Preliminary Hydrogeological Investigation

12909 Kennedy Road
Caledon, Ontario

Prepared For:

Trends Development Inc.
c/o Trend 12909 Kennedy Developments Inc.

Project #: 22-371-100
Date: January 17, 2023

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22-371-100 **January 17, 2023**

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RE: Preliminary Hydrogeological Investigation – 12909 Kennedy Road, Caledon, ON

DS Consultants Limited (DS) was retained by Trends Development Inc. & Trend 12909 Kennedy Developments Inc. to complete a preliminary hydrogeological Investigation for the proposed development at 12909 Kennedy Road (the Site). It is understood that the site is currently occupied by agricultural land, a 2-storey house, and eleven (11) other structures (i.e barns) associated with agricultural operations. It is further understood that the site will be developed with a residential subdivision consisting of single-family homes with a basement. The development is also to include a network of roads and underground utilities. This preliminary hydrogeological investigation was prepared in support of Site Plan Approval (SPA) submission. Detailed site plans were not available to DS at the time of preparing this report.

This hydrogeological assessment includes an overview of the existing geological and hydrogeological conditions at the Site and the surrounding area, an assessment of the hydrogeological constraints, impacts of the proposed development on the local groundwater and provides an estimation of construction dewatering and permanent drainage requirements during the proposed development. This investigation is based on monitoring wells installed by DS in support of geotechnical and hydrogeological investigations at the Site. If needed, the results of this investigation can be used in support of an application for a Category 3 Permit to Take Water (PTTW) or an Environmental Activity Sector Registry (EASR) for construction dewatering from the Ministry of the Environment Conservation and Parks (MECP) and discharge permitting from Peel Region.

Based on the results of our investigation, the following conclusions and recommendations are presented:

1. Based on the MECP water well records search, there are sixty-two (62) water wells within 500 meters of the Site. Thirty-two (32) wells were noted for domestic (DO) use and five (5) wells were noted for livestock (ST) use. All other wells were noted as test holes, monitoring well, not in use or unknown. A door-to-door water well survey was conducted on November 21st, 2022, to confirm the presence/absence of domestic wells within 500 m of the study area. Twenty-six (26) properties within the study area were canvassed. Of the properties canvassed, three (3) residents indicated that they are on domestic water supply.
2. In October 2022, DS advanced twelve (12) boreholes (BHs) to depths ranging from 6.7 to 9.1 meters below ground surface (mbgs). Monitoring wells (MWs) were installed into six (6) BHs (MW22-1,

MW22-2, MW22-4, MW22-10, MW22-11 and MW22-12) and screened to depths ranging from 6.1 to 7.5 mbgs.

3. The overburden at the site generally consists of 200 mm to 430 mm of topsoil overlying weathered/disturbed soils. Below the disturbed soils, cohesionless deposits of silty sand and gravelly sand/sandy gravel to sand and gravel, silt and sandy silt to silty sand were encountered extending to depths ranging between 1.5 to 8.1 mbgs at select borehole locations overlying a layer of clayey silt to silty clay till extending between 6.3 to 9.1 mbgs. The clayey silt to silty clay till overlays a lower sandy silt till deposit at some BH locations extending to the maximum explored depth.

4. Groundwater levels were measured on November 9th and January 13th, 2022. Groundwater was found in monitoring wells ranged from 265.3 meters above sea level (masl) to 271.6 masl, representing the groundwater elevation within the till overburden at the site. A groundwater level monitoring program is implemented at the site for a period of one (1) year with electronic level loggers installed at three (3) select wells programed to record daily water level readings. Manual water level readings will be recorded on a quarterly basis.

5. Four (4) Single Well Response Tests (SWRTs) were completed by DS in monitoring MW22-1, MW22-2, MW22-4 and MW22-12 in November 2022 to estimate hydraulic conductivity (k) for the representative geological units in which the wells were completed. The value of calculated hydraulic conductivity (k) ranges from 1.2 X 10^{-9} to 8.3 X 10^{-8} m/s within the clayey silt to silty clay till deposit.

6. One (1) unfiltered groundwater sample was collected from monitoring well MW22-4 on November 10th, 2022, and submitted to SGS Laboratories in Lakefield, Ontario. The groundwater sample was analyzed and compared against the parameters listed under the Peel Region Sanitary and Storm Sewer Use By-law 53_2010 and the Provincial Water Quality Objectives (PWQO) to assess groundwater quality before any discharge to Region's sewer and surface water system. The reported analytical results indicated that Total Suspended Solids (TSS) exceeded Peel Region's Storm Sewer Discharge By-Law criteria. All parameters met the Region's Sanitary Sewer Discharge By-Law criteria. Concentrations of phosphorus and 4AAP-Phenolics exceeded the PWQO standards. Discharge permits and agreements are required from the Peel Region for short-term discharge.

7. A preliminary site water balance analysis was completed to estimate pre-development and post-development evaporation, infiltration, and runoff for the development. The proposed development will produce a reduction in annual AET (120,399 m^3/yr), an increase in annual ET (25,964 m^3/yr), a reduction in annual infiltration (26,345 m^3/yr) and an increase in annual runoff (120,782 m^3/yr). The effects are mainly the result of increased impervious area and decreased pervious areas of the site.

8. The estimated maximum dewatering rate during construction for the unsealed excavation method of a basement for a single residential dwelling with estimated dimensions of 30 x 50 m is approximately 21,000 L/day. The anticipated pumping rate that is needed to achieve the required drawdown for a 30 m open cut trench to a depth of 4 mbgs for site servicing is approximately 5,000 L/day. These values incorporate a 100% safety factor and stormwater that may enter the excavation as a result of a 10 mm precipitation event in 24 hours.

9. Since the expected design dewatering rate(s) for the unsealed excavation(s) are below 50,000 L/day, a PTTW or an EASR for short-term dewatering are not required. However, should multiple excavations occur concurrently, and volumes exceed 50,000 L/day or 400,000 L/day an EASR or a PTTW will be required from the MECP.
10. The Humber River transects the northeastern quadrant of the site, with development proposed to occur approximately 400 m from the river. Therefore, temporary surface water impacts on the Humber River are not likely. However, it is recommended that a surface water quality sample be obtained from the Humber River to establish baseline conditions and that resampling occur during construction to ensure no adverse effects to the river from the proposed development.
11. There is a possibility of inducing settlement to neighboring structures when lowering water levels or depressurizing an aquifer. Due to the construction ending low permeable clayey silt to silty clay till, settlement due to construction dewatering activities is not likely.
12. In conformance with Regulation 903 of the Ontario Water Resources Act, the decommissioning of any dewatering system and monitoring wells should be carried out by a licensed contractor under the supervision of a licensed water well technician.

Should you have any questions regarding these findings, please contact the undersigned.

DS Consultants Ltd.

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APPENDICES:

1.0 INTRODUCTION

DS Consultants Limited (DS) was retained by Trends Development Inc. and Trend 12909 Kennedy Developments Inc. to complete a preliminary hydrogeological Investigation for the proposed development at 12909 Kennedy Road (the Site). It is understood that the site is currently occupied by agricultural land, a 2-storey house, and eleven (11) other structures (i.e. barns and silos) associated with agricultural operations. It is further understood that the site will be developed with a residential subdivision consisting of single-family homes with a basement. The development is to include a network of roads and underground utilities. This preliminary hydrogeological investigation was prepared in support of Site Plan Approval (SPA) submission. Detailed site plans were not available to DS at the time of preparing this report.

This hydrogeological assessment includes an overview of the existing geological and hydrogeological conditions at the Site and the surrounding area, an assessment of the hydrogeological constraints, impacts of the proposed development on the local groundwater and provides an estimation of construction dewatering and permanent drainage requirements during the proposed development. This investigation is based on monitoring wells installed by DS in support of geotechnical and hydrogeological investigations at the Site. If needed, the results of this investigation can be used in support of an application for a Category 3 Permit to Take Water (PTTW) or an Environmental Activity Sector Registry (EASR) for construction dewatering from the Ministry of the Environment Conservation and Parks (MECP) and discharge permitting from the Peel Region.

1.1 Purpose

The purpose of this investigation was to review and determine the need for dewatering, estimate dewatering rates, assess groundwater quality, and determine the need for a PTTW or an EASR from the MECP in addition to requirements to obtain discharge permits from the Peel Region. Potential impacts related to construction dewatering and associated monitoring/mitigation measures were also to be investigated.

1.2 Scope of Work

The scope of work for this investigation included:

(i) Site visits;

(ii) Desktop review of pertinent geological and hydrogeological resources;

(iii) Review the MECP Water Well Records and water use in the surrounding area;

(iv) Fieldwork including monitoring well drilling program consisting of twelve (12) boreholes and installation of six (6) monitoring wells;

(v) Conducting a residential water well survey within 500 m of the site to confirm the presence/absence of water wells in the area.

(vi) Conducting single well response tests (slug tests) to determine hydraulic conductivity values across the site;

(vii) Characterize the stratigraphy and measure the groundwater levels across the site;

(viii) Collection and analysis of groundwater samples to quantify and characterize any possible contaminants that may impact future discharge applications;

(ix) Estimation of construction dewatering volumes, which is to be used to predict the short-term groundwater control requirements for the construction of the proposed building on site.

(x) Estimation of long-term or permanent discharge rate after the construction;

(xi) Preliminary pre-development and post-development site water balance analysis to evaluate options for Low Impact Development (LID) measures as a mean of mitigation development impacts;

(xii) Data analyses and report preparation.

2.0 FIELD INVESTIGATION

In October 2022 DS advanced twelve (12) boreholes (BHs) to depths ranging from 6.7 to 9.1 mbgs. Monitoring wells (MWs) were installed into six (6) BHs (MW22-1, MW22-2, MW22-4, MW22-8, MW22-10, MW22-11 and MW22-12) and screened to depths ranging from 6.1 to 7.5 mbgs. Monitoring wells were constructed using 50 mm diameter PVC riser pipes and screens, which were installed into the select boreholes in accordance with O.Reg.903. All wells were developed before use to allow for groundwater level monitoring, hydraulic conductivity testing and assess groundwater quality. Four (4) single well response tests (SWRTs) were completed by performing a rising head test to estimate hydraulic conductivity values of formations/soils at the site. One (1) unfiltered groundwater sample was collected and analyzed for the parameters listed under the Peel Region Sewer Use Bylaw as well as PWQO to assess groundwater quality before any discharge to Region's sewer and surface water system and establish baseline water quality conditions. The BH/MW location plan is shown in **Figure 3**.

3.0 PHYSICAL SETTING

Available topographic maps, environmental, geotechnical and hydrogeological reports and the Ontario Geological Survey (OGS) were used to develop an understanding of the physical setting of the study area. The borehole logs from the current investigation at the Site and the MECP WWRs were used to interpret the geological and hydrogeological conditions at the Site.

3.1 Physiography and Drainage

The topography at the development site is undulating with a surface elevation of approximately 265 to 276 masl. The topography within the study area generally slopes southwest and southeast towards the Humber River and Etobicoke Creek, respectively. Drainage is generally controlled by streams, artificial channels and

the local topography. The Humber River transects the northeastern quadrant of the site and Etobicoke Creek is located approximately 120 m west of the site.

3.2 Geology

The following presents a brief description of regional and Site geology based on the review of available information and Site-specific soil investigations.

3.2.1 Quaternary Geology

The study area (500 m radius) lies within the South Slope physiographic region of southern Ontario and is characterized by drumlinized till plains landforms. Based on the regional mapping, the surficial geology at the Site and study area is characterized by till (5d) consisting of clay to silt-textured till deposits derived from glaciolacustrine deposits or shale. The northeastern corner is characterized by coarse-textured glaciolacustrine deposits (9c) consisting of sand, gravel, minor silt and clay from Foreshore and basinal deposits. The river and creek beds across the site and study area consist of is characterized by modern alluvial deposits (19) consisting of clay, silt, sand, gravel and some organic remains. The surficial geology map is shown in **Figure 2.**

3.2.2 Bedrock Geology

Available published mapping shows that bedrock in the area is predominantly shale, limestone, dolostone and siltstone of the Queenston Formation. Based on the review of existing boreholes logs and well record information, the depth to bedrock in the study area is estimated to be approximately 50 meters below the existing surface. Bedrock was not encountered during the current investigation and is not anticipated to have an impact of development activities.

3.2.3 Site Geology

On-Site subsurface soils were interpreted from the BHs/MWs advanced by DS at the site. A total of twelve (12) boreholes were drilled by DS in October 2022 as part of hydrogeological investigation concurrently with geotechnical investigation. The locations of the BHs/MWs are shown in **Figure 3** and geological cross-sections along (A-A') and (B-B') are shown in **Figures 5A** and **5B.** Detailed subsurface conditions are presented on the borehole Logs in **Appendix A**. The subsurface conditions in the boreholes are summarized in the following paragraphs.

Topsoil:

A surficial topsoil layer, ranging in thickness from 200 to 430 mm was encountered at all borehole locations.

Weathered/Disturbed Soils:

Weathered/disturbed soils generally consisting of sandy silt to silty sand were encountered in all boreholes and extended to depths ranging from about 0.8 to 1.5 m below existing ground surface. Some reworked (weathered/disturbed) soils might be fill materials. These materials typically contain trace to some organic matter, trace gravel and trace clay to clayey.

Silty Sand:

Below weathered/disturbed soils, a cohesionless silty sand deposit was encountered in boreholes BH22-5, BH22-6, and BH22-9 extended to depths ranging from 1.7 to 7.8 m below existing ground surface.

Gravelly Sand / Sandy Gravel to Sand and Gravel:

Deposits of gravelly sand and sandy gravel to sand and gravel were encountered below the weathered/disturbed soils in boreholes BH22-1 and BH22-2, below a sandy silt till deposit in boreholes BH22-3 and below the silty sand deposit in BH22-9 and extended to depths ranging from 1.4 to 8.1 m below existing ground surface, i.e., depth explored in BH22-9.

Silt:

A deposit of silt material with trace to some sand, trace clay and trace gravel was encountered below the silty sand deposit in borehole BH22-5 and extended to a depth of 2.8 m below existing ground surface.

Upper Sandy Silt to Silty Sand (Till):

Sandy silt to silty sand till deposits were encountered below the gravelly sand in BH22-1 and below the weathered/disturbed soils in BH22-3, BH22-7 and BH22-8 and extended to depths ranging from 1.0 to 2.4 m below existing ground surface.

Clayey Silt to Silty Clay (Till):

Below the upper sandy silt to silty sand till in boreholes BH22-1, BH22-7 and BH22-8, the weathered/disturbed soils in boreholes BH22-4, BH22-8 and BH22-10 to BH22-12, the gravelly sand in boreholes BH22-2 and BH22-3, the silt deposit in borehole BH22-5 and the silty sand deposit in borehole BH22-6, clayey silt to silty clay (till) deposits were encountered and extended to depths ranging from 6.3 to 9.1 m below existing ground surface. Boreholes BH22-1, BH22-3, BH22-4, BH22-5, BH22-6, BH22-8, and BH22-10 to BH22-12 were terminated in the clayey silt to silty (till) deposits. Cobbles/boulders were inferred within the till deposits during drilling.

Lower Sandy Silt (Till):

A lower sandy silt (till) deposit was encountered below the clayey silt to silty clay till in boreholes BH22-2 and BH22-7 and extended to depths of 9.6 and 6.7 m below existing ground surface, respectively, i.e., depth explored in the two boreholes.

3.2.4 Hydrostratigraphy

Regional stratigraphy in the area generally consists of the Halton Till overlying the Oak Ridges Moraine aquifer which overlies the Newmarket Aquitard and the Thorncliffe Aquifer. The clayey silt to silty clay till encountered during the drilling program is interpreted as the Halton Till. Based on the subsurface investigation consisting dominantly of low permeable till, no shallow overburden aquifer is present at the site. The groundwater encountered within the till is considered to be perched water within permeable seams rather than a local regional groundwater aquifer. Therefore, the proposed development is not likely to impact quality and quantity of any aquifers in the area as the below ground development is to extend within the low permeable till soils.

3.3 Hydrogeology

The hydrogeology at the study site was evaluated using the on-site monitoring wells installed by DS, local domestic wells and existing hydrogeological reports for the area.

3.3.1 Local Groundwater Use

As part of the hydrogeological study, DS completed a search of the MECP WWRs database. Based on the MECP water well records search, there are sixty-two (62) water wells within 500 meters of the Site (**Appendix D**). Thirty-two (32) wells were noted for domestic (DO) use and five (5) wells were noted for livestock (ST) use. All other wells were noted as test holes, monitoring well, not in use or unknown. Within the study area, water wells are screened within the overburden sediments or within the bedrock. The overburden aquifer in the area generally consists of sand gravel and kame deposits, while the bedrock aquifers include carbonate aquifers associated with the Niagara Escarpment or the Queenston Formation. **Figure 1** shows the MECP water well location plan.

A door-to-door water well survey was conducted on November 21st, 2022, to confirm the presence/absence of domestic wells within 500 m of the study area. Twenty-six (26) properties within the study area were canvassed. Of the properties canvassed, three (3) residents located at 3578 Old School Road, 13133 Kennedy Road, and 13121 Kennedy Road indicated that they use a domestic well on their property for water supply. Based on provided information from residents and the MECP WWR search, water well depths range approximately between 40-50 mbgs. The water level at 13133 Kennedy Road and 13121 Kennedy Road were 2.7 mbgs and 1.5 mbgs, respectively. The resident at 3756 Old School Road, 3771 Old School Road and staff from the school located at 12872 Kennedy Road indicated that they are serviced by municipal water supply. One (1) abandoned/damaged well was identified at 3431 Old School Road, and the tenant from 3771 Old School Road indicated they had a well decommissioned. No answers were received from all other canvassed properties at the time of the survey. The summary of the survey is presented in **Appendix E.** A detailed water well survey may be required from the Peel Region establishing baseline conditions (pre-construction) and conditions during and after construction, which may include continuous groundwater level monitoring and baseline groundwater quality analyses.

3.3.2 Groundwater Condition

A total of six (6) monitoring wells were used for the current groundwater assessment. All wells were screened within the clayey silt to silty clay till unit. Groundwater levels were measured on November 9th and January 13th, 2022. Groundwater was found in monitoring wells ranging from 265.3 masl to 271.6 masl, representing the groundwater elevation within the till overburden at the site. A groundwater level monitoring program for a period of one (1) year has been implemented at the site to assess seasonal groundwater fluctuations and confirm groundwater flow direction. The monitoring program consists of a data logger installed in MW22-1, MW22-4, and MW22-12 programmed to record daily water levels. Manual water level measurements will also be collected on a quarterly basis from all monitoring wells. Groundwater flow direction is inferred to be southwest towards Etobicoke Creek. The Humber River transects the northeastern quadrant of the site and Etobicoke Creek is located approximately 120 m west of the site. Both the Humber River and Etobicoke Creek ultimately discharge into Lake Ontario located 47 km southeast of the Site.

Table 3-1: Groundwater Levels in Monitoring Wells

Well ID	Ground Surface Elevation (masl)	Monitoring Well Depth (mbgs)	Date	Depth to Groundwater (mbgs)	Groundwater Elevation (masl)
MW22-1	272.2	6.1	09-Nov-22	2.1	270.1
			13-Jan-13	1.8	270.4
MW22-2	271.4	7.5	09-Nov-22	6.1	265.3
			13-Jan-13	5.9	265.5
MW22-4	268.3	6.1	09-Nov-22	1.9	266.4
			13-Jan-13	0.9	267.4
MW22-10	272.6	6.1	09-Nov-22	5.9	266.7
			13-Jan-13	4.7	267.9
MW22-11	272.5	6.5	09-Nov-22	dry	
			13-Jan-13	1.0	271.5
MW22-12	272.3	6.1	09-Nov-22	2.4	269.9
			13-Jan-13	0.7	271.6

3.3.3 Hydraulic Conductivity

Four (4) Single Well Response Tests (slug tests) were completed by DS in November 2022 in monitoring wells MW22-1 MW22-2, MW22-4 and MW22-12, to estimate hydraulic conductivity (k) for the representative geological units in which the wells were screened. Monitoring wells MW22-10 and MW22-11 had insufficient amount of water to complete the tests. The testing was completed using data loggers set to 5 seconds and placed at the bottom of the monitoring wells for 3-4 hours to accurately measure the change in the hydraulic head versus time. Hydraulic conductivity (k) values were calculated using the Bouwer and Rice method using the AquiferTest® Software. The semi-log plots for normalized drawdown versus time are provided in **Appendix B.** The k-values ranged between 1.2 X 10^{-9} to 8.3 X 10^{-8} m/s. **Table 3-2** presents the Hydraulic Conductivity (k) values for the representative geological units.

Table 3-2: Summary of Hydraulic Conductivity (k) Test Results

Well ID	Screened Interval (mbgs)	Screened Formation	k-value (m/s)	Geomean (m/s)
MW 22-1	3.-1-6.1	Clayey Silt to Silty Clay	8.3 X 10^{-8}	1.3 X 10^{-8}
MW 22-2	4.5-7.5	Clayey Silt to Silty Clay	1.8 X 10^{-8}	
MW 22-4	3.-1-6.1	Clayey Silt to Silty Clay	1.4 X 10^{-8}	
MW 22-12	3.-1-6.1	Clayey Silt to Silty Clay	1.2 X 10^{-9}	

3.3.4 Groundwater Quality

One (1) unfiltered groundwater sample from monitoring well MW22-4 was collected on November 10th, 20222, and submitted to SGS Laboratories in Lakefield, Ontario. SGS is certified by the Canadian Association of Laboratory Accreditation Inc. (CALA) and the Canadian Standard Association (CSA). The groundwater sample was analyzed and compared against the parameters listed under the Peel Region Sanitary and Storm Sewer Use By-law 53_2010 and PWQO to assess groundwater quality before any discharge to Region's sewer and surface water system. The reported analytical results indicated that TSS exceeded Peel Region's Storm Sewer Discharge By-Law criteria. All parameters met the Region's Sanitary Sewer Discharge By-Law criteria. Groundwater can be discharged into sanitary sewers without treatment. Concentrations of phosphorus and 4AAP-Phenolics exceeded the PWQO standards. The exceedances are summarized in **Table 3-3** and **Table 3-4.** The certificates of analyses are provided in **Appendix C.**

Table 3-3: Parameters in Groundwater Exceeding Peel Region Sewer Use BL-53_2010

Parameter	Unit	Peel Sanitary By-Law Criteria	Peel Region Storm By-Law Criteria	MW22-4
Total Suspended Solid (TSS)	mg/L	350	15	79
Bold- Exceeds Sanitary Sewer Use by Law Criteria Underlined- Exceeds Storm Sewer Use by Law Criteria				

Table 3-4: Parameters in Groundwater Exceeding the PWQO

Parameter	Unit	PWQO Criteria	MW22-4 Concentration
Phosphorus	mg/L	0.01	**0.162**
4AAP-Phenolics	mg/L	0.001	**0.003**
0.00- Exceeds PWQO Criteria			

4.0 PRELIMINARY WATER BALANCE ASSESSMENT

4.1 Existing Conditions

The subject Site has a total area of 360,340 m^2 and presently includes seven (7) buildings, associated with agricultural operations and a house with an approximate footprint of 1,980 m^2. The remainder of the property consists of open space (approximately 358,359 m^2) and is considered as a pervious area consisting of landscaped area, woodland and agricultural land (greenbelt).

4.2 Proposed Development

The area proposed for development includes the entire existing Site with a size of 360,340 m^2. It is proposed that the site will be re-developed with a residential subdivision with basements and a SWM Pond. For the Site Water Balance calculations in this report, post development areas were calculated based on site plan designs provided to DS. The total building, road and SWM pond area will occupy approximately 225,763 m^2 which will consider as impervious areas (driveway/walkway/parking area, building). The total post development landscaped area including parkland and the greenbelt area (pervious) will occupy approximately 134,576 m^2. **Appendix E** shows the pre- and post-development conceptual models considered for establishing pre/post-hydrologic conditions.

4.3 Water Balance Components (Thornthwaite Monthly Water Balance Model)

The Thornthwaite water balance (Thornthwaite, 1948; Mather, 1978; 1979) is an accounting type method used to analyze the allocation of water among various components of the hydrologic cycle. Inputs to the model are monthly temperature, Site latitude, and precipitation. Outputs include monthly potential and actual evapotranspiration, evaporation, water surplus, total infiltration, and total runoff. For ease of calculation, a spreadsheet model was used for the computation.

When precipitation (P) occurs, it can either runoff (R) through the surface water system, infiltrate (I) to the water table, or evaporate/evapotranspiration (ET) from the earth's surface and vegetation. The sum of R and I is termed as the water surplus (S). When long-term averages of P, R, I and ET are used, there is no net change in groundwater storage (ST). Annually, however, there is a potential for small changes in ST. The annual water budget can be stated as **P = ET + R + I + ST** and the components are discussed below.

4.3.1 Pre-development Water Balance

To predict outputs of the pre-development water balance, various inputs were entered into the Thornthwaite model including monthly precipitation and temperature, site latitude, water holding capacity values for native soils and factors of infiltration. Various inputs and outputs of the model are described in detail below. The detailed calculations are presented in **Appendix E.**

Precipitation (P)

Based on the 30-year average for the Toronto Lester B. International Airport Climate Station in Ontario, the average precipitation for the area is about 786 mm/year for the period between 1981 and 2010. Also, the average monthly temperature from this station has been used. The monthly distribution of precipitation is presented in **Table E1, Appendix E.**

Storage (St)

Groundwater storage (ST) of native soils for the existing Site was estimated using values of Water Holding Capacity (mm) of respective land use and soil types identified in Table 3.1 of the Storm Water Management (SWM) Planning & Design Manual (MOE, March 2003). The land uses, soil types and respective water holding capacities shown in Table 3 were chose to represent existing conditions and applied to March for monthly calculations.

Table 4-1 Existing Conditions – Water Holding Capacity and AET of Native Soils in Pervious Areas

Land uses / soil types	Water Holding Capacity (mm/year)	AET (mm/year)
Forest/Clay Loam	400	578
Moderately Rooted Crops/Clay Loam	200	552
Urban Lawn /Clay Loam	100	509

Using the procedures outlined in the SWM Planning & Design Manual for each of the above land uses and soil types, the annual change in storage is 0. The monthly distribution of ST is presented in **Table E-2, Appendix E.**

EVAPORATION / EVAPOTRANSPIRATION (ET)

In the pre-development scenario, it is assumed that evaporation will occur over existing impervious surfaces at approximately 15% of total precipitation. Considering a total annual precipitation of 786 mm, evaporation is estimated at 118 mm. With an impervious area totaling 5,544 m^2, a total annual volume of evaporation is estimated at 654 m^3/yr. The detailed calculations for evaporation are included in **Table E-2 Appendix E.**

Evapotranspiration in the pre-development scenario occurs over each pervious land use. Monthly Potential Evapotranspiration (PET) is estimated using monthly temperature data and is defined as a water loss from a homogeneous vegetation-covered area that never lacks water (Thornthwaite, 1948; Mather, 1978). In the Thornthwaite water balance model, PET is calculated using the Hamon equation (Hamon, 1061);

$$PET\ (HAMON) = 13.97 * D * D2 * WT$$

Where:

d = the number of days in the month
D = the mean monthly hours of daylight in units of 12 hours
Wt = a saturated water vapour density term = 4.95 * e0.627/100
T = the monthly mean temperature in degrees Celcius

Considering a total annual precipitation of 786 mm, adjusted Potential Evapotranspiration (PET) is estimated at 605 mm.

A comparison between PET and Precipitation (P) produces a soil moisture deficit which begins in June and is increases to a maximum of 146 mm in September. Actual Evapotranspiration (AET) is based on PET and changes in ST (Δ ST). Where there is not enough P to satisfy PET, a reduction in ST occurs. The total annual volume of AET across the existing site is estimated at 195,487 m^3/yr. Detailed calculations and the monthly distribution of AET is presented in **Table E-2, Appendix E**.

Precipitation Surplus (S)

Precipitation surplus is calculated as P-ET. For pervious areas, ET is considered AET and for impervious areas ET is evaporation. A surplus of 668 mm/year (85% of P) is calculated for impervious areas. For the pervious land use/soil type representing existing conditions at the site, P-AET produces a precipitation surplus of 314 mm/year (40% of P). The more detailed calculations are included in **Table E-2, Appendix E.**

Infiltration (I) and Runoff (R)

For pervious areas, precipitation surplus has two (2) components in the Thornthwaite model: a runoff component (overland flow that occurs when soil moisture capacity is exceeded) and an infiltration component. The accumulation of infiltration factors for topography, soil types and cover as prescribed in Table 3.1 of the SWM Planning & Design Manual give infiltration factors for existing conditions on the Site as shown below in **Table 4-2**.

Table 4-2 Existing Conditions – Infiltration Factor

Land uses / soil types	Topography	Soil	Cover	Total infiltration factor
Woodland /Clay Loam	0.2	0.20	0.20	0.60
Moderately Rooted Crop/Clay Loam	0.2	0.2	0.1	0.5
Urban Lawn/Clay Loam	0.2	0.2	0.1	0.5

Considering the above infiltration factors, the respective total annual volume of infiltration is estimated to be 42,276 m^3/year.

The runoff component calculated in the pre-development model is the remaining volume of precipitation surplus following infiltration. Considering the precipitation surpluses and the total infiltration volume, the total annual volume of runoff is estimated at 44,810 m^3/year. Detailed calculations and the monthly distribution of infiltration and runoff are presented in **Table E-2, Appendix E.**

4.3.2 Post-development Water Balance

Post-development conditions include impervious areas, pervious areas of urban lawn with silty loam soils. To predict outputs of the post-development water balance, the same 30-year average climate data and site latitude inputs were used. Changes in land use including landscaped areas (urban lawn) include a reduction in soil water holding capacity inputs and factors of infiltration. Various inputs and outputs of the post-development model are presented in **Table E-3, Appendix E.**

Storage (St)

Groundwater storage (ST) of native soils for the post-development site remains the same for undeveloped areas. The same water holding capacity was chosen as above to represent post-development conditions and applied to March for monthly calculations. Similar to the pre-development conditions, using the procedures outlined in the SWM Planning & Design Manual for each of the above land use, the annual change in storage is 0. The monthly distribution of ST is presented in **Table E-3, Appendix E.**

EVAPORATION / EVAPOTRANSPIRATION (ET)

In the post construction scenario, changes in land use result in totalling impervious surface area of about 225,763 m^2. For these areas it is assumed that evaporation will occur and will amount to approximately 15% of total precipitation. Considering a total annual precipitation of 786 mm, evaporation is estimated at 118 mm. As a result, a total annual volume of evaporation is estimated at 26,618 m^3/yr. The detailed calculations for evaporation are included in **Table E-3 Appendix E**.

For post-development pervious areas, monthly PET is estimated using the same inputs and calculations described in the pre-development model respective of land use and soil moisture holding capacity. In the post-development scenario, annual AET is 75,088 m^3/yr. The monthly distribution of Post-development AET and detailed calculations are presented in **Table E-3, Appendix E**.

Precipitation Surplus (S)

For post-development pervious surfaces at the site, precipitation surplus is calculated as P–AET which includes about 277 mm/yr for retained landscaped/forested areas. For Impervious surfaces at the site,

surplus is P-ET where ET is estimated at 15% of P. The resulting precipitation surplus is about 668 mm/yr. The more detailed calculations are included in **Table E-3, Appendix E**

Infiltration (I) and Runoff (R)

The accumulation of infiltration factors for topography, soil types and cover and prescribed in Table 3.1 of the SWM Planning & Design Manual. The infiltration factor remains unchanged. Considering the infiltration factor of 0.6 for forest land use, 0.5 for moderately rooted crops and 0.5 for urban lawn and clay loam soil type, the annual volume of infiltration is estimated at 390 m^3/year.

The runoff component calculated in the post-development model is the remaining volume of precipitation surplus following infiltration. Considering the precipitation surpluses and the total infiltration volume, the total runoff estimated is 15,930 m^3/year. Detailed calculations and the monthly distribution of infiltration and runoff are presented in **Table E-3, Appendix E.**

4.3.3 Post-development Water Balance

Based on results of the pre-development and post-development water balance completed, the proposed development will produce a reduction in annual AET (120,399 m^3/yr), an increase in annual ET (25,964 m^3/yr), a reduction in annual infiltration (26,345 m^3/yr) and an increase in annual runoff (120,782 m^3/yr), as shown in **Table E-4, Appendix E**. The effects are mainly the result of increased impervious area, replacing pervious areas of the site.

5.0 CONSTRUCTION DEWATERING

The proposed development is to consist of a residential subdivision consisting of single-family homes with a basement and is to include a network of roads and underground utilities. Detailed site plan designs were not available to DS at the time of this investigation. The basements and servicing trenches are estimated to extend approximately 4 mbgs. The water level should be lowered 1 m below the excavation depths to maintain dry conditions within the excavations. Any excavation below the groundwater table will require dewatering of any groundwater seepage into the excavation. Based on the stratigraphy at the site, the construction is generally expected to be ended into the low permeable clayey silt to silty clay till layer. As a conservative measure, the highest calculated hydraulic conductivity (k) value of 8.3 x 10^{-8} m/s was considered to estimate dewatering flow rates. This section calculates the estimated dewatering required during the construction of the proposed single residential dwellings and site servicing trenches.

5.1 Estimation of Flow Rate- Unsealed Method (basements)

The steady-state flow equation for unsealed excavation was used to estimate the construction dewatering value of basement for a single residential dwelling.

$$Q = \frac{\pi(H^2 - h^2)}{2.3 \log\left(\frac{R_0}{re}\right)}$$ Equation 3.1

$$R_0 = C(H - h)\sqrt{k}$$ Equation 3.2

$$r_e = \sqrt{\frac{ab}{\pi}}$$ Equation 3.3

Where,

Q- Flow rate = 3,000 L/day (3 m^3/day)

H- Initial Elevation of Water Table = 4.1 m
h- Final Elevation of Water Table = 1 m
K- Hydraulic Conductivity= 8.3 X 10^{-8} m/s
Ro- Radius of Influence = 25 m
Re- Equivalent Radius = 21.9 m
a- Length of excavation = 50 m
b- Width of excavation = 30 m
C- Dimensionless constant= 3

Additional pumping capacity may be required to maintain dry conditions within the open excavations during and following a major precipitation event. The estimated flow rate is based on the excavation dimensions and a 10 mm precipitation event in 24 hours. The total estimated dewatering that may be required from a 10 mm precipitation event is approximately **15,000 L/day (15 m^3/day).**

The total estimated daily rate for short term construction is estimated to be **21,000 L/day (21 m^3/day)**. This value incorporates a 100% safety factor and the above-mentioned storm water. The dewatering value will need to be reassessed once below grade designs become available for review.

5.2 Estimation of Flow Rate- Unsealed Method (site servicing)

The anticipated pumping rate that is needed to achieve the required drawdown for a 30 m open cut trench to a depth of 4 mbgs was estimated using the equation for water table flow from a line source to a drainage trench.

$$Q = \pi k(H^2 - h^2)Ln\,(R_o/R_e) + 2(XK(H^2 - h^2)/2L$$ Equation 3.4

Where,

Q- Flow rate = 2,000 L/day (2 m^3/day)

K – Hydraulic conductivity [m/day] = 8.3 X 10^{-8} m/s
H – Distance from static water level to the bottom of an aquifer = 4.1m
h – Depth of water in the well while pumping = 1m
r_e – equivalent radius [m] = $((a*b) / \pi)_{0.5}$ where a and b excavation dimensions (2 x 30 m) = 4.37 m
R_o – Radius of the cone of depression = r_e + 3000 * (H – h) * $K_{0.5}$, (k [m/s]) = 7 m
X – Length of Dewatering (Trench Length) = 30 m
L – Width of Dewatering = R_o/2= 3.52 m

The estimated flow rate is based on the excavation dimensions and a 10 mm precipitation event in 24 hours. The total estimated dewatering that may be required from a 10 mm precipitation event is approximately **1,000 L/day (1 m^3/day).**

The total estimated daily rate for short term construction is estimated to be **5,000 L/day (5 m^3/day)**. This value incorporates a 100% safety factor and the above-mentioned storm water. The dewatering value will need to be reassessed once below grade designs become available for review.

It is expected that the initial dewatering rates will be higher to remove groundwater from within the overburden formation. The dewatering rates are expected to decrease once the target water level is achieved in the excavation footprint as groundwater will have been removed locally from storage resulting in lower seepage rates into the excavation. The maximum flow calculation is intended to provide a conservative value to account for variations in K and weather events such as precipitation and snow melt. Groundwater control through sumps may be possible in areas where groundwater levels are over 1 m below finished grade. Positive dewatering through wells or eductors should be considered in areas with saturated subsurface conditions.

5.3 Zone of Influence During Construction

The radius of influence (Ro) for the construction dewatering was calculated based on the Sichardt equation (Equation 3.2). Ro is the distance at which the drawdown resulting from pumping is negligible. The equation is empirical and was developed to provide representative flow rates using the steady-state flow dewatering equations as indicated above. Under steady-state conditions, Ro of pumping will extend until boundary flow conditions are reached and sufficient water inputs are equal to the discharge rate due to pumping. Therefore, the Sichardt equation is used to provide a representative flow rate but is not precise in determining the actual radius of influence by pumping. Based on Sichardt equation the zone of influence for a single residential dwelling and a 30 x 2m trench at the site is approximately 25 m and 7 m, respectively.

5.4 Permit Requirements

5.4.1 Environmental Activity and Sector Registry (EASR) /Permit to Take Water (PTTW) Application

An Environmental Activity Sector Registration (EASR) is required to be submitted to the Ministry of the Environment, Conservation and Parks (MECP) if the taking of groundwater and stormwater for a temporary construction project is between 50,000 L/day and 400,000 L/ day. The EASR application is an online registry and should be submitted to the MECP before any construction dewatering. A PTTW is required to be submitted to the MECP if the taking of groundwater and stormwater for a temporary construction project is more than 400,000 L/ day.

Since the expected design dewatering rate(s) for the unsealed excavation(s) are below 50,000 L/day or more a PPTW or an EASR for short-term dewatering are not required. However, should multiple excavations occur at the same time and volumes should exceed 50,000 L/day or 400,000 L/day an EASR or a PTTW will be required from the MECP. All permitting requirements will be revised based on new design details.

5.4.2 Discharge Permits (Construction Dewatering and Permanent Drainage)

A discharge permit will be required from the Peel Region if private water is to be sent to the sewer system or nearby watercourse (Humber River).

6.0 POTENTIAL IMPACTS

The following are the predicted potential impacts as a result of development:

6.1 Local Groundwater Use

Based on the water well survey results, there may be some residents who rely on domestic water supply within a 500 m radius of the site. However, impacts to residential water wells is not likely due to the low zone(s) of influence for the proposed construction and since the proposed development is not to extend within a water supply aquifer at the site.

6.2 Surface Water

The Humber River transects the northeastern quadrant of the site, with development proposed to occur approximately 400 m from the river. Therefore, temporary surface water impacts on the Humber River are not likely. However, it is recommended that a surface water quality sample be obtained from the Humber River to establish baseline conditions and that resampling occur during construction to ensure no adverse effects to the river from the proposed development. Long-term impacts may be anticipated to the Humber River as a result of increased development within the area.

6.3 Source Protection Area

The site and study area fall within the Toronto Source Protection Area.

6.4 Highly Vulnerable Aquifer

A Highly Vulnerable Aquifer (HVA) is an aquifer on which external sources have or are likely to have a significant adverse effect and includes the land above the aquifer. The site and study are not located within an HVA. No aquifer impacts are anticipated due to the proposed temporary dewatering.

6.5 Wellhead Protection Area

A Wellhead Protection Area (WHPA) is an area that is related to a municipal well system and within which it is desirable to regulate or monitor drinking water threats. WHPAs are delineated for threats to quality and quantity. The site and the study area are not located within a municipal WHPA. No WHPA impacts are anticipated due to the proposed temporary dewatering.

6.6 Intake Protection Zone

An Intake Protection Zone (IPZ) is an area related to a surface water intake and within which it is desirable to regulate or monitor drinking water threats. These areas are either set distances, delineated based on the time it would take to respond to a spill, or based on the catchment area of the intake. The site and study area are not located within an IPZ.

6.7 Point of Discharge and Groundwater Quality

Groundwater quality analysis indicated that no parameters were in exceedance of the Peel Region's Storm Sewer Discharge By-Law criteria except for TSS. All parameters met the Region's Sanitary Sewer Discharge By-Law criteria. When compared against the PWQO guideline, concentrations of phosphorus and phenolics exceeded the PWQO standards. Therefore, groundwater at the Site is not suitable for discharge into the Peel Region's storm and nearby surface water system without treatment. A settlement tank should be considered as a basic treatment to minimize total suspended solids and associated metals during construction dewatering. Discharge permits and agreements are required from the Peel Region for short-term and long-term discharge.

6.8 Settlement Due to Dewatering Activities

There is a possibility of inducing settlement to neighboring structures when lowering water levels or depressurizing an aquifer. Due to the construction ending low permeable clayey silt to silty clay till, settlement due to construction dewatering activities is not likely.

6.9 Well Decommissioning

Following the completion of construction activities, all dewatering wells, well points, eductors and monitoring wells installed at various stages of this project must be decommissioned. The installation and eventual decommissioning of the wells and the dewatering system must be carried out by a licenced water well contractor in accordance with Regulation 903 of the Ontario Water Resources Act.

7.0 MONITORING AND MITIGATION

Based on the finding of hydrogeological assessment and associated potential impacts due to development, the following monitoring and mitigation program is provided:

- A groundwater level program has been implemented at the Site on a quarterly basis to document the pre-construction groundwater and surface water conditions, as well as assess seasonal fluctuations;
- Baseline groundwater has been assessed and established before construction. However, groundwater quality can change based on several factors (land-use change, spills, etc.) and should be monitored during construction dewatering and after construction to ensure that water quality meets the guideline or regulations associated with any permits from the MECP, Peel Region and Conservation Authority;
- A surface water quality sample is recommended to be obtained from the Humber River to assess baseline conditions prior to any overland discharge;
- Once a groundwater dewatering system is set up at the Site, a daily and weekly monitoring should be implemented to assess the groundwater conditions such as water levels, measurement of discharge flow, discharge water quality and any adverse impacts as a result of dewatering;
- Following the completion of construction activities, all dewatering wells, well points, eductors and monitoring wells installed at various stages of this project shall be decommissioned. The installation

and eventual decommissioning of the wells and the dewatering system will be carried out by a licenced water well contractor in accordance with Regulation 903 of the Ontario Water Resources Act.

Should you have any questions regarding these findings, please contact the undersigned.

DS Consultants Ltd.

Prepared By:

Dorothy Santos, M.Sc.
Project Manager

Reviewed By:

Martin Gedeon, M.Sc., P.Geo.
Senior Hydrogeologist

8.0 CONSULTANT QUALIFICATIONS

Martin Gedeon, M.Sc., P.Geo., is a Professional Geoscientist (P.Geo.) with over 26 years of experience as an environmental/hydrogeological consultant in the areas of groundwater and soil monitoring, environmental site assessments, environmental due diligence, and remediation. Martin has significant experience in physical and contaminant hydrogeology across Canada and overseas and has provided hydrogeological/environmental technical support on various projects. Martin has prepared hundreds of hydrogeological reports in support of permit applications for a private sector development application, municipal dewatering operations, and provincial infrastructure projects across the province.

Ms. Dorothy Santos, M.Sc., is project manager with DS Consultants Ltd. Dorothy holds a master's degree in Earth and Environmental Science (Hydrogeology) from the University of Waterloo and has several years of experience conducting hydrogeological investigations and environmental assessments. Dorothy has experience with conducing Phase One and Phase Two Environmental Site Assessments, hydrogeological investigations and has provided technical support for discharge permits. Dorothy has been involved with project coordination, field assessments, data interpretation and reporting.

9.0 REFERENCES

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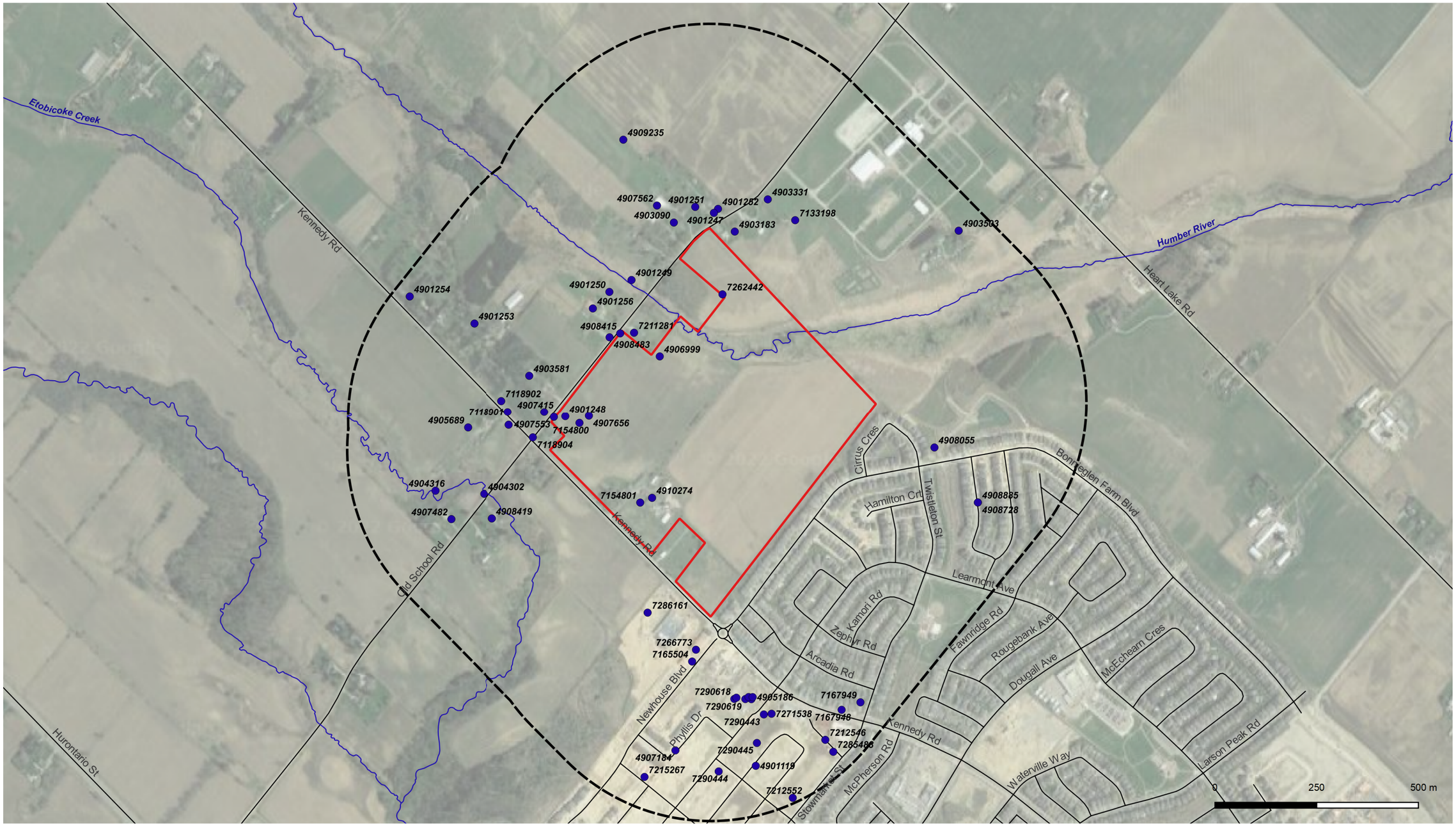
Figures



Legend

- Russell Property Boundary
- 500m Buffer
- Registered Water Well (MECP WWR)

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c/o TREND 12909 KENNEDY DEVELOPMENT INC.

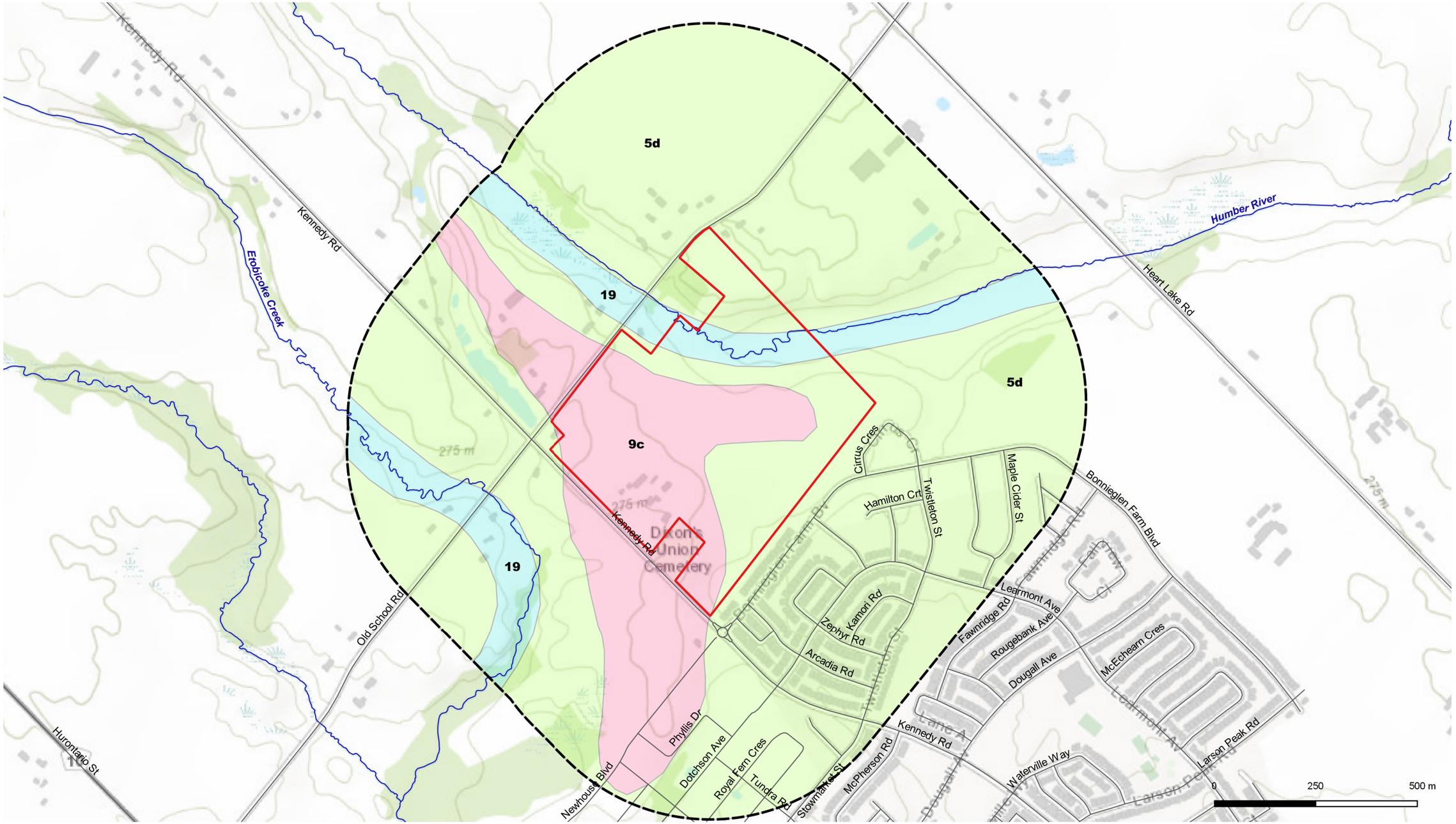
Project: HYDROGEOLOGICAL INVESTIGATION
12909 Kennedy Road, Caledon, ON

Title: **SITE LOCATION AND MECP WELL RECORDS**

Size:	Approved By:	Drawn By:	Date:
11x17	D.S	S.Y	January 2023
Rev. 0	Scale: As Shown	Project No.: 22-371-100	Figure No.: 1

Image/Map Source: *Google Satellite Image*

C:\0Sharon\22-371-100 12909 Kennedy Road, Caledon\1-QGIS\HydroG\Figure 1 – Site Location and MECP Well Records.qgs Jan-13 09:25



Legend

- Russell Property Boundary
- 500m Buffer
- 19 - Modern Alluvium
- 5d - Till
- 9c - Coarse-textured Glacial Lake Deposits

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Title: **SURFICIAL GEOLOGY MAP**

N

Client: TRENDS DEVELOPMENT INC.
c/o TREND 12909 KENNEDY DEVELOPMENT INC.

Size:	Approved By:	Drawn By:	Date:
11x17	D.S	S.Y	January 2023
Rev. 0	Scale: As Shown	Project No.: 22-371-100	Figure No.: 2

Image/Map Source: *Esri Topo Map & https://www.mndm.gov.on.ca/*

C:\0Sharon\22-371-100 12909 Kennedy Road, Caledon\1-QGIS\HydroG\Figure 2 – Surficial Geology Map.qgs Jan-13 09:26

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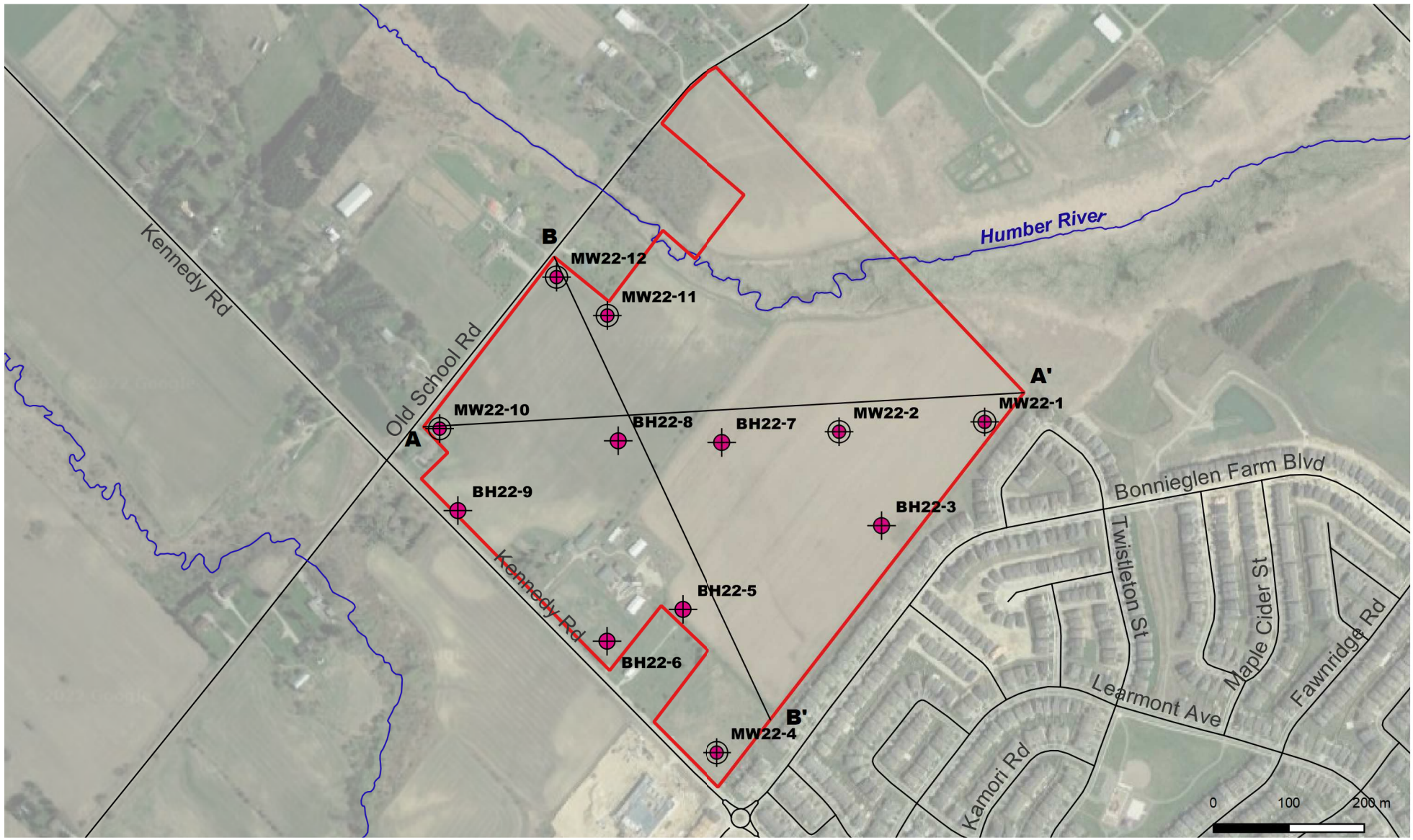

Legend

- Russell Property Boundary
- Borehole
- Monitoring Well
- Cross Section

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c/o TREND 12909 KENNEDY DEVELOPMENT INC.

Project: HYDROGEOLOGICAL INVESTIGATION
12909 Kennedy Road, Caledon, ON

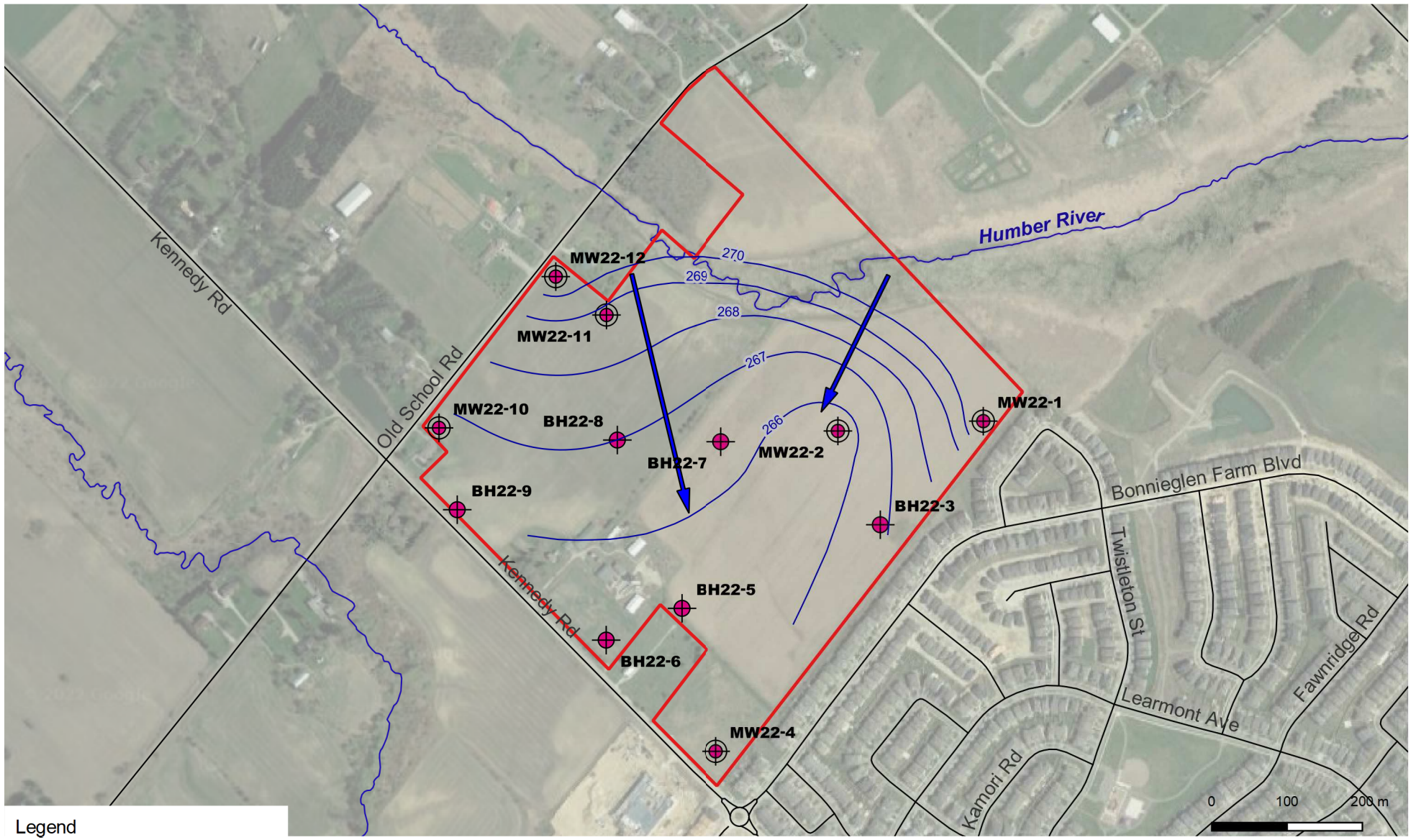
Title: **BOREHOLE AND MONITORING WELL LOCATIONS**

N

Size:	Approved By:	Drawn By:	Date:
8.5 x 11	D.S	S.Y	January 2023
Rev: 0	Scale: As Shown	Project No.: 22-371-100	Figure No.: 3

Image/Map Source: *Google Satellite Image*

D:\0DSConsultants\01 Backup January 2021\2022 PROJECTS\22-371-100 12909 Kennedy Road, Caledon\1-QGIS\HydroG\Figure 4 - Groundwater Elevation Contours and Flow Direction.qgs Jan-17



Legend

- Russell Property Boundary
- Borehole
- Monitoring Well
- Groundwater Elevation Contour (Nov 9, 2022)
- Groundwater Flow Direction

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Project: HYDROGEOLOGICAL INVESTIGATION
12909 Kennedy Road, Caledon, ON

Title: **GROUNDWATER ELEVATION CONTOURS AND FLOW DIRECTION**

N

Size:	Approved By:	Drawn By:	Date:
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Rev: 0	Scale: As Shown	Project No.: 22-371-100	Figure No.: 4

Image/Map Source: *Google Satellite Image*

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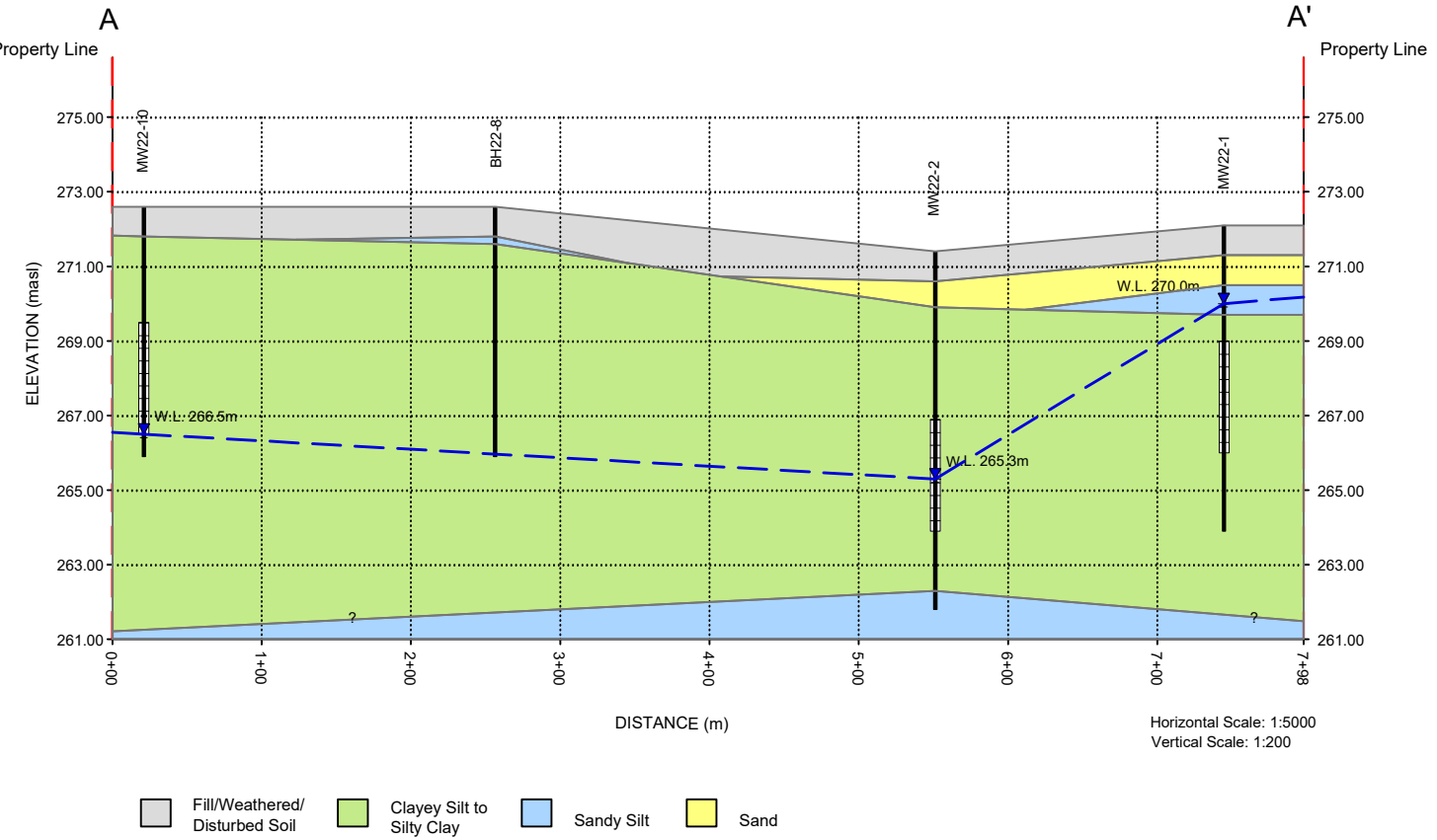
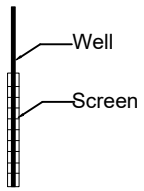


Inferred Groundwater Elevation (09 Nov 2022)



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Project: HYDROGEOLOGICAL INVESTIGATION
12909 Kennedy Road, Caledon, ON

Title: **GEOLOGICAL CROSS SECTION A-A'**

Client: TRENDS DEVELOPMENT INC.
c/o TREND 12909 KENNEDY DEVELOPMENT INC.

Size:	Approved By:	Drawn By:	Date:
8.5 x 11	D.S	S.Y	January 2023
Rev.	**Scale:**	**Project No:**	**Figure No.**
	As Shown	22-371-100	**5A**

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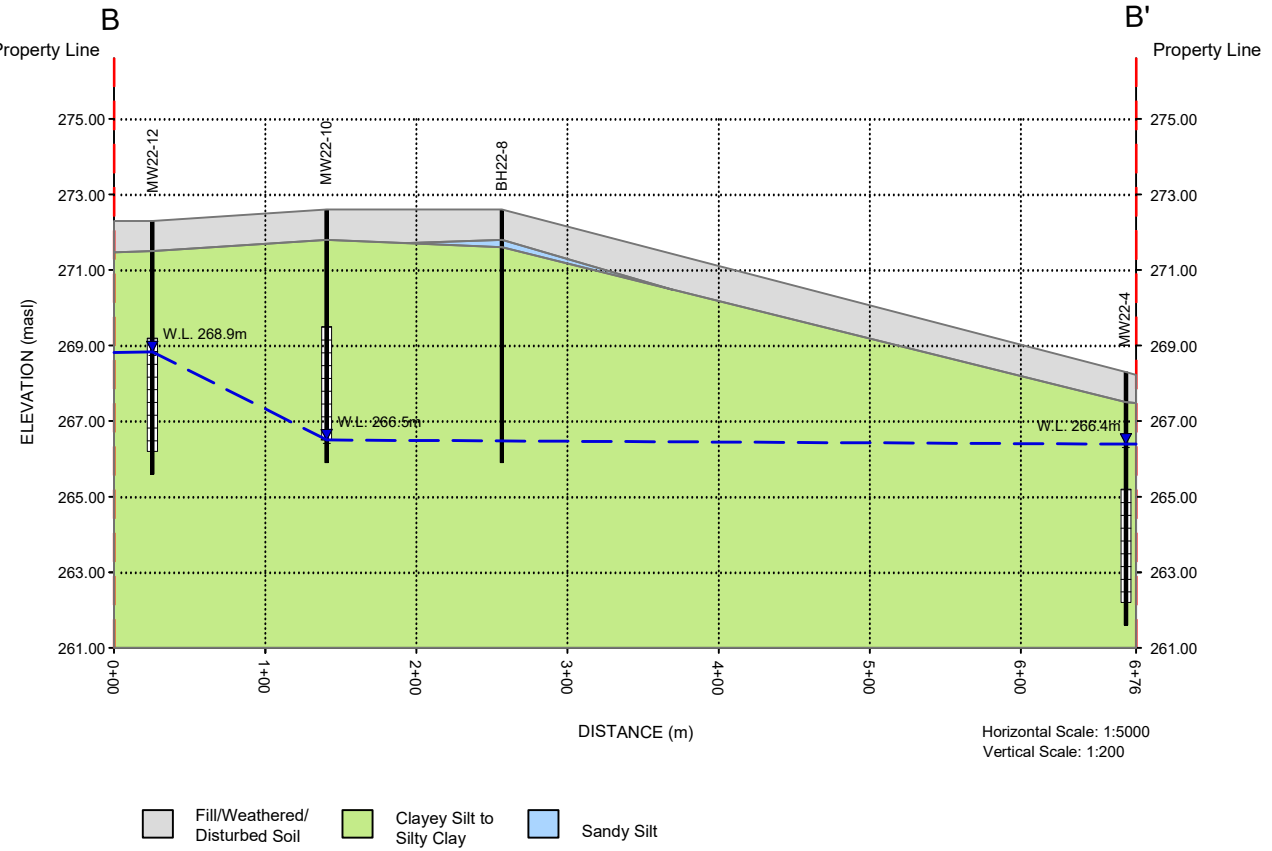

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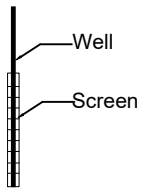

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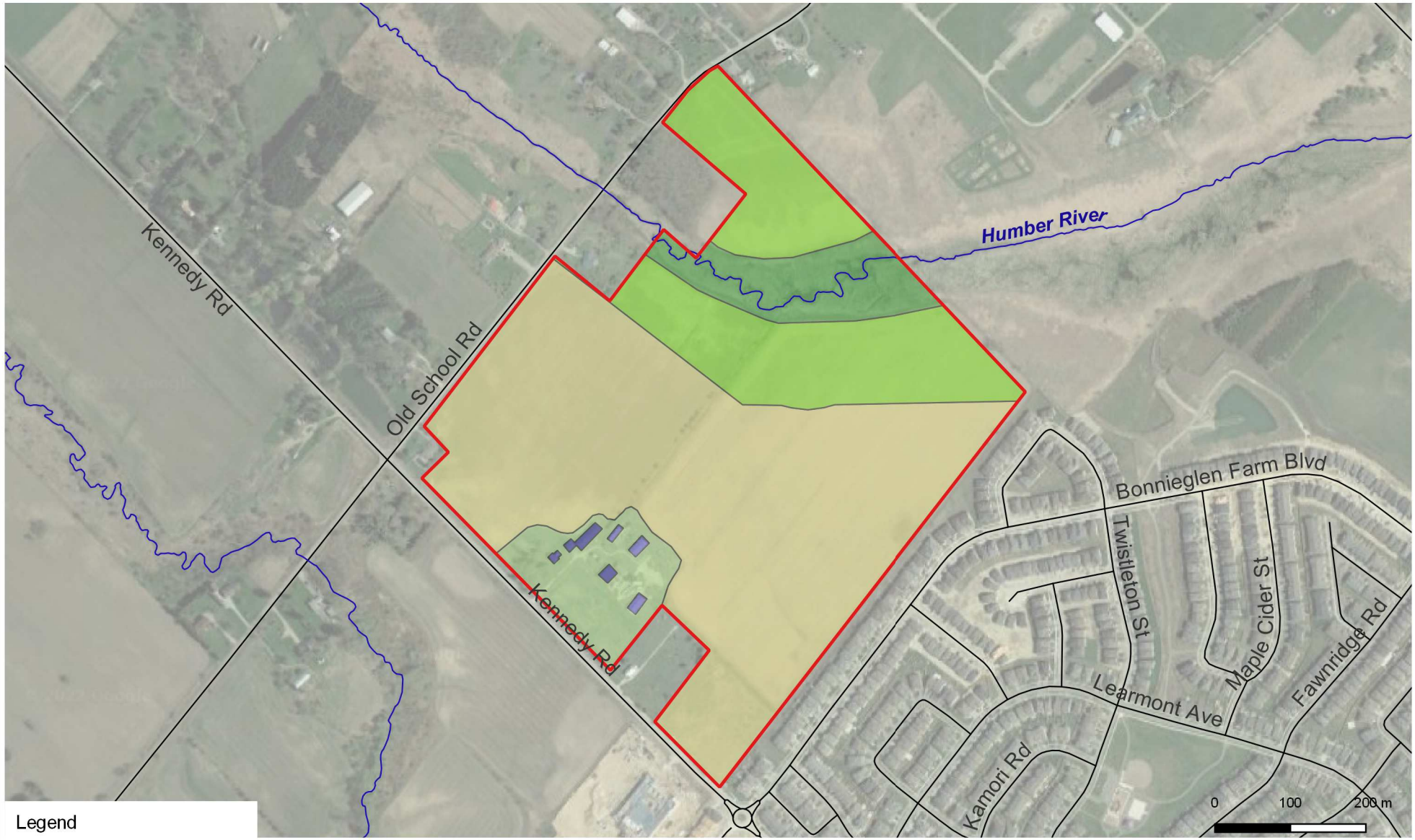
Project: HYDROGEOLOGICAL INVESTIGATION
12909 Kennedy Road, Caledon, ON

Title: **GEOLOGICAL CROSS SECTION B-B'**

Client: TRENDS DEVELOPMENT INC.
c/o TREND 12909 KENNEDY DEVELOPMENT INC.

Size:	Approved By:	Drawn By:	Date:
8.5 x 11	D.S	S.Y	January 2023
Rev.	Scale:	Project No:	Figure No.
	As Shown	22-371-100	**5B**

C:\0Sharon\22-371-100 12909 Kennedy Road, Caledon\1-QGIS\HydroG\Figure 6A – Pre-Development Landuse.qgs Jan-13 09:32



Legend

- Russell Property Boundary
- Agricultural
- Building
- Landscape Area
- Greenbelt
- Forest

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Project: HYDROGEOLOGICAL INVESTIGATION
12909 Kennedy Road, Caledon, ON

Title: **PRE-DEVELOPMENT LAND USE**

N

Size:	Approved By:	Drawn By:	Date:
8.5 x 11	D.S	S.Y	January 2023
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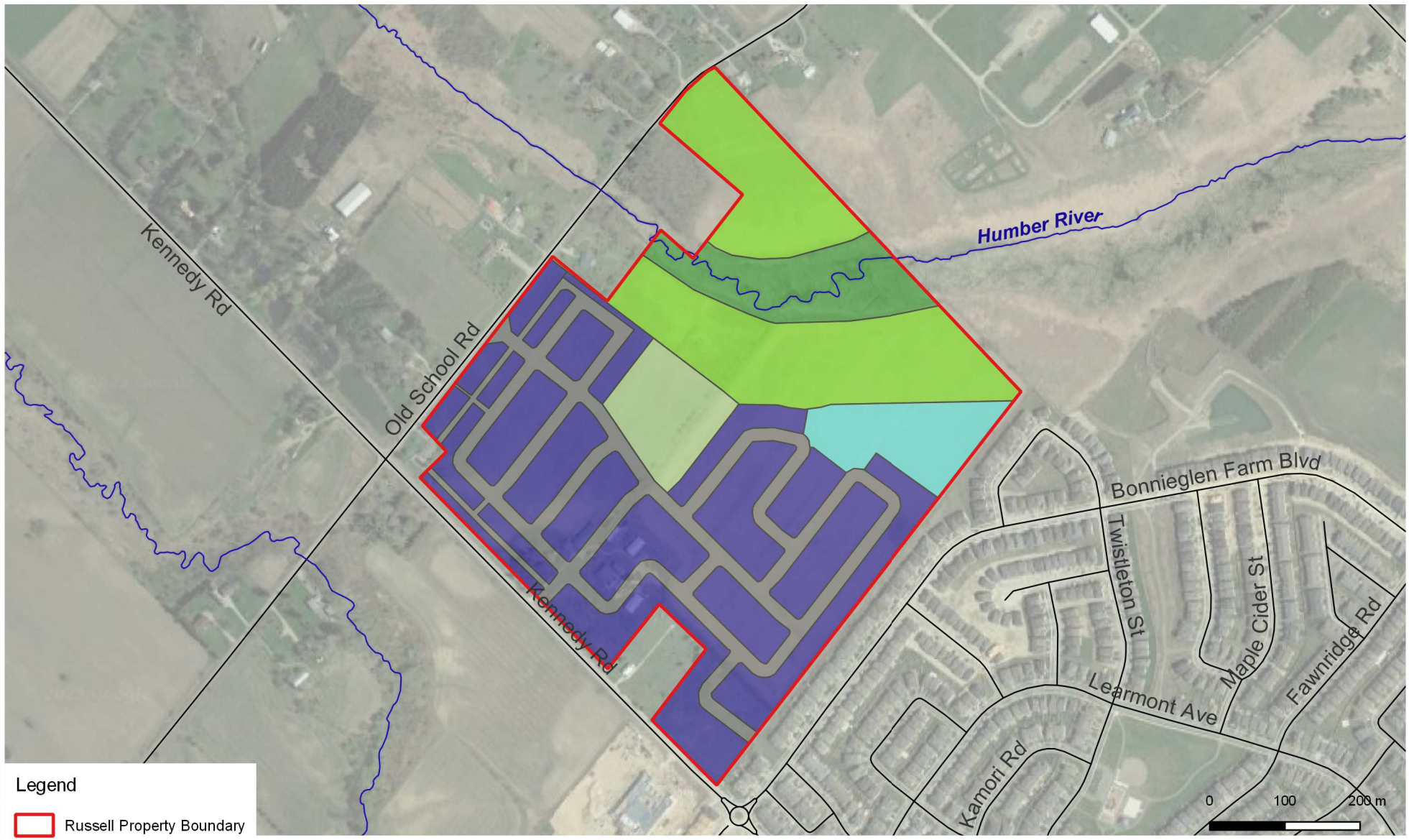
Image/Map Source: *Google Satellite Image*

C:\0Sharon\22-371-100 12909 Kennedy Road, Caledon\1-QGIS\HydroG\Figure 6B – Post-Development Landuse.qgs Jan-13 09:33



Legend

- Russell Property Boundary
- Buildings
- Greenbelt
- Park
- Forest
- SWM Pond
- Road

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c/o TREND 12909 KENNEDY DEVELOPMENT INC.

Project: HYDROGEOLOGICAL INVESTIGATION
12909 Kennedy Road, Caledon, ON

Title: **POST-DEVELOPMENT LAND USE**

N

Size:	Approved By:	Drawn By:	Date:
8.5 x 11	D.S	S.Y	January 2023
Rev: 0	Scale: As Shown	Project No.: 22-371-100	Figure No.: **6B**

Image/Map Source: *Google Satellite Image*

Appendix A

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Geotechnical ◆ Environmental ◆ Materials ◆ Hydrogeology

LOG OF BOREHOLE BH22-1

PROJECT: Geotechnical Investigation
CLIENT: Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.
PROJECT LOCATION: 12909 Kennedy Rd., Caledon, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4846306.45 E 594064.95

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct-27-2022

REF. NO.: 22-371-100
ENCL NO.: 2

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS "N" 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT (w_P w w_L) WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
272.1								20 40 60 80 100	10 20 30			
270.0	**TOPSOIL:** 200mm						272					
0.2	**WEATHERED/DISTURBED SOIL:** sandy silt, trace clay, trace rootlets, trace gravel, brown, moist, loose		1	SS	7							
271.3												
1 0.8	**GRAVELLY SAND:** trace silt, angular pieces of gravel, brown, moist, compact		2	SS	14		271					
270.5												
1.6	**SANDY SILT TILL:** trace clay, trace gravel, brown, moist, compact		3	SS	16	▽						
2 269.7							270					
2.4	**CLAYEY SILT TO SILTY CLAY TILL:** some sand to sandy, trace gravel, grey, moist, very stiff		4	SS	29		W. L. 270.0 m Nov 04, 2022					
3			5	SS	27		269					8 35 40 17
4							268					
5			6	SS	24		267					
6			7	SS	21		266					
7							265					
8 263.9			8	SS	16		264					
8.2	**END OF BOREHOLE:** Notes: 1) 50mm dia. monitoring well installed upon completion. 2) Water Level Readings: Date: Water Level(mbgl): Nov. 4, 2022 2.1											

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

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

DS CONSULTANTS LTD.
Geotechnical ◆ Environmental ◆ Materials ◆ Hydrogeology

LOG OF BOREHOLE BH22-2

PROJECT: Geotechnical Investigation
CLIENT: Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.
PROJECT LOCATION: 12909 Kennedy Rd., Caledon, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4846290.7 E 593872.09

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct-27-2022

REF. NO.: 22-371-100
ENCL NO.: 3

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION
271.4 / 0.0	**TOPSOIL:** 300mm						
271.1 / 0.3	**WEATHERED/DISTURBED SOIL:** sandy silt, trace clay, trace organics, trace rootlets, brown, moist, loose		1	SS	5		271
270.6 / 0.8	**GRAVELLY SAND:** trace silt, brown, moist, compact		2	SS	17		270
269.9 / 1.5	**CLAYEY SILT TO SILTY CLAY TILL:** some sand to sandy, trace gravel, brown, moist, stiff to hard		3	SS	18		
	grey below 2.3m		4	SS	43		269
			5	SS	27		268
			6	SS	32		267
	with sandy silt to silt pockets @6.1m		7	SS	37	W. L. 265.3 m Nov 04, 2022	266
			8	SS	45		264
262.3 / 9.1	**SANDY SILT TILL:** trace clay, trace gravel, grey, wet, very dense		9	SS	50/ 130mm		263
261.8 / 9.6	**END OF BOREHOLE:** Notes: 1) 50mm dia. monitoring well installed upon completion. 2) Water Level Readings: Date: Water Level(mbgl): Nov. 4, 2022 6.1						262

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × 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
	5	33	41	21

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

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

DS CONSULTANTS LTD.
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LOG OF BOREHOLE BH22-3

PROJECT: Geotechnical Investigation
CLIENT: Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.
PROJECT LOCATION: 12909 Kennedy Rd., Caledon, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4846159.17 E 593933.78

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct-27-2022

REF. NO.: 22-371-100
ENCL NO.: 4

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	TYPE	"N" BLOWS 0.3 m	GROUND WATER CONDITIONS	ELEVATION
270.9							
0.0 / 270.5	**TOPSOIL:** 350mm		1	SS	7		
0.4 / 270.1	**WEATHERED/DISTURBED SOIL:** sandy silt, trace clay, trace organics, trace rootlets, brown, moist, loose		2	SS	15		270
0.8 / 269.5	**SANDY SILT TO SILTY SAND TILL:** trace clay, trace gravel, brown, moist, compact		3	SS	13		269
1.4 / 269.2	**GRAVELLY SAND:** trace silt, brown, moist, compact						
1.7	**CLAYEY SILT TO SILTY CLAY TILL:** some sand to sandy, trace gravel, occasional cobble, brown, moist, stiff to hard grey below 2.3m		4	SS	32		268
			5	SS	28		267
			6	SS	31		266
			7	SS	32		265
264.2							
6.7	**END OF BOREHOLE:** Notes: 1) Auger grinding @ 4.6m due to possible cobble/boulder. 2) No water observed in borehole upon completion of drilling.						

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × 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

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LOG OF BOREHOLE BH22-4

PROJECT: Geotechnical Investigation
CLIENT: Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.
PROJECT LOCATION: 12909 Kennedy Rd., Caledon, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4845863.99 E 593715.76

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct-28-2022

REF. NO.: 22-371-100
ENCL NO.: 5

(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
268.3												
268.0 / 0.0	**TOPSOIL:** 250mm											
0.3 / 267.5	**WEATHERED/DISTURBED SOIL:** clayey silt, some sand, trace organics, trace rootlets, brown, moist, firm		1	SS	6		268					
1 / 0.8	**CLAYEY SILT TILL:** some sand to sandy, trace gravel, brown, moist, very stiff		2	SS	22		267					
2			3	SS	17	▽ W. L. 266.4 m Nov 04, 2022						
	grey below 2.3m		4	SS	28							
265.4 / 3 / 2.9	**CLAYEY SILT TO SILTY CLAY TILL:** sandy, trace gravel, grey, moist, stiff to very stiff		5	SS	24		265					
4							264					
5	Wet Silt Layer at 5.0m		6	SS	16		263					3 23 55 19
6			7	SS	14		262					
261.6 / 6.7	**END OF BOREHOLE:**											

Notes:
1) 50mm dia. monitoring well installed upon completion.
2) Water Level Readings:

Date:	Water Level(mbgl):
Nov. 4, 2022	1.91

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

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

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LOG OF BOREHOLE BH22-5

PROJECT: Geotechnical Investigation
CLIENT: Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.
PROJECT LOCATION: 12909 Kennedy Rd., Caledon, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4846054.38 E 593671.47

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct-27-2022

REF. NO.: 22-371-100
ENCL NO.: 6

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
272.9								20 40 60 80 100	10 20 30			
272.7 0.0	**TOPSOIL:** 230mm											
0.2	**WEATHERED/DISTURBED SOIL:** sandy silt to silty sand, trace clay, trace organics, trace rootlets, brown, moist, loose		1	SS	6							
271.9							272					
1.0	**SILTY SAND:** trace clay, trace gravel, brown, moist, loose to compact		2	SS	8							
271.2												
1.7	**SILT:** trace to some sand, trace clay, trace gravel, brown, wet, compact		3	SS	16		271					
2	grey, fine sand pockets@2.3m											
270.1			4	SS	24							
2.8	**CLAYEY SILT TO SILTY CLAY TILL:** some sand, trace gravel, occasional cobble, grey, moist, very stiff		5	SS	18		270					
4							269					
5			6	SS	19		268					Auger grinding, possible cobble/boulder
6							267					
266.2			7	SS	18							
6.7	**END OF BOREHOLE:** Notes: 1) Water encountered at 1.7 m depth during drilling.											

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

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

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LOG OF BOREHOLE BH22-6

PROJECT: Geotechnical Investigation
CLIENT: Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.
PROJECT LOCATION: 12909 Kennedy Rd., Caledon, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4846011.11 E 593571.54

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct-28-2022

REF. NO.: 22-371-100
ENCL NO.: 7

(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
272.9												
0.0 / 272.6	**TOPSOIL:** 330mm		1	SS	5		272					
0.3	**WEATHERED/DISTURBED SOIL:** silty sand, trace clay, trace organics, trace rootlets, brown to orange brown, moist, very loose to loose		2	SS	0							
1 / 271.4							271					
1.5	**SILTY SAND:** trace clay, brown, moist, loose to compact		3	SS	9							
2			4	SS	14		270					
3			5	SS	14							
4							269					
	saturated at 4.6m		6	SS	8		268					
5												
6 / 266.8							267					
6.1	**CLAYEY SILT TO SILTY CLAY TILL:** some sand, trace gravel, occasional cobbles, grey, moist, hard		7	SS	30							
7							266					
8 / 264.7			8	SS	34		265					
8.2	**END OF BOREHOLE:** 1) Water encountered at 4.6 m depth during drilling.											

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

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

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LOG OF BOREHOLE BH22-7

PROJECT: Geotechnical Investigation
CLIENT: Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.
PROJECT LOCATION: 12909 Kennedy Rd., Caledon, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4846267 E 593724.46

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct-27-2022

REF. NO.: 22-371-100
ENCL NO.: 8

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION
271.5							
0.0 / 271.1	**TOPSOIL:** 430mm		1	SS	9		271
0.4 / 270.7	**WEATHERED/DISTURBED SOIL:** sandy silt, trace clay, trace rootlets, brown, moist, loose						
0.8 / 270.3	**SILTY SAND TO SANDY SILT TILL:** trace clay, trace gravel, brown, moist, loose		2	SS	6		
1.2	**CLAYEY SILT TO SILTY CLAY TILL:** some sand, occasional sand pockets, occasional cobbles, brown, moist, very stiff to hard		3	SS	22		270
	grey below 2.3m		4	SS	33		269
			5	SS	25		268
			6	SS	21		267
							266
265.2							
6.3 / 264.8	**SANDY SILT TILL:** some clay to clayey, trace gravel, grey, moist, compact		7	SS	26		265
6.7	**END OF BOREHOLE:**						

Notes:
1) No water observed in borehole upon completion of drilling.

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × 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

Auger grinding @3.0m due to cobble/boulder

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

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

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LOG OF BOREHOLE BH22-8

PROJECT: Geotechnical Investigation
CLIENT: Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.
PROJECT LOCATION: 12909 Kennedy Rd., Caledon, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4846277.26 E 593579.21

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct-27-2022

REF. NO.: 22-371-100
ENCL NO.: 9

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m	GROUND WATER CONDITIONS	ELEVATION
272.6							
0.0 / 272.3	**TOPSOIL:** 300mm		1	SS	5		272
0.3 / 271.8	**WEATHERED DISTURBED SOIL:** sandy silt, trace clay, trace rootlets, trace gravel, brown, moist, loose						
270.8			2	SS	15		
1.0	**SILTY SAND TO SANDY SILT TILL:** trace clay, trace gravel, brown, moist, compact						271
	CLAYEY SILT TO SILTY CLAY TILL: some sand, trace gravel, brown, moist, stiff to very stiff		3	SS	14		
			4	SS	17		270
	grey below 2.9m		5	SS	11		269
			6	SS	11		268
			7	SS	12		267
			8	SS	18		266
264.4							265
8.2	**END OF BOREHOLE:** Notes: 1) No water observed in borehole upon completion of drilling.						

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × 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

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LOG OF BOREHOLE BH22-9

PROJECT: Geotechnical Investigation
CLIENT: Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.
PROJECT LOCATION: 12909 Kennedy Rd., Caledon, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4846189.91 E 593373.22

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct-28-2022

REF. NO.: 22-371-100
ENCL NO.: 10

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
273.5												
273.2 / 0.0	**TOPSOIL:** 250mm											
0.3 / 272.7	**WEATHERED/DISTURBED SOIL:** silty sand, trace clay, trace organics, trace rootlets, brown, moist, loose		1	SS	5		273					
0.8	**SILTY SAND:** trace clay, brown, moist, loose to compact		2	SS	12							
			3	SS	9		272					0 60 37 3
			4	SS	14		271					
			5	SS	18		270					
	wet below 4.6m		6	SS	21		269					
			7	SS	10		268					
265.7							267					
7.8 / 265.4	**SANDY GRAVEL TO SAND AND GRAVEL:** trace silt, brown, wet, very dense		8	SS	50/ 130mm		266					
8.1	**END OF BOREHOLE:** Notes: 1) Water encountered at 4.6 m depth during drilling.											

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

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

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LOG OF BOREHOLE BH22-10

PROJECT: Geotechnical Investigation
CLIENT: Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.
PROJECT LOCATION: 12909 Kennedy Rd., Caledon, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4846287.34 E 593341.04

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct-28-2022

REF. NO.: 22-371-100
ENCL NO.: 11

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	TYPE	"N" BLOWS 0.3 m	GROUND WATER CONDITIONS	ELEVATION
272.6							
0.0 / 272.3	**TOPSOIL:** 300mm						
0.3 / 271.8	**WEATHERED/DISTURBED SOIL:** sandy silt, some clay to clayey, trace organics, trace rootlets, brown, moist, compact		1	SS	11		272
0.8	**CLAYEY SILT TO SILTY CLAY TILL:** some sand, trace gravel, brown to greyish brown, moist, very stiff to hard		2	SS	25		
			3	SS	26		271
			4	SS	36		270
	grey below 3.1m		5	SS	30		269
			6	SS	17		268
			7	SS	15	W. L. 266.5 m Nov 04, 2022	267
265.9							266
6.7	**END OF BOREHOLE:**						

Notes:
1) 50mm dia. monitoring well installed upon completion.
2) Water Level Readings:

Date:	Water Level(mbgl):
Nov. 4, 2022	6.1

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

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GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

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

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LOG OF BOREHOLE BH22-11

PROJECT: Geotechnical Investigation
CLIENT: Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.
PROJECT LOCATION: 12909 Kennedy Rd., Caledon, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4846440.01 E 593561.37

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct-28-2022

REF. NO.: 22-371-100
ENCL NO.: 12

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	"N" BLOWS 0.3 m	ELEVATION
272.5 / 0.0	**TOPSOIL:** 250mm				
272.2 / 0.3	**WEATHERED/DISTURBED SOIL:** sandy silt, trace clay, trace organics, trace rootlets, brown, moist, loose	1	SS	4	272
271.7 / 0.8	**CLAYEY SILT TO SILTY CLAY TILL:** some sand, trace gravel, brown, moist, very stiff to hard	2	SS	17	
		3	SS	21	271
		4	SS	22	270
	greyish brown@3.1m	5	SS	34	269
	grey below 4.6m	6	SS	25	268
		7	SS	18	267
265.8 / 6.7	**END OF BOREHOLE:**				266

Notes:
1) 50mm dia. monitoring well installed upon completion.
2) Water Level Readings:

Date:	Water Level(mbgl):
Nov. 4, 2022	dry

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × 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

DS SOIL LOG-2021-FINAL 22-371-100 GEO COPY.GPJ DS.GDT 23-1-11

DS CONSULTANTS LTD.
Geotechnical ◆ Environmental ◆ Materials ◆ Hydrogeology

LOG OF BOREHOLE BH22-12

PROJECT: Geotechnical Investigation
CLIENT: Trend Developments Inc. & Trend 12909 Kennedy Developments Inc.
PROJECT LOCATION: 12909 Kennedy Rd., Caledon, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4846489.9 E 593493.3

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Oct-28-2022

REF. NO.: 22-371-100
ENCL NO.: 13

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	TYPE	"N" BLOWS 0.3 m	GROUND WATER CONDITIONS	ELEVATION
272.3							
0.0 / 272.0	**TOPSOIL:** 350mm		1	SS	7		272
0.4 / 271.5	**WEATHERED/DISTURBED SOIL:** sandy silt, trace to some clay, trace organics, trace rootlets, brown, moist, loose						
0.8	**CLAYEY SILT TO SILTY CLAY TILL:** some sand, trace gravel, brown, moist, very stiff to hard		2	SS	32		271
			3	SS	25		
	cobble/boulder@2.3m		4	SS	61		270
	sandy, grey below 3.1m		5	SS	39	▽	269
						W. L. 268.9 m Nov 04, 2022	
			6	SS	18		268
							267
265.6			7	SS	18		266
6.7	**END OF BOREHOLE:**						

Notes:
1) 50mm dia. monitoring well installed upon completion.
2) Water Level Readings:

Date:	Water Level(mbgl):
Nov. 4, 2022	3.47

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × 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
	6	32	40	22

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

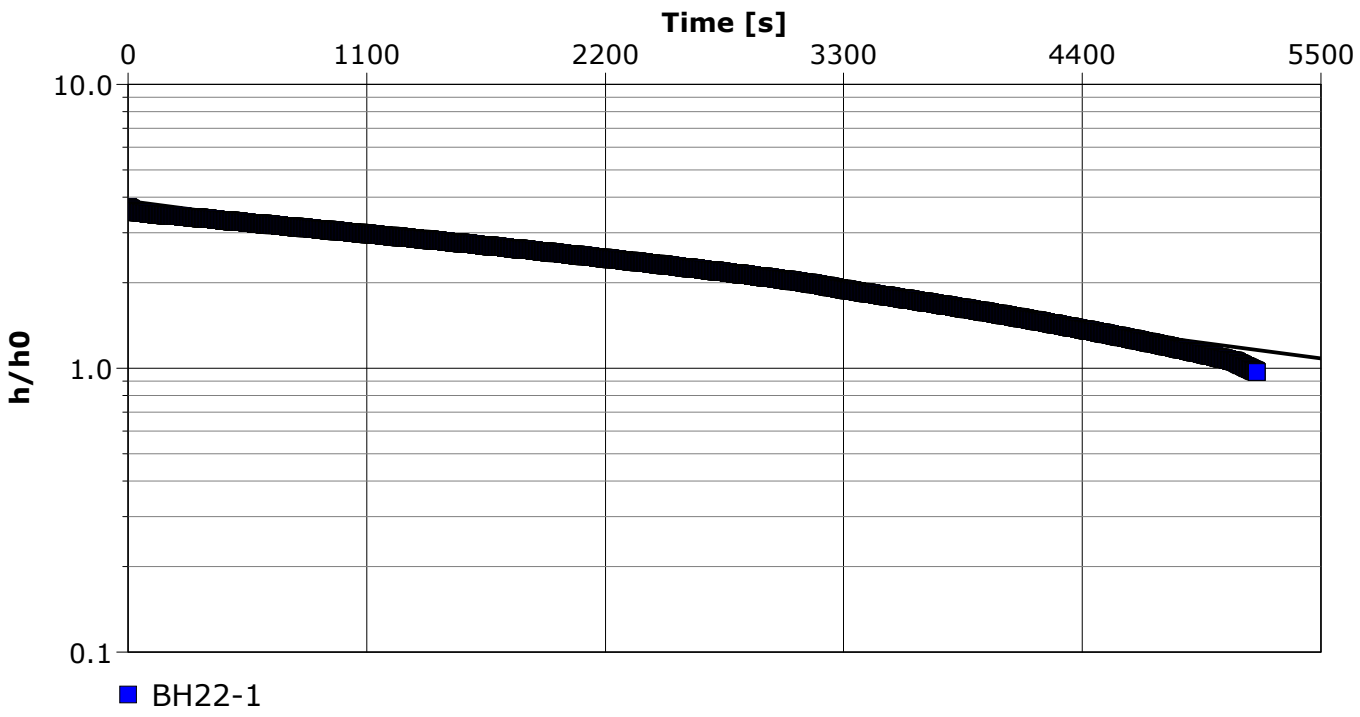
GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

DS SOIL LOG-2021-FINAL 22-371-100 GEO COPY.GPJ DS.GDT 23-1-11

Appendix B

	Slug Test Analysis Report
	Project: 12909 Kennedy Road
	Number: 22-371-100
	Client: Trends Development Inc.

Location: Caledon, ON	Slug Test: BH22-1	Test Well: BH22-1
Test Conducted by: HS		Test Date: 11/11/2022
Analysis Performed by: DS	BH22-1	Analysis Date: 11/17/2022
Aquifer Thickness: 9.34 m		

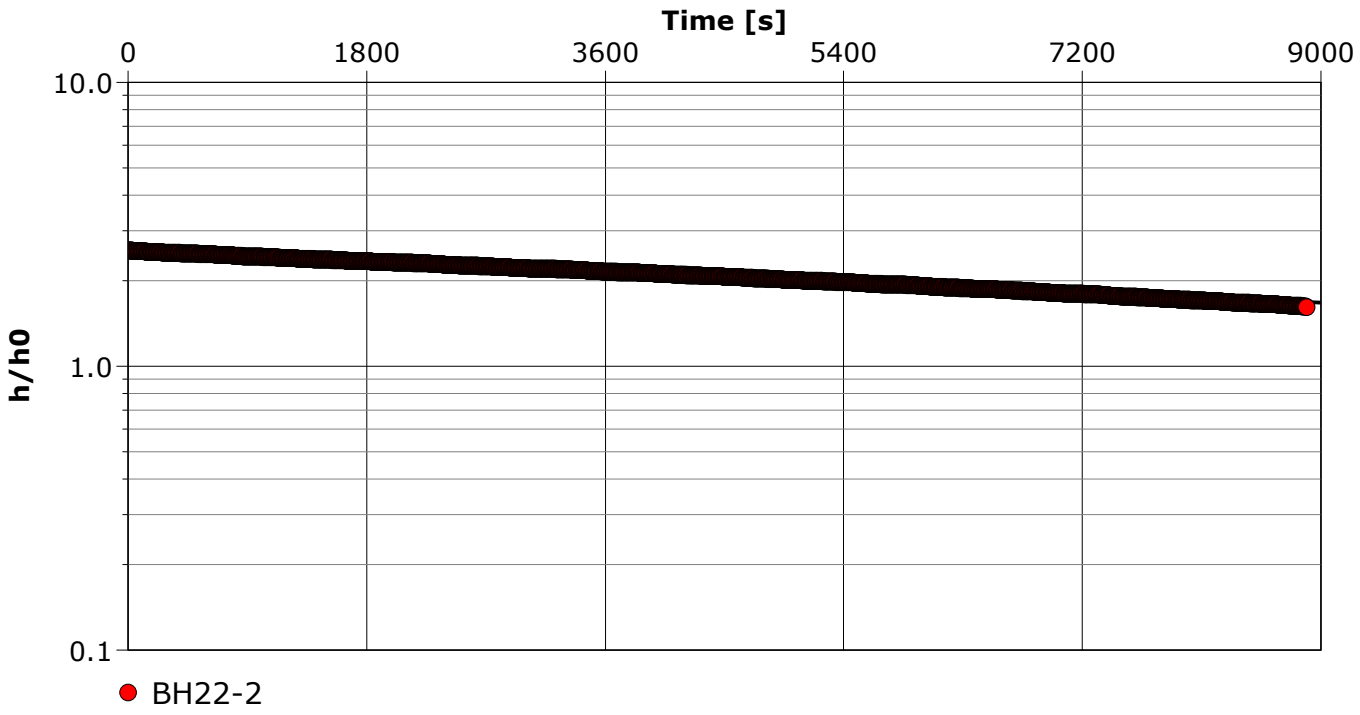


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH22-1	8.25×10^{-8}	

	Slug Test Analysis Report
	Project: 12909 Kennedy Road
	Number: 22-371-100
	Client: Trends Development Inc.

Location: Caledon, ON	Slug Test: BH22-2	Test Well: BH22-2
Test Conducted by: HS		Test Date: 11/11/2022
Analysis Performed by: DS	BH22-2	Analysis Date: 11/15/2022
Aquifer Thickness: 10.00 m		

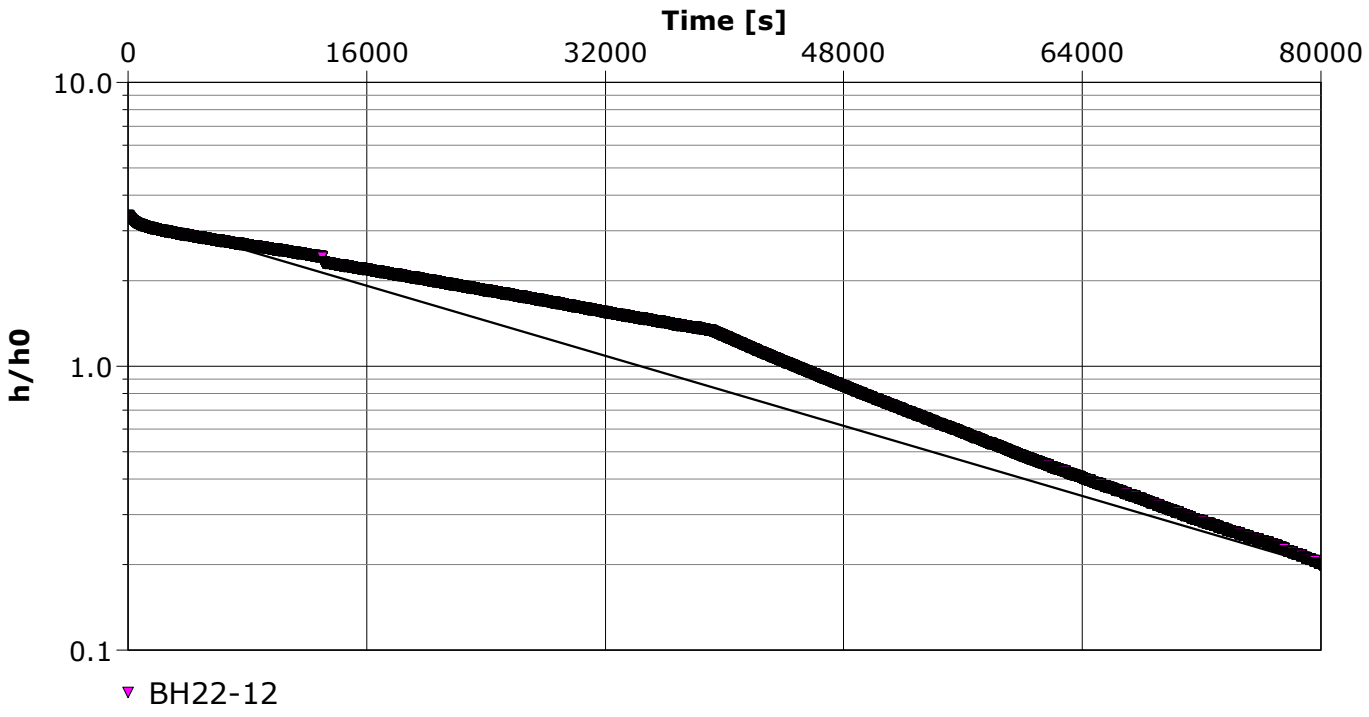


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH22-2	1.77×10^{-8}	

	Slug Test Analysis Report
	Project: 12909 Kennedy Road
	Number: 22-371-100
	Client: Trends Development Inc.

Location: Caledon, ON	Slug Test: BH22-4	Test Well: BH22-12
Test Conducted by: HS		Test Date: 11/11/2022
Analysis Performed by: DS	BH22-4	Analysis Date: 11/17/2022
Aquifer Thickness: 10.00 m		

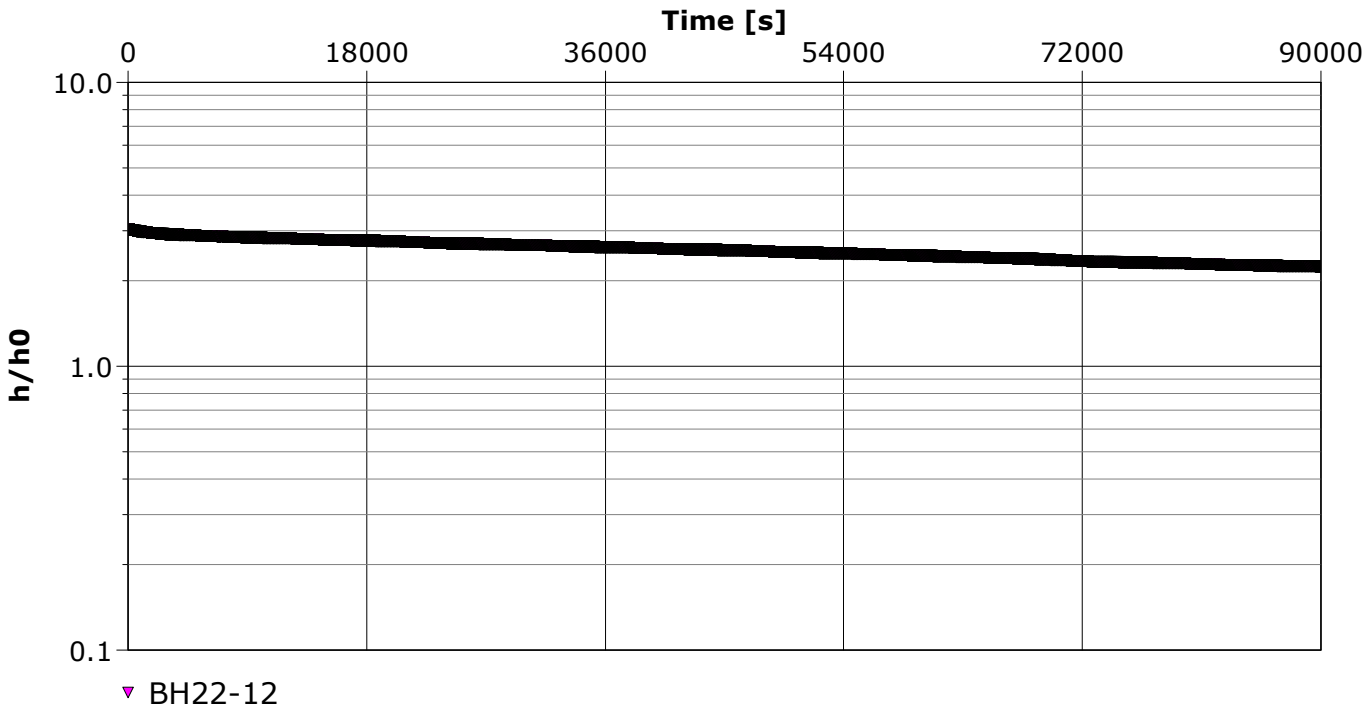


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH22-12	1.38×10^{-8}	

	Slug Test Analysis Report
	Project: 12909 Kennedy Road
	Number: 22-371-100
	Client: Trends Development Inc.

Location: Caledon, ON	Slug Test: BH22-12	Test Well: BH22-12
Test Conducted by: HS		Test Date: 11/11/2022
Analysis Performed by: DS	BH22-12	Analysis Date: 11/17/2022
Aquifer Thickness: 10.00 m		



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH22-12	1.17×10^{-9}	

Appendix C

FINAL REPORT

CA40150-NOV22 R1

22-371-100, 12909 Kennedy Rd, C.aledon L7C 2H1

Prepared for

DS Consultants

FINAL REPORT

First Page

CLIENT DETAILS

Client	DS Consultants
Address	6221 Highway 7 Unit 16 Vaughan, Ontario L4H 0K8. Canada
Contact	Dorothy Santos
Telephone	905-329-2735
Facsimile	905-264-2685
Email	dorothy.santos@dsconsultants.ca
Project	22-371-100, 12909 Kennedy Rd, C.aledon L7C 2H1
Order Number	
Samples	Ground Water (1)

LABORATORY DETAILS

Project Specialist	Maarit Wolfe, Hon.B.Sc
Laboratory	SGS Canada Inc.
Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-652-2000
Facsimile	705-652-6365
Email	Maarit.Wolfe@sgs.com
SGS Reference	CA40150-NOV22
Received	11/10/2022
Approved	11/22/2022
Report Number	CA40150-NOV22 R1
Date Reported	11/22/2022

COMMENTS

RL - SGS Reporting Limit

Temperature of Sample upon Receipt: 9 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: 029837

SIGNATORIES

Maarit Wolfe, Hon.B.Sc

TABLE OF CONTENTS

Client: DS Consultants
Project: 22-371-100, 12909 Kennedy Rd, C.aledon L7C 2H1
Project Manager: Dorothy Santos
Samplers: Chaitanya

MATRIX: WATER

L1 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

L2 = SANSEW / WATER / - - Peel Table 2 - Storm Sewer Discharge - BL_53_2010

Sample Number	8
Sample Name	MW 22-4
Sample Matrix	Ground Water
Sample Date	10/11/2022

Parameter	Units	RL	L1	L2	Result
General Chemistry					
Biochemical Oxygen Demand (BOD5)	mg/L	2	300	15	< 4 ↑
Total Suspended Solids	mg/L	2	350	15	79
Total Kjeldahl Nitrogen	as N mg/L	0.5	100	1	< 0.5
Metals and Inorganics					
Fluoride	mg/L	0.06	10		0.20
Cyanide (total)	mg/L	0.01	2	0.02	< 0.01
Sulphate	mg/L	2	1500		33
Aluminum (total)	mg/L	0.001	50		0.471
Antimony (total)	mg/L	0.0009	5		< 0.0009
Arsenic (total)	mg/L	0.0002	1	0.02	0.0023
Cadmium (total)	mg/L	0.000003	0.7	0.008	0.000009
Chromium (total)	mg/L	0.00008	5	0.08	0.00092
Copper (total)	mg/L	0.0002	3	0.05	0.0010
Cobalt (total)	mg/L	0.000004	5		0.000312
Lead (total)	mg/L	0.00009	3	0.12	0.00027
Manganese (total)	mg/L	0.00001	5	0.05	0.0210
Molybdenum (total)	mg/L	0.00004	5		0.00303
Nickel (total)	mg/L	0.0001	3	0.08	0.0012
Phosphorus (total)	mg/L	0.003	10	0.4	0.026
Selenium (total)	mg/L	0.00004	1	0.02	0.00009
Silver (total)	mg/L	0.00005	5	0.12	< 0.00005
Tin (total)	mg/L	0.00006	5		0.00316

Client: DS Consultants
Project: 22-371-100, 12909 Kennedy Rd, C.aledon L7C 2H1
Project Manager: Dorothy Santos
Samplers: Chaitanya

MATRIX: WATER

Sample Number	8
Sample Name	MW 22-4
Sample Matrix	Ground Water
Sample Date	10/11/2022

L1 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

L2 = SANSEW / WATER / - - Peel Table 2 - Storm Sewer Discharge - BL_53_2010

Parameter	Units	RL	L1	L2	Result
Metals and Inorganics (continued)					
Titanium (total)	mg/L	0.00005	5		0.0118
Zinc (total)	mg/L	0.002	3	0.04	0.002
Microbiology					
E. Coli	cfu/100mL	0		200	0
Nonylphenol and Ethoxylates					
Nonylphenol	mg/L	0.001	0.02		0.001
Nonylphenol Ethoxylates	mg/L	0.01	0.2		< 0.01
Nonylphenol diethoxylate	mg/L	0.01			< 0.01
Nonylphenol monoethoxylate	mg/L	0.01			< 0.01
Oil and Grease					
Oil & Grease (total)	mg/L	2			< 2
Oil & Grease (animal/vegetable)	mg/L	4	150		< 4
Oil & Grease (mineral/synthetic)	mg/L	4	15		< 4

Client: DS Consultants

Project: 22-371-100, 12909 Kennedy Rd, C.aledon L7C 2H1

Project Manager: Dorothy Santos

Samplers: Chaitanya

MATRIX: WATER

Sample Number	8
Sample Name	MW 22-4
Sample Matrix	Ground Water
Sample Date	10/11/2022

L1 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

L2 = SANSEW / WATER / - - Peel Table 2 - Storm Sewer Discharge - BL_53_2010

Parameter	Units	RL	L1	L2	Result
Other (ORP)					
pH	No unit	0.05	10	9	7.87
Mercury (total)	mg/L	0.00001	0.01	0.0004	< 0.00001
PCBs					
Polychlorinated Biphenyls (PCBs) - Total	mg/L	0.0001	0.001	0.0004	< 0.0001
Phenols					
4AAP-Phenolics	mg/L	0.002	1	0.008	< 0.002
SVOCs					
di-n-Butyl Phthalate	mg/L	0.002	0.08	0.015	< 0.002
Bis(2-ethylhexyl)phthalate	mg/L	0.002	0.012	0.0088	< 0.002
VOCs					
Chloroform	mg/L	0.0005	0.04	0.002	< 0.0005
1,2-Dichlorobenzene	mg/L	0.0005	0.05	0.0056	< 0.0005
1,4-Dichlorobenzene	mg/L	0.0005	0.08	0.0068	< 0.0005
cis-1,2-Dichloroethene	mg/L	0.0005	4	0.0056	< 0.0005
trans-1,3-Dichloropropene	mg/L	0.0005	0.14	0.0056	< 0.0005
Methylene Chloride	mg/L	0.0005	2	0.0052	< 0.0005
1,1,2,2-Tetrachloroethane	mg/L	0.0005	1.4	0.017	< 0.0005
Methyl ethyl ketone	mg/L	0.02	8		< 0.02
Styrene	mg/L	0.0005	0.2		< 0.0005
Tetrachloroethylene (perchloroethylene)	mg/L	0.0005	1	0.0044	< 0.0005
Trichloroethylene	mg/L	0.0005	0.4	0.008	< 0.0005

Client: DS Consultants

Project: 22-371-100, 12909 Kennedy Rd, C.aledon L7C 2H1

Project Manager: Dorothy Santos

Samplers: Chaitanya

MATRIX: WATER

Sample Number	8
Sample Name	MW 22-4
Sample Matrix	Ground Water
Sample Date	10/11/2022

L1 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

L2 = SANSEW / WATER / - - Peel Table 2 - Storm Sewer Discharge - BL_53_2010

Parameter	Units	RL	L1	L2	Result
VOCs - BTEX					
Benzene	mg/L	0.0005	0.01	0.002	< 0.0005
Ethylbenzene	mg/L	0.0005	0.16	0.002	< 0.0005
Toluene	mg/L	0.0005	0.27	0.002	< 0.0005
Xylene (total)	mg/L	0.0005	1.4	0.0044	< 0.0005
m-p-xylene	mg/L	0.0005			< 0.0005
o-xylene	mg/L	0.0005			< 0.0005

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010 L1	SANSEW / WATER / - - Peel Table 2 - Storm Sewer Discharge - BL_53_2010 L2
MW 22-4					
Total Suspended Solids	SM 2540D	mg/L	79		15

QC SUMMARY

Anions by discrete analyzer

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Sulphate	DIO5090-NOV22	mg/L	2	<2	1	20	111	80	120	108	75	125

Biochemical Oxygen Demand

Method: SM 5210 | Internal ref.: ME-CA-[ENVIEWL-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Biochemical Oxygen Demand (BOD5)	BOD0021-NOV22	mg/L	2	< 2	1	30	103	70	130	114	70	130

Cyanide by SFA

Method: SM 4500 | Internal ref.: ME-CA-[ENVISFA-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Cyanide (total)	SKA0126-NOV22	mg/L	0.01	<0.01	ND	10	94	90	110	92	75	125

QC SUMMARY

Fluoride by Specific Ion Electrode

Method: SM 4500 I Internal ref.: ME-CA-[ENVIEWL-LAK-AN-014

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Fluoride	EWL0308-NOV22	mg/L	0.06	<0.06	ND	10	95	90	110	84	75	125

Mercury by CVAAS

Method: EPA 7471A/SM 3112B I Internal ref.: ME-CA-[ENVISPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury (total)	EHG0027-NOV22	mg/L	0.00001	< 0.00001	ND	20	92	80	120	125	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (total)	EMS0111-NOV22	mg/L	0.00005	<0.00005	ND	20	100	90	110	104	70	130
Aluminum (total)	EMS0111-NOV22	mg/L	0.001	<0.001	17	20	99	90	110	113	70	130
Arsenic (total)	EMS0111-NOV22	mg/L	0.0002	<0.0002	6	20	100	90	110	125	70	130
Cadmium (total)	EMS0111-NOV22	mg/L	0.000003	<0.000003	1	20	98	90	110	108	70	130
Cobalt (total)	EMS0111-NOV22	mg/L	0.000004	<0.000004	16	20	98	90	110	103	70	130
Chromium (total)	EMS0111-NOV22	mg/L	0.00008	<0.00008	10	20	105	90	110	112	70	130
Copper (total)	EMS0111-NOV22	mg/L	0.0002	<0.0002	11	20	99	90	110	102	70	130
Manganese (total)	EMS0111-NOV22	mg/L	0.00001	<0.00001	13	20	101	90	110	104	70	130
Molybdenum (total)	EMS0111-NOV22	mg/L	0.00004	<0.00004	11	20	96	90	110	96	70	130
Nickel (total)	EMS0111-NOV22	mg/L	0.0001	<0.0001	13	20	100	90	110	93	70	130
Lead (total)	EMS0111-NOV22	mg/L	0.00009	<0.00001	3	20	99	90	110	124	70	130
Phosphorus (total)	EMS0111-NOV22	mg/L	0.003	<0.003	14	20	107	90	110	NV	70	130
Antimony (total)	EMS0111-NOV22	mg/L	0.0009	<0.0009	ND	20	101	90	110	82	70	130
Selenium (total)	EMS0111-NOV22	mg/L	0.00004	<0.00004	0	20	100	90	110	103	70	130
Tin (total)	EMS0111-NOV22	mg/L	0.00006	<0.00006	13	20	93	90	110	NV	70	130
Titanium (total)	EMS0111-NOV22	mg/L	0.00005	<0.00005	18	20	105	90	110	NV	70	130
Zinc (total)	EMS0111-NOV22	mg/L	0.002	<0.002	10	20	99	90	110	114	70	130

QC SUMMARY

Microbiology

Method: SM 9222D | Internal ref.: ME-CA-IENVIMIC-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
E. Coli	BAC9205-NOV22	cfu/100mL	-	ACCEPTED	ACCEPTED							

Nonylphenol and Ethoxylates

Method: ASTM D7065-06 | Internal ref.: ME-CA-IENVIGC-LAK-AN-015

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nonylphenol diethoxylate	GCM0306-NOV22	mg/L	0.01	<0.01			93	55	120			
Nonylphenol Ethoxylates	GCM0306-NOV22	mg/L	0.01	< 0.01								
Nonylphenol monoethoxylate	GCM0306-NOV22	mg/L	0.01	<0.01			92	55	120			
Nonylphenol	GCM0306-NOV22	mg/L	0.001	<0.001			94	55	120			

QC SUMMARY

Oil & Grease

Method: MOE E3401 | Internal ref.: ME-CA-[ENV]GC-LAK-AN-019

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Oil & Grease (total)	GCM0244-NOV22	mg/L	2	<2	NSS	20	104	75	125			

Oil & Grease-AV/MS

Method: MOE E3401/SM 5520F | Internal ref.: ME-CA-[ENV]GC-LAK-AN-019

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Oil & Grease (animal/vegetable)	GCM0244-NOV22	mg/L	4	< 4	NSS	20	NA	70	130			
Oil & Grease (mineral/synthetic)	GCM0244-NOV22	mg/L	4	< 4	NSS	20	NA	70	130			

pH

Method: SM 4500 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0294-NOV22	No unit	0.05	NA	0		100			NA		

QC SUMMARY

Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0140-NOV22	mg/L	0.002	<0.002	ND	10	97	80	120	102	75	125

Polychlorinated Biphenyls

Method: MOE E3400/EPA 8082A | Internal ref.: ME-CA-[ENV]GC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Polychlorinated Biphenyls (PCBs) - Total	GCM0305-NOV22	mg/L	0.0001	<0.0001	NSS	30	105	60	140	NSS	60	140

QC SUMMARY

Semi-Volatile Organics

Method: EPA 3510C/8270D | Internal ref.: ME-CA-[ENV]GC-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Bis(2-ethylhexyl)phthalate	GCM0251-NOV22	mg/L	0.002	< 0.002	NSS	30	111	50	140	NSS	50	140
di-n-Butyl Phthalate	GCM0251-NOV22	mg/L	0.002	< 0.002	NSS	30	105	50	140	NSS	50	140

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0398-NOV22	mg/L	2	< 2	1	10	99	90	110	NA		

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen	SKA0179-NOV22	as N mg/L	0.5	<0.5	2	10	99	90	110	101	75	125

QC SUMMARY

Volatile Organics

Method: EPA 5030B/8260C | Internal ref.: ME-CA-[ENVIGC-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
1,1,2,2-Tetrachloroethane	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	102	60	130	97	50	140
1,2-Dichlorobenzene	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	105	60	130	99	50	140
1,4-Dichlorobenzene	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	102	60	130	98	50	140
Benzene	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	106	60	130	102	50	140
Chloroform	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	104	60	130	100	50	140
cis-1,2-Dichloroethene	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	104	60	130	102	50	140
Ethylbenzene	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	109	60	130	104	50	140
m-p-xylene	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	107	60	130	102	50	140
Methyl ethyl ketone	GCM0295-NOV22	mg/L	0.02	<0.02	ND	30	102	50	140	99	50	140
Methylene Chloride	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	103	60	130	98	50	140
o-xylene	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	108	60	130	103	50	140
Styrene	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	108	60	130	102	50	140
Tetrachloroethylene (perchloroethylene)	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	104	60	130	99	50	140
Toluene	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	106	60	130	101	50	140
trans-1,3-Dichloropropene	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	105	60	130	99	50	140
Trichloroethylene	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	102	60	130	99	50	140

QC SUMMARY

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

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

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

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

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

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

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

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

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

LEGEND

FOOTNOTES

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

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

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

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

This report supersedes all previous versions.

-- End of Analytical Report --

Request for Laboratory Services and CHAIN OF CUSTODY

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

No: 029837 Page 1 of 1

Laboratory Information Section - Lab use only

Received By: Nicole Bigonet
Received Date: Nov / 10 / 22 (mm/dd/yy)
Received Time: 16 : 30 (hr : min)
Received By (signature):
Custody Seal Present: Yes ☑ No ☐
Custody Seal Intact: Yes ☑ No ☐
Cooling Agent Present: Yes ☑ No ☐ Type: Ice
Temperature Upon Receipt (°C) 9 . 9 . 9
LAB LIMS #: CA9050-NOV22

REPORT INFORMATION	INVOICE INFORMATION
Company: DS Consultants Ltd.	☑ (same as Report Information)
Contact: Dorthy Santos	Company:
Address: 6221 Hwy 7, Unit-16, Vaughan, ON	Contact: Accounting
Phone: 905-329-2735	Address:
Fax:	Phone:
Email: dorthy.santos@dsconsultants.ca	Email:

Quotation #: P.O. #:
Project #: 22 371-100 Site Location/ID: 12909 Kennedy Rd, Caledon, ON L7C 2H1

TURNAROUND TIME (TAT) REQUIRED

☑ Regular TAT (5-7days)
TAT's are quoted in business days (exclude statutory holidays & weekends).
Samples received after 6pm or on weekends: TAT begins next business day

RUSH TAT (Additional Charges May Apply): ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days
PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

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

REGULATIONS

☐ O.Reg 153/04 ☐ O.Reg 406/19
☐ Table 1 ☐ Res/Park Soil Texture: ☐ Coarse
☐ Table 2 ☐ Ind/Com ☐ Medium/Fine
☐ Table 3 ☐ Agri/Other
☐ Table _____ Appx. _____
Soil Volume ☐ <350m3 ☐ >350m3

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

Sewer By-Law:
☑ Sanitary
☑ Storm
Municipality: Peel

RECORD OF SITE CONDITION (RSC) ☐ YES ☐ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	M&I: Field Filtered (Y/N)	M&I: Metals & Inorganics (incl CrVI, CN,Hg pH,IB(HWS),EC,SAR–soil) (Cl, Na-water)	M&I: Full Metals Suite ICP metals plus B(HWS-soil only) Hg, CrVI	M&I: ICP Metals only Sb,As,Ba,Be,B,Cd, Cr,Co,Cu,Pb,Mo,Ni,Se,Ag,Tl,U,V,Zn	SVOC: PAHs only	SVOC: SVOCs all incl PAHs, ABNs, CPs	PCB: PCBs Total ☐ Aroclor ☐	PHC: F1-F4 + BTEX	PHC: F1-F4 only no BTEX	VOC: VOCs all incl BTEX	VOC: BTEX only	Pest: Pesticides Organochlorine or specify other	Other: Peel Sanitary / Storm sewer Use	Other: PWQO	Other	Other	Other: Sewer Use: Specify pkg:	Other: Water Characterization Pkg ☐ General ☐ Extended	SPLP: Specify tests ☐ Metals ☐ VOC ☐ 1,4-Dioxane ☐ OCP ☐ ABN	TCLP: Specify tests ☐ M&I ☐ VOC ☐ PCB ☐ B(a)P ☐ ABN ☐ Ignit.	COMMENTS:
1	MW 22-4	Nov 10th, 22	PM	17	GW	N												✓	✓							Non-filtered sample
2																										
3																										
4																										
5																										
6																										
7																										
8																										
9																										
10																										
11																										
12																										

Observations/Comments/Special Instructions

Sampled By (NAME): Chaitanya Signature: Chaitanya Date: 11 / 10 / 22 (mm/dd/yy)
Relinquished by (NAME): Chaitanya Signature: Chaitanya Date: 11 / 10 / 22 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

Revision #: 1.6
Date of Issue: 02 May 2022

FINAL REPORT

CA40150-NOV22 R1

22-371-100, 12909 Kennedy Rd, C.aledon L7C 2H1

Prepared for

DS Consultants

FINAL REPORT

First Page

CLIENT DETAILS

Client	DS Consultants
Address	6221 Highway 7 Unit 16 Vaughan, Ontario L4H 0K8. Canada
Contact	Dorothy Santos
Telephone	905-329-2735
Facsimile	905-264-2685
Email	dorothy.santos@dsconsultants.ca
Project	22-371-100, 12909 Kennedy Rd, C.aledon L7C 2H1
Order Number	
Samples	Ground Water (1)

LABORATORY DETAILS

Project Specialist	Maarit Wolfe, Hon.B.Sc
Laboratory	SGS Canada Inc.
Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-652-2000
Facsimile	705-652-6365
Email	Maarit.Wolfe@sgs.com
SGS Reference	CA40150-NOV22
Received	11/10/2022
Approved	11/22/2022
Report Number	CA40150-NOV22 R1
Date Reported	01/03/2023

COMMENTS

RL - SGS Reporting Limit

Temperature of Sample upon Receipt: 9 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: 029837

SIGNATORIES

Maarit Wolfe, Hon.B.Sc

TABLE OF CONTENTS

Client: DS Consultants
Project: 22-371-100, 12909 Kennedy Rd, C.aledon L7C 2H1
Project Manager: Dorothy Santos
Samplers: Chaitanya

MATRIX: WATER

L1 = PWQO_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Sample Number	8
Sample Name	MW 22-4
Sample Matrix	Ground Water
Sample Date	10/11/2022

Parameter	Units	RL	L1	Result
General Chemistry				
Biochemical Oxygen Demand (BOD5)	mg/L	2		< 4 ↑
Total Suspended Solids	mg/L	2		79
Total Kjeldahl Nitrogen	as N mg/L	0.5		< 0.5
Metals and Inorganics				
Fluoride	mg/L	0.06		0.20
Cyanide (total)	mg/L	0.01		< 0.01
Sulphate	mg/L	2		33
Aluminum (total)	mg/L	0.001		0.471
Antimony (total)	mg/L	0.0009	0.02	< 0.0009
Arsenic (total)	mg/L	0.0002	0.005	0.0023
Cadmium (total)	mg/L	0.000003	0.0001	0.000009
Chromium (total)	mg/L	0.00008	0.1	0.00092
Copper (total)	mg/L	0.0002	0.001	0.0010
Cobalt (total)	mg/L	0.000004	0.0009	0.000312
Lead (total)	mg/L	0.00009	0.005	0.00027
Manganese (total)	mg/L	0.00001		0.0210
Molybdenum (total)	mg/L	0.00004	0.04	0.00303
Nickel (total)	mg/L	0.0001	0.025	0.0012
Phosphorus (total)	mg/L	0.003	0.01	0.026
Selenium (total)	mg/L	0.00004	0.1	0.00009
Silver (total)	mg/L	0.00005	0.0001	< 0.00005
Tin (total)	mg/L	0.00006		0.00316

Client: DS Consultants
Project: 22-371-100, 12909 Kennedy Rd, C.aledon L7C 2H1
Project Manager: Dorothy Santos
Samplers: Chaitanya

MATRIX: WATER

L1 = PWQO_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Sample Number	8
Sample Name	MW 22-4
Sample Matrix	Ground Water
Sample Date	10/11/2022

Parameter	Units	RL	L1	Result
Metals and Inorganics (continued)				
Titanium (total)	mg/L	0.00005		0.0118
Zinc (total)	mg/L	0.002	0.02	0.002
Microbiology				
E. Coli	cfu/100mL	0	100	0
Nonylphenol and Ethoxylates				
Nonylphenol	mg/L	0.001		0.001
Nonylphenol Ethoxylates	mg/L	0.01		< 0.01
Nonylphenol diethoxylate	mg/L	0.01		< 0.01
Nonylphenol monoethoxylate	mg/L	0.01		< 0.01
Oil and Grease				
Oil & Grease (total)	mg/L	2		< 2
Oil & Grease (animal/vegetable)	mg/L	4		< 4
Oil & Grease (mineral/synthetic)	mg/L	4		< 4

Client: DS Consultants
Project: 22-371-100, 12909 Kennedy Rd, C.aledon L7C 2H1
Project Manager: Dorothy Santos
Samplers: Chaitanya

MATRIX: WATER

L1 = PWQO_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Sample Number	8
Sample Name	MW 22-4
Sample Matrix	Ground Water
Sample Date	10/11/2022

Parameter	Units	RL	L1	Result
Other (ORP)				
pH	No unit	0.05	8.6	7.87
Mercury (total)	mg/L	0.00001	0.0002	< 0.00001
PCBs				
Polychlorinated Biphenyls (PCBs) - Total	mg/L	0.0001		< 0.0001
Phenols				
4AAP-Phenolics	mg/L	0.002	0.001	< 0.002
SVOCs				
di-n-Butyl Phthalate	mg/L	0.002		< 0.002
Bis(2-ethylhexyl)phthalate	mg/L	0.002		< 0.002
VOCs				
Chloroform	mg/L	0.0005		< 0.0005
1,2-Dichlorobenzene	mg/L	0.0005		< 0.0005
1,4-Dichlorobenzene	mg/L	0.0005		< 0.0005
cis-1,2-Dichloroethene	mg/L	0.0005		< 0.0005
trans-1,3-Dichloropropene	mg/L	0.0005		< 0.0005
Methylene Chloride	mg/L	0.0005	0.1	< 0.0005
1,1,2,2-Tetrachloroethane	mg/L	0.0005	0.07	< 0.0005
Methyl ethyl ketone	mg/L	0.02		< 0.02
Styrene	mg/L	0.0005		< 0.0005
Tetrachloroethylene (perchloroethylene)	mg/L	0.0005	0.05	< 0.0005
Trichloroethylene	mg/L	0.0005	0.02	< 0.0005

Client: DS Consultants

Project: 22-371-100, 12909 Kennedy Rd, C.aledon L7C 2H1

Project Manager: Dorothy Santos

Samplers: Chaitanya

MATRIX: WATER

L1 = PWQO_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Sample Number	8
Sample Name	MW 22-4
Sample Matrix	Ground Water
Sample Date	10/11/2022

VOCs - BTEX

Parameter	Units	RL	L1	Result
Benzene	mg/L	0.0005	0.1	< 0.0005
Ethylbenzene	mg/L	0.0005	0.008	< 0.0005
Toluene	mg/L	0.0005	0.0008	< 0.0005
Xylene (total)	mg/L	0.0005		< 0.0005
m-p-xylene	mg/L	0.0005	0.002	< 0.0005
o-xylene	mg/L	0.0005	0.04	< 0.0005

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	PWQO_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E L1
MW 22-4				
Phosphorus	SM 3030/EPA 200.8	mg/L	0.026	0.01
4AAP-Phenolics	SM 5530B-D	mg/L	< 0.002	0.001

QC SUMMARY

Anions by discrete analyzer

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Sulphate	DIO5090-NOV22	mg/L	2	<2	1	20	111	80	120	108	75	125

Biochemical Oxygen Demand

Method: SM 5210 | Internal ref.: ME-CA-[ENVIEWL-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Biochemical Oxygen Demand (BOD5)	BOD0021-NOV22	mg/L	2	< 2	1	30	103	70	130	114	70	130

Cyanide by SFA

Method: SM 4500 | Internal ref.: ME-CA-[ENVISFA-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Cyanide (total)	SKA0126-NOV22	mg/L	0.01	<0.01	ND	10	94	90	110	92	75	125

QC SUMMARY

Fluoride by Specific Ion Electrode

Method: SM 4500 I Internal ref.: ME-CA-[ENVIEWL-LAK-AN-014

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Fluoride	EWL0308-NOV22	mg/L	0.06	<0.06	ND	10	95	90	110	84	75	125

Mercury by CVAAS

Method: EPA 7471A/SM 3112B I Internal ref.: ME-CA-[ENVISPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury (total)	EHG0027-NOV22	mg/L	0.00001	< 0.00001	ND	20	92	80	120	125	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (total)	EMS0111-NOV22	mg/L	0.00005	<0.00005	ND	20	100	90	110	104	70	130
Aluminum (total)	EMS0111-NOV22	mg/L	0.001	<0.001	17	20	99	90	110	113	70	130
Arsenic (total)	EMS0111-NOV22	mg/L	0.0002	<0.0002	6	20	100	90	110	125	70	130
Cadmium (total)	EMS0111-NOV22	mg/L	0.000003	<0.000003	1	20	98	90	110	108	70	130
Cobalt (total)	EMS0111-NOV22	mg/L	0.000004	<0.000004	16	20	98	90	110	103	70	130
Chromium (total)	EMS0111-NOV22	mg/L	0.00008	<0.00008	10	20	105	90	110	112	70	130
Copper (total)	EMS0111-NOV22	mg/L	0.0002	<0.0002	11	20	99	90	110	102	70	130
Manganese (total)	EMS0111-NOV22	mg/L	0.00001	<0.00001	13	20	101	90	110	104	70	130
Molybdenum (total)	EMS0111-NOV22	mg/L	0.00004	<0.00004	11	20	96	90	110	96	70	130
Nickel (total)	EMS0111-NOV22	mg/L	0.0001	<0.0001	13	20	100	90	110	93	70	130
Lead (total)	EMS0111-NOV22	mg/L	0.00009	<0.00001	3	20	99	90	110	124	70	130
Phosphorus (total)	EMS0111-NOV22	mg/L	0.003	<0.003	14	20	107	90	110	NV	70	130
Antimony (total)	EMS0111-NOV22	mg/L	0.0009	<0.0009	ND	20	101	90	110	82	70	130
Selenium (total)	EMS0111-NOV22	mg/L	0.00004	<0.00004	0	20	100	90	110	103	70	130
Tin (total)	EMS0111-NOV22	mg/L	0.00006	<0.00006	13	20	93	90	110	NV	70	130
Titanium (total)	EMS0111-NOV22	mg/L	0.00005	<0.00005	18	20	105	90	110	NV	70	130
Zinc (total)	EMS0111-NOV22	mg/L	0.002	<0.002	10	20	99	90	110	114	70	130

QC SUMMARY

Microbiology

Method: SM 9222D | Internal ref.: ME-CA-IENVIMIC-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
E. Coli	BAC9205-NOV22	cfu/100mL	-	ACCEPTED	ACCEPTED							

Nonylphenol and Ethoxylates

Method: ASTM D7065-06 | Internal ref.: ME-CA-IENVIGC-LAK-AN-015

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nonylphenol diethoxylate	GCM0306-NOV22	mg/L	0.01	<0.01			93	55	120			
Nonylphenol Ethoxylates	GCM0306-NOV22	mg/L	0.01	< 0.01								
Nonylphenol monoethoxylate	GCM0306-NOV22	mg/L	0.01	<0.01			92	55	120			
Nonylphenol	GCM0306-NOV22	mg/L	0.001	<0.001			94	55	120			

QC SUMMARY

Oil & Grease

Method: MOE E3401 | Internal ref.: ME-CA-[ENV]GC-LAK-AN-019

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Oil & Grease (total)	GCM0244-NOV22	mg/L	2	<2	NSS	20	104	75	125			

Oil & Grease-AV/MS

Method: MOE E3401/SM 5520F | Internal ref.: ME-CA-[ENV]GC-LAK-AN-019

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Oil & Grease (animal/vegetable)	GCM0244-NOV22	mg/L	4	< 4	NSS	20	NA	70	130			
Oil & Grease (mineral/synthetic)	GCM0244-NOV22	mg/L	4	< 4	NSS	20	NA	70	130			

pH

Method: SM 4500 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0294-NOV22	No unit	0.05	NA	0		100			NA		

QC SUMMARY

Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0140-NOV22	mg/L	0.002	<0.002	ND	10	97	80	120	102	75	125

Polychlorinated Biphenyls

Method: MOE E3400/EPA 8082A | Internal ref.: ME-CA-[ENV]GC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Polychlorinated Biphenyls (PCBs) - Total	GCM0305-NOV22	mg/L	0.0001	<0.0001	NSS	30	105	60	140	NSS	60	140

QC SUMMARY

Semi-Volatile Organics

Method: EPA 3510C/8270D | Internal ref.: ME-CA-[ENV]GC-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Bis(2-ethylhexyl)phthalate	GCM0251-NOV22	mg/L	0.002	< 0.002	NSS	30	111	50	140	NSS	50	140
di-n-Butyl Phthalate	GCM0251-NOV22	mg/L	0.002	< 0.002	NSS	30	105	50	140	NSS	50	140

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0398-NOV22	mg/L	2	< 2	1	10	99	90	110	NA		

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen	SKA0179-NOV22	as N mg/L	0.5	<0.5	2	10	99	90	110	101	75	125

QC SUMMARY

Volatile Organics

Method: EPA 5030B/8260C | Internal ref.: ME-CA-[ENVIGC-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
1,1,2,2-Tetrachloroethane	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	102	60	130	97	50	140
1,2-Dichlorobenzene	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	105	60	130	99	50	140
1,4-Dichlorobenzene	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	102	60	130	98	50	140
Benzene	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	106	60	130	102	50	140
Chloroform	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	104	60	130	100	50	140
cis-1,2-Dichloroethene	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	104	60	130	102	50	140
Ethylbenzene	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	109	60	130	104	50	140
m-p-xylene	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	107	60	130	102	50	140
Methyl ethyl ketone	GCM0295-NOV22	mg/L	0.02	<0.02	ND	30	102	50	140	99	50	140
Methylene Chloride	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	103	60	130	98	50	140
o-xylene	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	108	60	130	103	50	140
Styrene	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	108	60	130	102	50	140
Tetrachloroethylene (perchloroethylene)	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	104	60	130	99	50	140
Toluene	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	106	60	130	101	50	140
trans-1,3-Dichloropropene	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	105	60	130	99	50	140
Trichloroethylene	GCM0295-NOV22	mg/L	0.0005	<0.0005	ND	30	102	60	130	99	50	140

QC SUMMARY

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

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

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

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

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

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

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

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

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

LEGEND

FOOTNOTES

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

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

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

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

This report supersedes all previous versions.

-- End of Analytical Report --

Request for Laboratory Services and CHAIN OF CUSTODY

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

No: 029837 Page 1 of 1

Laboratory Information Section - Lab use only

Received By: Nicole Bigonet
Received Date: Nov / 10 / 22 (mm/dd/yy)
Received Time: 16 : 30 (hr : min)
Received By (signature):
Custody Seal Present: Yes ☑ No ☐
Custody Seal Intact: Yes ☑ No ☐
Cooling Agent Present: Yes ☑ No ☐ Type: Ice
Temperature Upon Receipt (°C) 9 . 9 . 9
LAB LIMS #: CA9050-NOV22

REPORT INFORMATION	INVOICE INFORMATION
Company: DS Consultants Ltd.	☑ (same as Report Information)
Contact: Dorthy Santos	Company:
Address: 6221 Hwy 7, Unit-16, Vaughan, ON	Contact: Accounting
Phone: 905-329-2735	Address:
Fax:	Phone:
Email: dorthy.santos@dsconsultants.ca	Email:

Quotation #: P.O. #:
Project #: 22 371-100 Site Location/ID: 12909 Kennedy Rd, Caledon, ON L7C 2H1

TURNAROUND TIME (TAT) REQUIRED

☑ Regular TAT (5-7days)
TAT's are quoted in business days (exclude statutory holidays & weekends).
Samples received after 6pm or on weekends: TAT begins next business day

RUSH TAT (Additional Charges May Apply): ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days
PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

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

REGULATIONS

☐ O.Reg 153/04 ☐ O.Reg 406/19
☐ Table 1 ☐ Res/Park Soil Texture: ☐ Coarse
☐ Table 2 ☐ Ind/Com ☐ Medium/Fine
☐ Table 3 ☐ Agri/Other
☐ Table _____ Appx. _____
Soil Volume ☐ <350m3 ☐ >350m3

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

Sewer By-Law:
☑ Sanitary
☑ Storm
Municipality: Peel

RECORD OF SITE CONDITION (RSC) ☐ YES ☐ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	M&I: Field Filtered (Y/N)	M&I: Metals & Inorganics (incl CrVI, CN,Hg pH,IB(HWS),EC,SAR–soil) (Cl, Na-water)	M&I: Full Metals Suite ICP metals plus B(HWS-soil only) Hg, CrVI	M&I: ICP Metals only Sb,As,Ba,Be,B,Cd, Cr,Co,Cu,Pb,Mo,Ni,Se,Ag,Tl,U,V,Zn	SVOC: PAHs only	SVOC: SVOCs all incl PAHs, ABNs, CPs	PCB: PCBs Total ☐ Aroclor ☐	PHC: F1-F4 + BTEX	PHC: F1-F4 only no BTEX	VOC: VOCs all incl BTEX	VOC: BTEX only	Pest: Pesticides Organochlorine or specify other	Other: Peel Sanitary / Storm sewer Use	Other: PWQO	Other	Other	Other: Sewer Use: Specify pkg:	Other: Water Characterization Pkg ☐ General ☐ Extended	SPLP: Specify tests ☐ Metals ☐ VOC ☐ 1,4-Dioxane ☐ OCP ☐ ABN	TCLP: Specify tests ☐ M&I ☐ VOC ☐ PCB ☐ B(a)P ☐ ABN ☐ Ignit.	COMMENTS:
1	MW 22-4	Nov 10th, 22	PM	17	GW	N												✓	✓							Non-filtered sample
2																										
3																										
4																										
5																										
6																										
7																										
8																										
9																										
10																										
11																										
12																										

Observations/Comments/Special Instructions

Sampled By (NAME): Chaitanya Signature: Chaitanya Date: 11 / 10 / 22 (mm/dd/yy)
Relinquished by (NAME): Chaitanya Signature: Chaitanya Date: 11 / 10 / 22 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

Revision #: 1.6
Date of Issue: 02 May 2022

Appendix D

MECP Water Well Record Search (500 m) - 12909 Kennedy Road, Caledon, ON

TOWNSHIP	UTM	E	N	DATE CNTR	CASING	WATER	PUMP TEST	WELL USE	SCREEN	WELL	WELL TAG	FORMATION
CALEDON TOWN (CHINGU	17 W	594004	4845521	2013/11 7472	2.04			MO	0020 10	7212546	(Z182844) A158951	BRWN MSND GRVL PCKD 0005 GREY CLAY SILT PCKD 0030
CALEDON TOWN (CHINGU HS E 02 023	17 W	593614	4846783	1968/05 4813	5	FR 0170	40/45/10/4:0	ST DO		4903090		BLCK LOAM 0004 BRWN CLAY 0023 BLUE CLAY 0087 SILT 0170 GRVL 0180
CALEDON TOWN (CHINGU	17 W	594089	4845614	2011/06 6875				NU		7167949	(Z117944) A	
CALEDON TOWN (CHINGU HS E 02 023	17 W	593460	4846500	1999/09 2576	1	FR 0167	20//1/1:30	DO	0164 3	4908483		BRWN SAND 0002 BRWN CLAY 0008 GREY CLAY 0143 GREY CLAY GRVL 0161 GREY SILT GRVL 0170 GREY LMSN SHLE 0218
CALEDON TOWN (CHINGU	17 W	593926	4845378	2013/11 7472						7212552	(Z182847) A	
CALEDON TOWN (CHINGU HS E 02 023	17 W	593584	4846455	1988/12 3513	6	0060 FR 01	18/150/4/4:0	DO		4906999		BRWN LOAM 0001 BRWN CLAY SAND 0010 BLUE CLAY SAND LYRD 0060 BLUE FGVL SNDY 0065 BLUE CLAY STNS SLTY 0160 BLUE SHLE 0175
CALEDON TOWN (CHINGU	17 W	593275	4846251	2008/11 1663	2	FR 0012	5///:	MO	0022 10	7118904	(Z94055) A075114	BRWN SAND GRVL FILL 0006 GREY CLAY GRVL 0012 GREY CLAY SAND GRVL 0018 BRWN FSND SILT 0024 GREY CLAY 0024 BRWN SAND SILT 0032 GREY CLAY 0033
CALEDON TOWN (CHINGU HS E 02 023	17 L	593487	4846984	2003/08 6865	6	FR 0162	57/88/8/1:0	DO	0159 3	4909235		BRWN LOAM 0001 BRWN CLAY 0003 BRWN CLAY GRVL TILL 0074 GREY HPAN 0085 GREY CLAY TILL 0147 GREY GRVL CLAY 0162
CALEDON TOWN (CHINGU	17 W	594043	4845595	2011/06 6875				NU		7167948	(Z117942) A	
CALEDON TOWN (CHINGU HS E 02 023	17 W	593722	4846818	1967/06 4813	5	FR 0153	30/144/4/3:0	DO	0155 4	4901252		BRWN CLAY 0030 SILT 0088 BLUE CLAY 0130 SILT 0153 MSND 0159
CALEDON TOWN (CHINGU	17 W	593871	4845583	2015/08 7215						7271538	(C29381) A184521 P	
CALEDON TOWN (CHINGU	17 W	593806	4845618	2016/08 6607	2			MO	0007 10	7290619	(Z229203) A202717	BRWN SAND GRVL FILL 0006 BRWN SAND SILT SOFT 0012 GREY SILT SAND DNSE 0017
CALEDON TOWN (CHINGU	17 W	593779	4845618	2016/08 6607	2			MO	0010 10	7290618	(Z229204) A202721	BRWN SAND GRVL FILL 0006 BRWN SAND SILT SOFT 0012 GREY SILT SAND DNSE 0020
CALEDON TOWN (CHINGU	17 W	593563	4845826	2016/12 7215						7286161	(C35191) A223828 P	
CALEDON TOWN (CHINGU	17 W	594024	4845492	2016/10 7437	2	27			0030 5	7285488	(Z239295) A209694	BRWN CLAY GRVL WBRG 0005 GREY CLAY GRVL WBRG 0010 BRWN SILT GRVL WBRG 0035 GREY SILT CLYY WBRG
CALEDON TOWN (CHINGU	17 W	593736	4846609	2016/02 7464						7262442	(C31023) A197001 P	
CALEDON TOWN (CHINGU	17 W	593561	4845424	2013/09 7247	2	UT 0005		MT	0030 5	7215267	(Z176655) A152926	BRWN SAND SILT 0010 GREY SILT SAND 0015 GREY SILT CLAY 0027 GREY SAND SILT DNSE 0032 GREY SILT CLAY DNSE 0035
CALEDON TOWN (CHINGU	17 W	593821	4845618	2016/08 6607	2			MO	0010 10	7290653	(Z299202) A202722	BRWN SAND GRVL FILL 0006 BRWN SAND SILT SOFT 0012 GREY SILT SAND DNSE 0020
CALEDON TOWN (CHINGU HS E 01 021	17 W	593743	4845440	7147	1.97	UT 0007			0005 10	7290444	(Z254977) A	
CALEDON TOWN (CHINGU HS E 01 021	17 W	593836	4845511	7147	5	UT 0002			0002 3	7290445	(Z254978) A	
CALEDON TOWN (CHINGU HS E 01 021	17 W	593636	4845490	1989/06 4919	30	UK 0020	20/40/10/1:0	DO		4907184		BRWN LOAM HARD 0001 BRWN CLAY SAND PCKD 0050 RED CLAY HARD 0060
CALEDON TOWN (CHINGU HS E 01 021	17 W	593683	4845737	6409						7266773	(Z232584) A158864 A	
CALEDON TOWN (CHINGU HS E 01 021	17 W	593814	4845623	1969/06 1307	30	FR 0027	///:	DO		4903248		BRWN LOAM 0010 GREY CLAY 0025 CSND 0027
CALEDON TOWN (CHINGU HS E 01 021	17 W	593852	4845581	7147	1.97	UT 0009			0003 8	7290443	(Z254983) A	
CALEDON TOWN (CHINGU HS E 01 021	17 W	593784	4845621	1958/03 3514	4 4	FR 0120	80/80/4/4:0	DO		4901118		LOAM CLAY 0010 BLUE CLAY STNS 0080 GRVL 0086 RED SHLE 0120
CALEDON TOWN (CHINGU HS E 01 021	17 W	593834	4845455	1967/10 1325	30	FR 0036	25/38/1/0:30	ST DO		4901119		LOAM 0002 BRWN CLAY 0006 GREY CLAY 0010 BLUE CLAY 0022 BLDR MSND 0024 HPAN 0036 MSND 0037 BLUE CLAY 0040
CALEDON TOWN (CHINGU HS E 01 021	17 W	593674	4845708	2011/04 4645	36			DO		7165504		
CALEDON TOWN (CHINGU HS E 01 021	17 W	593824	4845623	1977/06 4919	30 30	0020 UK 0	20/50//0:30	DO		4905186		BRWN LOAM HARD 0001 BRWN CLAY HARD 0010 GREY CLAY HARD 0030 GREY SAND SOFT 0040 GREY CLAY HARD 0058
CALEDON TOWN (CHINGU HS E 01 022	17 W	593156	4846111	1973/07 3637	30	0012 FR 00	7/19/7/1:0	DO		4904302		BRWN LOAM 0001 BRWN SAND 0003 GREY CLAY SNDS 0024 GREY SAND CLAY 0034
CALEDON TOWN (CHINGU HS E 01 022	17 W	593177	4846051	1998/08 6282	8 6	FR 0090	11/25/10/4:0	DO		4908419		BLCK LOAM 0001 BRWN CLAY SAND 0013 GREY CLAY GRVL 0046 GREY FSND GRVL CLAY 0077 RED CLAY GRVL 0089 BLUE MGVL 0093
CALEDON TOWN (CHINGU HS E 01 023	17 W	593114	4846273	1980/09 3513	5	FR 0108	22/35/10/4:0	DO		4905689		PRDG 0020 BRWN SAND 0028 GREY SAND CLAY LYRD 0060 GREY GRVL CLAY LYRD 0080 GREY GRVL HARD VERY 0108 RED GRVL LTCL 0110
CALEDON TOWN (CHINGU HS E 01 023	17 W	593076	4846048	1990/09 2918	6	FR 0082	31/52/8/9:0	DO		4907482		BRWN SAND STNS 0021 BRWN CLAY SAND 0079 BRWN GRVL SAND 0082
CALEDON TOWN (CHINGU HS E 01 023	17 W	593036	4846117	1973/12 4919	36 30	UK 0016	20/39/0/1:0	DO		4904316		BRWN LOAM 0001 BRWN SAND 0020 GREY CLAY 0042
CALEDON TOWN (CHINGU HS E 01 023	17 W	593215	4846281	2008/11 1663	2	UT 0012	1///:	MO	0016 10	7118903	(Z94054) A075113	BRWN SAND GRVL FILL 0006 BRWN FSND GRVL 0007 BRWN LOAM 0008 BRWN FSND GRVL 0012 GREY FSND SILT 0018 GREY FSND CLAY GRVL 0028
CALEDON TOWN (CHINGU HS E 02 021	17 L	594371	4846107	2001/11 7143	8 6	FR 0141	66/108/3/8:0	DO	0139 4	4908885		BRWN LOAM 0002 BLCK CLAY 0010 BRWN CLAY GRVL MSND 0040 BRWN SAND 0045 GREY SAND 0056 GREY CLAY SAND GRVL 0120 GREN CLAY SAND HARD 0141 GREY CSND CGVL 0145
CALEDON TOWN (CHINGU HS E 02 021	17 L	594371	4846107	2000/05 3132	6 6	FR 0170	49/89/10/6:	DO		4908728		BRWN CLAY STNS DNSE 0012 BLUE CLAY STNS DNSE 0057 BLUE CLAY STNS SAND 0110 BLUE SILT LOOS 0135 BLUE CLAY STNS DNSE 0175
CALEDON TOWN (CHINGU HS E 02 022	17 W	593389	4846288	2010/11 7407	11.8		28///:	DO		7154800	(Z50908) A100864	
CALEDON TOWN (CHINGU HS E 02 022	17 W	593712	4846808	1967/06 1612	6					4901247		LOAM 0001 BLUE CLAY 0060 GRVL 0061 CLAY MSND 0093
CALEDON TOWN (CHINGU HS E 02 022	17 W	593354	4846304	1967/05 4102	30	FR 0025	//4/:	DO		4901248		BRWN CLAY 0005 BLUE CLAY 0025 FSND 0027
CALEDON TOWN (CHINGU HS E 02 022	17 W	593486	4846510	1998/07 6782	8 6	FR 0170	63/140/2/14:30	DO		4908415		BRWN CLAY FGVL 0023 GREY CLAY MSND LYRD 0123 GREY FGVL CLAY 0170 GREY LMSN 0170
CALEDON TOWN (CHINGU HS E 02 022	17 W	593570	4846107	2006/07 4011	0.34		25///:			4910274	(Z49731) A	
CALEDON TOWN (CHINGU HS E 02 022	17 W	593541	4846095	2010/11 7407	11.8		88///:	DO		7154801	(Z50907) A100863	

CALEDON TOWN (CHINGU HS E 02 022	17 W	593912	4846793	2009/08 6809	2 2			MT		7133198	(M04964) A084309	BRWN SAND STNS 0012 GREY TILL SLTY 0017 GREY CLAY SILT 0030
CALEDON TOWN (CHINGU HS E 02 022	17 W	593520	4846512	2013/10 7147	5.9	FR 0010				7211281	(Z180492) A	
CALEDON TOWN (CHINGU HS E 02 022	17 W	593764	4846763	1969/07 4919	30	FR 0054	15//1/1:0	DO		4903183		BRWN LOAM 0004 GREY CLAY STNS 0056 GREY QSND CLAY 0057
CALEDON TOWN (CHINGU HS E 02 022	17 W	593302	4846314	1990/08 4919	30	UK 0040	20/40/10/1:0	DO		4907415		BRWN SAND HARD 0001 BRWN CLAY HARD 0020 GREY CLAY SAND LOOS 0060
CALEDON TOWN (CHINGU HS E 02 022	17 W	593844	4846843	1969/09 4919	30	FR 0053	40//0/24:0	DO		4903331		BRWN CLAY STNS 0012 BLUE CLAY 0052 GREY CLAY QSND GRVL 0053
CALEDON TOWN (CHINGU HS E 02 022	17 W	594314	4846773	1970/11 3612	30	FR 0045	27/43/3/1:0	ST		4903503		BRWN LOAM 0002 BRWN CLAY STNS 0040 GREY CLAY MSND 0045 GREY GRVL MSND 0050
CALEDON TOWN (CHINGU HS E 02 022	17 W	594262	4846240	1995/08 3903						4908055		BRWN CLAY STNS SNDY 0016 BRWN CLAY STNS LYRD 0052 GREY GRVL SILT LYRD 0059 GREY CLAY STNS HARD 0067 GREY GRVL SAND HARD 0078 GREY CLAY STNS SNDY 0082 BRWN FSND SILT LYRD 0097 GREY CLAY STNS HARD 0099 GREY SAND CLN LOOS 0102 GREY SAND SILT PCKD 0122 GREY
CALEDON TOWN (CHINGU HS E 02 022	17 W	593412	4846306	1992/03 4919	30	UK 0020	15/25/10/1:0	DO		4907656		BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY SAND PCKD 0051
CALEDON TOWN (CHINGU HS E 02 022	17 W	593326	4846302	1991/06 4919	30	UK 0060	20/40/10/1:0	DO		4907553		BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY HARD 0060 GREY SAND LOOS 0080
CALEDON TOWN (CHINGU HS E 02 023	17 W	593458	4846611	1958/09 1325	30	FR 0040	30//:	ST DO		4901250		BRWN CLAY 0015 BLUE CLAY 0040
CALEDON TOWN (CHINGU HS E 02 023	17 W	593264	4846403	1970/12 3637	30	FR 0032	20/30//:	DO		4903581		BRWN LOAM 0001 BRWN MSND 0004 GREY CLAY 0032 BLCK CSND 0033
CALEDON TOWN (CHINGU HS E 02 023	17 W	593572	4846824	1991/07 2918	6 6	FR 0165	2/54/5/18:30	DO		4907562		BRWN SAND 0024 GREY CLAY SNDS 0038 GREY CLAY 0049 GREY CLAY SAND 0087 GREY SILT 0102 GREY SAND 0154 GREY SILT CLAY GRVL 0162 GREY SAND GRVL 0165 GREY SHLE 0170
CALEDON TOWN (CHINGU HS E 02 023	17 W	592966	4846593	1967/05 3903	30	FR 0029	17//3/:	DO		4901254		BRWN CLAY 0015 BLUE CLAY 0029 MSND 0030
CALEDON TOWN (CHINGU HS E 02 023	17 W	593212	4846313	2008/11 1663	6	UT 0016	4/22/6/8:0	TH	0016 10	7118901	(Z94052) A075115	BRWN SAND GRVL FILL 0003 BLCK LOAM GRVL SAND 0006 GREY CLAY GRVL 0007 BRWN LOAM 0008 BRWN FSND GRVL CLAY 0012 BRWN FSND 0026 GREY CLAY SILT 0028
CALEDON TOWN (CHINGU HS E 02 023	17 W	593126	4846529	1967/05 3903	30	FR 0014	//3/:	DO		4901253		BRWN CLAY 0008 BLUE CLAY 0014 MSND 0015
CALEDON TOWN (CHINGU HS E 02 023	17 W	593196	4846340	2008/11 1663	2	UT 0008	4///:	MT	0016 10	7118902	(Z94053) A075112	BRWN SAND GRVL FILL 0003 BRWN SAND GRVL 0008 BRWN FSND GRVL CLAY 0012 GREY FSND 0018 GREY FSND CLAY SILT 0024 GREY CLAY SILT 0028
CALEDON TOWN (CHINGU HS E 02 023	17 W	593666	4846822	1967/05 1612	5	FR 0172	27/42/5/2:0	ST DO		4901251		LOAM 0001 BLUE CLAY STNS 0148 MSND GRVL 0172 GRVL 0182
CALEDON TOWN (CHINGU HS E 02 023	17 W	593418	4846570	1967/12 5001	30	FR 0035	33//2/:	DO		4901256		BLCK LOAM 0002 LOAM CLAY 0015 BLUE CLAY 0035 GREY MSND STNS 0041
CALEDON TOWN (CHINGU HS E 02 023	17 W	593512	4846641	1950/01 4620	6		5///:	NU		4901249		LOAM CLAY 0004 FSND 0014 CLAY MSND 0026 CLAY GRVL 0048 FSND CLAY 0053 GREY CLAY 0081

Appendix E

Door-to-Door Water Well Survey (500 m) 12909 Kennedy Road, Caledon, ON

Surveyed Address	Water Well Identified	Comments
Old School Road		
3441	N	No Response
3521	N	No Response
3538	N	No Response
3598	N	Denied Participation
3608	Y	Dug well, inaccessible
3611	N	No Response
3708	N	Inaccessble, gated property
3726	N	Tenant does have information
3736	N	No Response
3756	N	Property serviced by municipal water supply
3751	N	Tenant does have information
3402	N	Tenant does have information
3412	N	No Response
3431	Y	Well abandoned/damaged
3762	N	No Response
3771	Y	decomissed well identified. Municipaly water supply
Heart Lake Road		
12864	N	No Response
12942	N	No Response
Kennedy Road		
13133	Y	Water level- 2.7 mbgs, Depth- 110 mbgs
13121	Y	Water level- 1.5 mbgs, Depth- 100 mbgs
12909	Y	No Response
12872	N	School is on municipal water supply
13089	N	No Response
13159	N	Tenant does have information
12728	N	Residential subdivion
12976	N	No Response

Appendix F

TABLE E-1

CLIMATE NORMALS 1981-2010 (Toronto Lester B. International Airport WWTP Climate Station)

Water Balance - 12909 Kennedy Road, Caledon, ON

	Thornthwaite (1948)					
Month	Mean Temperature (°C)	Heat Index	Unadjusted Potential Evapotranspiration (mm)	Daylight Correction Value	Adjusted Potential Evapotranspiration (mm)	Total Precipitation (mm)
January	-5.5	0.0	0.0	0.78	0.0	51.8
February	-4.5	0.0	0.0	0.88	0.0	47.7
March	0.1	0.0	0.2	0.99	0.2	49.8
April	7.1	1.7	30.4	1.12	34.1	68.5
May	13.1	4.3	60.7	1.22	74.1	74.3
June	18.6	7.3	90.2	1.28	115.4	71.5
July	21.5	9.1	106.2	1.25	132.7	75.7
August	20.6	8.5	101.2	1.16	117.4	78.1
September	16.2	5.9	77.2	1.04	80.2	74.5
October	9.5	2.6	42.3	0.92	38.9	61.1
November	3.7	0.6	14.6	0.81	11.8	75.1
December	-2.2	0.0	0.0	0.75	0.0	57.9
TOTALS		**40.1**	**522.9**		**604.8**	**786.0**

Notes: Daylight Correction values obtained from Instruction and Tables For Computing Potential Evapotranspiration and The Water Balance (Thornthwaite & Mather, 1957)

TABLE E-2

Pre-development Water Balance

Water Balance - 12909 Kennedy Road, Caledon, ON

Catchments and Hydrologic Components			Month												Total
			March	April	May	June	July	August	September	October	November	December	January	February	
PET - Adjusted Potential Evapotranspiration (mm)			0.25	34.09	74.08	115.41	132.71	117.35	80.24	38.88	11.82	0.00	0.00	0.00	**604.83**
P - Total Precipitation (mm)			49.80	68.50	74.30	71.50	75.70	78.10	74.50	61.10	75.10	57.90	51.80	47.70	**786.00**
P-PET (mm)			49.55	34.41	0.22	-43.91	-57.01	-39.25	-5.74	22.22	63.28	57.90	51.80	47.70	-
Soil Moisture Deficit (mm)			0.00	0.00	0.00	-43.91	-100.92	-140.17	-145.91	-123.69	-60.42	-2.52	0.00	0.00	-
Site	Forest	Soil Moisture Storage (mm)	400.00	400.00	400.00	356.09	299.08	259.83	254.09	276.31	339.58	397.48	400.00	400.00	-
		Actual Potential Evapotranspiration (mm)	0.25	34.09	74.08	113.00	122.39	105.53	78.19	38.88	11.82	0.00	0.00	0.00	**578.22**
		P-AET (mm)	49.55	34.41	0.22	-41.50	-46.69	-27.43	-3.69	22.22	63.28	57.90	51.80	47.70	-
		Actual Soil Moisture Deficit (mm)	0.00	0.00	0.00	-41.50	-88.19	-115.61	-119.30	-97.08	-33.80	0.00	0.00	0.00	-
		Change in Soil Moisture Deficit (mm)	0.00	0.00	0.00	41.50	46.69	27.43	3.69	-22.22	-63.28	-33.80	0.00	0.00	-
		Precipitation Surplus (mm)	49.55	34.41	0.22	0.00	0.00	0.00	0.00	0.00	0.00	24.10	51.80	47.70	**207.78**
		MECP Infiltration Factor	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	-
		Run-Off Coefficient	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	-
		Infiltration (mm)	29.73	20.65	0.13	0.00	0.00	0.00	0.00	0.00	0.00	14.46	31.08	28.62	**124.67**
		Run-Off (mm)	19.82	13.77	0.09	0.00	0.00	0.00	0.00	0.00	0.00	9.64	20.72	19.08	**83.11**
		Catchment Area (m^2) = **28153.40**	Monthly Volumes												
	Total AET (m^3)		6.93	959.64	2085.61	3181.27	3445.63	2970.89	2201.27	1094.70	332.79	0.00	0.00	0.00	**16278.73**
	Total Evaporation (m^3)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Total Infiltration (m^3)		837.06	581.32	3.71	0.00	0.00	0.00	0.00	0.00	0.00	407.05	875.01	805.75	**3509.90**
	Total Runoff (m^3)		558.04	387.55	2.47	0.00	0.00	0.00	0.00	0.00	0.00	271.37	583.34	537.17	**2339.94**
	Moderlatley Rooted Crops	Soil Moisture Storage (mm)	200.00	200.00	200.00	156.09	99.08	59.83	54.09	76.31	139.58	197.48	200.00	200.00	-
		Actual Potential Evapotranspiration (mm)	0.25	34.09	74.08	110.59	112.07	93.70	76.14	38.88	11.82	0.00	0.00	0.00	**551.60**
		P-AET (mm)	49.55	34.41	0.22	-39.09	-36.37	-15.60	-1.64	22.22	63.28	57.90	51.80	47.70	-
		Actual Soil Moisture Deficit (mm)	0.00	0.00	0.00	-39.09	-75.46	-91.05	-92.69	-70.47	-7.19	0.00	0.00	0.00	-
		Change in Soil Moisture Deficit (mm)	0.00	0.00	0.00	39.09	36.37	15.60	1.64	-22.22	-63.28	-7.19	0.00	0.00	-
		Precipitation Surplus (mm)	49.55	34.41	0.22	0.00	0.00	0.00	0.00	0.00	0.00	50.71	51.80	47.70	**234.40**
		MECP Infiltration Factor	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	-
		Run-Off Coefficient	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	-
		Infiltration (mm)	24.78	17.21	0.11	0.00	0.00	0.00	0.00	0.00	0.00	25.35	25.90	23.85	**117.20**
		Run-Off (mm)	24.78	17.21	0.11	0.00	0.00	0.00	0.00	0.00	0.00	25.35	25.90	23.85	**117.20**
		Catchment Area (m^2) = **303812.60**	Monthly Volumes												
	Total AET (m^3)		74.81	10355.82	22506.50	33598.03	34047.54	28465.85	23130.81	11813.23	3591.28	0.00	0.00	0.00	**167583.86**
	Total Evaporation (m^3)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Total Infiltration (m^3)		7527.53	5227.67	33.39	0.00	0.00	0.00	0.00	0.00	0.00	7703.16	7868.75	7245.93	**35606.42**
	Total Runoff (m^3)		7527.53	5227.67	33.39	0.00	0.00	0.00	0.00	0.00	0.00	7703.16	7868.75	7245.93	**35606.42**
	Ianscaped	Soil Moisture Storage (mm)	100.00	100.00	100.00	56.09	0.00	0.00	0.00	22.22	85.50	100.00	100.00	100.00	-
		Actual Potential Evapotranspiration (mm)	0.25	34.09	74.08	105.77	91.69	78.10	74.50	38.88	11.82	0.00	0.00	0.00	**509.17**
		P-AET (mm)	49.55	34.41	0.22	-34.27	-15.99	0.00	0.00	22.22	63.28	57.90	51.80	47.70	-
		Actual Soil Moisture Deficit (mm)	0.00	0.00	0.00	-34.27	-50.26	-50.26	-50.26	-28.04	0.00	0.00	0.00	0.00	-
		Change in Soil Moisture Deficit (mm)	0.00	0.00	0.00	34.27	15.99	0.00	0.00	-22.22	-28.04	0.00	0.00	0.00	-
		Precipitation Surplus (mm)	49.55	34.41	0.22	0.00	0.00	0.00	0.00	0.00	35.24	57.90	51.80	47.70	**276.83**
		MECP Infiltration Factor	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	-
		Run-Off Coefficient	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	-
		Infiltration (mm)	24.78	17.21	0.11	0.00	0.00	0.00	0.00	0.00	17.62	28.95	25.90	23.85	**138.41**
		Run-Off (mm)	24.78	17.21	0.11	0.00	0.00	0.00	0.00	0.00	17.62	28.95	25.90	23.85	**138.41**
		Catchment Area* (m^2) = **22830.09**	Monthly Volumes												
	Existing Impervious Area	Precipitation (mm)	49.80	68.50	74.30	71.50	75.70	78.10	74.50	61.10	75.10	57.90	51.80	47.70	**786.00**
		Evaporation Factor	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	-
		Run-Off Coefficient	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	-
		Evaporation (mm)	7.47	10.28	11.15	10.73	11.36	11.72	11.18	9.17	11.27	8.69	7.77	7.16	**117.90**
		Run-Off (mm)	42.33	58.23	63.16	60.78	64.35	66.39	63.33	51.94	63.84	49.22	44.03	40.55	**668.10**
		Catchment Area (m^2) = **5543.61**	Monthly Volumes												
	Total AET (m^3)		5.62	778.19	1691.26	2414.70	2093.26	1783.03	1700.84	887.71	269.87	0.00	0.00	0.00	**11624.47**
	Total Evaporation (m^3)		41.41	56.96	61.78	59.46	62.95	64.94	61.95	50.81	62.45	48.15	43.07	39.66	**653.59**
	Total Infiltration (m^3)		565.66	392.84	2.51	0.00	0.00	0.00	0.00	0.00	402.26	660.93	591.30	544.50	**3159.99**
	Total Runoff (m^3)		800.32	715.61	352.62	336.91	356.70	368.01	351.05	287.91	756.13	933.76	835.38	769.26	**6863.67**
			Site Total Monthly Volumes												
	Total AET (m^3)		87.36	12093.65	26283.37	39194.00	39586.42	33219.77	27032.92	13795.63	4193.94	0.00	0.00	0.00	**195487.07**
	Total Evaporation (m^3)		41.41	56.96	61.78	59.46	62.95	64.94	61.95	50.81	62.45	48.15	43.07	39.66	**653.59**
	Total Infiltration (m^3)		8930.25	6201.83	39.61	0.00	0.00	0.00	0.00	0.00	402.26	8771.14	9335.05	8596.18	**42276.31**
	Total Runoff (m^3)		8885.89	6330.83	388.48	336.91	356.70	368.01	351.05	287.91	756.13	8908.28	9287.47	8552.36	**44810.03**

TABLE E-3

Post-development Water Balance

Water Balance - 12909 Kennedy Road, Caledon, ON

Catchments and Hydrologic Components			Month												Total
			March	April	May	June	July	August	September	October	November	December	January	February	
		PET - Adjusted Potential Evapotranspiration (mm)	0.25	34.09	74.08	115.41	132.71	117.35	80.24	38.88	11.82	0.00	0.00	0.00	**604.83**
		P - Total Precipitation (mm)	49.80	68.50	74.30	71.50	75.70	78.10	74.50	61.10	75.10	57.90	51.80	47.70	**786.00**
		P-PET (mm)	49.55	34.41	0.22	-43.91	-57.01	-39.25	-5.74	22.22	63.28	57.90	51.80	47.70	-
		Soil Moisture Deficit (mm)	0.00	0.00	0.00	-43.91	-100.92	-140.17	-145.91	-123.69	-60.42	-2.52	0.00	0.00	-
Site	Forest	Soil Moisture Storage (mm)	400.00	400.00	400.00	356.09	299.08	259.83	254.09	276.31	339.58	397.48	400.00	400.00	-
		Actual Potential Evapotranspiration (mm)	0.25	34.09	74.08	113.00	122.39	105.53	78.19	38.88	11.82	0.00	0.00	0.00	**578.22**
		P-AET (mm)	49.55	34.41	0.22	-41.50	-46.69	-27.43	-3.69	22.22	63.28	57.90	51.80	47.70	-
		Actual Soil Moisture Deficit (mm)	0.00	0.00	0.00	-41.50	-88.19	-115.61	-119.30	-97.08	-33.80	0.00	0.00	0.00	-
		Change in Soil Moisture Deficit (mm)	0.00	0.00	0.00	41.50	46.69	27.43	3.69	-22.22	-63.28	-33.80	0.00	0.00	-
		Precipitation Surplus (mm)	49.55	34.41	0.22	0.00	0.00	0.00	0.00	0.00	0.00	24.10	51.80	47.70	**207.78**
		MECP Infiltration Factor	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	-
		Run-Off Coefficient	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	-
		Infiltration (mm)	29.73	20.65	0.13	0.00	0.00	0.00	0.00	0.00	0.00	14.46	31.08	28.62	**124.67**
		Run-Off (mm)	19.82	13.77	0.09	0.00	0.00	0.00	0.00	0.00	0.00	9.64	20.72	19.08	**83.11**
		Catchment Area (m^2) = **28153.40**	**Monthly Volumes**												
		Total AET (m^3)	6.93	959.64	2085.61	3181.27	3445.63	2970.89	2201.27	1094.70	332.79	0.00	0.00	0.00	**16278.73**
		Total Evaporation (m^3)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
		Total Infiltration (m^3)	837.06	581.32	3.71	0.00	0.00	0.00	0.00	0.00	0.00	407.05	875.01	805.75	**3509.90**
		Total Runoff (m^3)	558.04	387.55	2.47	0.00	0.00	0.00	0.00	0.00	0.00	271.37	583.34	537.17	**2339.94**
	pasture & shrub	Soil Moisture Storage (mm)	250.00	250.00	250.00	206.09	149.08	109.83	104.09	126.31	189.58	247.48	250.00	250.00	-
		Actual Potential Evapotranspiration (mm)	0.25	34.09	74.08	111.55	116.20	98.43	76.96	38.88	11.82	0.00	0.00	0.00	**562.25**
		P-AET (mm)	49.55	34.41	0.22	-40.05	-40.50	-20.33	-2.46	22.22	63.28	57.90	51.80	47.70	-
		Actual Soil Moisture Deficit (mm)	0.00	0.00	0.00	-40.05	-80.55	-100.87	-103.33	-81.11	-17.84	0.00	0.00	0.00	-
		Change in Soil Moisture Deficit (mm)	0.00	0.00	0.00	40.05	40.50	20.33	2.46	-22.22	-63.28	-17.84	0.00	0.00	-
		Precipitation Surplus (mm)	49.55	34.41	0.22	0.00	0.00	0.00	0.00	0.00	0.00	40.06	51.80	47.70	**223.75**
		MECP Infiltration Factor	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	-
		Run-Off Coefficient	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	-
		Infiltration (mm)	24.78	17.21	0.11	0.00	0.00	0.00	0.00	0.00	0.00	20.03	25.90	23.85	**111.88**
		Run-Off (mm)	24.78	17.21	0.11	0.00	0.00	0.00	0.00	0.00	0.00	20.03	25.90	23.85	**111.88**
		Catchment Area (m^2) = **87072.80**	**Monthly Volumes**												
		Total AET (m^3)	21.44	2967.98	6450.37	9713.14	10117.47	8570.34	6700.81	3385.68	1029.26	0.00	0.00	0.00	**48956.49**
		Total Evaporation (m^3)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
		Total Infiltration (m^3)	2157.39	1498.25	9.57	0.00	0.00	0.00	0.00	0.00	0.00	1744.28	2255.19	2076.69	**9741.36**
		Total Infiltration (m^3)	2157.39	1498.25	9.57	0.00	0.00	0.00	0.00	0.00	0.00	1744.28	2255.19	2076.69	**9741.36**
	Parkland	Soil Moisture Storage (mm)	100.00	100.00	100.00	56.09	0.00	0.00	0.00	22.22	85.50	100.00	100.00	100.00	-
		Actual Potential Evapotranspiration (mm)	0.25	34.09	74.08	105.77	91.69	78.10	74.50	38.88	11.82	0.00	0.00	0.00	**509.17**
		P-AET (mm)	49.55	34.41	0.22	-34.27	-15.99	0.00	0.00	22.22	63.28	57.90	51.80	47.70	-
		Actual Soil Moisture Deficit (mm)	0.00	0.00	0.00	-34.27	-50.26	-50.26	-50.26	-28.04	0.00	0.00	0.00	0.00	-
		Change in Soil Moisture Deficit (mm)	0.00	0.00	0.00	34.27	15.99	0.00	0.00	-22.22	-28.04	0.00	0.00	0.00	-
		Precipitation Surplus (mm)	49.55	34.41	0.22	0.00	0.00	0.00	0.00	0.00	35.24	57.90	51.80	47.70	**276.83**
		MECP Infiltration Factor	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	-
		Run-Off Coefficient	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	-
		Infiltration (mm)	24.78	17.21	0.11	0.00	0.00	0.00	0.00	0.00	17.62	28.95	25.90	23.85	**138.41**
		Run-Off (mm)	24.78	17.21	0.11	0.00	0.00	0.00	0.00	0.00	17.62	28.95	25.90	23.85	**138.41**
		Catchment Area* (m^2) = **19350.00**	**Monthly Volumes**												
	Impervious Area	Precipitation (mm)	49.80	68.50	74.30	71.50	75.70	78.10	74.50	61.10	75.10	57.90	51.80	47.70	**786.00**
		Evaporation Factor	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	-
		Run-Off Coefficient	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	-
		Evaporation (mm)	7.47	10.28	11.15	10.73	11.36	11.72	11.18	9.17	11.27	8.69	7.77	7.16	**117.90**
		Run-Off (mm)	42.33	58.23	63.16	60.78	64.35	66.39	63.33	51.94	63.84	49.22	44.03	40.55	**668.10**
		Catchment Area (m^2) = **225763.46**	**Monthly Volumes**												
		Total AET (m^3)	4.76	659.57	1433.45	2046.62	1774.17	1511.24	1441.58	752.39	228.73	0.00	0.00	0.00	**9852.50**
		Total Evaporation (m^3)	1686.45	2319.72	2516.13	2421.31	2563.54	2644.82	2522.91	2069.12	2543.23	1960.76	1754.18	1615.34	**26617.51**
		Total Infiltration (m^3)	479.43	332.95	2.13	0.00	0.00	0.00	0.00	0.00	340.94	560.18	501.17	461.50	**2678.30**
		Total Runoff (m^3)	10036.00	13478.03	14260.22	13720.77	14526.75	14987.31	14296.47	11725.03	14752.55	11671.13	10441.53	9615.08	**153510.87**
			Site Total Monthly Volumes												
		Total AET (m^3)	33.14	4587.19	9969.43	14941.03	15337.27	13052.47	10343.65	5232.76	1590.79	0.00	0.00	0.00	**75087.73**
		Total Evaporation (m^3)	1686.45	2319.72	2516.13	2421.31	2563.54	2644.82	2522.91	2069.12	2543.23	1960.76	1754.18	1615.34	**26617.51**
		Total Infiltration (m^3)	3473.89	2412.53	15.41	0.00	0.00	0.00	0.00	0.00	340.94	2711.51	3631.36	3343.93	**15929.57**
		Total Runoff (m^3)	12751.44	15363.83	14272.26	13720.77	14526.75	14987.31	14296.47	11725.03	14752.55	13686.78	13280.05	12228.93	**165592.17**