Hydrogeological Investigation – 152 & 156 Miller Drive, City of Barrie, ON – Revision 1

May 15, 2024

Prepared for:
2609216 Ontario Inc.

Cambium Reference: 9089-002

CAMBIUM INC.

866.217.7900

cambium-inc.com

Table of Contents

List of Tables

List of Appended Figures

List of Appendices

1.0 Introduction

Cambium Inc. (Cambium) was retained by 2609216 Ontario Inc (the Client) to complete a hydrogeological investigation in support of the development of a proposed residential subdivision at 152 & 156 Miller Drive, City of Barrie, Ontario (herein referred to as Site).

The property is currently a predominantly vacant, “T” shaped Site, with sloping topography, generally falling towards the northwest and southeast property extents, and is approximately 1.44 hectares (ha) or 3.56 acres in size. At the time of the investigation, the eastern portion of the property contained two residential homes, with the remainder of the Site being undeveloped and consisting of a mixture of open field and medium mixed forest. Wet areas without any standing water were noted at the northwest and southeast property extents with deposits of organic soils.

Cambium understands that the proposed residential development consists of four detached single-family dwellings, and ten blocks of attached townhomes consisting of fifty-four total units. It is assumed that each dwelling will have an individual basement level. The development also includes internal roadways and parking areas.

Hydrogeological investigation is required as part of the application process of Draft Subdivision Plan and Site Plan Approval for the proposed residential development.

1.1 Scope of Work

This hydrogeological investigation was conducted with the following tasks:

- **Review of available background information**: a review of available geological and hydrogeological information for the Site and surrounding areas and the previous investigation reports completed for the Site, was conducted to provide background information to allow for characterization of the Site’s soil and groundwater conditions.
- **Detailed site inspection**: an inspection of the Site was completed to review existing site conditions including identification of any hydrogeological features such as significant areas of potential groundwater recharge or areas of groundwater discharge.

- **Measurement of groundwater levels:** groundwater levels were measured in the existing monitoring wells to establish and/or confirm the general groundwater flow condition and to assess the groundwater elevations.
- **Soil Infiltration Assessment:** Results of surficial soil testing completed during the geotechnical investigation across the Site were utilized to characterize the infiltration rate of the shallow surficial soils (i.e., within approximately 0.5 mbeg). The data will support the design and placement of Low Impact Development (LID) measures, as needed at the Site.
- **Single Well Response Test (SWRT):** two existing monitoring wells were hydraulically tested to calculate the hydraulic conductivity of the native soils to estimate potential dewatering rates.
- **Water Balance (Preliminary):** a preliminary water balance study was completed for the proposed development using the Thornthwaite-Mather approach and the climatic data obtained from Environment Canada.
- **Source Water Protection:** an assessment of source water protection issues identified at the Site was reviewed and appropriate recommendations provided.

Source Protection Policies (SPP) including RLU-1 (Notice 59 to proceed from Risk Management Official), DNAPL-1 (policy related to drinking water quality threat) and Salt (ICA)-2 (related to handling and storage of road salt) will apply to the Site. As such, SPP policies are addressed in the report (Section 8.0).

It should be noted that a geotechnical investigation was completed at the Site by Cambium in 2019 (Cambium, 2019). The data or information obtained in this former investigation has been incorporated into this hydrogeological investigation report.

The proposed development lots will have water and wastewater services provided by the City of Barrie.

The proposed development constitutes a major development as defined by the Lake Simcoe Protection Plan (LSPP) and is subjected to provide a detailed water balance and hydrogeological report. The proposed development plan is included in Appendix A.

1.2 Site Description

The Site is bound to the east by residential subdivision and by Miller Drive and surrounded by open lands with treed areas to the north, west and south.

The regional location of the Site is outlined on Figure 1, the property and surrounding areas outlined on Figure 2.

2.0 Environmental Features

To assess environmental features, various databases maintained by the Ministry of Natural Resources and Forestry (MNRF), the Ministry of Environment, Conservation and Parks (MECP), and the Nottawasaga Valley Conservation Authority (NVCA) were reviewed.

The Site is situated within the City of Barrie municipal limits and falls under the authority of the NVCA. The Site falls within the Bear Creek – Nottawasaga River subwatershed within the Nottawasaga River watershed. As per NVCA mapping, the majority of the Site is located within a regulated area (O.Reg 172/06; Figure 3); as such, regulation area development restrictions apply to the proposed development..

As per MNRF Natural Heritage System database, the Site is not located in a significant natural area or area of natural and scientific interests (ANSIs). From the provincial mapping (Appendix A), an unevaluated wetland is noted within the northwestern corner of the Site. This unevaluated wetland extends off-site, immediately adjacent to the western boundary of the Site and extends down south of the Site. A provincially significant wetland (PSW) is located approximately 200 m west of the Site, adjacent to the unevaluated wetland (MNRF, 2024). Cambium personnel noted that low lying areas in the northwest and southern portions of the property had no standing water during the site visits.

As shown on the MECP Source Water Protection Atlas map, the Site is in the following areas:

- Wellhead Protection Area C (WHPA-C);
- Wellhead Protection Area Q1 and Q2 (WHPA-Q1/Q2) with low stress level;
- A Highly Vulnerable Aquifer (HVA) area with a vulnerability score of 6;
- Significant Groundwater Recharge Area (SGRA) with a score of 6; and
- Issue Contributing Area (ICA) with chloride as a contaminant.

3.0 Physical Setting

3.1 Topography and Drainage

According to the regional topographic map of the area (Appendix A), the Site slopes generally to the south-southwest, with the elevations ranging from approximately 240 meters above sea level (masl) in the northeast to about 238 masl in the south.

A topographic survey was completed by Dino Astri Surveying Ltd. in 2019 for the Site (see Appendix A). The highest elevation was measured in the eastern portion at approximately 243 masl, sloping downwards to the southwest to an elevation of approximately 236 masl. Therefore, the total relief of the area is about 7 m.

The Site is situated within the Bear Creek – Nottawasaga River subwatershed. Surface drainage at the Site is expected to follow local topography and discharge off-site to the south, into the provincially mapped unevaluated wetland.

3.2 Physiography

According to Chapman and Putnam (1984), the Site is located at the boundary of the Simcoe Uplands and Simcoe Lowlands physiographic regions. The Simcoe Uplands generally consist of the topographic highs, rising up to 100 m above the adjacent Simcoe Lowlands. The Simcoe Lowlands were flooded by glacial Lake Algonquin, and as a result, are floored by sand, silt, and clay.

3.3 Overburden Geology

The surficial geology at the Site was characterized as ice-contact stratified deposits consisting mainly of sand and fine silt with varying amounts of gravel, with high infiltration capacity (Data Set 14 - Revised from the Ontario Geological Survey (OGS, 2000)).

3.4 Bedrock Geology

According to Miscellaneous Release – Data 219 from the Ontario Geological Survey (OGS, 2007), the bedrock can be characterized as being from the Paleozoic Era, belonging to the

Middle Ordovician Simcoe Group, consisting primarily of limestone, dolostone, shale, arkose, and sandstone. The Simcoe Group consists of four formations that dip gently towards the southwest; Gull River Formation, Bobcaygeon Formation, Verulam Formation, and the Lindsay Formation from oldest to youngest. Verulam Formation outcrops along the shoreline of Kempenfelt Bay and extends west of the City of Barrie and ranges in thickness from 32 to 65 m and consists of fossiliferous limestone with inter-beds of calcareous shale.

4.0 MECP Well Records

Water well records on file with the Ministry of the Environment, Conservation and Parks (MECP) served as a data source for this hydrogeological assessment. The well locations were provided from the MECP interactive water well record database. According to the well records, there appears to be 17 wells within a 500 m radius around the property and were installed between the years 1952 and 2010. The locations of the recorded water wells are shown on Figure 4 and the well records are included in Appendix B.

A thick layer of overburden materials is reportedly present in the study area based on the details in the well records. Overburden consists mainly of sand and clay with fine silt and gravel.

Well depths ranged from as shallow as 7.3 metres below ground surface (mbgs) to as deep as 110.3 mbgs. Shale bedrock was encountered at a depth of 108.6 mbgs in well No. 5714853, with the well installed to a total depth of 110.3 mbgs.

Water well record no. 5714853 was installed for water supply but abandoned due to insufficient supply and all the other wells were recorded as test holes, observation wells, abandoned wells or decommissioned wells.

5.0 Borehole and Monitoring Well Installation

During the geotechnical investigation completed at the Site between May 21 and 22, 2019 (Cambium, 2019), a total of 14 boreholes were completed. The boreholes were designated as BH101-19 through BH114-19, and each borehole was terminated at a depth of 5.0 mbgs. Caving (sloughing) was encountered in 12 of the boreholes.

The borehole locations and elevations were surveyed using a Sokkia RTK GPS system. The borehole elevations were tied to geodetic elevations referencing a known benchmark.

Two boreholes identified as BH110-19 and BH114-19 were completed as monitoring wells.

Figure 5 depicts the locations of boreholes and monitoring wells completed by Cambium. The observed soil stratigraphy and the details of monitoring wells installed by Cambium are presented in the borehole logs included in Appendix C. The subsurface conditions at the Site consist of a surficial layer of topsoil overlying brown sandy deposits with trace amounts of silt, clay, and gravel to the termination depths of 5.0 mbgs. The boreholes were terminated in native soils and bedrock was not encountered within the explored depths.

5.1 Physical Laboratory Testing

Physical laboratory testing, including three sieve and hydrometer analyses (LS-702, 705), was completed on selected soil samples to confirm the soil texture. The results are presented in Table 1 and are included in Appendix D.

Table 1 Particle Size Distribution

Sample	Depth (mbgs)	Soil	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Percolation Time (min/cm)
BH101-19	1.5 – 2.0	Sand trace Silt trace Clay	0	93	7		7
BH108-19	2.3 – 2.7	Sand trace Silt trace Gravel trace Clay	4	88	8		6
BH114-19	0.6 – 1.2	Sand some Silt trace Clay	0	83	17		8

As per the data above, the percolation times (T) ranged from 6 min/cm to 8 min/cm, with a geometric average of 7 min/cm, indicating soils with good drainage.

5.2 Groundwater Levels

Groundwater levels were measured in all the installed monitoring wells (BH110-19 and BH114-19) by Cambium on five occasions. The recorded groundwater levels are presented in Table 2 below.

Table 2 Measured Groundwater Details

Well		BH110-19	BH114-19
Top of Pipe Elevation (masl)		236.81	241.85
Ground Surface Elevation (masl)		235.73	240.94
Stick-up (m)		1.08	0.91
May 28, 2019	Water Level (mbgs)	0.10	4.49
	Groundwater Elev.(masl)	235.63	236.45
May 25, 2020	Water Level (mbgs)	0.13	4.49
	Groundwater Elev.(masl)	235.60	236.45
June 23, 2021	Water Level (mbgs)	0.86	4.49
	Groundwater Elev.(masl)	234.87	236.45
April 5, 2024	Water Level (mbgs)	0.10	4.33
	Groundwater Elev.(masl)	235.63	236.61
May 3, 2024	Water Level (mbgs)	0.11	4.29
	Groundwater Elev.(masl)	235.62	236.65

As presented above, the measured groundwater levels in the monitoring wells during the spring months (April to June), ranged in depth from as shallow as 0.10 mbgs in the southwestern part of the Site to as deep as 4.49 mbgs in the north, and the elevations ranged from 234.87 masl to 236.65 masl. The wide variation in depth to water levels can be attributed to the ground elevation differences across the Site.

It is noted that water levels did not fluctuate significantly at BH114-19 throughout any of the months, but that a larger water level fluctuation was noted for BH110-19 from April/May conditions to drier June conditions. As BH110-19 is at a lower elevation, fluctuations in

groundwater (with shallowest groundwater recorded during the spring months) is to be expected.

A long-term four-season water level monitoring is on-going and a letter report discussing the water level fluctuations and seasonal variations will be submitted after the conclusion of the program.

5.3 Inferred Groundwater Flow Direction

As only two monitoring wells were installed at the Site, groundwater contours could not be accurately interpreted. Based on the water table elevation data obtained from the monitoring events and the location of the unevaluated wetland, groundwater flow within the shallow unconfined aquifer was interpreted to flow to the south, where it is interpreted to discharge to surface into the unevaluated wetland.

5.4 In-Situ Hydraulic Conductivity Tests

Single well response tests (slug tests) were completed on the two on-site monitoring wells to determine the hydraulic conductivity (k-value) of the soils. The slug tests were conducted on June 23, 2021, as part of this hydrogeological study. A rising head test was performed in the existing monitoring well BH110-19; monitoring well BH114-19 did not have enough water to perform the test.

The hydraulic conductivity was estimated utilizing Aquifer Test Pro software utilizing the Hvorslev method. The field measurements of the slug test and the calculations are provided in Appendix E. The estimated hydraulic conductivity at BH110-19 was 1.24×10^{-6} m/sec, typical values for sand with trace silt.

6.0 Construction Dewatering Requirements

The proposed residential development consists of 4 detached single-family dwellings and ten blocks of attached townhomes with 54 total units. It is assumed that each dwelling will have an individual basement level. The development also includes municipal water and wastewater services; therefore, the installation of linear infrastructure also has the potential for short-term construction dewatering.

As per the grading plan provided (Appendix A) and correspondence with the Client, it is known that the depth of the basement is dependent on what model of dwelling is proposed for each block (i.e. split level, walkout, lookout, etc.); however, it is known that no full depth basements are proposed. It is also known that fill materials will be imported in select areas of the Site to raise the grade to ensure that basement level can be accommodated above the water table so no dewatering activities will be required.

Groundwater depths vary greatly across the Site due to varying surficial topography. Deeper groundwater conditions were encountered at BH114-19, with a spring maximum groundwater elevation of 236.65 masl. Based on the proposed grade elevations (Appendix A) of each dwelling in the northern, western, and central portions of the Site, short-term dewatering for the installation of the partial basements is not expected. It is known that spring groundwater elevations are close to ground surface in the southern corner of the Site, at a maximum of 235.63 masl. The dwellings in this area of the Site are walk-out basements, and the lowest elevation of each dwelling is provided on the grading plan. A review of the measured spring groundwater elevations and the walkout basement elevations, short-term dewatering is not anticipated for the installation of the dwellings in the southern corner of the Site.

Additionally, it is known that linear infrastructure is required to be installed at the Site to provide water and wastewater services. A detailed servicing plan was not provided at the time of this report's preparation; however, based on the surface grade of the internal roadways along the sanitary and sewer alignment and the presumed depth of linear infrastructure, short-term dewatering is not anticipated for the installation of linear infrastructure.

Cambium recommends planning the construction schedules during peak summer or early autumn seasons during the seasonal drought period so as to minimize any potential dewatering activity at the Site.

7.0 Water Balance Assessment

Following the Thornthwaite and Mather methodology (1957), a water balance is an accounting of water in the hydrologic cycle. Precipitation (P) falls as rain and snow. It can run off towards lakes and streams (R), infiltrate to the groundwater table (I), or evaporate from ground or be transpired by vegetation (ET). When long-term average values of P, R, I, and ET are used, there is minimal or no net change to groundwater storage (ΔS) in a steady-state system.

The annual water budget of a site can be expressed as:

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

Where:

P = Precipitation (mm/year)

ET = Evapotranspiration (mm/year)

R = Run-off (mm/year)

I = Infiltration (mm/year)

ΔS = Change in groundwater storage (taken as zero) (mm/year)

The calculations presented here compare the pre- and post-development water balance changes within the Site boundaries as a result of the proposed development. It is noted that the water balance described herein does not account for catchment areas that extend off-site.

At the time of the investigation, the eastern portion of the property contained two residential homes, the remainder of the site was undeveloped and consisted of a mixture of open field and medium mixed forest. The proposed residential development consists of four detached single-family dwellings, and ten blocks of attached townhomes with fifty-four total units. The development also includes internal roadways and parking areas. The pre- and post-development plans are shown in Figure 6 and Figure 7, respectively.

Based on the available design information, the pre- and post-development Site coverage can be generally categorized into three types: paved areas, roof areas, and landscaped areas. A detailed landscape plan was not available at the time of this report. However, based on the

Site statistics provided by the client, a summary of the surface areas of the development is listed in Table 3:

Table 3 Pre- and Post-Development Statistics

Type of Land Coverage	Pre-Developments Areas (m^2)	Post Development Areas (m^2)
Paved Area	394	4,219
Roof Area	423	5,093
Landscaped Area	13,615	5,120
Total (m^2)	**14,432**	**14,432**

7.1 Water Surplus

Water surplus is calculated by determining the difference between precipitation and evapotranspiration at a Site over the course of a year (changes in soil water storage were assumed to be negligible). The volume of water surplus is further sub-divided into portions that either infiltrate the on-site soils or directed off-site as runoff.

The climatic data, including monthly average temperature and precipitation from 1991 to 2020, were obtained from Environment Canada for Barrie WPCC (Climate ID: 6110557), located about 4 km distance from the Site. Accordingly, the average annual evapotranspiration was estimated to be about 535 mm/year using the USGS Thornthwaite Monthly Water Balance methodology (Appendix F), and the average annual precipitation was recorded to be 933 mm/year. Therefore, the water surplus of the Site was calculated to be 398 mm/yr.

Transpiration does not occur from structures, paved areas, or hard gravel surfaces. It was assumed that 10% of precipitation falling on these surfaces is lost directly to evaporation. The remaining depth (i.e., 90% of precipitation) was considered as surplus and converted to runoff.

7.2 Infiltration Rate

The volume of surplus water that infiltrates through pervious surfaces on-site was determined by applying an infiltration factor to the surplus depth. The surplus water that does not infiltrate into pervious surfaces will leave the Site as surface water runoff. The infiltration factor varies

from 0 to 1 and is estimated based on topography, soils, and vegetation cover as per the *Stormwater Management Planning and Design Manual* (MOE, 2003).

The rate of infiltration at a Site is expected to vary, based on a number of factors to be considered in any infiltration model. To partition the available water surpluses into infiltration and surface run-off, the MECP infiltration factor was used. The MECP *Stormwater Management Planning and Design Manual* (MOE, 2003) methodology for calculating total infiltration based on topography, soil type and land cover was used, and a corresponding run-off component was calculated for the soil moisture storage conditions. The infiltration factor calculated for the Site is included in Table 4.

Table 4 Infiltration Factor

Category	Infiltration Factor
Topography	Rolling land = 0.20
Soils	Sandy loam = 0.35
Cover	Woodland and cultivated land = 0.15
Total	**0.70**

The calculation of infiltration and runoff in the stages of pre-development and post-development is provided in Appendix F, and are presented in Table 5 through Table 8, below. All the numbers were rounded off to the nearest integer.

7.3 Pre-Development Water Balance

The water balance for the existing conditions of the Site is summarized in Table 5. The pre-development infiltration rate was calculated to be 3,793 m^3/yr and the runoff rate was 2,312 m^3/yr.

Table 5 Pre-Development Water Balance

Land Use		Area (m^2)	Precipitation (m^3)	Evapo-transpiration (m^3)	Infiltration (m^3)	Run-off (m^3)
Impervious Areas	Paved Area	394	368	37	-	331
	Roof Area	423	395	39	-	355
Pervious Area	Landscaped Area	13,615	12,703	7,284	3,793	1,626
Total		**14,432**	**13,465**	**7,360**	**3,793**	**2,312**

Assuming no infiltration occurring in paved and roof areas, and 10% of precipitation to be evaporated from paved and roof areas.

7.4 Post-Development Water Balance

The post-development water balance is summarized in Table 6. The post-development infiltration rate was calculated to be 1,426 m^3/yr and the runoff volume was 8,431 m^3/yr.

Table 6 Post-Development Water Balance

Land Use		Area (m^2)	Precipitation (m^3)	Evapo-transpiration (m^3)	Infiltration (m^3)	Run-off (m^3)
Impervious Areas	Paved Area	4,219	3,936	394	-	3,543
	Roof Area	5,093	4,752	475	-	4,277
Pervious Area	Landscaped Area	5,120	4,777	2,739	1,426	611
Total		14,432	13,465	3,608	1,426	8,431

Assuming no infiltration occurring in paved and roof areas, and 10% of precipitation to be evaporated from paved and roof areas.

7.5 Water Balance Comparison

The water balances of the pre-development and post-development scenarios are summarized below in Table 7.

Table 7 Comparison of Pre- and Post Development Water Balance

	Precipitation (m^3)	Evapotranspiration (m^3)	Infiltration (m^3)	Run-off (m^3)
Pre-Development	13,465	7,360	3,793	2,312
Post-Development	13,465	3,608	1,426	8,431
Change in Volume	-	- 3,752	- 2,367	6,119
Change in %	-	- 51	- 62	265

According to the above results, there is an infiltration deficit of 2,367 m^3/year compared to the pre-development infiltration. The runoff rate upon development of the Site was increased by 6,119 m^3/year.

As shown below in Table 8, approximately 55% of roof runoff is required to compensate the pre-development infiltration.

Table 8 Requirement of Infiltration from Roof Run-off

Volume of Pre-Development Infiltration (m^3/year)	3,793
Volume of Post-Development Infiltration (m^3/year)	1,426
Deficit from Pre to Post-Development Infiltration (m^3/year)	2,367
% of Roof Runoff required to match the Pre-Development Infiltration	55

Following the above calculations, a summary of the water balance could be provided as follows:

1. There is a net increase in run-off at the Site of 6,119 m^3/year, from 2,312 m^3/year to 8,341 m^3/year. This increase is a result of the development of the Site with more impervious areas such as roof and paved areas and decrease in pervious areas.
2. Post-development landscape area was decreased by about 8,495 m^2, when compared to the pre-development landscape, causing less infiltration and more run-off across the Site.
3. Without implementing any mitigation measures, there is a net deficit of 2,367 m^3/year in the post-development infiltration on a yearly basis.

4. Based on the estimation, a diversion of 55% of general roof water for infiltration would allow the proposed development to maintain an enhanced infiltration after the development. Therefore, Cambium would recommend the implementation of any Low Impact Development (LID) measures at the Site in its present design, in order to compensate the infiltration deficit caused due to the Site development.

7.6 Discussions on LID Measures

It is known that low impact development (LID) practices have received increasing attention as these strategies attempt to capture the runoff and mimic the natural hydrologic cycle.

In general, there are two primary categories of LIDs. The first promotes the infiltration of stormwater close to the source, besides reducing runoff and to improve the water quality. These infiltration type LIDs are preferred when hydrogeological and physical conditions are optimal and allow for their emplacement. The proposed development does not include a stormwater management pond; therefore, the second option described below should also be considered.

The second option captures and slowly releases the water to the groundwater system through the process of storage and filtration by infiltration LIDs. Infiltration targets may be achieved through the incorporation of a variety of stormwater management practices including reduced lot grading, roof downspout disconnection, roof leaders discharging to ponding areas or soak away pits, infiltration trenches, grassed swales etc.

The conceptual water balance indicates that there will be an infiltration deficit of about 2,367 m^3/year in the post-development infiltration upon development of the Site, compared to the pre-development. Based on the estimation, a diversion of 55% of the general roof water for infiltration would allow the proposed development to maintain an enhanced infiltration after the development.

Given the proposed lot design by the proponent and based on relatively deep-water table conditions in the northern half of the property, the implementation of LID features is feasible in this area of the Site. However, LID measures are not feasible in the south and southeastern

corner where groundwater levels are shallow. Downspout disconnection is a better method for the implementation of LID measures in the northern part of the Site. It should be noted that the minimum distance between the invert elevation of a LID feature such as infiltration trench and the maximum elevation of the water table should be 1.0 m. As Cambium does not provide design of LID facilities, it would be beneficial to consult with stormwater engineers for the LID design recommendations.

8.0 Source Water Protection and Risk Management

As per the South Georgian Bay Lake Simcoe Source Protection Plan (SBSLS SPR, 2021), the Subject Site is located in the following vulnerable areas and shown in respective figures:

- Wellhead Protection Area C (WHPA-C) (Figure 8).
- WHPA Q1/Q2 with low stress, related to groundwater recharge management (Figure 9).
- Highly Vulnerable Aquifer (HVA) with a vulnerability score of 6 (Figure 10).
- Issues Contributing Area (ICA) with chloride as contaminant (Figure 11) and a
- Significant Groundwater Recharge Area (SGRA)

Land Use Planning (LUP) Policies to manage or eliminate a threat activity were implemented through land use planning decisions (such as Official Plans, Zoning By-laws, and Site Plan Controls). Also, as per Section 58 of the Clean Water Act, a risk management plan should be developed to ensure that the threat to drinking water ceases to be significant.

The following Source Protection policies are applicable to the Site, including the Restricted Land Use (RLU-1) policy to ensure that activities in the designated area are assessed for their potential risk, and:

DNAPL-1: Property is located in Wellhead Protection Area C (5-year travel time) and RLU prohibits the future handling and storage of dense non-aqueous phase liquids (DNAPL-1) in any quantity (excluding incidental volumes for personal/domestic use) on the property.

Although the Site is located within WHPA-C, there is no DNAPL source present on-site and therefore, a ‘Contaminant Management Plan’ is not required. Also, as far as the Site use is concerned, there will not be any storage or handling of DNAPL’s at the Site, other than for personal/domestic use and therefore, the RLU-1 Policy is not applicable to the Site or proposed activities on the site.

SALT (ICA)-3: Handling and storage of road salt is a significant drinking water threat and therefore a Risk Management Plan (RMP) and a notice to proceed will be required.

As per the South Georgian Bay and Lake Simcoe Source Protection Plan, the SALT-(ICA)-3 is categorised as *Threat 12 and13: Application, Handling and Storage of Road Salt - issues contributing area.*

The ICA's specific to sodium and chloride were delineated under the Clean Water Act (2006). The issues contributing areas are the land areas where road salt has already affected drinking water supplies and that the elevated level of sodium and chloride in the source water are attributed to the road salt-related activities. Therefore, a reduction in winter salt application is required to mitigate anticipated chloride increases in local watercourses as well as water supply aquifers.

The proposed development is for independent residential lots and therefore, storage and handling of large quantities of road salt does not arise. Therefore, the development of Salt Management Plans is not required for the proposed development.

Best management practices for general use should be encouraged which could include the use of better salt application technologies such as electronic spreader controllers, anti-icing, and pre-wetting which would prevent ice formation and lead to reduced use of salt and therefore its environmental impacts.

8.1 Groundwater Recharge Management (WHPA-Q).

WHPA-Q or Recharge Management Area (WHPA-Q/RMA) are identified to ensure a sustainable supply of groundwater. RMA was identified through a water quantity risk assessment study considering the drought, future water demand, land-use change and population growth. Accordingly, the Site falls within a WHPA-Q/RMA.

A climate-based water balance assessment was completed for the pre- and post-development scenarios for the Site as described in Section 7.0. A climate-based water balance assessment is the first step to identify the post-development infiltration deficit and then utilize the Best Management Practices (BMPs) to minimize the reduction in groundwater recharge.

Accordingly, as per the water balance assessment completed above, it was estimated that there is a net infiltration deficit between the pre- and development scenarios in the order of

about 2,367 m^3 /annum. This infiltration deficit should be compensated for through the use of LID/infiltration features.

The proposed development does not involve any long- term or short-term dewatering and therefore, reduction to ground water supplies was not expected.

The preferred solution for recharge management is always for the post-development infiltration deficit to be mitigated during the development process. Surficial soils are relatively permeable for the infiltration to occur. Therefore, we recommend exploring all the lot level BMPs such as downspout disconnection or any other suitable measures at feasible locations to encourage the roof run-off infiltration in order to mitigate the estimated infiltration deficit.

8.2 Highly Vulnerable Aquifer

Highly Vulnerable Aquifer (HVA)are aquifers that are more sensitive to contamination. In general, a HVA will consist of granular materials (e.g., sand and/or gravel) or fractured rock that has a high permeability and is near the surface of the ground.

Site exists in an area of groundwater vulnerability with a score of 6 and threat activities are moderate, but not significant. Therefore, the land use practices at the proposed development Site are not expected to cause any contamination to the potable ground supplies. The Site will be under municipal sewage service and as such is not expected to cause any groundwater contamination by nitrates.

8.3 Significant Groundwater Recharge Area (SGRA)

Significant Groundwater Recharge Area (SGRA)exist in areas where water from surface more easily infiltrates the ground to recharge an aquifer that is used for municipal or other drinking water supplies. Under the Clean Water Act, 2006, an SGRA helps maintain the water level in an aquifer that supplies drinking water (including to private wells) and has higher than average recharge comparatively across the Source Protection Area.

As the development will create more impervious areas across the Site causing a reduction in infiltration, we recommend implementing lot level LID measures where practicable.

9.0 Assessment of Potential Impacts

As discussed, there is no construction dewatering required based on the nature of the development proposed at the Site. The potential impacts due to the Site development were assessed as follows.

9.1 Natural Features

As discussed, an unevaluated wetland is mapped in the northwestern portion of the Site, which also runs adjacent to the western boundary of the Site and to the South of the Site. Therefore, as per Ont. Reg. 172/06. (Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses), set-back distances or buffer zones as prescribed by NVCA should be followed to protect the natural features.

By implementing additional lot level infiltration recommended in Section 7.6, there will be no net loss in groundwater recharge; therefore any potential off-site impacts to natural features will be negligible.

9.2 Water Supply Wells near the Site

Given that no dewatering activities should be required and groundwater recharge should be retained (assuming recommendations in Section 7.5 are followed), potential impacts to surrounding water wells (private or public), if any, are not anticipated. Moreover, it is assumed that all the properties surrounding the Site are under municipal water and wastewater service and as such no impacts are anticipated on the groundwater regime.

9.3 Considerations on Drinking Water Vulnerability

As the Site is identified to include numerous groundwater vulnerable areas, the best management practices as discussed in Section 8.0 should be implemented across the Site to reduce water quality and quantity impacts on the municipal water supply aquifers.

Given that the Site is in an urbanized area, it’s assumed that the neighbouring properties would be relying on the City’s water supply. The proposed development may reduce the pervious area at the Site, which would result in decreased infiltration into subsurface and

decrease in groundwater recharge. There is a net deficit in post-development water balance due to the Site development, ultimately reducing the groundwater recharge to the local groundwater regime. Therefore, Cambium recommends implementing the lot level LID measures where possible across the Site in order to reduce the infiltration deficit, although water quantity threat is considered low due to the proposed development.

Considering that the municipal water wells were usually constructed in deep aquifers and no dewatering is required at the proposed development, the impact on the groundwater recharge is low to negligible.

10.0 Conclusions and Recommendations

2609216 Ontario Inc (Client) has retained Cambium Inc. to complete a hydrogeological assessment at 152 and 156 Miller Drive, City of Barrie, Ontario.

The majority of the Site is within a regulated area within the NVCA jurisdiction (as per O.Reg. 172/06) and therefore, development restrictions do apply to the proposed development. There is an unevaluated wetland mapped in the northwestern corner of the Site, which also runs adjacent to the western boundary of the Site and to the south of the Site.

Groundwater levels were measured to range from as shallow as 0.10 mbgs to as deep as 4.49 mbgs, with elevations ranging from 234.87 masl to 236.65 masl. Each dwelling in the development will be finished with half-basements or walkout basements and therefore, no dewatering was expected in most parts of Site due to proposed raise in grade to accommodate the basements. Short-term dewatering is not anticipated to be required for the installation of linear infrastructure but should be reassessed when a detailed servicing plan is prepared.

Soil percolation rates ranged from 6 to 8 min/cm, with a geometric mean of 7 min/cm, indicating the presence high transmissive soils at the Site.

The conceptual water balance indicates that there will be an infiltration deficit upon development of the Site in the order of about 2,367 m^3/year. It is Cambium's opinion that the infiltration deficit can be compensated for the proposed post-development plan if roof runoff is directed into a suite of LID measures (i.e. infiltration trench/gallery, roof downspout disconnection, etc.). The LID features, if any should be designed by a qualified person in order to compensate the infiltration deficit as determined.

Adjacent landowners/properties are on assumed to be on the City's water supply network and therefore are not anticipated to be influenced from the proposed development. However detailed development and construction plans should be reviewed (once prepared) for each lot to determine if dewatering is required during construction/operation of the development, and the potential influence of dewatering activities, if any.

Although, the Site is situated in a number of vulnerable areas, such as WHPA-C, WHPA-Q, HVA, SGRA and ICA related to Source Water Protection, no impacts on the municipal water supply aquifer were anticipated, provided best management practices are implemented across the Site.

11.0 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:
6AAA0661AAA8459...
Nicole Latimer, M.Sc., GIT
Project Coordinator

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

DocuSigned by:
677F3F2F4427404...
Kevin Warner, M.Sc., P. Geo (Ltd).
Group Manager – Water and Wastewater

P:\9000 to 9099\9089-002 Park City Inc. - HydroG & SWP Assess -152 & 156 Miller Dr, Barrie\Deliverables\REPORT - HydroG\Final\2024-05-15 HydroG, 152 & 156 Miller Dr, Barrie - r1.docx

12.0 References

Cambium. (2019). *Geotechnical Investigation Report - 156 Miller Drive, Barrie, Ontario.* Cambium Inc.

Chapman, L.J. and D.F. Putnam. (1984). *The Physiography of Southern Ontario: Ontario Geological Survey, Special Volume 2.*

MNRF. (2024). *Make A Map: Natural Heritage Areas*. Retrieved from https://www.lioapplications.lrc.gov.on.ca/Natural_Heritage/index.html?viewer=Natural_Heritage.Natural_Heritage&locale=en-CA

MOE. (2003). *Stormwater Management Planning and Design Manual.* Ministry of the Environment.

OGS. (2000). *Quaternary geology, seamless coverage of the Province of Ontario, Data Set 14 -- Revised.* Ontario Geological Survey.

OGS. (2007). *Paleozoic Geology of Southern Ontario.* Ontario Geological Survey, Miscellaneous Release - Data 219.

SBSLS SPR. (2021). *Approved South Georgian Bay Lake Simcoe Source Protection Plan.* South Georgian Bay Lake Simcoe Source Protection Region.

Thornthwaite, C., & Mather, J. (1957). *Instructions and tables for computing potential evapotranspiration and the water balance.* Centerton, N.J.: Laboratory of Climatology, Publications in Climatology, v. 10, no. 3, p. 185-311.

13.0 Standard Limitations

Limited Warranty

In performing work on behalf of a client, Cambium relies on its client to provide instructions on the scope of its retainer and, on that basis, Cambium determines the precise nature of the work to be performed. Cambium undertakes all work in accordance with applicable accepted industry practices and standards. Unless required under local laws, other than as expressly stated herein, no other warranties or conditions, either expressed or implied, are made regarding the services, work or reports provided.

Reliance on Materials and Information

The findings and results presented in reports prepared by Cambium are based on the materials and information provided by the client to Cambium and on the facts, conditions and circumstances encountered by Cambium during the performance of the work requested by the client. In formulating its findings and results into a report, Cambium assumes that the information and materials provided by the client or obtained by Cambium from the client or otherwise are factual, accurate and represent a true depiction of the circumstances that exist. Cambium relies on its client to inform Cambium if there are changes to any such information and materials. Cambium does not review, analyze or attempt to verify the accuracy or completeness of the information or materials provided, or circumstances encountered, other than in accordance with applicable accepted industry practice. Cambium will not be responsible for matters arising from incomplete, incorrect or misleading information or from facts or circumstances that are not fully disclosed to or that are concealed from Cambium during the provision of services, work or reports.

Facts, conditions, information and circumstances may vary with time and locations and Cambium's work is based on a review of such matters as they existed at the particular time and location indicated in its reports. No assurance is made by Cambium that the facts, conditions, information, circumstances or any underlying assumptions made by Cambium in connection with the work performed will not change after the work is completed and a report is submitted. If any such changes occur or additional information is obtained, Cambium should be advised and requested to consider if the changes or additional information affect its findings or results.

When preparing reports, Cambium considers applicable legislation, regulations, governmental guidelines and policies to the extent they are within its knowledge, but Cambium is not qualified to advise with respect to legal matters. The presentation of information regarding applicable legislation, regulations, governmental guidelines and policies is for information only and is not intended to and should not be interpreted as constituting a legal opinion concerning the work completed or conditions outlined in a report. All legal matters should be reviewed and considered by an appropriately qualified legal practitioner.

Site Assessments

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.

Only conditions at the site and locations chosen for study by the client are evaluated; no adjacent or other properties are evaluated unless specifically requested by the client. Any physical or other aspects of the site chosen for study by the client, or any other matter not specifically addressed in a report prepared by Cambium, are beyond the scope of the work performed by Cambium and such matters have not been investigated or addressed.

Reliance

Cambium's services, work and reports may be relied on by the client and its corporate directors and officers, employees, and professional advisors. Cambium is not responsible for the use of its work or reports by any other party, or for the reliance on, or for any decision which is made by any party using the services or work performed by or a report prepared by Cambium without Cambium's express written consent. Any party that relies on services or work performed by Cambium or a report prepared by Cambium without Cambium's express written consent, does so at its own risk. No report of Cambium may be disclosed or referred to in any public document without Cambium's express prior written consent. Cambium specifically disclaims any liability or responsibility to any such party for any loss, damage, expense, fine, penalty or other such thing which may arise or result from the use of any information, recommendation or other matter arising from the services, work or reports provided by Cambium.

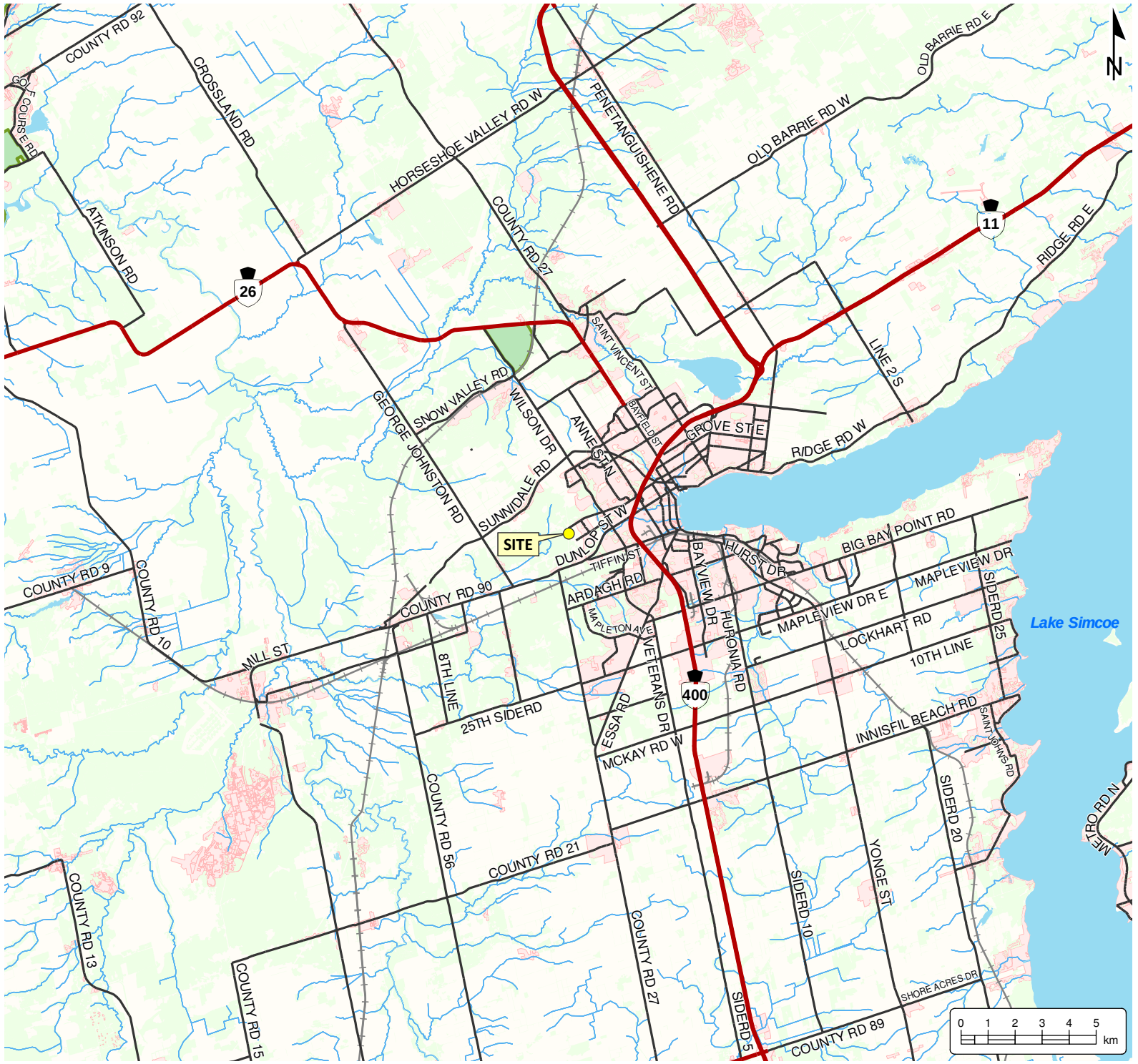
Limitation of Liability

Potential liability to the client arising out of the report is limited to the amount of Cambium's professional liability insurance coverage. Cambium shall only be liable for direct damages to the extent caused by Cambium's negligence and/or breach of contract. Cambium shall not be liable for consequential damages.

Personal Liability

The client expressly agrees that Cambium employees shall have no personal liability to the client with respect to a claim, whether in contract, tort and/or other cause of action in law. Furthermore, the client agrees that it will bring no proceedings nor take any action in any court of law against Cambium employees in their personal capacity.

Appended Figures



HYDROGEOLOGICAL INVESTIGATION

2609216 ONTARIO INC.
152 & 156 Miller Drive,
Barrie, Ontario

LEGEND

- Highway
- Major Road
- Railroad
- Watercourse
- Water Area
- Provincial Park
- Wooded Area
- Built Up Area

Notes:
- Base mapping features are © Queen's Printer of Ontario, 2019 (this does not constitute an endorsement by the Ministry of Natural Resources or the Ontario Government).
- Distances on this plan are in metres and can be converted to feet by dividing by 0.3048.
- Cambium Inc. makes every effort to ensure this map is free from errors but cannot be held responsible for any damages due to error or omissions. This map should not be used for navigation or legal purposes. It is intended for general reference use only.

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

REGIONAL LOCATION PLAN

Project No.:	9089-002	Date:	May 2024
		Rev.:	
Scale:	1:200,000	Projection:	NAD 1983 UTM Zone 17N
Created by:	MAT	Checked by:	SK
Figure:	1		

O:\GIS\MXDs\9000-9099\9089-002 Park City Inc. - Hydrogeological and SWP Assessment -152 & 156 Miller Drive, Barrie\2021-07-12 FIG 1 - Regional Location Plan.mxd

HYDROGEOLOGICAL INVESTIGATION

2609216 ONTARIO INC.
152 & 156 Miller Drive,
Barrie, Ontario

LEGEND

Site (approximate)

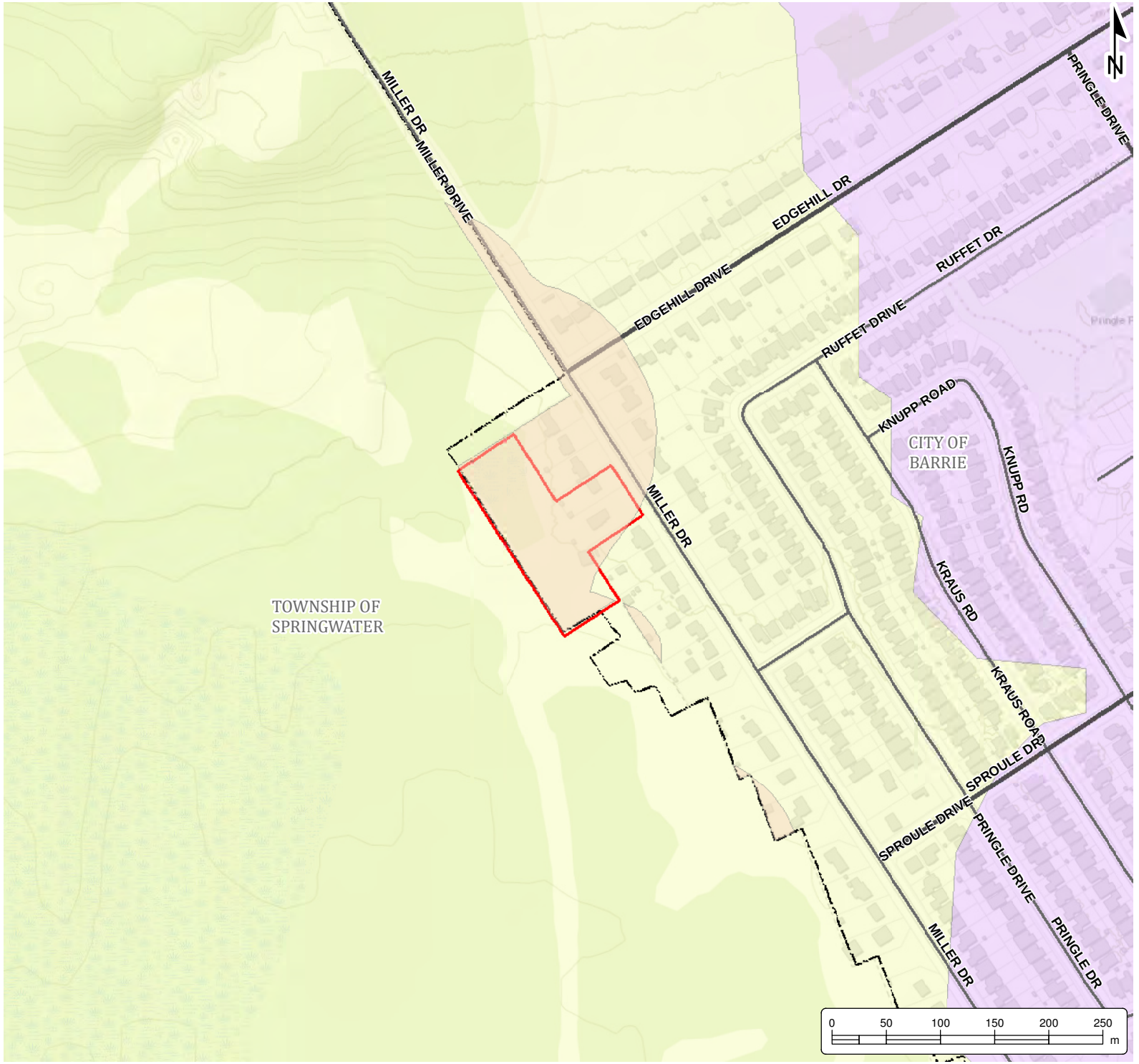
Notes:
- Site plan overlay was created by Gerrits Engineering, project No. 1981-001-23, drawing No. SG-1, titled: Site Grading Plan, dated February 18, 2022.
- Site is approximate; boundaries were obtained from Simcoe County online GIS database.
- Base mapping features are © Queen's Printer of Ontario, 2019 (this does not constitute an endorsement by the Ministry of Natural Resources or the Ontario Government).
- Distances on this plan are in metres and can be converted to feet by dividing by 0.3048.
- Cambium Inc. makes every effort to ensure this map is free from errors but cannot be held responsible for any damages due to error or omissions. This map should not be used for navigation or legal purposes. It is intended for general reference use only.

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

SITE PLAN

Project No.: 9089-002		Date: May 2024 Rev.:	
Scale: 1:1,000		Projection: NAD 1983 UTM Zone 17N	
Created by: MAT	Checked by: SK	Figure:	**2**

O:\GIS\MXDs\9000-9099\9089-002 Park City Inc. - Hydrogeological and SWP Assessment -152 & 156 Miller Drive, Barrie\2021-07-12 FIG 2 - Site Plan.mxd



HYDROGEOLOGICAL INVESTIGATION

2609216 ONTARIO INC.
152 & 156 Miller Drive,
Barrie, Ontario

LEGEND

- Major Road
- Minor Road
- Conservation Authority Regultion Limits
- Lake Simcoe Region Conservation Authority
- Nottawasaga Valley Conservation Authority
- Site (approximate)

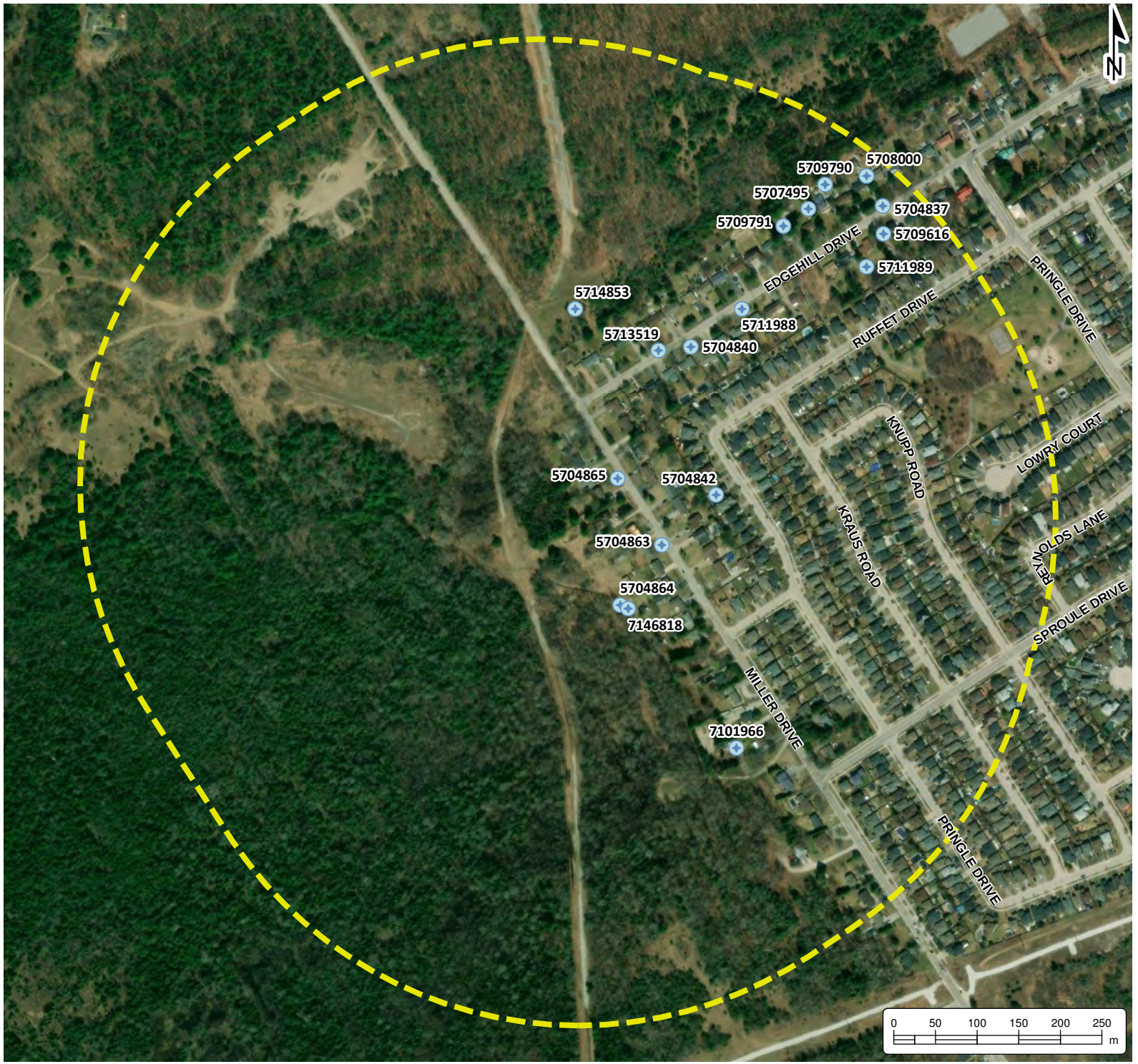
Notes:
- Site is approximate; boundaries were obtained from Simcoe County online GIS database.
- Base mapping features are © Queen's Printer of Ontario, 2019 (this does not constitute an endorsement by the Ministry of Natural Resources or the Ontario Government).
- Distances on this plan are in metres and can be converted to feet by dividing by 0.3048.
- Cambium Inc. makes every effort to ensure this map is free from errors but cannot be held responsible for any damages due to error or omissions. This map should not be used for navigation or legal purposes. It is intended for general reference use only.

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

CONSERVATION AUTHORITY REGULATION LIMIT

Project No.:	9089-002	Date:	May 2024
		Rev.:	
Scale:	1:5,000	Projection:	NAD 1983 UTM Zone 17N
Created by:	MAT	Checked by:	SK
Figure:	3		

O:\GIS\MXDs\9000-9099\9089-002 Park City Inc. - Hydrogeological and SWP Assessment -152 & 156 Miller Drive, Barrie\2021-07-16 FIG 3 - Conservation Authority Regulation Area Limit.mxd



HYDROGEOLOGICAL INVESTIGATION

2609216 ONTARIO INC.
152 & 156 Miller Drive,
Barrie, Ontario

LEGEND

- MECP Well Record
- 500m Study Area

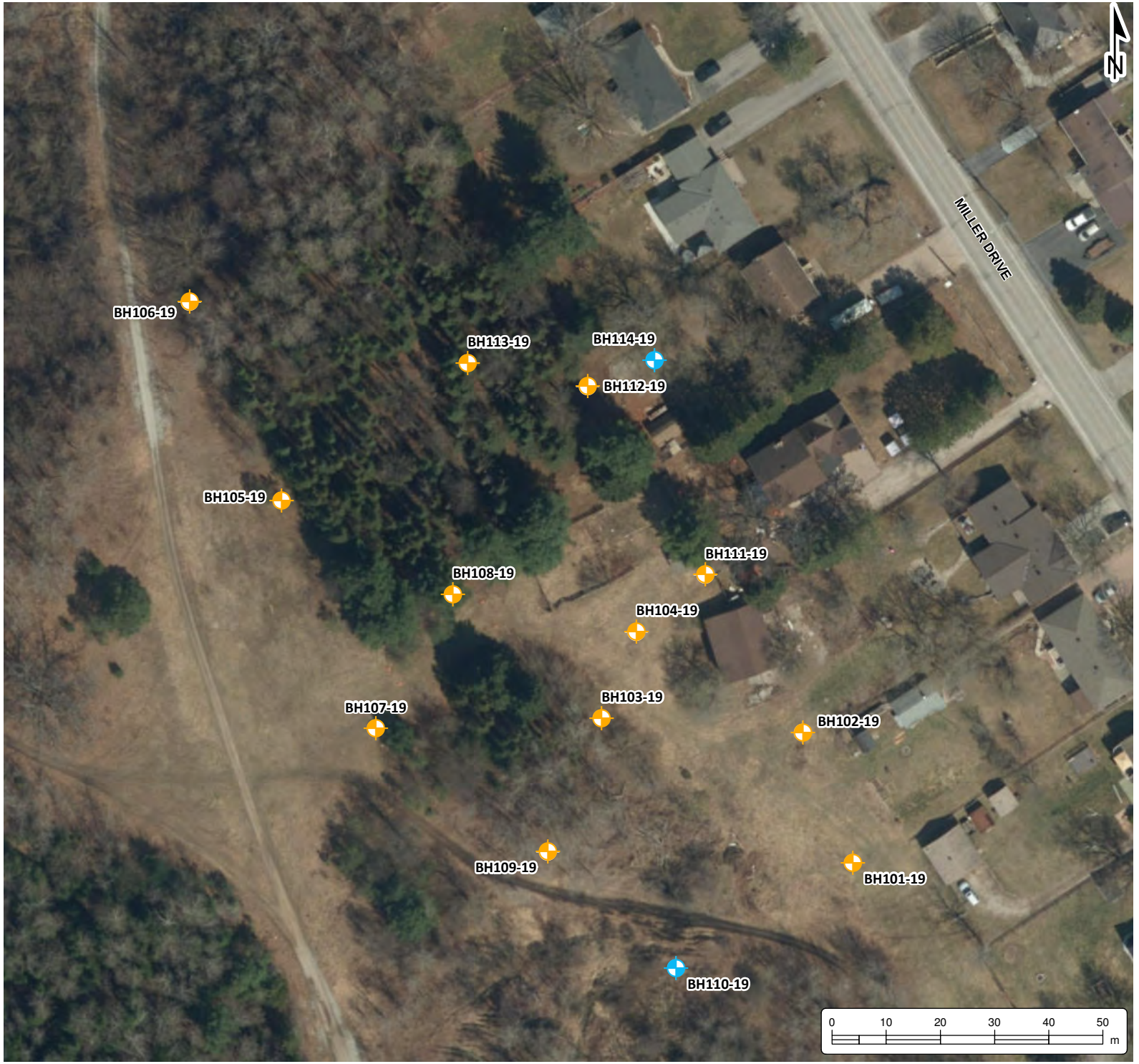
Notes:
- Site is approximate; boundaries were obtained from Simcoe County online GIS database.
- Base mapping features are © Queen's Printer of Ontario, 2019 (this does not constitute an endorsement by the Ministry of Natural Resources or the Ontario Government).
- Distances on this plan are in metres and can be converted to feet by dividing by 0.3048.
- Cambium Inc. makes every effort to ensure this map is free from errors but cannot be held responsible for any damages due to error or omissions. This map should not be used for navigation or legal purposes. It is intended for general reference use only.

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

MECP WELL RECORDS WITHIN 500m

Project No.: 9089-002		Date: May 2024 Rev.:	
Scale: 1:6,500		Projection: NAD 1983 UTM Zone 17N	
Created by: MAT	Checked by: SK	Figure:	4

O:\GIS\MXDs\9000-9099\9089-002 Park City Inc. - Hydrogeological and SWP Assessment -152 & 156 Miller Drive, Barrie\2021-07-12 FIG 4 - MECP Well Records within 500m.mxd



HYDROGEOLOGICAL INVESTIGATION

2609216 ONTARIO INC.
152 & 156 Miller Drive,
Barrie, Ontario

LEGEND

- Borehole
- Monitoring Well
- Site (approximate)

Notes:
- Site is approximate; boundaries were obtained from Simcoe County online GIS database.
- Base mapping features are © Queen's Printer of Ontario, 2019 (this does not constitute an endorsement by the Ministry of Natural Resources or the Ontario Government).
- Distances on this plan are in metres and can be converted to feet by dividing by 0.3048.
- Cambium Inc. makes every effort to ensure this map is free from errors but cannot be held responsible for any damages due to error or omissions. This map should not be used for navigation or legal purposes. It is intended for general reference use only.

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

BOREHOLE LOCATION PLAN

Project No.:	9089-002	Date:	May 2024
		Rev.:	
Scale:	1:1,000	Projection:	NAD 1983 UTM Zone 17N
Created by:	MAT	Checked by:	SK
Figure:	5		

O:\GIS\MXDs\9000-9099\9089-002 Park City Inc. - Hydrogeological and SWP Assessment -152 & 156 Miller Drive, Barrie\2021-07-12 FIG 5 - Borehoel Location Map.mxd

HYDROGEOLOGICAL INVESTIGATION

2609216 ONTARIO INC.
152 & 156 Miller Drive,
Barrie, Ontario

LEGEND

- Paved Area (394 m2)
- Roof Area (423 m2)
- Landscaped Area (13,615 m2)
- Site (approximate)

Notes:
- Aquifer data were obtained from the Nottawasaga Valley Conservation Authority.
- Site is approximate; boundaries were obtained from Simcoe County online GIS database.
- Base mapping features are © Queen's Printer of Ontario, 2019 (this does not constitute an endorsement by the Ministry of Natural Resources or the Ontario Government).
- Distances on this plan are in metres and can be converted to feet by dividing by 0.3048.
- Cambium Inc. makes every effort to ensure this map is free from errors but cannot be held responsible for any damages due to error or omissions. This map should not be used for navigation or legal purposes. It is intended for general reference use only.

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

PRE DEVELOPMENT PLAN

Project No.:	9089-002	Date:	May 2024
		Rev.:	
Scale:	1:1,000	Projection:	NAD 1983 UTM Zone 17N
Created by:	MAT	Checked by:	SK
Figure:	6		

O:\GIS\MXDs\9000-9099\9089-002 Park City Inc. - Hydrogeological and SWP Assessment -152 & 156 Miller Drive, Barrie\2021-07-12 FIG 6 - Pre Development Plan.mxd

	Area (m²)
Roof	5,093
Paved	4,219
Landscaped	5,118
Total	14,430

HYDROGEOLOGICAL INVESTIGATION

2609216 ONTARIO INC.
152 & 156 Miller Drive,
Barrie, Ontario

LEGEND

- Roof Area
- Paved Area
- Landscaped Area
- Site (approximate)

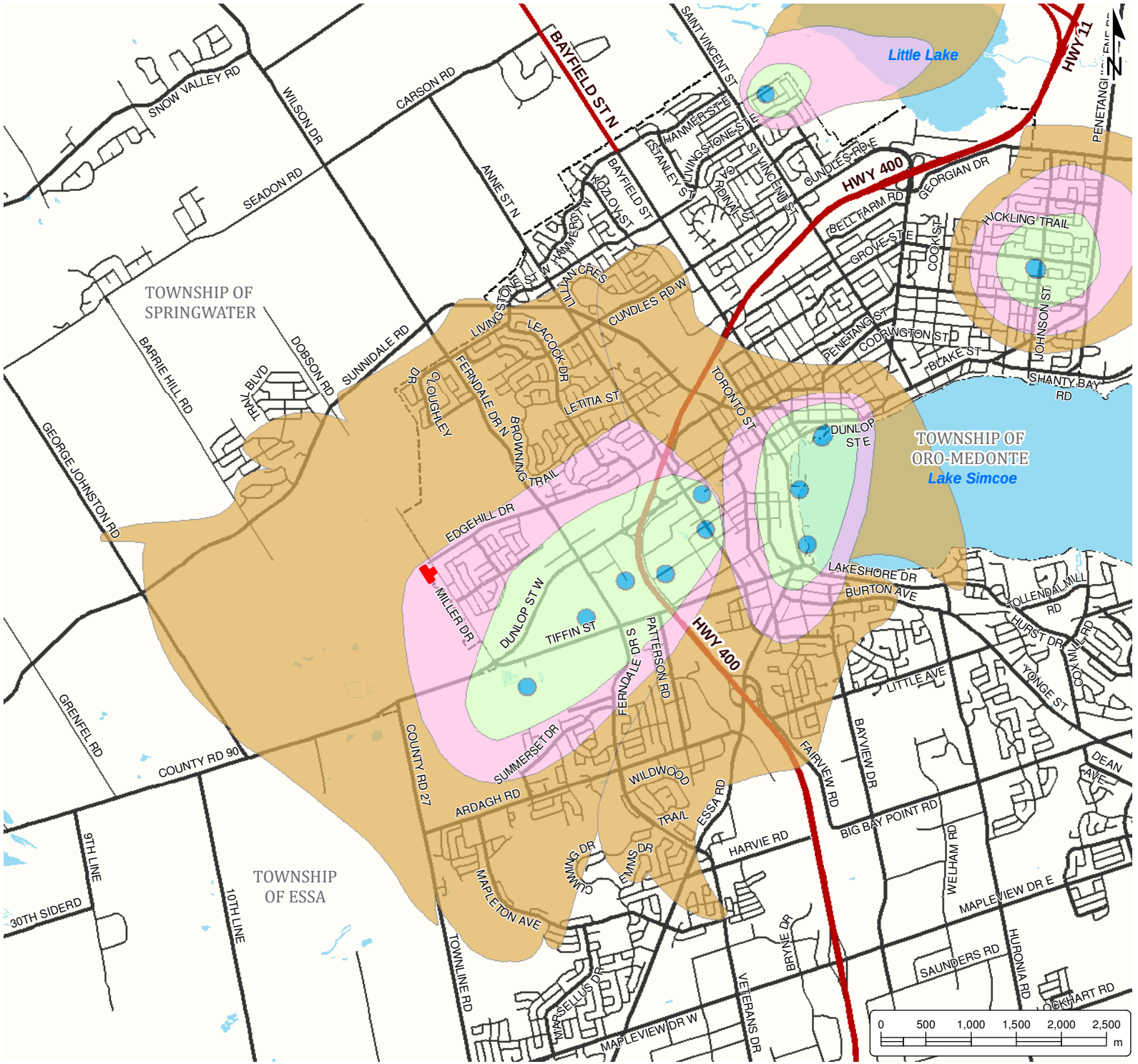
Notes:
- Site plan overlay was created by Gerrits Engineering, project No. 1981-001-23, figure No. SG-1, titled Site Grading Plan.
- Site is approximate; boundaries were obtained from Simcoe County online GIS database.
- Base mapping features are © Queen's Printer of Ontario, 2019 (this does not constitute an endorsement by the Ministry of Natural Resources or the Ontario Government).
- Distances on this plan are in metres and can be converted to feet by dividing by 0.3048.
- Cambium Inc. makes every effort to ensure this map is free from errors but cannot be held responsible for any damages due to error or omissions. This map should not be used for navigation or legal purposes. It is intended for general reference use only.

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

POST DEVELOPMENT PLAN

Project No.: 9089-002		Date: May 2024 Rev.:	
Scale: 1:1,000		Projection: NAD 1983 UTM Zone 17N	
Created by: MAT	Checked by: SK	Figure:	7

O:\GIS\MXDs\9000-9099\9089-002 Park City Inc. - Hydrogeological and SWP Assessment -152 & 156 Miller Drive, Barrie\2021-07-12 FIG 7 - Post Development Plan.mxd



HYDROGEOLOGICAL INVESTIGATION

2609216 ONTARIO INC.
152 & 156 Miller Drive,
Barrie, Ontario

LEGEND

- Highway
- Major Road
- Minor Road
- 100m Radius Offset From Operational Municipal Well
- 2 Year Capture Zone
- 10 Year Capture Zone
- 25 Year Capture Zone
- Water Area
- Site (approximate)

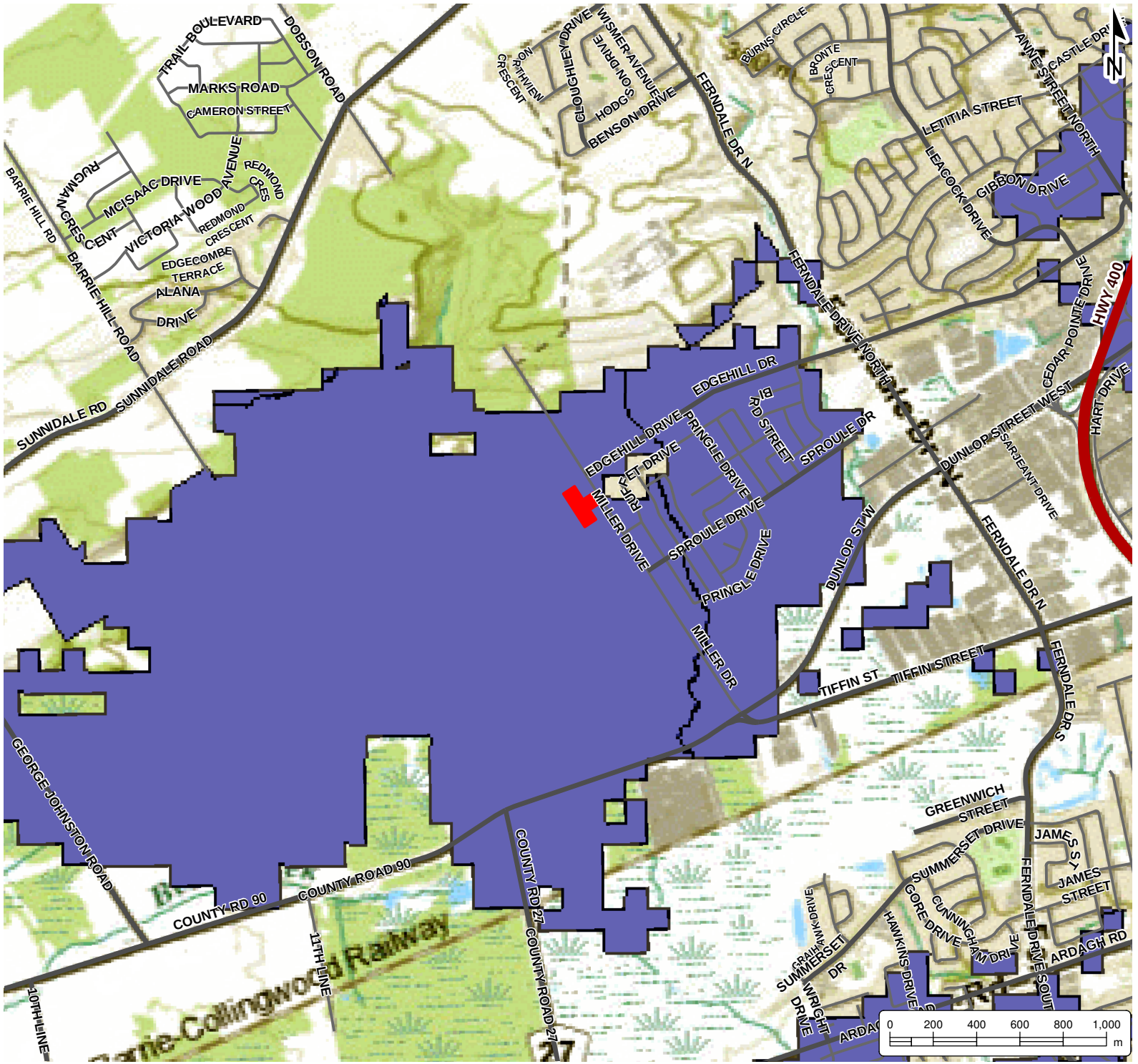
Notes:
- Wellhead protection data was obtained from the City of Barrie Official Plan Schedule G, Wells and Wellhead Protection Areas.
- Site is approximate; boundaries were obtained from Simcoe County online GIS database.
- Base mapping features are © Queen's Printer of Ontario, 2019 (this does not constitute an endorsement by the Ministry of Natural Resources or the Ontario Government).
- Distances on this plan are in metres and can be converted to feet by dividing by 0.3048.
- Cambium Inc. makes every effort to ensure this map is free from errors but cannot be held responsible for any damages due to error or omissions. This map should not be used for navigation or legal purposes. It is intended for general reference use only.

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

WELLHEAD PROTECTION AREAS (WHPA) MAP

Project No.:	9089-002	Date:	May 2024
		Rev.:	
Scale:	1:60,000	Projection:	NAD 1983 UTM Zone 17N
Created by:	MAT	Checked by:	SK
Figure:	8		

O:\GIS\MXDs\9000-9099\9089-002 Park City Inc. - Hydrogeological and SWP Assessment -152 & 156 Miller Drive, Barrie\2021-07-12 FIG 8 - Wellhead Protection Map.mxd



HYDROGEOLOGICAL INVESTIGATION

2609216 ONTARIO INC.
152 & 156 Miller Drive,
Barrie, Ontario

LEGEND

- Highway
- Major Road
- Minor Road
- Site (approximate)
- Highly Vulnerable Area

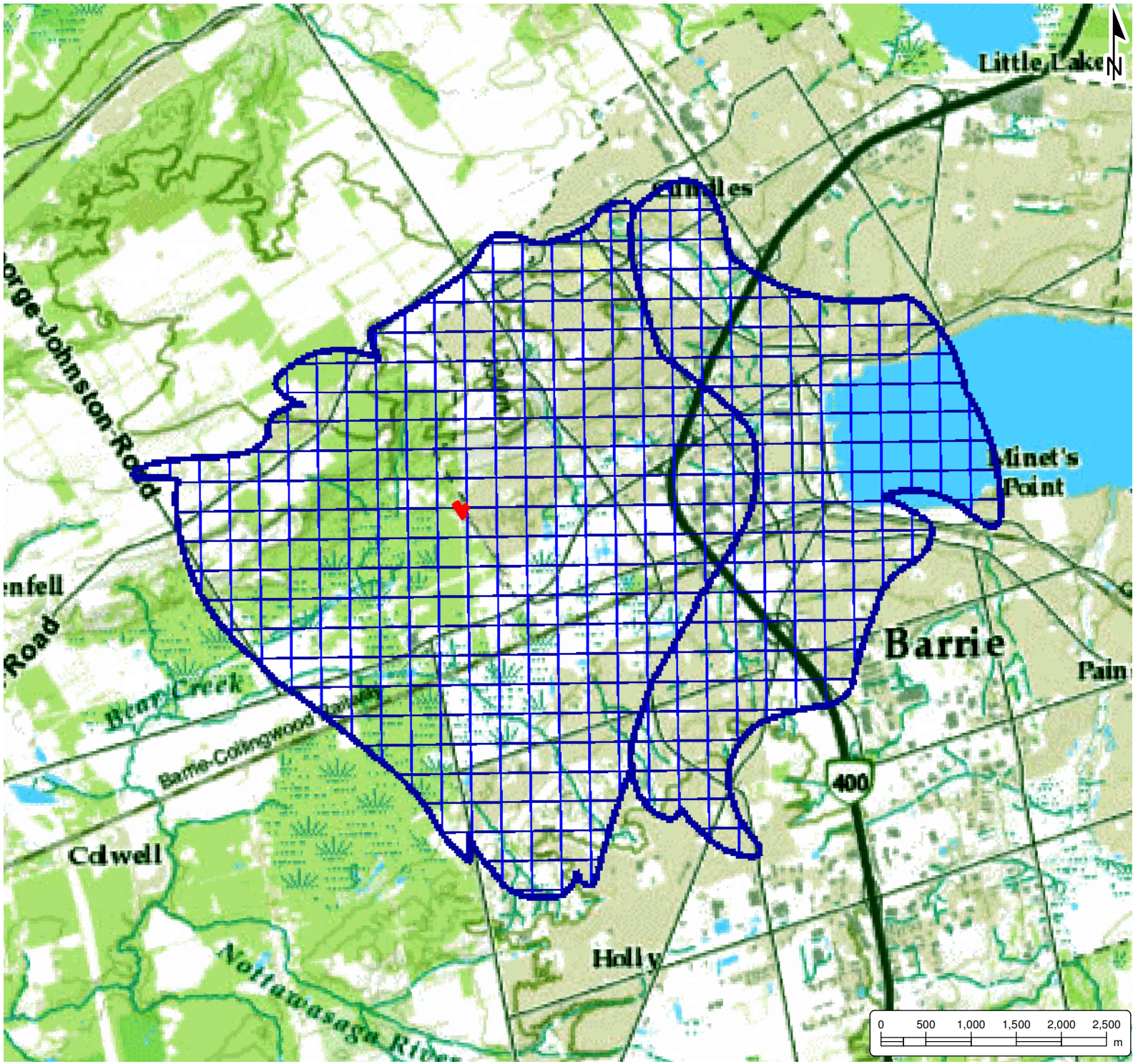
Notes:
- Aquifer data were obtained from the Nottawasaga Valley Conservation Authority.
- Site is approximate; boundaries were obtained from Simcoe County online GIS database.
- Base mapping features are © Queen's Printer of Ontario, 2019 (this does not constitute an endorsement by the Ministry of Natural Resources or the Ontario Government).
- Distances on this plan are in metres and can be converted to feet by dividing by 0.3048.
- Cambium Inc. makes every effort to ensure this map is free from errors but cannot be held responsible for any damages due to error or omissions. This map should not be used for navigation or legal purposes. It is intended for general reference use only.

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

HIGHLY VULNERABLE AREAS MAP

Project No.: 9089-002		Date: May 2024	Rev.:
Scale: 1:25,000		Projection: NAD 1983 UTM Zone 17N	
Created by: MAT	Checked by: SK	Figure: 9	

O:\GIS\MXDs\9000-9099\9089-002 Park City Inc. - Hydrogeological and SWP Assessment -152 & 156 Miller Drive, Barrie\2021-07-12 FIG 9 - Highly Vulnerable Areas.mxd



HYDROGEOLOGICAL INVESTIGATION

2609216 ONTARIO INC.
152 & 156 Miller Drive,
Barrie, Ontario

LEGEND

- Site (approximate)
- Issue Contributing Area

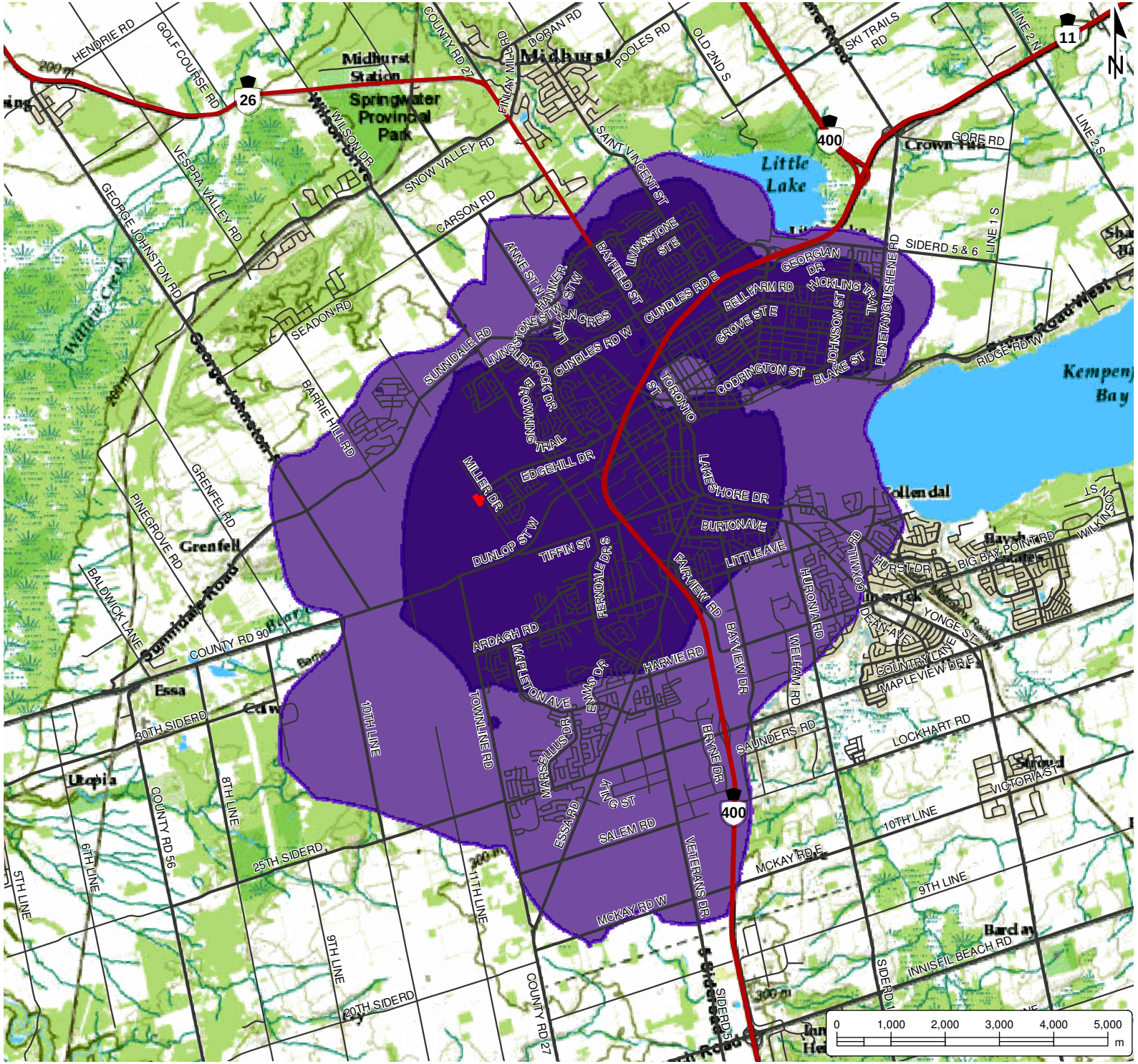
Notes:
- Aquifer data were obtained from the Nottawasaga Valley Conservation Authority.
- Site is approximate; boundaries were obtained from Simcoe County online GIS database.
- Base mapping features are © Queen's Printer of Ontario, 2019 (this does not constitute an endorsement by the Ministry of Natural Resources or the Ontario Government).
- Distances on this plan are in metres and can be converted to feet by dividing by 0.3048.
- Cambium Inc. makes every effort to ensure this map is free from errors but cannot be held responsible for any damages due to error or omissions. This map should not be used for navigation or legal purposes. It is intended for general reference use only.

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

ISSUE CONTRIBUTING AREA MAP

Project No.: 9089-002		Date: May 2024	Rev.:
Scale: 1:60,000		Projection: NAD 1983 UTM Zone 17N	
Created by: MAT	Checked by: SK	Figure: 10	

O:\GIS\MXDs\9000-9099\9089-002 Park City Inc. - Hydrogeological and SWP Assessment -152 & 156 Miller Drive, Barrie\2021-07-12 FIG 10 - Issue Contributing Area Map.mxd



HYDROGEOLOGICAL INVESTIGATION

2609216 ONTARIO INC.
152 & 156 Miller Drive,
Barrie, Ontario

LEGEND

- Highway
- Major Road
- Minor Road
- Site (approximate)
- Wellhead Protection Area Q1
- Wellhead Protection Area Q2

Notes:
- Aquifer data were obtained from the Nottawasaga Valley Conservation Authority.
- Site is approximate; boundaries were obtained from Simcoe County online GIS database.
- Base mapping features are © Queen's Printer of Ontario, 2019 (this does not constitute an endorsement by the Ministry of Natural Resources or the Ontario Government).
- Distances on this plan are in metres and can be converted to feet by dividing by 0.3048.
- Cambium Inc. makes every effort to ensure this map is free from errors but cannot be held responsible for any damages due to error or omissions. This map should not be used for navigation or legal purposes. It is intended for general reference use only.

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

WELL HEAD PROTECTION AREA - Q1/Q2 MAP

Project No.:	9089-002	Date:	May 2024
		Rev.:	
Scale:	1:100,000	Projection:	NAD 1983 UTM Zone 17N
Created by:	MAT	Checked by:	SK
Figure:	11		

O:\GIS\MXDs\9000-9099\9089-002 Park City Inc. - Hydrogeological and SWP Assessment -152 & 156 Miller Drive, Barrie\2021-07-12 FIG 11 - Well Head Protection Area - Q1 Q2 map.mxd

Appendix A

Proposed Development Plans

LEGEND

220.75 / 220.75	PROPOSED ELEVATION / EXISTED ELEVATION
2.0%	PROPOSED GRADE
	3:1 SLOPE
	SWALE
) (	HIGH POINT
T=TOP WALL	
B= BOTTOM WALL	

LOT GRADING TYPES:

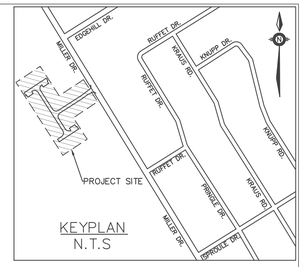
- SPL SPLIT DRAINED
- R2F REAR TO FRONT
- WO WALKOUT LOT
- WU WALKUP LOT
- LO LOOKOUT LOT
- LU LOOKUP LOT

243.09 GENERALLY RECOMMENDED FIRST FLOOR ELEVATION

USF= 240.29 GENERALLY RECOMMENDED UNDERSIDE OF FOOTING ELEVATION

TYPICAL SOAKAWAY PIT

TREE PRESERVATION FENCE



Gerrits ENGINEERING
222 Mapleview Drive West, Suite 300
Barrie, ON L4N 9E7 Canada
Tel.:705.737.3303
Fax.: F.705.737.1772
www.gerreng.com

No.	Issuance Description	YY/MM/DD
1.	CLIENT REVIEW	22/02/18
2.	1st SUBMISSION	22/03/11

Issued For:

DRAFT PLAN OF SUBDIVISION & SITE PLAN APPROVAL

Client
ALLIANCE HOMES Ltd.
6048 HIGHWAY #9 UNIT 7, SCHOMBERG, ON L0G 1T0

Project
152 MILLER DRIVE
BARRIE, ON L4N 9X3

Drawing:
SITE GRADING PLAN

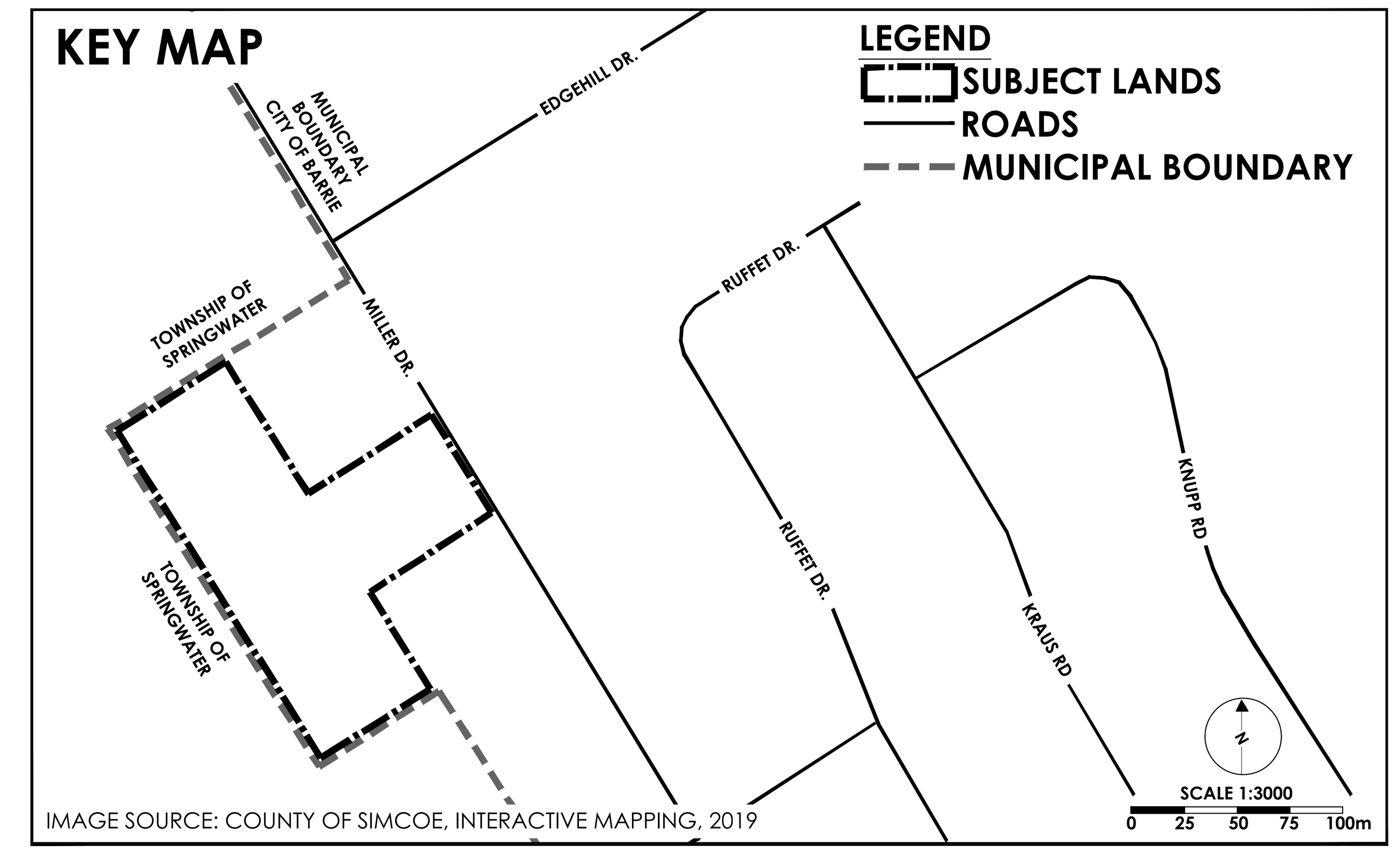
Project No.	1981-001-23	Designed by: KF	Checked by: KF
Scale:	1:300	Drawn by: RM	Approved by: JM

Orientation

Stamp

Sheet No.
8 OF 21

Drawing No.
SG-1



DRAFT PLAN OF SUBDIVISION

LOT 23, CONCESSION 8,
(GEOGRAPHIC TOWNSHIP OF VESPRA),
CITY OF BARRIE,
COUNTY OF SIMCOE

SCALE 1: 500

0 25 50 75 100 125 150m

LEGEND

SUBJECT LANDS

OWNER'S CERTIFICATE

I HEREBY AUTHORIZE INNOVATIVE PLANNING SOLUTIONS TO PREPARE THIS DRAFT PLAN OF SUBDIVISION AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION FOR APPROVAL.

DATE

OWNER'S NAME: TIM MOUZAFAROV C/O - 2609216 ONTARIO INC.
PIN 58355-0118

October 1, 2019
DATE

B. Evangelinos
OWNER'S NAME: BAERBEL EVANGELINOS
PIN 58355-0119 & PIN 58355-0226

SURVEYOR'S CERTIFICATE

I CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED AND THEIR RELATIONSHIP TO ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

October 1, 2019
DATE

SURVEYOR'S NAME: DINO R.S. ASTRI
ONTARIO LAND SURVEYOR
DINO ASTRI SURVEYING LTD.

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT

a) SHOWN ON PLAN
b) SHOWN ON PLAN
c) SEE KEY PLAN
d) RESIDENTIAL
e) SHOWN ON PLAN
f) SHOWN ON PLAN
g) SHOWN ON PLAN
h) MUNICIPAL WATER
i) SAND, SILT GLACIAL TILL
j) SHOWN ON PLAN
k) MUNICIPAL WATER & SEWAGE
l) NONE

LAND USE STATISTICS

LAND USE	LOT No.	BLOCK No.	UNITS	AREA (ha)
RESIDENTIAL	1- 4	5	43	1.43
FUTURE ROAD WIDENING BLOCK		6		0.01
TOTAL	4	6	43	1.44

SCHEDULE OF REVISIONS

No.	Date	Description	By
1	Oct. 1, 2019	Decrease width of Road Widening;	AS

IPS
INNOVATIVE PLANNING SOLUTIONS
PLANNERS • PROJECT MANAGERS • LAND DEVELOPERS
150 DUNLOP STREET EAST, SUITE 201, BARRIE, ONTARIO L4M 1B1
tel: 705 • 812 • 3281 fax: 705 • 812 • 3434 e: info@ipsconsultinginc.com www.ipsconsultinginc.com

Date: April 2, 2019	Checked By: A.P
File: 17-702	Drawn By: A.S

Ontario

Ministry of Natural Resources and Forestry

Make-a-Map: Natural Heritage Areas

Natural Heritage Mapping

Map created:5/15/2024

Legend

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

0.3 0 0.16 0.3 Kilometres

Absence of a feature in the map does not mean they do not exist in this area.

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 Natural Resources and Forestry(OMNRF) shall not be liable in any way for the use of, or reliance upon, this map or any information on this map.

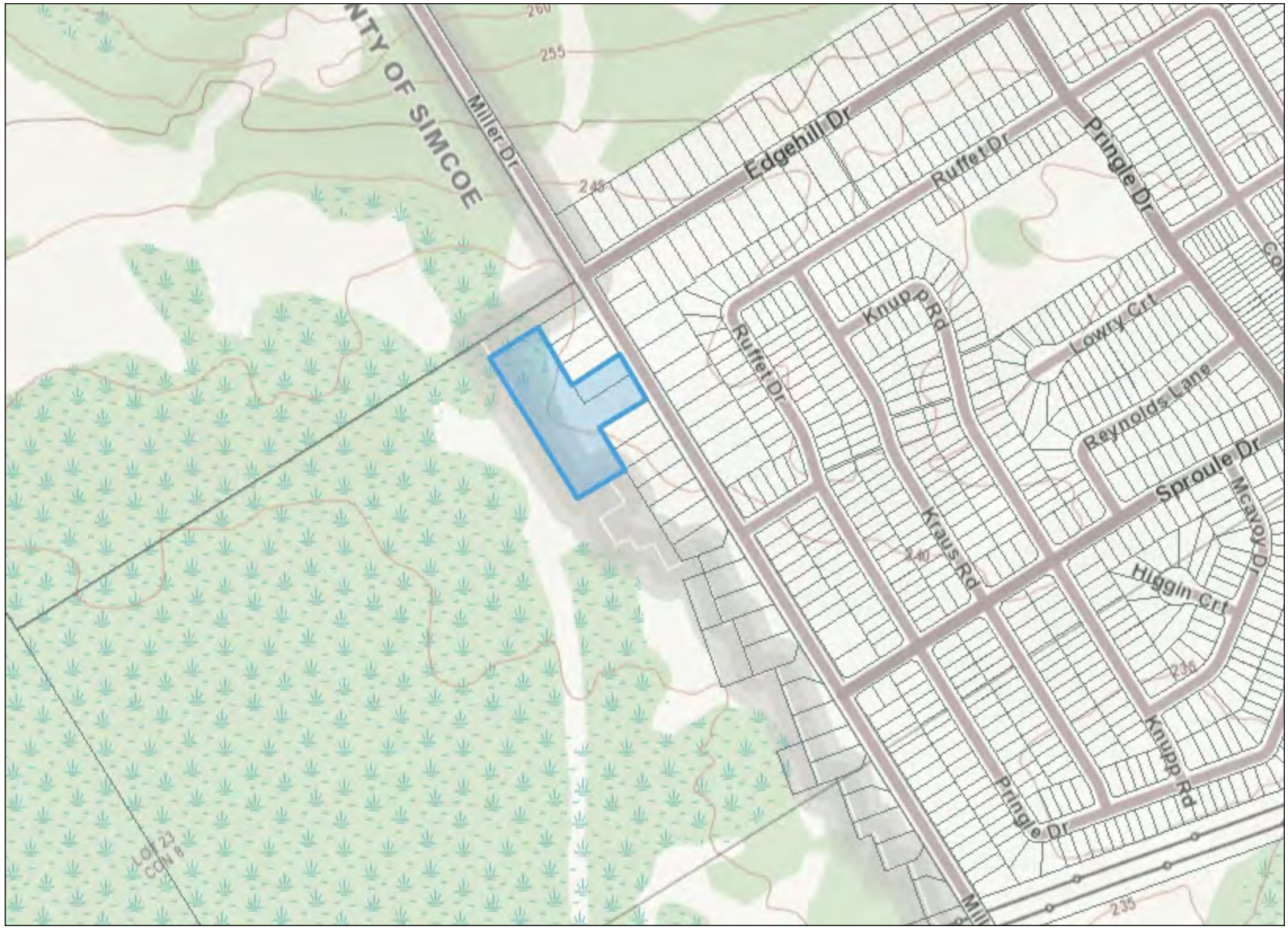
Ontario

MINISTRY OF NATURAL RESOURCES AND FORESTRY

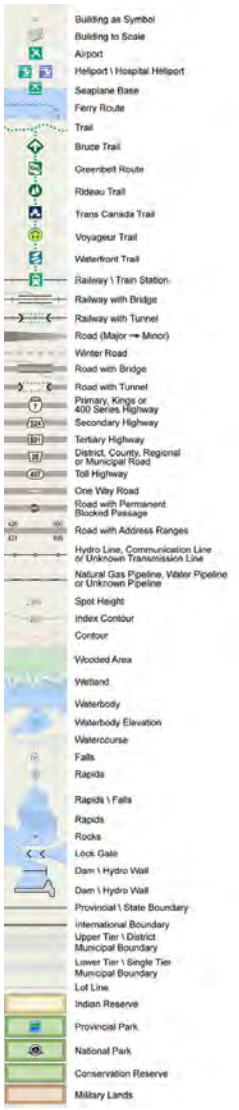
Make a Topographic Map

Topographic Map

Notes:



Legend



0 0.3 km

Projection: Web Mercator

The Ontario Ministry of Natural Resources and Forestry shall not be liable in any way for the use of, or reliance upon, this map or any information on this map. This map should not be used for: navigation, a plan of survey, routes, nor locations. THIS IS NOT A PLAN OF SURVEY.

Appendix B

MECP Well Records

Peterborough
Barrie
Oshawa
Kingston
T: 866-217-7900
www.cambium-inc.com

Log of Borehole: BH101-19

Client: iViva Homes
Project Name: Geotechnical Investigation - Miller Drive
Project No.: 9089-001
Contractor: Walker Drilling
Method: Hollow Stem Augers
Date Completed: May 21, 2019
Location: 156 Miller Drive, Barrie, ON
UTM: 17T, 4914192.74, 600358.14
Elevation: 236.42 mASL

SUBSURFACE PROFILE			SAMPLE							
Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
236 / 0		Topsoil: Dark brown topsoil, moist, loose	1A	SS	100	4				
		Sand: Brown fine sand, trace silt, moist, loose	1B							
235 / 1			2	SS	70	9				
		Wet								
		Compact	3	SS	50	14				GSA SS3: 0% Gravel 93% Sand 4% Silt 3% Clay
234 / 2										
		Loose	4	SS	65	8				
233 / 3										
			5	SS	90	9				
232 / 4										
			6	SS	75	9				
231 / 5		Borehole terminated at 5.0 mbgs								Groundwater and caving at 0.9 mbgs upon completion.
6										

Logged By: JSB
Input By: CM

Peterborough
Barrie
Oshawa
Kingston
T: 866-217-7900
www.cambium-inc.com

Log of Borehole: BH102-19

Client: iViva Homes
Project Name: Geotechnical Investigation - Miller Drive
Project No.: 9089-001
Contractor: Walker Drilling
Method: Hollow Stem Augers
Date Completed: May 21, 2019
Location: 156 Miller Drive, Barrie, ON
UTM: 17T, 4914216.82, 600348.92
Elevation: 237.51 mASL

Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
237 / 0		Topsoil: Dark brown topsoil, moist, loose	1A							
		Sand: Brown fine sand, trace silt, moist, loose	1B	SS	70	3				
237 / 1			2	SS	90	7				
236										
236 / 2		Wet	3	SS	80	7				
		Saturated, compact								
235			4	SS	60	12				
235 / 3										
			5	SS	65	12				
234										
234 / 4										
233										
233 / 5			6	SS	60	13				
232		Borehole terminated at 5.0 mbgs								Groundwater and caving at 1.95 mbgs upon completion.
232 / 6										

Logged By: JSB
Input By: CM

CAMBIUM
Peterborough
Barrie
Oshawa
Kingston
T: 866-217-7900
www.cambium-inc.com

Log of Borehole: BH103-19

Client: iViva Homes
Project Name: Geotechnical Investigation - Miller Drive
Project No.: 9089-001
Contractor: Walker Drilling
Method: Hollow Stem Augers
Date Completed: May 21, 2019
Location: 156 Miller Drive, Barrie, ON
UTM: 17T, 4914219.47, 600311.75
Elevation: 237.78 mASL

SUBSURFACE PROFILE			SAMPLE							
Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
0 / 237		Topsoil: Dark brown topsoil, moist, loose	1A	SS	30	3				
		Fine Sand: Brown fine sand, trace silt, moist, loose	1B							
1			2	SS	90	3				
236										
2			3	SS	10	7				
235			4	SS	75	9				
3										
		Compact	5	SS	40	12				
234										
4										
233			6	SS	90	21				
5										
		Borehole terminated at 5.0 mbgs								Groundwater and caving at 2.1 mbgs upon completion.
232										
6										

Logged By: JSB
Input By: CM

Peterborough
Barrie
Oshawa
Kingston
T: 866-217-7900
www.cambium-inc.com

Log of Borehole: BH104-19

Client: iViva Homes
Project Name: Geotechnical Investigation - Miller Drive
Project No.: 9089-001
Contractor: Walker Drilling
Method: Hollow Stem Augers
Date Completed: May 21, 2019
Location: 156 Miller Drive, Barrie, ON
UTM: 17T, 4914235.46, 600318.20
Elevation: 238.66 mASL

Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
238 / 0		Topsoil: Dark brown topsoil, moist, loose	1A							
		Sand: Brown sand, trace silt, brick fragments, moist, loose FILL	1B	SS	50	6				
238 / 1			2	SS	10	7				
237			3A							
		Sand: Brown fine sand, trace silt, moist, compact	3B	SS	65	14				
237 / 2										
		Wet	4	SS	55	16				
236										
236 / 3			5	SS	70	13				
235										
235 / 4										
234			6	SS	80	14				
234 / 5										
		Borehole terminated at 5.0 mbgs								Groundwater first observed at 2.7 mbgs and caving at 1.2 mbgs upon completion.
233 / 6										

Logged By: JSB
Input By: CM

Peterborough
Barrie
Oshawa
Kingston
T: 866-217-7900
www.cambium-inc.com

Log of Borehole: BH105-19

Client: iViva Homes
Project Name: Geotechnical Investigation - Miller Drive
Project No.: 9089-001
Contractor: Walker Drilling
Method: Hollow Stem Augers
Date Completed: May 21, 2019
Location: 156 Miller Drive, Barrie, ON
UTM: 17T, 4914259.67, 600252.72
Elevation: 238.71 mASL

Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
238 / 0		Topsoil: Dark brown topsoil, moist, loose	1A							
		Sand: Brown fine sand, trace silt, trace organics, moist, compact	1B	SS	60	2				
238 / 1			2	SS	50	5				
237 / 2		Sand: Brown to grey fine sand, trace silt, wet, loose	3A							
			3B	SS	70	8				
		Compact, wet	4	SS	65	21				
236 / 3		Fine Sand: Grey fine sand, trace silt, trace clay, moist, compact								
			5	SS	50	16				
235 / 4										
234 / 5			6	SS	55	20				
		Borehole terminated at 5.0 mbgs								Groundwater first observed at 2.3 mbgs and caving at 2.7 mbgs upon completion.
233 / 6										

Logged By: CM
Input By: CM

Peterborough
Barrie
Oshawa
Kingston
T: 866-217-7900
www.cambium-inc.com

Log of Borehole: BH106-19

Client: iViva Homes
Project Name: Geotechnical Investigation - Miller Drive
Project No.: 9089-001
Contractor: Walker Drilling
Method: Hollow Stem Augers
Date Completed: May 21, 2019
Location: 156 Miller Drive, Barrie, ON
UTM: 17T, 4914296.41, 600235.82
Elevation: 237.53 mASL

Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
237 / 0		Topsoil: Dark brown topsoil, moist, loose	1A							
		Sand: Brown sand, trace silt, moist, compact	1B	SS	60	11				
		Sand: Grey fine sand, trace silt, trace clay, saturated, compact	2	SS	70	11				
236 / 1										
		Loose	3	SS	100	3				
235 / 2										
		Compact	4	SS	100	17				
234 / 3										
			5	SS	60	18				
233 / 4										
			6	SS	90	21				
232 / 5		Borehole terminated at 5.0 mbgs								Groundwater at 0.6 mbgs and caving at 4.3 mbgs upon completion.
6										

Logged By: CM
Input By: CM

Peterborough
Barrie
Oshawa
Kingston
T: 866-217-7900
www.cambium-inc.com

Log of Borehole: BH107-19

Client:	iViva Homes	**Project Name:**	Geotechnical Investigation - Miller Drive	**Project No.:**	9089-001
Contractor:	Walker Drilling	**Method:**	Hollow Stem Augers	**Date Completed:**	May 21, 2019
Location:	156 Miller Drive, Barrie, ON	**UTM:**	17T, 4914217.61, 600270.10	**Elevation:**	237.12 mASL

Elevation (m)	Depth	Description	Number	Type	% Recovery	SPT (N)	Well Installation	Remarks
237	0	Topsoil: Dark brown topsoil, moist, loose	1A					
		Sand: Brown fine sand, trace silt, moist, compact	1B	SS	40	4		
		Sand: Brown to grey fine sand, trace silt, trace gravel, some cobbles, moist, compact	2	SS	70	11		
236	1							
		Wet	3	SS	60	27		
235	2							
		Fine Sand: Brown fine sand, trace silt, trace gravel, moist, compact	4	SS	70	21		
		Saturated						
234	3		5	SS	80	26		
233	4							
		Less gravel, grey	6	SS	70	18		
232	5	Borehole terminated at 5.0 mbgs						Groundwater first observed at 2.4 mbgs and caving at 0.3 mbgs upon completion.
	6							

% Moisture: 25 50 75

SPT (N): 10 20 30 40

Logged By: CM **Input By:** CM

Peterborough
Barrie
Oshawa
Kingston
T: 866-217-7900
www.cambium-inc.com

Log of Borehole: BH108-19

Client: iViva Homes
Project Name: Geotechnical Investigation - Miller Drive
Project No.: 9089-001
Contractor: Walker Drilling
Method: Hollow Stem Augers
Date Completed: May 22, 2019
Location: 156 Miller Drive, Barrie, ON
UTM: 17T, 4914242.38, 600284.30
Elevation: 238.47 mASL

Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
238 / 0		Topsoil: Dark brown topsoil, moist, loose	1A	SS	50	4				
		Sand: Brown fine sand, trace silt, moist, loose	1B							
237 / 1			2	SS	65	5				
236 / 2			3	SS	10	9				
		Coarser sand, compact								
			4	SS	50	20				GSA SS4: 4% Gravel 88% Sand 5% Silt 3% Clay
235 / 3		Saturated								
			5	SS	65	19				
234 / 4										
			6	SS	60	27				
233 / 5		Borehole terminated at 5.0 mbgs								Groundwater and caving at 1.95 mbgs upon completion.
232 / 6										

Logged By: JSB
Input By: CM

Peterborough
Barrie
Oshawa
Kingston
T: 866-217-7900
www.cambium-inc.com

Log of Borehole: BH109-19

Client: iViva Homes
Project Name: Geotechnical Investigation - Miller Drive
Project No.: 9089-001
Contractor: Walker Drilling
Method: Hollow Stem Augers
Date Completed: May 22, 2019
Location: 156 Miller Drive, Barrie, ON
UTM: 17T, 4914194.77, 600301.85
Elevation: 236.18 mASL

Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
236 / 0		Topsoil: Dark brown topsoil, wet, loose	1A	SS	50	3				
			1B							
		Sand: Brown fine sand, trace silt, wet, compact	2	SS	75	10				
235 / 1										
			3	SS	60	15				
234 / 2										
			4	SS	70	12				
233 / 3										
			5	SS	70	11				
232 / 4										
			6	SS	90	17				
231 / 5		Borehole terminated at 5.0 mbgs								Groundwater at 1.83 mbgs and caving at 0.6 mbgs upon completion
6										

Logged By: JSB
Input By: CM

Peterborough
Barrie
Oshawa
Kingston
T: 866-217-7900
www.cambium-inc.com

Log of Borehole: BH110-19

Client:	iViva Homes	**Project Name:**	Geotechnical Investigation - Miller Drive	**Project No.:**	9089-001
Contractor:	Walker Drilling	**Method:**	Hollow Stem Augers	**Date Completed:**	May 22, 2019
Location:	156 Miller Drive, Barrie, ON	**UTM:**	17T, 4914173.24, 600325.53	**Elevation:**	235.73 mASL

SUBSURFACE PROFILE			SAMPLE								
Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
0 / 235		Peat: Dark brown to black fine fiberous organic material, wet, compact	1A	SS	70	11			Cap	Top of Standpipe Elevation = 236.80 mASL Stickup Height = 1.078 m
		Sand: Brown sand, trace silt, wet, compact	1B							
1 / 234			2	SS	80	11			Cuttings	
									PVC Standpipe	
2 / 233			3	SS	60	12				
			4	SS	100	21			Bentonite Plug	
3 / 232			5	SS	100	13			Sand Pack PVC Screen	
4 / 231			6	SS	100	12			Cap	
5 / 230		Borehole terminated at 5.0 mbgs								Groundwater measured at 0.10 mbgs (235.62 mASL) on May 28th, 2019
6										

Logged By: JSB **Input By:** CM

Peterborough
Barrie
Oshawa
Kingston
T: 866-217-7900
www.cambium-inc.com

Log of Borehole: BH111-19

Client: iViva Homes
Project Name: Geotechnical Investigation - Miller Drive
Project No.: 9089-001
Contractor: Walker Drilling
Method: Hollow Stem Augers
Date Completed: May 22, 2019
Location: 156 Miller Drive, Barrie, ON
UTM: 17T, 4914245.99, 600330.94
Elevation: 239.95 mASL

SUBSURFACE PROFILE			SAMPLE								
Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
0 / 239		Topsoil: Dark brown sandy topsoil, moist, loose	1A							
		Sand: Brown sand, trace silt, moist, loose, FILL	1B	SS	100	3				
1			2	SS	70	3				
2 / 238			3	SS	45	8				
		Sand: Brown sand, trace silt, moist, loose								
			4	SS	0	6				Cobble in tip of split spoon
3 / 237										
		Compact	5	SS	60	12				
4 / 236										
5 / 235			6	SS	65	19				
		Borehole terminated at 5.0 mbgs								Groundwater and caving at 3.96 mbgs upon completion
6 / 234										

Logged By: JSB
Input By: CM

Peterborough
Barrie
Oshawa
Kingston
T: 866-217-7900
www.cambium-inc.com

Log of Borehole: BH112-19

Client: iViva Homes
Project Name: Geotechnical Investigation - Miller Drive
Project No.: 9089-001
Contractor: Walker Drilling
Method: Hollow Stem Augers
Date Completed: May 22, 2019
Location: 156 Miller Drive, Barrie, ON
UTM: 17T, 4914280.76, 600309.21
Elevation: 240.12 mASL

Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
240 / 0		Topsoil: Dark brown topsoil, moist, loose	1A							
		Sand: Brown fine sand, trace silt, moist, very loose	1B	SS	50	2				
239 / 1			2	SS	100	3				
		Loose	3	SS	75	5				
238 / 2		Very loose	4	SS	40	2				
237 / 3		Sandy Silt: Light brown sandy silt, some cobbles, saturated, compact	5	SS	50	11				
236 / 4		Silty Sand: Brown silty sand, saturated, compact	6	SS	65	15				
235 / 5		Borehole terminated at 5.0 mbgs								Groundwater and caving at 3.66 mbgs upon completion
6										

Logged By: JSB
Input By: CM

Peterborough
Barrie
Oshawa
Kingston
T: 866-217-7900
www.cambium-inc.com

Log of Borehole: BH113-19

Client: iViva Homes
Project Name: Geotechnical Investigation - Miller Drive
Project No.: 9089-001
Contractor: Walker Drilling
Method: Hollow Stem Augers
Date Completed: May 22, 2019
Location: 156 Miller Drive, Barrie, ON
UTM: 17T, 4914285.09, 600287.07
Elevation: 239.60 mASL

Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
0 / 239		Topsoil: Dark brown topsoil, moist, loose	1A	SS	50	2				
		Sand: Brown fine sand, trace silt, moist, very loose	1B							
1 / 238			2	SS	100	2				
2 / 237		Compact	3	SS	45	0				
3 / 236		Wet, some clay	4	SS	70	19				
4 / 235			5	SS	70	19				
5 / 234		Borehole terminated at 5.0 mbgs	6	SS	65	17				Groundwater and caving at 3.66 mbgs upon completion
6										

Logged By: JSB
Input By: CM

Peterborough
Barrie
Oshawa
Kingston
T: 866-217-7900
www.cambium-inc.com

Log of Borehole: BH114-19

Client:	iViva Homes	**Project Name:**	Geotechnical Investigation - Miller Drive	**Project No.:**	9089-001
Contractor:	Walker Drilling	**Method:**	Hollow Stem Augers	**Date Completed:**	May 22, 2019
Location:	156 Miller Drive, Barrie, ON	**UTM:**	17T, 4914285.62, 600321.57	**Elevation:**	240.94 mASL

SUBSURFACE PROFILE			SAMPLE							
Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
0 / 240		Topsoil: Dark brown topsoil, moist, loose	1A	SS	75	3			Cap	Top of Standpipe Elevation = 241.85 mASL Stickup Height = 0.907 m
		Sand: Brown fine sand, trace silt, moist, loose	1B							
1			2	SS	100	4			Cuttings	GSA SS2: 0% Gravel 83% Sand 13% Silt 4% Clay
		Compact							PVC Standpipe	
239 / 2			3	SS	90	11				
			4	SS	70	17			Bentonite Plug	
238 / 3		Increased clay and silt content, wet	5	SS	90	11				
									Sand Pack PVC Screen	
237 / 4										
			6	SS	75	10			Cap	
236 / 5		Borehole terminated at 5.0 mbgs								Groundwater measured at 4.49 mbgs (236.45 mASL) on May 28th, 2019
235 / 6										

Logged By: JSB **Input By:** CM

Appendix C

Borehole Logs

UTM 17 Z 610616 E
15 R 4911424 N
Elev. 15 R 0815
Basin 21 E 11

57 No 4837

The Ontario Water Resources Commission Act, 1957

WATER WELL RECORD

County or District Simcoe Township, Village, Town or City [redacted]

Date completed 21 / 5 / 1960 (day / month / year)

Address [redacted]

Casing and Screen Record

Inside diameter of casing 2"
Total length of casing 50'
Type of screen Factory made Cedar
Length of screen 6'
Depth to top of screen 50'
Diameter of finished hole 2"

Pumping Test

Static level 24'
Test-pumping rate 2 G.P.M.
Pumping level
Duration of test pumping 1 hr
Water clear or cloudy at end of test Clear
Recommended pumping rate G.P.M.
with pumping level of 30'

Well Log

Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	No. of feet water rises	Kind of water (fresh, salty, sulphur)
Hard fine sand	0	50			
" " "	50	56	50'	16'	Fresh

Water Record

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

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

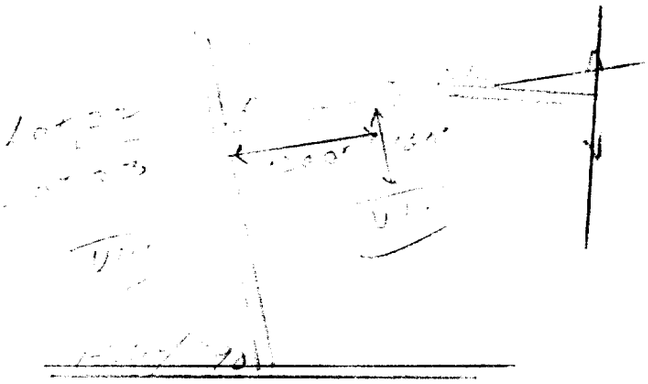
Drilling Firm [illegible]
Address [illegible]

Licence Number
Name of Driller [illegible]
Address [illegible]
Date May 25/60

[illegible]
(Signature of Licensed Drilling Contractor)

Location of Well

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



CSS3

UTM 17 Z 600439 E

Con VII 4914254 N

Elev. Lot 23 0800

Basin 2V

The Ontario Water Resources Commission Act

WATER WELL RECORD

B

No. 4840

County or District Simcoe

Township, Village, Town or City (Vespra)

Con. ~~8~~ VII Lot 23

Date completed 15 (day) Sept (month) 1964 (year)

[redacted]ess R.R. # 2 Barrie, Ont.

Casing and Screen Record

Inside diameter of casing 4"

Total length of casing 87

Type of screen JOHNSON S.S Slot 6

Length of screen 4'

Depth to top of screen 87

Diameter of finished hole 4"

Pumping Test

Static level 20'

Test-pumping rate 2 G.P.M.

Pumping level 66'

Duration of test pumping 1½ DAYS.

Water clear or cloudy at end of test CLEAR

Recommended pumping rate 2 G.P.M.

with pump setting of 86' feet below ground surface

Well Log

Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	Kind of water (fresh, salty, sulphur)
Dirty Sand	0'	23'		
Grey Clay	23'	60'		
Silty Clay	60'	64'		
Grey Clay	64'	87'		
Fine Sand	87'	91'	87	FRESH
Grey Clay	91'	94'		

(Water Record)

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

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

Drilling or Boring Firm Scott Wells

Address R.R. #1 Oro Station Ont.

Licence Number 1240

Name of Driller or Borer G.R. Scott

Address R.R. #1 Oro Station Ont.

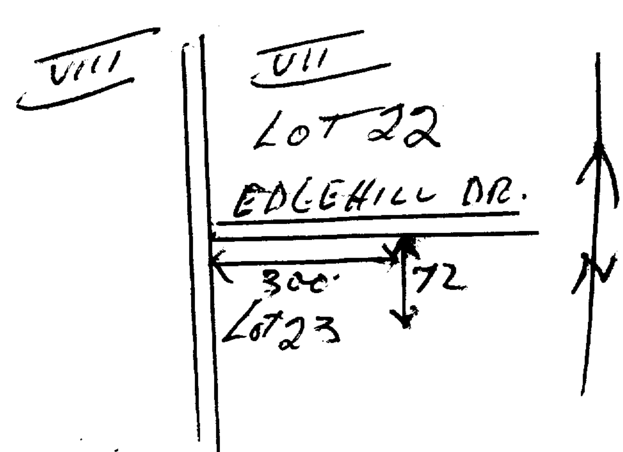
Date Nov. 4/64

G. R. Scott

(Signature of Licensed Drilling or Boring Contractor)

Location of Well

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



Form 7 15M-60-4138

OWRC COPY

C88.S8

UTM 17 600469 E
17 4914076 N
Elev. 17 0906
Basin 2M

ONTARIO

57 No 4842

The Well Drillers Act

Department of Mines, Province of Ontario

Water Well Record

BARRIE

County or Territorial District Simcoe Township, Village, Town or City Barrie

Con. 7 Lot 23 Street and Number (if in Village, Town or City)

Owner [redacted] Address Barrie R.R. #2

Date Completed 26 Sept. 1953 (day) (month) (year) Cost of Well (excluding pump)

Pipe and Casing Record

Casing diameter(s) 2"
Length(s) of casing(s) 54'
Type of screen Johnson Red Head
Length of screen 48"
Distance from top of screen to ground level 54'
Is well a gravel-wall type?

Pumping Test

Date Sept. 26 53
Static level 3'
Pumping level 15'
Pumping rate 300 gph Jenkins
Duration of test 1 hour
Distance from cylinder or bowls to ground level

Water Record

Kind (fresh or mineral) Fresh
Quality (hard, soft, contains iron, sulphur, etc.) Hard
Appearance (clear, cloudy, coloured) Clear
For what purpose(s) is the water to be used? Household
How far is well from possible source of contamination?
What is the source of contamination?
Enclose a copy of any mineral analysis that has been made of water

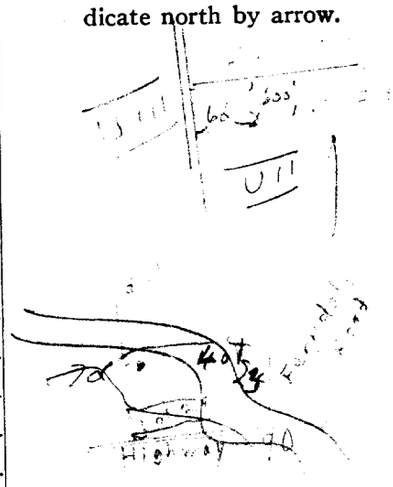
Depth(s) to Water Horizon(s)	Kind of Water	No. of Feet Water Rises
46'	Fresh	43'

Well Log

Overburden and Bedrock Record	From	To
Fine sand	0 ft.	41 ft.
Fine sand & veins clay	41'	46'
Fine sand	46'	50'
Medium Coarse sand	50'	58'

Location of Well

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



Situation: Is well on upland, in valley, or on hillside? Level ground

Drilling Firm [illegible]

Address Barrie R.R. #2

Name of Driller [illegible] Address Barrie R.R. #2

Date Sept. 28 53 Licence Number 532

Signature of Licensee

FORM 5

C

UTM 17 Z 600404 E

5 R 4914016 N

Elev. 5 R 0800

Basin 22

57 No 4863

The Ontario Water Resources Commission Act

WATER WELL RECORD

County or District SIMCOE Township, Village, Town or City VESPRA

Con. 8 Lot E.H Lot 23 Date completed 12 (day) 4 (month) 66 (year)

Owner [redacted] Address RR2 BARRIE

(print in block letters)

Casing and Screen Record

Inside diameter of casing 4"

Total length of casing 15'9"

Type of screen Johnston S.S. No 10 mesh

Length of screen 3'

Depth to top of screen 15'9

Diameter of finished hole 4"

Pumping Test

Static level 30'

Test-pumping rate 6 G.P.M.

Pumping level 90'

Duration of test pumping 2 hrs

Water clear or cloudy at end of test clear

Recommended pumping rate 5' G.P.M.

with pump setting of 120' feet below ground surface

Well Log

Overburden and Bedrock Record	From ft.	To ft.	Water Record: Depth(s) at which water(s) found	Water Record: Kind of water (fresh, salty, sulphur)
fine Sand	0	25		
sandy Clay	25	125		
runny sand & clay.	125	140	143 ft 9 in	fresh
Hard pan.	140	143	15'9 salt & water	
fine dirty sand ridges of Clay & gravel	143	158		
Hard pan.	158	159	159 to 162	
Course water bearing sand	159	162		

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

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

Drilling or Boring Firm Ken Mighton & Son

Address Durham

Licence Number 2077

Name of Driller or Borer Larry Mighton

Address Durham

Date 12/4/66

Kenneth G. Mighton

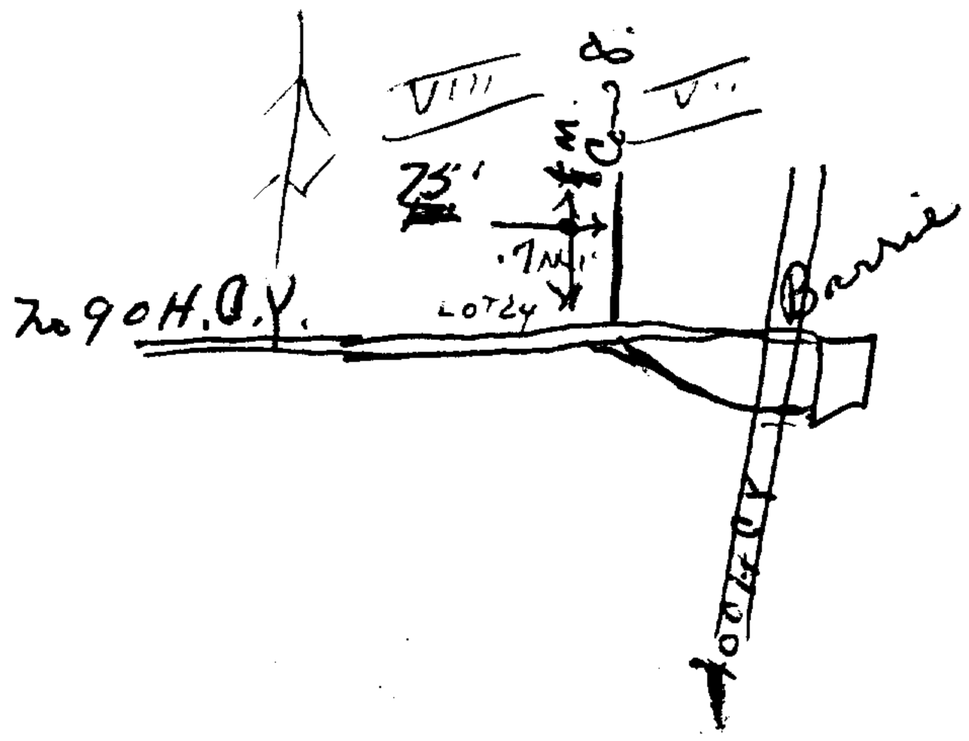
(Signature of Licensed Drilling or Boring Contractor)

Form 7 15M-60-4138

OWRC COPY

Location of Well

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



CSS.S8

[redacted]

APL

UTM 17 Z 6010315 E

15 R 4913944 N

Elev. 15 R 0775

57 No 4864

The Ontario Water Resources Commission Act

WATER WELL RECORD

Basin 22 | County or District Simco | Township, Village, Town or City Vespra

Con. VIII | Lot 23 | Date completed 30 (day) March (month) 1967 (year)

Owner Morris Cait Construction Ltd. (print in block letters) | Address Barrie

Casing and Screen Record

Inside diameter of casing 6¼"

Total length of casing 214'

Type of screen Johnsons S.S (3'slot 16 3'slot 18)

Length of screen 6'

Depth to top of screen 214'

Diameter of finished hole 6¼"

Pumping Test

Static level 34 FT

Test-pumping rate 30 G.P.M.

Pumping level 90'

Duration of test pumping 3 hrs

Water clear or cloudy at end of test clear

Recommended pumping rate 30 G.P.M.

with pump setting of 90' feet below ground surface

Well Log

Overburden and Bedrock Record	From ft.	To ft.	Water Record: Depth(s) at which water(s) found	Water Record: Kind of water (fresh, salty, sulphur)
Top soil	0	1		
Yellow SAND	1	56	24-40	
Very Fine grey SAND	56	163		
SILT with COURSE SAND	163	187		
HARD, CLAY, SAND, SILT	187	208		
CLAY, SILT, SAND	208	215		
Med SAND (SOME SILT)	215	222	214-222	FRESH
SANDY CLAY	222			

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

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

Drilling or Boring Firm Henry Hammers

Address RR #3 Barrie ONT

Licence Number 2216

Name of Driller or Borer A. Hammers

Address 90 Cumberland St. Barrie

Date April 6/67

Henry Hammers

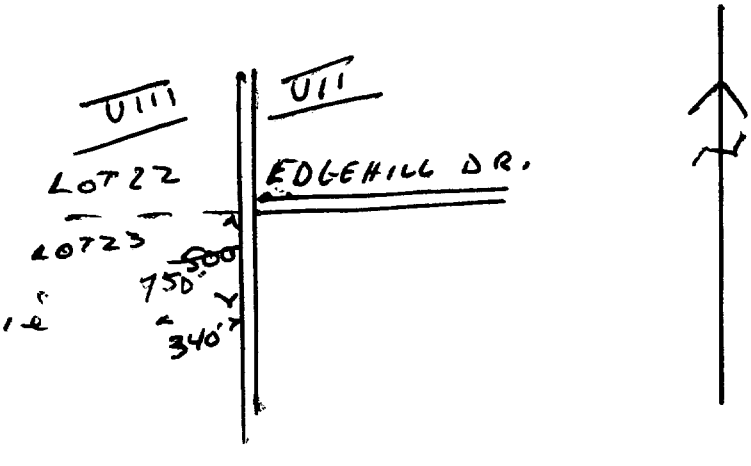
(Signature of Licensed Drilling or Boring Contractor)

Form 7 15M-60-4138

OWRC COPY

Location of Well

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



CSS.S8

UTM 17 Z 601351 E.
9 R 4914096 N
Elev. 9 R 0800
Basin 22

ONTARIO

57 No 4865

The Well Drillers Act
Department of Mines, Province of Ontario

Water Well Record

[redacted] p, Village, Town or City. Verner
Town or City)
s. Bauce R.R.#2

Date Completed 20 May 52. Cost of Well (excluding pump)
(day) (month) (year)

Pipe and Casing Record

Casing diameter(s) 2"
Length(s) of casing(s) 20'
Type of screen Johnson #10
Length of screen 48
Distance from top of screen to ground level 20
Is well a gravel-wall type? No

Pumping Test

Date May 20/52
Static level 4'
Pumping level 4'
Pumping rate 300 gal. per hour
Duration of test 8 hrs
Distance from cylinder or bowls to ground level None S.W. pump

Water Record

Kind (fresh or mineral) Fresh
Quality (hard, soft, contains iron, sulphur, etc.) Hard
Appearance (clear, cloudy, coloured) Clear
For what purpose(s) is the water to be used? House & garage
How far is well from possible source of contamination?
What is the source of contamination? None
Enclose a copy of any mineral analysis that has been made of water

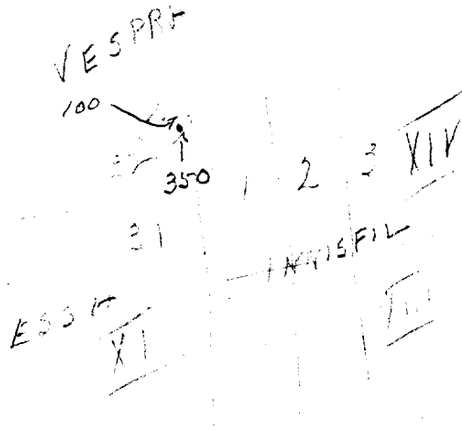
Depth(s) to Water Horizon(s)	Kind of Water	No. of Feet Water Rises
4'	Hard	16'
20		

Well Log

Overburden and Bedrock Record	From	To
	0 ft.	....ft.
Grey clay & pebbles	0	10
Fine sand & clay	10	18
Medium sand	18	24

Location of Well

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



Situation: Is well on upland, in valley, or on hillside? Valley
Drilling Firm. Preston Co. Ltd.
Address Bauce R.R.#2
Name of Driller Preston Co. Ltd. Address Bauce R.R.#2
Date July 2 1952 Licence Number 2232

Signature of Licensee

FORM 5

CSS.S8

The Ontario Water Resources Commission Act

WATER WELL RECORD

31 D / 5E

Water management in Ontario

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11

5707495 - MUNICIP. 57016 CON. Con 07

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT 25-27
Simcoe	Nespra	Con 7	~~22~~ 022

[redacted] R #2 Barrie Ont

DATE COMPLETED 48-53: DAY 30 MO ~~Sept~~ 09 YR. 70

[redacted] 914420 | RC. 4 | ELEVATION 0825 | RC. 5 | BASIN CODE 23

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH – FEET FROM	DEPTH – FEET TO
	red sand & stones			0	45
	fine sand + water			45	70

31 | 0045 7091 2 | 0070 08

32

41 WATER RECORD

WATER FOUND AT – FEET	KIND OF WATER
0060	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH – FEET FROM	DEPTH – FEET TO
04	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	188	0	~~70~~ 0065
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER	LENGTH
~~14~~ 006	04.000 INCHES	05 FEET

MATERIAL AND TYPE: ~~SS, 4 (~~ | DEPTH TO TOP OF SCREEN: 0065 ~~58~~ FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT – FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☒ BAILER

PUMPING RATE: 0005 GPM. | DURATION OF PUMPING: 01 HOURS 00 MINS.

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
040 ~~045~~ FEET	045 ~~040~~ FEET	045 FEET	045 FEET	045 FEET	045 FEET

WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY

IF FLOWING, GIVE RATE: GPM. | PUMP INTAKE SET AT: 60 FEET | WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☑ DEEP | RECOMMENDED PUMP SETTING: 060 FEET | RECOMMENDED PUMPING RATE: 0005 GPM.

0010 GPM./FT. SPECIFIC CAPACITY

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY
2 ☐ OBSERVATION WELL
3 ☐ TEST HOLE
4 ☐ RECHARGE WELL
5 ☐ ABANDONED, INSUFFICIENT SUPPLY
6 ☐ ABANDONED, POOR QUALITY
7 ☐ UNFINISHED

WATER USE 01

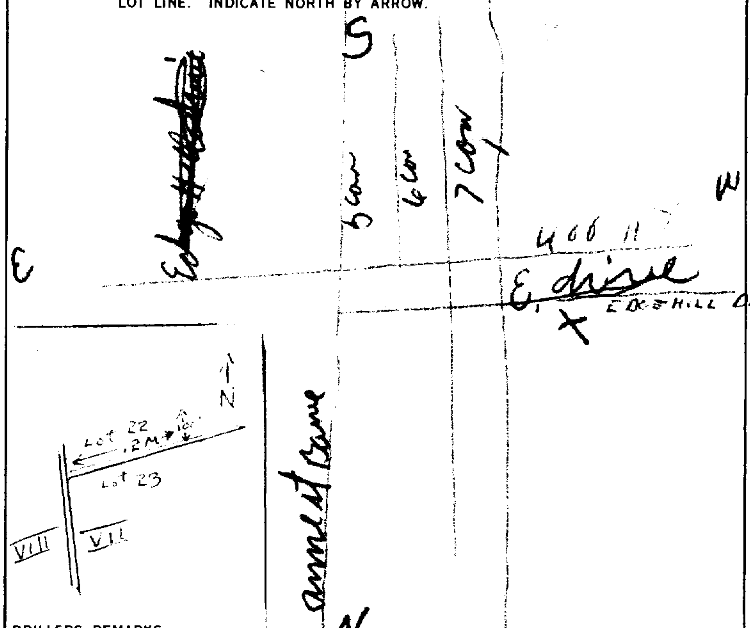
1 ☒ DOMESTIC
2 ☐ STOCK
3 ☐ IRRIGATION
4 ☐ INDUSTRIAL
☐ OTHER
5 ☐ COMMERCIAL
6 ☐ MUNICIPAL
7 ☐ PUBLIC SUPPLY
8 ☐ COOLING OR AIR CONDITIONING
9 ☐ NOT USED

METHOD OF DRILLING

1 ☒ CABLE TOOL
2 ☐ ROTARY (CONVENTIONAL)
3 ☐ ROTARY (REVERSE)
4 ☐ ROTARY (AIR)
5 ☐ AIR PERCUSSION
6 ☐ BORING
7 ☐ DIAMOND
8 ☐ JETTING
9 ☐ DRIVING

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

CONTRACTOR

NAME OF WELL CONTRACTOR	LICENCE NUMBER
Alex Cameron	1510

ADDRESS: R R # 1, Midhurst, Ont.

NAME OF DRILLER OR BORER: | LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: Alex Cameron | SUBMISSION DATE: DAY ___ MO. ___ YR. ___

OWRC COPY

OFFICE USE ONLY

DATA SOURCE: 1 | CONTRACTOR: 1510 | DATE RECEIVED: 061070

DATE OF INSPECTION: 24/3/71 | INSPECTOR: P.

REMARKS: CSS.S8

DocuSign Envelope ID: CFD7791E-D7D0-4963-8B32-258F7C1CD285

WELL RECORD

310/5E

Water management in On.

PLEASE PRINT ONLY IN SPACES PROVIDED
PLACE X IN CORRECT BOX WHERE APPLICABLE

11 (1 2)

5708000 (3 9)

MUNICIP. 57916 (10 14)

CON. CON (15 22 23 24)

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT (25-27)
SIMCOE	VESPRA	VII	23

OWNER (SURNAME FIRST) [redacted]

ADDRESS NORTH BAY ONT

DATE COMPLETED (48-53): DAY 17 MO. 04 YR. 71

21 (1 2)

UTM: ZONE 17 (10) EASTING 600650 (12 17) NORTHING 4914460 (18 24) RC. 14 (25) ELEVATION 0820 (26) RC. 5 (30) BASIN CODE 23 (31)

(II III IV) (47)

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH – FEET FROM	DEPTH – FEET TO
BROWN	SANDY CLAY			0	47
"	SAND		WET	47	64
"	"		DEAD	64	66

31: 0047 0057 0066 28

32: (1 2) (10) (14 15) (21) (32) (43) (54) (65) (75) (80)

41 WATER RECORD

WATER FOUND AT – FEET	KIND OF WATER
0047 0064 (10-13)	1 ☒ FRESH 3 ☐ SULPHUR (14) 2 ☐ SALTY 4 ☐ MINERAL
(15-18)	1 ☐ FRESH 3 ☐ SULPHUR (19) 2 ☐ SALTY 4 ☐ MINERAL
(20-23)	1 ☐ FRESH 3 ☐ SULPHUR (24) 2 ☐ SALTY 4 ☐ MINERAL
(25-28)	1 ☐ FRESH 3 ☐ SULPHUR (29) 2 ☐ SALTY 4 ☐ MINERAL
(30-33)	1 ☐ FRESH 3 ☐ SULPHUR (34) 2 ☐ SALTY 4 ☐ MINERAL (80)

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH – FEET FROM	DEPTH – FEET TO
(10-11) 05	1 ☒ STEEL (12) 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	188	0	0061 (16-17)
(17-18)	1 ☐ STEEL (19) 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			(20-23)
(24-25)	1 ☐ STEEL (26) 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			(27-30)

SCREEN

SIZE(S) OF OPENING (SLOT NO.) (31-33)	DIAMETER (34-38)	LENGTH (39-40)
008	05.000 INCHES	03 FEET

MATERIAL AND TYPE: JOHNSON S.S.

DEPTH TO TOP OF SCREEN (41-44): 0061 FEET (80)

61 PLUGGING & SEALING RECORD

DEPTH SET AT – FEET FROM	DEPTH SET AT – FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
(10-13)	(14-17)	
(18-21)	(22-25)	
(26-29)	(30-33) (80)	

71 PUMPING TEST

PUMPING TEST METHOD (10): 1 ☐ PUMP 2 ☒ BAILER

PUMPING RATE (11-14): 0003 GPM.

DURATION OF PUMPING: 01 (15-16) HOURS 30 (17-18) MINS.

STATIC LEVEL (19-21)	WATER LEVEL END OF PUMPING (22-24)	WATER LEVELS DURING (25) 1 ☒ PUMPING 2 ☐ RECOVERY			
		15 MINUTES (26-28)	30 MINUTES (29-31)	45 MINUTES (32-34)	60 MINUTES (35-37)
039 FEET	054 FEET	053 FEET	054 FEET	054 FEET	055 FEET

IF FLOWING, GIVE RATE (38-41): — GPM.

PUMP INTAKE SET AT: — FEET

WATER AT END OF TEST (42): 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP

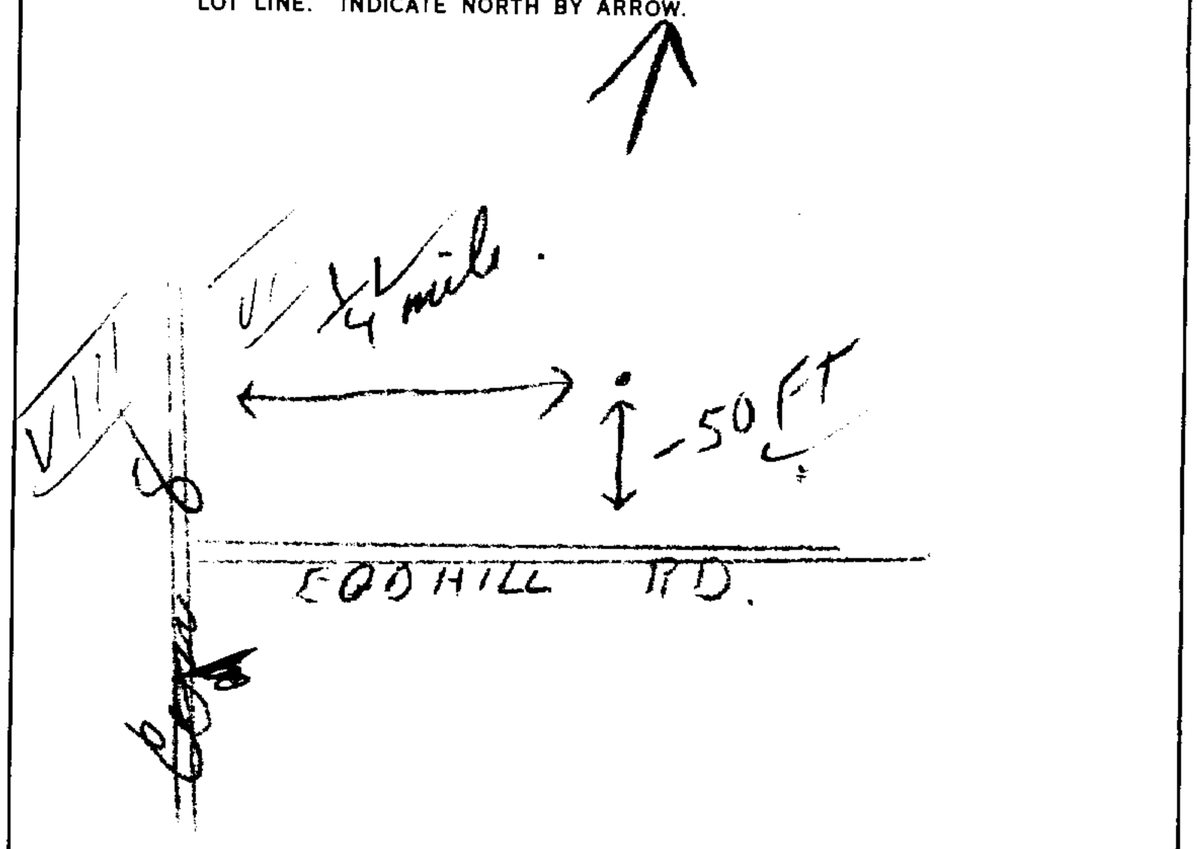
RECOMMENDED PUMP SETTING (43-45): 060 FEET

RECOMMENDED PUMPING RATE (46-49): 0003 GPM.

(50-53) 000.2 GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL (54)

1 ☒ WATER SUPPLY
2 ☐ OBSERVATION WELL
3 ☐ TEST HOLE
4 ☐ RECHARGE WELL
5 ☐ ABANDONED, INSUFFICIENT SUPPLY
6 ☐ ABANDONED, POOR QUALITY
7 ☐ UNFINISHED

WATER USE (55-56) 01

1 ☒ DOMESTIC
2 ☐ STOCK
3 ☐ IRRIGATION
4 ☐ INDUSTRIAL
5 ☐ COMMERCIAL
6 ☐ MUNICIPAL
7 ☐ PUBLIC SUPPLY
8 ☐ COOLING OR AIR CONDITIONING
9 ☐ NOT USED
☐ OTHER

METHOD OF DRILLING (57)

1 ☒ CABLE TOOL
2 ☐ ROTARY (CONVENTIONAL)
3 ☐ ROTARY (REVERSE)
4 ☐ ROTARY (AIR)
5 ☐ AIR PERCUSSION
6 ☐ BORING
7 ☐ DIAMOND
8 ☐ JETTING
9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: KNELSEN WATER WELLS — LICENCE NUMBER: 3203

ADDRESS: RR 1 BARRIE ONT

NAME OF DRILLER OR BORER: ANDREAS KNELSEN — LICENCE NUMBER: —

SIGNATURE OF CONTRACTOR: [signature] — SUBMISSION DATE: DAY 20 MO. 4 YR. 71

OWRC COPY

OFFICE USE ONLY

DATA SOURCE (58): 1 — CONTRACTOR (59-62): 3203 — DATE RECEIVED (63-68): 140771 (80)

DATE OF INSPECTION: — INSPECTOR: Z

REMARKS: C55.53

P M

WI

DocuSign Envelope ID: CFD7791E-D7D0-4963-8B32-258F7C1CD285

The Ontario Water Resources Commission Act

WATER WELL RECORD

310/5E

Water management in Ontario

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 5709013 | MUNICIP. 57016 | CON. GRN | 97

COUNTY OR DISTRICT: Simcoe

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Vespra

CON., BLOCK, TRACT, SURVEY, ETC.: 7

LOT: ~~Con.~~ 25-27 022

[redacted] Edge Hill Drive R.R. #1, BARRIE ONT.

DATE COMPLETED: DAY 18 MO ~~06~~ YR 72

RG | ELEVATION 0820 | RC 5 | BASIN CODE 22

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH – FEET FROM	DEPTH – FEET TO
	Brown sandy clay			0	40'
	mild Hard pan			40'	60'
	Course sand & water			60'	63'

31 00406050528 | 0006 14 | 0065 10

32

41 WATER RECORD

WATER FOUND AT – FEET	KIND OF WATER
0060	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH – FEET FROM	DEPTH – FEET TO
04	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	188	0	~~60~~ 0061
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.): 010 | DIAMETER: 04.000 INCHES | LENGTH: ~~04~~ FEET

MATERIAL AND TYPE: SS | DEPTH TO TOP OF SCREEN: ~~60~~ 0061 FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT – FEET FROM	DEPTH SET AT – FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☒ BAILER

PUMPING RATE: 0005 GPM | DURATION OF PUMPING: 01 HOURS 00 MINS

STATIC LEVEL: 040 FEET | WATER LEVEL END OF PUMPING: 045 FEET

WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY

15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
045 FEET	045 FEET	045 FEET	045 FEET

IF FLOWING, GIVE RATE: GPM

PUMP INTAKE SET AT: FEET

WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☐ DEEP

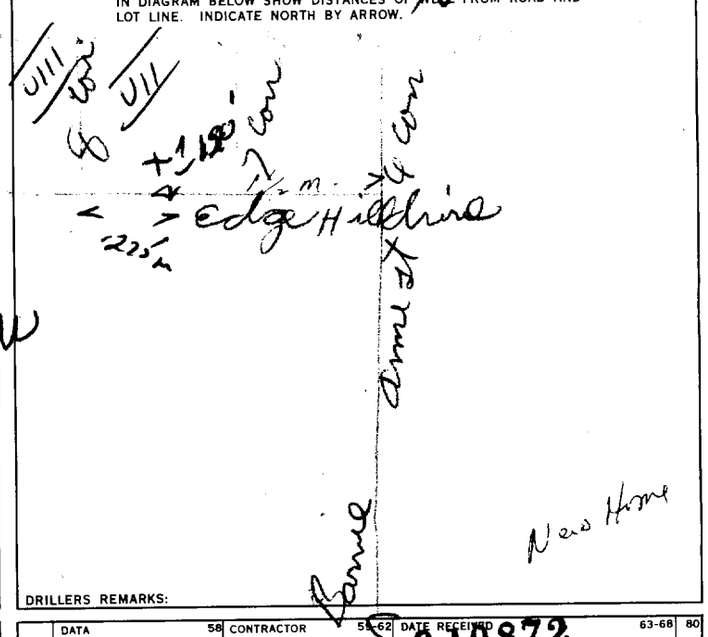
RECOMMENDED PUMP SETTING: ~~061~~ FEET

RECOMMENDED PUMPING RATE: 0005 GPM

001.0 GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL

54: 1 ☒ WATER SUPPLY 2 ☒ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE 01

55-56: 1 ☒ DOMESTIC 2 ☒ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING

57: 1 ☒ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: A E Cameron | LICENCE NUMBER: 1510

ADDRESS:

NAME OF DRILLER OR BORER: A E Cameron Jr. | LICENCE NUMBER: 1510

SIGNATURE OF CONTRACTOR: 17 Francis St | SUBMISSION DATE: DAY MO YR

OFFICE USE ONLY

DATA SOURCE: 1 | 58 CONTRACTOR: 1510 | 59-62 DATE RECEIVED: S 210872 | 63-68 80

DATE OF INSPECTION: | INSPECTOR: DM

REMARKS: | P | WI

OWRC COPY

The Ontario Water Resources Commission Act

WATER WELL RECORD

310/SE

Water management in Ontario

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 5709616 | MUNICIP. 57016 | CON. (A)W | 07

COUNTY OR DISTRICT: Simcoe | TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Vespra | CON., BLOCK, TRACT, SURVEY, ETC.: 7 | LOT: 23

[redacted] St. Vincent St. BARRIE, ONTARIO

DATE COMPLETED: DAY 23 MO. 12 YR. 72

RC 14390 | ELEVATION 0800 | RC 5 | BASIN CODE 22

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH – FEET FROM	DEPTH – FEET TO
Gray	Light sand			0	3
Brown	Clay			3	55

31: 0003128 | 0055605

32:

41 WATER RECORD

WATER FOUND AT – FEET	KIND OF WATER
0042	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
[illegible]	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH – FEET FROM	DEPTH – FEET TO
30	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☒ CONCRETE 4 ☐ OPEN HOLE	2½	0	55 / 0055
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT – FEET FROM	DEPTH SET AT – FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☒ BAILER | PUMPING RATE: 005 GPM | DURATION OF PUMPING: 01 HOURS 00 MINS.

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☒ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
042 FEET	050 FEET		049 FEET	047 FEET	045 FEET	043 FEET

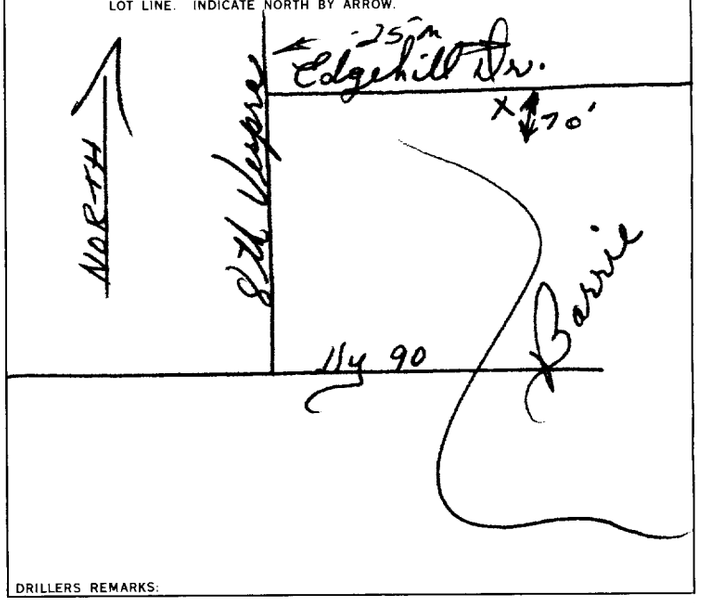
IF FLOWING, GIVE RATE: GPM | PUMP INTAKE SET AT: FEET | WATER AT END OF TEST: 1 ☐ CLEAR 2 ☒ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP | RECOMMENDED PUMP SETTING: 053 FEET | RECOMMENDED PUMPING RATE: 0004 GPM.

0006 GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE 01

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☒ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Roth Well Digging Ltd | LICENCE NUMBER: 4608

ADDRESS: RR# 5 Barrie Ont.

NAME OF DRILLER OR BORER: | LICENCE NUMBER: 4608

SIGNATURE OF CONTRACTOR: B Roth | SUBMISSION DATE: DAY 2 MO. 1 YR. 73

OFFICE USE ONLY

DATA SOURCE: 1 | CONTRACTOR: 4608 | DATE RECEIVED: 200273

DATE OF INSPECTION: | INSPECTOR:

REMARKS: | P | WI

OWRC COPY

The Ontario Water Resources Commission Act

WATER WELL RECORD

3105E

Water management in Ontario

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 — 5709790 — MUNICIP. 57016 — CON. CON — 07

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
SIMCOE	VESPRA TWP	CON 7	022

[redacted] CUNDLES E BARRIE — DATE COMPLETED: DAY 17 MO 05 YR 73

14450 — RC. 5 — ELEVATION 0820 — RC. 5 — BASIN CODE 22

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH – FEET FROM	DEPTH – FEET TO
BROWN	SAND	CLAY		0	55
BROWN	SILT			55	62
BROWN	SAND	GRAVEL		62	66

31 — 0055628O5 — 0062606 — 0066628 11

32

41 WATER RECORD

WATER FOUND AT – FEET	KIND OF WATER
0062	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH – FEET FROM	DEPTH – FEET TO
05	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	63 / 0063
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER	LENGTH
016	05.000 INCHES	03 FEET

MATERIAL AND TYPE: STAINLESS STEEL — DEPTH TO TOP OF SCREEN: 0063 FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT – FEET FROM	DEPTH SET AT – FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☒ BAILER — PUMPING RATE: 0005 GPM — DURATION OF PUMPING: 01 HOURS 00 MINS.

WATER LEVELS DURING: 1 ☐ PUMPING 2 ☒ RECOVERY

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
045 FEET	055 FEET	048 FEET	045 FEET	045 FEET	045 FEET

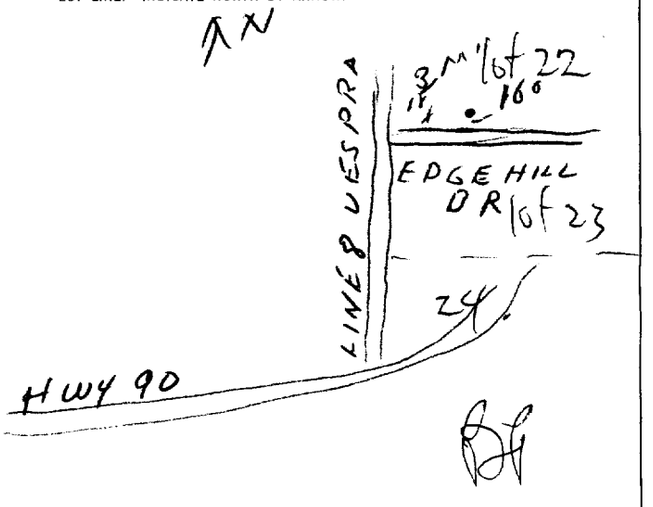
IF FLOWING, GIVE RATE: ____ GPM. — PUMP INTAKE SET AT: ____ FEET — WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP — RECOMMENDED PUMP SETTING: 062 FEET — RECOMMENDED PUMPING RATE: 0005 GPM.

____.____ GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL 0014

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL 54: 1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE 55-56: 01 — 1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING ☐ OTHER 9 ☐ NOT USED

METHOD OF DRILLING 57: 1 — 1 ☒ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: ANDERSON DRILLING — LICENCE NUMBER: 1204

ADDRESS: RR#2 THORNTON

NAME OF DRILLER OR BORER: O ANDERSON — LICENCE NUMBER: 1204

SIGNATURE OF CONTRACTOR: O Anderson — SUBMISSION DATE: DAY 18 MO 5 YR 73

OFFICE USE ONLY

DATA SOURCE 58: 1 — CONTRACTOR 59-62: 1204 — DATE RECEIVED 63-68: 220573

DATE OF INSPECTION: May 27/76 — INSPECTOR:

REMARKS:

P

WI

OWRC COPY

The Ontario Water Resources Commission Act

WATER WELL RECORD

3105E

Water management in Ontario

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 5709791 | MUNICIP. 57016 | CON. CON | 07

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
SIMCOE	VESPRA TWP	7 BP.	022 BP

OWNER (SURNAME FIRST)	ADDRESS	DATE COMPLETED
HUNTER CONST.		DAY 18 MO 05 YR 73

21 | UTM ZONE 17 | EASTING 600550 | NORTHING 4914400 | RC. 5 | ELEVATION 0820 | RC. 5 | BASIN CODE 22

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH – FEET FROM	DEPTH – FEET TO
BROWN	SAND	CLAY		0	42
BROWN	SAND	GRAVEL		42	48
BROWN	SAND			48	60

31 | 0042628 05 | 0048628 11 | 0060628

32

41 WATER RECORD

WATER FOUND AT – FEET	KIND OF WATER
10-13: 0048	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
15-18	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
20-23	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
25-28	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
30-33	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH – FEET FROM	DEPTH – FEET TO
05	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	57 / 0057
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER	LENGTH
010	05.000 INCHES	03 FEET

MATERIAL AND TYPE: STAINLESS STEEL 005 ?

DEPTH TO TOP OF SCREEN: FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT – FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
10-13	14-17	
18-21	22-25	
26-29	30-33	

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER

PUMPING RATE: 0004 GPM. DURATION OF PUMPING: 01 HOURS 00 MINS.

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☒ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
			042 FEET	040 FEET	037 FEET	037 FEET
097 FEET	049 FEET					

IF FLOWING, GIVE RATE: GPM.

PUMP INTAKE SET AT: FEET

WATER AT END OF TEST: 1 ☐ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP

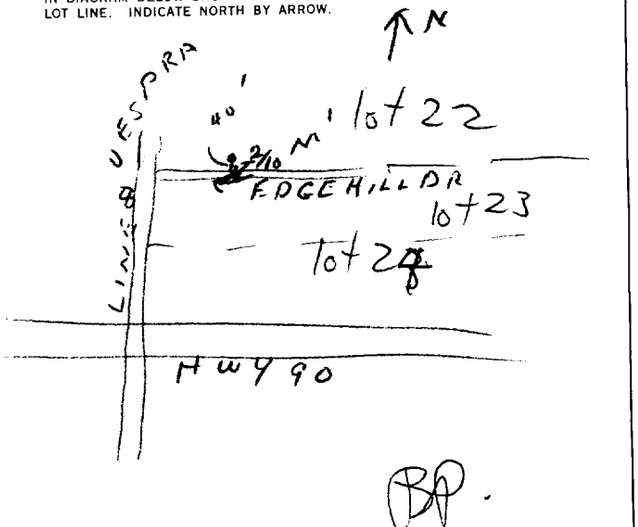
RECOMMENDED PUMP SETTING: 057 FEET

RECOMMENDED PUMPING RATE: 0004 GPM.

GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL 0014

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



BP.

DRILLERS REMARKS:

FINAL STATUS OF WELL	54	1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED
WATER USE	55-56: 01	1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED
METHOD OF DRILLING	57: 1	1 ☒ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: ANDERSON DRILLING — LICENCE NUMBER: 1204

ADDRESS: THORNTON RR#2

NAME OF DRILLER OR BORER: O ANDERSON — LICENCE NUMBER: 1204

SIGNATURE OF CONTRACTOR: O Anderson — SUBMISSION DATE: DAY 22 MO 5 YR 73

OFFICE USE ONLY

DATA SOURCE: 1 — CONTRACTOR: 1204 — DATE RECEIVED: [illegible] 63-68 80

DATE OF INSPECTION: May 27/76 — INSPECTOR:

REMARKS: P BP. WI

OWRC COPY

THE ENVIRONMENT

The Ontario Water Resources Act

WATER WELL RECORD

3 10SE

Ontario

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 5711988 | MUNICIP. 5701 6 | CON. CON 07

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
SIMCOE	VESPRA	7	023

[redacted] 3 GROVE ST BARRIE — DATE COMPLETED DAY 09 MO. 09 YR. 74

G 4300 | RC. 5 | ELEVATION 0800 | RC. 5 | BASIN CODE 22 | II | III | IV

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
DUG WELL				0	40
GREY	SAND		FINE	40	62
GREY	CLAY	SANDY		62	91
BROWN	SAND	GRAVEL		91	107

31 DOHO 23 | D0623208 | D09120581 | 0107628 1 1

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0091	1 ☑ FRESH 3 ☐ SULPHUR / 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR / 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR / 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR / 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR / 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
05	1 ☑ STEEL / 2 ☐ GALVANIZED / 3 ☐ CONCRETE / 4 ☐ OPEN HOLE	188	0	0103
	1 ☐ STEEL / 2 ☐ GALVANIZED / 3 ☐ CONCRETE / 4 ☐ OPEN HOLE			
	1 ☐ STEEL / 2 ☐ GALVANIZED / 3 ☐ CONCRETE / 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER	LENGTH
012	04.000 INCHES	04 FEET

MATERIAL AND TYPE: STAINLESS STEEL — DEPTH TO TOP OF SCREEN: 0103 FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☑ BAILER — PUMPING RATE: 0008 GPM — DURATION OF PUMPING: 01 HOURS 15 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☑ PUMPING 2 ☐ RECOVERY			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
020 FEET	042 FEET	042 FEET	042 FEET	042 FEET	042 FEET

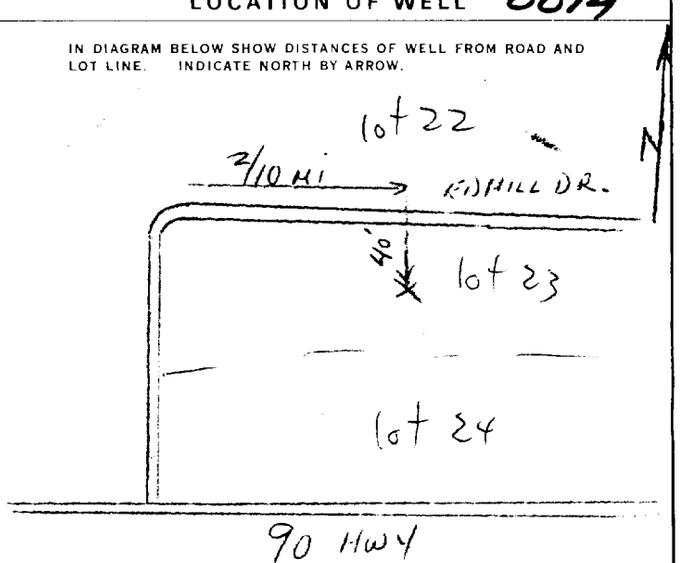
IF FLOWING, GIVE RATE: — GPM — PUMP INTAKE SET AT: — FEET — WATER AT END OF TEST: 1 ☑ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☑ SHALLOW ☐ DEEP — RECOMMENDED PUMP SETTING: 050 FEET — RECOMMENDED PUMPING RATE: 0008 GPM

— GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL 0014

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL 54: 1 ☑ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED

WATER USE 55-56: 01 — 1 ☑ DOMESTIC; 2 ☐ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; 9 ☐ NOT USED; ☐ OTHER

METHOD OF DRILLING 57: 1 ☑ CABLE TOOL; 2 ☐ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☐ ROTARY (AIR); 5 ☐ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: ONTARIO WELL BORING — LICENCE NUMBER: 4102

ADDRESS: 637 GORHAM ST. NEWMARKET

NAME OF DRILLER OR BORER: AL GILES — LICENCE NUMBER: 4102

SIGNATURE OF CONTRACTOR: [signature] — SUBMISSION DATE: DAY 10 MO. 2 YR. 75

OFFICE USE ONLY

DATA SOURCE 58: 1 — CONTRACTOR 59-62: 4102 — DATE RECEIVED 63-68: 02 04 75

DATE OF INSPECTION: May 27 76 — INSPECTOR: J.B

REMARKS: — P BP — WI

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 07-091

THE ENVIRONMENT

The Ontario Water Resources Act

WATER WELL RECORD

31 OSE

Ontario

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 5711989 | MUNICIP. 57016 | CON. CON 07

COUNTY OR DISTRICT: SIMCOE | TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: VESPRA | CON., BLOCK, TRACT, SURVEY, ETC.: 7 | LOT: 023

[redacted] GROVE ST. BARRIE | DATE COMPLETED: DAY 03 MO. 07 YR. 74

RC | ELEVATION: 14350 | RC: 5 | 0810 | RC: 5 | BASIN CODE: 22

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
	TOP SOIL			0	2
BROWN	CLAY		PACKED	2	16
BROWN	SAND		COARSE	16	40

31 D0021021 | D0166057 9 | 0040810

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0028	1 ☑ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
30	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☑ CONCRETE 4 ☐ OPEN HOLE	3	0	0020
30	1 ☐ STEEL 2 ☑ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE		20	0040
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☐ BAILER | PUMPING RATE: GPM. | DURATION OF PUMPING: HOURS MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
028 FEET	FEET		12 FEET	0022 FEET	NIL FEET	FEET

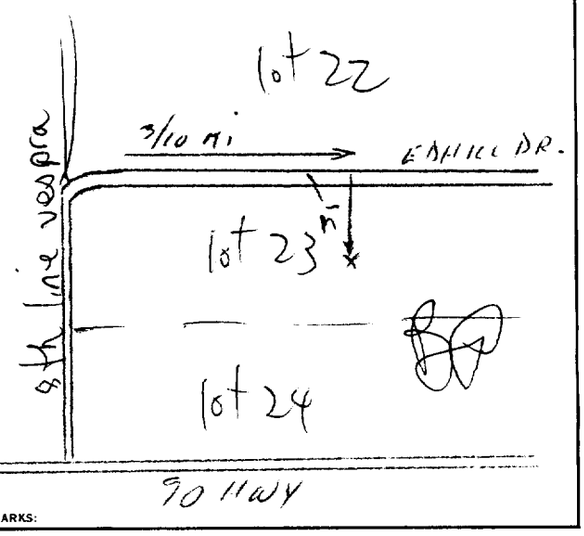
IF FLOWING, GIVE RATE: GPM. | PUMP INTAKE SET AT: FEET | WATER AT END OF TEST: 1 ☐ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☐ DEEP | RECOMMENDED PUMP SETTING: 037 FEET | RECOMMENDED PUMPING RATE: 0003 GPM.

GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL 0014

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL 1

1 ☑ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE 01

1 ☑ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING 6

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☑ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: ONTARIO WATER WELL DRILLING CO. | LICENCE NUMBER: 4102

ADDRESS: 637 GORHAM ST. NEWMARKET ONT.

NAME OF DRILLER OR BORER: DAVE MOORE | LICENCE NUMBER: 4102

SIGNATURE OF CONTRACTOR: Dave Moore | SUBMISSION DATE: DAY 10 MO. 2 YR. 75

OFFICE USE ONLY

DATA SOURCE 1 | CONTRACTOR 4102 | DATE RECEIVED 020475

DATE OF INSPECTION May 27/76 | INSPECTOR J.B.

REMARKS: P WI

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 07-091

Ontario — THE ENVIRONMENT

The Ontario Water Resources Act

WATER WELL RECORD

31 D5

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 — 7713519 — MUNICIP. 57016 — CON. C&N — 07

COUNTY OR DISTRICT: Simcoe — TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Vespra — CON., BLOCK, TRACT, SURVEY, ETC.: 7 — LOT: 023 — DATE COMPLETED: DAY 24 MO 06 YR

[redacted]

UTM 14250 — RC 5 — ELEVATION 0800 — RC 5 — BASIN CODE 22

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Grey	Sand	Clay	Grey Sand & Clay	15	45
Grey	Clay		Grey clay	45	83
Blue	Clay		Blue clay	83	111
Brown	Sand	Clay	Brown Sand & Clay	111	115
Grey	Clay		Grey Clay	115	123
Broken	Sand		Broken Sand	123	124
Grey	Clay		Grey Clay	124	131
Brown	Sand		Brown Med Sand	131	134

31 — 0014520 28 05 — 0008 32 05 — 01 11 13 05 — 01 15 16 28 05 — 01 23 20 5 — 01 24 16 28

32 — 01 31 20 5 — 01 31 46 09

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0131	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. - INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
05	1 ☑ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	0131
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.): 008 — DIAMETER: 05000 INCHES — LENGTH: 03 FEET

MATERIAL AND TYPE: Johnson Stainless — DEPTH TO TOP OF SCREEN: 0131 FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
~~120~~ 131		½ Packer

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☑ BAILER — PUMPING RATE: 0004 GPM — DURATION OF PUMPING: ____ HOURS ____ MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
023 FEET	FEET		FEET	FEET	FEET	FEET

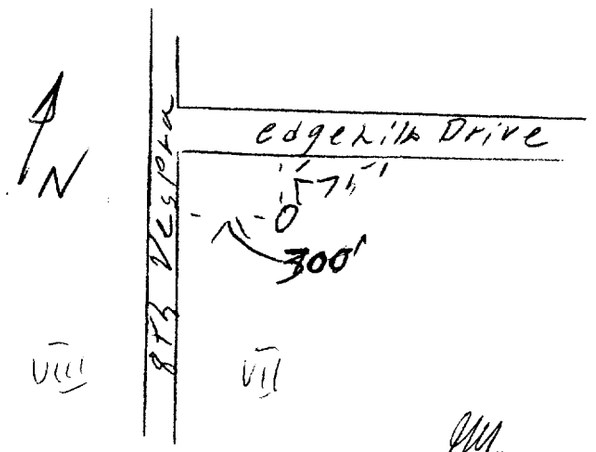
IF FLOWING, GIVE RATE: GPM — PUMP INTAKE SET AT: FEET — WATER AT END OF TEST: 1 ☐ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☑ DEEP — RECOMMENDED PUMP SETTING: FEET — RECOMMENDED PUMPING RATE: GPM

GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL 1 — 1 ☐ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE 1 — 1 ☑ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING 1 — 1 ☑ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: MARCHILDON DRILLING — LICENCE NUMBER: 3660

ADDRESS: Peter Marchildon

NAME OF DRILLER OR BORER: RR#2 Shanty Bay — LICENCE NUMBER: 3660

SIGNATURE OF CONTRACTOR — SUBMISSION DATE: DAY 26 MO. 8 YR 76

OFFICE USE ONLY

DATA SOURCE: 1 — CONTRACTOR: 3660 — DATE RECEIVED: 15 09 76

DATE OF INSPECTION — INSPECTOR

REMARKS: Yellow house — P JUNE 6/77 — WI

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 MOE 07-091

Ontario — THE ENVIRONMENT

The Ontario Water Resources Act

WATER WELL RECORD

1, W / 1/77

3105E

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

(11) 5714853 | MUNICIP. 57016 | CON. CON 07

COUNTY OR DISTRICT: SIMCOE | TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Vespra | CON. VII | LOT 022

OWNER (SURNAME FIRST): BARRIE PUC | ADDRESS: Ranfield Street Barrie | DATE COMPLETED: DAY 25 MO. 10 YR 77

(10) a 1-2-02 | ZONE 17 | EASTING 600300 | NORTHING 4914300 | RC 5 | ELEVATION 0825 5 | BASIN CODE 23

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Sand	clay	layers	0	25
Grey	clay	& some stones	soft	25	76
Grey	clay	soft & fine sand	layers	76	96
Grey	clay	sandy & some gravel	hard packed	96	104
Grey	clay	sandy	soft	104	116
Grey	clay	sandy & some stones	hard packed	116	126
Fine	Sand	& fine gravel	packed	126	148
Grey	clay		hard	148	184
Grey	fine Sand		packed	184	260
Grey	clay sandy	& fine Sand	layers	260	273
Grey	fine Sand	& clay?	packed	273	293
Grey	clay		hard	293	355
				355	396R

31 Check

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
10-13	1 ☐ FRESH 3 ☐ SULPHUR 14; 2 ☐ SALTY 4 ☐ MINERAL
15-18	1 ☐ FRESH 3 ☐ SULPHUR 19; 2 ☐ SALTY 4 ☐ MINERAL
20-23	1 ☐ FRESH 3 ☐ SULPHUR 24; 2 ☐ SALTY 4 ☐ MINERAL
25-28	1 ☐ FRESH 3 ☐ SULPHUR 29; 2 ☐ SALTY 4 ☐ MINERAL
30-33	1 ☐ FRESH 3 ☐ SULPHUR 34; 2 ☐ SALTY 4 ☐ MINERAL 80

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
10-11	1 ☐ STEEL 12; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE			13-16
17-18	1 ☐ STEEL 19; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE			20-23
24-25	1 ☐ STEEL 26; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE			27-30

SCREEN

SIZE(S) OF OPENING (SLOT NO.) 31-33	DIAMETER 34-38 INCHES	LENGTH 39-40 FEET
MATERIAL AND TYPE: Rotary Slot	DEPTH TO TOP OF SCREEN 41-44 FEET	80

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
10-13	14-17	
18-21	22-25	
26-29	30-33	80

71 PUMPING TEST

PUMPING TEST METHOD 10: 1 ☐ PUMP 2 ☐ BAILER | PUMPING RATE 11-14 GPM | DURATION OF PUMPING 15-16 HOURS 17-18 MINS

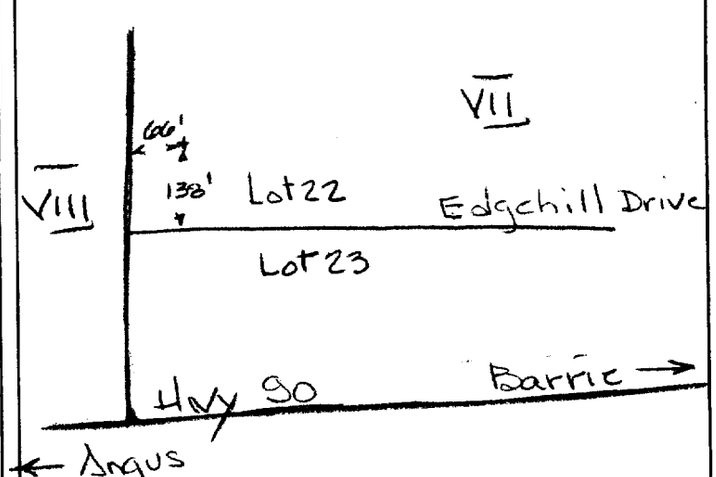
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING 25: 1 ☐ PUMPING 2 ☐ RECOVERY			
19-21 FEET	22-24 FEET	15 MINUTES 26-28 FEET	30 MINUTES 29-31 FEET	45 MINUTES 32-34 FEET	60 MINUTES 35-37 FEET

IF FLOWING, GIVE RATE 38-41 GPM	PUMP INTAKE SET AT FEET	WATER AT END OF TEST 42: 1 ☐ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☐ DEEP	RECOMMENDED PUMP SETTING 43-45 FEET	RECOMMENDED PUMPING RATE 46-49 GPM

50-53 ——•—— GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL 54

1 ☐ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED

WATER USE 55-56

1 ☐ DOMESTIC; 2 ☐ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; ☐ OTHER; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; 9 ☐ NOT USED

METHOD OF DRILLING 57

1 ☐ CABLE TOOL; 2 ☐ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☐ ROTARY (AIR); 5 ☐ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: International Water Supply Ltd. | LICENCE NUMBER 2801

ADDRESS: P.O. Box 310 Barrie Ont.

NAME OF DRILLER OR BORER | LICENCE NUMBER

SIGNATURE OF CONTRACTOR: John Wall | SUBMISSION DATE DAY 5 MO. 12 YR 77

OFFICE USE ONLY

DATA SOURCE 58 | CONTRACTOR 59-62 | DATE RECEIVED 63-68: 0 40178 | 80

DATE OF INSPECTION | INSPECTOR

REMARKS: Recorded 17/7/79

P 433

WI

FORM 7 MOE 07-091

MINISTRY OF THE ENVIRONMENT COPY

Ontario Ministry of the Environment

Measurements recorded in: ☐ Metric ☒ Imperial

Well Tag No. *(Place Sticker and/or Print Below)* A 063865

Well Record

Regulation 903 Ontario Water Resources Act

Page _____ of _____

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
110 Miller Drive	VESPRA.	23	8
County/District/Municipality	**City/Town/Village**	**Province**	**Postal Code**
SIMCOE	BARRIE	Ontario	
UTM Coordinates NAD 8 3 — Zone 17 — Easting 600508 — Northing 4913996	**Municipal Plan and Sublot Number**	**Other**	

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
	TOP SOIL			0'	3'
BROWN	CLAY			3'	25'
GREY	CLAY		Soft	25'	53'
GREY	CLAY	SILT	CEMENTED	53'	104'
GREY	SAND	WB	FINE	104	114'

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
0	109'	QUIK-GROUT	21 CU FT
	106'	K-PACKER	

Water Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
6 1/4"	STEEL	.188	+2'	109

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
5 1/2"	STEEL	#14	109	114

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	
109 (m/ft) ☐ Gas	☒ Fresh ☐ Untested	☐ Other, *specify*
(m/ft) ☐ Gas	☐ Fresh ☐ Untested	☐ Other, *specify*
(m/ft) ☐ Gas	☐ Fresh ☐ Untested	☐ Other, *specify*

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)

Pumping Test

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

If pumping discontinued, give reason:

Pump intake set at (m/ft): 110'

Pumping rate (l/min / GPM): 10 GPM

Duration of pumping: 8 hrs + — min

Final water level end of pumping (m/ft): 90'

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

Recommended pump depth (m/ft): 100'

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

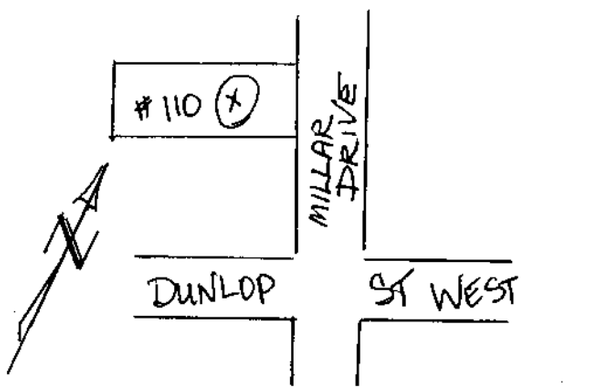
Well production (l/min / GPM):

Disinfected? ☒ Yes ☐ No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	32'		
1		1	
2		2	
3		3	
4	NR	4	NR
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
50		50	
60		60	

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: DRURY WELL DRILLING LTD
Well Contractor's Licence No.: 1851
Business Address (Street Number/Name): RR#1
Municipality: BARRIE
Province: ON
Postal Code: L4M4Y8
Business E-mail Address:
Bus. Telephone No. (inc. area code): 7052110053
Name of Well Technician (Last Name, First Name): N JACQUES
Well Technician's Licence No.: T171
Signature of Technician and/or Contractor:
Date Submitted: 2008 02 12

Well owner's information package delivered: ☒ Yes ☐ No
Date Package Delivered: 2008 02 14
Date Work Completed: 2007 08 24

Audit No. Z 80169
FEB 19 2008
Received

Ministry's Copy

Ontario Ministry of the Environment

Measurements recorded in: ☑ Metric ☐ Imperial

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

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
	CITY OF BARRIE	cityinfo@barrie.ca	

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. *(inc. area code)*
70 COLLIER ST., BOX 400	BARRIE	ON	L4M4T5	7057264242

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
MILLER DRIVE	VESPRA	23	8

County/District/Municipality	City/Town/Village	Province	Postal Code
SIMCOE	BARRIE	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	600378	4914162		

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
	DECOMMISSION	MILLER DRIVE TEST WELL			
		MOE 57-1864			
		150mm ϕ	SILICA GRAVEL	67.6	64.0
			BENTONITE GROUT	64.0	2.5m
			EXCAVATE AND CUT OFF 2m BGL		
			BENTONITE CHIPS	2.5	2.0
			NATIVE MATERIAL	2.0	ϕ

Annular Space

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

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

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

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)

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)*

Pumping rate *(l/min / GPM)*

Duration of pumping ____ hrs + ____ min

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

If flowing give rate *(l/min / GPM)*

Recommended pump depth *(m/ft)*

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

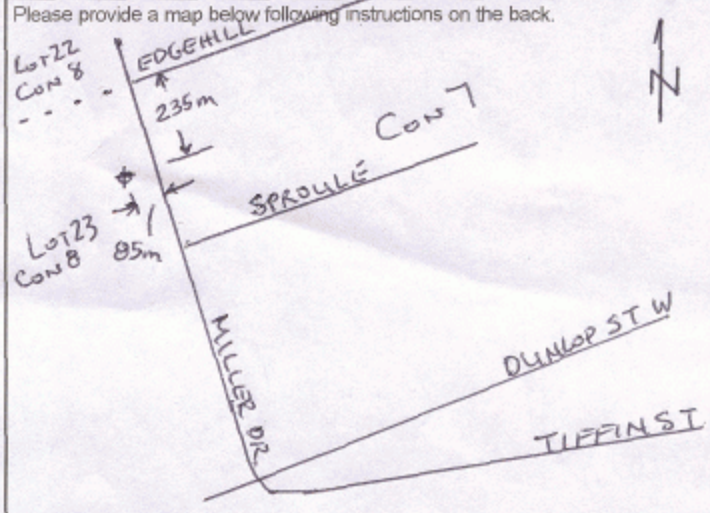
Well production *(l/min / GPM)*

Disinfected? ☐ Yes ☐ No

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

Map of Well Location MILLER DRIVE TW

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.
INTERNATIONAL WATER SUPPLY LTD	2801

Business Address (Street Number/Name)	Municipality
342 BAYVIEW DRIVE	BARRIE

Province	Postal Code	Business E-mail Address
ON	L4N4Y8	iwse iws.ca

Bus. Telephone No. *(inc. area code)*	Name of Well Technician (Last Name, First Name)
7057330111	MARCHILDON, PETER

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
0364	Tony Brown	20100614

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☐ No		20100531

Ministry Use Only

Audit No. z115265

Received JUN 17 2010

Ministry's Copy

Appendix D

Grain Size Analysis Data

Grain Size Distribution Chart

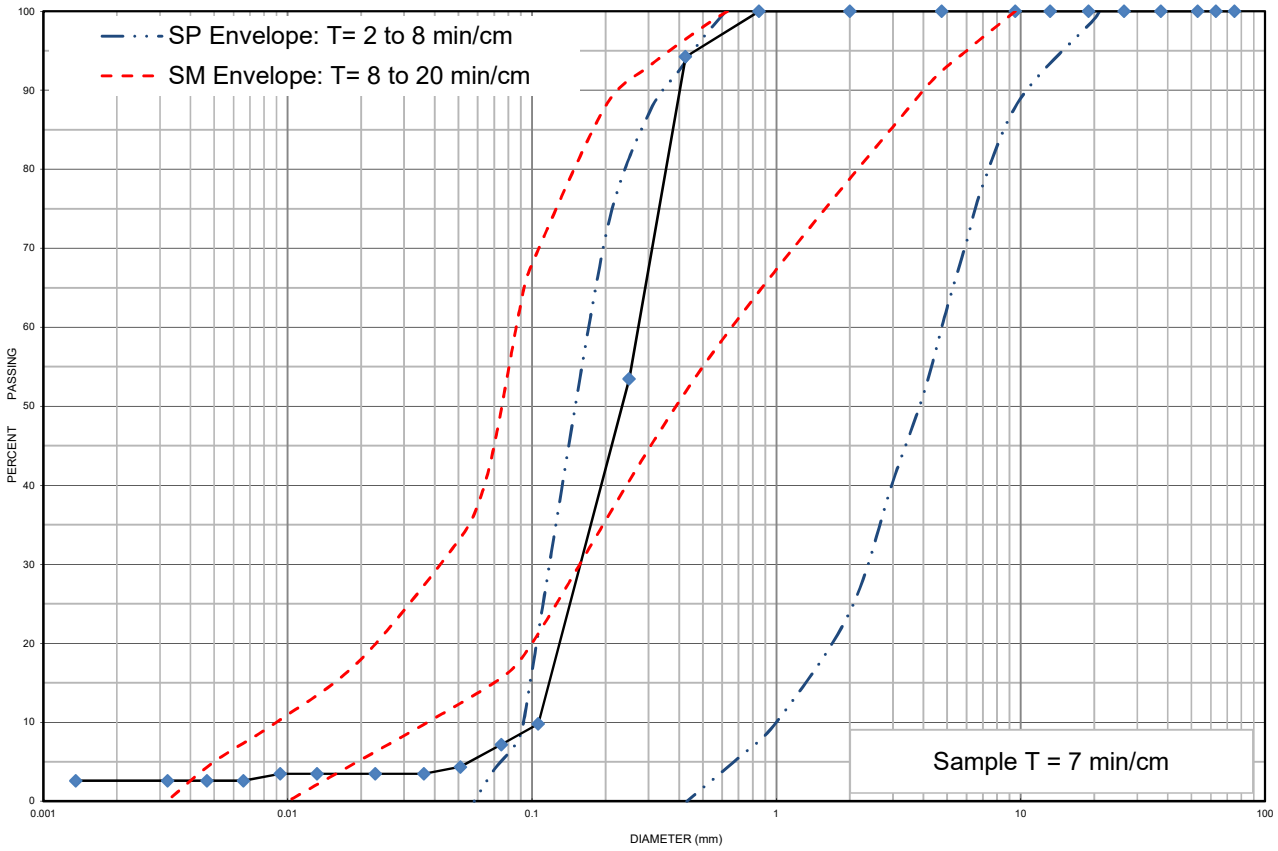
Project Number: *9089-001* **Client:** *iViva Homes*

Project Name: *Miller Drive Site*

Sample Date: *May 21, 2019* **Sampled By:** *Jacob Bell - Cambium Inc.*

Location: *BH 101-19 SS 3* **Depth:** *1.5 m to 2 m* **Lab Sample No:** *S-19-0334*

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 101-19	SS 3	1.5 m to 2 m	0	93	7		22.4

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Sand trace Silt trace Clay	SP	0.270	0.1600	0.1	2.45	0.86

Issued By: _____ *Date Issued:* *June 29, 2021*

(Senior Project Manager)

Cambium Inc. (Laboratory)
866.217.7900 | cambium-inc.com
701 The Queensway | Units 5-6 | Peterborough | ON | K9J 7J6

Grain Size Distribution Chart

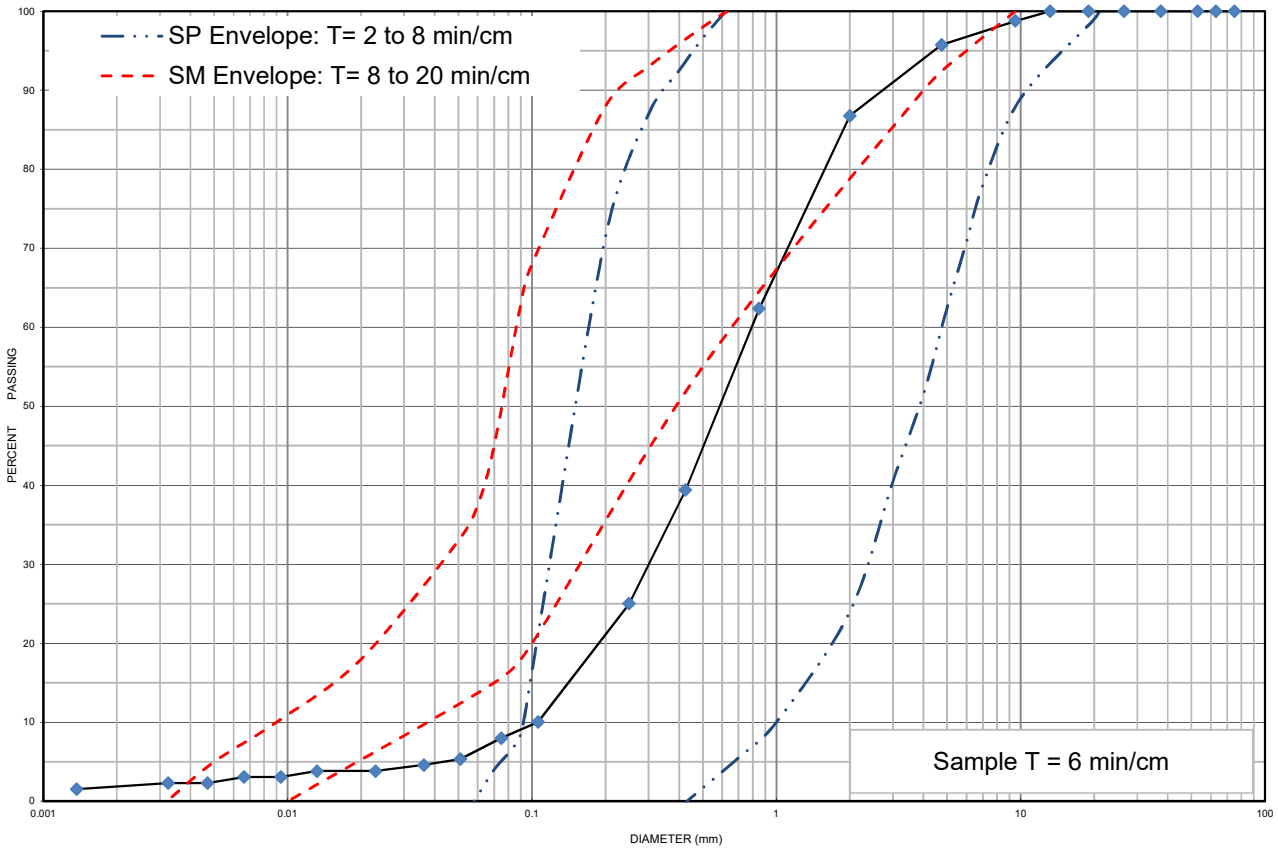
Project Number: *9089-001* **Client:** *iViva Homes*

Project Name: *Miller Drive Site*

Sample Date: *May 21, 2019* **Sampled By:** *Jacob Bell - Cambium Inc.*

Location: *BH 108-19 SS 4* **Depth:** *2.3 m to 2.7 m* **Lab Sample No:** *S-19-0335*

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 108-19	SS 4	2.3 m to 2.7 m	4	88	8		10.7

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Sand trace Silt trace Gravel trace Clay	SP	0.790	0.3000	0.1	7.18	1.04

Issued By: _____ *Date Issued:* *June 29, 2021*

(Senior Project Manager)

Cambium Inc. (Laboratory)
866.217.7900 | cambium-inc.com
701 The Queensway | Units 5-6 | Peterborough | ON | K9J 7J6

Grain Size Distribution Chart

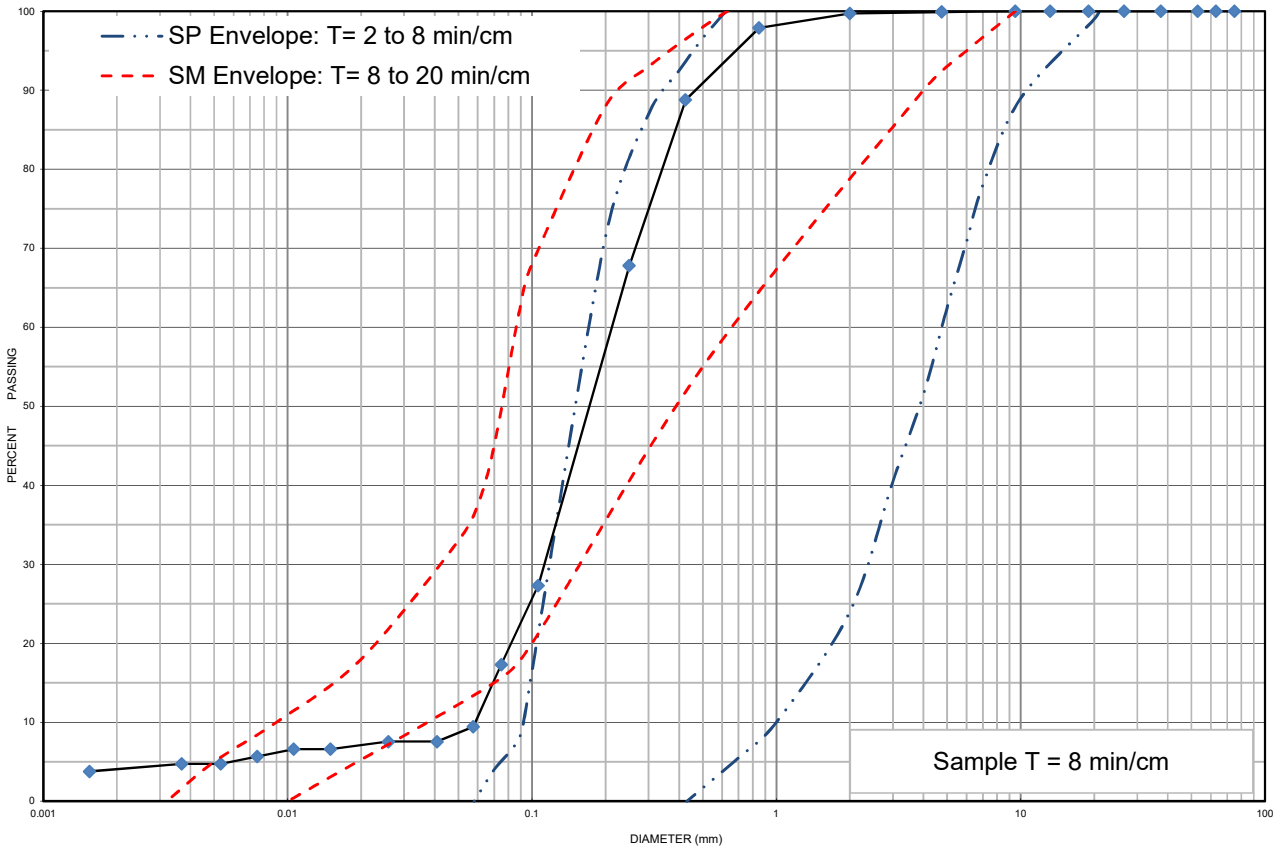
Project Number: *9089-001* **Client:** *iViva Homes*

Project Name: *Miller Drive Site*

Sample Date: *May 21, 2019* **Sampled By:** *Jacob Bell - Cambium Inc.*

Location: *BH 114-19 SS 2* **Depth:** *0.6 m to 1.2 m* **Lab Sample No:** *S-19-0336*

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 114-19	SS 2	0.6 m to 1.2 m	0	83	17		7.2

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Sand some Silt trace Clay	SP	0.220	0.1200	0.1	4.15	1.23

Issued By: _____ *Date Issued:* *June 29, 2021*

(Senior Project Manager)

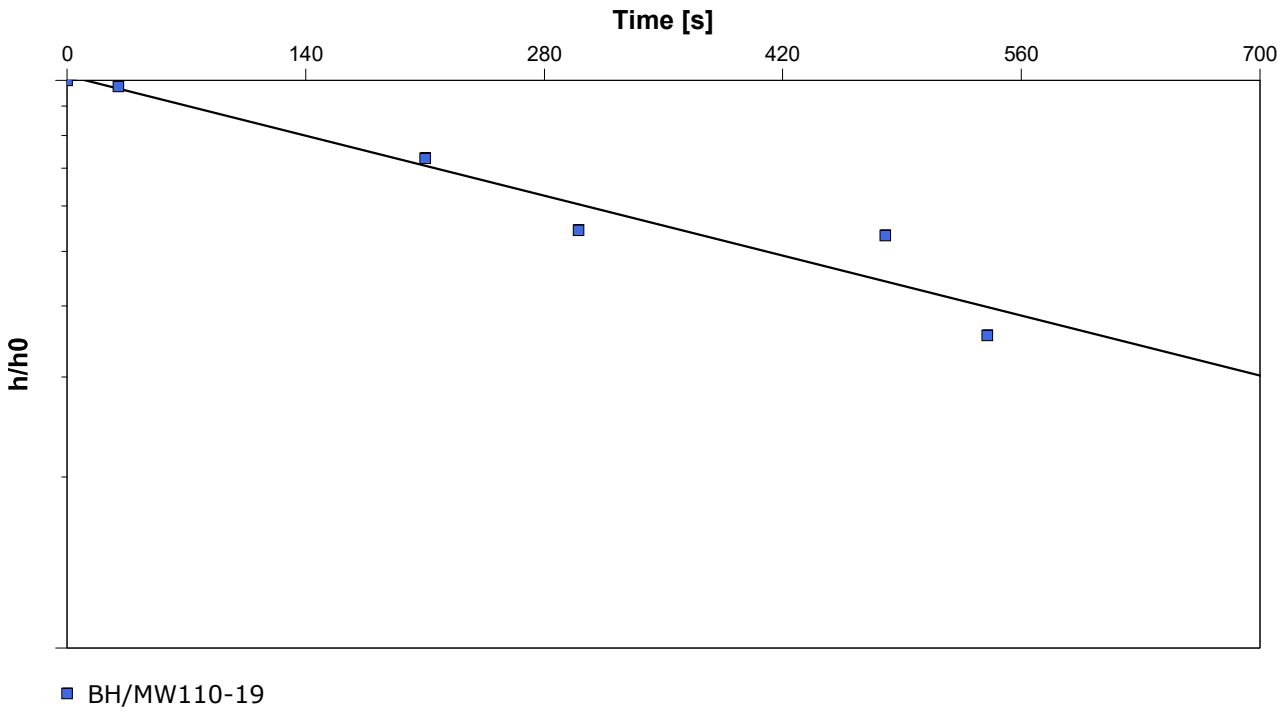
Cambium Inc. (Laboratory)
866.217.7900 | cambium-inc.com
701 The Queensway | Units 5-6 | Peterborough | ON | K9J 7J6

Appendix E

SWHT Results

Cambium Inc. 135 Bayfield St #102, Barrie, ON L4M 3B3	**Slug Test Analysis Report**
	Project: Hydrogeological Investigation
	Number: 9089-002
	Client: Park City Inc.

Location: 152 & 156 Miller Drive, Barrie	Slug Test: BH/MW110-19	Test Well: BH/MW110-19
Test Conducted by: Chris/Nicole		Test Date: 6/23/2021
Analysis Performed by: Sudhakar Kurli	Hvorslev	Analysis Date: 6/25/2021
Aquifer Thickness: 3.64 m		



Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
BH/MW110-19	1.24×10^{-6}	

Appendix F

Water Balance Calculations

Water Balance Calculations

152 156 Miller Drive, Barrie, Ontario

CAMBIUM

THORNTHWAITE-TYPE MONTHLY WATER-BALANCE MODEL

modified from Dingman 2015: Box 6-8 (pg 299) using ET model of Hamon (1963)

		Input Data				Computed Values							
											Surplus	398	mm/yr
Weather Station Location:	**Barrie WPCC**					**Latitude:**	**44.2**	**degree**					
Solar Declination (degree)	-20.6	-12.6	-1.5	10.0	19.0	23.1	21.0	13.4	2.6	-9.0	-18.5	-23.0	
DayLength (hr)*	9.1	10.3	11.8	13.3	14.6	15.3	14.9	13.8	12.3	10.8	9.5	8.7	
Available Water Storage Capacity		0.12	m/m		**Root Depth**	1000	mm		**SOILmax**	120.0	mm		

MONTHLY WATER BALANCE DATA

Temperatures in C, water-balance terms in mm.

Month:	J	F	M	A	M	J	J	A	S	O	N	D	Year
TEMPERATURE (T)	-7.7	-6.6	-2.1	5.6	12.3	17.9	20.8	19.7	15.3	8.7	2.7	-3.5	
PRECIPITATION (P)	82.5	61.8	58.1	62.2	82.4	84.8	77.2	89.9	94.0	77.5	88.9	73.6	933
RAIN	16.6	16.0	29.2	56.6	82.3	84.8	77.2	89.9	94.0	75.2	66.0	22.2	710
SNOW	66	46	29	6	0	0	0	0	0	2	23	51	223
MELT FACTOR (F)	0.00	0.00	0.00	0.93	1.00	1.00	1.00	1.00	1.00	1.00	0.45	0.00	
PACK	130	176	205	14	0	0	0	0	0	0	13	64	
MELT	0	0	0	196	14	0	0	0	0	2	10	0	223
INPUT (W)	17	16	29	253	96	85	77	90	94	78	76	22	933
POTENTIAL ET (PET)	0	0	0	39	68	96	116	100	67	40	23	0	548
NET INPUT (ΔW)	17	16	29	214	29	-12	-38	-10	27	38	54	22	
SOIL MOISTURE (SOIL)	120	120	120	120	120	109	79	73	100	120	120	120	
ΔSOIL	0	0	0	0	0	-11	-30	-6	27	20	0	0	0
ET	0	0	0	39	68	96	107	96	67	40	23	0	535
SURPLUS=W-ET-DSOIL	17	16	29	214	29	0	0	0	0	18	54	22	398

Notes:

Precipitation, Rain, Temperature, and Latitude are inputted parameters

SOILmax = available water storage capacity * root depth

m = month

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

$SNOW_m = P_m - RAIN_m$

$F_m = 0$ if $T_m <= 0^oC$; $F_m = 0.167*T_m$ if $0^oC<T_m<6^oC$; $F_m = 1$ if $T_m>=6^oC$

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

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

$W_m = RAIN_m+MELT_m$.

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

$\Delta W_m = W_m - PET_m$

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

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

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

Pre- and Post-Development Water Balance Calculations

152 156 Miller Drive, Barrie, Ontario

1 Climate Information

Precipitation	933	mm/yr
Actual Evapotranspiration	535	mm/yr
Water Surplus	398	mm/yr

2 Infiltration Rates

Table 2 Approach - Infiltration factors	
Topography: Rolling Land	0.2
Soil Type: Sandy Loam	0.35
Cover: Cultivated land/Woodland	0.15
Total Infiltration Factor	**0.7**

Infiltration (Water Surplus * Infiltration Factor)	**279**	mm/yr
Run-off (Water Surplus - Infiltration)	**119**	mm/yr

Table 3 Approach - Typical Recharge Rates		
Coarse Sand and Gravel	>250	mm/yr
Fine to medium sand	200-250	mm/yr
Silty sand to sandy silt	150-200	mm/yr
Silt	125-150	mm/yr
Clayey Silt	100- 125	mm/yr
Clay	<100	mm/yr

Site development area is underlain predominantly by sandy silt to silty clay

Based on the above, the recharge rate is typically	150-200	mm/yr

3 Pre-Development Property Statistics	**ha**	**m^2**
Total Paved Area	0.04	394
Total Roof Area	0.04	423
Total Landscape Area	1.36	13,615
Total	**1.44**	**14,432**

4 Post-Development Property Statistics	**ha**	**m^2**
Total Paved Area	0.41	4,219
Total Roof Area	0.28	5,093
Total Landscape Area	0.31	5,120
Total	**1.01**	**14,432**

Pre- and Post-Development Water Balance Calculations

152 156 Miller Drive, Barrie, Ontario

5 Pre-Development Water Balance

Land Use		Area (m^2)	Precipitation (m^3)	Evapotranspiration (m^3)	Infiltration (m^3)	Run-off (m^3)
Impervious Areas	Paved Area	394	368	37	-	331
	Roof Area	423	395	39	-	355
Pervious Areas	Landscape Area	13,615	12,703	7,284	3,793	1,626
	Totals	14,432	13,465	7,360	3,793	2,312
Assuming no infiltration occurring in paved and roof areas, and 10% of precipitation to be evaporated from paved and roof areas.						

6 Post-Development Water Balance

Land Use		Area (m^2)	Precipitation (m^3)	Evapotranspiration (m^3)	Infiltration (m^3)	Run-off (m^3)
Impervious Areas	Paved Area	4,219	3,936	394	-	3,543
	Roof Area	5,093	4,752	475	-	4,277
Pervious Areas	Landscape Area	5,120	4,777	2,739	1,426	611
	Totals	14,432	13,465	3,608	1,426	8,431
Assuming no infiltration occurring in paved and roof areas, and 10% of precipitation to be evaporated from paved and roof areas.						

7 Comparision of Pre- and Post -Development

	Precipitation (m^3)	Evapotranspiration (m^3)	Infiltration (m^3)	Run-off (m^3)
Pre-Development	13,465	7,360	3,793	2,312
Post-Development	13,465	3,608	1,426	8,431
Change in Volume	-	- 3,752	- 2,367	6,119
Change in %	-	- 51	- 62	265

8 Requirement for Infiltration of Roof Run-off

Volume of Pre-Development Infiltration (m^3/yr)	3,793
Volume of Post-Development Infiltration (m^3/yr)	1,426
Deficit from Pre to Post Development Infiltration (m^3/yr)	2,367
Percentage of Roof Runoff required to match the pre-development infiltration (%)	55