



REVISED
Hydrogeological Assessment
181 Burton Avenue
Barrie, Ontario

Prepared for:
Monolite Holdings Inc.

Prepared by:
Azimuth Environmental
Consulting, Inc.

August 2023

AEC 21-492



Environmental Assessments & Approvals

August 1st, 2023

AEC 21-492

Monolite Holdings Inc.
343 Sugar Maple Lane,
Richmond Hill, ON
L4C 4C3

Attn: Maria Rozentsvayg

Re: REVISED Hydrogeological Assessment
181 Burton Avenue, Barrie ON

Dear Maria:

Azimuth Environmental Consulting, Inc. (Azimuth) is pleased to provide our Revised Hydrogeological Assessment for the property located at 181 Burton Avenue within the City of Barrie, ON (the "Site"). This evaluation focused on the existing soil and ground water regime underlying the Site and the potential for the proposed development to impact the existing conditions. The report revisions include updating the dewatering assessment and inclusion of a water balance assessment.

Should you have any questions or wish to discuss the report in greater detail, please do not hesitate to contact the undersigned.

Yours truly,

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Colin Ross, B.Sc., P.Geo.
Senior Hydrogeologist

M:\Projects\21 Projects\21-492 RSC and Hydrogeology (181 Burton Ave)\05.0 - Reporting\05.1 - Working\June 2023\230704 181
Burton Ave REVISED HydroG Report - DRAFT For Client.docx



Table of Contents

	page
Letter of Transmittal	i
1.0 INTRODUCTION.....	1
2.0 ENVIRONMENTAL SETTING	1
2.1 Soil	1
2.2 Physiography	1
2.3 Topography and Drainage	1
2.4 Bedrock Geology	2
2.5 Quaternary Geology	2
2.6 Well Records.....	2
3.0 SOURCE WATER PROTECTION.....	3
4.0 MONITORING	3
4.1 Ground Water Level Monitoring	3
4.2 Hydraulic Conductivity Testing	4
4.3 Infiltration Testing.....	4
4.3.1 Methodology.....	5
4.3.2 Test Results.....	6
4.3.3 Recommendations	6
5.0 WATER BALANCE	7
5.1 Land Use	7
5.1.1 Pre-Development	7
5.1.2 Post-Development	8
5.2 Infiltration	8
5.2.1 Pre-Development Infiltration.....	9
5.2.2 Post-Development Infiltration	9
5.3 Water Balance Summary	10
6.0 DEWATERING ASSESSMENT.....	10
6.1 Approximate Dewatering Volumes	11
6.2 Impact Assessment.....	12
6.3 Water Quality.....	12



7.0 SUMMARY AND CONCLUSIONS	13
8.0 REFERENCES.....	15

List of In-Text Tables

Table 1: MECP Water Well Database Summary (300 m radius from Site)	3
Table 2: Hydraulic Testing Results.....	4
Table 3: Summary of Test Pit Location Details.....	5
Table 4: Results of Infiltration Assessment	6
Table 5: Summary of Design Infiltration Rate	7
Table 6: Pre Development Area Classification.....	8
Table 7: Post Development Area Classification	8
Table 8: Summary of Pervious Land Infiltration Factor.....	9
Table 9: Summary of Dewatering Conditions (Appendix F).....	12

List of Figures

Figure 1	Site Location
Figure 2	Site Layout & Existing Conditions
Figure 3	MECP Well Records
Figure 4	Ground Water Information

List of Appendices

Appendix A:	Figures
Appendix B:	Site Plan
Appendix C:	MECP Well Records
Appendix D:	Borehole Logs & Ground Water Elevations
Appendix E:	Hydraulic Conductivity Testing Results
Appendix F:	Dewatering Analysis
Appendix G:	Water Quality Results
Appendix H:	Water Balance Summary
Appendix I:	Guelph Permeameter Testing Results



1.0 INTRODUCTION

Azimuth Environmental Consulting Inc. (Azimuth) has been retained by Monolite Holdings Inc. to conduct a Hydrogeological Assessment for the property located at 181 Burton Avenue within the City of Barrie, Ontario (the “Site”)(Figure 1). The Site is approximately 1,995 square meters (m²) in size and is bound by Burton Avenue to the north, commercial properties to the east and west and vacant land to the north (Figure 2).

The proposed development is comprised of a four storey residential building (Appendix B). Access to the Site is from Burton Avenue, while all parking for the Site will be at grade north of the building.

The purpose of this assessment is to characterize the hydrogeological conditions at the Site and the potential for the proposed development to cause impact.

2.0 ENVIRONMENTAL SETTING

2.1 Soil

The soils at the Site are classified as Sargent Series gravelly sandy loam (Hoffman *et al*, 1962). This material has good drainage and is classified within hydrologic soil group “AB”. Group A soils have low runoff potential and high infiltration rates even when thoroughly wet, and consist of deep, well to excessively drained sand or gravel. Group B soils have moderate infiltration rates when thoroughly wet and consist of moderately fine to moderately coarse textures.

2.2 Physiography

According to Chapman and Putnam (1984) the Site falls within the Simcoe Lowlands physiographic region. It lies on one of the numerous glacial shorelines that define the Lake Simcoe basin. These lowlands are considered to be the former Lake Algonquin shoreline features. The lowland soils are described as being composed of sands, silt and clay.

2.3 Topography and Drainage

The topographic relief at the Site is quite limited with elevations ranging between approximately 229 masl at the south and 232 masl at the north along Burton Avenue. The current Site drainage is expected to follow the local topographic dip to the north, although any surface runoff exiting the Site is expected to be captured within the local municipal stormwater system along Cumberland Street to the north. Run on to the Site is not expected from the south due to the presence of curb and gutters along Burton Avenue. The only surface water feature that is present in proximity to the Site is a small wetland



area immediately north of the Site (Figure 2) as identified in the Cambium, 2022 Environmental Impact Study (EIS). This feature is described as a small wetland pocket that is not connected to any mapped watercourses.

2.4 Bedrock Geology

The underlying bedrock geology has been described by the Ontario Geologic Survey (OGS) as being composed of interbedded bioclastic to very-fine grained limestone and grey-green calcareous shale of the Verulam Formation of the Simcoe Group (OGS, 2022). The Simcoe Group is Middle Ordovician in age. The entire overburden profile beneath the Site is estimated to be over 100 m in depth before encountering the bedrock contact based on local MECP well records for the area.

2.5 Quaternary Geology

According to Barnett *et al.* (1991), the surficial material at the Site consists of glaciofluvial ice-contact stratified deposits consisting of gravel and sand. The stratigraphy is dominated by sands and gravels inter-bedded with silts and clays. As a result, the overburden is characterized by a complex of layered, coarse-grained sediments with interbedded with fine-grained sediments that are not regionally extensive.

The Site soils as defined in the Site Geotechnical Assessment (WSP, 2021) and Phase II ESA (Envision, 2022) were that approximately 2 to 3 m of silty sand fill are present at the Site overlying native sand to silty sand. The native soils are consistent with what is reported in the OGS mapping. For reference, the borehole logs from the Geotechnical Assessment and Phase II ESA have been provided in Appendix D.

2.6 Well Records

The Ontario Ministry of Environment, Conservation, and Parks (MECP) Water Well Records were referenced for any recorded well information within the vicinity of the Site (300 m) (MECP, 2022). The area has been historically municipally serviced; however well records can be used to gain subsurface information which can provide insight into shallow geological formation within the area. The well records found in the vicinity of the Site that are pertinent to this assessment are summarized in Table 1 and are shown on Figure 3.



Table 1: MECP Water Well Database Summary (300 m radius from Site)

MECP Well Record No.	Drill Date	Status	Well Type	Borehole Depth (mbgs)	Ground Elevation (masl)
5700255	11-Oct-60	Unknown	Municipal Water Supply	86.6	227.4
5700265	22-Nov-62	Unknown	Municipal Water Supply	91.7	219.9
5709345	21-Nov-72	Unknown	Municipal Water Supply	87.2	227.0
5711799	28-Oct-74	Decommissioned	Municipal Water Supply	71.6	227.2
7264481 / A162243	25-Apr-16	Active	Observation Well	10.7	238.0
7278306 / A208627	22-Dec-16	Active	Observation Well	1.9	237.0
7278307 / A208628	22-Dec-16	Active	Observation Well	1.9	237.0
7045815 / A058556	26-Jun-07	Abandoned	Unknown	4.1	232.4
7045817 / A058557	26-Jun-07	Abandoned	Unknown	19.7	232.1
7337101	15-Jun-18	Unknown	Unknown	-	232.3
7310630	15-Mar-18	Unknown	Unknown	-	233.0

The surrounding wells in the MECP well record database were drilled for monitoring and municipal water supply. The wells were drilled to depths between 1.9 and 91.7 m. Not all actual well records were available online, but those that were available for download have been included in Appendix C. The soils identified in these records were primarily sand, which matches the geological literature outlined above, as well as the Site specific soils identified at the Site through the Site geotechnical drilling program.

3.0 SOURCE WATER PROTECTION

A review of the Source Water Protection Areas as identified on the MECP Source Protection Information Atlas website indicates the Site is partially located within a Wellhead Protection Area (WHPA-C). The Site is also located within a Significant Ground Water Recharge Area (SGRA), a Highly Vulnerable Aquifer Area (HVA), a Wellhead Protection Area (WHPA Q1/2) for quantity threat and an Issues Contributing Area (ICA) for sodium and chloride and is also considered an Intake Protection Zone (IPZ) 3.

4.0 MONITORING

4.1 Ground Water Level Monitoring

Two ground water monitoring wells were installed as part of the 2021 WSP geotechnical assessment with depths of 4.6 to 5.0 mbgs, while two additional monitoring wells were installed by Envision in April 2022 to depths of 6.1 mbgs as part of their Phase II ESA. For reference, borehole logs have been included in Appendix D. Water levels were measured as part of the geotechnical assessment in February 2021 and monthly by



Azimuth between March and June 2022 to establish seasonally high water table conditions, along with additional measurements in July 2023. The ground water levels at the Site have shown variation over time with the most elevated conditions observed in April, 2022 and the lowest in February, 2021. The high ground water condition is shown on Figure 4. Ground water flow direction is interpreted to be to the northeast, following a local topographic decline towards Lake Simcoe. The ground water level and elevation details have been included in Appendix D.

4.2 Hydraulic Conductivity Testing

In order to understand the hydraulic characteristics of the underlying overburden, a transient slug test can be performed within monitoring wells to determine the average hydraulic conductivity of the screened interval. A slug test involves the instantaneous injection or withdrawal of a volume or slug of water or solid cylinder of known volume. This is accomplished by adding or displacing a known volume to/from a well and measuring water level response time to return to equilibrium.

Hydraulic conductivity testing was completed at the Site by Azimuth staff within BH21-1 and BH21-4 on March 16th and April 14th, 2022. Water level measurements were recorded both manually and with a datalogger, which were programmed to record the pressure of water above the data logger every five seconds. Data was analyzed using the Hvorslev Method (1951) for unconfined aquifers, which assumes a homogeneous, isotropic medium in which soil and water are incompressible. Hydraulic testing results are summarized in Table 2, and within Appendix E.

Table 2: Hydraulic Testing Results

Monitoring Well	Screen Depth (mbgs)	Hydraulic Conductivity (m/s)	Soil Description
BH21-1	3.1 - 4.6	2.3×10^{-6}	Sand
BH21-4	3.5 – 5.0	1.5×10^{-6}	Silty Sand

Slug test data indicates that the hydraulic conductivity of the deposits is between 1.5×10^{-6} and 2.3×10^{-6} m/s. The measured hydraulic conductivity is within the published range for a sandy material (Freeze & Cherry, 1979).

4.3 Infiltration Testing

The current Infiltration Assessment focused on the proposed subsurface infiltration chamber, which is sized to capture up to the 28 mm precipitation event runoff from the entire rooftop area. The purpose of this assessment was to assess the existing soil beneath the proposed LID location, and determine a suitable infiltration rate for use in detailed design.



4.3.1 Methodology

A field program was conducted by Azimuth staff on July 20th, 2023 between the hours of 8:00 am and 12:00 pm during which the weather was 22°C and overcast. One test pit was advanced by an excavating contractor at the western side of the Site in the area of the proposed LID (Figure 2). The test pit base elevation was therefore determined based on the ground elevation and test pit depth.

The Infiltration Assessment was completed in accordance with Appendix C of the *Low Impact Development Stormwater Management Planning and Design Guide* (TRCA 7 CVC, 2010). The test pits were advanced to an elevation approximately 0.2 m above the base of the LID (230.26 masl). A hand auger was then used within the test pit to remove approximately 0.2 m of additional soil. The infiltration assessment was therefore completed at the base of the proposed LID. Information on the proposed LID design is included in Appendix B and contained within the Stormwater Management & Servicing Report (Pearson, 2023). The test pit was approximately about 1.5 m wide and 4 m long. An additional 0.5 m was excavated after the testing was complete to confirm the underlying material for each test pit.

The Guelph Permeameter Model 2800K1 (Soil Moisture Equipment Corp.) was used to measure the in-situ hydraulic conductivity as per the *Guelph Permeameter Operating Instructions* (Soil Moisture, 2012). Due to the dominance of granular material encountered, the single head method using the combined reservoir was utilized. Two tests were completed within each end at the base of the TP-1 to assess potential variability in the soils. Each test was within an independent augered hole. The value from each of the two tests for each location were averaged to determine a representative value for the soil type.

Table 3: Summary of Test Pit Location Details

Test Pit ID (masl) ¹	Base of Test Pit Elevation (masl) ¹	Depth (mbgs) ²
TP-1 (231.5)	230.2	1.3

NOTES:

¹ Ground surface elevation taken from site survey information and includes the depth of the augered holes

² Depth below surface level is the target depth of proposed LID system.

A soil sample was collected from the test pit in the area of GP-1 at the approximate LID base elevation of infiltration testing for laboratory grain size and T-Time analysis. The soil sample analysis was used to confirm the in-situ results. After the infiltration tests



were completed, the test pits were advanced an additional 0.5 m to confirm the underlying material, and then backfilled with the original soil material.

4.3.2 Test Results

The material encountered within the test pits was composed of 1.1 m of fill in TP-1 underlain by native sand to a depth of >1.6 mbgs. Ground water was not encountered in TP-1. The complete test pit logs, grain size analysis and infiltration testing summary tables have been included in Appendix I.

The Guelph Permeameter generates a result as a hydraulic conductivity (K_{fs}) value. As per Table C1 from CVC & TRCA (2010), the K_{fs} values from the Guelph Permeameter and percolation rate (T-Time) values from the grain size analysis have been converted to an infiltration rate ($1/T$).

Based on the information provided in Table 4, the measured in-situ infiltration rate at the Site ranged between 99 and 93 mm/hr. These rates are consistent with values expected from a silty sand to sand material. The in-situ testing results and the estimate based on the grain size analysis appear to be lower than the measured rates, which could be a function of variability in silt content of the unit or limitations in relating grain size distribution to actual infiltration rates. Given the consistency between the two Guelph Permeameter values, it is felt that these values are most representative for use in establishing infiltration capacity of the Site.

Table 4: Results of Infiltration Assessment

Test Pit ID	Soil Type at Depth ¹	Guelph Permeameter Results			Estimated Infiltration Rate from Soil Sample ^{1,3} (mm/hr)
		Test # 1 Infiltration Rate ² (mm/hr)	Test # 2 Infiltration Rate ² (mm/hr)	Geometric Mean Infiltration Rate (mm/hr)	
TP-1	Silty Sand	99	93	96	20

NOTES:

¹ As per GEI Letter Report dated July 31st, 2023 titled T-Time Analyses, Ref. No. 21-492

² Guelph Permeameter results are converted from K_{fs} to $1/T$ according to Table C1 from TRCA & CVC (2010)

³ Soil sample collection results are converted from T-Time to $1/T$ according to Table C1 from TRCA & CVC (2010)

4.3.3 Recommendations

As per TRCA & CVC (2010), the infiltration rate used to design infiltration LIDs must incorporate a safety correction factor that compensates for potential reductions in soil permeability due to compaction or smearing during construction, gradual accumulation of fine sediments over the lifespan of the LID, and an uncertainty in measured values when less permeable soil horizons exist. A safety correction factor of 2.5 was used along with



the geometric mean for infiltration rate as per TRCA & CVC (2010). Table 5 summarizes the recommended design infiltration rate for the location investigated:

Table 5: Summary of Design Infiltration Rate

Geometric Mean Infiltration Rate* (mm/hr)	Safety Correction Factor	Design Infiltration Rate (mm/hr)
96	2.5	39

* - geometric mean of tested soil beneath the LID facility

After applying a correction factor of 2.5, the design infiltration rate for the LID area is 39 mm/hr. The results for the Site indicate that the infiltration rate for the material at the base of the LID is variable but feasible given the mean infiltration values.

5.0 WATER BALANCE

In order to determine the potential changes to the natural ground water recharge conditions, a pre- and post-development water balance assessment has been completed using the Thornthwaite and Mather method (1957). This method evaluates evapotranspiration based on precipitation and temperature. Residual soil saturation is a function of topography and soil type. Monthly data are tabulated from daily average temperature and precipitation, and the water budget is a continuous calculation over the period of record. To clarify, the method and the approach used by many individuals in examining infiltration resets annual conditions (moisture deficit, snow storage, etc) over the winter months because of the general lack of infiltration during the frost period. However, we maintain those records and carry them forward from month to month during the entire period of record.

Values were determined on a monthly basis, compiled from daily Environment Canada meteorological data station located in Barrie, Ontario between 1970 and 2021 (Barrie Climate Station – Station ID 6110557 / 6110556). The calculations are based on the average conditions during this period. The average precipitation was 907 millimeters (mm), rainfall was 654 mm, evapotranspiration was 479 mm, and the surplus was 428 mm per year.

5.1 Land Use

5.1.1 Pre-Development

The pre-development Site area was classified according to land use/vegetation type. Land within the pre-development area is provided in Table 6.



Table 6: Pre Development Area Classification

Land Use	Land Area (m ²)
Forest	1,248
Bare Ground	750
TOTAL	1,998

Land within the pre-development scenario is considered 0% impervious. The pre-development areas are shown on Figure 2.

5.1.2 Post-Development

The land classification in the post-development scenario was classified based on the Site Plan (Appendix B / Figure 2). Land within the post-development Site is summarized in the below Table 7:

Table 7: Post Development Area Classification

Land Use	Land Area (m ²)
Landscaped Grass	658
Rooftop	448
Paved Surface	892
TOTAL	1,998

(LID) – areas represent catchments 201 & 209 (including all subcatchments), which is being directed into LID infiltration gallery

Land within the post-development scenario is considered 67% impervious.

5.2 Infiltration

Infiltration is generated one of two ways: (1) directly from rainfall impact or snowmelt on pervious surfaces; and (2) indirectly when runoff from impervious surfaces is diverted into adjacent naturalized areas.

Infiltration factors for the Site were estimated based on the underlying soil, local topography, and ground cover as per Table 2 of the Ministry of Environment and Energy (MOEE) Hydrogeological Technical Information Requirements for Land Development Applications (1995).

The soil variable factor was determined by taking into account information obtained from the regional geologic mapping and the geotechnical program completed for the Site. This information suggests that the surficial material at the Site is primarily composed of silty sand to sand, however some areas with surficial silt to silt and clay was noted. The infiltration factors utilized in the water balance assessment are summarized in Table 8 below.



Table 8: Summary of Pervious Land Infiltration Factor

Scenario	Land Use	Infiltration Factor	Assumption
Pre-Development	Forest	0.70	Rolling land (0.2), silty sand to sand soil (0.3), treed (0.2)
	Landscaped / Grassed	0.60	Rolling land (0.2), silty sand to sand soil (0.3), grassed (0.1)
Post-Development	Landscaped / Grassed	0.60	Rolling land (0.2), silt sand to sand soil (0.3), lawn (0.1)

5.2.1 Pre-Development Infiltration

Pre-development direct infiltration was determined by multiplying the annual average surplus amount, the area of each land use, and the infiltration factor for each land use. The pre-development annual infiltration is therefore 545 m³/year (Appendix H).

5.2.2 Post-Development Infiltration

Post-development infiltration (without mitigation) was determined by multiplying the annual average surplus amount, the area of each land use, and the infiltration factor for each land use. The post-development annual direct infiltration is therefore 169 m³/year. There is therefore a decrease in infiltration of 376 m³/year from pre- to post-development without mitigation measures employed.

The post-development drainage plan includes low impact development (LID) to promote infiltration. An infiltration gallery will be included in the storm water design to collect runoff from the rooftop area. The details for this feature are outlined in the Pearson (2023) Storm Water Management & Servicing Report, which indicate a storage volume of 12.6 m³. Based on this storage volume and a rooftop capture area of 448 m², the LID is capable of capturing a 28 mm precipitation event. In order to correlate event based rainfall data, for which the LID is designed (i.e. 28 mm precipitation event), to annual averages, as is what is utilized in water balances, an event based assessment has been completed for the Barrie Climate station. Precipitation events over a 10 year period (2012-2021) were broken down by event size, such that total volumes for each of these events could be calculated for capture from hard surface area (road, rooftop). These totals were then related to the total volume over the same period to obtain a percentage. This percentage is then multiplied by the annual average precipitation value (907 mm) utilized in the overall water balance to obtain an annual average amount / depth for the various intervals. It was determined that an event depth of 28 mm represented an average annual precipitation total of 614 mm or 96% of the rainfall events over this period of record. It is noted that these represent cumulative amounts for all precipitation amounts less than the stated event size. In order to quantify the annual infiltration volumes for the



LID, the annual precipitation depth (event equivalent) discussed above is multiplied by the roof area, while an evaporation loss factor was also applied (10%). This results in a mitigated infiltration volume of 351 m³, creating an overall post-development annual infiltration volume of 520 m³, limiting the overall deficit from the pre-development condition to a loss of 25 m³, or 5%.

5.3 Water Balance Summary

Using the climate model data and calculations mentioned above, the water balance was completed for pre-development, post-development, and post-development with mitigation (Appendix H).

The pre-development infiltration volume is 545 m³/year. This assumes the Site is composed of treed and grassed areas. The post-development without mitigation infiltration volume is 169 m³/year, which is a deficit of 376 m³/year. This assumes the Site is composed of the above noted residential development. An additional 351 m³/year of infiltration can be obtained through LID capture (infiltration gallery). As a result of this mitigation measure, the post-development with mitigation volume is therefore 520 m³/year which represents a small decrease of 25 m³/year (-5%) from the pre-development configuration. Given this limited post-development infiltration deficit, no off-setting payments are required by the LSRCA as per their Water Balance Offsetting Policy (2023) (<100 m³/year).

As all post development surface runoff will be directed into the existing stormwater infrastructure along Burton Avenue, there will be a reduction in surface water contributions of 424 m³/year to the wetland to the north of the Site, the maintenance of ground water infiltration through the ground water infiltration chambers and additional infiltration in the shallow soil profile through the permeable pavers will offset the surface runoff reductions such that there is not expected to be a meaningful reduction of water contributions to the adjacent feature.

6.0 DEWATERING ASSESSMENT

A review of the Site servicing details indicated that the storm sewer infrastructure and potable water connection is all above the high water table at the Site, while the sanitary servicing connections at Burton Avenue will potentially intrude into the water table at the Burton Avenue connection by 0.7 m such that limited dewatering may be required if service connections are installed during high water table period (March – May). As such, calculations were completed to assess potential dewatering volumes under these conditions. However, if construction is completed during the summer / fall seasonal low water table conditions, water table is expected to be below the servicing connection elevations, as per the February, 2021 measurements (Appendix D).



A review of these items indicated that the maximum depths for the sanitary connections at Burton Avenue was at 228.44 masl, which are all below the maximum water table elevation of 229.39 masl for the Site in this location (BH21-1).

The following details and assumptions are included in this assessment:

- Construction ground water lowering will target a depth of 0.5 m below the base of the inverts to ensure dry working conditions;
- Water table depths are at or below the most elevated level observed at the Site, which is in close proximity to Burden Ave; and
- The entire length of sanitary servicing will be done at once which is 10 m in length and the width is 3 m.

The actual drawdown will depend on construction timing. It is therefore recommended that excavation / construction is completed in the dry summer months to avoid the need for dewatering.

6.1 Approximate Dewatering Volumes

For trench dewatering, the steady state method from Powers *et al.* (2007) used for rectangular excavations, where the length / width ratio is >1.5:

$$Q = \{[(\pi * K) * (H^2 - h^2)] / [\ln(R_o/r_e)] + 2 * [a * K * (H^2 - h^2) / (2R_o)]\}$$

(Ref: Powers *et al.* (2007))

The full dewatering assessment can be found in Appendix F. The dewatering details for the sanitary servicing connections are provided in Table 9 below.

Based on the information provided in Table 3, only very minimal ground water lowering will be required for the sanitary servicing. The dewatering volume is 2,500 L/day, while a 3x safety factor can then be applied which would make the volume 7,500 L/day. These values are based on worst case spring season ground water values. The dewatering volume is anticipated to not be required during dry summer months.

Any construction dewatering between 50,000 L/day and 400,000 L/day can be completed after registration under the Environmental Activity and Sector Registry (EASR). Any active construction dewatering above 400,000 L/day requires a Permit to Take Water (PTTW). As noted above, the magnitude of dewatering required will vary on the timing



of construction and less or no dewatering could be needed in the summer drought conditions. Based on the limited dewatering volumes, no permitting is required and any ground water encountered can likely be handled relatively informally, such as discharge and containment on site if required.

Table 9: Summary of Dewatering Conditions (Appendix F)

Variable	Sanitary Sewer Connection
Estimate of Equivalent Radius [r_e] (m)	4
Hydraulic Conductivity [K] (m/s)	2.3×10^{-6}
Maximum Required Drawdown [$H-h$] (m)	1.2
Saturated Thickness Before Pumping [H] (m)	1.7
Depth of Water During Pumping [h] (m)	0.5
length of excavation [a] (m)	10
width of excavation [b] (m)	3
Radius of Influence [R] (m) ¹	10
Discharge [Q] (L/day)	2,500
Discharge [Q] (L/day) 3 X Safety Factor Applied	<u>7,500</u>

6.2 Impact Assessment

Based on the information provided in Table 9, the largest zone of influence is 10 m, while the overall decline in water levels is quite limited due to the shallow intrusion in the water table. As such, no off-site impacts are expected as a result of any Site dewatering.

Given the potential for dewatering has shown to be limited, the small volumes potentially handled would not necessitate a formal dewatering discharge plan. It is assumed that all potential discharge can either be handled on-site. Mitigation measures would likely just be a tank or enviro-bag prior to discharge off-site storm sewer (if required).

6.3 Water Quality

A water sample was collected from BH21-1 on May 27th, 2020 to determine the on-site ground water quality in preparation for potential dewatering activities, while water quality results are also available from the Phase II ESA completed by Envision. The Azimuth results are included in Appendix D and have been compared to the Provincial Water Quality Objectives (PWQO), while the lab report from the Envision results has been included un-edited. All parameters met the PWQO with the exception of total phosphorus and aluminum.

The aluminum exceedance (0.08 mg/L), which is only marginally above PWQO (0.075 mg/L) is not seen as a concern as is commonly elevated in ground water due to the fact it is a naturally abundant earth element. The total phosphorus concentrations is more significantly elevated, but is interpreted to be sourced to the elevated sediment load in the



sample as evidenced by the elevated turbidity (1,180 NTU). The nutrient analysis was completed on water that was unfiltered, and therefore contained a high concentration of sediment particles. The increased phosphorus is therefore likely attributed to the excess nutrients that are bound to the sediment grains in suspension and dissolved within the acidified nutrients bottle. Sodium (150 – 1,000 mg/L) and chloride (800 – 1,320 mg/L) concentrations were noted to be elevated, which is likely associated with road salt application on Burton Avenue. The nitrate concentrations are also elevated (4.9 mg/L), which could be the result of leaky sewer infrastructure along Burton Avenue.

Finally, a suite of volatile organic compounds (VOCs) and Petroleum Hydrocarbons (PHCs) were analyzed for at the Site monitoring wells. The results indicated only a single trace detection of toluene at BH21-4 (0.48 ug/L), which given the lack of any other measurable organic parameter concentration would indicate that the results may be anomalous. This was confirmed with an additional sample collected on July 20th, 2023, which indicated no detection for toluene.

Overall, the water quality would not be detrimental if maintained on-site or discharged to the storm sewers as all parameters are noted to meet City of Barrie Storm Sewer Bylaw criteria if required.

7.0 SUMMARY AND CONCLUSIONS

Azimuth was retained by Monolite Holdings Inc. to conduct a Hydrogeological Assessment for the property located at 181 Burton Avenue, within the City of Barrie, Ontario. The Site is rectangular in shape and is approximately 1,995 m² in size and is accessed via Burton Avenue. The Site is bound by Burton Avenue to the north, commercial properties to the east and west and vacant land to the north. The Site is at an elevation of 232 masl along Burton Avenue sloping down to 229 masl at the north end of the Site which directs existing surface runoff towards a small isolated wetland area immediately north of the Site. The Site will be developed as a single multi unit residential building with at grade parking at the north end of the Site.

Boreholes logs from the Site show the subsurface is composed of approximately 3 m silty sand fill overlying a native sand or silty sand material. The inferred ground water flow direction is generally to the north following local topography towards Lake Simcoe. Ground water elevations at the Site were measured between 227.57 and 229.39 masl. Hydraulic conductivity testing was completed within the monitoring well BH21-1 & 21-4 at the Site by Azimuth staff. Slug test data indicates that the hydraulic conductivity of the deposits is $\sim 2 \times 10^{-6}$ m/s.



The pre-development infiltration volume is 545 m³/year. This assumes the Site is composed of treed and grassed areas. The post-development without mitigation infiltration volume is 169 m³/year, which is a deficit of 376 m³/year. This assumes the Site is composed of the above noted residential development. An additional 351 m³/year of infiltration can be obtained through LID capture (infiltration gallery). As a result of this mitigation measure, the post-development with mitigation volume is therefore 520 m³/year which represents a small decrease of 25 m³/year (-5%) from the pre-development configuration. Given this limited post-development infiltration deficit, no off-setting payments are required by the LSRCAs as per their Water Balance Offsetting Policy (2023) (<100 m³/year).

As all post development surface runoff will be directed into the existing stormwater infrastructure along Burton Avenue, there will be a reduction in surface water contributions of 424 m³/year to the wetland to the north of the Site, the maintenance of ground water infiltration through the ground water infiltration chambers and additional infiltration in the shallow soil profile through the permeable pavers will offset the surface runoff reductions such that there is not expected to be a meaningful reduction of water contributions to the adjacent feature.

Based on the ground water elevations and details related outlined on the development plan, all foundations and infrastructure will be located above the water table with the exception of the sanitary sewer connections at Burton Avenue. However, the intrusion is considered limited (~0.7 m) and of limited length (~10 m). It is also noted that this intrusion is only present during spring high water table conditions such that if the connections are completed during the summer and fall low water table conditions, dewatering will not be required. Despite this, a dewatering assessment was completed to assess requirements if these connections were completed during the spring high water table conditions. The daily water taking volume estimate is quite limited at 2,500 L/day or 7,500 L/day with a 3x safety factor. As such, no permitting would be required for any dewatering and it is likely that any ground water could be dealt with relatively informally with a sump and discharge on-site. The largest zone of influence is 10 m from the dewatering zone such that all drawdown will be maintained within the Site boundaries or road alignment.

Azimuth completed in-situ percolation testing at the site in July 2023 targeting the proposed LID location. The assessment was focused on the existing soil beneath the previously proposed LID locations to determine suitable infiltration rate for use in detailed design. The design infiltration rates for the Site are 93 to 99 mm/hr. After applying a correction factor of 2.5, the design infiltration rates for the Site is 39 mm/hr.



The results for the Site indicate that the infiltration rate for the material at the base of the LID is considered moderate to high.

8.0 REFERENCES

- Barnett, P.J., Cowan, W.R. and Henry, A.P. 1991. Quaternary Geology of Ontario, Ontario Geological Survey, Map 2556, Scale 1:1,000,000.
- Cambium Inc., 2020. Scoped Environmental Impact Study – 181 Burton Avenue, Barrie, ON
- Chapman L.J., and D.F. Putnam, 1984. The Physiography of Southern Ontario. 3rd Edition, OGS Special Volume 2, Ministry of Natural Resources.
- WSP, 2021. Three Storey Development, 181 Burton Ave, Barrie - Geotechnical Investigation
- Hoffman, D.W. & N.R. Richards, 1962. Soil Survey of Peel County. Report No. 18 of the Ontario Soil Survey.
- Ontario Geological Survey (OGS).2021. OGS Earth Mapping. Obtained from: <https://www.mndm.gov.on.ca/en/mines-and-minerals/applications/ogsearth>
- Ontario Ministry of the Environment and Climate Change (MOECC), 1995. MOEE Hydrogeological Technical Information Requirements for Land Development Applications.
- Pearson Engineering, 2023. Stormwater Management Report – 181 Burton Avenue, City of Barrie (Revised February 2023).
- Thornthwaite, C.W., and Mather, J.R., 1957. Instructions and tables for computing potential evapotranspiration and the water balance. Climatology, vol. 10.
- Toronto and Region Conservation Authority (TRCA) and Credit Valley Conservation (CVC). 2010. Low Impact Development Stormwater Management Planning And Design Guide. Version 1.



APPENDICES

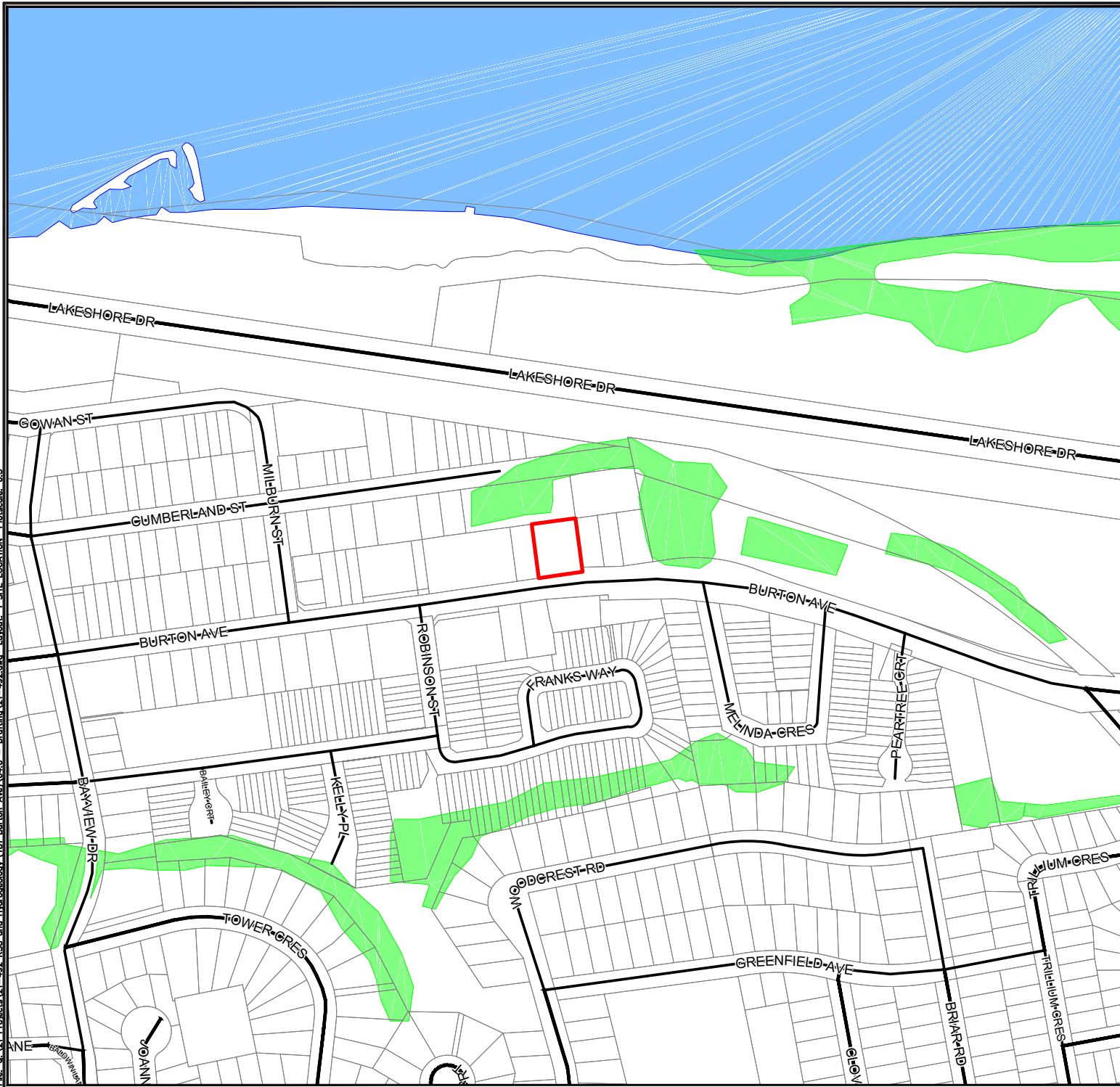
- Appendix A: Figures**
 - Appendix B: Site Plan**
 - Appendix C: MECP Well Records**
 - Appendix D: Borehole Logs & Ground Water Elevations**
 - Appendix E: Hydraulic Conductivity Testing Results**
 - Appendix F: Dewatering Analysis**
 - Appendix G: Water Quality Results**
 - Appendix H: Water Balance Summary**
 - Appendix I: Guelph Permeameter Testing Results**
-
-



APPENDIX A

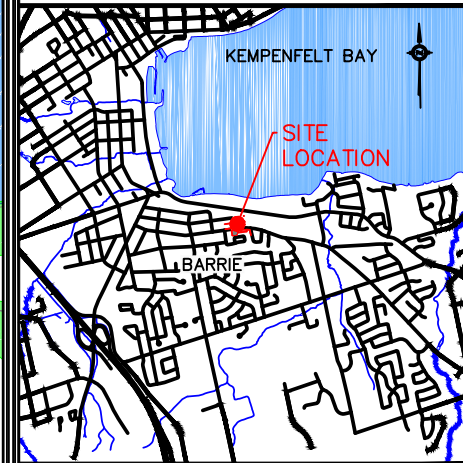
Figures

Plotted by: MCCARTNEY on June 8, 2022 at 5:51pm
File: C:\21-492-RSC and Hydrology\181 Burton Ave\04.0 - Drafting\21-492.dwg Layout: 1 SITE LOCATION PlotScale: 0.5



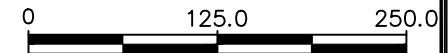
LEGEND:

----- APPROX. PROPERTY BOUNDARY



REGIONAL MAP

SCALE 1: 75000



HORIZONTAL SCALE 1: 5000



SITE AREA LOCATION

181 BURTON AVE,
BARRIE, ON

DATE ISSUED: JUNE 2022

CREATED BY: JM

PROJECT NO.: 21-492

REFERENCE: SIMCOE COUNTY

Figure No.

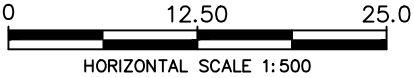
1

Plotted by: AUJ on July 28, 2023 at 11:24am
File: \\schubert\work\DATA\Projects\21-492_RSC and Hydrogeology\181_Burton_Ave\04.0 - Drafting\21-492.dwg Layout: 2 SITE PLAN PlotScale: 0.5



LEGEND:

- APPROX. PROPERTY BOUNDARY
- EXISTING MONITORING WELL LOCATIONS
- EXISTING BOREHOLE LOCATIONS
- WETLAND
- GUELPH PERMEAMETER TEST LOCATION
- TEST PIT LOCATION



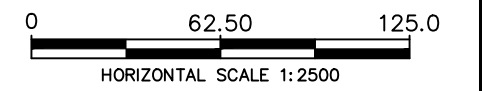
SITE PLAN

181 BURTON AVE.,
BARRIE, ON

DATE ISSUED:	AUGUST 2023	Figure No. 2
CREATED BY:	JM	
PROJECT NO.:	21-492	
REFERENCE:	SIMCOE COUNTY	

LEGEND:

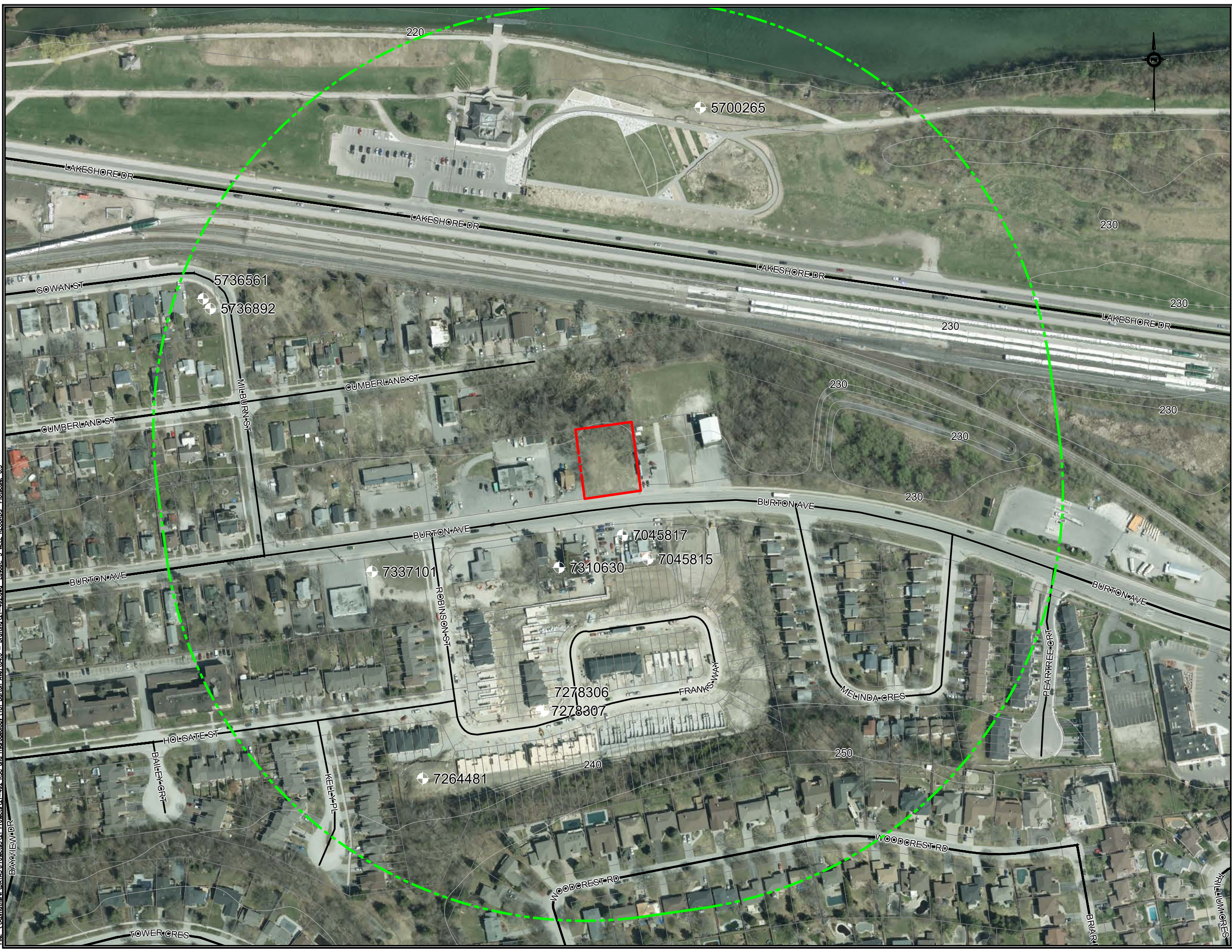
- APPROX. PROPERTY BOUNDARY
- 300m STUDY AREA
- WATER WELL LOCATIONS
- 10m OBM CONTOURS



WELL RECORDS

181 BURTON AVE.,
BARRIE, ON

DATE ISSUED:	AUGUST 2023	Figure No. 3
CREATED BY:	JM	
PROJECT NO.:	21-492	
REFERENCE:	SIMCOE COUNTY	



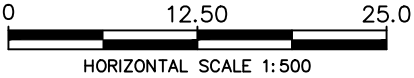
Plotted by: AUJ on July 28, 2023 at 11:25am
File: \\schubert\work\DATA\21-492\BSC and Hydrogeology\181 Burton Ave\04.0 - Drafting\21-492.dwg Layout: 3 WELL RECORDS PlotScale: 0.5

Plotted by: AUJ on July 28, 2023 at 11:25am
File: \\schubert\DATA\Projects\21-492_RSC and Hydrogeology\181 Burton Ave\04.0 - Drafting\21-492.dwg Layout: 4 GW INFO PlotScale: 0.5



LEGEND:

- APPROX. PROPERTY BOUNDARY
- EXISTING MONITORING WELL LOCATIONS
- EXISTING BOREHOLE LOCATIONS
- GUELPH PERMEAMETER TEST LOCATION
- TEST PIT LOCATION
- GROUND WATER LEVEL (April 28, 2022)
- 0.1m GROUND WATER CONTOURS
- 0.1m INFERRED GROUND WATER CONTOURS



GROUND WATER INFORMATION

181 BURTON AVE.,
BARRIE, ON

DATE ISSUED:	AUGUST 2023	Figure No. 4
CREATED BY:	JM	
PROJECT NO.:	21-492	
REFERENCE:	SIMCOE COUNTY	



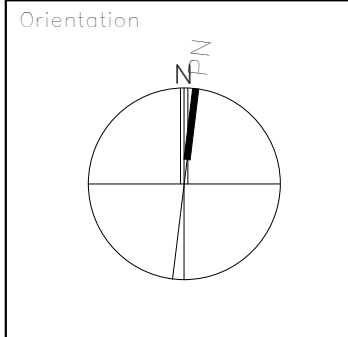
APPENDIX B

Development Plan



#	Description	Date
1	CLIENT REVIEW	APR 23, 2019
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		
37		
38		
39		
40		
41		
42		
43		
44		
45		
46		
47		
48		
49		
50		
51		
52		
53		
54		
55		
56		
57		
58		
59		
60		
61		
62		
63		
64		
65		
66		
67		
68		
69		
70		
71		
72		
73		
74		
75		
76		
77		
78		
79		
80		
81		
82		
83		
84		
85		
86		
87		
88		
89		
90		
91		
92		
93		
94		
95		
96		
97		
98		
99		
100		

Stamp



Client Information
MARIA ROZENTS

Project
181 BURTON -
RESIDENTIAL

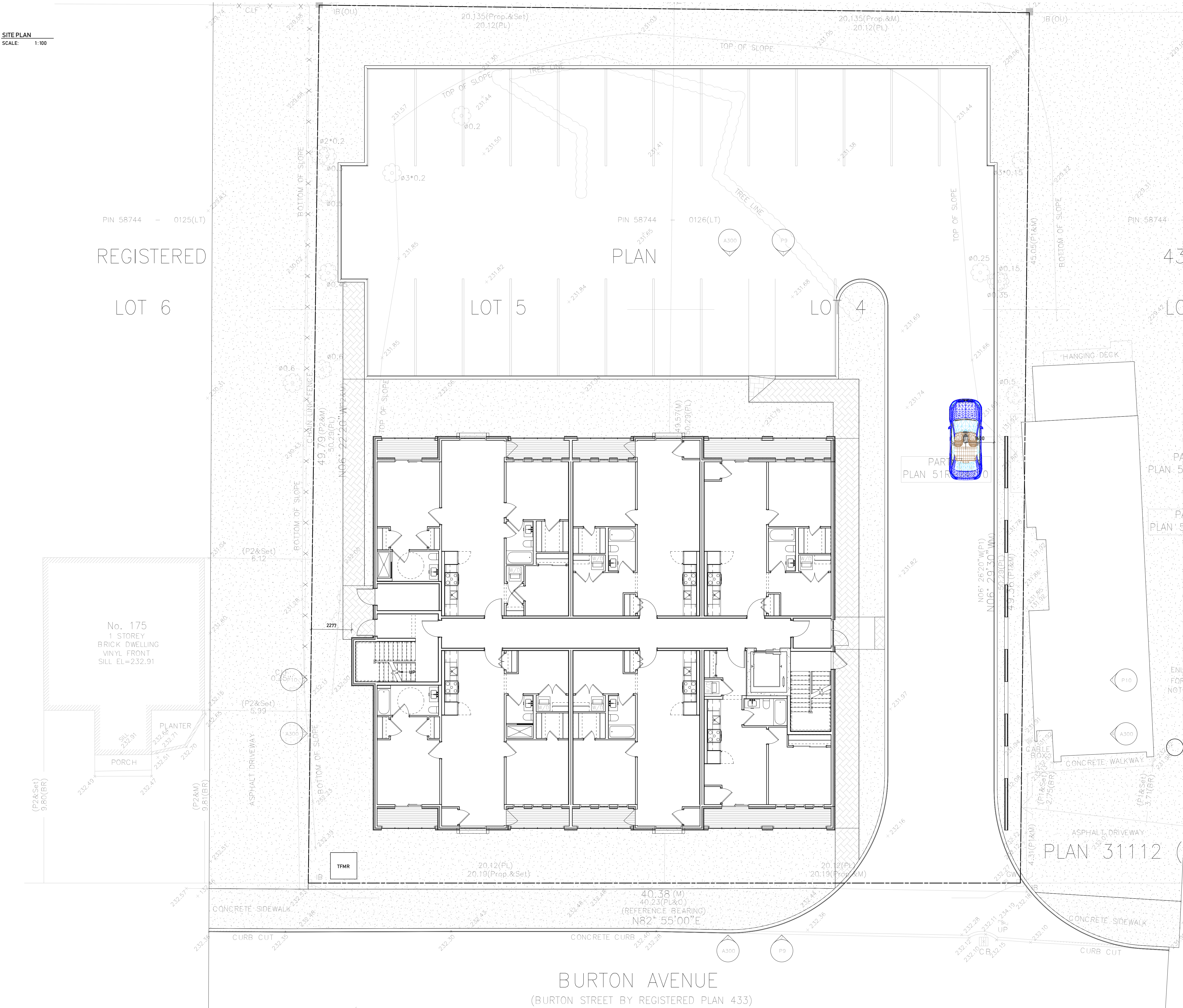
Project Information
Project No.: 194060
Drawn by: JB
Checked by: ISM
Date: APRIL 16, 2019
Scale: As indicated

Drawing
SITE PLAN

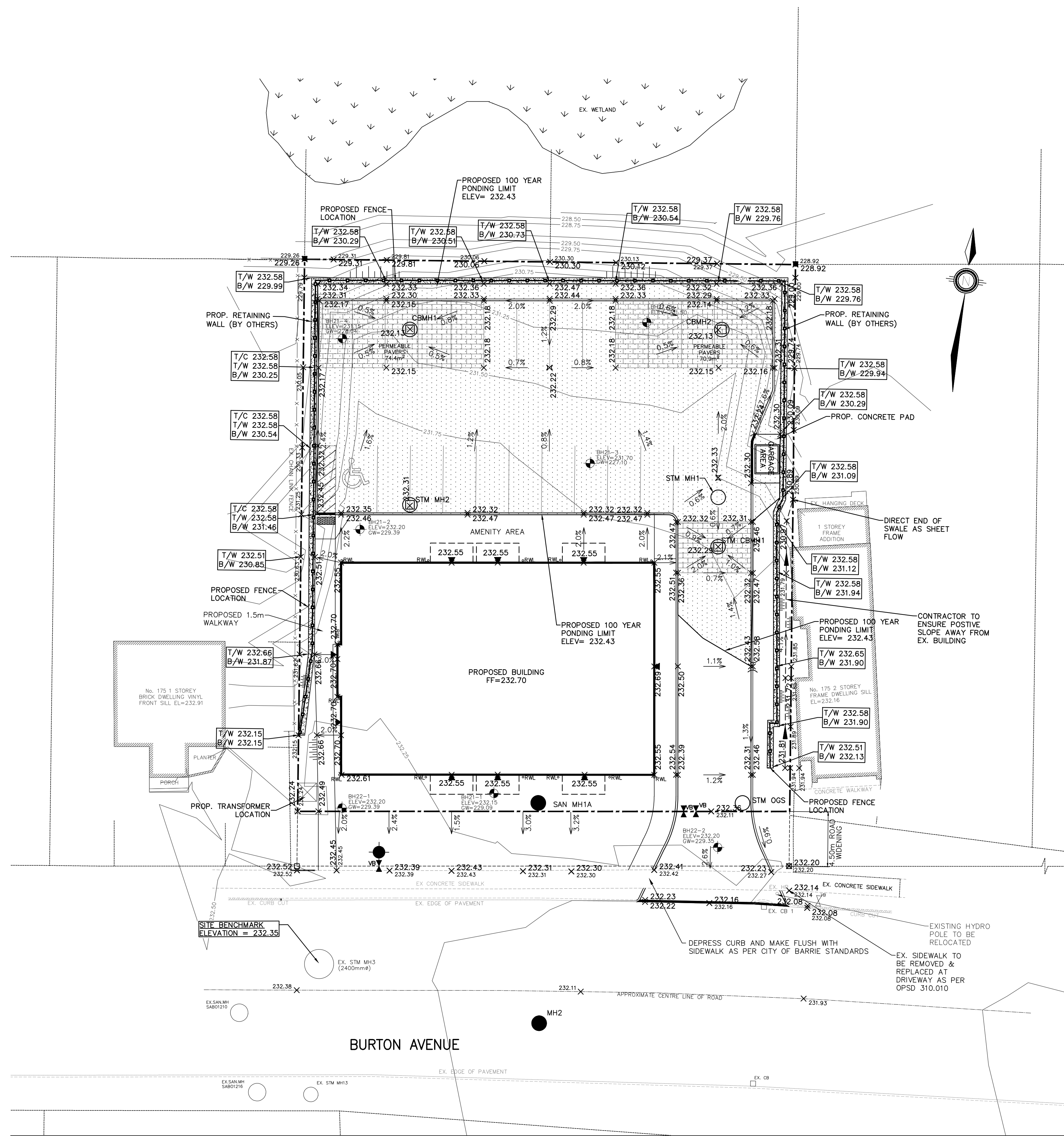
Drawing No.
A100

STANDARDS			
	REQUIRED BY BY-LAW (CURRENT - C4)	REQUIRED BY BY-LAW (REZONING - MU2)	PROPOSED
LOT AREA (min.)	450 m ²	- m ²	1,998.94 m ²
LOT FRONTAGE (min.)	15 m	- m	40.38 m
FRONT YARD (min.)	6 m	1m(75%)-5m(25%)	3.00 m
WEST INTERIOR SIDE YARD (min.)	3 m	13.25 m	2.27 m
EAST EXTERIOR SIDE YARD (min.)	3 m	3 m (max.)	3.15 m - WALL 0.85 m - COLUMN
REAR YARD (min.)	7 m	7 m	24.13 m
NUMBER OF UNITS	-	-	22
GROUND FLOOR AREA	-	-	556.71 m ²
GROSS FLOOR AREA	-	-	1,787.03 m ²
COMMERCIAL AREA	20%	50% GFA main floor	0% - 0 m ²
DWELLING UNIT AREA (min.)	35m ² + 10m ² /bedroom	35m ² + 10m ² /bedroom	One Bedroom: 55m ² Two Bedroom: 62m ² Three Bedroom: 94m ²
LOT COVERAGE (max.)	50%	-%	37.5% - 750.46m ²
LANDSCAPING (min.)	-	35%	48.7% - 7777m ²
G.F.A. (max.)	-%	-%	1,787.03m ² - 89.4%
AMENITY AREA (min.)	12m ² /unit (216m ²)	12m ² /unit (272m ²)	balcony (- m ²) + ground (- m ²) + - m ²
BUILDING HEIGHT (min.)	14 m	7.5-25.5 m	12.6 m
PARKING (min.)	1 space per unit @ 2.7mx5.5m + 18 spaces 1/30m ² + 12	1 space/unit @ 2.7mx5.5m + 18 spaces 1 space/24m ² commercial gfa = 14	22 spaces + 1/unit
DRIVE AISLE WIDTH (min.)	6.4 m	6.4 m	6.4 m
BARRIER FREE (min.)	1Type A @ 3.4mx5.5m & Each B.F. space shall contain a 1.5m access aisle	1Type A @ 3.4mx5.5m & Each B.F. space shall contain a 1.5m access aisle	1Type A @ 3.4mx5.5m C/W a B.F. access aisle of 1.5m in width
LANDSCAPED BUFFER STRIP	-	3 m landscaped buffer side and rear lot line	-
DENSITY (max.)	-	-	110 units/hectare

Zoning Standard
SCALE: 1:1

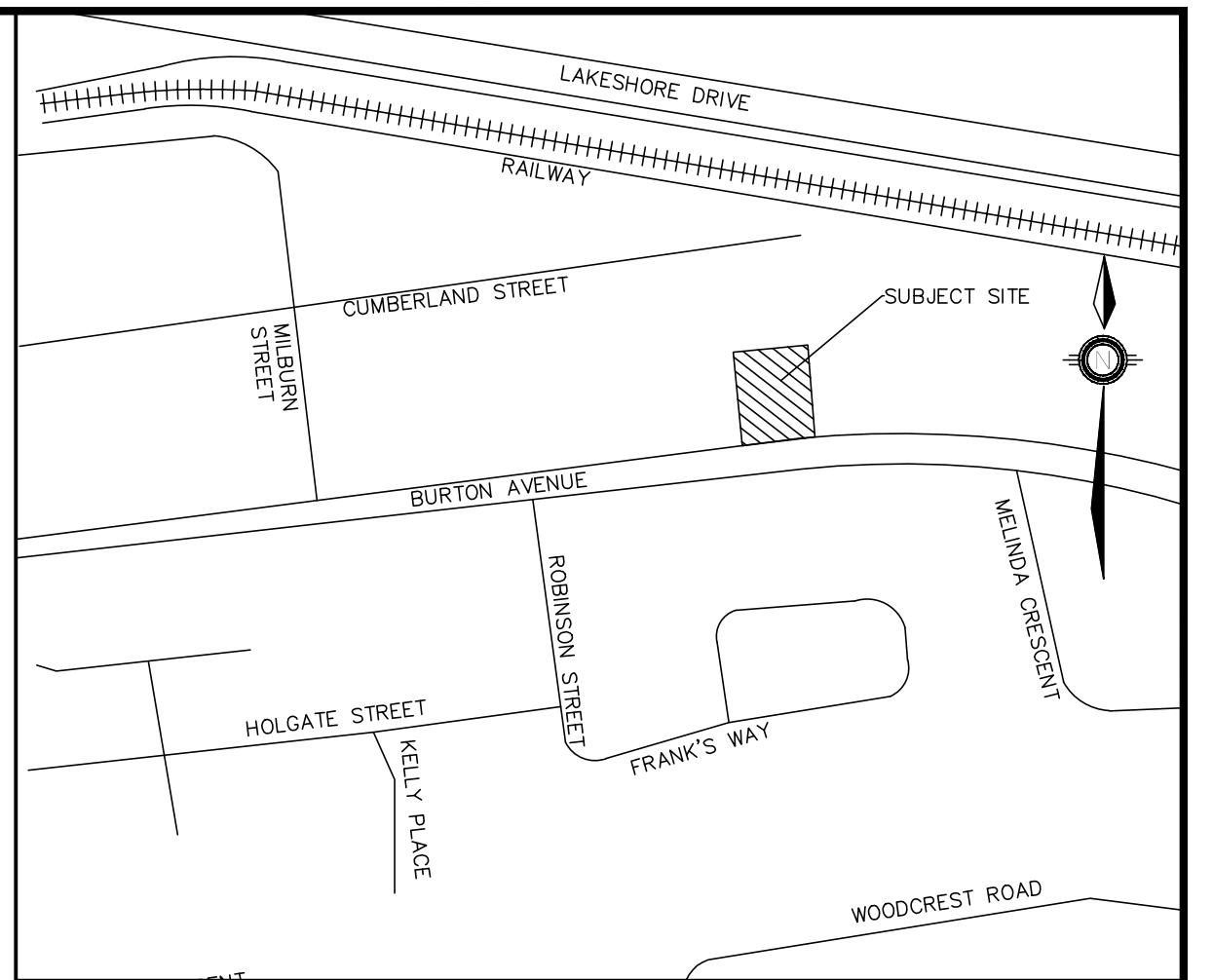
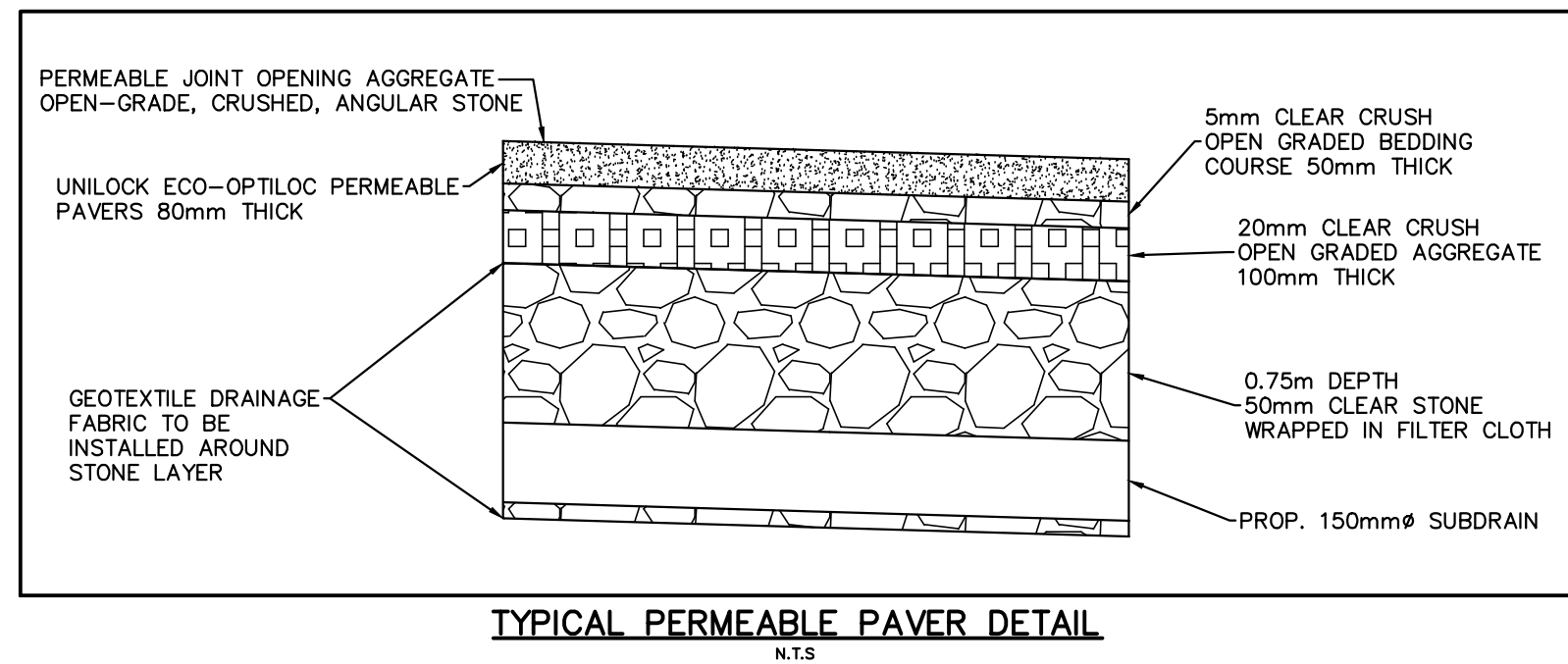
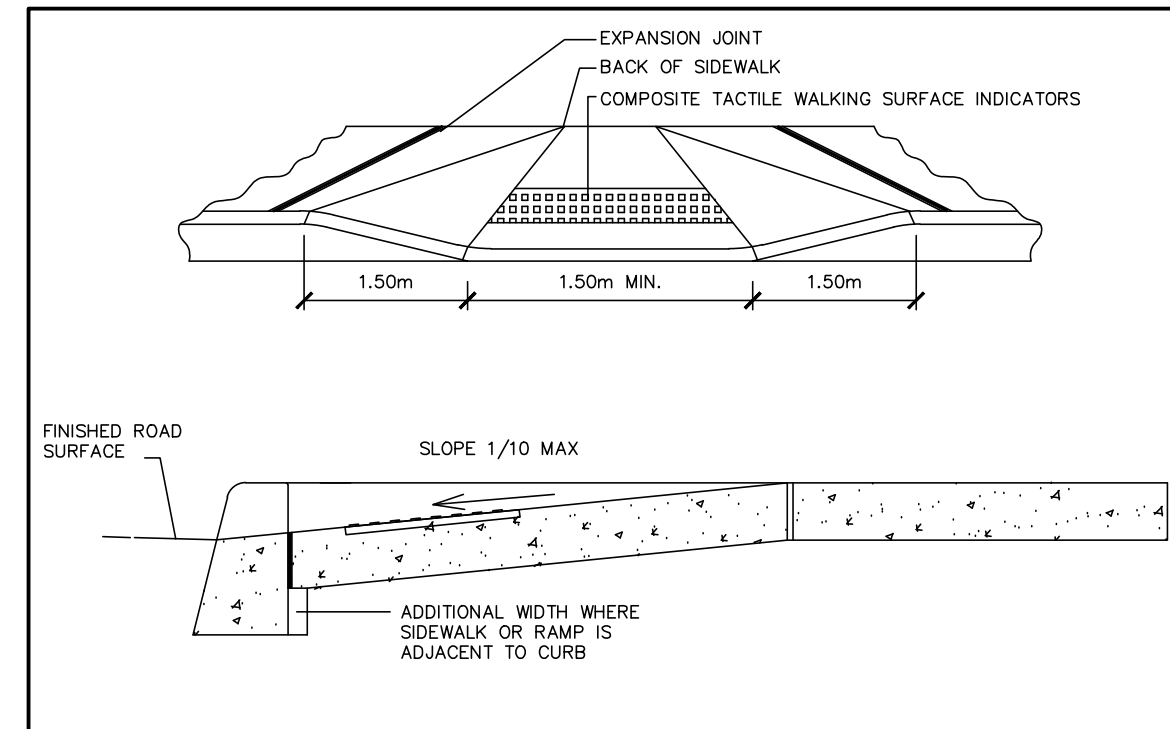


C:\Users\jpearce\AppData\Local\Temp\Aschubian_13940\19100-BASE.dwg Layout: SG-1 Plotted May 12, 2023 @ 4:02pm by jpearce © PEARSON ENGINEERING LTD.



ALL PROPOSED RETAINING WALLS TO BE DESIGNED BY OTHERS.
ALL T/W AND B/W REPRESENTS TOP OF WALL AND BOTTOM OF WALL RESPECTIVELY. THIS DOES NOT INCLUDE BURIED DEPTH.

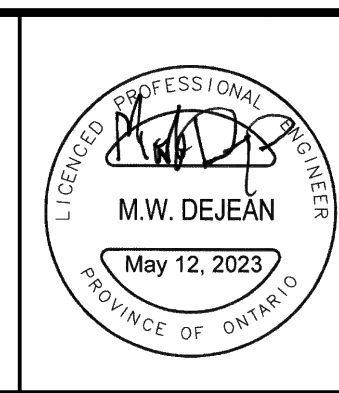
SUB-EXCAVATION NOTES:
1. CONTRACTOR TO STRIP TOPSOIL AND SUB-EXCAVATE POOR SOILS TO THE SATISFACTION OF THE GEOTECHNICAL CONSULTANT.
2. BACKFILL WITH SUITABLE FILL AS PER OPS ENGINEERED FILL STANDARDS.
3. SOIL AND COMPACTION REPORT TO BE PROVIDED TO LAND OWNER.



- KEYPLAN**
N.T.S.
- LEGEND**
- CB □ CATCH BASIN
 - DCB □ DOUBLE CATCH BASIN
 - CBMH ⊕ CATCH BASIN
 - MH ○ STORM MANHOLE
 - MH ● SANITARY MANHOLE
 - SERVICE CAP
 - HYD. ♦ FIRE HYDRANT
 - VB ▲ WATER VALVE
 - × 254.63 PROPOSED ELEVATION
 - 254.09 EXISTING ELEVATION
 - 1.5% PROPOSED DIRECTION AND GRADE
 - ← BACK OF CURB
 - EDGE OF PAVEMENT
 - CURB CUT LOCATION
 -) (HIGH POINT
 - ±RWL PROP. RAINWATER LEADER
 - ▼ MANDOOR
 - PROP. RETAINING WALL (BY OTHERS)
 - PROP. PERMEABLE PAVERS
 - PROP. FENCE LOCATION
 - 100 YEARS PONDING LIMITS
ELEV. 232.43
 - BH20-1 BOREHOLE NUMBER
ELEV. 232.20
OP-238.10
EXISTING GRADE ELEVATION
GROUNDWATER ELEVATION
GROUNDWATER ELEVATIONS AS PER AZIMUTH
HYDRO G REPORT DATED JUNE 2022

1	AS PER CITY OF BARRIE COMMENTS	05/12/23	JP	
NO.	REVISION NOTE	DATE	BY	

BENCHMARK:
EXISTING STORM MANHOLE 3 ON BURTON AVENUE LOCATED SOUTH OF THE SOUTH WESTERN PROPERTY CORNER.
ELEVATION = 232.35



APARTMENT DEVELOPMENT
181 BURTON AVENUE
BARRIE, ON

SITE GRADING PLAN



DESIGNED BY	PG/MWD	HORIZ SCALE	1:200	PROJECT #	19100
DRAWN BY	PG	VERT SCALE		DRAWING #	SG-1
CHECKED BY	GMP	DATE	OCTOBER 2021	REVISION #	1



APPENDIX C

MECP Well Records

UTM 17T 604 835 E

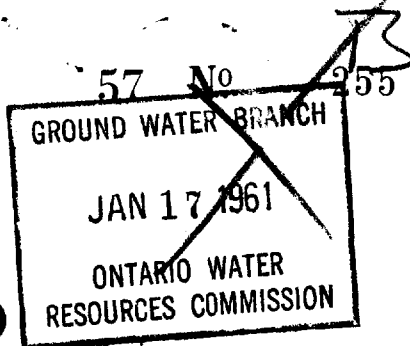
491 3901 N

Elev. 970.50

Basin 27 INTERNATIONAL WATER SUPPLY



The Ontario Water Resources Commission Act, 1957



ANS.

WATER WELL RECORD

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

Con. — Lot ✓ Date completed 11 10 60
(day) (month) (year)

Owner Barrie P.U.C. Address al
(print in block letters)

Casing and Screen Record

Pumping Test

Inside diameter of casing 2" "rotary" (5" nrlc). Static level flow
Total length of casing 213' Test-pumping rate 75 I G.P.M.
Type of screen slatted pipe Pumping level 1' - 15 1/8"
Length of screen 15-3 Duration of test pumping 6 hrs.
Depth to top of screen 213' Water clear or cloudy at end of test clear
Diameter of finished hole 5" Recommended pumping rate — G.P.M.
with pumping level of —

Well Log

2/60

Water Record

Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	No. of feet water rises	Kind of water (fresh, salty, sulphur)
<u>Sand & gravel</u>	<u>0</u>	<u>4</u>			
<u>sand</u>	<u>4</u>	<u>13</u>			
<u>sand gravel, boulders streaked</u>	<u>13</u>	<u>26</u>			
<u>Blue clay</u>	<u>26</u>	<u>28</u>			
<u>silty clay</u>	<u>28</u>	<u>33</u>			
<u>Blue clay</u>	<u>33</u>	<u>40</u>			
<u>Blue clay & gravel hard packed</u>	<u>40</u>	<u>49</u>			
<u>Gravel sand & boulders</u>	<u>49</u>	<u>55</u>			
<u>Sandy blue clay & gravel streak</u>	<u>55</u>	<u>65</u>			
<u>Hard Blue clay</u>	<u>65</u>	<u>74</u>			
<u>Sandy blue clay</u>	<u>74</u>	<u>99</u>			
<u>Hard silty blue clay</u>	<u>99</u>	<u>133</u>	<u>213-284</u>	<u>213+</u>	<u>FRESH</u>
<u>Sandy clay</u>	<u>133</u>	<u>150</u>			
<u>Packed fine sand fine gravel and clay streaks</u>	<u>150</u>	<u>206</u>	<u>w-becoming</u>	<u>See above</u>	

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

T.H. for Mun. W-S.

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

Drilling Firm International Water Supply Ltd.

Address 12 Maitland St

London Ont

Licence Number 121

Name of Driller C. E. Magee

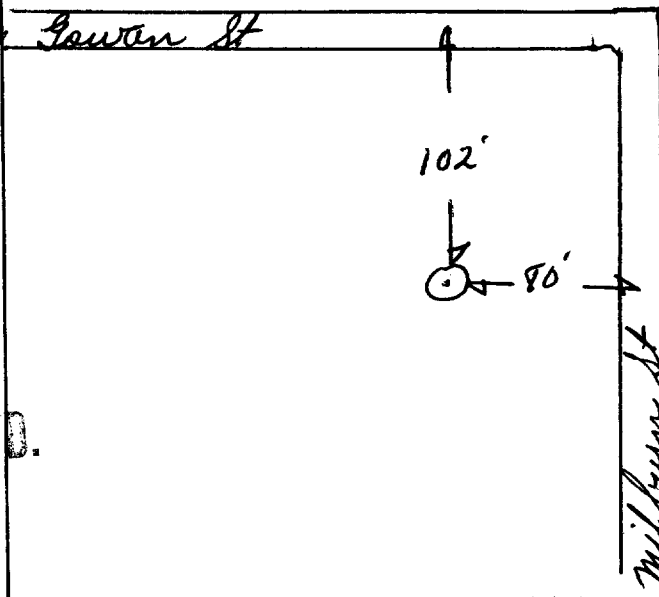
Address Same

Date Oct 24-60

DW Hamer
Signature of Licensed Drilling Contractor
INTERNATIONAL WATER SUPPLY LTD.
LONDON ONTARIO

Location of Well

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



B test 22-60
Page 2 of 2
NOV 25 1960
INTERNATIONAL WATER SUPPLY LTD.



GROUND WATER BRANCH
JAN 17 1961
ONTARIO WATER
RESOURCES COMMISSION

The Ontario Water Resources Commission Act, 1957

WATER WELL RECORD

ANS. _____
County or District Simcoe Township, Village, Town or City Barrie
Con. _____ Lot _____ Date completed 11 10 60
(day month year)
Owner Barrie P.M.C. Address _____
(print in block letters)

Casing and Screen Record	Pumping Test
Inside diameter of casing.....	Static level.....
Total length of casing.....	Test-pumping rate..... G.P.M.
Type of screen.....	Pumping level.....
Length of screen.....	Duration of test pumping.....
Depth to top of screen.....	Water clear or cloudy at end of test.....
Diameter of finished hole.....	Recommended pumping rate..... G.P.M.
	with pumping level of.....

Well Log <u>2/60</u>			Water Record		
Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	No. of feet water rises	Kind of water (fresh, salty, sulphur)
<u>Sandy blue clay</u>	<u>206</u>	<u>210'</u>	<u>w-bearing</u>		
<u>Rocky fine sand & fine gravel</u>	<u>210</u>	<u>228'</u>			
<u>Blue clay</u>	<u>228'</u>	<u>244'</u>			
<u>Sandy blue clay & gravel</u>	<u>244</u>	<u>245</u>			
<u>Blue clay</u>	<u>245</u>	<u>253</u>			
<u>Sandy blue clay & gravel streaks</u>	<u>253</u>	<u>264</u>	<u>Possible w-bearing str.</u>		
<u>Gravel sand & boulders & clay</u>	<u>264</u>	<u>272'</u>			
<u>Sandy gray clay hard packed</u>	<u>272</u>	<u>284'</u>			

For what purpose(s) is the water to be used?
.....
Is well on upland, in valley, or on hillside?.....
.....
Drilling Firm International Water Supply Ltd.
Address 12 Maitland St.
London Ont.
Licence Number.....
Name of Driller C. B. Magu
Address Same
Date Oct 24-60
INTERNATIONAL WATER SUPPLY LTD.
(Signature of Licensed Drilling Contractor) LONDON ONTARIO

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

265

Elev. | 9 | R | 0 | 7 | 2 | 5 |

WATER WELL RECORD

Basin 22
County or District 5711012

Township, Village, Town or City **BARRIE**

Con. _____ Lot _____ Date completed 22 11 1962
(day month year)

Owner BARRIE PUC

Address BARRIE ONT

(print in block letters)

Casing and Screen Record

NEGATIVE TEST WELL

Pumping Test

Inside diameter of casing	NA
Total length of casing	NA
Type of screen	NA NO CASING
Length of screen	ROTARY NA
Depth to top of screen	NA
Diameter of finished hole	5 1/2" DIAM. OPEN HOLE

Static level *NA*

Test-pumping rate *NA* G.P.M.

Pumping level *NA*

Duration of test pumping *NA*

Water clear or cloudy at end of test *NA*

Recommended pumping rate *NA* G.P.M.

with pump setting of *NA* feet below ground surface

Well Log

Water Record

Overburden and Bedrock Record

SAND
SAND & GRAVEL STREAKS
SANDY CLAY & GRAVEL
BLUE CLAY "HARD"
FINE SAND & GRAVEL STREAKS & SANDY CLAY
STREAKED
BLUE CLAY SANDY & GRAVEL STREAKS
BLUE CLAY
FINE SAND & CLAY & GRAVEL
BLUE CLAY
FINE SAND

From ft.	To ft..	Depth(s) at which water(s) found	Kind of water (fresh, salty, sulphur)
0	9		
9	27	NA	NA
27	58	↓	↓
58	77		
77	87		
87	96		
96	105		
105	119		
119	149		
149	162		

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

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

Drilling or Boring Firm. *INTERNATIONAL WATER*

Supply LT12

Address Box 2483 LONDON, ONT.

Box 535 OAKVILLE ONT.

Licence Number

Name of Driller or Borer *C. MAGEE*

Address

Date DEC 6-62

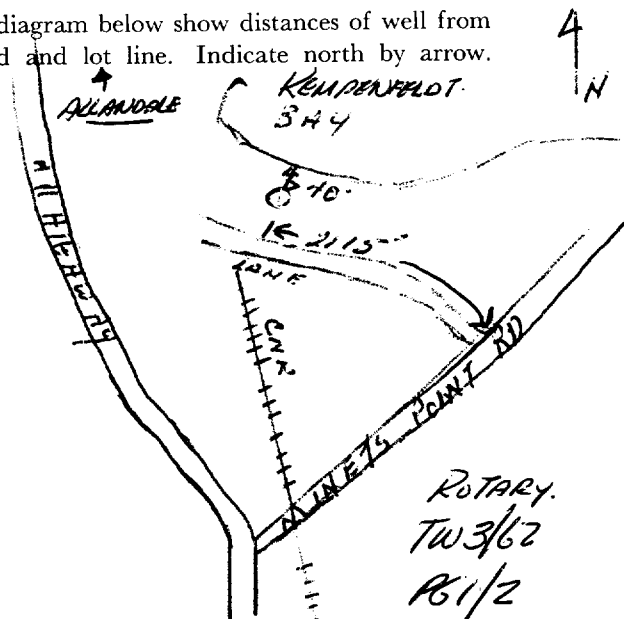
(Signature of Licensed Drilling or Boring Contractor)

Form 7 15M Sets 60-5930

OWRC COPY

Location of Well

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



ROTARY
TW 3/62
R 1/2

CS5.38

TEST #3-62 73E
R 491 40917N
Elev. R 0725



GROUND WATER BRANCH
AUG 26 1962
ONTARIO WATER
RESOURCES COMMISSION

57 No 265

WATER WELL RECORD

Basin 122
County or District SIMCOE
Township, Village, Town or City BARRIE
Con. Lot Date completed 22 11 1962
(day month year)
Owner BARRIE PUC (print in block letters) Address BARRIE ONT

Casing and Screen Record

NEGATIVE TEST WELL

Pumping Test

Inside diameter of casing NA
Total length of casing NA
Type of screen NA NO CASING
Length of screen NA
Depth to top of screen NA
Diameter of finished hole 5 1/2" DIAM. OPEN HOLE

Static level NA
Test-pumping rate NA G.P.M.
Pumping level NA
Duration of test pumping NA
Water clear or cloudy at end of test NA
Recommended pumping rate NA G.P.M.
with pump setting of NA feet below ground surface

Well Log

Water Record

Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	Kind of water (fresh, salty, sulphur)
SAND	0	9		
SAND & GRAVEL STREAKS	9	27	NA	NA
SANDY CLAY & GRAVEL	27	58	↓	↓
BLUE CLAY "HARD"	58	77		
FINE SAND & GRAVEL STREAKS & SANDY CLAY STREAKED	77	87		
BLUE CLAY SANDY & GRAVEL STREAKS	87	96		
BLUE CLAY	96	105		
FINE SAND & CLAY & GRAVEL	105	119		
BLUE CLAY	119	149		
FINE SAND	149	162		

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

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

Drilling or Boring Firm INTERNATIONAL WATER SUPPLY LTD

Address Box 2483 LONDON ONT
Box 535 OAKVILLE ONT

Licence Number

Name of Driller or Borer C. MAGEE

Address

Date DEC 6 62

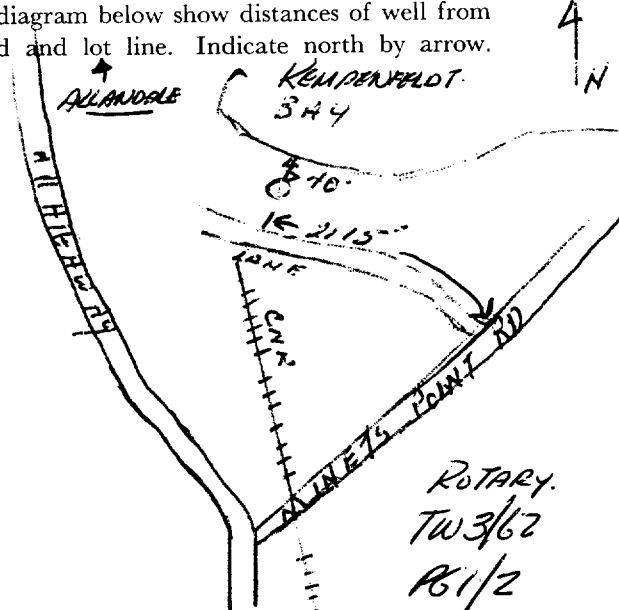
(Signature of Licensed Drilling or Boring Contractor)

Form 7 15M Sets 60-5930

OWRC COPY

Location of Well

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



ROTARY
TW 3/62
PG 1/2

CSS.S8



WATER WELL RECORD

Water management in Ontario 1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

COUNTY OR DISTRICT SINICOF	TOWNSHIP, CITY, TOWN, VILLAGE BARRIE	CON., BLOCK, TRACT, SURVEY, ETC. GOWAN ST.	LOT 25-27
OWNER (SURNAME FIRST) BARRIE Pte.	ADDRESS BARRIE ONTARIO	DATE COMPLETED 48-53 DAY 21 MO. 11 YR. 72	
ZONE 5709345 17	EASTING 604690	NORTHING 4913883	RC. ELEVATION 750
BASIN CODE 4		MAY 05, 1975 66	

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
Black	muck		Loose	0	1
Brown	sand &	gravel.	Loose	1	4
Brown	sand		Loose	4	9
Brown	sand	gravel & Brown clay	Laminated	9	27
Grey	clay	some stones	Soft	27	53
Grey	Gravel	& sand.		53'	67
Grey	clay	& gravel	Laminated	67	81
Grey	Sand	gravel & boulders	Laminated	81	83
Grey	clay		Hard	83	150
Grey	Solid fine & sand		packed	150	176
Grey	sand	fine gravel.	packed	176	178
Grey	fine sand	sand fine gravel layers & packed		178	208

41 WATER RECORD

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

51 CASING & OPEN HOLE RECORD

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

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER	LENGTH
	INCHES	FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN	41-44
		FEET

61 PLUGGING & SEALING RECORD

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

PUMPING TEST	71 PUMPING TEST METHOD 1 ☐ PUMP 2 ☐ BAILER	10 PUMPING RATE GPM.	11-14 DURATION OF PUMPING 15-16 HOURS 17-18 MINS.
	STATIC LEVEL 19-21 FEET	WATER LEVEL END OF PUMPING 22-24 FEET	WATER LEVELS DURING 15 MINUTES 26-28 FEET 30 MINUTES 29-31 FEET 45 MINUTES 32-34 FEET 60 MINUTES 35-37 FEET
	IF FLOWING, GIVE RATE See Sheet #2	38-41 PUMP INTAKE SET AT GPM.	WATER AT END OF TEST 42 FEET
	RECOMMENDED PUMP TYPE ☐ SHALLOW ☐ DEEP	RECOMMENDED PUMP SETTING	43-45 RECOMMENDED PUMPING RATE GPM.

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

CONTRACTOR	NAME OF WELL CONTRACTOR INTERNATIONAL WATER	LICENCE NUMBER
	ADDRESS Barrie Ont	
	NAME OF DRILLER OR BORER	LICENCE NUMBER
	SIGNATURE OF CONTRACTOR	SUBMISSION DATE DAY 18 MO. 12 YR. 72

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

OFFICE USE ONLY	58 CONTRACTOR	59-62 DATE RECEIVED 181272	63-68
	DATE OF INSPECTION Nov. 3/74	INSPECTOR P.J.B.	
	REMARKS:		



The Ontario Water Resources Commission Act

WATER WELL RECORD

Page 2 of 11 570 9345
316/5E

Water management in Ontario 1. PRINT ONLY IN SPACES PROVIDED

2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11

MUNICIP.

CON.

COUNTY OR DISTRICT

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE

CON., BLOCK, TRACT, SURVEY, ETC.

LOT 25-27

OWNER (SURNAME FIRST)

ADDRESS

DATE COMPLETED

48-53

DAY 21 MO. 11 YR. 72

ZONE

EASTING

NORTHING

RC.

ELEVATION

RC.

BASEIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
Grey	clay	sand & fine gravel	Layered	208	213
Grey	fine gravel	sand packed	Layered	213	230
Grey	clay		hard	230	243
Grey	clay	& gravel	Layered & hard packed	243	244
Grey	clay		hard	244	264
Grey	Gravel	sand & clay	Layered	264	273
Grey	sandy clay & gravel		hard packed	273	284
Brown	lime stone			284	286

3 021320538 023021128 0243205 0244205 0254205 0273 112805 11
34 0284205 0286615 32 43 54 65 75 80

41 WATER RECORD

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

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
10-11	1 ☒ STEEL	12		
	2 ☐ GALVANIZED			
	3 ☐ CONCRETE			
	4 ☐ OPEN HOLE			
17-18	1 ☒ STEEL	19		
	2 ☐ GALVANIZED			
	3 ☐ CONCRETE			
	4 ☐ OPEN HOLE			
24-25	1 ☐ STEEL	26		
	2 ☐ GALVANIZED			
	3 ☐ CONCRETE			
	4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.) 020

DIAMETER 02'00" INCHES

LENGTH 16' FEET

MATERIAL AND TYPE T.C. Black

DEPTH TO TOP OF SCREEN 0213' FEET

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

PUMPING TEST METHOD 1 ☒ PUMP 2 ☐ BAILER

PUMPING RATE 0037 GPM

DURATION OF PUMPING 06 HOURS 00 MINS

15-16 00 17-18 00

STATIC LEVEL 002 19-21 003 22-24 001 26-28 001 29-31 001 32-34 001 35-37 001

WATER LEVELS DURING 15 MINUTES 001 26-28 001 29-31 001 32-34 001 35-37 001

WATER LEVELS DURING 30 MINUTES 001 26-28 001 29-31 001 32-34 001 35-37 001

WATER LEVELS DURING 45 MINUTES 001 26-28 001 29-31 001 32-34 001 35-37 001

WATER LEVELS DURING 60 MINUTES 001 26-28 001 29-31 001 32-34 001 35-37 001

IF FLOWING, GIVE RATE 0.37 GPM

PUMP INTAKE SET AT 38-41 FEET

WATER AT END OF TEST 42 FEET

1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE 1 ☐ SHALLOW 2 ☐ DEEP

RECOMMENDED PUMP SETTING 43-45 FEET

RECOMMENDED PUMPING RATE 46-49 GPM

50-53 037.0 GPM/FT. SPECIFIC CAPACITY

LOCATION OF WELL

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

4N

61'

86'

4 miles

Drillers' Remarks:

FINAL STATUS OF WELL

1 ☐ WATER SUPPLY 5 ☐ ABANDONED, INSUFFICIENT SUPPLY

2 ☐ OBSERVATION WELL 6 ☐ ABANDONED, POOR QUALITY

3 ☐ TEST HOLE 7 ☐ UNFINISHED

4 ☐ RECHARGE WELL

WATER USE

1 ☒ DOMESTIC 5 ☐ COMMERCIAL

2 ☐ STOCK 6 ☐ MUNICIPAL

3 ☐ IRRIGATION 7 ☐ PUBLIC SUPPLY

4 ☐ INDUSTRIAL 8 ☐ COOLING OR AIR CONDITIONING

9 ☐ NOT USED

METHOD OF DRILLING

1 ☐ CABLE TOOL 6 ☐ BORING

2 ☒ ROTARY (CONVENTIONAL) 7 ☐ DIAMOND

3 ☐ ROTARY (REVERSE) 8 ☐ JETTING

4 ☐ ROTARY (AIR) 9 ☐ DRIVING

5 ☐ AIR PERCUSSION

NAME OF WELL CONTRACTOR International Water Supply Ltd 2801

ADDRESS 342 Bayview Barrie Ont

NAME OF DRILLER OR BORER J. Magu

SIGNATURE OF CONTRACTOR J. Magu

SUBMISSION DATE DAY 29 MO. Nov YR. 72

OFFICE USE ONLY

DATA SOURCE 1 2801 181272

DATE OF INSPECTION Nov. 13/74

INSPECTOR P/J.B.

REMARKS:

CSS.88

WI

WRC COPY



Ontario

WATER WELL RECORD

310/5E

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

11

5711799

5750.1

CON. 15 22 23 24

COUNTY OR DISTRICT Simco	TOWNSHIP, CANTON, CITY, TOWN, VILLAGE Barrie	CON., BLOCK, TRACT, SURVEY, ETC.	LOT 25-27
OWNER (SURNAME FIRST) City of Barrie PUC.	ADDRESS Barrie Ontario	DATE COMPLETED DAY 28 MO 10 YR 74	

ZONE EASTING NORTHING RC ELEVATION RC BASIN CODE
2 5711799 17 604880 4913766 4 750 5 23 NOV 07, 1975 104

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
Brown	TOP Soil			0	1
Brown	clay		Loose	1	3
Brown	sand	Gravel, clay	Loose	3	26
Grey	clay	Gravel	Firm	26	46
Brown	Gravel	Sand clay	Loose	46	59
Grey	clay	Gravel	Firm	59	77
Grey	Gravel	sand clay	Loose	77	82
Grey	clay	Gravel	Hard	82	135
Grey	Sand	fine to coarse	Loose	135	195
Grey	Sand	Gravel clay	Loose	195	211
Grey	Sand coarse	Gravel	Loose	211	229
Grey	clay		Firm	229	235

31 0001602 0003405 00266281105 004620511 00596112805 007720511 1
32 00822112805 013520511 0195209 02112281105 022921011 0235205 1

41 WATER RECORD	
WATER FOUND AT - FEET	KIND OF WATER
0003 10-13	1 ☒ FRESH 3 ☐ SULPHUR
0135 15-18	2 ☐ SALTY 4 ☐ MINERAL
0135 15-18	1 ☒ FRESH 3 ☐ SULPHUR
0135 15-18	2 ☐ SALTY 4 ☐ MINERAL
0135 15-18	1 ☒ FRESH 3 ☐ SULPHUR
0135 15-18	2 ☐ SALTY 4 ☐ MINERAL
0135 15-18	1 ☒ FRESH 3 ☐ SULPHUR
0135 15-18	2 ☐ SALTY 4 ☐ MINERAL
0135 15-18	1 ☒ FRESH 3 ☐ SULPHUR
0135 15-18	2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD			
INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET
24 10-11	1 ☒ STEEL	0.320	135 13-16
12 12-18	2 ☒ GALVANIZED	0.375	153 20-23
12 12-18	3 ☐ CONCRETE		0135
12 12-18	4 ☐ OPEN HOLE		0153

61 PLUGGING & SEALING RECORD		
SIZE(S) OF OPENING (SLOT NO.)	DIAMETER	LENGTH
050	10.000	15
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN	FEET
COOK SS	0153	1

71 PUMPING TEST	10 PUMPING METHOD	11-14 PUMPING RATE	15-18 DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	0800 GPM	24 HOURS	00 MINS
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	1 ☒ PUMPING 2 ☐ RECOVERY
005 19-21	061 22-24	039 25-27	046 28-30
4.60 FEET	60.75 FEET	39.41 FEET	42.44 FEET
IF FLOWING GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST	1 ☒ CLEAR 2 ☐ CLOUDY
	38-41 GPM	FEET	
RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE	46-49 GPM
☐ SHALLOW ☒ DEEP	150 FEET	0800 GPM	

54 FINAL STATUS OF WELL	5 ☐ ABANDONED, INSUFFICIENT SUPPLY
1 ☒ WATER SUPPLY	6 ☐ ABANDONED, POOR QUALITY
2 ☐ OBSERVATION WELL	7 ☐ UNFINISHED
3 ☐ TEST HOLE	
4 ☐ RECHARGE WELL	
55-56 WATER USE	5 ☐ COMMERCIAL
1 ☐ DOMESTIC	6 ☒ MUNICIPAL
2 ☐ STOCK	7 ☒ PUBLIC SUPPLY
3 ☐ IRRIGATION	8 ☐ COOLING OR AIR CONDITIONING
4 ☐ INDUSTRIAL	9 ☐ NOT USED
5 ☐ OTHER	
63-64 METHOD OF DRILLING	6 ☐ BORING
1 ☐ HAND TOOL	7 ☐ DIAMOND
2 ☐ AIR (CONVENTIONAL)	8 ☐ JETTING
3 ☐ AIR (REVERSE)	9 ☐ DRIVING
4 ☐ AIR (AIR)	
5 ☐ PERCUSSION	

LOCATION OF WELL #8 0413	
IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.	
DRILLERS REMARKS:	

CONTRACTOR	NAME OF WELL CONTRACTOR I.W.S.	LICENCE NUMBER 2801
	ADDRESS Box 310 Barrie ont.	
	NAME OF DRILLER OR BORER J.G. GRAY	LICENCE NUMBER
	SIGNATURE OF CONTRACTOR <i>[Signature]</i>	SUBMISSION DATE DAY 6 MO Jan YR 75

OFFICE USE ONLY	58 DATA SOURCE 1	59-62 CONTRACTOR 2801	63-68 DATE RECEIVED 130175
	DATE OF INSPECTION APR. 14/75	INSPECTOR J.B.	
	REMARKS CSS.S8		



—
N

A058556

Regulation 903 Ontario Water Resources Act

Page 1 of 1

First Name SOUTHVIEW	Last Name AUTO CENTRE LTD	E-mail Address			☐ Well Constructed by Well Owner
Mailing Address (Street Number/Name, RR) 188 BURTON AVE		Municipality BARRIE	Province ONT	Postal Code L4N 2S1	Telephone No. (inc. area code) 705 737 2826

Address of Well Location (Street Number/Name, RR) 188 BURTON AVE	Township CITY OF BARRIE	Lot 3 TO 5	Concession
County/District/Municipality SIMCOE	City/Town/Village BARRIE	Province Ontario	Postal Code

UTM Coordinates		Zone	Easting	Northing	GPS Unit Make	Model	Mode of Operation:		☐ Undifferentiated	☐ Averaged
NAD	83	17	605248	4913962		GARMEN	☐ Differentiated, specify			

[illegible]

Depth Set at (Metres)		Type of Sealant Used (Material and Type)	Volume Placed (Cubic Metres)
From	To		
0	13'4	1/2 BAG OF 3/8	HOLE PLUG

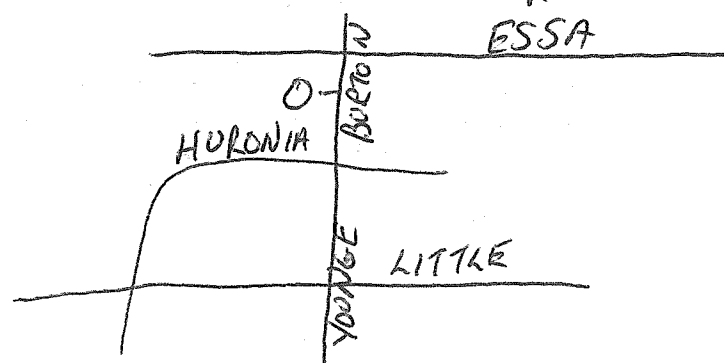
Results of well test				
Check box if after test of well yield, water was:	Draw Down		Recovery	
	Time (Min)	Water Level (Metres)	Time (Min)	Water Level (Metres)
☐ Clear and sand free	Static Level		Static Level	
☐ Cannot develop to sand-free state	1		1	
If pumping discontinued, give reason:	2		2	
Pumping test method	3		3	
Pump intake set at (Metres)	4		4	
Pumping rate (Litres/min)	5		5	
Duration of pumping hrs + min	10		10	
Final water level end of pumping (Metres)	15		15	
Recommended pump type ☐ Shallow ☐ Deep	20		20	
Recommended pump depth Metres	25		25	
Recommended pump rate (Litres/min)	30		30	
If flowing give rate (Litres/min)	40		40	
	50		50	
	60		60	

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

☐ Water Supply	☐ Dewatering Well	☒ Observation and/or Monitoring Hole
☐ Replacement Well	☐ Abandoned, Insufficient Supply	☐ Alteration (Construction)
☐ Test Hole	☐ Abandoned, Poor Water Quality	☐ Other, <i>specify</i> _____
☐ Recharge Well	☐ Abandoned, other, <i>specify</i> _____	

Please provide a map below showing:

- all property boundaries, and measurements sufficient to locate the well in relation to fixed points,
- an arrow indicating the North direction
- detailed drawings can be provided as attachments no larger than legal size (8.5" by 14")
- digital pictures of inside of well can also be provided



Water found at Depth Metres ☐ Gas	Kind of Water ☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals
Water found at Depth Metres ☐ Gas	Kind of Water ☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals
Water found at Depth Metres ☐ Gas	Kind of Water ☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals

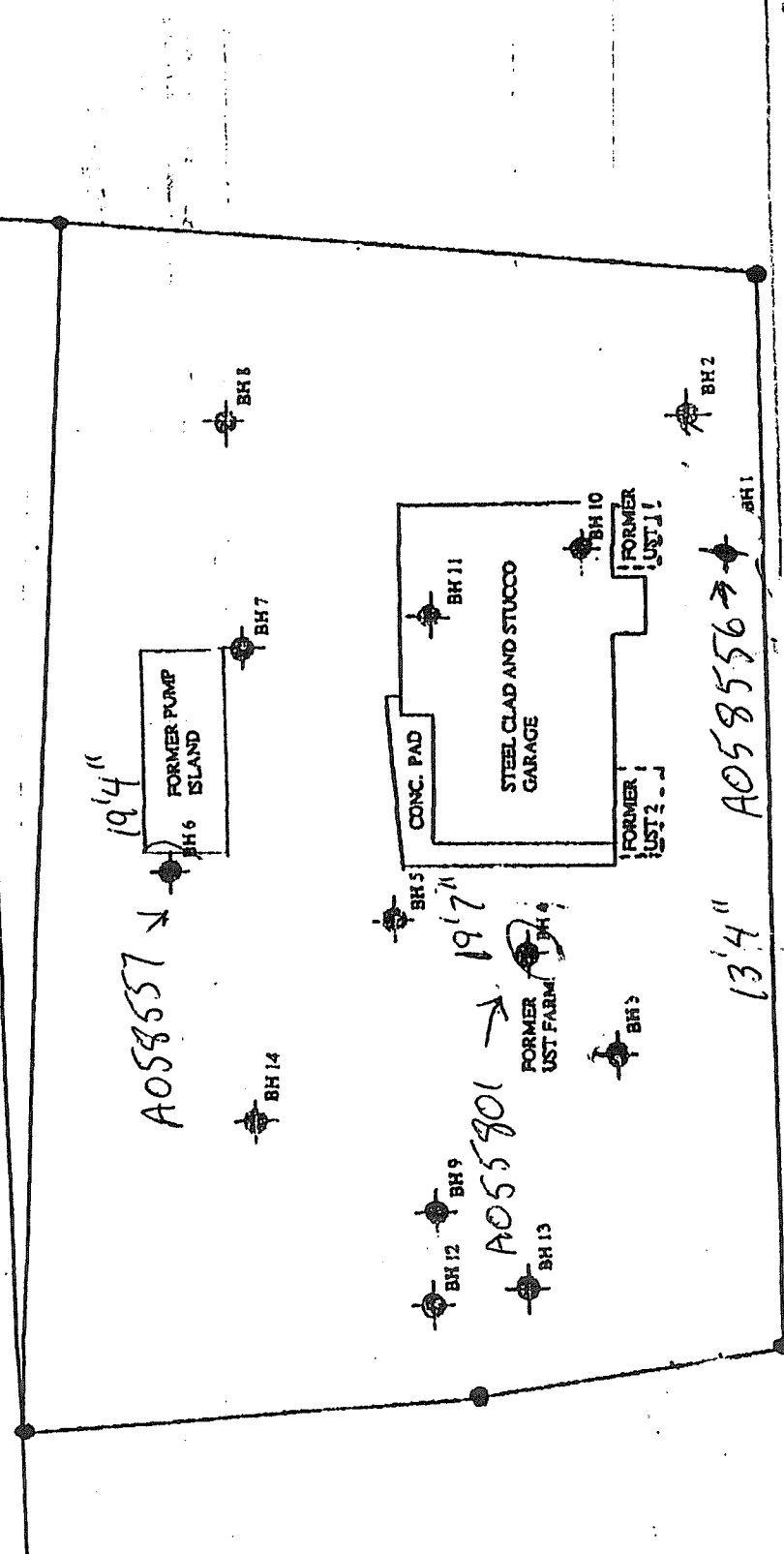
☐ Galvanized	☐ Galvanized	Diameter of the Hole (Centimetres)
☐ Steel	☐ Steel	Depth of the Hole (Metres)
☐ Fibreglass	☐ Fibreglass	
☐ Plastic	☐ Plastic	
☐ Concrete	☐ Concrete	Wall Thickness (Metres)

☐ Open Hole	Inside Diameter of the Casing (Metres) 2"
Disinfected? ☐ Yes ☐ No	Depth of the Casing (Metres) 13' 4"

Audit No. z 63963	Well Contractor No. 8413
Date Received (yyyy/mm/dd) JUN 29 2007	Date of Inspection (yyyy/mm/dd)
Remarks	

BURTON AVENUE

□ T&M



LEGEND

⊕ BH 1

Borehole by Trow - October, 2006

Trow Associates Inc. 1595 Clark Boulevard Brampton, Ontario L6T 4V1 Telephone: (905) 793-9800 Fax: (905) 793-0641		DATE: NOVEMBER 2006		DWG. TITLE AND PROJECT: BOREHOLE LOCATION PLAN, 188 BURTON AVENUE, BARRIE	
Trow		DWN:	CHKD:	PROJECT NO.:	DWG. NO.: 1
				ERGE001417298B	

263963

3413

JUN 29 2007


$$N)$$

Well Record

Page 1 of 1

© Queen's Printer for Ontario, 2006

BURTON AVENUE

16M

A058557

19'4"

FORMER PUMP ISLAND

BH 14

BH 7

BH 8

BH 12
BH 9

BH 13

A055801

19'7"

FORMER UST FARM

BH 3

BH 5

CONC. PAD

BH 11

STEEL CLAD AND STUCCO GARAGE

FORMER UST 2

FORMER UST 1

BH 10

13'4"

A058556

BH 1

BH 2

LEGEND

BH 1

Borehole by Trow - October, 2006



Trow Associates Inc.
1595 Clark Boulevard
Brampton, Ontario
L6T 4V1

Trow Telephone: (905) 793-9800
Fax: (905) 793-0641

DATE:

NOVEMBER 2006

DWN.:

CHKD.:

DWG. TITLE AND PROJECT:

BOREHOLE LOCATION PLAN,

188 BURTON AVENUE, BARRIE

PROJECT NO.:

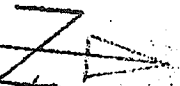
BRGE001417298B

DWG. NO.: 1

Z 63962

13413

JUN 29 2007



Measurements recorded in: ☐ Metric ☒ Imperial

A162243

Well Owner's Information

First Name: Last Name / Organization: E-mail Address: ☐ Well Constructed by Well Owner
MELCHOIR DEVELOPMENT INC. johnvellinga@sympatico.ca
Mailing Address (Street Number/Name): Municipality: Province: Postal Code: Telephone No. (inc. area code):
299 LAKESHORE DRIVE BARRIE ON L4N 7Y9 705-722-6706

Well Location

Address of Well Location (Street Number/Name): Township: Lot: Concession:
196 BURTON AVENUE
County/District/Municipality: City/Town/Village: Province: Postal Code:
SIMCOE COUNTY Barrie Ontario
UTM Coordinates: Zone: Easting: Northing: Municipal Plan and Sublot Number: Other:
NAD 83 1760508849 13806

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m)
				From To
Brown Clay	Clay		compact	0 20
Grey Clay	Clay		compact	20 35
"cluster of 5 monitoring wells"				

Annular Space		
Depth Set at (m/ft)	Type of Sealant Used (Material and Type)	Volume Placed (m ³ /ft ³)
From To		
25 28 Sand		
28 0 Bentonite		

Method of Construction		Well Use	
☐ Cable Tool	☐ Diamond	☐ Public	☐ Commercial
☒ Rotary (Conventional)	☐ Jetting	☐ Domestic	☐ Municipal
☐ Rotary (Reverse)	☐ Driving	☐ Livestock	☐ Test Hole
☐ Boring	☐ Digging	☐ Irrigation	☐ Cooling & Air Conditioning
☐ Air percussion		☐ Industrial	
☐ Other, specify		☐ Other, specify	

Construction Record - Casing			Status of Well	
Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Well Thickness (cm/in)	Depth (m)	
			From To	
2	Plastic		30 2.5	
☐ Water Supply ☐ Replacement Well ☐ Test Hole ☐ Recharge Well ☐ Dewatering Well ☒ Observation and/or Monitoring Hole ☐ Alteration (Construction) ☐ Abandoned, Insufficient Supply ☐ Abandoned, Poor Water Quality ☐ Abandoned, other, specify ☐ Other, specify				

Construction Record - Screen			Status of Well	
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m)	
			From To	
2	Plastic	010	35 30	
☐ Other, specify				

Water Details		Hole Diameter	
Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify	Depth (m/ft)	Diameter (cm/in)
		From To	
		0 35	8.5

Well Contractor and Well Technician Information			
Business Name of Well Contractor	Well Contractor's Licence No.		
DUNDON SOIL TEST LTD	7190		
Business Address (Street Number/Name)	Municipality		
B.R.Ce	DUNDALK		
Province	Postal Code	Business E-mail Address	
ON	N0C1B0	info@dundonsoil.com	
Bus Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)		
519-455-7777	ROSS, RYAN		
Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted	
315716		20160425	

Results of Well Yield Testing			
Draw Down		Recovery	
Time (min)	Water Level (m/ft)	Time (min)	Water Level (m/ft)
After test of well yield, water was: ☐ Clear and sand free ☐ Other, specify			
If pumping discontinued, give reason:			
Pump intake set at (m/ft)			
Pumping rate (l/min / GPM)			
Duration of pumping hrs + min			
Final water level end of pumping (m/ft)			
If flowing give rate (l/min / GPM)			
Recommended pump depth (m/ft)			
Recommended pump rate (l/min / GPM)			
Well production (l/min / GPM)			
Disinfected? ☐ Yes ☒ No			

Map of Well Location	
Please provide a map below following instructions on the back.	
Comments	

Ministry Use Only	
Well owner's information package delivered	Date Package Delivered
	Y Y Y Y M M D D
	Date Work Completed
	20160425
Audit No. 228535	
JUN 09 2016	



Tag #: A 208627

Measurements recorded in: ☐ Metric ☐ Imperial

Page _____ of _____

Well Owner's Information

First Name <u>Melchior</u>	Last Name / Organization <u>Management Corporation</u>	E-mail Address	☐ Well Constructed by Well Owner
Mailing Address (Street Number/Name) <u>299 Lakeshore Drive</u>		Municipality <u>Barrie</u>	Province <u>Ont</u>
		Postal Code <u>L4N7Y9</u>	Telephone No. (inc. area code)

Well Location

Address of Well Location (Street Number/Name) <u>196 Burton Ave</u>		Township	Lot	Concession
County/District/Municipality <u>Simcoe</u>		City/Town/Village <u>Barrie</u>	Province Ontario	Postal Code
UTM Coordinates Zone	Easting	North	Municipal Plan and Sublot Number	
NAD	<u>8317605174</u>	<u>4913854</u>		

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	to
Brown	Coarse Sand			0	1.5
Brown	Coarse Sand	Fine Sand	Damp	1.5	3
Brown	Coarse Sand	Grey Fine Sand	Wet	3	5
Grey	Fine Sand	Brown Coarse Sand, Trace Clay - Wet		5	6.1

Annular Space			
Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m ³ /ft ³)
0	3.7	Bentonite Holeplug	
3.7	6.1	Silica Sand	

Method of Construction	Well Use
☐ Cable Tool ☐ Rotary (Conventional) ☐ Rotary (Reverse) ☐ Boring ☐ Air percussion ☒ Other, specify <u>Dual Rotary</u>	☐ Diamond ☐ Jetting ☐ Driving ☐ Digging ☐ Public ☐ Domestic ☐ Livestock ☐ Irrigation ☐ Industrial ☐ Commercial ☐ Municipal ☐ Test Hole ☐ Cooling & Air Conditioning ☐ Not used ☐ Dewatering ☒ Monitoring

Construction Record - Casing				Status of Well	
Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	To	
5	Plastic	0.635	+0.9	5.2	☐ Water Supply ☐ Replacement Well ☐ Test Hole ☐ Recharge Well ☐ Dewatering Well ☒ Observation and/or Monitoring Hole ☐ Alteration (Construction) ☐ Abandoned, Insufficient Supply ☐ Abandoned, Poor Water Quality ☐ Abandoned, other, specify ☐ Other, specify

Construction Record - Screen				Status of Well	
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	To	
5	Plastic	10	5.2	6.1	☐ Other, specify

Water Details		Hole Diameter	
Water found at Depth <u>15-61</u> (m/ft) ☐ Gas	Kind of Water: ☒ Fresh ☒ Untested ☐ Other, specify	Depth (m/ft) From	To
Water found at Depth (m/ft) ☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify	0	61
Water found at Depth (m/ft) ☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify		15

Well Contractor and Well Technician Information			
Business Name of Well Contractor <u>Agrotech Dewatering</u>		Well Contractor's Licence No. <u>73411</u>	
Business Address (Street Number/Name) <u>331 Redner Road</u>		Municipality <u>Vaughan</u>	
Province <u>Ont</u>	Postal Code <u>L6A4P5</u>	Business E-mail Address <u>info@agvratd.com</u>	
Bus. Telephone No. (inc. area code) <u>9059107170</u>		Name of Well Technician (Last Name, First Name) <u>Melatosh, Greg</u>	
Well Technician's Licence No. <u>35610</u>		Signature of Technician and/or Contractor <u>[Signature]</u>	
		Date Submitted <u>2016/12/28</u>	

Results of Well Yield Testing			
After test of well yield, water was: ☐ Clear and sand free ☐ Other, specify		Draw Down	
If pumping discontinued, give reason:		Time (min)	Water Level (m/ft)
Pump intake set at (m/ft)		1	1
Pumping rate (l/min / GPM)		2	2
Duration of pumping hrs + min		3	3
Final water level end of pumping (m/ft)		4	4
If flowing give rate (l/min / GPM)		5	5
Recommended pump depth (m/ft)		10	10
Recommended pump rate (l/min / GPM)		15	15
Well production (l/min / GPM)		20	20
Disinfected?		25	25
☐ Yes ☐ No		30	30
		40	40
		50	50
		60	60

Map of Well Location	
Please provide a map below following instructions on the back.	
Comments: <u>Proposed Layout of Subdivision</u> <u>*Record For B41*</u>	
Well owner's information package delivered ☒ Yes ☐ No	Ministry Use Only Audit No. <u>2251699</u> DEC 29 2016 Received

Measurements recorded in: ☐ Metric ☐ Imperial

Well Owner's Information

First Name <u>Melchior</u>	Last Name / Organization <u>Management Corporation</u>	E-mail Address	☐ Well Constructed by Well Owner
Mailing Address (Street Number/Name) <u>299 Lakeshore Drive</u>	Municipality <u>Burnie</u>	Province <u>Ont</u>	Postal Code <u>L1A 7Y9</u>
Telephone No. (inc. area code)			

Well Location

Address of Well Location (Street Number/Name) <u>196 Burton Ave</u>	Township	Lot	Concession
County/District/Municipality <u>Simcoe</u>	City/Town/Village <u>Burnie</u>	Province Ontario	Postal Code
UTM Coordinates Zone <u>18</u>	Easting <u>83</u>	Northing <u>176051724913854</u>	Municipal Plan and Sublot Number
Other			

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft)
Brown	Coarse Sand			0 1.5
Brown	Coarse Sand	Fine Sand	Damp	1.5 3
Brown	Coarse Sand	Grey Fine Sand	Wet	3 5
Grey	Fine Sand	Brown Coarse Sand	Wet	5 6.1

Annular Space			
Depth Set at (m/ft)	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)	
0 3.7	Bentonite Holeplug		
3.7 6.1	Silica Sand		

Method of Construction	Well Use
☐ Cable Tool	☐ Public
☐ Rotary (Conventional)	☐ Commercial
☐ Rotary (Reverse)	☐ Domestic
☐ Boring	☐ Municipal
☐ Air percussion	☐ Test Hole
☒ Other, specify <u>Dual Rotary</u>	☐ Cooling & Air Conditioning
	☐ Not used
	☐ Dewatering
	☒ Monitoring
	☐ Industrial
	☐ Other, specify

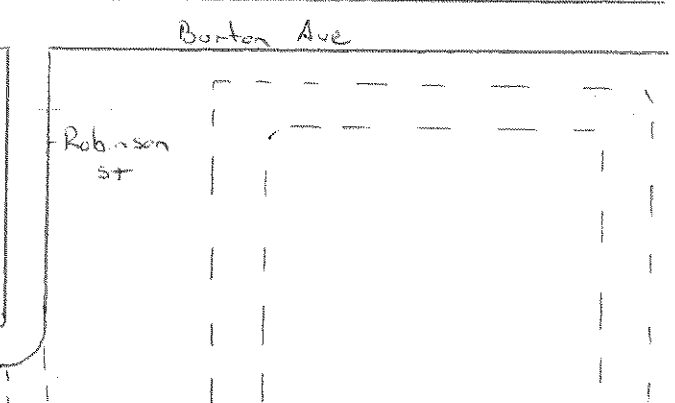
Construction Record - Casing				Status of Well
Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft)	
5	Plastic	0.635	40.9	5.2

Construction Record - Screen				Status of Well
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft)	
5	Plastic	10	5.2	6.1

Water Details		Hole Diameter	
Water found at Depth (m/ft)	Kind of Water: ☒ Fresh ☒ Untested	Depth (m/ft)	Diameter (cm/in)
1.5-6.1 (m/ft)	☐ Gas ☐ Other, specify	0 6.1	1.5

Business Name of Well Contractor <u>Aquatech Dewatering</u>		Well Contractor's Licence No. <u>7131411</u>
Business Address (Street Number/Name) <u>331 Redwood Road</u>		Municipality <u>Vaughan</u>
Province <u>Ont</u>	Postal Code <u>L6A 4P5</u>	Business E-mail Address <u>info@aquatech.com</u>
Bus. Telephone No. (inc. area code) <u>905-907-1700</u>		Name of Well Technician (Last Name, First Name) <u>Melchior, Gray</u>
Well Technician's Licence No. <u>315610</u>		Date Submitted <u>2016/12/28</u>

Results of Well Yield Testing			
After test of well yield, water was:		Draw Down	
☐ Clear and sand free		Time (min)	Water Level (m/ft)
☐ Other, specify		Time (min)	Water Level (m/ft)
If pumping discontinued, give reason:		Static Level	
Pump intake set at (m/ft)		1	1
Pumping rate (l/min / GPM)		2	2
Duration of pumping hrs + min		3	3
Final water level end of pumping (m/ft)		4	4
If flowing give rate (l/min / GPM)		5	5
Recommended pump depth (m/ft)		10	10
Recommended pump rate (l/min / GPM)		15	15
Well production (l/min / GPM)		20	20
Disinfected?		25	25
☐ Yes ☐ No		30	30
		40	40
		50	50
		60	60

Map of Well Location	
Please provide a map below following instructions on the back.	
	
Comments: <u>Proposed layout of Subdivision</u> <u>* Record For BH2 *</u>	
Well owner's information package delivered	Ministry Use Only
☒ Yes	Audit No. <u>2251700</u>
☐ No	DEC 29 2016
Date Package Delivered <u>2016/12/23</u>	Received
Date Work Completed <u>2016/12/22</u>	



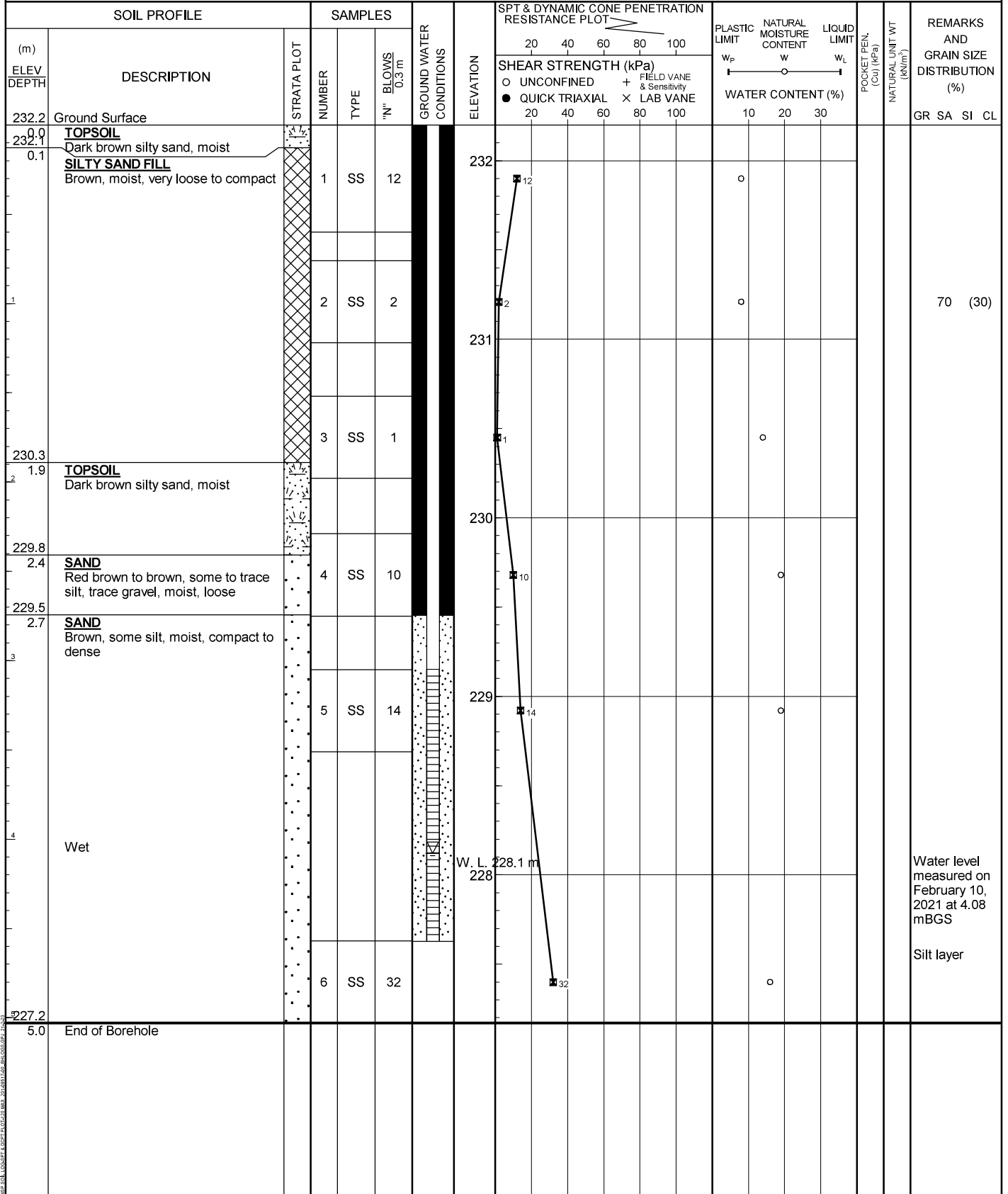
APPENDIX D

Borehole Logs & Ground Water Elevations

PROJECT: 181 Burton Avenue
 CLIENT: Monolite Holdings Inc.
 PROJECT LOCATION: Barrie, ON
 DATUM: Geodetic
 BH LOCATION: See Figure 2

Method: Solid Stem Auger
 Diameter: 100 mm
 Date: Jan-11-2021

REF. NO.: 201-09517-00
 ENCL NO.: 1



GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

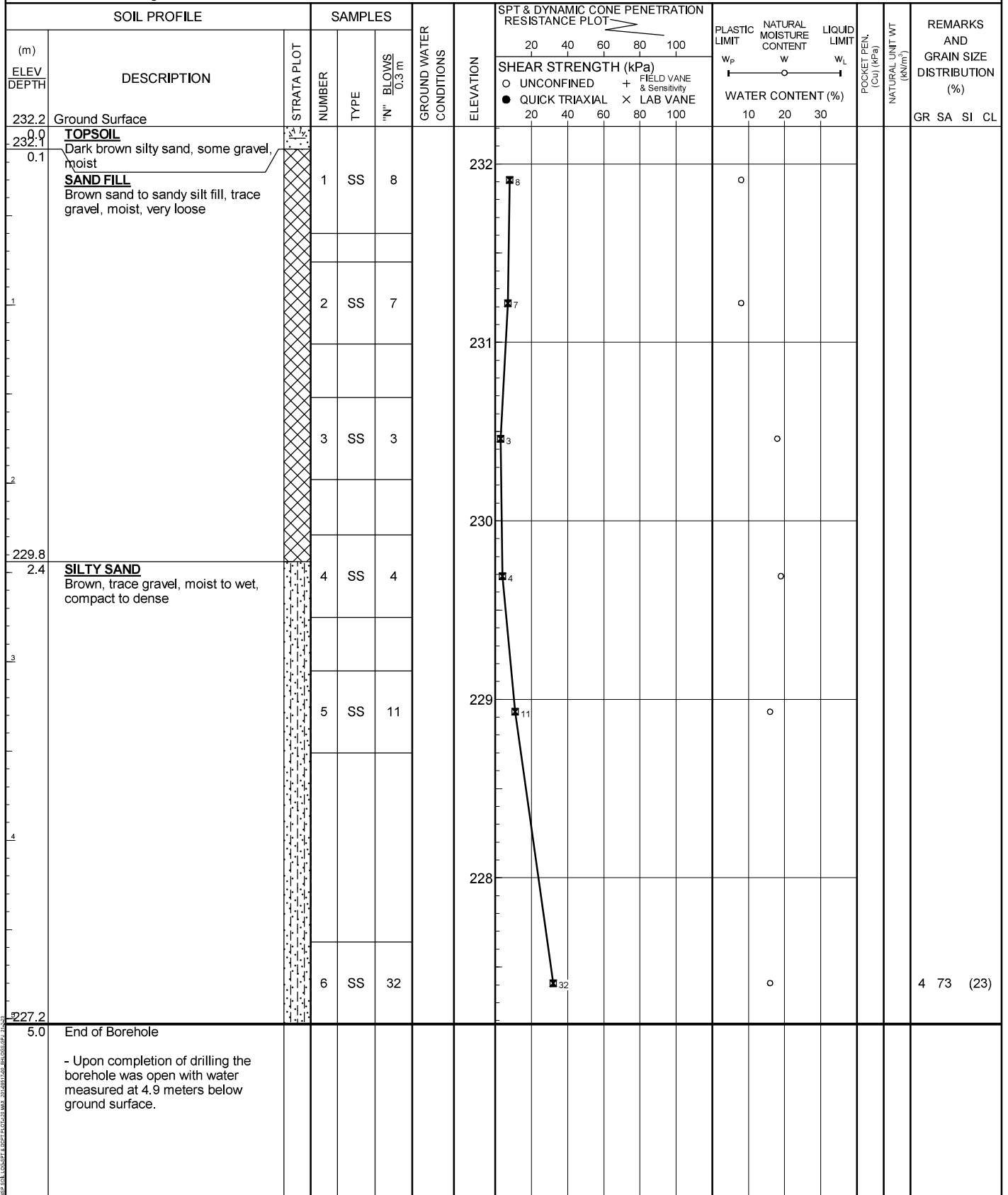
+ 3, × 3: Numbers refer to Sensitivity

○ = 3% Strain at Failure

PROJECT: 181 Burton Avenue
 CLIENT: Monolite Holdings Inc.
 PROJECT LOCATION: Barrie, ON
 DATUM: Geodetic
 BH LOCATION: See Figure 2

Method: Solid Stem Auger
 Diameter: 100 mm
 Date: Jan-11-2021

REF. NO.: 201-09517-00
 ENCL NO.: 2



GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

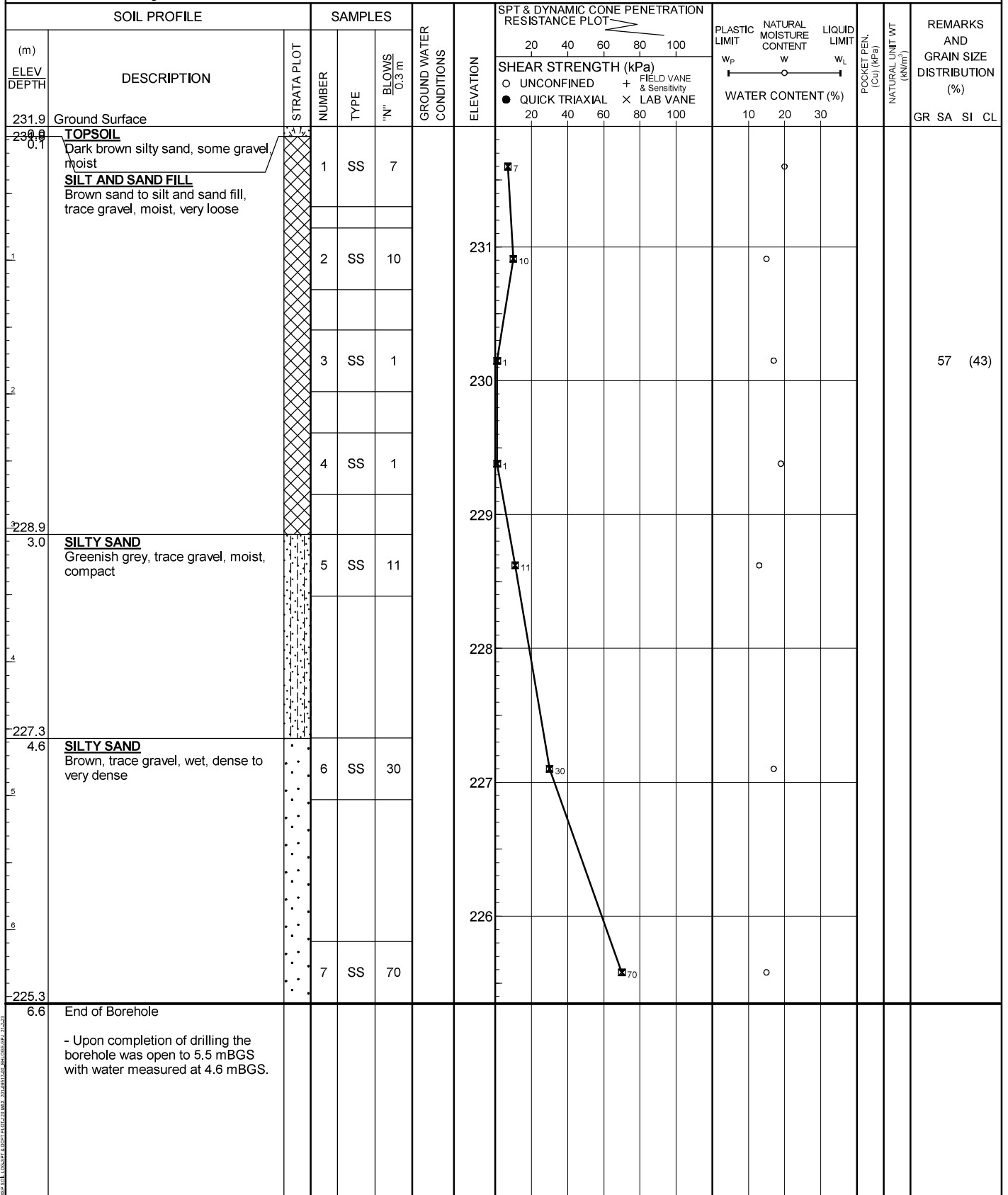
+ 3, × 3: Numbers refer to Sensitivity

○ = 3% Strain at Failure

PROJECT: 181 Burton Avenue
 CLIENT: Monolite Holdings Inc.
 PROJECT LOCATION: Barrie, ON
 DATUM: Geodetic
 BH LOCATION: See Figure 2

Method: Solid Stem Auger
 Diameter: 100 mm
 Date: Jan-11-2021

REF. NO.: 201-09517-00
 ENCL NO.: 3



GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

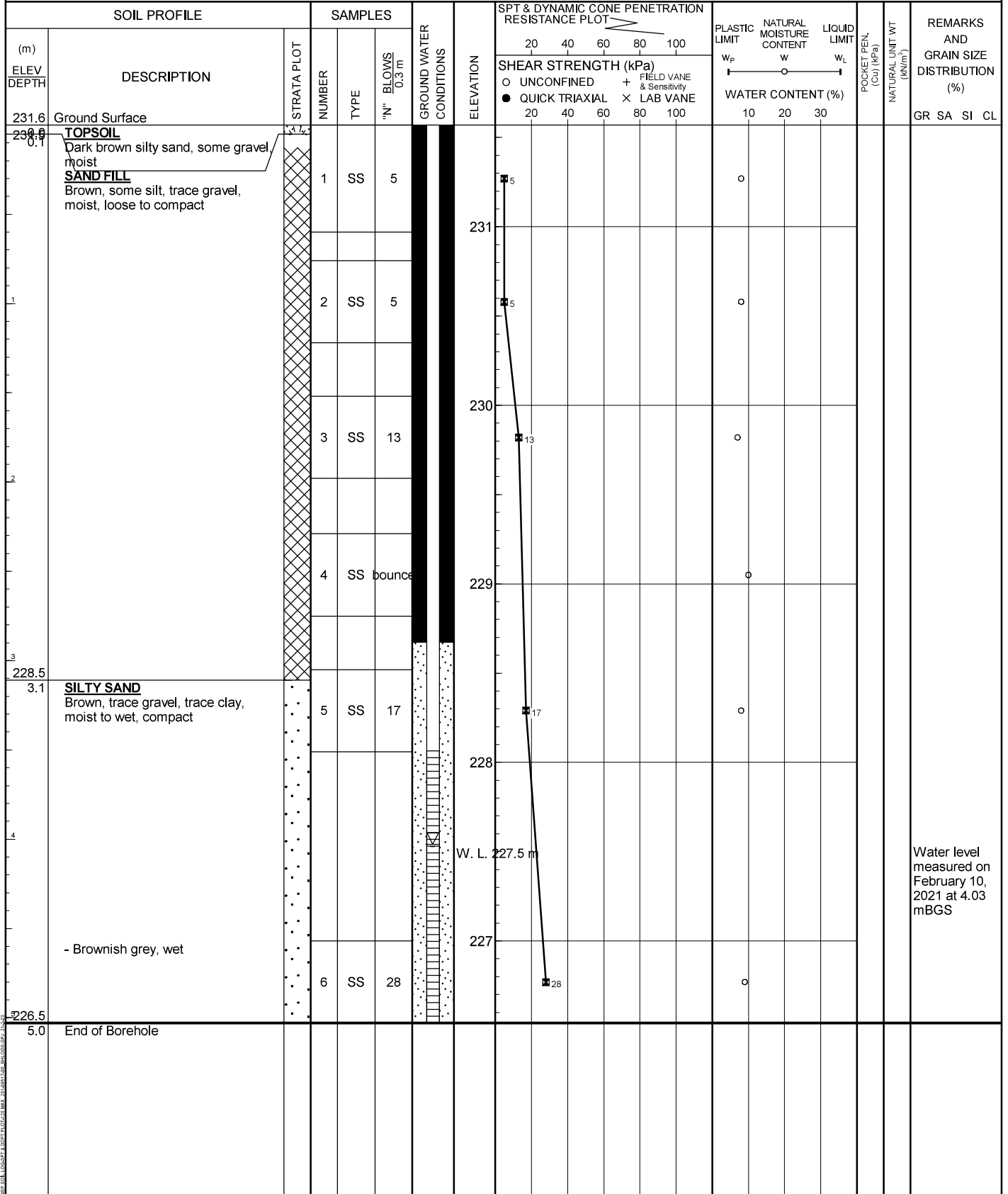
+ 3, × 3: Numbers refer to Sensitivity

○ = 3% Strain at Failure

PROJECT: 181 Burton Avenue
 CLIENT: Monolite Holdings Inc.
 PROJECT LOCATION: Barrie, ON
 DATUM: Geodetic
 BH LOCATION: See Figure 2

Method: Solid Stem Auger
 Diameter: 100 mm
 Date: Jan-11-2021

REF. NO.: 201-09517-00
 ENCL NO.: 4



GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

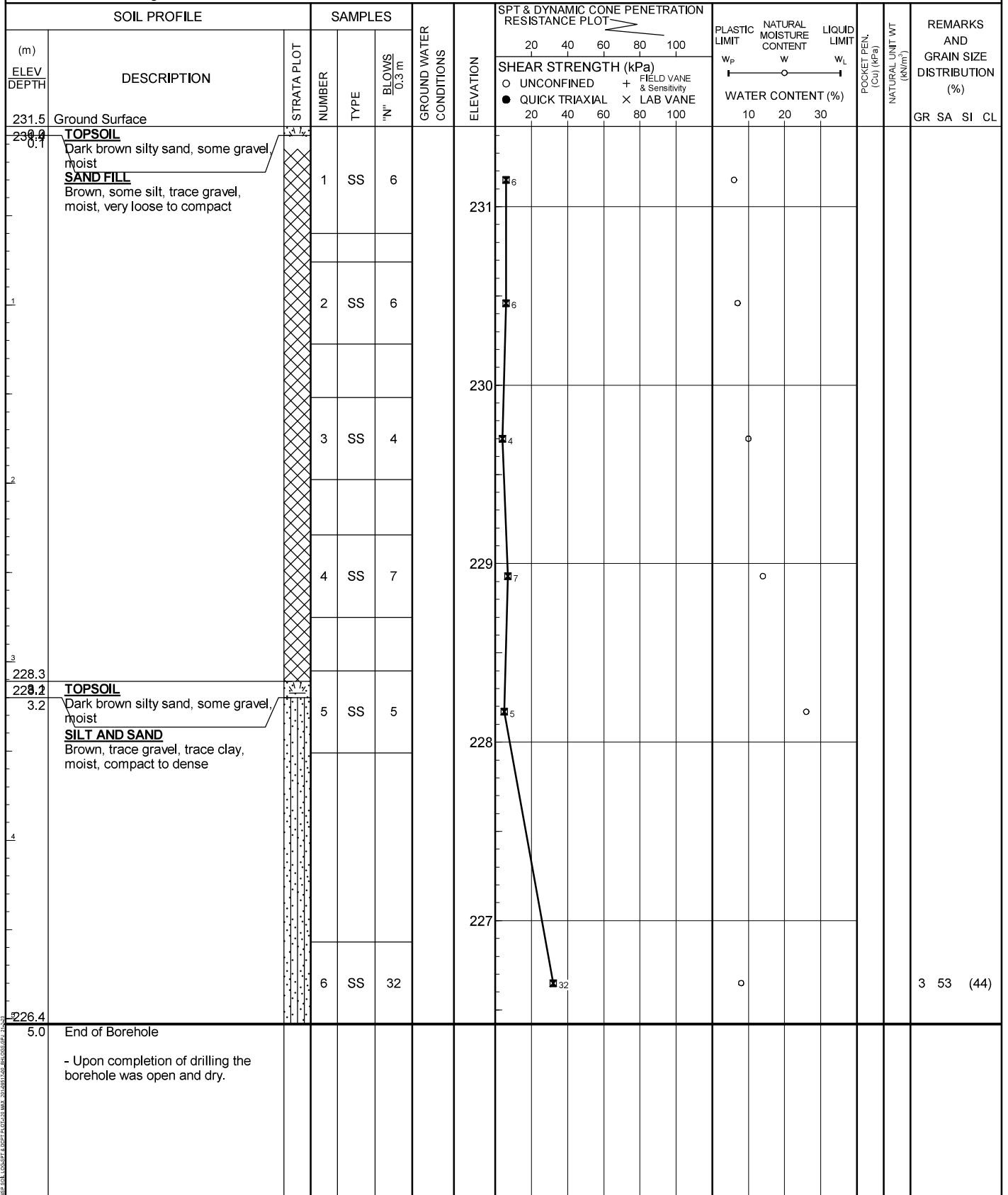
+ 3, × 3: Numbers refer to Sensitivity

○ = 3% Strain at Failure

PROJECT: 181 Burton Avenue
 CLIENT: Monolite Holdings Inc.
 PROJECT LOCATION: Barrie, ON
 DATUM: Geodetic
 BH LOCATION: See Figure 2

Method: Solid Stem Auger
 Diameter: 100 mm
 Date: Jan-11-2021

REF. NO.: 201-09517-00
 ENCL NO.: 5



GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

+ 3, × 3: Numbers refer to Sensitivity

○ = 3% Strain at Failure

PROJECT: Phase Two Environmental Site Assessment										REF. NO.: 22-0127					
CLIENT: Monolite Holdings Inc.										ENCL NO.:					
PROJECT LOCATION: 181 Burton Avenue, Barrie, Ontario										ORIGINATED BY KH					
DATUM: Geodetic										COMPILED BY FL					
BH LOCATION: N 4914009.96 E 605206.01										CHECKED BY JA					
SOIL PROFILE			SAMPLES			Soil Head Space Vapors		PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT W _p W W _L		POCKET PEN. (Cu) (kPa)		NATURAL UNIT WT (kN/m ³)		REMARKS AND GRAIN SIZE DISTRIBUTION (%)	
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m	GROUND WATER CONDITIONS	ELEVATION	PID (ppm)	CGD (ppm)	WATER CONTENT (%)					
232.2	Ground Surface														
230.9	TOPSOIL: 100mm														
0.1	FILL: silty sand, trace gravel, trace clay, trace organics, dark brown, moist.		1A	S			232								PAHs
1	silty sand to sandy silt at 0.8m		1B	S			231								PHCs & BTEX
2			2A	S			230								M&ORPs
229.9	SILTY SAND: trace clay, brown to grey, wet.		2B	S			229								PHCs & BTEX
2.3			3A	S			228								VOCs
3			3B	S			227								
4	grey below 3.8m		4A	S			226								
5			4B	S			225								
6															
226.1	END OF BOREHOLE: Notes: 1) 50mm diameter monitoring well was installed upon completion, screened at 3.05-6.10m. 2) Water Level Readings: Date: Water Level(mbgf): April 11, 2022 2.73														

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH
NOTES

+ 3, X 3: Numbers refer to Sensitivity

○ = 3% Strain at Failure

PROJECT: Phase Two Environmental Site Assessment										REF. NO.: 22-0127				
CLIENT: Monolite Holdings Inc.										ENCL NO.:				
PROJECT LOCATION: 181 Burton Avenue, Barrie, Ontario										ORIGINATED BY KH				
DATUM: Geodetic										COMPILED BY FL				
BH LOCATION: N 4914013.89 E 605235.91										CHECKED BY JA				
SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	Soil Head Space Vapors		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	POCKET PEN. (Cu) (MPa)	NATURAL UNIT WT (kN/m ³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%)
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m		PID (ppm)	CGD (ppm)						
231.9	Ground Surface													GR SA SI CL
230.9	TOPSOIL: 100mm													
0.1	FILL: silty sand, trace gravel, trace clay, trace organics, dark brown, moist.		1A	S										PAHs
1			1B	S										M&ORPs
2			2A	S										PHCs & BTEX
229.6														
2.3	SILTY SAND: trace clay, grey, wet.		2B	S										
3			3A	S										PHCs & BTEX
4			3B	S										
5			4A	S										VOCs
6			4B	S										
225.8														
6.1	END OF BOREHOLE: Notes: 1) 50mm diameter monitoring well was installed upon completion, screened at 3.05-6.10m. 2) Water Level Readings: Date: April 11, 2022 Water Level(mbgl): 2.73													

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH
NOTES

+ 3, X 3: Numbers refer to Sensitivity

○ = 3% Strain at Failure

PROJECT: Phase Two Environmental Site Assessment							REF. NO.: 22-0127							
CLIENT: Monolite Holdings Inc.							ENCL NO.:							
PROJECT LOCATION: 181 Burton Avenue, Barrie, Ontario							ORIGINATED BY KH							
DATUM: Geodetic							COMPILED BY FL							
BH LOCATION: N 4914031.41 E 605220.08							CHECKED BY JA							
SOIL PROFILE			SAMPLES		GROUND WATER CONDITIONS	ELEVATION	Soil Head Space Vapors		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m ³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%)
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE			"N" BLOWS 0.3 m	PID (ppm)						
232.5	Ground Surface													GR SA SI CL
230.9	TOPSOIL: 100mm													
0.1	FILL: silty sand, trace gravel, trace clay, trace organics, dark brown, moist.		1A	S										PAHs, PHCs&BTEX
1			1B	S										M&ORPs
	contains wood pieces at 1.5m		2A	S										
2														
230.2														
2.3	FILL: sand, trace gravel, trace silt, trace clay, brown, wet.		2B	S										
229.5														
3.1	SILTY SAND: trace clay, grey, wet.		3A	S										
4			3B	S										
227.9														
4.6	END OF BOREHOLE:													

INTEGRITY AND QUALITY ASSURANCE

2014-2022 24157 181 BURTON AVE. 9 2722

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH
NOTES

+ 3, × 3: Numbers refer to Sensitivity

○ ●=3% Strain at Failure

PROJECT: Phase Two Environmental Site Assessment										REF. NO.: 22-0127						
CLIENT: Monolite Holdings Inc.										ENCL NO.:						
PROJECT LOCATION: 181 Burton Avenue, Barrie, Ontario										Method: Geo Probe						
DATUM: Geodetic										Diameter:						
BH LOCATION: N 4914047.67 E 605222.53										Date: Apr/08/2022 to Apr/08/2022						
										ORIGINATED BY KH						
										COMPILED BY FL						
										CHECKED BY JA						
SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	Soil Head Space Vapors			PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	WATER CONTENT (%)	POCKET PEN. (C _u) (kPa)	NATURAL UNIT WT (kN/m ³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%)
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m		ELEVATION	PID (ppm)	CGD (ppm)							
232.3	Ground Surface															
232.0	TOPSOIL: 100mm															
0.1	FILL: silty sand, trace gravel, trace clay, trace organics, dark brown, moist.		1A	S			232									PAHs
1			1B	S			231									PHCs&BTEX
2			2A	S			230									M&ORPs
3			2B	S			229									
4			3A	S			228									
228.5	SILTY SAND: trace gravel, trace clay, grey, wet.		3B	S												
4.6	END OF BOREHOLE:															

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

+ 3, X 3: Numbers refer to Sensitivity

○ ●=3% Strain at Failure

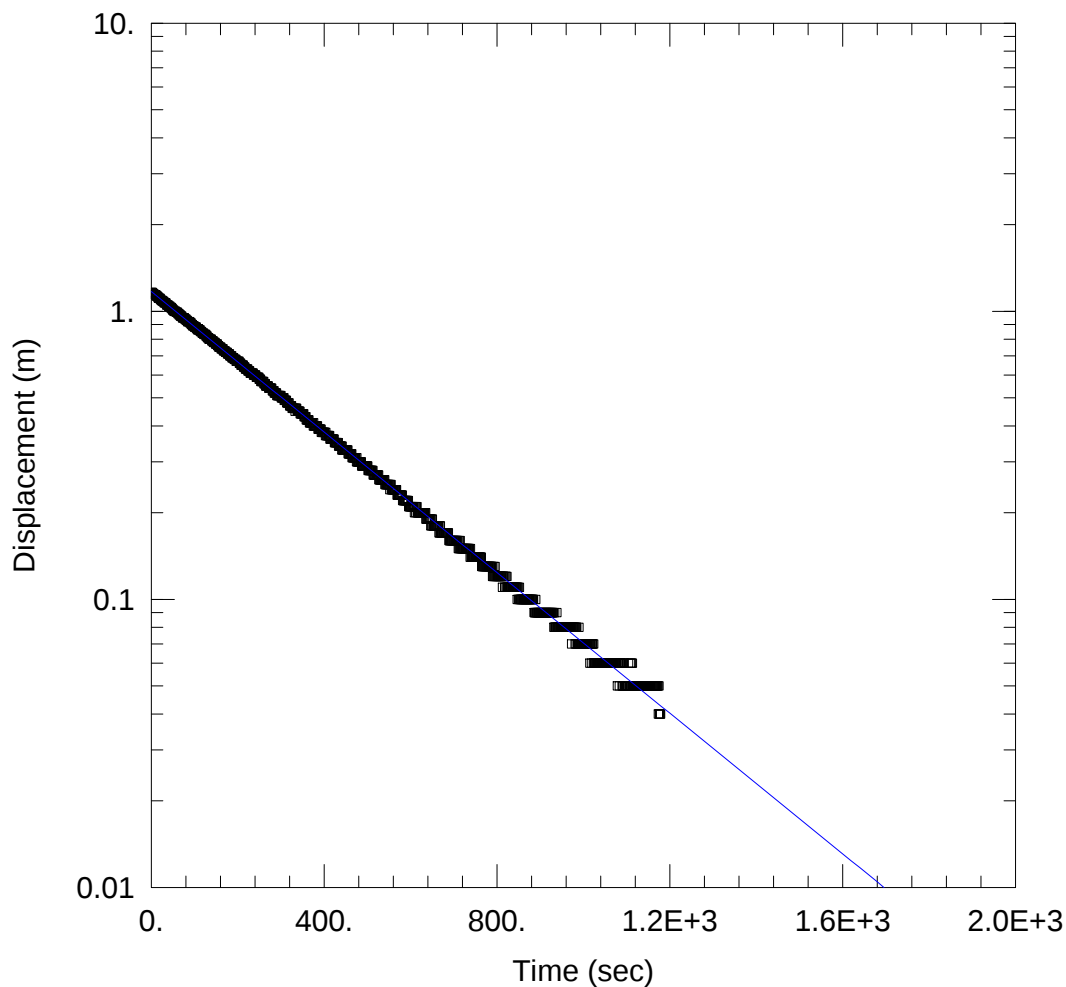
Monitoring Well Details & Ground Water Levels

Monitoring Well	Ground Elevation (masl)	Stickup (m)	Reference Elevation (masl)	Total Depth (mbgs)	Ground Water Level (mbgs)						Ground Water Elevation (masl)					
					10-Feb-21	16-Mar-22	28-Apr-22	12-May-22	06-Jun-22	20-Jul-23	10-Feb-21	16-Mar-22	28-Apr-22	12-May-22	06-Jun-22	20-Jul-23
BH21-1	232.20	0.80	233.00	4.60	4.08	3.14	3.06	3.12	3.25	3.13	228.12	229.06	229.14	229.08	228.95	229.07
BH21-4	231.60	0.81	232.41	5.00	4.03	3.09	3.06	3.10	3.22	3.15	227.57	228.51	228.54	228.50	228.38	228.45
BH22-1	232.2	0.95	233.15	6.13			2.81	2.87	3.01	2.84			229.39	229.33	229.19	229.36
BH22-2	231.9	1.07	232.97	5.86			2.85	2.88	2.97	2.83			229.05	229.02	228.93	229.07



APPENDIX E

Hydraulic Conductivity Testing Results



WELL TEST ANALYSIS

Data Set: M:\...\BH21-1 Slug Test.aqt
 Date: 05/18/22

Time: 15:37:09

PROJECT INFORMATION

Company: Azimuth Environmental
 Project: 21-492
 Location: 181 Burton Street
 Test Well: BH21-1
 Test Date: May 12th 2022

AQUIFER DATA

Saturated Thickness: 1.58 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (BH 21-1)

Initial Displacement: 1.16 m
 Total Well Penetration Depth: 1.58 m
 Casing Radius: 0.0254 m

Static Water Column Height: 1.58 m
 Screen Length: 1.52 m
 Wellbore Radius: 0.1 m

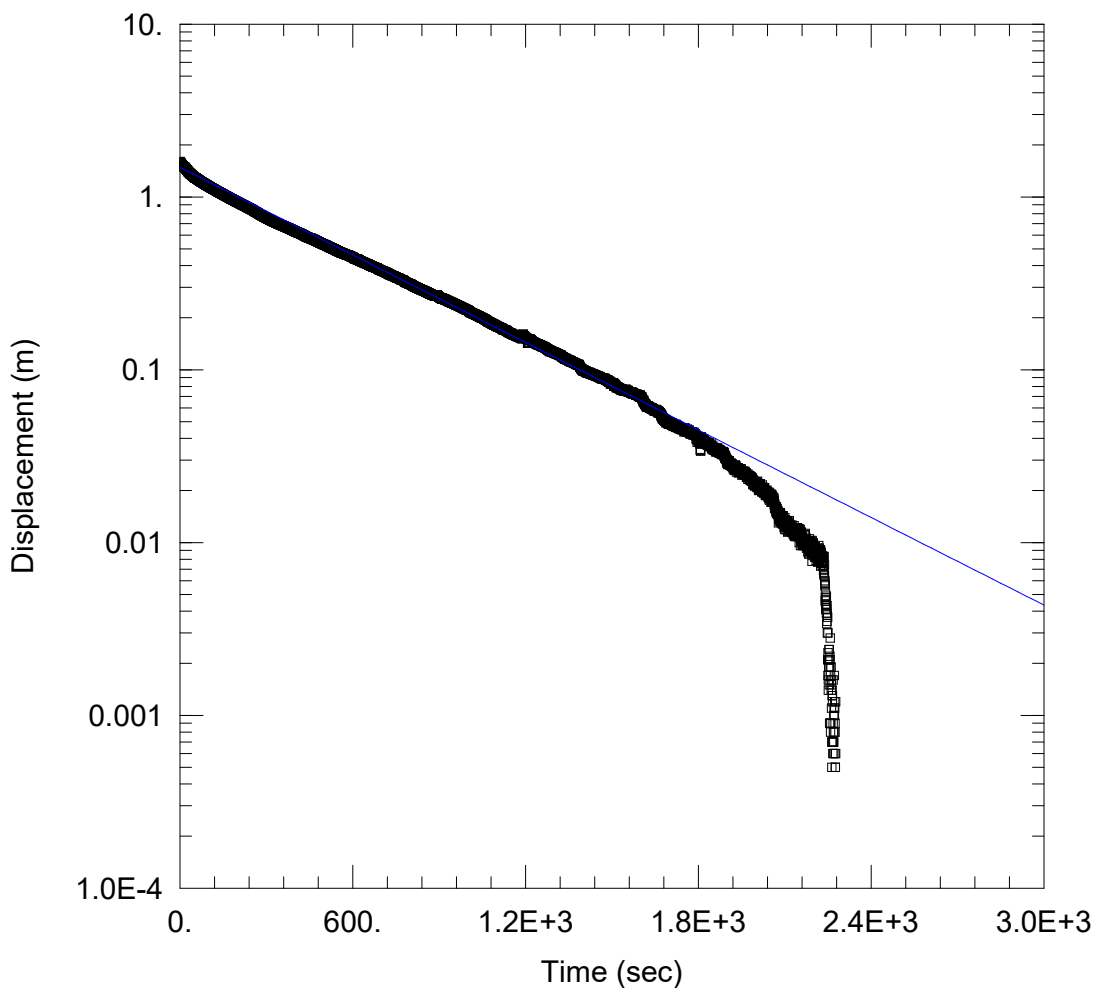
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

$K = 2.036E-6$ m/sec

$y_0 = 1.17$ m



181 BURTON

Data Set: M:\...\BH21-4 Slug Test.aqt

Date: 04/13/22

Time: 16:30:57

PROJECT INFORMATION

Company: Azimuth Environmental

Project: 21-492

Test Well: BH21-4

Test Date: Mar 16, 2022

AQUIFER DATA

Saturated Thickness: 1.91 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (BH21-4)

Initial Displacement: 1.6 m

Static Water Column Height: 1.91 m

Total Well Penetration Depth: 1.91 m

Screen Length: 1.5 m

Casing Radius: 0.0254 m

Wellbore Radius: 0.075 m

SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

$K = 1.543E-6$ m/sec

$y_0 = 1.484$ m



APPENDIX F

Dewatering Analysis

Type	ID	Length (m)	Width (m)	Effectivve Radius ¹ (m)	Hydraulic Conductivity (m/s)	Hydraulic Conductivity (m/day)	Initial Depth of Water (static head) prior to dewatering (m)	H ²	Depth of Water in the well while pumping (m)	h ²	H-h (m)	H ² -h ²	Radius of Influence ² (m)	Discharge Into Ends ³ (m ³ /day)	Plane Discharge ⁴ (m ³ /day)	Total Discharge (m ³ /day)	Total Discharge (L/day)	Total Discharge x 1.5 Safety Factor (L/day)
		a	b	re	k	k	H		h				Ro	Q	Q	Q	Q	Q
Servicing	Servicing Connection	10	3	4	2.30E-06	1.99E-01	1.70	3	0.5	0.3	3.0	3	10	2	0.5	2.5	2,500	7,500
Total Dewatering																	2,500	7,500

Notes

¹ $r_e = (a+b) / \pi$ - assuming $a/b > 1.5$, or $r_e = \sqrt{ab} / \pi$ (Powers et al., 2007)

² $R_o = r_e + 3000 * (H-h) * \sqrt{k}$ - Sichardts Formula, (Cashman and Preene, 2001)

³ $Q = [(\pi * K) * (H^2 - h^2)] / [\ln(R_o / r)]$ (Powers et al., 2007)

⁴ $Q = 2 * [\pi * K * (H^2 - h^2) / (2R_o)]$ (Powers et al., 2007)

* H & h are relative to base of active ground water levels



APPENDIX G

Water Quality Results

Summary of Water Quality Data

			O, Reg. 153/04 Table 2 Criteria	City of Barrie Storm Sewer By- law	Provincial Water Quality Objectives (1994)	BH21-1
						Sampled on: 2022-03-16
						Sampled by: SY
						Analyzed by: Caduceon
Parameter	Symbol	Units			Objective	
Saturation pH			-		-	6.51
pH (lab)			-	6.0-9.5	6.5-8.5	7.8
Langelier Saturation Index			-		-	1.29
Alkalinity (4.2) (as Calcium Carbonate)		mg/L	-		-	519
Bicarbonate	HCO ₃ ⁻	mg/L	-		-	519
Carbonate	CO ₃ ⁻²	mg/L	-		-	< 5
Hydroxide			-		-	< 5
Conductivity		µS/cm	-		-	4980
Fluoride	F ⁻	mg/L	-		-	< 0.1
Chloride	Cl ⁻	mg/L	790		-	1320
Nitrate (as Nitrogen)	NO ₃ -N	mg/L	-		-	4.9
Nitrite (as Nitrogen)	NO ₂ -N	mg/L	-		-	< 0.1
Bromide	Br ⁻	mg/L	-		-	< 0.4
Sulphate	SO ₄ ⁻²	mg/L	-		-	48
Calcium	Ca	mg/L	-		-	197
Magnesium	Mg	mg/L	-		-	15.7
Sodium	Na	mg/L	490		-	825
Potassium	K	mg/L	-		-	3.1
Total Ammonia (as Nitrogen)	NH ₃ -N	mg/L	-		-	0.07
Phosphate (ortho)	PO ₄ ⁻³	mg/L	-		-	0.019
Phosphorus	P	mg/L	-		0.02	0.95
Reactive Silica	Si	mg/L	-		-	8.58
Dissolved Organic Carbon	DOC	mg/L	-		-	2.1
Colour			-		-	3
Turbidity			-		-	1180
Aluminum	Al	mg/L	-		0.075	0.08
Arsenic	As	mg/L	0.025		0.1	< 0.0005
Barium	Ba	mg/L	1		-	0.268
Boron	B	mg/L	5		0.2	0.06
Cadmium	Cd	mg/L	0.0027	0.001	0.0005	< 0.000059
Chromium	Cr	mg/L	0.05	0.08	0.0089	0.002
Copper	Cu	mg/L	0.087	0.01	0.005	< 0.002
Iron	Fe	mg/L	-		0.3	< 0.005
Lead	Pb	mg/L	0.01	0.05	0.005	0.00027
Manganese	Mn	mg/L	-		-	0.001
Molybdenum	Mo	mg/L	0.07		0.04	< 0.01
Nickel	Ni	mg/L	0.1	0.05	0.025	< 0.01
Selenium	Se	mg/L	0.01		0.1	0.004
Silver	Ag	mg/L	0.0015		0.0001	< 0.0002
Strontium	Sr	mg/L	-		-	2.06
Thallium	Tl	mg/L	0.002		0.0003	0.00005
Tin	Sn	mg/L	-		-	< 0.05
Titanium	Ti	mg/L	-		-	< 0.005
Uranium	U	mg/L	0.02		0.005	0.00065
Vanadium	V	mg/L	0.0062		0.006	< 0.0007
Zinc	Zn	mg/L	1.1		0.02	< 0.005
Total Dissolved Solids	TDS	mg/L	-		-	2745
Hardness (as Calcium Carbonate)		mg/L	-		-	557
% Difference / Ion Balanace			-		-	2.02

Bold and Highlighted indicates PWQO Exceedance

Bold and Italics indicates O.Reg. 153/04 Table 2 exceedance

Bold and Underlined indicates City of Barrie Storm Sewer Bylaw Exceedance



Bureau Veritas Job #: C296748
Report Date: 2022/11/29

EnVision Consultants Ltd.
Client Project #: 22-0127.120
Site Location: 181 BURTON AVE
Sampler Initials: KH

O.REG 153 METALS & INORGANICS PKG (WTR)

Bureau Veritas ID			SIO598			SIO598			SIO599		
Sampling Date			2022/04/12 11:20			2022/04/12 11:20			2022/04/12 11:40		
COC Number			873637-01-01			873637-01-01			873637-01-01		
	UNITS	Criteria	BH20-1	RDL	QC Batch	BH20-1 Lab-Dup	RDL	QC Batch	BH20-4	RDL	QC Batch

Inorganics											
WAD Cyanide (Free)	ug/L	66	<1	1	7938174	<1	1	7938174	<1	1	7938174
Dissolved Chloride (Cl-)	mg/L	790	1400	15	7939326				180	2.0	7939326
Metals											
Chromium (VI)	ug/L	25	1.0	0.50	7935665				<0.50	0.50	7935665
Mercury (Hg)	ug/L	0.29	<0.10	0.10	7937804				<0.10	0.10	7937804
Dissolved Antimony (Sb)	ug/L	6.0	<0.50	0.50	7940296				<0.50	0.50	7940296
Dissolved Arsenic (As)	ug/L	25	<1.0	1.0	7940296				<1.0	1.0	7940296
Dissolved Barium (Ba)	ug/L	1000	340	2.0	7940296				110	2.0	7940296
Dissolved Beryllium (Be)	ug/L	4.0	<0.40	0.40	7940296				<0.40	0.40	7940296
Dissolved Boron (B)	ug/L	5000	61	10	7940296				36	10	7940296
Dissolved Cadmium (Cd)	ug/L	2.7	<0.090	0.090	7940296				<0.090	0.090	7940296
Dissolved Chromium (Cr)	ug/L	50	<5.0	5.0	7940296				<5.0	5.0	7940296
Dissolved Cobalt (Co)	ug/L	3.8	<0.50	0.50	7940296				0.64	0.50	7940296
Dissolved Copper (Cu)	ug/L	87	2.0	0.90	7940296				1.7	0.90	7940296
Dissolved Lead (Pb)	ug/L	10	<0.50	0.50	7940296				<0.50	0.50	7940296
Dissolved Molybdenum (Mo)	ug/L	70	<0.50	0.50	7940296				<0.50	0.50	7940296
Dissolved Nickel (Ni)	ug/L	100	<1.0	1.0	7940296				1.4	1.0	7940296
Dissolved Selenium (Se)	ug/L	10	<2.0	2.0	7940296				<2.0	2.0	7940296
Dissolved Silver (Ag)	ug/L	1.5	<0.090	0.090	7940296				<0.090	0.090	7940296
Dissolved Sodium (Na)	ug/L	490000	1000000	500	7940296				150000	100	7940296
Dissolved Thallium (Tl)	ug/L	2.0	<0.050	0.050	7940296				<0.050	0.050	7940296
Dissolved Uranium (U)	ug/L	20	0.67	0.10	7940296				0.65	0.10	7940296
Dissolved Vanadium (V)	ug/L	6.2	<0.50	0.50	7940296				1.4	0.50	7940296
Dissolved Zinc (Zn)	ug/L	1100	<5.0	5.0	7940296				<5.0	5.0	7940296

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels
RDL = Reportable Detection Limit	
QC Batch = Quality Control Batch	
Lab-Dup = Laboratory Initiated Duplicate	
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)	
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition	
Potable Ground Water- All Types of Property Uses - Coarse Textured Soil	



O.REG 153 METALS & INORGANICS PKG (WTR)

Bureau Veritas ID			SIO600		SIO601		
Sampling Date			2022/04/12 11:00		2022/04/12 10:30		
COC Number			873637-01-01		873637-01-01		
	UNITS	Criteria	BH22-1	RDL	BH22-2	RDL	QC Batch
Inorganics							
WAD Cyanide (Free)	ug/L	66	1	1	<1	1	7938174
Dissolved Chloride (Cl-)	mg/L	790	800	7.0	1200	10	7939326
Metals							
Chromium (VI)	ug/L	25	<0.50	0.50	<0.50	0.50	7935665
Mercury (Hg)	ug/L	0.29	<0.10	0.10	<0.10	0.10	7937804
Dissolved Antimony (Sb)	ug/L	6.0	<0.50	0.50	<0.50	0.50	7940296
Dissolved Arsenic (As)	ug/L	25	<1.0	1.0	<1.0	1.0	7940296
Dissolved Barium (Ba)	ug/L	1000	200	2.0	270	2.0	7940296
Dissolved Beryllium (Be)	ug/L	4.0	<0.40	0.40	<0.40	0.40	7940296
Dissolved Boron (B)	ug/L	5000	52	10	58	10	7940296
Dissolved Cadmium (Cd)	ug/L	2.7	<0.090	0.090	<0.090	0.090	7940296
Dissolved Chromium (Cr)	ug/L	50	<5.0	5.0	<5.0	5.0	7940296
Dissolved Cobalt (Co)	ug/L	3.8	<0.50	0.50	<0.50	0.50	7940296
Dissolved Copper (Cu)	ug/L	87	1.7	0.90	1.3	0.90	7940296
Dissolved Lead (Pb)	ug/L	10	<0.50	0.50	<0.50	0.50	7940296
Dissolved Molybdenum (Mo)	ug/L	70	0.94	0.50	1.0	0.50	7940296
Dissolved Nickel (Ni)	ug/L	100	<1.0	1.0	<1.0	1.0	7940296
Dissolved Selenium (Se)	ug/L	10	<2.0	2.0	<2.0	2.0	7940296
Dissolved Silver (Ag)	ug/L	1.5	<0.090	0.090	<0.090	0.090	7940296
Dissolved Sodium (Na)	ug/L	490000	570000	100	740000	500	7940296
Dissolved Thallium (Tl)	ug/L	2.0	<0.050	0.050	<0.050	0.050	7940296
Dissolved Uranium (U)	ug/L	20	1.2	0.10	0.53	0.10	7940296
Dissolved Vanadium (V)	ug/L	6.2	1.0	0.50	0.50	0.50	7940296
Dissolved Zinc (Zn)	ug/L	1100	15	5.0	<5.0	5.0	7940296
No Fill	No Exceedance						
Grey	Exceeds 1 criteria policy/level						
Black	Exceeds both criteria/levels						
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)							
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition							
Potable Ground Water- All Types of Property Uses - Coarse Textured Soil							



Bureau Veritas Job #: C296748

Report Date: 2022/11/29

EnVision Consultants Ltd.

Client Project #: 22-0127.120

Site Location: 181 BURTON AVE

Sampler Initials: KH

O.REG 153 VOCs BY HS & F1-F4 (WATER)

Bureau Veritas ID			SIO598	SIO599	SIO600	SIO601	SIO602		
Sampling Date			2022/04/12 11:20	2022/04/12 11:40	2022/04/12 11:00	2022/04/12 10:30	2022/04/12 10:30		
COC Number			873637-01-01	873637-01-01	873637-01-01	873637-01-01	873637-01-01		
	UNITS	Criteria	BH20-1	BH20-4	BH22-1	BH22-2	GW22-1	RDL	QC Batch
Calculated Parameters									
1,3-Dichloropropene (cis+trans)	ug/L	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7936373
Volatile Organics									
Acetone (2-Propanone)	ug/L	2700	<10	<10	<10	<10	<10	10	7938140
Benzene	ug/L	5.0	<0.17	<0.17	<0.17	<0.17	<0.17	0.17	7938140
Bromodichloromethane	ug/L	16.0	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7938140
Bromoform	ug/L	25.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7938140
Bromomethane	ug/L	0.89	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7938140
Carbon Tetrachloride	ug/L	0.79	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	7938140
Chlorobenzene	ug/L	30	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	7938140
Chloroform	ug/L	2.4	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	7938140
Dibromochloromethane	ug/L	25.0	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7938140
1,2-Dichlorobenzene	ug/L	3.0	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7938140
1,3-Dichlorobenzene	ug/L	59	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7938140
1,4-Dichlorobenzene	ug/L	1.0	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7938140
Dichlorodifluoromethane (FREON 12)	ug/L	590	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7938140
1,1-Dichloroethane	ug/L	5	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	7938140
1,2-Dichloroethane	ug/L	1.6	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7938140
1,1-Dichloroethylene	ug/L	1.6	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	7938140
cis-1,2-Dichloroethylene	ug/L	1.6	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7938140
trans-1,2-Dichloroethylene	ug/L	1.6	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7938140
1,2-Dichloropropane	ug/L	5.0	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	7938140
cis-1,3-Dichloropropene	ug/L	0.5	<0.30	<0.30	<0.30	<0.30	<0.30	0.30	7938140
trans-1,3-Dichloropropene	ug/L	0.5	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	7938140
Ethylbenzene	ug/L	2.4	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	7938140
Ethylene Dibromide	ug/L	0.2	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	7938140
Hexane	ug/L	51	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	7938140
Methylene Chloride(Dichloromethane)	ug/L	50	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	7938140
Methyl Ethyl Ketone (2-Butanone)	ug/L	1800	<10	<10	<10	<10	<10	10	7938140
No Fill	No Exceedance								
Grey	Exceeds 1 criteria policy/level								
Black	Exceeds both criteria/levels								
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)									
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition									
Potable Ground Water- All Types of Property Uses - Coarse Textured Soil									



O.REG 153 VOCs BY HS & F1-F4 (WATER)

Bureau Veritas ID				SIO598	SIO599	SIO600	SIO601	SIO602		
Sampling Date				2022/04/12 11:20	2022/04/12 11:40	2022/04/12 11:00	2022/04/12 10:30	2022/04/12 10:30		
COC Number				873637-01-01	873637-01-01	873637-01-01	873637-01-01	873637-01-01		
	UNITS	Criteria	BH20-1	BH20-4	BH22-1	BH22-2	GW22-1	RDL	QC Batch	
Methyl Isobutyl Ketone	ug/L	640	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	7938140	
Methyl t-butyl ether (MTBE)	ug/L	15	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7938140	
Styrene	ug/L	5.4	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7938140	
1,1,1,2-Tetrachloroethane	ug/L	1.1	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7938140	
1,1,2,2-Tetrachloroethane	ug/L	1.0	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7938140	
Tetrachloroethylene	ug/L	1.6	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	7938140	
Toluene	ug/L	24	<0.20	0.48	<0.20	<0.20	<0.20	0.20	7938140	
1,1,1-Trichloroethane	ug/L	200	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	7938140	
1,1,2-Trichloroethane	ug/L	4.7	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7938140	
Trichloroethylene	ug/L	1.6	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	7938140	
Trichlorofluoromethane (FREON 11)	ug/L	150	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	7938140	
Vinyl Chloride	ug/L	0.5	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	7938140	
p+m-Xylene	ug/L	-	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	7938140	
o-Xylene	ug/L	-	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	7938140	
Total Xylenes	ug/L	300	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	7938140	
F1 (C6-C10)	ug/L	750	<25	<25	<25	<25	<25	25	7938140	
F1 (C6-C10) - BTEX	ug/L	750	<25	<25	<25	<25	<25	25	7938140	
F2-F4 Hydrocarbons										
F2 (C10-C16 Hydrocarbons)	ug/L	150	<100	<100	<100	<100	<100	100	7941387	
F3 (C16-C34 Hydrocarbons)	ug/L	500	<200	<200	<200	<200	<200	200	7941387	
F4 (C34-C50 Hydrocarbons)	ug/L	500	<200	<200	<200	<200	<200	200	7941387	
Reached Baseline at C50	ug/L	-	Yes	Yes	Yes	Yes	Yes		7941387	
Surrogate Recovery (%)										
o-Terphenyl	%	-	99	99	100	99	98		7941387	
4-Bromofluorobenzene	%	-	87	88	87	88	88		7938140	
D4-1,2-Dichloroethane	%	-	106	106	107	105	106		7938140	
D8-Toluene	%	-	91	92	92	92	91		7938140	
No Fill	No Exceedance									
Grey	Exceeds 1 criteria policy/level									
Black	Exceeds both criteria/levels									
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)										
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition										
Potable Ground Water- All Types of Property Uses - Coarse Textured Soil										



O.REG 153 VOCS BY HS (WATER)

Bureau Veritas ID			SIO603		
Sampling Date			2022/04/12		
COC Number			873637-01-01		
	UNITS	Criteria	TRIP BLANK	RDL	QC Batch
Calculated Parameters					
1,3-Dichloropropene (cis+trans)	ug/L	0.5	<0.50	0.50	7936373
Volatile Organics					
Acetone (2-Propanone)	ug/L	2700	<10	10	7938148
Benzene	ug/L	5.0	<0.20	0.20	7938148
Bromodichloromethane	ug/L	16.0	<0.50	0.50	7938148
Bromoform	ug/L	25.0	<1.0	1.0	7938148
Bromomethane	ug/L	0.89	<0.50	0.50	7938148
Carbon Tetrachloride	ug/L	0.79	<0.19	0.19	7938148
Chlorobenzene	ug/L	30	<0.20	0.20	7938148
Chloroform	ug/L	2.4	<0.20	0.20	7938148
Dibromochloromethane	ug/L	25.0	<0.50	0.50	7938148
1,2-Dichlorobenzene	ug/L	3.0	<0.40	0.40	7938148
1,3-Dichlorobenzene	ug/L	59	<0.40	0.40	7938148
1,4-Dichlorobenzene	ug/L	1.0	<0.40	0.40	7938148
Dichlorodifluoromethane (FREON 12)	ug/L	590	<1.0	1.0	7938148
1,1-Dichloroethane	ug/L	5	<0.20	0.20	7938148
1,2-Dichloroethane	ug/L	1.6	<0.49	0.49	7938148
1,1-Dichloroethylene	ug/L	1.6	<0.20	0.20	7938148
cis-1,2-Dichloroethylene	ug/L	1.6	<0.50	0.50	7938148
trans-1,2-Dichloroethylene	ug/L	1.6	<0.50	0.50	7938148
1,2-Dichloropropane	ug/L	5.0	<0.20	0.20	7938148
cis-1,3-Dichloropropene	ug/L	0.5	<0.30	0.30	7938148
trans-1,3-Dichloropropene	ug/L	0.5	<0.40	0.40	7938148
Ethylbenzene	ug/L	2.4	<0.20	0.20	7938148
Ethylene Dibromide	ug/L	0.2	<0.19	0.19	7938148
Hexane	ug/L	51	<1.0	1.0	7938148
Methylene Chloride(Dichloromethane)	ug/L	50	<2.0	2.0	7938148
Methyl Ethyl Ketone (2-Butanone)	ug/L	1800	<10	10	7938148
No Fill	No Exceedance				
Grey	Exceeds 1 criteria policy/level				
Black	Exceeds both criteria/levels				
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)					
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition					
Potable Ground Water- All Types of Property Uses - Coarse Textured Soil					



BUREAU
VERITAS

Bureau Veritas Job #: C296748
Report Date: 2022/11/29

EnVision Consultants Ltd.
Client Project #: 22-0127.120
Site Location: 181 BURTON AVE
Sampler Initials: KH

O.REG 153 VOCS BY HS (WATER)

Bureau Veritas ID			SIO603		
Sampling Date			2022/04/12		
COC Number			873637-01-01		
	UNITS	Criteria	TRIP BLANK	RDL	QC Batch
Methyl Isobutyl Ketone	ug/L	640	<5.0	5.0	7938148
Methyl t-butyl ether (MTBE)	ug/L	15	<0.50	0.50	7938148
Styrene	ug/L	5.4	<0.40	0.40	7938148
1,1,1,2-Tetrachloroethane	ug/L	1.1	<0.50	0.50	7938148
1,1,2,2-Tetrachloroethane	ug/L	1.0	<0.40	0.40	7938148
Tetrachloroethylene	ug/L	1.6	<0.20	0.20	7938148
Toluene	ug/L	24	<0.20	0.20	7938148
1,1,1-Trichloroethane	ug/L	200	<0.20	0.20	7938148
1,1,2-Trichloroethane	ug/L	4.7	<0.40	0.40	7938148
Trichloroethylene	ug/L	1.6	<0.20	0.20	7938148
Trichlorofluoromethane (FREON 11)	ug/L	150	<0.50	0.50	7938148
Vinyl Chloride	ug/L	0.5	<0.20	0.20	7938148
p+m-Xylene	ug/L	-	<0.20	0.20	7938148
o-Xylene	ug/L	-	<0.20	0.20	7938148
Total Xylenes	ug/L	300	<0.20	0.20	7938148
Surrogate Recovery (%)					
4-Bromofluorobenzene	%	-	90		7938148
D4-1,2-Dichloroethane	%	-	112		7938148
D8-Toluene	%	-	93		7938148
No Fill	No Exceedance				
Grey	Exceeds 1 criteria policy/level				
Black	Exceeds both criteria/levels				
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)					
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition					
Potable Ground Water- All Types of Property Uses - Coarse Textured Soil					

Report To:

Azimuth Environmental

642 Welham Rd

Barrie, ON L4N9A1

Attention:

Alan Turner

CADUCEON Environmental Laboratories

112 Commerce Park Dr Unit L

Barrie, ON L4N 8W8

Tel: 705-252-5743

DATE SUBMITTED:

20-Jul-23

CUSTOMER PROJECT: 21-492

DATE REPORTED:

28-Jul-23

P.O. NUMBER:

SAMPLE MATRIX:

Ground Water

WATERWORKS NO:

R153 Tbl. 2 - PGW

Client ID:

MW 21-4

R153 Table 2 - Potable Ground

Sample ID:

23-018389-1

Date Collected:

20-Jul-23

Maximum Concentration

Parameter	Units	R.L.		
Benzene	µg/L	0.5	<0.5	5
Ethylbenzene	µg/L	0.5	<0.5	2.4
Toluene	µg/L	0.5	<0.5	24
Xylene, m,p-	µg/L	1	<1	
Xylene, m,p,o-	µg/L	1.1	<1.1	300
Xylene, o-	µg/L	0.5	<0.5	

R.L. = Reporting Limit

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior written consent from Caduceon Environmental Laboratories.



APPENDIX H

Water Balance Summary

Table A: Pre-Development

Catchment Designation	Landscaped Grass	Forest	Total
Area (m ²)	1,248	750	1,998
Pervious Area (m ²)	1,248	750	1,998
Impervious Area (m ²)	0	0	0
Infiltration Factors			
Topography Infiltration Factor	0.2	0.2	
Soil Infiltration Factor	0.3	0.3	
Land Cover Infiltration Factor	0.1	0.2	
Infiltration Factor	0.6	0.7	
Run-Off Coefficient	0.4	0.3	
Run-Off From Impervious Surfaces	0.8	0.8	
Inputs (Per Unit Area)			
Precipitation (mm/yr)	907	907	907
Rainfall (mm/yr)	654	654	654
Run-On (mm/yr)	0	0	0
Other Inputs (mm/yr)	0	0	0
Total Inputs (mm/yr)	907	907	907
Outputs (Per Unit Area)			
Precipitation Surplus (mm/yr)	428	428	428
Net Surplus (mm/yr)	428	428	428
Evapotranspiration (mm/yr)	479	479	479
Infiltration (mm/yr)	257	300	273
Surplus Infiltration (mm/yr)	0	0	0
Total Infiltration (mm/yr)	257	300	273
Run-Off Pervious Areas (mm/yr)	171	128	155
Run-Off Impervious Areas (mm/yr)	0	0	0
Total Run-Off (mm/yr)	171	128	155
Total Outputs (mm/yr)	907	907	907
Difference (Inputs - Outputs)	0	0	0
Inputs (Volumes)			
Precipitation (m ³ /yr)	1,132	680	1,812
Run-On (m ³ /yr)	0	0	0
Other Inputs (m ³ /yr)	0	0	0
Total Inputs (m³/yr)	1,132	680	1,812
Outputs (Volumes)			
Precipitation Surplus (m ³ /yr)	534	321	855
Net Surplus (m ³ /yr)	534	321	855
Evapotranspiration (m ³ /yr)	598	359	957
Infiltration (m ³ /yr)	320	225	545
Surplus Infiltration (m ³ /yr)	0	0	0
Total Infiltration (m³/yr)	320	225	545
Run-Off Pervious Areas (m ³ /yr)	214	96	310
Run-Off Impervious Areas (m ³ /yr)	0	0	0
Total Run-Off (m ³ /yr)	214	96	310
Total Outputs (m³/yr)	1,132	680	1,812
Difference (Inputs - Outputs)	0	0	0

Table B: Post-Development (no mit)

Catchment Designation	Landscaped Grass	Paved Surface	Building	Total
Area (m ²)	658	892	448	1,998
Pervious Area (m ²)	658	0	0	658
Impervious Area (m ²)	0	892	448	1,340
Infiltration Factors				
Topography Infiltration Factor	0.2	0	0	
Soil Infiltration Factor	0.3	0	0	
Land Cover Infiltration Factor	0.1	0	0	
Infiltration Factor	0.6	0	0	
Run-Off Coefficient	0.4	1	1	
Run-Off From Impervious Surfaces	0.8	0.8	0.8	
Inputs (Per Unit Area)				
Precipitation (mm/yr)	907	907	907	907
Rainfall (mm/yr)	654	654	654	654
Run-On (mm/yr)	0	0	0	0
Other Inputs (mm/yr)	0	0	0	0
Total Inputs (mm/yr)	907	907	907	907
Outputs (Per Unit Area)				
Precipitation Surplus (mm/yr)	428	726	726	628
Net Surplus (mm/yr)	428	726	726	628
Evapotranspiration (mm/yr)	479	181	181	279
Infiltration (mm/yr)	257	0	0	85
Surplus Infiltration (mm/yr)	0	0	0	0
Total Infiltration (mm/yr)	257	0	0	85
Run-Off Pervious Areas (mm/yr)	171	0	0	56
Run-Off Impervious Areas (mm/yr)	0	726	726	487
Total Run-Off (mm/yr)	171	726	726	543
Total Outputs (mm/yr)	907	907	907	907
Difference (Inputs - Outputs)	0	0	0	0
Inputs (Volumes)				
Precipitation (m ³ /yr)	597	809	406	1,812
Run-On (m ³ /yr)	0	0	0	0
Other Inputs (m ³ /yr)	0	0	0	0
Total Inputs (m³/yr)	597	809	406	1,812
Outputs (Volumes)				
Precipitation Surplus (m ³ /yr)	282	647	325	1,254
Net Surplus (m ³ /yr)	282	647	325	1,254
Evapotranspiration (m ³ /yr)	315	162	81	558
Infiltration (m ³ /yr)	169	0	0	169
Surplus Infiltration (m ³ /yr)	0	0	0	0
Total Infiltration (m³/yr)	169	0	0	169
Run-Off Pervious Areas (m ³ /yr)	113	0	0	113
Run-Off Impervious Areas (m ³ /yr)	0	647	325	972
Total Run-Off (m ³ /yr)	113	647	325	1,085
Total Outputs (m³/yr)	597	809	406	1,812
Difference (Inputs - Outputs)	0	0	0	0

Table C: Post-Development (with mitigation)

Catchment Designation	Landscaped Grass	Paved Surface	Building	Total
Area (m ²)	658	892	448	1,998
Pervious Area (m ²)	658	0	0	658
Impervious Area (m ²)	0	892	448	1,340
Infiltration Factors				
Topography Infiltration Factor	0.2	0	0	
Soil Infiltration Factor	0.3	0	0	
Land Cover Infiltration Factor	0.1	0	0	
Infiltration Factor	0.6	0	0	
Run-Off Coefficient	0.4	1	1	
Run-Off From Impervious Surfaces	0.8	0.8	0.8	
Inputs (Per Unit Area)				
Precipitation (mm/yr)	907	907	907	907
Rainfall (mm/yr)	654	654	654	654
Run-On (mm/yr)	0	0	0	0
Other Inputs (mm/yr)	0	0	0	0
Total Inputs (mm/yr)	907	907	907	907
Outputs (Per Unit Area)				
Precipitation Surplus (mm/yr)	428	726	726	628
Net Surplus (mm/yr)	428	726	726	628
Evapotranspiration (mm/yr)	479	181	181	279
Infiltration (mm/yr)	257	0	0	85
Surplus Infiltration (mm/yr)	0	0	784	176
Total Infiltration (mm/yr)	257	0	784	260
Run-Off Pervious Areas (mm/yr)	171	0	0	56
Run-Off Impervious Areas (mm/yr)	0	726	-58	311
Total Run-Off (mm/yr)	171	726	-58	367
Total Outputs (mm/yr)	907	907	907	907
Difference (Inputs - Outputs)	0	0	0	0
Inputs (Volumes)				
Precipitation (m ³ /yr)	597	809	406	1,812
Run-On (m ³ /yr)	0	0	0	0
Other Inputs (m ³ /yr)	0	0	0	0
Total Inputs (m³/yr)	597	809	406	1,812
Outputs (Volumes)				
Precipitation Surplus (m ³ /yr)	282	647	325	1,254
Net Surplus (m ³ /yr)	282	647	325	1,254
Evapotranspiration (m ³ /yr)	315	162	81	558
Infiltration (m ³ /yr)	169	0	0	169
Surplus Infiltration (m ³ /yr)	0	0	351	351
Total Infiltration (m³/yr)	169	0	351	520
Run-Off Pervious Areas (m ³ /yr)	113	0	0	113
Run-Off Impervious Areas (m ³ /yr)	0	647	-26	621
Total Run-Off (m ³ /yr)	113	647	-26	734
Total Outputs (m³/yr)	597	809	406	1,812
Difference (Inputs - Outputs)	0	0	0	0

Table D: Water Balance Summary Table

Characteristic	Site						
	Pre-Development	Post-Development	Change (Pre to Post)		Post-Development with Mitigation	Change (Pre to Post with Mitigation)	
Inputs (Volume)							
Precipitation (m³/yr)	1,812	1,812	0	0%	1,812	0	0%
Run-On (m³/yr)	0	0	0	NA	0	0	NA
Other Inputs (m³/yr)	0	0	0	NA	0	0	NA
Total Inputs (m³/yr)	1,812	1,812	0	0%	1,812	0	0%
Outputs (Volume)							
Precipitation Surplus (m³/yr)	855	1,254	399	47%	1,254	399	47%
Net Surplus (m³/yr)	855	1,254	399	47%	1,254	399	47%
Evapotranspiration (m³/yr)	957	558	-399	-42%	558	-399	-42%
Infiltration (m³/yr)	545	169	-376	-69%	169	-376	-69%
Rooftop Infiltration (m³/yr)	0	0	0	NA	351	351	NA
Total Infiltration (m³/yr)	545	169	-376	-69%	520	-25	-5%
Run-Off Pervious Areas (m³/yr)	310	113	-197	-64%	113	-197	-64%
Run-Off Impervious Areas (m³/yr)	0	972	972	NA	621	621	NA
Total Run-Off (m³/yr)	310	1,085	775	250%	734	424	137%
Total Outputs (m³/yr)	1,812	1,812	0	0%	1,812	0	0%



APPENDIX I

Guelph Permeameter Testing Results

Guelph Pereameter Infiltration Test Results

Investigator: A Turner & J. Millington
 Date: 20-Jul-23
 Location: 181 Burton Ave. Barrie, ON
 TP ID: TP-1
 Depth of Hole: 20 cm auger hole
 Radius: 3 cm
 Reservoirs used during test: Combined
 (Combined or Inner)
 Reservoir constant used: 35.22
 Ground Surface Elevation: 231.5 masl

Water Level in Well: 10 cm

Time t (min)	Δt (min)	Water level in Reservoir h (cm)	Δh (cm)	Rate of Change $\Delta h / \Delta t$ (cm/ min)
0	--	2.0	--	--
0.25	0.25	2.7	0.7	2.80
0.5	0.25	3.5	0.8	3.20
0.75	0.25	4.4	0.9	3.60
1	0.25	5.1	0.7	2.80
1.5	0.5	6.5	1.4	2.80
2	0.5	7.9	1.4	2.80
2.5	0.5	9.1	1.2	2.40
3	0.5	10.2	1.1	2.20
3.5	0.5	11.5	1.3	2.60
4	0.5	12.6	1.1	2.20
4.5	0.5	13.7	1.1	2.20
5	0.5	14.7	1.0	2.00
Steady rate for 3 consecutive readings (R_1):				2.80

Water Level in Well: 10 cm

Time t (min)	Δt (min)	Water level in Reservoir h (cm)	Δh (cm)	Rate of Change $\Delta h / \Delta t$ (cm/ min)
0	--	0	--	--
0.25	0.25	1.5	1.5	6.00
0.5	0.25	1.8	0.3	1.20
0.75	0.25	2.2	0.4	1.60
1	0.25	2.5	0.3	1.20
1.5	0.5	3.7	1.2	2.40
2	0.5	4.8	1.1	2.20
2.5	0.5	6.1	1.3	2.60
3	0.5	7.5	1.4	2.80
3.5	0.5	8.8	1.3	2.60
4	0.5	9.9	1.1	2.20
4.5	0.5	11.1	1.2	2.40
5	0.5	12	0.9	1.80
5.5	0.5	13	1.0	2.00
6	0.5	14	1.0	2.00
6.5	0.5	15.3	1.3	2.60
7	0.5	16.5	1.2	2.40
7.5	0.5	17.5	1.0	2.00
8	0.5	19	1.5	3.00
8.5	0.5	20.2	1.2	2.40
9	0.5	21.2	1.0	2.00
9.5	0.5	22.3	1.1	2.20
10	0.5	23.4	1.1	2.20
10.5	0.5	24.5	1.1	2.20
Steady rate for 3 consecutive readings (R_2):				2.20



Guelph Permeameter Calculations

Input

Result

Support: ali@soilmoisture.com

Head #1

Reservoir Type (enter "1" for Combined and "2" for Inner reservoir): 1
Enter water Head Height ("H" in cm): 10
Enter the Borehole Radius ("a" in cm): 3

Enter the soil texture-structure category (enter one of the below numbers): 3

1. Compacted, Structure-less, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.
2. Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.
3. Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.
4. Coarse and gravely sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc

Steady State Rate of Water Level Change ("R" in cm/min): 2.8000

Res Type 35.22
H 10
a 3
H/a 3.333
a* 0.12
C0.01 1.218
C0.04 1.29
C0.12 1.288
C0.36 1.288
C 1.288
R 2.800
Q 1.644
pi 3.142

$$\alpha^* = 0.12 \text{ (cm}^{-1}\text{)}$$

$$C = 1.287543$$

$$Q = 1.6436$$

$$K_{fs} = \begin{matrix} 1.78E-03 & \text{cm/sec} \\ 1.07E-01 & \text{cm/min} \\ 1.78E-05 & \text{m/sec} \\ 4.21E-02 & \text{inch/min} \\ 7.01E-04 & \text{inch/sec} \end{matrix}$$

$$\Phi_{fs} = 1.48E-02 \text{ (cm}^2\text{/min)}$$

Head #2

Reservoir Type (enter "1" for Combined and "2" for Inner reservoir): 1
Enter water Head Height ("H" in cm): 10
Enter the Borehole Radius ("a" in cm): 3

Enter the soil texture-structure category (enter one of the below numbers): 3

1. Compacted, Structure-less, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.
2. Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.
3. Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.
4. Coarse and gravely sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc

Steady State Rate of Water Level Change ("R" in cm/min): 2.2000

Res Type 35.22
H 10
a 3
H/a 3.333333
a* 0.12
C0.01 1.21841
C0.04 1.290234
C0.12 1.287543
C0.36 1.287543
C 1.287543
R 2.200
Q 1.2914
pi 3.1415

$$\alpha^* = 0.12 \text{ (cm}^{-1}\text{)}$$

$$C = 1.287543$$

$$Q = 1.2914$$

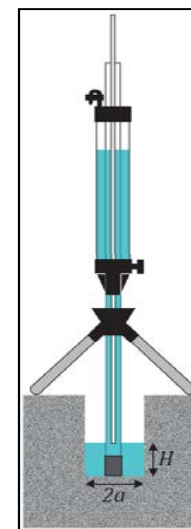
$$K_{fs} = \begin{matrix} 1.40E-03 & \text{cm/sec} \\ 8.40E-02 & \text{cm/min} \\ 1.40E-05 & \text{m/sec} \\ 3.31E-02 & \text{inch/min} \\ 5.51E-04 & \text{inch/sec} \end{matrix}$$

$$\Phi_{fs} = 1.17E-02 \text{ (cm}^2\text{/min)}$$

Average

$$K_{fs} = \begin{matrix} 1.59E-03 & \text{cm/sec} \\ 9.54E-02 & \text{cm/min} \\ 1.59E-05 & \text{m/s} \\ 3.76E-02 & \text{inch/min} \\ 6.26E-04 & \text{inch/sec} \end{matrix}$$

$$\Phi_{fs} = 1.33E-02 \text{ (cm}^2\text{/min)}$$



TEST PIT LOG 1

Environmental Assessments & Approvals

Project Name/ Project Client	Guelph Permeameter Testing - Hydrogeological Assessment Monolite Holdings Inc.	Project Address	181 Burton Avenue, Barrie, Ontario	Date	July 20, 2023
Test Pit Number	1	Contractor	Mark St. John	Elevation	231.50 masl
Equipment	Rubber Track Mini-Excavator	Test Pit Size	1.2x4.0 m	Datum	17T E 605210 N 4914039
Temperature	22 °C	Weather	Sunny, partly cloudy	Sample Type	Soil

Depth		Soil description	Samples		Screening Parameters	Remarks / Chemical Analysis
From (m)	To (m)		No.	Depth (mbgs)		
0.00	0.22	TOPSOIL: Dark brown to black, sand, trace to some silt, some gravel, organics, moist				
0.22	1.10	FILL: Dark brown to black, sand, trace to some silt, some gravel to gravelly, organics, moist				
1.10	1.60	SAND: Compact to dense, brown, sand, trace to some silt, trace to some gravel, moist	1	1.3		Submitted for T-Time and grain size analysis
						Guelph Permeameter Test #1 completed at north side of test pit, Test #2 completed at south side of test pit. Both tests completed at 1.3 m depth
		Test Pit Terminated at ____1.6 m____				
Comments			Water Conditions in Test Pit			
No water seepage No sidewall sloughing			☐ Wet upon completion ☒ Dry upon completion			

JOB No.	21-492
TEST PIT No.	1
FIELD STAFF	Alan Turner



July 31, 2023

Azimuth Environmental Consulting Inc.
642 Welham Road
Barrie, Ontario
L4N 9A1

Attn: Alan Turner

RE: Job No. 21-492
Determination of Estimated T-Time

Dear Mr. Turner

GEI Consultants (GEI) was provided with one (1) soil sample on July 20, 2023 to complete a grain size analysis to determine the percolation rate of the tested soil (T-Time analysis).

The delivered sample was identified as shown below.

- TP1 GS1, 1.3 m

A grain size distribution curve was developed by testing the above referenced soil sample in accordance with ASTM Standard Test Methods for Particle-Size Distribution D6913 (Gradation) of Soils Using Sieve Analysis and ASTM D7928 (Gradation) of Fine-Grained Soils using the Sedimentation (Hydrometer) Analysis. The result of the laboratory test and graphical representation of the grain size analysis is enclosed.

Determination of percolation rate is based on the "*Ministry of Municipal Affairs and Housing (MMAH) Supplementary Guidelines SB-6, Percolation Time and Soil Descriptions, September 14, 2012*". Based on this document, a summary of the result and the estimated percolation rate of the soil is as follows:

Client Ref.	GEI Lab No.	Soil Description (MIT)	USCS Soil Classification	Estimated Percolation Rate or "T-Time" (mins/cm)	Estimated Infiltration Rate (mm/hr)
TP1 GS1, 1.3 m	5932	SILTY SAND, Some Clay, Trace Gravel	S.M.	30 mins/cm	20 mm/hour

It is noted that the typical range for an S.M. classified soil is typically on the order 8 to 20 mins/cm. Due to the extremely well graded nature of the soil samples, and that soils such as these (glacial tills) are typically hard or very dense, it is recommended that 30 mins/cm be used for instead for TP1 GS1, 1.3 m as a more realistic and conservative estimate.

It is noted that percolation time not only varies based on the grain size distribution but is also influenced by other soil characteristics such as the density of the soil, the structure of the soil, the percentage/mineralogy of clay, the plasticity of the soil, the organic content of the soil, and the groundwater table level which are not expressly calculated as part of a grain size analysis.

No field investigation was conducted by GEI in conjunction with the above testing and did not witness the depth or location in which these samples were obtained. GEI is providing the percolation rates as factual information, to be used in design by a qualified professional with due regard to the limitations as indicated above.

We trust this information is sufficient for your present purposes. Should you have any questions concerning the above, or can be of any further assistance, please do not hesitate to contact the undersigned.

Yours truly,
GEI Consultants

A handwritten signature in black ink, appearing to read "Donna Davidson-Gorry".

Donna Davidson-Gorry
Laboratory Testing Services Practice Lead
(705) 718-6604
ddavidsongorry@geiconsultants.com

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

Andrew Jones
Materials Testing and Inspection Practice Lead
(705) 220-0060
ajones@geiconsultants.com

Enclosures (1)

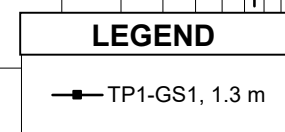
Grain Size Analysis (T-Time)

ENCLOSURE 1

Grain Size Analysis (T-Time)

CLAY AND SILT	SAND			GRAVEL	
	Fine	Medium	Coarse	Fine	Coarse

SIEVE DESIGNATION (IMPERIAL)



	GRAIN SIZE DISTRIBUTION - 21-492	FIGURE No. -
	SILTY SAND	REF. No. 2005133
		DATE July 2023