Geotechnical Investigation
Proposed Student Focused Housing
409 Huron Street
Toronto, Ontario

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Ma002568b
(rev.) May 2, 2019

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1. Introduction

This report presents the results of a geotechnical investigation carried out in the property located at 409 Huron Street in Toronto, Ontario. Site location Plan (Drawing No. 1) is attached.

The Site is currently occupied in parts by a three (3) storey brick apartment and surface paved parking area and driveway. The on-site apartment building has a basement.

The project involves the proposed design and construction of four (4) level student residence with associated surface paved driveway and parking area. The proposed student residence will have one (1) to two (2) levels of basement. The upper and lower basement floor slab will be set at approximately 1 m and 3.65 m below street grade on Huron Street. The footprint of the upper and lower basement floor slab covers an area of about 666 m^2. Site plan and sections of the proposed development is provided in Appendix A.

The geotechnical investigation was carried out in conjunction with the hydro-geological site assessment. Results of the hydro-geological site assessment are provided under separate cover.

The purpose of this geotechnical investigation was to determine the subsoil and groundwater conditions at the Site and, based on this information, to provide geotechnical engineering guidelines for the design and construction of the proposed student residence. Recommendations and/or comments regarding foundation type, allowable bearing pressures, groundwater conditions, excavation and backfill, pipe installation, slab-on-grade construction, permanent drainage requirements, site seismic classifications, lateral earth pressures on subsurface wall, temporary shoring requirements, pavement design and construction were to be provided.

Our Terms of Reference includes environmental testing on soil and groundwater samples. The tests were carried out to provide a preliminary assessment of environmental quality of the soil and groundwater at the Site and to determine the disposal options for excess soils and groundwater to be generated during construction at the Site. Results of the environmental soil and groundwater testing are discussed in Section 6.3 of the report.

The comments and recommendations given in this report are based on the assumption that the above-described design concept 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 geotechnical viewpoint.

2. Procedure

2.1 Soil Sampling

The fieldworks were carried out on December 4, 2018. Three (3) sampled boreholes (Boreholes 1, 2 and 3) were drilled to a depth of about 7.95 m below grades at the approximate locations shown on the attached Borehole and Section Location Plan (Drawing No. 1).

The boreholes were advanced, using a truck-mounted drill rig equipped with continuous flight hollow stem augers owned, supplied and operated by a specialist drilling Contractor. The overburden soils were recovered using a conventional split spoon sampler in conjunction with standard penetration test (SPT). The fieldwork was supervised throughout by Edward Wong's geotechnical personnel who monitored the drilling and sampling operations and logged the borings.

Tests for the generation of methane gas and Total Organic Vapors were carried out in Boreholes 1, 2 and 3, using a portable combustible gas tester (RKI Eagle multi-gas detector).

The groundwater conditions in the open boreholes were closely monitored during and upon completion of drilling. Monitoring well, 50 mm in diameter, was installed in each of Boreholes 1, 2 and 3 for subsequent groundwater level measurements and groundwater sampling and testing.

The soil samples were examined in the field for lithology as well as aesthetic of impacts (i.e. stains, odors and debris). Soil samples were placed in plastic bags and reserved for headspace combustible vapor measurements. The headspace measurements were made inside the plastic samples bags using a RKI Eagle multi-gas detector calibrated for hexane. The headspace monitoring was carried out for preliminary screening for hydrocarbons or volatile organic compounds to assist with the selection of soil samples for chemical analysis.

Soil samples for chemical testing were kept in laboratory supplied jars and vials. The jars and vials were kept in a portable cooler during field storage and transportation to the Maxxam Analytics in Mississauga for chemical analysis.

All recovered soil samples were transported to Edward Wong' geotechnical laboratory for detailed visual examinations and soil classifications. Moisture content determinations were carried out on all recovered soil samples.

Grain size analysis and hydrometer tests were carried out on two (2) representative soil samples,, with the test results provided in Appendix B.

Borehole locations were established in the field by Edward Wong & Associates Inc. Prior to the commencement of drilling, the borehole locations were cleared for underground utilities

by a private locator retained by Edward Wong & Associates Inc. to minimize the potential of contacting them during drilling.

2.2 Development of Monitoring Well and Groundwater Sampling

Monitoring wells were installed in Boreholes 1, 2 and 3 to a depth of 7.95 m below grades. The monitoring wells were completed with a flush mount well cover. The monitoring well construction was shown in the relevant logs of borehole.

Development of the monitoring well and sampling of groundwater was carried out on December 17, 2018 (10 days after completion of drilling). Boreholes 1 and 2 were dry. Groundwater level was measured at a depth of 2.78 m below grade on December 10, 2018.

Prior to groundwater sampling, Borehole 3 was developed and purged of more than three (3) well volumes of water, using clean polyethylene bailers. No free product or sheen was detected on the surface of the groundwater in Borehole 3.

Groundwater samples were collected and stored in laboratory supplied bottles and jars. The bottles and jars were kept in a portable cooler during field storage and transportation to Maxxam Analytics in Mississauga for chemical analysis.

Results of the groundwater testing are provided in Section 6.3.2 of the report.

3. Subsurface Conditions

The subsurface stratigraphy at the Site, as revealed in the logs of borehole, consisted of a topsoil layer or pavement structure over a discontinuous fill stratum followed by native deposits of silty sand, fine sand, silty sand till and silty clay. Soil profile is shown on attached Drawing 2.

3.1 Subsoil

A brief description of the soil profiles, in order of depth, are as follow.

3.1.1 Topsoil

Topsoil, about 75 mm thick, was encountered at the ground surface in Borehole 1 advanced in the landscaped area.

3.1.2 Pavement Structure

Pavement structure was encountered at the ground surface in Boreholes 2 and 3 drilled on the driveway and parking area. The pavement structure consisted of about 65 mm of asphaltic concrete over about 175 mm of sand and gravel granular base materials. The granular materials were very moist. Moisture contents were about 15 percent and 13 percent.

3.1.3 Fill

Fill was encountered below the pavement structure in Boreholes 2 and 3 and extended to a depth of about 1.5 mm and 0.75 m below grade, respectively. The fill materials consisted of silty sand. Brick fragments and topsoil were noted in the fill samples recovered from Borehole 2 and 3, respectively. SPT "N" values ranged from 3 blows per 300 mm penetration to 7 blows per 300 mm penetration. Based on the "N" value, the fill materials were judged to be loose to very loose. The fill was very moist Moisture contents ranged from 13 percent to 17 percent.

3.1.4 Silty Sand

Silty sand was encountered below the topsoil in Borehole 1 and extended to a depth of 2.4 m below grade. Silty sand was also contacted below the fill in Borehole 2 and 3 at a depth of about 1.5 m and 0.75 m, respectively, and extended to a depth of about 3.0 m and 1.5 m, respectively. The relative density of the silty sand varied from very loose to compact. SPT "N" values ranged from 2 blows per 300 mm penetration to 20 blows per 300 mm penetration. Moisture contents ranged from 8 percent to 17 percent, indicating moist to very moist conditions.

3.1.5 Fine Sand

A localized fine sand layer was found below the silty sand at a depth of about 1.5 m below grade in Borehole 3 and extended to a depth of about 3 m. SPT "N" values were 18 blows per 300 mm penetration and 33 blows per 300 mm penetration. The relative density of the fine sand ranged from compact to dense. The fine sand was moist to wet. Moisture contents were 8 percent and 22 percent.

Grain size analysis and hydrometer test was carried out on one (1) selected silty sand sample. The test result is provided in Appendix B and summarized in Table 1 below.

Table 1: Result of Grain Size Analysis and Hydrometer Test - Fine Sand

Borehole No.	Depth	Composition (%) Gr, Sa, Si & Cl	Estimated Coefficient of Permeability (m/s)	Unified Soil Classification	Comments
3	1.5 - 1.95	0, 95.2, 4.8	*8.1 x 10^{-5}	SP (poorly grade sand)	Medium Permeable

Note: Gr, Sa, Si, Cl - Gravel, Sand, Silt and Clay

* based on Haze Formula, $k = 10^{-2} D^2_{10}$ m/s

3.1.6 Silty Sand Till

Dense silty sand till was contacted below the silty clay at a depth of 6 m below grade in Borehole 1 and extended to a depth of about 7.5 m. SPT "N" value was 37 blows per 300 mm penetration. Un-confined compressive strength measured from the pocket penetrometer gave the values of un-drained shear strength greater than 225 kPa. Moisture content was 8 percent, indicating a moist condition.

Grain size analysis and hydrometer test was carried out on one (1) silty sand till sample. The test result is provided in Appendix B and summarized in Table 2 below.

Table 2: Result of Grain Size Analysis and Hydrometer Test - Fine Sand

Borehole No.	Depth	Composition (%) Gr, Sa, Si & Cl	Estimated Coefficient of Permeability (m/s)	Unified Soil Classification	Comments
1	6.0 - 6.45	6, 59.6, 28, 6.4	1 x 10^{-5}	SC (sand-clay mixtures	Low Permeable

Note: Gr, Sa, Si, Cl - Gravel, Sand, Silt, Clay

3.1.7 Silty Clay

Silty clay was encountered below the silty sand at depths of about 2.4 m and 3 m below grade in Boreholes 1 and 2 and extended to depth of 6 m and 7.95 m, respectively. Silty clay was found below the fine sand at a depth of about 3 m below grade in Borehole 3 and extended to termination depth of 7.95 m. In Borehole 1, a lower silty clay layer was contacted at a depth of 7.5 m below grade and extended to termination depth of 7.95 m. SPT "N" values ranged from 25 blows per 300 mm penetration to 39 blows per 300 mm penetration. Un-confined compressive strength measured from the pocket penetrometer gave the values of un-drained shear strength from 175 kPa to greater than 225 kPa, corresponding to very stiff to hard consistency. Moisture contents ranged from 8 percent to 12 percent.

3.2 Groundwater

Groundwater conditions were assessed in the open boreholes during the course of the fieldwork. Short term groundwater level measurements are shown in Table 3 below.

Table 3: Groundwater Level Measurements

Borehole Location	Depth (Elevation (m))			
	During Drilling	Upon Completion of Drilling	Dec. 14, 2018 (7 days after completion of drilling)	Dc. 21, 2018 (14 days after completion of drilling)
1	Dry	Dry	Dry	Dry
2	Dry	Dry	Dry	Dry
3	Dry	2.25	1.8	2.78

The measured groundwater levels in Borehole 3 was originated from water perched in the fine sand layer overlying the silty clay deposit. The groundwater levels are expected to fluctuate on seasonal basis (± 1 m) and could be higher in spring or after prolonged period of rain.

4. Slug Test

On December 22, 2018, slug test was carried out in Borehole 3 to assess the hydraulic conductivity of the in-situ conductivity of the subsoil. Screen of the monitoring well was placed within the native silty clay deposit. Groundwater level in Borehole 3 was likely originated from water perched in the fine sand deposit overlying the silty clay. At the time of the slug test, groundwater level in Borehole 3 was measured at about 2.78 m below grade.

Water level readings and results of the slug test are provided in Appendix C of the report. The hydraulic conductivity of the native silt clay was found to be 6.82×10^{-7} m/min (1.1×10^{-8} m/ sec.). Water level readings and results of slug test analysis are provided in Appendix D.

5. Engineering Discussions and Recommendations

5.1 General

The project involves the proposed design and construction of four (4) level student residence with associated surface paved driveway and parking area. The proposed student residence will have one (1) to two (2) levels of basement. The upper and lower basement floor slab will be set at approximately 1 m and 3.65 m below street grade on Huron Street.

The Site is currently occupied by one (1) three story apartment building with one (1) level of basement. Except the southwest portion of the apartment building, the remaining of the apartment building will be demolished to accumulate the construction of the proposed student residence.

5.2 Building Construction

5.2.1 Foundation Considerations

The results of the geotechnical investigation reveals that the Site is covered by topsoil or pavement structure over a discontinuous fill stratum followed by native deposits of silty sand, fine sand, silty sand till and silty clay. Perched groundwater level was measured at about 2.78 m below grade locally in Borehole 3 advanced on the east side of the Site. .

Footing base excavation for the proposed student residence will be extended to about 2.1 m and 5.0 m below grade.

Based on the results of the investigation, the use of spread and strip footings to support the proposed student residence is considered feasible.

Providing effective groundwater measures are implemented at the Site, footings founded on competent undisturbed native soils (compact silty sand/ fine sand) below the pavement structure, existing fill and all soft and/ or loose soils may be designed for the following recommended bearing capacities:

- Bearing Capacity at Serviceability Limit State (SLS) = 150 kPa
- Factored Bearing Capacity at Ultimate Limit State (ULS) = 225 kPa

The recommended bearing values are available at about 1.5 m to 2.25 m below grades at Borehole 1, 2 and 3 locations. Higher soil bearing capacities of 300 kPa at SLS and 450 kPa at ULS are available for footings founded on very stiff to hard clay at greater depths.

Table 4 below shows the highest elevations at the borehole locations where the recommended bearing values can be applied.

Table 4: Highest Elevation at Borehole Locations where Recommended Bearing Values can be applied Proposed Student Residence

Borehole Location	Ground Surface Elevation (m)	Spread and Strip Footing 150 kPa at SLS 225 kPa at ULS		Spread and Strip Footing 300 kPa at SLS 450 kPa at ULS	
		Founding Soil	Depth (Elevation (m))	Founding Soil	Depth (Elevation (m))
1	114.7	Compact Silty Sand	1.5 (113.2)	Hard Silty Clay	2.4 (112.30)
2	114.6	Compact Silty Sand	2.25 (112.35)	Hard Silty Clay	3.0 (111.60)
3	114.37	Compact Fine Sand	2.25 (112.12)	Hard Silty Clay	3.0 (111.37)

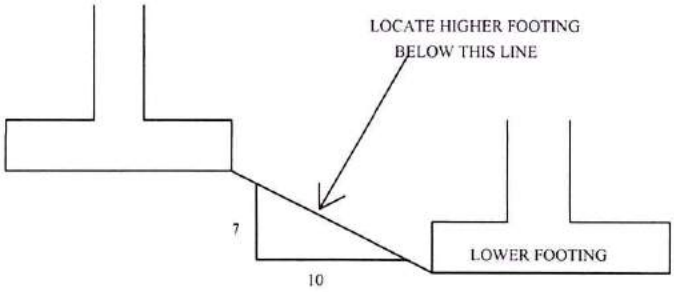
Excavation leftover after the removal of buried foundations and site services may be backfilled with engineered fill. Guideline for engineered fill construction is provided in Appendix C. Footings founded on an engineered fill pad constructed as described in Appendix C may be designed for the following bearing pressures: 150 kPa at SLS and 225 kPa at ULS.

5.2.1.1 Foundation General

New footings constructed immediately adjacent to the existing building should be founded at the same level as the existing footings to eliminate underpinning requirements.

Where footings are stepped, a maximum level difference of 600 mm should be maintained.

Footings which are to be placed on overburden at different elevations should be located such that the higher footings are set below a line drawn up at 10 horizontal to 7 vertical from the near edge of the lower footing, as indicated on the following sketch:



FOOTINGS AT DIFFERENT ELEVATIONS

Footings should be stepped down below any loose soils, fill and or site services and placed on competent and approved subgrade.

All footings exposed to seasonal freezing conditions should be protected from frost action by at least 1.2 m of soil cover or equivalent insulation, depending on the final design requirements.

The total and differential settlements of well designed and constructed footings placed on undisturbed native soils in accordance with the above recommendations are expected to be less than 25 mm and 15 mm, respectively.

Prior to placement of structural concrete, all founding surfaces must be evaluated by geotechnical personnel from Edward Wong & Associates Inc. to ensure that the founding soils are similar to those identified in the boreholes and are capable of supporting the design soil bearing pressure.

5.2.2 Groundwater Control

5.2.2.1 Short Term Groundwater Control Requirements (Construction Phase)

Groundwater levels in Boreholes 2 and 3 were measured at about 2.76 m to 4.78 m below grade. It is recommended that the groundwater levels be lowered to approximately 1 m below the bottom of excavation to provide a stable working base for construction. In view of the silty nature of the subsoil, no major groundwater problems are anticipated during construction. Groundwater entering into the excavation may be controlled by temporary sump pumps or deep well in local area. Detailed calculations are provided in Table I in Appendix E.

The estimated factored dewatering flow rate (0.92 m^3/day) including direct precipitation (24.97 m^3/day) for the proposed building is 25.89 m^3/ day.

Under the new regulations, a Permit-To-Take Water (PTTW) is required from the Ministry of Environmental and Climate Change (MOECC) if a volume of water greater than 400 m^3/ day is pumped from the excavations. If the volume of water to be pumped will be greater than 50 m^3/ day but less than 400 m^3/ day, the groundwater taking will not require a PPTW, but

will need to be registered in the Environmental Activity and Sector Registry (EASR) as a prescribed activity.

Based on the results of dewatering calculations, no PTTW and registration in the EASR will be required.

5.2.2.2 Long Term Groundwater Control Requirements (Post-Construction Phase)

If the basement is a water-proofed structure, no long term dewatering is required. In this case, the dewatering flow rate is could be 0 m^3/ day.

If the basement is a drained structure then a permanent dewatering system will be required. Weeping tiles may be installed along the perimeter wall footing and below the floor slab to control the groundwater. The estimated factored dewatering rate for the proposed apartment building is about 0.72 m^3/ day. Detailed calculations are shown in Table 1 in Appendix E.

5.2.2.3 Assessment of Potential Impacts

At the construction phase, the groundwater may be discharged to low lying area for percolation and evaporation. Should groundwater be discharged into the local storm or sanitary sewer system, a permit or approval from the City of Toronto is required.

The on-site dewatering activities will lower down the local groundwater level, increase the effective stress on the existing footing founding level and increase the potential risk of consolidation.

The estimated zone of influence is 1.32 m during construction and 0.96 m at post construction stage. The estimated zone of influence will not extend beyond the property limits. The on-site dewatering activities will not compromise the stability and integrity of adjacent buildings, site services, landscaped and walkway. It is recommended that a pre-construction survey be carried out, prior to the construction.

The closest surface water feature to the Site is the Don River, which is located at about 2 km to the east of the Site. The Lake Ontario is located at about 3.46 km to the south of the Site. The groundwater control activities will result in localized depression of the groundwater level. The zone of influence is not expected to extend beyond the property limits. The on-site dewatering activities will not have any negative impacts to surface water features.

The Site and surrounding area are provided with municipal piped water and sewer supply. Groundwater is not used for water supply. There would be no impacts to drinking water wells.

No gasoline stations and auto garages were noted in surrounding properties. A Dry Cleaner Store (St. George Dry Cleaner, 337 B;oor Street West) is located on north adjacent property. The drawdown resulting from the on-site dewatering activities will be localized. The on-site

dewatering activities are not expected to draw contaminates from neighborhood properties towards the Site.

At the construction phase, the groundwater may be discharged to low lying area for percolation and evaporation. Should groundwater be discharged into the local storm or sanitary sewer system, a permit or approval from the City of Toronto is required. The chemical quality of the tested groundwater sample recovered from Borehole 3 complied with both City of Toronto Sanitary and Storm Sewer By Law Guideline criteria.

5.2.3 Excavation

Footing base excavation for the proposed one (1) to two (2) level of basement will extend to a depth of about 3.65 m below grade. Groundwater seepages are expected to enter the excavation. It is anticipated that the groundwater inflow can be controlled by conventional sump pumping techniques or deep well in local areas. No aggressive groundwater control measures will be required.

Providing that effective groundwater control measures are implemented at the Site, excavation in the overburden may be carried out in the open cuts using a backhoe. Boulders and cobbles are common in the glacial deposits and their presence may influence the progress of the excavation. Consequently, provisions should be made in the contract documents to cover any delays caused by boulder obstructions.

All construction works must conform to the latest edition of the Occupational Health and Safety Act (OHSA) and local regulations. With respect to the OHSA, the wet fine sand and very loose silty sand are considered as Type 4 soils. The dewatered fine sand, the existing fill and the loose to compact silty sand are considered as Type 3 soils. The very stiff silty clay, the dense silty sand and silty sand till are considered as Type 2 soils. The hard sillty clay are considered as a Type 1 soil.

The OHSA requires that excavation slopes be cut at predetermined inclinations, based on the highest number of the soil types. If an excavation contains more than one soil type, trench and excavation slope geometry shall be governed by the highest numbered soil.

For guideline, side slopes of 1 vertical to 1 horizontal may be used for the temporary excavation anticipated, subject to geotechnical inspection during construction. Where loose soil is encountered at shallow depth or within persistent seepage at depth, it may be necessary to locally flatten the side slopes.

The exact locations and depths of the existing structures and services adjacent to the excavation should be determined and a support system be implemented, if the structure or services are within the zone of influence defined on the attached Drawing No. 4. It will be necessary to support existing services in the excavation, if any, where the excavation extends below the existing services.

5.2.4 Shoring

Where there is insufficient room to permit sloping of the sides of the excavation, a shoring system may be required. Conventional soldier piles and timber lagging walls may be used in the areas where no adjacent buildings and structures were located. A rigid caisson walls would be required to support structural loads from adjacent existing building. Where and if required, tiebacks (soil anchors), rakers and wales could be installed to provide lateral supports.

Excavation for the proposed lower basement floor slab will extend to a depth of approximately 3.65 m below grade. A triangular earth pressure distribution similar to that used for the basement wall design is appropriate.

$$P_s = k(\gamma h + q)$$

where P_s = lateral earth pressure in kPa acting at depth h;

k = un-factored earth pressure coefficient; use 0.35 where small movement is permissible, 0.45 where movements are to be minimized

γ = unit weight of backfill, assume 21.0 kN/m^3

h = depth to point of interest in m; and

q = equivalent value of surcharge on ground surface, use 12 kPa

Conventional soil anchors (if required) made on the hard silty clay are expected to develop an ultimate adhesion of about 60 kPa on the perimeter area of the bored hole. This implies a factored geotechnical resistance of 30 kPa for the design. During installation of the soil anchors, the holes should be cased to prevent caving in the wet sand/ silt zones.

Pile toes will be made in the hard silty clay. The horizontal resistance of the soldier pile toes will be developed by embedment below the base of the excavation, where resistance is developed from the passive earth pressure. A passive earth pressure coefficient K_p equals to 3.0 may be used.

Positive measures will be required to prevent the loss of soil through the spaces between the timber lagging boards. This could probably achieved by placing well graded sand and gravel and a geotextile behind the lagging board.

Where and if tiebacks are installed, at least one full scale test should be carried out on an anchor. This test should be taken to 200 percent of the design load or until there is a significant increase in the pull out rate. The test should be undertaken in accordance with the procedure outlined in the Canadian Foundation Manual. Based on the results of the pull out test, it may be necessary to modify the anchor design and place limits on the tieback capacity.

In addition, each working anchor must be proof-loaded. This is achieved by loading the anchor to 133 percent of the design load and the anchor must be capable of sustaining this load for 20 minutes without creep. The load may then be relaxed to 100 percent and locked in.

The performance of the shoring system must be checked through monitoring for lateral movement of the walls of the excavation to ensure that the shoring movements remain within the design limits. The most effective method for monitoring the shoring movements can best be devised by this office when the shoring plans become available. The shoring designers should however assess the specific site requirements and submit to Edward Wong & Associates Inc. for review and comment.

As per convention prevailing in the Greater Toronto area, the Contractor and his shoring designers are fully responsible for the design, construction and performance of the shoring system.

It is recommended that a pre-construction survey of the adjacent buildings and structures should be carried out.

5.2.5 Pipe Installation

The invert levels of the proposed sewer have not been established at the time of preparation of the report. Excavation for the sewer pipe installation is expected to be extended to about 4 m to 5 m below grades.

Providing that positive groundwater control measure is implemented at the Site, no bearing capacity is envisaged for the pipes founded on the undisturbed native soils. Any unsuitable materials encountered at the design pipe subgrade level should be removed and replaced with thin lifts of approved materials compacted to at least 98 percent standard Proctor maximum dry density.

The bases of the excavation in the competent native soils should remain stable providing that the excavation are not left open for extended period of time and the work is done in accordance with good construction practice.

Class "B" granular bedding (minimum 150 mm of compacted 19 mm crusher run limestone) may be used for the proposed pipes. If the subgrade becomes unduly wet during construction, the wet subgrade materials should be removes and additional lifts of bedding materials be placed.

Clear 19 mm crushed limestone may also be used as pipe bedding material on the clay subgrade. Where sand or silt or other wet material is encountered during excavation, the clear crushed limestone should be wrapped with approved geotextile filter fabric (Terrafix 270R or approved equivalent) to prevent migration of subgrade materials into voids of the bedding materials and help prevent consequent loss of subgrade support.

Granular material (Granular "B" Type I) should be used as pipe cover material. The pipe cover material should be carried up as backfill to at least 300 mm above the top of the pipe.

The cover and bedding materials should be placed in thin lifts not more than 200 mm thick and compacted to at least 95 percent SPMDD. The first lift above the pipe should be at least 300 mm in thickness in order to minimize the risk of pipe damage. Particular attention should be given to ensure material placed beneath the bottom quadrants of the pipe is adequately compacted.

The trench backfill should be placed in maximum 300 mm thick loose lifts and compacted to minimum 95 percent standard Proctor maximum dry density to within 600 mm of final subgrade level and 98 percent SPMDD for the upper 600 mm.

All backfilling and compaction operations should be monitored by qualified geotechnical personnel. Refer to Section 5.2.8 "Backfill Considerations" for additional comments on backfilling.

5.2.6 Floor Slab Construction and Permanent Drainage

The floor slab may be poured as a slab-on-grade on prepared and approved subgrade. Slab-on-grade construction may be carried out in accordance with the following recommendations.

Prior to slab-on-grade construction, all buried building foundations, existing asphalt pavement structures, site services, topsoil and all obviously unsuitable materials should be removed from the entire floor area. The exposed subgrade should be proof-rolled with a heavy roller and examined by qualified geotechnical personnel. Any soft areas detected during the proof-rolling process should be dug out. The area can then be brought up to design subgrade level with approved on-site or imported materials.

The fill materials should be clean and inorganic soil with its moisture content close to its optimum moisture content determined in standard Proctor test. The fill materials should be placed in lifts not more than 200 mm thick in the loose state, each lift being compacted to at least 98 percent standard Proctor maximum dry density (SPMDD).

All backfilling and compaction operations should be monitored by qualified geotechnical personnel to approve material, evaluate placement operations and ensure the specified degree of compaction is achieved uniformly throughout the fill

A minimum 200 mm thick layer of 19 mm clear crushed limestone is recommended directly beneath the floor slab to serve as a moisture barrier.

If a moisture sensitive floor finish is to be provided, polyethylene sheeting should be used as a vapor barrier.

A coefficient of subgrade reaction of 28 MPa/ m may be used for the slab-on-grade constructed as recommended as above.

Within any un-heated areas and entrances to service areas, adequate insulation should be provided below the floor slab and adjacent perimeter walls to protect them against movement due to frost heave.

Both under-floor and perimeter wall drains are required for proposed student residence with one (1) to two (2) level of basement. Drainage and backfill recommendations for basement are provided in Drawing No. 5. Schematic drainage details against shoring system (soldier pile and lagging or caisson wall) is provided in Drawing No. 6.

Around the perimeter of the proposed student residence, the ground surfaces should be sloped away from the structures to promote surface water run-off and reduce groundwater infiltration adjacent to the foundations.

5.2.7 Site Seismic Classifications

Based on the investigation results, the Site can be classified as "Class D" (Stiff soil) in accordance with Table 4.1.8.4.A, OBC 2012.

The seismic hazard design values for Toronto (City Hall) area are shown on Table 5 below (Table 1.2, Design Data for Selected Location in Ontario, OBC 2012; Supplementary Standard SB-1):

Table 5: Seismic Hazard Design Values for Toronto (City Hall) Area

Sa (0.2)	Sa(0.5)	Sa(1.0)	Sa(2.0)	PGA
0.22	0.13	0.067	0.021	0.12g

PGA is the peak ground acceleration in unit of g. Sa (T) is the spectral acceleration. T is the period in seconds.

Based on OBC Table 4.1.8.4B and OBC Table 4.1.8.4C, an acceleration based site coefficient (Fa) and a velocity based site coefficient (FV) value of 1.3 and 1.4 may be used, respectively.

5.2.8 Backfill Considerations

Backfill used to satisfy underfloor slab requirements, and service trenches, etc., should be compactible fill, i.e. clean inorganic soil with its moisture content close to its optimum moisture content determined in a Standard Proctor test.

The fill should be placed in lifts not exceeding 200 mm and compacted to the following requirements:

I. Within the building area - minimum 98 percent SPMDD for slab-on-grade support.

II. Pavement areas - minimum of 95 percent SPMDD to within 600 mm of final subgrade level and 98 percent SPMDD for the upper 600 mm.

III. General Backfill including trench backfill, backfill adjacent to foundation walls - minimum of 95 percent SPMDD.

Backfill should be placed simultaneously on both sides of the foundation walls. Heavy compactors, which generate large lateral stress, should be kept at a safe distance from subsurface walls to avoid structural damage.

Selected portion of the existing fill and excavated native soils (silty sand, silty sand till, silty clay) which are not mixed with topsoil, debris or other obviously unsuitable materials may be reused as backfill.

Any organic or excessively wet or otherwise deleterious materials should not be used for backfilling purposes. Some moisture content adjustments may be required for efficient compaction depending upon weather conditions at the time of construction.

The wet native soils should not be used for backfilling purposes, unless they can be adequately air-dried. Any shortfall of suitable on-site excavated material can be made up with suitable earth fill or imported granular material, OPSS Granular 'B' or equivalent.

Imported granular materials conforming OPSS 1010 Granular "B" gradation requirement should be used in areas where free-draining characteristics are required.

All backfilling and compaction operations should be monitored by qualified geotechnical personnel to approve material, evaluate placement operations and ensure the specified degree of compaction is achieved uniformly throughout the fill.

In areas where substantial cutting and filling is required, the compaction of the fill should be monitored full-time by a representative of Edward Wong & Associates Inc. This is particularly important within the building area where structural supports will be required as well as in the pavement area.

5.2.9 Earth Pressures on Subsurface Walls

The lateral earth pressure acting on subsurface walls may be calculated from the following equation:

$$p = k(\gamma h + q)$$

where p = lateral earth pressure in kPa acting at depth h;

k = un-factored earth pressure coefficient; use 0.35

γ = unit weight of backfill, assume 21.0 kN/m^3

h = depth to point of interest in m; and

q = equivalent value of any surcharge the ground surface in kPa.

Free draining materials (OPSS Granular "B" Type I) should be used as backfill behind the wall. The above expression assumes that perimeter wall drainage system prevents the build-up of any hydrostatic pressure behind the wall.

The basement walls should be suitably damp-proofed. In order to minimize infiltration of surface water, the ground surface should be sloped away from the structures.

5.2.10 Sub-surface Concrete Requirements

The results of groundwater soluble sulphate content determination (Section 6.3 of the report) indicated negligible degree of sulphate attack on buried concrete structure (CSA A23.1 Table 3). Normal cement may be used in the concrete.

5.3 Pavement Design and Construction

The anticipated subgrade for the proposed driveway and parking area consists of compacted fill and competent native soils (stiff to hard clayey silt). Based on the strength and frost susceptibility of the subgrade materials, loading requirements and assuming adequate drainage, the recommended flexible pavement structures are provided in Table 6 below:

Table 6: Recommended Flexible Pavement Structure Thickness

Pavement Layer	Compaction Requirements	Light-Duty Parking (Cars)	Medium-Duty Parking and Access Road (Trucks)	Heavy-Duty Parking and Access Road (Trucks)
Asphaltic Concrete	97 percent Bulk Marshall Density	40 mm HL3 over 40 mm HL8	40 mm HL3 over 50 mm HL8	40 mm HL3 over 80 mm HL8
19 mm crusher-run limestone Granular Base	100 percent SPMDD*	150 mm	150 mm	150 mm
50 mm crusher-run limestone Granular Sub-base	100 percent SPMDD*	150 mm	300 mm	400 mm

* Denotes standard Proctor maximum dry density, ASTM-D698

The subgrade should be compacted to 98 percent SPMDD.

Hot mix asphalt should conform to the requirements of OPSS 1150. Performance grade (PG) asphalt should be specified (OPSS 1101). PG asphalt binders are identified by both the maximum and minimum temperatures by which they are expected to perform. PG 58-28 is recommended for this project. It is recommended that the asphalt mix design should be reviewed by the geotechnical engineer before selection of the final mix design and prior to the start of the paving.

The granular base and sub-base courses should conform the gradation requirements provided in OPSS Form 1010 for Granular "A" and Granular "B", respectively.

Additional comments on the construction of parking areas are as follows:

1. As part of the subgrade preparation, all obviously unsuitable materials should be removed from areas for the proposed pavement.

2. The exposed subgrade should be properly shaped, crowned and then proof-rolled in the full-time presence of a qualified geotechnical personnel. Soft or spongy areas should be sub-excavated and properly replaced with suitable approved backfill compacted 98 percent SPMDD.

3. The need for adequate drainage cannot be over-emphasized. The finished pavement surface and underlying granular and subgrade surfaces should be free from depressions and sloped to provide effective surface drainage towards catch-basins.

4. Perimeter sub-drains should be provided around parking areas. In addition, sub-drains extending from and between catch-basins should also be installed. This will ensure no water collects in the granular course which could result in pavement failure during the spring thaw.

5. To minimize the problems of differential movement between the pavement and catch-basins/manhole due to frost action, the backfill around the structures should consist of free-draining granular. In addition, the catch-basin should be perforated just above the drain and the holes screened with filter cloth.

6. The most severe loading conditions on light-duty pavement areas and the subgrade may occur during construction. Consequently, special provisions such as restricted lanes, half-loads during paving, etc., may be required, especially if construction is carried out during unfavorable weather.

7. It is recommended that the final pavement structure design and drainage plans be reviewed by the geotechnical engineer, prior to construction.

8. Use a step key in joint treatment where old and new asphalt pavement layer is abutted. A step key-in-joint consisting of milling the surface layer approximately 300 mm wide and 50 mm deep should be used to provide better pavement tie in to adjacent asphalt pavement structure and to minimize surface water seeping into the granular base materials.

9. All construction joints at the ends of the pavement structure treatment should be cleaned with stiff bristle brooms and compressed air to remove all dusts, dirt and other foreign matters. A tack coat should be applied to all construction joints prior to the placement of asphaltic concrete to ensure an adequate bond between the old and new pavements.

10. Placement and compaction of the asphaltic concrete, granular road base and sub-base materials should be carried out in accordance with the applicable City of Toronto Standard Specifications and OPSS.

11. All compaction operations should be monitored on a full-time basis by qualified geotechnical personnel to approve materials, evaluate placement operations and ensure the specified degree of compaction is achieved.

6. Environmental Testing

6.1 Gas Vapor Monitoring

Tests for the generation of methane gas and Total Organic Vapors were carried out in Boreholes 1,2 and 3, using a portable combustible gas tester (RKI Eagle multi-gas detector).

No chemical odors or staining which may be indicative of contamination were noted in the soil samples recovered from Boreholes 1, 2 and 3.

6.2 Assessment Criteria

The results of the soil chemical analyses were evaluated using the Site Condition Standards contained in the MOE Document entitled "Soil, Groundwater and Sediment Standards for Use under Part XV.1 of the Environment Protective Act", dated April 15, 2011.

The Site was assessed using the MOE Document Table 3 (non-potable groundwater condition) Standard. The use of Table 3 Standard is considered appropriate, based on the following:

- The Site is not located within 30 m of a water body;
- The Site is not located adjacent to a provincial or municipal park, adjacent to an area of natural significance or a wetland and based on this; it is not anticipated to provide a habitat of endangered or threatened species identified by the Ministry of Natural Resources;
- The Site is not located within areas where the Niagara Escarpment Planning and Development Act or the Oak Ridges Moraine Conservations Act, 2011 apply and;
- Bedrock was not encountered within 2 m of the ground surface at any of the borehole locations completed for this investigation.

The texture of the soils encountered on the Site is considered to be fine to medium texture.

Based on these considerations, the standard for "Residential/ Parkland/ Institutional" (RPI) property land use in a non-potable groundwater condition for fine to medium textured soil contained in Table 3 of the MOE Document were used to evaluate the environmental quality of the soil at the Site.

Since some receivers of excess soils require conformance with MOE Document Table 1 (Background Site Condition) criteria, a comparison to Table 1 "Residential/ Parkland/ Institutional/ Industry/ Commercial/ Community" (RPIICC) property use criteria were also made.

6.3 Laboratory Testing Program

Three (3) soil samples were submitted to Maxxam Analytics in Mississauga for chemical analysis. The results of the chemical analysis results were used to determine the disposal options for the excess soil materials.

Results of the groundwater testing are provided in the hydro-geological site assessment report under separate cover. Sample locations and analytical data are listed in Table 7 below. The Certificates of Chemical Analyses are provided in Appendix E.

Table 7: Sample Locations and Analytical Data

Sample I.D.	Borehole Location and Depth	Matrix	Analytical Data
IMX 964	BH 1, SS2 0.3 - 0.75 m depth	Soil	General and Inorganic Parameters
IMX 965	BH 2, SS3 1.5 - 2.25 m depth	Soil	General and Inorganic Parameters
IMX 966	BH 3, SS4 2.25 - 2.7 m depth	Soil	PHC (F1- F4) and VOCc
IOO971	BH 3	Groundwater	Toronto Storm and Sanitary Sewer By Law, soluble Sulphate, General and Inorganic Parameters, PHC (F - F4 Fractions) and VOCs.

Notes: PHC - Petroleum Hydrocarbons; VOC's - Volatile Organic Compounds

6.3.1 Subsoil

6.3.1.1 Comparison to the MOE Document entitled "Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the *Environment Protection Act*"

6.3.1.1 General and Inorganic Parameters

The analytical concentrations of the soil samples generally complied with the applicable MOE Document Table 1 and 3 criteria for general and inorganic parameters, with the following exceptions.

A Sodium Adsorption Ratio (SAR) value of 8.4 was recorded in the soil sample from Borehole 1. The recorded SAR value exceeded the MOE Document Table 1 RPIICC and Table 3 RPI property use criterion of 2.4 and 5 for SAR, respectively.

The measured concentration of Conductivity in the soil sample recovered from Borehole1 was 0.86 mS/cm, which exceeded the MOE Document Table 1 RPIICC and Table 3 RPI property use criterion of 0.57 mS/cm and 0.7 mS/cm for Conductivity, respectively.

6.3.1.1.2 Petroleum Hydrocarbons (F1 - F4 Fractions)

The analytical concentrations were below the laboratory detective limits and therefore complied the applicable MOE Document Table 1 and 3 criteria for Petroleum Hydrocarbons (F1- F4 Fractions)

6.3.1.1.3 Benzene, Toluene, Ethyl-benzene and Xylene

The measured concentrations were below the laboratory detective limits and complied the applicable MOE Document Table 1 and 3 criteria for Benzene, Toluene, Ethyl-benzene and Xylene.

6.3.1.1.4 Volatile Organic Compounds

The analytical concentrations were below the laboratory detective limits and therefore complied the applicable MOE Document Tables 1 and 3 criteria for Volatile Organic Compounds.

6.3.1.2 Comments

The SAR and EC parameters were associated with winter road salting activities. It should be noted that the elevated SAR and EC level are not considered to be harmful for human health, but could interference with the growth of certain species of plants and vegetation. Therefore, near surface placement of these materials are not recommended for landscaping, parkland or agricultural purposes. As such, elevated levels of SAR and EC do not automatically preclude disposal at development Sites accepting clean fill.

Excess soil generated at the above captioned site may be disposed of at any land based Sites in Ontario that are being developed for "Residential/ Institutional/ Commercial/ Industrial/ Community" land uses in the areas where landscaping is not intended, subject to approval from individual receiving Site authorities.

6.3.2 Groundwater

6.3.2.1 Comparison to MOE's Document entitled "Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act", dated April 2011

The analytical concentrations of the tested groundwater sample complied with the applicable MOE Document Tables 1 and 3 criteria for general and inorganic parameters, petroleum hydrocarbons and volatile organic compounds.

6.3.2.2 Comparison to Toronto Sanitary and Storm Guidelines

The chemical quality of the tested groundwater sample recovered from Borehole 3 complied with both City of Toronto Sanitary and Storm Sewer By Law Guideline criteria. Subject to the approval of the City of Toronto, groundwater collected from the dewatering system may discharged into the existing storm or sanitary system.

7. General Comments

The recommendations in this report have been based on the findings in the boreholes. Soil conditions may vary between and beyond the boreholes. Consequently, during the future development of the property, conditions not observed during this investigation may become apparent; should this occur, Edward Wong & Associates Inc. should be contacted to assess the situation and additional testing and reporting may be required. Edward Wong & Associates Inc. has qualified personnel to provide assistance in regards to future geotechnical and environmental issues related to this property.

The comments given in this report are intended only for the guidance of design engineers. Edward Wong & Associates Inc. should be retained for a general review of the final design and specifications to verify that this report has been properly interpreted and implemented. If not accorded the privilege of making this review, Edward Wong & Associates Inc. will assume no responsibility for interpretation of the recommendations in the report.

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

Yours truly,

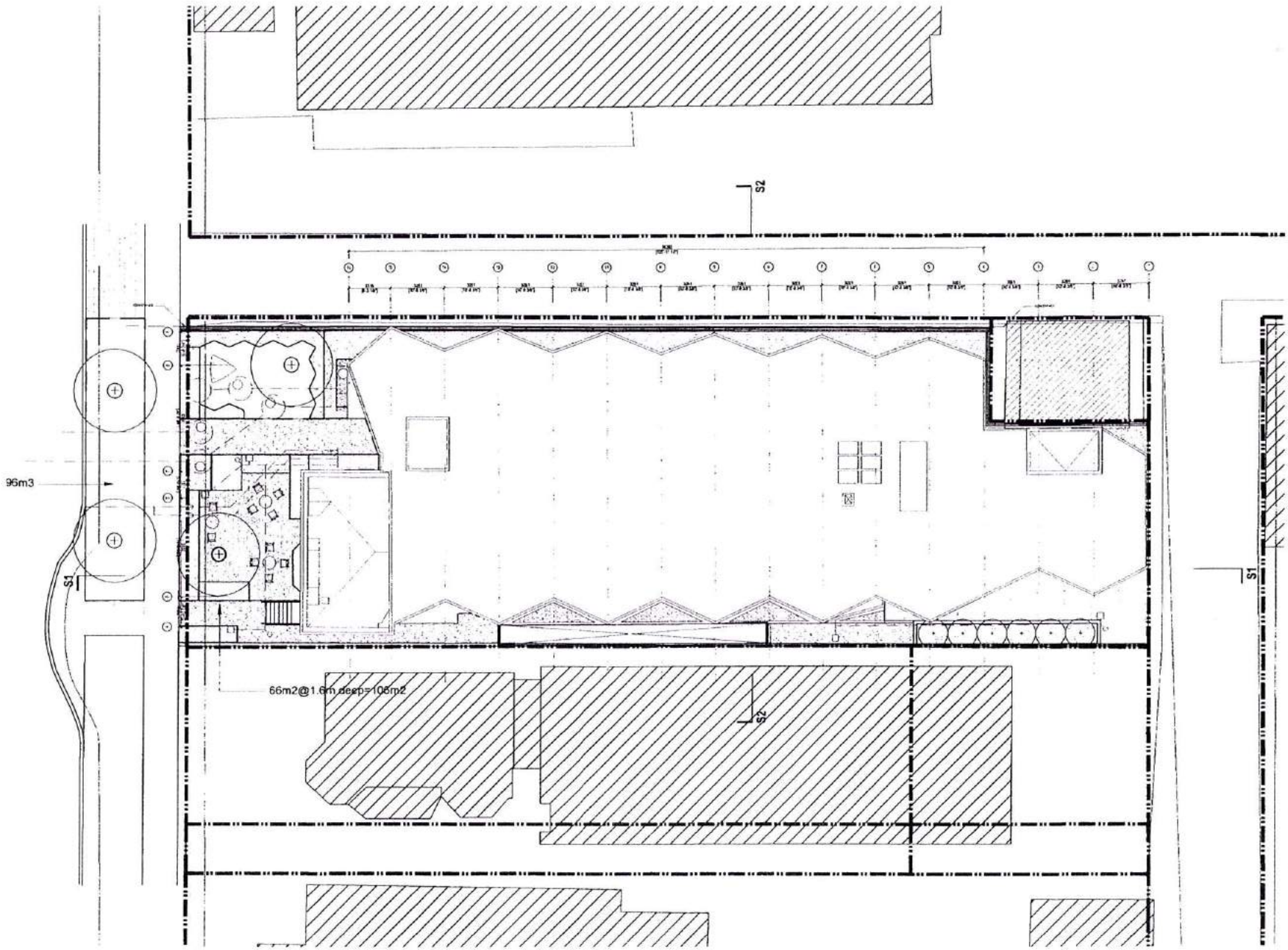
Edward Wong & Associates Inc.

Edward B.H. Wong, M. Eng. P. Eng.

Distribution: Client (2)

Appendix A

Site Plan and Cross Sections
Proposed Development



NO.	DATE	REVISION / ISSUANCE
01	2019.12.31	ZBA DRAFT
02	2019.03.11	ZBA DRAFT - REVISED
03	2019.03.29	ZBA DRAFT - REVISED
04	2019.04.17	ZBA DRAFT - SUBMISSION
04	2019.05.04	ZBA - SUBMISSION

ARCHITECT

LANDSCAPE

HERITAGE

CIVIL

PLANNING

TRANSPORTATION

HYDRO-GEOTECHNICAL

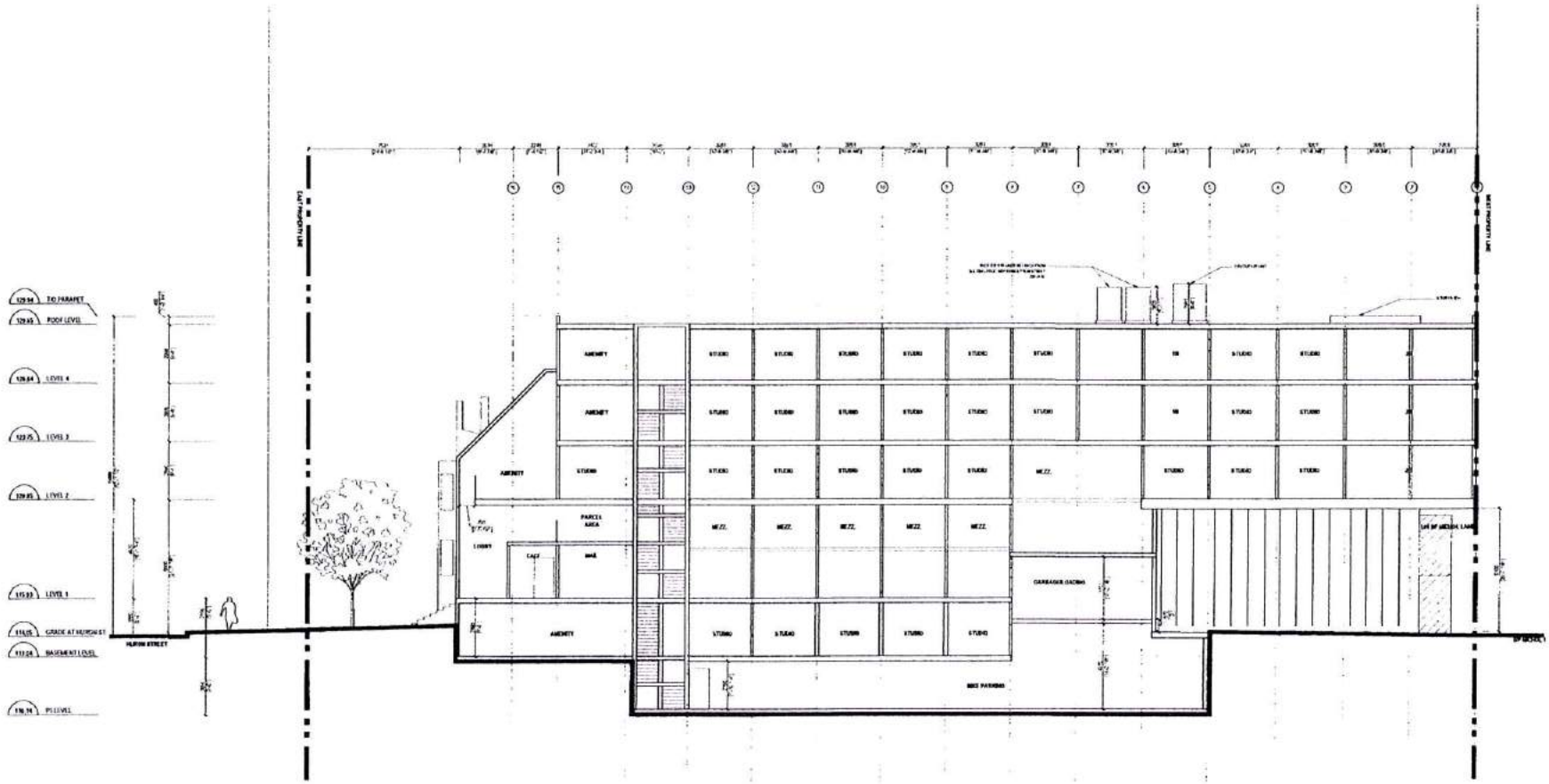
ENERGY

SvN

STUDENT FOCUSED HOUSING

SITE PLAN

A010



NO.	DATE	REVISION / ISSUANCE
01	21.10.12.23	ZBA DRAFT
02	21.11.03.10	ZBA DRAFT - REVISED
03	21.12.03.29	ZBA DRAFT - REVISED
04	22.01.04.07	ZBA DRAFT - SUBMISSION
04	22.11.03.04	ZBA - SUBMISSION

ARBORIST

LANDSCAPE

HERITAGE

CIVIL

PLANNING

TRANSPORTATION

HYDRO-G/ GEOTECHNICAL

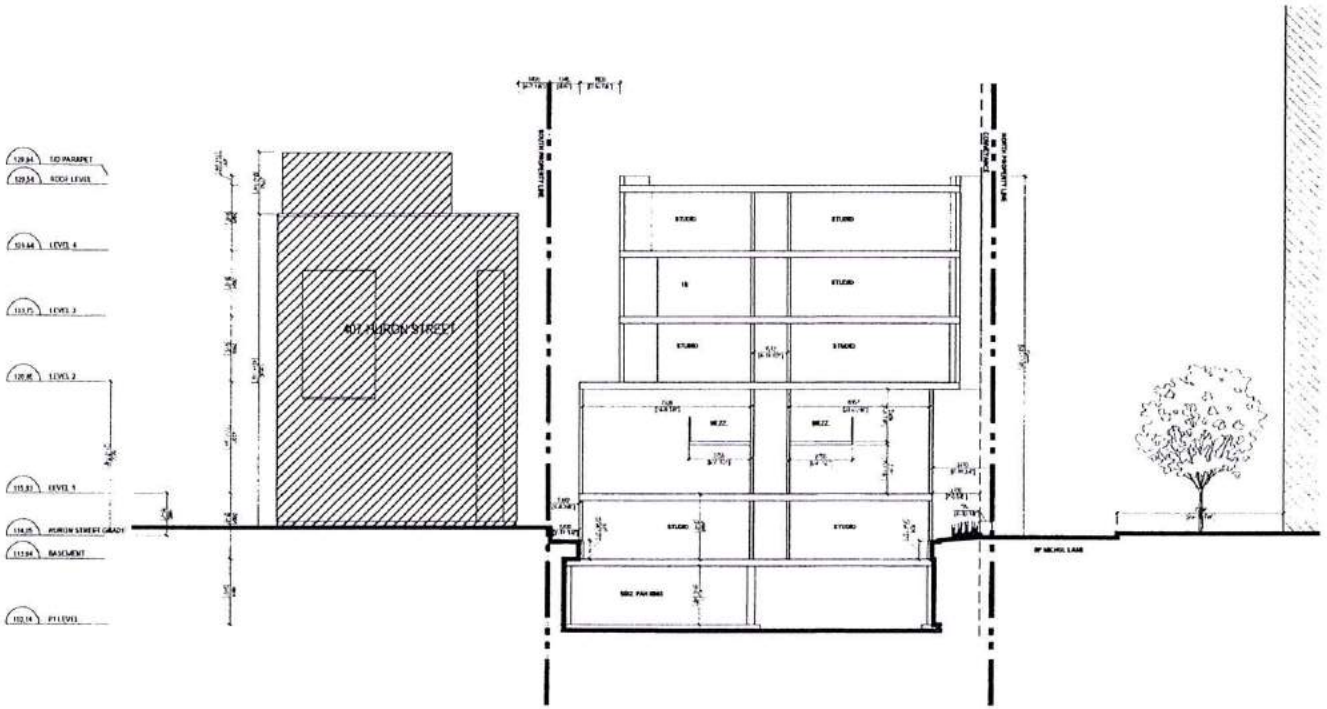
ENERGY

SvN

STUDENT FOCUSED HOUSING

SECTION 01

A400



NO.	DATE	REVISION/ISSUANCE
01	2019.12.21	ZBA DRAFT
02	2019.03.11	ZBA DRAFT - REVISED
03	2019.03.25	ZBA DRAFT - REVISED
04	2019.04.17	ZBA DRAFT - SUBMISSION
04	2019.05.01	ZBA - SUBMISSION

ARBORIST

LANDSCAPE

HERITAGE

CIVIL

PLANNING

TRANSPORTATION

HYDRO-/GEOTECHNICAL

ENERGY

SvN

STUDENT FOCUSED HOUSING

401 Huron Street
Toronto, Ontario M5S 2G5

The Regionalcare Group
305 Town Centre Blvd, Suite 101
Markham, Ontario L3R 0G8

SECTION 02

PROJECT	#401	DRAWN	ZS
SCALE	1:75	CHECKED	JK
DATE	2019_12.21	PLOTTED	2019.05.01

A401

Appendix B
Logs of Borehole

EDWARD WONG

WELL NUMBER 1

CLIENT The Impressive Group **PROJECT NAME** 409 Huron Street

PROJECT NUMBER Ma002568b **PROJECT LOCATION** Toronto

DATE STARTED 12/7/18 **COMPLETED** 12/7/18 **GROUND ELEVATION** 114.7 m **HOLE SIZE** 150 mm

DRILLING CONTRACTOR Terra Firma **GROUND WATER LEVELS:**

DRILLING METHOD Hollow Stem Augers **AT TIME OF DRILLING** Dry

LOGGED BY J.T. **CHECKED BY** E.W. **AT END OF DRILLING** Dry

NOTES **AFTER DRILLING** —

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
	SS 1	2-1-1 (2)	MC = 14%		0.08 **TOPSOIL** - ~75 mm thick. 114.63 **SILTY SAND** - brown, moist, very loose.	Protective Cap, Portland Cement Concrete
	SS 2	2-3-3 (6)	MC = 9%		-becoming loose below ~0.75 m depth	Bentonite
2	SS 3	5-7-10 (17)	MC = 8%		-becoming compact below ~1.5 m depth	
	SS 4	10-11-15 (26)	PP >450 kPa MC = 7%		2.40 112.30 **SILTY CLAY** - brown, trace sand, occasional gravel, scattered sand seams, brown, moist, hard.	Filter Sand, 50 mm dia. PVC Riser
4	SS 5	10-17-18 (35)	PP >450 kPa MC = 8%		-becoming grey below ~3.0 m depth	
	SS 6	13-20-19 (39)	PP >450 kPa MC = 8%			
6	SS 7	12-20-17 (37)	PP >450 kPa MC = 8%		6.00 108.70 **SILTY SAND TILL** - trace silt, trace gravel, grey, moist, dense.	Filter Sand. Filter Sock, 50 mm dia. PVC Slotted Pipe
	SS 8	8-13-19 (32)	PP >450 kPa MC = 8%		7.50 107.20 **SILTY CLAY** - grey, moist, hard. 7.95 106.75 Bottom of hole at 7.95 m.	

EDWARD WONG

WELL NUMBER 2

CLIENT The Impressive Group **PROJECT NAME** 409 Huron Street

PROJECT NUMBER Ma002568b **PROJECT LOCATION** Toronto

DATE STARTED 12/7/18 **COMPLETED** 12/7/18 **GROUND ELEVATION** 114.6 m **HOLE SIZE** 150 mm

DRILLING CONTRACTOR Terra Firma **GROUND WATER LEVELS:**

DRILLING METHOD Hollow Stem Augers **AT TIME OF DRILLING** Dry

LOGGED BY J.T. **CHECKED BY** E.W. **AT END OF DRILLING** Dry

NOTES **AFTER DRILLING** 4.78 m / Elev 109.82 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
	AU					
	SS 1	5-3-2 (5)	MC = 15%		0.25 **PAVEMENT STRUCTURE** - ~65 mm of asphaltic concrete over ~185 mm of brown sand and gravel, very moist. 114.35	Protective Cap, Portland Cement Concrete
	SS 2	2-1-2 (3)	MC = 18%		**FILL** - silty sand, brick fragments, brown, very moist.	Bentonite
	SS 3	2-1-3 (4)	MC = 17%		1.50 113.10 **SILTY SAND** - brown, very moist, very loose.	
2						
	SS 4	8-12-8 (20)	MC = 15%		-becoming compact below ~2.25 m depth	
	SS 5	8-15-16 (31)	PP >450 kPa MC = 9%		3.00 111.60 **SILTY CLAY**- trace sand, occasional gravel, grey, moist, hard.	Filter Sand, 50 mm dia, PVC Riser
4						
	SS 6	6-14-16 (30)	PP = 300 kPa MC = 10%		-becoming very stiff and very moist below ~4.5 m depth	
6						
	SS 7	7-21-16 (37)	PP >450 kPa MC = 10%		-becoming hard below ~7.5 m depth	Filter Sand, Filter Sock, PVC Slotted Pipe
	SS 8	9-21-17 (38)	PP >450 kPa MC = 10%		7.95 106.65	
					Bottom of hole at 7.95 m.	

EDWARD WONG

WELL NUMBER 3

CLIENT The Impressive Group
PROJECT NAME 409 Huron Street
PROJECT NUMBER Ma002568b
PROJECT LOCATION Toronto

DATE STARTED 12/7/18 **COMPLETED** 12/7/18
GROUND ELEVATION 114.37 m **HOLE SIZE** 150 mm
DRILLING CONTRACTOR Terra Firma
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Augers
AT TIME OF DRILLING Dry
LOGGED BY J.T. **CHECKED BY** E.W.
AT END OF DRILLING 2.25 m / Elev 112.12 m
NOTES
AFTER DRILLING 2.57 m / Elev 111.80 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
	AU				0.25 **PAVEMENT STRUCTURE** - ~65 mm of asphaltic concrete over~185 mm of brown sand and gravel, very moist. 114.12	Protective Cap, Portland Cement Concrete
	SS 1	5-4-3 (7)	MC = 13%		0.75 **FILL** - silty sand, topsoil inclusions, dark brown, very moist. 113.62	
	SS 2	3-1-1 (2)	MC = 15%		**SILTY SAND** - brown, very moist, very loose. 1.50 112.87	Bentonite
2	SS 3	5-8-10 (18)	MC = 6%		**FINE SAND** - trace silt, brown, moist, compact.	
	SS 4	9-11-22 (33)	MC = 22%		- groundwater was first encountered at ~2.25 m depth -becoming dense and wet below ~2.25 m depth	
	SS 5	6-12-13 (25)	PP >450 kPa MC = 11%		3.00 111.37 **SILTY CLAY**- trace sand, occasional gravel, scattered sand seams, brown, very moist, hard.	Filter Sand, 50 mm dia. PVC Riser
4						
	SS 6	11-13-15 (28)	PP >450 kPa MC = 12%		-becoming grey below ~3.0 m depth	
6						Filter Sand, Filter Sock, 50 mm dia., PVC Slotted Pipe
	SS 7	8-14-18 (32)	PP >450 kPa MC = 10%			
	SS 8	12-15-13 (28)	PP >450 kPa MC = 12%		7.95 106.42	
					Bottom of hole at 7.95 m.	

Appendix C

Results of Grain Size Analysis and Hydrometer Test

EDWARD WONG

Edward Wong & Associates Inc.
441 Esna Park Drive, Unit 19
Markham, Ontario, L3R 1H7
Telephone: (416) 903-4288
Fax: (905) 964-1188

Grain Size Analysis and Hydrometer Test

Sample Test No.: S1 **Report No.:** 1 **Date Reported:** 23-Dec-18

Project No.: Ma002568a
Project Name: 409 Huron Street, Toronto

Grain Size Proportion (%)

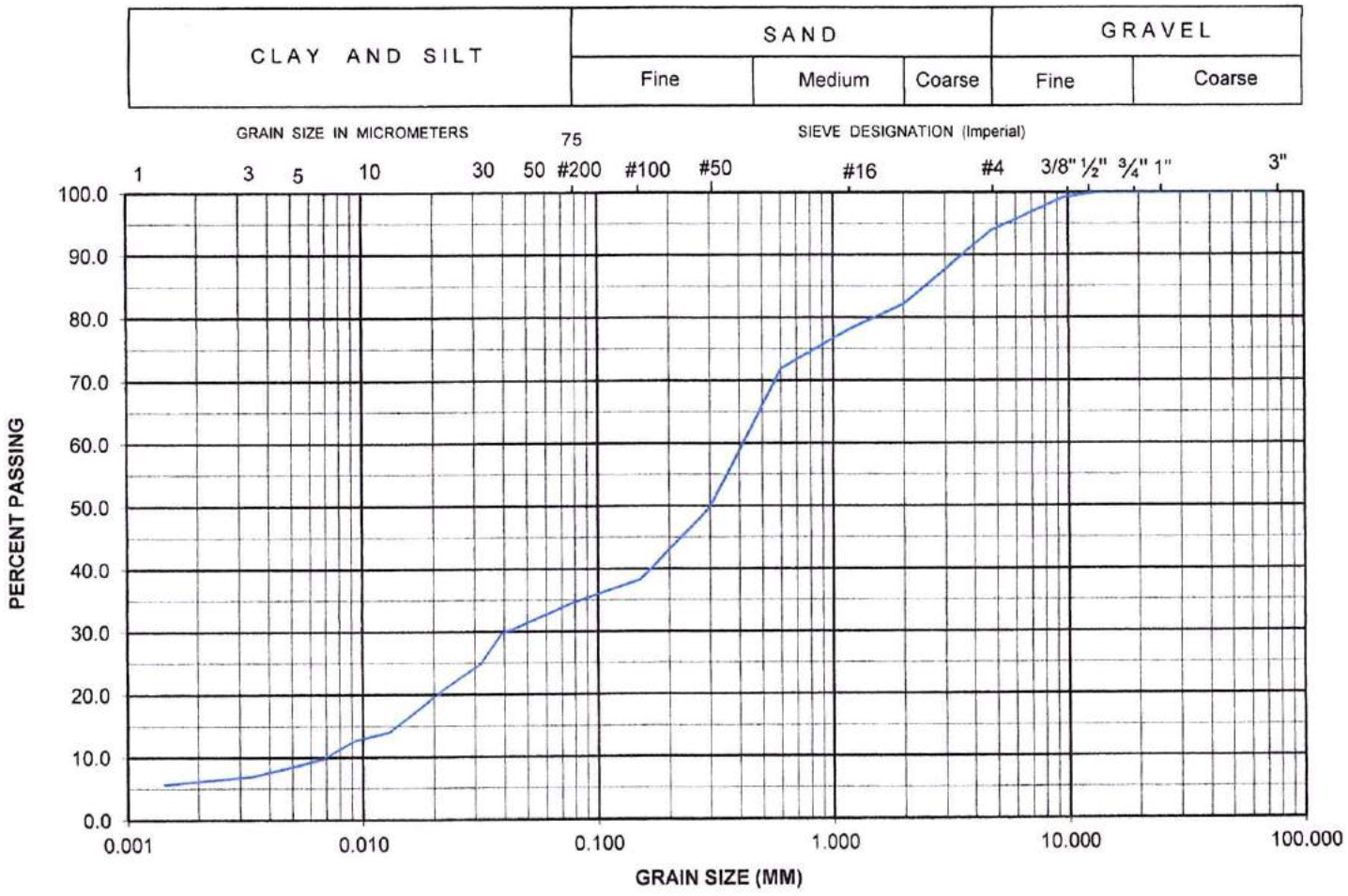
Gravel (> 4.75mm):	6.0
Sand (> 75μm, < 4.75mm):	59.6
Silt (> 2μm), < 75μm):	28.0
Clay (< 2μm):	6.4

Sample Information

Sample Location: BH 1
Sample No.: 7
Sample Method: SPT
Depth (m): 6.0 - 6.45
Sample Description: Grey Silty Sand Till trace silt trace gravel
Sampled By: J.T.
Sampling Date: 7-Dec-18
Client Sample ID:
Comments:

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
75.00	100.0	**0.092**	12.8
26.50	100.0	**0.007**	9.8
19.00	100.0	**0.003**	7.0
13.25	100.0	**0.014**	5.7
9.50	99.2		
4.75	94.0		
2.00	82.2		
1.180	78.2		
0.600	71.9		
0.300	49.9		
0.150	38.3		
0.075	34.4		
0.039	29.6		
0.032	24.8		
0.021	20.0		
0.013	14.1		

UNIFIED SOIL CLASSIFICATION SYSTEM



EDWARD WONG

Edward Wong & Associates Inc.
441 Esna Park Drive, Unit 19
Markham, Ontario, L3R 1H7
Telephone: (416) 903-4288
Fax: (905) 964-1188

Grain Size Analysis and Hydrometer Test

Sample Test No.: S2 **Report No.:** 2 **Date Reported:** 23-Dec-18

Project No.: Ma002568a
Project Name: 409 Huron Street, Toronto

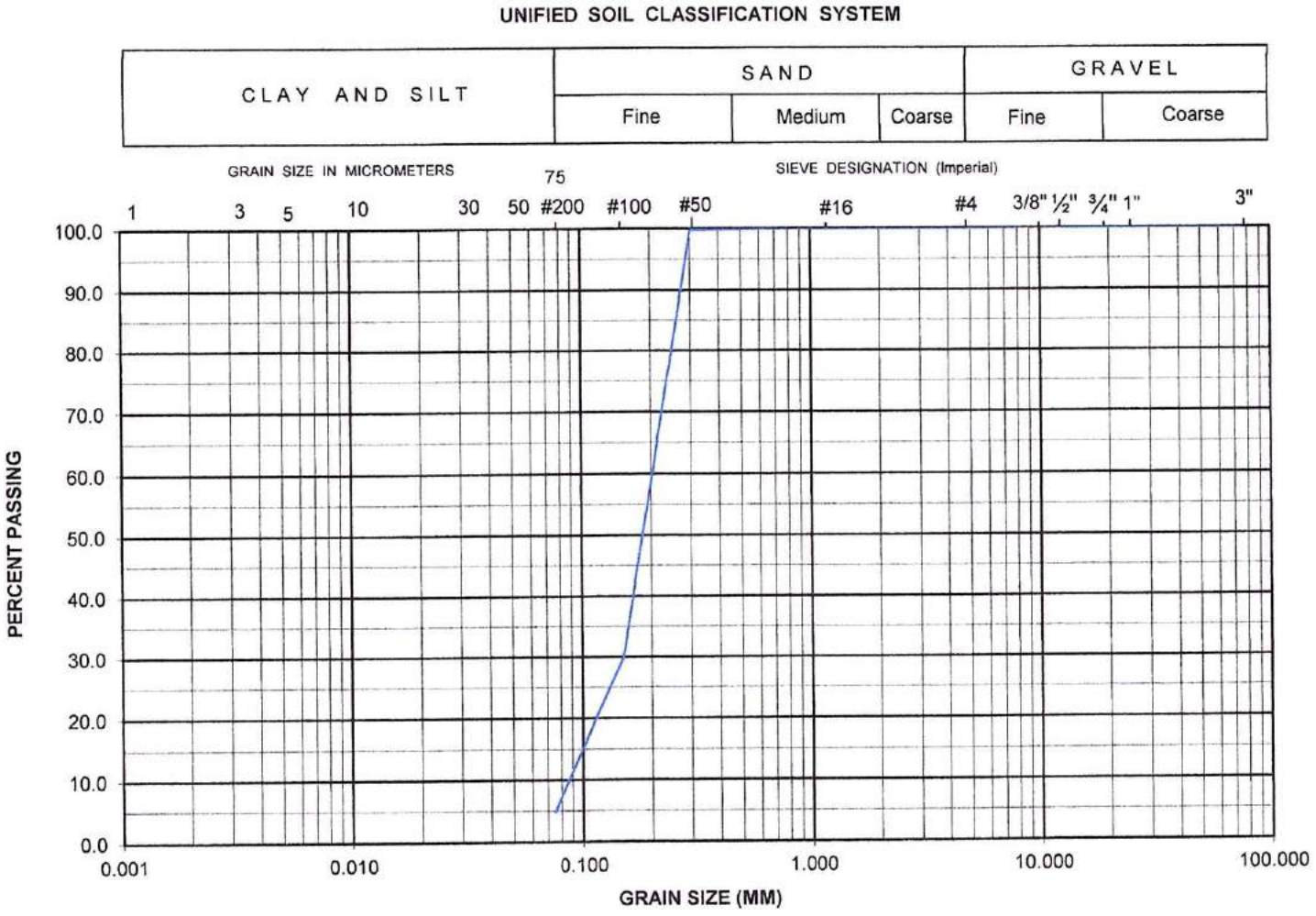
Grain Size Proportion (%)

Gravel (> 4.75mm):	
Sand (> 75μm, < 4.75mm):	95.2
Silt (> 2μm), < 75μm):	4.8
Clay (< 2μm):	

Sample Information

Sample Location:	BH 3
Sample No.:	3
Sample Method:	SPT
Depth (m):	1.5 - 1.95
Sample Description:	Brown Fine Sand, trace silt
Sampled By:	J.T.
Sampling Date:	7-Dec-18
Client Sample ID:	
Comments:	

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
75.00	100.0		
26.50	100.0		
19.00	100.0		
13.25	100.0		
9.50	100.0		
4.75	100.0		
2.00	100.0		
1.180	100.0		
0.600	100.0		
0.300	99.8		
0.150	29.8		
0.075	4.8		



Appendix D
Results of Slug Test

Edward Wong & Associates Inc.
441 Esna Park Drive, Unit 19
Markham, Ontario
L3R 1H7

Slug Test - Water Level Data

Project: 409 Huron Street

Number: Ma002568b

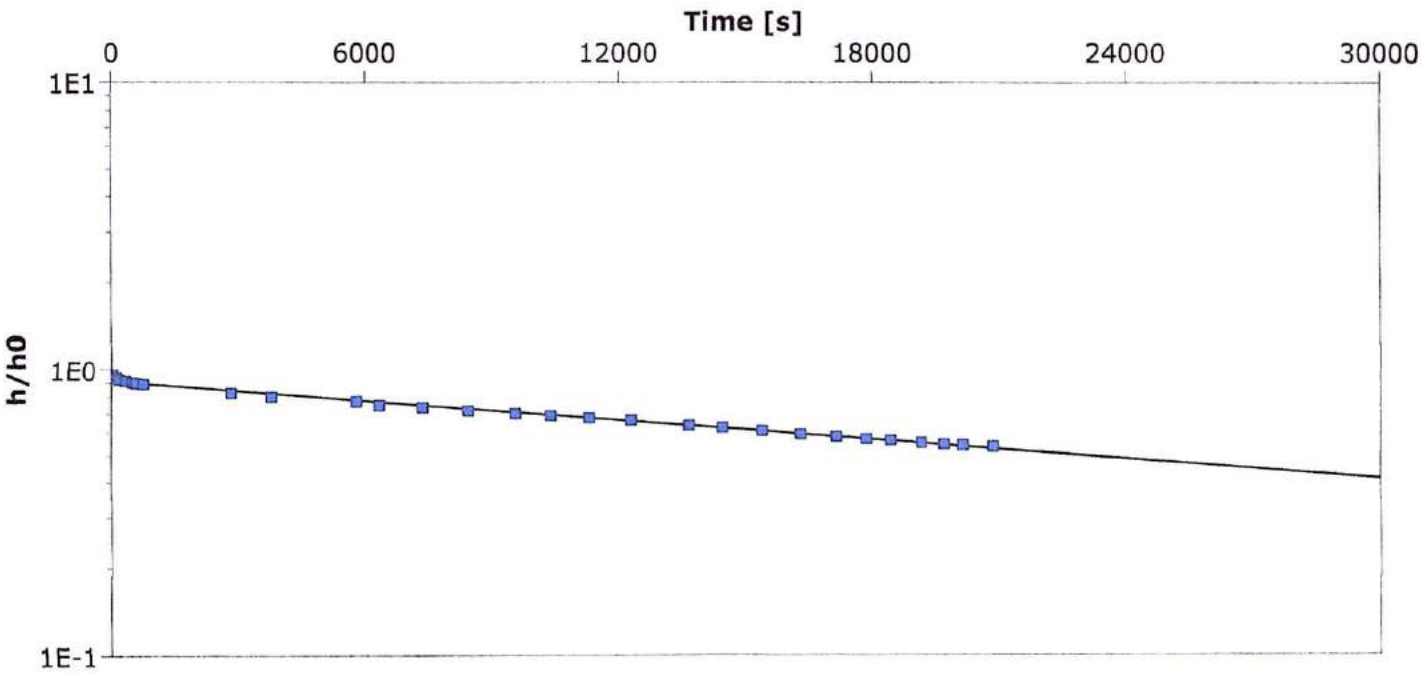
Client: The Impression Group

Location: Toronto, Ontario	Slug Test: Slug Test 1	Test Well: BH 3
Test conducted by: J.T.	Test date: 12/22/2018	
Water level at t=0 [m]: 7.68	Static water level [m]: 2.76	Water level change at t=0 [m]: 4.92

	Time [s]	Water Level [m]	WL Change [m]
1	41	7.46	4.70
2	113	7.38	4.62
3	174	7.30	4.54
4	334	7.24	4.48
5	497	7.18	4.42
6	590	7.165	4.405
7	749	7.13	4.37
8	2820	6.83	4.07
9	3783	6.705	3.945
10	5786	6.565	3.805
11	6341	6.45	3.69
12	7365	6.38	3.62
13	8432	6.29	3.53
14	9562	6.21	3.45
15	10374	6.14	3.38
16	11292	6.08	3.32
17	12282	6.03	3.27
18	13651	5.875	3.115
19	14430	5.82	3.06
20	15368	5.75	2.99
21	16290	5.665	2.905
22	17135	5.61	2.85
23	17837	5.56	2.80
24	18403	5.52	2.76
25	19132	5.465	2.705
26	19665	5.44	2.68
27	20113	5.42	2.66
28	20826	5.39	2.63

Edward Wong & Associates Inc. 441 Esna Park Drive, Unit 19 Markham, Ontario L3R 1H7	Slug Test Analysis Report
	Project: 409 Huron Street
	Number: Ma002568b
	Client: The Impression Group

Location: Toronto, Ontario	Slug Test: Slug Test 1	Test Well: BH 3
Test conducted by: J.T.		Test date: 12/22/2018
Analysis performed by:	New analysis 1	Analysis date: 12/22/2018
Aquifer Thickness: 7.95 m		



Calculation after Hvorslev

Observation well	Hydraulic Conductivity [m/min]	
BH 3	6.82×10^{-7}	

Appendix E
Dewatering Calculations

Project No.: Ma002568c
Location: 409 Huron Street, Toronto
Title: Flow Rate, Construction and Post Construction

Data

Ground Surface (masl)	114.05	
Highest W.L. (masl)	112.61	(1 m above highest measured groundwater level)
Base of Excavation (m)	109.4	(1 m below top of P1 slab)
Draw down target (m)	108.4	(during construction)
Aquifer Bottom (masl)	108.4	tip of pump during construction
Draw down target (m)	109.4	(post construction)
Aquifer Bottom (masl)	109.4	invert of weeping tile, post construction
Rainfall (mm)	25	
Factor of Safety	1.5	

Cefficient of Permeability K = 1.1 x 10-8 m/s
Zone of Inflence, Ro = 3000 s √ k

s= drawdown in borehole = 4.21 m during construction
s= drawdown in borehole = 3.21 m during construction
Ro =1.32 m during construction
Ro =0.96 m post construction
Equivalent Radius of Excavation
rs= √area/ 3.14

Area = 666 m 2
rs= 14.6

Dewatering Rate, $Q = \frac{3.14 \times K \times (H^2 - h^2)}{\ln (R0 + rs) / rs}$

	Dewatering	
	Pre-construction	**Post-construction**
K (m/s)	1.1 x 10-8	1.1x 10-8
H (m)	4.21	3.21
h (m)	0	0
dH (m)	4.21	3.21
R0 (m)	1.32	0.96
rs (m)	14.6	14.6
rs +R0 (m)	15.92	15.56
Q (m^3/ sec.)	7.07 x 10-6	5.587 x 10-6
Q (m^3/ day)	0.61	0.48
Qf (m^3/ day)	0.92	0.72
Q rain (m^3/ day)	16.65	0
Qf rain (m^3/day)	24.97	0
Q total (m^3 /day)	**25.89**	**0.72**

Reference : J.Patrick Powers, Construction Dewatering and Groundwater Control, 2007

Appendix F
Certificate of Chemical Analysis

Maxxam
A Bureau Veritas Group Company

Your Project #: MA0025686
Site Location: 409 HURON STREET, TORONTO
Your C.O.C. #: 115023

Attention: Edward Wong

Edward Wong & Associates Inc
441 Esna Park Dr
Unit 19
Markham, ON
CANADA L3R 1H7

Report Date: 2018/12/17
Report #: R5528985
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8W9612
Received: 2018/12/10, 11:25

Sample Matrix: Soil
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Hot Water Extractable Boron	2	2018/12/14	2018/12/14	CAM SOP-00408	R153 Ana. Prot. 2011
Free (WAD) Cyanide	2	2018/12/13	2018/12/14	CAM SOP-00457	OMOE E3015 m
Conductivity	2	2018/12/14	2018/12/14	CAM SOP-00414	OMOE E3530 v1 m
Hexavalent Chromium in Soil by IC (1)	2	2018/12/14	2018/12/14	CAM SOP-00436	EPA 3060/7199 m
Petroleum Hydro. CCME F1 & BTEX in Soil (2)	1	N/A	2018/12/13	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Soil (3)	1	2018/12/12	2018/12/13	CAM SOP-00316	CCME CWS m
Strong Acid Leachable Metals by ICPMS	2	2018/12/14	2018/12/14	CAM SOP-00447	EPA 6020B m
Moisture	1	N/A	2018/12/11	CAM SOP-00445	Carter 2nd ed 51.2 m
Moisture	2	N/A	2018/12/13	CAM SOP-00445	Carter 2nd ed 51.2 m
pH CaCl2 EXTRACT	2	2018/12/14	2018/12/14	CAM SOP-00413	EPA 9045 D m
Sodium Adsorption Ratio (SAR)	2	N/A	2018/12/14	CAM SOP-00102	EPA 6010C

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. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

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. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

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. When sampling is not conducted by Maxxam, results relate to the supplied 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.

Maxxam
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Your Project #: MA0025686
Site Location: 409 HURON STREET, TORONTO
Your C.O.C. #: 115023

Attention: Edward Wong

Edward Wong & Associates Inc
441 Esna Park Dr
Unit 19
Markham, ON
CANADA L3R 1H7

Report Date: 2018/12/17
Report #: R5528985
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8W9612
Received: 2018/12/10, 11:25

(1) Soils are reported on a dry weight basis unless otherwise specified.
(2) No lab extraction date is given for F1BTEX & VOC samples that are field preserved with methanol. Extraction date is the date sampled unless otherwise stated.
(3) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key

Gina Baybayan
Project Manager
18 Dec 2018 15:30:55

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Gina Baybayan, Project Manager
Email: GBaybayan@maxxam.ca
Phone# (905)817-5766

==========

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.

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Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B8W9612
Report Date: 2018/12/17

Edward Wong & Associates Inc
Client Project #: MA0025686
Site Location: 409 HURON STREET, TORONTO
Sampler Initials: JT

O.REG 153 METALS & INORGANICS PKG (SOIL)

Maxxam ID			IMX964	IMX964	IMX965		
Sampling Date			2018/12/07	2018/12/07	2018/12/06		
COC Number			115023	115023	115023		
	UNITS	Criteria	1-2	1-2 Lab-Dup	2-3	RDL	QC Batch
Calculated Parameters							
Sodium Adsorption Ratio	N/A	2.4	1.1	N/A	**8.4**	N/A	5879803
Inorganics							
Conductivity	mS/cm	0.57	0.11	0.11	**0.86**	0.002	5888922
Moisture	%	-	8.5	8.1	9.0	1.0	5886262
Available (CaCl2) pH	pH	-	7.72	N/A	8.24	N/A	5887099
WAD Cyanide (Free)	ug/g	0.051	<0.01	N/A	<0.01	0.01	5886602
Chromium (VI)	ug/g	0.66	0.3	N/A	<0.2	0.2	5888446
Metals							
Hot Water Ext. Boron (B)	ug/g	-	0.13	N/A	0.62	0.050	5888649
Acid Extractable Antimony (Sb)	ug/g	1.3	<0.20	N/A	0.26	0.20	5888629
Acid Extractable Arsenic (As)	ug/g	18	<1.0	N/A	5.7	1.0	5888629
Acid Extractable Barium (Ba)	ug/g	220	13	N/A	31	0.50	5888629
Acid Extractable Beryllium (Be)	ug/g	2.5	<0.20	N/A	0.27	0.20	5888629
Acid Extractable Boron (B)	ug/g	36	<5.0	N/A	<5.0	5.0	5888629
Acid Extractable Cadmium (Cd)	ug/g	1.2	<0.10	N/A	<0.10	0.10	5888629
Acid Extractable Chromium (Cr)	ug/g	70	14	N/A	10	1.0	5888629
Acid Extractable Cobalt (Co)	ug/g	21	2.4	N/A	2.9	0.10	5888629
Acid Extractable Copper (Cu)	ug/g	92	2.8	N/A	7.0	0.50	5888629
Acid Extractable Lead (Pb)	ug/g	120	2.4	N/A	29	1.0	5888629
Acid Extractable Molybdenum (Mo)	ug/g	2	<0.50	N/A	0.58	0.50	5888629
Acid Extractable Nickel (Ni)	ug/g	82	4.9	N/A	6.7	0.50	5888629
Acid Extractable Selenium (Se)	ug/g	1.5	<0.50	N/A	<0.50	0.50	5888629
Acid Extractable Silver (Ag)	ug/g	0.5	<0.20	N/A	<0.20	0.20	5888629
Acid Extractable Thallium (Tl)	ug/g	1	<0.050	N/A	0.079	0.050	5888629
Acid Extractable Uranium (U)	ug/g	2.5	0.49	N/A	0.50	0.050	5888629
Acid Extractable Vanadium (V)	ug/g	86	43	N/A	28	5.0	5888629
Acid Extractable Zinc (Zn)	ug/g	290	9.1	N/A	22	5.0	5888629

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 1: Full Depth Background Site Condition Standards
Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use
N/A = Not Applicable

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Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B8W9612
Report Date: 2018/12/17

Edward Wong & Associates Inc
Client Project #: MA0025686
Site Location: 409 HURON STREET, TORONTO
Sampler Initials: JT

O.REG 153 METALS & INORGANICS PKG (SOIL)

Maxxam ID			IMX964	IMX964	IMX965		
Sampling Date			2018/12/07	2018/12/07	2018/12/06		
COC Number			115023	115023	115023		
	UNITS	Criteria	1-2	1-2 Lab-Dup	2-3	RDL	QC Batch
Acid Extractable Mercury (Hg)	ug/g	0.27	<0.050	N/A	<0.050	0.050	5888629

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 1: Full Depth Background Site Condition Standards
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Maxxam
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Maxxam Job #: B8W9612
Report Date: 2018/12/17

Edward Wong & Associates Inc
Client Project #: MA0025686
Site Location: 409 HURON STREET, TORONTO
Sampler Initials: JT

O.REG 153 PETROLEUM HYDROCARBONS (SOIL)

Maxxam ID			IMX966	IMX966		
Sampling Date			2018/12/07	2018/12/07		
COC Number			115023	115023		
	UNITS	Criteria	3-4	3-4 Lab-Dup	RDL	QC Batch
Inorganics						
Moisture	%	-	17	17	1.0	5882040
BTEX & F1 Hydrocarbons						
Benzene	ug/g	0.02	<0.020	N/A	0.020	5885401
Toluene	ug/g	0.2	<0.020	N/A	0.020	5885401
Ethylbenzene	ug/g	0.05	<0.020	N/A	0.020	5885401
o-Xylene	ug/g	-	<0.020	N/A	0.020	5885401
p+m-Xylene	ug/g	-	<0.040	N/A	0.040	5885401
Total Xylenes	ug/g	0.05	<0.040	N/A	0.040	5885401
F1 (C6-C10)	ug/g	25	<10	N/A	10	5885401
F1 (C6-C10) - BTEX	ug/g	25	<10	N/A	10	5885401
F2-F4 Hydrocarbons						
F2 (C10-C16 Hydrocarbons)	ug/g	10	<10	N/A	10	5884033
F3 (C16-C34 Hydrocarbons)	ug/g	240	<50	N/A	50	5884033
F4 (C34-C50 Hydrocarbons)	ug/g	120	<50	N/A	50	5884033
Reached Baseline at C50	ug/g	-	Yes	N/A	N/A	5884033
Surrogate Recovery (%)						
1,4-Difluorobenzene	%	-	103	N/A	N/A	5885401
4-Bromofluorobenzene	%	-	97	N/A	N/A	5885401
D10-Ethylbenzene	%	-	81	N/A	N/A	5885401
D4-1,2-Dichloroethane	%	-	102	N/A	N/A	5885401
o-Terphenyl	%	-	105	N/A	N/A	5884033

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 1: Full Depth Background Site Condition Standards
Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use
N/A = Not Applicable

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Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B8W9612
Report Date: 2018/12/17

Edward Wong & Associates Inc
Client Project #: MA0025686
Site Location: 409 HURON STREET, TORONTO
Sampler Initials: JT

TEST SUMMARY

Maxxam ID: IMX964
Sample ID: 1-2
Matrix: Soil

Collected: 2018/12/07
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	5888649	2018/12/14	2018/12/14	Suban Kanapathippllai
Free (WAD) Cyanide	TECH	5886602	2018/12/13	2018/12/14	Louise Harding
Conductivity	AT	5888922	2018/12/14	2018/12/14	Kazzandra Adeva
Hexavalent Chromium in Soil by IC	IC/SPEC	5888446	2018/12/14	2018/12/14	Sally Norouz
Strong Acid Leachable Metals by ICPMS	ICP/MS	5888629	2018/12/14	2018/12/14	Daniel Teclu
Moisture	BAL	5886262	N/A	2018/12/13	Jatinder Ghumann
pH CaCl2 EXTRACT	AT	5887099	2018/12/14	2018/12/14	Neil Dassanayake
Sodium Adsorption Ratio (SAR)	CALC/MET	5879803	N/A	2018/12/14	Automated Statchk

Maxxam ID: IMX964 Dup
Sample ID: 1-2
Matrix: Soil

Collected: 2018/12/07
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Conductivity	AT	5888922	2018/12/14	2018/12/14	Kazzandra Adeva
Moisture	BAL	5886262	N/A	2018/12/13	Jatinder Ghumann

Maxxam ID: IMX965
Sample ID: 2-3
Matrix: Soil

Collected: 2018/12/06
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	5888649	2018/12/14	2018/12/14	Suban Kanapathippllai
Free (WAD) Cyanide	TECH	5886602	2018/12/13	2018/12/14	Louise Harding
Conductivity	AT	5888922	2018/12/14	2018/12/14	Kazzandra Adeva
Hexavalent Chromium in Soil by IC	IC/SPEC	5888446	2018/12/14	2018/12/14	Sally Norouz
Strong Acid Leachable Metals by ICPMS	ICP/MS	5888629	2018/12/14	2018/12/14	Daniel Teclu
Moisture	BAL	5886262	N/A	2018/12/13	Jatinder Ghumann
pH CaCl2 EXTRACT	AT	5887099	2018/12/14	2018/12/14	Neil Dassanayake
Sodium Adsorption Ratio (SAR)	CALC/MET	5879803	N/A	2018/12/14	Automated Statchk

Maxxam ID: IMX966
Sample ID: 3-4
Matrix: Soil

Collected: 2018/12/07
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	5885401	N/A	2018/12/13	Georgeta Rusu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	5884033	2018/12/12	2018/12/13	Prabhjot Gulati
Moisture	BAL	5882040	N/A	2018/12/11	Prgya Panchal

Maxxam ID: IMX966 Dup
Sample ID: 3-4
Matrix: Soil

Collected: 2018/12/07
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	5882040	N/A	2018/12/11	Prgya Panchal

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Maxxam Job #: B8W9612
Report Date: 2018/12/17

Edward Wong & Associates Inc
Client Project #: MA0025686
Site Location: 409 HURON STREET, TORONTO
Sampler Initials: JT

GENERAL COMMENTS

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

Package 1	12.0°C

Results relate only to the items tested.

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Maxxam
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Maxxam Job #: B8W9612
Report Date: 2018/12/17

QUALITY ASSURANCE REPORT

Edward Wong & Associates Inc
Client Project #: MA0025686
Site Location: 409 HURON STREET, TORONTO
Sampler Initials: JT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5884033	o-Terphenyl	2018/12/12	96	60 - 130	104	60 - 130	101	%		
5885401	1,4-Difluorobenzene	2018/12/13	102	60 - 140	103	60 - 140	106	%		
5885401	4-Bromofluorobenzene	2018/12/13	96	60 - 140	99	60 - 140	99	%		
5885401	D10-Ethylbenzene	2018/12/13	89	60 - 140	86	60 - 140	81	%		
5885401	D4-1,2-Dichloroethane	2018/12/13	100	60 - 140	101	60 - 140	104	%		
5882040	Moisture	2018/12/11							0	20
5884033	F2 (C10-C16 Hydrocarbons)	2018/12/13	93	50 - 130	100	80 - 120	<10	ug/g	NC	30
5884033	F3 (C16-C34 Hydrocarbons)	2018/12/13	95	50 - 130	103	80 - 120	<50	ug/g	NC	30
5884033	F4 (C34-C50 Hydrocarbons)	2018/12/13	97	50 - 130	104	80 - 120	<50	ug/g	NC	30
5885401	Benzene	2018/12/13	83	60 - 140	90	60 - 140	<0.020	ug/g	NC	50
5885401	Ethylbenzene	2018/12/13	86	60 - 140	90	60 - 140	<0.020	ug/g	NC	50
5885401	F1 (C6-C10) - BTEX	2018/12/13					<10	ug/g	NC	30
5885401	F1 (C6-C10)	2018/12/13	103	60 - 140	106	80 - 120	<10	ug/g	NC	30
5885401	o-Xylene	2018/12/13	84	60 - 140	89	60 - 140	<0.020	ug/g	NC	50
5885401	p+m-Xylene	2018/12/13	85	60 - 140	90	60 - 140	<0.040	ug/g	NC	50
5885401	Toluene	2018/12/13	88	60 - 140	92	60 - 140	<0.020	ug/g	NC	50
5885401	Total Xylenes	2018/12/13					<0.040	ug/g	NC	50
5886262	Moisture	2018/12/13							4.8	20
5886602	WAD Cyanide (Free)	2018/12/14	60 (1)	75 - 125	100	80 - 120	<0.01	ug/g	NC	35
5887099	Available (CaCl2) pH	2018/12/14			98	97 - 103			0.81	N/A
5888446	Chromium (VI)	2018/12/14	49 (2)	70 - 130	87	80 - 120	<0.2	ug/g	NC	35
5888629	Acid Extractable Antimony (Sb)	2018/12/14	96	75 - 125	103	80 - 120	<0.20	ug/g	NC	30
5888629	Acid Extractable Arsenic (As)	2018/12/14	97	75 - 125	101	80 - 120	<1.0	ug/g	11	30
5888629	Acid Extractable Barium (Ba)	2018/12/14	NC	75 - 125	100	80 - 120	<0.50	ug/g	0.27	30
5888629	Acid Extractable Beryllium (Be)	2018/12/14	102	75 - 125	103	80 - 120	<0.20	ug/g	4.3	30
5888629	Acid Extractable Boron (B)	2018/12/14	94	75 - 125	103	80 - 120	<5.0	ug/g	NC	30
5888629	Acid Extractable Cadmium (Cd)	2018/12/14	105	75 - 125	108	80 - 120	<0.10	ug/g	15	30
5888629	Acid Extractable Chromium (Cr)	2018/12/14	100	75 - 125	109	80 - 120	<1.0	ug/g	7.6	30
5888629	Acid Extractable Cobalt (Co)	2018/12/14	99	75 - 125	106	80 - 120	<0.10	ug/g	6.3	30
5888629	Acid Extractable Copper (Cu)	2018/12/14	94	75 - 125	107	80 - 120	<0.50	ug/g	0.89	30
5888629	Acid Extractable Lead (Pb)	2018/12/14	97	75 - 125	102	80 - 120	<1.0	ug/g	5.4	30
5888629	Acid Extractable Mercury (Hg)	2018/12/14	96	75 - 125	97	80 - 120	<0.050	ug/g	NC	30

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Maxxam Job #: B8W9612
Report Date: 2018/12/17

QUALITY ASSURANCE REPORT(CONT'D)

Edward Wong & Associates Inc
Client Project #: MA0025686
Site Location: 409 HURON STREET, TORONTO
Sampler Initials: JT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5888629	Acid Extractable Molybdenum (Mo)	2018/12/14	102	75 - 125	107	80 - 120	<0.50	ug/g	5.6	30
5888629	Acid Extractable Nickel (Ni)	2018/12/14	99	75 - 125	108	80 - 120	<0.50	ug/g	5.6	30
5888629	Acid Extractable Selenium (Se)	2018/12/14	101	75 - 125	106	80 - 120	<0.50	ug/g	NC	30
5888629	Acid Extractable Silver (Ag)	2018/12/14	102	75 - 125	103	80 - 120	<0.20	ug/g	NC	30
5888629	Acid Extractable Thallium (Tl)	2018/12/14	99	75 - 125	102	80 - 120	<0.050	ug/g	19	30
5888629	Acid Extractable Uranium (U)	2018/12/14	93	75 - 125	93	80 - 120	<0.050	ug/g	0.39	30
5888629	Acid Extractable Vanadium (V)	2018/12/14	102	75 - 125	107	80 - 120	<5.0	ug/g	0.65	30
5888629	Acid Extractable Zinc (Zn)	2018/12/14	NC	75 - 125	107	80 - 120	<5.0	ug/g	0.77	30
5888649	Hot Water Ext. Boron (B)	2018/12/14	94	75 - 125	96	75 - 125	<0.050	ug/g	NC	40
5888922	Conductivity	2018/12/14			102	90 - 110	<0.002	mS/cm	0.093	10

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.

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).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) The matrix spike recovery was below the lower control limit. This may be due in part to the reducing environment of the sample. The sample was reanalyzed with the same results.

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Maxxam Job #: B8W9612
Report Date: 2018/12/17

Edward Wong & Associates Inc
Client Project #: MA0025686
Site Location: 409 HURON STREET, TORONTO
Sampler Initials: JT

VALIDATION SIGNATURE PAGE

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

Anastassia Hamanov, Scientific Specialist

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.

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6740 Campobello Road, Mississauga, Ontario L5N 2L8
Phone 905-817-5700 Fax 905 817 5779 Toll Free 800 563 6266
CAM FCD 01191/3

CHAIN OF CUSTODY RECORD

115023 Page ___ of ___

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required
Company Name	Edward Wong & Associates Inc	Company Name		Quotation #		☑ Regular TAT (5-7 days) Most analyses
Contact Name:	Edward Wong	Contact Name		P.O. #/ AFE#		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address	441 Esna Park Drive Unit 19, Markham.	Address		Project #	Mac025636	Rush TAT (Surcharges will be applied)
				Site Location	469 Hu... Street	☐ 1 Day ☐ 2 Days ☐ 3-4 Days
Phone	416-903-4288 Fax:	Phone	Fax	Site #	Toronto	
Email	edwardwongassociates.com	Email		Sampled By	J.T.	Date Required:

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

Rush Confirmation #:

Regulation 153
- ☑ Table 1 ☑ Res/Park ☐ Med/Fine
- ☐ Table 2 ☐ Ind/Comm ☐ Coarse
- ☐ Table 3 ☐ Agri/Other
- ☐ Table ___
- FOR RSC (PLEASE CIRCLE) Y / N

Other Regulations
- ☐ CCME ☐ Sanitary Sewer Bylaw
- ☐ MISA ☐ Storm Sewer Bylaw
- ☐ PWQO Region ___
- ☐ Other (Specify)
- ☐ REG 558 (MIN. 3 DAY TAT REQUIRED)

Include Criteria on Certificate of Analysis: Y / N

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

Analysis Requested

	SAMPLE IDENTIFICATION	DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED	FIELD FILTERED (CIRCLE) Metals / Hg / CrVI	BTEX/ PHC F1	PHCs F2 - F4	VOCs	REG 153 METALS & INORGANICS	REG 153 ICPMS METALS	REG 153 METALS (Hg, Cr VI, ICPMS Metals, HWS - B)	Physical and Inorganic parameters	PHC (F1 - F4)	Fractions				HOLD- DO NOT ANALYZE	COMMENTS
1	1-2	Dec 7, 18	a.m	Soil									✓							Contact Gina.
2	2-3	Dec 7, 18	a.m										✓							
3	3-4	Dec 7, 18	a.m												✓					
4																				
5																				
6																				
7																				
8																				
9																				
10																				

LABORATORY USE ONLY

CUSTODY SEAL Y / (N)		COOLER TEMPERATURES
Present	Intact	
		2 / 12 / 12

COOLING MEDIA PRESENT: Y / (N)

RELINQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)
[signature]	Dec 10, 2018	a.m	Ravi Patel	2018/12/10	11:25

10-Dec-18 11:25
Gina Baybayan
B8W9612
RPC ENV-856

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. Sample container, preservation, hold time and package information can be viewed at http://maxxam.ca/wp-content/uploads/Ontario-COC...

COC 1004 (03/17)

White: Maxxam Yellow: Client

Maxxam
A Bureau Veritas Group Company

Your Project #: 469 HURON ST, TORONTO
Site Location: MA002568
Your C.O.C. #: 696646-01-01

Attention: Edward Wong

Edward Wong & Associates Inc
441 Esna Park Dr
Unit 19
Markham, ON
CANADA L3R 1H7

Report Date: 2018/12/28
Report #: R5541487
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8X7317
Received: 2018/12/17, 14:57

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Sewer Use By-Law Semivolatile Organics	1	2018/12/19	2018/12/20	CAM SOP 00301	EPA 8270 m
Biochemical Oxygen Demand (BOD)	1	2018/12/18	2018/12/23	CAM SOP-00427	SM 23 5210B m
Chloride by Automated Colourimetry	1	N/A	2018/12/19	CAM SOP-00463	EPA 325.2 m
Chromium (VI) in Water	1	N/A	2018/12/21	CAM SOP-00436	EPA 7199 m
Free (WAD) Cyanide	1	N/A	2018/12/18	CAM SOP-00457	OMOE E3015 m
Total Cyanide	1	2018/12/18	2018/12/18	CAM SOP-00457	OMOE E3015 5 m
Fluoride	1	2018/12/18	2018/12/19	CAM SOP-00449	SM 23 4500-F C m
Mercury in Water by CVAA	1	2018/12/21	2018/12/21	CAM SOP-00453	EPA 7470A m
Mercury	1	2018/12/21	2018/12/21	CAM SOP-00453	EPA 7470A m
Dissolved Metals by ICPMS	1	N/A	2018/12/21	CAM SOP-00447	EPA 6020B m
Total Metals Analysis by ICPMS	1	N/A	2018/12/20	CAM SOP-00447	EPA 6020B m
E.coli, (CFU/100mL)	1	N/A	2018/12/17	CAM SOP-00552	MOE LSB E3371
Total Nonylphenol in Liquids by HPLC	1	2018/12/21	2018/12/22	CAM SOP-00313	In-house Method
Nonylphenol Ethoxylates in Liquids: HPLC	1	2018/12/21	2018/12/22	CAM SOP-00313	In-house Method
Animal and Vegetable Oil and Grease	1	N/A	2018/12/20	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2018/12/20	2018/12/20	CAM SOP-00326	EPA1664B m,SM5520A m
Polychlorinated Biphenyl in Water	1	2018/12/18	2018/12/19	CAM SOP-00309	EPA 8082A m
pH	1	N/A	2018/12/19	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2018/12/20	CAM SOP-00444	OMOE E3179 m
Sulphate by Automated Colourimetry	1	N/A	2018/12/19	CAM SOP-00464	EPA 375.4 m
Total Kjeldahl Nitrogen in Water	1	2018/12/18	2018/12/19	CAM SOP-00938	OMOE E3516 m
Total PAHs (1)	1	N/A	2018/12/20	CAM SOP - 00301	EPA 8270 m
Mineral/Synthetic O & G (TPH Heavy Oil) (2)	1	2018/12/20	2018/12/20	CAM SOP-00326	EPA1664B m,SM5520F m
Total Suspended Solids	1	2018/12/18	2018/12/19	CAM SOP-00428	SM 23 2540D m
Volatile Organic Compounds in Water	1	N/A	2018/12/20	CAM SOP-00228	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

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Maxxam
A Bureau Veritas Group Company

Your Project #: 469 HURON ST, TORONTO
Site Location: MA002568
Your C.O.C. #: 696646-01-01

Attention: Edward Wong

Edward Wong & Associates Inc
441 Esna Park Dr
Unit 19
Markham, ON
CANADA L3R 1H7

Report Date: 2018/12/28
Report #: R5541487
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8X7317
Received: 2018/12/17, 14:57

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. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

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. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

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. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
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

Gina Baybayan
Project Manager
03 Jan 2019 09:21:46

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Gina Baybayan, Project Manager
Email: GBaybayan@maxxam.ca
Phone# (905)817-5766

==========

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Maxxam
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Maxxam Job #: B8X7317
Report Date: 2018/12/28

Edward Wong & Associates Inc
Client Project #: 469 HURON ST, TORONTO
Site Location: MA002568
Sampler Initials: JT

TORONTO SANITARY & STORM SEWER PACKAGE (WATER)

Maxxam ID				IOO971		
Sampling Date				2018/12/17		
COC Number				696646-01-01		
	UNITS	San	Stm	BH3	RDL	QC Batch
Calculated Parameters						
Total Animal/Vegetable Oil and Grease	mg/L	150	-	<0.50	0.50	5891841
Inorganics						
Total BOD	mg/L	300	15	5	2	5894324
Fluoride (F-)	mg/L	10	-	0.20	0.10	5895291
Total Kjeldahl Nitrogen (TKN)	mg/L	100	-	0.48	0.10	5895567
pH	pH	6.0:11.5	6.0:9.5	8.03	N/A	5895295
Phenols-4AAP	mg/L	1.0	0.008	<0.0010	0.0010	5896525
Total Suspended Solids	mg/L	350	15	<10	10	5894051
Total Cyanide (CN)	mg/L	2	0.02	<0.0050	0.0050	5894364
Petroleum Hydrocarbons						
Total Oil & Grease	mg/L	-	-	<0.50	0.50	5899489
Total Oil & Grease Mineral/Synthetic	mg/L	15	-	<0.50	0.50	5899493
Miscellaneous Parameters						
Nonylphenol Ethoxylate (Total)	mg/L	0.2	0.01	<0.005	0.005	5900941
Nonylphenol (Total)	mg/L	0.02	0.001	<0.001	0.001	5900939
Metals						
Chromium (VI)	ug/L	2000	40	<0.50	0.50	5892920
Mercury (Hg)	mg/L	0.01	0.0004	<0.0001	0.0001	5900659
Total Aluminum (Al)	ug/L	50000	-	14	5.0	5898904
Total Antimony (Sb)	ug/L	5000	-	2.2	0.50	5898904
Total Arsenic (As)	ug/L	1000	20	1.5	1.0	5898904
Total Cadmium (Cd)	ug/L	700	8	<0.10	0.10	5898904
Total Chromium (Cr)	ug/L	4000	80	<5.0	5.0	5898904
Total Cobalt (Co)	ug/L	5000	-	<0.50	0.50	5898904
Total Copper (Cu)	ug/L	2000	40	<1.0	1.0	5898904
Total Lead (Pb)	ug/L	1000	120	<0.50	0.50	5898904
Total Manganese (Mn)	ug/L	5000	50	42	2.0	5898904
Total Molybdenum (Mo)	ug/L	5000	-	7.4	0.50	5898904
Total Nickel (Ni)	ug/L	2000	80	1.0	1.0	5898904

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
San,Stm: Toronto Sanitary and Storm Sewer Use By Law Guidelines, respectively. Referenced to Chapter 681
N/A = Not Applicable

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Maxxam
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Maxxam Job #: B8X7317
Report Date: 2018/12/28

Edward Wong & Associates Inc
Client Project #: 469 HURON ST, TORONTO
Site Location: MA002568
Sampler Initials: JT

TORONTO SANITARY & STORM SEWER PACKAGE (WATER)

Maxxam ID				IOO971		
Sampling Date				2018/12/17		
COC Number				696646-01-01		
	UNITS	**San**	**Stm**	**BH3**	**RDL**	**QC Batch**
Total Phosphorus (P)	ug/L	10000	400	<100	100	5898904
Total Selenium (Se)	ug/L	1000	20	2.8	2.0	5898904
Total Silver (Ag)	ug/L	5000	120	<0.10	0.10	5898904
Total Tin (Sn)	ug/L	5000	-	<1.0	1.0	5898904
Total Titanium (Ti)	ug/L	5000	-	5.4	5.0	5898904
Total Zinc (Zn)	ug/L	2000	40	6.2	5.0	5898904
Semivolatile Organics						
Di-N-butyl phthalate	ug/L	80	15	<2	2	5896960
Bis(2-ethylhexyl)phthalate	ug/L	12	8.8	<2	2	5896960
3,3'-Dichlorobenzidine	ug/L	2	0.8	<0.8	0.8	5896960
Pentachlorophenol	ug/L	5	2	<1	1	5896960
Phenanthrene	ug/L	-	-	<0.2	0.2	5896960
Anthracene	ug/L	-	-	<0.2	0.2	5896960
Fluoranthene	ug/L	-	-	<0.2	0.2	5896960
Pyrene	ug/L	-	-	<0.2	0.2	5896960
Benzo(a)anthracene	ug/L	-	-	<0.2	0.2	5896960
Chrysene	ug/L	-	-	<0.2	0.2	5896960
Benzo(b/j)fluoranthene	ug/L	-	-	<0.2	0.2	5896960
Benzo(k)fluoranthene	ug/L	-	-	<0.2	0.2	5896960
Benzo(a)pyrene	ug/L	-	-	<0.2	0.2	5896960
Indeno(1,2,3-cd)pyrene	ug/L	-	-	<0.2	0.2	5896960
Dibenz(a,h)anthracene	ug/L	-	-	<0.2	0.2	5896960
Benzo(g,h,i)perylene	ug/L	-	-	<0.2	0.2	5896960
Dibenzo(a,i)pyrene	ug/L	-	-	<0.2	0.2	5896960
Benzo(e)pyrene	ug/L	-	-	<0.2	0.2	5896960
Perylene	ug/L	-	-	<0.2	0.2	5896960
Dibenzo(a,j) acridine	ug/L	-	-	<0.4	0.4	5896960
7H-Dibenzo(c,g) Carbazole	ug/L	-	-	<0.4	0.4	5896960
1,6-Dinitropyrene	ug/L	-	-	<0.4	0.4	5896960
1,3-Dinitropyrene	ug/L	-	-	<0.4	0.4	5896960
1,8-Dinitropyrene	ug/L	-	-	<0.4	0.4	5896960

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
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Maxxam
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Maxxam Job #: B8X7317
Report Date: 2018/12/28

Edward Wong & Associates Inc
Client Project #: 469 HURON ST, TORONTO
Site Location: MA002568
Sampler Initials: JT

TORONTO SANITARY & STORM SEWER PACKAGE (WATER)

Maxxam ID				IOO971		
Sampling Date				2018/12/17		
COC Number				696646-01-01		
	UNITS	San	Stm	BH3	RDL	QC Batch
Calculated Parameters						
Total PAHs (18 PAHs)	ug/L	5	2	<1	1	5892469
Volatile Organics						
Benzene	ug/L	10	2	<0.20	0.20	5889554
Chloroform	ug/L	40	2	<0.20	0.20	5889554
1,2-Dichlorobenzene	ug/L	50	5.6	<0.50	0.50	5889554
1,4-Dichlorobenzene	ug/L	80	6.8	<0.50	0.50	5889554
cis-1,2-Dichloroethylene	ug/L	4000	5.6	<0.50	0.50	5889554
trans-1,3-Dichloropropene	ug/L	140	5.6	<0.40	0.40	5889554
Ethylbenzene	ug/L	160	2	<0.20	0.20	5889554
Methylene Chloride(Dichloromethane)	ug/L	2000	5.2	<2.0	2.0	5889554
1,1,2,2-Tetrachloroethane	ug/L	1400	17	<0.50	0.50	5889554
Tetrachloroethylene	ug/L	1000	4.4	<0.20	0.20	5889554
Toluene	ug/L	16	2	0.72	0.20	5889554
Trichloroethylene	ug/L	400	7.6	<0.20	0.20	5889554
p+m-Xylene	ug/L	1400	4.4	<0.20	0.20	5889554
o-Xylene	ug/L	1400	4.4	<0.20	0.20	5889554
Total Xylenes	ug/L	1400	4.4	<0.20	0.20	5889554
PCBs						
Total PCB	ug/L	1	0.4	<0.05	0.05	5894872
Microbiological						
Escherichia coli	CFU/100mL	-	200	<10	10	5893343
Surrogate Recovery (%)						
2,4,6-Tribromophenol	%	-	-	20	N/A	5896960
2-Fluorobiphenyl	%	-	-	71	N/A	5896960
D14-Terphenyl (FS)	%	-	-	84	N/A	5896960
D5-Nitrobenzene	%	-	-	70	N/A	5896960
D8-Acenaphthylene	%	-	-	74	N/A	5896960
Decachlorobiphenyl	%	-	-	78	N/A	5894872
4-Bromofluorobenzene	%	-	-	87	N/A	5889554

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
San,Stm: Toronto Sanitary and Storm Sewer Use By Law Guidelines, respectively. Referenced to Chapter 681
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Maxxam
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Maxxam Job #: B8X7317
Report Date: 2018/12/28

Edward Wong & Associates Inc
Client Project #: 469 HURON ST, TORONTO
Site Location: MA002568
Sampler Initials: JT

TORONTO SANITARY & STORM SEWER PACKAGE (WATER)

Maxxam ID				IOO971		
Sampling Date				2018/12/17		
COC Number				696646-01-01		
	UNITS	San	Stm	BH3	RDL	QC Batch
D4-1,2-Dichloroethane	%	-	-	116	N/A	5889554
D8-Toluene	%	-	-	95	N/A	5889554

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
San,Stm: Toronto Sanitary and Storm Sewer Use By Law Guidelines, respectively. Referenced to Chapter 681
N/A = Not Applicable

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Maxxam Job #: B8X7317
Report Date: 2018/12/28

Edward Wong & Associates Inc
Client Project #: 469 HURON ST, TORONTO
Site Location: MA002568
Sampler Initials: JT

RESULTS OF ANALYSES OF WATER

Maxxam ID		IOO971	IOO971		
Sampling Date		2018/12/17	2018/12/17		
COC Number		696646-01-01	696646-01-01		
	UNITS	BH3	BH3 Lab-Dup	RDL	QC Batch
Inorganics					
Dissolved Sulphate (SO4)	mg/L	47	47	1.0	5894885

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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O.REG 153 METALS & INORGANICS PKG (WTR)

Maxxam ID				IOO971	IOO971		
Sampling Date				2018/12/17	2018/12/17		
COC Number				696646-01-01	696646-01-01		
	UNITS	San	Stm	BH3	BH3 Lab-Dup	RDL	QC Batch
Inorganics							
WAD Cyanide (Free)	ug/L	-	-	<1	N/A	1	5894029
Dissolved Chloride (Cl-)	mg/L	-	-	90	90	1.0	5894899
Metals							
Mercury (Hg)	ug/L	10	0.4	<0.1	<0.1	0.1	5901230
Dissolved Antimony (Sb)	ug/L	5000	-	1.4	N/A	0.50	5895010
Dissolved Arsenic (As)	ug/L	1000	20	2.4	N/A	1.0	5895010
Dissolved Barium (Ba)	ug/L	-	-	160	N/A	2.0	5895010
Dissolved Beryllium (Be)	ug/L	-	-	<0.50	N/A	0.50	5895010
Dissolved Boron (B)	ug/L	-	-	83	N/A	10	5895010
Dissolved Cadmium (Cd)	ug/L	700	8	<0.10	N/A	0.10	5895010
Dissolved Chromium (Cr)	ug/L	4000	80	<5.0	N/A	5.0	5895010
Dissolved Cobalt (Co)	ug/L	5000	-	<0.50	N/A	0.50	5895010
Dissolved Copper (Cu)	ug/L	2000	40	<1.0	N/A	1.0	5895010
Dissolved Lead (Pb)	ug/L	1000	120	<0.50	N/A	0.50	5895010
Dissolved Molybdenum (Mo)	ug/L	5000	-	4.1	N/A	0.50	5895010
Dissolved Nickel (Ni)	ug/L	2000	80	<1.0	N/A	1.0	5895010
Dissolved Selenium (Se)	ug/L	1000	20	<2.0	N/A	2.0	5895010
Dissolved Silver (Ag)	ug/L	5000	120	<0.10	N/A	0.10	5895010
Dissolved Sodium (Na)	ug/L	-	-	99000	N/A	100	5895010
Dissolved Thallium (Tl)	ug/L	-	-	<0.050	N/A	0.050	5895010
Dissolved Uranium (U)	ug/L	-	-	1.1	N/A	0.10	5895010
Dissolved Vanadium (V)	ug/L	-	-	1.1	N/A	0.50	5895010
Dissolved Zinc (Zn)	ug/L	2000	40	5.7	N/A	5.0	5895010

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
San,Stm: Toronto Sanitary and Storm Sewer Use By Law Guidelines, respectively. Referenced to Chapter 681
N/A = Not Applicable

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TEST SUMMARY

Maxxam ID: IOO971
Sample ID: BH3
Matrix: Water

Collected: 2018/12/17
Shipped:
Received: 2018/12/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sewer Use By-Law Semivolatile Organics	GC/MS	5896960	2018/12/19	2018/12/20	Kathy Horvat
Biochemical Oxygen Demand (BOD)	DO	5894324	2018/12/18	2018/12/23	Nusrat Naz
Chloride by Automated Colourimetry	KONE	5894899	N/A	2018/12/19	Deonarine Ramnarine
Chromium (VI) in Water	IC	5892920	N/A	2018/12/21	Lang Le
Free (WAD) Cyanide	SKAL/CN	5894029	N/A	2018/12/18	Christine Pham
Total Cyanide	SKAL/CN	5894364	2018/12/18	2018/12/18	Christine Pham
Fluoride	ISE	5895291	2018/12/18	2018/12/19	Surinder Rai
Mercury in Water by CVAA	CV/AA	5900659	2018/12/21	2018/12/21	Medhat Nasr
Mercury	CV/AA	5901230	2018/12/21	2018/12/21	Medhat Nasr
Dissolved Metals by ICPMS	ICP/MS	5895010	N/A	2018/12/21	Arefa Dabhad
Total Metals Analysis by ICPMS	ICP/MS	5898904	N/A	2018/12/20	Thao Nguyen
E.coli, (CFU/100mL)	PL	5893343	N/A	2018/12/17	Sirimathie Aluthwala
Total Nonylphenol in Liquids by HPLC	LC/FLU	5900939	2018/12/21	2018/12/22	Tonghui (Jenny) Chen
Nonylphenol Ethoxylates in Liquids: HPLC	LC/FLU	5900941	2018/12/21	2018/12/22	Tonghui (Jenny) Chen
Animal and Vegetable Oil and Grease	BAL	5891841	N/A	2018/12/20	Automated Statchk
Total Oil and Grease	BAL	5899489	2018/12/20	2018/12/20	Mansoor Ahmed
Polychlorinated Biphenyl in Water	GC/ECD	5894872	2018/12/18	2018/12/19	Svitlana Shaula
pH	AT	5895295	N/A	2018/12/19	Surinder Rai
Phenols (4AAP)	TECH/PHEN	5896525	N/A	2018/12/20	Bramdeo Motiram
Sulphate by Automated Colourimetry	KONE	5894885	N/A	2018/12/19	Deonarine Ramnarine
Total Kjeldahl Nitrogen in Water	SKAL	5895567	2018/12/18	2018/12/19	Rajni Tyagi
Total PAHs	CALC	5892469	N/A	2018/12/20	Automated Statchk
Mineral/Synthetic O & G (TPH Heavy Oil)	BAL	5899493	2018/12/20	2018/12/20	Mansoor Ahmed
Total Suspended Solids	BAL	5894051	2018/12/18	2018/12/19	Mandeep Kaur
Volatile Organic Compounds in Water	GC/MS	5889554	N/A	2018/12/20	Blair Gannon

Maxxam ID: IOO971 Dup
Sample ID: BH3
Matrix: Water

Collected: 2018/12/17
Shipped:
Received: 2018/12/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride by Automated Colourimetry	KONE	5894899	N/A	2018/12/19	Deonarine Ramnarine
Mercury	CV/AA	5901230	2018/12/21	2018/12/21	Medhat Nasr
Sulphate by Automated Colourimetry	KONE	5894885	N/A	2018/12/19	Deonarine Ramnarine

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GENERAL COMMENTS

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

Package 1	7.7°C

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

Edward Wong & Associates Inc
Client Project #: 469 HURON ST, TORONTO
Site Location: MA002568
Sampler Initials: JT

			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
5889554	4-Bromofluorobenzene	2018/12/19	96	70 - 130	97	70 - 130	91	%				
5889554	D4-1,2-Dichloroethane	2018/12/19	111	70 - 130	107	70 - 130	112	%				
5889554	D8-Toluene	2018/12/19	126	70 - 130	105	70 - 130	95	%				
5894872	Decachlorobiphenyl	2018/12/19	89	60 - 130	87	60 - 130	86	%				
5896960	2,4,6-Tribromophenol	2018/12/20	104	10 - 130	91	10 - 130	59	%				
5896960	2-Fluorobiphenyl	2018/12/20	63	30 - 130	59	30 - 130	62	%				
5896960	D14-Terphenyl (FS)	2018/12/20	83	30 - 130	82	30 - 130	84	%				
5896960	D5-Nitrobenzene	2018/12/20	115	30 - 130	93	30 - 130	99	%				
5896960	D8-Acenaphthylene	2018/12/20	74	30 - 130	68	30 - 130	69	%				
5889554	1,1,2,2-Tetrachloroethane	2018/12/19	107	70 - 130	100	70 - 130	<0.50	ug/L	NC	30		
5889554	1,2-Dichlorobenzene	2018/12/19	94	70 - 130	91	70 - 130	<0.50	ug/L	NC	30		
5889554	1,4-Dichlorobenzene	2018/12/19	94	70 - 130	92	70 - 130	<0.50	ug/L	NC	30		
5889554	Benzene	2018/12/19	96	70 - 130	93	70 - 130	<0.20	ug/L	1.7	30		
5889554	Chloroform	2018/12/19	98	70 - 130	95	70 - 130	<0.20	ug/L	NC	30		
5889554	cis-1,2-Dichloroethylene	2018/12/19	100	70 - 130	95	70 - 130	<0.50	ug/L	NC	30		
5889554	Ethylbenzene	2018/12/19	93	70 - 130	91	70 - 130	<0.20	ug/L	0.20	30		
5889554	Methylene Chloride(Dichloromethane)	2018/12/19	108	70 - 130	102	70 - 130	<2.0	ug/L	NC	30		
5889554	o-Xylene	2018/12/19	92	70 - 130	92	70 - 130	<0.20	ug/L	1.5	30		
5889554	p+m-Xylene	2018/12/19	95	70 - 130	92	70 - 130	<0.20	ug/L	0.98	30		
5889554	Tetrachloroethylene	2018/12/19	89	70 - 130	89	70 - 130	<0.20	ug/L	NC	30		
5889554	Toluene	2018/12/19	NC	70 - 130	92	70 - 130	<0.20	ug/L	1.2	30		
5889554	Total Xylenes	2018/12/19					<0.20	ug/L	1.2	30		
5889554	trans-1,3-Dichloropropene	2018/12/19	112	70 - 130	88	70 - 130	<0.40	ug/L	NC	30		
5889554	Trichloroethylene	2018/12/19	90	70 - 130	89	70 - 130	<0.20	ug/L	NC	30		
5892920	Chromium (VI)	2018/12/21	105	80 - 120	107	80 - 120	<0.50	ug/L	NC	20		
5894029	WAD Cyanide (Free)	2018/12/18	109	80 - 120	103	80 - 120	<1	ug/L	NC	20		
5894051	Total Suspended Solids	2018/12/19					<10	mg/L	NC	25	97	85 - 115
5894324	Total BOD	2018/12/23					<2	mg/L	8.6	30	107	80 - 120
5894364	Total Cyanide (CN)	2018/12/18	105	80 - 120	104	80 - 120	<0.0050	mg/L	NC	20		
5894872	Total PCB	2018/12/19	103	60 - 130	88	60 - 130	<0.05	ug/L	NC	40		
5894885	Dissolved Sulphate (SO4)	2018/12/19	NC	75 - 125	105	80 - 120	<1.0	mg/L	0.33	20		
5894899	Dissolved Chloride (Cl-)	2018/12/19	NC	80 - 120	102	80 - 120	<1.0	mg/L	0.62	20		

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QUALITY ASSURANCE REPORT(CONT'D)

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Sampler Initials: JT

			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
5895010	Dissolved Antimony (Sb)	2018/12/21	120	80 - 120	105	80 - 120	<0.50	ug/L	NC	20		
5895010	Dissolved Arsenic (As)	2018/12/21	113	80 - 120	102	80 - 120	<1.0	ug/L	NC	20		
5895010	Dissolved Barium (Ba)	2018/12/21	114	80 - 120	100	80 - 120	<2.0	ug/L	0.28	20		
5895010	Dissolved Beryllium (Be)	2018/12/21	108	80 - 120	99	80 - 120	<0.50	ug/L	NC	20		
5895010	Dissolved Boron (B)	2018/12/21	104	80 - 120	100	80 - 120	<10	ug/L	1.8	20		
5895010	Dissolved Cadmium (Cd)	2018/12/21	116	80 - 120	103	80 - 120	<0.10	ug/L	NC	20		
5895010	Dissolved Chromium (Cr)	2018/12/21	106	80 - 120	97	80 - 120	<5.0	ug/L	NC	20		
5895010	Dissolved Cobalt (Co)	2018/12/21	110	80 - 120	101	80 - 120	<0.50	ug/L	NC	20		
5895010	Dissolved Copper (Cu)	2018/12/21	116	80 - 120	104	80 - 120	<1.0	ug/L	20	20		
5895010	Dissolved Lead (Pb)	2018/12/21	112	80 - 120	100	80 - 120	<0.50	ug/L	NC	20		
5895010	Dissolved Molybdenum (Mo)	2018/12/21	115	80 - 120	99	80 - 120	<0.50	ug/L	1.6	20		
5895010	Dissolved Nickel (Ni)	2018/12/21	106	80 - 120	98	80 - 120	<1.0	ug/L	16	20		
5895010	Dissolved Selenium (Se)	2018/12/21	112	80 - 120	103	80 - 120	<2.0	ug/L	NC	20		
5895010	Dissolved Silver (Ag)	2018/12/21	54 (1)	80 - 120	98	80 - 120	<0.10	ug/L	NC	20		
5895010	Dissolved Sodium (Na)	2018/12/21	NC	80 - 120	102	80 - 120	<100	ug/L	3.4	20		
5895010	Dissolved Thallium (Tl)	2018/12/21	112	80 - 120	98	80 - 120	<0.050	ug/L	NC	20		
5895010	Dissolved Uranium (U)	2018/12/21	111	80 - 120	101	80 - 120	<0.10	ug/L	1.5	20		
5895010	Dissolved Vanadium (V)	2018/12/21	109	80 - 120	97	80 - 120	<0.50	ug/L	0	20		
5895010	Dissolved Zinc (Zn)	2018/12/21	111	80 - 120	101	80 - 120	<5.0	ug/L	NC	20		
5895291	Fluoride (F-)	2018/12/19	102	80 - 120	105	80 - 120	<0.10	mg/L	4.2	20		
5895295	pH	2018/12/19			102	98 - 103			0.59	N/A		
5895567	Total Kjeldahl Nitrogen (TKN)	2018/12/19	NC	80 - 120	100	80 - 120	<0.10	mg/L	2.6	20	97	80 - 120
5896525	Phenols-4AAP	2018/12/19	99	80 - 120	102	80 - 120	<0.0010	mg/L	NC	20		
5896960	1,3-Dinitropyrene	2018/12/20	11 (1)	30 - 130	70	30 - 130	<0.4	ug/L	NC	40		
5896960	1,6-Dinitropyrene	2018/12/20	16 (1)	30 - 130	72	30 - 130	<0.4	ug/L	NC	40		
5896960	1,8-Dinitropyrene	2018/12/20	11 (1)	30 - 130	67	30 - 130	<0.4	ug/L	NC	40		
5896960	3,3'-Dichlorobenzidine	2018/12/20	2.0 (2)	30 - 130	75	30 - 130	<0.8	ug/L	NC	40		
5896960	7H-Dibenzo(c,g) Carbazole	2018/12/20	69	30 - 130	60	30 - 130	<0.4	ug/L	NC	40		
5896960	Anthracene	2018/12/20	87	30 - 130	85	30 - 130	<0.2	ug/L	NC	40		
5896960	Benzo(a)anthracene	2018/12/20	80	30 - 130	80	30 - 130	<0.2	ug/L	NC	40		
5896960	Benzo(a)pyrene	2018/12/20	82	30 - 130	88	30 - 130	<0.2	ug/L	NC	40		
5896960	Benzo(b/j)fluoranthene	2018/12/20	91	30 - 130	88	30 - 130	<0.2	ug/L	NC	40		

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QUALITY ASSURANCE REPORT(CONT'D)

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			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
5896960	Benzo(e)pyrene	2018/12/20	91	30 - 130	95	30 - 130	<0.2	ug/L	NC	40		
5896960	Benzo(g,h,i)perylene	2018/12/20	85	30 - 130	84	30 - 130	<0.2	ug/L	NC	40		
5896960	Benzo(k)fluoranthene	2018/12/20	76	30 - 130	92	30 - 130	<0.2	ug/L	NC	40		
5896960	Bis(2-ethylhexyl)phthalate	2018/12/20	95	30 - 130	104	30 - 130	2,RDL=2	ug/L	NC	40		
5896960	Chrysene	2018/12/20	103	30 - 130	104	30 - 130	<0.2	ug/L	NC	40		
5896960	Dibenz(a,h)anthracene	2018/12/20	91	30 - 130	89	30 - 130	<0.2	ug/L	NC	40		
5896960	Dibenzo(a,i)pyrene	2018/12/20	79	30 - 130	72	30 - 130	<0.2	ug/L	NC	40		
5896960	Dibenzo(a,j) acridine	2018/12/20	81	30 - 130	79	30 - 130	<0.4	ug/L	NC	40		
5896960	Di-N-butyl phthalate	2018/12/20	101	30 - 130	100	30 - 130	<2	ug/L	NC	40		
5896960	Fluoranthene	2018/12/20	92	30 - 130	92	30 - 130	<0.2	ug/L	NC	40		
5896960	Indeno(1,2,3-cd)pyrene	2018/12/20	86	30 - 130	86	30 - 130	<0.2	ug/L	NC	40		
5896960	Pentachlorophenol	2018/12/20	98	30 - 130	57	30 - 130	<1	ug/L	NC	40		
5896960	Perylene	2018/12/20	100	30 - 130	101	30 - 130	<0.2	ug/L	NC	40		
5896960	Phenanthrene	2018/12/20	94	30 - 130	87	30 - 130	<0.2	ug/L	NC	40		
5896960	Pyrene	2018/12/20	93	30 - 130	92	30 - 130	<0.2	ug/L	NC	40		
5898904	Total Aluminum (Al)	2018/12/21	97	80 - 120	99	80 - 120	<5.0	ug/L	7.4	20		
5898904	Total Antimony (Sb)	2018/12/21	107	80 - 120	104	80 - 120	<0.50	ug/L	13	20		
5898904	Total Arsenic (As)	2018/12/21	100	80 - 120	100	80 - 120	<1.0	ug/L	18	20		
5898904	Total Cadmium (Cd)	2018/12/21	100	80 - 120	101	80 - 120	<0.10	ug/L	NC	20		
5898904	Total Chromium (Cr)	2018/12/21	94	80 - 120	95	80 - 120	<5.0	ug/L	NC	20		
5898904	Total Cobalt (Co)	2018/12/21	93	80 - 120	96	80 - 120	<0.50	ug/L	NC	20		
5898904	Total Copper (Cu)	2018/12/21	96	80 - 120	97	80 - 120	<1.0	ug/L	3.9	20		
5898904	Total Lead (Pb)	2018/12/21	90	80 - 120	94	80 - 120	<0.50	ug/L	0.45	20		
5898904	Total Manganese (Mn)	2018/12/21	93	80 - 120	95	80 - 120	<2.0	ug/L	4.8	20		
5898904	Total Molybdenum (Mo)	2018/12/21	104	80 - 120	101	80 - 120	<0.50	ug/L	0.55	20		
5898904	Total Nickel (Ni)	2018/12/21	91	80 - 120	95	80 - 120	<1.0	ug/L	0.59	20		
5898904	Total Phosphorus (P)	2018/12/21	105	80 - 120	110	80 - 120	<100	ug/L	2.2	20		
5898904	Total Selenium (Se)	2018/12/21	105	80 - 120	107	80 - 120	<2.0	ug/L	NC	20		
5898904	Total Silver (Ag)	2018/12/21	94	80 - 120	97	80 - 120	<0.10	ug/L	NC	20		
5898904	Total Tin (Sn)	2018/12/21	102	80 - 120	99	80 - 120	<1.0	ug/L	NC	20		
5898904	Total Titanium (Ti)	2018/12/21	92	80 - 120	100	80 - 120	<5.0	ug/L	NC	20		
5898904	Total Zinc (Zn)	2018/12/21	97	80 - 120	101	80 - 120	<5.0	ug/L	11	20		

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QUALITY ASSURANCE REPORT(CONT'D)

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Site Location: MA002568
Sampler Initials: JT

			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
5899489	Total Oil & Grease	2018/12/20			97	85 - 115	<0.50	mg/L	2.8	25		
5899493	Total Oil & Grease Mineral/Synthetic	2018/12/20			92	85 - 115	<0.50	mg/L	4.3	25		
5900659	Mercury (Hg)	2018/12/21	97	75 - 125	99	80 - 120	<0.0001	mg/L	NC	20		
5900939	Nonylphenol (Total)	2018/12/22	108	50 - 130	105	50 - 130	<0.001	mg/L	1.2	40		
5900941	Nonylphenol Ethoxylate (Total)	2018/12/22	91	50 - 130	101	50 - 130	<0.005	mg/L	NC	40		
5901230	Mercury (Hg)	2018/12/21	100	75 - 125	98	80 - 120	<0.1	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).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) Some recoveries were below the lower control limits. This may represent a low bias in some results for these flagged analytes.

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
A Bureau Veritas Group Company

Maxxam Job #: B8X7317
Report Date: 2018/12/28

Edward Wong & Associates Inc
Client Project #: 469 HURON ST, TORONTO
Site Location: MA002568
Sampler Initials: JT

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

MAXXAM

Maxxam Analytics International Corporation o/a Maxxam Analytics

CHAIN OF CUSTODY RECORD

Page ___ of ___

INVOICE TO		REPORT TO		PROJECT INFORMATION		Laboratory Use Only:	
Company Name	#25869 Edward Wong & Associates Inc	Company Name		Quotation #		Maxxam Job #	Bottle Order #
Attention	Edward Wong	Attention		P.O. #			
Address	441 Esna Park Dr Unit 19	Address		Project		COC #:	Project Manager:
	Markham ON L3R 1H7			Project Name			
Tel	(416) 903-4288 Fax (416) 221-0795	Tel	Fax	Site #		C#696646-01-01	Gina Baybayan
Email	ed@edwardwongassociates.com, edwardwong58@gm	Email		Sampled By			

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

Regulation 153 (2011)	Other Regulations	Special Instructions
☐ Table 1 ☐ Res/Park ☐ Medium/Fine	☐ CCME ☐ Sanitary Sewer Bylaw	
☐ Table 2 ☐ Ind/Comm ☐ Coarse	☐ Reg 558 ☐ Storm Sewer Bylaw	
☐ Table 3 ☐ Agr/Other ☐ For RSC	☐ MISA Municipality ____	
☐ Table ___	☐ PWQO	
	☐ Other ____	

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

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

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

	Sample Barcode Label	Sample Location/Identification	Date Sampled	Time Sampled	Matrix	Toronto Sanitary & Storm Sewer (Package)	Suitable for Automated Measurement	(1) Reg 153 Metals & Inorganics Pkg (Water)	# of Bottles	Comments
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

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 #)*

17-Dec-18 14:57
Gina Baybayan
B8X7317
THP ENV-700

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
		2:55PM	[illegible]	2018/12/17	14:57	

Laboratory Use Only					
Time Sensitive	Temperature (°C) on Recpt	Custody Seal Present	Yes	No
	8 8 7 ice	Custody Seal Intact		

* 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.

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

White: Maxxam Yellow: Client

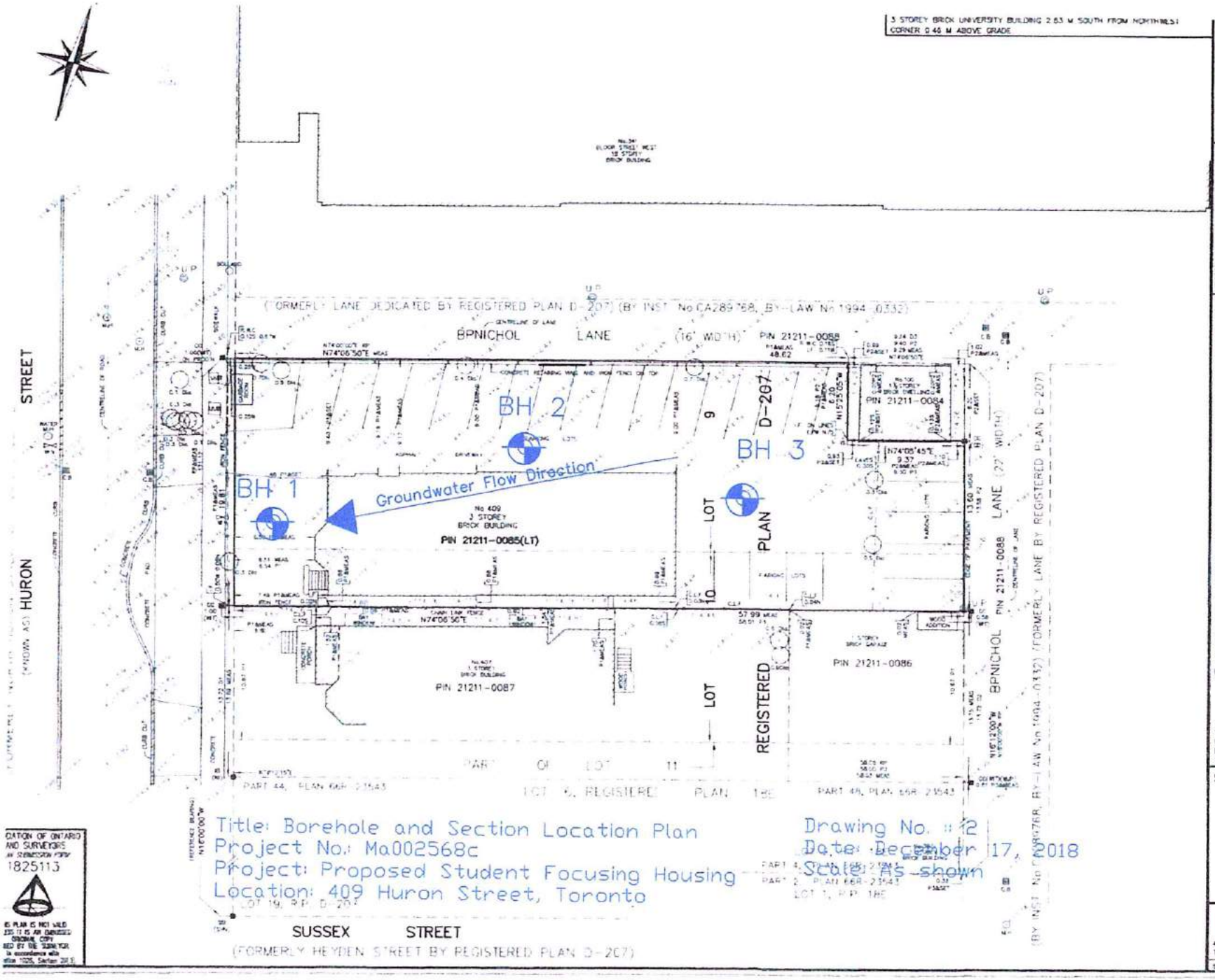
Drawings

Site Location Plan
Borehole and Section Location Plan
Soil Profile - Cross Section A-A
Guideline for Underpinning in Soil
Drainage and Backfill Recommendations
for Basement Construction
Exterior Drainage against Soldier Pile
and Lagging Shoring System

Imagery ©2019 Google, Map data ©2019 Google 20 m

Title: Site Location Plan
Project No.: Ma002568c
Project: Proposed Student Focusing Housing
Location: 409 Huron Street, Toronto

Drawing No. : 1
Date: December 17, 2018
Scale: As shown



Title: Borehole and Section Location Plan
Project No.: Ma002568c
Project: Proposed Student Focusing Housing
Location: 409 Huron Street, Toronto

Drawing No. : 2
Date: December 17, 2018
Scale: As shown

CIATION OF ONTARIO AND SURVEYORS
1825113
IS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY SIED BY THE SURVEYOR In accordance with ation 1025, Section 29(3)

REGISTERED PLAN D-207
CITY OF TORONTO

SCALE 1:200
0 1 2 3 4 5 10 15m

MANDARIN SURVEYORS LIMITED, O.L.S. ©

METRIC

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN E CONVERTED TO FEET BY DIVIDING BY 0.3048

PART 2 (SURVEY REPORT)

1. REGISTERED EASEMENTS AND/OR RIGHT OF WAYS: NONE
2. ADDITIONAL COMMENTS: NOTE THE LOCATION OF THE FEN THE LIMITS OF THE SUBJECT PROPERTY. NOTE THE LOCA CONCRETE RETAINING WALL ALONG THE NORTHERLY LIMIT LOCATION OF THE EAVES OF No.100 BPNICHOL LANE. NO LOCATION OF THE GARBAGE ROOM
3. THIS PLAN DOES NOT CERTIFY COMPLIANCE WITH ZONING

THIS REPORT WAS PREPARED FOR IMPRESSIONS GROUP AND ACCEPTS NO RESPONSIBILITY FOR ITS USE BY OTHER PARTIE

LEGEND

SIB	DENOTES MONUMENT SET
■	DENOTES MONUMENT FOUND
⊕	DENOTES IRON BAR
SIB	DENOTES STANDARD IRON BAR
CC	DENOTES CUT CROSS
RP	DENOTES REGISTERED PLAN D-207
P1	DENOTES PLAN OF SURVEY BY WINTERS, MAUGHAN DATED APRIL 7, 1981
P2	DENOTES PLAN OF SURVEY BY C.E. DOTTERILL LTD., DATED OCTOBER 12, 1994
P3	DENOTES PLAN 66R-23543
D1	DENOTES INSTRUMENT No.EP129990
D2	DENOTES INSTRUMENT No.EP147720
D3	DENOTES INSTRUMENT No.CA314640
WJP	DENOTES WILLIAM J. PLAXTON, O.L.S.
SVN	DENOTES SPEIGHT & VAN NOSTRAND, O.L.S.
CD	DENOTES C.E. DOTTERILL, O.L.S.
PIN	DENOTES PROPERTY IDENTIFIER NUMBER
(NI)	DENOTES NOT IDENTIFIABLE
MEAS	DENOTES MEASURED
N,S,E,W	DENOTES NORTH, SOUTH, EAST, WEST
I.F.	DENOTES IRON FENCE
C.L.F.	DENOTES CHAIN LINK FENCE
R.W.C.	DENOTES CONCRETE RETAINING WALL
WIT	DENOTES WITNESS
I.S.	DENOTES POINT ESTABLISHED BY INTERSECTION MET
D.S.	DENOTES FINISHED SILL ELEVATION AT ENTRY
CONC	DENOTES CONCRETE
UUB	DENOTES UNDERGROUND UTILITY BOX
	DENOTES UTILITY POLE
	DENOTES WATER VALVE
	DENOTES STREET SIGN
	DENOTES MAN HOLE
	DENOTES CATCH BASIN
	DENOTES CONIFEROUS TREE
	DENOTES DECIDUOUS TREE

ALL TIES TO FOUNDATION, UNLESS NOTED OTHERWISE

BEARINGS SHOWN HEREON ARE ASTRONOMIC AND ARE REFE EASTERLY LIMIT OF HURON STREET (FORMERLY NORTH HUR SHOWN ON REGISTERED PLAN D-207 HAVING A BEARING OF

SURVEYOR'S CERTIFICATE

I CERTIFY THAT

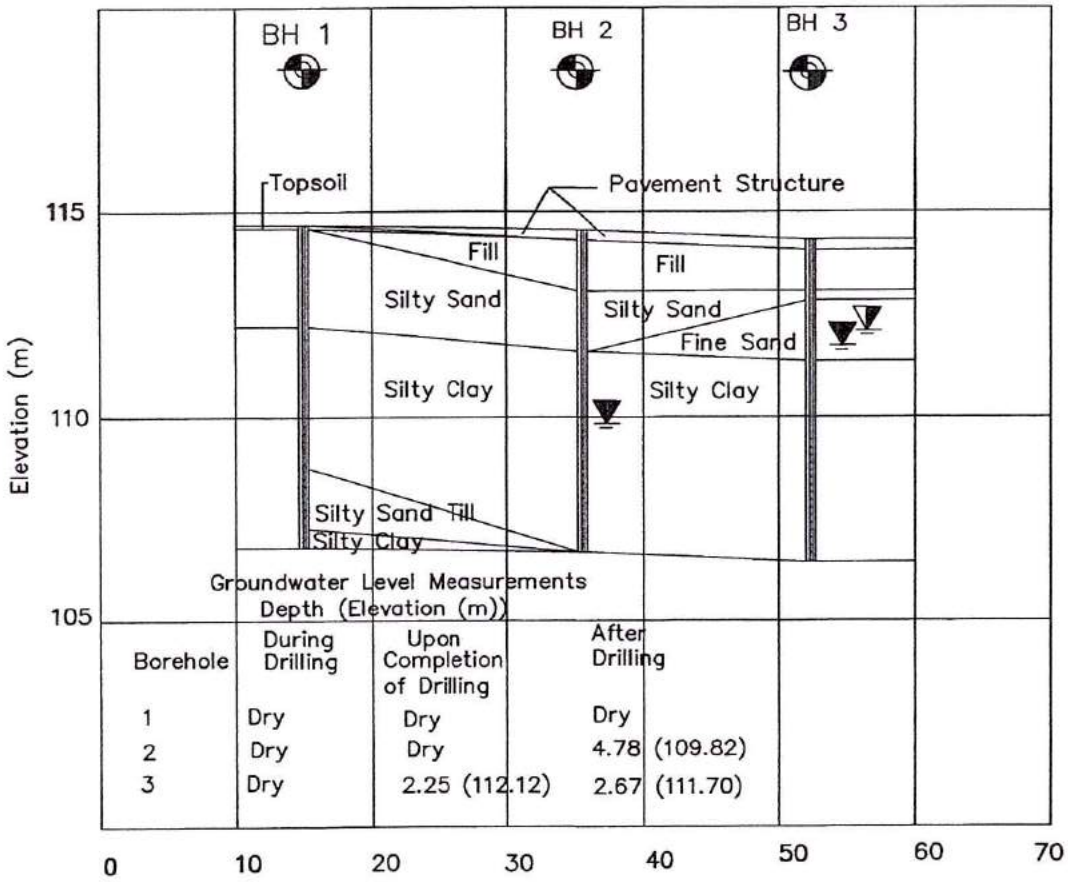
1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORD WITH THE SURVEYS ACT, THE SURVEYORS ACT AND TH REGULATIONS MADE UNDER THEM
2. THE SURVEY WAS COMPLETED ON THE 17th DAY OF AUGUST, 2018

DATE

2, ZEI
ONTARIO LAND

MANDARIN SURVEYORS L
ONTARIO LAND SURVEYOR CANADA LAND
WWW.MANDARINSURVEYOR.COM
42 RAVENCLIFF CRESCENT PHONE (647)430-1366
TORONTO, ONTARIO M1T 1R8 E-MAIL MANDARIN

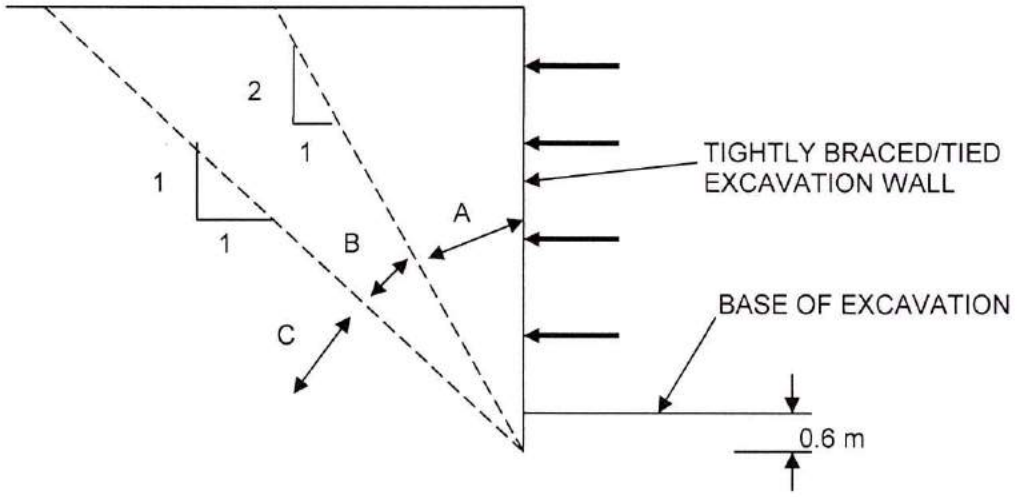
SURVEY BY: S.Z CAD No 12-028SRPR JOB



Title: Section A-A
Project No.: Ma002568c
Project: Proposed Student Focusing Housing
Location: 409 Huron Street, Toronto

Drawing No. : 3
Date: December 17, 2018
Scale: As shown

Project: Ma002568b **Drawing No. 4**



Zone A Foundations located within this zone normally require underpinning. Horizontal and vertical pressures on the excavation wall of non underpinned foundations must be considered

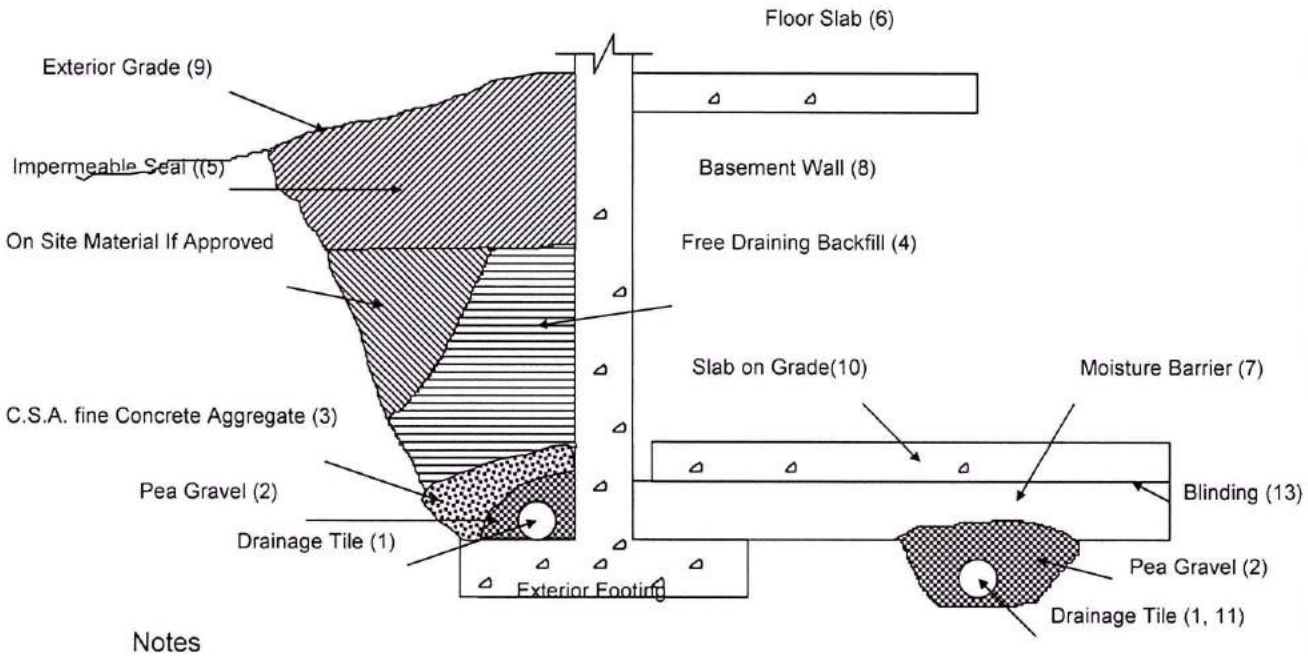
Zone B Foundations located within this zone normally do not require underpinning. Horizontal and vertical pressures on the excavation wall of non underpinned foundations must be considered

Zone C Underpinning to structures is normally founded in this zone. Lateral pressure from underpinning is not normally considered

(Figure 27.16 from Canadian Foundation Engineering Manual, 3rd Edition)

Guidelines for Underpinning in Soil

Project: Ma002568b **Drawing No: 5**



Notes

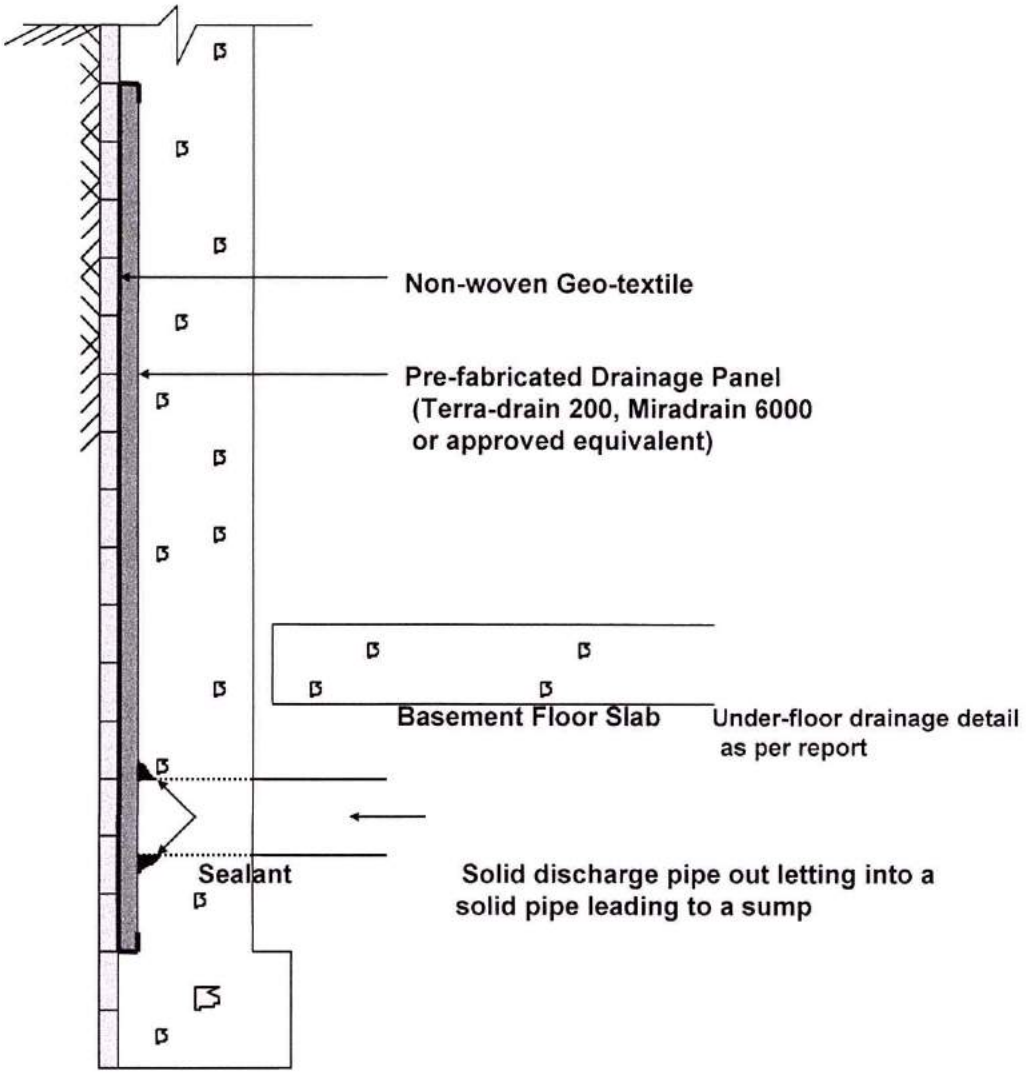
1. Drainage tile to consist of 100 mm diameter weeping tile or equivalent perforated pipe leading to a positive sump or outlet. Invert to be a minimum of 150 mm below underside of floor slab.
2. Pea gravel - 150 mm top and side of drain. If drain is not on footing, place 100 mm of pea gravel below drain. 20 mm clear stone is an alternative provided it is surrounded by an approved porous plastic membrane (Terrafix 270R or equivalent).
3. C.S.A. fine concrete aggregate to act as filter material. Minimum 300 mm top and side of tile drain. This may be replaced by an approved porous plastic membrane as indicated in (2).
4. Free Draining backfill - OPSS Granular B or equivalent compacted to the specified density. Do not use heavy compaction equipment within 450 mm of the wall. Use hand controlled light compaction equipment within 1.8 m of wall.
5. Impermeable backfill seal - compacted clay, clayey silt or equivalent. If original soil is free-draining, seal may be omitted.
6. Do not backfill until wall is supported by basement and floor slabs or adequate bracing.
7. Moisture barrier to be at least 200 mm of compacted clear 20 mm stone or equivalent free draining material.
8. Basement wall to be damp-proofed.
9. Exterior grade to slope away from building.
10. Slab on grade should not be structurally connected to the wall or footing.
11. Underfloor drain invert to be at least 300 mm below underside of floor slab. Drainage tile placed in parallel rows 6 to 8 m centers one way. Place drain on 100 mm pea gravel with 150 mm of pea gravel on top and sides. Provide filter material as noted in (3) if moisture barrier is not clear crushed stone.
12. Do not connect the underfloor drains to perimeter drains.
13. If the 20 mm stone requires surface blinding, use 6 mm clear stone chips.

DRAINAGE AND BACKFILL RECOMMENDATIONS FOR BASEMEMT CONSTRUCTION

(not to scale)

Project: Ma002568b

Drawing No. 6



Drawing No. 4 - SCHEMATIC DRAINAGE DETAIL
SOLDIER PILE AND LAGGING SHORING SYSTEM