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A REPORT TO
2599302 ONTARIO LTD.

HYDROGEOLOGICAL ASSESSMENT FOR

PROPOSED 15-STOREY HOTEL
2157 LAKESHORE BOULEVARD WEST

CITY OF TORONTO

REFERENCE NO. 1811-W006

FEBRUARY 2020

DISTRIBUTION

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1.0 EXECUTIVE SUMMARY

Soil Engineers Ltd. (SEL) has conducted a hydrogeological assessment for a development site at 2157 Lakeshore Boulevard West, City of Toronto, located east of the intersection of Silver Moon Drive, and Lakeshore Boulevard West. Surrounding land use includes; commercial and residential properties to the north, residential properties to the east, Silver Moon Drive, and a residential development currently under construction to the south, and Lakeshore Boulevard West, and an undeveloped property to the west of the site. The site is currently occupied by a paved above-grade parking lot. The site is anticipated to be developed as a 15- storey hotel building having a 1-level underground parking structure.

The subject site lies on the mapped localized silt to silty clay plains within the Physiographic Region of Southern Ontario known as the Iroquois Sand Plain, where a Sand Plain comprises the dominant local physiography.

A review of the surface geological map of Ontario shows that the subject site is located close to the boundary between outcropping bedrock and glaciolacustrine deposits (Sandy). The sandy glaciolacustrine deposits, consists, predominantly of sand, gravelly sand, and gravel, interpreted as being nearshore and beach deposits, and the bedrock is comprised of undifferentiated carbonate and clastic sedimentary rock, which is exposed at surface or is covered by a discontinuous, thin layer of overburden soil drift.

The subject site is located within the Lower Humber sub-watershed of the Humber River Watershed.

A review of the local topography shows that the site is generally flat, exhibiting a gentle decline in elevation relief towards its east limits.

This study has disclosed that beneath the granular fill, and earth fill layers, the native soils underlying the subject site consist of consists of silt, silty clay, and shale bedrock, extending to the termination depth of the investigation at 9.9 m below the prevailing ground surface.

The findings of this study confirm that the groundwater level elevations beneath the site, range from 77.10 to 80.60 masl (i.e., 3.30 to 6.60 m below ground surface). A review of the average of shallow groundwater elevations suggests that it flows in southerly, southeasterly, and southwesterly directions from an interpreted localized higher groundwater area, located within the northwestern portion of the site.

The single well response tests yielded hydraulic conductivity (K) estimates for the silty clay unit which range 9.2×10^{-9} to 1.0×10^{-8} m/sec, and the K estimate for the silty clay and shale unit is estimated at 6.7×10^{-9} m/sec. These results suggest low groundwater seepage rates are expected during earthworks excavation, where minor construction dewatering is anticipated to lower the groundwater table to facilitate safe, stable subsoil conditions for excavation and construction.

The shallow groundwater level elevation is about 0.60 m below the proposed 1-level underground parking structure, and it is about 2.60 m above the proposed elevator pit structures.

The dewatering flow estimates for the construction of the proposed underground parking structures suggests that it is about 425 L/day; by applying a safety factor of three (3), it could reach a maximum of 1,274 L/day.

The dewatering flow estimates for the construction of the proposed elevator pit structure suggests that the flow rate is about 39 L/day; by applying a safety factor of three (3), it could reach a maximum of 118 L/day. This dewatering rate for

excavation is below the 50,000 L/day threshold limit for requiring an approval for any proposed construction related groundwater takings, which will not require any registration or approval filing with the MECP.

The estimated zone of influence for construction dewatering could reach a maximum of 1.1 m away from the conceptual dewatering alignments around the proposed building footprint. There are adjacent neighbouring residential and mixed-used development properties, that are within the conceptual zone of influence for construction dewatering; however, there are no groundwater receptors, such as bodies of water, watercourses or wetlands are present within the conceptual zone of influence for dewatering for the proposed development. The local shallow groundwater flow pattern may be temporarily affected during construction.

Long-term foundation drainage rates for the completed new building and basement structure from both an under-slab floor drainage network and for a perimeter mira drainage system for a conventionally shored excavation foundation for the proposed underground parking structure is approximately 4.87 L/day. By applying a safety factor of three (3), the anticipated foundation drainage flow rates could reach a maximum of 14.62 L/day.

The long-term foundation drainage rates from both an under-basement slab floor drainage network and from a mira drainage network for a conventionally shored excavation foundation for the proposed elevator pit structure is approximately 2.90 L/day. By applying a safety factor of three (3), the drainage rates could reach a maximum of 8.69 L/day.

Dewatering effluent from any short-term construction dewatering or from any long-term foundation drainage is acceptable for disposal to the City of Toronto sanitary sewer. For disposal to the storm sewer, the effluent will require minor

pre-treatment to lower Total Suspended Solids and Total Manganese. A pretreatment system designed to lower the levels suspended solids and Manganese should result in the effluent being acceptable for disposal to the City's storm sewer. Any short-term dewatering may be associated with seepage of any perched shallow groundwater encountered within excavations, or from the removal of the accumulated runoff from within the construction footprint excavation following storm events. It is anticipated that there may be limited construction dewatering following storm events during excavation works. However, any groundwater seepage within excavations will likely dissipate relatively quickly after the earthworks commences, and the local water table has been lowered in advance of or during excavation.

The groundwater lies at depths, ranging between 3.30 m and 6.60 m below the prevailing ground surface. The underlying shallow silt, silty clay with occasional and seams layers, and weathered shale layers could facilitate the implementation of Low Impact Development (LID) infrastructure to infiltrate precipitation at the developed site to the subsurface to recharge the shallow aquifer at depth to address future stormwater management planning for the proposed development.

2.0 INTRODUCTION

2.1 Project Description

In accordance with authorization, dated March 20, 2019, from Mr. Sandy Uppal, President of 2599302 Ontario Ltd., (SEL) has performed a hydrogeological assessment for a proposed 15-storey hotel development site, located at 2157 Lakeshore Boulevard West, in the City of Toronto. The location of the subject site is shown on Drawing No. 1.

The subject site is located within an existing urban developed area; where the surrounding land use includes; commercial and residential properties to the north, residential properties to the east, Silver Moon Drive, and a residential development, currently under construction to the south, and Lakeshore Boulevard West, and an undeveloped property to the west of the site. The site is currently occupied by a paved, above-grade parking lot. The site is anticipated to be developed as a 15-storey hotel building, having a 1-level underground parking structure.

This report summarizes findings of the field study and associated groundwater monitoring and hydraulic testing. The current study provides preliminary recommendations for any construction dewatering needs, including long-term foundation drainage needs prior to detailed design. In addition, comments are provided regarding the groundwater quality to be discharged to the City of Toronto Sewer Systems. A description and characterization of the hydrogeostratigraphy for the site and surrounding area is provided, together with an assessment of the site's groundwater function relative to the maintenance for any on-site or nearby groundwater receptors.

2.2 **Project Objectives**

The major objectives of this Hydrogeological Assessment Report are as follows:

1. Establish the hydrogeological setting for the subject site and surrounding local vicinity;
2. Interpret shallow groundwater flow and runoff patterns;
3. Identify zones of higher groundwater yield as potential sources for ongoing shallow groundwater seepage;
4. Characterize the hydraulic conductivity (K) for the groundwater-bearing sub-soil soil strata;
5. Prepare an interpreted hydrostratigraphic cross-section across the subject site and the proposed development footprint;
6. Estimate the anticipated dewatering flows that may be required to lower the groundwater table to facilitate construction, or for any permanent long-term foundation drainage needs, following construction;
7. Assess shallow groundwater quality for evaluation to sewer use standards
8. Evaluate potential impacts to any nearby groundwater receptors within the anticipated zone of influence for construction dewatering; and to develop preliminary estimates for any temporary dewatering flow rates that may be required to facilitate excavation for construction, or from any long-term foundation drainage needs, following construction.

2.3 **Scope of Work**

The scope of work for the hydrogeological assessment is summarized below:

1. Clearance of underground services, drilling of five (5) boreholes, and installation of monitoring wells, one within each of the boreholes advance on site within the site's development footprint;
2. Monitoring well development and performance of Single Well Response Tests (SWRTs) at the five (5) monitoring wells to estimate the hydraulic conductivity (K) for the groundwater-bearing subsoil and bedrock strata at the depths of the well screens;
3. Describing the geological and hydrogeological setting for the subject site and local surrounding areas; and,
4. Estimating the hydraulic conductivity (K) for the groundwater bearing subsoil and bedrock strata, based on the SWRT results and from a review of soils grain size analyses.
5. Review of the findings of the previous geotechnical study; review of available engineering development plans and profiles for the proposed multi-storey mixed-use hotel development; assessing the preliminary construction dewatering needs and estimation of any anticipated dewatering flows to lower the groundwater levels for construction, or for any anticipated long-term foundation drainage needs following construction.
6. Groundwater sampling and analysis from one (1) monitoring well to assess shallow groundwater quality for comparison and evaluation against the City of Toronto Sanitary and Storm Sewer Use By-Law limits to assess any disposal management options for any dewatering effluent generated during construction or from any long-term foundation drainage.

3.0 METHODOLOGY

3.1 Borehole Advancement and Monitoring Well Installation

Borehole drilling and monitoring well construction were performed on December 5, and 6, 2018. The program comprised of the drilling of five boreholes, and the installation of five (5) monitoring wells, one in each of the five (5) boreholes advanced beneath the site. The locations of the boreholes and monitoring wells are shown on, Drawing No. 2.

The borehole drilling and monitoring well construction were completed by a licensed water well contractor, DBW Drilling Ltd., under the full-time supervision of a geotechnical technician from SEL, who also logged the soil sub-strata encountered during borehole advancement and collected representative subsoil samples for textural classification. The boreholes were drilled using continuous flight power augers. Detailed descriptions of the encountered subsoil and groundwater conditions are presented on the borehole and monitoring well logs, on the enclosed Figures 1 to 5, inclusive.

The monitoring wells were constructed, using 50-mm diameter PVC riser pipes and screens, which were installed in each of the boreholes in accordance with Ontario Regulation (O. Reg.) 903. All of the monitoring wells were provided with flushmount protective steel casings at the ground surface. The details of the monitoring well construction are provided on the enclosed Borehole Logs (Figures 1 to 5).

The UTM coordinates and ground surface elevations at the borehole/monitoring well locations, together with the well construction details, are provided in Table 3-1.

Table 3-1 - Monitoring Well Installation Details

Well ID	Installation Date	UTM Coordinates		Ground El. (masl)	Borehole Depth (mbgs)	Screen Interval (mbgs)	Casing Dia. (mm)
		East	North				
BH/MW 1	5-Dec-18	622664	4831372	83.3	6.1	3.0-6.1	50
BH/MW 2	5-Dec-18	622652	4831378	83.7	6.1	3.0-6.1	50
BH/MW 3	5-Dec-18	622658	4831395	83.9	6.1	3.0-6.1	50
BH/MW 4	5-Dec-18	622671	4831393	83.4	6.1	3.0-6.1	50
BH/MW 5	6-Dec-18	622660	4831384	83.7	9.1	6.0-9.1	50

Notes:
mbgs - metres below ground surface
masl - metres above sea level

3.2 Groundwater Monitoring

The groundwater levels in the monitoring wells were measured manually on January 12, 26, February 9, and 23, and on March 9, and 21, 2019.

3.3 Mapping of Ontario Water Well Records

SEL received the Ministry of the Environment, Conservation and Park (MECP) Water Well Records (WWRs) for the registered wells located on the subject site and within 500 m of the site boundaries (study area). The well records indicate that one hundred and twenty-nine (129) registered well records are located within the 500 m zone of influence study area relative to the subject site boundaries. The WWR well locations are shown on Drawing No. 3, and a summary of the WWRs reviewed for this study are listed in Appendix 'A', with a discussion of the findings provided in Section 6.2.

3.4 Monitoring Well Development and Single Well Response Tests

All of the monitoring wells, except BH/MW 4, underwent development in preparation for single well response testing (SWRT) to estimate the hydraulic

conductivity (K) for saturated subsoil and bedrock strata at the depths of the monitoring well screens. Well development involved the purging and removal of several casing volumes of groundwater from each monitoring well to remove remnants of clay, silt and other debris introduced into the monitoring wells during construction, and to induce the flow of formation groundwater through the well screens, thereby improving the transmissivity of the subsoil and bedrock strata formation at the monitoring well screen depths.

The K values derived from the SWRT's provide an indication of the yield capacity for the groundwater-bearing subsoil strata, at the well screen depths, and can be used to estimate the flow of groundwater through the groundwater-bearing subsoil/bedrock strata.

The SWRT involves the placement of a slug of known volume into the monitoring well, below the water table, to displace the groundwater level upward. The rate at which the water level recovers to static conditions (falling head) is tracked using a data logger/pressure transducer, and/or manually using a water level tape. The rate at which the water table recovers to static conditions is used to estimate the K value for the groundwater-bearing substrata formation at the well screen depth interval.

The SWRT could not be performed on BH/MW 4, due to the insufficient volume of groundwater within this well throughout the monitoring period. The K test estimate results are provided in Appendix 'B', with a summary of the results provided in Table 6-2.

3.5 **Groundwater Quality Assessment**

The monitoring well at BH/MW 3 underwent sampling for groundwater quality analysis to characterize its quality for evaluation against the City of Toronto Storm

and Sanitary Sewer Use By-Law parameters. This was performed to assess whether any anticipated dewatering effluent can be disposed of into the City of Toronto sewer systems during construction, or following site development, from any anticipated long-term foundation drainage. Based on the results, recommendations for any pre-treatment of any dewatering effluent can be developed, if required.

BH/MW 3 was developed and purged of at least 3 well casing volumes of groundwater prior to sample collection. In accordance with City of Toronto Storm and Sanitary Sewer use by-law sampling protocols, one entire set of groundwater samples was not field filtered prior to placement in the laboratory sample bottles, while a second set of selected samples that were collected underwent filtration in the laboratory for metals and phosphorus parameter analysis. This was performed to provide a basis of comparison between the unfiltered and filtered groundwater sample for metals and total phosphorous (TP) analysis to assess potential sources for any elevated metals and phosphorous from the analysis of groundwater. Upon sampling, all of the bottles were placed in ice and packed in a cooler at about 4^0 C for shipment to the analytical laboratory. Sample analysis was performed by SGS Environmental Services, which is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA).

Results of the water quality analysis are provided in Appendix 'C', with a discussion of the findings and evaluation provided in Section 7.5.

3.6 **Review Summary of Concurrent Report**

The following Geotechnical Investigation report was reviewed for the preparation of this hydrogeological study:

“A Report to 2599302 Ontario Ltd., a Geotechnical Investigation for Proposed 15-Storey Hotel, 2157 Lakeshore Boulevard West, City of Toronto”, Reference No. 1811-S006, dated January 2019.

4.0 REGIONAL AND LOCAL SETTING

4.1 Regional Geology

The subject site lies within the Physiographic Region of Southern Ontario known as the Iroquois Plain, where a Sand Plain is the predominant shallow physiographic feature mapped for the area. The Lake Iroquois Plain occupies the lowlands around the western part of Lake Ontario, covering a distance of about 300 km, extending from the Niagara River in the west to the Trent River in the east. It has a width varying from about 100 m to over 10 km. When the last glacier (Wisconsinan) was receding from Southern Ontario, the area was inundated by a body of water known as Lake Iroquois, which emptied eastward at Rome, New York State (Chapman and Putnam, 1984). Sand sediments were deposited as beaches along the former lake shoreline areas forming the present-day Sand Plain.

Review of the surface geological map of Ontario shows that the subject site is located close to the boundary, between outcropping bedrock and glaciolacustrine deposits (Sandy). The sandy glaciolacustrine deposits, consists predominantly of sand, gravelly sand, and gravel, interpreted as being nearshore and beach deposits, and the bedrock is comprised of undifferentiated carbonate and clastic sedimentary rock, exposed at surface or covered by a discontinuous, thin layer of overburden soil drift. Drawing No. 4, as reproduced from Ontario Geological Survey (OGS) mapping, illustrates the quaternary surface soil geology for the site and surrounding area.

The bedrock underlying the site is comprised mainly of Upper Ordovician aged shale, limestone, dolostone and siltstone of the Georgian Bay Formation, the Blue Mountain Formation, the Billings Formation, the Collingwood Member and the Eastview Member (Ontario Ministry of Northern Department and Mines, 1991). Shale bedrock was encountered during borehole drilling beneath the site, with the top

of bedrock ranging in depth from between 6.2 to 6.5 mbgs, or at elevations, ranging between 77.1 to 77.6 masl.

4.2 **Physical Topography**

A review of the local topography shows that the subject site is generally flat, exhibiting a decline in elevation relief towards its east limits. Runoff from the site is expected to drain in an easterly direction. Based on the topographic map for the area, and from review of the ground surface elevations at the borehole and monitoring well locations, the elevation relief across the subject site is about 0.6 m. Drawing No. 5 shows the mapped topographical contours for the site and surrounding area.

4.3 **Watershed Setting**

The subject site is located within the Lower Humber Sub-Watershed of the Humber River Watershed. The Humber River has is headwaters in the Niagara Escarpment and on the South Slope of the Oak Ridges Moraine. It occupies an area of 908 square kilometers and collects water from about 750 creeks and tributaries in a fan-shaped area north and northwest of Toronto, that encompasses portions of Dufferin County, the Regional Municipality of Peel, Simcoe County, and the Regional Municipality of York. The main branch runs for about 100 kilometers from the Niagara Escarpment in the northwest, while another major branch, known as the East Humber River, which starts at Lake St. George on the Oak Ridges Moraine, near Aurora to the northeast. They join north of Toronto and then flow, generally in a southeasterly direction into Lake Ontario.

The Humber River watershed is bounded by Mimico Creek to the west, and the Don River Watersheds to the east. Drawing No. 6 shows the location of the subject site within the Lower Humber River Sub-watershed.

4.4 **Local Surface Water and Natural Features**

The subject site is located about 300 m north of the Mimico Creek, and it is about 975 m southwest of the Humber River. Lake Ontario is located approximately 260 m east of the site. Wooded areas are located approximately 16.25 m west of and 32.5 m east of the site. Wooded areas were also observed along the river banks.

Wetlands classified as being Provincially Significant are located approximately 975 m northeast of the site, and are associated with the Humber River. The location of the subject site relative to the mentioned natural features in the area is shown on Drawing No. 7.

5.0 SOIL LITHOLOGY

This study has disclosed that beneath the layer of granular fill, and earth fill, the native soils underlying the subject site consists of silt, silty clay, and weathered shale. A Key Plan and an interpreted geological cross-section along the delineated north west-to-southeast and northeast-southwest transects are presented on Drawing Nos. 8-1 and 8-2.

5.1 **Granular Fill** (All BH/MWs)

Granular fill, about 15 to 30 cm thick, was observed at the ground surface at all of the BH/MW's locations.

5.2 **Earth Fill** (BH/MWs 1, 3, 4 and 5)

Earth fill, ranging between 0.5 to 4.1 m in thickness, was encountered beneath the granular fill horizon at the BH/MWs 1 3, 4, and 5 location. It consists of brown sand, sandy silt, and silty clay, having a trace of gravel, and occasional bedrock and organic inclusions.

5.3 **Silt** (BH/MWs 1, 2, 3 and 5)

Silt, ranging in thickness, between 1.4 m and 2.5 m, was contacted beneath the granular and earth fill layers at the BH/MWs 1, 2, 3 and 5, location. The silt is brown to grey in colour, and is compact to dense in consistency, having traces of clay, and occasional sand seams. The moisture content for the silt ranges from 13% to 18%, indicating damp to moist conditions.

5.4 **Silty Clay** (All BH/MWs location)

Silty clay, ranging in thickness from between 2.0 m and 4.4 m, was encountered at all of the BH/MWs location. It is grey in colour, compact to dense in consistency, having occasional sand seams and layers. Its moisture content ranged from 15% to 25%, indicating damp to moist conditions at the time of the field work.

The estimated permeability for the silty clay layer at BH/MW 3, at a depth of 4.8 mbgs, and at BH/MW 5, at a depth of 6.3 mbgs, is about 10^{-9} m/sec. Grain size analyses were performed on two (2) samples, and the soil gradation curves are plotted on Figure No. 6.

5.5 **Shale** (All BH/MWs location)

Weathered shale bedrock was contacted at all of the BH/MWs location, at depths ranging from between 6.2 to 6.5 mbgs beneath the silty clay unit. The shale is grey in colour, where it extends to the maximum investigated depths of 6.3 to 9.9 mbgs.

6.0 GROUNDWATER STUDY

6.1 Review of Concurrent Reports

A review of the findings from the concurrent Geotechnical Investigation Report, (SEL, Reference No. 1811-S006) indicates that beneath the granular fill horizon and layer of earth fill in places, site is underlain by strata of silt and silty clay, overlying the shale bedrock which appeared weathered at depths of between 6.2 m and 6.5 m below the existing ground level. Groundwater was not encountered in the open boreholes during the geotechnical investigation.

6.2 Review of Ontario Water Well Records

The Ministry of the Environment, Conservation and Parks (MECP) water well records for the subject site and for the properties within a 500 m radius of the boundaries of the subject site (study area) were reviewed.

The records indicate that one hundred and twenty-nine (129) well records are located within the study area. The locations of these well records, based on the UTM coordinates provided by the records, are shown on Drawing No 3. Details of the MECP water well records that were reviewed are provided in Appendix ‘A’.

A review of the final status of the well records within the study area reveals that fifty (50) are registered as monitoring and test holes wells, fifteen (15) are registered as observation wells, twenty (20) are abandoned-other wells, and forty-three (43) well records are registered as wells having unknown statuses.

A review of the first use of the wells shows that eight- four (84) are registered monitoring and test holes, one (1) well is registered as being used for irrigation, and there are records for forty-two (42) other wells having unknown statuses.

6.3 **Groundwater Monitoring**

The groundwater levels in the monitoring wells were measured on six occasions over the study period, on the following dates; January 12, 26, February 9, 23, and on March 9, and 21, 2019, to record the fluctuation of the shallow groundwater table beneath the site. The water levels and their corresponding elevations are given in Table 6-1.

Table 6-1 - Groundwater Level Measurements

Well ID		12-Jan-19	26-Jan-19	9-Feb-19	Feb-23-19	Mar-9-19	Mar-21-19	Average Elevation	Fluctuation (m)
BH/MW 1	mbgs	4.76	4.46	4.24	3.38	4.26	4.21	4.22	1.38
	masl	78.54	78.84	79.06	79.90	79.04	79.09	79.08	
BH/MW 2	mbgs	4.60	5.00	5.10	4.80	5.24	5.17	4.99	0.64
	masl	79.10	78.70	78.60	78.90	78.46	78.53	78.72	
BH/MW 3	mbgs	3.97	3.30	3.38	3.72	3.66	3.41	3.97	0.67
	masl	79.93	80.60	80.52	80.18	80.24	80.49	80.33	
BH/MW 4	mbgs	5.56	5.43	5.40	5.50	5.36	5.34	5.43	0.22
	masl	77.84	77.97	78.00	77.90	78.04	78.06	77.97	
BH/MW 5	mbgs	6.60	6.60	6.56	6.15	6.15	6.14	6.37	0.46
	masl	77.10	77.10	77.14	77.55	77.55	77.56	77.33	

Notes
mbgs -- metres below ground surface
masl -- metres above sea level

As shown above, the groundwater levels at BH/MW 1 increased consistently between January 12, and March 9, 2019, and then, decreased again, between March 9, and 21, 2019. The groundwater levels at BH/MW 2 fluctuated, where they decreased between January 12, and February 9, 2019, increased between February 9, and 23, 2019, and decreased again between February 23, and March 9, 2019, and increased again between March 9, and 21, 2019. The groundwater levels at

BH/MW 3 fluctuated, where they increased between January 12, and 26, 2019, decreased between January 26, and February 23, 2019, and exhibited an increasing trend throughout the remaining monitoring period. The groundwater levels at BH/MW 4 increased consistently between January 12, and February 9, 2019, and then it decreased between February 9, and 23, 2019, and exhibited an increasing trend throughout the remaining monitoring period into early spring. The groundwater levels at BH/MW 5 fluctuated, where they stabilized between January 12, and 26, 2019, increased between January 26, and February 23, 2019, and stabilized between February 23, and March 9, 2019, and increased, again between March 9, and 21, 2019.

The greatest fluctuation was observed at BH/MW 1, where the groundwater levels increased by 1.38 m during the monitoring period.

6.4 **Shallow Groundwater Flow Pattern**

The shallow groundwater flow pattern beneath the site was interpreted from the average of groundwater level measurements recorded at all of the BH/MWs location. The recorded measured groundwater levels indicate that shallow groundwater flows in southerly, southeasterly, and southwesterly directions from an interpreted localized higher groundwater area within the northwestern portion of the site. The interpreted shallow groundwater flow pattern for the subject site area is illustrated on Drawing No. 9.

6.5 **Single Well Response Test Analysis**

All of the BH/MWs, except for BH/MW 4, underwent single well response testing (SWRT), to estimate the hydraulic conductivity (K) for saturated shallow aquifer sub-soils and bedrock strata at the depths of the well screens. The SWRT could not

be performed on BH/MW 4 due to insufficient groundwater volume within this monitoring well throughout the monitoring period. The results of the SWRTs are presented in Appendix 'B', with a summary of the findings shown in Table 6-2.

Table 6-2 - Summary of SWRTs Results

Well ID	Ground El. (masl)	Monitoring Well Depth (mbgs)	Borehole Depth (mbgs)	Well Screen Interval (mbgs)	Screened Subsoil Strata	Hydraulic Conductivity (K) (m/sec)
BH/MW 1	83.30	6.1	6.3	3.0-6.1	Silty Clay	1.0×10^{-8}
BH/MW 2	83.70	6.1	6.7	3.0-6.1	Silty Clay	9.2×10^{-9}
BH/MW 3	83.90	6.1	6.4	3.0-6.1	Silty Clay	9.6×10^{-9}
BH/MW 5	83.70	9.1	6.5	6.0-9.1	Silty Clay/Shale	6.7×10^{-9}

Notes
mbgs -- metres below ground surface
masl -- metres above sea level

As shown in Table 6-2, the SWRT derived K estimates for the silty clay unit range from between 9.2×10^{-9} to 1.0×10^{-8} m/sec, and the K estimate for the silty clay and shale unit was estimated at 6.7×10^{-9} m/sec. The above results suggest that the K estimates for the groundwater-bearing subsoils at the depths of the well screen are low, with corresponding low anticipated groundwater seepage rates into open excavations, below the water table.

7.0 GROUNDWATER CONTROL

The hydraulic conductivity (K) estimates for the silt, silty clay and weathered shale bedrock, suggest that groundwater seepage rates into open excavations below the groundwater table will low. To provide safe, dry and stable conditions for earthworks excavations for construction of the proposed 1-level underground parking structures, the groundwater table should be lowered in advance of, or, during construction. The preliminary estimates for the construction dewatering flows required to locally lower the water table, based on the SWRT, K test estimates, are discussed in the following sections.

7.1 Groundwater Construction Dewatering Rates

Review of the proposed development plans, provided by the Client, indicate that it is planned to construct a fifteen -storey (15) high hotel building, having a 1-level underground parking structure. The proposed development footprint encompasses an area of approximately 792.48 square meters.

Fifteen (15) Storey Hotel Building Construction – 1-Level Underground Parking Structure (30.48 m x 26.0 m) with a Finished Floor Elevation of Approximately 84.0 masl:

For the proposed fifteen (15) storey hotel building, for the preliminary construction dewatering calculations, the estimated area for the excavation footprint for the 1-level underground parking structure is approximately 792.48 square meters which is approximately 30.48 m long by 26.0 m wide, having a perimeter of approximately 112.96 m, with a finished floor elevation at about 84.0 masl.

An additional excavation depth of 4.0 m (to El. 80.0 masl) was considered to accommodate the proposed underground parking level structure and foundation footings which were considered for this dewatering needs assessment. To facilitate excavation and construction in dry and stable subsoil conditions, it is proposed that the shallow groundwater table be lowered to an elevation of 79.0 masl, which is about 1 m below the lowest proposed excavation depth. The subsoil comprises granular fill, sand, silt, and silty clay, extending to the maximum proposed depths for excavation. Comparison of the lowest proposed excavation depths with the highest measured shallow groundwater level indicates that the lowest proposed excavation depth is about 0.60 m below the highest measured shallow groundwater level elevation of 80.60 masl, as recorded at the BH/MW 3 location. By having the anticipated groundwater table lowered by one (1) additional meter, it is anticipated that some limited, temporary construction dewatering will be required in support of the proposed earthworks program for construction of the proposed hotel building and its associated underground parking basement structure.

Assuming an excavation, being approximately 30.48 m long by 26.0 m wide for the proposed underground parking structure, having a perimeter of about 112.96 m, and using the estimated hydraulic conductivity of 1.0×10^{-8} m/s, the anticipated construction dewatering flow rate could reach an estimated daily rate of 425 L/day. By applying a safety factor of three (3), it could reach a maximum of 1,274 L/day. The estimated zone of influence could extend to a maximum of 0.50 m away from the conceptual dewatering area around the construction footprint for the proposed underground parking structure.

This dewatering flow rate for excavation is below the 50,000 L/day threshold limit for requiring an approval for any proposed construction related groundwater takings, which will not require any registration or filing with the MECP. It is anticipated that, following the localized lowering of the water table, groundwater seepage removal via

a dewatering system from the open excavation will be a fraction of the above estimate, since much of the shallow groundwater within the proposed development footprint area will have been removed from local storage. If construction is completed during the dry season (late Summer and early Fall), this might minimize the construction dewatering requirements as groundwater levels are anticipated to be significantly lower during the dry season, typically expected between mid-July through mid-October.

Installation of Elevator Pit Beneath the 15-Storey Hotel Building, at an elevation of 78.0 masl:

The estimated finished floor elevation for the proposed underground parking structure is at an elevation of 80.0 masl. An excavation depth of approximately 2.00 m (El. 78.0 masl) below the proposed elevation of the underground parking structure was considered to accommodate the proposed elevator pit. To facilitate excavation and construction in dry and stable subsoil conditions, it is proposed that the groundwater table be lowered to an elevation of 77.0 masl, which is about 1 m below the lowest proposed excavation depth. The subsoil comprises earth fill, sand, silt, and silty clay, extending to the maximum proposed depths for excavation. Comparison of the lowest proposed excavation depths with the highest groundwater level elevation of 80.60 masl, as measured at the BH/MW 3 location, indicates that the proposed elevation for the elevator pit footing is about 2.60 m below the highest shallow groundwater level. By having the anticipated groundwater table lowered by one (1) additional meter, it is anticipated that some limited, temporary construction dewatering will be required for the proposed earthworks program for construction of this portion of the building's elevator pit, underground structure.

Assuming an excavation, being approximately 4 m long by 4 m wide for the proposed elevator pit structure, having a perimeter of about 16 m, and using the estimated hydraulic conductivity of 1.0 x 10^{-8} m/s, the anticipated construction dewatering flow rate could reach an estimated daily rate of 39 L/day. By applying a safety factor of three (3), it could reach a maximum of 118 L/day. The estimated zone of influence could extend to a maximum of 1.1 m away from the conceptual dewatering alignment being considered for construction of the elevator pit structure. This dewatering rate for excavation is below the 50,000 L/day threshold limit for requiring an approval for any proposed construction related groundwater takings, which will not require any registration or filing with the MECP. It is anticipated that, following the localized lowering of the water table, groundwater seepage removal via dewatering from the open excavation will be a fraction of the above estimate, since much of the shallow groundwater within the proposed development footprint area will have been removed from local storage. If construction is completed during the dry season (late Summer and early Fall), this might minimize the construction dewatering requirements as groundwater levels are anticipated to be significantly lower during the dry season, typically expected between mid-July through mid-October.

7.2 **Groundwater Control Methodology**

Given that low groundwater seepage rates are being anticipated into open excavations below the water table, construction dewatering can likely be accomplished by occasional pumping from sumps when and where needed during earthworks. If necessary, well points can be employed to lower water table if sump pit dewatering cannot maintain stable sub-soil conditions. The final design for the dewatering system will be the responsibility of the construction contractors.

Tables 7-1 which follows, summarizes the dewatering flow rate estimates for the proposed underground parking level and elevator pit structures.

Table 7-1 - Summary of Dewatering Flow Estimates

Hotel Development/Structure	Anticipated Unit Type	Finished Floor Elevation (masl)	Area (square meters)	Depth Elevation for Underground Parking/Elevator Pit Structures (masl)	Highest Measure Groundwater Level Elevation (masl)	Groundwater Elevation from Nearest BH/MW	Anticipated Groundwater Level Drawdown for Construction Dewatering (m)	Estimated Zone of Influence (m)	Dewatering Flow Estimates (L/day)	Flow Estimates with x 3 Safety Factor (L/day)
Hotel Building	15- Storey Hotel Building, with 1-Level Underground Parking	84.00	792.48	80.0	80.60	BH/MW 3	1.60	0.5	425	1,274
Elevator Pit Structure		-	8	78.0	80.60	BH/MW 3	3.60	1.1	39	118

Notes:
masl -- metres above sea level

7.3 **Mitigation of Potential Impacts Associated with Dewatering**

The zone of influence for any dewatering well or dewatering array used during construction, could range between 0.5 m and 1.1 m away from the conceptual dewatering array wells or sump pits alignment around the excavation footprints for the proposed development portions of the subject site.

The subject site is located within a developed, existing residential and former industrial area, surrounded by residential and mixed-used development buildings that could potentially be affected by ground settlement associated with the zone of influence for any construction dewatering. It is recommended that a geotechnical engineer be consulted to review potential ground settlement concerns prior to construction and earthworks.

Based on the WWR review, there are records for five (5) observation wells located at the western limits of the site. These wells are identified as Numbers 74, 75, 78, 79, 80 and 82, on Drawing No. 3 and also in Appendix 'A'. These wells were drilled and installed to depths ranging between 6.56 and 6.71, and are screened from 3.51 to 6.71 mbgs. Information regarding the static water level elevations for the above-mentioned monitoring wells are unavailable. The groundwater elevations within these wells could potentially be impacted on a temporary basis from any proposed construction dewatering activities. These wells, however were not observed during monitoring. It is however anticipated that these monitoring wells will be decommissioned prior to earthworks and excavation required for construction of the 15-storey hotel building.

There are no bodies of water, watercourses, wetlands or any natural features, that are present within the conceptual zone of influence for construction dewatering.

7.4 **Permanent Drainage for Underground Structures**

The proposed development plans indicate that it is planned to construct a fifteen (15) storey, hotel building having a 1-level underground parking structure, at the site.

The anticipated finished floor elevation for the proposed 1-level underground parking structure is at 80.0 masl. As such, the highest shallow groundwater elevation is about 0.60 above the base of the proposed underground parking structure, and it is about 2.60 m above the proposed elevator pit structure. As such, it is anticipated that some long-term foundation drainage will be required for the proposed underground parking and elevator pit structures.

Given the low anticipated groundwater seepage rate estimates for long-term foundation drainage, a conventionally shored excavation, using pile and lagging methods can be designed and completed for the construction of the proposed 1-level underground parking structure. A Mira drainage network can be included with the design of a conventionally shored excavation, along with a simple basement under-slab drainage network to address any long-term groundwater seepage to the excavation and the completed underground structure. These systems can be drained to separate sump pits. The drainage network should be designed by a qualified mechanical engineer, having experience with the designs for under-slab and Mira drainage networks.

The drainage networks should have separate connections to proposed sump pits, with one pit connected to the Mira drainage network for the shore walls and a second pit connected to the under-slab floor drainage network.

Permanent Drainage for the Proposed 1-Level Underground Parking and Elevator Pit Structures

Fifteen (15) Storey Hotel Building Construction – 1-Level Underground Parking Structure (30.48 m x 26.0 m) with a Finished Floor Elevation Footing of 80.0 masl:

For the proposed fifteen (15) storey hotel building, for the preliminary foundation drainage calculations, the estimated excavation footprint for the 1-level underground parking structure occupies an area of approximately 792.48 square meters. It is approximately 30.48 m long by 26.0 m wide, having a perimeter of approximately 112.96 m, and having a finished floor elevation of about 84 masl.

The proposed elevation for the 1-level underground parking structure footings for the hotel building are at approximately 80.0 masl. A comparison of the proposed lowest excavation depth with the highest shallow groundwater level elevation of 80.60 masl, indicates that the anticipated shallow groundwater level as measured at BH/MW 3 location is about 0.60 m above lowest proposed depth elevation for the underground parking structure. As such, it is anticipated that that some permanent long-term foundation drainage will be required for the proposed 1-level parking basement structures. Darcy's Expression below, was used to assess the long-term foundation seepage flow estimates to the proposed underground structure:

$$Q = KiA$$

Where:

Q = Estimated groundwater seepage drainage rate (m^3/day)

K = 1.0×10^{-8} m/sec (highest hydraulic conductivity (K) assessed for the silty clay unit encountered at the depths proposed for the underground structure depths during the study)

A = 67.78 m^2 for the surface area for the shore wall areas around the perimeter of the foundation footings, and 49.77 m^2 for the total under-slab floor drainage network which are the approximate total surface areas for weeper tiles used to estimate groundwater seepage to the under-slab drainage network, below the groundwater table (cross-sectional area of flow) (m^2)

iv = 0.004188 [unitless], Vertical Hydraulic Gradient for groundwater considered for the under-slab basement drainage network

ih = 0.0802 [unitless], Horizontal Hydraulic Gradient for groundwater considered for the perimeter, shore wall, mira drainage network

Based on the proposed 1-level underground basement structure, the long-term seepage drainage flow rate to a Mira, perimeter drainage network for a conventionally shored excavation is 4.69 L/day. The long-term, average drainage rate for an under-slab basement floor drainage network is 0.18 L/day. The combined, long-term seepage rates from both the perimeter shore wall mira drainage and the under-slab basement floor drainage networks is estimated at 4.87 L/day. By applying a safety factor of three (3), the combined drainage flow rate is estimated at 14.62 L/day.

The pumping facility and sump systems should be designed for the maximum expected seepage drainage flow rates. The drainage piping should be properly

constructed using weeper tiles, surrounded by filter cloth, in turn surrounded by bedding stone or concrete sand to minimize potential losses of fines and to prevent silt from clogging of weeper tiles. Over time, the foundation drainage flows to the underground structures may diminish to a lower, or possibly negligible rate, but more likely to a lower, steady-state rate that will remain relatively constant over time. During the expected dry season, minimal or negligible long-term foundation drainage flows may be experienced.

Permanent Drainage for Elevator Pit Beneath the Proposed Hotel Building at a depth elevation of 78 masl:

An excavation depth elevation of 80 masl was indicated for the proposed 1-level basement floor elevation for the proposed underground parking structure. An additional excavation depth of 2.0 m (El. 78 masl) was considered to accommodate the base of the proposed elevator pit/shaft structure. Based on this depth, the shallow groundwater level elevation is about 2.60 m above the proposed base for the proposed elevator pit structure.

Given the low anticipated groundwater seepage rate estimates for any long-term foundation drainage, a standard drainage network can be included with the design for a conventionally shored excavation, along with a simple basement under-slab drainage network to address any long-term foundation seepage to the excavation and the completed underground elevator pit structure. These systems can be drained to sump pits. The drainage network should be designed by a qualified mechanical engineer, having experience with the designs for under-slab and shored wall mira drainage networks.

It is our understanding, that a sump pit is required within an elevator pit to satisfy building code requirements for fire retardant sprinklers to meet fire protection codes. The sump pit to meet fire protection codes can be drained to the sanitary sewer.

In order to estimate the long-term foundation drainage needs associated with a perimeter shore wall foundation drainage network and the under-slab elevator pit structure drainage systems, Darcy's Equation was used, as described below:

$$Q = KiA$$

Where:

- Q = Estimated seepage drainage rate (m^3/day)
- K = 1.0×10^{-8} m/sec (highest hydraulic conductivity (K) assessed for the silty clay unit encountered at the depth for the elevator pit structure during the study
- A = 41.6 m^2 for the surface area for the mira drain shored wall perimeter around the elevator pit and 1.0 m^2 for the total under-slab floor drainage network beneath the elevator pit, which is the approximate total surface areas for weeper tiles used to estimate groundwater seepage to under slab drainage network, below the water table (cross-sectional area of flow) (m)
- iv = 0.0181 [unitless], Vertical Hydraulic Gradient for groundwater considered for the under-slab of elevator pit drainage system
- ih = 0.0802 [unitless], Horizontal Hydraulic Gradient for groundwater considered for the perimeter, shore wall, mira drainage system.

Based on the proposed elevator pit structure, the long-term groundwater seepage drainage rate to the perimeter Mira perimeter, drainage network for a conventionally shored excavation is 2.88 L/day. The long-term, average drainage seepage rate to an

under-slab elevator pit floor drainage network is 0.02 L/day. The combined, long-term seepage rates from both the perimeter foundation and the under-slab elevator pit floor drainage networks are estimated at 2.90 L/day. By applying a safety factor of three (3), the combined drainage flow rate is estimated at 8.69 L/day.

The pumping facility and sump systems should be designed for the maximum expected drainage flow rate. The systems should be designed by a qualified mechanical engineer having experience with the design for foundation drainage systems. The drainage piping should be properly constructed, using weeper tiles surrounded by filter cloth, in turn surrounded by bedding stone or concrete sand to minimize potential losses of fines and to prevent silt from clogging of weeper tiles drainage network. Over time, the foundation drainage flows for the underground structures may diminish to a lower, or possibly negligible drainage rate, but more likely to a lower, steady- state rate that will remain relatively constant over time. During the expected dry season, minimal or negligible long-term foundation flows may be experienced. The drainage networks should have separate connections to the proposed sump pits, with one pit connected to the shored wall/mira drainage network and a second pit connected to the basement underslab drainage network.

7.5 **Groundwater Quality**

One (1) groundwater sample was collected for analysis from the groundwater monitoring well at BH/MW 3, on March 21, 2019, using the Geotech Low Flow Sampling pump. The monitoring well was purged of three well casing volumes of groundwater prior to sample collection. Upon sampling, all of the sample bottles were placed in ice and packed in a cooler, at about 4^{o} C for shipment to the analytical laboratory. The groundwater sample was submitted for analysis and evaluation against the City of Toronto storm and sanitary sewer use by-law parameters. Sample

analysis was performed by SGS Environmental Services, which is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA). Results of the analysis are provided in Appendix 'C', with a discussion of the findings provided below.

As per the protocol for City of Toronto storm and sanitary sewer use, a full set of samples consisted of unfiltered groundwater were submitted for analysis, with results presented as totals for various parameters analyzed. A second set of select samples underwent field filtration, during collection, prior to analyses for Metals and Total Phosphorous. This was performed in order to evaluate the sources of any potentially elevated Metals and Phosphorous in a dissolved form, indicated from the results of the total analysis (unfiltered samples). The chain of custody number for the submitted samples that underwent analysis is 006298 (SGS Group). The analytical results for the unfiltered groundwater, show a couple of exceedances of the City of Toronto Storm and Sanitary Sewer Use By-Law parameters.

The exceedances, together with the storm and sanitary sewer use standards, are presented in Table 7-2.

Table 7-2 - Groundwater Quality Exceedances Results (Unfiltered Groundwater)

Parameter	Groundwater Quality Results (Unfiltered Groundwater) (mg/L) BH/MW 3	City of Toronto Storm Sewer Use Limits (mg/L)	City of Toronto Sanitary Sewer Use Limits (mg/L)	Comments
Total Suspended Solids (TSS)	50	15	350	Exceeds Storm; meets Sanitary Sewer
Total Manganese	0.169	0.05	5	Exceeds Storm; meets Sanitary Sewer

As shown above, the results of analysis for unfiltered groundwater obtained from BH/MW 3 indicate that the concentrations for all of the measured parameters are

within the City of Toronto sanitary use limits and the concentrations for Total Suspended Solids and Total Manganese exceed the City of Toronto storm sewer use limits. The results suggest that any short-term construction dewatering effluent, and any effluent from long-term foundation drainage should be acceptable for disposal to the City of Toronto Storm Sewer with minimal pre-treatment being implemented to lower levels of TSS and Total Manganese to acceptable disposal standards.

The results suggest that short-term construction dewatering effluent and any long-term foundation drainage effluent should be acceptable for disposal to the City of Toronto Sanitary Sewer use limits, with no anticipated pretreatment being required.

A review of the results for the filtered groundwater sample shown in Table 7-3 below, indicates that all of the tested parameters meet the Storm Sewer Use limits, however the concentration for Manganese exceeds the City of Toronto Storm Sewer Use limits. As such, pre-treatment only to lower Manganese is anticipated if the drainage effluent is being considered for disposal to the City's Storm Sewer System.

Table 7-3 - Groundwater Quality Exceedances Results (Filtered Groundwater)

Parameter	**Groundwater Quality Results (Filtered Groundwater) (mg/L)**	**City of Toronto Storm Sewer Use Limits (mg/L)**	**City of Toronto Sanitary Sewer Use Limits (mg/L)**	**Comments**
	BH/MW 3			
Dissolved Manganese	0.0839	0.05	5	Exceeds Storm Sewer use limits; meets Sanitary Sewer use limits

The results suggest that if there is any short-term construction dewatering effluent and/or any long-term foundation drainage effluent, the effluent should be acceptable for disposal to the City of Toronto sanitary sewer. The anticipated drainage effluent from both sources would not be acceptable for disposal to the City of Toronto Storm

Sewer System; however, implementing minor pre-treatment to lower dissolved Manganese to meet City of Toronto Storm Sewer Use limits should permit its disposal to the City's Storm Sewer.

A foundation drainage system designed to minimize TSS and Manganese should result in the effluent being acceptable for disposal to the City's storm sewer system.

The final design for any construction dewatering effluent pre-treatment system will be the responsibility of the contractors responsible for construction. The final design for any long-term foundation drainage system effluent pre-treatment, will be the responsibility of the mechanical engineer or the associated water treatment specialists responsible for the design for the long-term foundation drainage pretreatment system.

7.6 **Groundwater Function of the Subject Site**

The subject site is located within an existing developed residential and mixed-use land use area. The site is located about 300 m north of the Mimico Creek, and it is about 975 m southwest of the Humber River. Lake Ontario is located approximately 260 m east of the site. Wooded areas are located approximately 16.25 m west and 32.5 m east of the site. Wooded areas were also observed along the river banks. Wetlands classified as being Provincially Significant are located approximately 975 m northeast of the site, and are associated with the Humber River.

7.7 **Low Impact Development**

The subsoil beneath the site consists, predominantly of earth fill, underlain by silt, silty clay and weathered shale. Opportunities may exist to infiltrate collected runoff to the subsurface at the developed site, using appropriate Low Impact Development

(LID) Infrastructure, such as infiltration galleries or underground storage/exfiltration tanks.

The groundwater lies at depths, ranging between 3.30 to 6.60 m below the ground surface. Potential LID infrastructure could be implemented in areas where the shallow groundwater is deeper than 1 m below the ground surface, and where it is possible to maintain a minimum of 1 m separation between the base of any proposed LID stormwater management infiltration infrastructure and the groundwater table. Any proposed LID infrastructure should be designed by the stormwater engineer for the project.

8.0 CONCLUSIONS AND RECOMMENDATIONS

1. The subject site lies on the mapped localized silt to silty clay plains, within the Physiographic Region of Southern Ontario known as the Iroquois Sand Plain, where a Sand Plain comprises the dominant local physiography.
2. The surface geological map of Ontario shows that the subject site is located close to the boundary between bedrock and glaciolacustrine deposits (Sandy). The sandy glaciolacustrine deposits, consists, predominantly of sand, gravelly sand, and gravel, interpreted as being nearshore and beach deposits, and the bedrock is comprised of undifferentiated carbonate and clastic sedimentary rock, exposed at surface or covered by a discontinuous, thin layer of overburden soil drift.
3. The subject site is located within the Lower Humber sub-watershed of the Humber River Watershed.
4. A review of the local topography shows that the site is generally flat, exhibiting a gentle decline in elevation relief towards its east limits.
5. This study has disclosed that beneath the granular fill horizon, and earth fill layers, the native soils underlying the subject site consists of silt, silty clay, and shale bedrock, extending to the termination depth of the investigation at 9.9 m below the prevailing ground surface.
6. The findings of this study confirm that the groundwater level elevations beneath the site, ranges from 77.10 to 80.60 masl (i.e., 3.30 to 6.60 m below ground surface).
7. A review of the average of shallow groundwater elevations suggests that it flows in southerly, southeasterly, and southwesterly directions from an interpreted localized groundwater higher area located approximately within the northern western portion of the site.

8. The single well response tests yielded K estimates, for the silty clay that range from 9.2 x 10^{-9} to 1.0 x 10^{-8} m/sec, and the K estimate for the silty clay and shale unit was estimated at 6.7 x 10^{-9} m/sec. These results suggest low groundwater seepage rates can be expected during excavation, where minor construction dewatering is anticipated to lower the groundwater table to facilitate safe, stable conditions for earthworks excavation and construction of the proposed underground structures.
9. The shallow groundwater level elevation is about 0.60 m below the proposed 1-level underground parking structure, and it is about 2.60 m above the proposed elevator pit structure.
10. The dewatering flow estimates for the construction of the proposed underground parking structures suggests that it is about 425 L/day; by applying a safety factor of three (3), it could reach a maximum of 1,274 L/day.
11. The dewatering flow estimates for the construction of the proposed elevator pit structure suggests that the flow rate is about 39 L/day; by applying a safety factor of three (3), it could reach a maximum of 118 L/day. These anticipated dewatering flow rates for earthworks excavation are below the 50,000 L/day threshold limit for requiring an approval for any proposed construction related groundwater takings and which will not require any registration or filing with the MECP.
12. The estimated zone of influence for construction dewatering could reach a maximum of 1.1 m away from the conceptual dewatering alignments around the proposed building footprint. There are existing adjacent neighbouring residential and mixed-use development properties, that are within the conceptual zone of influence for construction dewatering; however, there are no other groundwater receptors, such as bodies of water, watercourses or wetlands that are present within the conceptual zone of influence for construction dewatering for the proposed development. The local, shallow

groundwater flow pattern for the development site may be temporarily affected during construction.

13. Long-term foundation drainage rates for the completed new building from both an under-slab floor drainage network and for a perimeter, mira drainage system for a conventionally shored excavation foundation for the proposed underground parking structure is approximately 4.87 L/day. By applying a safety factor of three (3), the anticipated drainage flow rates could reach a maximum of 14.62 L/day.
14. Long-term foundation drainage rates from both an under-slab floor drainage network, and from a mira drainage network for a conventionally shored excavation foundation for the proposed elevator pit structures beneath the proposed underground structures are approximately 2.90 L/day. By applying a safety factor of three (3), the foundation drainage rates could reach a maximum of 8.69 L/day.
15. The dewatering effluent from any short-term construction dewatering, or from any long-term foundation drainage is acceptable for disposal to the City of Toronto sanitary sewer. For disposal to the storm sewer, the effluent will require minor pre-treatment to lower Total Suspended Solids and Total Manganese. A pretreatment system designed to lower the levels of TSS and Manganese should result in the effluent being acceptable for disposal to the City's storm sewer. Any short-term dewatering effluent may be associated with seepage of any perched shallow groundwater encountered within excavations, or from the removal of the accumulated runoff from within the excavation following rainfall storm events. It is anticipated that there may be limited construction dewatering following storm events during excavation works. However, any groundwater seepage within excavations will likely dissipate relatively quickly after the earthworks program has commenced.

16. The groundwater lies at depths, ranging from between 3.30 and 6.60 m below the ground surface. The underlying shallow silt, silty clay with occasional seams layers, and weathered shale layers could facilitate the implementation of Low Impact Development (LID) infrastructure to infiltrate precipitation received at the developed site to the subsurface to recharge the shallow aquifer at depth to address future stormwater management planning.

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FIGURES 1 to 5

MONITORING WELL LOGS

REFERENCE NO. 1811-W006

LIST OF ABBREVIATIONS AND DESCRIPTION OF TERMS

The abbreviations and terms commonly employed on the borehole logs and figures, and in the text of the report, are as follows:

SAMPLE TYPES

AS Auger sample
CS Chunk sample
DO Drive open (split spoon)
DS Denison type sample
FS Foil sample
RC Rock core (with size and percentage recovery)
ST Slotted tube
TO Thin-walled, open
TP Thin-walled, piston
WS Wash sample

PENETRATION RESISTANCE

Dynamic Cone Penetration Resistance:

A continuous profile showing the number of blows for each foot of penetration of a 2-inch diameter, 90° point cone driven by a 140-pound hammer falling 30 inches.

Plotted as '—●—'

Standard Penetration Resistance or 'N' Value:

The number of blows of a 140-pound hammer falling 30 inches required to advance a 2-inch O.D. drive open sampler one foot into undisturbed soil.

Plotted as '○'

WH Sampler advanced by static weight
PH Sampler advanced by hydraulic pressure
PM Sampler advanced by manual pressure
NP No penetration

SOIL DESCRIPTION

Cohesionless Soils:

'N' (blows/ft)	Relative Density
0 to 4	very loose
4 to 10	loose
10 to 30	compact
30 to 50	dense
over 50	very dense

Cohesive Soils:

Undrained Shear Strength (ksf)	'N' (blows/ft)	Consistency
less than 0.25	0 to 2	very soft
0.25 to 0.50	2 to 4	soft
0.50 to 1.0	4 to 8	firm
1.0 to 2.0	8 to 16	stiff
2.0 to 4.0	16 to 32	very stiff
over 4.0	over 32	hard

Method of Determination of Undrained Shear Strength of Cohesive Soils:

x 0.0 Field vane test in borehole; the number denotes the sensitivity to remoulding

△ Laboratory vane test

□ Compression test in laboratory

For a saturated cohesive soil, the undrained shear strength is taken as one half of the undrained compressive strength

METRIC CONVERSION FACTORS

1 ft = 0.3048 metres
1lb = 0.454 kg
1 inch = 25.4 mm
1ksf = 47.88 kPa

JOB NO.: 1811-W006

LOG OF BOREHOLE NO.: BH/MW 1

FIGURE NO.: 1

PROJECT DESCRIPTION: Proposed 15-Storey Hotel

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 2157 Lakeshore Boulevard West
City of Toronto

DRILLING DATE: December 5, 2018

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
83.3	Ground Surface							
0.0	**20 cm GRANULAR FILL**	1	DO	31	0		8	
	EARTH FILL brown sand and silty clay, some gravel and occ. pieces of rock	2	DO	19	1		13	
		3	DO	17	2		13	
		4	DO	11	3		16	
80.5 2.8	Grey, compact **SILT** trace of clay occ. sand seams	5	DO	16	4		13	
79.1 4.2	Grey, stiff **SILTY CLAY** occ. sand seams	6	DO	9	5		18	
77.1 6.2 6.3	Grey, hard **WEATHERED SHALE**	7A 7B	DO	50/8	6		6 33	
	END OF BOREHOLE **Refusal to Augering**				7			
	Installed 50 mm Ø monitoring well to 6.1 m Slotted screen from 3.0 to 6.1 m Sand backfill from 2.4 to 6.1 m Bentonite seal from 0.3 to 2.4 m Provided with a flush mount casing				8			
	Groundwater Readings: W.L @ 78.54 masl on January 12, 2019 W.L @ 78.84 masl on January 26, 2019 W.L @ 79.06 masl on February 9, 2019 W.L @ 79.92 masl on February 23, 1019 W.L @ 79.04 masl on March 9, 2019 W.L @ 79.09 masl on March 21, 2019				9			
					10			
					11			
					12			

Soil Engineers Ltd.

JOB NO.: 1811-W006

LOG OF BOREHOLE NO.: BH/MW 2

FIGURE NO.: 2

PROJECT DESCRIPTION: Proposed 15-Storey Hotel

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 2157 Lakeshore Boulevard West
City of Toronto

DRILLING DATE: December 5, 2018

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
83.7	Ground Surface							
0.0 83.4	**30 cm GRANULAR FILL** Brown, compact to dense	1A 1B	DO	13	0		8 16	
	SILT trace of clay occ. sand seams	2	DO	44	1		14	
		3	DO	24	2		18	
80.9		4	DO	32			16	
2.8	Grey, stiff **SILTY CLAY** occ. sand seams and layers	5	DO	8	3		23	
		6	DO	9	4 5		19	
77.2		7	DO	13	6		19	
6.5	Grey, hard	8	AS				12	
6.7	**WEATHERED SHALE** **END OF BOREHOLE** **Refusal to Augering**				7			
	Installed 50 mm Ø monitoring well to 6.1 m Slotted screen from 3.0 to 6.1 m Sand backfill from 2.4 to 6.1 m Bentonite seal from 0.3 to 2.4 m Provided with a flush mount casing				8			
	Groundwater Readings: W.L @ 79.10 masl on January 12, 2019 W.L @ 78.70 masl on January 26, 2019 W.L @ 80.52 masl on February 9, 2019 W.L @ 80.18 masl on February 23, 1019 W.L @ 78.46 masl on March 9, 2019 W.L @ 78.53 masl on March 21, 2019				9 10 11 12			

JOB NO.: 1811-W006

LOG OF BOREHOLE NO.: BH/MW 3

FIGURE NO.: 3

PROJECT DESCRIPTION: Proposed 15-Storey Hotel

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 2157 Lakeshore Boulevard West
City of Toronto

DRILLING DATE: December 5, 2018

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)
83.9 / 0.0	Ground Surface				
0.0	**15 cm GRANULAR FILL**	1	DO	15	0
	EARTH FILL brown sandy silt and silty sand, a trace of gravel, occ. organic inclusions	2	DO	6	1
		3	DO	6	2
81.8 / 2.1	Brown, compact **SILT** trace of clay occ. sand seams	4	DO	12	
		5	DO	18	3
79.9 / 4.0	Grey, stiff **SILTY CLAY** occ. sand seams and layers	6	DO	9	4
					5
77.6 / 6.3	Grey, hard **WEATHERED SHALE**	7A 7B	DO	50/13	6
6.4	**END OF BOREHOLE** **Refusal to Augering**				7
	Installed 50 mm Ø monitoring well to 6.1 m Slotted screen from 3.0 to 6.1 m Sand backfill from 2.4 to 6.1 m Bentonite seal from 0.3 to 2.4 m Provided with a flush mount casing				8
	Groundwater Readings: W.L @ 79.93 masl on January 12, 2019 W.L @ 80.60 masl on January 26, 2019 W.L @ 80.52 masl on February 9, 2019 W.L @ 80.18 masl on February 23, 1019 W.L @ 78.04 masl on March 9, 2019 W.L @ 80.49 masl on March 21, 2019				9 10 11 12

Dynamic Cone (blows/30 cm) 10 30 50 70 90

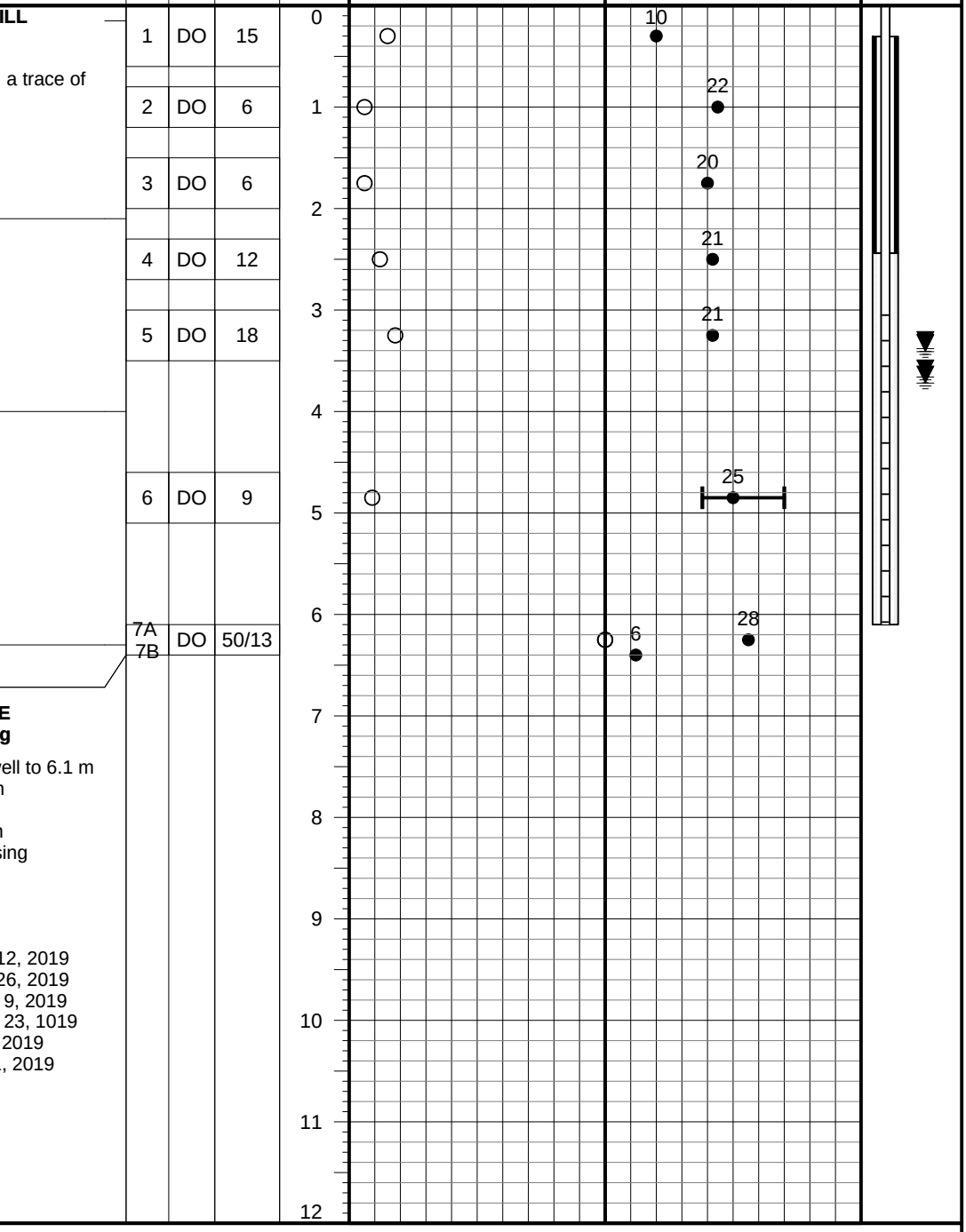
Shear Strength (kN/m²) 50 100 150 200

Penetration Resistance (blows/30 cm) 10 30 50 70 90

Atterberg Limits PL LL

Moisture Content (%) 10 20 30 40

WATER LEVEL



Soil Engineers Ltd.

JOB NO.: 1811-W006

LOG OF BOREHOLE NO.: BH/MW 4

FIGURE NO.: 4

PROJECT DESCRIPTION: Proposed 15-Storey Hotel

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 2157 Lakeshore Boulevard West
City of Toronto

DRILLING DATE: December 5, 2018

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)
83.4 / 0.0	Ground Surface				
	15 cm GRANULAR FILL	1	DO	11	0
	EARTH FILL brown to grey sandy silt pockets of silty sand, some clay, occ. organic inclusions	2	DO	14	1
		3	DO	19	2
		4	DO	12	
		5	DO	22	3
79.2 / 4.2	Grey, firm to stiff	6	DO	6	4
	SILTY CLAY occ. sand seams	7	DO	6	5
		8	DO	12	
77.2 / 6.2	Grey, hard	9A 9B	DO	50/10	6
6.4	**WEATHERED SHALE**				7
	END OF BOREHOLE **Refusal to Augering**				8
	Installed 50 mm Ø monitoring well to 6.1 m Slotted screen from 3.0 to 6.1 m Sand backfill from 2.4 to 6.1 m Bentonite seal from 0.3 to 2.4 m Provided with a flush mount casing				9
	Groundwater Readings: W.L @ 77.84 masl on January 12, 2019 W.L @ 77.97 masl on January 26, 2019 W.L @ 78.00 masl on February 9, 2019 W.L @ 77.90 masl on February 23, 1019 W.L @ 78.04 masl on March 9, 2019 W.L @ 78.06 masl on March 21, 2019				10
					11
					12

Dynamic Cone (blows/30 cm) 10 30 50 70 90
Shear Strength (kN/m²) 50 100 150 200
Penetration Resistance (blows/30 cm) 10 30 50 70 90

Atterberg Limits PL LL

Moisture Content (%) 10 20 30 40

Moisture content values: 9, 12, 15, 17, 14, 18, 16, 15, 6, 17

WATER LEVEL

Soil Engineers Ltd.

JOB NO.: 1811-W006

LOG OF BOREHOLE NO.: BH/MW 5

FIGURE NO.: 5

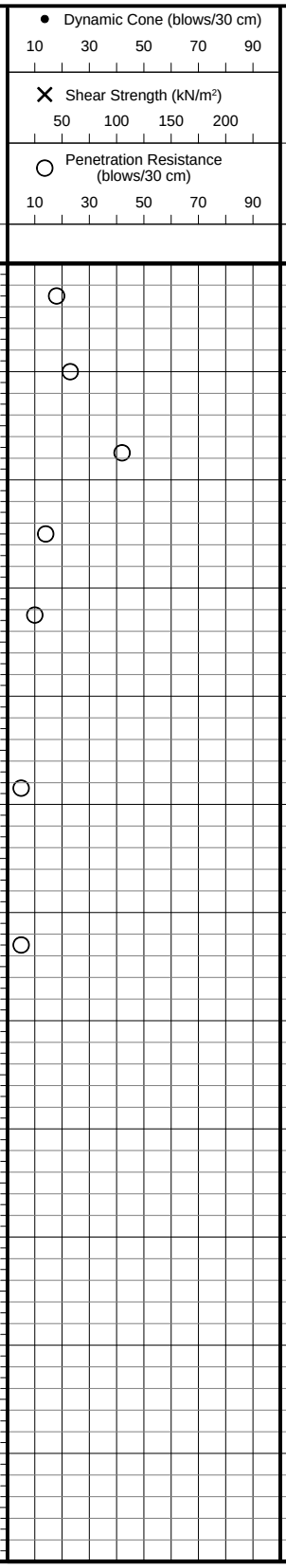
PROJECT DESCRIPTION: Proposed 15-Storey Hotel

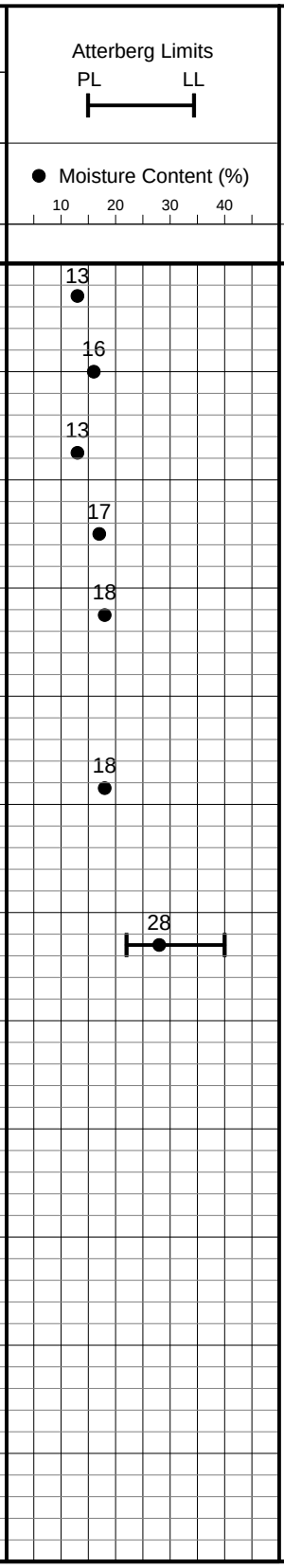
METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 2157 Lakeshore Boulevard West
City of Toronto

DRILLING DATE: December 6, 2018

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)
83.7	Ground Surface				
0.0	**25 cm GRANULAR FILL**	1	DO	18	0
83.0 / 0.7	**EARTH FILL** brown silty sand, a trace of gravel Brown, compact to dense	2	DO	23	1
	SILT trace clay occ. sand seams	3	DO	42	2
81.6 / 2.1	Grey, firm to stiff	4	DO	14	
	SILTY CLAY occ. sand seams	5	DO	10	3
		6	DO	5	4 5
77.2 / 6.5	Grey, hard **WEATHERED SHALE**	7	DO	5	6
	Groundwater Readings: W.L @ 77.10 masl on January 12, 2019 W.L @ 77.10 masl on January 26, 2019 W.L @ 77.31 masl on February 9, 2019 W.L @ 77.55 masl on February 23, 1019 W.L @ 77.55 masl on March 9, 2019 W.L @ 77.56 masl on March 21, 2019	8	RCD RQD	81% 9%	7 8
73.8 / 9.9	**END OF BOREHOLE** Installed 50 mm Ø monitoring well to 9.1 m Slotted screen from 6.0 to 9.1 m Sand backfill from 5.5 to 9.1 m Bentonite seal from 0.3 to 5.5 m Provided with a flush mount casing	9	RCD RQD	93% 22%	9 10 11 12





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FAX: (705) 721-7864	FAX: (905) 542-2769	FAX: (905) 725-1315	FAX: (905) 881-8335	FAX: (705) 684-8522	FAX: (905) 725-1315	FAX: (905) 542-2769

FIGURE 6

GRAIN SIZE DISTRIBUTION GRAPH

REFERENCE NO. 1811-W006

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

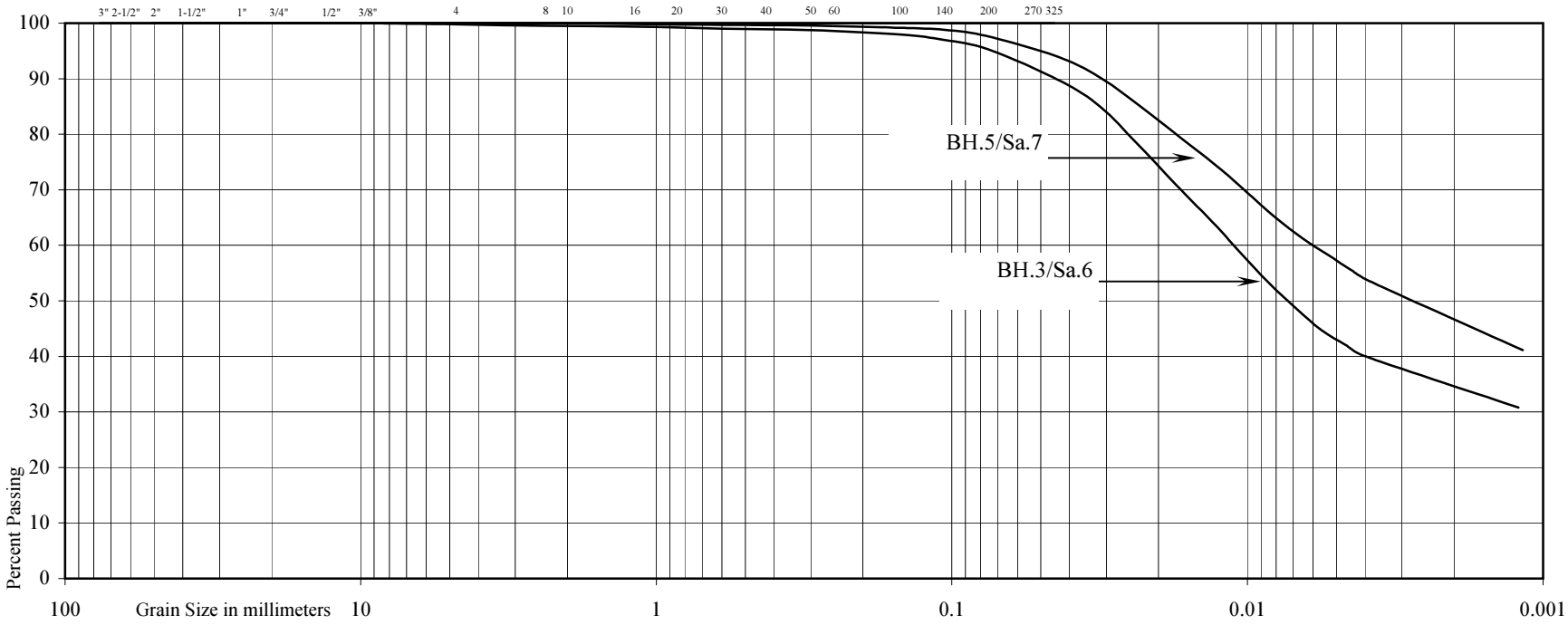
Reference Number: 1811-W006

U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL			SAND				SILT	CLAY
COARSE		FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project: Proposed 15-Storey Hotel

Location: 2157 Lakeshore Boulevard West, City of Torotno

Borehole No:	3	5
Sample No:	6	7
Depth (m):	4.8	6.3
Elevation (m):	79.1	77.4

Estimated Permeability (m./sec.) = 10^{-9} 10^{-9}

Classification of Sample [& Group Symbol]: SILTY CLAY, a trace to some sand, a trace of fine sand

Figure: 6

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FAX: (705) 721-7864	FAX: (905) 542-2769	FAX: (905) 725-1315	FAX: (905) 881-8335	FAX: (705) 684-8522	FAX: (905) 725-1315	FAX: (905) 542-2769

DRAWINGS 1 to 9

REFERENCE NO. 1811-W006

N

- Approximate Boundary of Subject Site
- Waterbody
- Watercourse
- Expressway/Freeway
- Major Road
- Local Road
- Railway

Soil Engineers Ltd.

Title: Site Location Plan

Project:

Hydrogeological Assessment
Proposed 15-Storey Hotel
2157 Lakeshore Boulevard West
City of Toronto (Etobicoke)

Reference No. 1811-W006

Date: January 4, 2019

Scale:

0 15 30 60 90 120 150
Metres

Drawing No. 1

Source: Water Course, Ontario Ministry of Natural Resources and Forestry
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Source: Water Body, Ontario Ministry of Natural Resources and Forestry
©Queen's Printer for Ontario

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Source: Water Course, Ontario Ministry of Natural Resources and Forestry
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Source: Water Body, Ontario Ministry of Natural Resources and Forestry
©Queen's Printer for Ontario

N

Approximate Boundary of Subject Site

Borehole with Monitoring Well

Major Road

Local Road

Soil Engineers Ltd.

Title: Borehole and Monitoring Well Location Plan

Project:

Hydrogeological Assessment
Proposed 15-Storey Hotel
2157 Lakeshore Boulevard West
City of Toronto (Etobicoke)

Reference No. 1811-W006

Date: January 4, 2019

Scale:

0 1.5 3 6 9 12 15

Metres

Drawing No. 2

Source: Water Course, Ontario Ministry of Natural Resources and Forestry
© Queen's Printer for Ontario
Source: Water Body, Ontario Ministry of Natural Resources and Forestry
© Queen's Printer for Ontario

N

- Approximate Boundary of Subject Site
- 500 metres from Subject Site Boundary
- 1 Well Location from MECP Well Records (see Appendix 'A')
- Waterbody
- Watercourse
- Expressway/Freeway
- Major Road
- Local Road
- Railway

Soil Engineers Ltd.

Title: MECP Well Location Plan

Project:

Hydrogeological Assessment
Proposed 15-Storey Hotel
2157 Lakeshore Boulevard West
City of Toronto (Etobicoke)

Reference No. 1811-W006

Date: January 4, 2019

Scale:

0 30 60 120 180 240 300
Metres

Drawing No. 3

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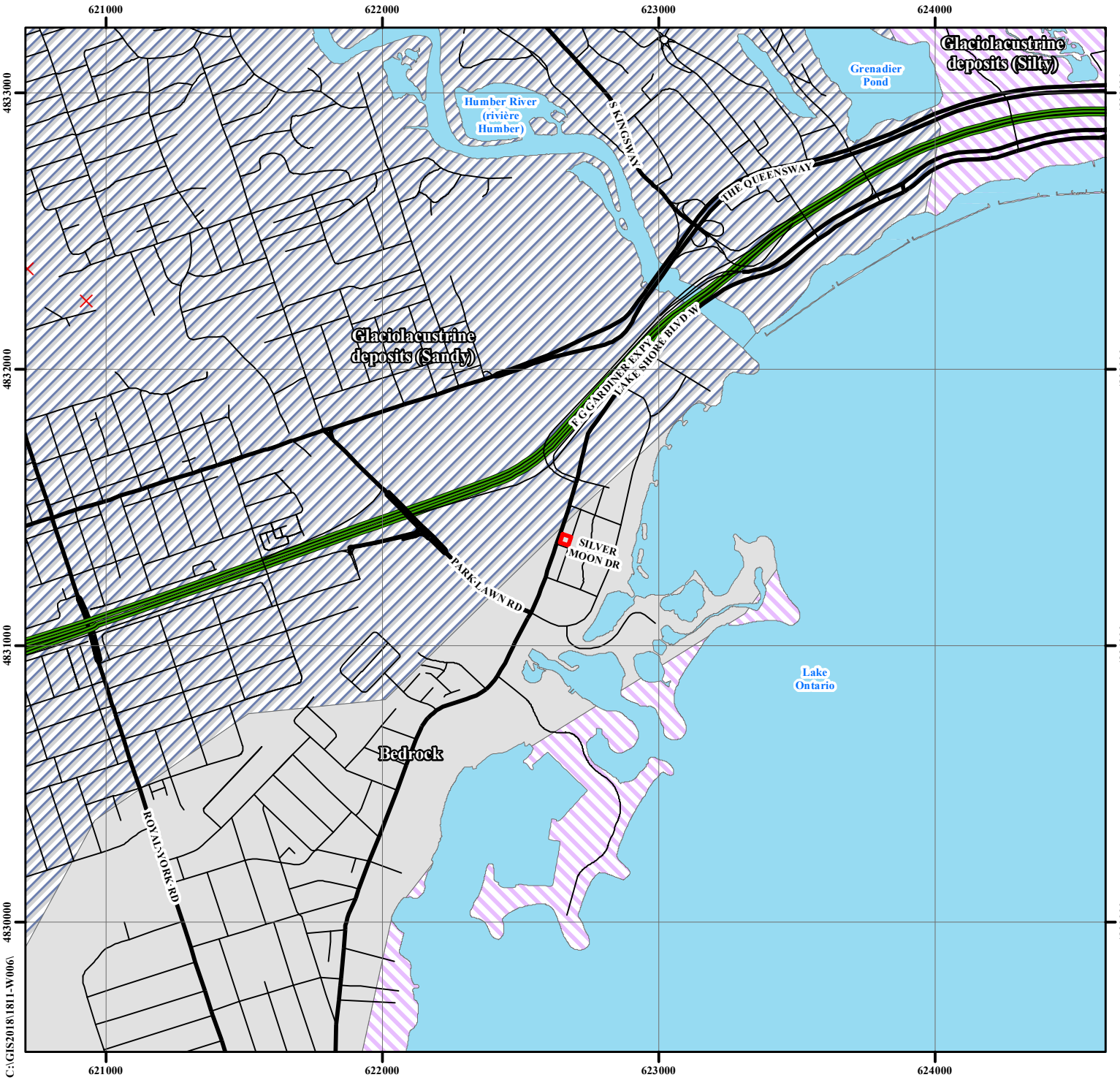

Source:Ontario Geological Survey, 1997,
Surface Geology of Ontario; Ontario Geological Survey,
Miscellaneous Released-Data 0014

N

Approximate Boundary of Subject Site

Bedrock, undifferentiated igneous and metamorphic rock, or carbonate and clastic sedimentary rock, exposed at surface or covered by a discontinuous, thin layer of drift

Glaciolacustrine deposits (Sandy)
Material: sand, gravelly sand and gravel, nearshore and beach deposits

Glaciolacustrine deposits (Silty)
Material: silt and clay, minor sand, basin and quiet water deposits

Outcrops

Expressway/Freeway

Major Road

Local Road

Soil Engineers Ltd.

Title: Quarternary and Surface Geology Map

Project:

Hydrogeological Assessment
Proposed 15-Storey Hotel
2157 Lakeshore Boulevard West
City of Toronto (Etobicoke)

Reference No. 1811-W006

Date: January 4, 2019

Scale:

0 100 200 400 600 800 1,000
Metres

Drawing No. 4

N

- Approximate Boundary of Subject Site
- Waterbody
- Watercourse
- Expressway/Freeway
- Major Road
- Local Road
- Railway
- 84 Topographic Contour (masl)

Soil Engineers Ltd.

Title: Topographic Map

Project:

Hydrogeological Assessment
Proposed 15-Storey Hotel
2157 Lakeshore Boulevard West
City of Toronto (Etobicoke)

Reference No. 1811-W006

Date: January 4, 2019

Scale:

0 15 30 60 90 120 150
Metres

Drawing No. 5

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Source: Contour, Ontario Ministry of Natural Resources and Forestry, 2015
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Source: Water Body, Ontario Ministry of Natural Resources and Forestry, 2015
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Source: Water Course, Ontario Ministry of Natural Resources and Forestry, 2015
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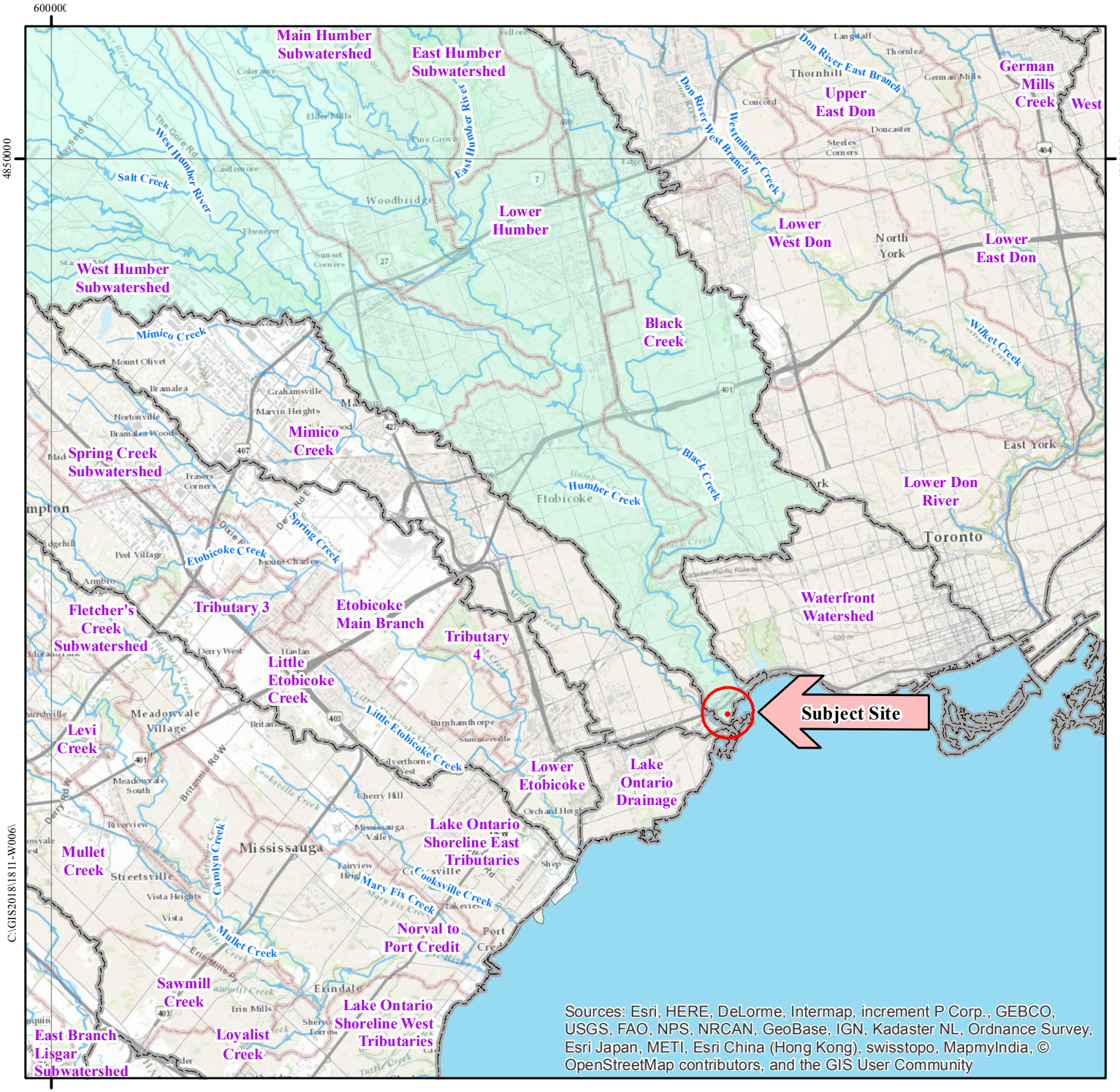

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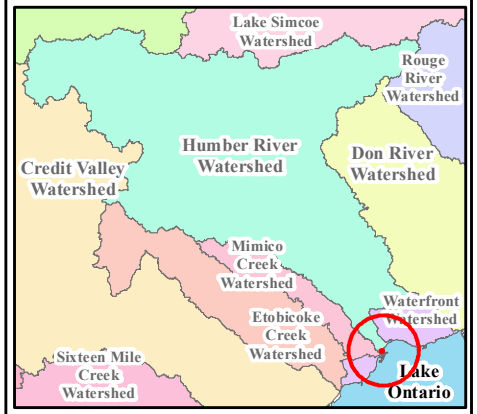
N

Watershed:



Approximate Boundary of the Subject Site

Watershed Boundaries

Waterbody

Watercourse

Expressway/Major Road

Soil Engineers Ltd.

Title: Watershed and Subwatershed Map

Project:

Hydrogeological Assessment
Proposed 15-Storey Hotel
2157 Lakeshore Boulevard West
City of Toronto (Etobicoke)

Reference No. 1811-W006

Date: January 4, 2019

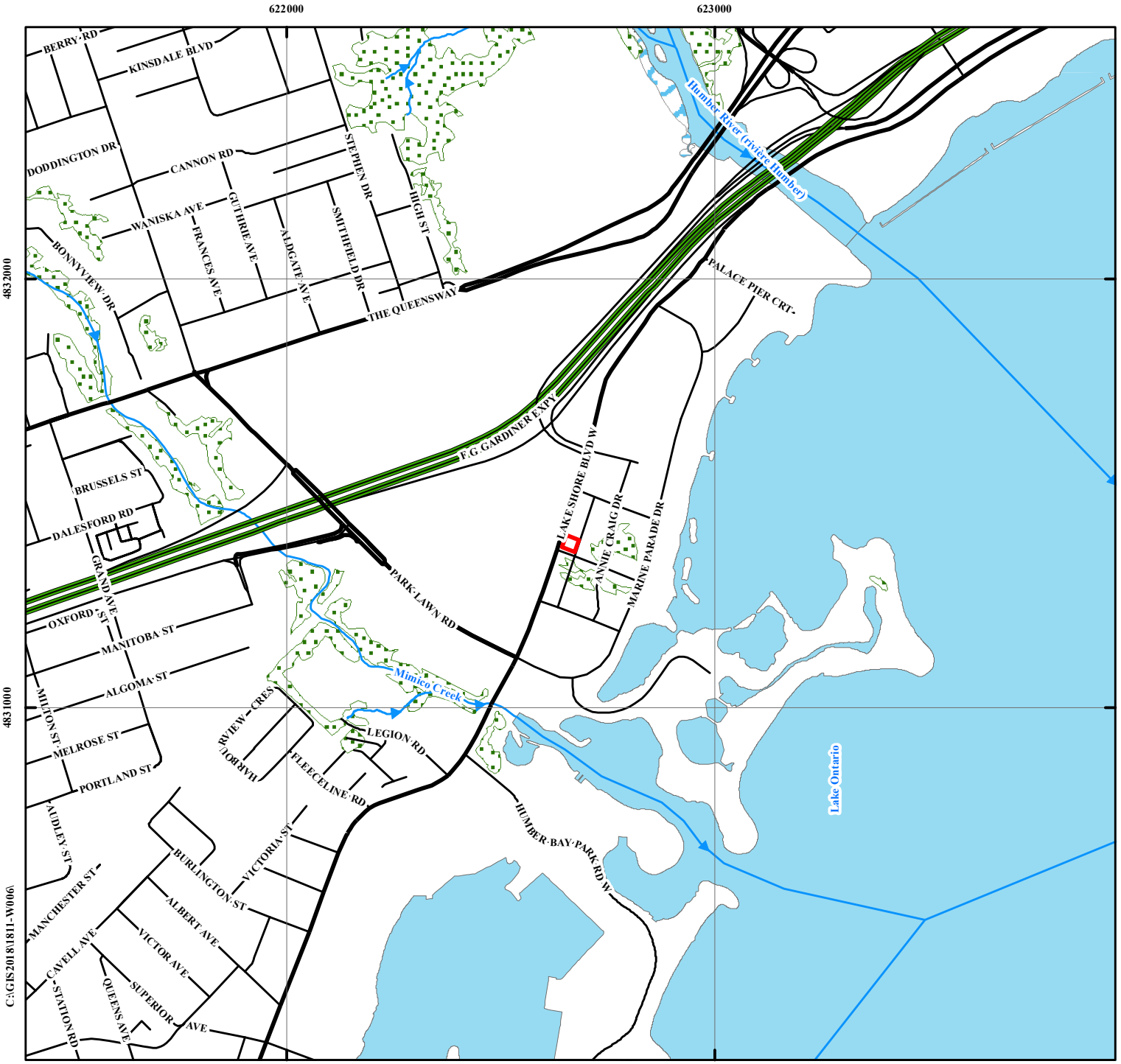
Scale:

0 4,750 9,500 19,000 28,500 38,000 47,500

Metres

Drawing No. 6

this mapping was produced by SEL and should be used for information purposes only.
Data sources used in its production are of varying quality and accuracy and all boundaries should be considered approximate.



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N

Approximate Boundary of Subject Site

Borehole with Monitoring Well

Major Road

Local Road

A A' Cross-Section Direction

84 Topographic Contour (masl)

Soil Engineers Ltd.

Title: Cross-Section Key Plan

Project:

Hydrogeological Assessment
Proposed 15-Storey Hotel
2157 Lakeshore Boulevard West
City of Toronto (Etobicoke)

Reference No. 1811-W006

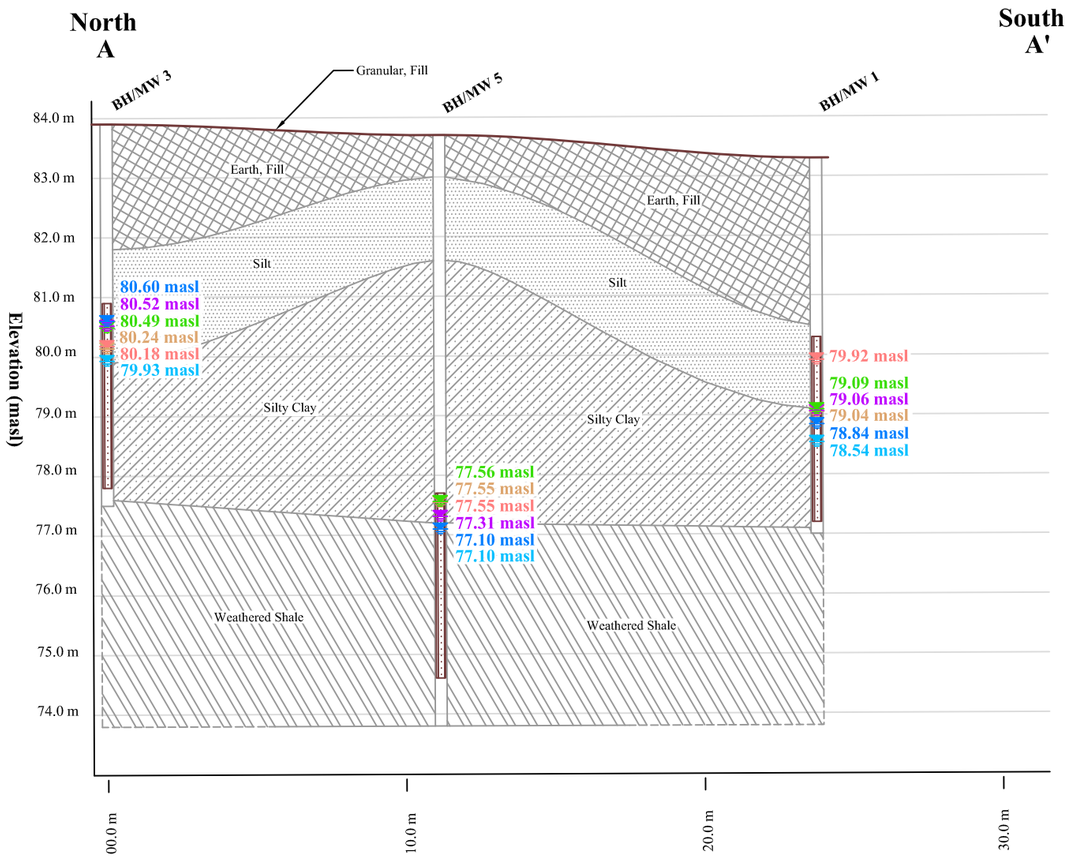
Date: January 4, 2019

Scale:

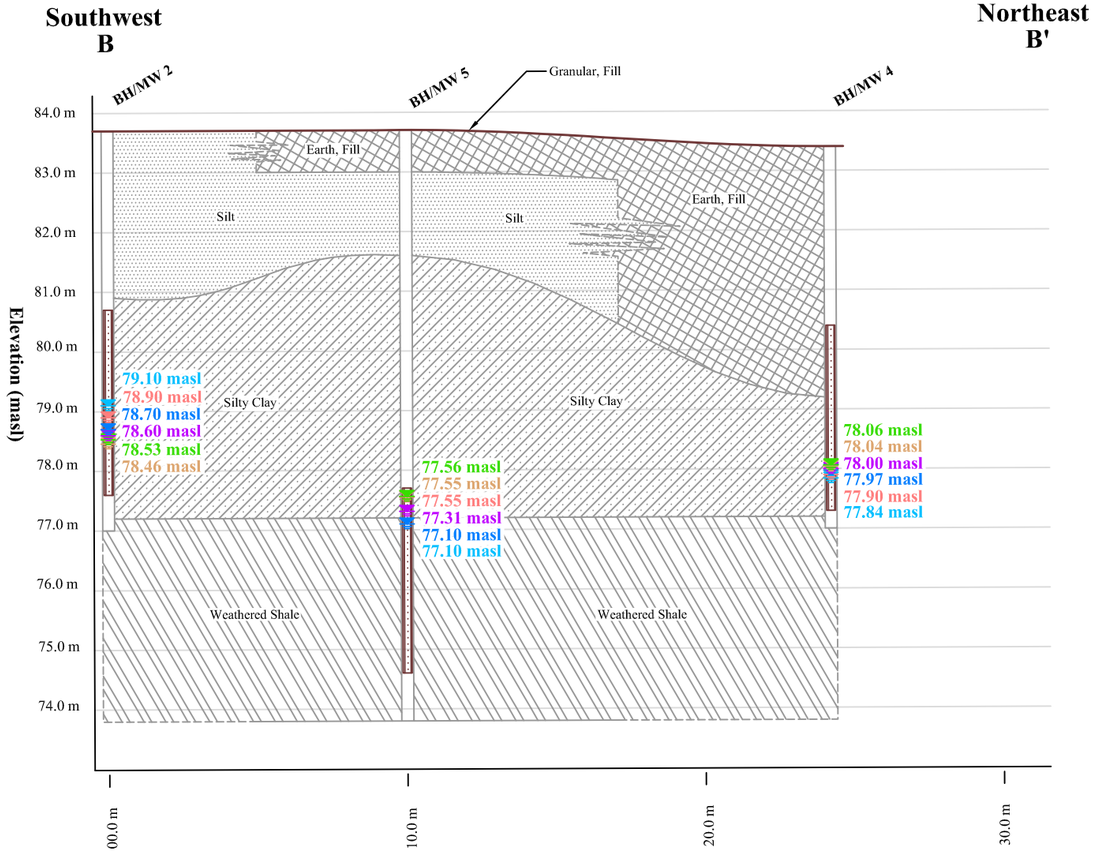
0 1.5 3 6 9 12 15

Metres

Drawing No. 8-1



Section A-A'



Section B-B'

Earth, Fill

Silt

Silty Clay

Shale

3.0 m Screen

Water Table on January 12, 2019
Water Table on January 26, 2019
Water Table on February 9, 2019
Water Table on February 23, 2019
Water Table on March 9, 2019
Water Table on March 21, 2019

C:Projects/2018 Jobs/1811-W006

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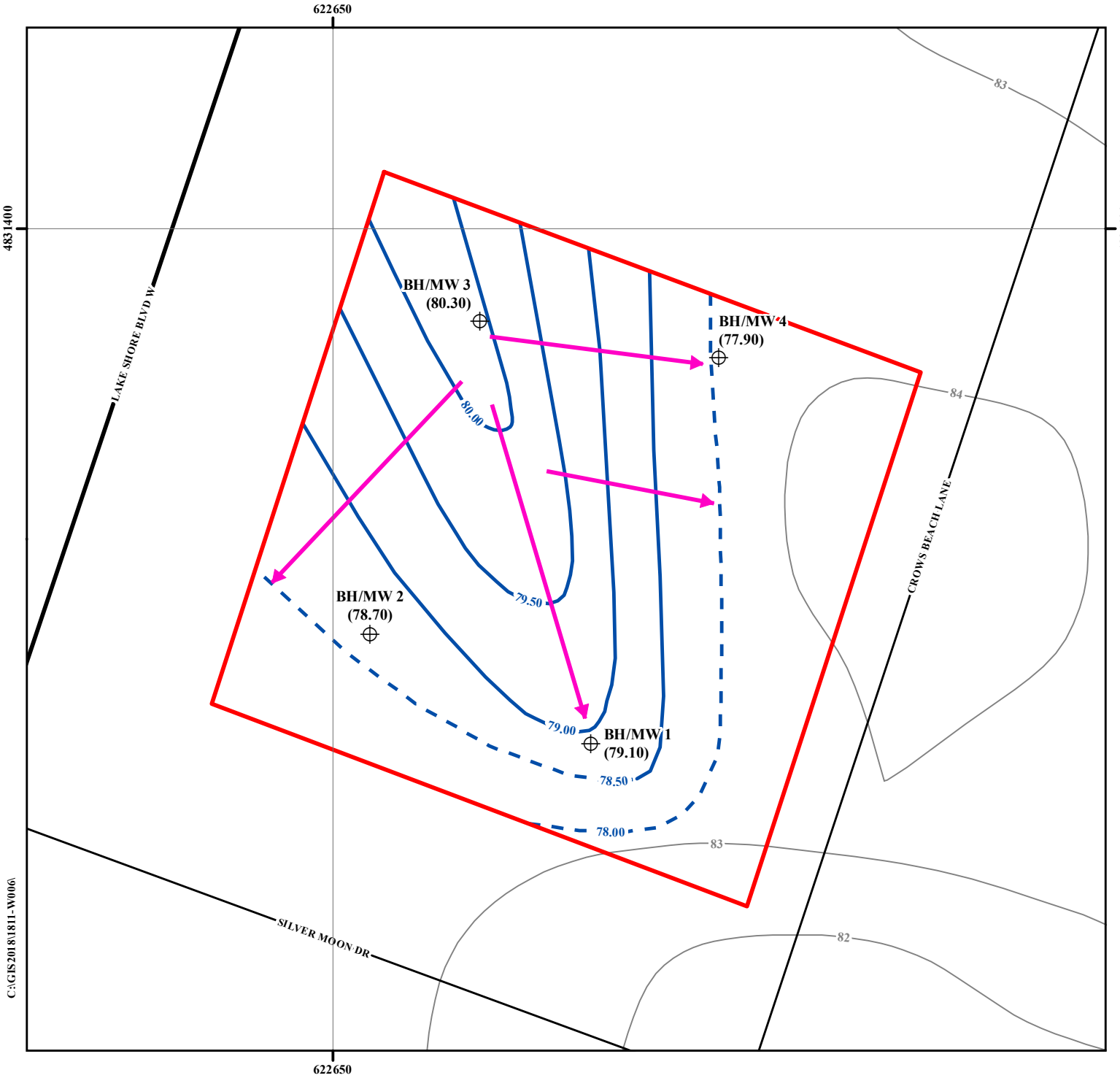
Title: Geological Cross-Section (A-A' and B-B')

Project: Hydrogeological Assessment
Proposed 15-Storey Hotel
2157 Lakeshore Boulevard West, City of Toronto

Reference No:	Date:	Scale: V	Scale: H	Drawing No.
1811-W006	March, 2019	1:100	1:200	8-2



Source: Contour, Ontario Ministry of Natural Resources and Forestry, 2015
©Queen's Printer for Ontario, 2015

Source: Water Body, Ontario Ministry of Natural Resources and Forestry, 2015
©Queen's Printer for Ontario, 2015

Source: Water Course, Ontario Ministry of Natural Resources and Forestry, 2015
©Queen's Printer for Ontario, 2015

N

- Approximate Boundary of Subject Site
- Borehole with Monitoring Well
- Interpreted Shallow Groundwater Flow Direction
- Interpreted Shallow Groundwater Level Elevation (masl)
- Inferred Shallow Groundwater Level Elevation (masl)
- Major Road
- Local Road
- 84 — Topographic Contour (masl)
- 77.90 Average Shallow Groundwater Level Elevation (masl)

Soil Engineers Ltd.

Title: Shallow Groundwater Flow Pattern Plan

Project:

Hydrogeological Assessment
Proposed 15-Storey Hotel
2157 Lakeshore Boulevard West
City of Toronto (Etobicoke)

Reference No. 1811-W006

Date: June 20, 2019

Scale:

0 1.5 3 6 9 12 15
Metres

Drawing No. 9

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FAX: (705) 721-7864	FAX: (905) 542-2769	FAX: (905) 725-1315	FAX: (905) 881-8335	FAX: (705) 684-8522	FAX: (905) 725-1315	FAX: (905) 542-2769

APPENDIX 'A'

MECP WATER WELL RECORDS SUMMARY

REFERENCE NO. 1811-W006

Ontario Water Well Records

WELL ID	MECP WWR ID	Construction Method	Well Depth (m)**	Well Usage		Water Found (m)**	Static Water Level (m)**	Top of Screen Depth (m)**	Bottom of Screen Depth (m)**
				Final Status	First Use				
1	7123282	-	4.50	Test Hole	Monitoring	-	3.0	1.5	4.5
2	7280730	-	-	-	-	-	-	-	-
3	7198955	-	-	-	-	-	-	-	-
4	7280729	-	-	-	-	-	-	-	-
5	7193856	Rotary (Convent.)	7.63	-	Monitoring	-	-	3.66	6.71
6	7193857	Rotary (Convent.)	7.63	-	Monitoring	-	-	4.58	7.63
7	7195661	Rotary (Convent.)	4.58	Observation Wells	Monitoring	-	-	4.58	4.58
8	7237313	Direct Push	4.58	Monitoring and Test Hole	Monitoring and Test Hole	-	-	1.53	4.58
9	7280731	-	-	-	-	-	-	-	-
10	7280728	-	-	-	-	-	-	-	-
11	7208830	Air Percussion	3.36	Observation Wells	Monitoring	-	-	0.31	3.36
12	7208829	Air Percussion	3.97	Observation Wells	Monitoring	-	-	0.46	3.97
13	7108871	-	7.60	Test Hole	Monitoring and Test Hole	-	1.50	4.60	7.60
14	7239893	-	-	-	-	-	-	-	-
15	7237314	Direct Push	3.97	Monitoring and Test Hole	Monitoring and Test Hole	-	-	2.44	3.97
16	7237317	Direct Push	3.66	Monitoring and Test Hole	Monitoring and Test Hole	-	-	1.53	3.66
17	7280740	-	-	-	-	-	-	-	-
18	7280739	-	-	-	-	-	-	-	-
19	6928586	Boring	15.00	Observation Wells	Not Used	-	-	1.53	4.58
20	7280736	-	-	-	-	-	-	-	-
21	7280737	-	-	-	-	-	-	-	-
22	7140488	Rotary (Convent.)	13.73	-	Monitoring	-	-	12.20	13.73
23	7280727	-	-	-	-	-	-	-	-
24	7280738	-	-	-	-	-	-	-	-
25	7140489	Rotary (Convent.)	10.07	-	Monitoring	-	-	8.23	9.76
26	7181302	Direct Push	8.54	Test Hole	Monitoring and Test Hole	-	-	5.49	8.54
27	7280735	-	-	-	-	-	-	-	-
28	7182493	-	-	-	-	-	-	-	-
29	7280734	-	-	-	-	-	-	-	-
30	7239892	-	-	-	-	-	-	-	-
31	7188198	Air Percussion	0.20	Observation Wells	Monitoring	-	-	0.61	1.83
32	7280721	-	-	-	-	-	-	-	-
33	7188199	Air Percussion	1.58	Observation Wells	Monitoring	-	-	0.66	1.58
34	7213466	-	-	-	-	-	-	-	-
35	7280722	-	-	-	-	-	-	-	-
36	7188200	Air Percussion	0.20	Observation Wells	Monitoring	-	-	0.61	1.0675

Ontario Water Well Records

WELL ID	MECP WWR ID	Construction Method	Well Depth (m)**	Well Usage		Water Found (m)**	Static Water Level (m)**	Top of Screen Depth (m)**	Bottom of Screen Depth (m)**
				Final Status	First Use				
37	7163892	Rotary (Convent.)	7.63	Observation Wells	Monitoring	3.05	-	4.58	7.63
38	7280733	-	-	-	-	-	-	-	-
39	7280726	-	-	-	-	-	-	-	-
40	7280720	-	-	Abandoned-Other	-	-	-	-	-
41	7280732	-	-	-	-	-	-	-	-
42	7280716	-	-	-	-	-	-	-	-
43	7280717	-	-	-	-	-	-	-	-
44	7203995	-	-	-	-	-	-	-	-
45	7280718	-	-	-	-	-	-	-	-
46	7280719	-	-	-	-	-	-	-	-
47	7228460	Direct Push	7.63	Monitoring and Test Hole	Monitoring and Test Hole	-	-	4.58	7.63
48	7228459	Direct Push	7.63	Monitoring and Test Hole	Monitoring and Test Hole	-	-	4.58	7.63
49	7237315	Direct Push	2.90	Monitoring and Test Hole	Monitoring and Test Hole	-	-	0.76	2.90
50	7240312	Direct Push	-	Abandoned Monitoring and Test Hole	Monitoring and Test Hole	-	-	-	-
51	7237316	Direct Push	3.05	-	Monitoring and Test Hole	-	-	0.92	3.05
52	7240313	Direct Push	-	Monitoring and Test Hole	Monitoring and Test Hole	-	-	-	-
53	7154076	Other Method	3.36	Monitoring and Test Hole	Monitoring and Test Hole	-	-	0.92	3.36
54	7228458	Direct Push	7.63	Monitoring and Test Hole	Monitoring and Test Hole	-	-	4.58	7.63
55	7238436	-	6.10	Abandoned-Other	-	-	-	-	-
56	7198107	Direct Push	6.10	Test Hole	Monitoring and Test Hole	-	-	3.05	6.10
57	7259674	-	-	-	-	-	-	-	-
58	7222640	-	-	-	-	-	-	-	-
59	7280715	-	-	-	-	-	-	-	-
60	7240357	-	-	Abandoned Monitoring and Test Hole	Monitoring and Test Hole	-	-	-	-
61	7222641	-	-	-	-	-	-	-	-
62	7238437	-	7.02	Abandoned-Other	-	-	-	-	-
63	7222642	-	-	-	-	-	-	-	-
64	7280724	-	-	-	-	-	-	-	-
65	7240317	Direct Push	-	Abandoned Monitoring and Test Hole	Monitoring and Test Hole	-	-	-	-
66	7224069	Direct Push	-	Abandoned Monitoring and Test Hole	Monitoring and Test Hole	-	-	-	-
67	7174357	Direct Push	6.71	Test Hole	Monitoring and Test Hole	-	-	3.66	6.71
68	7280723	-	-	-	-	-	-	-	-
69	7228463	Direct Push	7.93	Monitoring and Test Hole	Monitoring and Test Hole	-	-	4.88	7.93
70	7239937	Rotary (Convent.)	6.10	Observation Wells	Monitoring and Test Hole	5.80	-	3.05	6.10
71	7238435	-	6.10	Abandoned-Other	-	-	-	-	-
72	7263500	Boring	8.54	Test Hole	Test Hole	7.63	-	5.49	8.54

Ontario Water Well Records

WELL ID	MECP WWR ID	Construction Method	Well Depth (m)**	Well Usage		Water Found (m)**	Static Water Level (m)**	Top of Screen Depth (m)**	Bottom of Screen Depth (m)**
				Final Status	First Use				
73	7280725	-	-	-	-	-	-	-	-
74	7224067	Direct Push	-	Abandoned Monitoring and Test Hole	Monitoring and Test Hole	-	-	-	-
75	7206534	Direct Push	6.56	Monitoring and Test Hole	Monitoring and Test Hole	-	-	3.51	6.56
76	7207615	Direct Push	-	Abandoned Monitoring and Test Hole	Monitoring and Test Hole	-	-	-	-
77	7174362	Direct Push	6.56	Monitoring and Test Hole	Monitoring and Test Hole	-	-	3.51	6.56
78	7213437	Direct Push	6.71	Test Hole	Monitoring and Test Hole	-	-	3.66	6.71
79	7213438	Direct Push	6.71	Test Hole	Monitoring and Test Hole	-	-	3.66	6.71
80	7213439	Direct Push	6.71	Test Hole	Monitoring	-	-	3.66	6.71
81	7228457	Direct Push	7.32	Monitoring and Test Hole	Monitoring and Test Hole	-	-	4.27	7.32
82	7224066	-	-	-	-	-	-	-	-
83	7137708	Boring	6.90	Abandoned-Other	Monitoring	-	4.70	-	-
84	7207614	Direct Push	-	Abandoned Monitoring and Test Hole	Monitoring and Test Hole	-	-	-	-
85	7207612	Direct Push	-	Abandoned-Other	Monitoring and Test Hole	-	-	-	-
86	7207613	Direct Push	-	Abandoned Monitoring and Test Hole	Monitoring and Test Hole	-	-	-	-
87	7228456	Direct Push	7.02	Monitoring and Test Hole	Monitoring and Test Hole	-	-	3.97	7.02
88	7207610	Direct Push	-	Abandoned-Other	Monitoring and Test Hole	-	-	-	-
89	7206536	Direct Push	6.56	Monitoring and Test Hole	Monitoring and Test Hole	-	-	3.51	6.56
90	7213512	Direct Push	-	Test Hole	Monitoring and Test Hole	-	-	5.50	8.50
91	7206535	Direct Push	6.25	Monitoring and Test Hole	Monitoring and Test Hole	-	-	3.20	6.25
92	7213513	Direct Push	8.85	Test Hole	Monitoring and Test Hole	-	-	5.80	8.85
93	7046382	Boring	6.10	Observation Wells	Not Used	-	-	2.44	7.32
94	7206537	Direct Push	5.49	Monitoring and Test Hole	Monitoring and Test Hole	-	-	2.44	5.49
95	7205802	Rotary (Convent.)	19.82	Observation Wells	Monitoring	-	-	16.77	19.82
96	7228455	Direct Push	6.41	Monitoring and Test Hole	Monitoring and Test Hole	-	-	3.36	6.41
97	7207611	Direct Push	-	Abandoned-Other	Monitoring and Test Hole	-	-	-	-
98	7210999	-	-	Abandoned-Other	Monitoring	-	-	-	-
99	7195874	Boring	6.40	Observation Wells	Monitoring	-	-	3.30	6.40
100	7198106	Direct Push	6.86	Test Hole	Monitoring and Test Hole	-	-	3.81	6.86
101	7174359	Direct Push	3.05	Monitoring and Test Hole	Monitoring and Test Hole	-	-	0.92	3.05
102	7174358	Direct Push	3.05	Monitoring and Test Hole	Monitoring and Test Hole	-	-	0.92	3.05
103	7217527	Direct Push	5.80	Test Hole	Monitoring and Test Hole	-	-	7.02	-
104	7220952	Direct Push	4.73	Test Hole	Monitoring and Test Hole	-	-	1.68	4.73
105	7210364	Rotary (Convent.)	10.68	-	Monitoring	-	-	8.54	10.07
106	7174363	Direct Push	4.88	Monitoring and Test Hole	Monitoring and Test Hole	-	-	1.83	4.88
107	7263501	Boring	8.54	Test Hole	Test Hole	7.02	-	5.49	8.54
108	7228461	Direct Push	7.02	Monitoring and Test Hole	Monitoring and Test Hole	-	-	3.66	7.02

Ontario Water Well Records

WELL ID	MECP WWR ID	Construction Method	Well Depth (m)**	Well Usage		Water Found (m)**	Static Water Level (m)**	Top of Screen Depth (m)**	Bottom of Screen Depth (m)**
				Final Status	First Use				
109	7207609	Direct Push	-	Abandoned-Other	Monitoring and Test Hole	-	-	-	-
110	7240311	Direct Push	-	Abandoned Monitoring and Test Hole	Monitoring and Test Hole	-	-	-	-
111	7228462	Direct Push	7.02	Monitoring and Test Hole	Monitoring and Test Hole	-	-	3.97	7.02
112	7198105	Direct Push	6.10	Test Hole	Monitoring and Test Hole	-	-	3.05	6.10
113	7240318	Direct Push	-	Abandoned Monitoring and Test Hole	Monitoring and Test Hole	-	-	-	-
114	7174360	Direct Push	4.12	Monitoring and Test Hole	Monitoring and Test Hole	-	-	1.98	4.12
115	7205677	Rotary (Convent.)	22.88	Test Hole	Test Hole	-	5.26	-	-
116	7263502	Boring	8.23	Test Hole	Test Hole	6.41	-	5.19	8.23
117	7204521	Air Percussion	9.14	-	-	-	-	6.10	9.14
118	7195873	Boring	7.60	Observation Wells	Monitoring	-	-	4.50	7.60
119	7174361	Direct Push	4.12	Monitoring and Test Hole	Monitoring and Test Hole	-	-	1.98	4.12
120	7217526	Direct Push	10.98	Test Hole	Monitoring and Test Hole	-	-	7.93	10.98
121	7239725	Direct Push	-	Monitoring and Test Hole	Monitoring and Test Hole	-	-	-	-
122	7204520	Air Percussion	4.22	Test Hole	Monitoring and Test Hole	-	-	6.10	9.14
123	7204522	Air Percussion	5.49	Test Hole	Monitoring and Test Hole	-	-	6.10	9.14
124	7239724	Direct Push	-	Monitoring and Test Hole	Monitoring and Test Hole	-	-	-	-
125	7195872	Boring	1.37	Observation Wells	Monitoring	-	-	0.46	-
126	7239723	Direct Push	-	Monitoring and Test Hole	Monitoring and Test Hole	-	-	-	-
127	7239726	Direct Push	-	Monitoring and Test Hole	Monitoring and Test Hole	-	-	-	-
128	6930912	Rotary (Air)	6.10	Water Supply	Irrigation	13.88	6.71	-	-
129	7120230	Rotary (Convent.)	4.88	Observation Wells	-	-	-	-	-

Notes:

*MECP WWID: Ministry of Environment, Conservation, and Parks - Water Well Records Identification

**metres below ground surface

Soil Engineers Ltd.
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FAX: (705) 721-7864	FAX: (905) 542-2769	FAX: (905) 725-1315	FAX: (905) 881-8335	FAX: (705) 684-8522	FAX: (905) 725-1315	FAX: (905) 542-2769

APPENDIX 'B'

RESULT OF SINGLE WELL RESPONSE TESTS

REFERENCE NO. 1811-W006

Falling Head Test (Slug Test)

Test Date:		26-Jan-19	
Piezometer/Well No.:		BH/MW 5	
Ground level:		83.70	m
Screen top level:		74.60	m
Screen bottom level:		77.70	m
Test El. (at midpoint of screen):		76.15	m
Test depth (at midpoint of screen):		7.55	m
Screen length	L=	3.1	m
Diameter of undisturbed portion c	2R=	0.22	m
Standpipe diameter	2r=	0.05	m
Initial unbalanced head	Ho=	-0.259	m
Initial water depth		6.60	m
Aquifer material:		**SILTY CLAY/SHALE**	

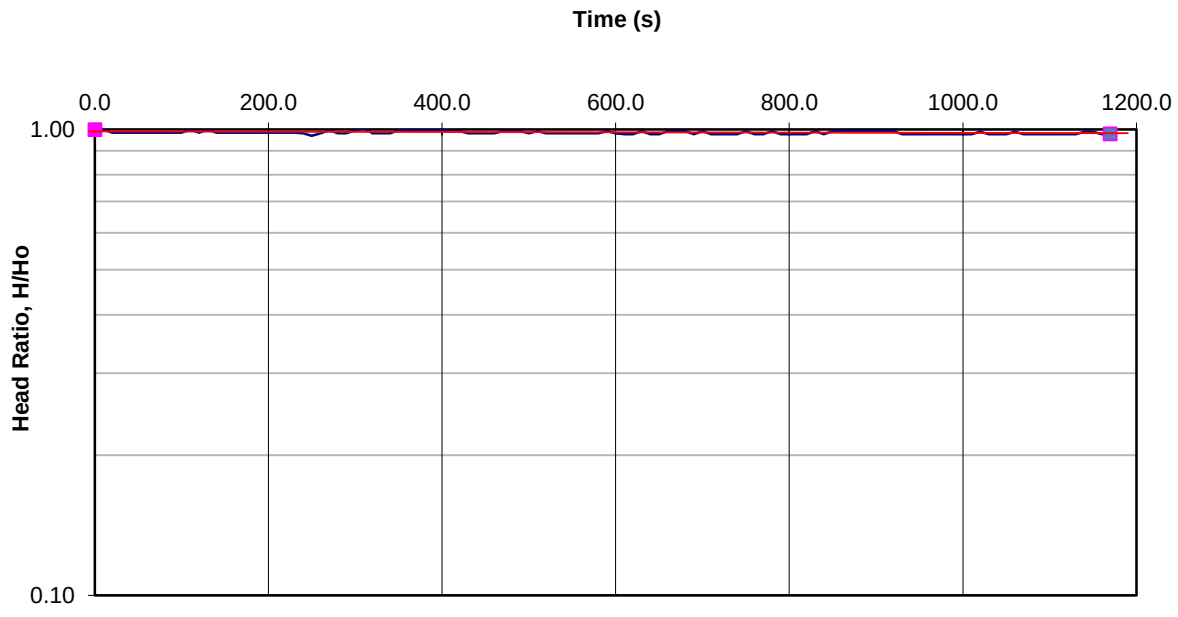
Shape factor $F = \frac{2 \times 3.14 \times L}{\ln(L/R)} = 5.83401$ m

Permeability $K = \frac{3.14 \times r2}{F \times (t2 - t1)} \times \ln(H1/H2)$ (Bouwer and Rice Method)

$\frac{\ln(H1/H2)}{(t2 - t1)} = 2.0033E\text{-}05$

K= **6.7E-07** cm/s

6.7E-09 m/s



Falling Head Test (Slug Test)

Test Date:		26-Jan-19	
Piezometer/Well No.:		BH/MW 2	
Ground level:		83.70	m
Screen top level:		80.70	m
Screen bottom level:		77.60	m
Test El. (at midpoint of screen):		79.15	m
Test depth (at midpoint of screen):		4.55	m
Screen length	L=	3.1	m
Diameter of undisturbed portion	2R=	0.22	m
Standpipe diameter	2r=	0.05	m
Initial unbalanced head	Ho=	-0.221	m
Initial water depth		5.00	m
Aquifer material:		**SILTY CLAY**	

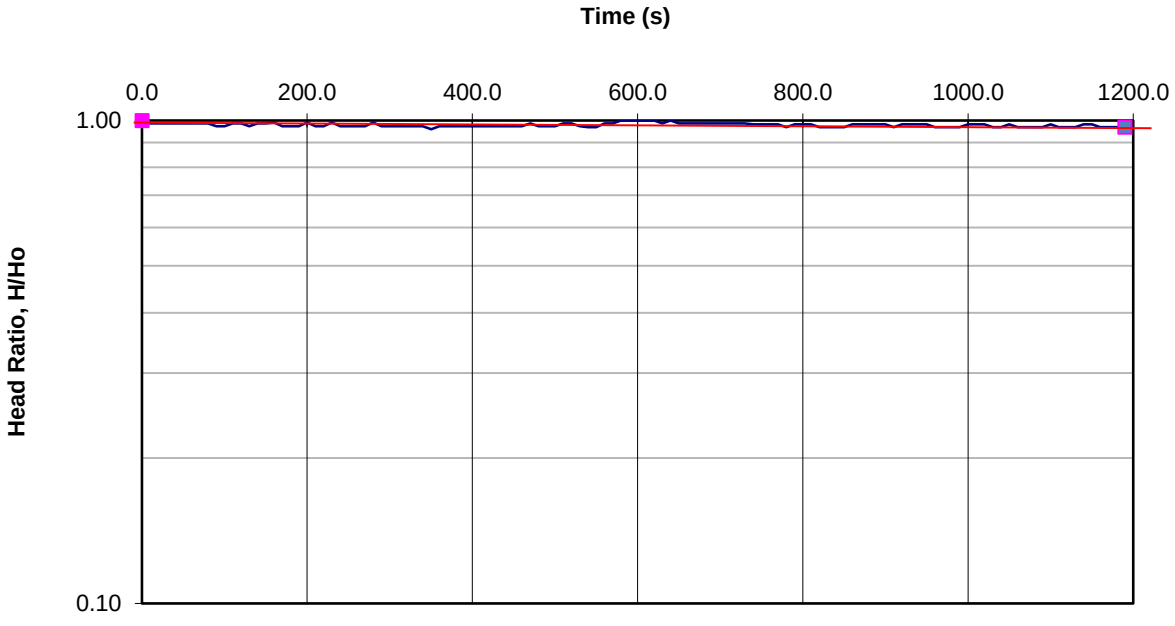
Shape factor $F = \frac{2 \times 3.14 \times L}{\ln(L/R)} = 5.83401$ m

Permeability $K = \frac{3.14 \times r2}{F \times (t2 - t1)} \times \ln(H1/H2)$ (Bouwer and Rice Method)

$\frac{\ln(H1/H2)}{(t2 - t1)} = 2.733E\text{-}05$

K= **9.2E-07** cm/s

9.2E-09 m/s



Falling Head Test (Slug Test)

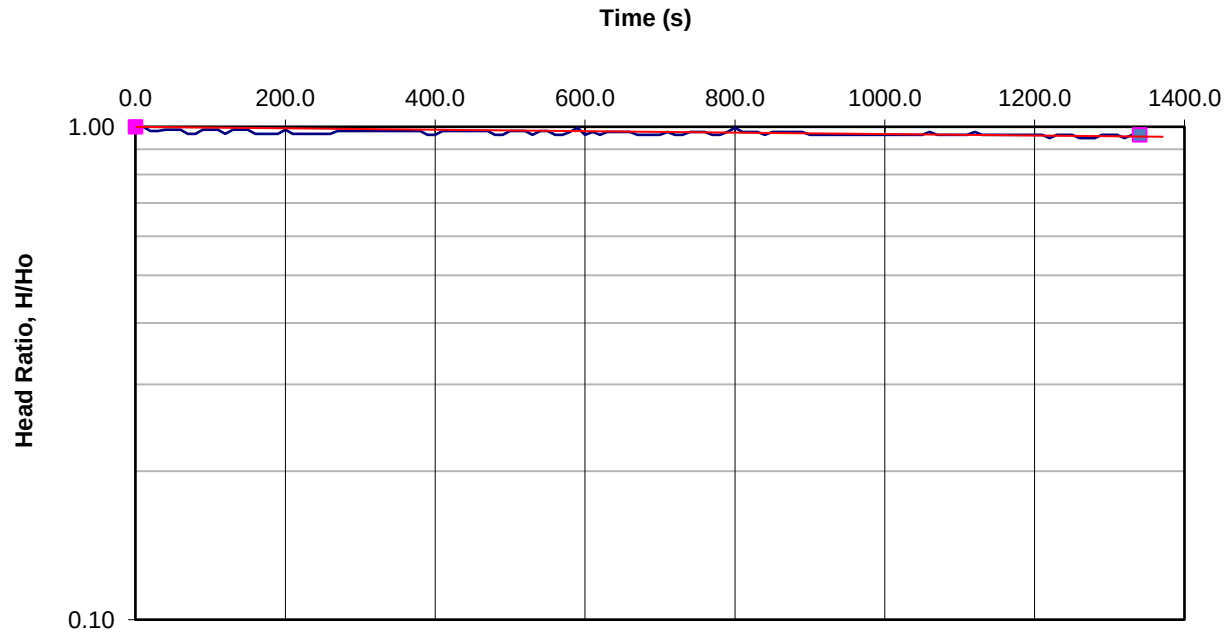
Test Date:		26-Jan-19	
Piezometer/Well No.:		BH/MW 3	
Ground level:		83.90	m
Screen top level:		80.90	m
Screen bottom level:		77.80	m
Test El. (at midpoint of screen):		79.35	m
Test depth (at midpoint of screen):		4.55	m
Screen length	L=	3.1	m
Diameter of undisturbed portion c	2R=	0.22	m
Standpipe diameter	2r=	0.05	m
Initial unbalanced head	Ho=	-0.214	m
Initial water depth		3.3	m
Aquifer material:		**SILTY CLAY**	

Shape factor $F = \frac{2 \times 3.14 \times L}{\ln(L/R)} = 5.83401$ m

Permeability $K = \frac{3.14 \times r2}{F \times (t2 - t1)} \times \ln(H1/H2)$ (Bouwer and Rice Method)

$\frac{\ln(H1/H2)}{(t2 - t1)} = 2.8433E\text{-}05$

K= **9.6E-07** cm/s
9.6E-09 m/s



Falling Head Test (Slug Test)

Test Date:		26-Jan-19	
Piezometer/Well No.:		BH/MW 5	
Ground level:		83.70	m
Screen top level:		74.60	m
Screen bottom level:		77.70	m
Test El. (at midpoint of screen):		76.15	m
Test depth (at midpoint of screen):		7.55	m
Screen length	L=	3.1	m
Diameter of undisturbed portion c	2R=	0.22	m
Standpipe diameter	2r=	0.05	m
Initial unbalanced head	Ho=	-0.259	m
Initial water depth		6.60	m
Aquifer material:		**SILTY CLAY/SHALE**	

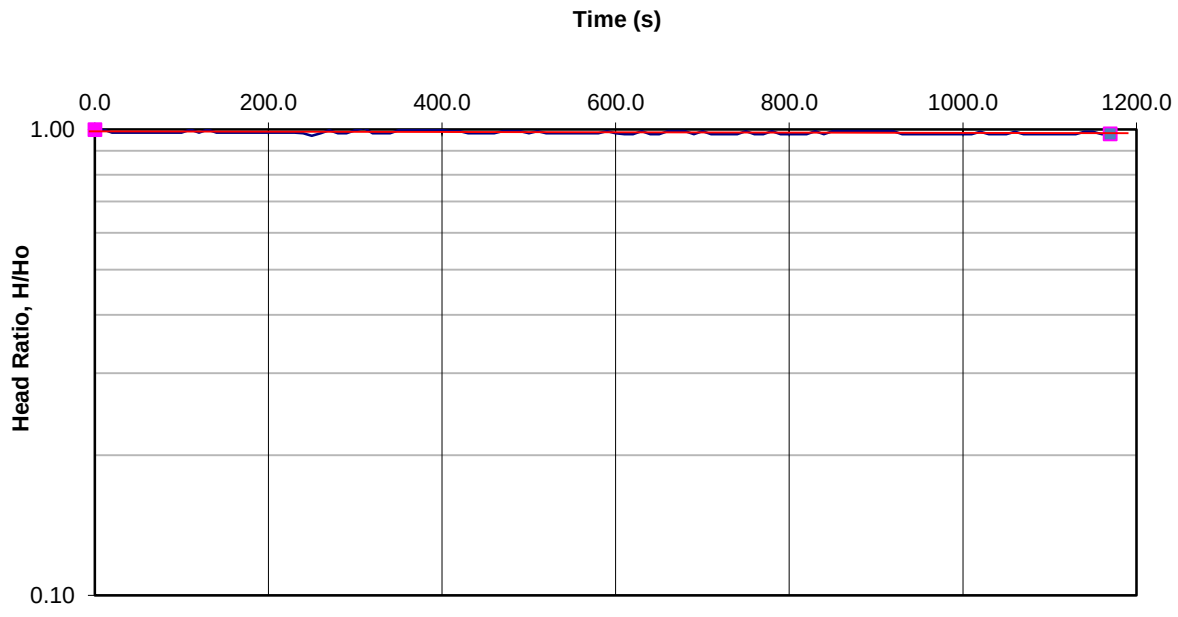
Shape factor $F = \frac{2 \times 3.14 \times L}{\ln(L/R)} = 5.83401$ m

Permeability $K = \frac{3.14 \times r2}{F \times (t2 - t1)} \times \ln(H1/H2)$ (Bouwer and Rice Method)

$\frac{\ln(H1/H2)}{(t2 - t1)} = 2.0033E\text{-}05$

K= **6.7E-07** cm/s

6.7E-09 m/s



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APPENDIX 'C'

WATER QUALITY CERTIFICATE OF ANALYSIS

REFERENCE NO. 1811-W006

FINAL REPORT

CA14603-MAR19 R1

1811-W006 2157 Lakeshore Blvd W Toronto

Prepared for

Soil Engineers Ltd.

FINAL REPORT

First Page

CLIENT DETAILS		LABORATORY DETAILS	
Client	Soil Engineers Ltd.	Project Specialist	Brad Moore Hon. B.Sc
		Laboratory	SGS Canada Inc.
Address	90 West Beaver Creek Richmond Hill, ON L4B 1E7. Canada	Address	185 Concession St., Lakefield ON, K0L 2H0
Contact	Carly Preston	Telephone	705-652-2000
Telephone	416-754-8515	Facsimile	705-652-6365
Facsimile	416-754-8516	Email	
Email	carly.preston@soilengineersltd.com; dhwanish.parikh@soileng	SGS Reference	CA14603-MAR19
Project	1811-W006 2157 Lakeshore Blvd W Toronto	Received	03/21/2019
Order Number		Approved	03/28/2019
Samples	Ground Water (2)	Report Number	CA14603-MAR19 R1
		Date Reported	03/28/2019

COMMENTS

RL - SGS Reporting Limit

Nonylphenol Ethoxylates is the sum of nonylphenol monoethoxylate and nonylphenol diethoxylate.

Total PAH is the sum of anthracene, benzo(a)pyrene, benzo(a)anthracene, benzo(e)pyrene, benzo(b,j)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenzo(a,h)anthracene, dibenzo(a,i)pyrene, dibenzo(a,j)acridine, 7H-dibenzo(c,g)carbazole, fluoranthene, indeno(1,2,3-c,d)pyrene, perylene, phenanthrene and pyrene..

Temperature of Sample upon Receipt: 2 degrees C
Cooling Agent Present:yes
Custody Seal Present: yes

Chain of Custody Number: 006298

SIGNATORIES

Brad Moore Hon. B.Sc

TABLE OF CONTENTS

Client: Soil Engineers Ltd.
Project: 1811-W006 2157 Lakeshore Blvd W Toronto
Project Manager: Carly Preston
Samplers: Carly Preston

PACKAGE: **SANSEW - General Chemistry** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

			Sample Number		8	
			Sample Name		BH/MW3	
			Sample Matrix		Ground Water	
			Sample Date		21/03/2019	
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	
General Chemistry						
Biochemical Oxygen Demand (BOD5)	mg/L	2	300	15	< 4↑	
Total Kjeldahl Nitrogen	as N mg/L	0.5	100		< 0.5	
Total Suspended Solids	mg/L	2	350	15	46	

PACKAGE: **SANSEW - Metals and Inorganics** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

				Sample Number		8	9
				Sample Name		BH/MW3	BH/MW3 Diss
				Sample Matrix		Ground Water	Ground Water
				Sample Date		21/03/2019	21/03/2019
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	
Metals and Inorganics							
Fluoride	mg/L	0.06	10		0.22		
Cyanide (total)	mg/L	0.01	2	0.02	< 0.01		
Aluminum (total)	mg/L	0.001	50		0.474	0.002	
Antimony (total)	mg/L	0.0009	5		< 0.0009	< 0.0009	
Arsenic (total)	mg/L	0.0002	1	0.02	0.0004	0.0002	
Cadmium (total)	mg/L	0.000003	0.7	0.008	0.000018	0.000010	
Chromium (total)	mg/L	0.00008	4	0.08	0.00097	0.00011	
Cobalt (total)	mg/L	0.000004	5		0.000612	0.000169	

Client: Soil Engineers Ltd.

Project: 1811-W006 2157 Lakeshore Blvd W Toronto

Project Manager: Carly Preston

Samplers: Carly Preston

PACKAGE: **SANSEW - Metals and Inorganics**

(WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number					8	9
Sample Name					BH/MW3	BH/MW3 Diss
Sample Matrix					Ground Water	Ground Water
Sample Date					21/03/2019	21/03/2019
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**
Metals and Inorganics (continued)						
Copper (total)	mg/L	0.0002	2	0.04	0.0016	0.0006
Lead (total)	mg/L	0.00001	1	0.12	0.00138	< 0.00001
Manganese (total)	mg/L	0.00001	5	0.05	0.114	0.0839
Molybdenum (total)	mg/L	0.00004	5		0.00279	0.00274
Nickel (total)	mg/L	0.0001	2	0.08	0.0019	0.0011
Phosphorus (total)	mg/L	0.003	10	0.4	0.037	0.005
Selenium (total)	mg/L	0.00004	1	0.02	0.00037	0.00043
Silver (total)	mg/L	0.00005	5	0.12	< 0.00005	< 0.00005
Tin (total)	mg/L	0.00006	5		0.00123	0.00047
Titanium (total)	mg/L	0.00005	5		0.0163	0.00011
Zinc (total)	mg/L	0.002	2	0.04	0.005	< 0.002

Client: Soil Engineers Ltd.
Project: 1811-W006 2157 Lakeshore Blvd W Toronto
Project Manager: Carly Preston
Samplers: Carly Preston

PACKAGE: **SANSEW - Microbiology** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	BH/MW3
Sample Matrix	Ground Water
Sample Date	21/03/2019

Parameter	Units	RL	L1	L2	Result
Microbiology					
E. Coli	cfu/100mL	-		200	< 2↑

PACKAGE: **SANSEW - Nonylphenol and Ethoxylates** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	BH/MW3
Sample Matrix	Ground Water
Sample Date	21/03/2019

Parameter	Units	RL	L1	L2	Result
Nonylphenol and Ethoxylates					
Nonylphenol	mg/L	0.001	0.02	0.001	< 0.001
Nonylphenol Ethoxylates	mg/L	0.01	0.2	0.01	< 0.01
Nonylphenol diethoxylate	mg/L	0.01			< 0.01
Nonylphenol monoethoxylate	mg/L	0.01			< 0.01

PACKAGE: **SANSEW - Oil and Grease** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	BH/MW3
Sample Matrix	Ground Water
Sample Date	21/03/2019

Parameter	Units	RL	L1	L2	Result

Client: Soil Engineers Ltd.

Project: 1811-W006 2157 Lakeshore Blvd W Toronto

Project Manager: Carly Preston

Samplers: Carly Preston

PACKAGE: **SANSEW - Oil and Grease** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	BH/MW3
Sample Matrix	Ground Water
Sample Date	21/03/2019

Parameter	Units	RL	L1	L2	Result
Oil and Grease					
Oil & Grease (total)	mg/L	2			< 2
Oil & Grease (animal/vegetable)	mg/L	4	150		< 4
Oil & Grease (mineral/synthetic)	mg/L	4	15		< 4

PACKAGE: **SANSEW - Other (ORP)** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	BH/MW3
Sample Matrix	Ground Water
Sample Date	21/03/2019

Parameter	Units	RL	L1	L2	Result
Other (ORP)					
pH	no unit	0.05	11.5	9.5	7.66
Chromium VI	mg/L	0.0002	2	0.04	< 0.0002
Mercury (total)	mg/L	0.00001	0.01	0.0004	< 0.00001

PACKAGE: **SANSEW - PCBs** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	BH/MW3
Sample Matrix	Ground Water
Sample Date	21/03/2019

Parameter	Units	RL	L1	L2	Result

Client: Soil Engineers Ltd.
Project: 1811-W006 2157 Lakeshore Blvd W Toronto
Project Manager: Carly Preston
Samplers: Carly Preston

PACKAGE: **SANSEW - PCBs** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	BH/MW3
Sample Matrix	Ground Water
Sample Date	21/03/2019

Parameter	Units	RL	L1	L2	Result
PCBs					
Polychlorinated Biphenyls (PCBs) - Total	mg/L	0.0001	0.001	0.0004	< 0.0001

PACKAGE: **SANSEW - Phenols** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	BH/MW3
Sample Matrix	Ground Water
Sample Date	21/03/2019

Parameter	Units	RL	L1	L2	Result
Phenols					
4AAP-Phenolics	mg/L	0.002	1	0.008	0.006

PACKAGE: **SANSEW - SVOCs** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	BH/MW3
Sample Matrix	Ground Water
Sample Date	21/03/2019

Parameter	Units	RL	L1	L2	Result
SVOCs					
di-n-Butyl Phthalate	mg/L	0.002	0.08	0.015	< 0.002
Bis(2-ethylhexyl)phthalate	mg/L	0.002	0.012	0.0088	< 0.002
3,3-Dichlorobenzidine	mg/L	0.0005	0.002	0.0008	< 0.0005

Client: Soil Engineers Ltd.
Project: 1811-W006 2157 Lakeshore Blvd W Toronto
Project Manager: Carly Preston
Samplers: Carly Preston

PACKAGE: **SANSEW - SVOCs** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	BH/MW3
Sample Matrix	Ground Water
Sample Date	21/03/2019

Parameter	Units	RL	L1	L2	Result
SVOCs (continued)					
Pentachlorophenol	mg/L	0.0005	0.005	0.002	< 0.0005
PAHs (Total)	mg/L	-	0.005	0.002	< 0.001
Perylene	mg/L	0.0005			< 0.0005

PACKAGE: **SANSEW - SVOCs - PAHs** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	BH/MW3
Sample Matrix	Ground Water
Sample Date	21/03/2019

Parameter	Units	RL	L1	L2	Result
SVOCs - PAHs					
7Hdibenzo(c,g)carbazole	mg/L	0.0001			< 0.0001
Anthracene	mg/L	0.0001			< 0.0001
Benzo(a)anthracene	mg/L	0.0001			< 0.0001
Benzo(a)pyrene	mg/L	0.0001			< 0.0001
Benzo(b,j)fluoranthene	mg/L	0.0001			< 0.0001
Benzo[e]pyrene	mg/L	0.0001			< 0.0001
Benzo(ghi)perylene	mg/L	0.0002			< 0.0002
Benzo(k)fluoranthene	mg/L	0.0001			< 0.0001
Chrysene	mg/L	0.0001			< 0.0001
Dibenzo(a,h)anthracene	mg/L	0.0001			< 0.0001
Dibenzo(a,i)pyrene	mg/L	0.0001			< 0.0001

Client: Soil Engineers Ltd.
Project: 1811-W006 2157 Lakeshore Blvd W Toronto
Project Manager: Carly Preston
Samplers: Carly Preston

PACKAGE: **SANSEW - SVOCs - PAHs** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	BH/MW3
Sample Matrix	Ground Water
Sample Date	21/03/2019

Parameter	Units	RL	L1	L2	Result
SVOCs - PAHs (continued)					
Dibenzo(a,j)acridine	mg/L	0.0001			< 0.0001
Fluoranthene	mg/L	0.0001			< 0.0001
Indeno(1,2,3-cd)pyrene	mg/L	0.0002			< 0.0002
Phenanthrene	mg/L	0.0001			< 0.0001
Pyrene	mg/L	0.0001			< 0.0001

PACKAGE: **SANSEW - VOCs** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	BH/MW3
Sample Matrix	Ground Water
Sample Date	21/03/2019

Parameter	Units	RL	L1	L2	Result
VOCs					
Chloroform	mg/L	0.0005	0.04	0.002	< 0.0005
1,2-Dichlorobenzene	mg/L	0.0005	0.05	0.0056	< 0.0005
1,4-Dichlorobenzene	mg/L	0.0005	0.08	0.0068	< 0.0005
cis-1,2-Dichloroethene	mg/L	0.0005	4	0.0056	< 0.0005
trans-1,3-Dichloropropene	mg/L	0.0005	0.14	0.0056	< 0.0005
Methylene Chloride	mg/L	0.0005	2	0.0052	< 0.0005
1,1,2,2-Tetrachloroethane	mg/L	0.0005	1.4	0.017	< 0.0005
Tetrachloroethylene (perchloroethylene)	mg/L	0.0005	1	0.0044	< 0.0005
Trichloroethylene	mg/L	0.0005	0.4	0.0076	< 0.0005

Client: Soil Engineers Ltd.

Project: 1811-W006 2157 Lakeshore Blvd W Toronto

Project Manager: Carly Preston

Samplers: Carly Preston

PACKAGE: **SANSEW - VOCs - BTEX** (WATER)

L1 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016

L2 = SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016

Sample Number	8
Sample Name	BH/MW3
Sample Matrix	Ground Water
Sample Date	21/03/2019

Parameter	Units	RL	L1	L2	Result
VOCs - BTEX					
Benzene	mg/L	0.0005	0.01	0.002	< 0.0005
Ethylbenzene	mg/L	0.0005	0.16	0.002	< 0.0005
Toluene	mg/L	0.0005	0.016	0.002	< 0.0005
Xylene (total)	mg/L	0.0005	1.4	0.0044	< 0.0005
m-p-xylene	mg/L	0.0005			< 0.0005
o-xylene	mg/L	0.0005			< 0.0005

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	SANSEW / WATER / - - Toronto Sewer Use By Law Table 1 - Sanitary and Combined Sewer Discharge - BL_100_2016 L1	SANSEW / WATER / - - Toronto Sewer Use By Law Table 2 - Storm Sewer Discharge - BL_100_2016 L2
BH/MW3					
Total Suspended Solids	SM 2540D	mg/L	46		15
Manganese	SM 3030/EPA 200.8	mg/L	0.114		0.05
BH/MW3 Diss					
Manganese	SM 3030/EPA 200.8	mg/L	0.0839		0.05

QC SUMMARY

Biochemical Oxygen Demand

Method: SM 5210 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Biochemical Oxygen Demand (BOD5)	BOD0043-MAR19	mg/L	2	< 2	8	30	98	70	130	NV	70	130

Cyanide by SFA

Method: SM 4500 I Internal ref.: ME-CA-IENVISFA-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Cyanide (total)	SKA0171-MAR19	mg/L	0.01	<0.01	ND	10	100	90	110	92	75	125

Fluoride by Specific Ion Electrode

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Fluoride	EWL0369-MAR19	mg/L	0.06	<0.06	6	10	98	90	110	101	75	125

QC SUMMARY

Hexavalent Chromium by IC

Method: EPA218.6/EPA3060A | Internal ref.: ME-CA-[ENV]IC-LAK-AN-008

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chromium VI	DIO0336-MAR19	mg/L	0.0002	1	11	20	104	80	120	91	75	125

Mercury by CVAAS

Method: EPA 7471A/SM 3112B | Internal ref.: ME-CA-[ENV]SPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury (total)	EHG0021-MAR19	mg/L	0.00001	< 0.00001	ND	20	82	80	120	84	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (total)	EMS0113-MAR19	mg/L	0.00005	<0.00005	ND	20	98	90	110	75	70	130
Aluminum (total)	EMS0113-MAR19	mg/L	0.001	<0.001	1	20	95	90	110	NV	70	130
Arsenic (total)	EMS0113-MAR19	mg/L	0.0002	<0.0002	13	20	99	90	110	91	70	130
Cadmium (total)	EMS0113-MAR19	mg/L	0.000003	<0.000003	ND	20	100	90	110	96	70	130
Cobalt (total)	EMS0113-MAR19	mg/L	0.000004	<0.000004	1	20	97	90	110	90	70	130
Chromium (total)	EMS0113-MAR19	mg/L	0.00008	<0.00008	7	20	96	90	110	120	70	130
Copper (total)	EMS0113-MAR19	mg/L	0.0002	<0.0002	1	20	98	90	110	NV	70	130
Manganese (total)	EMS0113-MAR19	mg/L	0.00001	<0.00001	1	20	98	90	110	NV	70	130
Molybdenum (total)	EMS0113-MAR19	mg/L	0.00004	<0.00004	1	20	99	90	110	97	70	130
Nickel (total)	EMS0113-MAR19	mg/L	0.0001	<0.0001	0	20	98	90	110	85	70	130
Lead (total)	EMS0113-MAR19	mg/L	0.00001	<0.00001	6	20	100	90	110	94	70	130
Antimony (total)	EMS0113-MAR19	mg/L	0.0009	<0.0009	ND	20	106	90	110	102	70	130
Selenium (total)	EMS0113-MAR19	mg/L	0.00004	<0.00004	6	20	104	90	110	93	70	130
Tin (total)	EMS0113-MAR19	mg/L	0.00006	<0.00006	2	20	98	90	110	NV	70	130
Titanium (total)	EMS0113-MAR19	mg/L	0.00005	<0.00005	1	20	97	90	110	NV	70	130
Zinc (total)	EMS0113-MAR19	mg/L	0.002	<0.002	3	20	93	90	110	92	70	130

QC SUMMARY

Metals in aqueous samples - ICP-OES

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Phosphorus (total)	EMS0113-MAR19	mg/L	0.003	<0.003	3	20	102	90	110	NV	70	130

Microbiology

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
E. Coli	BAC9339-MAR19	cfu/100mL	-	ACCEPTED	ACCEPTED							

QC SUMMARY

Nonylphenol and Ethoxylates

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nonylphenol diethoxylate	GCM0319-MAR19	mg/L	0.01	< 0.01			80	55	120			
Nonylphenol Ethoxylates	GCM0319-MAR19	mg/L	0.01	< 0.01								
Nonylphenol monoethoxylate	GCM0319-MAR19	mg/L	0.01	< 0.01			90	55	120			
Nonylphenol	GCM0319-MAR19	mg/L	0.001	< 0.001			87	55	120			

Oil & Grease

Method: MOE E3401 | Internal ref.: ME-CA-IENVIGC-LAK-AN-019

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Oil & Grease (total)	GCM0365-MAR19	mg/L	2	<2			99	75	125			

QC SUMMARY

Oil & Grease-AV/MS

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Oil & Grease (animal/vegetable)	GCM0365-MAR19	mg/L	4	< 4			NA	70	130			
Oil & Grease (mineral/synthetic)	GCM0365-MAR19	mg/L	4	< 4			NA	70	130			

pH

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0373-MAR19	no unit	0.05	NA	0		101			NA		

Phenols by SFA

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0173-MAR19	mg/L	0.002	<0.002	2	10	110	90	110	96	75	125

QC SUMMARY

Polychlorinated Biphenyls

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Polychlorinated Biphenyls (PCBs) - Total	GCM0312-MAR19	mg/L	0.0001	<0.0001	ND	30	110	60	140	105	60	140

QC SUMMARY

Semi-Volatile Organics

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
7Hdibenzo(c,g)carbazole	GCM0321-MAR19	mg/L	0.0001	< 0.0001	NSS	30	112	50	140	NSS	50	140
Anthracene	GCM0321-MAR19	mg/L	0.0001	< 0.0001	NSS	30	109	50	140	NSS	50	140
Benzo(a)anthracene	GCM0321-MAR19	mg/L	0.0001	< 0.0001	NSS	30	108	50	140	NSS	50	140
Benzo(a)pyrene	GCM0321-MAR19	mg/L	0.0001	< 0.0001	NSS	30	108	50	140	NSS	50	140
Benzo(b,j)fluoranthene	GCM0321-MAR19	mg/L	0.0001	< 0.0001	NSS	30	112	50	140	NSS	50	140
Benzo[e]pyrene	GCM0321-MAR19	mg/L	0.0001	< 0.0001	NSS	30	101	50	140	NSS	50	140
Benzo(ghi)perylene	GCM0321-MAR19	mg/L	0.0002	< 0.0002	NSS	30	112	50	140	NSS	50	140
Benzo(k)fluoranthene	GCM0321-MAR19	mg/L	0.0001	< 0.0001	NSS	30	115	50	140	NSS	50	140
Bis(2-ethylhexyl)phthalate	GCM0321-MAR19	mg/L	0.002	< 0.002	NSS	30	120	50	140	NSS	50	140
Chrysene	GCM0321-MAR19	mg/L	0.0001	< 0.0001	NSS	30	112	50	140	NSS	50	140
di-n-Butyl Phthalate	GCM0321-MAR19	mg/L	0.002	< 0.002	NSS	30	120	50	140	NSS	50	140
Dibenzo(a,h)anthracene	GCM0321-MAR19	mg/L	0.0001	< 0.0001	NSS	30	111	50	140	NSS	50	140
Dibenzo(a,i)pyrene	GCM0321-MAR19	mg/L	0.0001	< 0.0001	NSS	30	117	50	140	NSS	50	140
Dibenzo(a,j)acridine	GCM0321-MAR19	mg/L	0.0001	< 0.0001	NSS	30	105	50	140	NSS	50	140
Fluoranthene	GCM0321-MAR19	mg/L	0.0001	< 0.0001	NSS	30	112	50	140	NSS	50	140
Indeno(1,2,3-cd)pyrene	GCM0321-MAR19	mg/L	0.0002	< 0.0002	NSS	30	112	50	140	NSS	50	140
Pentachlorophenol	GCM0321-MAR19	mg/L	0.0005	< 0.0005	NSS	30	93	50	140	NSS	50	140
Perylene	GCM0321-MAR19	mg/L	0.0005	< 0.0005	NSS	30	102	50	140	NSS	50	140
Phenanthrene	GCM0321-MAR19	mg/L	0.0001	< 0.0001	NSS	30	109	50	140	NSS	50	140
Pyrene	GCM0321-MAR19	mg/L	0.0001	< 0.0001	NSS	30	110	50	140	NSS	50	140

QC SUMMARY

Semi-Volatile Organics (continued)

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
3,3-Dichlorobenzidine	GCM0322-MAR19	mg/L	0.0005	< 0.0005	NSS	30	87	30	130	NSS	30	130

Suspended Solids

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0399-MAR19	mg/L	2	< 2	2	10	NV	90	110	NA		

Total Nitrogen

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen	SKA0172-MAR19	as N mg/L	0.5	<0.5	5	10	96	90	110	81	75	125
Total Kjeldahl Nitrogen	SKA0182-MAR19	as N mg/L	0.5	<0.5	1	10	97	90	110	93	75	125

QC SUMMARY

Volatile Organics

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
1,1,2,2-Tetrachloroethane	GCM0306-MAR19	mg/L	0.0005	<0.0005	ND	30	97	60	130	92	50	140
1,2-Dichlorobenzene	GCM0306-MAR19	mg/L	0.0005	<0.0005	ND	30	99	60	130	93	50	140
1,4-Dichlorobenzene	GCM0306-MAR19	mg/L	0.0005	<0.0005	ND	30	98	60	130	92	50	140
Benzene	GCM0306-MAR19	mg/L	0.0005	<0.0005	ND	30	98	60	130	98	50	140
Chloroform	GCM0306-MAR19	mg/L	0.0005	<0.0005	ND	30	97	60	130	97	50	140
cis-1,2-Dichloroethene	GCM0306-MAR19	mg/L	0.0005	<0.0005	ND	30	95	60	130	95	50	140
Ethylbenzene	GCM0306-MAR19	mg/L	0.0005	<0.0005	ND	30	99	60	130	97	50	140
m-p-xylene	GCM0306-MAR19	mg/L	0.0005	<0.0005	ND	30	98	60	130	97	50	140
Methylene Chloride	GCM0306-MAR19	mg/L	0.0005	<0.0005	ND	30	95	60	130	94	50	140
o-xylene	GCM0306-MAR19	mg/L	0.0005	<0.0005	ND	30	100	60	130	97	50	140
Tetrachloroethylene (perchloroethylene)	GCM0306-MAR19	mg/L	0.0005	<0.0005	ND	30	96	60	130	93	50	140
Toluene	GCM0306-MAR19	mg/L	0.0005	<0.0005	ND	30	95	60	130	96	50	140
trans-1,3-Dichloropropene	GCM0306-MAR19	mg/L	0.0005	<0.0005	ND	30	96	60	130	95	50	140
Trichloroethylene	GCM0306-MAR19	mg/L	0.0005	<0.0005	ND	30	93	60	130	93	50	140

QC SUMMARY

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

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

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

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

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

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

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

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

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

LEGEND

FOOTNOTES

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

Samples analysed as received. Solid samples expressed on a dry weight basis. "Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act" published by the Ministry and dated March 9, 2004 as amended.

-- End of Analytical Report --

SGS Canada Inc.
P.O. Box 4300 - 185 Consession Street
Lakefield, Ontario, - K0L 2H0
Phone: (705) 652 2000 FAX: (705) 652 6365

SIR Issued Date: **21-Mar-2019**
Date Received: **21-Mar-2019**
Received By:

Soil Engineers Ltd.
Attn: Carly Preston
90 West Beaver Creek, Richmond Hill, ON
Canada
Phone: 416-754-8515

SGS Report: **CA14603-MAR19**
Project Number:
Reference: **1811-W006 2157 Lakeshor**
Version: **V 1.0**

SAMPLE INTEGRITY REPORT

Sample Integrity of Submission
The following have been identified as Sample Integrity Violations Related to SGS Canada Report: CA14603-MAR19
The report was found to contain 3 ISSUES

GENERAL INTEGRITY VIOLATIONS

Bottles / Samples received but not listed on the CoC
rec'd 20 bottles in total CofC says 18 marked the rest as extra

SAMPLE SPECIFIC INTEGRITY VIOLATIONS

SEDIMENT LOG

SGS Sample ID	**CA14603-MAR19-**
Date / Time Sampled	**21-Mar-2019 10:0**
Client Sample ID	**BH/MW3**

Groundwater Samples contain visible sediment / particulate

SGS Sample ID	**CA14603-MAR19-**
Date / Time Sampled	**21-Mar-2019 10:0**
Client Sample ID	**BH/MW3 Diss**

Groundwater Samples contain visible sediment / particulate

COMMENTS

Request for Laboratory Services and CHAIN OF CUSTODY

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

No: 006298
Page 1 of 1

Laboratory Information Section - Lab use only

Received By: LEYLAND
Received Date (mm/dd/yyyy): 03/21/19 (mm\dd\yy)
Received Time: ___ : ___
Received By (signature):
Custody Seal Present: ☑
Custody Seal Intact: ☑
Cooling Agent Present: ☑
Temperature Upon Receipt (°C): 5°C/6°C/4°C 2x3
CA14603-Mar19
LAB LIMS #:

REPORT INFORMATION

Company: Carly Preston
Contact: Soil Engineers Ltd.
Address: 90 West Beaver Creek Rd, Richmond Hill
Phone: (647) 223-1743
Email: Carly.Preston@soilengineers ltd.com

INVOICE INFORMATION

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

PROJECT INFORMATION

Quotation #:
P.O. #:
Project #: 1811-W006
Site Location/ID: 2157 Lakeshore Blvd W, Toronto

TURNAROUND TIME (TAT) REQUIRED

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

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

REGULATIONS

Regulation 153/04:
☐ Table 1 ☐ R/P/I
☐ Table 2 ☐ I/C/C
☐ Table 3 ☐ A/O
☐ Table ____
Soil Texture: ☐ Coarse ☐ Medium ☐ Fine

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

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

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

RECORD OF SITE CONDITION (RSC) ☐ YES ☐ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	Field Filtered (Y/N)	Metals & Inorganics	PAH ☐ ABN ☐ SVOC(all) ☐	PCB Total ☐ Aroclor ☐	PHC F1-F4 ☐ VOC ☐ BTEX ☐ BTEX/F1 ☐ F2-F4 ☐	VOC ☐ BTEX ☐ THM ☐	Pesticides OC ☐ OP ☐	TCLP M&I ☐ VOC ☐ PCB ☐ B(a)P ☐ ABN ☐ Ignit. ☐	Water Pkg Gen. ☐ Ext. ☐	Sewer Use: Storm + San. Toronto	Dissolved Metals					COMMENTS:
1	BH/MW 3	3/21/19	10am	17	GW	N									✓	✓					
2	BH/MW 3	3/21/19	10am	1	GW	Y															
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					

Observations/Comments/Special Instructions

Sampled By (NAME): CARLY PRESTON
Signature: Carly Preston
Date: 03/21/19 (mm/dd/yy)

Relinquished by (NAME):
Signature:
Date: __/__/__ (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

Revision #: 1.1
Date of Issue: 04 April, 2018