☐ Other, specify

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☒ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ 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	To
6	Steel	.188	+4	60
6	open Hole		60	80

Construction Record - Screen

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

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

Water Details

Water found at Depth (m/ft)	Gas	Kind of Water	Other, specify
65	☐	☐ Fresh ☒ Untested	
71	☐	☐ Fresh ☒ Untested	
	☐	☐ Fresh ☐ Untested	

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	20	10
20	80	6

Results of Well Yield Testing

After test of well yield, water was:
☒ Clear and sand free
☐ Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft): 70.0

Pumping rate (l/min / GPM): 10

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping (m/ft): 58.2

If flowing give rate (l/min/GPM)

Recommended pump depth (m/ft): 70.0

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

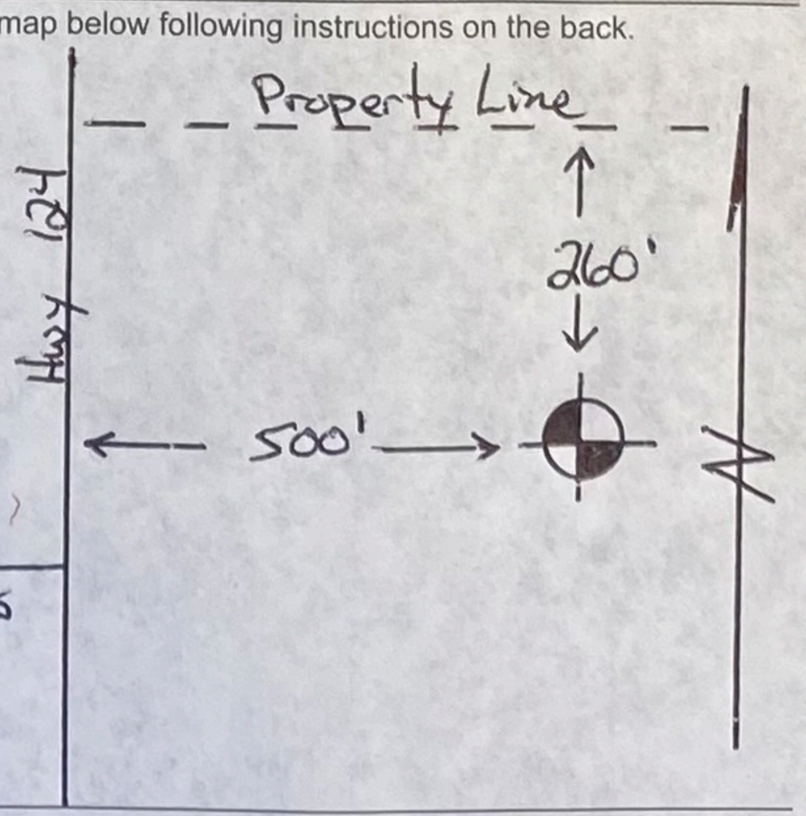
Well production (l/min/GPM)

Disinfected? ☒ Yes ☐ No

Draw Down Time (min)	Water Level (m/ft)	Recovery Time (min)	Water Level (m/ft)
Static Level	58.0		
1	58.2	1	58.05
2		2	58.0
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
50		50	
60	58.2	60	58.0

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Franklin Drilling Services Inc	7719

Business Address (Street Number/Name)	Municipality
6891 Sdrd 7 West	Mount Forest

Province	Postal Code	Business E-mail Address
ON	N0G2L0	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
5195014750	Franklin Liam

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3594		2024 05 30

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☒ Yes ☐ No	2024 04 26	2024 04 24

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Audit No. Z424833

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DocuSign Envelope ID: 78897FBC-F346-4361-A2AC-47ED24D74793

Ontario — Ministry of the Environment, Conservation and Parks

Well Record

Regulation 903 Ontario Water Resources Act

TW2

Measurements recorded in: ☐ Metric ☒ Imperial

Well Tag No. (Place Sticker and/or Print Below) Tag#:A365985 A365985

Page 1 of 1

Well Owner's Information

First Name	Last Name/Organization	E-mail Address	☐ Well Constructed by Well Owner
Angelo	Carnevale		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
537086 Main St	Melancthon	ON	L9V1X6	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
537086 Main St	Melancthon	13	2

County/District/Municipality	City/Town/Village	Province	Postal Code
Dufferin	Hornings Mills	Ontario	L9V1X6

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	563417	4888500		

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	To
Brown	Topsoil			0	2
Brown	Gravel	Sand, Cobbles, Clay		2	20
Brown	Clay	Gravel, Sand		20	46
Brown	Limestone		Soft	46	88
Grey	Limestone		Med	88	96
Blue	Shale			96	98

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/imp gal)
0	21	Bentonite	7.35

Method of Construction

☐ Cable Tool ☐ Diamond
☒ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☒ Air percussion
☐ Other, specify

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☒ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ 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	To
6	Steel	.188	+3	52
6	Open Hole		52	98

Construction Record - Screen

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

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

Water Details

Water found at Depth	Kind of Water	
65 (m/ft) ☐ Gas	☐ Fresh ☒ Untested	☐ Other, specify
89 (m/ft) ☐ Gas	☐ Fresh ☒ Untested	☐ Other, specify
(m/ft) ☐ Gas	☐ Fresh ☐ Untested	☐ Other, specify

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	21	10
21	98	6

Results of Well Yield Testing

After test of well yield, water was:
☒ Clear and sand free
☐ Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft): 70.0

Pumping rate (l/min / GPM): 10

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping (m/ft): 67.0

If flowing give rate (l/min/GPM)

Recommended pump depth (m/ft): 75

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

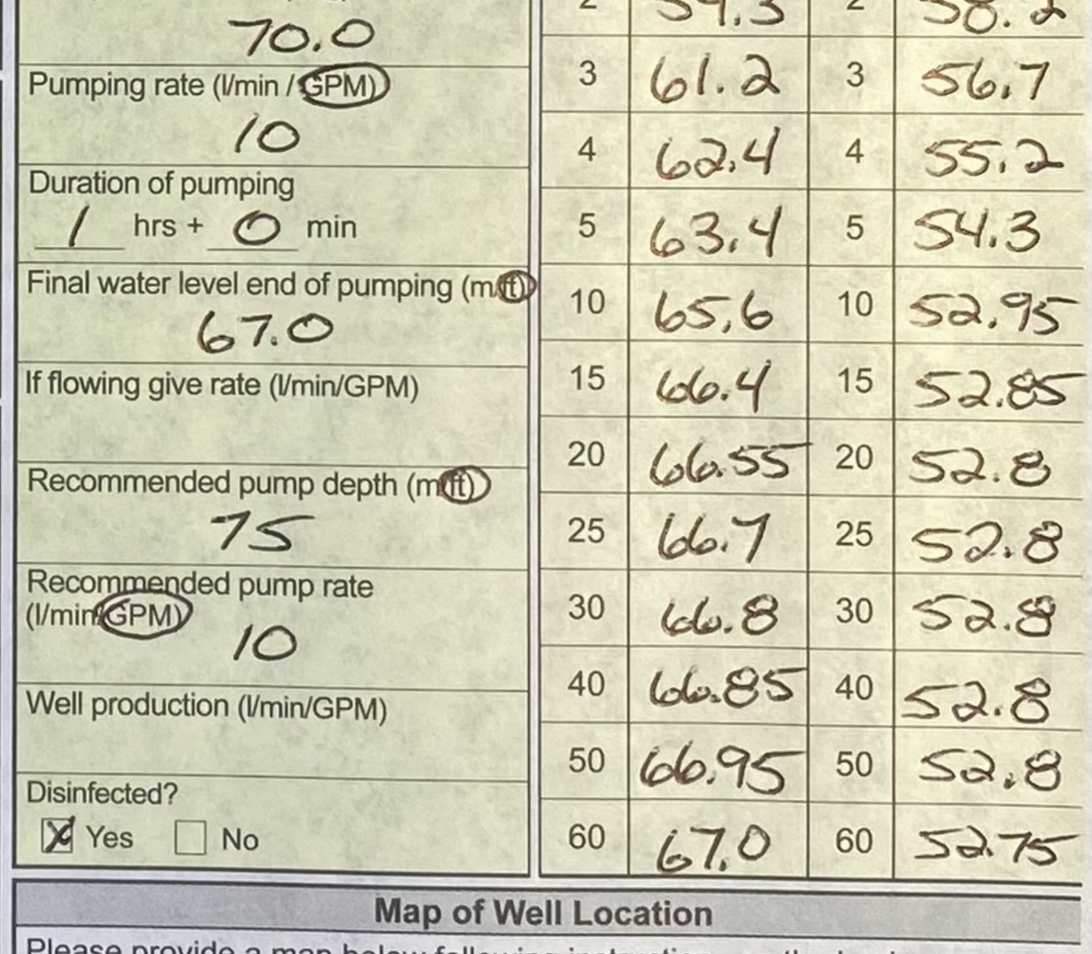
Well production (l/min/GPM)

Disinfected? ☒ Yes ☐ No

Draw Down Time (min)	Water Level (m/ft)	Recovery Time (min)	Water Level (m/ft)
Static Level	52.75		
1	57.4	1	62.8
2	59.3	2	58.2
3	61.2	3	56.7
4	62.4	4	55.2
5	63.4	5	54.3
10	65.6	10	52.95
15	66.4	15	52.85
20	66.55	20	52.8
25	66.7	25	52.8
30	66.8	30	52.8
40	66.85	40	52.8
50	66.95	50	52.8
60	67.0	60	52.75

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Franklin Drilling Services Inc	7719

Business Address (Street Number/Name)	Municipality
6891 Sdrd 7 West	Mount Forest

Province	Postal Code	Business E-mail Address
ON	N0G2L0	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
5195014750	Franklin Liam

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3594		20240530

Well owner's information package delivered	Date Package Delivered	Ministry Use Only
☒ Yes ☐ No	20240501	Audit No. Z424835
	Date Work Completed: 20240425	Received

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Ontario — Ministry of the Environment, Conservation and Parks

TW3

Measurements recorded in: ☐ Metric ☒ Imperial

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

Tag#:A365986 A365986

Well Record

Regulation 903 Ontario Water Resources Act

Well Owner's Information

First Name	Last Name/Organization	E-mail Address	☐ Well Constructed by Well Owner
Angelo	Carnevale		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
537086 Main St	Melancthon	ON	L9V1X6	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
537086 Main St	Melancthon	13	2

County/District/Municipality	City/Town/Village	Province	Postal Code
Dufferin	Hornings Mills	Ontario	L9V1X6

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	563589	4888664		

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	To
Brown	Topsoil			0	1
Brown	Gravel	Sand, Cobbles, Clay		1	18
Brown	Clay	Gravel, Sand		18	29
Brown	Limestone		Soft	29	55
Grey	Limestone		Med	55	63
Blue	Shale			63	65'6"

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	21	Bentonite	7.4

Method of Construction

☐ Cable Tool ☐ Diamond
☒ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☒ Air percussion
☐ Other, specify

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☒ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ 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	To
6	Steel	.188	+3	35'6"
6	Open Hole		35'6"	65'6"

Construction Record - Screen

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

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

Water Details

Water found at Depth (m/ft)	Kind of Water	Gas	Other, specify
52	☐ Fresh ☒ Untested	☐	
	☐ Fresh ☐ Untested	☐	
	☐ Fresh ☐ Untested	☐	

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	21	10
21	65'6"	6

Results of Well Yield Testing

After test of well yield, water was:
☒ Clear and sand free
☐ Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft): 61.0

Pumping rate (l/min / GPM): 5gpm

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping (m/ft): 50.4

If flowing give rate (l/min/GPM)

Recommended pump depth (m/ft): 60

Recommended pump rate (l/min/GPM): 3

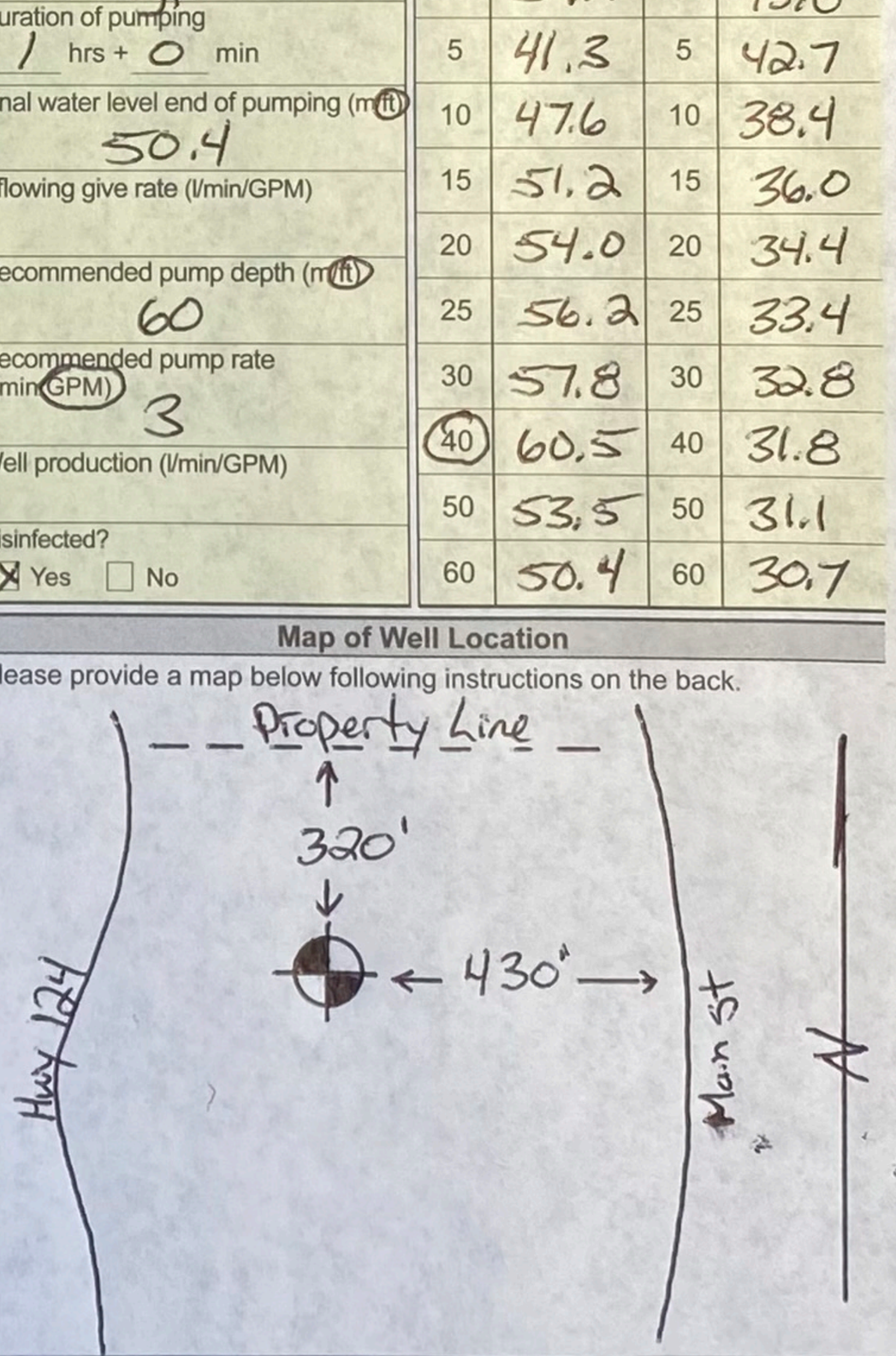
Well production (l/min/GPM)

Disinfected? ☒ Yes ☐ No

Draw Down Time (min)	Water Level (m/ft)	Recovery Time (min)	Water Level (m/ft)
Static Level	29.95		
1	33.2	1	48.1
2	35.7	2	46.5
3	37.9	3	45.0
4	39.7	4	43.8
5	41.3	5	42.7
10	47.6	10	38.4
15	51.2	15	36.0
20	54.0	20	34.4
25	56.2	25	33.4
30	57.8	30	32.8
40	60.5	40	31.8
50	53.5	50	31.1
60	50.4	60	30.7

Map of Well Location

Please provide a map below following instructions on the back.



Comments:
Changed rate to 3gpm @ 40 minutes yield Test

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Franklin Drilling Services Inc	7719

Business Address (Street Number/Name)	Municipality
6891 Sdrd 7 West	Mount Forest

Province	Postal Code	Business E-mail Address
ON	N0G2L0	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
5195014750	Franklin Liam

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3594		20240530

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☒ Yes ☐ No	20240501	20240425

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Audit No. Z424834

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Appendix E

Water Quality Data

FINAL REPORT

CA14340-MAY24 R1

17217-001

Prepared for

Cambium Inc.

FINAL REPORT

First Page

CLIENT DETAILS

Client	Cambium Inc.
Address	135 Bayfield St. Suite 102 Barrie, ON . Canada
Contact	Nicole Latimer
Telephone	705-279-6374
Facsimile	
Email	nicole.latimer@cambium-inc.com; file@cambium-inc.com; esda
Project	17217-001
Order Number	
Samples	Ground Water (2)

LABORATORY DETAILS

Project Specialist	Brad Moore Hon. B.Sc
Laboratory	SGS Canada Inc.
Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-652-2143
Facsimile	705-652-6365
Email	brad.moore@sgs.com
SGS Reference	CA14340-MAY24
Received	05/10/2024
Approved	05/17/2024
Report Number	CA14340-MAY24 R1
Date Reported	05/17/2024

COMMENTS

Temperature of Sample upon Receipt: 15
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: n/a

SIGNATORIES

Brad Moore Hon. B.Sc

TABLE OF CONTENTS

FINAL REPORT

CA14340-MAY24 R1

Client: Cambium Inc.
Project: 17217-001
Project Manager: Nicole Latimer
Samplers: Warren Young

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

				Sample Number	9	10
				Sample Name	TW1	TW1 QA/QC
				Sample Matrix	Ground Water	Ground Water
				Sample Date	10/05/2024	10/05/2024
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**
General Chemistry						
Alkalinity	mg/L as CaCO3	2	500		266	---
Colour	TCU	3	5		5	---
Conductivity	uS/cm	2			634	---
Total Dissolved Solids	mg/L	30	500		363	---
Turbidity	NTU	0.10	5	1	0.20	---
Dissolved Organic Carbon	mg/L	1	5		< 1	---
Ammonia+Ammonium (N)	as N mg/L	0.1			< 0.1	---
Metals and Inorganics						
Sulphate	mg/L	2	500		14	---
Nitrite (as N)	as N mg/L	0.03		1	< 0.03	---
Nitrate (as N)	as N mg/L	0.06		10	4.37	---
Hardness	mg/L as CaCO3	0.05	100		316	---
Calcium (total)	mg/L	0.01			87.7	---
Iron (total)	mg/L	0.007	0.3		0.009	---
Magnesium (total)	mg/L	0.001			23.7	---
Manganese (total)	mg/L	0.00001	0.05		0.00036	---
Sodium (total)	mg/L	0.01	200	20	20.4	---

FINAL REPORT

CA14340-MAY24 R1

Client: Cambium Inc.
Project: 17217-001
Project Manager: Nicole Latimer
Samplers: Warren Young

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

				Sample Number	9	10
				Sample Name	TW1	TW1 QA/QC
				Sample Matrix	Ground Water	Ground Water
				Sample Date	10/05/2024	10/05/2024
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**
Microbiology						
E. Coli	cfu/100mL	0		0	0	0
Total Coliform	cfu/100mL	0		0	0	0
Total Coliform Background	cfu/100mL	0			0	---
Fecal Coliform	cfu/100mL	0			0	---
Other (ORP)						
pH	No unit	0.05	8.5		8.09	---
Chloride	mg/L	1	250		38	---

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03 L1	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03 L2
TW1					
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	316	100	
Sodium	SM 3030/EPA 200.8	mg/L	20.4		20

FINAL REPORT

QC SUMMARY

Alkalinity

Method: SM 2320 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0319-MAY24	mg/L as CaCO3	2	< 2	0	20	98	80	120	NA		

Ammonia by SFA

Method: SM 4500 I Internal ref.: ME-CA-IENVISFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0138-MAY24	as N mg/L	0.1	<0.1	ND	10	99	90	110	99	75	125

FINAL REPORT

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO8049-MAY24	mg/L	1	<1	ND	20	98	80	120	97	75	125
Sulphate	DIO8049-MAY24	mg/L	2	<2	0	20	109	80	120	96	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-[ENV]IC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nitrite (as N)	DIO0291-MAY24	mg/L	0.03	<0.03	ND	20	99	90	110	104	75	125
Nitrate (as N)	DIO0291-MAY24	mg/L	0.06	<0.06	0	20	97	90	110	95	75	125

FINAL REPORT

QC SUMMARY

Carbon by SFA

Method: SM 5310 | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Dissolved Organic Carbon	SKA5060-MAY24	mg/L	1	<1	0	20	99	90	110	96	75	125

Colour

Method: SM 2120 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Colour	EWL0336-MAY24	TCU	3	< 3	ND	10	105	80	120	NA		

Conductivity

Method: SM 2510 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0319-MAY24	uS/cm	2	< 2	0	20	99	90	110	NA		

FINAL REPORT

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 I Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Calcium (total)	EMS0124-MAY24	mg/L	0.01	<0.01	3	20	101	90	110	102	70	130
Iron (total)	EMS0124-MAY24	mg/L	0.007	<0.007	13	20	103	90	110	125	70	130
Magnesium (total)	EMS0124-MAY24	mg/L	0.001	<0.001	1	20	99	90	110	99	70	130
Manganese (total)	EMS0124-MAY24	mg/L	0.00001	<0.00001	1	20	102	90	110	103	70	130
Sodium (total)	EMS0124-MAY24	mg/L	0.01	<0.01	0	20	101	90	110	102	70	130

Microbiology

Method: OMOE MICROMFDC-E3407A I Internal ref.: ME-CA-IENVIMIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Coliform Background	BAC9195-MAY24	cfu/100mL	-	ACCEPTED	ACCEPTED							
E. Coli	BAC9195-MAY24	cfu/100mL	-	ACCEPTED	ACCEPTED							
Fecal Coliform	BAC9195-MAY24	cfu/100mL	-	ACCEPTED	ACCEPTED							
Total Coliform	BAC9195-MAY24	cfu/100mL	-	ACCEPTED	ACCEPTED							

FINAL REPORT

QC SUMMARY

pH

Method: SM 4500 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High
pH	EWL0319-MAY24	No unit	0.05	NA	0		101			NA		

Solids Analysis

Method: SM 2540C I Internal ref.: ME-CA-IENVIEWL-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High
Total Dissolved Solids	EWL0321-MAY24	mg/L	30	<30	3	20	91	80	120	NA		

Turbidity

Method: SM 2130 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High
Turbidity	EWL0342-MAY24	NTU	0.10	< 0.10	0	10	101	90	110	NA		

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

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

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

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

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS	Insufficient sample for analysis.
RL	Reporting Limit.
↑	Reporting limit raised.
↓	Reporting limit lowered.
NA	The sample was not analysed for this analyte
ND	Non Detect

Results relate only to the sample tested.
Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.
"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.
Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

This report supersedes all previous versions.

-- End of Analytical Report --

SGS SGS Environmental Services

Request for Laboratory Services and CHAIN OF CUSTODY

No:

Page 1 of 1

- Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Toll Free: 877-747-7658 Fax: 705-652-6365
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361 Web: www.ca.sgs.com

Laboratory Information Section - Lab use only

Received By:
Received Date (mm/dd/yyyy): 05/10/24
Received Time: 21:30
Received By (signature):
Custody Seal Present: ☐
Custody Seal Intact: ☑
Cooling Agent Present: ☑ ice pack
Temperature Upon Receipt (°C): 8 13
LAB LIMS #: ~~May 16632~~ CA14340-May24

REPORT INFORMATION

Company: Cambium Inc
Contact: Nicole Latimer
Address: 194 Sophia St, Peterborough ontario
Phone: 705 279 6374
Fax:
Email: Nicole.Latimer@cambium-inc.com

INVOICE INFORMATION

☒ (same as Report Information)
Company:
Contact:
Address:
Phone:
Email:

PROJECT INFORMATION

Quotation #: 2024 417
P.O. #:
Project #: 17217-001
Site Location/ID:

TURNAROUND TIME (TAT) REQUIRED

☒ Regular TAT (5-7days)
TAT's are quoted in business days (exclude statutory holidays & weekends). Samples received after 3pm or on weekends : TAT begins the next business day

RUSH TAT (Additional Charges May Apply) ☐ 1 Day ☐ 2 Days ☐ 3-4 Days

PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

Specify Due Date:
Rush Confirmation ID:

DRINKING WATER SAMPLES (POTABLE WATER FOR HUMAN CONSUMPTION) MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

REGULATIONS

Regulation 153 (2011): ☐ Table 1 ☐ Table 2 ☐ Table 3 ☐ Table ___ ☐ Res/Park ☐ Ind/Com ☐ Agri/Other
Soil Texture: ☐ Coarse ☐ Medium ☐ Fine

Other Regulations: ☐ Reg 347/558 (3 Day min TAT) ☐ PWQO ☐ MMER ☐ CCME ☐ Other: ☐ MISA

Sewer By-Law: ☐ Sanitary ☐ Storm
Municipality:

RECORD OF SITE CONDITION (RSC) ☐ YES ☐ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	Total Coliform & E.coli	Per Quote										COMMENTS: Field Filtered (F) Preserved (P)
1	TW1	05/10/24	15:00	10	GW		X										
2	TW1 QA/QC	05/10/24	15:00	1	GW	X											
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Observations/Comments/Special Instructions

Sampled By (NAME): Warren Young — Signature: [signature] — Date: 05/10/24 (mm/dd/yy)
Relinquished by (NAME): Warren Young — Signature: [signature] — Date: 05/10/24 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

Revision #: 1.0
Date of Issue: 01 June, 2014

RE: CA14340-May24 - Turbidity UAL - Please proceed

Campbell, Jill (Lakefield) <Jill.Campbell@sgs.com>

Tue 2024-05-14 11:33 AM

To:LR.Envlogin1 (Lakefield) <LR.Envlogin1@sgs.com>
Cc:Lakefield.Consultant.PM.Team <Lakefield.Consultant.PM.Team@sgs.com>

Hi Katelyn,

Client has confirmed to proceed with Turbidity as UAL.

Kind Regards,

Jill Campbell, B.Sc.,GISAS
Environmental Health & Safety
Project Specialist

SGS CANADA INC
185 Concession Street, P.O. Box 4300
Lakefield, Ontario K0L 2H0 Canada
Phone: +1 705-652-2165
Mobile:+1 705-868-4340

E-mail: jill.campbell@sgs.com

PLEASE SEND ALL BOTTLE ORDERS & COURIER REQUESTS VIA EMAIL TO:
Lakefield.EHS.Courier.Request@SGS.com
Email preferred for bottle orders and courier requests (unless emergency). This email goes to a number of SGS employees and will get processed accordingly.

PLEASE SEND ALL OTHER REQUESTS VIA EMAIL TO:
Lakefield.Consultant.PM.Team@sgs.com

FINAL REPORT

CA15713-MAY24 R1

17217-001

Prepared for

Cambium Inc.

FINAL REPORT

First Page

CLIENT DETAILS

Client	Cambium Inc.
Address	135 Bayfield St. Suite 102 Barrie, ON . Canada
Contact	Nicole Latimer
Telephone	705-279-6374
Facsimile	
Email	nicole.latimer@cambium-inc.com; file@cambium-inc.com; esda
Project	17217-001
Order Number	
Samples	Ground Water (2)

LABORATORY DETAILS

Project Specialist	Maarit Wolfe, Hon.B.Sc
Laboratory	SGS Canada Inc.
Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-652-2000
Facsimile	705-652-6365
Email	Maarit.Wolfe@sgs.com
SGS Reference	CA15713-MAY24
Received	05/09/2024
Approved	05/16/2024
Report Number	CA15713-MAY24 R1
Date Reported	06/12/2024

COMMENTS

Temperature of Sample upon Receipt: 13 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: 036200

Colour dup RPD high, results within RL

SIGNATORIES

Maarit Wolfe, Hon.B.Sc

TABLE OF CONTENTS

FINAL REPORT

CA15713-MAY24 R1

Client: Cambium Inc.
Project: 17217-001
Project Manager: Nicole Latimer
Samplers: Warren Young

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

				Sample Number	9	10
				Sample Name	TW2	TW QA/QC
				Sample Matrix	Ground Water	Ground Water
				Sample Date	08/05/2024	08/05/2024
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**
General Chemistry						
Alkalinity	mg/L as CaCO3	2	500		245	---
Colour	TCU	3	5		12	---
Conductivity	uS/cm	2			659	---
Total Dissolved Solids	mg/L	30	500		386	---
Turbidity	NTU	0.10	5	1	0.60	---
Dissolved Organic Carbon	mg/L	1	5		< 1	---
Ammonia+Ammonium (N)	as N mg/L	0.1			< 0.1	---
Metals and Inorganics						
Sulphate	mg/L	2	500		15	---
Nitrite (as N)	as N mg/L	0.03		1	< 0.03	---
Nitrate (as N)	as N mg/L	0.06		10	5.84	---
Hardness	mg/L as CaCO3	0.05	100		291	---
Calcium (total)	mg/L	0.01			81.1	---
Iron (total)	mg/L	0.007	0.3		0.044	---
Magnesium (total)	mg/L	0.001			21.6	---
Manganese (total)	mg/L	0.00001	0.05		0.00096	---
Sodium (total)	mg/L	0.01	200	20	15.0	---

FINAL REPORT

CA15713-MAY24 R1

Client: Cambium Inc.
Project: 17217-001
Project Manager: Nicole Latimer
Samplers: Warren Young

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

				Sample Number	9	10
				Sample Name	TW2	TW QA/QC
				Sample Matrix	Ground Water	Ground Water
				Sample Date	08/05/2024	08/05/2024
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**
Microbiology						
E. Coli	cfu/100mL	0		0	0	0
Total Coliform	cfu/100mL	0		0	0	0
Total Coliform Background	cfu/100mL	0			0	---
Fecal Coliform	cfu/100mL	0			0	---
Other (ORP)						
pH	No unit	0.05	8.5		8.10	---
Chloride	mg/L	1	250		31	---

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03 L1	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03 L2
TW2					
Colour	SM 2120	TCU	12	5	
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	291	100	

FINAL REPORT

QC SUMMARY

Alkalinity

Method: SM 2320 I Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0278-MAY24	mg/L as CaCO3	2	< 2	0	20	98	80	120	NA		

Ammonia by SFA

Method: SM 4500 I Internal ref.: ME-CA-[ENV]SFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0127-MAY24	as N mg/L	0.1	<0.1	ND	10	100	90	110	102	75	125

FINAL REPORT

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 375.4 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Sulphate	DIO8044-MAY24	mg/L	2	<2	1	20	108	80	120	101	75	125
Chloride	DIO8045-MAY24	mg/L	1	<1	5	20	92	80	120	95	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-[ENV]IC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nitrite (as N)	DIO0216-MAY24	mg/L	0.03	<0.03	ND	20	98	90	110	98	75	125
Nitrate (as N)	DIO0216-MAY24	mg/L	0.06	<0.06	2	20	97	90	110	99	75	125

FINAL REPORT

QC SUMMARY

Carbon by SFA

Method: SM 5310 | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Dissolved Organic Carbon	SKA0107-MAY24	mg/L	1	<1	1	20	100	90	110	89	75	125

Colour

Method: SM 2120 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Colour	EWL0193-JUN24	TCU	3	< 3	0	10	105	80	120	NA		

Conductivity

Method: SM 2510 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0278-MAY24	uS/cm	2	< 2	0	20	99	90	110	NA		

FINAL REPORT

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 I Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Calcium (total)	EMS0106-MAY24	mg/L	0.01	<0.01	1	20	99	90	110	104	70	130
Iron (total)	EMS0106-MAY24	mg/L	0.007	<0.007	ND	20	99	90	110	100	70	130
Magnesium (total)	EMS0106-MAY24	mg/L	0.001	<0.001	ND	20	102	90	110	104	70	130
Manganese (total)	EMS0106-MAY24	mg/L	0.00001	<0.00001	ND	20	96	90	110	109	70	130
Sodium (total)	EMS0106-MAY24	mg/L	0.01	<0.01	8	20	102	90	110	100	70	130

Microbiology

Method: OMOE MICROMFDC-E3407A I Internal ref.: ME-CA-IENVIMIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Coliform Background	BAC9164-MAY24	cfu/100mL	-	ACCEPTED	ACCEPTED							
E. Coli	BAC9164-MAY24	cfu/100mL	-	ACCEPTED	ACCEPTED							
Fecal Coliform	BAC9164-MAY24	cfu/100mL	-	ACCEPTED	ACCEPTED							
Total Coliform	BAC9164-MAY24	cfu/100mL	-	ACCEPTED	ACCEPTED							

FINAL REPORT

QC SUMMARY

pH

Method: SM 4500 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0278-MAY24	No unit	0.05	NA	0		100			NA		

Solids Analysis

Method: SM 2540C I Internal ref.: ME-CA-IENVIEWL-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Dissolved Solids	EWL0247-MAY24	mg/L	30	<30	5	20	95	80	120	NA		

Turbidity

Method: SM 2130 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Turbidity	EWL0238-MAY24	NTU	0.10	< 0.10	ND	10	100	90	110	NA		

FINAL REPORT

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Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

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

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS	Insufficient sample for analysis.
RL	Reporting Limit.
↑	Reporting limit raised.
↓	Reporting limit lowered.
NA	The sample was not analysed for this analyte
ND	Non Detect

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This report supersedes all previous versions.

-- End of Analytical Report --

Request for Laboratory Services and CHAIN OF CUSTODY

No: 036200

SGS Industries & Environment - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Fax: 705-652-6365 Web: www.sgs.com/environment
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361

Laboratory Information Section - Lab use only

Received By: Nishi Patel
Received Date: MAY 09 2024 (mm/dd/yy)
Received Time: : (hr : min)
Received By (signature): NP
Custody Seal Present: Yes ☑ No ☐
Custody Seal Intact: Yes ☑ No ☐
Cooling Agent Present: Yes ☑ No ☐ Type: Ice Pack
Temperature Upon Receipt (°C) 13 x 3
CA-15713-May 24 NP
LAB LIMS #:

REPORT INFORMATION

Company: Combium Inc
Contact: Nicole Latimer
Address: 194 Sophia St
Peterborough ON
Phone: 705-957-0137
Fax:
Email: Nicole.Latimer@Combium-Inc.com

INVOICE INFORMATION

☒ (same as Report Information)
Company:
Contact:
Address:
Phone:
Email:

Quotation #: 2024 417
Project #: 17217-001
P.O. #:
Site Location/ID:

TURNAROUND TIME (TAT) REQUIRED

☒ Regular TAT (5-7days)

TAT's are quoted in business days (exclude statutory holidays & weekends). Samples received after 6pm or on weekends: TAT begins next business day

RUSH TAT (Additional Charges May Apply): ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days

PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

Specify Due Date:

*NOTE: DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

REGULATIONS

☐ O.Reg 153/04 ☐ O.Reg 406/19

☐ Table 1 ☐ Res/Park Soil Texture: ☐ Coarse
☐ Table 2 ☐ Ind/Com ☐ Medium/Fine
☐ Table 3 ☐ Agri/Other
☐ Table ____ Appx. ____
Soil Volume ☐ <350m3 ☐ >350m3

Other Regulations:
☐ Reg 347/558 (3 Day min TAT)
☐ PWQO ☐ MMER
☐ CCME ☐ Other:
☐ MISA
☐ ODWS Not Reportable *See note

Sewer By-Law:
☐ Sanitary
☐ Storm
Municipality:

RECORD OF SITE CONDITION (RSC) ☐ YES ☐ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	Field Filtered (Y/N)	M&I: Metals & Inorganics (Incl CrVI, CN, Hg pH,(B(HWS),EC,SAR–soil) (Cl, Na–water))	M&I: Full Metals Suite (ICP metals plus B(HWS-soil only) Hg, CrVI	M&I: ICP Metals only Sb,As,Ba,Be,B,Cd, Cr,Co,Cu,Pb,Mo,Ni,Se,Ag,Tl,U,V,Zn	SVOC: PAHs only	SVOC: SVOCs all incl PAHs, ABNs, CPs	PCB: Aroclor ☐ Total ☐ PCBs	PHC: F1-F4 + BTEX	PHC: F1-F4 only no BTEX	VOC: VOCs all incl BTEX	VOC: BTEX only	Pest: Pesticides Organochlorine or specify other	Other: Per Quote	Other: Total Coliform & Ecoli	Other	Other	Other	Sewer Use: Specify pkg:	Water Characterization Pkg General ☐ Extended ☐	SPLP Specify tests: ☐ Metals ☐ VOC ☐ 1,4-Dioxane ☐ OCP ☐ ABN	TCLP Specify tests: ☐ M&I ☐ VOC ☐ PCB ☐ B(a)P ☐ ABN ☐ Ignit.	COMMENTS:
1	TW2	05/08/24	11:45	1D	GW													X								
2	TW2 QA/QC	05/08/24	11:45	1	GW														X								
3																											
4																											
5	*ODWS Non Reportable. Use "0" detection limit for bacteria.																										
6																											
7																											
8																											
9																											
10																											
11																											
12																											

Observations/Comments/Special Instructions

Sampled By (NAME): Warren Young
Signature: Warren Young
Date: 05 / 08 / 24 (mm/dd/yy)

Relinquished by (NAME): Warren Young
Signature: Warren Young
Date: 05 / 08 / 24 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

FINAL REPORT

CA15732-MAY24 R1

17217-001

Prepared for

Cambium Inc.

FINAL REPORT

First Page

CLIENT DETAILS

Client	Cambium Inc.
Address	135 Bayfield St. Suite 102 Barrie, ON . Canada
Contact	Nicole Latimer
Telephone	705-279-6374
Facsimile	
Email	nicole.latimer@cambium-inc.com; file@cambium-inc.com; esda
Project	17217-001
Order Number	
Samples	Ground Water (2)

LABORATORY DETAILS

Project Specialist	Maarit Wolfe, Hon.B.Sc
Laboratory	SGS Canada Inc.
Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-652-2000
Facsimile	705-652-6365
Email	Maarit.Wolfe@sgs.com
SGS Reference	CA15732-MAY24
Received	05/10/2024
Approved	05/17/2024
Report Number	CA15732-MAY24 R1
Date Reported	05/17/2024

COMMENTS

Temperature of Sample upon Receipt: 4 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: n/a

SIGNATORIES

Maarit Wolfe, Hon.B.Sc

TABLE OF CONTENTS

FINAL REPORT

CA15732-MAY24 R1

Client: Cambium Inc.
Project: 17217-001
Project Manager: Nicole Latimer
Samplers: Warren Young

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

				Sample Number	9	10
				Sample Name	TW3	TW3 QAQC
				Sample Matrix	Ground Water	Ground Water
				Sample Date	09/05/2024	09/05/2024
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**
General Chemistry						
Alkalinity	mg/L as CaCO3	2	500		241	---
Colour	TCU	3	5		< 3	---
Conductivity	uS/cm	2			537	---
Total Dissolved Solids	mg/L	30	500		346	---
Turbidity	NTU	0.10	5	1	0.35	---
Dissolved Organic Carbon	mg/L	1	5		< 1	---
Ammonia+Ammonium (N)	as N mg/L	0.1			< 0.1	---
Metals and Inorganics						
Sulphate	mg/L	2	500		18	---
Nitrite (as N)	as N mg/L	0.03		1	< 0.03	---
Nitrate (as N)	as N mg/L	0.06		10	4.58	---
Hardness	mg/L as CaCO3	0.05	100		281	---
Calcium (total)	mg/L	0.01			82.2	---
Iron (total)	mg/L	0.007	0.3		0.036	---
Magnesium (total)	mg/L	0.001			18.5	---
Manganese (total)	mg/L	0.00001	0.05		0.00427	---
Sodium (total)	mg/L	0.01	200	20	6.17	---

FINAL REPORT

CA15732-MAY24 R1

Client: Cambium Inc.
Project: 17217-001
Project Manager: Nicole Latimer
Samplers: Warren Young

MATRIX: WATER

L1 = ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03

L2 = ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03

				Sample Number	9	10
				Sample Name	TW3	TW3 QAQC
				Sample Matrix	Ground Water	Ground Water
				Sample Date	09/05/2024	09/05/2024
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**
Microbiology						
E. Coli	cfu/100mL	0		0	0	0
Total Coliform	cfu/100mL	0		0	0	0
Total Coliform Background	cfu/100mL	0			0	---
Fecal Coliform	cfu/100mL	0			0	---
Other (ORP)						
pH	No unit	0.05	8.5		8.25	---
Chloride	mg/L	1	250		< 1	---

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03 L1	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03 L2
TW3					
Hardness	SM 3030/EPA 200.8	mg/L as CaCO3	281	100	

FINAL REPORT

QC SUMMARY

Alkalinity

Method: SM 2320 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Alkalinity	EWL0309-MAY24	mg/L as CaCO3	2	< 2	0	20	102	80	120	NA		

Ammonia by SFA

Method: SM 4500 I Internal ref.: ME-CA-IENVISFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0138-MAY24	as N mg/L	0.1	<0.1	ND	10	99	90	110	99	75	125

FINAL REPORT

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO8049-MAY24	mg/L	1	<1	ND	20	98	80	120	97	75	125
Sulphate	DIO8049-MAY24	mg/L	2	<2	0	20	109	80	120	96	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-[ENV]IC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nitrite (as N)	DIO0270-MAY24	mg/L	0.03	<0.03	ND	20	99	90	110	100	75	125
Nitrate (as N)	DIO0270-MAY24	mg/L	0.06	<0.06	ND	20	97	90	110	97	75	125

FINAL REPORT

QC SUMMARY

Carbon by SFA

Method: SM 5310 | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Dissolved Organic Carbon	SKA0107-MAY24	mg/L	1	<1	1	20	100	90	110	89	75	125

Colour

Method: SM 2120 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Colour	EWL0336-MAY24	TCU	3	< 3	ND	10	105	80	120	NA		

Conductivity

Method: SM 2510 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0280-MAY24	uS/cm	2	< 2	0	20	99	90	110	NA		

FINAL REPORT

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-[ENV]SPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Calcium (total)	EMS0145-MAY24	mg/L	0.01	<0.01	0	20	99	90	110	98	70	130
Iron (total)	EMS0145-MAY24	mg/L	0.007	<0.007	2	20	100	90	110	100	70	130
Magnesium (total)	EMS0145-MAY24	mg/L	0.001	<0.001	1	20	95	90	110	94	70	130
Manganese (total)	EMS0145-MAY24	mg/L	0.00001	<0.00001	3	20	101	90	110	101	70	130
Sodium (total)	EMS0145-MAY24	mg/L	0.01	<0.01	0	20	98	90	110	97	70	130

Microbiology

Method: OMOE MICROMFDC-E3407A | Internal ref.: ME-CA-[ENV]MIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Coliform Background	BAC9191-MAY24	cfu/100mL	-	ACCEPTED	ACCEPTED							
E. Coli	BAC9191-MAY24	cfu/100mL	-	ACCEPTED	ACCEPTED							
Fecal Coliform	BAC9191-MAY24	cfu/100mL	-	ACCEPTED	ACCEPTED							
Total Coliform	BAC9191-MAY24	cfu/100mL	-	ACCEPTED	ACCEPTED							

FINAL REPORT

QC SUMMARY

pH

Method: SM 4500 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0280-MAY24	No unit	0.05	NA	0		101			NA		

Solids Analysis

Method: SM 2540C I Internal ref.: ME-CA-IENVIEWL-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Dissolved Solids	EWL0269-MAY24	mg/L	30	<30	6	20	96	80	120	NA		

Turbidity

Method: SM 2130 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Turbidity	EWL0277-MAY24	NTU	0.10	< 0.10	0	10	100	90	110	NA		

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

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

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

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

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS	Insufficient sample for analysis.
RL	Reporting Limit.
↑	Reporting limit raised.
↓	Reporting limit lowered.
NA	The sample was not analysed for this analyte
ND	Non Detect

Results relate only to the sample tested.
Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.
"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.
Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

This report supersedes all previous versions.

-- End of Analytical Report --

SGS Request for Laboratory Services and CHAIN OF CUSTODY

SGS Environmental Services - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Toll Free: 877-747-7658 Fax: 705-652-6365
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361 Web: www.ca.sgs.com

No: CA15732-MAY24

Page 1 of 1

Laboratory Information Section - Lab use only

Received By: MAY 10 2024 ice
Received Date (mm/dd/yyyy):
Received Time:
Received By (signature):
Custody Seal Present: ☐
Custody Seal Intact: ☐
Cooling Agent Present: ☐
Temperature Upon Receipt (°C): 4x3
LAB LIMS #:

REPORT INFORMATION

Company: Cambium Inc
Contact: Nicole Latimer
Address: 194 Sophia St Peterborough Ontario
Phone: 705-957-0137
Fax:
Email: Nicole.Latimer@cambium-inc.com

INVOICE INFORMATION

☒ (same as Report Information)
Company:
Contact:
Address:
Phone:
Email:

PROJECT INFORMATION

Quotation #: 2024 417
P.O. #:
Project #: 17217-001
Site Location/ID:

TURNAROUND TIME (TAT) REQUIRED

☒ Regular TAT (5-7days) — TAT's are quoted in business days (exclude statutory holidays & weekends). Samples received after 3pm or on weekends : TAT begins the next business day

RUSH TAT (Additional Charges May Apply) ☐ 1 Day ☐ 2 Days ☐ 3-4 Days

PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

Specify Due Date:
Rush Confirmation ID:

REGULATIONS

Regulation 153 (2011):
☐ Table 1 ☐ Res/Park Soil Texture: ☐ Coarse
☐ Table 2 ☐ Ind/Com ☐ Medium
☐ Table 3 ☐ Agri/Other ☐ Fine
☐ Table ____

Other Regulations:
☐ Reg 347/558 (3 Day min TAT)
☐ PWQO ☐ MMER
☐ CCME ☐ Other:
☐ MISA

Sewer By-Law:
☐ Sanitary
☐ Storm
Municipality:

DRINKING WATER SAMPLES (POTABLE WATER FOR HUMAN CONSUMPTION) MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

RECORD OF SITE CONDITION (RSC) ☐ YES ☐ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	Total Coliform & E.Coli	Per Analyte										COMMENTS: Field Filtered (F) Preserved (P)
1	TW3	05/09/24	13:00	10	GW		X										
2	TW3 QAQC	05/09/24	13:00	1	GW	X		3EC	ice								
3																	
4																	
5	*ODWS Non Reportable*																
6																	
7																	
8																	
9																	
10																	

Observations/Comments/Special Instructions

Sampled By (NAME): Warren Young **Signature:** Date: 05/09/24 (mm/dd/yy)
Relinquished by (NAME): Warren Young **Signature:** Date: 05/09/24 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

Revision #: 1.0
Date of Issue: 01 June, 2014

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Appendix F

MECP Well Records within 500m

Water Well Records Summary Report

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

All units in meters unless otherwise specified

Well ID: 1700304 **Easting:** 563756 **UTM Zone** 17
Construction Date: 1966-11-04 **Northing:** 4889091 **Positional Accuracy:** margin of error : 100 m - 300 m

Well Depth:	39.6	**Water Kind**	FRESH	**Pump Rate (LPM):**	32
Well Diameter (cm):	10.2	**Final Status**	Water Supply	**Recommended Pump Rate:**	23
Water First Found:	38.7	**Primary Water Use:**	Domestic	**Pumping Duration (h:m):**	5 : 0
Static Level:	20				

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	37.5
2	LIMESTONE	37.5	39.6

Well ID: 1700326 **Easting:** 563692 **UTM Zone** 17
Construction Date: 1959-12-07 **Northing:** 4888302 **Positional Accuracy:** margin of error : 100 m - 300 m

Well Depth:	27.4	**Water Kind**	FRESH	**Pump Rate (LPM):**	23
Well Diameter (cm):	10.2	**Final Status**	Water Supply	**Recommended Pump Rate:**	23
Water First Found:	26.8	**Primary Water Use:**	Livestock	**Pumping Duration (h:m):**	4 : 0
Static Level:	24				

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	1.22
2	HARDPAN	1.22	12.2
3	MEDIUM SAND	12.2	21.3
4	ROCK	21.3	27.4

Well ID: 1700330 **Easting:** 563550 **UTM Zone** 17
Construction Date: 1964-11-04 **Northing:** 4889122 **Positional Accuracy:** margin of error : 100 m - 300 m

Well Depth:	11.9	**Water Kind**	FRESH	**Pump Rate (LPM):**	45
Well Diameter (cm):	10.2	**Final Status**	Water Supply	**Recommended Pump Rate:**	36
Water First Found:	11.6	**Primary Water Use:**	Domestic	**Pumping Duration (h:m):**	2 : 0
Static Level:	6				

Layer:	Driller's Description:	Top:	Bottom:
1	PREV. DRILLED	0	1.52
2	ROCK	1.52	9.14
3	SHALE	9.14	11.9

Well ID: 1700331 **Easting:** 563554 **UTM Zone** 17
Construction Date: 1967-12-01 **Northing:** 4889172 **Positional Accuracy:** margin of error : 100 m - 300 m

Well Depth:	27.4	**Water Kind**	FRESH	**Pump Rate (LPM):**	27
Well Diameter (cm):	10.2	**Final Status**	Water Supply	**Recommended Pump Rate:**	18
Water First Found:	27.4	**Primary Water Use:**	Domestic	**Pumping Duration (h:m):**	4 : 0
Static Level:	14				

Layer:	Driller's Description:	Top:	Bottom:
1	MEDIUM SAND	0	25.9
2	MEDIUM SAND	25.9	27.1
3	GRAVEL	27.1	27.4

Well ID: 1700971
Construction Date: 1969-05-14
Easting: 563574
Northing: 4889103
UTM Zone 17
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 26.5
Well Diameter (cm): 10.2
Water First Found: 26.5
Static Level: 12
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 41
Recommended Pump Rate: 36
Pumping Duration (h:m): 3 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	MEDIUM SAND	0	26.2
2	LIMESTONE	26.2	26.5

Well ID: 1700973
Construction Date: 1969-05-14
Easting: 563734
Northing: 4889143
UTM Zone 17
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 33.2
Well Diameter (cm): 10.2
Water First Found: 33.2
Static Level: 20
Water Kind MINERIAL
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 41
Recommended Pump Rate: 27
Pumping Duration (h:m): 4 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	GRAVEL	0	12.2
2	MEDIUM SAND	12.2	32.6
3	LIMESTONE	32.6	33.2

Well ID: 1701152
Construction Date: 1970-12-14
Easting: 563650
Northing: 4889165
UTM Zone 17
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 25
Well Diameter (cm): 12.7
Water First Found: 25
Static Level: 11
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 27
Recommended Pump Rate: 23
Pumping Duration (h:m): 4 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	MEDIUM SAND	0	6.1
1	MEDIUM SAND	0	6.1
2	GRAVEL	6.1	21.0
2	GRAVEL	6.1	21.0
3	MEDIUM SAND	21.0	23.8
3	MEDIUM SAND	21.0	23.8
4	LIMESTONE	23.8	25
4	LIMESTONE	23.8	25

Well ID: 1701317
Construction Date: 1972-06-09
Easting: 563564
Northing: 4889073
UTM Zone 17
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 25.3
Well Diameter (cm): 10.2
Water First Found: 25.3
Static Level: 12
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 23
Recommended Pump Rate: 23
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	GRAVEL	0	15.9
2	SAND	15.9	19.5
3	GRAVEL	19.5	25.3

Well ID: 1701877
Construction Date: 1975-05-27
Easting: 563805
Northing: 4889139
UTM Zone 17
Positional Accuracy: margin of error : 100 m - 300 m

Well Depth: 27.7
Well Diameter (cm): 12.7
Water First Found: 27.7
Static Level: 18
Water Kind MINERIAL
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 32
Recommended Pump Rate: 27
Pumping Duration (h:m): 3 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	1.83
2	CLAY	1.83	24.4
3	GRAVEL	24.4	27.7

Well ID: 1702519
Construction Date: 1979-06-01
Easting: 563914
Northing: 4888223
UTM Zone 17
Positional Accuracy: margin of error : 100 m - 300 m

Well Depth: 25
Well Diameter (cm): 15.2
Water First Found: 23.8
Static Level: 14
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Livestock
Pump Rate (LPM): 27
Recommended Pump Rate: 27
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	9.45
1	CLAY	0	9.45
2	LIMESTONE	9.45	10.4
2	LIMESTONE	9.45	10.4
3	COARSE GRAVEL	10.4	11.9
3	COARSE GRAVEL	10.4	11.9
4	LIMESTONE	11.9	25
4	LIMESTONE	11.9	25

Well ID: 1702982
Construction Date: 1984-03-19
Easting: 563016
Northing: 4888589
UTM Zone 17
Positional Accuracy: unknown UTM

Well Depth: 39.0
Well Diameter (cm): 12.7
Water First Found: 34.4
Static Level: 26
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 45
Recommended Pump Rate: 45
Pumping Duration (h:m): 2 : 30

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	1.52
2	GRAVEL	1.52	33.2
3	ROCK	33.2	34.1
4	UNKNOWN TYPE	34.1	39.0

Well ID: 1703053
Construction Date: 1985-01-04
Easting: 562905
Northing: 4889187
UTM Zone 17
Positional Accuracy: unknown UTM

Well Depth: 49.4
Well Diameter (cm): 20.3
Water First Found: 48.8
Static Level: 8
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 136
Recommended Pump Rate: 114
Pumping Duration (h:m): 1 : 0

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	CLAY	0.30	3.66
2	CLAY	0.30	3.66
2	CLAY	0.30	3.66
2	CLAY	0.30	3.66
3	SHALE	3.66	4.57
3	SHALE	3.66	4.57
3	SHALE	3.66	4.57
3	SHALE	3.66	4.57
4	LIMESTONE	4.57	25
4	LIMESTONE	4.57	25
4	LIMESTONE	4.57	25
4	LIMESTONE	4.57	25
5	SHALE	25	49.4
5	SHALE	25	49.4
5	SHALE	25	49.4
5	SHALE	25	49.4

Well ID: 1703058
Construction Date: 1985-02-14

Easting: 562905
Northing: 4889187

UTM Zone 17
Positional Accuracy: unknown UTM

Well Depth: 30.8
Well Diameter (cm): 15.2
Water First Found: 29.3
Static Level: 10

Water Kind FRESH
Final Status Water Supply
Primary Water Use: Public

Pump Rate (LPM): 45
Recommended Pump Rate: 36
Pumping Duration (h:m): 1 : 30

Layer:	Driller's Description:	Top:	Bottom:
1	GRAVEL	0	4.27
1	GRAVEL	0	4.27
2	COARSE GRAVEL	4.27	4.88
2	COARSE GRAVEL	4.27	4.88
3	SHALE	4.88	5.49
3	SHALE	4.88	5.49
4	SHALE	5.49	7.62
4	SHALE	5.49	7.62
5	SHALE	7.62	18.3
5	SHALE	7.62	18.3
6	SHALE	18.3	20.7
6	SHALE	18.3	20.7
7	SHALE	20.7	30.8
7	SHALE	20.7	30.8

Well ID: 1703481
Construction Date: 1987-10-23
Easting: 562905
Northing: 4889187
UTM Zone 17
Positional Accuracy: unknown UTM

Well Depth: 34.8
Well Diameter (cm): 15.2
Water First Found: 34.8
Static Level:
Water Kind Not stated
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 50
Recommended Pump Rate: 45
Pumping Duration (h:m): 12 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	FILL	0	1.52
1	FILL	0	1.52
1	FILL	0	1.52
1	FILL	0	1.52
2	GRAVEL	1.52	9.14
2	GRAVEL	1.52	9.14
2	GRAVEL	1.52	9.14
2	GRAVEL	1.52	9.14
3	SHALE	9.14	12.2
3	SHALE	9.14	12.2
3	SHALE	9.14	12.2
3	SHALE	9.14	12.2
4	LIMESTONE	12.2	34.8
4	LIMESTONE	12.2	34.8
4	LIMESTONE	12.2	34.8
4	LIMESTONE	12.2	34.8

Well ID: 1703825
Construction Date: 1989-03-17
Easting: 562905
Northing: 4889187
UTM Zone 17
Positional Accuracy: unknown UTM

Well Depth: 43
Well Diameter (cm):
Water First Found: 42.1
Static Level: 20
Water Kind Not stated
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 23
Recommended Pump Rate: 23
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	11.6
1	CLAY	0	11.6
1	CLAY	0	11.6
2	LIMESTONE	11.6	15.9
2	LIMESTONE	11.6	15.9
2	LIMESTONE	11.6	15.9
3	LIMESTONE	15.9	17.7
3	LIMESTONE	15.9	17.7
3	LIMESTONE	15.9	17.7
4	LIMESTONE	17.7	38.4
4	LIMESTONE	17.7	38.4
4	LIMESTONE	17.7	38.4
5	SHALE	38.4	43

5	SHALE	38.4	43
5	SHALE	38.4	43

Well ID: 1704054 **Easting:** 562905 **UTM Zone** 17
Construction Date: 1990-02-20 **Northing:** 4889187 **Positional Accuracy:** unknown UTM

Well Depth: 29 **Water Kind** FRESH **Pump Rate (LPM):** 68
Well Diameter (cm): 15.2 **Final Status** Water Supply **Recommended Pump Rate:** 45
Water First Found: 27.4 **Primary Water Use:** Domestic **Pumping Duration (h:m):** 12 : 0
Static Level: 11

Layer:	Driller's Description:	Top:	Bottom:
1	STONES	0	9.14
2	CLAY	9.14	15.2
3	CLAY	15.2	22.9
4	SHALE	22.9	29

Well ID: 1704163 **Easting:** 563016 **UTM Zone** 17
Construction Date: 1990-05-08 **Northing:** 4888589 **Positional Accuracy:** unknown UTM

Well Depth: 42.1 **Water Kind** FRESH **Pump Rate (LPM):** 45
Well Diameter (cm): 15.2 **Final Status** Water Supply **Recommended Pump Rate:** 45
Water First Found: 33.5 **Primary Water Use:** Domestic **Pumping Duration (h:m):** 6 : 0
Static Level: 18

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.61
2	CLAY	0.61	8.53
3	CLAY	8.53	24.4
4	CLAY	24.4	25.6
5	LIMESTONE	25.6	29
6	LIMESTONE	29	36.6
7	LIMESTONE	36.6	40.5
8	LIMESTONE	40.5	41.8
9	SHALE	41.8	42.1

Well ID: 1704207 **Easting:** 562905 **UTM Zone** 17
Construction Date: 1990-07-24 **Northing:** 4889187 **Positional Accuracy:** unknown UTM

Well Depth: 18.6 **Water Kind** FRESH **Pump Rate (LPM):** 23
Well Diameter (cm): 15.2 **Final Status** Water Supply **Recommended Pump Rate:** 23
Water First Found: 16.8 **Primary Water Use:** Domestic **Pumping Duration (h:m):** 1 : 0
Static Level: 5

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.30
2	CLAY	0.30	6.1
3	CLAY	6.1	12.2
4	SHALE	12.2	18.3
5	LIMESTONE	18.3	18.6

Well ID: 1704336
Construction Date: 1991-05-22
Easting: 563016
Northing: 4888589
UTM Zone 17
Positional Accuracy: unknown UTM

Well Depth: 22
Well Diameter (cm): 15.2
Water First Found: 22
Static Level: 11
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 91
Recommended Pump Rate: 68
Pumping Duration (h:m): 1 : 0

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	SAND	0.30	6.71
2	SAND	0.30	6.71
2	SAND	0.30	6.71
2	SAND	0.30	6.71
3	CLAY	6.71	10.4
3	CLAY	6.71	10.4
3	CLAY	6.71	10.4
3	CLAY	6.71	10.4
4	CLAY	10.4	21.0
4	CLAY	10.4	21.0
4	CLAY	10.4	21.0
4	CLAY	10.4	21.0
5	LIMESTONE	21.0	22
5	LIMESTONE	21.0	22
5	LIMESTONE	21.0	22
5	LIMESTONE	21.0	22

Well ID: 1704665
Construction Date: 1993-12-24
Easting: 563016
Northing: 4888589
UTM Zone 17
Positional Accuracy: unknown UTM

Well Depth: 4.27
Well Diameter (cm): 45.7
Water First Found: 3.05
Static Level: 3
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 14
Recommended Pump Rate: 9
Pumping Duration (h:m): 1 : 30

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.61
2	CLAY	0.61	3.05
3	SAND	3.05	4.27

Well ID: 1705035
Construction Date: 1997-06-25
Easting: 562905
Northing: 4889187
UTM Zone 17
Positional Accuracy: unknown UTM

Well Depth: 72.5
Well Diameter (cm): 15.2
Water First Found: 46.6
Static Level: 23
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 14
Recommended Pump Rate: 14
Pumping Duration (h:m): 1 : 30

Layer:	Driller's Description:	Top:	Bottom:

1	TOPSOIL	0	0.30
1	TOPSOIL	0	0.30
1	TOPSOIL	0	0.30
2	SAND	0.30	7.62
2	SAND	0.30	7.62
2	SAND	0.30	7.62
3	GRAVEL	7.62	17.7
3	GRAVEL	7.62	17.7
3	GRAVEL	7.62	17.7
4	SAND	17.7	18.9
4	SAND	17.7	18.9
4	SAND	17.7	18.9
5	SILT	18.9	24.4
5	SILT	18.9	24.4
5	SILT	18.9	24.4
6	CLAY	24.4	42.1
6	CLAY	24.4	42.1
6	CLAY	24.4	42.1
7	GRAVEL	42.1	43
7	GRAVEL	42.1	43
7	GRAVEL	42.1	43
8	LIMESTONE	43	43.9
8	LIMESTONE	43	43.9
8	LIMESTONE	43	43.9
9	SILT	43.9	47.2
9	SILT	43.9	47.2
9	SILT	43.9	47.2
10	SHALE	47.2	59.7
10	SHALE	47.2	59.7
10	SHALE	47.2	59.7
11	SHALE	59.7	61.9
11	SHALE	59.7	61.9
11	SHALE	59.7	61.9
12	SHALE	61.9	72.5
12	SHALE	61.9	72.5
12	SHALE	61.9	72.5

Well ID: 1705498
Construction Date: 2000-05-11
Easting: 563016
Northing: 4888588
UTM Zone 17
Positional Accuracy: unknown UTM

Well Depth: 35.4
Well Diameter (cm): 15.2
Water First Found: 34.4
Static Level: 14
Water Kind Not stated
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 82
Recommended Pump Rate: 68
Pumping Duration (h:m): 1 :

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.30
1	TOPSOIL	0	0.30
2	SAND	0.30	14.6
2	SAND	0.30	14.6
3	SAND	14.6	27.1
3	SAND	14.6	27.1
4	SAND	27.1	28.0
4	SAND	27.1	28.0
5	LIMESTONE	28.0	29
5	LIMESTONE	28.0	29
6	LIMESTONE	29	31.1
6	LIMESTONE	29	31.1
7	LIMESTONE	31.1	35.4
7	LIMESTONE	31.1	35.4

Well ID: 1705499
Construction Date: 2000-05-11
Easting: 563016
Northing: 4888588
UTM Zone 17
Positional Accuracy: unknown UTM

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

Layer:	Driller's Description:	Top:	Bottom:

Well ID: 1705990
Construction Date: 2003-03-17
Easting: 563607
Northing: 4888178
UTM Zone 17
Positional Accuracy: margin of error : 300 m - 1 km

Well Depth: 36
Well Diameter (cm): 15.2
Water First Found: 35.0
Static Level: 20
Water Kind Not stated
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 45
Recommended Pump Rate: 36
Pumping Duration (h:m): 2 : 37

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0	3.66
1	SAND	0	3.66
1	SAND	0	3.66
2	GRAVEL	3.66	14.0
2	GRAVEL	3.66	14.0
2	GRAVEL	3.66	14.0
3	GRAVEL	14.0	17.7
3	GRAVEL	14.0	17.7

3	GRAVEL	14.0	17.7
4	SANDSTONE	17.7	35.0
4	SANDSTONE	17.7	35.0
4	SANDSTONE	17.7	35.0
5	SHALE	35.0	36
5	SHALE	35.0	36
5	SHALE	35.0	36

Well ID: 1706159
Construction Date: 2003-12-09

Easting: 563013
Northing: 4888587

UTM Zone 17
Positional Accuracy: unknown UTM

Well Depth: 37.2
Well Diameter (cm): 15.2
Water First Found: 35.0
Static Level: 23

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

Pump Rate (LPM): 68
Recommended Pump Rate: 55
Pumping Duration (h:m): 1 : 30

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0	0.61
1	TOPSOIL	0	0.61
1	TOPSOIL	0	0.61
1	TOPSOIL	0	0.61
1	TOPSOIL	0	0.61
1	TOPSOIL	0	0.61
2	CLAY	0.61	2.44
2	CLAY	0.61	2.44
2	CLAY	0.61	2.44
2	CLAY	0.61	2.44
2	CLAY	0.61	2.44
2	CLAY	0.61	2.44
3	CLAY	2.44	27.7
3	CLAY	2.44	27.7
3	CLAY	2.44	27.7
3	CLAY	2.44	27.7
3	CLAY	2.44	27.7
3	CLAY	2.44	27.7
4	LIMESTONE	27.7	31.4
4	LIMESTONE	27.7	31.4
4	LIMESTONE	27.7	31.4
4	LIMESTONE	27.7	31.4
4	LIMESTONE	27.7	31.4
4	LIMESTONE	27.7	31.4
5	LIMESTONE	31.4	37.2
5	LIMESTONE	31.4	37.2
5	LIMESTONE	31.4	37.2
5	LIMESTONE	31.4	37.2

5	LIMESTONE	31.4	37.2
5	LIMESTONE	31.4	37.2

Well ID: 1706413
Construction Date: 2005-07-04
Easting: 563729
Northing: 4888869
UTM Zone 17
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 73.2
Well Diameter (cm): 15.9
Water First Found: 71.3
Static Level: 17
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 27
Recommended Pump Rate: 27
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0	4.27
1	SAND	0	4.27
1	SAND	0	4.27
1	SAND	0	4.27
2	CLAY	4.27	10.4
2	CLAY	4.27	10.4
2	CLAY	4.27	10.4
2	CLAY	4.27	10.4
3	CLAY	10.4	30.5
3	CLAY	10.4	30.5
3	CLAY	10.4	30.5
3	CLAY	10.4	30.5
4	LIMESTONE	30.5	40.5
4	LIMESTONE	30.5	40.5
4	LIMESTONE	30.5	40.5
4	LIMESTONE	30.5	40.5
5	SHALE	40.5	46.9
5	SHALE	40.5	46.9
5	SHALE	40.5	46.9
5	SHALE	40.5	46.9
6	SHALE	46.9	73.2
6	SHALE	46.9	73.2
6	SHALE	46.9	73.2
6	SHALE	46.9	73.2

Well ID: 1706482
Construction Date: 2005-10-03
Easting: 563975
Northing: 4889017
UTM Zone 17
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 59.7
Well Diameter (cm): 12.7
Water First Found: 49.7
Static Level: 16
Water Kind
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 50
Recommended Pump Rate: 36
Pumping Duration (h:m): 50 :

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

1	CLAY	0	2.13
1	CLAY	0	2.13
1	CLAY	0	2.13
1	CLAY	0	2.13
1	CLAY	0	2.13
1	CLAY	0	2.13
1	CLAY	0	2.13
1	CLAY	0	2.13
1	CLAY	0	2.13
1	CLAY	0	2.13
1	CLAY	0	2.13
1	CLAY	0	2.13
1	CLAY	0	2.13
1	CLAY	0	2.13
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
2	GRAVEL	2.13	12.2
3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32

3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32
3	CLAY	12.2	32
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
4	SHALE	32	33.5
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1

5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
5	CLAY	33.5	42.1
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
6	GRAVEL	42.1	43
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7
7	CLAY	43	45.7

8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7
8	SHALE	45.7	59.7

Well ID: 7100320
Construction Date: 2008-01-09
Easting: 563942
Northing: 4888984
UTM Zone 17
Positional Accuracy: margin of error : 10 - 30 m

Well Depth: 54.3
Well Diameter (cm): 15.2
Water First Found: 51
Static Level: 13
Water Kind Not stated
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 22
Recommended Pump Rate: 22
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0	6.12
2	CLAY	6.12	22.9
3	SAND	22.9	25.9
4	CLAY	25.9	35.0
5	SHALE	35.0	54.3

Well ID: 7100321
Construction Date: 2008-01-09
Easting: 563938
Northing: 4888980
UTM Zone 17
Positional Accuracy: margin of error : 10 - 30 m

Well Depth: 29.9
Well Diameter (cm): 15.2
Water First Found: 27
Static Level: 8
Water Kind
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	SAND	0	3
2	SAND	3	20.1
3	LIMESTONE	20.1	29.9

Well ID: 7140973
Construction Date: 2010-03-04
Easting: 563823
Northing: 4888528
UTM Zone 17
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 29.3
Well Diameter (cm): 15.2
Water First Found: 13.1
Static Level: 9
Water Kind Untested
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	SAND	0	1.21
1	SAND	0	1.21
2	CLAY	1.21	4.26
2	CLAY	1.21	4.26
3	GRAVEL	4.26	7.01
3	GRAVEL	4.26	7.01
4	SHALE	7.01	7.6
4	SHALE	7.01	7.6
5	GRAVEL	7.6	8.53
5	GRAVEL	7.6	8.53
6	SHALE	8.53	9.75
6	SHALE	8.53	9.75
7	LIMESTONE	9.75	22.3
7	LIMESTONE	9.75	22.3
8	SHALE	22.3	29.3
8	SHALE	22.3	29.3

Well ID: 7188688
Construction Date: 2012-10-04
Easting: 562944
Northing: 4888489
UTM Zone 17
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 44.2
Well Diameter (cm): 15.2
Water First Found: 36.9
Static Level: 22
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 36
Recommended Pump Rate: 36
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	5.49
1	CLAY	0	5.49
1	CLAY	0	5.49
1	CLAY	0	5.49
2	GRAVEL	5.49	16.8
2	GRAVEL	5.49	16.8
2	GRAVEL	5.49	16.8
2	GRAVEL	5.49	16.8
3	CLAY	16.8	27.7
3	CLAY	16.8	27.7
3	CLAY	16.8	27.7
3	CLAY	16.8	27.7
4	LIMESTONE	27.7	37.5

4	LIMESTONE	27.7	37.5
4	LIMESTONE	27.7	37.5
4	LIMESTONE	27.7	37.5
5	LIMESTONE	37.5	43.6
5	LIMESTONE	37.5	43.6
5	LIMESTONE	37.5	43.6
5	LIMESTONE	37.5	43.6
6	SHALE	43.6	44.2
6	SHALE	43.6	44.2
6	SHALE	43.6	44.2
6	SHALE	43.6	44.2

Well ID: 7199023
Construction Date: 2013-03-20

Easting: 562832
Northing: 4888384

UTM Zone 17
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 46.3
Well Diameter (cm): 15.2
Water First Found: 43.3
Static Level: 22

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

Pump Rate (LPM): 36
Recommended Pump Rate: 36
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	SILT	0	8.53
1	SILT	0	8.53
1	SILT	0	8.53
1	SILT	0	8.53
2	SAND	8.53	26.5
2	SAND	8.53	26.5
2	SAND	8.53	26.5
2	SAND	8.53	26.5
3	CLAY	26.5	32.3
3	CLAY	26.5	32.3
3	CLAY	26.5	32.3
3	CLAY	26.5	32.3
4	LIMESTONE	32.3	38.1
4	LIMESTONE	32.3	38.1
4	LIMESTONE	32.3	38.1
4	LIMESTONE	32.3	38.1
5	LIMESTONE	38.1	46.0
5	LIMESTONE	38.1	46.0
5	LIMESTONE	38.1	46.0
5	LIMESTONE	38.1	46.0
6	SHALE	46.0	46.3
6	SHALE	46.0	46.3
6	SHALE	46.0	46.3
6	SHALE	46.0	46.3

Well ID: 7246259
Construction Date: 2015-08-10

Easting: 562823
Northing: 4888398

UTM Zone 17
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 45.1
Well Diameter (cm): 15.9
Water First Found: 33.5
Static Level: 20

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

Pump Rate (LPM): 18
Recommended Pump Rate: 18
Pumping Duration (h:m): 2 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	11.3
1	CLAY	0	11.3
1	CLAY	0	11.3
1	CLAY	0	11.3
2	CLAY	11.3	25.6
2	CLAY	11.3	25.6
2	CLAY	11.3	25.6
2	CLAY	11.3	25.6
3	LIMESTONE	25.6	29.3
3	LIMESTONE	25.6	29.3
3	LIMESTONE	25.6	29.3
3	LIMESTONE	25.6	29.3
4	LIMESTONE	29.3	45.1
4	LIMESTONE	29.3	45.1
4	LIMESTONE	29.3	45.1
4	LIMESTONE	29.3	45.1

Well ID: 7273758
Construction Date: 2016-10-21

Easting: 563021
Northing: 4888537

UTM Zone 17
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 79.3
Well Diameter (cm): 12.7
Water First Found: 73.5
Static Level: 21

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

Pump Rate (LPM): 45
Recommended Pump Rate: 45
Pumping Duration (h:m): 3 :

Layer:	Driller's Description:	Top:	Bottom:
1	SAND	0	2.44
1	SAND	0	2.44
1	SAND	0	2.44
2	GRAVEL	2.44	25.3
2	GRAVEL	2.44	25.3
2	GRAVEL	2.44	25.3
3	LIMESTONE	25.3	36.9
3	LIMESTONE	25.3	36.9
3	LIMESTONE	25.3	36.9
4	LIMESTONE	36.9	41.8
4	LIMESTONE	36.9	41.8
4	LIMESTONE	36.9	41.8
5	SHALE	41.8	67.4

5	SHALE	41.8	67.4
5	SHALE	41.8	67.4
6	ROCK	67.4	75
6	ROCK	67.4	75
6	ROCK	67.4	75
7	SHALE	75	79.3
7	SHALE	75	79.3
7	SHALE	75	79.3

Well ID: 7285247
Construction Date: 2017-04-13
Easting: 562914
Northing: 4888329
UTM Zone 17
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 43.3
Well Diameter (cm): 15.2
Water First Found: 39.9
Static Level: 22
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 32
Recommended Pump Rate: 32
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	3.66
1	CLAY	0	3.66
2	CLAY	3.66	22.9
2	CLAY	3.66	22.9
3	CLAY	22.9	30.2
3	CLAY	22.9	30.2
4	LIMESTONE	30.2	43.3
4	LIMESTONE	30.2	43.3

Well ID: 7311464
Construction Date: 2018-05-18
Easting: 563054
Northing: 4888378
UTM Zone 17
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 43.3
Well Diameter (cm): 15.2
Water First Found: 39.3
Static Level: 21
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 55
Recommended Pump Rate: 45
Pumping Duration (h:m): 1 :

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0	5.18
1	CLAY	0	5.18
1	CLAY	0	5.18
1	CLAY	0	5.18
2	SAND	5.18	22.6
2	SAND	5.18	22.6
2	SAND	5.18	22.6
2	SAND	5.18	22.6
3	CLAY	22.6	25.3
3	CLAY	22.6	25.3
3	CLAY	22.6	25.3
3	CLAY	22.6	25.3
4	LIMESTONE	25.3	43.3

4	LIMESTONE	25.3	43.3
4	LIMESTONE	25.3	43.3
4	LIMESTONE	25.3	43.3

Appendix G

Nitrate and Water Balance Calculations

CAMBIUM

Nitrate Attenuation

Calculations for Rural Developments

Input Data	Computed Values

Areas	Total
LOT AREA (m^2)	102,000

Surplus water

0.479	m/yr
0.001313	m/day
133.936292	m^3/day

Infiltration Factor

Rolling Land	0.2
Sandy Loam	0.4
Cultivated land	0.1
Total	0.7

Infiltrated water

0.00091917	m/day
93.7554045	m^3/day

Runoff 40.18088765 m^3/day

Concentrations at Site Boundary

	26 Lots
Qe	26,000
Ce	40
Qi	93,755
Ci	0.1
Qt	119,755
mg/L	**8.76**