HYDROGEOLOGICAL IMPACT STUDY

Proposed New Sub-Division

0 Mount Pleasant Road

Town of Caledon, Ontario

Prepared for:

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Project: SP17-212-00
October 17, 2019

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1. INTRODUCTION AND BACKGROUND

Sirati & Partners Consultants Limited (SIRATI) was retained by Tropical Land Development Limited c/o David Goodman (collectively referred to as the Client**)** to conduct a Hydrogeological Assessment at the property located at 0 Mount Pleasant Road, Town of Caledon, Ontario (the Property or the Site). The site location map is presented in Figure 1-1. The entire Property is an approximately 12.28-hectare (30.34 acres) parcel of land extending approximately 678.5 metres (m) along northeast and southwest and about 181 m along Mount Pleasant Road. The Property is a cultivated undeveloped land, and includes no structures.

The hydrogeological study was conducted to assess the subsurface soil conditions, soil stratigraphy, groundwater table condition and its flow direction, and identify potential impact to base flow of local streams or significant natural features within the study area.

This hydrogeological assessment was carried out in accordance with the following scope of work:

- **Review of available background information**: A review of available geological and hydrogeological information for the site and surrounding areas was conducted. This is done to provide background information to allow for characterization of regional hydrogeological conditions.
- **Detailed site inspection**: An inspection of the property 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:** To confirm the groundwater table levels and elevations using existing boreholes/monitoring wells drilled/installed during the geotechnical investigation program.
- **In-situ hydraulic conductivity tests:** In-situ hydraulic conductivity tests (rising-head tests) in selected monitoring wells to estimate the hydraulic conductivity of the underlying soils in order to determine potential dewatering requirements/volumes.
- **Private water well survey:** An inventory survey for water wells located within approximately 500 m radius of the site boundary, and to obtain well information and/or permission from the property owners to visit the water wells, if any.
- **Water Balance:** A preliminary water balance study for the proposed development as part of the hydrogeological study. The water balance study was carried out using the Thornthwaite approach

based on available climatic information associated with pre-development and post-development conditions at the subject lands.

- **Reporting:** Preparation of a report to summarize the soil and groundwater conditions at the Site, provide an assessment of potential changes to the water balance as a result of site development, as well as provide potential mitigation measures that can be implemented in order to maintain groundwater function at the Site, such as including managing the overland flow to encourage infiltration. The report would include the following information:
  - Description of the factual information reviewed and obtained from available public data sources and from the previous investigation reports,
  - Description of the work program conducted and the data gathered during this study,
  - Summary of the identified significant hydrogeological features and functions, and the water use status at and near the Site,
  - Summary of water balance study for the Site on the existing pre-development and the proposed post-development conditions,
  - Assessment of potential impacts due to the proposed development on the natural environment as well as use of water wells, and providing appropriate mitigating measures.

It should be noted that concurrent with this hydrogeological assessment, a preliminary geotechnical investigation was conducted by SIRATI at the Site, for which eight (8) boreholes were advanced and five (5) monitoring wells were installed to characterize the subsurface soil and groundwater conditions. The existing monitoring wells were utilized for groundwater monitoring, sampling and testing in this hydrogeological investigation.

This report presents the results of the hydrogeological assessment for the proposed development along with supporting materials.

2. LAND USE

The Subject Property is a vacant undeveloped parcel of land, and is bounded by Mount Pleasant Road to the northeast, vegetated woodlot to the southeast and southwest, and a property with a single/detached residential house to the northwest.

As shown in Figure 2-2, the Subject Property is located within Oak Ridges Moraine Conservation Plan area, in an area designated as Palgrave Estate Residential Community land use area (a component of Countryside Area), where residential development is permitted. The Subject Property is within the jurisdiction of the Nottawasaga Valley Conservation Authority (NVCA).

3. DEVELOPMENT PLAN

The Property covering an area of about 12.28-hectare (30.34 acres), was proposed to be developed as a residential subdivision, ultimately comprising of eight (8) single detached custom homes with one-level basement on eight (8) development lots. The site development plan is included in Figure 3-1, which presents the and elevations for finished floor and basement level of each of the proposed residential houses.

It is also understood that the source of potable water to the proposed development will be through the Palgrave municipal supply wells and serviced by private septic systems.

Based on the topography and the current surface water drainage condition, the Subject Property can be divided into two (2) catchments, as Catchment Area 1 and Catchment Area 2, as shown in Figure 3-2. A topographic divide or high seems to be located in the mid-portion of the Site, near the area of Lot 3, Lot 6 and Lot 7. The post-development plans are presented in Figure 3-3, 3-4 and 3-5. It should be noted that the site statistics presented in these maps were used for the water balance calculations.

It was found, based on preliminary survey plan (Figure 3-6), that the highest average grade elevation was located in Lot 3 at 297.69 metres above sea level (mASL), while the lowest average elevation was at Lot 8 at 293.74 mASL.

A revised preliminary Site grading plan prepared by Valdor Engineering (Figure 3-7) was provided by the client. Accordingly, as per the grading plan, the finished floor elevations ranged from 298.30 mASL at Lot 3 to 295.55 mASL at Lot 8, while the basement elevations ranged between 295.00 mASL and 292.45 mASL.

4. NATURAL ENVIRONMENTAL FEATURES

To assess the natural environmental features, the databases maintained by the Ministry of Natural Resources and Forestry (MNRF), the Ministry of Environment, Conservation and Parks (MECP) and Nottawasaga Valley Conservation Authority (NVCA) were reviewed. As shown on Figure 4-1, no wetland, provincial parks, reserve area or area of natural heritage and scientific interest (ANSI) was found on or near the Property. However, the following features have been identified.

1) The Property is located in Oak Ridges Moraines (ORM) area. The ORM is an irregularly shaped geologic feature, formed from glacial sand and gravel deposition and is classified as Significant Recharge Area due to the presence of coarse-grained sand and gravel deposits with layers of silty clay to clayey silt till, protecting the water supply aquifers. The Site, however, as

shown in Figure 2-2, is located in Palgrave Estate Residential Community land use area, where residential development is permitted.

2) As shown in Figure 2-1, the Site is located in Nottawasaga Valley Watershed, in Innisfil Creek subwatershed. An unnamed creek is located in the northeast of the Property, along which NVCA regulated area is identified. A 30-m buffer from the creek will be required.

3) The Property is located in an area identified as Significant Groundwater Recharge Areas (SGRAs). SGRAs are geographic areas within which it is desirable to regulate or monitor drinking water threats that may affect the recharge to an aquifer. SGRAs are the areas where the recharge is 15% greater than the average recharge across the study area.

4) Part of the Property (the southwest portion) is located in the wellhead protection area (WHPA) -D, (25 year time of travel) for the Palgrave municipal system, with a vulnerability score of 4 out of 10. A wellhead protection area is the area around the wellhead where land use activities have the potential to affect the quality of water that flows into the well.

5) Part of the Property (the southwest portion) is located in an area identified as a highly vulnerable aquifer (HVA). HVA is one that is particularly susceptible to contamination because of either its location near the ground's surface or because of the type of materials found in the ground around it.

5. PHYSICAL SETTING

5.1 Topography and Drainage

As shown in Figure 5-1, the topography of the Site ranges in elevation generally between 290 mASL located in the northeast, and 300 mASL in the southwest of the Property. The elevated locations are located in the mid-portion of the Site, where a drainage divide is apparently present in areas of Lots 3, 6 and 7. The highest elevation is identified to be approximately 298.1 mASL in Lot 3 (as in Figure 5-1a).

The Site is located within the Nottawasaga Valley Watershed which has nine (9) subwatersheds. The Innisfil Creek subwatershed is one of the nine (9) subwatersheds, and consists of four main creek systems, namely Innisfil Creek, Bailey Creek, Beeton Creek and Penville Creek that drain the southeast portion of the Nottawasaga River watershed. The Subject Property falls within the Beeton Creek system.

Beeton Creek arises on the Oak Ridges Moraine south of Tottenham. Flowing north, the creek enters a reservoir at the Tottenham Conservation Area and then continues downstream. An east branch, originating east of Tottenham, flows westward through agricultural lands and enters Beeton Creek north

of Tottenham. Beeton Creek continues to flow northward through an agricultural landscape, skirting the west side of Beeton before joining Bailey Creek and then entering Innisfil Creek.

Also as shown in Figure 5-1, one (1) unnamed tributary is located in the northeast portion of the Site, and one (1) tributary is located southwest/outside of the Property. However, historic aerial photographs do not indicate a permanent water course located on the Site.

5.2 Physiography

The Nottawasaga Valley Watershed is located within five (5) main regional-scale physiographic regions as defined by Chapman and Putnam (1984). These regions include the Horseshoe Moraines, Oak Ridges Moraine, Peterborough Drumlin Field, Schomberg Clay Plains and Simcoe Lowlands (Figure 5-2).

The Subject Property lies within the physiographic region termed as Oak Ridges Moraine. The Oak Ridges Moraine is comprised of rolling sandy hills, hummocky topography and closed depressions that form the source of the headwaters to major stream that drain off the moraine. The moraine within the subwatershed consists primarily of surficial sand and gravel deposits.

5.3 Overburden

As shown in Figure 5-3, the Subject Property is located in an area covered with ice-contact stratified deposits, which generally consist of gravel and sand deposits, with minor till, and also contain esker, kame, end moraine, ice-marginal delta and subaqueous fan deposits.
The Paleozoic bedrock topography appears to strongly influence the overlying Quaternary sediment thickness and distribution. The thicker Quaternary sediments occur in bedrock topographical lows (i.e. within bedrock valleys and beneath the ORM). The overburden thickness within the Oak Ridges Moraine (ORM) ranges from approximately 56 m to 240 m.

5.4 Bedrock

The bedrock consists of shale, interbedded dolomitic siltstone, and minor limestone, which were deposited in shallow seas about 450 million years ago. These beds, named the Georgian Bay Formation are approximately 250 m thick and dip to the southeast at about 5 m/km. Following long periods of additional sedimentation and erosion, the ancient Laurentian River and its tributaries cut several deep, poorly-defined bedrock valleys trending northwest-southeast across the area. As depicted in Figure 5-4, the study area is underlain by the Georgian Bay Formation, which has an important influence on drift thickness and groundwater distribution in the study area.

6. HYDROGEOLOGY

The regional hydrogeological conditions were assessed using the data obtained from the MECP water well database including domestic water wells and municipal water wells.

6.1 Private Water Wells

As shown in Figure 6-1, seventeen (17) water wells have been found within a 500 m radius around the property. All these wells were completed between 1966 and 2004, and were screened from the bottom depths ranging from 10 mbgs and 80.4 mbgs (31 ft. to 277 ft.) in medium to coarse sand. No well has encountered bedrock up to the drilled depths of 80.4 mbgs, indicating huge thickness of unconsolidated sediments.

The nearest recorded domestic water wells included the wells #4903748 and #4907241, which are located about 300 m northwest of the Site. Based on the details of the MECP water well records, Well #4903748 was screened between 56.4 mbgs and 57.9 mbgs in coarse sand, with a static water level of 21.3 mbgs, while Well #4907241 was screened between 56.1 mbgs and 57.3 mbgs in sand, with a static water level of 26.7 mbgs.

A private property exists immediately north of the Subject Property and it appears the Well #4904792 is probably associated with this property. The well was drilled to a depth of 43 mbgs and screened between 39.7 mbgs and 41.5 mbgs in sand, with a static water level of 22.7 mbgs.

In spite of best efforts, we could not reach the property owner to obtain well information. It is recommended to contact the home owner to get well information before any construction excavation begins at the Subject Property.

To present the local geologic profile, a cross-section as shown in Figure 6-2 has been plotted using the information acquired from selected well records.

6.2 Palgrave Municipal Water Supply Wells

The Palgrave community is being serviced by Palgrave municipal supply wells #2, #3 and #4. The Subject Property is situated within a wellhead protection zone, which is associated with the municipal supply well Palgrave Well#3.

Palgrave Well#3 is located about 740 m southwest of the Site, on the northeast side of Mount Hope Road, in Caledon, Ontario. Geologically, Palgrave Well#3 is located near the edge of a local bedrock valley and is overlain by about 80 m thick overburden of Oak Ridges Moraine Aquifer Complex (ORMAC) stratified sediments. This sequence consists (from surface downward) of about four metres of sand and

gravel, about 35 m of silt and clay with minor sand, about 25 m of gravelly sand and silty sand, a silt and clay unit about five metres thick, and finally, about 10 m of gravelly sand where the well is screened (Earthfx , May 2007).

Based on MECP water well record, Palgrave Well#3 was found to have a well ID of 4906859, and was drilled to the depth of approximately 82.3 mbgs into (sandy) clay, and screened between 71.3 mbgs and 80.5 mbgs in (gravelly) sand. The static water level was recorded to be 15.1 mbgs.

Based on the above findings, it can be inferred that layers in a significant thickness of unconsolidated overburden are present in the site area, and multiple sandy soils can serve as the aquifer for water supply. However, it is more common that the deeper aquifer is selected for the water supply aquifer, probably because of having a thicker and better protection from the potential contamination.

7. BOREHOLE INSTALLATION PROGRAM

As part of geotechnical investigation, a total of eight (8) boreholes (BH1 to BH8) were drilled on June 1 and 2, 2017, to depths ranging from 8.2 mbgs to 11.2 mbgs.

Figure 7-1 shows the borehole location plan. Boreholes were drilled with hollow stem continuous flight auger equipment by a drilling sub-contractor under the direction and supervision of SIRATI personnel. Samples were retrieved at regular intervals with a 50 mm O.D. split-barrel sampler driven with a hammer weighing 624 N and dropping 760 mm in accordance with the Standard Penetration Test (SPT) method. The samples were logged in the field and returned to the SIRATI laboratory for detailed examination by the project engineer and for laboratory testing.

As well as visual examination in the laboratory, all the soil samples were tested for moisture content.

Water level observations were made during drilling and in the open boreholes at the completion of the drilling operations. Monitoring wells were installed in five (5) boreholes (BH1, BH2, BH4, BH6 & BH8) for the long-term (stabilized) groundwater level monitoring. The elevations at the borehole locations were surveyed by the SIRATI personnel using a differential GPS system.

8. SOIL STRATIGRAPHY

The soil stratigraphy of the Site as revealed in the boreholes generally consisted of topsoil with or without fill materials, underlain by native soils of sand, and then by silty sand, silt and sand or sandy silt, locally with silt or clayey silt to silty clay. No bedrock was encountered at the maximum explored depth of 11.2 mbgs.

A summary of the encountered soils is made as follows.

- Topsoil: in all the boreholes except for BH5
- Fill materials: consisting of silty sand, sandy silt, or sand, in BH1, BH4, BH6, BH7 and BH8, extending to a maximum depth of 1.6 mbgs
- Sand: in all the boreholes, extending to a maximum depth of 11.2 mbgs
- Silty sand to Sandy Silt: in BH2, BH4, BH5, BH6, BH7 and BH8, extending to maximum depth of 9.1 mbgs
- Silt: in BH4 extending to the bottom of borehole at BH4 at the depth of 8.2 mbgs
- Clayey Silt to Silty Clay: in BH2 from 9.1 to 11.2 mbgs, and in BH8 from 1.8 mbgs to 3.0 mbgs

The details of the soil stratigraphy are presented in Borehole Logs in Appendix A. In addition, two (2) cross sections (as shown on Figures 8-1 and 8-2) were constructed to illustrate the horizontal and vertical extents of the soil and groundwater conditions.

9. SHORT-TERM GROUNDWATER LEVEL MONITORING

During the borehole drilling, groundwater was found in the boreholes at depths ranging from 4.6 mbgs to 9.1 mbgs. The stabilized groundwater level was measured in the monitoring wells on June 16, 2017 and July 11, 2017. The details of the monitoring well construction and the measured groundwater levels are presented in Table 9-1 below.

Table 9-1: Groundwater Levels Observed in June/July 2017

Monitoring Well	Ground Surface Elevation (mASL)	Borehole Depth (mbgs)	Screen Depth (mbgs)	June 16, 2017		July 11, 2017	
				Groundwater Level (mbgs)	Groundwater Elevation (mASL)	Groundwater Level (mbgs)	Groundwater Elevation (mASL)
BH/MW1	291.90	11.2	8.2 – 11.2	9.8	282.1	9.7	282.2
BH/MW2	295.76	11.2	7.6 – 10.6	9.6	286.16	9.5	286.26
BH/MW4	291.64	8.2	5.2 – 8.2	4.7	286.94	4.3	287.30
BH/MW6	295.13	8.2	5.2 – 8.2	8.2	286.93	dry	dry
BH/MW8	290.95	9.8	6.8 – 9.8	8.8	282.15	8.7	282.25

As presented, the measured groundwater levels ranged from 4.3 mbgs to 9.8 mbgs, and elevation ranged from 282.1 mASL to 286.94 mASL. The monitoring well BH/MW6 was found to be dry or wet at the bottom at July 2017 monitoring event.

Based on the groundwater level data obtained on June 16, 2107, a groundwater elevation contour map was prepared. As shown on Figure 9-1, the groundwater flow at the Site could be inferred to be in a direction of northeast.

10. LONG-TERM GROUNDWATER MONITORING

Sirati & Partners were authorized by the Client to undertake long term monthly water level monitoring at the Site for a period of six (6) months. The primary objective of the monthly monitoring was to characterize the seasonal groundwater level fluctuations and flow direction variations at the Property.

The long-term groundwater monitoring was conducted from October 2017 to March 2018 over a period of six (6) months. The results of the long-term groundwater monitoring are summarized as follows.

10.1 Groundwater Levels

Groundwater levels were measured in the five (5) monitoring wells on a monthly basis. The recorded groundwater levels are presented in Table 10-1 and on Figure 10-A below.

Table 10-1: Groundwater Levels Measured from October 2017 to March 2018

				October 2017		November 2017		December 2017	
Monitor	**Easting**	**Northing**	**Ground Elevation**	**Depth to Water**	**Water Table Elevation**	**Depth to Water**	**Water Table Elevation**	**Depth to Water**	**Water Table Elevation**
			(mASL)	**(mbgs)**	**(mASL)**	**(mbgs)**	**(mASL)**	**(mbgs)**	**(mASL)**
MW1	594824.541	4869284.668	291.90	9.61	282.3	8.80	283.1	9.60	282.30
MW2	594761.854	4869196.908	295.76	9.97	285.8	9.21	286.6	10.13	285.63
MW4	594576.489	4868882.106	291.64	5.05	286.6	4.41	287.2	5.32	286.32
MW6	594801.508	4869020.018	295.13	7.70	287.4	6.93	288.2	7.74	287.39
MW8	594962.874	4869244.776	290.95	8.43	282.5	8.41	282.5	8.50	282.45

Table 10-1, continued……

Monitor	January 2018		February 2018		March 2018	
	Depth to Water (mbgs)	Water Table Elevation (mASL)	Depth to Water (mbgs)	Water Table Elevation (mASL)	Depth to Water (mbgs)	Water Table Elevation (mASL)
MW1	9.50	282.40	9.55	282.35	9.49	282.41
MW2	10.12	285.64	10.30	285.46	10.20	285.56
MW4	5.42	286.22	5.47	286.17	5.32	286.32
MW6	7.72	287.41	7.73	287.40	7.73	287.40
MW8	8.58	282.37	8.54	282.41	8.40	282.55

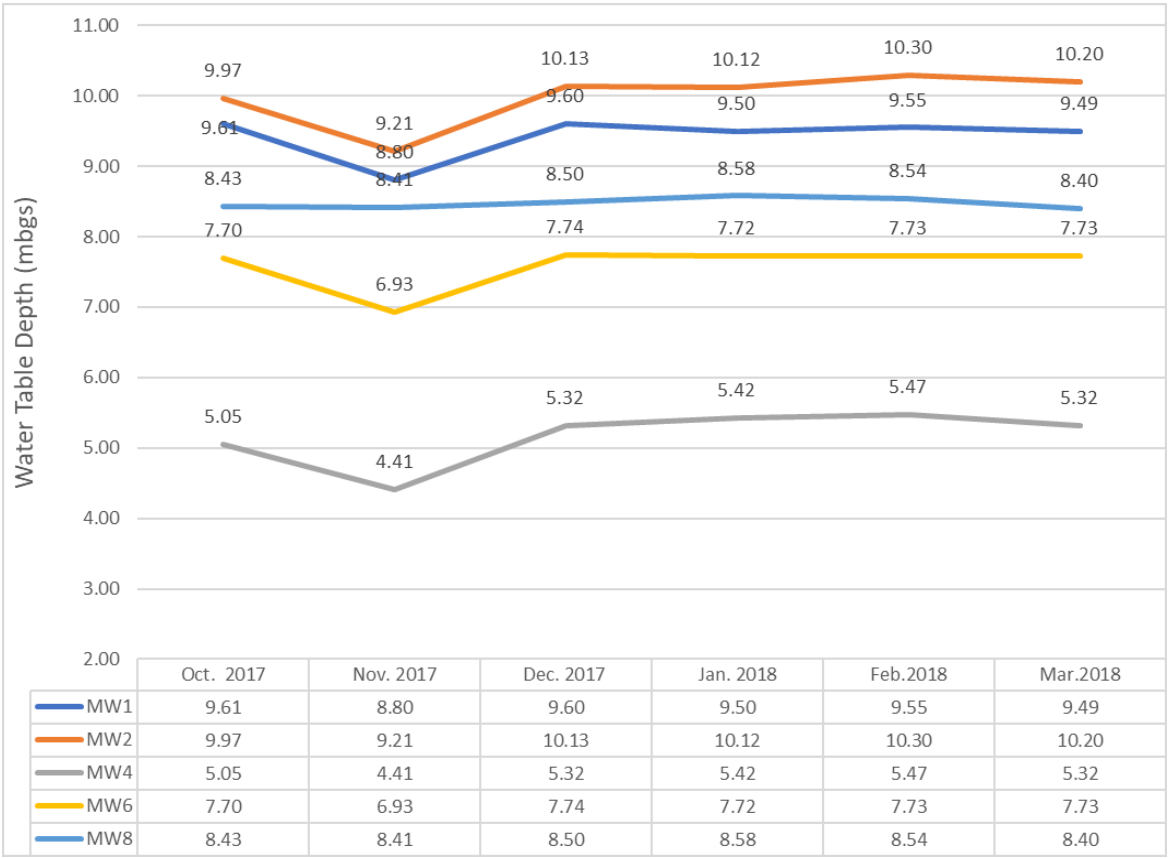

Figure 10-A. Monthly Water Level Changes from October 2017 to March 2018

As presented above, the measured groundwater levels ranged from 4.41 mbgs measured at monitoring well MW4 in November 2017 to 10.30 mbgs measured at MW2 in February 2018, while the elevations ranged between 282.3 mASL measured at MW1 in October 2017 and 288.2 mASL measured at MW6 in November 2017. The highest groundwater level was measured at MW6, where the high ground elevations are located.

Based on the data obtained, the biggest variation in water level was found to be 1.06 m measured at MW4, while the smallest variation was 0.18 m measured at MW8.

As shown on Figure 10-A, there was a rise in the water levels measured in November 2017 in all the monitoring wells, except at MW8. This was probably due to the prevailing warm temperatures with associated high precipitation events occurring in the month of November 2017, during which time a record of 59.8 mm precipitation was made in the month of November 2017 as per Environment Canada in 2018.

10.2 Inferred Groundwater Flow

Based on the data obtained from the monthly monitoring, groundwater elevation contours were drawn using Surfer program, which are presented on Figures 10-1 to 10-6.

It was often found that the highest groundwater elevation was recorded at monitoring well MW6, and groundwater flow was inferred to be divergent from this location. This trend was consistent throughout the entire monitoring period, as shown in the groundwater table contour maps. There should be a mound of groundwater table or a groundwater divide located near MW6.

As discussed before, elevated locations are located in the mid-portion of the Site, where a local drainage divide is present in the area of Lots 3, 6 and 7. Therefore, the local topography should be one of the factors which influence the local groundwater conditions.

10.3 Observations Made during Monitoring/Site Visits

During the site visit conducted by SIRATI's staff for borehole drilling and groundwater monitoring, site feature observations were also made. No surface water body or flow was observed on the Property, except when the Property was covered with snow in the winter season. Based on the observations, the tributary noted on the northeast portion of the Site should be an ephemeral flow.

It should be noted that monitoring well MW8 was found to be damaged when October 2017 groundwater monitoring was conducted, which was repaired in the next monitoring event in December 2017. Records of observations are presented in photographs below.

Photograph 1: View of the damaged monitoring well (MW8). The PVC pipe was broken and the protective casing was uprooted. A cut was noted in the protective steel casing.

Photograph 2: View of the broken PVC pipe. A cut could be seen.

Photograph 3: View of the restored PVC pipe. Due to the hard ground surface, the protective casing could not be set in place.

Photograph 4: View of the restored PVC pipe

11. IN-SITU HYDRAULIC CONDUCTIVITY TESTS

Slug tests were conducted on two (2) of the monitoring wells on July 11,2017, as monitoring the well MW6 was dry and the other two (2) monitoring wells (MW1 and MW8) had deep water levels with very flat-water columns. The slug test data was interpreted using Aqtesolv pumping tests software and hydraulic conductivity ("k") was calculated using the Hvorslev method for rising head tests conducted on MW2 and MW4. The results are summarized in Table 10-1 and are compared to typical ranges of hydraulic conductivities of soil types similar to those found at the Site. Plots of the rising head tests along with calculations of the hydraulic conductivity based on Hvorslev method are presented in Appendix B. Since the Site is predominantly characterized by sand and silty sand, the "k" values closely resemble the lithology encountered in the monitoring wells.

Table 10.1: Results of Slug (Rising Head) Tests and Estimated Infiltration Rates

Monitor	Hydraulic Conductivity (m/s)	Tested Soil Type	Range of Hydraulic Conductivity (m/s) *	Estimated Infiltration Rates (mm/hr.) **
MW2	5.23×10^{-6}	Silty Sand and Clayey Silt	$10^{-9} – 10^{-6}$	22
MW4	7.70×10^{-6}	Sandy Silt; Silt	$10^{-9} – 10^{-6}$	24
Average	**6.47×10^{-6}**			**23**

* Domenico, P.A. and F.W. Schwartz, 1990. *Physical and Chemical Hydrogeology*, John Wiley & Sons, New York, 824 p.

** Infiltration rates based on OMMAH, 1997.

Based on the approximate relationship between the hydraulic conductivity and infiltration rate (OMMAH 1997), the average infiltration rate corresponding to the average hydraulic conductivity of 6.47 x 10^{-6} m/s was estimated to be about 23 mm/hour (Table 10.1).

12. CONSTRUCTION DEWATERING

It is understood that the development will consist of construction of eight (8) single detached residential houses with one-level basement in eight (8) lots.

As per revised Site Grading Plan in Figure 3-7, the designed basement elevations range from 292.45 mASL for the house in Lot 8 to 295.20 mASL for the house in Lot 3.

Building cross-sections for Lots 1 to 8, showing the finished floor elevations, basement elevations and average groundwater elevations are shown in Figures 12-1 and 12-2. Based on the results of monthly groundwater monitoring, the groundwater levels measured in all the monitoring wells ranged from 282.3 mASL to 288.2 mASL. Apparently, the groundwater will be well below the proposed basements as well as below the required excavation. As a result, no positive dewatering will be expected during the construction. In addition, basement drainage will not be required after construction.

13. ASSESSMENT OF POTENTIAL IMPACTS DUE TO SITE DEVELOPMENT

13.1 Private and Public Water Wells

As discussed, no dewatering will be required during and after the construction. Therefore, there will be no impact on use of water wells near the Property due to the proposed residential development.

13.2 Open Water Body

Based on review of the data and observation, no open water body was found to be present on the Property. The water course noted in the northeast portion of the Site was found to be ephemeral without a well-defined water channel or water flow.

Based on the site development plan as shown on Figure 3-1, a channel has been proposed in the northeast portion of the Site, along the properties in Lot 1 and Lot 8.

As no dewatering is anticipated to be associated with the proposed residential development, the impact on the water body will not be anticipated.

13.3 Well Head Protection Area

It is known that the Property lies within the Palgrave municipal supply well No. 3 wellhead protection area (WHPA). As shown on Figures 13-1 and 13-2, Part of the Site is located within the WHPA-D (5 and 25-year time of travel zone), an area with a vulnerability score of 2 to 4 (low to medium score).

As no dewatering is anticipated, there should be no quantitative impact on the use of the municipal well – Palgrave Well#3. From the qualitative aspect, if no contamination will take place during and after the development on the Property, the impact if any will be considered to be very minor.

13.4 Significant Groundwater Recharge Area (SGRA) and Highly Vulnerable Aquifer (HVA)

Based on the NVCA database, the Property is located within a Significant Groundwater Recharge Area (SGRA), and part of Property is situated within the area with Highly Vulnerable Aquifer (Figure 13-3).

It is anticipated that the excavation for construction of the basement will extend to the depth about three (3) metres below the ground surface, which is very shallow as compared to the depth of the potential local aquifers.

However, the development may increase the impervious surface, which will result in the decrease in the filtration or the recharge of the groundwater. In addition, application of de-icing salt on the roadways in winter seasons for traffic safety purpose or other activities which involve potential contaminants may be an environmental concern related to the quality of recharge water.

To protect and preserve the SGRAs and HVAs, the following recommendations could be provided.

- Incompatible land uses such as storage of chemicals and/or liquids should be avoided and directed away from the SGRA.
- Existing and post-development groundwater recharge conditions should be maintained by means of implementing low-impact development (LID) measures which will be described in the next section. It is understood that bioswales have been proposed along both sides of the proposed roadways as presented on Figures 3-1 to 3-3.
- Since the proposed development is a major development (> 500 m²) within the SGRA, an Infiltration Management Plan that demonstrates pre-development recharge rates will be maintained, is a requirement.
- Also, a Contaminant Management Plan might be a requirement within the highly vulnerable aquifers, as the development is a major development.

- Promote awareness of the importance of SGRAs and HVAs by means of sign boards explaining the linkage between surface activities and their impact on groundwater quality and quantity.
- A salt management plan may be considered to be developed and implemented.

14. WATER BALANCE

Based on the site topographic map and the existing surficial drainage, the Subject Property can be bisected topographically into two (2) catchments, Catchment 1 and Catchment 2, as depicted in Figures 3-1 to 3-3. Accordingly, as per the "Hydrogeological Assessment Submissions" Conservation Authority Guidelines for Development Applications, June 2013, a preliminary water balance was completed separately for Catchment 1 and Catchment 2.

A preliminary water balance for the Site was calculated for both pre-development and post-development conditions in order to assess the change in overall rate of infiltration. Impermeable and permeable surfaces in pre-development and post-development plans were identified and their surface areas (as measured and cross-checked using the drawings/information provided by the Client) were used for calculating the amount of run-off and infiltration. The pre- and post-development plans consist of different types of surface as listed in Table 14.1.

Table 14.1: Pre-and Post-development Statistics for Catchments 1 and 2

Catchment 1: Type of Land Coverage	**Pre-Development Area (m^2)**	**Post- Development Area (m^2)**
Roofs	0	2,050
Roadway/Paving/Parking	0	9,200
Landscape/Vegetated Area	67,100	55,850
Total	**67,100**	**67,100**
Catchment 2: Type of Land Coverage	**Pre-Development Area (m^2)**	**Post- Development Area (m^2)**
Roofs	-	750
Roadway/Paving/Parking	-	1,800
Landscape/Vegetated Area	55,700	53,150
Total	**55,700**	**55,700**

14.1 Site Level Water Balance

Based on the Thornthwaite and Mather methodology (1957), the 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 evapotranspiration 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).

The annual water budget 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)

14.2 Climatic Data

Monthly average temperature and precipitation data were obtained from Environment Canada, for Orangeville WPCP station (climate identifier: 6155790) as the nearest station located at about 8 km distance from the Property. Data was available between the years 1962 to 2006. Temporal variations of temperature and precipitation are shown on Figures 14-1 and 14-2.

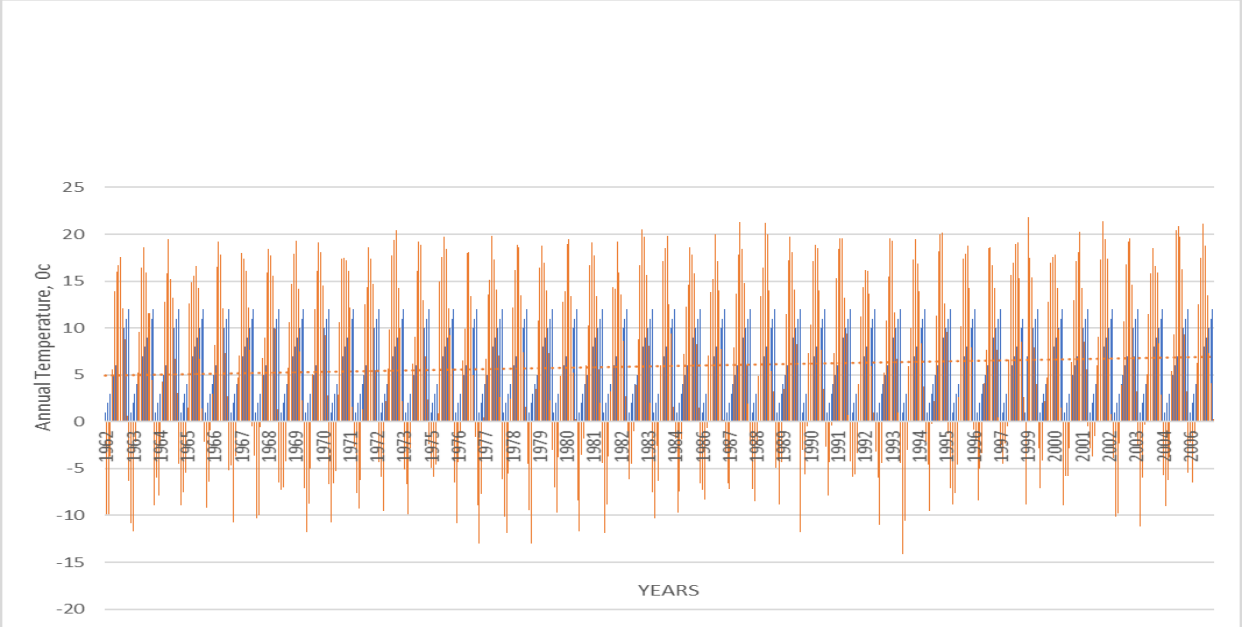

Figure 14-1: Mean Annual Temperature at the Site

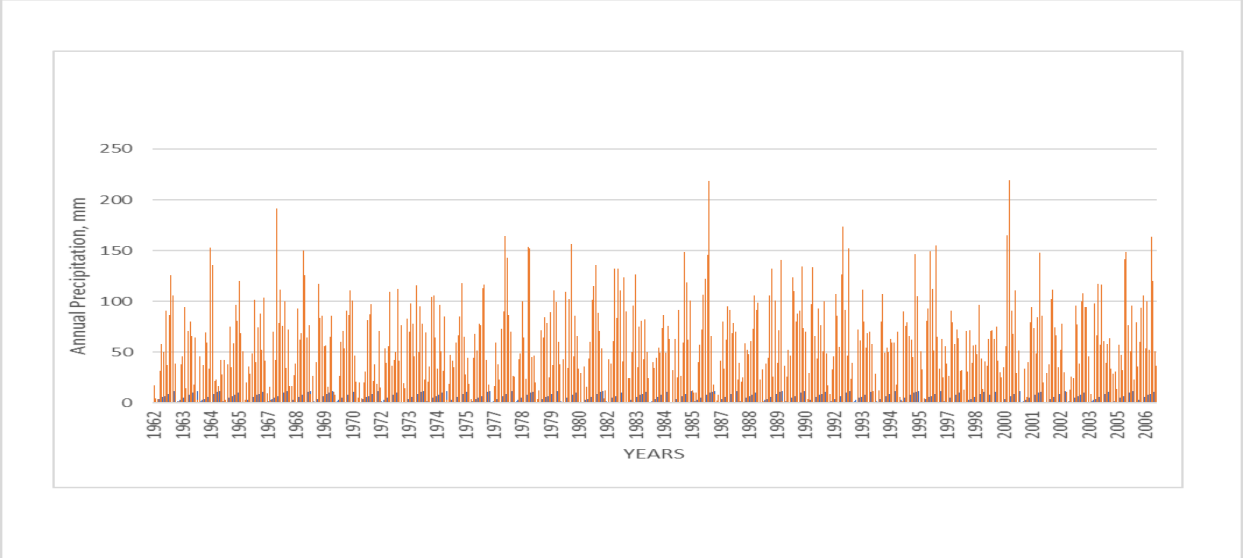

Figure 14-2: Mean Annual Precipitation at the Site

Average monthly variations of both temperature and precipitation were calculated for the period from 1962 to 2006 and is presented below on Figures 14-3 and 14-4, respectively. The highest temperature was recorded in the month of July, while the highest rainfall was in the month of August.

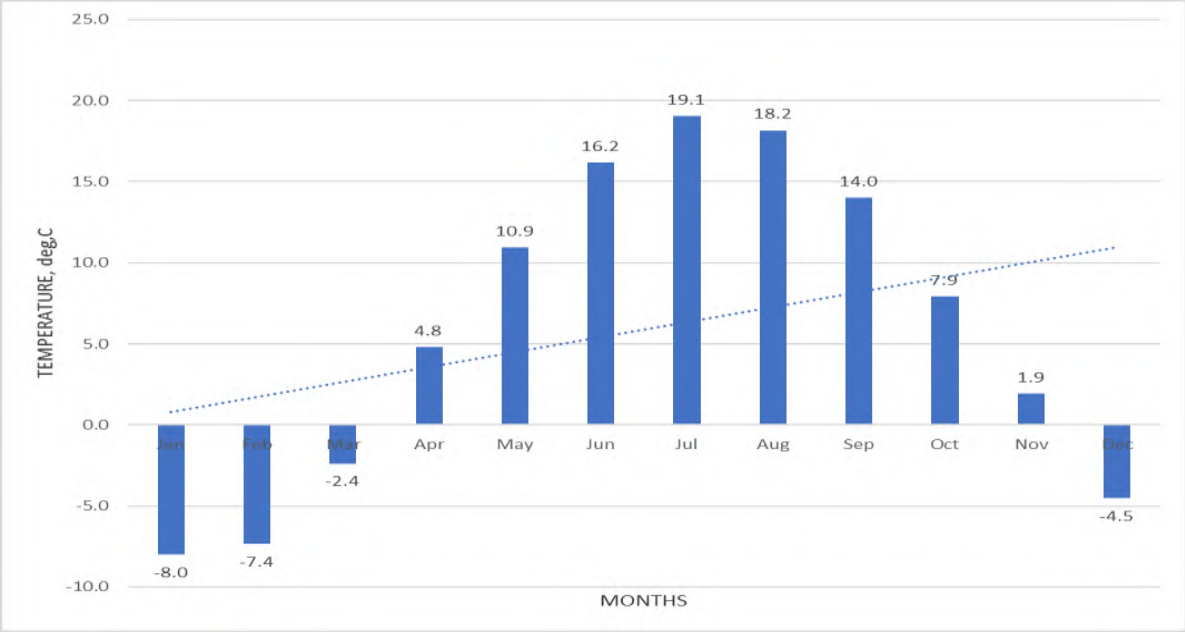

Figure 14-3: Average Monthly Temperature at the Site

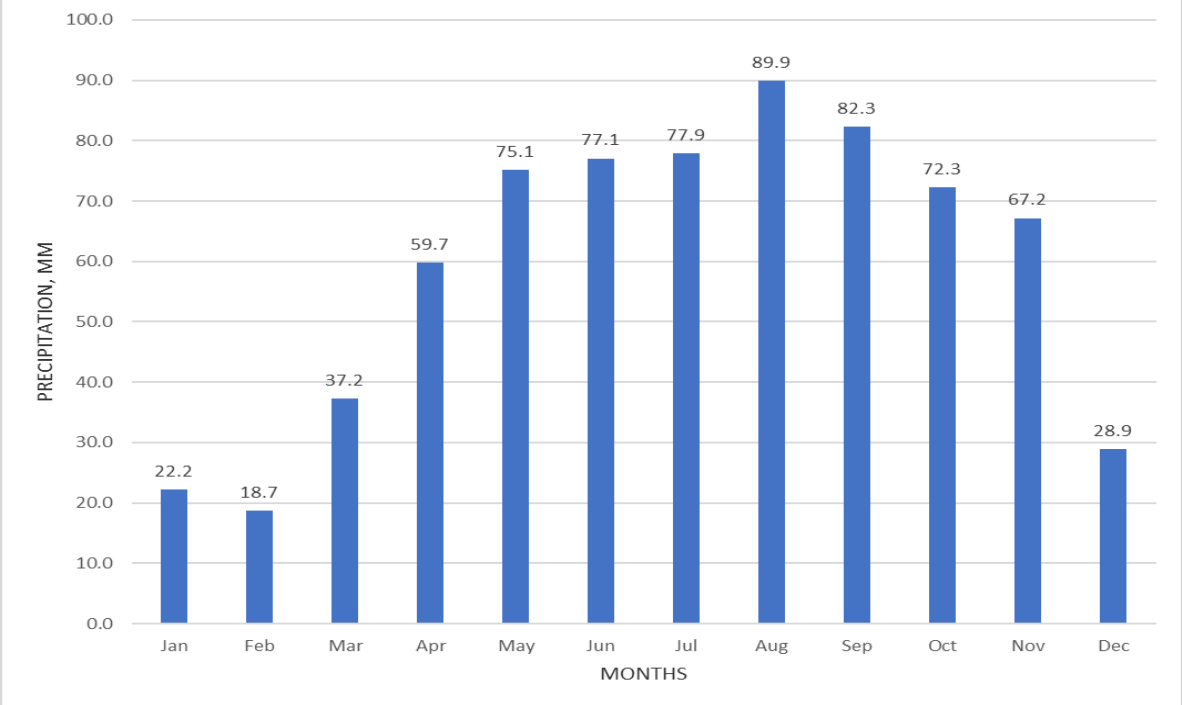

Figure 14-4: Average Monthly Precipitation at the Site

14.3 Infiltration and Runoff

Potential evapotranspiration was estimated to be about 529 mm/annum using the USGS Thornthwaite Monthly Water Balance software (Appendix C) utilizing average monthly temperature and precipitation results of Environment Canada Orangeville weather station.

As mentioned above, given the potential evapotranspiration at 529 mm/annum and the average annual precipitation of 725 mm/annum, there is a net water surplus of 196 (=725-529) mm/annum occurring at the Site, which can either infiltrate into subsurface or go as run-off.

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 Ministry of Environment (MOE) infiltration factor was used. The MOE Storm Water Management Planning and Design Manual (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. Please, note that MOE has been changed into Ministry of Environment, Conservation and Parks (MECP).

14.4 Water Balance – Catchment 1

The calculation of infiltration and runoff in the stages of pre-development and post-development is provided in Appendix C, and are presented in Tables 14-2 to 14-5, below.

Table 14-2: Annual Pre-Development Water Balance

Land Use		Area (m^2)	Precipitation (m3)	Evapotranspiration (m^3)	Infiltration (m^3)	Run-off (m^3)
Impervious Areas	Paved Area	0	0	0	0	0
	Roof Area	0	0	0	0	0
Pervious Areas	Landscape	67,100	48,648	28,397	11,138	9,113
Total		**67,100**	**48,648**	**28,397**	**11,138**	**9,113**
Assuming no infiltration occurring in paved and roof areas, and 10% of precipitation to be evaporated from paved and roof areas.						

Table 14-3: Annual Post-Development Water Balance

Land Use		Area (m2)	Precipitation (m3)	Evapotranspiration (m3)	Infiltration (m3)	Run-off (m3)
Impervious Areas	Paved Area	9200	6,670	667	0	6,003
	Roof Area	2050	1,486	149	0	1,338
Pervious Areas	Landscape Area	55850	40,491	23,636	9,271	7,585
		67,100	**48,648**	**24,451**	**9,271**	**14,926**
Assuming no infiltration occurring in paved and roof areas, and 10% of precipitation to be evaporated from paved and roof areas.						

Table 14-4: Comparison of Pre- and Post Development Water Balance Components

	Precipitation (m3)	Evapotranspiration (m3)	Infiltration (m3)	Run-off (m3)
Pre-Development	**48,648**	**28,397**	**11,138**	**9,113**
Post-Development	**48,648**	**24,451**	**9,271**	**14,926**
Change in %			**-17**	**64**

Table 14-5: Requirement for Infiltration of Roof Run-off

Volume of Pre-Development Infiltration	11,138
Volume of Post-Development Infiltration	9,271
Deficit from Pre to Post Development Infiltration	1,867
Percentage of **Roof Runoff** required to match the pre-development infiltration (%)	140

14.5 Summary of Water Balance Calculation- Catchment 1

Based on the above calculations, a summary could be made as follows:

1) There is a net increase in run-off at the Site of about 5,813 m^3/annum (or 64% increase), from 9,113 m^3/annum to 14,926 m^3/annum. This increase is a result of the development of the Site with more impervious areas such as roof and paved areas, and reduction in pervious areas.
2) Without implementation of mitigation measures, there is a net deficit of about 1,867 m^3 /annum (17% declikrease) in the post-development infiltration from 11,138 m^3 to 9,271 m^3 on a yearly basis.
3) There is a volume of 1,338 m^3/annum collected from the roof area, which can be used for the enhanced infiltration for the purpose of implementing the Low Impact Development (LID) measures. However, the total volume is not sufficient to compensate for the total infiltration

deficit. Extra source should be considered.

14.6 Water Balance – Catchment 2

The detailed calculations for Catchment 2 are provided in Appendix C, and are presented in Tables 14-6 to 14-9, below.

Table 14-6: Annual 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	0	0	0	0	0
	Roof Area	0	0	0	0	0
Pervious Areas	Landscape	55,700	40,383	23,572	9,246	7,565
Total		**55,700**	**40,383**	**23,572**	**9,246**	**7,565**

Table 14-7: Annual Post-Development Water Balance

Land Use		Area (m2)	Precipitation (m3)	Evapotranspiration (m3)	Infiltration (m3)	Run-off (m3)
Impervious Areas	Paved Area	1800	1,305	131	0	1,175
	Roof Area	750	544	54	0	489
Pervious Areas	Landscape Area	53150	38,534	22,493	8,822	7,218
		55,700	**40,383**	**22,678**	**8,822**	**8,882**
Assuming no infiltration occurring in paved and roof areas, and 10% of precipitation to be evaporated from paved and roof areas.						

Table 14-8: Comparison of Pre- and Post Development Water Balance Components

	Precipitation (m3)	Evapotranspiration (m3)	Infiltration (m3)	Run-off (m3)
Pre-Development	**40,383**	**23,572**	**9,246**	**7,565**
Post-Development	**40,383**	**22,678**	**8,822**	**8,882**
Change in %			**-5**	**17**

Table 14-9: Requirement for Infiltration of Roof Run-off

Volume of Pre-Development Infiltration	9,246
Volume of Post-Development Infiltration	8,822
Deficit from Pre to Post Development Infiltration	423
Percentage of ***Roof Runoff*** required to match the pre-development infiltration (%)	86

14.7 Summary of Water Balance Calculation- Catchment 2

Based on the above calculations, a summary could be made as follows:

1) There is a net increase in run-off at the Site of about 1,446 m^3/annum (or 19% increase), from 7,565 m^3/annum to 8,882 m^3/annum.
2) Without implementation of mitigation measures, there is a net deficit of about 423 m^3 /annum (or 5% decrease) in the post-development infiltration from 9,246 m^3 to 8,822 m^3 on a yearly basis.
3) There is a net volume of 489 m^3/annum collected from the roof area, which can be used for the enhanced infiltration for the purpose of implementing the Low Impact Development (LID) measures. This volume is sufficient for compensate for the total infiltration deficit in Catchment 2 area.

14.8 Discussions on LID Measures

Based on the above water balance calculations, an infiltration deficit will be anticipated in an amount of 1,867 m^3/year in Catchment 1 Area, and 423 m^3/year in Catchment 2 Area, with a total amount of 2,290 m^3/year at the whole Site.

On the other hand, a total amount of 1,827 m^3/year of roof water is expected at the whole Site, which can be used to compensate for the infiltration deficit through implementing LID measures. However, this volume does not fully cover the total anticipated infiltration deficit. Other sources of clean water should be considered, such as collecting and diverting the runoff in the proposed landscaped areas for infiltration.

Based on the borehole drilling and observations, the soils at shallow depths were found to be mainly composed of sand and/or silty sand, which have relatively high infiltration rates and are good for application and implementation of the LID measures.

It should be noted that SIRATI is not providing any design of LID techniques since selection and designing of applicable LID techniques shall be conducted by engineering designers.

It is understood that road side bio-retention swales have been proposed to be used in the development

project. The water will flow along the length of the bioretention swale and filter through a 0.50 m deep filtration media to a 1.2 m wide by 1.2 m deep stone trench below for infiltration.

Considering that the Site is located in a significant groundwater recharge area, the quality of the water to be used for infiltration shall be considered in order to protect the groundwater from contamination.

15. WATER QUALITY

The Nottawasaga Valley Conservation Authority (NVCA), in their review comments on this report has requested to provide a background water quality characterization of the unconfined/groundwater table aquifer. Accordingly, groundwater samples were collected from monitoring wells MW1, MW2 and MW4 on July 17, 2019, and analyzed as per Water Quality Assessment package provided by AGAT laboratories. The analytical results for the groundwater samples are provided in Laboratory Certificate of Analysis in Appendix D.

The results were compared to Ontario Drinking Water Quality Standards (ODWQS)-Aesthetic Objectives and Operational Guidelines, and are summarized in Table 15-1.

Table 15-1: Guideline Violation of Groundwater Samples Compared to ODWQS-AO&OG

Sample ID	Parameter	Guideline	Guideline Value (mg/L)	Measured Concentration (mg/L)
MW1	Aluminum	ODWQS	0.1	2.30
MW1	Iron	ODWQS	0.3	2.65
MW1	Manganese	ODWQS	0.05	0.834
MW1	Total Hardness (as $CaCO_3$)	ODWQS	80-100	321
MW1	Turbidity	ODWQS	5	7480
MW1	Nitrate as N	ODWQS	10	33.1
MW2	Aluminum	ODWQS	0.1	0.719
MW2	Iron	ODWQS	0.3	1.31
MW2	Manganese	ODWQS	0.05	0.230
MW2	Total Hardness (as $CaCO_3$)	ODWQS	80-100	232
MW2	Turbidity	ODWQS	5	4210
MW4	Aluminum	ODWQS	0.1	0.802
MW4	Iron	ODWQS	0.3	0.654
MW4	Manganese	ODWQS	0.05	2.40
MW4	Total Hardness (as $CaCO_3$)	ODWQS	80-100	202
MW4	Turbidity	ODWQS	5	29700

Based on the results above, exceedances or elevated concentrations for aluminum, iron, manganese, total hardness and turbidity were found in all the tested groundwater samples. In addition, nitrate was found exceeding the ODWQS limit of 10 mg/L in groundwater taken from MW1.

It should be noted that the groundwater samples analyzed were in unfiltered state and shall contain a certain amount of sediments and/or particulates, which caused high value of turbidity. The exceedances or elevated concentrations may have resulted from the sediments and/or particulates in the water samples.

Since, the proposed development is likely being serviced by the Palgrave municipal water supply system and no private wells are proposed at the Site, as such the background water quality will not have any negative bearing on the Site development.

16. CONCLUSIONS AND RECOMMENDATIONS

This report was prepared by SIRATI in support of a proposed residential development at the Site located at 0 Mt. Pleasant Road, Town of Caledon, Ontario.

Based on the hydrogeological investigation conducted on the Property, the following conclusions are presented:

- The Property falls within the Beeton Creek secondary watershed of Innisfil Creek subwatershed of Nottawasaga Valley Conservation Authority (NVCA).
- The Property lies within the physiographic region termed as Oak Ridges Moraine, and is located in an area covered with ice-contact stratified deposits consisting of gravel and sand deposits, with minor till, and also contain esker, kame, end moraine, ice-marginal delta and subaqueous fan deposits.
- The soil stratigraphy of the Site as revealed in the boreholes generally consisted of topsoil with or without fill materials, underlain by native soils of sand, and then by silty sand, silt and sand or sandy silt, locally with silt or clayey silt to silty clay. No bedrock was encountered at the maximum explored depth of 11.2 mbgs.
- Monthly groundwater monitoring indicated that the measured groundwater levels ranged from 4.41 mbgs to 10.30 mbgs, while the elevations ranged between 282.3 mASL and 288.2 mASL.
- The biggest variation in water level was found to be 1.06 m measured at MW4, while the smallest variation was 0.18 m measured at MW8. The highest groundwater level was measured at MW6.

- A potential groundwater mound or divide is located near the mid-portion of the Site or near MW6, where groundwater appears to be divergent in this area.
- In-situ hydraulic conductivity tests resulted in 5.23 x 10^{-6} m/s at MW2 and 7.70 x 10^{-6} m/s at MW4 with an average hydraulic conductivity of about 6.47 x 10^{-6} m/s.
- Groundwater sampling and testing indicated that unfiltered groundwater samples may not meet the guidelines for Ontario Drinking Water Quality Standards due to the parameters including aluminum, iron, manganese, total hardness, turbidity or nitrate.
- Based on the observed deep groundwater levels relative to the anticipated excavation depths, construction dewatering (short-term and long-term) is not anticipated.
- Given that no dewatering is required, no impact will be anticipated on the surrounding environments if LID measures are to be considered and implemented to compensate for the anticipated infiltration deficit.
- Based on the preliminary water balance study completed, it is anticipated that there is an infiltration deficit for a total amount of 9,723 m^3/year in at the whole Site. Collection and diversion of the roof water for infiltration, which is totaled in an amount of 1,827 m^3/year, will not fully compensate for the anticipated infiltration deficit due to the proposed development. Extra clean water sources should be considered, such as the runoff in the proposed landscaping areas.
- As the Property is located in a significant groundwater recharge area (SGRA) and partly in an area with highly vulnerable aquifer (HVA), attention should be paid to the potential contamination to the local groundwater due to the activities, such as application of de-icing salt, which may bring in contaminants after the development.

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LIMITATIONS AND USE OF THE REPORT

This report was produced for the sole use of Tropical Land Developments Limited, c/o David Goodman (the Client) for the property located at 0 Mt. Pleasant Road, Town of Caledon, Ontario and may not be relied upon by any other person or entity without the written authorization of Sirati & Partners Consultants Limited (SIRATI).The conclusions presented in this report are professional opinions based on the historical and current records search, visual observations and limited information provided by persons knowledgeable about past and current activities on this site. As such, SIRATI cannot be held responsible for environmental conditions at the Property that was not apparent from the available information. No investigation method can completely eliminate the possibility of obtaining partially imprecise or incomplete information; it can only reduce the possibility to an acceptable level.

Professional judgement was exercised in gathering and analyzing data and formulation of recommendations using current industry guidelines and standards. Similar to all professional persons rendering advice, SIRATI cannot act as absolute insurer of the conclusion we have reached. No additional warranty or representation, expressed or implied, is included or intended in this report other than stated herein the report.

The assessment should not be considered a comprehensive audit that eliminates all risks of encountering environmental problems. The information presented herein this report is primarily based on information collected during the hydrogeological study based on the condition of the Property at the time of site inspection/drilling followed by a review of historical data, as appended to this report.

In assessing the environmental setting of the Property, SIRATI has solely relied upon information supplied by others in good faith and has therefore assumed that the information supplied is factual and accurate. We accept no responsibility for any inaccurate information, misrepresentation or for any deficiency of the information supplied by any third party.

The scope of services performed in the execution of this investigation may not be appropriate to satisfy third parties. SIRATI accepts no responsibility for damages if any, suffered by any third party as a result of decisions made or action taken based on this report. Any use, copying or distribution of the report in whole or in part is not permitted without the express written permission of SIRATI and use of findings, conclusions and recommendations represented in this report, is at the sole risk of third parties.

In the event that during future work new information regarding the environmental condition of the Property is encountered, or in the event that the outstanding responses from the regulatory agencies

indicate outstanding issues on file with respect to the Property, SIRATI should be notified in order that we may re-evaluate the findings of this assessment and provide amendments, as required.

Should you have any questions regarding the information presented or limitation set in this report, please do not hesitate to contact our office.

Yours truly,

Sirati and Partners Consultants Limited

Sudhakar Kurli, M.Sc., P. Geo.
Hydrogeologist/Project Manager

Bujing Guan, M. A.Sc., P. Geo.
Senior Hydrogeologist/Environmental Specialist

FIGURES

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Geotechnical Hydrogeological & Environmental Solutions

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Geotechnical Hydrogeological & Environmental Solutions
12700- Keele Street
King City, ON. L7B 1H5
Phone# 905 833 1582, Fax# 905 833 5360

North:

Legend:

Property Boundary

Project Title:
Hydrogeological Investigation

Site Location:
0 Mt. Pleasant Road, Caledon, ON.

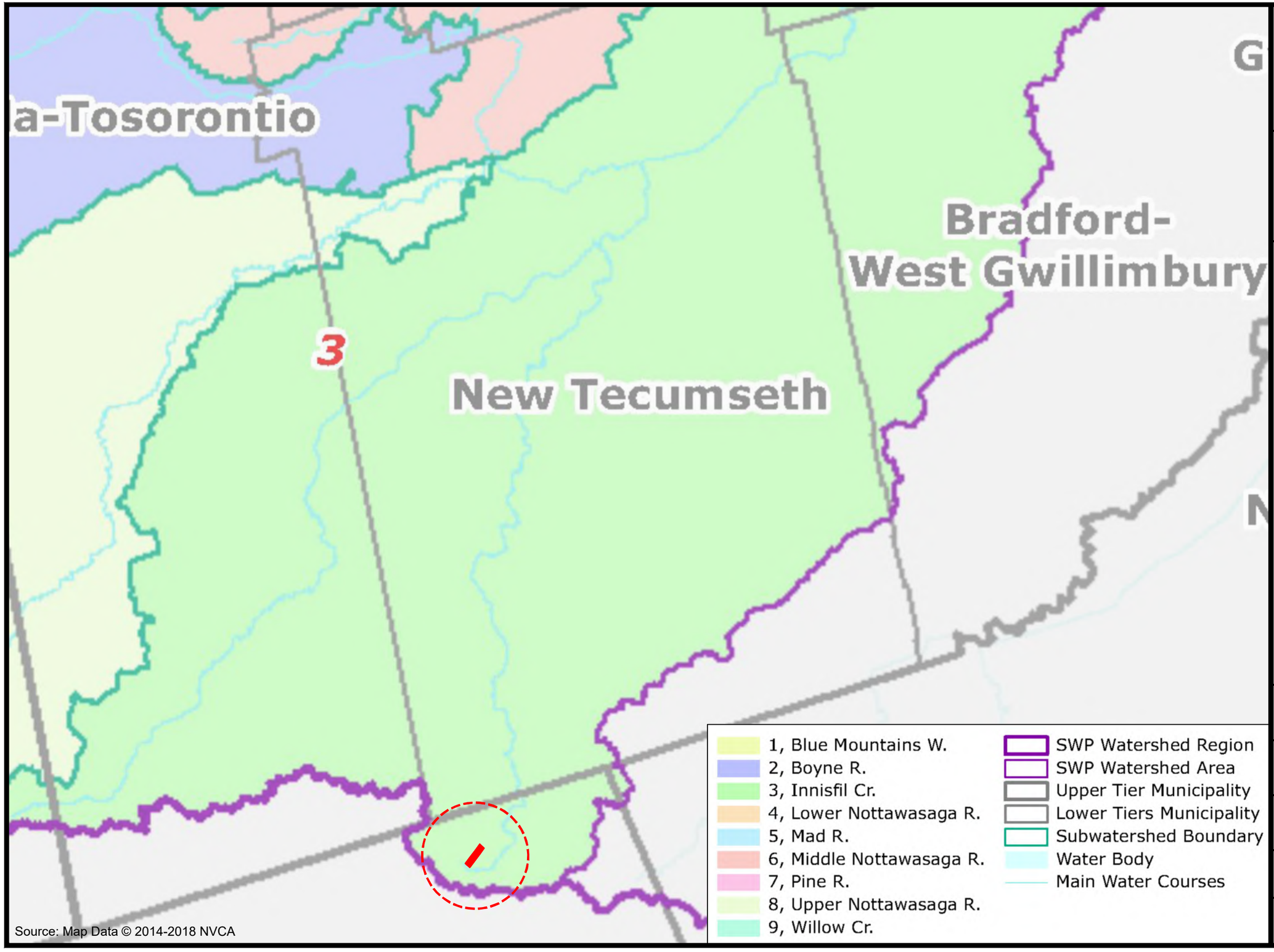
Figure Title:
Site Location Plan

Scale:
0m 100m 200m

Project Number:
SP17-212-30

Date:
September 2019

Figure Number:
1-1



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King City, ON. L7B 1H5
Phone# 905 833 1582, Fax# 905 833 5360

North:

Legend:

Subject Site

Approximate Site Location

Project Title:
Hydrogeological Investigation

Site Location:
0 Mt. Pleasant Road, Caledon, ON.

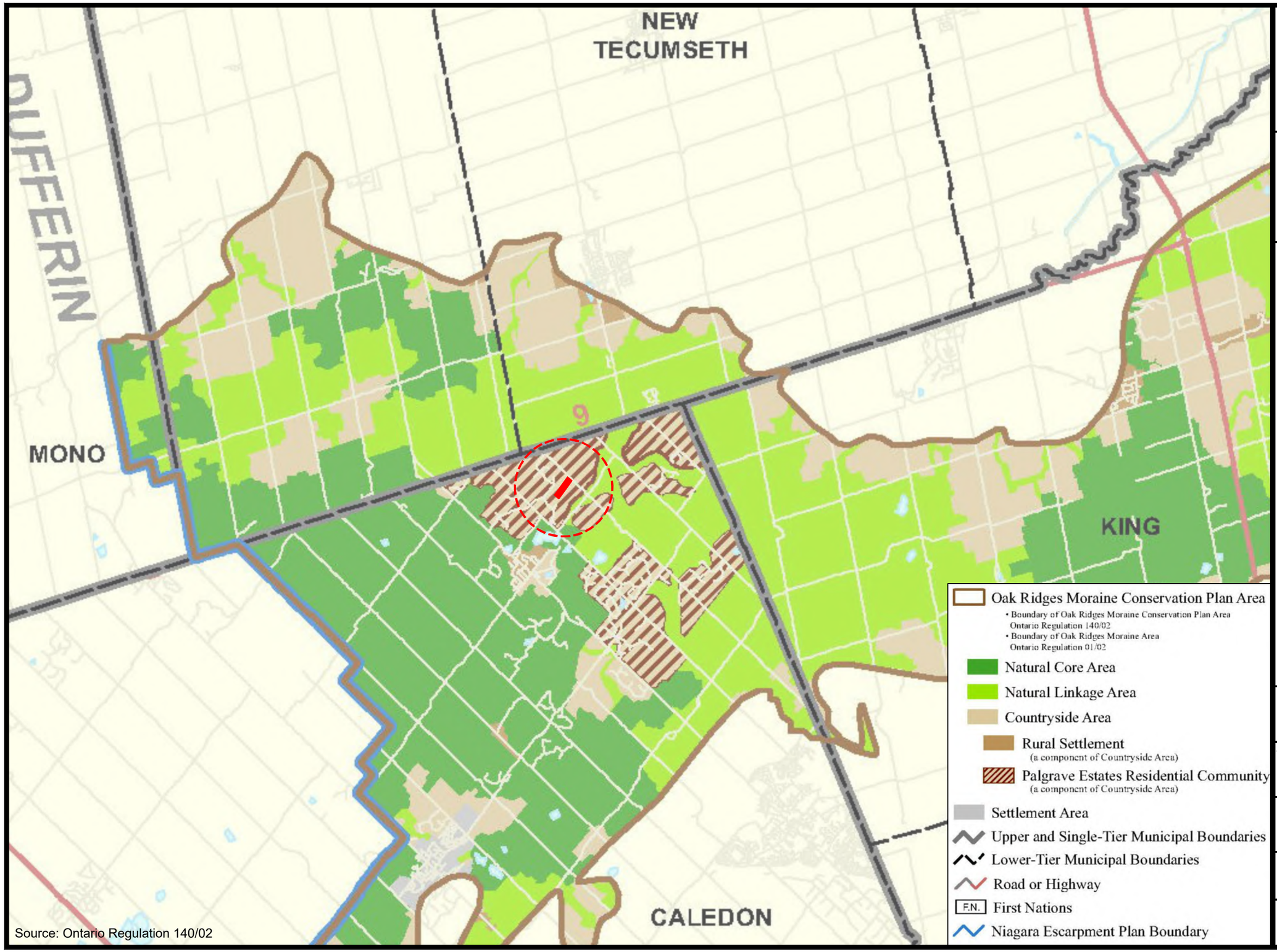
Figure Title:
Innisfil Creek Watershed Map

Scale: 0m 1km 2km

Project Number: SP17-212-30

Date: September 2019

Figure Number: 2-1



Source: Ontario Regulation 140/02

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Phone# 905 833 1582, Fax# 905 833 5360

North:

Legend:

Subject Site

Approximate Site Location

Project Title:
Hydrogeological Investigation

Site Location:
0 Mt. Pleasant Road, Caledon, ON.

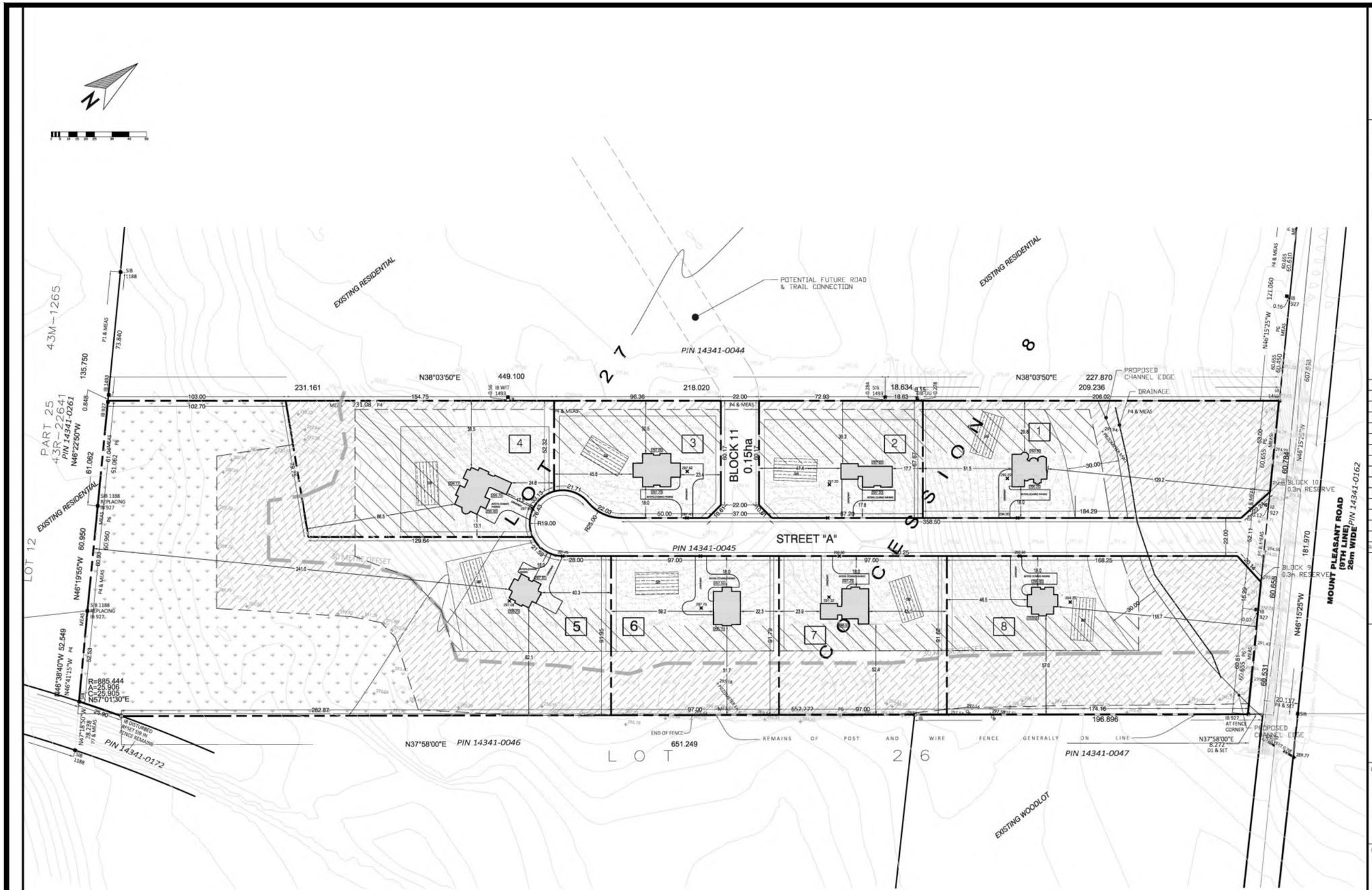
Figure Title:
Oak Ridges Moraine Conservation Plan
Land Use Designation Map

Scale: 0m 1km 2km

Project Number: SP17-212-30

Date: September 2019

Figure Number: 2-2



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Phone# 905 833 1582, Fax# 905 833 5360

North:

Legend:

Property Boundary

Project Title

0 MOUNT PLEASANT ROAD, CALEDON
TROPICAL LAND DEVELOPMENT LTD.

Location
MOUNT PLEASANT ROAD-CALEDON

Drawing Title
SITE PLAN

Scale	1:1000	Date	October 3, 2017
Drawn By	C.K./S.R	Checked By	F.C
Project No.	201711	Drawing No.	A-101

Project Title:

Hydrogeological Investigation

Site Location:

0 Mt. Pleasant Road, Caledon, ON.

Figure Title:

Site Development Plan

Scale:	Project Number:
0m 50m	SP17-212-30
Date: July 2019	**Figure Number:** 3-1

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King City, ON. L7B 1H5
Phone# 905 833 1582, Fax# 905 833 5360

North:

Legend:

- Property Boundary
- Paving
- Roof
- Landscape

Site Statistics:

Catchemnt 1

Paving:	0 sq.m
Roof:	0 sq.m
Landscape:	67100 sq.m

Catchment 2:

Paving:	0 sq.m
Roof:	0 sq.m
Landscape:	55700 sq.m
Total	122800 sq.m

Project Title:

Hydrogeological Investigation

Site Location:

0 Mt. Pleasant Road, Caledon, ON.

Figure Title:

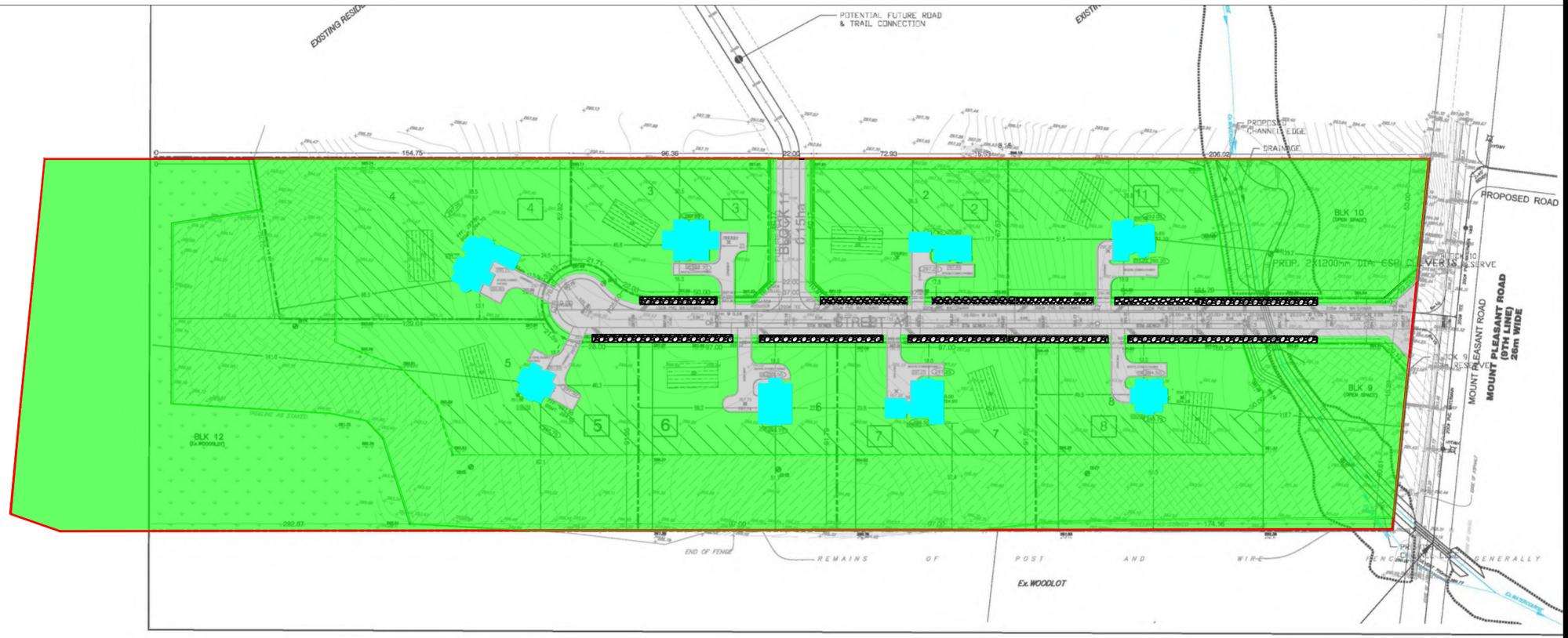
Pre-Development Plan
Catchment 1 and Catchment 2

Scale: 0m 50m

Project Number: SP17-212-30

Date: September 2019

Figure Number: 3-2



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King City, ON. L7B 1H5
Phone# 905 833 1582, Fax# 905 833 5360

North:

Legend:

- Property Boundary
- Paving
- Roof
- Landscape
- Proposed Bioswale

Site Statistics:

Paving:	11000 sq.m
Roof:	2800 sq.m
Landscape:	109000 sq.m
Total	122800 sq.m

Project Title:

Hydrogeological Investigation

Site Location:

0 Mt. Pleasant Road, Caledon, ON.

Figure Title:

Post-Development Plan- Entire Site

Scale: 0m 50m

Project Number: SP17-212-30

Date: September 2019

Figure Number: 3-3

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Phone# 905 833 1582, Fax# 905 833 5360

North:

Legend:

- Property Boundary
- Paving
- Roof
- Landscape
- Proposed Bioswale

Site Statistics:

Paving:	9200 sq.m
Roof:	2050 sq.m
Landscape:	55850 sq.m
Total	67100 sq.m

Project Title:

Hydrogeological Investigation

Site Location:

0 Mt. Pleasant Road, Caledon, ON.

Figure Title:

Post-Development Plan
Catchment 1

Scale: As Shown	**Project Number:** SP17-212-30
Date: September 2019	**Figure Number:** 3-4

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Phone# 905 833 1582, Fax# 905 833 5360

North:

Legend:

- Property Boundary
- Paving
- Roof
- Landscape
- Proposed Bioswale

Site Statistics:

Paving:	1800 sq.m
Roof:	750 sq.m
Landscape:	53150 sq.m
Total	55700 sq.m

Project Title:

Hydrogeological Investigation

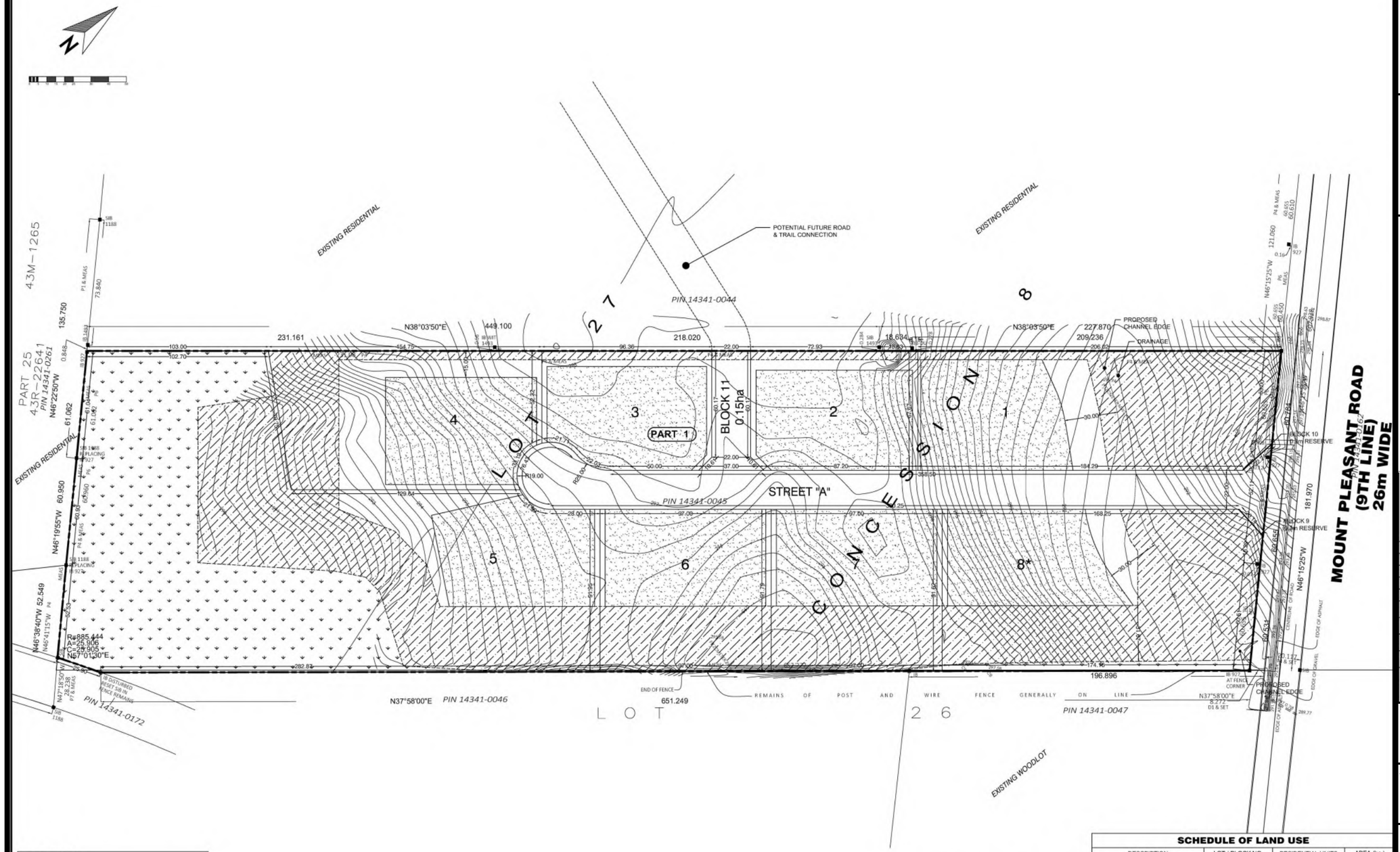
Site Location:

0 Mt. Pleasant Road, Caledon, ON.

Figure Title:

Post-Development Plan
Catchment 2

Scale:	Project Number:
As Shown	SP17-212-30
Date:	**Figure Number:**
September 2019	3-5



LEGEND

- ENVIRONMENTAL PROTECTION
- REFORESTED / PROTECTION AREA AREA = 4.00ha
- STRUCTURE ENVELOPE
- * DENSITY BONUS LOT PER O.P. POLICY 7.19.12

LOT SIZE SUMMARY CHART

LOT #	LOT AREA (Ha)	STRUCTURE ENVELOPE (Ha)
1	1.358	0.500
2	0.638	0.500
3	0.616	0.499
4	1.138	0.500
5	3.965	0.500
6	0.891	0.499
7	0.890	0.498
8	1.621	0.484

SCHEDULE OF LAND USE

DESCRIPTION	LOT / BLOCK NO.	RESIDENTIAL UNITS	AREA (ha.)
SINGLE DETACHED RESIDENTIAL	1 - 8	8	11.117
TOTAL SINGLE DETACHED		8	
NET DEVELOPABLE TOTAL		8	11.117
0.3 RESERVE	09, 10		0.005
FUTURE ROAD & TRAIL CONNECTION	11		0.154
RIGHT OF WAY	STREET "A"		0.999
TOTAL SITE AREA		8	12.275

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North:

Legend:

Property Boundary

TROPICAL LAND DEVELOPMENT LTD.

REVISIONS			
3			
2			
1	REVISION	6/12/19	JS
No.	Description	Date	Int.

PROJECT No.: 17445
DATE: May 4, 2018
SCALE: 1:1000
DRAFTED BY: JS
CHECKED BY: MJ
DRAWING No.: **DP-01**

Project Title:

Hydrogeological Investigation

Site Location:

0 Mt. Pleasant Road, Caledon, ON.

Figure Title:

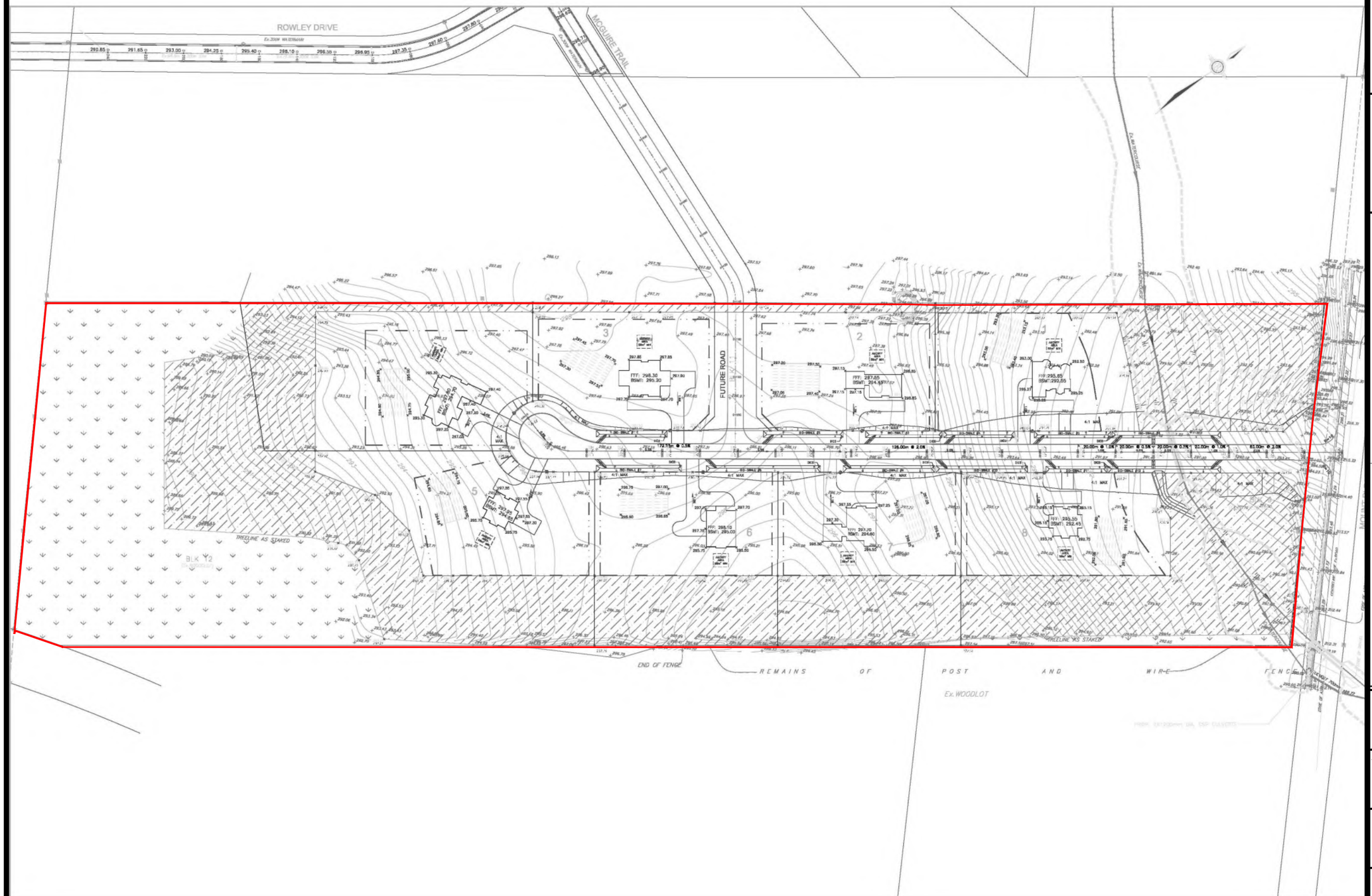
Topographic Survey Map

Scale: 0m 50m

Project Number: SP17-212-30

Date: September 2019

Figure Number: 3-6



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Phone# 905 833 1582, Fax# 905 833 5360

North:

Legend:

Property Boundary

ESTATE RESIDENTIAL SUBDIVISION
MOUNT PLEASANT ROAD
TOWN OF CALEDON
REGION OF PEEL

PRELIMINARY GRADING PLAN

SCALE:	DATE OF DWG.	PROJECT NO.
1:500	MAY 17, 2018	17122
DRAWN BY: E.T.	DRAWING NO.	PGR-1
CHKD BY D.G.		

Project Title:

Hydrogeological Investigation

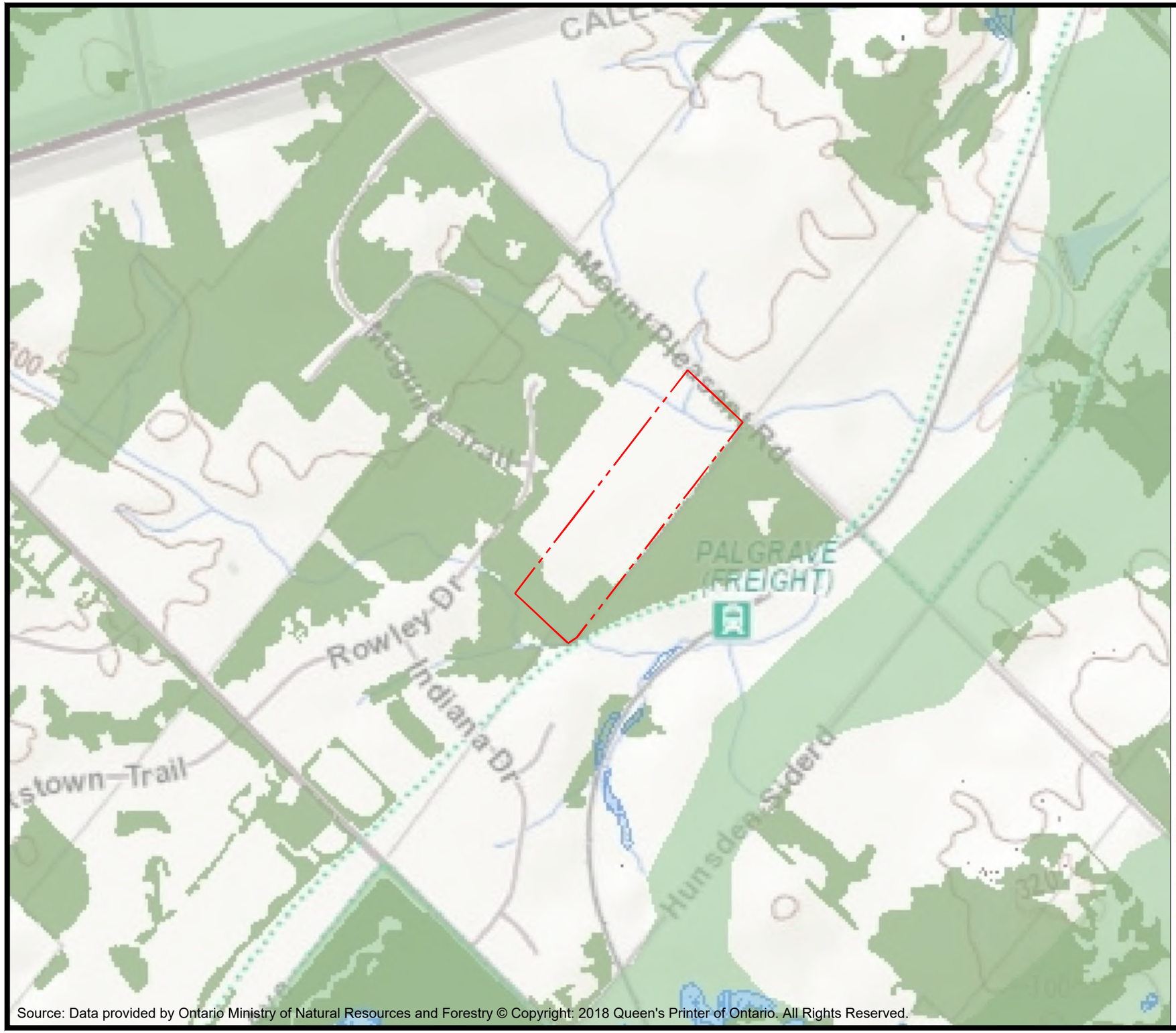
Site Location:

0 Mt. Pleasant Road, Caledon, ON.

Figure Title:

Site Grading Plan

Scale:	Project Number:
0m 50m	SP17-212-30
Date: October 2019	**Figure Number:** 3-7



Assessment Parcel
Woodland
Conservation Reserve
Provincial Park
Natural Heritage System
Ecoregion

Wetland
- Provincially Significant Wetland Evaluated
- Non - Provincially Significant Wetland Evaluated
- Unevaluated Wetland

Area of Natural Heritage & Scientific Interest (ANSI)
- Provincially Significant Life Science ANSI
- Provincially Significant Earth Science ANSI

Greenbelt Plan
- Boundary
- River Valley Connections

Land Use Designations
- Protected Countryside
- Towns and Villages
- Hamlets
- Urban River Valley
- Specialty Crop Area

Niagara Escarpment Plan (NEP)
- Boundary
- Parks and Open Space System

Land Use Designations
- Escarpment Natural Area
- Escarpment Protection Area
- Escarpment Rural Area
- Mineral Resource Extraction Area
- Escarpment Recreation Area
- Urban Area
- Minor Urban Centre

Oak Ridges Moraine Conservation Plan (ORM)
- Boundary

Land Use Designations
- Natural Core Area
- Natural Linkage Area
- Countryside Area
- Rural Settlement
- Palgrave Estates Residential Community
- Settlement Area

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North:

Legend:

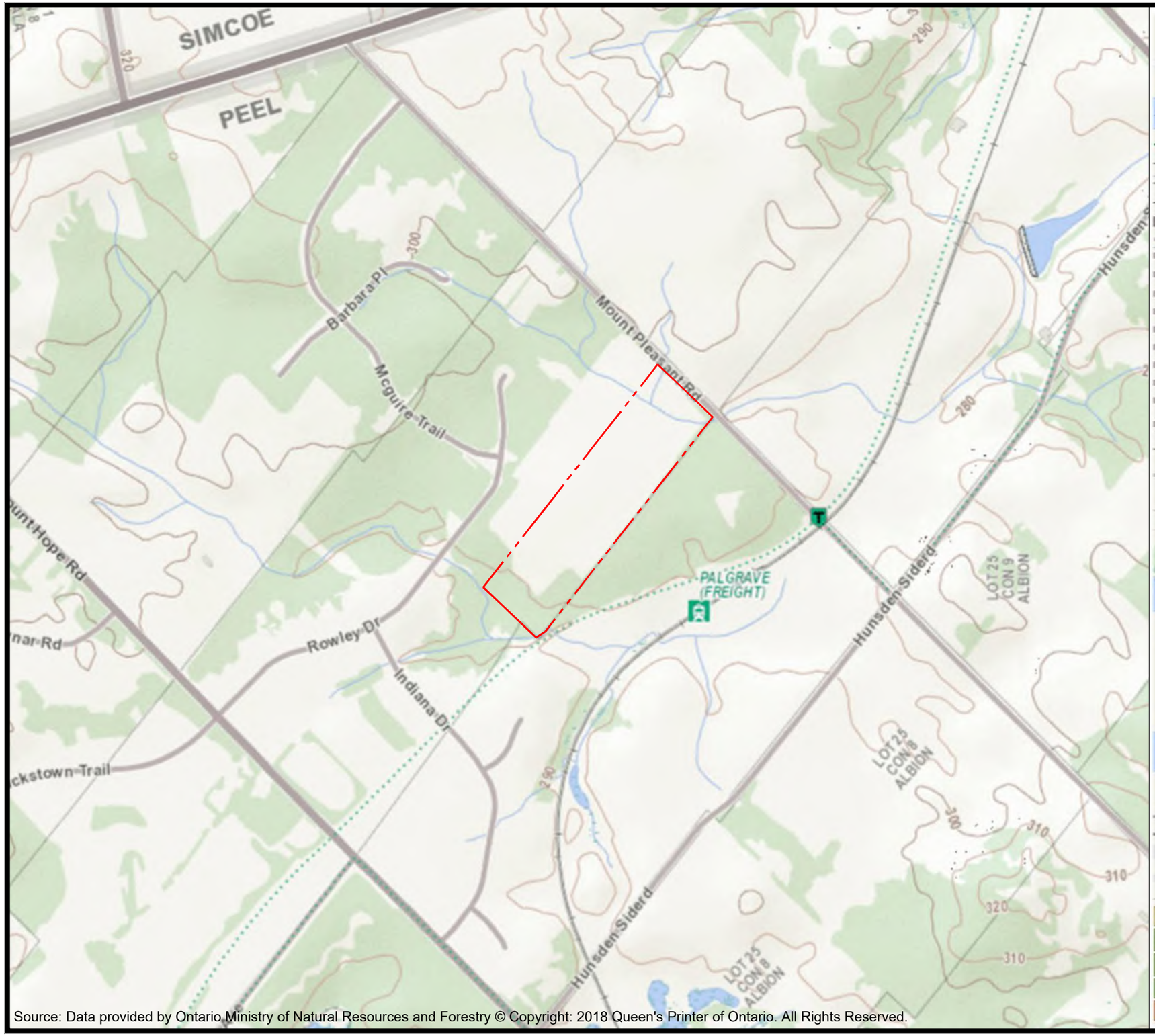
Property Boundary

Project Title:
Hydrogeological Investigation

Site Location:
0 Mt. Pleasant Road, Caledon, ON.

Figure Title:
Natural Features Area Map - Lake Simcoe Region

Scale:	Project Number:
0m 100m 200m	SP17-212-30
Date: September 2019	**Figure Number:** 4-1



- Building as Symbol
- Building to Scale
- Airport
- Heliport \ Hospital Heliport
- Seaplane Base
- Ferry Route
- Trail Head \ Trail
- Railway \ Train Station
- Railway with Bridge
- Railway with Tunnel
- Road (Major → Minor)
- Winter Road
- Road with Bridge
- Road with Tunnel
- Primary, Kings or 400 Series Highway
- Secondary Highway
- Tertiary Highway
- District, County, Regional or Municipal Road
- Toll Highway
- One Way Road
- Road with Permanent Blocked Passage
- Road with Address Ranges (420 500 / 421 499)
- Hydro Line, Communication Line or Unknown Transmission Line
- Natural Gas Pipeline, Water Pipeline or Unknown Pipeline
- Spot Height (208)
- Index Contour (200)
- Contour
- Wooded Area
- Wetland
- Waterbody
- Waterbody Elevation (184)
- Watercourse
- Falls
- Rapids
- Rapids \ Falls
- Rapids
- Rocks
- Lock Gate
- Dam \ Hydro Wall
- Dam \ Hydro Wall
- Provincial \ State Boundary
- International Boundary
- Upper Tier \ District Municipal Boundary
- Lower Tier \ Single Tier Municipal Boundary
- Lot Line
- Indian Reserve
- Provincial Park
- National Park
- Conservation Reserve
- Military Lands

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North:

Legend:

Property Boundary

Project Title:
Hydrogeological Investigation

Site Location:
0 Mt. Pleasant Road, Caledon, ON.

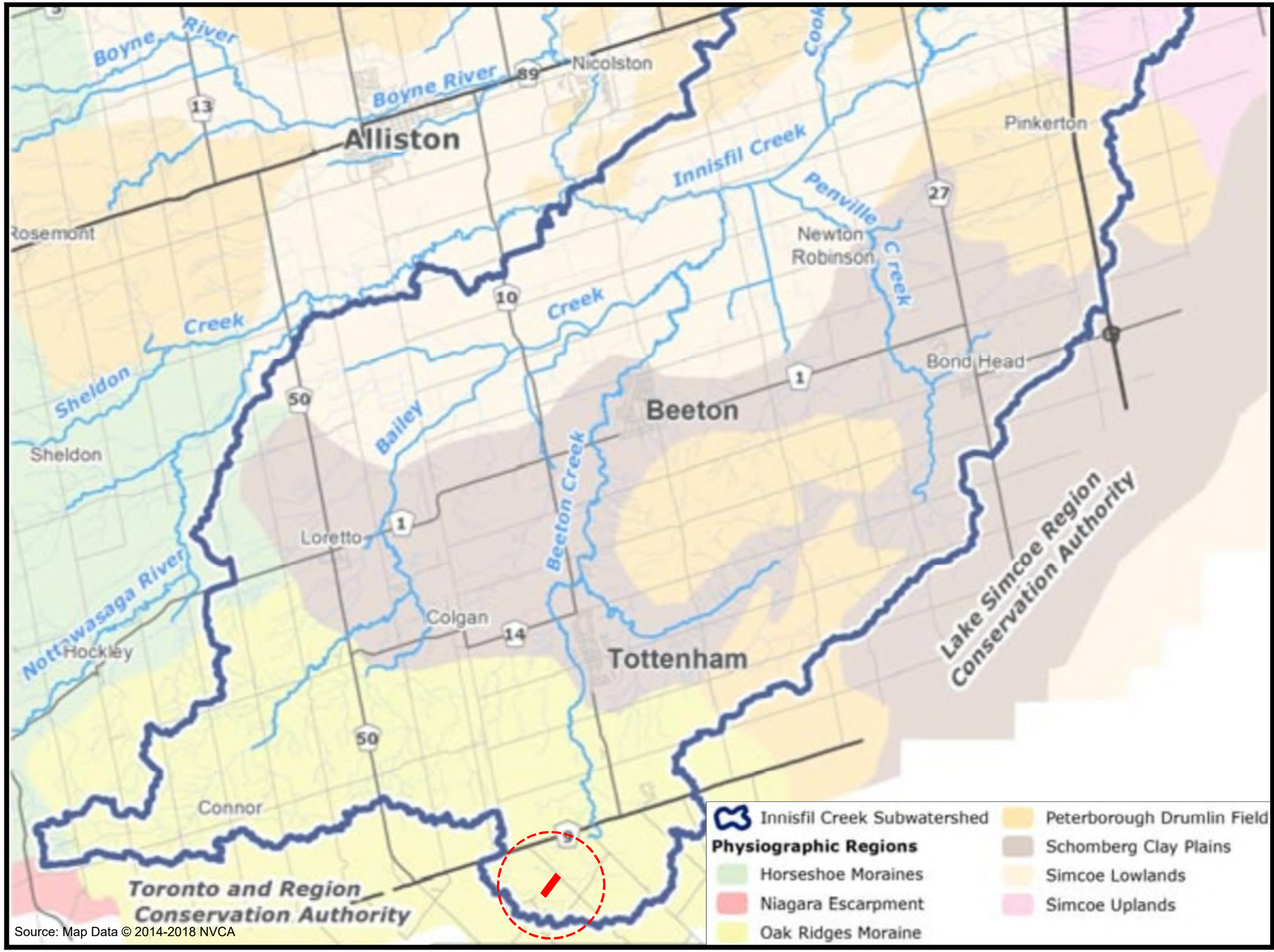
Figure Title:
Regional Topographic Map

Scale: 0m 100m 200m

Project Number: SP17-212-30

Date: September 2019

Figure Number: 5-1



Source: Map Data © 2014-2018 NVCA

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North:

Legend:

Subject Site

Approximate Site Location

Project Title:

Hydrogeological Investigation

Site Location:

0 Mt. Pleasant Road, Caledon, ON.

Figure Title:

Physiography Map

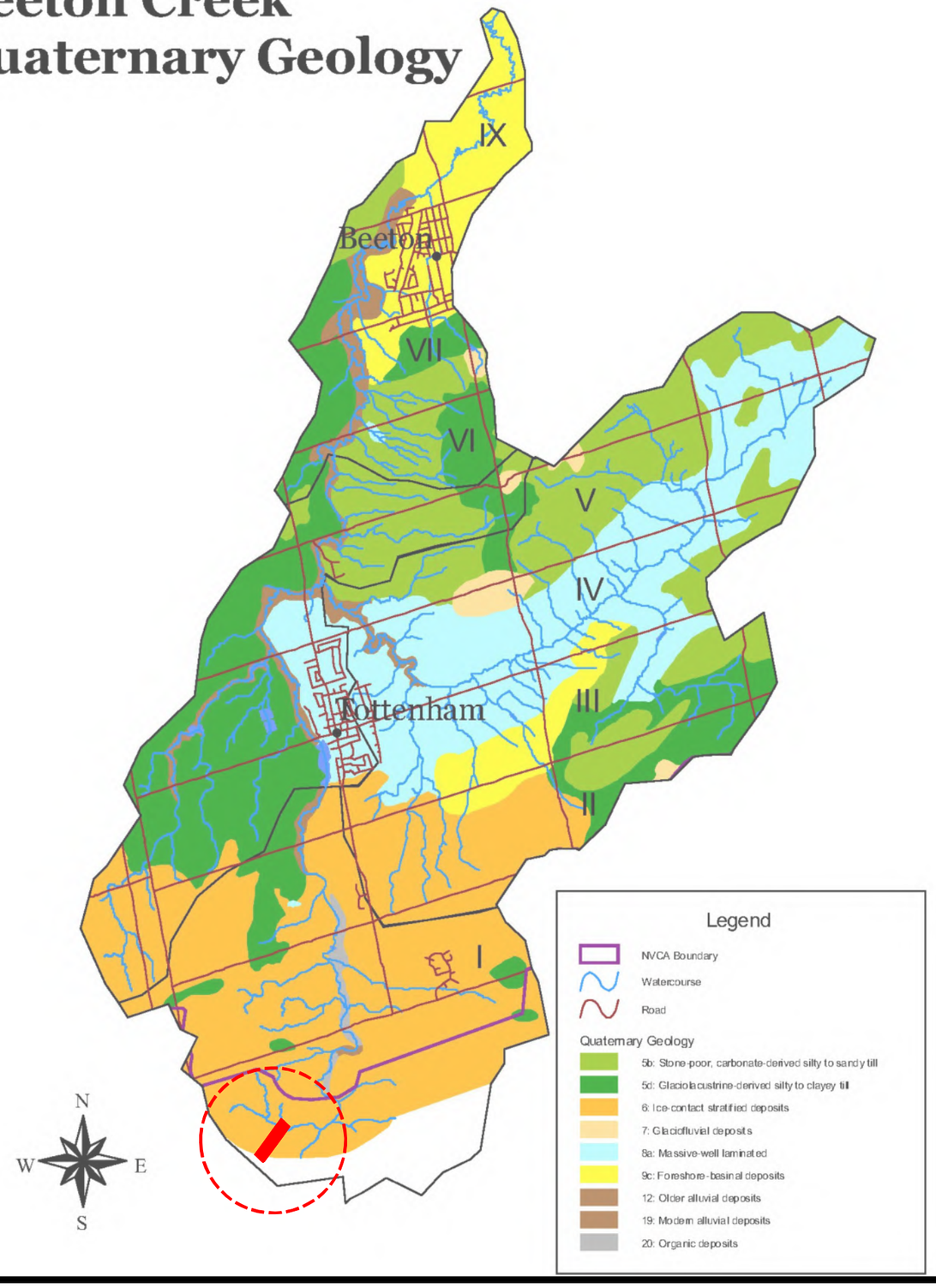
Scale: 0m 1km 2km

Project Number: SP17-212-30

Date: September 2019

Figure Number: 5-2

Beeton Creek
Quaternary Geology



Source: Map Data © 2014-2018 NVCA

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North:

Legend:

Subject Site

Approximate Site Location

Project Title:
Hydrogeological Investigation

Site Location:
0 Mt. Pleasant Road, Caledon, ON.

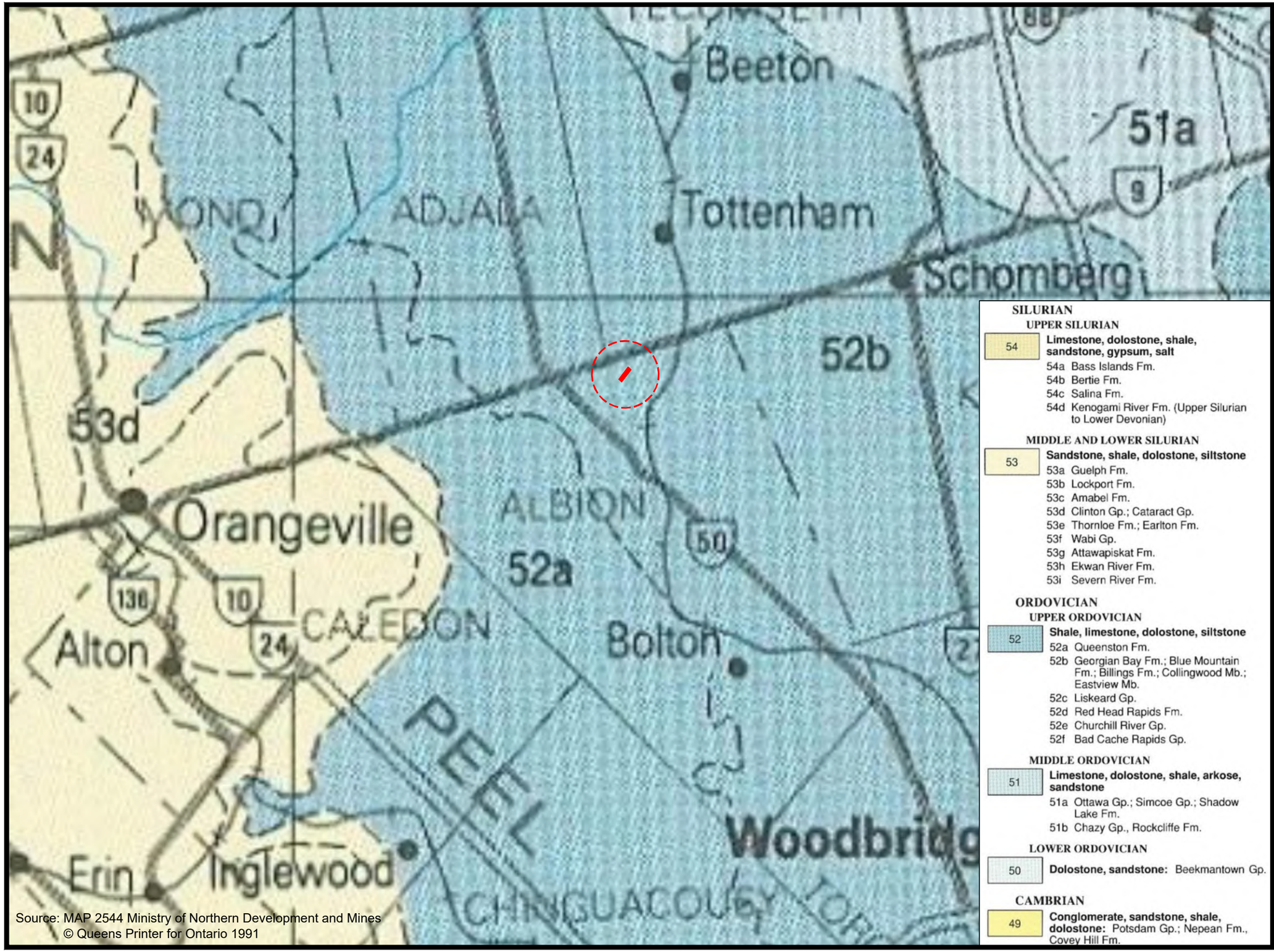
Figure Title:
Surficial Geology Map

Scale: 0m 500m

Project Number: SP17-212-30

Date: September 2019

Figure Number: 5-3



Source: MAP 2544 Ministry of Northern Development and Mines

SILURIAN

UPPER SILURIAN

54 **Limestone, dolostone, shale, sandstone, gypsum, salt**
- 54a Bass Islands Fm.
- 54b Bertie Fm.
- 54c Salina Fm.
- 54d Kenogami River Fm. (Upper Silurian to Lower Devonian)

MIDDLE AND LOWER SILURIAN

53 **Sandstone, shale, dolostone, siltstone**
- 53a Guelph Fm.
- 53b Lockport Fm.
- 53c Amabel Fm.
- 53d Clinton Gp.; Cataract Gp.
- 53e Thornloe Fm.; Earlton Fm.
- 53f Wabi Gp.
- 53g Attawapiskat Fm.
- 53h Ekwan River Fm.
- 53i Severn River Fm.

ORDOVICIAN

UPPER ORDOVICIAN

52 **Shale, limestone, dolostone, siltstone**
- 52a Queenston Fm.
- 52b Georgian Bay Fm.; Blue Mountain Fm.; Billings Fm.; Collingwood Mb.; Eastview Mb.
- 52c Liskeard Gp.
- 52d Red Head Rapids Fm.
- 52e Churchill River Gp.
- 52f Bad Cache Rapids Gp.

MIDDLE ORDOVICIAN

51 **Limestone, dolostone, shale, arkose, sandstone**
- 51a Ottawa Gp.; Simcoe Gp.; Shadow Lake Fm.
- 51b Chazy Gp., Rockcliffe Fm.

LOWER ORDOVICIAN

50 **Dolostone, sandstone:** Beekmantown Gp.

CAMBRIAN

49 **Conglomerate, sandstone, shale, dolostone:** Potsdam Gp.; Nepean Fm., Covey Hill Fm.

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North:

Legend:

Subject Site

Approximate Site Location

Project Title:
Hydrogeological Investigation

Site Location:
0 Mt. Pleasant Road, Caledon, ON.

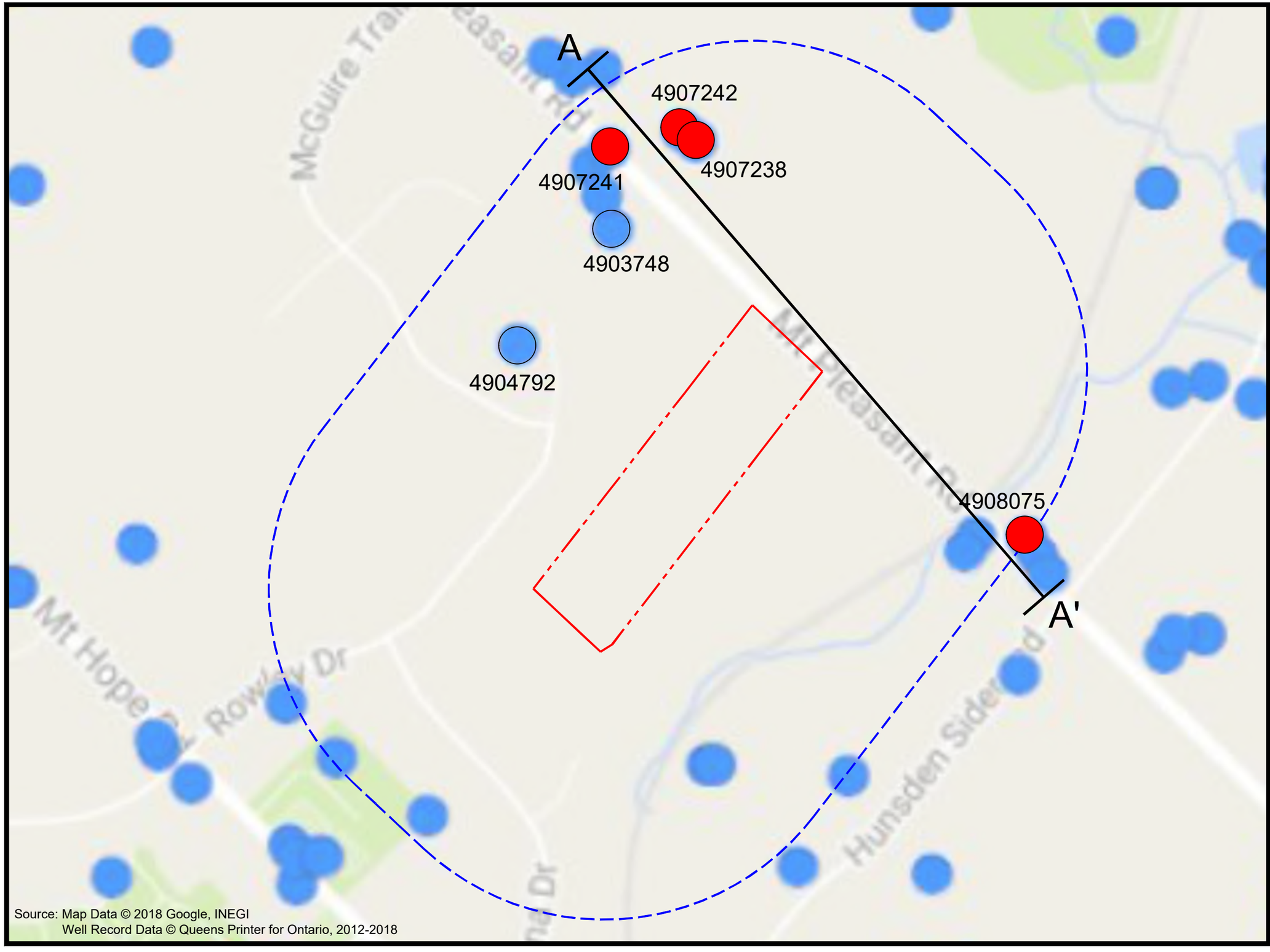
Figure Title:
Bedrock Geology

Scale: 0m 2km 4km

Project Number: SP17-212-30

Date: September 2019

Figure Number: 5-4



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North:

Legend:

Property Boundary

500 m Study Area

Project Title:
Hydrogeological Investigation

Site Location:
0 Mt. Pleasant Road, Caledon, ON.

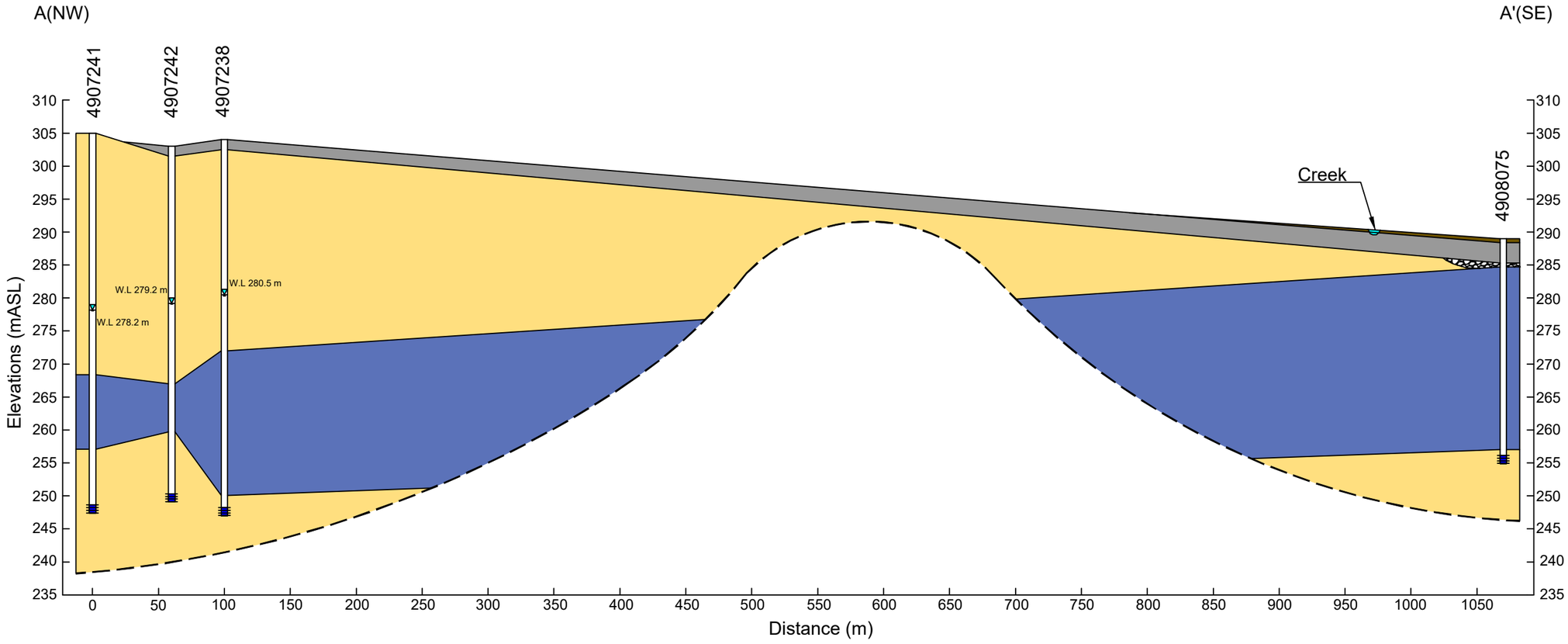
Figure Title:
MECP Well Record Map

Scale: 0m 100m 200m

Project Number: SP17-212-30

Date: September 2019

Figure Number: 6-1



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North:

Legend:

- Top Soil
- Sand
- Clay
- Silt
- Gravel

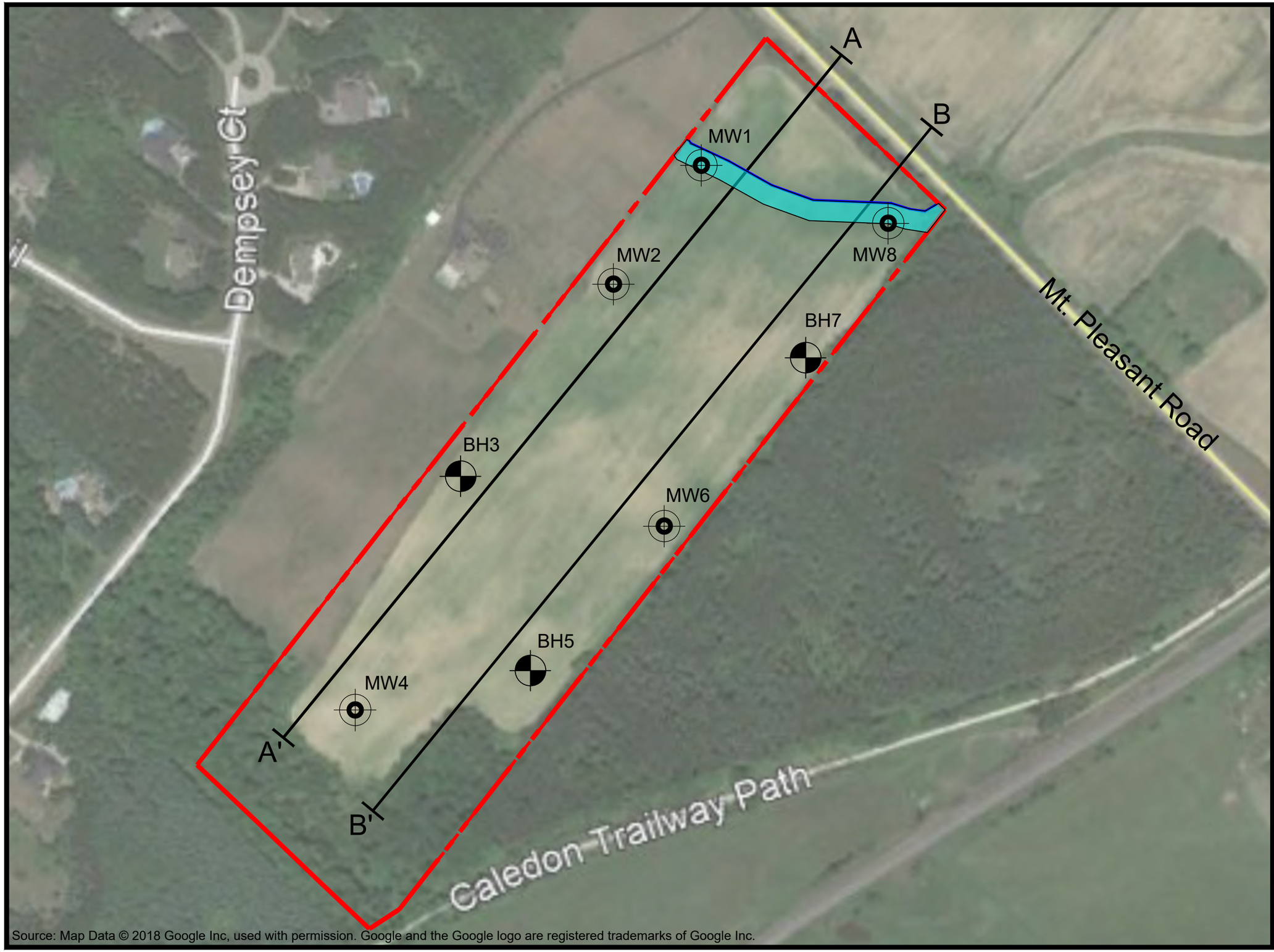
1234567
- Borehole / Well ID
- Water Level
- Well Screen

Project Title:
Hydrogeological Investigation

Site Location:
0 Mt. Pleasant Road, Caledon, ON.

Figure Title:
Hydrogeologic Cross Section a/c MECP Well Records

Scale:	Project Number:
As Shown	SP17-212-30
Date:	**Figure Number:**
September 2019	6-2



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North:

Legend:

- Property Boundary
- Creek
- Creek Buffer
- Monitoring Well
- Borehole

Project Title:
Hydrogeological Investigation

Site Location:
0 Mt. Pleasant Road, Caledon, ON.

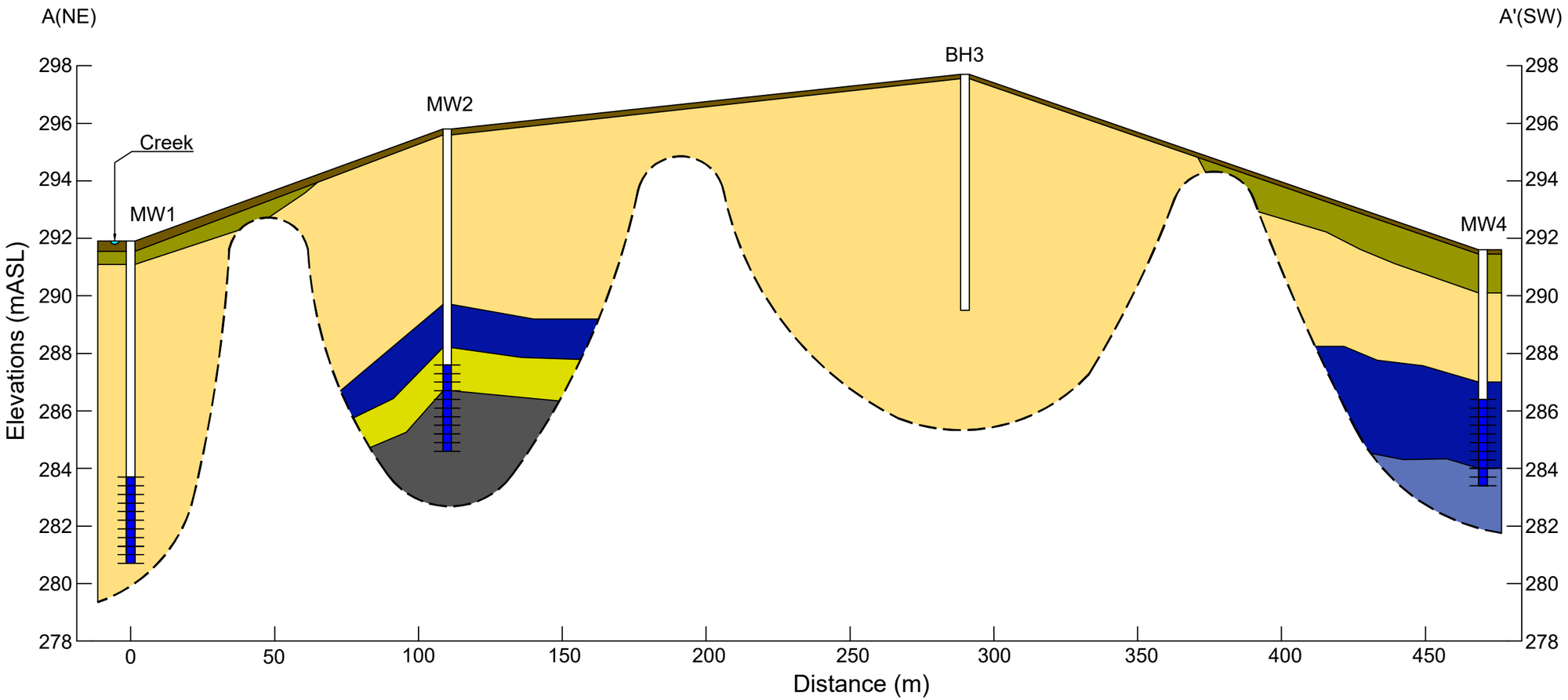
Figure Title:
SIRATI Borehole / Monitoring Well Location Map

Scale: 0m 30m 60m

Project Number: SP17-212-30

Date: September 2019

Figure Number: 7-1



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North:

Legend:

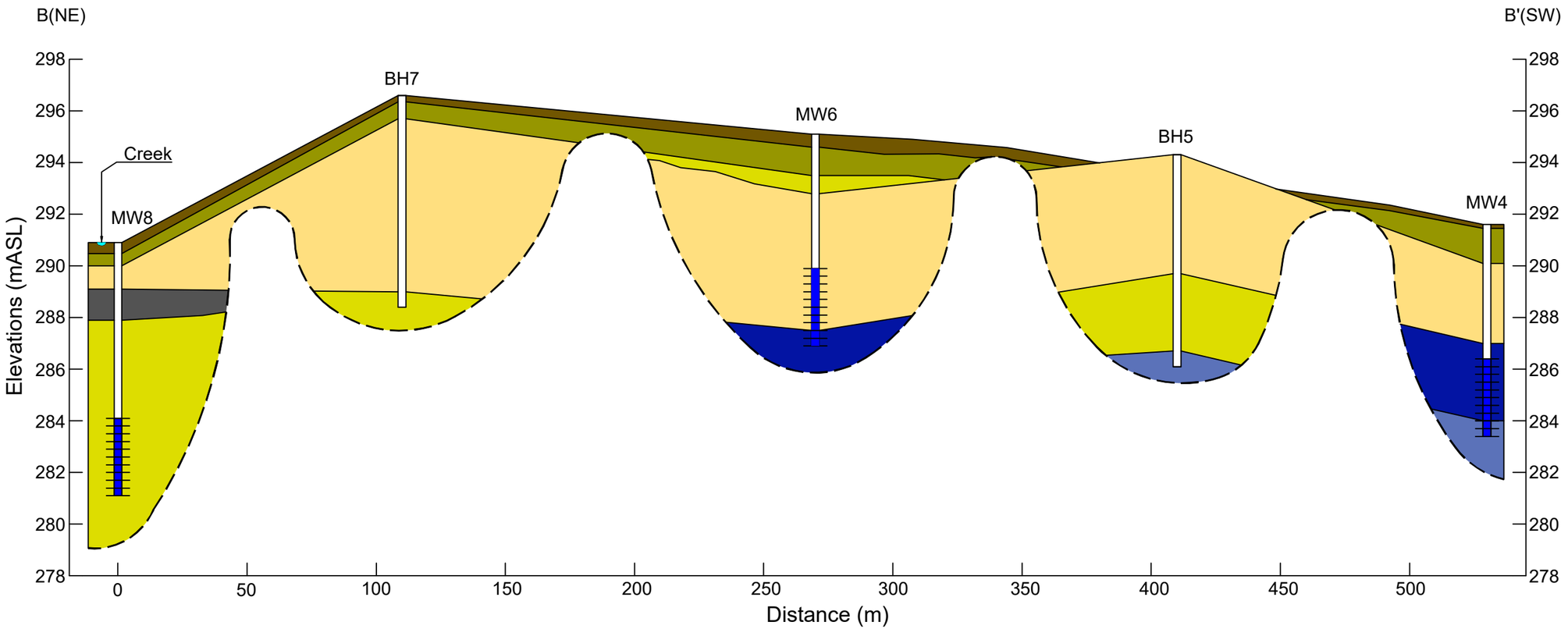
- Top Soil
- Fill
- Sand
- Silty Sand
- Clayey Silt / Silty Clay
- Sandy Silt
- Silt
- MW1 — Borehole / Well ID
- Water Level
- Well Screen

Project Title:
Hydrogeological Investigation

Site Location:
0 Mt. Pleasant Road, Caledon, ON.

Figure Title:
Hydrogeologic Cross Section a/c SIRATI Boreholes MW1, MW2 and MW4 – A-A'

Scale:	Project Number:
As Shown	SP17-212-30
Date:	**Figure Number:**
September 2019	8-1



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Phone# 905 833 1582, Fax# 905 833 5360

North:

Legend:

- Top Soil
- Fill
- Sand
- Silty Sand
- Clayey Silt / Silty Clay
- Sandy Silt
- Silt
- MW1 ← Borehole / Well ID
- Water Level
- Well Screen

Project Title:
Hydrogeological Investigation

Site Location:
0 Mt. Pleasant Road, Caledon, ON.

Figure Title:
Hydrogeologic Cross Section a/c SIRATI Boreholes MW5, MW6, MW7 and MW8 - B-B'

Scale:	Project Number:
As Shown	SP17-212-30
Date:	**Figure Number:**
September 2019	8-2

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North:

N

Legend:

- Contour Line
- Inferred Groundwater Flow Direction
- 188.0 mASL — Monitoring Well & Groundwater Elevation

Project Title:
Hydrogeological Investigation

Site Location:
0 Mt. Pleasant Road, Caledon, ON.

Figure Title:
Inferred Groundwater Table Contour Map
June 2017

Scale:	Project Number:
0m 30m 60m	SP17-212-30
Date: September 2019	**Figure Number:** 9-1

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Phone# 905 833 1582, Fax# 905 833 5360

North:

Legend:

- Contour Line
- Inferred Groundwater Flow Direction
- 188.0 mASL — Monitoring Well & Groundwater Elevation

Project Title:
Hydrogeological Investigation

Site Location:
0 Mt. Pleasant Road, Caledon, ON.

Figure Title:
Inferred Groundwater Table Contour Map
October 2017

Scale: 0m 30m 60m

Project Number: SP17-212-30

Date: September 2019

Figure Number: 10-1

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Phone# 905 833 1582, Fax# 905 833 5360

North:

Legend:

Contour Line

Inferred Groundwater Flow Direction

188.0 mASL
Monitoring Well & Groundwater Elevation

Project Title:
Hydrogeological Investigation

Site Location:
0 Mt. Pleasant Road, Caledon, ON.

Figure Title:
Inferred Groundwater Table Contour Map
November 2017

Scale: 0m 30m 60m

Project Number: SP17-212-30

Date: September 2019

Figure Number: 10-2

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Phone# 905 833 1582, Fax# 905 833 5360

North:

Legend:

Contour Line

Inferred Groundwater Flow Direction

188.0 mASL
Monitoring Well & Groundwater Elevation

Project Title:
Hydrogeological Investigation

Site Location:
0 Mt. Pleasant Road, Caledon, ON.

Figure Title:
Inferred Groundwater Table Contour Map
December 2017

Scale: 0m 30m 60m

Project Number: SP17-212-30

Date: September 2019

Figure Number: 10-3

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Phone# 905 833 1582, Fax# 905 833 5360

North:

N

Legend:

- Contour Line
- Inferred Groundwater Flow Direction
- 188.0 mASL — Monitoring Well & Groundwater Elevation

Project Title:
Hydrogeological Investigation

Site Location:
0 Mt. Pleasant Road, Caledon, ON.

Figure Title:
Inferred Groundwater Table Contour Map
January 2018

Scale: 0m 30m 60m

Project Number: SP17-212-30

Date: September 2019

Figure Number: 10-4

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Phone# 905 833 1582, Fax# 905 833 5360

North:

N

Legend:

- Contour Line
- Inferred Groundwater Flow Direction
- 188.0 mASL — Monitoring Well & Groundwater Elevation

Project Title:
Hydrogeological Investigation

Site Location:
0 Mt. Pleasant Road, Caledon, ON.

Figure Title:
Inferred Groundwater Table Contour Map
February 2018

Scale: 0m 30m 60m

Project Number: SP17-212-30

Date: September 2019

Figure Number: 10-5

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North:

N

Legend:

- Contour Line
- Inferred Groundwater Flow Direction
- 188.0 mASL — Monitoring Well & Groundwater Elevation

Project Title:
Hydrogeological Investigation

Site Location:
0 Mt. Pleasant Road, Caledon, ON.

Figure Title:
Inferred Groundwater Table Contour Map
March 2018

Scale:	Project Number:
0m 30m 60m	SP17-212-30
Date: September 2019	**Figure Number:** 10-6

Finished Floor Elevation 295.65 mASL

Basement Elevation 292.55 mASL

Excavation Base Elevation 292.1 mASL
(No Dewatering Required)

Block 1

Average Groundwater Elevation 284.12 mASL

Finished Floor Elevation 297.55 mASL

Basement Elevation 294.45mASL

Excavation Base Elevation 294.00 mASL
(No Dewatering Required)

Block 2

Average Groundwater Elevation 285.77 mASL

Finished Floor Elevation 298.30 mASL

Basement Elevation 295.20 mASL

Excavation Base Elevation 294.75 mASL
(No Dewatering Required)

Block 3

Average Groundwater Elevation 285.77 mASL

Finished Floor Elevation 297.80 mASL

Basement Elevation 294.70 mASL

Excavation Base Elevation 294.25 mASL
(No Dewatering Required)

Block 4

Average Groundwater Elevation 286.47 mASL

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North:

Legend:

Project Title:
Hydrogeological Investigation

Site Location:
0 Mt. Pleasant Road, Caledon, ON.

Figure Title:
Dewatering Cross Sections - Blocks 1 to 4

Scale:	Project Number:
As Shown	SP17-212-30
Date:	**Figure Number:**
October 2019	12-1

Finished Floor Elevation 297.95 mASL

Basement Elevation 294.85 mASL

Excavation Base Elevation 291.40 mASL
(No Dewatering Required)

Block 5

Average Groundwater Elevation 286.47 mASL

Finished Floor Elevation 298.1 mASL

Basement Elevation 295.00mASL

Excavation Base Elevation 294.55 mASL
(No Dewatering Required)

Block 6

Average Groundwater Elevation 287.54 mASL

Finished Floor Elevation 297.7 mASL

Basement Elevation 294.6 mASL

Excavation Base Elevation 294.15

Block 7

Average Groundwater Elevation 285.01 mASL

Finished Floor Elevation 295.55 mASL

Basement Elevation 292.45 mASL

Excavation Base Elevation 292.00 mASL
(No Dewatering Required)

Block 8

Average Groundwater Elevation 282.14 mASL

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Phone# 905 833 1582, Fax# 905 833 5360

North:

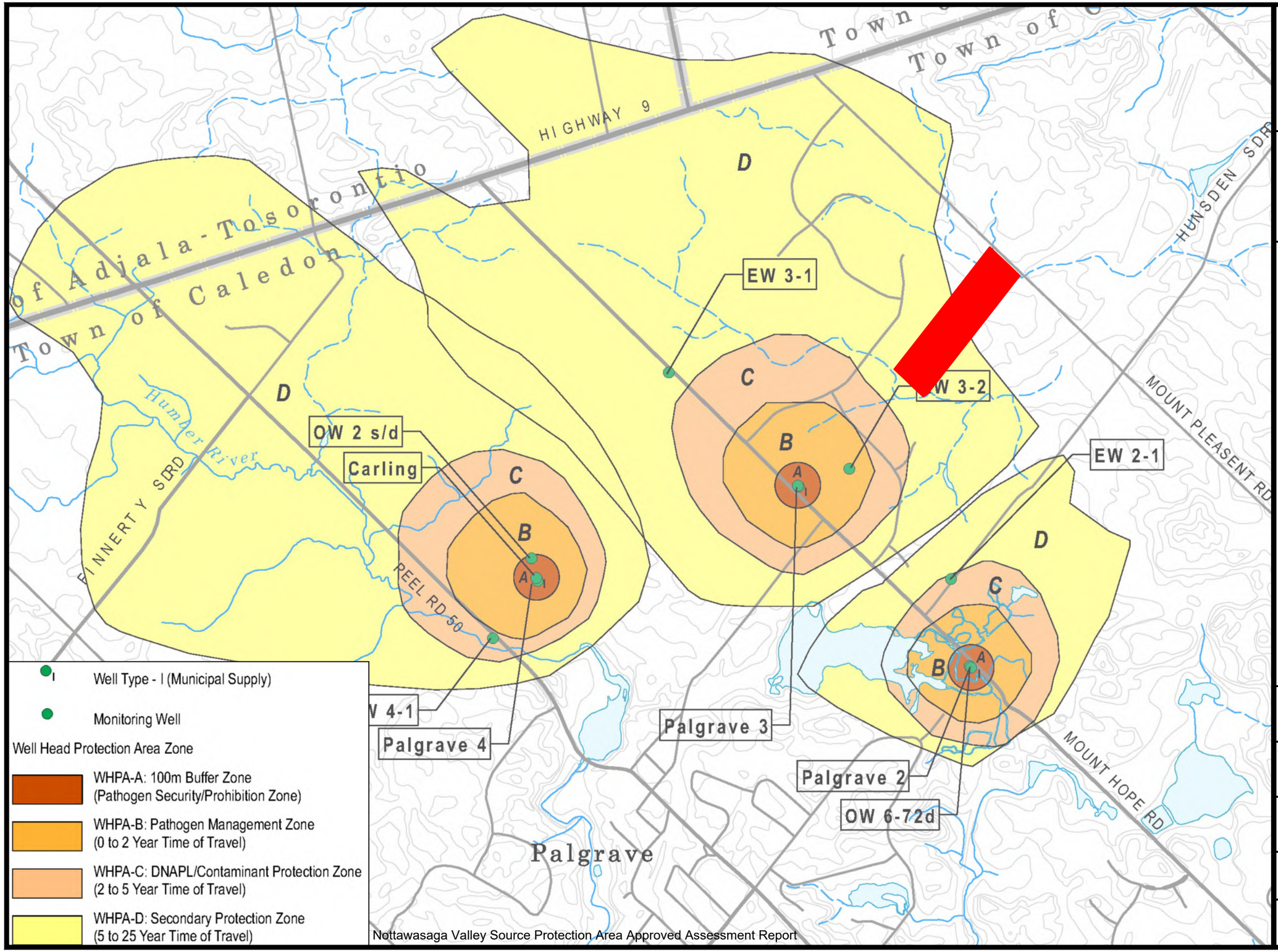
Legend:

Project Title:
Hydrogeological Investigation

Site Location:
0 Mt. Pleasant Road, Caledon, ON.

Figure Title:
Dewatering Cross Sections - Blocks 5 to 8

Scale:	Project Number:
As Shown	SP17-212-30
Date:	**Figure Number:**
October 2018	12-2



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King City, ON. L7B 1H5
Phone# 905 833 1582, Fax# 905 833 5360

North:

Legend:

Subject Site

Project Title:

Hydrogeological Investigation

Site Location:

0 Mt. Pleasant Road, Caledon, ON.

Figure Title:

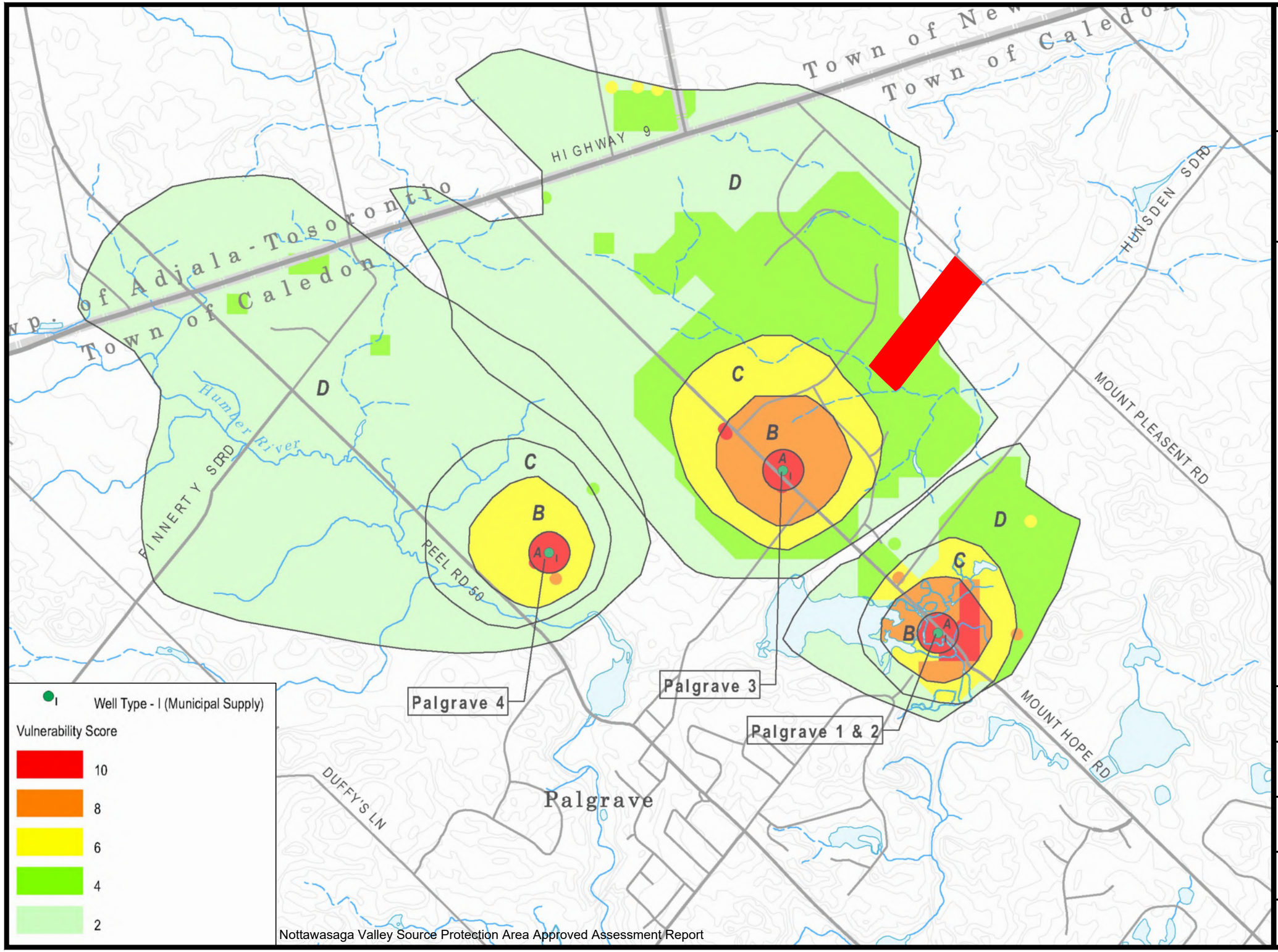
Well Head Protection Area (Palgrave Well#3) Map

Scale: 0m 200m 400m

Project Number: SP17-212-30

Date: September 2019

Figure Number: 13-1



SIRATI & PARTNERS
Geotechnical Hydrogeological & Environmental Solutions
12700- Keele Street
King City, ON. L7B 1H5
Phone# 905 833 1582, Fax# 905 833 5360

North:

Legend:

Subject Site

Project Title:
Hydrogeological Investigation

Site Location:
0 Mt. Pleasant Road, Caledon, ON.

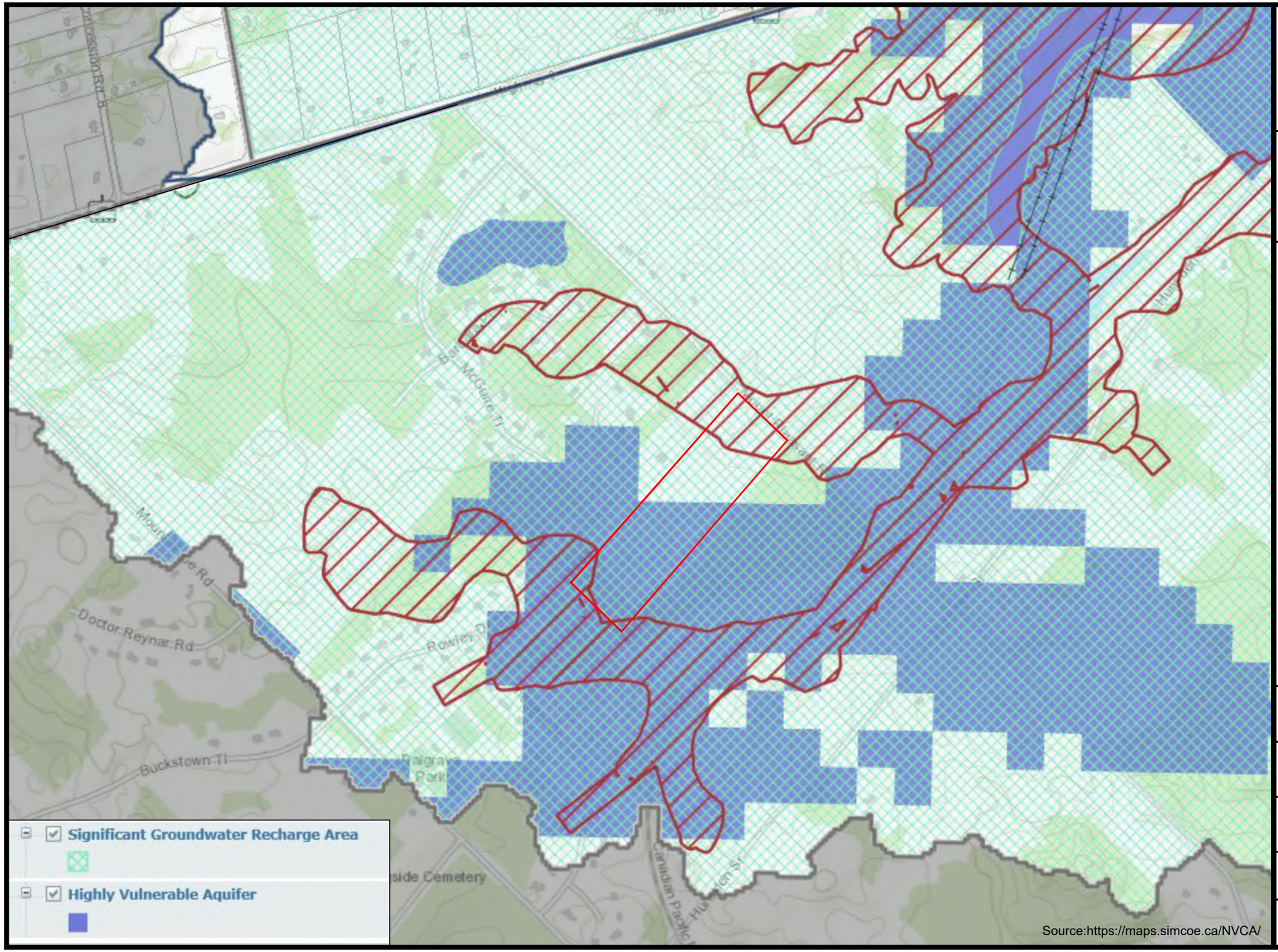
Figure Title:
Vulnerability Scores (Palgrave Well#3) Map

Scale: 0m 200m 400m

Project Number: SP17-212-30

Date: September 2019

Figure Number: 13-2



SIRATI & PARTNERS
Geotechnical Hydrogeological & Environmental Solutions
12700- Keele Street
King City, ON. L7B 1H5
Phone# 905 833 1582, Fax# 905 833 5360

North:

Legend:

Property Boundary

Project Title:
Hydrogeological Investigation

Site Location:
0 Mt. Pleasant Road, Caledon, ON.

Figure Title:
Map Showing SGRA/HVA

Scale: 0m 100m 200m

Project Number: SP17-212-30

Date: September 2019

Figure Number: 13-3

APPENDICES

SIRATI & PARTNERS

Geotechnical Hydrogeological & Environmental Solutions

APPENDIX A

SIRATI & PARTNERS

Geotechnical Hydrogeological & Environmental Solutions

Sirati & Partners Consultants Ltd.
Geotechnical & Environmental Services
Engineering Solutions

LOG OF BOREHOLE BH1

PROJECT: Geotechnical, Environmental and Hydrogeological Services
CLIENT: Tropical Land Development Limited
PROJECT LOCATION: Mt Pleasent Road, Caledon, ON
DATUM: Geodetic
BH LOCATION: See Figure 7-1

DRILLING DATA
Method: Hollow Stem Augers
Diameter: 200mm
Date: Jun/02/2017

REF. NO.: SP17-212-10
ENCL NO.: 2

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
291.9												
0.0 / 291.6	**TOPSOIL:** 350mm		1	SS	7							
0.4 / 291.1	**FILL:** silty sand, trace clay, trace rootlets, brown, moist, loose											
1 0.8	**SAND:** trace silt, trace gravel, brown, moist, very loose		2	SS	3		291					
			3	SS	2		290					
2			4	SS	2							
3			5	SS	4		289					0 96 2 2
4							288					
			6	SS	2							
5							287					
6	compact below 6.1m		7	SS	12		286					
7							285					
8			8	SS	22		284					
9	very moist to wet below 9.1m		9	SS	17		283					
10						W. L. 282.1 m Jun 16, 2017						
11 280.7			10	SS	17		281					
11.2	**END OF BOREHOLE** Notes: 1) Monitoring well installed in the borehole upon completion. 2) Water level in monitoring well at 9.8m on June 16, 2017.											

SPCL SOIL LOG SP17-212-10 - MOUNT PLEASANT, CALEDON.GPJ SPCL.GDT 7/5/17

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

Sirati & Partners Consultants Ltd.
Geotechnical & Environmental Services
Engineering Solutions

LOG OF BOREHOLE BH2

PROJECT: Geotechnical, Environmental and Hydrogeological Services
CLIENT: Tropical Land Development Limited
PROJECT LOCATION: Mt Pleasant Road, Caledon, ON
DATUM: Geodetic
BH LOCATION: See Figure 7-1

DRILLING DATA
Method: Hollow Stem Augers
Diameter: 200mm
Date: Jun/01/2017

REF. NO.: SP17-212-10
ENCL NO.: 3

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	BLOWS 0.3 m "N"	ELEVATION
295.8 / 0.0	**TOPSOIL:** 200mm				
0.2	**SAND:** trace silt, trace gravel, brown, moist, loose to compact	1	SS	6	
		2	SS	18	295
		3	SS	21	294
		4	SS	16	293
	occasional silt seams at 3m	5	SS	20	
		6	SS	26	292
289.7 / 6.1	**SILT TO SANDY SILT:** trace clay, trace gravel, grey, wet, compact	7	SS	20	291
					290
288.2 / 7.6	**SILTY SAND:** trace clay, brown, wet, compact	8	SS	29	289
286.7 / 9.1	**CLAYEY SILT TO SILTY CLAY:** trace sand, occasional sand seams, greyish brown, wet, stiff	9	SS	9	288
					287
		10	SS	13	286
					285
284.6 / 11.2	**END OF BOREHOLE**				

Notes:
1) Monitoring well installed in the borehole upon completion.
2) Water level in monitoring well at 9.6m on June 16, 2017.

W. L. 286.2 m
Jun 16, 2017

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
SHEAR STRENGTH (kPa) (20 40 60 80 100)
○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE
PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%) (10 20 30)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)	GR	SA	SI	CL
	0	10	66	24

POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m³)

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; ε_f=3% Strain at Failure

SPCL SOIL LOG SP17-212-10 - MOUNT PLEASANT, CALEDON.GPJ SPCL.GDT 7/5/17

Sirati & Partners Consultants Ltd.
Geotechnical & Environmental Services
Engineering Solutions

LOG OF BOREHOLE BH3

PROJECT: Geotechnical, Environmental and Hydrogeological Services
CLIENT: Tropical Land Development Limited
PROJECT LOCATION: Mt Pleasant Road, Caledon, ON
DATUM: Geodetic
BH LOCATION: See Figure 7-1

DRILLING DATA
Method: Hollow Stem Augers
Diameter: 200mm
Date: Jun/01/2017

REF. NO.: SP17-212-10
ENCL NO.: 4

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION
297.7							
297.6	**TOPSOIL:** 150mm						
0.2	**SAND:** weathered/disturbed, trace silt, brown, moist, loose		1	SS	6		
296.9							297
0.8	**SAND:** trace silt, brown, moist, compact		2	SS	12		
	occasional silt seams at 1.5m		3	SS	23		296
			4	SS	27		295
			5	SS	24		
							294
			6	SS	25		293
							292
			7	SS	25		
							291
			8	SS	26		290
289.5							
8.2	**END OF BOREHOLE**						

Notes:
1) Borehole dry on completion.

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED
● QUICK TRIAXIAL
+ FIELD VANE & Sensitivity
× LAB VANE
20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L

WATER CONTENT (%)
10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

SPCL SOIL LOG SP17-212-10 - MOUNT PLEASANT, CALEDON.GPJ SPCL.GDT 7/5/17

Sirati & Partners Consultants Ltd.
Geotechnical & Environmental Services
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LOG OF BOREHOLE BH4

PROJECT: Geotechnical, Environmental and Hydrogeological Services
CLIENT: Tropical Land Development Limited
PROJECT LOCATION: Mt Pleasant Road, Caledon, ON
DATUM: Geodetic
BH LOCATION: See Figure 7-1

DRILLING DATA
Method: Hollow Stem Augers
Diameter: 200mm
Date: Jun/01/2017

REF. NO.: SP17-212-10
ENCL NO.: 5

SOIL PROFILE			SAMPLES												
(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
291.6												
290.6	**TOPSOIL:** 150mm											
0.2	**FILL:** silty sand, trace topsoil, dark brown, moist, very loose		1	SS	4		291					
1			2	SS	3							
290.1												
1.5	**SAND:** some silt, brown, moist, compact		3	SS	17		290					
2			4	SS	26		289					
3			5	SS	21							
4							288					
287.0			6	SS	19	▽	287					
4.6	**SANDY SILT:** trace clay, trace gravel, grey, wet, compact							W. L. 286.9 m Jun 16, 2017				
5							286					
6			7	SS	16		285					
7												
284.0							284					
7.6	**SILT:** trace sand, grey, wet, compact		8	SS	19							
8												
283.4												
8.2	**END OF BOREHOLE**											

Notes:
1) Monitoring well installed in the borehole upon completion.
2) Water level in monitoring well at 4.7m on June 16, 2017.

SPCL SOIL LOG SP17-212-10 - MOUNT PLEASANT, CALEDON.GPJ SPCL.GDT 7/5/17

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; ε_f=3% Strain at Failure

Sirati & Partners Consultants Ltd.
Geotechnical & Environmental Services
Engineering Solutions

LOG OF BOREHOLE BH5

PROJECT: Geotechnical, Environmental and Hydrogeological Services
CLIENT: Tropical Land Development Limited
PROJECT LOCATION: Mt Pleasant Road, Caledon, ON
DATUM: Geodetic
BH LOCATION: See Figure 7-1

DRILLING DATA
Method: Hollow Stem Augers
Diameter: 200mm
Date: Jun/01/2017

REF. NO.: SP17-212-10
ENCL NO.: 6

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
294.3								
0.0	**SAND:** trace silt, trace gravel, brown, moist, loose to compact		1	SS	7		294	
			2	SS	6		293	
			3	SS	9		292	
			4	SS	11		291	
			5	SS	13		290	
289.7								
4.6	**SANDY SILT TO SILTY SAND:** trace clay, greyish brown, moist to wet, compact		6	SS	25		289	0 23 65 12
			7	SS	22		288	
286.7							287	
7.6	**INTERBEDED SAND AND SILT:** trace clay, brown, moist, dense		8	SS	35			
286.1								
8.2	**END OF BOREHOLE** Notes: 1) Borehole open and dry on completion.							

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE; 20 40 60 80 100
PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%): 10 20 30
POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m³)

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; ε_f=3% Strain at Failure

SPCL SOIL LOG SP17-212-10 - MOUNT PLEASANT, CALEDON.GPJ SPCL.GDT 7/5/17

Sirati & Partners Consultants Ltd.
Geotechnical & Environmental Services
Engineering Solutions

LOG OF BOREHOLE BH6

PROJECT: Geotechnical, Environmental and Hydrogeological Services
CLIENT: Tropical Land Development Limited
PROJECT LOCATION: Mt Pleasant Road, Caledon, ON
DATUM: Geodetic
BH LOCATION: See Figure 7-1

DRILLING DATA
Method: Hollow Stem Augers
Diameter: 200mm
Date: Jun/01/2017

REF. NO.: SP17-212-10
ENCL NO.: 7

ELEV / DEPTH (m)	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS "N" 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
295.1												
0.0 / 294.6	**TOPSOIL:** 500mm		1	SS	5		295					
0.5 / 294.3	**FILL:** sandy silt, trace topsoil, brown, moist, loose											
1 0.8 / 293.5	**POSSIBLE FILL:** sand, trace silt, brown, moist, very loose		2	SS	2		294					
1.6 / 2 / 292.8	**SILTY SAND:** trace clay, brown, moist, very loose		3	SS	4		293					
2.3	**SAND:** trace silt, trace gravel, occasional silt layers, brown to greyish brown, moist to very moist, compact to dense		4	SS	25		292					
3			5	SS	27							
4							291					
			6	SS	34							
5							290					
6							289					
			7	SS	41							
7 / 287.5							288					
7.6 / 8 / 286.9	**SILT TO SANDY SILT:** trace clay, grey, moist, compact		8	SS	28		287					
8.2	**END OF BOREHOLE** Notes: 1) Monitoring well installed in the borehole upon completion.											

SPCL SOIL LOG SP17-212-10 - MOUNT PLEASANT, CALEDON.GPJ SPCL.GDT 7/5/17

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; ○ ε_f=3% Strain at Failure

Sirati & Partners Consultants Ltd.
Geotechnical & Environmental Services
Engineering Solutions

LOG OF BOREHOLE BH7

PROJECT: Geotechnical, Environmental and Hydrogeological Services
CLIENT: Tropical Land Development Limited
PROJECT LOCATION: Mt Pleasent Road, Caledon, ON
DATUM: Geodetic
BH LOCATION: See Figure 7-1

DRILLING DATA
Method: Hollow Stem Augers
Diameter: 200mm
Date: Jun/02/2017

REF. NO.: SP17-212-10
ENCL NO.: 8

ELEV / DEPTH (m)	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS "N" 0.3 m	GROUND WATER CONDITIONS	ELEVATION
296.6 / 0.0	**TOPSOIL:** 250mm						
296.4 / 0.3	**FILL:** sand, some silt, brown, moist, loose		1	SS	6		
295.8 / 0.9	**FILL:** sandy silt to silty sand mixed with topsoil, brown, moist, compact		2	SS	15		
	SAND: trace silt, trace gravel, brown to greyish brown, moist, compact		3	SS	18		
			4	SS	22		
			5	SS	33		
			6	SS	21		
			7	SS	22		
289.0 / 7.6	**SILTY FINE SAND:** trace clay, layer of silt, brown, wet, compact		8	SS	21		
288.4 / 8.2	**END OF BOREHOLE** Notes: 1) Borehole open and water level at 7.8m during drilling.						

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
SHEAR STRENGTH (kPa) (20 40 60 80 100)
○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%) (10 20 30)

POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
○ε=3%: Strain at Failure

SPCL SOIL LOG SP17-212-10 - MOUNT PLEASANT, CALEDON.GPJ SPCL.GDT 7/5/17

Sirati & Partners Consultants Ltd.
Geotechnical & Environmental Services
Engineering Solutions

LOG OF BOREHOLE BH8

PROJECT: Geotechnical, Environmental and Hydrogeological Services
CLIENT: Tropical Land Development Limited
PROJECT LOCATION: Mt Pleasant Road, Caledon, ON
DATUM: Geodetic
BH LOCATION: See Figure 7-1

DRILLING DATA
Method: Hollow Stem Augers
Diameter: 200mm
Date: Jun/02/2017

REF. NO.: SP17-212-10
ENCL NO.: 9

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION
290.9							
0.0 / 290.5	**TOPSOIL:** 430mm		1	SS	8		
0.4 / 290.0	**FILL:** silty sand, trace clay, dark brown, moist, loose						
0.9 / 289.1	**SAND:** trace silt, brown, moist, very loose to compact		2	SS	4		290
1.8 / 287.9	**CLAYEY SILT TO SILTY CLAY:** trace sand, brown, moist, stiff		3	SS	11		289
			4	SS	10		
3.0	**SANDY SILT TO SILTY SAND:** trace clay, trace gravel, brown, moist, compact to dense		5	SS	13		288
			6	SS	42		287
							286
							285
	wet below 7.6m		7	SS	37		
			8	SS	34		284
							283
			9	SS	25	W. L. 282.1 m Jun 16, 2017	
281.1							
9.8	**END OF BOREHOLE** Notes: 1) Monitoring well installed in the borehole upon completion. 2) Water level in monitoring well at 8.8m on June 16, 2017.						

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)

SHEAR STRENGTH (kPa) (20 40 60 80 100)
○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%) (10 20 30)

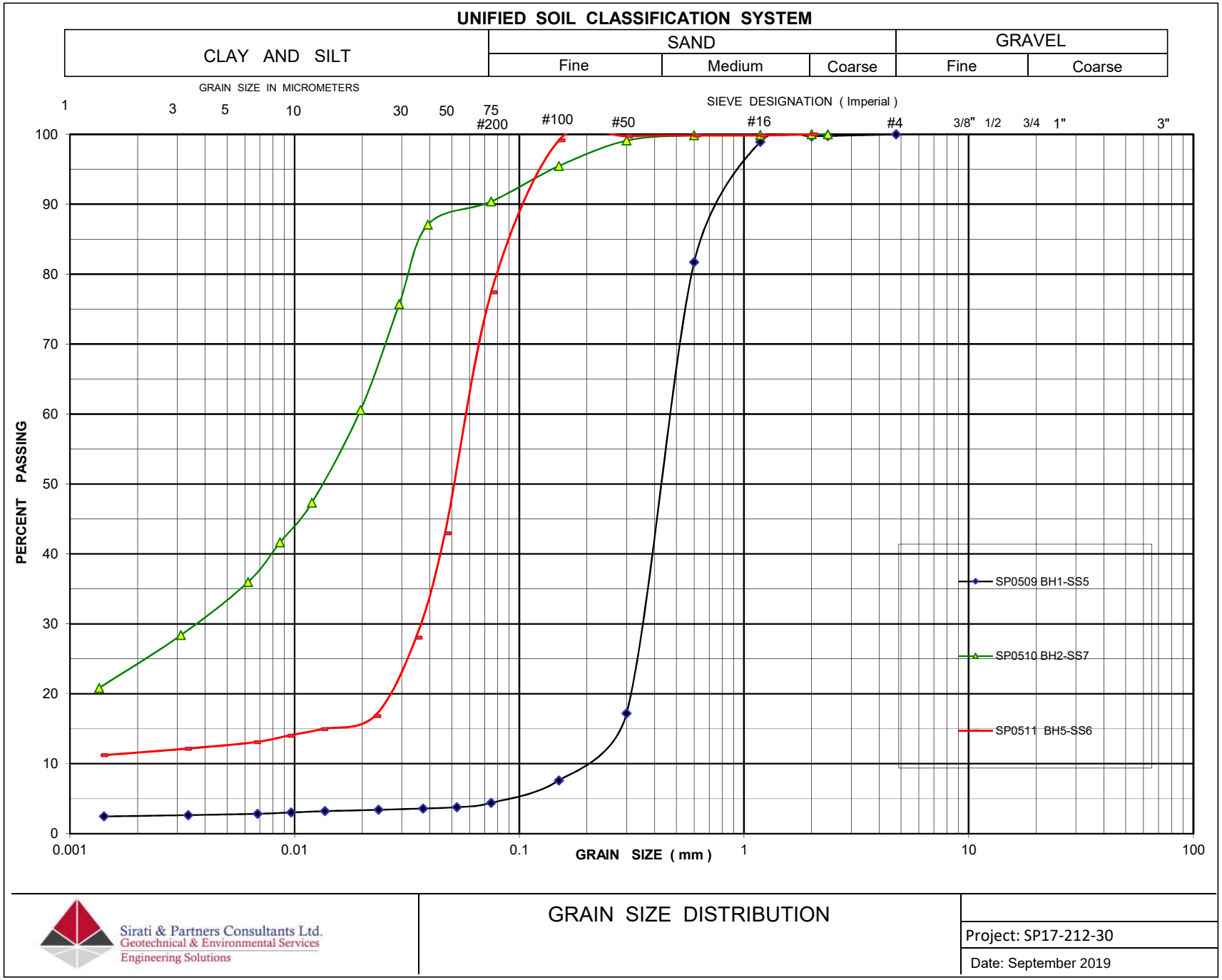
POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

SPCL SOIL LOG SP17-212-10 - MOUNT PLEASANT, CALEDON.GPJ SPCL.GDT 7/5/17

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
$+^3$, $\times^3$: Numbers refer to Sensitivity
○ $^{\varepsilon}$=3% Strain at Failure



Sirati & Partners Consultants Ltd.
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Engineering Solutions

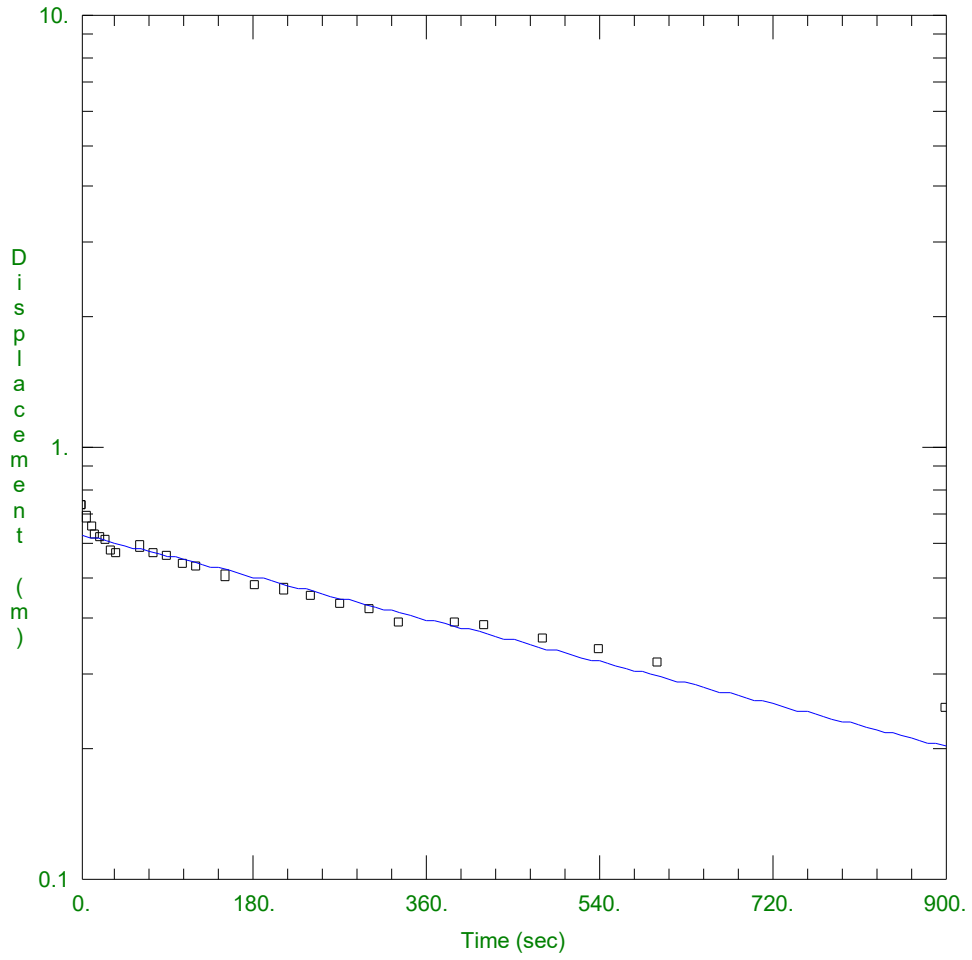
GRAIN SIZE DISTRIBUTION

Project: SP17-212-30

Date: September 2019

APPENDIX B

SIRATI & PARTNERS
Geotechnical Hydrogeological & Environmental Solutions



RISING HEAD TEST RESULTS

Data Set:
Date: 09/09/19 Time: 09:52:17

PROJECT INFORMATION

Company: Sirati and Partners
Client: Tropical land Developments
Project: SP17-212-30
Location: 0 MT.PLEASANT ROAD, CALEDON
Test Well: MW2
Test Date: July 11, 2017

AQUIFER DATA

Saturated Thickness: 1.19 m Anisotropy Ratio (Kz/Kr): 1.

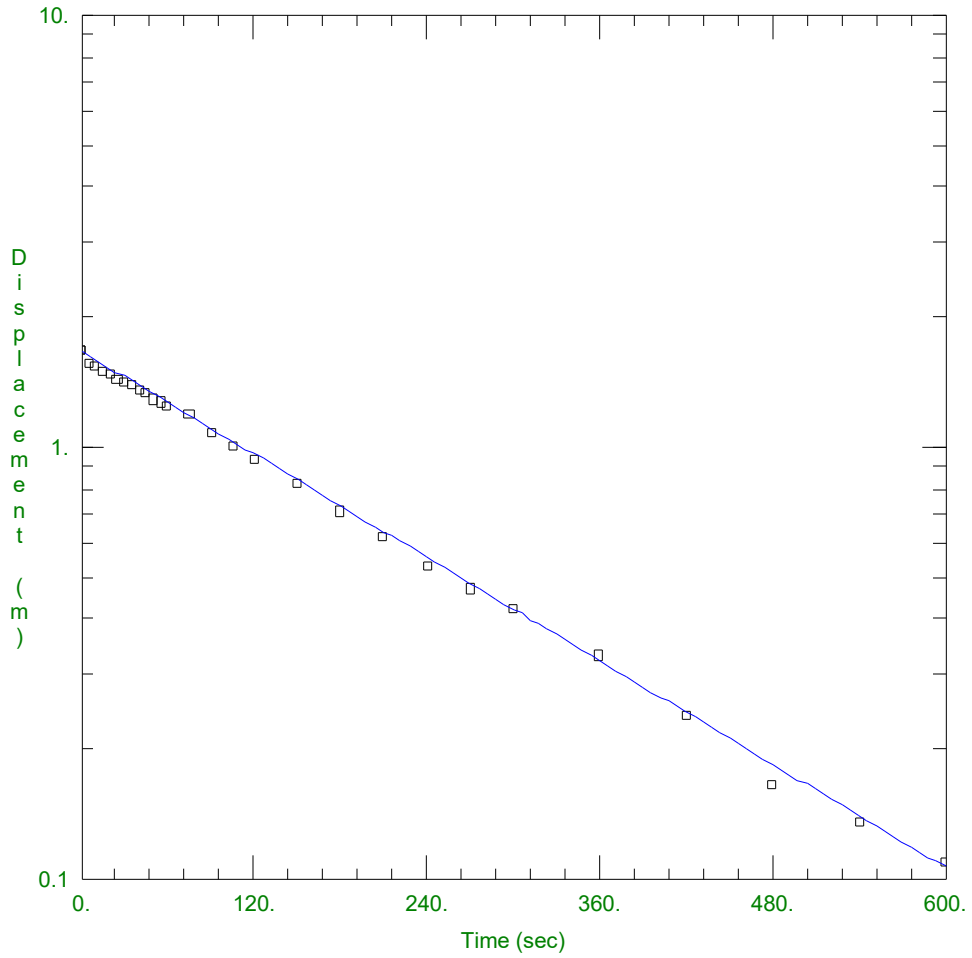
WELL DATA (MW2)

Initial Displacement: 0.74 m
Total Well Penetration Depth: 11.2 m
Casing Radius: 0.05 m
Static Water Column Height: 1.19 m
Screen Length: 3.6 m
Well Radius: 0.05 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 5.235E-6 m/sec y0 = 0.6269 m



RISING HEAD TEST RESULTS

Data Set: Z:\...\MW4.aqt
Date: 09/09/19 Time: 10:03:14

PROJECT INFORMATION

Company: Sirati and Partners
Client: Tropical land Developments
Project: SP17-212-30
Location: 0 MT.PLEASANT ROAD, CALEDON
Test Well: MW4
Test Date: July 11, 2017

AQUIFER DATA

Saturated Thickness: 2.96 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW4)

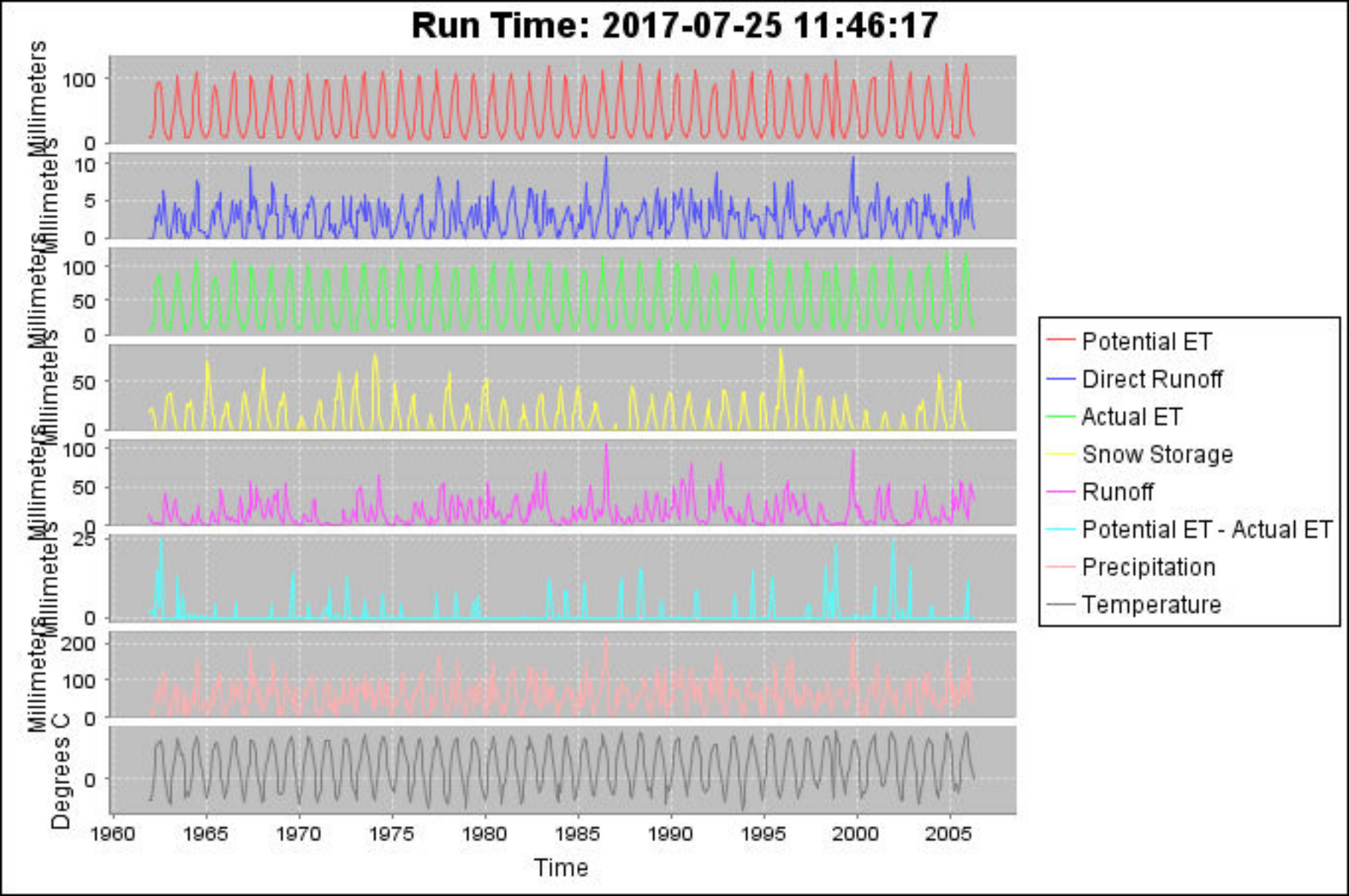
Initial Displacement: 1.68 m
Total Well Penetration Depth: 8.2 m
Casing Radius: 0.05 m
Static Water Column Height: 2.96 m
Screen Length: 3. m
Well Radius: 0.05 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 7.698E-6 m/sec
y0 = 1.671 m

APPENDIX C

SIRATI & PARTNERS
Geotechnical Hydrogeological & Environmental Solutions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Millimeters
100
0
Millimeters
10
5
0
Millimeters
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50
0
Millimeters
50
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50
0
Millimeters
25
0
Millimeters
200
100
0
Degrees C
0
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
Time
Potential ET
Direct Runoff
Actual ET
Snow Storage
Runoff
Potential ET - Actual ET
Precipitation
Temperature

Date	PET	P	p-PET	soil Moisture	AET	PET-AET	Snow Storage	surplus	Rototal
Jan-62	6.7	17.5	-6.5	145.1	5.1	1.6	17.3	0	12.7
Feb-62	7.7	4.6	-7.5	139.6	5.6	2.1	21.8	0	6.4
Mar-62	16.2	3.8	-8.8	133.5	13.5	2.7	18.2	0	3.3
Apr-62	35.9	31.5	3.1	136.6	35.9	0	9.1	0	3.2
May-62	74.8	58.4	-10.2	129.6	71.5	3.2	0	0	3.7
Jun-62	90.4	50	-42.9	101.8	75.3	15.1	0	0	2.9
Jul-62	93.4	90.9	-7.1	98.2	90	3.5	0	0	4.7
Aug-62	84	37.3	-48.5	74.4	59.3	24.7	0	0	2
Sep-62	45.6	86.4	36.4	110.8	45.6	0	0	0	4.4
Oct-62	29.5	125.7	89.9	200	29.5	0	0	0.8	6.7
Nov-62	13.2	105.9	75.6	200	13.2	0	12.9	75.6	42.2
Dec-62	7.7	38.9	8.3	200	7.7	0	35.3	8.3	23.7
Jan-63	6.3	1	-6.3	193.7	6.3	0	36.3	0	11.6
Feb-63	6.9	1.5	-6.9	187	6.6	0.2	37.8	0	5.8
Mar-63	17.9	38.1	19.5	200	17.9	0	37.5	6.5	7.3
Apr-63	35	46.2	27.6	200	35	0	18.7	27.6	19.2
May-63	57.3	94.2	41.6	200	57.3	0	9.4	41.6	33.9
Jun-63	92.6	14.5	-69.5	130.5	92.6	0	0	0	15.3
Jul-63	105.1	70.9	-37.7	105.9	92	13.1	0	0	10.9
Aug-63	75.6	80	0.4	106.3	75.6	0	0	0	7.7
Sep-63	44.2	65.8	18.3	124.6	44.2	0	0	0	5.1
Oct-63	35.1	18.3	-17.7	113.6	28.4	6.7	0	0	1.8
Nov-63	16.8	64.3	44.3	157.9	16.8	0	0	0	3.7
Dec-63	6.6	2.8	-3.8	154.9	5.8	0.8	0	0	0.2
Jan-64	8.5	45.7	9.3	164.3	8.5	0	27.2	0	0.8
Feb-64	8.7	0	-6.5	158.9	7.5	1.2	25	0	0.1
Mar-64	17.3	37.1	13.8	172.7	17.3	0	29.9	0	1.1
Apr-64	33.1	69.3	47.7	200	33.1	0	15	20.4	13.7
May-64	69.9	59.7	-5.7	194.3	69.9	0	7.5	0	8.1
Jun-64	89.3	33.8	-49.7	146.1	87.9	1.4	0	0	4.2
Jul-64	111.1	152.7	33.9	180	111.1	0	0	0	8.9
Aug-64	72.4	136.1	56.9	200	72.4	0	0	36.9	25.9
Sep-64	48.9	21.6	-28.3	171.7	48.9	0	0	0	10.6
Oct-64	25.9	23.1	-3.9	168.3	25.3	0.6	0	0	5.9
Nov-64	15.4	17	0.8	169.1	15.4	0	0	0	3.2
Dec-64	8.6	42.4	13.2	182.3	8.6	0	19.7	0	2.1
Jan-65	7.1	27.9	-3.1	179.5	6.9	0.3	43.4	0	0.7
Feb-65	8.9	42.2	5.9	185.4	8.9	0	70.4	0	0.7
Mar-65	14.6	3.3	-0.9	184.6	14.5	0.1	60	0	0.2
Apr-65	27.8	37.8	31.4	200	27.8	0	37	16	9.7
May-65	69	75.2	20.9	200	69	0	18.5	20.9	18.3
Jun-65	84.4	35.3	-41.6	158.4	84.4	0	9.2	0	9
Jul-65	87.3	58.7	-22.3	140.7	82.6	4.6	0	0	6.6
Aug-65	78.9	96.5	12.8	153.5	78.9	0	0	0	6.6
Sep-65	52.3	80.8	24.5	178	52.3	0	0	0	4.9
Oct-65	25.9	119.9	88	200	25.9	0	0	66	39.4
Nov-65	13.8	69.1	52.3	200	13.8	0	0	52.3	45.8
Dec-65	10	51.1	25	200	10	0	14.6	25	35.5

Jan-66	7	2.8	-6.3	193.7	7	0	16.7	0	17
Feb-66	9.5	20.6	0.1	193.8	9.5	0	27.4	0	8.8
Mar-66	19.2	36.1	17.5	200	19.2	0	25.5	11.3	11.1
Apr-66	30.5	29	9.2	200	30.5	0	13.4	9.2	11
May-66	52.5	48.8	0.5	200	52.5	0	6.7	0.5	7.5
Jun-66	93.2	101.3	9.7	200	93.2	0	0	9.7	12.4
Jul-66	109.1	40.4	-70.7	129.3	109.1	0	0	0	5.7
Aug-66	85	74.7	-14.1	120.2	80	5	0	0	5.6
Sep-66	45.6	87.9	37.9	158.1	45.6	0	0	0	5.3
Oct-66	26.9	52.3	22.8	180.9	26.9	0	0	0	3.1
Nov-66	15	103.4	83.5	200	15	0	0	64.4	37.4
Dec-66	8.2	41.4	10.7	200	8.2	0	21.7	10.7	22.3
Jan-67	9.2	9.9	0	200	9.2	0	22.1	0	11
Feb-67	7.3	16	-7.3	192.7	7.3	0	38.1	0	5.4
Mar-67	16.2	2.5	-5.7	187.2	16	0.2	30.1	0	2.8
Apr-67	33.9	69.9	47.5	200	33.9	0	15.1	34.7	22.2
May-67	49.1	42.7	-1	199	49.1	0	7.5	0	11.5
Jun-67	102.3	191.8	87.4	200	102.3	0	0	86.5	57.5
Jul-67	97.6	78.7	-22.8	177.2	97.6	0	0	0	27.9
Aug-67	76.5	111.8	29.7	200	76.5	0	0	6.9	21
Sep-67	45.9	75.9	26.2	200	45.9	0	0	26.2	24.6
Oct-67	27.5	99.8	67.3	200	27.5	0	0	67.3	49
Nov-67	12.3	34.3	20.8	200	12.3	0	0	20.8	33.6
Dec-67	9.1	72.1	32.9	200	9.1	0	28.4	32.9	34.4
Jan-68	6.5	16.5	-6.5	193.5	6.5	0	44.9	0	16.3
Feb-68	7.6	17	-7.6	186.1	7.4	0.2	61.9	0	8.2
Mar-68	19.6	27.2	23.4	200	19.6	0	45.2	9.5	9.8
Apr-68	38.6	38.9	20.9	200	38.6	0	22.6	20.9	16.8
May-68	55.2	92.7	44.2	200	55.2	0	11.3	44.2	34.1
Jun-68	89.8	62	-25.3	174.7	89.8	0	5.6	0	17.9
Jul-68	103.8	68.6	-33	145.9	99.6	4.2	0	0	10.8
Aug-68	84.5	150.4	58.4	200	84.5	0	0	4.3	13.4
Sep-68	56.7	125.5	62.5	200	56.7	0	0	62.5	40.5
Oct-68	31.6	64.8	30	200	31.6	0	0	30	35.3
Nov-68	13.7	76.7	53.1	200	13.7	0	6.6	53.1	45.8
Dec-68	7.6	8.6	-3.8	196.2	7.6	0	11.3	0	21.4
Jan-69	7.9	26.4	0.5	196.8	7.9	0	29	0	10.9
Feb-69	9.2	0	-5.9	191	9.1	0.1	25.8	0	5.3
Mar-69	15.7	40.4	11.6	200	15.7	0	38	2.6	4.8
Apr-69	36.3	117.3	94.1	200	36.3	0	19	94.1	54.9
May-69	61	84.1	28.4	200	61	0	9.5	28.4	42.9
Jun-69	83.4	85.6	7.4	200	83.4	0	0	7.4	27.4
Jul-69	100.6	56.1	-47.3	152.7	100.6	0	0	0	14.3
Aug-69	93.3	56.4	-39.7	122.3	83.9	9.4	0	0	8.6
Sep-69	52	15.7	-37.1	99.7	37.6	14.4	0	0	3.7
Oct-69	27.2	65.3	34.8	134.5	27.2	0	0	0	4.7
Nov-69	14.6	85.9	67.3	200	14.6	0	0	1.8	5.6
Dec-69	7.3	10.9	3.5	200	7.3	0	0	3.5	2.7
Jan-70	5.9	8.1	-5.9	194.1	5.9	0	8.1	0	1.3

Feb-70	8.3	1	0.8	194.9	8.3	0	0	0	0.6
Mar-70	14.9	26.4	-2.4	192.6	14.9	0.1	13.4	0	0.8
Apr-70	34.8	60.5	29.4	200	34.8	0	6.7	21.9	14.2
May-70	66.5	70.9	7.6	200	66.5	0	0	7.6	12.9
Jun-70	90.9	53.6	-40	160	90.9	0	0	0	7.4
Jul-70	108.4	90.7	-22.2	142.2	104	4.4	0	0	6.9
Aug-70	86.6	86.4	-4.5	139	85.3	1.3	0	0	5.5
Sep-70	53	110.7	52.2	191.2	53	0	0	0	6.1
Oct-70	30.2	101.1	65.8	200	30.2	0	0	57	33.9
Nov-70	15.1	47	29.7	200	15.1	0	0	29.7	31.5
Dec-70	7.5	20.8	-0.7	199.3	7.5	0	13.7	0	14.9
Jan-71	6.4	5.1	-6.4	193	6.3	0	18.8	0	7.3
Feb-71	9.4	20.6	0	192.9	9.4	0	29.8	0	3.9
Mar-71	14.7	4.8	-7.2	186	14.4	0.3	27.1	0	1.9
Apr-71	30.3	20.3	1.8	187.8	30.3	0	14.3	0	1.9
May-71	61	31	-24.4	164.9	59.5	1.5	7.1	0	2
Jun-71	98.6	81.5	-14	153.3	96.1	2.5	0	0	4.3
Jul-71	98.2	87.1	-15.4	141.5	94.6	3.6	0	0	4.5
Aug-71	81.9	97.5	10.7	152.2	81.9	0	0	0	4.9
Sep-71	58.5	21.8	-37.8	123.5	49.5	9	0	0	1.1
Oct-71	36.4	37.8	-0.5	123.2	36.2	0.2	0	0	1.9
Nov-71	14	18.5	3.7	126.9	14	0	0	0	0.8
Dec-71	9.6	70.9	36.1	163	9.6	0	23.2	0	1.9
Jan-72	7.7	15	-1.9	161.4	7.4	0.4	32.3	0	0.1
Feb-72	8	0	-7.1	155.7	6.6	1.4	31.4	0	0
Mar-72	13.9	53.6	10.7	166.3	13.9	0	59.8	0	0.8
Apr-72	27.5	39.6	32.4	198.7	27.5	0	37.8	0	1.7
May-72	68.6	56.1	3.6	200	68.6	0	18.9	2.4	4
Jun-72	81.8	109.5	31.6	200	81.8	0	9.5	31.6	21.9
Jul-72	105.1	36.8	-60.7	139.3	105.1	0	0	0	10
Aug-72	82.9	42.7	-42.4	109.8	70.1	12.9	0	0	6.2
Sep-72	53.6	50.5	-5.6	106.7	51.1	2.5	0	0	4.6
Oct-72	24	112.5	82.9	189.6	24	0	0	0	6.7
Nov-72	12.6	41.4	20.6	200	12.6	0	6.6	10.2	7.1
Dec-72	8.7	76.5	33.2	200	8.7	0	39.6	33.2	21
Jan-73	8.6	19.8	5.4	200	8.6	0	45.1	5.4	12.7
Feb-73	7.9	14.7	-6.2	193.8	7.9	0	58.1	0	6.2
Mar-73	23.3	82.8	78.6	200	23.3	0	35.2	72.4	43.1
Apr-73	36.1	70.4	48.4	200	36.1	0	17.6	48.4	47.4
May-73	58	98	43.9	200	58	0	8.8	43.9	48.8
Jun-73	100.4	78	-17.5	182.5	100.4	0	0	0	25.8
Jul-73	110.4	46	-66.7	121.6	104.6	5.9	0	0	13.3
Aug-73	99.9	115.8	10.1	131.7	99.9	0	0	0	11.3
Sep-73	52.3	50	-4.8	128.5	50.7	1.6	0	0	5.2
Oct-73	31.7	95.3	58.8	187.3	31.7	0	0	0	6.1
Nov-73	14.5	77.7	59.6	200	14.5	0	0	46.9	27.7
Dec-73	8.3	23.1	2.5	200	8.3	0	11.9	2.5	13.7
Jan-74	8.2	69.6	16.2	200	8.2	0	56.3	16.2	15.6
Feb-74	7.7	21.1	-7.2	192.8	7.7	0	76.9	0	7.4

Mar-74	17.1	36.3	26.9	200	17.1	0	68.2	19.7	14.5
Apr-74	37.2	104.1	95.8	200	37.2	0	34.1	95.8	59.9
May-74	55.5	106.2	62.4	200	55.5	0	17.1	62.4	63.8
Jun-74	90.9	64.8	-20.8	179.2	90.9	0	8.5	0	32.5
Jul-74	109.1	33.5	-68.7	117.6	101.9	7.2	0	0	16.3
Aug-74	91	96.5	0.7	118.3	91	0	0	0	12.1
Sep-74	48.3	51.1	0.3	118.5	48.3	0	0	0	6.2
Oct-74	26.4	31.8	3.9	122.4	26.4	0	0	0	3.4
Nov-74	14.7	85.1	66.4	188.8	14.7	0	0	0	4.9
Dec-74	9.8	3.3	-6.6	182.6	9.4	0.4	0	0	0.6
Jan-75	9.1	19.1	0.1	182.7	9.1	0	9.5	0	0.6
Feb-75	9.8	47.5	10.6	193.3	9.8	0	35.8	0	0.8
Mar-75	15.3	41.9	13.2	200	15.3	0	48.4	6.5	4.2
Apr-75	26.8	35.1	23	200	26.8	0	32.3	23	14.6
May-75	80.1	59.4	-7.5	192.5	80.1	0	16.2	0	9.5
Jun-75	99.8	66.5	-28.5	165	98.7	1.1	8.1	0	6.6
Jul-75	112.5	85.1	-23.6	145.6	108.4	4.1	0	0	5.9
Aug-75	88.2	117.9	23.8	169.3	88.2	0	0	0	6.7
Sep-75	45.6	65	16.1	185.4	45.6	0	0	0	3.7
Oct-75	30.2	28.4	-3.2	182.5	30	0.2	0	0	1.6
Nov-75	18	44.7	24.4	200	18	0	0	6.9	5.8
Dec-75	7.6	18.5	-1.2	198.8	7.6	0	11.8	0	2
Jan-76	6.3	3.6	-6.3	192.5	6.3	0	15.4	0	0.9
Feb-76	10.8	44.5	16	200	10.8	0	32.1	8.6	5.7
Mar-76	19	68.1	42.6	200	19	0	36.4	42.6	25.9
Apr-76	37.9	51.8	29.5	200	37.9	0	18.2	29.5	29.1
May-76	58.4	77.7	24.5	200	58.4	0	9.1	24.5	29.4
Jun-76	102.3	76.5	-20.5	179.5	102.3	0	0	0	16.6
Jul-76	101.9	112.8	5.3	184.7	101.9	0	0	0	12
Sep-76	49.5	116.8	61.5	200	49.5	0	0	46.2	32.1
Oct-76	23.3	42.7	17.3	200	23.3	0	0	17.3	23.9
Nov-76	11.5	17.8	5.8	200	11.5	0	0	5.8	14.3
Dec-76	6.6	1.3	-5.3	194.7	6.6	0	0	0	6.9
Jan-77	5.5	0	-5.5	189.4	5.4	0.1	0	0	3.4
Feb-77	8.8	16.8	-4.8	184.8	8.5	0.3	12.7	0	1.9
Mar-77	21	59.3	33.4	200	21	0	15.2	18.2	12.3
Apr-77	38.4	37.9	5.2	200	38.4	0	7.6	5.2	9.5
May-77	73.4	23.1	-43.8	156.2	73.4	0	0	0	5
Jun-77	85.5	73	-16.1	143.6	81.9	3.5	0	0	5.5
Jul-77	113.2	90.3	-27.4	123.9	105.5	7.7	0	0	5.5
Aug-77	82.4	164	73.4	197.3	82.4	0	0	0	8.7
Sep-77	51.7	142.9	84.1	200	51.7	0	0	81.3	48.1
Oct-77	26.5	86.8	55.9	200	26.5	0	0	55.9	52.8
Nov-77	14.9	70.3	52.1	200	14.9	0	0	52.1	53.6
Dec-77	7.8	26.6	2.4	200	7.8	0	16	2.4	26.7
Jan-78	6.6	25.9	-6.6	193.4	6.6	0	41.9	0	13.2
Feb-78	6.8	0	-6.8	186.8	6.5	0.2	41.9	0	6.6
Mar-78	14.5	43.2	11.3	198.2	14.5	0	58.6	0	4
Apr-78	29.6	48.8	42.9	200	29.6	0	32.6	41.1	24.5

May-78	67.3	100.2	44.2	200	67.3	0	16.3	44.2	38.2
Jun-78	91.5	64.8	-21.8	178.2	91.5	0	8.2	0	19.8
Jul-78	107.1	23.8	-76.3	110.2	98.8	8.3	0	0	9.5
Aug-78	89.3	153.8	56.8	167	89.3	0	0	0	11.8
Sep-78	49.8	152.2	94.8	200	49.8	0	0	61.8	40.6
Oct-78	27	45.2	15.9	200	27	0	0	15.9	26.7
Nov-78	14	46.6	30.6	200	14	0	0	30.6	29.5
Dec-78	8.6	20.4	1.9	200	8.6	0	9.5	1.9	15.1
Jan-79	6.9	4	-6.4	193.6	6.9	0	13	0	7.4
Feb-79	6.3	12.2	-6.3	187.4	6.1	0.2	25.2	0	3.7
Mar-79	20.2	71.4	46.4	200	20.2	0	27.3	33.9	21.4
Apr-79	31.5	64.6	43.5	200	31.5	0	13.6	43.5	34.4
May-79	61.7	84.2	25.1	200	61.7	0	6.8	25.1	32.3
Jun-79	92.6	78.4	-11.3	188.7	92.6	0	0	0	18
Jul-79	106.4	25	-82.7	110.7	101.7	4.7	0	0	8.3
Aug-79	80.9	89.2	3.8	114.5	80.9	0	0	0	8
Sep-79	51.3	37.4	-15.8	105.5	44.6	6.8	0	0	3.6
Oct-79	26.9	111.2	78.8	184.3	26.9	0	0	0	6.4
Nov-79	14.6	99.6	80.4	200	14.6	0	0	64.6	37.4
Dec-79	9.5	60.2	28.2	200	9.5	0	21	28.2	32
Jan-80	8	37.8	5.8	200	8	0	44.6	5.8	18.5
Feb-80	7.8	1	-7.2	192.8	7.8	0	45.1	0	9.1
Mar-80	16.1	43.4	19	200	16.1	0	52.3	11.8	11.5
Apr-80	34.3	109.3	95.7	200	34.3	0	26.2	95.7	58.5
May-80	69.9	34.2	-24.3	175.7	69.9	0	13.1	0	28.2
Jun-80	79.3	102	24.1	199.8	79.3	0	6.5	0	18.4
Jul-80	107.7	156.2	47.2	200	107.7	0	0	47	37.9
Aug-80	94.5	46	-50.8	149.2	94.5	0	0	0	17.4
Sep-80	49.5	86	32.2	181.5	49.5	0	0	0	11.8
Oct-80	23.6	66	39.1	200	23.6	0	0	20.6	17.4
Nov-80	12.9	33.8	19.6	200	12.9	0	0	19.6	18.1
Dec-80	6.8	29.2	-1.9	198.1	6.8	0	24.1	0	8.6
Jan-81	6	0	-6	192.2	5.9	0.1	24.1	0	4.2
Feb-81	11.4	35.7	15.5	200	11.4	0	32	7.7	6.8
Mar-81	18.2	16	2.9	200	18.2	0	26.4	2.9	4.9
Apr-81	36.8	43.6	17.8	200	36.8	0	13.2	17.8	13.3
May-81	59.8	60	3.8	200	59.8	0	6.6	3.8	10.5
Jun-81	94.4	101.8	8.9	200	94.4	0	0	8.9	13.3
Jul-81	108.4	115.4	1.2	200	108.4	0	0	1.2	10.5
Aug-81	84.5	136	44.7	200	84.5	0	0	44.7	31.5
Sep-81	49.5	88.8	34.9	200	49.5	0	0	34.9	34.2
Oct-81	24.2	70.6	42.9	200	24.2	0	0	42.9	39.9
Nov-81	14.3	53.8	37	200	14.3	0	0	37	39.1
Dec-81	8.7	4.6	-4.2	195.8	8.7	0	0	0	18.4
Jan-82	5.9	12.2	-5.9	190	5.8	0.1	12.2	0	9.2
Feb-82	8.2	0	-7.7	182.8	7.8	0.4	11.6	0	4.6
Mar-82	16.2	43	11.3	194.1	16.2	0	26.2	0	3.3
Apr-82	30.9	39	19	200	30.9	0	13.3	13.1	9.6
May-82	77.1	60.6	-12.9	187.1	77.1	0	6.7	0	6.9

Jun-82	80.8	132.6	51.8	200	80.8	0	0	38.9	28
Jul-82	109.1	83.8	-29.5	170.5	109.1	0	0	0	14.9
Aug-82	75.6	132.6	50.4	200	75.6	0	0	20.9	22.4
Sep-82	50.1	110.8	55.2	200	50.1	0	0	55.2	41
Oct-82	29.1	41.2	10	200	29.1	0	0	10	24.8
Nov-82	15	123.4	102.5	200	15	0	0	102.5	68.5
Dec-82	10.7	90	57	200	10.7	0	19.3	57	62.9
Jan-83	8.5	24.6	3.8	200	8.5	0	31.3	3.8	32.1
Feb-83	10.7	24.2	8.2	200	10.7	0	36.1	8.2	20.5
Mar-83	19.1	50	30.7	200	19.1	0	34.6	30.7	27
Apr-83	32.3	96.2	76.4	200	32.3	0	17.3	76.4	55.7
May-83	54.5	126.4	74.2	200	54.5	0	8.6	74.2	68.9
Jun-83	94.4	35	-52.5	147.5	94.4	0	0	0	33
Jul-83	118.2	75.4	-46.6	113.1	106	12.2	0	0	19.4
Aug-83	95.6	81.2	-18.5	102.7	87.6	8	0	0	11.9
Sep-83	57	43.4	-15.8	94.5	49.4	7.7	0	0	6.1
Oct-83	28.2	82	49.7	144.2	28.2	0	0	0	6.1
Nov-83	14.3	50.4	33.8	178	14.3	0	0	0	3.3
Dec-83	7.2	24.6	-0.9	177.2	7.1	0.1	18.1	0	0.7
Jan-84	6.5	0	-6.5	171.4	5.8	0.7	18.1	0	0.2
Feb-84	12	40.5	19.4	190.8	12	0	26	0	1.2
Mar-84	13.8	34.4	2.4	193.2	13.8	0	43.8	0	0.5
Apr-84	36.8	44.2	27.1	200	36.8	0	21.9	20.3	12.4
Jun-84	96.8	54.6	-33.9	166.1	96.8	0	10.9	0	7.8
Jul-84	104.4	49.4	-52	122.9	95.6	8.8	5.5	0	5
Aug-84	96.2	73.8	-20.7	110.2	88.3	8	0	0	5
Sep-84	46.8	86.7	35.6	145.7	46.8	0	0	0	5
Oct-84	30.6	49.6	16.5	162.3	30.6	0	0	0	2.8
Nov-84	14	76.2	58.9	200	14	0	0	21.2	14.1
Dec-84	10.2	63.2	34.3	200	10.2	0	16.8	34.3	24.5
Jan-85	6.8	0.8	-6.6	193.4	6.8	0	17.3	0	11.3
Feb-85	8.9	32.4	1.3	194.8	8.9	0	39.2	0	5.9
Mar-85	18.1	63.1	37.9	200	18.1	0	44.4	32.6	21
Apr-85	39.6	25	6.3	200	39.6	0	22.2	6.3	14
May-85	67.7	91.6	30.4	200	67.7	0	11.1	30.4	26.1
Jun-85	82.9	26.6	-52	148	82.9	0	5.6	0	12.1
Jul-85	105.1	59.6	-42.9	116.2	93.9	11.2	0	0	8.4
Aug-85	85	148.7	56.2	172.5	85	0	0	0	10.1
Sep-85	57.4	118.9	55.6	200	57.4	0	0	28	21.3
Oct-85	28.6	62.4	30.7	200	28.6	0	0	30.7	26.1
Nov-85	13.9	100.6	74.6	200	13.9	0	7.7	74.6	53.2
Dec-85	7.6	12.4	-2.4	197.6	7.6	0	14.8	0	24.6
Jan-86	7.9	10.2	-3.6	194.1	7.8	0	20.6	0	12.3
Feb-86	8.5	10.1	-5.4	188.9	8.3	0.2	27.5	0	6.2
Mar-86	19.5	40.4	21.2	200	19.5	0	25.8	10.1	9.5
Apr-86	39.4	57.5	28.2	200	39.4	0	12.9	28.2	21
May-86	74.3	72.1	0.6	200	74.3	0	6.5	0.6	13
Jun-86	86	106.9	22	200	86	0	0	22	21
Jul-86	114.6	122	1.3	200	114.6	0	0	1.3	14.6

Aug-86	81.4	145.6	56.9	200	81.4	0	0	56.9	40
Sep-86	51.3	218.9	156.6	200	51.3	0	0	156.6	105.6
Oct-86	27.7	65.6	34.6	200	27.7	0	0	34.6	67.9
Nov-86	12.8	18.4	4.9	200	12.8	0	0	4.9	35.5
Dec-86	9.3	9.2	-0.4	199.6	9.3	0	0	0	17.6
Jan-87	8.2	2.4	-5.8	193.8	8.2	0	0	0	8.7
Feb-87	9.1	8	-1.1	192.7	9	0	0	0	4.4
Mar-87	20.2	41.7	13.2	200	20.2	0	6.7	5.9	6.7
Apr-87	41.4	80	41.3	200	41.4	0	0	41.3	27.2
May-87	73.9	33.6	-41.9	158.1	73.9	0	0	0	13.3
Jun-87	101	62	-42.1	124.7	92.2	8.8	0	0	8.9
Jul-87	124.2	95.1	-33.9	103.6	111.5	12.8	0	0	7.7
Aug-87	88.2	91.6	-1.2	103	87.7	0.6	0	0	6
Sep-87	54	68.5	11.1	114.1	54	0	0	0	4.2
Oct-87	24.8	79	50.3	164.4	24.8	0	0	0	4.3
Nov-87	14.3	70.2	52.8	200	14.3	0	0	17.2	11.9
Dec-87	9.8	23.3	12.8	200	9.8	0	0	12.8	11.5
Jan-88	7.9	39.2	3.2	200	7.9	0	27.7	3.2	7.4
Feb-88	8.4	21	-3.5	196.5	8.4	0	43.7	0	3.6
Mar-88	17.4	25.4	11.6	200	17.4	0	39.3	8.1	6.5
Apr-88	34.3	58.9	41.3	200	34.3	0	19.7	41.3	26.5
May-88	72.5	52.4	-12.9	187.1	72.5	0	9.8	0	14.4
Jun-88	92.6	48.2	-37	152.5	90.3	2.4	0	0	8.3
Jul-88	123.5	61.2	-65.3	102.7	108	15.5	0	0	6
Aug-88	97.4	73	-28.1	88.2	83.8	13.7	0	0	5.1
Sep-88	51.3	106.1	49.5	137.7	51.3	0	0	0	6
Oct-88	23.9	91.3	62.9	200	23.9	0	0	0.6	5.2
Nov-88	15.5	98.5	78.2	200	15.5	0	0	78.2	44.3
Dec-88	8.4	23.2	2.8	200	8.4	0	11.6	2.8	21.5
Jan-89	9.6	33	11	200	9.6	0	23.3	11	16.8
Feb-89	8.2	2	-6.9	193.1	8.2	0	24	0	8
Mar-89	15.6	39	10.2	200	15.6	0	36.3	3.3	6.5
Apr-89	31.5	44.7	29.1	200	31.5	0	18.2	29.1	19.6
May-89	64.5	106.2	45.5	200	64.5	0	9.1	45.5	36.8
Jun-89	97.4	132	37.1	200	97.4	0	0	37.1	40.9
Jul-89	112.5	26.2	-87.6	112.4	112.5	0	0	0	18.5
Aug-89	86.6	100.6	9	121.3	86.6	0	0	0	13.6
Sep-89	51.7	39.7	-13.9	112.9	46.2	5.5	0	0	6.3
Oct-89	28.6	71.6	39.4	152.3	28.6	0	0	0	5.7
Nov-89	12.8	140.6	101.5	200	12.8	0	21	53.8	33.3
Dec-89	5.5	2	-5.5	194.5	5.5	0	23	0	14
Jan-90	10.3	37	18.9	200	10.3	0	29.8	13.4	14.7
Feb-90	10	26.2	6.1	200	10	0	39.5	6.1	10.3
Mar-90	19.7	52.4	35.3	200	19.7	0	35	35.3	24.5
Apr-90	39.9	46.6	21.9	200	39.9	0	17.5	21.9	24.6
May-90	60.2	123.4	65.8	200	60.2	0	8.8	65.8	50.2
Jun-90	96.8	109.8	16.3	200	96.8	0	0	16.3	35.7
Jul-90	107.1	80.4	-30.7	169.3	107.1	0	0	0	19.1
Aug-90	88.8	88.1	-5.1	165	88	0.8	0	0	11.9

Sep-90	51.3	90.9	35	200	51.3	0	0	0	8.3
Oct-90	27.5	134.4	100.2	200	27.5	0	0	100.2	58.7
Nov-90	15.7	73.5	54.1	200	15.7	0	0	54.1	56.7
Dec-90	9.6	70	35.5	200	9.6	0	22.9	35.5	46.2
Jan-91	7.6	3.8	-4.9	195.1	7.6	0	24.1	0	22.2
Feb-91	10.8	29.8	10.1	200	10.8	0	32.3	5.1	14.3
Mar-91	19.9	97.6	68.5	200	19.9	0	38	68.5	44.6
Apr-91	39.9	133.6	106.1	200	39.9	0	19	106.1	80.2
May-91	81.6	65.6	-9.8	190.2	81.6	0	9.5	0	40.1
Jun-91	104.9	44.1	-53.5	139.4	102.3	2.6	0	0	20.6
Jul-91	111.8	93	-23.5	123	104.7	7.1	0	0	13.8
Aug-91	95.1	76.6	-22.3	109.3	86.5	8.6	0	0	8.4
Sep-91	48.9	51.1	-0.3	109.1	48.7	0.1	0	0	4.9
Oct-91	30.6	100.2	64.6	173.7	30.6	0	0	0	6.2
Nov-91	13.2	48.6	33.4	200	13.2	0	0	7.1	6.1
Dec-91	8.8	17.5	8.3	200	8.8	0	0	8.3	6.6
Jan-92	8.6	9	0.3	200	8.6	0	0	0.3	3.4
Feb-92	10	33.2	4.1	200	10	0	18.5	4.1	4.2
Mar-92	16.5	45.6	15.3	200	16.5	0	31.2	15.3	10.6
Apr-92	32.5	107.2	85	200	32.5	0	15.6	85	52.6
May-92	63.3	85.6	25.9	200	63.3	0	7.8	25.9	40.8
Jun-92	81.8	55.4	-21.4	178.6	81.8	0	0	0	21
Jul-92	90.6	126.6	29.7	200	90.6	0	0	8.3	19.6
Aug-92	76.5	173.8	88.6	200	76.5	0	0	88.6	59.6
Sep-92	50.4	91.4	36.4	200	50.4	0	0	36.4	48.3
Oct-92	24.6	46.6	19.6	200	24.6	0	0	19.6	34
Nov-92	13.5	152.2	117	200	13.5	0	15.4	117	80.6
Dec-92	9.3	23.6	9	200	9.3	0	20.1	9	42.3
Jan-93	8.5	39.4	9.9	200	8.5	0	40.5	9.9	26.4
Feb-93	7.2	0	-7.2	192.8	7.2	0	40.5	0	12.9
Mar-93	15.5	0.2	-6.9	186.2	15.2	0.2	32	0	6.5
Apr-93	35	72.1	49.5	200	35	0	16	35.7	24.7
May-93	61.7	61.6	4.8	200	61.7	0	8	4.8	16
Jun-93	87.6	111.4	26.2	200	87.6	0	0	26.2	25.2
Jul-93	111.8	80.4	-35.4	164.6	111.8	0	0	0	13.8
Aug-93	93.3	54.4	-41.6	130.3	85.9	7.4	0	0	7.6
Sep-93	44.5	68.8	20.8	151.2	44.5	0	0	0	5.9
Oct-93	25.9	70.3	40.9	192.1	25.9	0	0	0	4.7
Nov-93	13.5	58.4	36.6	200	13.5	0	5.9	28.6	17.3
Dec-93	8.7	12	-1.2	198.8	8.7	0	10.2	0	7.7
Jan-94	5.2	28.5	-5.2	193.7	5.1	0	38.7	0	3.7
Feb-94	7.3	0	-7.3	186.6	7.1	0.2	38.7	0	1.9
Mar-94	16.9	12.4	1	187.6	16.9	0	32.8	0	1.3
Apr-94	36.5	80.4	56.2	200	36.5	0	16.4	43.9	26.4
May-94	58.7	107.6	51.7	200	58.7	0	8.2	51.7	42.4
Jun-94	98	49.4	-42.8	157.2	98	0	0	0	21
Jul-94	111.1	54.7	-59.2	110.7	98.5	12.7	0	0	12
Aug-94	80.4	50	-32.9	92.5	65.7	14.7	0	0	7.1
Sep-94	51	63	8.8	101.3	51	0	0	0	5.5

Oct-94	28.7	59.5	27.8	129.1	28.7	0	0	0	4.1
Nov-94	16	59.2	40.2	169.3	16	0	0	0	3.5
Dec-94	10	18.4	7.9	177.1	10	0	0	0	0.8
Jan-95	9.3	69.9	26.1	200	9.3	0	33.1	3.2	3.2
Feb-95	7.9	6	-6.9	193.1	7.9	0	38.1	0	0.9
Mar-95	20.1	1.4	-4.9	188.3	19.9	0.2	24.3	0	0.5
Apr-95	29.1	90	63.9	200	29.1	0	17.2	52.3	30.5
May-95	63.7	76.2	17.3	200	63.7	0	8.6	17.3	25.7
Jun-95	103.6	79.8	-19.2	180.8	103.6	0	0	0	14.9
Jul-95	114.6	65.9	-52	133.8	109.6	5	0	0	8.8
Aug-95	98.7	62.2	-39.6	107.3	85.6	13.1	0	0	5.8
Sep-95	47.1	45.4	-3.9	105.2	45.2	1.8	0	0	3.6
Oct-95	31	146.3	108	200	31	0	0	13.2	14.6
Nov-95	11.7	105.2	65.6	200	11.7	0	24.5	65.6	39.9
Dec-95	7.3	0	-4.7	195.3	7.3	0	21.8	0	18.2
Jan-96	7.2	50.8	0.3	195.6	7.2	0	65	0	9.3
Feb-96	8.8	33.4	5.2	200	8.8	0	84	0.8	5.3
Mar-96	15.3	4.8	4.2	200	15.3	0	69.2	4.2	4.7
Apr-96	29.8	80.8	77.7	200	29.8	0	38.7	77.7	45
May-96	59.5	93	48.2	200	59.5	0	19.3	48.2	49.3
Jun-96	98.6	149.2	52.8	200	98.6	0	9.7	52.8	56.2
Jul-96	100.6	112.4	15.8	200	100.6	0	0	15.8	37.9
Aug-96	90.5	52	-41.1	158.9	90.5	0	0	0	18.7
Sep-96	52.3	155.1	95	200	52.3	0	0	54	42.8
Oct-96	27.9	65.2	34.1	200	27.9	0	0	34.1	37.8
Nov-96	12.1	33.6	13.6	200	12.1	0	6.8	13.6	25.2
Dec-96	10.1	63.2	35.7	200	10.1	0	22.3	35.7	31.8
Jan-97	7.3	25.5	-1.7	198.3	7.3	0	42.1	0	15.1
Feb-97	10.4	55.6	23.9	200	10.4	0	62.4	22.2	19.6
Mar-97	16.5	39	22.2	200	16.5	0	61.7	22.2	21.4
Apr-97	32.7	26.6	23.4	200	32.7	0	30.8	23.4	23.2
May-97	50.9	90.8	50.8	200	50.9	0	15.4	50.8	40.9
Jun-97	105.5	79.7	-22.1	177.9	105.5	0	7.7	0	22.1
Jul-97	105.1	58.3	-42	140.5	100.5	4.6	0	0	12
Aug-97	79.4	72.5	-10.5	133.1	76.3	3.1	0	0	8.2
Sep-97	52.3	63.7	8.2	141.3	52.3	0	0	0	5.5
Oct-97	27.5	31.6	2.5	143.8	27.5	0	0	0	2.7
Nov-97	13.1	32.6	18.2	162.1	13.1	0	0	0	1.9
Dec-97	9.6	13	3.1	165.1	9.6	0	0	0	0.6
Jan-98	9.4	71.2	27.3	192.4	9.4	0	33.1	0	1.6
Feb-98	12.3	30.8	18	200	12.3	0	32.7	10.4	6.2
Mar-98	19.7	71.8	48	200	19.7	0	34.2	48	29.2
Apr-98	38.2	39.2	16.2	200	38.2	0	17.1	16.2	23.4
May-98	83.6	56.7	-21.2	178.8	83.6	0	8.6	0	13.5
Jun-98	96.2	57	-33.4	148.9	92.6	3.5	0	0	8.2
Jul-98	107.7	47.8	-62.3	102.5	91.8	15.9	0	0	5.1
Aug-98	92.2	96.4	-0.6	102.2	91.9	0.3	0	0	6.2
Sep-98	55.7	44	-13.9	95.1	48.9	6.8	0	0	2.9
Oct-98	28.9	13.6	-16	87.5	20.5	8.4	0	0	1

Nov-98	14.9	40.6	23.8	111.3	14.9	0	0	0	2.1
Jan-99	7.2	37	-2.5	109.9	6.1	1.1	32.1	0	0.3
Jul-99	128.2	63.4	-51.9	81.4	104.8	23.4	16.1	0	3.2
Aug-99	83.4	70.7	-8.2	78.1	78.6	4.9	8	0	3.6
Sep-99	56	71.6	20.1	98.1	56	0	0	0	3.6
Oct-99	27.9	63.1	32.1	130.2	27.9	0	0	0	3.2
Nov-99	16.2	75.4	55.4	185.6	16.2	0	0	0	3.8
Dec-99	9.6	42	17.2	200	9.6	0	14	2.8	2.6
Jan-00	8	30.6	2.5	200	8	0	33.8	2.5	2.3
Feb-00	11	25	10.1	200	11	0	37.2	10.1	6.6
Mar-00	23.3	35.1	25.6	200	23.3	0	21.7	25.6	17.5
Apr-00	33.9	56	30.1	200	33.9	0	10.8	30.1	25.8
May-00	69.9	164.9	92.2	200	69.9	0	5.4	92.2	65.8
Jun-00	96.2	219	117.3	200	96.2	0	0	117.3	98.4
Jul-00	98.8	91.2	-12.1	187.9	98.8	0	0	0	48.3
Aug-00	85	68.4	-20	169	83.8	1.2	0	0	25.3
Sep-00	52.3	110.6	52.8	200	52.3	0	0	21.8	27.4
Oct-00	31.4	29.6	-3.2	196.8	31.4	0	0	0	12.4
Nov-00	13.9	51.4	35.3	200	13.9	0	0	32	23.7
Dec-00	6.6	0	-6.6	193.4	6.6	0	0	0	10.7
Jan-01	8.6	0	-8.6	185.1	8.3	0.3	0	0	5.4
Feb-01	9.9	34	4	189.1	9.9	0	19.6	0	3.2
Mar-01	17.1	6	-8	181.6	16.7	0.4	16.3	0	1.5
Apr-01	37.7	40	8.5	190	37.7	0	8.1	0	2.7
May-01	70.7	79.2	12.7	200	70.7	0	0	2.7	5.6
Jun-01	96.8	94.4	-7.1	192.9	96.8	0	0	0	5.6
Jul-01	101.9	73.6	-32	162.1	100.8	1.1	0	0	4.1
Aug-01	99.3	48.6	-53.1	119.1	89.2	10.1	0	0	2.6
Sep-01	52.3	84.4	27.9	146.9	52.3	0	0	0	4.3
Oct-01	28.9	147.9	111.6	200	28.9	0	0	58.5	36.7
Nov-01	17.9	85.6	63.4	200	17.9	0	0	63.4	50.6
Dec-01	11	20	8.2	200	11	0	0	8.2	28
Jan-02	10.4	1	-9.4	190.6	10.4	0	0	0	13.7
Feb-02	11.3	29.8	5.9	196.5	11.3	0	12	0	7.5
Mar-02	18.5	38.1	12.8	200	18.5	0	17.5	9.3	9.3
Apr-02	36.8	102.5	69.4	200	36.8	0	8.8	69.4	43.8
May-02	55.5	111.4	59	200	55.5	0	0	59	54.4
Jun-02	98	74.8	-26.9	173.1	98	0	0	0	28.2
Jul-02	125	66.6	-61.8	119.7	116.7	8.3	0	0	15.5
Aug-02	94.5	35	-61.2	83	69.9	24.6	0	0	7.9
Sep-02	63.4	52.5	-13.5	77.4	55.5	7.9	0	0	5.7
Oct-02	25.9	78	48.2	125.6	25.9	0	0	0	5.4
Nov-02	13.3	30	15.5	141.1	13.3	0	0	0	2
Dec-02	8.9	11	1.8	142.9	8.9	0	0	0	0.6
Jan-03	6.6	0	-6.6	138.2	4.7	1.9	0	0	0.2
Feb-03	7.7	13	-7.4	133.1	5.4	2.3	12.7	0	0.1
Mar-03	17.6	25.8	3.4	136.4	17.6	0	16.7	0	0.8
Apr-03	32.3	24.6	-0.5	136.1	32.1	0.2	8.4	0	1.3
May-03	61.3	95.6	37.9	173.9	61.3	0	0	0	4.8

Jun-03	95	77.3	-21.5	155.2	92.2	2.8	0	0	3.9
Jul-03	109.1	38.8	-72.2	99.2	92.9	16.2	0	0	1.9
Aug-03	95.1	99.9	-0.1	99.1	95	0.1	0	0	5
Sep-03	53.3	107.8	49.1	148.2	53.3	0	0	0	5.4
Oct-03	26.4	94.6	63.5	200	26.4	0	0	11.7	10.6
Nov-03	15.5	94.4	74.3	200	15.5	0	0	74.3	44.7
Dec-03	9.7	45.6	20.3	200	9.7	0	14.3	20.3	31.5
Jan-04	6.2	9.2	-6.2	193.8	6.2	0	23.5	0	15.1
Feb-04	9.8	1	-5.8	188.2	9.6	0.2	20.5	0	7.6
Mar-04	20	98	65.1	200	20	0	29.9	53.3	34
Apr-04	34.8	66.3	43.2	200	34.8	0	15	43.2	40.1
May-04	64.5	117	54.2	200	64.5	0	7.5	54.2	51.3
Jun-04	89.3	57.5	-27.2	172.8	89.3	0	0	0	25.6
Jul-04	104.4	116.7	6.4	179.3	104.4	0	0	0	17.2
Aug-04	78.9	60.8	-21.2	160.3	76.7	2.2	0	0	8.7
Sep-04	57.8	39.7	-20	144.2	53.8	4	0	0	4.8
Oct-04	28.7	58.4	26.7	171	28.7	0	0	0	4.3
Nov-04	15.2	63.9	45.6	200	15.2	0	0	16.6	12.1
Dec-04	8	33.5	6	200	8	0	19	6	8
Jan-05	7.1	29	-3.3	196.7	7.1	0	44.1	0	3.8
Feb-05	9.6	31.2	8.3	200	9.6	0	56.9	5	4.8
Mar-05	16.1	14	5.1	200	16.1	0	49.4	5.1	5.1
Apr-05	35.4	57.1	43.5	200	35.4	0	24.7	43.5	27
May-05	56.2	47.2	1	200	56.2	0	12.3	1	14.9
Jun-05	118.7	32.3	-81.9	118.1	118.7	0	6.2	0	7.9
Jul-05	121.2	141.7	19.6	137.7	121.2	0	0	0	10.2
Aug-05	95.6	148.3	45.2	183	95.6	0	0	0	9
Sep-05	59.2	76.6	13.6	196.5	59.2	0	0	0	4.6
Oct-05	30.4	51	18.1	200	30.4	0	0	14.6	10.2
Nov-05	15.5	95.9	75.7	200	15.5	0	0	75.7	46.4
Dec-05	8.1	23.3	2.1	200	8.1	0	12.6	2.1	22.3
Jan-06	10.8	79.3	46.7	200	10.8	0	32.1	46.7	36.6
Feb-06	9.5	36	7.3	200	9.5	0	50.9	7.3	21.3
Mar-06	18.8	59.9	41.9	200	18.8	0	48.2	41.9	33.3
Apr-06	37.5	93.6	75.6	200	37.5	0	24.1	75.6	58.1
May-06	68.6	106.1	44.3	200	68.6	0	12	44.3	54.2
Jun-06	99.2	53.9	-42	158	99.2	0	6	0	27.1
Jul-06	122.7	100.4	-21.3	141.2	118.2	4.5	0	0	17.2
Aug-06	90.5	52.6	-40.5	112.6	78.6	11.9	0	0	8.7
Sep-06	49.8	163.3	105.4	200	49.8	0	0	18	20.2
Oct-06	26.9	120.2	87.3	200	26.9	0	0	87.3	55.7
Nov-06	16.3	50.8	31.9	200	16.3	0	0	31.9	43.3
Dec-06	11.6	36.6	23.6	200	11.6	0	0	23.6	33.6
	529	725	163	2141	516	13	142	175	207

DETAILED WATER BALANCE CALCULATIONS - CATCHMENT 1
0 Mt. Pleasant Road, Caledon. ON

1 Climate Information

Precipitation	725	mm/a
Evapotranspiration	529	mm/a
Water Surplus	196	mm/a

2 Infiltration Rates

Table 2 Approach - Infiltration factors

Topography: rolling land	0.2	
Soil Type: sand, silt to silty sand	0.25	
Cover: Cultivated Land	0.1	
Total	**0.55**	
Infiltration (0.55 x 196)	108	mm/a
Run-off (196-108)	88	mm/a

Table 3 Approach - Typical Recharge Rates

Coarse Sand and Gravel	>250	mm/a
Fine to medium sand	200-250	mm/a
Silty sand to sandy silt	150-200	mm/a
Silt	125-150	mm/a
Clayey Silt	100- 125	mm/a
Clay	<100	mm/a
Site development area is underlain by sand, silt to silty sand		
Based on the above, the recharge rate is typically	150~200	mm/a

3 Pre-Development Property Statistics	**ha**	**m2**
Paved Area	0	0
Roof Area	0	0
Landscape Area	6.71	67100
Total	**6.71**	**67100**

4 Post-Development Property Statistics	**ha**	**m2**
Paved Area	0.92	9200
Roof Area	0.205	2050
Landscape Area	5.585	55850
Total	**6.71**	**67100**

5. Annual Pre-Development Water Balance

Land Use		Area (m2)	Precipitation (m3)	Evapotranspiration (m3)	Infiltration (m3)	Run-off (m3)
Impervious Areas	Paved Area	0	0	0	0	0
	Roof Area	0	0	0	0	0
Pervious Areas	Landscape Area	67,100	48,648	28,397	11,138	9,113
		67,100	**48,648**	**28,397**	**11,138**	**9,113**

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

6. Annual Post-Development Water Balance

Land Use		Area (m2)	Precipitation (m3)	Evapotranspiration (m3)	Infiltration (m3)	Run-off (m3)
Impervious Areas	Paved Area	9200	6,670	667	0	6,003
	Roof Area	2050	1,486	149	0	1,338
Pervious Areas	Landscape Area	55850	40,491	23,636	9,271	7,585
		67,100	**48,648**	**24,451**	**9,271**	**14,926**

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 (m3)	Evapotranspiration (m3)	Infiltration (m3)	Run-off (m3)
Pre-Development	**48,648**	**28,397**	**11,138**	**9,113**
Post-Development	**48,648**	**24,451**	**9,271**	**14,926**
Change in %			**-17**	**64**

8. Requirement for Infiltration of Roof Run-off

Volume of Pre-Development Infiltration	**11,138**
Volume of Post-Development Infiltration	**9,271**
Deficit from Pre to Post Development Infiltration	**1,867**
Percentage of Roof Runoff required to match the pre-development infiltration (%)	**140**

DETAILED WATER BALANCE CALCULATIONS-CATCHMENT 2
0 Mt. Pleasant Road, Caledon. ON

1 Climate Information

Precipitation	725	mm/a
Evapotranspiration	529	mm/a
Water Surplus	196	mm/a

2 Infiltration Rates

Table 2 Approach - Infiltration factors

Topography: rolling land	0.2	
Soil Type: sand, silt to silty sand	0.25	
Cover: Cultivated Land	0.1	
Total	**0.55**	

Infiltration (0.55 x 196)	108	mm/a
Run-off (196-108)	88	mm/a

Table 3 Approach - Typical Recharge Rates

Coarse Sand and Gravel	>250	mm/a
Fine to medium sand	200-250	mm/a
Silty sand to sandy silt	150-200	mm/a
Silt	125-150	mm/a
Clayey Silt	100- 125	mm/a
Clay	<100	mm/a

Site development area is underlain by sand,silt to silty sand

Based on the above, the recharge rate is typically 150~200 mm/a

3 Pre-Development Property Statistics	**ha**	**m2**
Paved Area	0	0
Roof Area	0	0
Landscape Area	5.57	55700
Total	**5.57**	**55700**

4 Post-Development Property Statistics	**ha**	**m2**
Paved Area	0.18	1800
Roof Area	0.075	750
Landscape Area	5.315	53150
Total	**5.57**	**55700**

5. Annual Pre-Development Water Balance

Land Use		Area (m2)	Precipitation (m3)	Evapotranspiration (m3)	Infiltration (m3)	Run-off (m3)
Impervious Areas	Paved Area	0	0	0	0	0
	Roof Area	0	0	0	0	0
Pervious Areas	Landscape Area	55,700	40,383	23,572	9,246	7,565
		55,700	**40,383**	**23,572**	**9,246**	**7,565**

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

6. Annual Post-Development Water Balance

Land Use		Area (m2)	Precipitation (m3)	Evapotranspiration (m3)	Infiltration (m3)	Run-off (m3)
Impervious Areas	Paved Area	1800	1,305	131	0	1,175
	Roof Area	750	544	54	0	489
Pervious Areas	Landscape Area	53150	38,534	22,493	8,822	7,218
		55,700	**40,383**	**22,678**	**8,822**	**8,882**

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 (m3)	Evapotranspiration (m3)	Infiltration (m3)	Run-off (m3)
Pre-Development	**40,383**	**23,572**	**9,246**	**7,565**
Post-Development	**40,383**	**22,678**	**8,822**	**8,882**
Change in %			**-5**	**17**

8. Requirement for Infiltration of Roof Run-off

Volume of Pre-Development Infiltration	**9,246**
Volume of Post-Development Infiltration	**8,822**
Deficit from Pre to Post Development Infiltration	**423**
Percentage of Roof Runoff required to match the pre-development infiltration (%)	**86**

APPENDIX D

SIRATI & PARTNERS
Geotechnical Hydrogeological & Environmental Solutions

AGAT Laboratories

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FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: MISC AGAT CLIENT ON, ON

ATTENTION TO: Sudhakar Kurli

PROJECT: SP17-212-30

AGAT WORK ORDER: 19T494518

WATER ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer

DATE REPORTED: Jul 25, 2019

PAGES (INCLUDING COVER): 10

VERSION*: 1

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

NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 19T494518

PROJECT: SP17-212-30

CLIENT NAME: MISC AGAT CLIENT ON

SAMPLING SITE:

ATTENTION TO: Sudhakar Kurli

SAMPLED BY:Sudhakar Kurl

Water Quality Assessment (mg/L)

DATE RECEIVED: 2019-07-18

DATE REPORTED: 2019-07-25

					SAMPLE DESCRIPTION:		20190717-001-MW4		20190717-002-MW2		20190717-003-MW1
					SAMPLE TYPE:		Water		Water		Water
					DATE SAMPLED:		2019-07-17		2019-07-17		2019-07-17
Parameter	Unit	G / S: A	G / S: B	RDL		RDL	362226	RDL	362272	RDL	362273
Electrical Conductivity	µS/cm			2		2	423	2	511	2	691
pH	pH Units		6.5-8.5	NA		NA	7.95	NA	7.91	NA	7.84
Saturation pH (Calculated)							7.28		7.16		7.01
Langelier Index (Calculated)							0.67		0.75		0.83
Total Hardness (as CaCO3) (Calculated)	mg/L		80-100	0.5		0.5	202	0.5	232	0.5	321
Total Dissolved Solids	mg/L		500	20		20	222[<B]	20	314[<B]	20	500[B]
Alkalinity (as CaCO3)	mg/L		30-500	5		5	176	5	214	5	219
Bicarbonate (as CaCO3)	mg/L			5		5	176	5	214	5	219
Carbonate (as CaCO3)	mg/L			5		5	<5	5	<5	5	<5
Hydroxide (as CaCO3)	mg/L			5		5	<5	5	<5	5	<5
Fluoride	mg/L	1.5		0.05		0.05	<0.05[<A]	0.05	<0.05[<A]	0.10	<0.10[<A]
Chloride	mg/L		250	0.10		0.10	5.95[<B]	0.10	8.84[<B]	0.20	7.18[<B]
Nitrate as N	mg/L	10.0		0.05		0.05	8.64[<A]	0.05	0.49[<A]	0.10	33.1[>A]
Nitrite as N	mg/L	1.0		0.05		0.05	0.27[<A]	0.05	<0.05[<A]	0.10	<0.10[<A]
Bromide	mg/L			0.05		0.05	<0.05	0.05	<0.05	0.10	<0.10
Sulphate	mg/L		500	0.10		0.10	11.5[<B]	0.10	47.0[<B]	0.20	12.5[<B]
Ortho Phosphate as P	mg/L			0.10		0.10	<0.10	0.10	<0.10	0.20	<0.20
Ammonia as N	mg/L			0.02		0.02	<0.02	0.02	<0.02	0.02	<0.02
Total Phosphorus	mg/L			0.02		0.02	1.21	0.02	0.40	0.02	0.93
Total Organic Carbon	mg/L			0.5		0.5	3.1	0.5	1.5	0.5	2.9
Colour	TCU		5	5		5	<5[<B]	5	<5[<B]	5	<5[<B]
Turbidity	NTU		5	3.0		0.5	29700[>B]	0.5	4210[>B]	0.5	7480[>B]
Calcium	mg/L			0.05		0.05	73.2	0.05	77.9	0.05	121
Magnesium	mg/L			0.05		0.05	4.56	0.05	9.16	0.05	4.69
Sodium	mg/L	20	200	0.05		0.05	3.12[<A]	0.05	3.28[<A]	0.05	3.32[<A]
Potassium	mg/L			0.05		0.05	1.55	0.05	11.3	0.05	5.86
Aluminum	mg/L		0.1	0.004		0.004	0.802[>B]	0.004	0.719[>B]	0.004	2.30[>B]
Antimony	mg/L	0.006		0.003		0.003	<0.003[<A]	0.003	<0.003[<A]	0.003	<0.003[<A]

Certified By: Vivine Basily

AGAT Laboratories

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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 19T494518

PROJECT: SP17-212-30

CLIENT NAME: MISC AGAT CLIENT ON

SAMPLING SITE:

ATTENTION TO: Sudhakar Kurli

SAMPLED BY:Sudhakar Kurl

Water Quality Assessment (mg/L)

DATE RECEIVED: 2019-07-18

DATE REPORTED: 2019-07-25

					20190717-001-		20190717-002-		20190717-003-
			SAMPLE DESCRIPTION:		MW4		MW2		MW1
			SAMPLE TYPE:		Water		Water		Water
			DATE SAMPLED:		2019-07-17		2019-07-17		2019-07-17
Parameter	Unit	G / S: A	G / S: B	RDL	362226	RDL	362272	RDL	362273
Arsenic	mg/L	0.025		0.003	<0.003[<A]	0.003	<0.003[<A]	0.003	<0.003[<A]
Barium	mg/L	1		0.002	0.139[<A]	0.002	0.069[<A]	0.002	0.109[<A]
Beryllium	mg/L			0.001	<0.001	0.001	<0.001	0.001	<0.001
Boron	mg/L	5		0.010	0.031[<A]	0.010	0.033[<A]	0.010	0.031[<A]
Cadmium	mg/L	0.005		0.001	<0.001[<A]	0.001	<0.001[<A]	0.001	<0.001[<A]
Chromium	mg/L	0.05		0.003	<0.003[<A]	0.003	<0.003[<A]	0.003	0.004[<A]
Cobalt	mg/L			0.001	0.006	0.001	0.002	0.001	0.006
Copper	mg/L		1	0.003	<0.003[<B]	0.003	0.004[<B]	0.003	0.010[<B]
Iron	mg/L		0.3	0.010	0.654[>B]	0.010	1.31[>B]	0.010	2.65[>B]
Lead	mg/L	0.01		0.001	<0.001[<A]	0.001	0.002[<A]	0.001	0.007[<A]
Manganese	mg/L		0.05	0.002	2.40[>B]	0.002	0.230[>B]	0.002	0.834[>B]
Mercury	mg/L	0.001		0.0001	<0.0001[<A]	0.0001	<0.0001[<A]	0.0001	<0.0001[<A]
Molybdenum	mg/L			0.002	<0.002	0.002	<0.002	0.002	<0.002
Nickel	mg/L			0.003	<0.003	0.003	<0.003	0.003	<0.003
Selenium	mg/L	0.05		0.004	<0.004[<A]	0.004	<0.004[<A]	0.004	<0.004[<A]
Silver	mg/L			0.002	<0.002	0.002	<0.002	0.002	<0.002
Strontium	mg/L			0.005	1.71	0.005	0.297	0.005	0.476
Thallium	mg/L			0.006	<0.006	0.006	<0.006	0.006	<0.006
Tin	mg/L			0.002	<0.002	0.002	<0.002	0.002	<0.002
Titanium	mg/L			0.002	0.030	0.002	0.017	0.002	0.039
Tungsten	mg/L			0.010	<0.010	0.010	<0.010	0.010	<0.010
Uranium	mg/L	0.02		0.002	<0.002[<A]	0.002	<0.002[<A]	0.002	<0.002[<A]
Vanadium	mg/L			0.002	<0.002	0.002	0.003	0.002	0.005
Zinc	mg/L		5	0.005	0.008[<B]	0.005	0.008[<B]	0.005	0.020[<B]
Zirconium	mg/L			0.004	<0.004	0.004	<0.004	0.004	<0.004
% Difference/ Ion Balance (Calculated)	%			NA	4.04	NA	4.38	NA	3.43

Certified By: Vivine Basily

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Certificate of Analysis

AGAT WORK ORDER: 19T494518

PROJECT: SP17-212-30

CLIENT NAME: MISC AGAT CLIENT ON

SAMPLING SITE:

ATTENTION TO: Sudhakar Kurli

SAMPLED BY:Sudhakar Kurl

Water Quality Assessment (mg/L)

DATE RECEIVED: 2019-07-18 **DATE REPORTED: 2019-07-25**

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to Ontario Drinking Water Quality Standards. Na value is derived from O. Reg. 248, B Refers to Ontario Drinking Water Quality Standards - Aesthetic Objectives and Operational Guidelines
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

362226 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analytes within the calibration range of the instrument and to reduce matrix interference.

362273 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analytes within the calibration range of the instrument and to reduce matrix interference.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Vivine Basily

AGAT Laboratories

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Guideline Violation

AGAT WORK ORDER: 19T494518

PROJECT: SP17-212-30

CLIENT NAME: MISC AGAT CLIENT ON

ATTENTION TO: Sudhakar Kurli

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
362226	20190717-001-MW4	O.Reg. 169(mg/L)AO&OG	Water Quality Assessment (mg/L)	Aluminum	mg/L	0.1	0.802
362226	20190717-001-MW4	O.Reg. 169(mg/L)AO&OG	Water Quality Assessment (mg/L)	Iron	mg/L	0.3	0.654
362226	20190717-001-MW4	O.Reg. 169(mg/L)AO&OG	Water Quality Assessment (mg/L)	Manganese	mg/L	0.05	2.40
362226	20190717-001-MW4	O.Reg. 169(mg/L)AO&OG	Water Quality Assessment (mg/L)	Total Hardness (as CaCO3) (Calculate	mg/L	80-100	202
362226	20190717-001-MW4	O.Reg. 169(mg/L)AO&OG	Water Quality Assessment (mg/L)	Turbidity	NTU	5	29700
362272	20190717-002-MW2	O.Reg. 169(mg/L)AO&OG	Water Quality Assessment (mg/L)	Aluminum	mg/L	0.1	0.719
362272	20190717-002-MW2	O.Reg. 169(mg/L)AO&OG	Water Quality Assessment (mg/L)	Iron	mg/L	0.3	1.31
362272	20190717-002-MW2	O.Reg. 169(mg/L)AO&OG	Water Quality Assessment (mg/L)	Manganese	mg/L	0.05	0.230
362272	20190717-002-MW2	O.Reg. 169(mg/L)AO&OG	Water Quality Assessment (mg/L)	Total Hardness (as CaCO3) (Calculated)	mg/L	80-100	232
362272	20190717-002-MW2	O.Reg. 169(mg/L)AO&OG	Water Quality Assessment (mg/L)	Turbidity	NTU	5	4210
362273	20190717-003-MW1	O.Reg. 169(mg/L)AO&OG	Water Quality Assessment (mg/L)	Aluminum	mg/L	0.1	2.30
362273	20190717-003-MW1	O.Reg. 169(mg/L)AO&OG	Water Quality Assessment (mg/L)	Iron	mg/L	0.3	2.65
362273	20190717-003-MW1	O.Reg. 169(mg/L)AO&OG	Water Quality Assessment (mg/L)	Manganese	mg/L	0.05	0.834
362273	20190717-003-MW1	O.Reg. 169(mg/L)AO&OG	Water Quality Assessment (mg/L)	Total Hardness (as CaCO3) (Calculate	mg/L	80-100	321
362273	20190717-003-MW1	O.Reg. 169(mg/L)AO&OG	Water Quality Assessment (mg/L)	Turbidity	NTU	5	7480
362273	20190717-003-MW1	O.Reg.169/03(mg/L)	Water Quality Assessment (mg/L)	Nitrate as N	mg/L	10.0	33.1

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Quality Assurance

CLIENT NAME: MISC AGAT CLIENT ON

AGAT WORK ORDER: 19T494518

PROJECT: SP17-212-30

ATTENTION TO: Sudhakar Kurli

SAMPLING SITE:

SAMPLED BY:Sudhakar Kurl

Water Analysis

RPT Date: Jul 25, 2019

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Water Quality Assessment (mg/L)															
Electrical Conductivity	360471		940	942	0.2%	< 2	108%	80%	120%						
pH	360471		8.10	8.00	1.2%	NA	100%	90%	110%						
Total Dissolved Solids	362801		164	162	1.2%	< 20	98%	80%	120%						
Alkalinity (as CaCO3)	360471		358	359	0.3%	< 5	98%	80%	120%						
Bicarbonate (as CaCO3)	360471		358	359	0.2%	< 5									
Carbonate (as CaCO3)	360471		<5	<5	NA	< 5									
Hydroxide (as CaCO3)	360471		<5	<5	NA	< 5									
Fluoride	357185		<0.25	<0.25	NA	< 0.05	99%	90%	110%	96%	90%	110%	108%	85%	115%
Chloride	357185		103	103	0.0%	< 0.10	91%	90%	110%	101%	90%	110%	111%	85%	115%
Nitrate as N	357185		0.99	1.00	NA	< 0.05	94%	90%	110%	102%	90%	110%	108%	85%	115%
Nitrite as N	357185		<0.25	<0.25	NA	< 0.05	NA	90%	110%	106%	90%	110%	108%	85%	115%
Bromide	357185		<0.25	<0.25	NA	< 0.05	93%	90%	110%	100%	90%	110%	105%	85%	115%
Sulphate	357185		128	130	1.0%	< 0.10	95%	90%	110%	101%	90%	110%	100%	85%	115%
Ortho Phosphate as P	357185		<0.50	<0.50	NA	< 0.10	97%	90%	110%	102%	90%	110%	111%	80%	120%
Ammonia as N	363013		<0.02	<0.02	NA	< 0.02	93%	90%	110%	101%	90%	110%	102%	70%	130%
Total Phosphorus	362160		0.03	<0.02	NA	< 0.02	100%	80%	120%	99%	90%	110%	101%	70%	130%
Total Organic Carbon	360517		1.3	1.2	NA	< 0.5	91%	90%	110%	92%	90%	110%	81%	80%	120%
Colour	362741		29	30	2.7%	< 5	102%	90%	110%						
Turbidity	362226	362226	29700	29800	0.6%	< 0.5	98%	90%	110%						
Calcium	362226	362226	73.2	74.3	1.5%	< 0.05	97%	90%	110%	98%	90%	110%	123%	70%	130%
Magnesium	362226	362226	4.56	4.54	0.4%	< 0.05	98%	90%	110%	99%	90%	110%	117%	70%	130%
Sodium	362226	362226	3.12	3.14	0.7%	< 0.05	96%	90%	110%	96%	90%	110%	119%	70%	130%
Potassium	362226	362226	1.55	1.57	1.1%	< 0.05	97%	90%	110%	97%	90%	110%	120%	70%	130%
Aluminum	362160		<0.004	<0.004	NA	< 0.004	94%	90%	110%	91%	90%	110%	104%	70%	130%
Antimony	362160		<0.003	<0.003	NA	< 0.003	100%	90%	110%	95%	90%	110%	118%	70%	130%
Arsenic	362160		<0.003	<0.003	NA	< 0.003	100%	90%	110%	99%	90%	110%	119%	70%	130%
Barium	362160		0.012	0.011	8.7%	< 0.002	106%	90%	110%	106%	90%	110%	121%	70%	130%
Beryllium	362160		<0.001	<0.001	NA	< 0.001	101%	90%	110%	99%	90%	110%	125%	70%	130%
Boron	362160		0.310	0.322	3.8%	< 0.010	107%	90%	110%	102%	90%	110%	100%	70%	130%
Cadmium	362160		<0.001	<0.001	NA	< 0.001	99%	90%	110%	101%	90%	110%	104%	70%	130%
Chromium	362160		<0.003	<0.003	NA	< 0.003	100%	90%	110%	103%	90%	110%	104%	70%	130%
Cobalt	362160		<0.001	<0.001	NA	< 0.001	103%	90%	110%	103%	90%	110%	130%	70%	130%
Copper	362160		<0.003	<0.003	NA	< 0.003	100%	90%	110%	105%	90%	110%	128%	70%	130%
Iron	362160		<0.010	<0.010	NA	< 0.010	110%	90%	110%	102%	90%	110%	114%	70%	130%
Lead	362160		<0.001	<0.001	NA	< 0.001	100%	90%	110%	101%	90%	110%	124%	70%	130%
Manganese	362160		0.020	0.020	0.0%	< 0.002	107%	90%	110%	106%	90%	110%	107%	70%	130%
Mercury	360517		<0.0001	<0.0001	NA	< 0.0001	101%	90%	110%	101%	80%	120%	101%	80%	120%
Molybdenum	362160		0.011	0.011	0.0%	< 0.002	104%	90%	110%	101%	90%	110%	117%	70%	130%
Nickel	362160		<0.003	<0.003	NA	< 0.003	108%	90%	110%	109%	90%	110%	106%	70%	130%

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Quality Assurance

CLIENT NAME: MISC AGAT CLIENT ON

AGAT WORK ORDER: 19T494518

PROJECT: SP17-212-30

ATTENTION TO: Sudhakar Kurli

SAMPLING SITE:

SAMPLED BY:Sudhakar Kurl

Water Analysis (Continued)

RPT Date: Jul 25, 2019			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Selenium	362160		<0.004	<0.004	NA	< 0.004	103%	90%	110%	103%	90%	110%	128%	70%	130%
Silver	362160		<0.002	<0.002	NA	< 0.002	102%	90%	110%	108%	90%	110%	105%	70%	130%
Strontium	362160		16.7	16.7	0.0%	< 0.005	100%	90%	110%	101%	90%	110%	114%	70%	130%
Thallium	362160		<0.006	<0.006	NA	< 0.006	103%	90%	110%	106%	90%	110%	129%	70%	130%
Tin	362160		<0.002	<0.002	NA	< 0.002	105%	90%	110%	101%	90%	110%	125%	70%	130%
Titanium	362160		0.003	0.004	NA	< 0.002	104%	90%	110%	100%	90%	110%	124%	70%	130%
Tungsten	362160		<0.010	<0.010	NA	< 0.010	96%	90%	110%	100%	90%	110%	123%	70%	130%
Uranium	362160		<0.002	<0.002	NA	< 0.002	106%	90%	110%	91%	90%	110%	106%	70%	130%
Vanadium	362160		<0.002	<0.002	NA	< 0.002	103%	90%	110%	104%	90%	110%	103%	70%	130%
Zinc	362160		<0.005	<0.005	NA	< 0.005	93%	90%	110%	94%	90%	110%	119%	70%	130%
Zirconium	362160		<0.004	<0.004	NA	< 0.004	100%	90%	110%	99%	90%	110%	118%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By: Nivine Basily

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Method Summary

CLIENT NAME: MISC AGAT CLIENT ON

AGAT WORK ORDER: 19T494518

PROJECT: SP17-212-30

ATTENTION TO: Sudhakar Kurli

SAMPLING SITE:

SAMPLED BY:Sudhakar Kurl

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Saturation pH (Calculated)		SM 2320 B	CALCULATION
Langelier Index (Calculated)		SM 2330B	CALCULATION
Total Hardness (as CaCO3) (Calculated)	MET-93-6105	EPA SW-846 6010C & 200.7	CALCULATION
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Bicarbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Carbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Hydroxide (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Fluoride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	SM 4500-NH3 H	LACHAT FIA
Total Phosphorus	INOR-93-6057	QuikChem 10-115-01-3-A & SM 4500-P I	LACHAT FIA
Total Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310	SHIMADZU CARBON ANALYZER
Colour	INOR-93-6046	SM 2120 B	SPECTROPHOTOMETER
Turbidity	INOR-93-6044	SM 2130 B	NEPHELOMETER
Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Potassium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Aluminum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Antimony	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Mercury	MET-93-6100	EPA SW 846 7470 & 245.1	CVAAS
Molybdenum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Selenium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Silver	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Strontium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Thallium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Tin	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Titanium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS

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Method Summary

CLIENT NAME: MISC AGAT CLIENT ON

AGAT WORK ORDER: 19T494518

PROJECT: SP17-212-30

ATTENTION TO: Sudhakar Kurli

SAMPLING SITE:

SAMPLED BY:Sudhakar Kurl

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Tungsten	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Uranium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zirconium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
% Difference/ Ion Balance (Calculated)		SM 1030 E	CALCULATION

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Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only

Work Order #: 19T494518

Cooler Quantity: 1 cooler

Arrival Temperatures: 3.7 | 3.5 | 3.5
ICE 2.5 | 2.7 | 2.8

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes:

Report Information:

Company: SIRATI & PARTNERS
Contact: SUDHAKAR KURLI
Address: 12700 Keele St
King City, ON
Phone: 647. 554.7057 Fax:
Reports to be sent to:
1. Email: Sudhakar@Sirati.ca
2. Email:

Regulatory Requirements:

(Please check all applicable boxes)

☒ No Regulatory Requirement

☐ Regulation 153/04
Table (Indicate One) ☐ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One) ☐ Coarse ☐ Fine

☐ Sewer Use ☐ Sanitary ☐ Storm
Region (Indicate One) ☐ MISA

☐ Regulation 558 ☐ CCME ☐ Prov. Water Quality Objectives (PWQO) ☐ Other
(Indicate One)

Is this submission for a **Record of Site Condition?** ☐ Yes ☒ No

Report Guideline on *Certificate of Analysis* ☒ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: SP17-212-30
Site Location: 0 Mt. Pleasant Rd, Caledon
Sampled By: SUDHAKAR KURLI
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email:

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (Y/N)	O. Reg 153: Metals and Inorganics (☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (Incl. Hydrides))	O. Reg 153: ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr^{6+} ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_2+NO_3	Volatiles: ☐ VOC ☐ BTEX ☐ THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	Sewer Use	WQA Analysis					Potentially Hazardous or High Concentration (Y/N)
20190717-001-MW4	7/17	11.00	5	GW		N																X				
20190717-002-MW2	7/17	11.45	5	GW		N																X				
20190717-003-MW1	7/17	12.30	5	GW		N																X				

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
SUDHAKAR KURLI	07/18			July 18/19	9:10
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time

Page ____ of ____

Nº: T 091326