Preliminary Hydrogeological Investigation
5800 Yonge St.
Toronto, Ontario

Prepared For:

Life Construction Inc.

Project #: 18-733-100
Date: Mar 27th, 2019

DS CONSULTANTS LTD.
6221 Highway 7, Unit 16
Vaughan, Ontario, L4H 0K8
Telephone: (905) 264-9393
www.dsconsultants.ca

18-733-100 **March 27th, 2019**

Hamid Ghadaki
Life Construction Inc.
3985 Highway 7, Suite 202
Markham, ON
L3R 2A2

Via email: hamid@timesgroupcorp.com

RE: Preliminary Hydrogeological Assessment – 5800 Yonge St., Toronto, ON

DS Consultants Limited (DS) was retained by Life Construction Inc. to complete a preliminary hydrogeological investigation for the proposed development at 5800 Yonge St., Toronto (Site). The Site is located on the west side of Yonge St., south of Drewry Ave. The Site is comprised of approximately 32,766 m^2 parcel of land which is currently occupied by a vacant building (formerly Toronto Hydro), a paved parking area and a park. The proposed development will consist of mixed residential and commercial developments with four (4) multi-storey buildings. It is understood that there will be two (2) phases of construction. Phase 1 will consist of the development located on the west side and Phase 2 will consist of the development on the east side of the Site. Each phase of development will have five (5) levels of underground parking (P5). The finished floor elevations of the proposed developments were not known to DS at the time of writing this report and are estimated to extend seventeen (17) meters below ground surface (mbgs). This preliminary hydrogeological assessment includes an overview of the existing geological and hydrogeological conditions at the Site and the surrounding area, an assessment of the hydrogeological constraints, impacts of the proposed development on the local groundwater and provides a preliminary estimation of construction dewatering and permanent drainage requirements during the proposed development phase. This investigation is based on monitoring wells installed by DS in support of the geotechnical, environmental and hydrogeological investigations at the Site.

If needed, the results of this investigation can be used in support of an application for a Category 3 Permit to Take Water (PTTW) or an Environmental Activity Sector Registry (EASR) for construction dewatering from the Ministry of the Environment Conservation and Parks (MECP).

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

1. Based on the MECP water well records search, there are records of thirty (30) water wells within 500 m of the Site (Fig. 1). All wells were noted as test hole, monitoring well, not in use or unknown. The study area is fully serviced with municipal water supply. It is not expected that there are any groundwater users within a radius of 500 meters of the Site.
2. A total of ten (10) boreholes were drilled by DS as part of the geotechnical, environmental and hydrogeological investigations. The boreholes were advanced to depths ranging from

6.5 to 21.5 meters below ground surface (mbgs) (Elev. 169.26 to 184.32 masl). Eight (8) boreholes (BH18-1 to BH18-7, BH18-10) were converted to monitoring wells (MWs) at the Site to allow for groundwater level monitoring, hydraulic conductivity testing, and assess groundwater quality. Six (6) shallow monitoring wells were screened into the clayey silt till and clayey silt units, ranging in depths of 6.1 to 6.5 (184.0 to 184.4 masl), and two (2) deep wells were screened in the silt and silty sand units (MW18-2 and MW18-6) to depths of 18.5 and 21.5 mbgs (Elev. 171.9 and 169.5 masl), respectively.

3. The overburden geology at the site and study area is dominated by clayey silt till, silty sand and silt. Bedrock is estimated at an elevation of 40 masl which is approximately 150 m below the ground surface.

4. Groundwater levels were measured on February 4th, 7th and 22nd, 2019 in all accessible monitoring wells by DS. Perched groundwater was found in monitoring wells ranging from 0.55 to 3.5 mbgs (Elev. 187.6-190.0 masl) in the clayey silt till unit, representing the groundwater elevation at the Site. No groundwater was present in the deeper lithological units.

5. Hydraulic conductivity testing was completed at all monitoring wells on February 7th, 2019. All shallow wells (MW18-1, MW18-3 to MW18-5, MW18-7, and MW18-10) were screened into the clayey silt till/ clayey silt units and the deep wells (MW18-2 and MW18-6) were screened into silty sand and sand units, respectively. The values of calculated hydraulic conductivity (k) ranges from 6.48×10^{-7} m/s to 1.13×10^{-6} in the silt and silty sand units, and ranges from 3.74×10^{-9} to 5.23×10^{-7} m/s in the clayey silt till unit.

6. The preliminary estimated dewatering rate for an unsealed excavation method for Phase 1 (west) and Phase 2 (east) is approximately 318,000 L/day (318 m^3/day) and 265,000 L/day (265 m^3/day), respectively. These values include a safety factor of x2 and accounts for storm water that may accumulate as result of a 10 mm precipitation event in 24 hrs.

7. The preliminary estimated value is above the MECP pumping limit of 50,000 L/day, as such, an EASR application is required to be submitted to the MECP for short-term dewatering. In addition, there is a need to obtain a temporary discharge permit from the City of Toronto in addition to the permanent drainage agreement at a later stage.

8. Following construction of underground parking garages, long-term groundwater flow to the underdrain system for the buildings will be a function of the upward flux and from precipitation along the foundation wall. Based on current design, depth to water and flow rates, the estimated permanent theoretical flow is approximately 5,000 L/day (5 m^3/day) under each of the two (2) phases. The drainage control system around and beneath the buildings should be designed with enough capacity to handle the expected permanent volume. This value is recommended to be verified once the underground construction is completed and access is provided to DS to assess actual flow rates at the sumps.

9. One (1) unfiltered groundwater sample was collected from monitoring well MW18-10 on March 11th, 2019. Groundwater quality analysis indicates that total manganese and total Polycyclic Aromatic Hydrocarbons (PAHs) exceeded Toronto Region Storm Sewer Use By-Law criteria. There were no exceedances reported under Toronto's Sanitary Sewer Use By-Law criteria. Therefore, groundwater

at the Site is not suitable for discharge into the City's storm sewers without pre-treatment. Groundwater can be discharged to the sanitary sewer system with no treatment. A discharge permit will be required from the City if private water is to be discharged to the sewer system.

10. There are structures and utilities within the predicted radius of influence when considering an unsealed excavation. Since the proposed building is anticipated to extend into the dry silty sand and silt units, settlement is unlikely. However, if groundwater is present, settlement due to the loss of fines may occur within the predicted zone of influence of about 87.8 m and 79.8 m from the center of excavation for Phase 1 and Phase 2, respectively.
11. In conformance with Regulation 903 of the Ontario Water Resources Act, the decommissioning of any dewatering system and monitoring wells should be carried out by a licensed contractor under the supervision of a licensed water well technician.

Should you have any questions regarding these findings, please do not hesitate to contact the undersigned.

DS Consultants Ltd.

Prepared By:

Dorothy Garda, M.Sc.
Junior Hydrogeologist

Reviewed By:

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

Table of Contents

FIGURES

APPENDICES

1. INTRODUCTION

DS Consultants Limited (DS) was retained by Life Construction Inc. to complete a preliminary hydrogeological investigation for the proposed development at 5800 Yonge St., Toronto (Site). The Site is approximately 32,766 m^2 and is currently occupied by a vacant building (formerly Toronto Hydro Lands), paved parking area and a park. The Site is located on the west side of Yonge St., south of Drewry Ave. The Site location is shown on **Figure 1.** The proposed development will consist of two (2) development phases (east and west) with four (4) multi-storey buildings with five (5) levels of underground parking (P5). The finished floor elevations of the proposed development were not known to DS at the time of writing this report, they are estimated to extend seventeen (17) meters below ground surface (mbgs). This hydrogeological investigation includes an overview of the existing geological and hydrogeological conditions at the Site and the surrounding area, an assessment of the hydrogeological constraints, impacts of the proposed development on the local groundwater and provides an estimation of construction dewatering and permanent drainage requirements during the proposed development phase. This investigation is based on monitoring wells installed by DS in support of the geotechnical, environmental and hydrogeological investigations at the Site.

If needed, the results of this investigation can be used in support of an application for a Category 3 Permit to Take Water (PTTW) or an Environmental Activity Sector Registry (EASR) for construction dewatering from the Ministry of the Environment Conservation and Parks (MECP).

1.1 Purpose

The purpose of this investigation was to review and determine the need for dewatering, estimate dewatering rates, assess groundwater quality, and determine the need for a Permit to Take Water (PTTW) or an Environmental Activity Sector Registry (EASR) from the Ministry of Environment and Conservation and Parks (MECP). Potential impacts related to construction dewatering and associated monitoring/mitigation measures were also to be investigated.

1.2 Scope of Work

The scope of work for this investigation included:

(i) Site visits;

(ii) Collecting and interpreting available reports and data including the MECP Water Well Records (WWR), geotechnical, hydrogeological and environmental studies completed at the Site;

(iii) In-situ hydraulic conductivity testing of existing monitoring wells;

(iv) Estimation of temporary groundwater flow rate during the construction;

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

(vi) Assessing groundwater quantity and quality to evaluate discharge options; and,

(vii) Data analyses and report preparation.

2. PHYSICAL SETTING

A total of ten (10) boreholes were drilled by DS as part of the geotechnical, environmental and hydrogeological investigations (**Figure 4**). Boreholes were advanced from January 4-10, 2019 to depths of 6.5 to 21.5 meters below ground surface (mbgs) (Elev. 169.3 to 184.3 masl). Eight (8) boreholes (BH18-1 to BH18-7 and BH18-10) were converted to monitoring wells (MWs) at the Site to allow for groundwater level monitoring, hydraulic conductivity testing, and assess groundwater quality. Six (6) shallow monitoring wells were screened into the clayey silt till and clayey silt units, ranging in depths of 6.1 to 6.5 (184.0 to 184.4 masl), and two (2) deep wells were screened in the sand and silt units (MW18-2 and MW18-6) to depths of 18.5 and 21.5 mbgs (Elev. 171.9 and 169.5 masl), respectively.

3. PHYSICAL SETTING

Available topographic maps, environmental, geotechnical and hydrogeological reports were used to develop an understanding of the physical setting of the study area. The borehole logs from the Site as well as the Ministry of the Environment, Conservation and Parks Water Wells Records (MECP WWRs) were used to interpret the geological and hydrogeological conditions at the Site.

3.1 Physiography and Drainage

The topography at the Site is relatively flat with a surface elevation of approximately 190-191 metres above sea level (masl). The topography within the study area generally slopes south-east towards the Newtonbrook creek which is a tributary of the east branch of the Don River, and south-west to the Westminster creek which is a tributary of the west branch of the Don River. Drainage is generally controlled by streams, artificial channels and underground utilities. The Newtonbrook creek and Westminster creeks are located approximately 2.5 km and 3 km of the Site, respectively. Drainage at the Site is shown on the groundwater flow map **(Figure 3).**

3.2 Geology

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

3.2.1 Quaternary Geology

The study area (500 m radius) lies within the Peel Plain physiographic region of Southern Ontario and is characterized by the Bevelled Till Plain physiographic landform (as per OGS Earth). The surficial geology in the immediate vicinity of the site has been mapped as Halton Till (Ontario-Erie lobe): predominantly silt to clayey silt matrix, high in matrix carbonate content and clast poor. The surficial geology map is shown in **Figure 2.**

3.2.2 Bedrock Geology

Available published mapping shows that bedrock in the area is predominantly shale, limestone, dolostone and siltstone of the Georgian Bay Formation (MNDM Map 2544 Bedrock Geology of Ontario). Shale bedrock was not encountered at the time of this subsurface investigation. Bedrock is estimated at an elevation of 40 masl (as per OGS Earth) which is approximately 150 m below the ground surface.

3.2.3 Site Geology

On-site subsurface soils were interpreted from the boreholes/monitoring wells (BHs/MWs) drilled by DS. The locations of the BHs/MWs are shown on **Figure 4** and detailed subsurface conditions are presented on the in the borehole Logs in **Appendix A**. The subsurface conditions in the boreholes are summarized in the following paragraphs, and the geologic cross sections (A-A') and (B-B') are presented in **Figure 5A** and **Figure 5B.**

Pavement Structure:

Boreholes BH18-1 through BH18-4 and BH18-7 were drilled on paved surface and encountered a pavement structure consisting of 100mm to 125mm of asphaltic concrete overlying 200 to 360mm of granular base. 75 to 450mm thick topsoil was encountered in Boreholes BH18-5, BH18-6, BH18-8 to BH18-10

Fill:

Fill material was found in all boreholes extending to depths ranging from 0.9 to 3.1m below ground surface. The fill consisted of silty sand, sand and gravel and clayey silt and was in a firm to stiff consistency, with measured SPT 'N' values ranging from 4 to 10 blows per 300 mm penetration. Traces of organics and topsoil were also observed in fill material.

Cohesive Deposits (Clayey Silt Till/Silty Till/Clayey Silt):

Cohesive deposits of clayey silt till and clayey silt to clayey silt were encountered in all boreholes and extended to depths ranging from 5.7m to 9.4m below ground surface. Another layer of clayey silt was found in BH18-5 at a depth of 17.9m and extended to a depth of 19.5m below ground surface. Boreholes BH18-4 and BH18-7 were terminated in these deposits. Cohesive deposits were found to have very stiff to hard consistency with, measured SPT 'N' values ranging from 16 to more than 50 blows per 300 mm of penetration.

Cohesionless deposits (Sand, Silt, Sand and Gravel, Sandy Silt to Silty Sand): Below the cohesive deposits in Boreholes BH18-1, BH18-2, BH18-5, BH18-6 and BH18-10, cohesionless deposits of sand, silt, sand and gravel and sandy silt to silty sand were encountered and extended to the maximum explored depths in most of the boreholes. Boreholes BH18-1, BH18-5, BH18-6 and BH18-10 were terminated in cohesionless deposits. Cohesionless deposits were generally found in a very dense state with occasional dense layers with, measured SPT 'N' values ranging from 41 to more than 50 blows per 300 mm of penetration. Sand and gravel in Boreholes BH18-5 and BH18-6 were found wet at depths 16.7m and 13.4m, respectively.

Sandy Silt Till: These deposits were encountered at various depths in Boreholes BH18-2, BH18-3, BH18-6, BH18-8 and BH18-9. These deposits were found generally in a very dense state, with occasional dense layers with, measured SPT 'N' values ranging from 36 to more than 50 blows per 300 mm of penetration.

3.3 Hydrogeology

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

3.3.1 Local Groundwater Use

As part of the hydrogeological study, DS completed a search of the Ministry of the Environment, Conservation and Parks (MECP) Water Well Record (WWR) database. Based on the MECP water well records search, there are thirty (30) water wells within 500 meters of the Site (**Appendix D**). All wells were noted as test hole, monitoring well, not in use or unknown. **Figure 1** shows the MECP water well location plan. The study area is fully serviced with municipal water and therefore, no groundwater users are expected in the area.

3.3.2 Groundwater Conditions

A total of ten (10) boreholes (BHs) and eight (8) monitoring wells (MWs) were used for the current groundwater assessment. Monitoring wells were installed in the clayey silt till, sand and silt units. Groundwater levels were measured on February 4th, 7th, and 22nd 2019 by DS. **Table 1** presents the groundwater levels in all monitoring wells. Groundwater was found in monitoring wells ranging from 0.55 to 3.6 mbgs (Elev. 187.6-190.0 masl) in the clayey silt till unit, representing the groundwater elevation at the Site. The groundwater flow direction within the study area is inferred to be south-east and south-west, towards the east and west branch of the Don River.

Table 1: Groundwater Levels in Monitoring Wells

					February 4th, 2019		February 7th, 2019		February 22nd, 2019	
Well ID	**Ground Elevation (masl)**	**Well Depth (mbgs)**	**Stick up (m)**	**Screened Interval (mbgs)**	**Depth to Water (mbgs)**	**Groundwater Elevation (masl)**	**Depth to Water (mbgs)**	**Groundwater Elevation (masl)**	**Depth to Water (mbgs)**	**Groundwater Elevation (masl)**
MW18-1	190.5	6.1	n/a	3.1-6.1	2.2	188.3	2.4	188.1	1.9	188.6
MW18-2	190.4	18.5	n/a	15.5-18.5	dry		dry		dry	
MW18-3	190.8	6.4	n/a	3.4-6.4	1.8	189.1	1.8	189.0	inaccessible	
MW18-4	190.9	6.4	n/a	3.4-6.4	1.4	189.5	1.1	189.8	inaccessible	
MW18-5	191.1	6.3	0.93	3.3-6.3	1.4	189.7	1.1	190.0	2.3	187.9
MW18-6	190.9	21.5	n/a	18.5-21.5	dry		dry		dry	
MW18-7	191.1	6.2	n/a	3.2-6.2	3.5	187.6	1.5	189.6	3.6	187.6
MW18-10	190.5	6.5	0.60	3.5-6.5	0.77	189.7	0.55	190.0	1.4	188.4

3.3.3 Hydraulic Conductivity

Single Well Response Tests (SWRTs) were completed by DS in all monitoring wells on February 4th, 2019 to estimate hydraulic conductivity (k) for the representative geological units in which the wells were completed. SWRTs were completed by performing a rising head test (slug test) in the shallow wells with the use of one-liter bailer to 'instantaneously' remove water from the well at the wells screened into the clayey silt till and clayey silt units. A falling head test was completed at the deep dry wells screened into the underlying silty sand and sand units (MW18-2 and MW18-6) by pouring 2L of ozonated deionized water down the well. A data logger was placed at the bottom of the wells to monitor the recovery and drop in hydraulic head. Hydraulic conductivity (k) values were calculated using the Hvorslev method. **Table 2** presents a summary of the Hydraulic Conductivity (k) results for the representative geological units. The

values of calculated hydraulic conductivity (k) ranges from 6.48×10^{-7} m/s 1.13×10^{-6} in the silt and silty sand units, and ranges from 3.74×10^{-9} to 5.23×10^{-7} m/s in the clayey silt till and clayey silt units, which is consistent with typical k-values 10^{-1} m/s to 10^{-7} m/s for sand/silt, and 10^{-6} m/s to 10^{-12} m/s for clayey silt till/clayey silt. The hydraulic testing results are provided in **Appendix B.**

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

Monitoring Well ID	Screened Interval (mbgs)	Screened Formation	In-situ K- Value (m/s)	Geomean (m/s)
MW18- 1	3.1-6.1	Clayey Silt Till/Clayey silt	5.65×10^{-7}	1.31×10^{-7}
MW18- 2	15.5-18.5	Silt	1.13×10^{-6}	
MW18- 3	3.4-6.4	Sandy Silt Till	4.56×10^{-8}	
MW18- 4	3.4-6.4	Clayey Silt Till	1.88×10^{-7}	
MW18- 5	3.3-6.3	Clayey Silt Till	7.56×10^{-8}	
MW18- 6	18.5-21.5	Silty Sand	6.48×10^{-7}	
MW18- 7	3.2-6.2	Clayey silt	3.74×10^{-9}	
MW18- 10	3.5-6.5	Clayey silt	8.81×10^{-8}	

3.3.4 Groundwater Quality

One (1) unfiltered groundwater sample was collected from monitoring well MW18-10 on March 11th, 2019. Groundwater samples were submitted to ALS Laboratory in Mississauga, Ontario for analysis. ALS Laboratory is a Canadian Association of Laboratory Accreditation Inc. (CALA) and Canadian Standard Association (CSA) certified**.** The reported results indicate that total manganese and total Polycyclic Aromatic Hydrocarbons (PAHs) exceeded Toronto's storm sewer criteria. There were no reported exceedances under Toronto's sanitary sewer criteria. **Table 3** presents a summary of exceeded parameters, and the certificate of analysis is provided in **Appendix C.**

Table 3: Parameters in Groundwater Exceeding the City of Toronto's By-Law Discharge Criteria

Parameter	Unit	Sanitary By-Law Criteria	Storm By-Law Criteria	MW 18-10 Concentration
PAHs- Total	µg/L	5	2	<u><3.5</u>
Manganese-Total	mg/L	5	0.05	<u>0.928</u>

Notes:

Criteria exceeding sanitary sewer criteria are **bold**

Criteria exceeding storm criteria are <u>underlined</u>

4.0 CONSTRUCTION DEWATERING

4.1 Estimation of Flow Rate- unsealed excavation method

For the dewatering calculations, five (5) levels of underground parking (P5) for each of the two (2) phases were considered, with an excavation depth of approximately 17 mbgs (Elev. 173.4 masl). Dewatering estimates for each phase were completed using approximated dimensions based on underground plans.

Excavation dimensions of 99 m long and 90 m wide for the phase 1 for the buildings located on the west side of the Site, and excavation dimensions of 99 m long and 65 m wide for the phase 2 for buildings located on the east side of the Site were considered for the dewatering calculation. The highest groundwater elevation (190.0 masl) was used in the calculations.

The estimated dewatering values are based on the highest k-value screened into the clayey silt till/clayey silt unit obtained from MW18-1 (5.65 x 10^{-7} m/s).

$$Q_R = K\,x\frac{H^2 - h^2}{0.733}\,x\,Log\,(R_0/r_e)$$

Where:

Parameters	Phase 1 (west)	Phase 2 (east)
K (m/s)	5.23 x 10^{-7}	
H (m)	20.5	
h (m)	4.6	
Dimensions (m)	99 x 90	99 x 65
r_e equivalent radius	53.2	42.3
r_o Radius Cone of Depression	87.8	79.8
Q (L/day)	**114,000**	**100,000**

R_e- Equivalent radius:

$$r_e = \left(\frac{(a\,x\,b)}{\pi}\right)^{0.5}$$

R_0 – Radius of the cone of depression:

$$R_0 = (r_e + 3000)(H - h)(k^{0.5})$$

4.2 Estimation of Flow Rate- Storm Water Consideration

Additional flow rate may be required from precipitation into the open excavation during construction. The estimated flow rate is based on an excavation dimensions for Phase 1 (west) and Phase 2 (east); about 99 meters long and 90 meters wide, and about 99 meters long and 65 meters wide, respectively, and in total 10 mm precipitation events in 24 hours. The total estimated dewatering that might be needed a as a result of precipitation events for Phase 1 and Phase 2 would be approximately **90,000 L/day (90 m^3/day)** and **65,000 L/day (65 m^3/day),** respectively.

4.3 Total Estimation of Flow Rate (Short-Term/ Temporary Discharge)

Perched groundwater was observed in the upper clayey silt till and clayey silt units, where the maximum well depths extended to 6.5 mbgs (Elev. 184 masl). However, no groundwater was observed in the underly silty sand and silt units at MW18-2 and MW18-6, which extended to depths of 18.5 and 21.5 mbgs (Elev. 171.9 and 169.4 masl), respectively. A perched groundwater table was likely encountered during the current investigation where the accumulation of groundwater that is above the deeper water table in the

unsaturated zone occurs. The groundwater is usually trapped overlying an impermeable soil layer, such as clay, and forms a lens of saturated material in the unsaturated zone. The perched groundwater table often runs dry after being excavated due to lack of continuity and recharge. Groundwater has been previously been reported in the area to extend to approximately 15.0 to 36.8 mbgs in the underlying silty sand and sandy silt till units (Golder, 2018). Furthermore, during the current investigation, wet sand seams below the clayey silt till unit were identified at BH18-5 and BH18-6 ranging in depths from 13.4 to 16.7 mbgs, suggesting the presence of groundwater. However, since groundwater was not identified in either of the two (2) deep wells (MW18-2 and MW18-6), the lower groundwater table in the unsaturated zone is inferred to be below the deepest well depth of 21.5 mbgs (Elev. 169.5 masl). A bi-weekly groundwater monitoring program for the period of three (3) months is being completed to verify seasonal groundwater fluctuations.

Since the proposed excavation depth is below the upper groundwater table, and no water was detected in the underlying silty sand unit, initial dewatering primarily from the upper water bearing unit will be required. Therefore, the highest K-value from the clayey silt till unit was considered for the dewatering calculation. Considering the unsealed excavation method, the estimated steady-state flow rate to the development during Phase 1 will be approximately **228,000 L/day (228 m^3/day)** with a 2x safety factor**.** The estimated steady-state flow rate to the development during Phase 2 would be approximately **200,000 L/day (200 m^3/day)** with a 2x safety factor. A high safety factor of x2 has been added to both development phases to account for the variability in hydraulic conductivity that may be encountered. The additional flow rate that may be needed as a result of precipitation events would be approximately **90,000 L/day (90 m^3/day)** for Phase 1 and **65,000 L/day (65 m^3/day)** for the development at Phase 2. Therefore, the recommended pumping rate for construction dewatering for the developments during Phase 1 and Phase 2 is approximately **318,000 L/day (318 m^3/day)** and **265,000 L/day (265 m^3/day),** respectively.

4.4 Permanent Drainage (Long-term Discharge)

Following construction of the underground structure, long-term groundwater flow to the underfloor drainage system for the building will be a function of the upward flux and from drainage along the foundation wall. Under steady state flow conditions, groundwater follow to the underlain system will be controlled by horizontal gradient within the sand and silt soils. Therefore, the hydraulic conductivity in the silt unit from MW18-2 was considered for the following calculation. The Darcy flow equation was used to estimate permanent drainage to the building as follows:

$$\boldsymbol{Q = K\ x\ i\ x\ A}$$

Where,

Parameter	Phase 1 (west)	Phase 2 (east)
Hydraulic Conductivity (K) (m/d)	0.10	
Hydraulic Gradient (i)	0.004	
Area (A)	8,910 m^2	6,435 m^2

Based on current design, depth to water and flow rates, the estimated permanent theoretical flow is approximately **5,000 L/day (5 m^3/day)** for the development during Phase 1 and Phase 2 Construction. The drainage control system around and beneath the buildings should be designed with enough capacity to handle the expected permanent volume. This value is recommended to be verified once the underground construction is completed and access is provided to DS to assess actual flow rates at the sumps.

4.5 Permit Requirements

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

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

Since the expected design dewatering rate for the unsealed excavations for the developments for Phase 1 and Phase 2 are between 50,000 and 400,000 L/day, an EASR application is required to be submitted to the MECP for short-term dewatering. Based on current groundwater conditions, permanent groundwater flow or permanent drainage is expected to be less than the water taking limit of 50,000 L/day, therefore, a PTTW is not required on a permanent basis.

4.5.2 Discharge Permits (Construction Dewatering and Permanent Drainage)

A discharge permit will be required from Toronto Region if private water is to be sent to the sewer system.

5.0 POTENTIAL IMPACTS

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

5.1 Local Groundwater Use

The area is fully serviced by a municipal water supply. Since it is not expected to have any use of groundwater as a source of drinking water within a radius of 500 meters from the Site and there will be no short-term or long-term predicted impacts to private water wells occurring from the proposed dewatering activities.

5.2 Point of Discharge and Groundwater Quality

A discharge plan will be required for the discharge of pumped groundwater from construction dewatering activities. The plan must identify the discharge location and ensure the discharge will not result in any adverse impacts by identifying the discharge measures to be installed and control measures to limit the suspended solids in discharged water.

Groundwater quality analysis indicates that total manganese and total PAHs exceeded Toronto Region's Storm Sewer Use By-Law criteria. Therefore, groundwater at the Site is not suitable for discharge into the City's storm sewers without treatment. The groundwater can be discharged to the sanitary sewer system without treatment. Discharge permits and agreements are required from the City of Toronto for short-term and long-term discharge.

5.3 Settlement Due to Dewatering Activities

There are structures and utilities within the predicted radiuses of influence (about 87.8 m and 79.8 m from the center of excavation) when considering an unsealed excavation. There is a possibility of inducing settlement to neighbouring buildings, utilities and underground structures when lowering water levels or depressurizing an aquifer. Since the proposed building is anticipated to extend in the dry sand and silt units, settlement is unlikely, However, if groundwater is present, settlement due to the loss of fines is may occur within the predicted zone of influence. Therefore, settlement monitoring and bi-weekly groundwater level monitoring program is recommended during construction. Settlement can be reduced with the use of cut off structures, (i.e. caisson shoring wall) along the perimeter of the Site in order to reduce the zone of influence as a result of dewatering.

5.4 Well Decommissioning

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

6.0 MONITORING AND MITIGATION

- Water quality should be monitored during and following construction dewatering on a biweekly basis for a period of three (3) months to monitor seasonal fluctuations, and to ensure that water quality meets the discharge criteria.
- Based on the dewatering assessment, an EASR application is required to be submitted to the MECP for short-term dewatering.
- Once a groundwater dewatering system is set up at the Site, daily and weekly monitoring is recommended by DS to assess the groundwater conditions such as water levels, measurement of discharge flow, discharge water quality and any adverse impacts because of dewatering such as settlement.
- DS recommends implementing a settlement monitoring program during dewatering activities to identify any potential settlement. Subject to a detailed assessment and construction program, monitoring of the settlement points should be carried out on a weekly basis for the first three (3) months after the commencement of dewatering and then biweekly thereafter.
- DS recommends discharging into the Sanitary Sewer, where no treatment is required.

7.0 LIMITATIONS

This report was prepared for the sole use of Life Construction Inc. to provide an assessment of the hydrogeological conditions on the property. The information presented in this report is based on information collected during the completion of the hydrogeological investigation by DS Consultants Ltd. DS Consultants Ltd. was required to use and rely upon various information sources produced by other parties. The information provides in this report reflects DS' judgment in light of the information available at the time of report preparation. This report may not be relied upon by any other person or entity without the written authorization of DS Consultants Ltd. The scope of services performed in the execution of this investigation may not be appropriate to satisfy the needs of other users, and any use or reuse of this documents or findings, conclusions and recommendations represented herein, is at the sole risk of said users. The conclusions drawn from the Hydrogeological report were based on information at selected observation and sampling locations. Different conditions between and beyond these locations may become apparent during future investigations or on-site work, which could not be detected or anticipated at the time of this investigation. DS Consultants Ltd. cannot be held responsible for hydrogeological conditions at the site that was not apparent from the available information.

Should you have any questions regarding these findings, please do not hesitate to contact the undersigned.

DS Consultants Ltd.

Prepared By:

Dorothy Garda, M.Sc.
Junior Hydrogeologist

Reviewed By:

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

8.0 CONSULTANTS QUALIFICATIONS

Martin Gedeon, M.Sc., P.Geo., is a Professional Geoscientist (P.Geo.) with over 23 years of experience as an environmental/hydrogeological consultant in the areas of groundwater and soil monitoring, environmental Site assessments, environmental due diligence, and remediation. Martin has significant experience in physical and contaminant hydrogeology across Canada and overseas and has provided hydrogeological/environmental technical support on various projects. Martin has prepared hundreds of hydrogeological reports in support of permit applications for private sector development application, municipal dewatering operations and provincial infrastructure projects across the province.

Dorothy Garda, M.Sc., has 1 year of environmental consulting experience. Dorothy has experience with conducting hydrogeological investigations in the Greater Toronto Area (GTA) for development, and has been involved with project coordination, field assessments, data interpretation and reporting. Dorothy has assisted with PTTW, EASRs and Discharge Permit applications in support of construction dewatering from the MECP and discharge permitting.

9.0 REFERENCES

Chapman, L.J., and D.F. Putnam; The Physiography of Southern Ontario, Third Edition, Ontario Geological Survey Special Volume 2; 1984, & 2007.

Freeze, R.A. and J.A. Cherry. “Groundwater”. Prentice-Hall, Inc. Englewood Cliffs, NJ. 1979.

Hydrogeology Investigation and Dewatering Assessment. Newtonbrook Development by Golder Associates, February 2018.

Ontario Regulation 153/04 made under the Environmental Protection Act, July 1, 2011.

The Toronto Region Sewers By-law.

Ontario Regulation 245/11- Environmental Activity and Sector Registry.

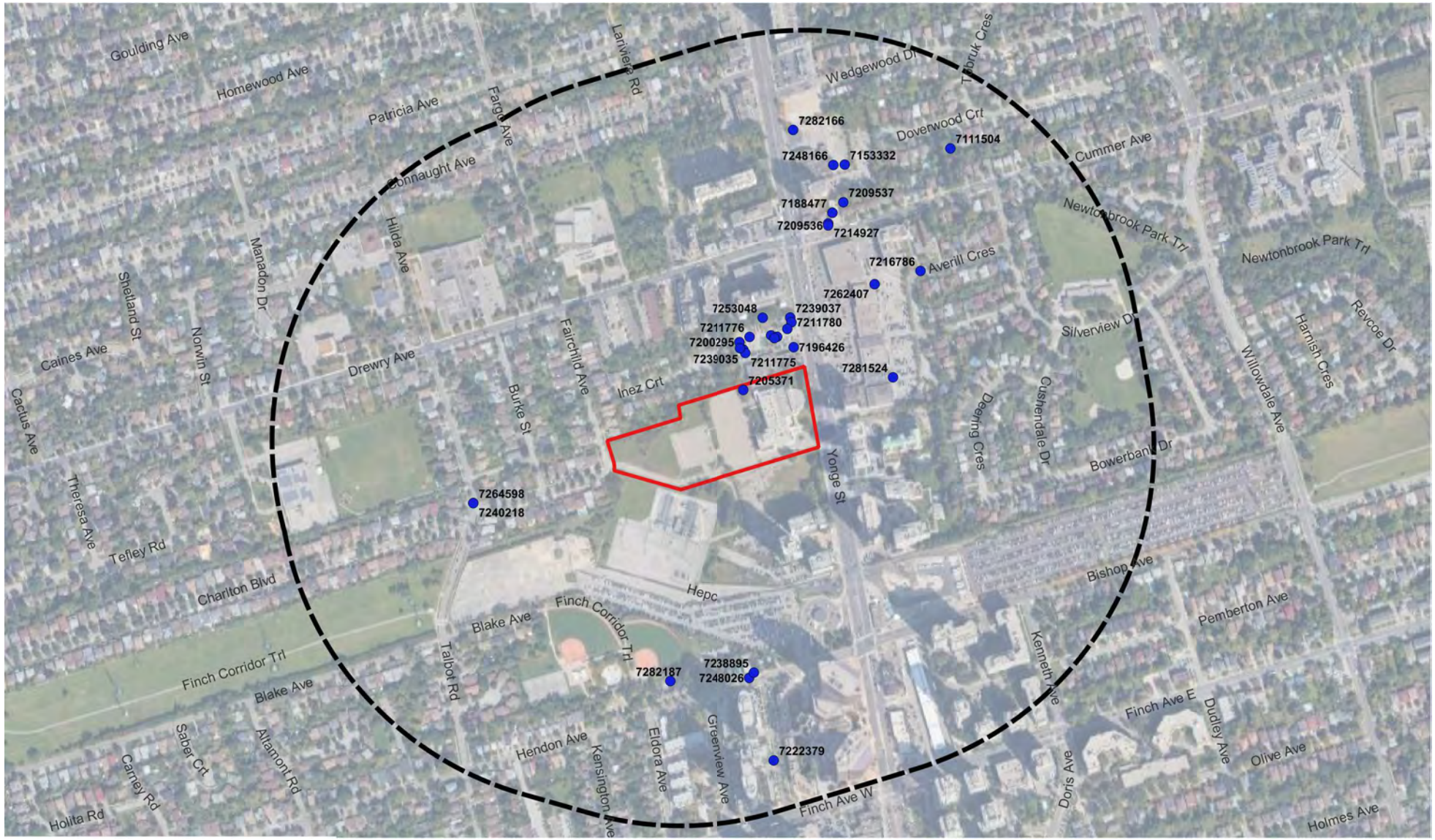
Powers, J. Patrick, P.E. (1992); Construction Dewatering: New Methods and Applications - Second Edition, New York: John Wiley & Sons.

Pat M. Cashman and Martin Preene; Groundwater Lowering in Construction- Second Edition, CRC Press.

Preliminary Geotechnical Investigation, 5800 Yonge Street, Toronto, Ontario by DS Consultants Ltd., February 2019.

Figures

J:\-GIS\18-733-30 5800 Yonge_Life Construction\1-QGIS\Hydrogeology\Figure 1 - Site Location and MECP Well Records.qgs



Legend

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

0 150 300 m

DS CONSULTANTS LTD.
6221 Highway 7, UNIT 16
Vaughan, Ontario L4H 0K8
Telephone: (905) 264-9393
www.dsconsultants.ca

Project: HYDROGEOLOGICAL INVESTIGATION
5800 Yonge Street, North York, ON

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

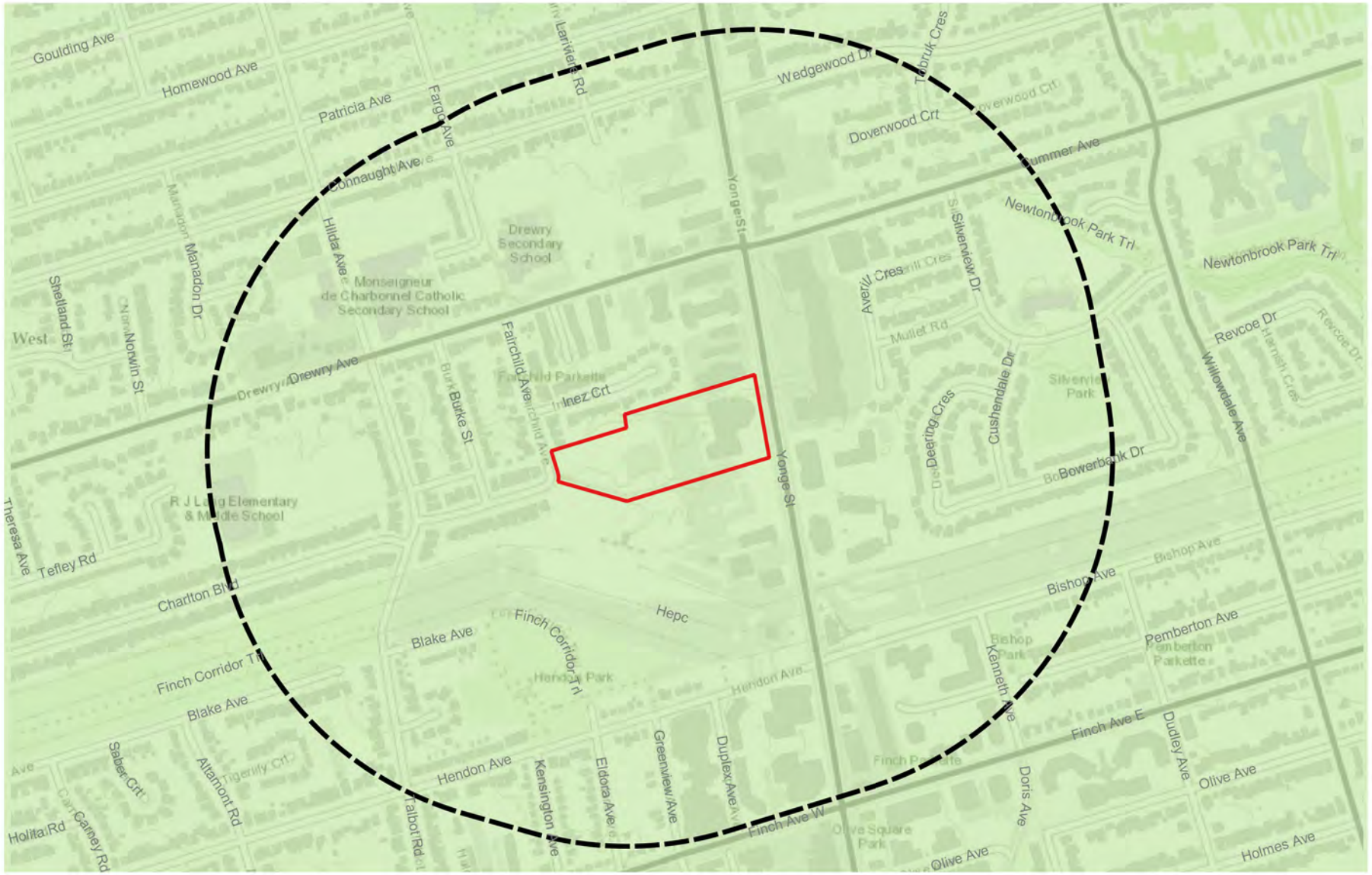
N

Client: LIFE CONSTRUCTION

Size:	Approved By:	Drawn By:	Date:
8.5 x 11	P.P	S.Y	February 2019
Rev: 0	Scale: As Shown	Project No.: 18-733-100	Figure No.: 1

Image/Map Source: *Google Satellite Image*

J:\-GIS\18-733-30 5800 Yonge_Life Construction\1-QGIS\Hydrogeology\Figure 2 - Surficial Geology Map.qgs



Legend

- Approx. Property Boundary
- 500m Buffer
- 5b - Till

0 150 300 m

DS CONSULTANTS LTD.
6221 Highway 7, UNIT 16
Vaughan, Ontario L4H 0K8
Telephone: (905) 264-9393
www.dsconsultants.ca

Project: HYDROGEOLOGICAL INVESTIGATION
5800 Yonge Street, North York, ON

Title: **SURFICIAL GEOLOGY MAP**

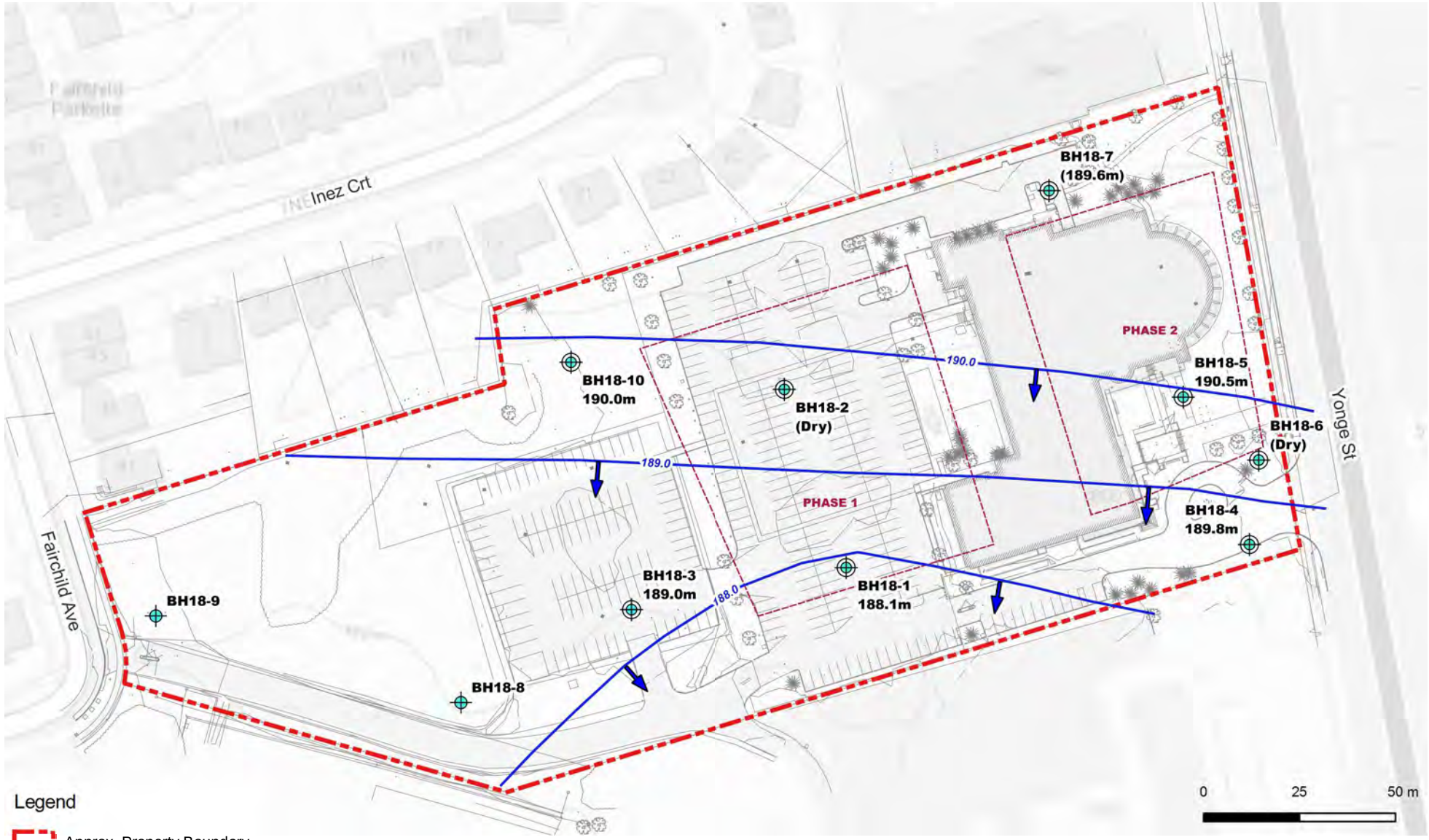
N

Client: LIFE CONSTRUCTION

Size:	Approved By:	Drawn By:	Date:
8.5 x 11	P.P	S.Y	January 2019
Rev: 0	Scale: As Shown	Project No.: 18-733-100	Figure No.: 2

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

J:\-GIS\18-733-30 5800 Yonge_Life Construction\1-QGIS\Hydrogeology\Figure 3 - GW Flow Map.qgs



Legend

- Approx. Property Boundary
- Borehole Location
- Monitoring Well Location
- Groundwater Flow Direction
- Groundwater Contour

Note: BH18-7 outlier value

DS CONSULTANTS LTD.
6221 Highway 7, UNIT 16
Vaughan, Ontario L4H 0K8
Telephone: (905) 264-9393
www.dsconsultants.ca

Project: HYDROGEOLOGICAL INVESTIGATION
5800 Yonge Street, North York, ON

Title: **GROUNDWATER FLOW MAP**

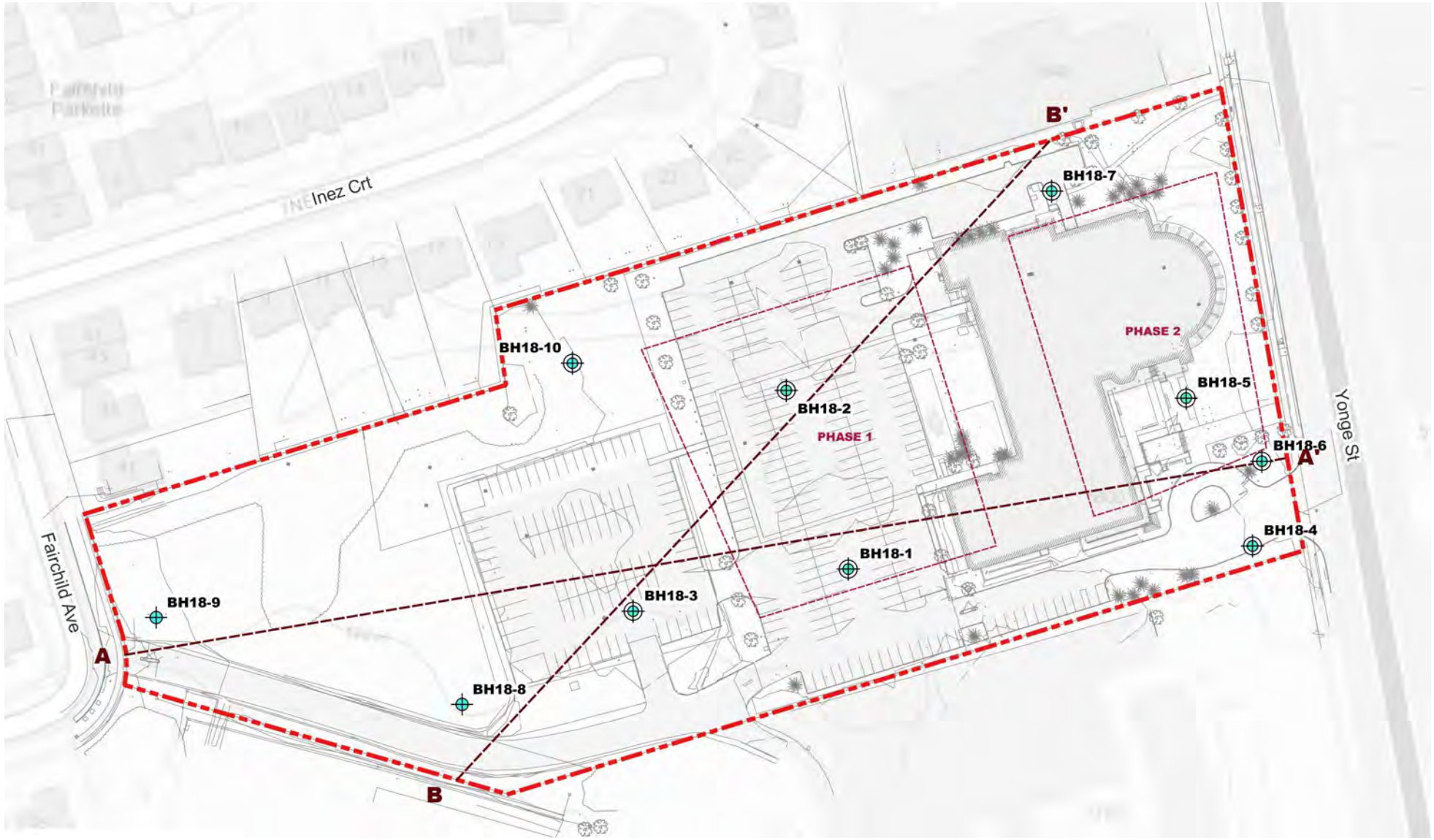
N

Client: LIFE CONSTRUCTION

Size:	Approved By:	Drawn By:	Date:
8.5 x 11	P.P	S.Y	February 2019
Rev: 0	Scale: As Shown	Project No.: 18-733-100	Figure No.: 3

Image/Map Source: *Survey CAD Drawing*

J:\-GIS\18-733-30 5800 Yonge_Life Construction\1-QGIS\Hydrogeology\Figure 4 - Borehole and Monitoring Well Locations.qgs



Legend

- Approx. Property Boundary
- Borehole Location
- Monitoring Well Location
- Cross Section Line

0 25 50 m

DS CONSULTANTS LTD.
6221 Highway 7, UNIT 16
Vaughan, Ontario L4H 0K8
Telephone: (905) 264-9393
www.dsconsultants.ca

Project: HYDROGEOLOGICAL INVESTIGATION
5800 Yonge Street, North York, ON

Title: **BOREHOLE AND MONITORING WELL LOCATIONS**

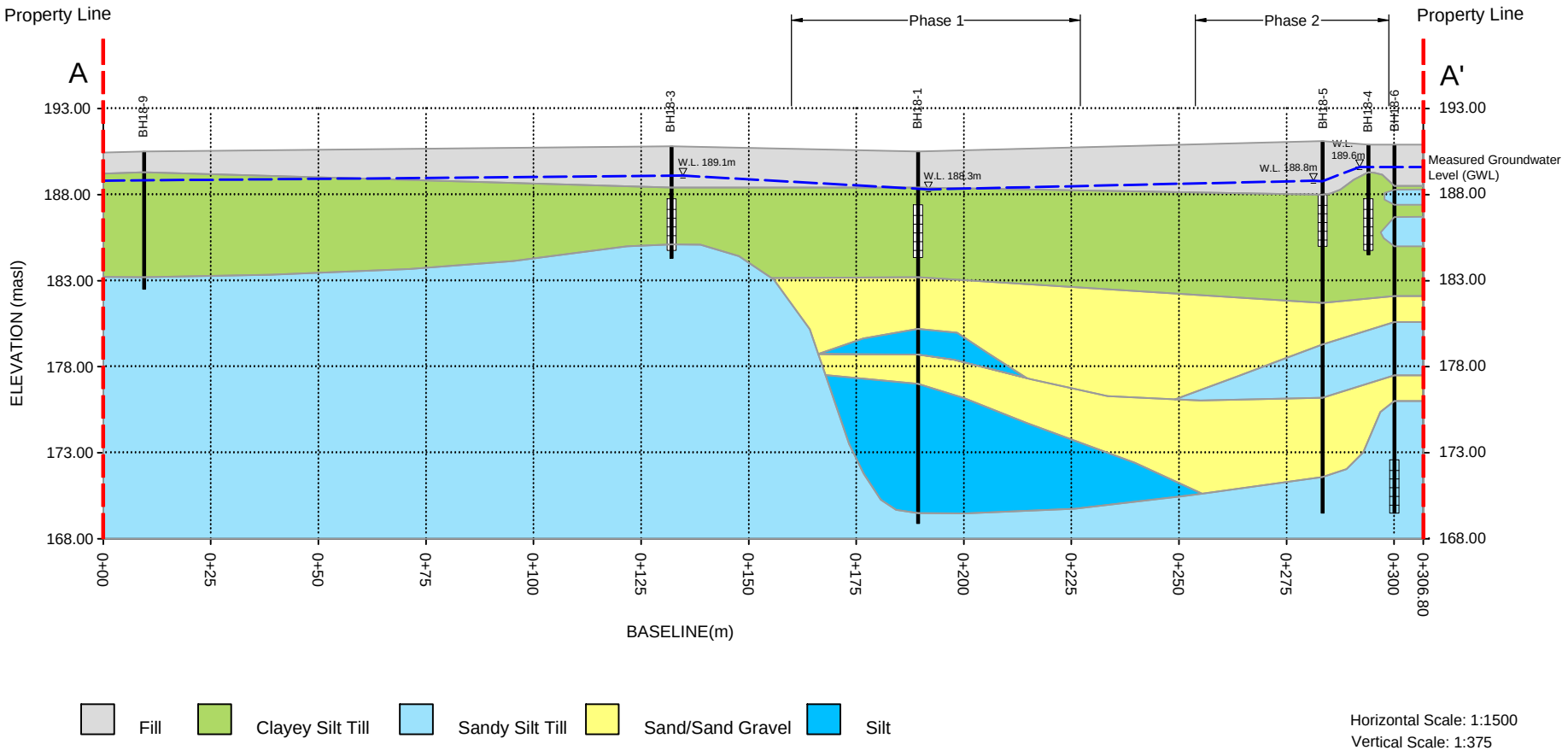
N

Client: LIFE CONSTRUCTION

Size:	Approved By:	Drawn By:	Date:
8.5 x 11	P.P	S.Y	February 2019
Rev: 0	Scale: As Shown	Project No.: 18-733-100	Figure No.: 4

Image/Map Source: *Survey CAD Drawing*

Path:j:\-gis\18-733-30 5800 yonge_life construction\7-misc\cad\geological cross sections - 5800 yonge.dwg



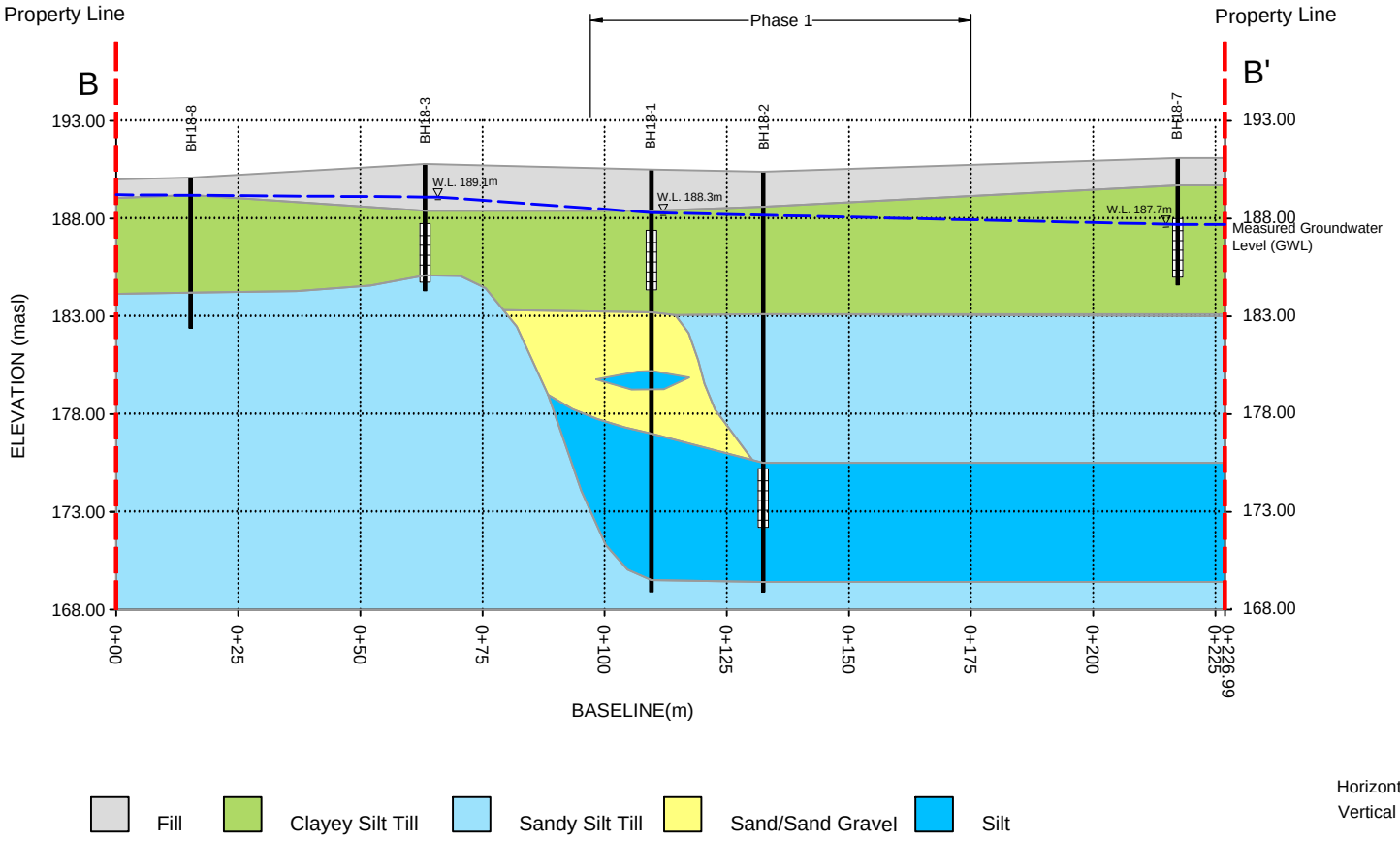
DS CONSULTANTS LTD.
6221 Highway 7, UNIT 16
Vaughan, Ontario L4H 0K8
Telephone: (905) 264-9393
www.dsconsultants.ca

Project: HYDROGEOLOGICAL INVESTIGATION
5800 Yonge Street, North York, ON

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

Client:	Size:	Approved By:	Drawn By:	Date:
LIFE CONSTRUCTION	8.5 x 11	P.P	S.Y	February 2019
	Rev.	Scale: As Shown	Project No: 18-733-100	Figure No. 5A

Path:j:\-gis\18-733-30 5800 yonge_life construction\7-misc\cad\geological cross sections - 5800 yonge.dwg



Well

Screen

DS CONSULTANTS LTD.
6221 Highway 7, UNIT 16
Vaughan, Ontario L4H 0K8
Telephone: (905) 264-9393
www.dsconsultants.ca

Project: HYDROGEOLOGICAL INVESTIGATION
5800 Yonge Street, North York, ON

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

Client:	Size:	Approved By:	Drawn By:	Date:
LIFE CONSTRUCTION	8.5 x 11	P.P	S.Y	February 2019
	Rev.	Scale: As Shown	Project No: 18-733-100	Figure No. 5B

Appendices

Appendix A: Borehole Logs

LOG OF BOREHOLE BH18-1

PROJECT: Geotechnical Investigation- 5800 Yonge Street
CLIENT: Life Construction
PROJECT LOCATION: Toronto, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 203mm
Date: Jan-07-2019

REF. NO.: 18-733-10
ENCL NO.: 2

(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS "N" 0.3 m	ELEVATION
190.5					
190.4 / 0.1	**ASPHALT:** 100 mm				
190.2 / 0.3	**GRANULAR BASE:** 200mm	1	SS	34	190
189.7 / 0.8	**FILL:** silty sand, trace gravel, some organics, wet, grey, dense	2	SS	13	
	FILL: clayey silt, trace sand, some organics, grey, moist, stiff	3	SS	13	
188.4 / 2.1	**CLAYEY SILT TILL:** some sand to sandy, trace gravel, trace cobble/boulders, brown, moist, very stiff to hard	4	SS	37	
		5	SS	38	187
186.1 / 4.4	**SILTY CLAY:** trace sand, grey, moist, very stiff to hard	6	SS	57	
		7	SS	27	184
183.2 / 7.3	**SAND:** trace silt, trace clay, brown, moist, very dense	8	SS	50/ 100mm	183
		9	SS	50/ 100mm	181
180.2 / 10.3	**SILT:** trace sand, trace clay, brown, moist, very dense	10	SS	50/ 100mm	180
178.7 / 11.8	**SAND AND GRAVEL:** trace to some clay, occassional cobble/boulder, brown to grey, moist, very dense	11	SS	50/ 75mm	178
177.0 / 13.5	**SILT:** trace sand, trace clay, brown, moist, very dense	12	SS	50/ 125mm	177
		13	SS	50/ 125mm	175
	grey below 16.7m	14	SS	50/ 100mm	174
		15	SS	50/ 125mm	172
					171

Bentonite
W. L. 188.3 m Feb 04, 2019
Filter Pack
Slotted Pipe
Slough

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

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

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

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)

	GR	SA	SI	CL
7	2	33	65	
14	3	94	3	

DS SOIL LOG 18-733-100 5800 YONGE STREET.GPJ DS.GDT 19-2-7

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

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

LOG OF BOREHOLE BH18-1

PROJECT: Geotechnical Investigation- 5800 Yonge Street
CLIENT: Life Construction
PROJECT LOCATION: Toronto, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 203mm
Date: Jan-07-2019

REF. NO.: 18-733-10
ENCL NO.: 2

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS "N" 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa): ○ UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE & Sensitivity, × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SILT: trace sand, trace clay, brown, moist, very dense(Continued)		16	SS	50/ 100mm		170					
169.5												
21.0 / 168.9	**SANDY SILT:** trace clay, grey, moist, very dense		17	SS	50/ 25mm		169		○			
21.6	**END OF BOREHOLE**											

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

Date	Water Depth (mbgs)
Feb. 04, 2019	2.2

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

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

LOG OF BOREHOLE BH18-10

PROJECT: Geotechnical Investigation- 5800 Yonge Street
CLIENT: Life Construction
PROJECT LOCATION: Toronto, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Augers
Diameter: 150 mm
Date: Jan-10-2019

REF. NO.: 18-733-10
ENCL NO.: 11

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES: NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
190.4												
190.0 0.0	**TOPSOIL:** 300mm		1	SS	6		190					
189.7 0.3	**FILL:** clayey silt mixed with topsoil, trace sand, brown, moist, stiff											
189.5 0.9	**CLAYEY SILT TILL:** trace sand, trace gravel, occassional cobble/boulders, brown, moist, very stiff to hard		2	SS	24							
			3	SS	36		Bentonite W. L. 189.1 m Feb 04, 2019					
			4	SS	33		188					
187.1 3.3	**SAND:** trace silt, trace clay, grey, wet, very dense		5	SS	50/ 125mm		187					
186.0 4.4	**SILTY CLAY:** trace sand, grey, moist, hard grey below 4.6m		6	SS	50/ 100mm		Filter Pack Slotted Pipe					
			7	SS	62		185					
183.1 7.3							184					
182.7 7.7	**SANDY SILT:** trace clay, grey, moist, very dense 75mm thick sand layer at 7.5m		8	SS	50/ 150mm		183					
	END OF BOREHOLE Notes: 1) Groundwater was at 3.3m during drilling. 2) Water Level Readings Date Water Depth (mbgs) Feb. 04, 2019 1.3											

DS SOIL LOG 18-733-100 5800 YONGE STREET.GPJ DS.GDT 19-2-7

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

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

LOG OF BOREHOLE BH18-2

PROJECT: Geotechnical Investigation- 5800 Yonge Street
CLIENT: Life Construction
PROJECT LOCATION: Toronto, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 203 mm
Date: Jan-04-2019

REF. NO.: 18-733-10
ENCL NO.: 3

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	BLOWS 0.3 m "N"
190.4 / 0.0	**ASPHALT:** 125 mm			
190.1 / 0.3	**GRANULAR BASE:** 200mm			
189.6 / 0.8	**FILL:** silty trace silt, brown, wet, compact	1	SS	12
	FILL: clayey silt, trace sand, brown, moist, stiff	2	SS	9
188.6 / 1.8	**CLAYEY SILT TILL:** some sand to sandy, trace gravel, trace cobble/boulders, brown, moist, very stiff to hard	3	SS	31
		4	SS	50/ 125mm
		5	SS	50/ 125mm
186.0 / 4.4	**SILTY CLAY:** trace sand, grey, moist, hard	6	SS	74
		7	SS	38
183.1 / 7.3	**SILTY SAND:** trace clay, brown, moist, very dense	8	SS	50/ 125mm
		9	SS	50/ 100mm
		10	SS	50/ 75mm
	silt seams below 12.3m	11	SS	50/ 75mm
		12	SS	50/ 125mm
		13	SS	50/ 125mm
		14	SS	50/ 125mm
175.5 / 14.9	**SILT:** trace sand, trace clay, brown, moist, very dense	15	SS	50/ 125mm
		16	SS	50/ 100mm
		17	SS	50/ 125mm

Bentonite
Filter Pack
Slotted Pipe
Bentonite

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

REMARKS AND GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL
2 95 3

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

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

LOG OF BOREHOLE BH18-2

PROJECT: Geotechnical Investigation- 5800 Yonge Street
CLIENT: Life Construction
PROJECT LOCATION: Toronto, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 203 mm
Date: Jan-04-2019

REF. NO.: 18-733-10
ENCL NO.: 3

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS "N" 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa): ○ UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE & Sensitivity, × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	grey below 19.8m		18	SS	50/ 75mm		170				
169.4	**SILT:** trace sand, trace clay, brown, moist, very dense(Continued)										
21.0											
168.9	**SANDY SILT TILL:** trace to some clay, trace gravel, trace cobble/boulders, grey, moist, very dense		19	SS	50/ 125mm						
21.5	**END OF BOREHOLE**										

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

Date	Water Depth (mbgs)
Feb. 04, 2019	Dry

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

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

DS SOIL LOG 18-733-100 5800 YONGE STREET.GPJ DS.GDT 19-2-7

LOG OF BOREHOLE BH18-3

PROJECT: Geotechnical Investigation- 5800 Yonge Street
CLIENT: Life Construction
PROJECT LOCATION: Toronto, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Augers
Diameter: 150 mm
Date: Jan-08-2019

REF. NO.: 18-733-10
ENCL NO.: 4

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	BLOWS "N" 0.3 m	ELEVATION
190.8					
190.7 / 0.1	**ASPHALT:** 100 mm	1	SS	35	
190.4 / 0.4	**GRANULAR BASE:** 360 mm				
190.0 / 0.8	**FILL:** sand and gravel, trace clay, trace silt, brown, moist, dense	2	SS	16	190
	FILL: clayey silt, trace sand, trace to some organics, brown, moist, firm to very stiff	3	SS	6	
188.4					
2.4	**CLAYEY SILT TILL:** trace sand, trace gravel, occassional cobble/boulders, brown, moist, very stiff to hard	4	SS	31	188
		5	SS	26	
					187
		6	SS	16	186
185.1					
5.7	**SANDY SILT TILL:** trace clay, trace gravel, occassional cobble/boulders, grey, moist, very dense	7	SS	79	185
184.3 / 6.5	**END OF BOREHOLE**				

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

Date	Water Depth (mbgs)
Feb. 04, 2019	1.7

Bentonite
W. L. 189.1 m Feb 04, 2019
Filter Pack
Slotted Pipe

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

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

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

DS SOIL LOG 18-733-100 5800 YONGE STREET.GPJ DS.GDT 19-2-7

LOG OF BOREHOLE BH18-4

PROJECT: Geotechnical Investigation- 5800 Yonge Street
CLIENT: Life Construction
PROJECT LOCATION: Toronto, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Augers
Diameter: 150 mm
Date: Jan-08-2019

REF. NO.: 18-733-10
ENCL NO.: 5

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	BLOWS "N" 0.3 m	ELEVATION
190.9					
190.8 / 0.0	**ASPHALT:** 100 mm	1	SS	14	
190.4 / 0.5	**GRANULAR BASE:** 360 mm				
190.1 / 0.8	**FILL:** sand and gravel, trace clay, trace silt, brown, moist, compact	2	SS	21	190
189.3 / 1.6	**FILL:** clayey silt, trace sand, brown, moist, very stiff	3	SS	15	
	CLAYEY SILT TILL: trace sand, trace gravel, occassional cobble/boulders, brown, moist, very stiff to hard	4	SS	19	
		5	SS	35	188
	grey below 4.6m	6	SS	39	187 / 186 / 185
184.4 / 6.5	**END OF BOREHOLE**	7	SS	38	

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

Date	Water Depth (mbgs)
Feb. 04, 2019	1.3

GROUND WATER CONDITIONS: Bentonite; W. L. 189.6 m Feb 04, 2019; Filter Pack; Slotted Pipe

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

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

POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m³)
REMARKS AND GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

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

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

LOG OF BOREHOLE BH18-5

PROJECT: Geotechnical Investigation- 5800 Yonge Street
CLIENT: Life Construction
PROJECT LOCATION: Toronto, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 203 mm
Date: Jan-09-2019

REF. NO.: 18-733-10
ENCL NO.: 6

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION
191.1 / 0.0	**TOPSOIL:** 300 mm						191
0.3	**FILL:** clayey silt, trace sand, trace topsoil, some organics, brown to grey, moist, firm to very stiff		1	SS	16		
			2	SS	7		190
			3	SS	16		
			4	SS	10		189
188.0							
3.1	**CLAYEY SILT TILL:** some sand to sandy, trace gravel, trace cobble/boulders, brown, moist, hard		5	SS	50/ 50mm		188
	grey below 4.6m		6	SS	50/ 50mm		187
			7	SS	42		186
			8	SS	53		185
181.7			9	SS	50/ 25mm		184
9.4	**SAND:** trace silt, trace clay, brown, moist, very dense		10	SS	50/ 75mm		183
179.3							182
11.8	**SILTY SAND TO SANDY SILT:** trace clay, brown, moist, very dense		11	SS	50/ 25mm		181
	silt seams below 13.6m		12	SS	50/ 25mm		180
176.2							179
14.9	**SAND AND GRAVEL:** trace silt, trace clay, brown, moist, very dense		13	SS	50/ 25mm		178
	wet at 16.7m		14	SS	50/ 25mm		177
173.2							176
17.9	**CLAYEY SILT:** trace sand, brown, moist, hard		15	SS	50/ 100mm		175
171.6							174
19.5							173
							172

Bentonite
W. L. 188.8 m Feb 04, 2019
Filter Pack
Slotted Pipe
Bentonite
Slough

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

REMARKS AND GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL
10 79 11

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

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

DS SOIL LOG 18-733-100 5800 YONGE STREET.GPJ DS.GDT 19-2-7

LOG OF BOREHOLE BH18-5

PROJECT: Geotechnical Investigation- 5800 Yonge Street
CLIENT: Life Construction
PROJECT LOCATION: Toronto, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 203 mm
Date: Jan-09-2019

REF. NO.: 18-733-10
ENCL NO.: 6

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS "N" 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa): ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
21 / 169.7	**SANDY SILT TO SILTY SAND:** trace clay, grey, moist, very dense(Continued)		16	SS	50/ 125mm		171 / 170					
21.4	**END OF BOREHOLE**		17	SS	50/ 125mm							

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

Date	Water Depth (mbgs)
Feb. 04, 2019	2.3

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

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

DS SOIL LOG 18-733-100 5800 YONGE STREET.GPJ DS.GDT 19-2-7

LOG OF BOREHOLE BH18-6

PROJECT: Geotechnical Investigation- 5800 Yonge Street
CLIENT: Life Construction
PROJECT LOCATION: Toronto, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 203 mm
Date: Jan-08-2019

REF. NO.: 18-733-10
ENCL NO.: 7

(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION
190.9						
0.0 / 190.4	**TOPSOIL:** 450 mm	1	SS	6		190
0.5 / 189.5	**FILL:** clayey silt, trace sand, trace topsoil, brown, moist, firm to stiff	2	SS	4		
189.4						
1.7 / 188.5	**FILL:** sand and gravel, trace silt, brown, wet, loose	3	SS	6		189
2.4 / 188.1	**FILL:** clayey silt, trace sand, brown, moist, firm	4	SS	27		188
187.9						
3.0 / 187.4	**CLAYEY SILT TILL:** some sand to sandy, trace gravel, trace cobble/boulders, brown, moist, very stiff	5	SS	41		
3.5 / 186.7	**SAND:** trace silt, trace clay, brown, wet, dense					187
4.2	**SANDY SILT TILL:** trace to some clay, trace gravel, trace cobble/boulders, brown, moist, dense	6	SS	36		186
185.0						
5.9	**CLAYEY SILT TILL:** some sand to sandy, trace gravel, trace cobble/boulders, brown, moist, hard	7	SS	60		185
	SANDY SILT TILL: trace to some clay, trace gravel, trace cobble/boulders, grey, wet sand seams, moist, dense					184
	SILTY CLAY: trace sand, grey, moist, very stiff to hard	8	SS	18		183
182.1						
8.8 / 180.6	**SAND:** trace silt, trace clay, brown, moist, very dense	9	SS	50/ 100mm	Bentonite	
10.3	**SILTY SAND TO SANDY SILT:** trace clay, brown, moist, very dense	10	SS	50/ 150mm		181
		11	SS	50/ 50mm		180
177.5						179
13.4 / 176.0	**SAND AND GRAVEL:** trace silt, trace clsy, brown, wet, very dense	12	SS	50/ 150mm		178
14.9	**SILTY SAND TO SANDY SILT:** trace clay, grey, moist, very dense	13	SS	50/ 150mm		177
		14	SS	50/ 125mm		176
		15	SS	50/ 150mm		175
						174
						173
					Filter Pack	172
					Slotted Pipe	

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

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

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

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

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

Continued Next Page

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

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

DS SOIL LOG 18-733-100 5800 YONGE STREET.GPJ DS.GDT 19-2-7

LOG OF BOREHOLE BH18-6

PROJECT: Geotechnical Investigation- 5800 Yonge Street
CLIENT: Life Construction
PROJECT LOCATION: Toronto, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 203 mm
Date: Jan-08-2019

REF. NO.: 18-733-10
ENCL NO.: 7

SOIL PROFILE (m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	TYPE	BLOWS "N" 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
21 169.5	**SILTY SAND TO SANDY SILT:** trace clay, grey, moist, very dense(Continued)		16	SS	50/ 150mm		170				
21.4	**END OF BOREHOLE**		17	SS							

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

DS SOIL LOG 18-733-100 5800 YONGE STREET.GPJ DS.GDT 19-2-7

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

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

LOG OF BOREHOLE BH18-7

PROJECT: Geotechnical Investigation- 5800 Yonge Street
CLIENT: Life Construction
PROJECT LOCATION: Toronto, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Augers
Diameter: 150 mm
Date: Jan-08-2019

REF. NO.: 18-733-10
ENCL NO.: 8

ELEV / DEPTH (m)	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS / 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
191.1 0.0	**ASPHALT:** 100 mm		1	SS	9		191			
190.9 0.2	**GRANULAR BASE:** 200 mm									
190.3 0.8	**FILL:** sand and gravel, trace silt, trace clay, brown, moist, compact		2	SS	39					
189.7 1.4	**FILL:** sandy silt, trace clay, brown, moist, dense		3	SS	66		Bentonite			
	CLAYEY SILT TILL: trace sand, trace gravel, occassional cobble/boulders, brown, moist, hard		4	SS	50/ 125mm		189			
	grey below 3.1m		5	SS	50/ 125mm	W. L. 187.7 m Feb 04, 2019	188			
186.6 4.5	**CLAYEY SILT:** trace sand, grey, moist, hard		6	SS	80	Filter Pack Slotted Pipe	186			
184.6 6.5	**END OF BOREHOLE**		7	SS	51		185			

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

Date	Water Depth (mbgs)
Feb. 04, 2019	3.4

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

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

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

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

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

DS SOIL LOG 18-733-100 5800 YONGE STREET.GPJ DS.GDT 19-2-7

LOG OF BOREHOLE BH18-8

PROJECT: Geotechnical Investigation- 5800 Yonge Street
CLIENT: Life Construction
PROJECT LOCATION: Toronto, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Augers
Diameter: 150 mm
Date: Jan-08-2019

REF. NO.: 18-733-10
ENCL NO.: 9

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	BLOWS / 0.3 m "N"	ELEVATION
190.1 / 0.0	**TOPSOIL:** 75mm	1	SS	8	190
189.9 / 0.2	**FILL:** clayey silt mixed with topsoil, trace sand, brown, moist, stiff				
189.2 / 0.9	**CLAYEY SILT TILL:** trace sand, trace gravel, occassional cobble/boulders, brown, moist, very stiff to hard	2	SS	28	189
		3	SS	30	188
		4	SS	44	
		5	SS	30	187
	grey below 4.6m	6	SS	21	186
184.2 / 5.9	**SANDY SILT TILL:** trace to some clay, trace gravel, occassional cobble/boulders, grey, moist, very dense	7	SS	50/ 150mm	185
182.4 / 7.7	**END OF BOREHOLE**	8	SS	50/ 100mm	184
	Notes: 1) Borehole dry and open upon completion.				183

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

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

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

WATER CONTENT (%): 10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

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

DS SOIL LOG 18-733-100 5800 YONGE STREET.GPJ DS.GDT 19-2-7

LOG OF BOREHOLE BH18-9

PROJECT: Geotechnical Investigation- 5800 Yonge Street
CLIENT: Life Construction
PROJECT LOCATION: Toronto, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Augers
Diameter: 150 mm
Date: Jan-08-2019

REF. NO.: 18-733-10
ENCL NO.: 10

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION
190.5							
190.4 / 0.1	**TOPSOIL:** 75mm						
	FILL: clayey silt mixed with topsoil, trace sand, brown, moist, stiff		1	SS	7		190
189.3 / 1.2	**CLAYEY SILT TILL:** trace sand, trace gravel, occassional cobble/boulders, brown, moist, very stiff to hard		2	SS	14		
			3	SS	22		189
			4	SS	40		188
			5	SS	25		187
	grey below 4.6m		6	SS	16		186
	wet sand seams at 6.1m		7	SS	22		185
183.2 / 7.3	**SANDY SILT TILL:** trace to some clay, trace gravel, occassional cobble/boulders, grey, moist, very dense		8	SS	70		184
182.5 / 8.0	**END OF BOREHOLE**						183

Notes:
1) Borehole dry and open upon completion.

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

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

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

POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m³)
REMARKS AND GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

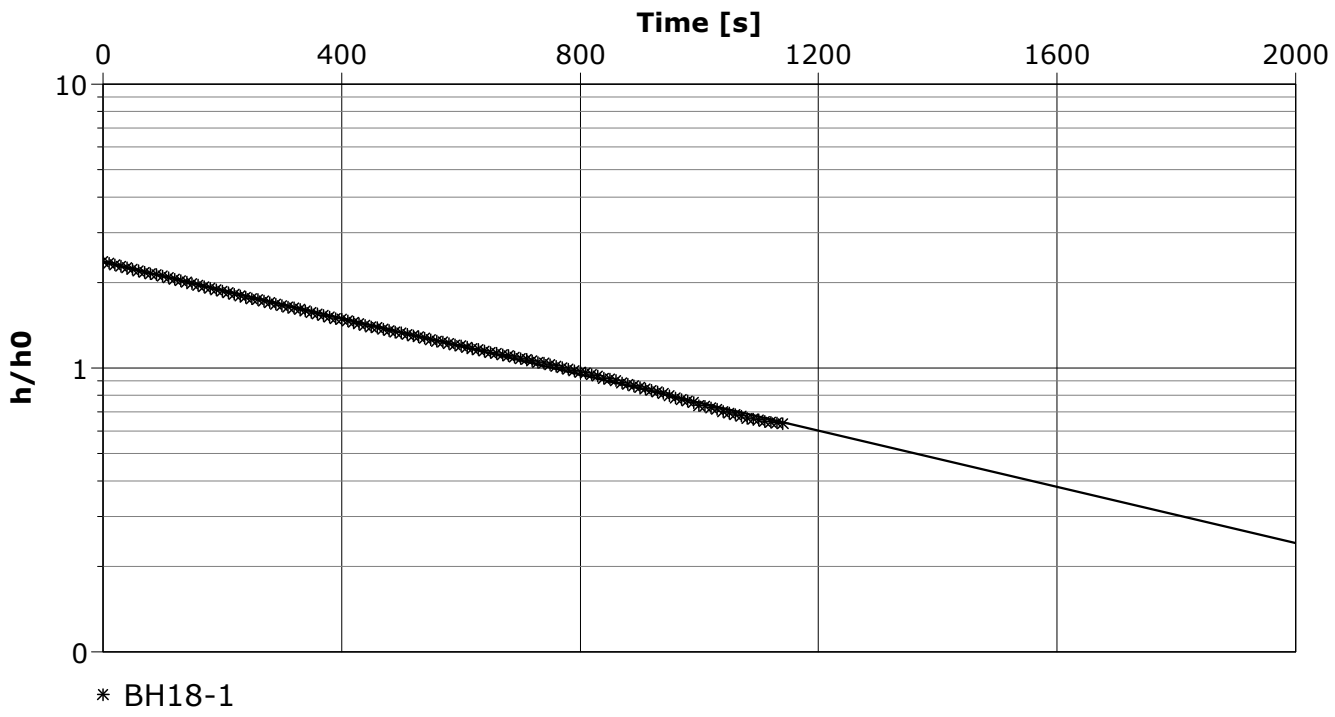
GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

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

Appendix B: Hydraulic Conductivity Analysis

	Slug Test Analysis Report
	Project: 5800 Yonge St
	Number: 18-733-100
	Client: Times Group Corp

Location: 5800 Yonge St.	Slug Test: BH18-1	Test Well: BH18-1
Test Conducted by: DG		Test Date: 2019-02-04
Analysis Performed by: DG	BH18-1	Analysis Date: 2019-02-06
Aquifer Thickness: 6.12 m		

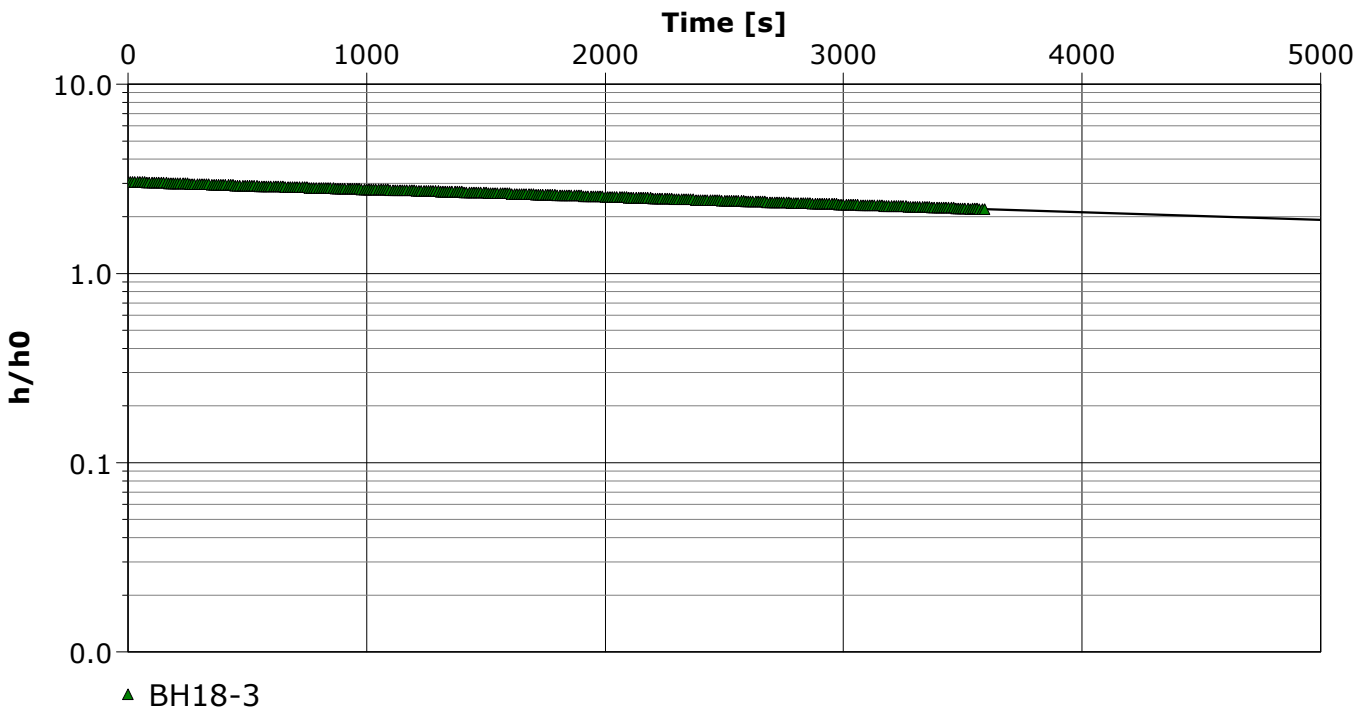


Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
BH18-1	5.65×10^{-7}	

	Slug Test Analysis Report
	Project: 5800 Yonge St
	Number: 18-733-100
	Client: Times Group Corp

Location: 5800 Yonge St.	Slug Test: BH18-3	Test Well: BH18-3
Test Conducted by: DG		Test Date: 2019-02-04
Analysis Performed by: DG	BH18-3	Analysis Date: 2019-02-06
Aquifer Thickness: 6.35 m		

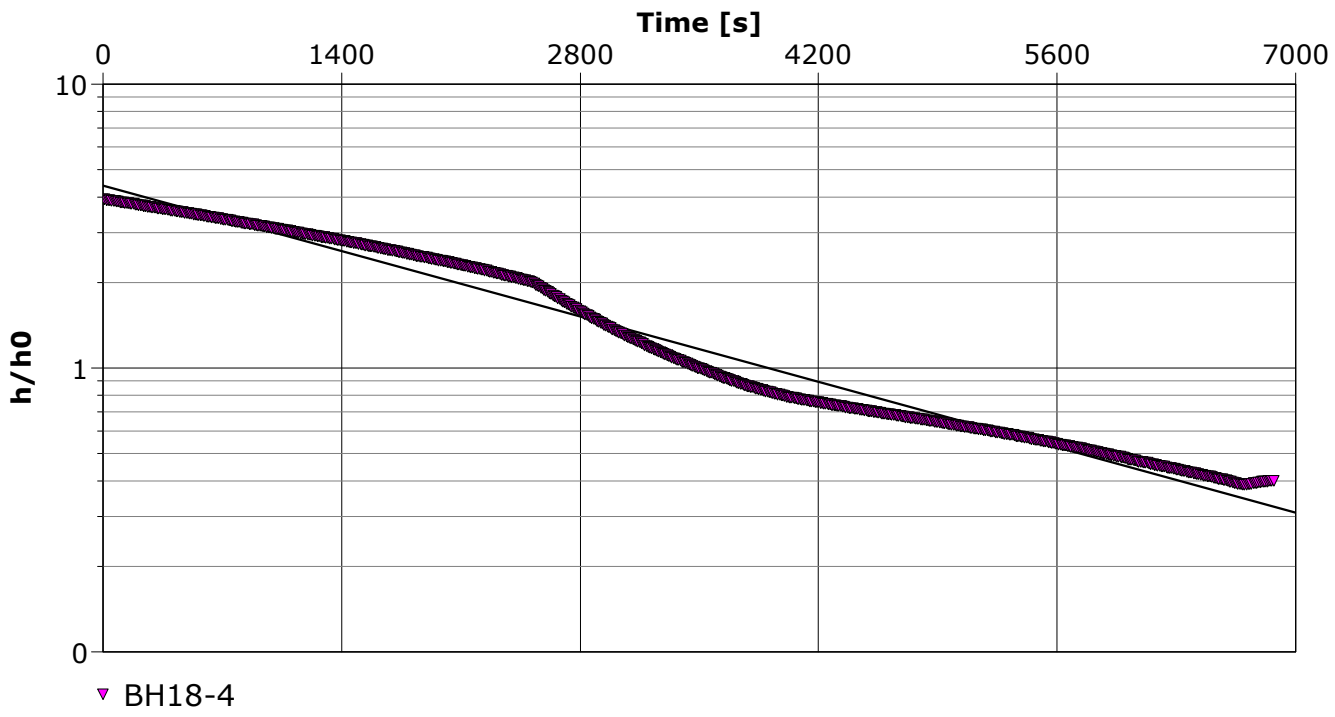


Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
BH18-3	4.56×10^{-8}	

	Slug Test Analysis Report
	Project: 5800 Yonge St
	Number: 18-733-100
	Client: Times Group Corp

Location: 5800 Yonge St.	Slug Test: BH18-4	Test Well: BH18-4
Test Conducted by: DG		Test Date: 2019-02-04
Analysis Performed by: DG	BH18-4	Analysis Date: 2019-02-06
Aquifer Thickness: 6.20 m		

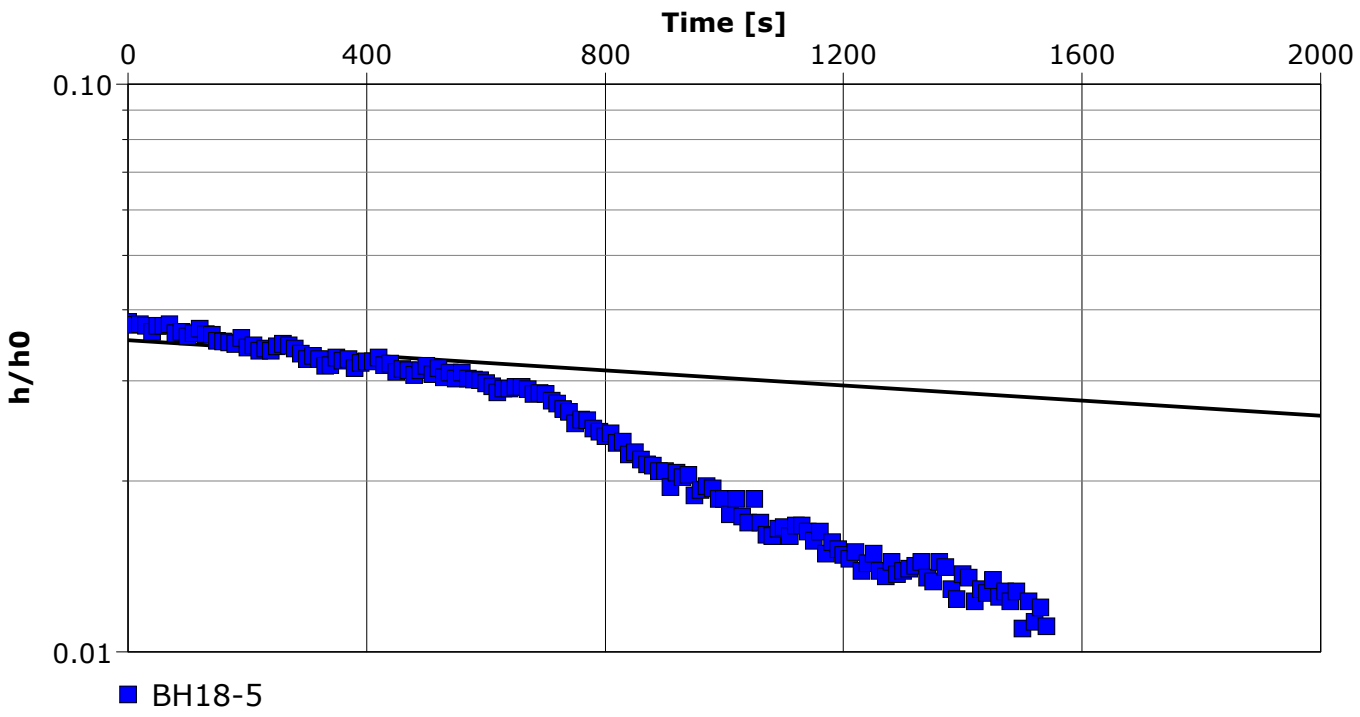


Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
BH18-4	1.88×10^{-7}	

	Slug Test Analysis Report
	Project: 5800 Yonge St
	Number: 18-733-100
	Client: Times Group Corp

Location: 5800 Yonge St.	Slug Test: BH18-5	Test Well: BH18-5
Test Conducted by: DG		Test Date: 2019-02-04
Analysis Performed by: DG	BH18-5	Analysis Date: 2019-02-06
Aquifer Thickness: 7.08 m		

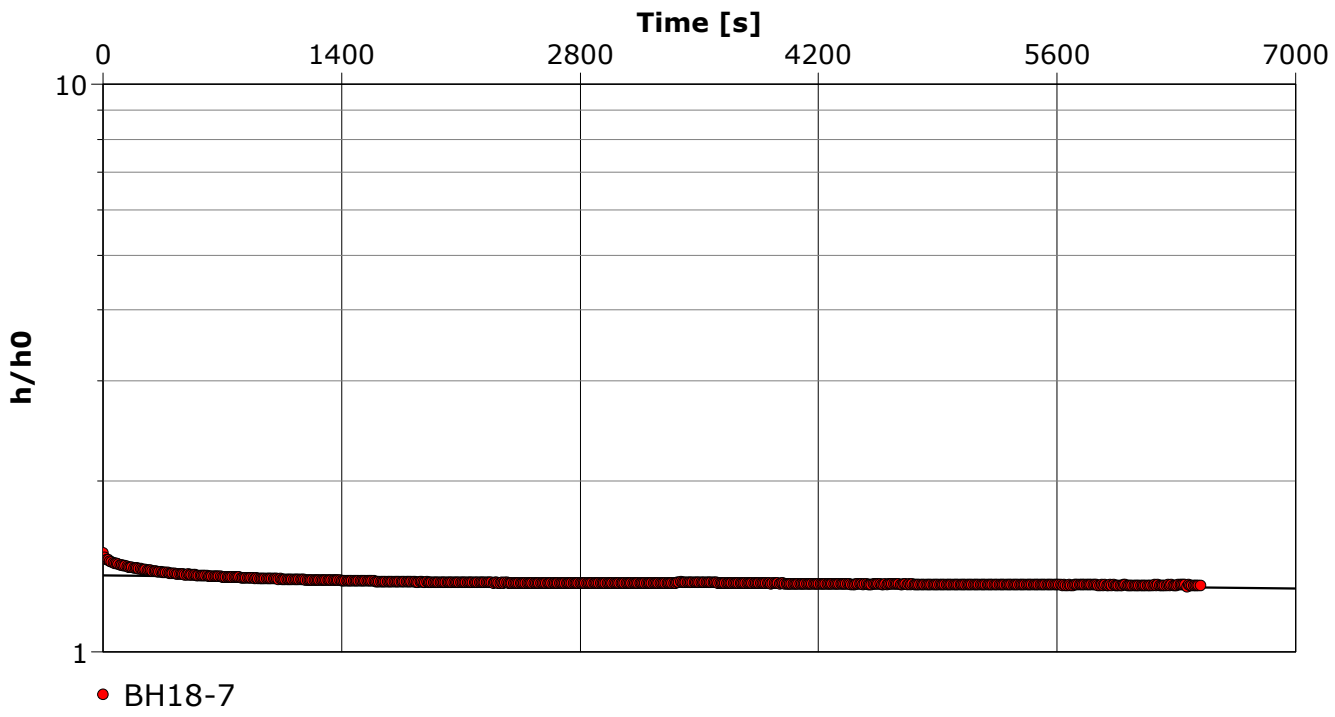


Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
BH18-5	7.56×10^{-8}	

	Slug Test Analysis Report
	Project: 5800 Yonge St
	Number: 18-733-100
	Client: Times Group Corp

Location: 5800 Yonge St.	Slug Test: BH18-7	Test Well: BH18-7
Test Conducted by: DG		Test Date: 2019-02-04
Analysis Performed by: DG	BH18-7	Analysis Date: 2019-02-06
Aquifer Thickness:		

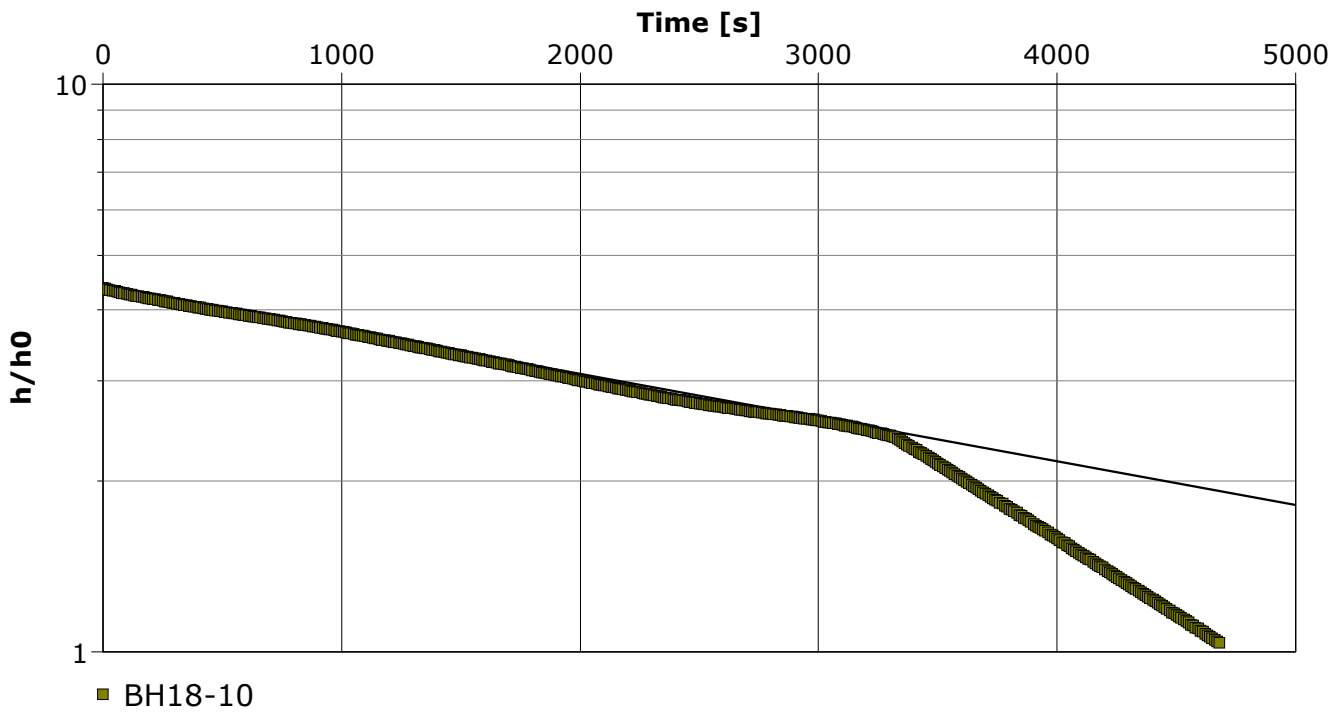


Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
BH18-7	3.74×10^{-9}	

	Slug Test Analysis Report
	Project: 5800 Yonge St
	Number: 18-733-100
	Client: Times Group Corp

Location: 5800 Yonge St.	Slug Test: BH18-10	Test Well: BH18-10
Test Conducted by: DG		Test Date: 2019-02-04
Analysis Performed by: DG	BH18-1	Analysis Date: 2019-02-11
Aquifer Thickness: 7.13 m		

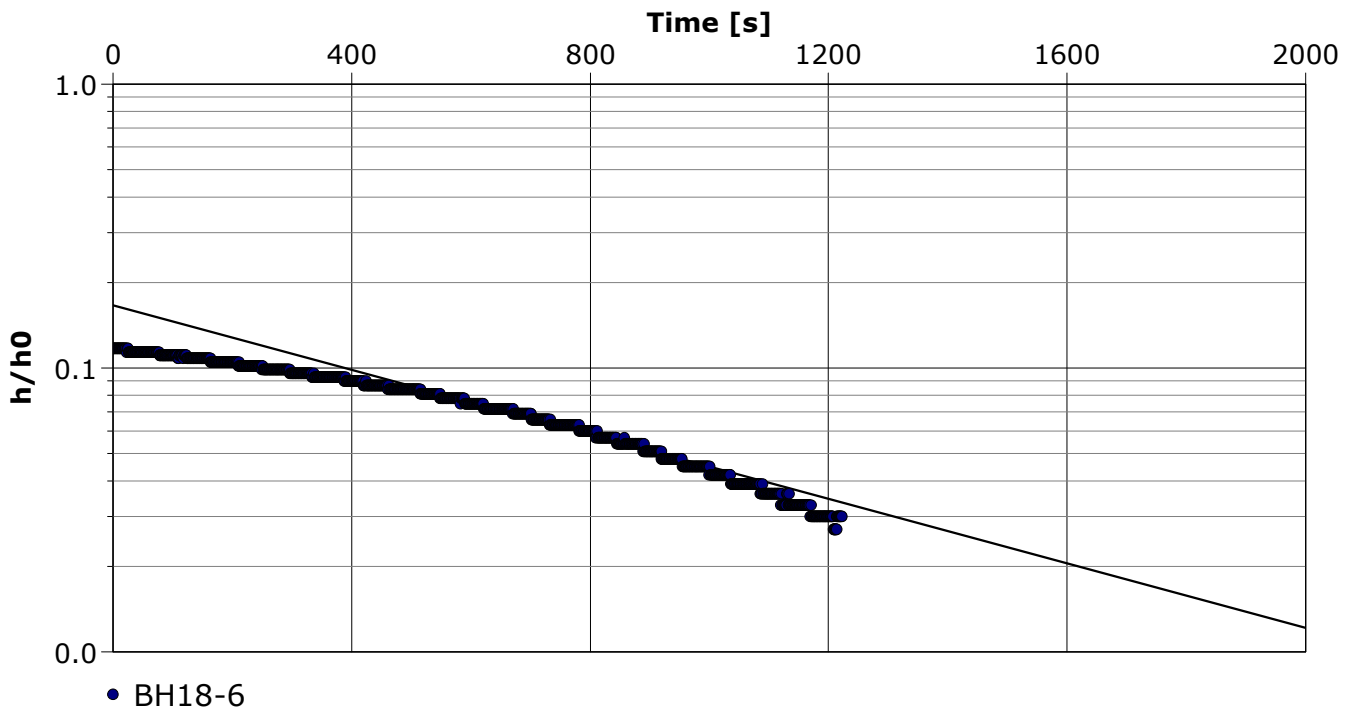


Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
BH18-10	8.81×10^{-8}	

	Slug Test Analysis Report
	Project: 5800 Yonge St
	Number: 18-733-100
	Client: Times Group Corp

Location: 5800 Yonge St.	Slug Test: BH18-6	Test Well: BH18-6
Test Conducted by: DG		Test Date: 2019-02-04
Analysis Performed by: DG	BH18-6	Analysis Date: 2019-02-22
Aquifer Thickness: 21.60 m		

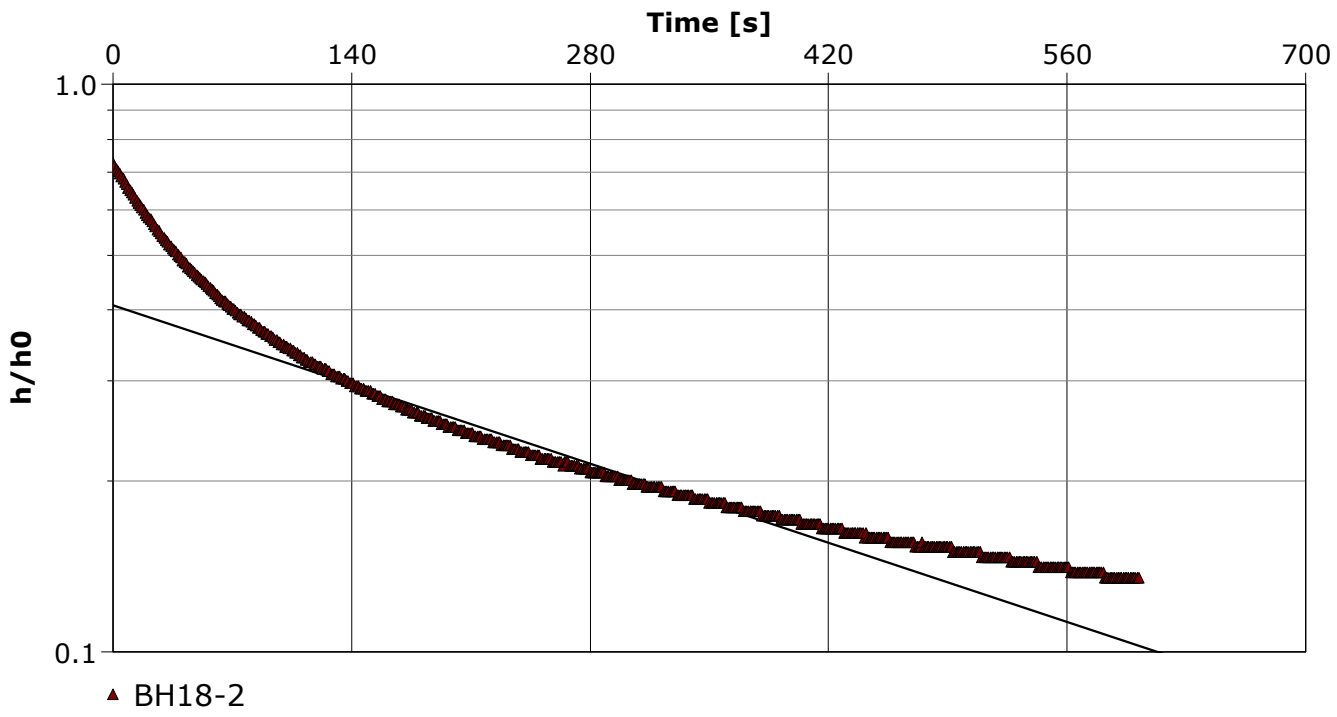


Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
BH18-6	6.48×10^{-7}	

	Slug Test Analysis Report
	Project: 5800 Yonge St
	Number: 18-733-100
	Client: Times Group Corp

Location: 5800 Yonge St.	Slug Test: BH18-2	Test Well: BH18-2
Test Conducted by: DG		Test Date: 2019-02-04
Analysis Performed by: DG	BH18-2	Analysis Date: 2019-02-22
Aquifer Thickness: 18.50 m		



Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
BH18-2	1.13×10^{-6}	

Appendix C: Groundwater Quality Certificate of Analysis

DS Consultants (Vaughan)
ATTN: Dorothy Garda
6221 Highway 7
Unit 16
Vaughan ON L4H 0K8

Date Received: 12-MAR-19
Report Date: 19-MAR-19 12:49 (MT)
Version: FINAL

Client Phone: 905-264-9393

Certificate of Analysis

Lab Work Order #: L2243112

Project P.O. #: NOT SUBMITTED
Job Reference: 18-733-100
C of C Numbers: 17-724656
Legal Site Desc:

Amanda Fazekas
Account Manager

ANALYTICAL REPORT

Summary of Guideline Exceedances

ALS ID	Client ID	Grouping	Analyte	Result	Guideline Limit	Unit
Guideline						
Ontario Toronto Sanitary Discharge Sewer By-Law 100-2016 (FEB 4,2016) - Ontario Toronto Sanitary Discharge Sewer By-Law						
(No parameter exceedances)						
Ontario Toronto Sanitary Discharge Sewer By-Law 100-2016 (FEB 4,2016) - Ontario Toronto Storm Sewer By-Law						
L2243112-1	BH18-10	Total Metals	Manganese (Mn)-Total	0.928	0.05	mg/L
		Polycyclic Aromatic Hydrocarbons	Total PAHs	<3.5	2	ug/L

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Physical Tests - WATER

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID: L2243112-1 Sample Date: 11-MAR-19 Sample ID: BH18-10
pH	pH units	6.00-11.5	6.0-9.5	6.95
Total Suspended Solids	mg/L	350	15	6.7

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Anions and Nutrients - WATER

			Lab ID	L2243112-1
			Sample Date	11-MAR-19
			Sample ID	BH18-10
		Guide Limits		
Analyte	Unit	#1	#2	
Fluoride (F)	mg/L	10	-	<0.20 DLDS
Total Kjeldahl Nitrogen	mg/L	100	-	0.60
Phosphorus, Total	mg/L	10	0.4	0.0123

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

ANALYTICAL REPORT

Cyanides - WATER

			Lab ID	L2243112-1
			Sample Date	11-MAR-19
			Sample ID	BH18-10
		Guide Limits		
Analyte	Unit	#1	#2	
Cyanide, Total	mg/L	2	0.02	<0.020 DLM

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Bacteriological Tests - WATER

		Guide Limits		Lab ID	Sample Date	Sample ID
Analyte	Unit	#1	#2			
E. Coli	CFU/100mL	-	200	L2243112-1	11-MAR-19	BH18-10
				0		

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Total Metals - WATER

			Lab ID	L2243112-1
			Sample Date	11-MAR-19
			Sample ID	BH18-10
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
Aluminum (Al)-Total	mg/L	50	-	<0.050 DLHC
Antimony (Sb)-Total	mg/L	5	-	<0.0010 DLHC
Arsenic (As)-Total	mg/L	1	0.02	<0.0010 DLHC
Cadmium (Cd)-Total	mg/L	0.7	0.008	<0.000050 DLHC
Chromium (Cr)-Total	mg/L	4	0.08	<0.0050 DLHC
Cobalt (Co)-Total	mg/L	5	-	0.0028 DLHC
Copper (Cu)-Total	mg/L	2	0.04	<0.010 DLHC
Lead (Pb)-Total	mg/L	1	0.12	<0.00050 DLHC
Manganese (Mn)-Total	mg/L	5	0.05	0.928 DLHC
Mercury (Hg)-Total	mg/L	0.01	0.0004	<0.000010
Molybdenum (Mo)-Total	mg/L	5	-	<0.00050 DLHC
Nickel (Ni)-Total	mg/L	2	0.08	0.0054 DLHC
Selenium (Se)-Total	mg/L	1	0.02	<0.00050 DLHC
Silver (Ag)-Total	mg/L	5	0.12	<0.00050 DLHC
Tin (Sn)-Total	mg/L	5	-	<0.0010 DLHC
Titanium (Ti)-Total	mg/L	5	-	<0.0030 DLHC
Zinc (Zn)-Total	mg/L	2	0.04	<0.030 DLHC

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Speciated Metals - WATER

		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
Lab ID				L2243112-1
Sample Date				11-MAR-19
Sample ID				BH18-10
Chromium, Hexavalent	mg/L	2	0.04	<0.00050

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Aggregate Organics - WATER

			Lab ID	L2243112-1
			Sample Date	11-MAR-19
			Sample ID	BH18-10
		Guide Limits		
Analyte	Unit	#1	#2	
BOD	mg/L	300	15	<2.0
Oil and Grease, Total	mg/L	-	-	<2.0
Animal/Veg Oil & Grease	mg/L	150	-	<2.0
Mineral Oil and Grease	mg/L	15	-	<1.0
Phenols (4AAP)	mg/L	1.0	0.008	0.0011

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Volatile Organic Compounds - WATER

			Lab ID	L2243112-1
			Sample Date	11-MAR-19
			Sample ID	BH18-10
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
Benzene	ug/L	10	2	<0.50
Chloroform	ug/L	40	2	<1.0
1,2-Dichlorobenzene	ug/L	50	5.6	<0.50
1,4-Dichlorobenzene	ug/L	80	6.8	<0.50
cis-1,2-Dichloroethylene	ug/L	4000	5.6	<0.50
Dichloromethane	ug/L	2000	5.2	<2.0
trans-1,3-Dichloropropene	ug/L	140	-	<0.50
Ethylbenzene	ug/L	160	2	<0.50
1,1,2,2-Tetrachloroethane	ug/L	1400	17	<0.50
Tetrachloroethylene	ug/L	1000	4.4	<0.50
Toluene	ug/L	16	2	<0.50
Trichloroethylene	ug/L	400	7.6	<0.50
o-Xylene	ug/L	-	-	<0.50
m+p-Xylenes	ug/L	-	-	<1.0
Xylenes (Total)	ug/L	1400	4.4	<1.1
Surrogate: 4-Bromofluorobenzene	%	-	-	96.2
Surrogate: 1,4-Difluorobenzene	%	-	-	100.0

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Polycyclic Aromatic Hydrocarbons - WATER

			Lab ID	L2243112-1
			Sample Date	11-MAR-19
			Sample ID	BH18-10
Analyte	Unit	Guide Limits #1	#2	
Acenaphthene	ug/L	-	-	<0.010
Anthracene	ug/L	-	-	<0.010
Benzo(a)anthracene	ug/L	-	-	<0.010
Benzo(a)pyrene	ug/L	-	-	<0.010
Benzo(b)fluoranthene	ug/L	-	-	<0.010
Benzo(e)pyrene	ug/L	-	-	<0.050
Benzo(ghi)perylene	ug/L	-	-	<0.010
Benzo(k)fluoranthene	ug/L	-	-	<0.010
Chrysene	ug/L	-	-	<0.010
Dibenz(a,h)acridine	ug/L	-	-	<0.050
Dibenz(a,j)acridine	ug/L	-	-	<0.050
Dibenzo(a,h)anthracene	ug/L	-	-	<0.010
Dibenzo(a,i)pyrene	ug/L	-	-	<0.050
7H-Dibenzo(c,g)carbazole	ug/L	-	-	<0.050
1,3-Dinitropyrene	ug/L	-	-	<2.0 RRR
1,6-Dinitropyrene	ug/L	-	-	<2.0 RRR
1,8-Dinitropyrene	ug/L	-	-	<2.0 RRR
Fluoranthene	ug/L	-	-	<0.010
Fluorene	ug/L	-	-	<0.010
Indeno(1,2,3-cd)pyrene	ug/L	-	-	<0.010
Naphthalene	ug/L	-	-	<0.010
Perylene	ug/L	-	-	<0.010
Phenanthrene	ug/L	-	-	<0.010
Pyrene	ug/L	-	-	<0.010
Surrogate: 2-Fluorobiphenyl	%	-	-	99.9
Surrogate: d14-Terphenyl	%	-	-	78.4
Surrogate: p-Terphenyl d14	%	-	-	98.8
Total PAHs	ug/L	5	2	<3.5

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Phthalate Esters - WATER

			Lab ID	L2243112-1
			Sample Date	11-MAR-19
			Sample ID	BH18-10
		Guide Limits		
Analyte	Unit	#1	#2	
Bis(2-ethylhexyl)phthalate	ug/L	12	8.8	<2.0
Surrogate: 2-fluorobiphenyl	%	-	-	90.9
Surrogate: p-Terphenyl d14	%	-	-	101.3

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

ANALYTICAL REPORT

Semi-Volatile Organics - WATER

			Lab ID	L2243112-1
			Sample Date	11-MAR-19
			Sample ID	BH18-10
		Guide Limits		
Analyte	Unit	#1	#2	
3,3'-Dichlorobenzidine	ug/L	2	0.8	<0.40
Di-n-butylphthalate	ug/L	80	15	<1.0
Surrogate: 2-Fluorobiphenyl	%	-	-	90.9
Surrogate: p-Terphenyl d14	%	-	-	101.3

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

ANALYTICAL REPORT

Phenolics - WATER

			Lab ID	L2243112-1
			Sample Date	11-MAR-19
			Sample ID	BH18-10
Analyte	**Unit**	**Guide Limits #1**	**#2**	
Pentachlorophenol	ug/L	5	2	<0.50
Surrogate: 2,4,6-Tribromophenol	%	-	-	122.1

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Polychlorinated Biphenyls - WATER

			Lab ID	L2243112-1
			Sample Date	11-MAR-19
			Sample ID	BH18-10
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
Aroclor 1242	ug/L	-	-	<0.020
Aroclor 1248	ug/L	-	-	<0.020
Aroclor 1254	ug/L	-	-	<0.020
Aroclor 1260	ug/L	-	-	<0.020
Total PCBs	ug/L	1	0.4	<0.040
Surrogate: 2-Fluorobiphenyl	%	-	-	93.1

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Organic Parameters - WATER

			Lab ID	L2243112-1
			Sample Date	11-MAR-19
			Sample ID	BH18-10
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
Nonylphenol	ug/L	20	1	<1.0
Nonylphenol Diethoxylates	ug/L	-	-	0.14
Total Nonylphenol Ethoxylates	ug/L	200	10	<2.0
Nonylphenol Monoethoxylates	ug/L	-	-	<2.0

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Reference Information

Additional Comments for Sample Listed:

Samplenum	Matrix	Report Remarks	Sample Comments
L2243112-1	Water	Note: RRR; Reporting limit has been adjusted based on lower instrument responses	

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
RRR	Refer to Report Remarks for issues regarding this analysis

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
625-33DCBENZIDINE-WT	Water	3,3-Dichlorobenzidine	SW846 8270

Aqueous samples are extracted and extracts are analyzed on GC/MSD.

625-BIS-2-PHTH-WT	Water	Bis(2-ethylhexyl)phthalate	SW846 8270

Aqueous samples are extracted and extracts are analyzed on GC/MSD.

625-DNB-PHTH-WT	Water	Di-n-Butyl Phthalate	SW846 8270

Aqueous samples are extracted and extracts are analyzed on GC/MSD.

625-PAH-LOW-WT	Water	EPA 8270 PAH (Low Level)	SW846 8270

Aqueous samples are extracted and extracts are analyzed on GC/MSD. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

625-PCP-WT	Water	Pentachlorophenol	SW846 8270
BOD-WT	Water	BOD	APHA 5210 B

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

CR-CR6-IC-WT	Water	Chromium +6	EPA 7199

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution. Chromium (III) is calculated as the difference between the total chromium and the chromium (VI) results.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
EC-WW-MF-WT	Water	E. Coli	SM 9222D
A 100 mL volume of sample is filtered through a membrane, the membrane is placed on mFC-BCIG agar and incubated at 44.5 –0 .2 °C for 24 – 2 h. Method ID: WT-TM-1200			
F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)
Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.			
MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)
Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.			
Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).			
NP,NPE-LCMS-WT	Water	Nonylphenols and Ethoxylates by LC/MS-MS	J. Chrom A849 (1999) p.467-482
Water samples are filtered and analyzed on LCMS/MS by direct injection.			
OGG-SPEC-CALC-WT	Water	Speciated Oil and Grease A/V Calc	CALCULATION
Sample is extracted with hexane, sample speciation into mineral and animal/vegetable fractions is achieved via silica gel separation and is then determined gravimetrically.			
OGG-SPEC-WT	Water	Speciated Oil and Grease-Gravimetric	APHA 5520 B
The procedure involves an extraction of the entire water sample with hexane. Sample speciation into mineral and animal/vegetable fractions is achieved via silica gel separation and is then determined gravimetrically.			
P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.			
PAH-EXTRA-WT	Water	Sanitary Sewer Use By-Law Additional PAH	SW846 8270
PAH-SUM-CALC-WT	Water	TOTAL PAH's	CALCULATION
Total PAH represents the sum of all PAH analytes reported for a given sample. Note that regulatory agencies and criteria differ in their definitions of Total PAH in terms of the individual PAH analytes to be included.			
PCB-WT	Water	Polychlorinated Biphenyls	EPA 8082
PCBs are extracted from an aqueous sample at neutral pH with aliquots of dichloromethane using a modified separatory funnel technique. The extracts are analyzed by GC/MSD.			
PH-WT	Water	pH	APHA 4500 H-Electrode
Water samples are analyzed directly by a calibrated pH meter.			

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
		Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days	
PHENOLS-4AAP-WT	Water	Phenol (4AAP)	EPA 9066
		An automated method is used to distill the sample. The distillate is then buffered to pH 9.4 which reacts with 4AAP and potassium ferricyanide to form a red complex which is measured colorimetrically.	
SOLIDS-TSS-WT	Water	Suspended solids	APHA 2540 D-Gravimetric
		A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104–1°C for a minimum of four hours or until a constant weight is achieved.	
TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D
		This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.	
VOC-ROU-HS-WT	Water	Volatile Organic Compounds	SW846 8260
		Aqueous samples are analyzed by headspace-GC/MS.	
XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION
		Total xylenes represents the sum of o-xylene and m&p-xylene.	

**ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody Numbers:

17-724656

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Reference Information

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Workorder: L2243112 Report Date: 19-MAR-19

Client: DS Consultants (Vaughan)
6221 Highway 7 Unit 16
Vaughan ON L4H 0K8
Contact: Dorothy Garda

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-33DCBENZIDINE-WT	**Water**							
Batch **R4563568**								
WG3005132-2 **LCS**								
3,3'-Dichlorobenzidine			82.9		%		50-140	14-MAR-19
WG3005132-1 **MB**								
3,3'-Dichlorobenzidine			<0.40		ug/L		0.4	14-MAR-19
Surrogate: p-Terphenyl d14			114.5		%		40-130	14-MAR-19
625-BIS-2-PHTH-WT	**Water**							
Batch **R4563568**								
WG3005132-2 **LCS**								
Bis(2-ethylhexyl)phthalate			132.5		%		50-140	14-MAR-19
WG3005132-1 **MB**								
Bis(2-ethylhexyl)phthalate			<2.0		ug/L		2	14-MAR-19
Surrogate: 2-fluorobiphenyl			81.7		%		40-130	14-MAR-19
Surrogate: p-Terphenyl d14			114.5		%		40-130	14-MAR-19
625-DNB-PHTH-WT	**Water**							
Batch **R4563568**								
WG3005132-2 **LCS**								
Di-n-butylphthalate			119.2		%		50-150	14-MAR-19
WG3005132-1 **MB**								
Di-n-butylphthalate			<1.0		ug/L		1	14-MAR-19
Surrogate: 2-Fluorobiphenyl			81.7		%		40-130	14-MAR-19
Surrogate: p-Terphenyl d14			114.5		%		40-130	14-MAR-19
625-PAH-LOW-WT	**Water**							
Batch **R4564230**								
WG3005132-2 **LCS**								
Acenaphthene			104.7		%		50-140	14-MAR-19
Anthracene			105.4		%		50-140	14-MAR-19
Benzo(a)anthracene			109.4		%		50-140	14-MAR-19
Benzo(a)pyrene			104.3		%		60-130	14-MAR-19
Benzo(b)fluoranthene			94.1		%		50-140	14-MAR-19
Benzo(ghi)perylene			107.5		%		50-140	14-MAR-19
Benzo(k)fluoranthene			123.9		%		50-140	14-MAR-19
Chrysene			109.2		%		50-140	14-MAR-19
Dibenzo(a,h)anthracene			106.5		%		50-140	14-MAR-19
Fluoranthene			108.8		%		50-140	14-MAR-19
Fluorene			110.3		%		50-140	14-MAR-19
Indeno(1,2,3-cd)pyrene			113.2				50-140	

Quality Control Report

Client: DS Consultants (Vaughan)
6221 Highway 7 Unit 16
Vaughan ON L4H 0K8
Contact: Dorothy Garda

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-PAH-LOW-WT	**Water**							
Batch R4564230								
WG3005132-2 LCS								
Indeno(1,2,3-cd)pyrene			113.2		%		50-140	14-MAR-19
Naphthalene			92.2		%		50-130	14-MAR-19
Perylene			95.1		%		50-140	14-MAR-19
Phenanthrene			104.1		%		50-140	14-MAR-19
Pyrene			106.3		%		50-140	14-MAR-19
WG3005132-1 MB								
Acenaphthene			<0.010		ug/L		0.01	14-MAR-19
Anthracene			<0.010		ug/L		0.01	14-MAR-19
Benzo(a)anthracene			<0.010		ug/L		0.01	14-MAR-19
Benzo(a)pyrene			<0.010		ug/L		0.01	14-MAR-19
Benzo(b)fluoranthene			<0.010		ug/L		0.01	14-MAR-19
Benzo(ghi)perylene			<0.010		ug/L		0.01	14-MAR-19
Benzo(k)fluoranthene			<0.010		ug/L		0.01	14-MAR-19
Chrysene			<0.010		ug/L		0.01	14-MAR-19
Dibenzo(a,h)anthracene			<0.010		ug/L		0.01	14-MAR-19
Fluoranthene			<0.010		ug/L		0.01	14-MAR-19
Fluorene			<0.010		ug/L		0.01	14-MAR-19
Indeno(1,2,3-cd)pyrene			<0.010		ug/L		0.01	14-MAR-19
Naphthalene			<0.010		ug/L		0.01	14-MAR-19
Perylene			<0.010		ug/L		0.01	14-MAR-19
Phenanthrene			<0.010		ug/L		0.01	14-MAR-19
Pyrene			<0.010		ug/L		0.01	14-MAR-19
Surrogate: 2-Fluorobiphenyl			92.2		%		40-130	14-MAR-19
Surrogate: p-Terphenyl d14			94.4		%		40-130	14-MAR-19
625-PCP-WT	**Water**							
Batch R4563568								
WG3005132-2 LCS								
Pentachlorophenol			134.1		%		50-140	14-MAR-19
WG3005132-1 MB								
Pentachlorophenol			<0.50		ug/L		0.5	14-MAR-19
Surrogate: 2,4,6-Tribromophenol			90.1		%		40-150	14-MAR-19
BOD-WT	**Water**							

Quality Control Report

Client: DS Consultants (Vaughan)
6221 Highway 7 Unit 16
Vaughan ON L4H 0K8
Contact: Dorothy Garda

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BOD-WT	**Water**							
Batch R4569122								
WG3005798-6 DUP		**L2242986-2**						
BOD		<2.0	<2.0	RPD-NA	mg/L	N/A	20	18-MAR-19
WG3005798-7 LCS								
BOD			98.3		%		85-115	18-MAR-19
WG3005798-5 MB								
BOD			<2.0		mg/L		2	18-MAR-19
CN-TOT-WT	**Water**							
Batch R4565154								
WG3005289-3 DUP		**L2241938-1**						
Cyanide, Total		<2.0	<2.0	RPD-NA	mg/L	N/A	20	14-MAR-19
WG3005289-2 LCS								
Cyanide, Total			83.5		%		80-120	14-MAR-19
WG3005289-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	14-MAR-19
WG3005289-4 MS		**L2241938-1**						
Cyanide, Total			76.18		%		70-130	14-MAR-19
CR-CR6-IC-WT	**Water**							
Batch R4561259								
WG3005539-10 DUP		**WG3005539-8**						
Chromium, Hexavalent		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	13-MAR-19
WG3005539-7 LCS								
Chromium, Hexavalent			101.1		%		80-120	13-MAR-19
WG3005539-6 MB								
Chromium, Hexavalent			<0.00050		mg/L		0.0005	13-MAR-19
WG3005539-9 MS		**WG3005539-8**						
Chromium, Hexavalent			95.6		%		70-130	13-MAR-19
EC-WW-MF-WT	**Water**							
Batch R4563273								
WG3005450-3 DUP		**L2243112-1**						
E. Coli		0	<10	RPD-NA	CFU/100mL	N/A	65	14-MAR-19
WG3005450-1 MB								
E. Coli			0		CFU/100mL		1	14-MAR-19
F-IC-N-WT	**Water**							
Batch R4565187								
WG3005423-15 DUP		**WG3005423-13**						
Fluoride (F)		0.292	0.291		mg/L	0.3	20	13-MAR-19
WG3005423-12 LCS								

Quality Control Report

Client: DS Consultants (Vaughan)
6221 Highway 7 Unit 16
Vaughan ON L4H 0K8
Contact: Dorothy Garda

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-WT	**Water**							
Batch R4565187								
WG3005423-12 LCS								
Fluoride (F)			103.8		%		90-110	13-MAR-19
WG3005423-11 MB								
Fluoride (F)			<0.020		mg/L		0.02	13-MAR-19
WG3005423-14 MS		**WG3005423-13**						
Fluoride (F)			104.6		%		75-125	13-MAR-19
HG-T-CVAA-WT	**Water**							
Batch R4561269								
WG3005206-4 DUP		**WG3005206-3**						
Mercury (Hg)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	13-MAR-19
WG3005206-2 LCS								
Mercury (Hg)-Total			98.9		%		80-120	13-MAR-19
WG3005206-1 MB								
Mercury (Hg)-Total			<0.000010		mg/L		0.00001	13-MAR-19
WG3005206-6 MS		**WG3005206-5**						
Mercury (Hg)-Total			95.5		%		70-130	13-MAR-19
MET-T-CCMS-WT	**Water**							
Batch R4559871								
WG3004984-4 DUP		**WG3004984-3**						
Aluminum (Al)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	12-MAR-19
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-MAR-19
Arsenic (As)-Total		0.00444	0.00456		mg/L	2.6	20	12-MAR-19
Cadmium (Cd)-Total		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	12-MAR-19
Chromium (Cr)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	12-MAR-19
Cobalt (Co)-Total		0.00017	0.00017		mg/L	0.9	20	12-MAR-19
Copper (Cu)-Total		0.0349	0.0407		mg/L	15	20	12-MAR-19
Lead (Pb)-Total		0.000123	0.000124		mg/L	0.6	20	12-MAR-19
Manganese (Mn)-Total		0.0691	0.0687		mg/L	0.5	20	12-MAR-19
Molybdenum (Mo)-Total		0.000542	0.000548		mg/L	1.0	20	12-MAR-19
Nickel (Ni)-Total		0.00079	0.00080		mg/L	1.2	20	12-MAR-19
Selenium (Se)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	12-MAR-19
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	12-MAR-19
Tin (Sn)-Total		0.00014	0.00012		mg/L	16	20	12-MAR-19
Titanium (Ti)-Total		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	12-MAR-19
Zinc (Zn)-Total		0.0143	0.0151		mg/L	5.1	20	12-MAR-19
WG3004984-2 LCS								

Quality Control Report

Client: DS Consultants (Vaughan)
6221 Highway 7 Unit 16
Vaughan ON L4H 0K8
Contact: Dorothy Garda

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4559871								
WG3004984-2 LCS								
Aluminum (Al)-Total			96.3		%		80-120	12-MAR-19
Antimony (Sb)-Total			99.97		%		80-120	12-MAR-19
Arsenic (As)-Total			94.5		%		80-120	12-MAR-19
Cadmium (Cd)-Total			95.8		%		80-120	12-MAR-19
Chromium (Cr)-Total			94.8		%		80-120	12-MAR-19
Cobalt (Co)-Total			95.5		%		80-120	12-MAR-19
Copper (Cu)-Total			95.8		%		80-120	12-MAR-19
Lead (Pb)-Total			97.3		%		80-120	12-MAR-19
Manganese (Mn)-Total			97.0		%		80-120	12-MAR-19
Molybdenum (Mo)-Total			97.0		%		80-120	12-MAR-19
Nickel (Ni)-Total			96.1		%		80-120	12-MAR-19
Selenium (Se)-Total			94.5		%		80-120	12-MAR-19
Silver (Ag)-Total			95.9		%		80-120	12-MAR-19
Tin (Sn)-Total			97.3		%		80-120	12-MAR-19
Titanium (Ti)-Total			94.4		%		80-120	12-MAR-19
Zinc (Zn)-Total			92.0		%		80-120	12-MAR-19
WG3004984-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	12-MAR-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	12-MAR-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	12-MAR-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	12-MAR-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	12-MAR-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	12-MAR-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	12-MAR-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	12-MAR-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	12-MAR-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	12-MAR-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	12-MAR-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	12-MAR-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	12-MAR-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	12-MAR-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	12-MAR-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	12-MAR-19
WG3004984-5 MS		**WG3004984-6**						

Quality Control Report

Client: DS Consultants (Vaughan)
6221 Highway 7 Unit 16
Vaughan ON L4H 0K8
Contact: Dorothy Garda

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4559871								
WG3004984-5 MS		**WG3004984-6**						
Aluminum (Al)-Total			103.2		%		70-130	12-MAR-19
Antimony (Sb)-Total			99.2		%		70-130	12-MAR-19
Arsenic (As)-Total			99.0		%		70-130	12-MAR-19
Cadmium (Cd)-Total			90.3		%		70-130	12-MAR-19
Chromium (Cr)-Total			100.9		%		70-130	12-MAR-19
Cobalt (Co)-Total			98.5		%		70-130	12-MAR-19
Copper (Cu)-Total			92.2		%		70-130	12-MAR-19
Lead (Pb)-Total			87.9		%		70-130	12-MAR-19
Manganese (Mn)-Total			N/A	MS-B	%		-	12-MAR-19
Molybdenum (Mo)-Total			102.5		%		70-130	12-MAR-19
Nickel (Ni)-Total			95.1		%		70-130	12-MAR-19
Selenium (Se)-Total			97.8		%		70-130	12-MAR-19
Silver (Ag)-Total			84.0		%		70-130	12-MAR-19
Tin (Sn)-Total			97.8		%		70-130	12-MAR-19
Titanium (Ti)-Total			106.6		%		70-130	12-MAR-19
Zinc (Zn)-Total			77.0		%		70-130	12-MAR-19
NP,NPE-LCMS-WT	**Water**							
Batch R4567753								
WG3006894-3 DUP		**WG3006894-5**						
Nonylphenol		<1.0	<1.0	RPD-NA	ug/L	N/A	30	15-MAR-19
Nonylphenol Monoethoxylates		<10	<10	RPD-NA	ug/L	N/A	30	15-MAR-19
Nonylphenol Diethoxylates		<0.50	<0.50	RPD-NA	ug/L	N/A	30	15-MAR-19
WG3006894-2 LCS								
Nonylphenol			87.2		%		75-125	15-MAR-19
Nonylphenol Monoethoxylates			93.0		%		75-125	15-MAR-19
Nonylphenol Diethoxylates			101.0		%		75-125	15-MAR-19
WG3006894-1 MB								
Nonylphenol			<1.0		ug/L		1	15-MAR-19
Nonylphenol Monoethoxylates			<2.0		ug/L		2	15-MAR-19
Nonylphenol Diethoxylates			<0.10		ug/L		0.1	15-MAR-19
WG3006894-4 MS		**WG3006894-5**						
Nonylphenol			96.4		%		50-150	15-MAR-19
Nonylphenol Monoethoxylates			136.7		%		50-150	15-MAR-19
Nonylphenol Diethoxylates			99.4		%		50-150	15-MAR-19

Quality Control Report

Client: DS Consultants (Vaughan)
6221 Highway 7 Unit 16
Vaughan ON L4H 0K8
Contact: Dorothy Garda

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
OGG-SPEC-WT	**Water**							
Batch R4569571								
WG3008450-2 LCS								
Oil and Grease, Total			94.4		%		70-130	18-MAR-19
Mineral Oil and Grease			88.6		%		70-130	18-MAR-19
WG3008450-1 MB								
Oil and Grease, Total			<2.0		mg/L		2	18-MAR-19
Mineral Oil and Grease			<1.0		mg/L		1	18-MAR-19
P-T-COL-WT	**Water**							
Batch R4567388								
WG3006769-3 DUP		**L2243274-1**						
Phosphorus, Total		0.0319	0.0334		mg/L	4.5	20	15-MAR-19
WG3006769-2 LCS								
Phosphorus, Total			101.5		%		80-120	15-MAR-19
WG3006769-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	15-MAR-19
WG3006769-4 MS		**L2243274-1**						
Phosphorus, Total			78.6		%		70-130	15-MAR-19
PAH-EXTRA-WT	**Water**							
Batch R4563268								
WG3005132-2 LCS								
Benzo(e)pyrene			101.0		%		60-130	14-MAR-19
1,3-Dinitropyrene			146.2	LCS-H	%		60-130	14-MAR-19
1,6-Dinitropyrene			127.4		%		60-130	14-MAR-19
Dibenz(a,h)acridine			126.0		%		60-130	14-MAR-19
1,8-Dinitropyrene			98.4		%		60-130	14-MAR-19
Dibenz(a,j)acridine			93.2		%		60-130	14-MAR-19
7H-Dibenzo(c,g)carbazole			122.9		%		60-130	14-MAR-19
Dibenzo(a,i)pyrene			86.7		%		60-130	14-MAR-19
WG3005132-1 MB								
Benzo(e)pyrene			<0.050		ug/L		0.05	14-MAR-19
1,3-Dinitropyrene			<1.0		ug/L		1	14-MAR-19
1,6-Dinitropyrene			<1.0		ug/L		1	14-MAR-19
Dibenz(a,h)acridine			<0.050		ug/L		0.05	14-MAR-19
1,8-Dinitropyrene			<1.0		ug/L		1	14-MAR-19
Dibenz(a,j)acridine			<0.050		ug/L		0.05	14-MAR-19
7H-Dibenzo(c,g)carbazole			<0.050		ug/L		0.05	14-MAR-19
Dibenzo(a,i)pyrene			<0.050		ug/L		0.05	14-MAR-19

Quality Control Report

Client: DS Consultants (Vaughan)
6221 Highway 7 Unit 16
Vaughan ON L4H 0K8
Contact: Dorothy Garda

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-EXTRA-WT	**Water**							
Batch R4563268								
WG3005132-1 MB								
Surrogate: d14-Terphenyl			75.6		%		40-130	14-MAR-19
PCB-WT	**Water**							
Batch R4564391								
WG3005668-2 LCS								
Aroclor 1242			97.8		%		65-130	13-MAR-19
Aroclor 1248			100.9		%		65-130	13-MAR-19
Aroclor 1254			106.4		%		65-130	13-MAR-19
Aroclor 1260			96.7		%		65-130	13-MAR-19
WG3005668-1 MB								
Aroclor 1242			<0.020		ug/L		0.02	13-MAR-19
Aroclor 1248			<0.020		ug/L		0.02	13-MAR-19
Aroclor 1254			<0.020		ug/L		0.02	13-MAR-19
Aroclor 1260			<0.020		ug/L		0.02	13-MAR-19
Surrogate: 2-Fluorobiphenyl			80.5		%		50-150	13-MAR-19
PH-WT	**Water**							
Batch R4561392								
WG3005150-4 DUP		**WG3005150-3**						
pH		7.59	7.60	J	pH units	0.01	0.2	13-MAR-19
WG3005150-2 LCS								
pH			6.98		pH units		6.9-7.1	13-MAR-19
PHENOLS-4AAP-WT	**Water**							
Batch R4563447								
WG3005367-7 DUP		**L2242386-1**						
Phenols (4AAP)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	13-MAR-19
WG3005367-6 LCS								
Phenols (4AAP)			97.6		%		85-115	13-MAR-19
WG3005367-5 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	13-MAR-19
WG3005367-8 MS		**L2242386-1**						
Phenols (4AAP)			95.9		%		75-125	13-MAR-19
SOLIDS-TSS-WT	**Water**							

Quality Control Report

Client: DS Consultants (Vaughan)
6221 Highway 7 Unit 16
Vaughan ON L4H 0K8
Contact: Dorothy Garda

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TSS-WT	**Water**							
Batch R4567980								
WG3007132-3 DUP		**L2242974-2**						
Total Suspended Solids		3060	2600		mg/L	16	20	18-MAR-19
WG3007132-2 LCS								
Total Suspended Solids			100.7		%		85-115	18-MAR-19
WG3007132-1 MB								
Total Suspended Solids			<2.0		mg/L		2	18-MAR-19
TKN-WT	**Water**							
Batch R4567143								
WG3006258-3 DUP		**L2242644-1**						
Total Kjeldahl Nitrogen		11.6	11.6		mg/L	0.5	20	14-MAR-19
WG3006258-2 LCS								
Total Kjeldahl Nitrogen			104.2		%		75-125	14-MAR-19
WG3006258-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	14-MAR-19
WG3006258-4 MS		**L2242644-1**						
Total Kjeldahl Nitrogen			N/A	MS-B	%		-	14-MAR-19
VOC-ROU-HS-WT	**Water**							
Batch R4563027								
WG3001900-4 DUP		**WG3001900-3**						
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-MAR-19
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-MAR-19
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-MAR-19
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-MAR-19
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	14-MAR-19
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-MAR-19
Dichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	14-MAR-19
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-MAR-19
m+p-Xylenes		<1.0	<1.0	RPD-NA	ug/L	N/A	30	14-MAR-19
o-Xylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-MAR-19
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-MAR-19
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-MAR-19
trans-1,3-Dichloropropene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-MAR-19
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-MAR-19
WG3001900-1 LCS								
1,1,2,2-Tetrachloroethane			97.1		%		70-130	14-MAR-19
1,2-Dichlorobenzene			108.8		%		70-130	14-MAR-19

Quality Control Report

Client: DS Consultants (Vaughan)
6221 Highway 7 Unit 16
Vaughan ON L4H 0K8
Contact: Dorothy Garda

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ROU-HS-WT	**Water**							
Batch R4563027								
WG3001900-1 LCS								
1,4-Dichlorobenzene			111.8		%		70-130	14-MAR-19
Benzene			111.4		%		70-130	14-MAR-19
Chloroform			109.3		%		70-130	14-MAR-19
cis-1,2-Dichloroethylene			101.3		%		70-130	14-MAR-19
Dichloromethane			103.5		%		70-130	14-MAR-19
Ethylbenzene			104.1		%		70-130	14-MAR-19
m+p-Xylenes			105.7		%		70-130	14-MAR-19
o-Xylene			102.7		%		70-130	14-MAR-19
Tetrachloroethylene			110.3		%		70-130	14-MAR-19
Toluene			104.4		%		70-130	14-MAR-19
trans-1,3-Dichloropropene			102.2		%		70-130	14-MAR-19
Trichloroethylene			114.7		%		70-130	14-MAR-19
WG3001900-2 MB								
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	14-MAR-19
1,2-Dichlorobenzene			<0.50		ug/L		0.5	14-MAR-19
1,4-Dichlorobenzene			<0.50		ug/L		0.5	14-MAR-19
Benzene			<0.50		ug/L		0.5	14-MAR-19
Chloroform			<1.0		ug/L		1	14-MAR-19
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	14-MAR-19
Dichloromethane			<2.0		ug/L		2	14-MAR-19
Ethylbenzene			<0.50		ug/L		0.5	14-MAR-19
m+p-Xylenes			<1.0		ug/L		1	14-MAR-19
o-Xylene			<0.50		ug/L		0.5	14-MAR-19
Tetrachloroethylene			<0.50		ug/L		0.5	14-MAR-19
Toluene			<0.50		ug/L		0.5	14-MAR-19
trans-1,3-Dichloropropene			<0.50		ug/L		0.5	14-MAR-19
Trichloroethylene			<0.50		ug/L		0.5	14-MAR-19
Surrogate: 1,4-Difluorobenzene			100.9		%		70-130	14-MAR-19
Surrogate: 4-Bromofluorobenzene			96.3		%		70-130	14-MAR-19
WG3001900-5 MS		**WG3001900-3**						
1,1,2,2-Tetrachloroethane			107.4		%		50-150	14-MAR-19
1,2-Dichlorobenzene			107.8		%		50-150	14-MAR-19
1,4-Dichlorobenzene			107.2		%		50-150	14-MAR-19
Benzene			112.1		%		50-150	14-MAR-19

Quality Control Report

Client: DS Consultants (Vaughan)
6221 Highway 7 Unit 16
Vaughan ON L4H 0K8
Contact: Dorothy Garda

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ROU-HS-WT	**Water**							
Batch R4563027								
WG3001900-5 MS		**WG3001900-3**						
Chloroform			111.7		%		50-150	14-MAR-19
cis-1,2-Dichloroethylene			102.4		%		50-150	14-MAR-19
Dichloromethane			106.3		%		50-150	14-MAR-19
Ethylbenzene			100.8		%		50-150	14-MAR-19
m+p-Xylenes			102.1		%		50-150	14-MAR-19
o-Xylene			100.6		%		50-150	14-MAR-19
Tetrachloroethylene			104.6		%		50-150	14-MAR-19
Toluene			102.1		%		50-150	14-MAR-19
trans-1,3-Dichloropropene			98.6		%		50-150	14-MAR-19
Trichloroethylene			111.1		%		50-150	14-MAR-19

Quality Control Report

Workorder: L2243112 Report Date: 19-MAR-19

Client: DS Consultants (Vaughan)
6221 Highway 7 Unit 16
Vaughan ON L4H 0K8
Contact: Dorothy Garda

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
J	Duplicate results and limits are expressed in terms of absolute difference.
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2243112-COFC

COC Number: 17 - 724656

Page of

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	DS Consultants Ltd.	Select Report Format: [X] PDF [X] EXCEL [ ] EDD (DIGITAL)	Regular [R] [X] Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Dorothy Garda	Quality Control (QC) Report with Report [X] YES [ ] NO	PRIORITY (Business Days): 4 day [P4-20%] [ ] / 3 day [P3-25%] [ ] / 2 day [P2-50%] [ ]
Phone:	(905) 264-9393	[X] Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E-100%] [ ] / Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)] [ ]
	Company address below will appear on the final report	Select Distribution: [X] EMAIL [ ] MAIL [ ] FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:	6221 Highway 7, Unit 16	Email 1 or Fax dorothy.garda@dsconsultants.ca	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Vaughan, ON	Email 2	
Postal Code:	L4H 0K8	Email 3	

Invoice To		Invoice Distribution	
	Same as Report To [X] YES [ ] NO	Select Invoice Distribution: [X] EMAIL [ ] MAIL [ ] FAX	
	Copy of Invoice with Report [X] YES [ ] NO		
Company:		Email 1 or Fax	
Contact:		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	18-733-100	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):	L2243112	ALS Contact: AF	Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	X Toronto Sanitary / Storm	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
	BH18-10	11-3-19		GW	X			10

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? [ ] YES [X] NO	
Are samples for human consumption/ use? [ ] YES [X] NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen [ ]		SIF Observations	Yes [ ]	No [ ]	
Ice Packs [ ]	Ice Cubes [X]	Custody seal intact	Yes [ ]	No [ ]	
Cooling Initiated [ ]					

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
	8.7°C

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
	12-3-19	2:45pm					12/Mar/2019	14:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JULY 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Appendix D: MECP Water Wells Records

18-733-30 **5800 Yonge Street, North York , ON**

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
NORTH YORK BOROUGH	17 627569 4847581 W	2008/02 6607	2.00	FR 0030		MO		7111504 (M01274) A059254	BRWN FILL 0008 BRWN TILL GRVL DNSE 0013 GREY TILL SILT 0016 GREY SILT TILL DNSE 0020 GREY SAND SILT LOOS 0035
NORTH YORK BOROUGH	17 627415 4849557 W	2010/09 7215	2			TH	0025 15	7153332 (Z121765) A103131	BRWN FILL WBRG 0004 BRWN SILT CLAY DRY 0010 BRWN SILT SAND DRY 0040
NORTH YORK BOROUGH	17 627398 4849485 W	2012/08 7218						7188477 (C19331) A136190 P	
NORTH YORK BOROUGH	17 627344 4849284 W	2012/12 6032	2			MO	0010 10	7196426 (Z158130) A102117	GREY CLAY SILT DNSE 0015 GREY CLAY SILT DNSE 0020
NORTH YORK BOROUGH	17 627263 4849290 W	2013/03 7501	2	UT		MT	0055 10	7200295 (Z165098) A143165	BRWN SILT CLAY SAND 0008 GREY SILT CLAY DNSE 0030 BRWN SAND SILT DNSE 0035 BRWN SILT SAND DNSE 0060 GREY SILT CLAY DNSE 0065
NORTH YORK BOROUGH	17 627264 4849281 W	2013/04 7501	2			MT	0070 10	7202744 (Z165053) A143109	BRWN CLAY SILT DNSE 0030 BRWN SAND MGRD 0032 GREY SILT SAND DNSE 0065 GREY SILT CLAY DNSE 0080
NORTH YORK BOROUGH	17 627270 4849219 W	2012/07 7215						7205371 (C19348) A128792 P	
NORTH YORK BOROUGH	17 627392 4849466 W	2013/10 7147	1.97	FR 0011			0004 10	7209536 (Z171606) A	
NORTH YORK BOROUGH	17 627414 4849501 W	2013/10 7147	1.97	FR 0011			0004 10	7209537 (Z171607) A118428 A	
NORTH YORK BOROUGH	17 627272 4849274 W	2013/10 7472	2.04			MO	0015 10	7211775 (Z181825) A158415	BRWN FSND FILL LOOS 0005 BRWN SILT CLAY DNSE 0025
NORTH YORK BOROUGH	17 627278 4849298 W	2013/10 7472	2.04			MO	0015 10	7211776 (Z181817) A158414	BRWN FSND FILL LOOS 0005 BRWN SILT CLAY DNSE 0025
NORTH YORK BOROUGH	17 627315 4849297 W	2013/10 7472	2.04			MO	0060 10	7211777 (Z181826) A158413	BRWN FSND FILL LOOS 0005 BRWN SILT CLAY DNSE 0034 BRWN FSND SILT DNSE 0070
NORTH YORK BOROUGH	17 627319 4849299 W	2013/10 7472	2.04			MO	0015 10	7211778 (Z181815) A158418	BRWN FSND FILL LOOS 0005 BRWN SILT CLAY DNSE 0025
NORTH YORK BOROUGH	17 627334 4849311 W	2013/10 7472	2.04			MO	0015 10	7211779 (Z181814) A158417	BRWN FSND FILL LOOS 0005 BRWN SILT CLAY DNSE 0025
NORTH YORK BOROUGH	17 627340 4849321 W	2013/10 7472	2.04			MO	0060 10	7211780 (Z181813) A158416	BRWN FSND FILL LOOS 0005 BRWN SILT CLAY DNSE 0035 BRWN FSND SILT DNSE 0070
NORTH YORK BOROUGH	17 627392 4849469 W	2013/09 6988						7214927 (C20118) A118428 P	
NORTH YORK BOROUGH	17 627531 4849401 W	2013/06 7230						7216786 (C23273) A139271 P	
NORTH YORK BOROUGH	17 627294 4848799 W	2014/12 6988	2.00			TH	0042 10	7238895 (Z199440) A174899	BRWN FILL LOOS 0005 BRWN CLAY SILT TILL 0020 GREY CLAY SILT TILL 0052
NORTH YORK BOROUGH	17 627269 4849279 W	2015/02 7472	2.04			MO	0080 10	7239035 (Z208532) A179678	BRWN LOAM GRVL LOOS 0010 GREY SILT CLAY PCKD 0025 BRWN MSND PCKD 0065 GREY SILT STNS DNSE 0090
NORTH YORK BOROUGH	17 627310 4849301 W	2015/02 7472	2.04			MO	0085 10	7239036 (Z208533) A179679	BRWN LOAM GRVL FILL 0010 GREY SILT CLAY PCKD 0025 BRWN MSND PCKD 0065 GREY SILT STNS DNSE 0095

NORTH YORK BOROUGH	17 627338 4849328 W	2015/02 7472	2.04			MO	0008 82	7239037 (Z208534) A179680	BRWN LOAM GRVL FILL 0010 GREY SILT CLAY PCKD 0025 BRWN MSND PCKD 0065 GREY SILT STNS DNSE 0090
NORTH YORK BOROUGH	17 626869 4849043 W	2015/03 6902	2.00			MO	0010 5	7240218 (Z204745) A174860	BLCK DNSE 0000 GREY SAND GRVL 0002 BRWN FILL SAND CLAY 0005 BRWN CLAY SLTY SOFT 0015
NORTH YORK BOROUGH	17 627287 4848791 W	2015/05 6988						7248026 (C27479) A174918 P	
NORTH YORK BOROUGH	17 627398 4849556 W	2015/07 6032	1.79	UT 0040		MO	0055 10	7248166 (Z194283) A181478	BRWN SAND GRVL DNSE 0040 GREY SAND SILT DNSE 0057 GREY SAND 0070
NORTH YORK BOROUGH	17 627297 4849327 W	2014/08 7215	2			TH	0014 10	7253048 (Z178760) A172177	BRWN FILL 0002 BRWN SAND 0010 BRWN SILT CLAY 0014
NORTH YORK BOROUGH	17 627463 4849380 W	2016/03 6032	1.97	UT 0118		MT	0115 10	7262407 (Z206892) A194321	BRWN CLAY DNSE 0039 BRWN SAND DNSE 0098 GREY SAND 0125
NORTH YORK BOROUGH	17 626869 4849043 W	2016/05 6902				MO		7264598 (Z211025) A174860 A	
NORTH YORK BOROUGH	17 627493 4849242 W	2016/06 6032	2			MO	0104 10	7281524 (Z206947) A202418	BRWN SAND SILT SOFT 0007 BRWN SILT SAND DNSE 0090 GREY SAND SILT DNSE 0114
NORTH YORK BOROUGH	17 627337 4849607 W	2016/07 7230	2.04	FR		TH MO	0050 10	7282166 (Z247266) A209436	BRWN FILL SAND LOOS 0016 BRWN SILT SAND DNSE 0025 BRWN SAND CLAY DNSE 0030 BRWN SILT SAND DNSE 0060
NORTH YORK BOROUGH	17 627168 4848784 W	2016/10 7230						7282187 (C36610) A217106 P	