Proposed Residential Development

Preliminary Hydrogeological Investigation

11 to 21 Yorkville Avenue, and
16 to 18 Cumberland Street
Toronto, ON

Client:
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Project Number:
MRK- 00242474-A0

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1. Introduction

1.1 Project Description

EXP Services Inc. (EXP) was retained by Ms. Kristy Shortall of 11 Yorkville Partners Inc. to conduct a Preliminary Hydrogeological Investigation in support of the proposed residential development at 11 to 21 Yorkville Avenue and 16 to 18 Cumberland Street, in the City of Toronto, Ontario (hereinafter referred to as the 'Site') as shown in Figure 1.

The Site consists of two portions. One portion is 11 to 21 Yorkville Avenue which is bound by Yorkville Avenue to the north, a public laneway to the east, a public laneway to the south and west. The second portion of the Site, 16 to 18 Cumberland Street is bound by a public laneway to the north, Cumberland Street to the south and commercial buildings to the east and west. The Site measures approximately 3129 square metres in area for both portions. The Site is generally flat. The Site is currently developed with mixed commercial landuse.

It is our understanding that the Site will be developed in two portions based on the Sweeny & Co Architects Site Drawings dated March 2, 2018. A 62 storey high-rise structure with one (1) concourse level and four (4) levels of underground parking to a finished floor elevation (FFE) of 20.3 metres below ground surface (mbgs) on the Yorkville Avenue portion of the Site. The Cumberland Street portion of the Site will consist of a two (2) storey commercial building with one level of concourse below grade extending to an estimated FFE of 4 mbgs. The east west public laneway will be maintained through the Site.

The comments and recommendations provided in this report solely for dewatering purposes and are based on the assumption the above-described work will proceed into construction. If changes are made either in the design phase or during construction, this office must be retained to review these modifications. The result of this review may be a modification of our recommendations or the requirement of additional field or laboratory work to check whether the changes are acceptable from a hydrogeological viewpoint.

1.2 Project Objectives

The objectives for this Preliminary Hydrogeological Investigation include:

- Establish the local hydrogeological settings within the Site;
- Assess preliminary construction dewatering flow rate, for the proposed site plan; and,
- Assess preliminary long-term foundation sub-drain discharge volumes, for the proposed site plan.

The Preliminary Hydrogeological Investigation will evaluation of construction dewatering and foundation sub-drain discharge volumes will be estimated using analytical methods.

1.3 Scope of Work

To achieve the Investigation objectives, EXP **c**ompleted the following Scope of Work:

- Review available geological and hydrogeological information for the Site;
- Develop all monitoring wells in the development area and conduct Single Well Response Tests (SWRT) to evaluate hydraulic properties of the saturated soils at the Site;
- Complete two (2) rounds of groundwater level measurements in all monitoring wells;
- Collect one (1) groundwater sample for laboratory testing of the City of Toronto Sanitary and Storm Sewer By-Law parameters;
- Evaluate the information collected during the field investigation program, including borehole geological information, SWRT results, groundwater level measurements and groundwater water quality;
- Preparation of site plans, cross sections, geological mapping, and groundwater contour mapping for the Site;
- Calculate construction dewatering flow rates (construction), for the proposed site plan configuration;
- Provide a preliminary calculation for the sub-drain discharge volumes (post construction) for the proposed site plan configuration; and,
- Prepare a Preliminary Hydrogeological Investigation Report to document the findings.

Please note that the foundation drain analysis will provide preliminary flow rate estimates based on analytical methods. Actual flow rate measurements of the sump discharge, once it is built, will be required to confirm these flow rates estimates for permitting purposes or use for infiltration capacity, if necessary.

2. Hydrogeological Setting

2.1 Regional Setting

2.1.1 Regional Physiography

The Site is located within a physiographic region known as the Iroquois Plain and the Physiographic landform known as Sand Plain (Ministry of Northern Development and Mines 2012, Chapman & Putnam, 1984). The Iroquois Plain was created by the movement of glaciers and basal deposits during the last glaciation event and is characterized by level to gently rolling topography, with a consistent and gradual slope toward Lake Ontario. The Iroquois Plain of a silty sand layer to a depth of 4 mbgs, over a silty clay layer to a depth of 12 mbgs, over a silty sand/sandy silt layer to 34 mbgs. A clayey silt till layer was encountered immediately overlying the shale bedrock, from approximately 34 to 38 mbgs.

2.1.2 Regional Geology, Topography and Hydrogeology

The Quaternary geology of the Site and surrounding area are characterized by Glaciolacustrine deposits consisting of sand and gravel; nearshore and beach deposits from the Google Earth - Ontario Geological Survey 2000: Quaternary Geology seamless coverage of Province of Ontario.

Bedrock of the region corresponds to the Upper Ordovician aged Georgian Bay Formation from the Ontario Geological Survey, Data 126 Revision 1, Bedrock Geology of Ontario 2011. The Georgian Bay Formation is composed of primarily of interbedded calcareous shale, limestone, dolostone, and siltstone. the bedrock elevation of the site is at approximately 80 metres above sea level (masl), at a depth of approximately 36 mbgs (Sharpe, 1980).

The topography in the area of the Site is generally flat with a slight gradient downwards to the south, as indicated on the Ontario Ministry of Natural Resources topographic maps (Sheet 10 17 6250 48350 and Sheet 10 17 6300 48350). The Ministry of Natural Resources and Forestry – Heritage Lands Map, 2017 did not identify any Areas of Natural Scientific Interest (ANSI) or wetlands on or near the Site.

The shallow groundwater will likely flow in the general direction of the local topography. Therefore, the groundwater in the area of the Site is likely to the south, towards Lake Ontario approximately 3.6km south of the Site.

Local deviation from the shallow regional groundwater flow directions may occur in response to changes in topography and/or soils, as well as the presence of surface water features and/or existing subsurface infrastructure.

2.1.3 Existing Water Well Survey

Well Records from the MOECC Water Well Record (WWR) Database were reviewed to determine the number of water wells present within a 500m radius from the property boundary of the Site. A total of one hundred and seventy-five (175) well records were located within 500m of the Site as shown Appendix A. Twelve (12) of the records are shown to be located on the Site. None of the wells were listed as Domestic (DO), Stock (ST), Commercial (CO), Irrigation (IR), or Industrial (IN). Eighty-five (85) were listed as Monitoring Wells (MO/MT or Test Holes (TH), twelve (12) were listed as Dewatering wells (DE) and seventy-eight (78) were listed as not identified in the database or Not Used (NU).

The measured water level depth in one of the twelve well records on the Site was 3.6 mbgs. Groundwater was encountered in the other well records within the study area at depths ranging from 0.3 to 99.9 mbgs. The water levels measured in the wells installed deeper than 15.2 mbgs ranged in depth from 14.3 to 17.4 mbgs.

The well records document the surficial soils at the Site within the 500m study area consist of silty clay underlain by mixtures of sandy silt some clay, sandy silt, clay with shale inclusions and shale. Bedrock was encountered at a depth of 34.7 mbgs in well record 7241015 on the east adjacent property, (Appendix A).

The study area surrounding the Site is municipally serviced and developed with residential or commercial landuse. It is unknown if any of the domestic, industrial and commercial installed water supply wells remain in the study area of the Site and has not been verified in this investigation.

2.2 Site Setting

2.2.1 Site Topography

The topography is considered relatively flat with an overall gradual downwards slope to the south west. Based on the elevation contours from the Ontario Ministry of Natural Resources topographic maps (Sheet 10 17 6250 48350 and Sheet 10 17 6300 48350). The ground elevation of the Site ranged from approximately from 116 to 116.3 meters above sea level (masl). The measured ground surface elevations are provided in the Topographic Plan Drawing Number 17M-01494-000, prepared by WSP Geomatics Ontario Limited, dated August 21, 2017.

2.2.2 Local Surface Water Features

There are no local surface water features on the Site. Surface drainage is influenced by the local topography that slopes to the southwest and catchbasins on the Site.

2.2.3 Local Geology and Hydrogeology

Based on the borehole logs (Appendix B), the general subsurface geology of the Site encountered in the Borehole Locations, shown in Figure 2, consists of surficial concrete or pavement structure underlain by fill overlying native sand/silty sand and silty clay/silty clay till over alternating deposits of silt, sandy silt, sandy silt to silty sand underlain by clayey silt till. The clayey silt till deposit was overlying weathered shale bedrock in Borehole BH1. The subsurface deposits are summarized on two geological cross-sections, referenced in Figure 3, as east-west (A-A'), and north-south (B-B') and included in Figures 4 and 5, respectively.

2.2.4 Site Subsurface Soil Conditions

The detailed soil profile encountered in each borehole and the results of laboratory moisture content and selected unit weight determinations are indicated on the attached borehole logs. It should be noted the soil boundaries indicated on the borehole logs are inferred from non-continuous sampling and observations during drilling. These boundaries are intended to reflect approximate transition zones for the purpose of geotechnical design and should not be interpreted as exact planes of geological change. The "Notes on Sample Descriptions" preceding the borehole logs form an integral part of and should be read in conjunction with this report.

The stratigraphy of the Site, as revealed in the boreholes installed by EXP in January 2018 (Boreholes TH1 to TH4) and by SPL in 2015 (Boreholes BH15-2, BH15-3 and BH15-3S), generally comprised surficial concrete or pavement structure underlain by fill overlying native Sand/Silty Sand and Silty Clay/Silty Clay Till over alternating deposits of Silt, Sandy Silt, Sandy

Silt to Silty Sand underlain by Clayey Silt Till. The Clayey Silt Till deposit was overlying weathered Shale bedrock as shown in Borehole BH1 from McClymont and Rak, installed in February 2016.

A brief description of the stratigraphy, in order of depth, follows.

Pavement Structure

Pavement structure, comprising 50 mm asphaltic concrete, was encountered in Boreholes TH1 to TH4 and BH1.

Concrete

Surficial concrete, measuring 100 mm thick, was encountered in Borehole BH15-3.

Fill

Fill was encountered in both boreholes, extending to depths of about 1.5 to 2.3 m below the existing grade. The fill material generally comprised silty sand to sand with variable amounts of gravel. Brick, coal, asphalt and concrete fragments were noted within the fill. The fill was generally moist to very moist.

Sand/Silty Sand

Sand/Silty Sand was encountered below the fill in the boreholes, and extended to depths of about 3.5 to 4.6 m below the existing grade. The Sand/Silty Sand existed in a loose to compact state of compactness. The Sand/Silty Sand was found to be moist becoming wet at about 3 m below then existing grade.

Lower Sand/Silty Sand layers were encountered at depths of about 12.2 to 25.9 m below the existing grade in Borehole 1. Based on the SPT N values, the lower Sand/Silty Sand existed in a dense to very dense state of compactness. The lower Sand/Silty Sand unit exist in a moist to wet condition.

Silty Clay / Silty Clay Till

Silty Clay or Silty Clay Till was encountered below the Sand/Silty Sand. The Silty Clay/Silty Clay till deposits were grey in colour, contained trace Sand and Gravel, and were stiff to very stiff in consistency. The Silty Clay/Silty Clay Till were in a moist condition. The Silty Clay/Silty Clay Till deposits extended to depths of about 4.55 to 12.2 m below then existing grade.

Alternating Deposits of Silt, Sandy silt, Sandy Silt to Silty Sand

Alternating deposits of Silt, Sandy Silt, and Sandy Silt to Silty Sand was encountered below the Silty Clay or Sand/Silty Sand in both boreholes. The deposits contained variable amounts of Clay. Frequent Clayey Silt seams/layers were noted in the Sandy Silt to Silty Sand deposit. The compactness of the deposits ranged from compact to very dense, but was typically dense to very dense. The deposits were generally in a wet condition.

A lower Sandy Silt layer was encountered at a depth of 21.7 m below then existing grade in Borehole BH15-3, and extended to the termination depth of borehole at 21.9 m below the existing grade. The lower Sandy Silt layer contained trace Clay and existed in a dense state of compactness. The lower Sandy Silt layer existed in a wet condition.

Clayey Silt Till

Clayey Silt Till was encountered at depths ranging from approximately 19.3 to 33.5 m below existing grade. The Clayey Silt Till contained variable amounts of Sand, trace Gravel, and was hard in consistency. Shale fragments were noted in the clayey silt till with depth. The Clayey Silt Till was in a moist condition.

Weathered Shale

Weathered Shale bedrock was encountered below the Clayey Silt Till deposit in Borehole BH1. The contact surface of the bedrock was at about 38.1 m below then existing grade, corresponding to approximately Elevation 78.5 m. No coring was carried out to confirm and to determine the quality of the bedrock for this preliminary investigation. As such, the contact elevations should not be interpreted as exact planes of bedrock since the auger will frequently penetrate some distance into the weathered Shale bedrock before noticeable resistance is encountered.

Based on EXP's past experience in the area, the bedrock encountered in the borehole belongs to the Georgian Bay Formation (Ordovician period) and underlies this Site to a significant depth. The upper zone of the bedrock is generally highly weathered to weathered. The distinction between highly weathered shale and the overlying strata, particularly if the latter contains abundant shale fragments, is not always clear and consequently, some of the soils resting on the surface of the bedrock might be very weak or highly weathered rock.

2.2.5 Site Groundwater Conditions

Groundwater conditions were observed in the boreholes during the fieldwork and in monitoring wells installed in previous investigations on the Site. The water levels in monitoring wells installed in Boreholes BH1, BH15-3, BH15-3S, MW01, MW02, MW03, MW04, MW05, TH1, TH2, TH3 and TH4 were monitored by EXP from November 28, 2017 to February 5, 2018 for subsequent readings. Groundwater measurements are included on the EXP borehole logs (TH1, TH2, TH3 and TH4) in Appendix B and tabulated in Appendix C.

On completion of drilling of EXP Boreholes, groundwater levels were measured in three (3) of the four (4) boreholes (Boreholes TH2, TH3 and TH4) ranging in depth from 3.19 to 3.40 metres below ground surface (mbgs). The groundwater appears to originate from the shallow Sand deposits ranging from 2.43 to 4.50 mbgs and perched on a Silty Clay deposit. Borehole TH1 was installed to a depth of 15.8 mbgs and was dry on completion of drilling.

The short-term groundwater levels in the monitoring wells are highly variable and influenced by the extent and thickness of pervious seams and layers within the moderate to low permeability soils at this Site.

3. Results

3.1 Review of Previous Reports

The following reports were reviewed as part of this Preliminary Hydrogeological Investigation:

- Preliminary Geotechnical Assessment, 11 to 21 Yorkville Avenue and 16 to 18 Cumberland Street, City of Toronto, Ontario, by EXP Services Inc., (February 28, 2018), prepared for 17 Yorkville Partners Inc.
- Environmental Soil and Groundwater Investigation, 11 & 17 Yorkville Avenue, Toronto, Ontario, by SPL prepared for Bazis Inc., February 13, 2015;
- Phase II Environmental Site Assessment, 21-25 Yorkville Avenue, Toronto, Ontario, by Pinchin, prepared for King Sett Capital, January 21, 2016; and,
- Preliminary Geo-Environmental Investigation, 19 Yorkville Avenue, Toronto, Ontario, by McClymont and Rak Engineers Inc., prepared for Bazis International Inc., March 4, 2016.

Subsurface soils and groundwater conditions described in this report have been incorporated in this report.

3.2 Monitoring Wells

Monitoring wells were installed in the EXP boreholes TH1, TH2, TH3 and TH4 for subsequent groundwater readings during the EXP field program. The Short-term groundwater measurements are included in the attached borehole logs in Appendix B and subsequent water level measurements are summarized in Appendix C.

The water levels in monitoring wells installed in Boreholes BH1, BH15-3, BH15-3S, MW01, MW02, MW03, MW04, MW05, TH1, TH2, TH3 and TH4 were monitored by EXP from November 28, 2017 to February 5, 2018 for subsequent readings. Winter conditions restricted access to some monitoring wells during this period as indicated in Appendix C.

The deep monitoring wells installed in Boreholes BH1, BH15-3 and TH1 were installed to a depth ranging from 15.8 to 27.45 mbgs to evaluate the groundwater conditions at the design base of the foundation of the building (assumed 16 mbgs) and determine groundwater conditions at depth.

The boreholes installed by EXP were sealed above the well screen and sand pack with bentonite as described in the Borehole Logs. The screened portion of the monitoring well was installed at various depths to collect groundwater and conduct insitu testing of various subsurface materials. The monitoring wells are installed in the borehole locations, shown on Figure 2.

The static water level within each EXP monitoring well was measured after installation and prior to the start of the well development. Each monitoring well was developed to remove fines introduced into the screens following construction. The development process involved surging of the groundwater and purging of the monitoring wells to flush out any fines in the sand pack and

induce the flow of fresh formation water from the surrounding soil deposits through the well screen.

3.3 Water Level Monitoring

As part of the Preliminary Hydrogeological Investigation, static water levels were recorded on November 28, 2017 January 29 and 31, 2018, and February 5, 2018 by EXP. The elevation of the ground surface at the borehole locations was determined from a Topographic Plan Drawing Number 17M-01494-000, prepared by WSP Geomatics Ontario Limited, dated August 21, 2017, provided by the client.

A summary of the water level data from the date of installation of the EXP monitoring wells and the data from the other monitoring wells collected for this Preliminary Hydrogeological Investigation are summarized in the Water Level Measurements Table, included in Appendix C.

Shallow monitoring wells installed at the Site in Boreholes BH15-3S, MW01, MW02, MW03, MW04, MW05, TH2, TH3 and TH4 encountered a perched groundwater that ranged in depth from 0.44 mbgs to 5.33 mbgs with a maximum elevation of 113.82 masl. This groundwater was found in the shallow Sand deposit perched on a Silty Clay deposit below.

Monitoring wells in Boreholes BH1, BH15-3 and TH1 were installed to a depth ranging from 15.8 to 27.45 mbgs to evaluate the groundwater conditions at the designed foundation level of the building (assumed 16 mbgs). The groundwater levels in these monitoring wells are included in Appendix C. As indicated, Borehole TH1 did not have any detectable water level or less than a depth of 15.8 mbgs. The water level in Borehole BH15-3 was measured to be 16.9 mbgs on January 28, 2015, 17.99 mbgs on November 28, 2017 and 17.41 mbgs on February 5, 2018. The water level in Borehole BH1 was measured to be 13.0 mbgs on February 26, 2016, 20.29 mbgs on November 28, 2017 and 20.25 mbgs on February 5, 2018.

Comparison of the water levels in the monitoring wells in Boreholes BH15-3 and BH1, installed at depths of 21.30 mbgs and 27.45 mbgs, respectively, indicate the water levels measured in November 28, 2017 and February 5, 2018 were consistent and below the design foundation level of the building (assumed 16 mbgs). Also, comparing these measured groundwater levels in the deeper monitoring wells, installed at different depths, indicates the deep groundwater is not under artesian conditions in the overburden.

Seasonal fluctuation of the groundwater levels at the Site should be anticipated.

3.4 Hydraulic Conductivity Testing

Single Well Response Tests (SWRT's) were completed on the monitoring wells on February 5, 2018. The SWRTs were completed on the monitoring wells to estimate the hydraulic conductivity (K) of the saturated soils at the well screen depths. SWRT tests could not be completed on the shallow monitoring wells within the perched groundwater condition, as a poor response to water extraction was encountered from these wells.

The static water level was measured in each monitoring well immediately prior to the start of the SWRT. A known volume of water was removed instantaneously from the monitoring well. Groundwater level measurements began immediately thereafter and continued until the water level had recovered by at least 70%, or a minimum of 60 minutes had passed. Groundwater levels were recorded using a Solinst Graduated Water level tape.

Hydraulic conductivity values were calculated from the SWRT data using the Bouwer and Rice equation for unconfined aquifers as included in AQTESOLV Pro Version 4.50.002 software package. Field data collected from the SWRT and semi-log plots for drawdown versus time and Modelling data, are included in Appendix D.

A summary of the hydraulic conductivity (K) values calculated from the SWRTs are provided in Table 2.

Table 2: Summary of Hydraulic Conductivity Testing Results

BH	Well Depth (mbgs)	Screened Interval (mbgs)	Formation(s) Screened	Calculated Hydraulic Conductivity (m/s)
1	27.45	21.65 to 27.45	Sandy Silt/Silty Sand	$9.87x10^{-7}$
15-3	21.30	18.3 to 21.30	Sandy Silt/Silty Sand/Clayey Silt Till	$1.20x10^{-7}$
			Geometric Mean	$3.44x10^{-7}$

SWRT provides calculates of hydraulic conductivity (K) for the geological formation or soil deposits in the immediate zone surrounding the well screens in each borehole and may not be representative of bulk hydraulic conductivities of the regional formation or soil deposits. As shown in Table 2, the highest calculated hydraulic conductivity (K) for the deep overburden is $9.87x10^{-7}$ m/s from Borehole BH1 from a depth of 21.65 mbgs to 27.45 mbgs that intercepted a saturated Sandy Silt/Silty Sand deposit at depth. The geometric mean of the measured K values for the monitoring wells installed at or below the depth of excavation in Boreholes BH1 and BH15-3 was 3.44×10^{-7} m/s. A conservative hydraulic conductivity of 1×10^{-6} m/s was assigned to the perched groundwater condition in the shallow Sand deposit based on similar materials encountered for assessment purposes.

3.5 Groundwater Quality

To assess the suitability for discharge of pumped groundwater to the City of Toronto Sanitary and Storm Sewer System during construction activities, one (1) groundwater sample was collected from the groundwater at an elevation closest to the proposed foundation elevation of the building (assume 20.6 mbgs) from Borehole BH15-3 (Sample BH15-3). The groundwater sample was analysed for metals and general chemistry parameters from Sanitary and Storm Discharge Limits Chapter 681.

The groundwater sample was collected using Waterra low density polyethylene tubing and foot valve. The sample was placed into pre-cleaned laboratory-supplied vials and/or bottles provided with analytical test group specific preservatives, as provided. Dedicated nitrile gloves were used during sample handling. The groundwater sample was submitted to an independent laboratory, Maxxam Analytics Inc., in Mississauga, Ontario, for analysis.

The analytical results for the groundwater sample from Borehole BH15-3 (Sample BH15-3) met the City of Toronto Sanitary Sewer discharge limits except for the parameter Total Suspended Solids (TSS), as included in Appendix E.

The analytical results also met the City of Toronto Storm Sewer Discharge limits with the exception of the parameters Total Suspended Solids (TSS), manganese (Mn), phosphorus (P), and zinc (Zn).

Any accumulated groundwater in the construction excavation must be treated prior to discharge to the City of Toronto Sewer System.

4. Construction Dewatering Assessment

4.1 Construction Excavation Dewatering Rate Assumptions

It is our understanding that the highrise construction will consist of a concourse and four (4) levels of underground parking including with an estimated finished floor depth of the lowest level of underground to be 20.1 mbgs. Therefore, dewatering will have to be evaluated to a depth of 21.1 mbgs or an elevation of 95.1 masl. The commercial building with a concourse at an assumed FFE of 4 mbgs will be evaluated at a potential dewatering depth of 4.5 mbgs or elevation of 111.7 masl. Assumptions used to calculate the dewatering rate for the construction excavation are included in Appendix F. The assumptions used are based on current site conditions and information provided. Where elevation changes are made to the final design, EXP should be contacted to evaluate if the changes made affect any of the calculations within this document. The volume of water calculated to enter the excavation from linear groundwater flow are provided in Appendix F.

4.2 Radius of Influence

The radius of influence (R_o) on the shallow groundwater from the construction dewatering activities can be estimated based on the empirical Sichardt equation. The empirical equation is used to predict the distance at which the drawdown of the shallow groundwater from dewatering or pumping is negligible. This empirical equation was developed to provide representative flow rates using steady state radial flow dewatering scenarios, as discussed below.

It is noted that in steady state conditions, the drawdown of the shallow groundwater from pumping results in the development of a radius of influence in the groundwater. The radius of influence continues to extend out from the pumping until the boundary flow conditions stabilize and provide sufficient water to balance the rate of pumping. It is noted that the Sichardt's equation provides

an estimate the actual radius of influence by pumping and was primarily developed for the coarse grained (sand and gravel) aquifers, and as such, it generates conservative values for finer grained aquifers. The radius of Influence, for dewatering of excavations, extends from the edge of the excavation where the dewatering is occurring. It is not anticipated that the radius of Influence will interact with any nearby surface water bodies.

The R_o of pumping based on the Sichardt formula and the assumptions in Appendix F are described as follows:

$$\mathrm{Ro} = 3000(H - h)\sqrt{K}$$

Where:
3000 = Constant used for radial flow
H = Water level above the base of the aquifer prior to dewatering (m)
h = dewatering level at the excavation (m)
K = Hydraulic Conductivity (m/s)

Based on the Sichardt empirical equation, using the highest hydraulic conductivity (K) measured on the Site from the SWRT tests, the radius of influence of the excavation pumping is estimated to be approximately 6.4 m from the sides of the excavation for the perched groundwater and 11.2 m for the deep groundwater encountered (Appendix F).

4.3 Preliminary Construction Dewatering Flow Rate

The analytical solution for calculating groundwater flow from an Unconfined Aquifer to both sides of a fully penetrating excavation are given by Dupuit Equation;

$$Q_w = xK(H^2 - h^2)/Lo$$

Where:
Q_w = Flow rate per unit length of Excavation (m^3/s)
K = Hydraulic conductivity (m/s)
H = Height of static water table above base of water bearing zone (m)
h = Height of target water level above base of water bearing zone (m)
L_o = Distance of Influence (m)

The Preliminary Construction Dewatering Flow is calculated in Appendix F for the Proposed Development. The target depth of dewatering is below the base of the footings of the forth level of underground parking (assume 21.1 mbgs) and assume 4.5 mbgs for the commercial building. Based on the current subsurface information, the perched groundwater encountered will contribute groundwater to both excavations unless completely sealed and the deep groundwater will contribute to the highrise construction area. The total volume of groundwater discharged during construction is 4.5 m^3/day for the commercial building portion and 114.2 m^3/day for the highrise portion of the Site. The total volume in both areas is calculated to be 118.7 cubic meters per day (m^3/day). Allowing a safety factor of two (2) for groundwater variation throughout the duration of excavation, the total volume of groundwater 237.3 m^3/day.

4.4 Rainfall

The Preliminary Construction Dewatering Flow Rates at the Site should also accommodate the direct input of rain water that may accumulate in the excavation.

A 15 mm precipitation event was utilized for calculating the volume of rainfall that may accumulate in the excavation. The estimated area of excavation from P4 Floor Plan (Drawing A101) and Building B – Floor Plans (Drawing A122), prepared by Sweeny & Co. Architects, dated 2018-03-02, distributed on March 6, 2018, is 2900 m^2 and 329 m^2, respectively (Appendix F). Assuming the surface runoff from offsite is directed away from the construction area, it is not included in the discharge calculation volume. The volume of water to be discharged from direct precipitation from a 15mm rainfall event for both construction areas is calculated to be 49 m^3 (Appendix F).

In the event of significant precipitation events, the excavation may need to be dewatered over the course of a day or more at the maximum rates provided before safe work conditions can be resumed.

4.5 Total Construction Dewatering Rate Estimate

Based on the assumptions provided in Appendix F, the total construction dewatering flow rate during construction at the Site is calculated to be 14 m^3/day for the commercial construction site and the 272 m^3/day for the highrise construction site following a 15 mm precipitation event in addition to the perched and deep groundwater.

Surface runoff should be diverted away from the excavation to prevent exceeding the allowable discharge volumes. Berms should be placed along Site boundaries near hardened surfaces on adjacent properties to prevent overland flow from off site to contact the perimeter shoring or enter the Site.

The dewatering volumes estimated for construction dewatering should be considered as potential peak volumes and will likely vary over time. The actual dewatering volumes will vary over time subject to reaching steady state conditions, accumulation of precipitation, seasonal fluctuations in the groundwater table, flow from bedding materials of existing sewers, variation in hydrogeological properties beyond those encountered during this investigation, and construction sequence.

It is the responsibility of the contractor to ensure dry working conditions are maintained within the excavation at all times. Additional pumping capacity may be required to maintain dry conditions within the excavation during and following significant precipitation events. Safety measures must be considered in accordance with the Occupational Health and Safety Act and associated Regulations when planning for excavation activities, as related to soil and groundwater conditions and the weather conditions.

4.6 Environmental Activity and Sector Registry (EASR)

In accordance with the Ontario Water Resources Act, if the water taking for the construction dewatering will be more than 50 m^3/day but less than 400 m^3/day an application for the Environmental Activity and Sector Registry (EASR) with the MOECC is required.

It is anticipated that groundwater control within the excavation may be achieved by sump pits and perimeter drainage swale or weeper piping installed within the base of the excavation for groundwater collection and pumping from filtered sumps within a central pit. Consideration should be given installation of a caisson wall shoring system to reduce the lateral movement of groundwater as recommended in the geotechnical report. Where ground seepage is encountered into the excavations through the caisson wall inspection should be considered to determine if any erosion has occurred as a result of the seepage that may undermine any structures on the outside of the caisson wall.

Approval from the municipality for short term discharge from the construction drainage system should be obtained during the approval process for the site development.

5. Preliminary Foundation-Drain Flow Rate Estimate

5.1 Analytical Method/Assumptions

It is understood that the development structure will be equipped with a permanent foundation sub-drain system under and around the footings and will be connected to the City of Toronto Sewer System. Since a perched groundwater and a deep groundwater condition were encountered at the Site, two different calculations were required to evaluate volume contributions from each.

The Dupuit equation was used to calculate the groundwater flow from the perched groundwater for a fully penetrating future foundation drainage system and groundwater flow from the deep groundwater for a partially penetrating future foundation drainage system around the foundation of the structure. The assumptions used to calculate the foundation drain system discharge volumes are included in Appendix G.

5.2 Preliminary Foundation Drain Discharge Volumes

Based on the assumptions in Section 5.1 of this report, the long-term groundwater discharge volume estimates are calculated for the foundation sub-drain system around the commercial and underground parking of the highrise buildings.

The analytical solution for calculating perched groundwater flow from an Unconfined Aquifer to both sides of a fully penetrating foundation drainage system are given by Dupuit Equation;

$$Q_w = xK(H^2 - h^2)/Lo$$

Where:

Q_w = Flow rate per unit length of Excavation (m^3/s)

K = Hydraulic conductivity (m/s)
H = Height of static water table above base of water bearing zone (m)
h = Height of target water level above base of water bearing zone (m)
L_o = Distance of Influence (m)

The foundation sub-drain flow from the commercial building due to the perched groundwater is calculated in Appendix G1 for the Proposed Development. The target depth of dewatering is below at the footing elevation (assume 4.5 mbgs). The perched groundwater encountered will contribute groundwater to the foundation drain unless completely sealed. The volume of discharge from the commercial building foundation sub-drain from the perched groundwater is calculated to be 4.5 cubic meters per day (m^3/day). Allowing a safety factor of two (2) for groundwater variation, the total volume of perched groundwater is 9.0 m^3/day.

The foundation sub-drain flow from the high-rise building due to the perched groundwater is calculated in Appendix G1 for the Proposed Development. The target depth of dewatering is below at the footing elevation (assume 20.6 mbgs). The depth used in the calculation will be the base of the sand layer to fully drain the perched groundwater. The perched groundwater encountered will contribute groundwater to the foundation drain unless completely sealed. The volume of discharge from the highrise foundation sub-drain from the perched groundwater is calculated to be 13 cubic meters per day (m^3/day). Allowing a safety factor of two (2) for groundwater variation, the total volume of perched groundwater is 26 m^3/day.

The extent of the perched aquifer was not confirmed and may have a limited duration for discharge to the foundation drainage system.

The analytical solution for estimating groundwater flow from the deep unconfined aquifer to a partially penetrating foundation sub-drain system are given by Dupuit Equation;

$$Q_w = \left[0.73 + 0.23\left(\frac{P}{H}\right)\right] xK(H^2 - h^2)/Lo$$

Where:
Q_w = Flow rate per unit length of Excavation (m^3/s)
P = Depth of Penetration of the Excavation below the original water table (m)
x = *length of excavation (m)*
K = Hydraulic conductivity (m/s)
H = Height of static water table above base of water bearing zone (m)
h = Height of target water level above base of water bearing zone (m)
L_o = Distance of Influence (m)

Based on the depth of the water table from the deep groundwater the calculated long-term foundation sub-drain Flow Rates for the high-rise building is 85 m^3/day. Allowing a safety factor of two (2) for groundwater variation, the total volume of deep groundwater contribution to the high-rise foundation subdrain system is calculated to be 170 m^3/day, (Appendix G).

Therefore, the total discharge rates of water from the commercial building is calculated to be 9.0 m^3/day and 196 m^3/day from the highrise foundation subdrain. Seasonal fluctuations and precipitation events will affect the daily flow rates from the foundation drainage. Since the estimated long-term foundation drainage flow rate is above the Ontario Water Resources Act threshold of 50 m^3/day for the high-rise building, and an application for a Category 3 Permit to Take Water with the MOECC will be required at the end of construction. Please note that the MOECC has up to 90 days to review PTTW applications, and the submission of the permit should be made four (4) to six (6) months in advance for anticipated end of construction.

Approval from the municipality for long term discharge from the foundation sub-drain should be obtained during the approval process for the site development.

6. Environmental Impact Assessment

6.1 Surface Water Features

There are no surface water features on or adjacent to the Site. The shallow groundwater gradient in the area of the Site is likely to the south, following the topography of the surrounding area, toward Lake Ontario. It is unlikely that the construction activities or long-term foundation drains will have any adverse impact on Lake Ontario.

6.2 Groundwater Sources

The study area of 500m surrounding the Site is serviced with the City of Toronto municipal water supply. There were no water supply wells located within the study area. The construction activity at the Site is not anticipated to disturb or impact the deep aquifer at depth. It is not anticipated that construction on the Site would interfere with groundwater levels encountered at the Site.

6.3 Water Quality

Treatment systems are considered for discharge from the excavation or foundation drainage system. The specifications of the treatment system(s) will need to be provided/adjusted by the treatment specialist/process engineer during the pre-design and commissioning stage of the system. Refer to Sections 3.5 for information on the groundwater quality.

It is noted that an agreement to discharge to the City of Toronto will be required prior to discharge any construction or permanent foundation drain water.

6.4 Environmental Considerations

The Site has been previously developed since the 1950s. There are known volatile organic compound impacts identified on the Site. Environmental Site Assessments should be reviewed for more details on environmental considerations and taken into consideration for treatment system design, when available.

6.5 Geotechnical Considerations

Documentation related to geotechnical issues (i.e. settlement) as it pertains to the Site is recommended to be completed, if required are provided in the Preliminary Geotechnical Assessment prepared by EXP, 2018.

7. Conclusions and Recommendations

Based on the findings of the Preliminary Hydrogeological Investigation, the following summary of conclusions and recommendations are provided:

- The Site is located within a physiographic region known as the Iroquois Plain and the Physiographic landform known as Sand Plain;
- The Quaternary geology of the Site and surrounding area are characterized by Glaciolacustrine deposits consisting of sand and gravel; nearshore and beach deposits;
- Bedrock of the region corresponds to the Upper Ordovician aged Georgian Bay Formation, being composed primarily of interbedded calcareous shale, limestone, dolostone, and siltstone;
- The topography in the area of the Site is generally flat with a slight gradient downwards to the south. The ground elevation of the Site is approximately from 116.00 to 116.30 masl. The shallow groundwater gradient in the area of the Site is likely to the south, following the topography of the surrounding area, toward Lake Ontario approximately 3.6km south of the Site;
- The stratigraphy of the Site, as revealed in the boreholes installed by EXP in January 2018 (Boreholes TH1 to TH4) and by SPL in 2015 (Boreholes BH15-2, BH15-3 and BH15-3S), generally comprised surficial concrete or pavement structure underlain by fill overlying native Sand/Silty Sand and Silty Clay/Silty Clay Till over alternating deposits of Silt, Sandy Silt, Sandy Silt to Silty Sand underlain by Clayey Silt Till. The Clayey Silt Till deposit was overlying weathered Shale bedrock as shown in Borehole BH1 from McClymont and Rak, installed in February 2016;
- The groundwater levels recorded completion of drilling of EXP Boreholes, groundwater levels were measured in three (3) of the four (4) boreholes (Boreholes TH2, TH3 and TH4) ranging in depth from 3.19 to 3.40 mbgs. The groundwater appears to originate from the shallow Sand deposits ranging from 2.43 to 3.20 mbgs. Borehole TH1 was installed to a depth of 15.8 mbgs and was found dry on completion of drilling;
- Shallow monitoring wells were previously installed by others and EXP at the Site in Boreholes BH15-3S, MW01, MW02, MW03, MW04, MW05, TH2, TH3 and TH4 encountered perched groundwater that ranged in depth from 0.44 mbgs to 5.33 mbgs with a maximum elevation of 113.82 masl. This groundwater was in the shallow Sand deposit perched on a Silty Clay deposit below;

- The deep monitoring wells installed in Boreholes BH1, BH15-3 and TH1 were installed to a depth ranging from 15.8 to 27.45 mbgs to evaluate the groundwater conditions at the design base of the foundation of the building (assumed 20.6 mbgs) and determine groundwater conditions at depth;
- Borehole TH1 did not have any detectable water level installed by EXP and monitored on January 29, 2018 to February 5, 2018. The water level in Borehole BH15-3 was measured to be from 16.9 mbgs to 17.41 mbgs from January 28, 2015 to February 5, 2018, respectively. The stabilized water level in Borehole BH1 was measured to be 17.41 mbgs on February 5, 2018;
- Comparison of the water levels in the monitoring wells in Boreholes BH15-3 and BH1, installed at depths of 21.30 mbgs and 27.45 mbgs, respectively, indicate the water levels measured in November 28, 2017 and February 5, 2018 were consistent and do not indicate artesian groundwater conditions;
- The highest calculated hydraulic conductivity (K) for the overburden is 9.87 x 10^{-7} m/s from Borehole BH1 from a depth of 21.65 mbgs to 27.45 mbgs that intercepted a saturated Sandy Silt/Silty Sand deposit at depth. The geometric mean of the measured K values for the monitoring wells installed at or below the depth of excavation (assumed 16 mbgs) in Boreholes BH1 and BH15-3 was 3.44 x 10^{-7} m/s. A conservative hydraulic conductivity of 1 x 10^{-6} m/s was assigned to the shallow Sand deposit with perched groundwater encountered at the Site, based on similar materials encountered for assessment purposes;
- The analytical results for the groundwater sample from Borehole BH15-3 (Sample BH15-3) met the City of Toronto Sanitary Sewer discharge limits except for the parameter Total Suspended Solids (TSS). The analytical results also met the City of Toronto Storm Sewer Discharge limits with the exception of the parameters Total Suspended Solids (TSS), manganese (Mn), phosphorus (P), and zinc (Zn);
- The total construction dewatering flow rate during construction at the Site is calculated to be 14 m^3/day for the commercial construction site and the 272 m^3/day for the highrise construction site following a 15 mm precipitation event in addition to the perched and deep groundwater. The dewatering volumes estimated for construction dewatering should be considered as potential peak volumes and will likely over time. The actual dewatering volumes will vary over time subject to reaching steady state conditions, accumulation of precipitation, seasonal fluctuations in the groundwater table, flow from bedding materials of existing sewers, variation in hydrogeological properties beyond those encountered during this investigation, and construction sequence;
- Runoff from the Site should be diverted away from the excavations always to prevent exceeding the allowable total discharge volumes;
- The maximum construction dewatering rate for construction of the commercial building and high-rise building is estimated to be more than 50 m^3/day but less than 400 m^3/day,

as such, an application for the Environmental Activity and Sector Registry (EASR), with the MOECC is required;

- Approval from the municipality for short term discharge to the sewer system should be obtained during the approval process for the site development;
- Based on the radius of Influence and the average thickness of the aquifer and a Factor of Safety of two (2), the Calculated Long-Term Foundation Drainage Flow Rates for the commercial building is 9.0 m^3/day from the perched groundwater condition on the Site;
- Based on the radius of Influence and the average thickness of the aquifer and a Factor of Safety of two (2), the Calculated Long-Term Foundation Drainage Flow Rates for the high-rise building is 26.0 m^3/day from the perched groundwater and 170 m^3/day from the deep groundwater for a combined flow of 196 m^3/day from the foundation subdrain system;
- Since the estimated long-term foundation drainage flow rate is above the Ontario Water Resources Act threshold of 50 m^3/day for the high-rise building, and an application for a Category 3 Permit to Take Water (PTTW) with the MOECC will be required. The submission of the permit to the MOECC should be made four (4) to six (6) months in advance for anticipated end of construction;
- Approval from the municipality for long term discharge from the foundation sub-drain should be obtained during the approval process for the site development;
- It is noted that all monitoring wells will need to be decommissioned as per Ontario Regulation 903 once they are no longer needed and prior to construction;

It should be noted that the comments and recommendations in this report are based on the assumptions described throughout the report. Any changes to the design concept may result in a modification to the recommendations provided in this report. The recommendations provided above should be read in conjunction with the entirety of the report.

8. Limitations

This report is based on a limited investigation designed to provide information to support an assessment of the current hydrogeological conditions within the study area. The conclusions and recommendations presented within this report reflect Site conditions existing at the time of the assessment. EXP must be contacted immediately if any unforeseen Site conditions are experienced during the dewatering activities. This will allow exp to review the new findings and provide appropriate recommendations to allow the construction to proceed in a timely and cost-effective manner.

Our undertaking at EXP, therefore, is to perform our work within limits prescribed by our clients, with the usual thoroughness and competence of the geoscience/engineering profession. No other warranty or representation, either expressed or implied, is included or intended in this report.

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We trust that this information is satisfactory for your purposes. Should you have any questions or comments, please do not hesitate to contact this office.

Sincerely,

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9. References

- Preliminary Geotechnical Assessment, 11 to 21 Yorkville Avenue and 16 to 18 Cumberland Street, City of Toronto, Ontario, by EXP Services Inc., (February 28, 2018), prepared for 11 Yorkville Partners Inc.;
- Environmental Soil and Groundwater Investigation, 11 & 17 Yorkville Avenue, Toronto, Ontario, by SPL prepared for Bazis Inc., February 13, 2015;
- Phase II Environmental Site Assessment, 21-25 Yorkville Avenue, Toronto, Ontario, by Pinchin, prepared for King Sett Capital, January 21, 2016;
- Preliminary Geo-Environmental Investigation, 19 Yorkville Avenue, Toronto, Ontario, by McClymont and Rak Engineers Inc., prepared for Bazis International Inc., March 4, 2016;
- Chapman, L. J., and Donald F. Putnam (1984). The Physiography of Southern Ontario [Ontario Geological Survey Special Volume 2, Third Edition. Government of Ontario;
- Google Earth - Ontario Geological Survey 2000: Quaternary Geology seamless coverage of Province of Ontario;
- Ontario Geological Survey, Data 126 Revision 1, Bedrock Geology of Ontario 2011;
- Ministry of the Environment and Climate Change Water Well Database;
- Ontario Ministry of Natural Resources topographic maps (Sheet 10 17 6250 48350 and Sheet 10 17 6300 48350);
- The Ministry of Natural Resources and Forestry – Heritage Lands Map, 2017
- Topographic Plan Drawing Number 17M-01494-000, prepared by WSP Geomatics Ontario Limited, dated August 21, 2017;
- Ontario Ministry of the Environment (April 2008). Technical Guidance Document for Hydrogeological Studies in Support of Category 3 Applications for Permit to Take Water;
- Somerville, S. H. (1986). Control of Groundwater for Temporary Works. Construction Industry Research and Information Association.

Figures

LEGEND

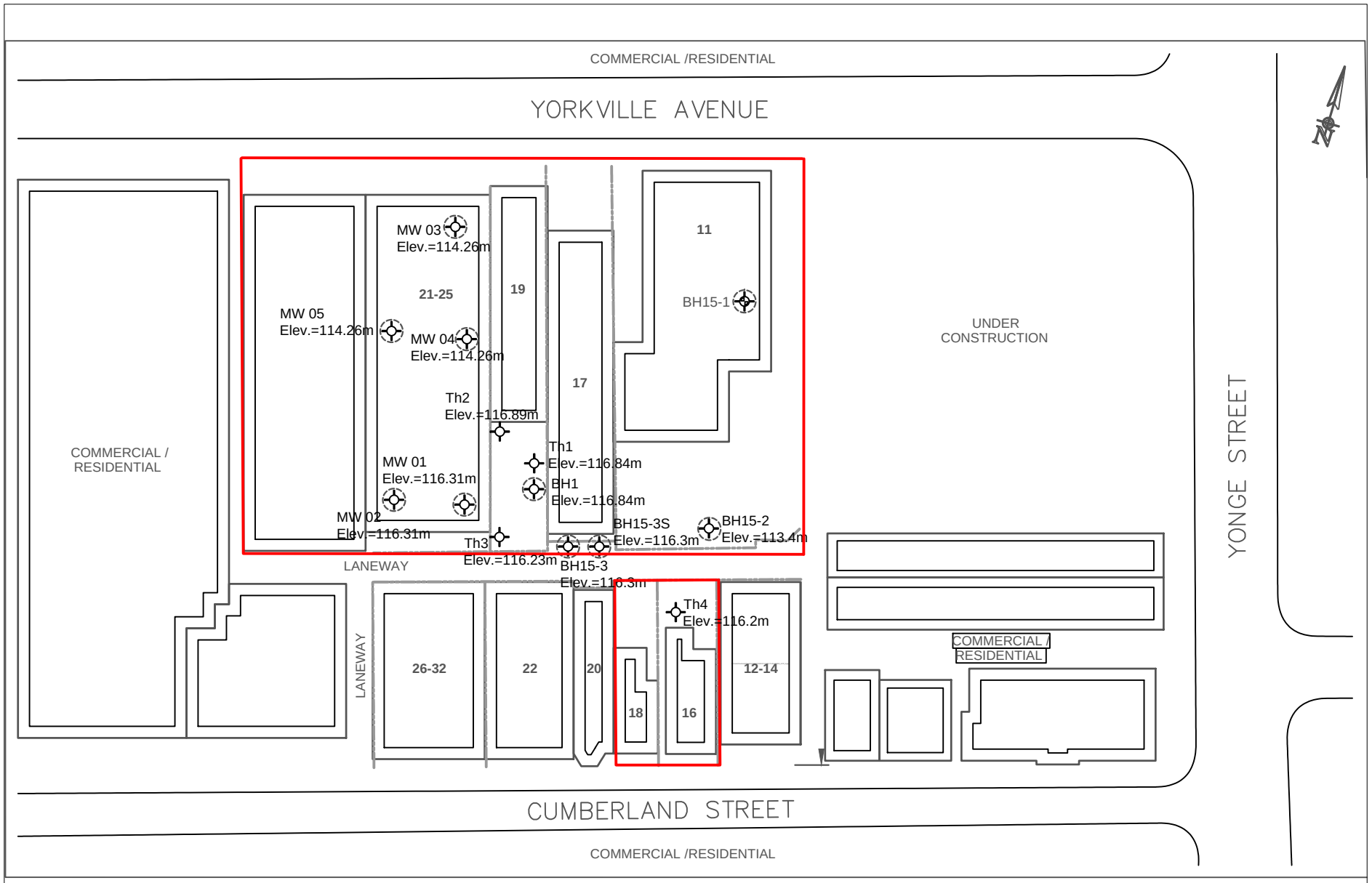
APPROXIMATE PROPERTY BOUNDARY

exp.

N

PRELIMINARY HYDROGEOLOGICAL INVESTIGATION
11 TO 21 YORKVILLE AVENUE AND 16 TO 18 CUMBERLAND STREET, TORONTO, ONTARIO
SITE LOCATION MAP

Scale:	Checked by:	Date:	Project No.:
As Shown	RF	February 2018	MRK-00242474-A0
	Drawn by: RKZ		FIGURE NO.: 1



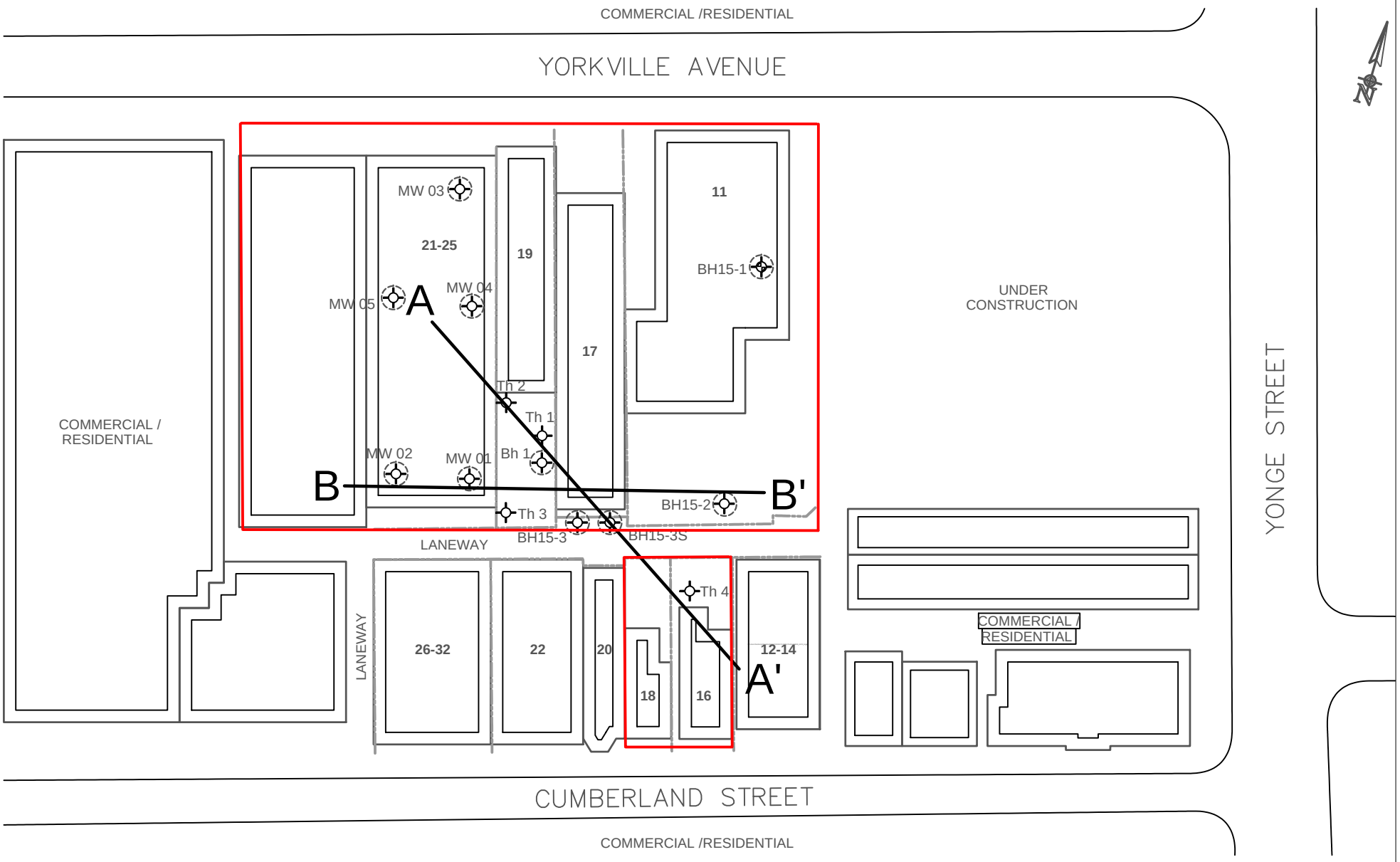
LEGEND

- PROPERTY BOUNDARY
- TEST HOLE WITH MONITOR DEEP MONITOR TH1 (EXP, 2018) SHALLOW MONITOR TH2, TH3, TH4 (EXP, 2018)
- TEST HOLE WITH MONITORS BH15-2, BH15-3, BH15-3S (SPL, 2015) BH1 (MCCLYMONT & RAK, 2016) MW SERIES (PINCHIN, 2016)
- TEST HOLE BH15-1 (SPL, 2015)

exp.

PRELIMINARY HYDROGEOLOGICAL INVESTIGATION
11 TO 21 YORKVILLE AVENUE AND 16 TO 18 CUMBERLAND STREET, TORONTO, ONTARIO
BOREHOLE LOCATION PLAN

Scale:	Checked by:	Date:	Project No.:
0 7.5 15m (APPROXIMATE)	RF	February 2018	MRK-00242474-A0
	Drawn by: RKZ		FIGURE NO.: 2



LEGEND

- PROPERTY BOUNDARY
- TEST HOLE WITH MONITOR DEEP MONITOR TH1 (EXP, 2018) SHALLOW MONITOR TH2, TH3, TH4 (EXP, 2018)
- TEST HOLE WITH MONITORS BH15-2, BH15-3, BH15-3S (SPL, 2015) BH1 (MCCLYMONT & RAK, 2016) MW SERIES (PINCHIN, 2016)
- TEST HOLE BH15-1 (SPL, 2015)
- A — A' CROSS SECTION A-A'
- B — B' CROSS SECTION B-B'

PRELIMINARY HYDROGEOLOGICAL INVESTIGATION
11 TO 21 YORKVILLE AVENUE AND 16 TO 18 CUMBERLAND STREET, TORONTO, ONTARIO

CROSS SECTION INDEX MAP

Scale:	Checked by:	Date:	Project No.:
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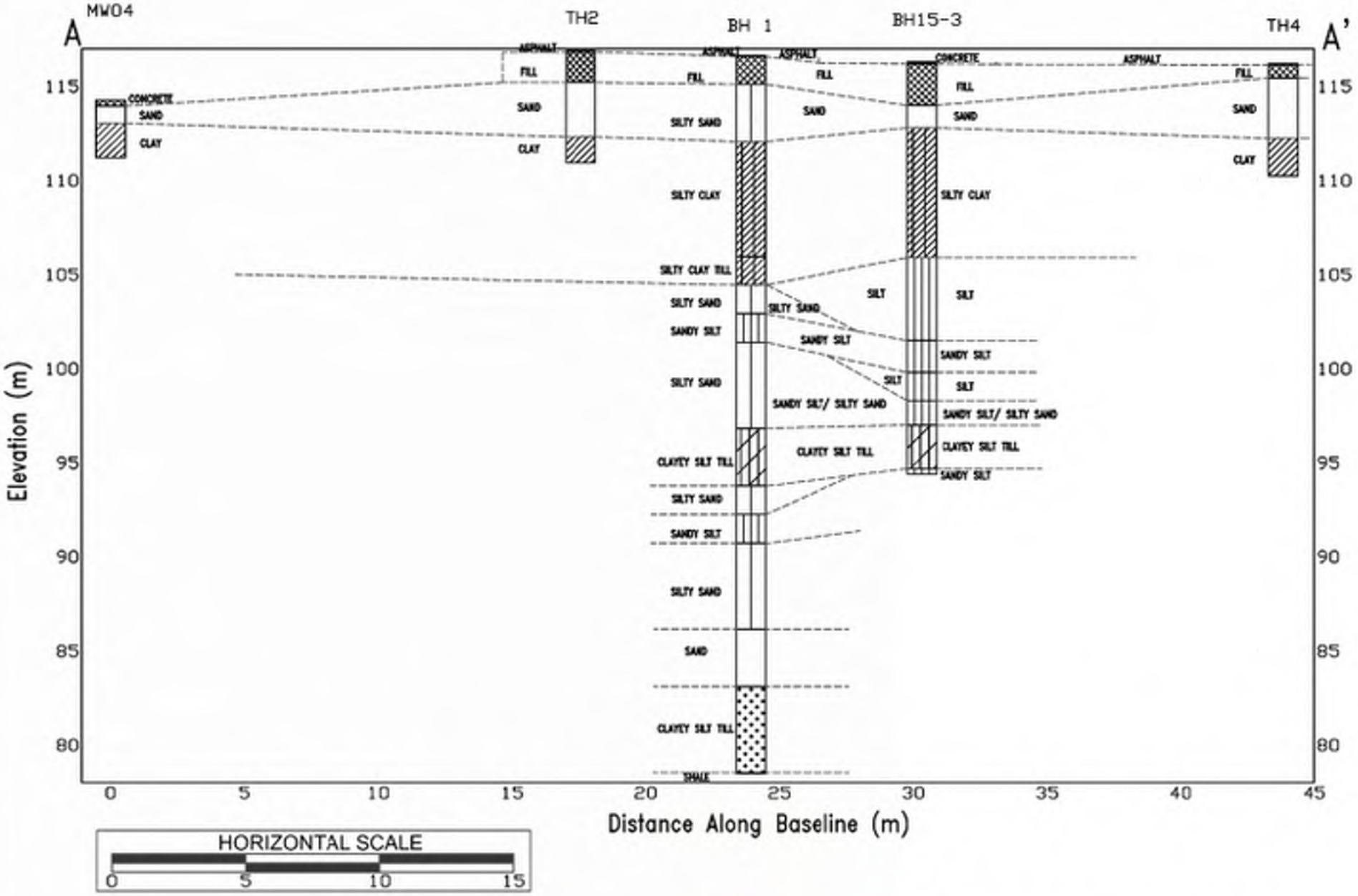
	Drawn by: RKZ		FIGURE NO.: 3



LEGEND

A—A' Cross Section A-A'

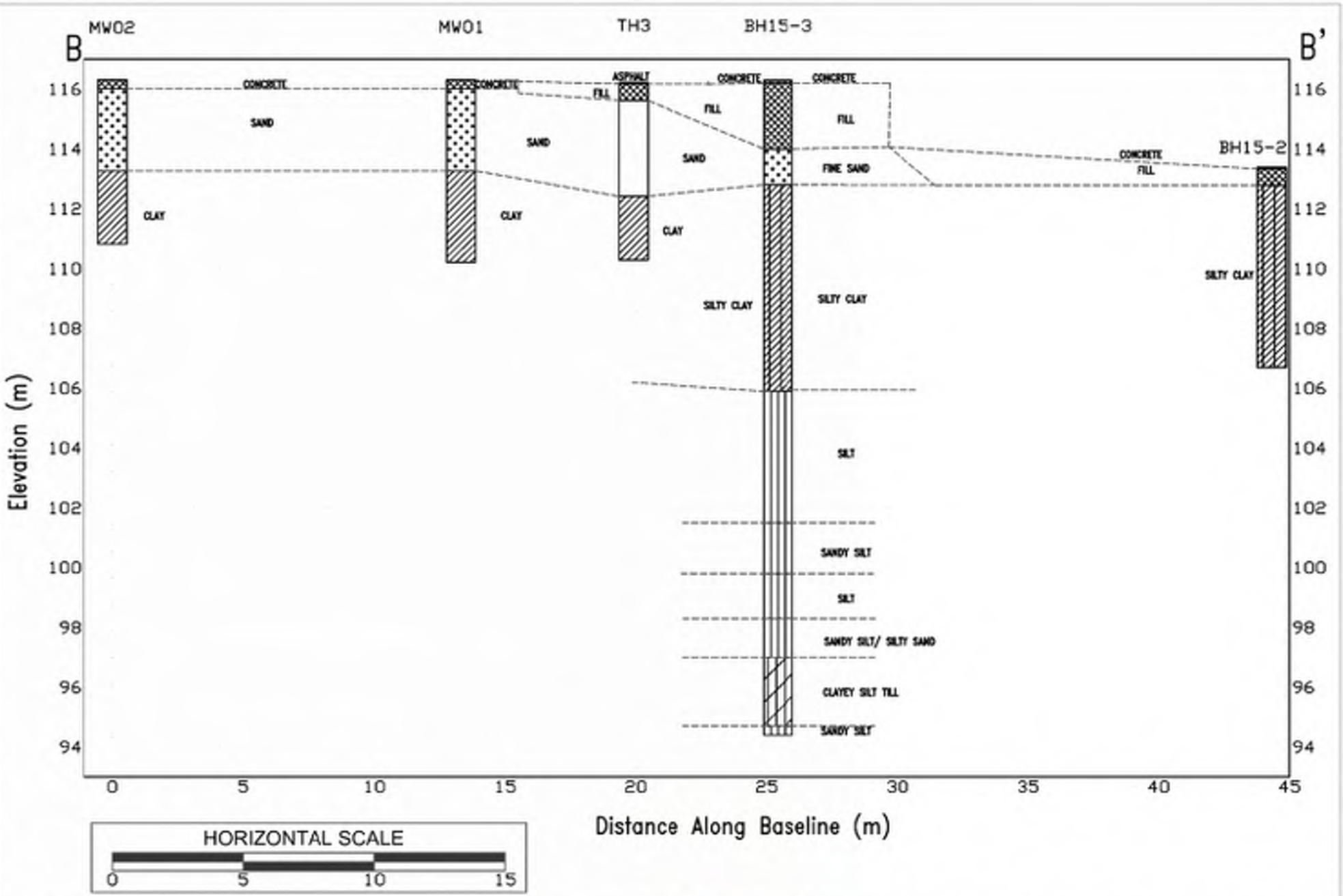
B—B' Cross Section B-B'

exp.

PRELIMINARY HYDROGEOLOGICAL INVESTIGATION
11 TO 21 YORKVILLE AVENUE AND 16 TO 18 CUMBERLAND STREET,
TORONTO, ONTARIO

CROSS SECTION A-A'

Scale:	Checked by:	Date	Project No.
As Shown	RF	February 2018	MRK-00242474-A0
	Drawn by: RKZ		FIGURE NO.: 4



LEGEND

A——A' Cross Section A-A'

B——B' Cross Section B-B'

PRELIMINARY HYDROGEOLOGICAL INVESTIGATION
11 TO 21 YORKVILLE AVENUE AND 16 TO 18 CUMBERLAND STREET,
TORONTO, ONTARIO

CROSS SECTION **B-B'**

Scale:	Checked by:	Date	Project No.
As Shown	RF	February 2018	MRK-00242474-A0
	Drawn by: RKZ		FIGURE NO.: 5

Appendix A:
MOECC Water Well Database Records

Appendix A - MOECC Water Well Record Summary - 500m Study Area

Project No: MRK00242474-A0

11 to 21 Yorkville Avenue and 16 to 18 Cumberland Street, City of Toronto, ON

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
TORONTO CITY	17 630312 4836780 W	2004/03 7241	0.98			NU	0011 5	6927748 (Z08033) A007982	GREY FILL WDFR WDFR 0011 GREY CLAY SILT SOFT 0016
TORONTO CITY	17 629875 4836781 W	2006/06 6926	1.79	FR 0007			0016 7	6930363 (Z45894) A041306	GREY SAND SILT WBRG 0023
TORONTO CITY	17 630080 4836308 W	2007/03 7147	1.25			NU	0008 5	7047868 (Z65746) A048904	BRWN 0001 GREY SILT CLAY 0012
TORONTO CITY	17 629817 4836571 W	2007/08 7241	1.25				0005 10	7049721 (Z74088) A061517	GREY CONG 0001 BRWN SAND 0012 GREY CLAY 0015
TORONTO CITY	17 630012 4836420 W	2007/04 1663	6.26 5.46	80	54/82/6/1:0	NU	0070 5 0092 3	7051935 (Z64048) A042130	BRWN SAND GRVL FILL 0013 GREY CLAY SAND GRVL 0038 GREY CLAY SAND GRVL 0060 GREY CLAY SILT 0076 GREY SILT 0083 GREY FSND SILT 0113 GREY CLAY SILT 0119 GREY SHLE 0129
TORONTO CITY	17 630002 4836404 W	2007/04 1663	6.21 5.46	72	54/74/7/1:0	NU	0072 8 0080 6	7051936 (Z64049) A042129	BRWN FILL 0012 GREY CLAY SAND 0057 GREY CLAY SILT 0070 GREY SILT SAND 0077 GREY SILT CLAY LYRD 0089 GREY CLAY SILT GRVL 0097 GREY CLAY 0098 GREY SILT SAND 0105 GREY CLAY SILT 0110
TORONTO CITY	17 629546 4836543 W	2007/12 7241	1.97			NU		7100537 (Z61718) A061595	BRWN CLAY SAND DNSE 0013 GREY CLAY SILT DNSE 0022
TORONTO CITY	17 629843 4836679 W	2007/10 1663	6.21	50	47/52/16/:10	NU	0048 5	7100941 (Z64087) A064833	BRWN FILL 0006 GREY CLAY SILT 0050 GREY SAND SILT 0053 GREY SAND SILT 0065 GREY SAND SILT 0078 BRWN FSND 0083 GREY FSND SILT 0098 GREY FSND SILT 0100 GREY CLAY SILT GRVL 0107
TORONTO CITY	17 629974 4836429 W	2007/12 6926	1.99	59		DE		7101519 (Z76057) A066222	BRWN FILL GRVL SAND 0007 BRWN SAND 0013 BRWN CLAY SLTY 0046 GREY SILT 0052 GREY SILT SNDY 0066
TORONTO CITY	17 630095 4836286 W	2007/12 1663	6.21 5.46	57	57/71/15/5:30	NU	0073 37	7101985 (Z64097) A064871	BRWN FILL 0012 BRWN CLAY GRVL 0044 BRWN CLAY 0056 GREY SILT CLAY 0067 GREY CLAY SILT LYRD 0074 GREY SAND SILT 0078 GREY SILT SAND CLAY 0090 GREY SAND CLAY SILT 0110 GREY CLAY GRVL 0117
TORONTO CITY	17 630095 4836286 W	2007/12 1663	6.21 5.46	57	57/71/15/5:30	NU	0073 37	7101985 (Z64097) A064871	BRWN FILL 0012 BRWN CLAY GRVL 0044 BRWN CLAY 0056 GREY SILT CLAY 0067 GREY CLAY SILT LYRD 0074 GREY SAND SILT 0078 GREY SILT SAND CLAY 0090 GREY SAND CLAY SILT 0110 GREY CLAY GRVL 0117
TORONTO CITY	17 629781 4836649 W	2008/04 2644	6.25	FR 0075	52///:	DE		7105893 (Z75843) A071077	GREY SAND SLTY 0044 BRWN SAND SILT 0075 BRWN FSND 0083 BRWN SILT SAND 0095
TORONTO CITY	17 629808 4836725 W	2008/04 2644	2.46	FR 0328	52///:	DE		7105894 (Z75844) A071078	GREY SAND SILT 0148 BRWN SAND SILT 0328 BRWN FSND 0354
TORONTO CITY	17 630047 4836401 W	2008/06 6926	2.2			DE		7106559 (M00388) A058478	GREY SILT CLYY 0003 GREY SAND 0015 GREY SAND SLTY 0017 GREY SAND SLTY 0020
TORONTO CITY	17 630039 4836420 W	2008/05 6926	1.61	UK 0010		DE		7106574 (M00387) A058479	GREY SILT TILL CLYY 0007 GREY SAND 0016 GREY SILT DNSE 0018
TORONTO CITY	17 629618 4836462 W	2008/06 7147	1.97	FR		MO		7108159 (M02855) A061595	GREY ---- 0001 BRWN FILL SAND GRVL 0002 BRWN CLAY SLTY 0013
TORONTO CITY	17 630122 4836512 W	2007/08 7147	1.97			NU		7109171 (Z65753) A048904	GREY 0001 BRWN FILL 0002 BRWN SAND 0010 BRWN SILT CLAY 0037
TORONTO CITY	17 630039 4836420 W	2008/07 6926	1.61					7109291 (M00397) A058479 A	GREY SILT TILL CLYY 0007 GREY SAND 0016 GREY SILT DNSE 0018
TORONTO CITY	17 630186 4836308 W	2008/06 1663	6.25 5	UT	54/76/6/6:0		0075 3	7109621 (Z83469) A075081 A	BRWN FILL 0010 GREY CLAY GRVL 0036 GREY CLAY SILT 0055 GREY SAND SILT CLAY 0080 LYRD GREY SILT SAND CLAY 0085 GREY FSND SILT GRVL 0091 GREY SILT CLAY 0094 GREY SAND SILT CLAY 0105
TORONTO CITY	17 630192 4836320 W	2007/07 1663	6.25 5 5	UT	56/98/6/1:0		0084 7 0094 7	7109622 (Z83468) A075082	BRWN ---- 0007 BRWN FSND CLAY 0018 GREY CLAY SAND SILT 0076 GREY SILT 0084 GREY SILT CLAY LYRD 0108 GRVL
TORONTO CITY	17 630219 4836353 W	2008/07 1663	3.98	UK 0003		DE		7109693 (M00563) A075080	GREY CLAY 0010 GREY SAND SILT CLAY 0018 GREY SAND SILT 0023 GREY SAND SILT CLAY 0033 GREY MSND SILT CLAY 0043
TORONTO CITY	17 630047 4836401 W	2008/07 6926	2.2			DE		7111424 (M03451) A058478 A	GREY SILT CLYY 0003 GREY SAND 0015 GREY SAND SLTY 0017 GREY SAND SLTY 0020
MARKHAM TOW	17 630129 4862985 W	2008/08 6926	2.2			DE		7114037 (M03462) A066192	BRWN FILL 0001 BRWN SAND SLTY 0005 BRWN SAND SLTY 0010 BRWN SAND 0039 BRWN SAND SLTY 0073
TORONTO CITY	17 629974 4836429 W	2008/10 6926	1.99					7115422 (Z76082) A066722	BRWN FILL GRVL SAND 0007 BRWN SAND 0013 BRWN CLAY 0046 GREY SILT 0052 GREY SILT 0066
TORONTO CITY	17 629936 4836407 W	7341	1.99	FR 0003		DE		7119992 (Z79581) A065434	GREY SILT SAND 0036
TORONTO CITY	17 629936 4836407 W	2009/05 7341						7122932 (Z095531) A065434 A	
TORONTO CITY	17 629623 4836461 W	2008/01 7147	1.99	FR 0013		NU		7128405 (Z77691) A056437	GREY 0001 BRWN SAND 0002 GREY CLAY 0020
TORONTO CITY	17 629623 4836461 W	2009/11 7147	1.97	FR 0010		MO		7134520 (M08653) A056437	GREY 0001 BRWN FILL 0002 BRWN CLAY SLTY 0014
TORONTO CITY	17 629830 4836195 W	2009/11 6988	0.98			TH	0020 5	7136374 (Z82952) A087087	BRWN SILT SAND LOOS 0009 GREY SILT CLAY HARD 0025
TORONTO CITY	17 629799 4836357 W	2009/11 7241	1.59			MT	0020 15	7138421 (Z106585) A090955	WHIT ---- HARD 0001 BRWN SAND SOFT LOOS 0016 GREY SILT CLAY HARD 0034
TORONTO CITY	17 629798 4836324 W	2009/12 7241	0.75			MO	0005 8	7138422 (Z108766) A084275	BRWN FILL GRVL 0002 GREY CLAY SILT WBRG 0013
TORONTO CITY	17 629825 4836343 W	2009/12 7241	4.03			TH	0006 5	7138423 (Z108760) A089064	BRWN FILL GRVL LOOS 0002 GREY CLAY SILT DNSE 0011
TORONTO CITY	17 629795 4836334 W	2009/11 7241	1.37			MO	0011 5	7138424 (Z106570) A090900	GREY ---- 0001 BRWN SILT SAND DNSE 0010 GREY CLAY SILT DNSE 0016
TORONTO CITY	17 630192 4836320 W	2007/07 6926	5					7143557 (Z79664) A075082 A	BRWN 0007 BRWN FSND CLAY 0018 GREY CLAY SAND SILT 0076 GREY SILT 0084 GREY SILT CLAY GRVL 0108
TORONTO CITY	17 630219 4836353 W	2010/01 6926	3.98	33				7143558 (M05998) A075080 A	GREY CLAY 0010 GREY SAND CLAY SILT 0018 GREY SAND SILT 0023 GREY SAND CLAY SILT 0033 GREY MSND SILT CLAY 0043
TORONTO CITY	17 630279 4836322 W	2010/03 7215	1.25			TH	0003 9	7144671 (Z112587) A097532	BRWN FILL 0002 BRWN MSND 0010 BRWN MSND FSND WBRG 0012
TORONTO CITY	17 629794 4836352 W	2010/04 7241	2.04			MT	0020 15	7145330 (Z114361) A089070	BLCK ---- SOFT 0000 BRWN SAND SOFT 0034
TORONTO CITY	17 629796 4836344 W	2010/04 7241	2.04			MT	0020 15	7145331 (Z114360) A097159	BLCK ---- SOFT 0000 BRWN SAND SOFT 0034
TORONTO CITY	17 629795 4836349 W	2010/04 7241	2.04			MT	0020 15	7145351 (Z114359) A091047	BLCK ---- SOFT 0000 BRWN SAND SOFT 0034
TORONTO CITY	17 629800 4836356 W	2010/12 6988						7160119 (M06937) A098142 P	
TORONTO CITY	17 630294 4836383 W	2011/01 6809	2			MT	0030 10	7164542 (Z121115) A108323	BRWN SAND GRVL 0010 GREY CLAY 0033 GREY SAND SLTY WBRG 0050 GREY CLAY TILL 0065 GREY SAND WBRG 0080
TORONTO CITY	17 630303 4836331 W	2011/02 6809						7164543 (M10175) A108324 P	
TORONTO CITY	17 629920 4836133 W	2011/07 6926						7165046 (M08916) A117496 P	
TORONTO CITY	17 629818 4836642 W	2011/06 7241						7166592 (M10623) A111587 P	
TORONTO CITY	17 629849 4836640 W	2011/04 6032	2			MO	0022 11	7167141 (Z121258) A083935	GREY STNS HARD 0001 BRWN SAND STNS LOOS 0008 BRWN SAND SILT CLAY 0012 GREY SILT CLAY DNSE 0050 GREY SAND SILT DNSE 0070
TORONTO CITY	17 630042 4836468 W	2011/08 7241	4.03			MT	0006 3	7167679 (Z136667) A115774	BRWN FILL SAND LOOS 0001 BRWN SAND SILT SOFT 0004 BRWN CLAY SILT SOFT 0005 GREY CLAY SILT SOFT 0009
TORONTO CITY	17 629815 4836634 W	2011/10 7472	2.04			MT	0057 10	7171232 (Z125962) A121869	BRWN CLAY SILT PCKD 0016 GREY CLAY SILT PCKD 0067
TORONTO CITY	17 629877 4836974 W	2011/07 6032	2			MO	0015 10	7172604 (Z121309) A084009	BRWN FILL GRVL SOFT 0008 GREY CLAY SLTY DRY 0015 GREY CLAY SLTY DNSE 0060 BRWN SAND SILT WBRG 0070
TORONTO CITY	17 629815 4836750 W	2012/01 7147	1.25	FR 0010			0010 10	7175657 (Z142173) A107276	GREY 0001 BRWN SAND GRVL FILL 0005 BRWN SAND 0010 GREY SAND SLTY 0020
TORONTO CITY	17 629992 4836395 W	2011/12 7241	1.36			MT	0004 8	7176874 (Z143262) A123754	GREY ---- 0001 GREY CLAY 0012
TORONTO CITY	17 630141 4836715 W	2012/01 7241	1.25			MT	0010 10	7176968 (Z145207) A128366	BRWN FILL SAND 0005 BRWN SAND 0008 GREY CLAY STKY 0020
TORONTO CITY	17 630075 4836213 W	2011/12 6926						7179618 (C17791) A122546 P	
TORONTO CITY	17 630423 4836486 W	2012/02 7314						7180022 (M05442) A089544 P	
TORONTO CITY	17 629803 4836825 W	2012/05 6875	5.9	FR 0055	//6/:	DE	0083 4	7187279 (Z134160) A065749	GREY CLAY STNS TILL 0044 GREY FSND SLTY DNSE 0087
TORONTO CITY	17 629998 4836594 W	2012/07 7360						7188417 (C19307) A133002 P	
TORONTO CITY	17 629478 4836510 W	2012/07 7147						7188812 (C16641) A107310 P	

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
TORONTO CITY	17 629860 4836649 W	2012/09 7241	1.25			MT	0004 10	7189981 (Z158590) A123894	
TORONTO CITY	17 629802 4836316 W	2012/10 7241	2			MO	0016 5	7190894 (Z160617) A135068	0001 BRWN SAND SILT LOOS 0014 GREY CLAY SILT DNSE 0021
TORONTO CITY	17 629944 4836599 W	2012/10 7241	1.25			MT	0004 8	7190899 (Z160780) A119385	BRWN SAND SILT LOOS 0010 GREY CLAY SILT SOFT 0012
TORONTO CITY	17 629961 4836606 W	2012/10 7241	1.25			MT	0005 7	7190900 (Z160781) A119386	BRWN SAND SILT LOOS 0010 GREY CLAY SILT SOFT 0012
TORONTO CITY	17 629454 4836584 W	2012/11 7501	2			MO	0095 5	7192365 (Z150597) A137403	BRWN SAND LOOS 0010 GREY SILT CLAY DNSE 0025 GREY CLAY SILT SOFT 0055 GREY SAND SILT DNSE 0065 GREY SILT SAND DNSE 0120 GREY SHLE FCRD 0125
TORONTO CITY	17 630075 4836213 W	2012/12 6926						7195731 (C19840) A122546 P	
TORONTO CITY	17 629803 4836825 W	2012/11 6875	15			DE	0026 1	7197315 (Z158817) A065749 A	
TORONTO CITY	17 629929 4836751 W	2013/01 6946						7198968 (C21403) A143307 P	
TORONTO CITY	17 629797 4836193 W	2013/04 7241	2			MT	0010 10	7200989 (Z167704) A098672	BRWN LOAM LOOS 0001 BRWN SAND SILT LOOS 0010 GREY CLAY SILT LOOS 0020
TORONTO CITY	17 629793 4836192 W	2012/04 7241	2			MT	0010 10	7200990 (Z167705) A098673	BRWN LOAM LOOS 0001 BRWN SAND SILT LOOS 0010 GREY CLAY SILT LOOS 0020
TORONTO CITY	17 629801 4836835 W	2013/02 6875	12.6	UT 0003		DE	0018 2	7201409 (Z158776) A118572	BRWN SAND SILT 0020
TORONTO CITY	17 629963 4836975 W	2012/12 7215						7202140 (C20388) A139558 P	
TORONTO CITY	17 629711 4836247 W	2013/04 7501	2			MO	0055 10	7202746 (Z165123) A143184	BRWN SAND FILL HARD 0012 GREY SILT CLAY HARD 0030 GREY SAND SILT HARD 0065
TORONTO CITY	17 629733 4836296 W	2013/05 7501	2			MO	0060 10	7203868 (Z165124) A143179	BRWN SAND GRVL HARD 0013 GREY CLAY SILT HARD 0035 GREY SILT CLAY HARD 0055 GREY SAND SILT HARD 0070
TORONTO CITY	17 629753 4836244 W	2013/05 7501	2			MO	0055 10	7203869 (Z165110) A143181	BRWN SAND GRVL HARD 0012 GREY CLAY SILT HARD 0042 GREY SILT SAND HARD 0065
TORONTO CITY	17 629977 4836826 W	2013/06 7215						7205566 (C22827) A139558 P	
TORONTO CITY	17 629925 4836105 W	2013/08 7147						7207954 (C22682) A107306 P	
TORONTO CITY	17 629792 4837105 W	2013/08 7241	2			MT	0005 10	7208711 (Z176335) A150787	BRWN FILL 0002 BRWN SAND SLTY 0005 GREY CLAY SILT 0015
TORONTO CITY	17 630008 4836832 W	2013/02 6988						7209363 (C20109) A118409 P	
TORONTO CITY	17 629977 4836820 W	2013/11 7383						7217869 (C18519) A151244 P	
TORONTO CITY	17 630277 4836367 W	2013/03 7341	4.3	FR 0004			0006 1	7219055 (Z150240) A116980 A	
TORONTO CITY	17 630277 4836367 W	2012/12 7341	4.3	FR 0001			0006 1	7219063 (Z150239) A116980	GREY SILT SAND 0007
TORONTO CITY	17 630066 4836260 W	2014/07 7147	1.25	FR 0010		MO	0000 10	7224346 (Z191989) A161050	GREY 0001 BRWN SAND GRVL 0001 BRWN SILT TILL 0010
TORONTO CITY	17 630305 4836481 W	2014/07 6607						7225756 (C23970) A163477 P	
TORONTO CITY	17 629950 4836759 W	2014/07 7241	2			MT	0040 10	7227050 (Z193070) A168858	BRWN SILT SAND 0028 GREY SILT SAND 0050
TORONTO CITY	17 629958 4836638 W	2012/07 7147						7231481 (C12952) A107302 P	
TORONTO CITY	17 630315 4836497 W	2014/12 7147						7234124 (C26943) A161064 P	
TORONTO CITY	17 630053 4836299 W	2014/12 7147						7234424 (C26959) A175815 P	
TORONTO CITY	17 629677 4837121 W	2014/12 7241				MT	0007 10	7235312 (Z201894) A176704	BRWN FILL GRVL LOOS 0002 BRWN CLAY SILT SOFT 0005 GREY CLAY SILT DNSE 0017
TORONTO CITY	17 629690 4837112 W	2014/12 7241				MT	0005 10	7235313 (Z201896) A164904	BRWN FILL GRVL LOOS 0002 BRWN CLAY SILT SOFT 0005 GREY CLAY SILT SOFT 0015
TORONTO CITY	17 629701 4837121 W	2014/12 7241				MT	0005 10	7235314 (Z201895) A171322	BRWN FILL GRVL LOOS 0002 BRWN CLAY SILT SOFT 0005 GREY CLAY SILT DNSE 0015
TORONTO CITY	17 629711 4837129 W	2014/12 7241	1.5			MT	0008 10	7235315 (Z201892) A176702	BLCK 0000 BRWN SAND GRVL LOOS 0001 BRWN SAND SILT CLAY 0010 GREY CLAY SILT LOOS 0020
TORONTO CITY	17 629738 4836579 W	2014/11 7472	2.04			MO	0015 10	7237214 (Z204909) A172539	BRWN FSND LOOS 0015 GREY CLAY SILT PCKD 0025
TORONTO CITY	17 629980 4836618 W	2014/12 7472	0.75			MO	0050 10	7237225 (Z204891) A176108	BRWN FILL FSND SILT 0015 GREY CLAY SILT PCKD 0055 GREY MSND SILT PCKD 0060
TORONTO CITY	17 629963 4836613 W	2014/12 7472	0.75			MO	0050 10	7237226 (Z204892) A176109	BRWN FILL FSND SILT 0015 GREY CLAY SILT PCKD 0055 GREY MSND SILT PCKD 0060
TORONTO CITY	17 629943 4836633 W	2015/01 7241	1			MT	0012 10	7237606 (Z193762) A177141	GREY 0000 BRWN FILL 0002 GREY CLAY SILT 0022
TORONTO CITY	17 629923 4836618 W	2015/01 7472	2.04			MO	0060 10	7237827 (Z204950) A176155	BRWN FILL SAND LOOS 0005 GREY CLAY SILT PCKD 0065 GREY SAND TILL PCKD 0070
TORONTO CITY	17 629924 4836616 W	2015/01 7472	2.04			MO	0008 10	7237828 (Z204951) A176156	BRWN FILL SAND LOOS 0005 GREY CLAY SILT PCKD 0018
TORONTO CITY	17 629730 4836523 W	2015/01 7472	2.04			MO	0055 10	7237838 (Z204949) A176118	BRWN FILL FSND LOOS 0015 GREY CLAY SILT LOOS 0055 GREY FSND PCKD 0065
TORONTO CITY	17 629712 4836547 W	2015/01 7472	2.04			MO	0055 10	7237839 (Z204953) A176119	BRWN FILL FSND LOOS 0015 GREY CLAY SILT LOOS 0055 GREY FSND PCKD 0065
TORONTO CITY	17 629938 4836609 W	2015/02 7241	1.25	12		MO	0000 7	7238504 (Z206203) A179349	GREY GRVL 0002 BRWN SAND SILT LOOS 0017 GREY SILT SAND WBRG
TORONTO CITY	17 629667 4837119 W	2015/03 7241	1.5			MT	0007 5	7239711 (Z207707) A180178	GREY GRVL SAND LOOS 0012
TORONTO CITY	17 630361 4836488 W	2015/03 7241	1.25			MT	0005 10	7240271 (Z206325) A180155	BLCK 0000 BRWN FILL 0006 BRWN SAND 0012 GREY SILT CLAY 0015
TORONTO CITY	17 629957 4836664 W	2015/02 6032	1.79			MO	0085 10	7241015 (Z183668) A138122	BRWN CLAY SILT PCKD 0030 BRWN SILT SAND CLAY 0070 BRWN SAND SILT DNSE 0104 GREY CLAY SHLE HARD 0114 GREY SHLE LYRD 0118
TORONTO CITY	17 629481 4836814 W	2015/02 7247	2	OT		MT	0020 10	7241059 (Z204091) A174066	BRWN SAND FILL LOOS 0005 BRWN TILL 0020 GREY CLAY SLTY 0030
TORONTO CITY	17 630331 4836457 W	2015/03 7230						7241596 (C29459) A178330 P	
TORONTO CITY	17 629975 4836815 W	2015/04 7215						7247588 (C29331) P	
TORONTO CITY	17 629745 4836782 W	2015/08 7472	2.04			MO	0130 10	7248583 (Z219766) A188285	BRWN FILL LOOS 0010 GREY CLAY PCKD 0035 GREY MSND GRVL LOOS 0070 GREY SHLE HARD 0140
TORONTO CITY	17 629765 4836763 W	2015/08 7472	2.04			MO	0050 10	7248584 (Z219767) A188284	BRWN FILL LOOS 0010 GREY CLAY PCKD 0035 GREY MSND SAND 0060
TORONTO CITY	17 630069 4836650 W	2015/10 7501	2	UT 0045		MT	0040 10	7251697 (Z172774) A149185	BRWN GRVL SAND FILL 0005 BRWN SAND SILT FILL 0010 GREY SILT SAND 0050
TORONTO CITY	17 630187 4836291 W	2015/10 7241	1			MT	0004 10	7253364 (Z204711) A188389	GREY 0001 GREY GRVL LOOS 0002 BRWN CLAY DNSE 0006 GREY CLAY DNSE 0014
TORONTO CITY	17 630175 4836306 W	2015/10 7241	1			MT	0005 5	7253365 (Z204710) A188684	GREY 0000 GREY GRVL LOOS 0004 BRWN CLAY DNSE 0006 GREY CLAY DNSE 0010
TORONTO CITY	17 630175 4836286 W	2015/10 7241	1			MT	0005 5	7253366 (Z204709) A188476	GREY 0000 GREY GRVL LOOS 0002 BRWN CLAY DNSE 0006 GREY CLAY DNSE 0010
TORONTO CITY	17 630165 4836303 W	2015/10 7241	1			MT	0005 6	7253367 (Z204708) A166984	GREY 0000 GREY LOOS 0002 BRWN DNSE 0006 GREY DNSE 0012
TORONTO CITY	17 630156 4836293 W	2015/10 7241	1			MT	0008 10	7253368 (Z204706) A188779	GREY 0000 GREY GRVL LOOS 0002 BRWN CLAY DNSE 0010 GREY CLAY DNSE 0018
TORONTO CITY	17 629917 4836650 W	2015/12 7241	1			MT	0005 10	7256362 (Z225032) A183432	GREY SAND LOOS 0002 GREY SAND DNSE 0006 GREY SAND DNSE 0010 BRWN CLAY DNSE 0014 BRWN CLAY DNSE 0018 BRWN CLAY DNSE 0020
TORONTO CITY	17 629914 4836648 W	2015/12 7241	1			MT	0010 10	7256363 (Z225033) A183433	GREY SAND LOOS 0002 GREY SAND LOOS 0006 GREY SAND DNSE 0010 BRWN CLAY DNSE 0014 BRWN CLAY LOOS 0018 BRWN CLAY DNSE 0020
TORONTO CITY	17 629913 4836667 W	2015/12 7241	1			MT	0002 8	7256364 (Z225036) A183437	GREY SAND LOOS 0002 GREY SAND DNSE 0006 BRWN CLAY DNSE 0010
TORONTO CITY	17 629911 4836654 W	2015/12 7241	1			MT	0005 10	7256365 (Z225034) A183434	GREY SAND DNSE 0002 GREY CLAY DNSE 0006 GREY CLAY DNSE 0010 BRWN CLAY DNSE 0014 BRWN CLAY DNSE 0016
TORONTO CITY	17 629909 4836663 W	2015/12 7241	1.25			MT	0005 10	7256366 (Z225037) A183436	GREY CLAY DNSE 0002 GREY CLAY DNSE 0006 GREY CLAY DNSE 0010 GREY CLAY DNSE 0014 GREY CLAY DNSE 0015
TORONTO CITY	17 630138 4836363 W	2015/11 7241	1.25			MT	0014 10	7256743 (Z224728) A183395	GREY 0000 BRWN FILL 0007 GREY CLAY 0024
TORONTO CITY	17 629803 4836464 W	2016/01 7241	1.25			MT	0002 10	7257954 (Z225957) A200847	GREY ---- 0000 GREY ---- STNS LOOS 0001 GREY SILT CLAY 0012
TORONTO CITY	17 629807 4836474 W	2016/01 7241	1.25			MT	0002 10	7257955 (Z225958) A200846	GREY ---- 0000 GREY ---- STNS LOOS 0001 GREY SILT CLAY 0012
TORONTO CITY	17 629796 4836492 W	2016/01 7241	1.25			MT	0002 10	7257956 (Z225959) A200845	GREY ---- 0000 GREY ---- STNS WBRG 0001 GREY SILT CLAY WBRG 0012
TORONTO CITY	17 629806 4836478 W	2011/01 7241	1.25			MT	0005 10	7257957 (Z225956) A200848	GREY ---- 0000 GREY ---- SILT 0001 BRWN SAND FILL 0014 GREY CLAY SILT 0015

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
TORONTO CITY	17 629809 4836481 W	2016/01 7241	1.25			MT	0002 10	7257958 (Z226049) A201100	GREY ---- 0000 GREY STNS SILT LOOS 0001 GREY CLAY SILT 0005 GREY CLAY SILT WBRG 0012
TORONTO CITY	17 629800 4836492 W	2016/01 7241	1.25			MT	0002 10	7257959 (Z226050) A201099	GREY ---- 0000 GREY STNS SILT LOOS 0001 GREY CLAY SILT 0005 GREY CLAY SILT WBRG 0012
TORONTO CITY	17 629804 4836459 W	2016/01 7241	1.25			MT	0002 10	7257960 (Z226048) A201098	GREY ---- 0000 GREY ---- SILT LOOS 0001 GREY CLAY SILT 0005 GREY CLAY SILT WBRG 0012
TORONTO CITY	17 629928 4836748 W	2016/02 6032	2			MO	0090 10	7259533 (Z206894) A194349	GREY GRVL HARD 0001 BRWN FILL SAND FILL 0010 GREY SILT CLAY STNS 0050 GREY SAND SILT LOOS 0060 GREY SILT SAND CLAY 0090
TORONTO CITY	17 629921 4836620 W	2016/02 6032	2			MO	0080 10	7259534 (Z206882) A194413	BRWN SAND SILT DNSE 0080 GREY SAND SILT DNSE 0090
TORONTO CITY	17 629800 4836503 W	2016/03 6571	2.06				0004 10	7261416 (Z193633) A083196	
TORONTO CITY	17 629798 4836503 W	2016/03 6571	2.07				0004 10	7261417 (Z193634) A083197	---- 0006 SAND GRVL 0014
TORONTO CITY	17 629798 4836504 W	2016/03 6571	2.07				0004 10	7261418 (Z193635) A083198	---- 0006 ---- 0012 GREY CLAY 0014
TORONTO CITY	17 629798 4836502 W	2016/03 6571	2.07				0003 10	7261419 (Z193636) A083199	---- 0006 SAND GRVL 0013
TORONTO CITY	17 629799 4836501 W	2016/03 6571	2.07				0001 9	7261420 (Z193637) A083200	---- 0006 SAND GRVL 0013
TORONTO CITY	17 629800 4836502 W	2016/03 6571	2.07				0003 10	7261421 (Z193638) A083201	---- 0006 SAND GRVL 0013
TORONTO CITY	17 629970 4836617 W	2016/03 7472	2			MO	0055 10	7261462 (Z230568) A202586	BRWN FILL FSND LOOS 0012 GREY CLAY SILT PCKD 0055 GREY MSND SILT PCKD 0065
TORONTO CITY	17 630315 4836497 W	2016/05 7147						7263987 (C32454) A161064 P	
TORONTO CITY	17 629596 4836528 W	7147						7265365 (C32440) A198688 P	
TORONTO CITY	17 629570 4836608 W	7147						7265366 (C32438) A198656 P	
TORONTO CITY	17 629466 4836443 W	2014/10 7341						7266435 (C24731) A117042 P	
TORONTO CITY	17 630388 4836541 W	2015/02 7215						7267060 (C00531) A178787 P	
TORONTO CITY	17 629905 4836605 W	2016/08 7147						7271427 (C34000) A198578 P	
TORONTO CITY	17 629880 4836628 W	7147						7273992 (C35633) A198578 P	
TORONTO CITY	17 629662 4836631 W	2016/04 7215						7276345 (C33235) A197132 P	
TORONTO CITY	17 629758 4836758 W	2016/11 7241	2			MT	0028 10	7277781 (Z245658) A211442	BRWN GRVL DNSE 0011 GREY CLAY WBRG 0034 BRWN SILT FSND 0038
TORONTO CITY	17 629763 4836787 W	2016/11 7241	2			MT	0045 10	7277782 (Z245657) A211443	BRWN SAND FILL 0012 GREY CLAY WBRG 0022 GREY SILT FSND 0055
TORONTO CITY	17 629806 4836748 W	2016/11 7241	2			MT	0003 5	7277783 (Z245652) A211444	BRWN SAND FILL 0008
TORONTO CITY	17 629759 4836786 W	2016/11 7241	2			MT	0065 10	7277784 (Z245653) A211445	BRWN SAND GRVL FILL 0013 GREY CLAY SILT 0033 GREY SILT SAND WBRG 0075
TORONTO CITY	17 629769 4836725 W	2016/11 7241	1.25			MT	0002 9	7277785 (Z247442) A205742	GREY CLAY SLTY LOOS 0011
TORONTO CITY	17 629801 4836745 W	2016/11 7241	1.25				0000 12	7277786 (Z245483) A211379	GREY CLAY SLTY LOOS 0012
TORONTO CITY	17 629748 4836541 W	2016/11 6926	2.04	40		DE	0044 10	7278273 (Z242777) A190512	FILL SILT SNDY 0002 SILT CLYY 0045 SILT SAND 0054
TORONTO CITY	17 629842 4836566 W	2016/10 7215						7279208 (C35101) A206692 P	
TORONTO CITY	17 629750 4836757 W	2017/01 7241	2			TH MO	0064 10	7281893 (Z251024) A185762	BRWN FILL 0010 BRWN SILT SAND 0020 GREY SILT SAND DNSE 0074
TORONTO CITY	17 629742 4836783 W	2017/01 7241	2			TH MO	0064 10	7281894 (Z251022) A185759	BRWN FILL 0010 BRWN SILT SAND 0020 GREY SILT SAND DNSE 0074
TORONTO CITY	17 629744 4836773 W	2017/01 7241	2			TH MO	0063 1	7281895 (Z251023) A185730	BRWN FILL 0010 BRWN SILT SAND 0020 GREY SILT SAND DNSE 0073
TORONTO CITY	17 630034 4836455 W	2016/03 6809						7283885 (C32693) A186073 P	
TORONTO CITY	17 630058 4836448 W	2016/01 6809						7283889 (C32679) A186085 P	
TORONTO CITY	17 629791 4836499 W	2017/02 6571	2.07				0001 10	7283914 (Z251189) A169533	GRVL SAND 0001 CLAY 0015
TORONTO CITY	17 629797 4836498 W	2017/02 6571	2.07				0017 10	7283915 (Z251190) A169534	SAND GRVL 0001 CLAY 0025
TORONTO CITY	17 629795 4836495 W	2017/02 6571	2.07				0001 4	7283916 (Z251191) A169535	SAND 0001 CLAY 0015
TORONTO CITY	17 629798 4836497 W	2017/02 6571	2.07				0001 10	7283917 (Z251192) A169536	SAND GRVL 0015 CLAY 0020
TORONTO CITY	17 629802 4836498 W	2017/02 6571	2.07				0001 10	7283918 (Z251193) A169537	SAND GRVL 0001 CLAY 0011
TORONTO CITY	17 629798 4836492 W	2017/02 6571	2.07				0001 10	7283919 (Z251194) A169538	SAND GRVL 0012
TORONTO CITY	17 629804 4836491 W	2017/02 6571	2.07				0017 10	7283920 (Z251195) A169573	SAND GRVL 0001 CLAY 0025
TORONTO CITY	17 629802 4836495 W	2017/02 6571	2.07				0001 9	7283921 (Z251196) A169574	SAND GRVL 0002 CLAY 0012
TORONTO CITY	17 629805 4836499 W	2017/02 6571	2.07				0017 10	7283922 (Z251197) A169575	SAND 0001 CLAY 0025 0030
TORONTO CITY	17 629807 4836484 W	2017/02 6571	2.07				0001 10	7283923 (Z251198) A169576	SAND 0001 CLAY 0020
TORONTO CITY	17 630429 4836507 W	2016/03 6809	2			MO	0055 10	7284074 (Z224351) A186062	BRWN SAND FILL 0015 GREY SILT STNS SILT 0060 GREY SAND WBRG 0070 GREY SILT CLAY 0085 GREY SAND WBRG 0115 GREY SILT STNS 0121 GREY SAND FSND WBRG 0123 GREY SHLE ROCK 0146
TORONTO CITY	17 629574 4836609 W	2017/03 7215	2	38		TH	0030 10	7285830 (Z248786) A212467	BRWN SAND FILL 0016 GREY CLAY SNDY 0040
								7291677 (Z257858) A226387	
								7291694 (Z257857) A226388	
								7294297 (Z255065) A198635	
								7294298 (Z255064) A198636	
								7294826 (Z210387) A222466	
								7295831 (Z261093)	

Notes:
measurements in feet
Casing diameter in inches
water - FR (fresh), UK(unknown), SA (salty), SU (sulphur), MN (mineral),UT (untested), 0126(depth in feet found)
well use - DO(domestic), ST (stock), NU (not used), PS(public supply), IR (irrigation), MO(monitoring), CA (cooling and air conditioning), TH(test hole), DE(dewatering), MT(monitoring), IN(industrial)
screen - depth installed and , length of screen
formation - MSND(medium sand), GRVL(gravel), HPAN(hardpan), QSND(quick sand), FSND(fine sand), SLTY(silty), WBRG(water bearing), BLCK(black), BRWN(brown), LOOS(loose), CMTD(cemented), CSND(coarse sand), SNDY(sandy), DNSE(dense), SHLE(shale), STNS(stones), BLDR(boulder), PCKD(packed), PORS(porous), LYRD(layered), CLN(clean)
- (yellow highlight) well records located on the Site

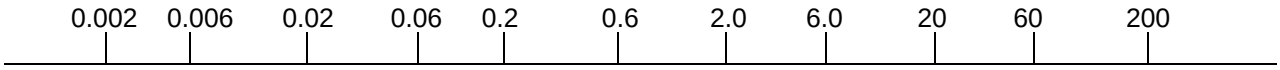
Appendix B:
Borehole Logs

Notes On Sample Descriptions

1. All sample descriptions included in this report follow the Canadian Foundations Engineering Manual soil classification system. This system follows the standard proposed by the International Society for Soil Mechanics and Foundation Engineering. Laboratory grain size analyses provided by exp also follow the same system. Different classification systems may be used by others; one such system is the Unified Soil Classification. Please note that, with the exception of those samples where a grain size analysis has been made, all samples are classified visually. Visual classification is not sufficiently accurate to provide exact grain sizing or precise differentiation between size classification systems.

ISSMFE SOIL CLASSIFICATION

CLAY	SILT			SAND			GRAVEL			COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE		



EQUIVALENT GRAIN DIAMETER IN MILLIMETERS

CLAY (PLASTIC) TO	FINE	MEDIUM	CRS.	FINE	COARSE
SILT (NONPLASTIC	SAND			GRAVEL	

UNIFIED SOIL CLASSIFICATION

2. Fill: Where fill is designated on the borehole log it is defined as indicated by the sample recovered during the boring process. The reader is cautioned that fills are heterogeneous in nature and variable in density or degree of compaction. The borehole description may therefore not be applicable as a general description of site fill materials. All fills should be expected to contain obstruction such as wood, large concrete pieces or subsurface basements, floors, tanks, etc., none of these may have been encountered in the boreholes. Since boreholes cannot accurately define the contents of the fill, test pits are recommended to provide supplementary information. Despite the use of test pits, the heterogeneous nature of fill will leave some ambiguity as to the exact composition of the fill. Most fills contain pockets, seams, or layers of organically contaminated soil. This organic material can result in the generation of methane gas and/or significant ongoing and future settlements. Fill at this site may have been monitored for the presence of methane gas and, if so, the results are given on the borehole logs. The monitoring process does not indicate the volume of gas that can be potentially generated nor does it pinpoint the source of the gas. These readings are to advise of the presence of gas only, and a detailed study is recommended for sites where any explosive gas/methane is detected. Some fill material may be contaminated by toxic/hazardous waste that renders it unacceptable for deposition in any but designated land fill sites; unless specifically stated the fill on this site has not been tested for contaminants that may be considered toxic or hazardous. This testing and a potential hazard study can be undertaken if requested. In most residential/commercial areas undergoing reconstruction, buried oil tanks are common and are generally not detected in a conventional geotechnical site investigation.

3. Till: The term till on the borehole logs indicates that the material originates from a geological process associated with glaciation. Because of this geological process the till must be considered heterogeneous in composition and as such may contain pockets and/or seams of material such as sand, gravel, silt or clay. Till often contains cobbles (60 to 200 mm) or boulders (over 200 mm). Contractors may therefore encounter cobbles and boulders during excavation, even if they are not indicated by the borings. It should be appreciated that normal sampling equipment cannot differentiate the size or type of any obstruction. Because of the horizontal and vertical variability of till, the sample description may be applicable to a very limited zone; caution is therefore essential when dealing with sensitive excavations or dewatering programs in till materials.

Log of Borehole TH1

Project No. MRK-00242474-A0 Drawing No. 1

Project: Phase Two Environmental Site Assessment Sheet No. 1 of 2

Location: Yorkville Avenue and Cumberland Street, Toronto, Ontario

Date Drilled: January 25 & 26, 2018

Drill Type: CME-55 Track, HSA

Datum: Benchmark CT828

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value (20, 40, 60)	Combustible Vapour Reading (ppm) (25, 50, 75)	SAMPLES	% RECOV	SAMPLE ID	ANALYSIS
			116.84							
		5cm of **ASPHALT** pavement.	~116.8	0		ND		80	SS1	ING PAH
		Brown sand and gravel **FILL**, trace brick, moist, no odour, no staining.								
			~115.8	1		ND		40	SS2	pH
		Brown **SAND**, turning grey at 3.05 mbgs, wet at 3.05 mbgs, no odour, no staining.		2		ND		60	SS3	ING PAH
						ND		60	SS4	
				3		ND		70	SS5	PHC VOC
			~113.2	4		ND		60	SS6	Grain size
		Grey silty **CLAY**, moist to wet, no odour, no staining.		5		ND		80	SS7	
				6		ND		80	SS8	
				7		ND		70	SS9	
						ND		60	SS10	pH
				8		ND		80	SS11	
				9		ND		60	SS12	
				10		ND		80	SS13	
		Grey silty **SAND**, moist , no odour, no staining.	~107.1	11		ND		80	SS14	
				12						

ENVIRONMENTAL-EXP MRK-242474- YORKVILLE.GPJ 2/28/18

Continued Next Page

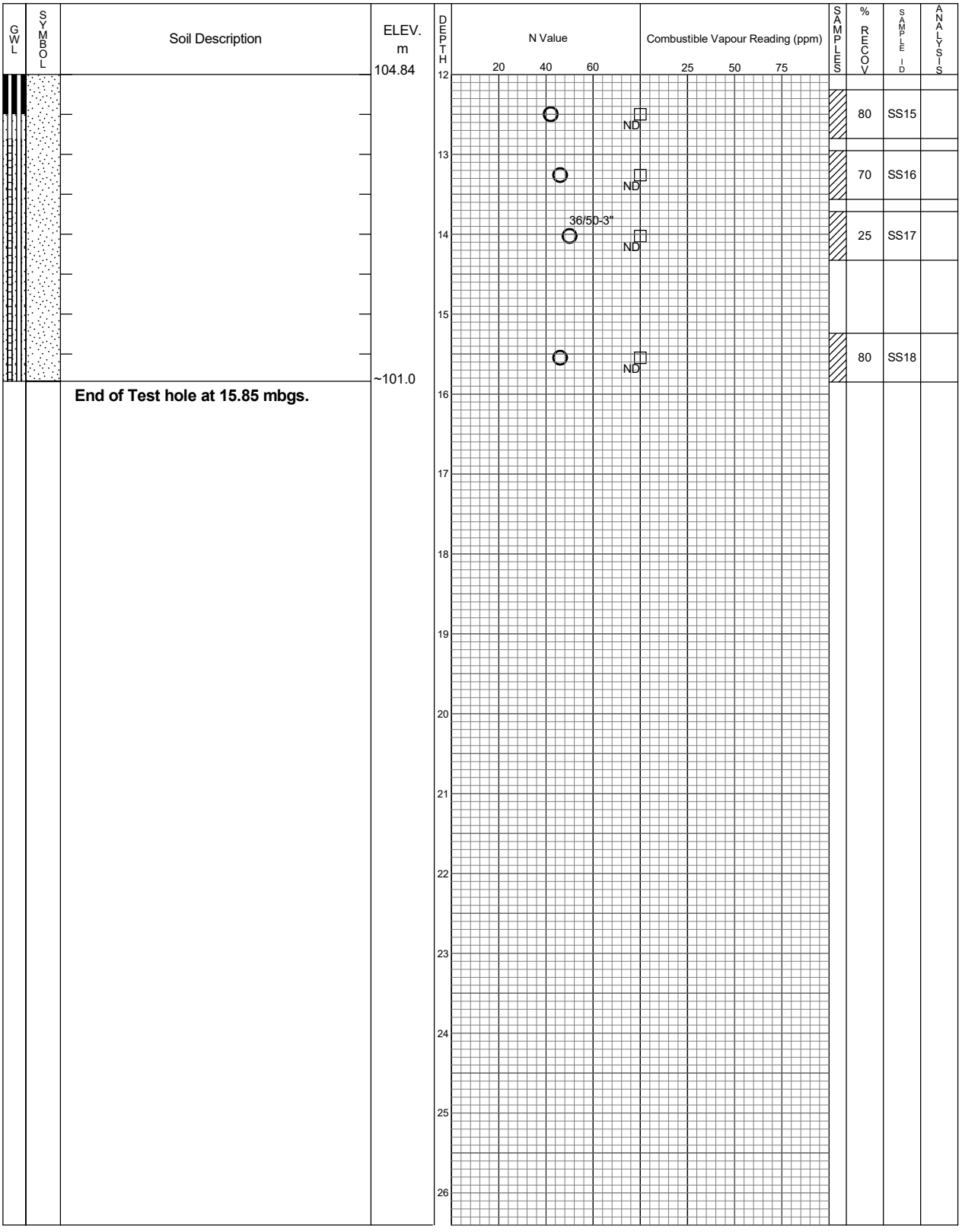
Time	Water Level (m)	Depth to Cave (m)
January 29, 2018	Dry	
January 31, 2018	Dry	
February 5, 2018	Dry	

exp Services Inc.
Markham, Ontario
Telephone: 905.695.3217

Log of Borehole TH1

Project No. MRK-00242474-A0 Drawing No. 1

Project: Phase Two Environmental Site Assessment Sheet No. 2 of 2



ENVIRONMENTAL-EXP MRK-242474- YORKVILLE.GPJ 2/28/18

exp Services Inc.
Markham, Ontario
Telephone: 905.695.3217

Time	Water Level (m)	Depth to Cave (m)
January 29, 2018	Dry	
January 31, 2018	Dry	
February 5, 2018	Dry	

Log of Borehole TH2

Project No. MRK-00242474-A0 Drawing No. 2

Project: Phase Two Environmental Site Assessment Sheet No. 1 of 1

Location: Yorkville Avenue and Cumberland Street, Toronto, Ontario

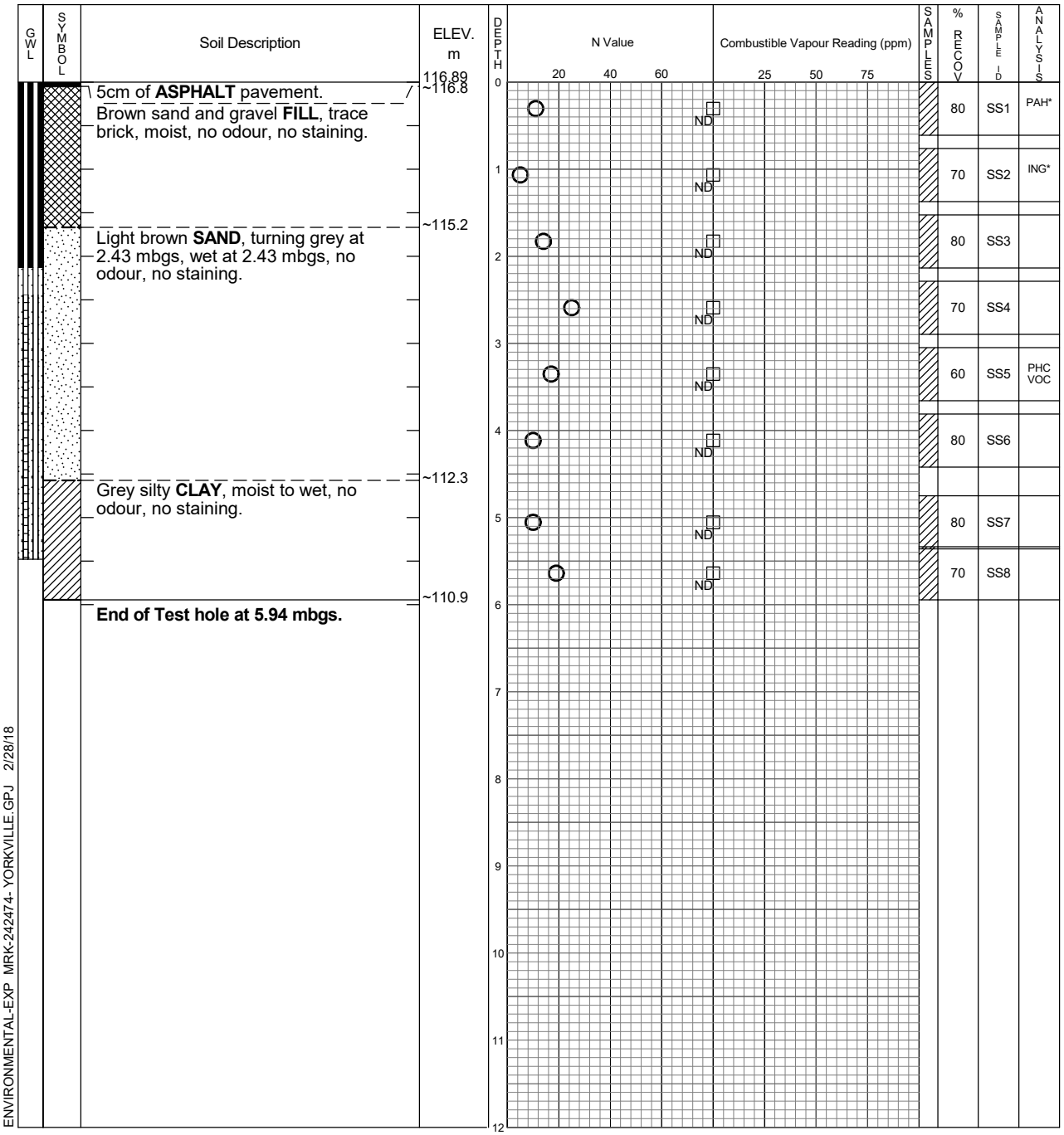
Date Drilled: January 26, 2018

Drill Type: CME-45 Truck, HSA

Datum: Benchmark CT828

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		



ENVIRONMENTAL-EXP MRK-242474- YORKVILLE.GPJ 2/28/18

Time	Water Level (m)	Depth to Cave (m)
January 29, 2018	3.41	
February 5, 2018	3.44	

exp Services Inc.
Markham, Ontario
Telephone: 905.695.3217

Log of Borehole TH3

Project No. MRK-00242474-A0 Drawing No. 3

Project: Phase Two Environmental Site Assessment Sheet No. 1 of 1

Location: Yorkville Avenue and Cumberland Street, Toronto, Ontario

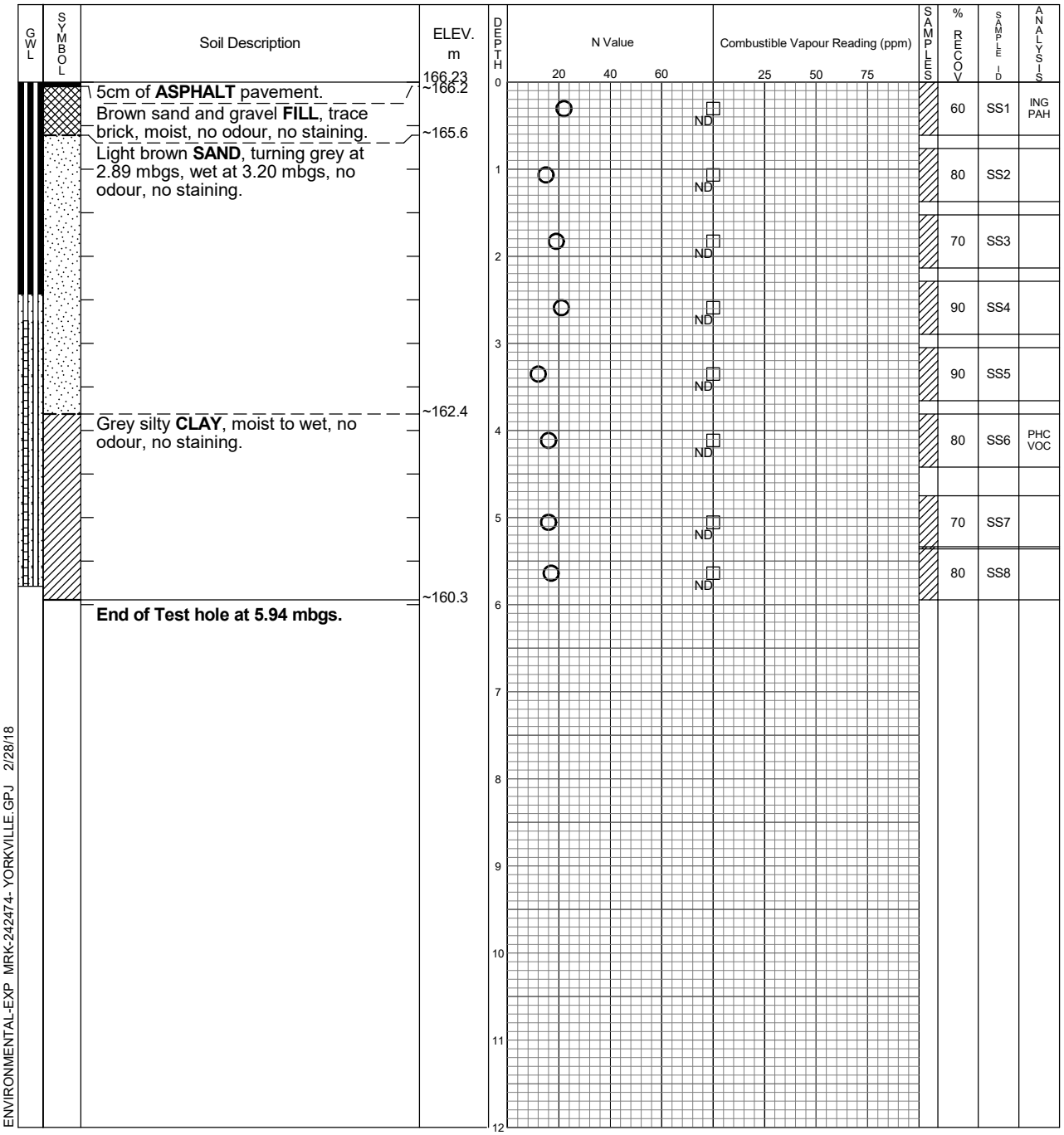
Date Drilled: January 29, 2018

Drill Type: CME-55 Track, HSA

Datum: Benchmark CT828

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		



ENVIRONMENTAL-EXP MRK-242474- YORKVILLE.GPJ 2/28/18

Time	Water Level (m)	Depth to Cave (m)
January 29, 2018	3.19	
January 31, 2018	3.22	

exp Services Inc.
Markham, Ontario
Telephone: 905.695.3217

Log of Borehole TH4

Project No. MRK-00242474-A0 Drawing No. 4

Project: Phase Two Environmental Site Assessment Sheet No. 1 of 1

Location: Yorkville Avenue and Cumberland Street, Toronto, Ontario

Date Drilled: January 29, 2018

Drill Type: CME-55 Track, HSA

Datum: Benchmark CT828

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value 20 40 60	Combustible Vapour Reading (ppm) 25 50 75	SAMPLES	% RECOV	SAMPLE ID	ANALYSIS
		166.20		0						
		5cm of **ASPHALT** pavement.	~166.1							
		Brown sand and gravel **FILL**, trace brick, moist, no odour, no staining.								
			~165.4	1						
		Light brown **SAND**, turning grey at 3.05 mbgs, cobble encountered at 3.20 mbgs, wet at 3.05 mbgs, no odour, no staining.								
				2						
				3						
			~162.2	4						
		Grey silty **CLAY**, moist to wet, no odour, no staining.								
				5						
			~160.3	6						
		End of Test hole at 5.94 mbgs.		7						
				8						
				9						
				10						
				11						
				12						

		0	ND	80	SS1	ING PAH
		1	ND	90	SS2	
		2	ND	90	SS3	
		3	ND	80	SS4	ING PAH
		4	ND	80	SS5	PHC VOC
		5	ND	90	SS6	
		6	ND	90	SS7	
				80	SS8	

ENVIRONMENTAL-EXP MRK-242474- YORKVILLE.GPJ 2/28/18

exp Services Inc.
Markham, Ontario
Telephone: 905.695.3217

Time	Water Level (m)	Depth to Cave (m)
January 29, 2018	3.23	
January 31, 2018	3.25	

RECORD OF BOREHOLE 1

PROJECT : E4703
LOCATION : 19 Yorkville Avenue, Toronto, Ontario
STARTED : February 22, 2016
COMPLETED : February 24, 2016

MC CLYMONT & RAK ENGINEERS, INC.

SHEET 1 OF 1
DATUM Geodetic

DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m
		GROUND SURFACE		116.64			
		50 mm ASPHALT		116.49 0.15	1	SS	36
		FILL: sand and gravel, trace of brick, coal, asphalt and concrete pieces, brown, moist, compact.		115.12 1.52	2	AS	
2		SILTY SAND: brown, moist, loose to compact. -wet below 3.05 m depth.			3	SS	9
					4	SS	19
					5	SS	20
4				112.07 4.57			
		SILTY CLAY: grey, moist, stiff to very stiff.			6	SS	13
6					7	SS	29
					8	SS	24
8					9	SS	14
10				105.97 10.67	10	SS	17
		SILTY CLAY TILL: trace of sand and gravel, grey moist, very stiff.		104.45 12.19	11	SS	31
12		SILTY SAND: grey, wet, dense.		102.92 13.72	12	SS	>100
14		SANDY SILT: grey, moist, very dense.		101.40 15.24	13	SS	39
		SILTY SAND: grey, moist to wet, dense to very dense. -wet at 16.8 m depth.			14	SS	>100
16					15	SS	83
18				96.83 19.81	16	SS	60
20		CLAYEY SILT TILL: trace of sand and gravel, grey, moist, hard. -some sand below 21.3 m depth.			17	SS	78
22				93.78 22.86	18	SS	54
		SILTY SAND: grey, wet, very dense.		92.26 24.38	19	SS	61
24		SANDY SILT: grey, wet, very dense.		90.73 25.91	20	SS	64
26		SILTY SAND: grey, wet, very dense.			21	SS	74
28					22	SS	61
30				86.16 30.48	23	SS	66
		SAND: grey, wet, very dense.			24	SS	>100
32				83.11 33.53	25	SS	>100
34		CLAYEY SILT TILL: trace of sand, gravel and shale fragments, grey, moist, hard.			26	SS	>100
36					27	SS	>100
38		-tricone bit grinding below 36.9 m depth (possible shale bedrock).		78.54	28	SS	>100
		WEATHERED SHALE: grey, moist.		78.49 38.15			
40		End of Borehole.					
42		Note: 1) Water level was not measured on completion of drilling due to use of mud. 2) Water level was measured at 13.0 m bgs on February 25, 2016.					

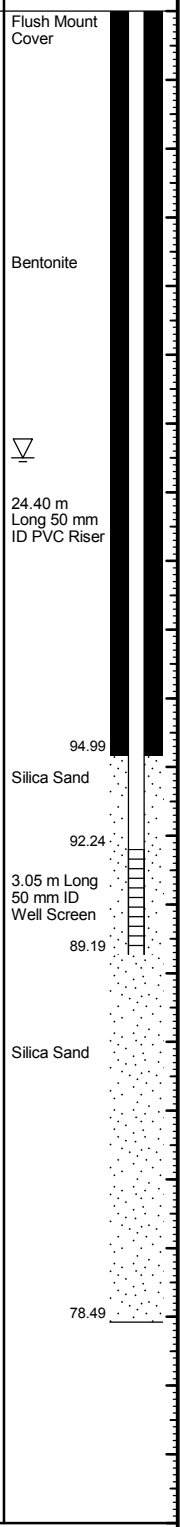
POWER BORING
ROTARY MUD DRILLING

ORGANIC VAPOUR READINGS (ppm) ⊗: 100 200 300 400
% LEL (hexane) □: 20 40 60 80

SHEAR STRENGTH: Cu, KPa — nat V - ✤, rem V - ●, Q - ✖, U - ▲: 20 40 60 80
WATER CONTENT, PERCENT — wp, w, wl: 10 20 30 40

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION



GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
WATER LEVEL (date)

LOGGED : VSL
CHECKED : JB

RAK6 4703.GPJ 3/4/16

Log of Borehole: MW01

Project #: 110954 **Logged By:** B.B.

Project: Phase II Environmental Site Assessment

Client: KingSett Capital

Location: 21-25 Yorkville Avenue, Toronto, ON

Drill Date: December 17, 2015 **Project Manager:** R.R.

SUBSURFACE PROFILE

Depth (ft / m)	Symbol	Description	Measured Depth (m)
0 / 0		Ground Surface	0.00
		Concrete	0.30
1 / 2 / 3 / 4 / 1		***Sand*** Fine to medium grained, moist, brown Trace oxidation from 0.6 to 1.8 mbgs	0.61
5 / 6 / 7 / 8 / 2		Grey-brown, coarse grained sand from 2.44 to 2.59 mbgs	2.44
9 / 10 / 3		***Clay*** Trace silt, wet to saturated, grey, trace oxidation from 3.05 to 3.66 mbgs Moist	3.05 3.66 6.10
		End of Borehole Soil Vapours measured using a photoionization detector (PID) and an RKI Eagle hydrocarbon surveyor.	

Monitoring Well Details: Riser, Bentonite, Silica Sand, Screen

Water level measured at 5.325 mbgs on December 22, 2105.

SAMPLE

Sampler #	Recovery (%)	Sample ID	Soil Vapour Concentration RKI/PID	Laboratory Analysis
1	10	S1	10/0	
2	30	S2	10/0	pH
3	90	S3	5/0	
		S4	5/0	
4	100	S5	5/0	VOCs
		S6	5/0	Grain Size
5	100	S7	0/0	
		S8	0/0	
6	100	S9	10/0	VOCs

Contractor: Strata Drilling Group

Drilling Method: Direct Push

Well Casing Size: 2.54cm

Pinchin Ltd.
2470 Milltower Court
Mississauga, ON L5N 7W5

Grade Elevation: NM

Top of Casing Elevation: NM

Sheet: 1 of 1

Log of Borehole: MW02

Project #: 110954 **Logged By:** B.B.

Project: Phase II Environmental Site Assessment

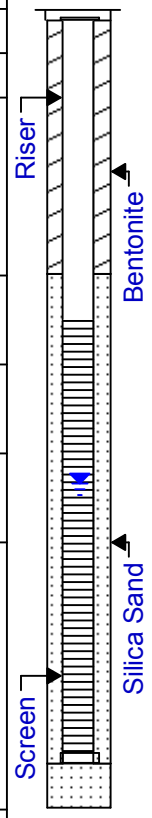
Client: KingSett Capital

Location: 21-25 Yorkville Avenue, Toronto, ON

Drill Date: December 17, 2015 **Project Manager:** R.R.

SUBSURFACE PROFILE

Depth (ft / m)	Symbol	Description	Measured Depth (m)
0 / 0		Ground Surface	0.00
		Concrete	0.30
1 / 0		***Sand*** Fine to medium grained, moist, brown	0.61
2		Trace oxidation from 0.6 to 1.2 mbgs	
3 / 1			
4		Grey-brown	1.83
5			
6 / 2			2.44
7		Coarse grained sand from 2.44 to 2.59 mbgs	
8			
9			3.05
10 / 3		***Clay*** Trace silt, wet to saturated, grey, trace oxidation from 3.05 to 3.66 mbgs	3.66
11			
12		Moist	
13 / 4			
14			
15			
16 / 5			
17			5.49
18		End of Borehole	
19			
20 / 6			
21			
22		Soil Vapours measured using a photoionization detector (PID) and an RKI Eagle hydrocarbon surveyor.	
23 / 7			
24			
25			



Water level measured at 3.254 mbgs on December 22, 2105.

SAMPLE

Sampler #	Recovery (%)	Sample ID	Soil Vapour Concentration RKI/PID	Laboratory Analysis
1	25	S1	0/1	
2	60	S2	15/0	Metals
		S3	5/1	
3	80	S4	0/0	
		S5	0/0	
4	100	S6	35/5	VOCs
		S7	25/0	
5	100	S8	5/0	
		S9	5/0	

Contractor: Strata Drilling Group

Drilling Method: Direct Push

Well Casing Size: 2.54cm

Pinchin Ltd.
2470 Milltower Court
Mississauga, ON L5N 7W5

Grade Elevation: NM

Top of Casing Elevation: NM

Sheet: 1 of 1

Log of Borehole: MW03

Project #: 110954 **Logged By:** B.B.

Project: Phase II Environmental Site Assessment

Client: KingSett Capital

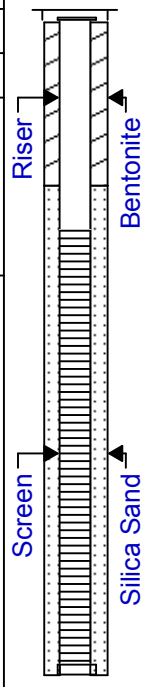
Location: 21-25 Yorkville Avenue, Toronto, ON

Drill Date: December 17, 2015 **Project Manager:** R.R.

SUBSURFACE PROFILE

Depth (ft / m)	Symbol	Description	Measured Depth (m)
0 / 0		Basement Surface	0.00
		Concrete Basement floor slab	0.30
1		***Clay*** Trace silt, moist, grey	0.61
2 / 1		Moist to wet	
3			
4			
5			1.83
6 / 2		Wet	
7			
8			
9			
10 / 3			
11			
12			
13 / 4			
14			
15			
16 / 5			4.88
17		End of Borehole	
18			
19			
20 / 6			
21			
22			
23 / 7			
24			
25			

Soil Vapours measured using a photoionization detector (PID) and an RKI Eagle hydrocarbon surveyor.



Monitoring well was dry on December 22, 2105.

SAMPLE

Sampler #	Recovery (%)	Sample ID	Soil Vapour Concentration RKI/PID	Laboratory Analysis
1	50	S1	25/0	
2	100	S2	25/0	Metals
		S3	25/0	VOCs, PHCs, pH, Grain Size
3	100	S4	5/0	PAHs
		S5	5/0	
4	100	S6	0/0	
		S7	0/0	
5	50	S8	0/0	

Contractor: Strata Drilling Group

Drilling Method: Direct Push

Well Casing Size: 2.54cm

Pinchin Ltd.
2470 Milltower Court
Mississauga, ON L5N 7W5

Grade Elevation: NM

Top of Casing Elevation: NM

Sheet: 1 of 1

Log of Borehole: MW04

Project #: 110954 **Logged By:** B.B.

Project: Phase II Environmental Site Assessment

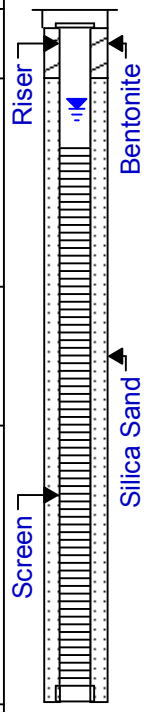
Client: KingSett Capital

Location: 21-25 Yorkville Avenue, Toronto, ON

Drill Date: December 18, 2015 **Project Manager:** R.R.

SUBSURFACE PROFILE

Depth (ft / m)	Symbol	Description	Measured Depth (m)
0 / 0		Basement Surface	0.00
		Concrete Basement floor slab	0.30
1 / 1		***Sand*** Fine to coarse grained, saturated, brown grey	1.22
4 / 2		***Clay*** Trace silt, moist to wet, grey Saturated	1.83
10 / 3		End of Borehole	3.05
13 / 4		Soil Vapours measured using a photoionization detector (PID) and an RKI Eagle hydrocarbon surveyor.	



Water level measured at 0.439 mbgs on December 22, 2015.

SAMPLE

Sampler #	Recovery (%)	Sample ID	Soil Vapour Concentration RKI/PID	Laboratory Analysis
1	40	S1	20/1	
2	100	S2	15/1	Metals
		S3	15/0	
3	100	S4	25/0	VOCs
		S5	15/0	

Contractor: Strata Drilling Group

Drilling Method: Direct Push

Well Casing Size: 2.54cm

Pinchin Ltd.
2470 Milltower Court
Mississauga, ON L5N 7W5

Grade Elevation: NM

Top of Casing Elevation: NM

Sheet: 1 of 1

Log of Borehole: MW05

Project #: 110954 **Logged By:** B.B.

Project: Phase II Environmental Site Assessment

Client: KingSett Capital

Location: 21-25 Yorkville Avenue, Toronto, ON

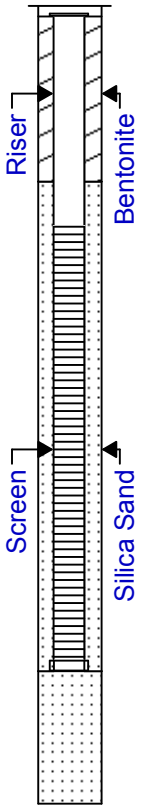
Drill Date: December 18, 2015 **Project Manager:** R.R.

SUBSURFACE PROFILE

Depth (ft / m)	Symbol	Description	Measured Depth (m)
0 / 0		Basement Surface	0.00
		Concrete Basement floor slab	0.30
		Clay Trace silt, moist, grey	0.61
1 / 1		Moist to wet	
2 / 2			
3 / 3			
4 / 4			
5 / 5			
6 / 6			
7 / 7			5.49
		End of Borehole	

Soil Vapours measured using a photoionization detector (PID) and an RKI Eagle hydrocarbon surveyor.

Monitoring Well Details



Monitoring well was dry on December 22, 2105.

SAMPLE

Sampler #	Recovery (%)	Sample ID	Soil Vapour Concentration RKI/PID	Laboratory Analysis
1	75	S1	5/0	
2	100	S2	5/0	VOCs
		S3	0/0	
3	100	S4	0/0	
		S5	0/0	
4	100	S6	0/0	
		S7	0/0	
5	100	S8	0/0	
		S9	0/0	

Contractor: Strata Drilling Group

Drilling Method: Direct Push

Well Casing Size: 2.54cm

Pinchin Ltd.
2470 Milltower Court
Mississauga, ON L5N 7W5

Grade Elevation: NM

Top of Casing Elevation: NM

Sheet: 1 of 1

SPL Consultants Limited
Geotechnical Environmental Materials Hydrogeology

LOG OF BOREHOLE BH15-2

PROJECT: Environmental Soil & Groundwater Investigation
CLIENT: Bazis Inc.
PROJECT LOCATION: 11-17 Yorkville Avenue, Toronto, Ontario
DATUM: Geodetic
BH LOCATION: See Borehole Location Plan

DRILLING DATA
Method: Geoprobe 420
Diameter:
Date: Jan/23/2015

REF. NO.: 10001354-100
ENCL NO.: 1

SOIL PROFILE (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 (Mg/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
113.4											
113.2 0.2	**CONCRETE:** 200mm		1	S							
112.8 0.6	**FILL:** silty sand to sand, brown to grey, moist.		2A	S							
	SILTY CLAY trace sand, grey, moist.		2B	S			112				
	moist to very moist.		3A	S							
			3B	S							
			4A	S			110				
			4B	S							
			5A	S							
			5B	S			108				
			6A	S							
106.7			6B	S							
6.7	**END OF BOREHOLE**										

Notes:
1) 32mm dia. monitoring well installed in the borehole upon completion.
2) Well was dry on January 28, 2015 and February 6, 2015.

GROUNDWATER ELEVATIONS
Shallow/ Single Installation ▽ ▼ Deep/Dual Installation ▼ ▼

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

SPL SOIL LOG 10001354-17YORKVILLE,-BOREHOLE LOGS.GPJ SPL.GDT 2/11/15

SPL Consultants Limited
Geotechnical Environmental Materials Hydrogeology

LOG OF BOREHOLE BH15-3

PROJECT: Environmental Soil & Groundwater Investigation
CLIENT: Bazis Inc.
PROJECT LOCATION: 11-17 Yorkville Avenue, Toronto, Ontario
DATUM: Geodetic
BH LOCATION: See Borehole Location Plan

DRILLING DATA
Method: Hollow Stem Augers
Diameter: 203mm
Date: Jan/24/2015

REF. NO.: 10001354-100
ENCL NO.: 2

SOIL PROFILE (m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	TYPE	BLOWS "N" 0.3 m	GROUND WATER CONDITIONS	ELEVATION
116.3							
116.2 / 0.1	**CONCRETE:** 100mm		1	SS	19		116
0.4	**FILL:** silty sand to sand, trace clay, trace brick fragments, brownish grey to brown, moist to very moist, very loose to compact		2	SS	3		
114.0			3	SS	5		114
2.3	**FINE SAND:** trace silt, brown to grey, moist, compact		4	SS	12		
112.8	wet below 3.1m		5	SS	10		112
3.5	**SILTY CLAY** trace sand, occasional seams of fine sand and silt, grey, moist, stiff to very stiff		6	SS	10		
			7	SS	15		110
			8	SS	14		
			9	SS	12		108
105.9							
10.4	**SILT:** trace sand, trace clay, grey, wet, compact		10	SS	23		106
	some clay, moist below 12.2m		11	SS	59		104
			12	SS	72		102
101.5							
14.8	**SANDY SILT:** trace clay, grey, wet, dense		13	SS	58		
99.8							100
16.5	**SILT:** trace clay, grey, wet, very dense		14	SS	66	▽	W. L. 99.4 m Jan 28, 2015
98.3							98
18.0	**SANDY SILT TO SILTY SAND:** frequent clayey silt seams/layers, grey, wet, very dense		15	SS	64		
97.0							
19.3	**CLAYEY SILT TILL:** some sand to sandy, trace gravel, grey, moist, hard		16	SS	46		96
94.7							
94.6	**SANDY SILT:** trace clay, grey, wet,		17	SS	43		
21.9	dense						
	END OF BOREHOLE						
	Notes: 1) 50mm dia. monitoring well installed in the borehole upon completion.						

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 (Mg/m³)

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

SPL SOIL LOG 10001354-17YORKVILLE,-BOREHOLE LOGS.GPJ SPL.GDT 2/11/15

GROUNDWATER ELEVATIONS
Shallow/ Single Installation ▽ ▼ Deep/Dual Installation ▼ ▼

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

SPL Consultants Limited
Geotechnical Environmental Materials Hydrogeology

LOG OF BOREHOLE BH15-3S

PROJECT: Environmental Soil & Groundwater Investigation
CLIENT: Bazis Inc.
PROJECT LOCATION: 11-17 Yorkville Avenue, Toronto, Ontario
DATUM: Geodetic
BH LOCATION: See Borehole Location Plan

DRILLING DATA
Method: Hollow Stem Augers
Diameter: 203mm
Date: Jan/24/2015

REF. NO.: 10001354-100
ENCL NO.: 3

ELEV / DEPTH (m)	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (Mg/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
116.3												
116.2 / 0.1	**CONCRETE:** 100mm											
0.4	**FILL:** silty sand to sand, trace clay, trace brick fragments, brownish grey to brown, moist to very moist, very loose to compact						116					
114.0												
2.3	**FINE SAND:** trace silt, brown to grey, moist, compact						114					
112.8	wet below 3.1m					W. L. 113.2 m Jan 28, 2015						
3.5	**SILTY CLAY** trace sand, occasional seams of fine sand and silt, grey, moist, stiff to very stiff						112					
111.7												
4.6	**END OF BOREHOLE**											

Notes:
1) 50mm dia. monitoring well installed in the borehole upon completion.
2) Stratigraphy assumed from BH15-3.

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
WATER CONTENT (%): 10 20 30

GROUNDWATER ELEVATIONS
Shallow/ Single Installation ▽ ▼ Deep/Dual Installation ▼ ▼

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

SPL SOIL LOG 10001354-17YORKVILLE,-BOREHOLE LOGS.GPJ SPL.GDT 2/11/15

Appendix C:
Groundwater Levels

Appendix C Water Level Measurements

Project: 11 to 21 Yorkville Avenue and 16 to 18 Cumberland Street, Toronto, ON

Project No.: MRK-00242474-A0

							Jan 28, 2015/ Feb. 25, 2016 (BH1)		28-Nov-17		29-Jan-18		31-Jan-18		5-Feb-18		Estimated Hydraulic
Borehole:	**Address**	**BH Elev. (masl)**	**Stick up (m)**	**Screen interval (mbgs)**	**Well Depth (mbgs)**	**Deposit Screened**	**Depth (mbgs)**	**Elev. (masl)**	**Depth (mbgs)**	**Elev. (masl)**	**Depth (mbgs)**	**Elev. (masl)**	**Depth (mbgs)**	**Elev. (masl)**	**Depth (mbgs)**	**Elev. (masl)**	**Conductivity (m/s)**
BH1	19 Y	116.64	0	24.2 to 26.6	27.9	Sandy Silt/ Silty Sand	13.00	103.64	20.29	96.35	na		na		20.25	96.39	9.87E-07
BH15-3	17 Y	116.27	0	18.3 to 21.3	21.3	Sandy Silt/Silty Sand/ Clayey Silt Till	16.90	99.37	17.99	98.28	na		na		17.41	98.86	1.20E-07
TH1	19 Y	116.84	0	12.8 to 15.8	15.8	Silty Sand					dry	dry	dry	dry	dry	dry	
BH15-3S	17Y	116.27	0	2.4 to 5.5	5.5	Fill/Sand/Silty Clay	3.00	113.27	3.19	113.08	na		na		na		
MW01	21Y	116.31	0	3.0 to 6.1	6.1	Clay	5.33	110.98	4.19	112.12	na		na		na		
MW02	25Y	116.31	0	2.1 to 5.2	5.2	Sand/Clay	3.35	112.96	3.34	112.97	na		na		na		
MW03	21Y	114.26	0	1.5 to 4.6	4.6	Clay	dry	dry	dry	dry	na		na		na		
MW04	21Y	114.26	0	0.6 to 3.0	3.0	Sand/Clay	0.44	113.82	0.58	113.68	na		na		na		
MW05	25Y	114.26	0	1.5 to 4.6	4.6	Clay	dry	dry	dry	dry	na		na		na		
TH2	19Y	116.89	0	2.4 to 5.5	5.5	Sand/Silty Clay					3.41	113.48	na		3.44	113.45	
TH3	19Y	116.23	0	2.7 to 5.8	5.8	Sand/Silty Clay					3.19	113.04	3.22	113.01	na		
TH4	16C	116.2	0	2.9 to 5.9	5.9	Sand/Silty Clay					3.24	112.96	3.24	112.96	na		
																Geometric Mean Estimated Hydraulic Conductivity - Deep	3.44E-07

Notes:

Address Address of property with borehole location "Y"-Yorkville, "C" - Cum

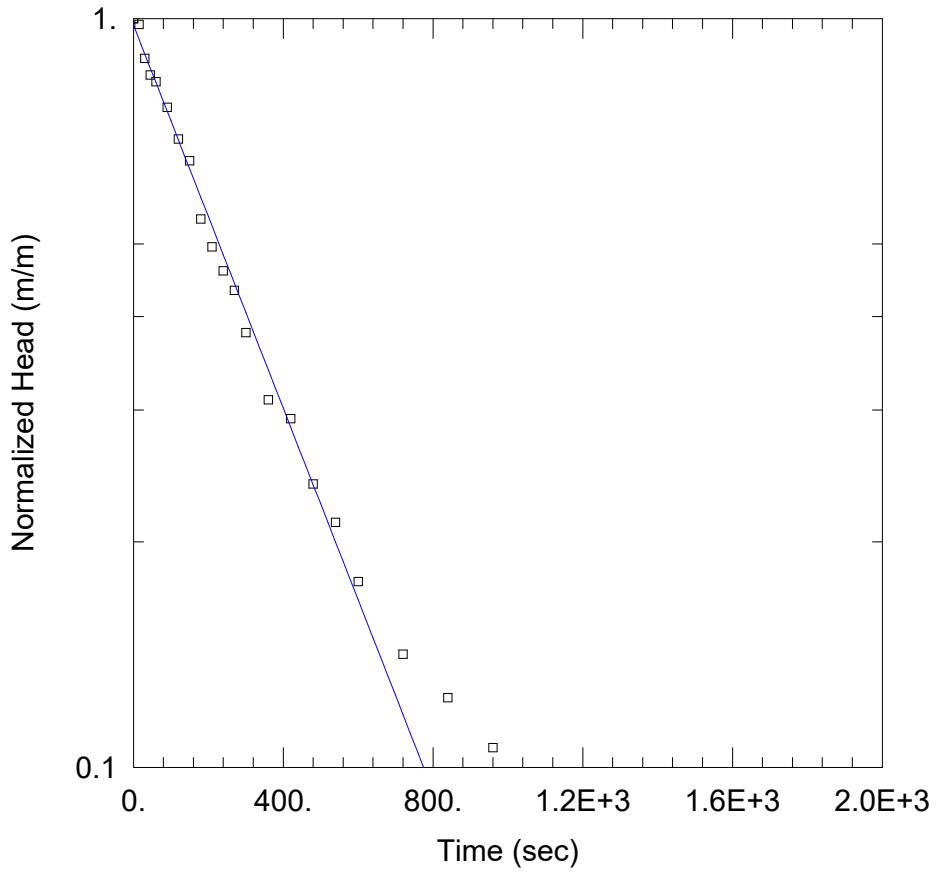
masl - metres above sea level

mbgs -metres below ground surface

na - not accessible

Geometric Deep Groundwater Elevation (masl)	97.31			97.62
lowest	96.35			96.39
highest	113.68			113.45
Geometric Shallow Groundwater Elevation (masl)	112.92	113.16	112.98	113.45
lowest	112.12	112.96	112.96	113.45
highest	113.68	113.48	113.01	113.45

Appendix D:
SWRT Results and Data Analysis



BH1-FALLING HEAD SWRT TEST

Data Set: F:\...\AqtwBH1.aqt
Date: 02/22/18 Time: 16:42:17

PROJECT INFORMATION

Company: exp Services Inc.
Client: 11 Yorkville Partners Inc.
Project: MRK00242474-A0
Location: 11 to 25 Yorkville Ave.
Test Well: BH1
Test Date: Feb 5, 2018

AQUIFER DATA

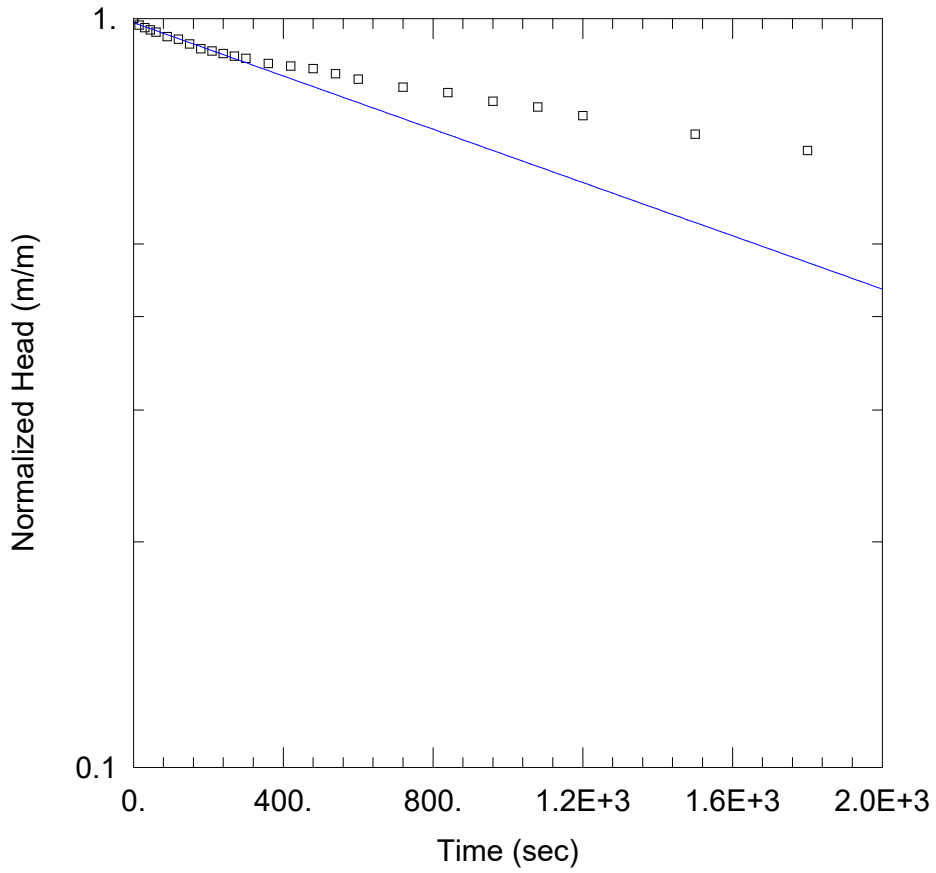
Saturated Thickness: 7.65 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH1)

Initial Displacement: 1.13 m
Total Well Penetration Depth: 7.65 m
Casing Radius: 0.0254 m
Static Water Column Height: 7.65 m
Screen Length: 3. m
Well Radius: 0.1016 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 9.874E-7 m/sec
y0 = 1.108 m



BH15-3-FALLING HEAD SWRT TEST

Data Set: F:\...\AqtwBH15-3.aqt
Date: 02/22/18 Time: 16:43:09

PROJECT INFORMATION

Company: exp Services Inc.
Client: 11 Yorkville Partners Inc.
Project: MRK00242474-A0
Location: 11 to 25 Yorkville Ave.
Test Well: BH15-3
Test Date: Feb 5, 2018

AQUIFER DATA

Saturated Thickness: 3.89 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH15-3)

Initial Displacement: 1.47 m
Static Water Column Height: 3.89 m
Total Well Penetration Depth: 3.89 m
Screen Length: 3. m
Casing Radius: 0.0254 m
Well Radius: 0.1016 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 1.197E-7 m/sec
y0 = 1.451 m

Appendix E:
Laboratory Certificates of Analysis

Your Project #: MRK-00242474-A0
Site Location: 19 YORKVILLE
Your C.O.C. #: 649244-01-01

Attention: Robert Ferris

exp Services Inc
Markham Branch
220 Commerce Valley Dr W
Suite 500
Markham, ON
L3T 0A8

Report Date: 2018/02/13
Report #: R4984388
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B828879
Received: 2018/02/07, 15:12

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Sewer Use By-Law Semivolatile Organics	1	2018/02/09	2018/02/11	EPA 8270 CAM SOP 00301	EPA 8270 m
Biochemical Oxygen Demand (BOD)	1	2018/02/07	2018/02/12	CAM SOP-00427	SM 23 5210B m
Chromium (VI) in Water	1	N/A	2018/02/12	CAM SOP-00436	EPA 7199 m
Total Cyanide	1	2018/02/09	2018/02/09	CAM SOP-00457	OMOE E3015 5 m
Fluoride	1	2018/02/09	2018/02/12	CAM SOP-00449	SM 23 4500-F C m
Mercury in Water by CVAA	1	2018/02/08	2018/02/09	CAM SOP-00453	EPA 7470A m
Total Metals Analysis by ICPMS	1	N/A	2018/02/13	CAM SOP-00447	EPA 6020B m
E.coli, (CFU/100mL)	1	N/A	2018/02/07	CAM SOP-00552	MOE LSB E3371
Total Nonylphenol in Liquids by HPLC	1	2018/02/08	2018/02/09	CAM SOP-00313	In-house Method
Nonylphenol Ethoxylates in Liquids: HPLC	1	2018/02/08	2018/02/09	CAM SOP-00313	In-house Method
Animal and Vegetable Oil and Grease	1	N/A	2018/02/09	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2018/02/09	2018/02/09	CAM SOP-00326	EPA1664B m,SM5520A m
Polychlorinated Biphenyl in Water	1	2018/02/08	2018/02/08	CAM SOP-00309	EPA 8082A m
pH	1	N/A	2018/02/12	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2018/02/12	CAM SOP-00444	OMOE E3179 m
Total Kjeldahl Nitrogen in Water	1	2018/02/09	2018/02/09	CAM SOP-00938	OMOE E3516 m
Total PAHs (1)	1	N/A	2018/02/12	CAM SOP - 00301	EPA 8270 m
Mineral/Synthetic O & G (TPH Heavy Oil) (2)	1	2018/02/09	2018/02/09	CAM SOP-00326	EPA1664B m,SM5520F m
Total Suspended Solids	1	2018/02/08	2018/02/08	CAM SOP-00428	SM 23 2540D m
Volatile Organic Compounds in Water	1	N/A	2018/02/09	CAM SOP-00226	EPA 8260C m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Your Project #: MRK-00242474-A0
Site Location: 19 YORKVILLE
Your C.O.C. #: 649244-01-01

Attention: Robert Ferris

exp Services Inc
Markham Branch
220 Commerce Valley Dr W
Suite 500
Markham, ON
L3T 0A8

Report Date: 2018/02/13
Report #: R4984388
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B828879
Received: 2018/02/07, 15:12

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Total PAHs include only those PAHs specified in the sewer use by-by-law.
(2) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Deepthi Shaji, Project Manager
Email: dshaji@maxxam.ca
Phone# (905)817-5700 Ext:5807
==========
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B828879
Report Date: 2018/02/13

exp Services Inc
Client Project #: MRK-00242474-A0
Site Location: 19 YORKVILLE
Sampler Initials: PS

TORONTO SANITARY & STORM SEWER PACKAGE (WATER)

Maxxam ID				GBA094			GBA094		
Sampling Date				2018/02/07 11:30			2018/02/07 11:30		
COC Number				649244-01-01			649244-01-01		
	UNITS	**Criteria**	**Criteria-2**	**BH15-3**	**RDL**	**QC Batch**	**BH15-3 Lab-Dup**	**RDL**	**QC Batch**
Calculated Parameters									
Total Animal/Vegetable Oil and Grease	mg/L	150	-	3.8	0.50	5388315			
Inorganics									
Total BOD	mg/L	300	15	8	2	5388675			
Fluoride (F-)	mg/L	10	-	0.16	0.10	5393435			
Total Kjeldahl Nitrogen (TKN)	mg/L	100	-	2.1	0.10	5392265			
pH	pH	6.0:11.5	6.0:9.5	7.93		5393439			
Phenols-4AAP	mg/L	1.0	0.008	<0.0010	0.0010	5394856			
Total Suspended Solids	mg/L	350	15	12000	50	5390802			
Total Cyanide (CN)	mg/L	2	0.02	<0.0050	0.0050	5392358	<0.0050	0.0050	5392358
Petroleum Hydrocarbons									
Total Oil & Grease	mg/L	-	-	5.7	0.50	5392153			
Total Oil & Grease Mineral/Synthetic	mg/L	15	-	1.9	0.50	5392155			
Miscellaneous Parameters									
Nonylphenol Ethoxylate (Total)	mg/L	0.2	0.01	<0.005	0.005	5390589			
Nonylphenol (Total)	mg/L	0.02	0.001	<0.001	0.001	5390573			
Metals									
Chromium (VI)	ug/L	2000	40	<0.50	0.50	5395203	<0.50	0.50	5395203
Mercury (Hg)	mg/L	0.01	0.0004	<0.0001	0.0001	5391083			
Total Aluminum (Al)	ug/L	50000	-	19000	25	5392751			
Total Antimony (Sb)	ug/L	5000	-	1.3	0.50	5392751			
Total Arsenic (As)	ug/L	1000	20	5.5	1.0	5392751			
Total Cadmium (Cd)	ug/L	700	8	0.29	0.10	5392751			
Total Chromium (Cr)	ug/L	4000	80	44	5.0	5392751			
Total Cobalt (Co)	ug/L	5000	-	16	0.50	5392751			
Total Copper (Cu)	ug/L	2000	40	36	1.0	5392751			
Total Lead (Pb)	ug/L	1000	120	14	0.50	5392751			
Total Manganese (Mn)	ug/L	5000	50	940	2.0	5392751			
Total Molybdenum (Mo)	ug/L	5000	-	2.1	0.50	5392751			
Total Nickel (Ni)	ug/L	2000	80	37	1.0	5392751			
Total Phosphorus (P)	ug/L	10000	400	1700	100	5392751			
Total Selenium (Se)	ug/L	1000	20	<2.0	2.0	5392751			

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
Criteria: Toronto Sanitary and Combined Sewers Discharge Guidelines. Referenced to the Chapter 681.
Criteria-2: Toronto Storm Sewer Discharge Use By-Law

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B828879
Report Date: 2018/02/13

exp Services Inc
Client Project #: MRK-00242474-A0
Site Location: 19 YORKVILLE
Sampler Initials: PS

TORONTO SANITARY & STORM SEWER PACKAGE (WATER)

Maxxam ID				GBA094			GBA094		
Sampling Date				2018/02/07 11:30			2018/02/07 11:30		
COC Number				649244-01-01			649244-01-01		
	UNITS	**Criteria**	**Criteria-2**	**BH15-3**	**RDL**	**QC Batch**	**BH15-3 Lab-Dup**	**RDL**	**QC Batch**
Total Silver (Ag)	ug/L	5000	120	<0.10	0.10	5392751			
Total Tin (Sn)	ug/L	5000	-	1.4	1.0	5392751			
Total Titanium (Ti)	ug/L	5000	-	880	25	5392751			
Total Zinc (Zn)	ug/L	2000	40	76	5.0	5392751			
Semivolatile Organics									
Di-N-butyl phthalate	ug/L	80	15	<2	2	5393106			
Bis(2-ethylhexyl)phthalate	ug/L	12	8.8	<2	2	5393106			
3,3'-Dichlorobenzidine	ug/L	2	0.8	<0.8	0.8	5393106			
Pentachlorophenol	ug/L	5	2	<1	1	5393106			
Phenanthrene	ug/L	-	-	<0.2	0.2	5393106			
Anthracene	ug/L	-	-	<0.2	0.2	5393106			
Fluoranthene	ug/L	-	-	<0.2	0.2	5393106			
Pyrene	ug/L	-	-	<0.2	0.2	5393106			
Benzo(a)anthracene	ug/L	-	-	<0.2	0.2	5393106			
Chrysene	ug/L	-	-	<0.2	0.2	5393106			
Benzo(b/j)fluoranthene	ug/L	-	-	<0.2	0.2	5393106			
Benzo(k)fluoranthene	ug/L	-	-	<0.2	0.2	5393106			
Benzo(a)pyrene	ug/L	-	-	<0.2	0.2	5393106			
Indeno(1,2,3-cd)pyrene	ug/L	-	-	<0.2	0.2	5393106			
Dibenz(a,h)anthracene	ug/L	-	-	<0.2	0.2	5393106			
Benzo(g,h,i)perylene	ug/L	-	-	<0.2	0.2	5393106			
Dibenzo(a,i)pyrene	ug/L	-	-	<0.2	0.2	5393106			
Benzo(e)pyrene	ug/L	-	-	<0.2	0.2	5393106			
Perylene	ug/L	-	-	0.5	0.2	5393106			
Dibenzo(a,j) acridine	ug/L	-	-	<0.4	0.4	5393106			
7H-Dibenzo(c,g) Carbazole	ug/L	-	-	<0.4	0.4	5393106			
1,6-Dinitropyrene	ug/L	-	-	<0.4	0.4	5393106			
1,3-Dinitropyrene	ug/L	-	-	<0.4	0.4	5393106			
1,8-Dinitropyrene	ug/L	-	-	<0.4	0.4	5393106			
Calculated Parameters									
Total PAHs (18 PAHs)	ug/L	5	2	<1	1	5389478			

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
Criteria: Toronto Sanitary and Combined Sewers Discharge Guidelines. Referenced to the Chapter 681.
Criteria-2: Toronto Storm Sewer Discharge Use By-Law

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Maxxam Job #: B828879
Report Date: 2018/02/13

exp Services Inc
Client Project #: MRK-00242474-A0
Site Location: 19 YORKVILLE
Sampler Initials: PS

TORONTO SANITARY & STORM SEWER PACKAGE (WATER)

Maxxam ID				GBA094			GBA094		
Sampling Date				2018/02/07 11:30			2018/02/07 11:30		
COC Number				649244-01-01			649244-01-01		
	UNITS	**Criteria**	**Criteria-2**	**BH15-3**	**RDL**	**QC Batch**	**BH15-3 Lab-Dup**	**RDL**	**QC Batch**
Volatile Organics									
Benzene	ug/L	10	2	<0.10	0.10	5391155	<0.10	0.10	5391155
Chloroform	ug/L	40	2	<0.10	0.10	5391155	<0.10	0.10	5391155
1,2-Dichlorobenzene	ug/L	50	5.6	<0.20	0.20	5391155	<0.20	0.20	5391155
1,4-Dichlorobenzene	ug/L	80	6.8	<0.20	0.20	5391155	<0.20	0.20	5391155
cis-1,2-Dichloroethylene	ug/L	4000	5.6	<0.10	0.10	5391155	<0.10	0.10	5391155
trans-1,3-Dichloropropene	ug/L	140	5.6	<0.20	0.20	5391155	<0.20	0.20	5391155
Ethylbenzene	ug/L	160	2	<0.10	0.10	5391155	<0.10	0.10	5391155
Methylene Chloride(Dichloromethane)	ug/L	2000	5.2	<0.50	0.50	5391155	<0.50	0.50	5391155
1,1,2,2-Tetrachloroethane	ug/L	1400	17	<0.20	0.20	5391155	<0.20	0.20	5391155
Tetrachloroethylene	ug/L	1000	4.4	<0.10	0.10	5391155	<0.10	0.10	5391155
Toluene	ug/L	16	2	<0.20	0.20	5391155	<0.20	0.20	5391155
Trichloroethylene	ug/L	400	7.6	<0.10	0.10	5391155	<0.10	0.10	5391155
p+m-Xylene	ug/L	-	-	<0.10	0.10	5391155	<0.10	0.10	5391155
o-Xylene	ug/L	-	-	<0.10	0.10	5391155	<0.10	0.10	5391155
Total Xylenes	ug/L	1400	4.4	<0.10	0.10	5391155	<0.10	0.10	5391155
PCBs									
Total PCB	ug/L	1	0.4	<0.05	0.05	5390822			
Microbiological									
Escherichia coli	CFU/100mL	-	200	<10	10	5389800			
Surrogate Recovery (%)									
2,4,6-Tribromophenol	%	-	-	81		5393106			
2-Fluorobiphenyl	%	-	-	38		5393106			
D14-Terphenyl (FS)	%	-	-	88		5393106			
D5-Nitrobenzene	%	-	-	32		5393106			
D8-Acenaphthylene	%	-	-	57		5393106			
Decachlorobiphenyl	%	-	-	75		5390822			
4-Bromofluorobenzene	%	-	-	97		5391155	98		5391155
D4-1,2-Dichloroethane	%	-	-	103		5391155	104		5391155
D8-Toluene	%	-	-	97		5391155	98		5391155

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
Criteria: Toronto Sanitary and Combined Sewers Discharge Guidelines. Referenced to the Chapter 681.
Criteria-2: Toronto Storm Sewer Discharge Use By-Law

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Maxxam Job #: B828879
Report Date: 2018/02/13

exp Services Inc
Client Project #: MRK-00242474-A0
Site Location: 19 YORKVILLE
Sampler Initials: PS

TEST SUMMARY

Maxxam ID: GBA094
Sample ID: BH15-3
Matrix: Water

Collected: 2018/02/07
Shipped:
Received: 2018/02/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sewer Use By-Law Semivolatile Organics	GC/MS	5393106	2018/02/09	2018/02/11	Kathy Horvat
Biochemical Oxygen Demand (BOD)	DO	5388675	2018/02/07	2018/02/12	Barbara Kalbasi Esfahani
Chromium (VI) in Water	IC	5395203	N/A	2018/02/12	Sally Coughlin
Total Cyanide	SKAL/CN	5392358	2018/02/09	2018/02/09	Xuanhong Qiu
Fluoride	ISE	5393435	2018/02/09	2018/02/12	Surinder Rai
Mercury in Water by CVAA	CV/AA	5391083	2018/02/08	2018/02/09	Ron Morrison
Total Metals Analysis by ICPMS	ICP/MS	5392751	N/A	2018/02/13	Prempal Bhatti
E.coli, (CFU/100mL)	PL	5389800	N/A	2018/02/07	Sirimathie Aluthwala
Total Nonylphenol in Liquids by HPLC	LC/FLU	5390573	2018/02/08	2018/02/09	Dennis Boodram
Nonylphenol Ethoxylates in Liquids: HPLC	LC/FLU	5390589	2018/02/08	2018/02/09	Dennis Boodram
Animal and Vegetable Oil and Grease	BAL	5388315	N/A	2018/02/09	Automated Statchk
Total Oil and Grease	BAL	5392153	2018/02/09	2018/02/09	Francis Afonso
Polychlorinated Biphenyl in Water	GC/ECD	5390822	2018/02/08	2018/02/08	Sarah Huang
pH	AT	5393439	N/A	2018/02/12	Surinder Rai
Phenols (4AAP)	TECH/PHEN	5394856	N/A	2018/02/12	Bramdeo Motiram
Total Kjeldahl Nitrogen in Water	SKAL	5392265	2018/02/09	2018/02/09	Rajni Tyagi
Total PAHs	CALC	5389478	N/A	2018/02/12	Automated Statchk
Mineral/Synthetic O & G (TPH Heavy Oil)	BAL	5392155	2018/02/09	2018/02/09	Francis Afonso
Total Suspended Solids	BAL	5390802	2018/02/08	2018/02/08	Nusrat Naz
Volatile Organic Compounds in Water	P&T/MS	5391155	N/A	2018/02/09	Rebecca McClean

Maxxam ID: GBA094 Dup
Sample ID: BH15-3
Matrix: Water

Collected: 2018/02/07
Shipped:
Received: 2018/02/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chromium (VI) in Water	IC	5395203	N/A	2018/02/12	Sally Coughlin
Total Cyanide	SKAL/CN	5392358	2018/02/09	2018/02/09	Xuanhong Qiu
Volatile Organic Compounds in Water	P&T/MS	5391155	N/A	2018/02/09	Rebecca McClean

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exp Services Inc
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Site Location: 19 YORKVILLE
Sampler Initials: PS

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.3°C

TORONTO SANITARY & STORM SEWER PACKAGE (WATER)

Nonylphenol Ethoxylates in Liquids: HPLC: The recovery in the matrix spike was not calculated (NC) due to background interference.

Total Nonylphenol in Liquids by HPLC: The recovery in the matrix spike was not calculated (NC) due to background interference.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: MRK-00242474-A0
Site Location: 19 YORKVILLE
Sampler Initials: PS

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5390822	Decachlorobiphenyl	2018/02/08	105	60 - 130	83	60 - 130	85	%				
5391155	4-Bromofluorobenzene	2018/02/09	102	70 - 130	101	70 - 130	99	%				
5391155	D4-1,2-Dichloroethane	2018/02/09	103	70 - 130	100	70 - 130	102	%				
5391155	D8-Toluene	2018/02/09	99	70 - 130	100	70 - 130	98	%				
5393106	2,4,6-Tribromophenol	2018/02/11	90	10 - 130	88	10 - 130	77	%				
5393106	2-Fluorobiphenyl	2018/02/11	73	30 - 130	60	30 - 130	67	%				
5393106	D14-Terphenyl (FS)	2018/02/11	96	30 - 130	103	30 - 130	100	%				
5393106	D5-Nitrobenzene	2018/02/11	76	30 - 130	61	30 - 130	63	%				
5393106	D8-Acenaphthylene	2018/02/11	82	30 - 130	70	30 - 130	70	%				
5388675	Total BOD	2018/02/12					<2	mg/L	NC	30	100	80 - 120
5390573	Nonylphenol (Total)	2018/02/09	NC	50 - 130	106	50 - 130	<0.001	mg/L	7.3	40		
5390589	Nonylphenol Ethoxylate (Total)	2018/02/09	NC	50 - 130	103	50 - 130	<0.005	mg/L	0.69	40		
5390802	Total Suspended Solids	2018/02/08					<10	mg/L	1.0	25	100	85 - 115
5390822	Total PCB	2018/02/08	108	60 - 130	78	60 - 130	<0.05	ug/L	NC	40		
5391083	Mercury (Hg)	2018/02/09	102	75 - 125	99	80 - 120	<0.0001	mg/L	NC	20		
5391155	1,1,2,2-Tetrachloroethane	2018/02/09	110	70 - 130	101	70 - 130	<0.20	ug/L	NC	30		
5391155	1,2-Dichlorobenzene	2018/02/09	101	70 - 130	94	70 - 130	<0.20	ug/L	NC	30		
5391155	1,4-Dichlorobenzene	2018/02/09	102	70 - 130	95	70 - 130	<0.20	ug/L	NC	30		
5391155	Benzene	2018/02/09	100	70 - 130	90	70 - 130	<0.10	ug/L	NC	30		
5391155	Chloroform	2018/02/09	103	70 - 130	91	70 - 130	<0.10	ug/L	NC	30		
5391155	cis-1,2-Dichloroethylene	2018/02/09	104	70 - 130	92	70 - 130	<0.10	ug/L	NC	30		
5391155	Ethylbenzene	2018/02/09	103	70 - 130	92	70 - 130	<0.10	ug/L	NC	30		
5391155	Methylene Chloride(Dichloromethane)	2018/02/09	105	70 - 130	91	70 - 130	<0.50	ug/L	NC	30		
5391155	o-Xylene	2018/02/09	105	70 - 130	95	70 - 130	<0.10	ug/L	NC	30		
5391155	p+m-Xylene	2018/02/09	105	70 - 130	94	70 - 130	<0.10	ug/L	NC	30		
5391155	Tetrachloroethylene	2018/02/09	98	70 - 130	88	70 - 130	<0.10	ug/L	NC	30		
5391155	Toluene	2018/02/09	100	70 - 130	90	70 - 130	<0.20	ug/L	NC	30		
5391155	Total Xylenes	2018/02/09					<0.10	ug/L	NC	30		
5391155	trans-1,3-Dichloropropene	2018/02/09	110	70 - 130	98	70 - 130	<0.20	ug/L	NC	30		
5391155	Trichloroethylene	2018/02/09	102	70 - 130	91	70 - 130	<0.10	ug/L	NC	30		
5392153	Total Oil & Grease	2018/02/09			101	85 - 115	<0.50	mg/L	4.5	25		

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Maxxam Job #: B828879
Report Date: 2018/02/13

QUALITY ASSURANCE REPORT(CONT'D)

exp Services Inc
Client Project #: MRK-00242474-A0
Site Location: 19 YORKVILLE
Sampler Initials: PS

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5392155	Total Oil & Grease Mineral/Synthetic	2018/02/09			92	85 - 115	<0.50	mg/L	3.0	25		
5392265	Total Kjeldahl Nitrogen (TKN)	2018/02/09	NC	80 - 120	100	80 - 120	<0.10	mg/L	1.7	20	99	80 - 120
5392358	Total Cyanide (CN)	2018/02/09	102	80 - 120	99	80 - 120	<0.0050	mg/L	NC	20		
5392751	Total Aluminum (Al)	2018/02/13	109	80 - 120	105	80 - 120	<5.0	ug/L	NC	20		
5392751	Total Antimony (Sb)	2018/02/13	105	80 - 120	98	80 - 120	<0.50	ug/L	NC	20		
5392751	Total Arsenic (As)	2018/02/13	102	80 - 120	98	80 - 120	<1.0	ug/L	NC	20		
5392751	Total Cadmium (Cd)	2018/02/13	102	80 - 120	97	80 - 120	<0.10	ug/L	NC	20		
5392751	Total Chromium (Cr)	2018/02/13	101	80 - 120	98	80 - 120	<5.0	ug/L	NC	20		
5392751	Total Cobalt (Co)	2018/02/13	106	80 - 120	101	80 - 120	<0.50	ug/L	NC	20		
5392751	Total Copper (Cu)	2018/02/13	112	80 - 120	104	80 - 120	<1.0	ug/L	NC	20		
5392751	Total Lead (Pb)	2018/02/13	97	80 - 120	100	80 - 120	<0.50	ug/L	NC	20		
5392751	Total Manganese (Mn)	2018/02/13	101	80 - 120	98	80 - 120	<2.0	ug/L	0.26	20		
5392751	Total Molybdenum (Mo)	2018/02/13	107	80 - 120	95	80 - 120	<0.50	ug/L	5.3	20		
5392751	Total Nickel (Ni)	2018/02/13	102	80 - 120	100	80 - 120	<1.0	ug/L	NC	20		
5392751	Total Phosphorus (P)	2018/02/12	102	80 - 120	96	80 - 120	<100	ug/L				
5392751	Total Selenium (Se)	2018/02/13	105	80 - 120	108	80 - 120	<2.0	ug/L	NC	20		
5392751	Total Silver (Ag)	2018/02/13	100	80 - 120	98	80 - 120	<0.10	ug/L	NC	20		
5392751	Total Tin (Sn)	2018/02/13	102	80 - 120	94	80 - 120	<1.0	ug/L	NC	20		
5392751	Total Titanium (Ti)	2018/02/13	101	80 - 120	98	80 - 120	<5.0	ug/L	NC	20		
5392751	Total Zinc (Zn)	2018/02/13	97	80 - 120	96	80 - 120	<5.0	ug/L	NC	20		
5393106	1,3-Dinitropyrene	2018/02/12	76	30 - 130	94	30 - 130	<0.4	ug/L	NC	40		
5393106	1,6-Dinitropyrene	2018/02/12	83	30 - 130	95	30 - 130	<0.4	ug/L	NC	40		
5393106	1,8-Dinitropyrene	2018/02/12	86	30 - 130	103	30 - 130	<0.4	ug/L	NC	40		
5393106	3,3'-Dichlorobenzidine	2018/02/12	93	30 - 130	112	30 - 130	<0.8	ug/L	NC	40		
5393106	7H-Dibenzo(c,g) Carbazole	2018/02/12	94	30 - 130	85	30 - 130	<0.4	ug/L	NC	40		
5393106	Anthracene	2018/02/12	89	30 - 130	88	30 - 130	<0.2	ug/L	NC	40		
5393106	Benzo(a)anthracene	2018/02/12	91	30 - 130	98	30 - 130	<0.2	ug/L	NC	40		
5393106	Benzo(a)pyrene	2018/02/12	93	30 - 130	98	30 - 130	<0.2	ug/L	NC	40		
5393106	Benzo(b/j)fluoranthene	2018/02/12	99	30 - 130	99	30 - 130	<0.2	ug/L	NC	40		
5393106	Benzo(e)pyrene	2018/02/12	98	30 - 130	102	30 - 130	<0.2	ug/L	NC	40		
5393106	Benzo(g,h,i)perylene	2018/02/12	102	30 - 130	93	30 - 130	<0.2	ug/L	NC	40		

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QUALITY ASSURANCE REPORT(CONT'D)

exp Services Inc
Client Project #: MRK-00242474-A0
Site Location: 19 YORKVILLE
Sampler Initials: PS

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
5393106	Benzo(k)fluoranthene	2018/02/12	88	30 - 130	100	30 - 130	<0.2	ug/L	NC	40		
5393106	Bis(2-ethylhexyl)phthalate	2018/02/12	91	30 - 130	98	30 - 130	<2	ug/L	NC	40		
5393106	Chrysene	2018/02/12	99	30 - 130	101	30 - 130	<0.2	ug/L	NC	40		
5393106	Dibenz(a,h)anthracene	2018/02/12	104	30 - 130	95	30 - 130	<0.2	ug/L	NC	40		
5393106	Dibenzo(a,i)pyrene	2018/02/12	120	30 - 130	123	30 - 130	<0.2	ug/L	NC	40		
5393106	Dibenzo(a,j) acridine	2018/02/12	97	30 - 130	88	30 - 130	<0.4	ug/L	NC	40		
5393106	Di-N-butyl phthalate	2018/02/12	103	30 - 130	102	30 - 130	<2	ug/L	NC	40		
5393106	Fluoranthene	2018/02/12	95	30 - 130	101	30 - 130	<0.2	ug/L	NC	40		
5393106	Indeno(1,2,3-cd)pyrene	2018/02/12	107	30 - 130	99	30 - 130	<0.2	ug/L	NC	40		
5393106	Pentachlorophenol	2018/02/12	88	30 - 130	68	30 - 130	<1	ug/L	NC	40		
5393106	Perylene	2018/02/12	92	30 - 130	92	30 - 130	<0.2	ug/L	NC	40		
5393106	Phenanthrene	2018/02/12	90	30 - 130	91	30 - 130	<0.2	ug/L	NC	40		
5393106	Pyrene	2018/02/12	96	30 - 130	101	30 - 130	<0.2	ug/L	NC	40		
5393435	Fluoride (F-)	2018/02/12	105	80 - 120	101	80 - 120	<0.10	mg/L	3.3	20		
5393439	pH	2018/02/12			101	98 - 103			0.43	N/A		
5394856	Phenols-4AAP	2018/02/12	103	80 - 120	98	80 - 120	<0.0010	mg/L	6.1	20		
5395203	Chromium (VI)	2018/02/12	96	80 - 120	100	80 - 120	<0.50	ug/L	NC	20		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

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

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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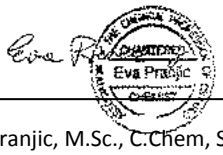
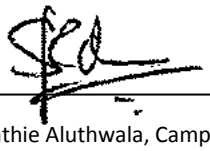
VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



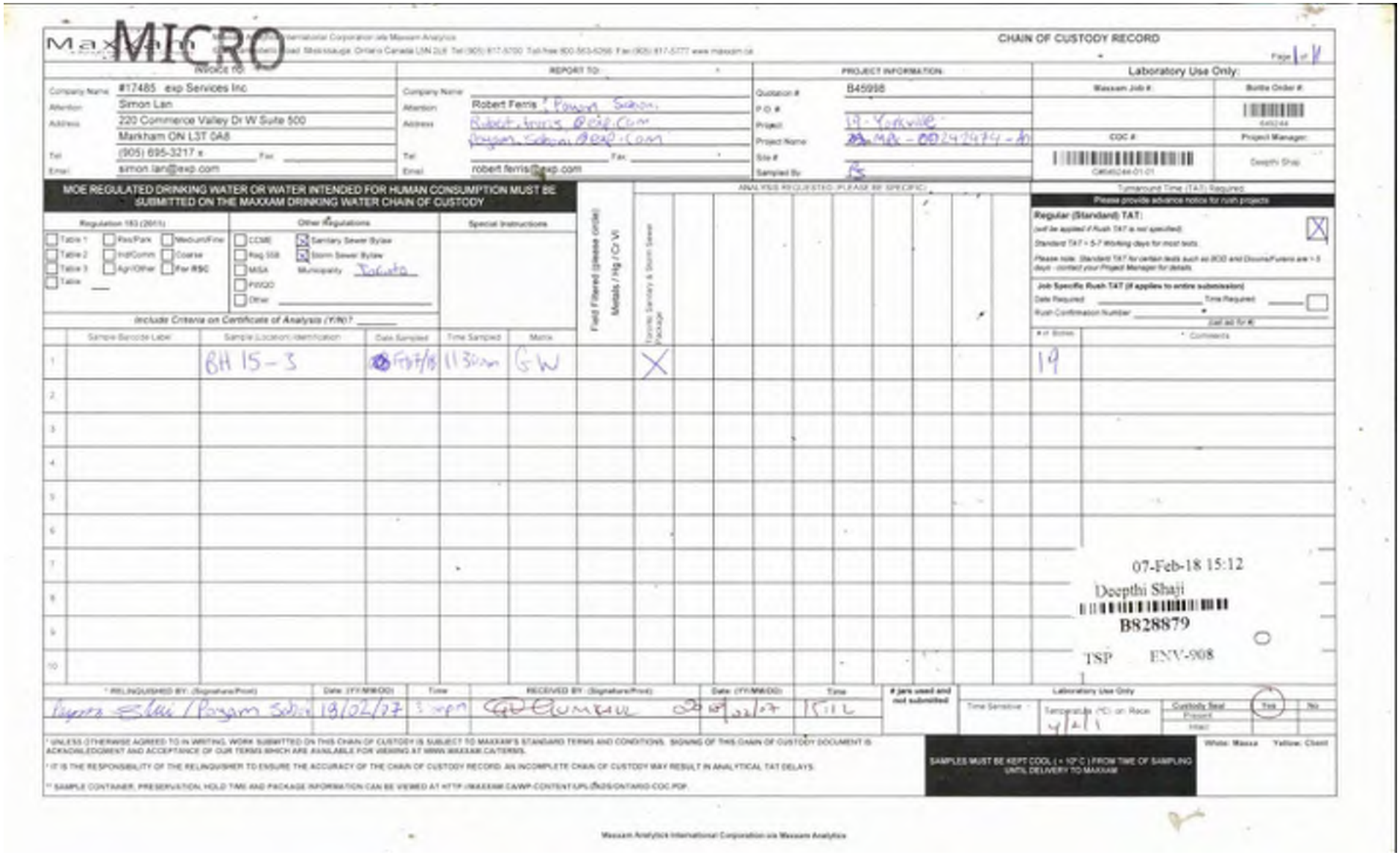
Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist



Sirimathie Aluthwala, Campobello Micro

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca



MICRO

CHAIN OF CUSTODY RECORD

Page 1 of 1

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name	#17485 exp Services Inc	Company Name		Quotation #	B45998	Maxxam Job #	Bottle Order #
Attention	Simon Lan	Attention	Robert Ferris / Pouya Sabeti	P.O. #			
Address	220 Commerce Valley Dr W Suite 500	Address	Robert.ferris@exp.com	Project	19-Yorkville		
	Markham ON L3T 0A8		Pouya.Sabeti@exp.com	Project Name	MX-0024794-A0	COC #	Project Manager
Tel	(905) 695-3217 x	Tel	Fax	Site #		C#665244-01-01	Deepthi Shaji
Email	simon.lan@exp.com	Email	robert.ferris@exp.com	Sampled By	RF		

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011): ☐ Table 1 ☐ Res/Park ☐ Medium/Fine ☐ Table 2 ☐ Ind/Comm ☐ Coarse ☐ Table 3 ☐ Agri/Other ☐ For RSC ☐ Table ___

Other Regulations: ☐ CCME ☒ Sanitary Sewer Bylaw ☐ Reg 558 ☒ Storm Sewer Bylaw ☐ MISA Municipality Toronto ☐ PWQO ☐ Other

Special Instructions:

Include Criteria on Certificate of Analysis (Y/N)? ___

ANALYSIS REQUESTED (PLEASE BE SPECIFIC):

Field Filtered (please circle): Metals / Hg / Cr VI

Toronto Sanitary & Storm Sewer Package

Turnaround Time (TAT) Required:

Please provide advance notice for rush projects

Regular (Standard) TAT: (will be applied if Rush TAT is not specified) ☒

Standard TAT = 5-7 Working days for most tests.

Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)

Date Required: ___ Time Required: ___ ☐

Rush Confirmation Number: ___ (call lab for #)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	# of Bottles	Comments
1		BH 15-3	Feb 7/18	11:30am	GW	19	
2							
3							
4							
5							
6							
7							
8							
9							
10							

07-Feb-18 15:12
Deepthi Shaji
B828879
TSP ENV-908

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Laboratory Use Only: Time Sensitive	Temperature (°C) on Rece	Custody Seal Present	Yes	No
Pouya Sabeti / Pouya Sabeti	18/02/07	3:00pm	[illegible]	2018/02/07	15:16			4/2/1			

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT HTTP://MAXXAM.CA/WP-CONTENT/UPLOADS/ONTARIO-COC.PDF.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

White: Maxxam Yellow: Client

Maxxam Analytics International Corporation o/a Maxxam Analytics

Job Number: 9820079

INCOMING ADDITIONAL SAMPLES

CLIENT: Exp services, IQ: 17485 Measure Compatible

Bottle Codes

Line	Sample ID																	
1																		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
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12																		
13																		
14																		
15																		
16																		
17																		
18																		
19																		
20																		

Instructions:

Add samples to existing job

Relinquished By:	Date	Time	Received By	Date	Time	Custody Seal Y/N	Temperature on Receipt

MUT 435204

Appendix F:
Construction Dewatering Rate Calculations

Appendix F: Construction Dewatering Calculations

Project: MRK-00242474-A0

11 to 21 Yorkville Avenue and 16 to 18 Cumberland Street, Toronto, ON

Table F-1: Assumptions - Flow from All Sides of the Excavation

		Commercial Building	Highrise		
Input Parameter	**Units**	**Shallow Groundwater**	**Shallow Groundwater**	**Deeper groundwater**	**Notes**
Geological Formation		**Silty Sand/ Sandy Silt**	**Silty Sand/ Sandy Silt**	**Silty Fine Sand, Sandy Silt Till**	From borehole logs
Average ground elevation	masl	116.2	116.2	116.2	From borehole logs
Maximum Groundwater elevation	masl	113.82	113.82	98.86	From Monitoring Level Data February 5, 2018
Top of Aquifer	masl	113.45	113.45	98.86	From Monitoring Level Data February 5, 2018
Bottom of Aquifer	masl	111.7	111.7	88.74	From Borehole Logs
Thickness of Aquifer	m	1.75	1.75	10.12	calculated
(H) Water level Height above base of Aquifer	m	2.12	2.12	10.12	calculated
Dewatering Elevation Target	masl	111.7	111.7	95.1	calculated
(h) (dewatered water table above bottom of aquifer	m	0.00	0.00	6.36	calculated
(K) Shallow Hydraulic Conductivity (Geometric)	m/s	1.00E-06	1.00E-06	9.80E-07	Appendix D
(T) Transmissivity	m^2/s	0.00E+00	0.00E+00	6.23E-06	calculated
Dimension of building (a)	m	22.5	57.6	57.6	Drawings A101 and A122 from Sweeny & Co. dated 2018-03-02
Dimension of Building (b)	m	14.3	50	50	Drawings A101 and A122 from Sweeny & Co. dated 2018-03-02
Area of Construction	m^2	329	2900	2900	Drawings A101 and A122 from Sweeny & Co. dated 2018-03-02
Base Elevation of Excavation	masl	12.2	95.1	95.1	calculated
Method to Calculate Radius of Influence (R_o)		Sichardt	Sichardt	Sichardt	
(R_o) Radius of Influence from Sides of Excavation	m	6.4	6.4	11.2	calculated ($R_o = 3000(H-h)\sqrt{K}$)
(L_o) Distance to Linear Source from Sides of Excavation ($L_o = R_o/2$)	m	3.2	3.2	5.6	calculated
(Q_w) Dewatering Flow Rate (unconfined linear flow component)	m^3/day	4.5	13.1	101.1	calculated (see formula below)
Factor of Safety		2	2	2	
Construction Dewatering Flow Rate with Factor of Safety	m^3/day	**9.0**	**26.3**	**202**	calculated

Note: masl - meters above sea level

Dupuit - Analytical Solution for Estimating Groundwater Flow from an Unconfined Aquifer to a fully Penetrating Excavation

$$Q_w = xK(H^2 - h^2)/L_o$$

where:

Q_w = Flow rate per unit length of Excavation (m^3/s)

x = Length of the excavation (m)

K= Hydraulic conductivity (m/s)

H= Height of target water level above base of water bearing zone (m)

h_w = Height of target water level above base of water bearing zone (m)

L_o = Distance of Influence (m)

Table F-2: Precipitation Estimate

Location	Assumed Precipitation Event (mm)	Excavation Area (m^2)	Excavation Area (m^2)
	15	329	2900
Calculated Volume of Precipitation (m^3)		**5**	**44**

Table F-3: Total Construction Dewatering Flow Rate

Location	Total Construction Dewatering Flow
Excavation (m^3/day)	**286**

Appendix G:
Calculated Long Term Preliminary Sub-Drain Flow Rate

Appendix G1: Long Term Perched Groundwater Drainage Calculations

Project: MRK-00242474-A0

11 to 21 Yorkville Avenue and 16 to 18 Cumberland Street, Toronto, ON

Table G1-1: Assumptions - Flow from All Sides of the Foundation

Input Parameter	Units	Commercial Perched Groundwater	Highrise Perched Groundwater	Notes
Geological Formation		**Silty Sand/ Sandy Silt**	**Silty Sand/ Sandy Silt**	From borehole logs
Average ground elevation	masl	116.2	116.2	From borehole logs
Maximum Groundwater elevation	masl	113.82	113.82	From Monitoring Level Data February 5, 2018
Top of Aquifer	masl	113.45	113.45	From Monitoring Level Data February 5, 2018
Bottom of Aquifer	masl	111.7	111.7	From Borehole Logs
Thickness of Aquifer	m	1.75	1.75	calculated
(H) Water level Height above base of Aquifer	m	2.12	2.12	calculated
Sub-Drain Elevation Target	masl	111.7	111.7	calculated
(h) (dewatered water table above bottom of aquifer	m	0.00	0.00	calculated
(K) Shallow Hydraulic Conductivity (Geometric)	m/s	1.00E-06	1.00E-06	Appendix D
(T) Transmissivity	m^2/s	0.00E+00	0.00E+00	calculated
Dimension of building (a)	m	22.5	57.6	Topographic Plan 2017 by WSP Geomatics
Dimension of Building (b)	m	14.3	50	Topographic Plan 2017 by WSP Geomatics
Area of Foundation	m^2	329	2900	Topographic Plan 2017 by WSP Geomatics
Base Elevation of Sub-Drain	masl	111.7	95.1	calculated
Method to Calculate Radius of Influence (R_o)		Sichardt	Sichardt	
(R_o) Radius of Influence from Sides of Foundation	m	6.4	6.4	calculated ($R_o = 3000(H-h)\sqrt{K}$)
(L_o) Distance to Linear Source from Sides of Excavation ($L_o = R_o/2$)	m	3.2	3.2	calculated
(Q_w) Sub-Drain Flow Rate (unconfined linear flow component)	m^3/day	4.5	13.1	calculated (see formula below)
Factor of Safety		2	2	
Sub-Drain Flow Rate with Factor of Safety	m^3/day	9.0	26.3	calculated

Note: masl - meters above sea level

Dupuit - Analytical Solution for Estimating Groundwater Flow from an Unconfined Aquifer to a fully Penetrating Foundation

$$Q_w = xK(H^2 - h^2)/L_o$$

where:

Q_w = Flow rate per unit length of Excavation (m^3/s)

x = Length of the excavation (m)

K= Hydraulic conductivity (m/s)

H= Height of target water level above base of water bearing zone (m)

h_w = Height of target water level above base of water bearing zone (m)

L_o = Distance of Influence (m)

APPENDIX G2: Calculation of Long Term Preliminary Drain Flow Rate (using Highest K)

Project: MRK-00242474-A0

11 to 21 Yorkville Avenue and 16 to 18 Cumberland Street, Toronto, ON

Table G2-1: Assumptions for Calulation of Discharge from a Foundation Sub-Drain

Input Parameter	Units	Values for Deep groundwater	Notes
Geological Formation		**Silty Fine Sand, Sandy Silt Till**	From borehole logs
Average ground elevation	masl	116.2	From borehole logs
Maximum Groundwater elevation	masl	98.86	From Monitoring Level Data Nov. 14, 2017
Top of Aquifer	masl	98.86	From Monitoring Level Data Nov. 14, 2017
Bottom of Aquifer	masl	88.74	1m below base of excavation
Thickness of Aquifer	m	10.12	calculated
(H) Water level Height above base of Aquifer	m	10.12	calculated
Long Term Groundwater Elevation at Subdrain	masl	95.5	calculated (base of perched aquifer for shallow)
(h_w) (dewatered water table above bottom of aquifer	m	6.76	calculated
(K) Shallow Hydraulic Conductivity Highest	m/s	9.80E-07	Appendix D
(T) Transmissivity	m^2/s	6.62E-06	calculated
Finished Floor Elevation	masl	96.1	calculated
Dimension of foundation (a)	m	57.6	Drawings A101 from Sweeny & Co. dated 2018-03-02
Dimension of foundation (b)	m	50	Drawings A101 from Sweeny & Co. dated 2018-03-02
Perimeter of Foundation	m	107.6	Drawings A101 from Sweeny & Co. dated 2018-03-02
Area of Foundation	m^2	2900	Drawings A101 from Sweeny & Co. dated 2018-03-02
Base Elevation of Excavation	masl	95.1	calculated
Method to Calculate Radius of Influence (R_o)		Sichardt	
(R_o) Radius of Influence from Sides of Excavation	m	10.0	calculated ($R_o = 3000(H-h)\sqrt{K}$)
(L_o) Distance to Linear Source from Sides of Excavation ($L_o = R_o/2$)	m	5.0	calculated
(Q_w) Sub-Drain Flow Rate (unconfined linear flow component)	m^3/day	85	calculated (see formula below)
Factor of Safety		2	
Sub-Drain Flow Rate with Factor of Safety	m^3/day	170	calculated

Note: masl - meters above sea level

Analytical Solution for Estimating Groundwater Flow from an Unconfined Aquifer to a Partially Penetrating Foundation (Based on Dupuit Equation)

$$Q_w = [0.73 + 0.27(P/H)]Kx(H^2 - h_w^2)/L_o$$

where:

Q_w = Flow rate per unit length of Excavation (m^3/s)

P = Depth of Penetration of the excavation below the original water table (m)

x = length of the founation (m)

K= Hydraulic conductivity (m/s)

H= Height of target water level above base of water bearing zone (m)

h_w = Height of target water level above base of water bearing zone (m)

L_o = Distance of Influence (m)