WEST VILLAGE (PORT CREDIT)

PORT CREDIT WEST VILLAGE PARTNERS INC.

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

City of Mississauga
70 Mississauga Road South / 181 Lakeshore Road West
City File Numbers OP/OZ 17-12 and 21T-M 17004
Project Number 16-489
March 1st, 2018

urbantech

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FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

This report provides functional servicing design and stormwater management information in support of proposed Official Plan and Zoning By-Law Amendment applications and Draft Plan of Subdivision for the subject lands. This report fulfils DARC 17-201 W1 submission requirements and addresses City of Mississauga comments related to grading, servicing, drainage, stormwater management and LID measures regarding City File 21T-M 170044. The servicing and development strategies presented in this report have been developed in conjunction with the greater consulting team and should be considered in conjunction with their work. The following studies are included in the appendices:

- *Final Report - Geotechnical Feasibility Study (Stantec, 2018)*
- *Watermain Hydraulic Modelling Analysis – (AECOM, 2018)*

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INTRODUCTION

Urbantech Consulting has been retained by Port Credit West Village Partners Inc. to prepare a preliminary engineering design and functional servicing report for the former Imperial Oil property located at 70 Mississauga Road South and 181 Lakeshore Road West in the City of Mississauga, Region of Peel.

This report is applicable to any future revisions to the Draft Plan, assuming the revisions are in general conformance with the land use, servicing and stormwater management concepts outlined herein. The design information presented in this report considers the following guidelines:

- *City of Mississauga Engineering Standard Drawings Manual*
- *Credit Valley Conservation Authority Stormwater Management Criteria Document (August 2012)*
- *Draft Ministry of the Environment and Climate Change LID SWM Guidance Manual (2017)*
- *Regional Municipality of Peel PW Design Specifications and Procedures*
- *Stormwater Management Planning and Design Manual by the Ministry of Environment and Climate Change; (March 2003)*

The subject property is approximately 29 hectares (72.0 acres) and is located in the City of Mississauga. The site was formerly used by Imperial Oil for refinery and other industrial uses (including a brickworks facility). Currently, the site is generally covered in low lying vegetation and some remnant roads, parking areas, a former service building and remnants of a gas service station. The site is bounded by:

- Lakeshore Road West to the north;
- Mississauga Road to the east;
- A strip of waterfront land to the south (not subject to this applications); and
- Existing residential lands with frontages on Pine Avenue to the west.

Figure 1 illustrates the location of the site. The legal description of the site is All of Lot 10, Part of Lots 9 and 11 and Water Lot Location in Front of Lot 9, Broken Front Range, Credit Indian Reserve (Geographic Township of Toronto), in the City of Mississauga, Regional Municipality of Peel.

The strip of waterfront lands abutting Lake Ontario are not part of this application.

The proposed development will proceed under an Official Plan Amendment, Rezoning and Plan of Subdivision processes. Subsequent site plan applications for the private blocks will be submitted once the process is further advanced.

SITE STATS

Location:
Lakeshore Road West & Mississauga Road

Existing Site / Drainage Area:
Approx. 29 ha

Subwatershed:
Credit River / Lake Ontario

Owner:
Port Credit West Village Partners Inc.

EXISTING CONDITIONS

Land Use & Topography

The majority of the site is covered in vegetation with some areas of asphalt/concrete and remnants of the former industrial use. There is an existing shale pond located in the southern portion of the site which was the former extraction pit for the brickworks and then functioned as a stormwater management pond during oil refinery operations. Throughout the site there are multiple monitoring wells used to monitor the environmental conditions / quality of the groundwater.

A topographical survey of the subject lands was completed by JD Barnes in February of 2017. The site generally falls from Lakeshore Road to Lake Ontario with a maximum grade change of approximately 7m. Along the western boundary, an existing 3m high berm separates the rear yards of the existing residences on Pine Avenue South from the subject lands. The average slope from Lakeshore Road to the south property limit is approximately 1.5%.

Figure 3 illustrates the existing site features, topography and drainage patterns.

Shoreline

Lands adjacent to Lake Ontario are regulated by the Credit Valley Conservation Authority (CVCA). Limits of the Regulated Area are shown on **Figure 5**. The development will require new storm sewers discharging directly to Lake Ontario. All works within the regulated area will include appropriate shoreline protection, restoration and ESC measures required. Based on comments received, CVCA and Provincial approvals will be required for the proposed shoreline alterations and will obtained through the detailed design process. This process is currently underway.

The waterfront lands directly to the south of the site adjacent to Lake Ontario are owned by the Crown and not subject to this application. Discussions with the City related to the shoreline will be held after the first submission is filed.

Soil Conditions

Stantec Consulting has been retained by Port Credit West Village Partners Inc. to investigate the geotechnical conditions of the site. Stantec has provided a final report titled "Geotechnical Feasibility Study – Development of 70 Mississauga Road South, City of Mississauga, ON" (March 7th, 2018) that provides a detailed discussion of geotechnical site conditions. The report states that the site is located in the Iroquois Plain and that the soil stratigraphy in this area is generally characterized by clay till overlain by sand. Underlying bedrock comprises shale and limestone of the Georgian Bay Formation.

- The overburden consisted of sand with gravel, sandy silt, sandy clay with gravel, clay with sand or clay, underlain by native clay to clay with sand to clay with gravel
- The overburden was underlain by slightly to highly weathered shale bedrock.
- Depth of bedrock ranged from 1.2m to 11.0m below existing grade and certain areas may require rock-breaking equipment for excavation.

Stantec (on behalf of Port Credit West Village Partners Inc.) has prepared a detailed environmental remediation program to be undertaken on site. This program consists primarily of conventional excavation and disposal of impacted materials at approved facilities and the completion of Risk Assessments, as per Ontario Regulation 153/04, as amended. A significant quantity of the existing soils will be removed, which provides opportunities to construct the site with engineered fill suitable for construction and for low-impact development stormwater management measures / restoration.

Groundwater was encountered in both the overburden and the bedrock:

- Median depth of 2.0 m below existing grade, with a maximum depth of 6.0 m below existing grade in the overburden.
- Median depth of 4.0 m below existing grade; maximum depth of 16.0 m below existing grade in the bedrock.

Please refer to Appendix A for further information.

Existing Drainage

Drainage from the existing site is generally north to south, towards the lake. The majority of the site drainage is intercepted by the existing Shale Pond on the subject lands.

In terms of external drainage, Lakeshore Road West is urbanized and drains via storm sewers to the existing Mississauga Road storm sewer system. A 1050mm diameter storm sewer on Mississauga Road collects drainage from Lakeshore Road West and the existing developments east of Mississauga Road (approximately 13.65 ha). This sewer extends beneath the waterfront trail and discharges to the lake via a headwall.

Refer to Figure 3 for the existing site drainage.

SOILS

Topsoil Depth:

Varies

Predominant Soils:

Clay till / sand & Bedrock (1.2m -11.0m below ground)

Groundwater depth:

0.0m – 6.0m (overburden)

0.1m – 16.0m (bedrock)

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DEVELOPMENT CONCEPT

Draft Plan

As shown on **Figure 2**, the proposed 29.0 ha development consists of several public right-of-ways and private site plan blocks, including:

- Mixed use blocks including campus
- High density residential blocks
- A commercial development block
- Park blocks / Open space
- Public ROWs

The proposed development will be advanced through both Draft Plan of Subdivision approval process and the Site Plan approval process for the individual private site plan blocks. The Subdivision components will consist of the public ROW areas, open space blocks, and services. Preliminary cross sections have been prepared and are included in **Appendix E**. These cross sections have been developed to support the proposed surface treatment of the various right of ways. The cross sections will be further refined in consultation with the required approval agencies and utility companies, and in keeping with the developing master plan vision. The cross sections are conceptual and represent an enhanced treatment to be discussed further with the City of Mississauga.

Refer to Figure 4 – Concept Plan

Conceptual Development Phasing

Currently the project is proposed to be developed in 5 phases. Servicing infrastructure is designed to facilitate the proposed phasing and provide flexibility should the phasing be altered. The current phasing is based on the anticipated development schedule provided by Port Credit West Village Partners Inc. and may change through the approval process.

External servicing works are required for the proposed development to proceed. These include a new sanitary sewer from the development lands to the existing Front Street Sanitary Pump Station (SPS), a new storm sewer within Mississauga Road from Lakeshore Drive to Lake Ontario and a storm outfall through the central portion of the site to Lake Ontario.

If required, the Phase 1 commercial block can be serviced independently in advance of the proposed subdivision through storm, sanitary and water connections to the existing municipal infrastructure within Mississauga road and lakeshore. Consequently, an interim storm servicing strategy may be pursued for Phase 1. This interim servicing strategy may consist of a temporary pond located on the subject lands. Any interim servicing facilities will comply with the same quality and erosion control criteria as the ultimate servicing strategy outlined in this report.

Refer to Figure 5 – Proposed Conceptual Phasing Plan

GRADING

The proposed conceptual grading for the development will be designed in accordance with City of Mississauga standards. Grading is generally governed by the existing boundary conditions. Site grading has also been designed to ensure that adequate cover over proposed services is maintained. No external grading works are proposed.

A preliminary grading concept plan has been prepared for the subject lands based on the following engineering constraints:

- Storm outlet elevations
- Major system drainage paths
- Provision of minimum cover over services
- Proposed road patterns and land use
- Elevations along boundary roads, property lines and waterfront trail
- Application of the City of Mississauga standards

The grading plans are consistent with the City standards. In general, grading of all proposed roads and site plan blocks adjacent to the surrounding development and roads matches the existing grades or the ultimate anticipated grades at the property line, as appropriate.

As noted in the preceding section, a considerable amount of soil will be removed from the lands as part of an environmental remediation program. The site grading design minimizes the overall site earthworks program once impacted soils are removed and will continue to be refined to maximize the sustainable reuse of soils within the property.

Refer to Drawing GR-1 for further details.

SANITARY SERVICING

Existing & Future Infrastructure

There are two existing sanitary pump stations (SPS) in the vicinity of the subject lands.

The Ben Machree SPS is located to the south west of the subject site on Ben Machree Drive and services a relatively small drainage area representing approximately 140 residential lots. The Region of Peel identified that it has minimal excess service capacity available to increase its service area (refer to correspondence in **Appendix B)**.

The Front Street SPS is located to the east of the subject site at the southeast corner of Lakeshore Road and Front Street and services a 166 hectare drainage area representing a mixture of residential and commercial lands. The Region of Peel identified that this pump station has significant excess service capacity available to service the subject site (refer to correspondence in **Appendix B** for details).

The Region of Peel has identified the need to upgrade the wastewater infrastructure and has identified that a new large trunk sanitary sewer will be constructed along the frontage of the site. One of the outcomes is to remove the requirement for the existing SPS in the area. The proposed Lakeshore Trunk is currently in the Environmental Assessment (EA) process and is anticipated to be submitted to the MOE in 2018 with approvals expected later that year. The Region's Draft Master Plan identifies this as Project WW-ST-163 with a planned in service date of 2022.

There are existing sanitary mains surrounding the site which provide servicing to the existing drainage area, namely:

- the 350mm and 375mm sanitary sewers on Lakeshore Road West
- a 250 mm sanitary sewer on Mississauga Road
- a 250 mm sanitary sewer on Port Street
- a 250 mm sanitary sewer on Bay Street
- the 250, 300 and 375 mm sanitary sewers within Front Street

Refer to Drawing SAN-1 and Appendix B for further details.

Proposed Sanitary Drainage

A review of the 2013 Region of Peel Water and Wastewater Master Plan indicates that the Front Street SPS has excess/available capacity of approximately 200 L/s (i.e., the difference between the firm capacity of 276 L/s, and present-day peak wet weather flow of 76 L/s).

The existing sanitary sewers on Lakeshore Road, Mississauga Road, Port Street and Front Street do not have adequate capacity to convey the proposed sanitary flows to the Front Street SPS. It is proposed that a new 450mm sanitary sewer be constructed along Port Street and Front Street as an outfall for the subject lands. The existing sanitary sewer on Port Street would remain in place. Refer to **Drawing SAN-1** for the proposed sanitary sewer location. There is some available capacity in the surrounding network and the opportunity to utilize components of the existing sewer system will be further reviewed at the detailed design stage.

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SANITARY DESIGN CRITERIA

Average Dry Weather Flow:

302.8 L/c/day

Infiltration / Inflow:

0.2 L/s/ha

Peaking Factor:

Harmon Formula

(Section 2.2 in Region Design Criteria)

Population (people per ha):

Semi-detached – 70

Row Dwellings – 175

Apartment – 475

Commercial - 50

(people per unit):

Apartments – 2.7

Based on a review of the available as-constructed information (refer to **Appendix B**), the subject lands can be serviced entirely by gravity sewers to the Front Street SPS (although private pumping within the site plan blocks may be necessary depending on evolving site plan concepts and depths of underground parking structures).

Wastewater infrastructure will be designed in accordance with the latest Region of Peel standards and specifications.

Sanitary sewer design sheets have been prepared and used to size proposed sanitary sewers for the proposed development. The population is estimated using the population equivalent densities per the Region of Peel standards. Using a rate of 2.7 people per unit (ppu), whenever the proposed population equivalent is greater than the population equivalents based on land use, the calculated population equivalent was used for design.

Population Estimates and Sanitary Design Sheets can be found in **Appendix B.**

Based on the above criteria and the proposed external improvements it has been determined that there is sufficient capacity to service the subject lands as the proposed development generates approximately **96.5 L/s** of additional peak flow to the Front Street SPS, which would result in a total peak wet weather flow of **172.5 L/s** (96.5 L/s proposed + 76 L/s existing).

A preliminary profile of the proposed 450 mm sanitary sewer and pictures of the proposed route are included in **Appendix B**.

Refer to Drawing SAN-1 for further details.

Timing Implications

With the exception of the proposed 450 mm sanitary outfall to the Front Street SPS which will be constructed by the proponent, all necessary sanitary infrastructure is in place and available to service the subject lands. 450 mm sanitary sewers qualify for development credits under the Region of Peel Capital Plan. Further discussions with the Region are required.

The Region's project WW-ST-163 is scheduled to be completed in 2022. This project is not required in order for the development of the subject lands to proceed.

As requested by the Region of Peel, the sanitary design calculations included in **Appendix B** have been designed using a 40% safety factor.

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WATER DISTRIBUTION

Existing & Future Infrastructure

There are existing watermains on Lakeshore Road (300 mm and 400 mm) and Mississauga Road (300 mm).

The Region of Peel has identified the need to upgrade the water servicing in Pressure Zone 1 and has identified that a new 600 mm diameter watermain is to be constructed along Lakeshore Road from the subject lands easterly to the existing Lakeview Water Treatment Plant located south of Lakeshore Road on Cawthra Road. This new 600 mm diameter watermain is identified as Regional Project 18-1119 in the Region's 2015 Capital Budget and is funded through Development Charges. This watermain is expected to be in service by 2020.

Refer to Drawing WM-1 for further details.

Proposed Water Infrastructure

AECOM was retained to carry out a detailed hydraulic analysis of the proposed developments impact on both existing and proposed infrastructure. The analysis includes design years of 2021, 2026, 2027 and 2041.

The analysis was based on Region of Peel 2016 design Criteria and the following criteria

All scenarios were modelled without the proposed 600mm watermain on Lakeshore Road.

A network of municipal watermains is proposed throughout the subject lands. In accordance with AECOM's recommendations these have been proposed as 300 mm in diameter. The findings of the report indicate that the proposed development can be serviced without the proposed 600 mm watermain on Lakeshore Road, even under the 2041 maximum day demand conditions.

The Hydraulic Analysis Report is included in **Appendix C**.

Refer to Drawing WM-1 and Appendix C for further details.

WATER DESIGN CRITERIA

Minimum Pressure:

275 kPa (40 psi)

Maximum Pressure:

700 kPA (100 psi)

Maximum Velocity:

2.0 m/s

Fire Flow:

25,020 L/minute

417 L/s

Minimum Pressure

(max. day + fire flow):

140 kPa (20 psi)

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STORM DRAINAGE

Minor & Major System

Storm servicing for the development will conform to City of Mississauga standards. Storm sewers will be designed to convey minor system flows resulting from the 10-year storm event for ultimate discharge to Lake Ontario.

The runoff coefficients were based on the proposed land use and the City standard runoff coefficients. The 100-year flows from the subject lands were calculated using the increased runoff coefficients (1.25 x $C_{10\text{-year}}$) as per the City requirements. The storm sewers have been conservatively sized assuming no LID / stormwater management measures are in place. However, at the detailed design stage and in consultation with CVCA and City of Mississauga it may be possible to realize benefits from the LIDs and reduce the conservative pipe sizes included in this report.

Two separate outfalls are proposed to Lake Ontario. The western headwall will provide an outlet for the minor system drainage from the west, centre and southern portions of the site. Due to grading constraints, some isolated areas within the site will capture the major system flow into the minor system as shown on **Drawing STM-2.** The remaining major system drainage from these areas will be conveyed along Street A and Street F to a channel sized to convey the major system flow (100-year minus the 10-year flow). Under interim conditions, this channel will be located above the proposed minor system pipe that connects to the western headwall. As shown on **Drawing STM-2,** the channel will have two inlets to collect the incoming major system flows from Street A and Street F. The location of the ultimate condition channel will be determined in collaboration with the City of Mississauga Recreation and Parks Department and Engineering Department. The interim channel will discharge over the proposed shoreline and into Lake Ontario. The majority of the subject lands will discharge from the site through the western headwall and proposed channel. Channel capacity calculations are included in **Appendix D**.

As shown on **Drawing STM-2**, the eastern portion of the site will drain to an outfall on Mississauga Road. Mississauga Road is low relative to the rest of the site and drainage naturally travels to the east. A storm sewer is proposed to replace the existing storm sewer on Mississauga Road. The proposed sewer has been designed to accommodate the existing drainage and post-development site plan drainage. As shown on **Drawing STM-2**, the minor system within this eastern section will convey the 100-year flows from specific areas that cannot drain overland due to grading constraints. The major system flows from the rest of this area will drain overland to Mississauga Road. These 100-year major system flows are to be captured into the minor system at the southern end of Mississauga Road. Analysis of this drainage scenario shows that the proposed storm sewers on Mississauga Road will have to be increased in size in order to accommodate the additional flows from the subject lands. The final leg of the Mississauga Road storm sewer would have to be increased from a 1050mm circular pipe to a 900x2400mm box culvert. This upgrade would account for 100-year capture from the subject lands as shown on **Drawing STM-2**.

The proposed storm sewers within the subject lands will be designed to intercept the minor and some of the major system flows as shown on **Drawing STM-1** and **Drawing STM-2**. All major system flows will be captured prior to discharge into Lake Ontario via the western and eastern outlets.

The existing eastern outlet is protected with an existing armour stone seawall structure. The existing seawall will be modified to accommodate appropriate headwalls for the proposed storm infrastructure. The proposed invert of approximately 75.0m is expected to locate the pipes well above the existing lake bottom and will reduce the likelihood of any sediment entering the pipe. The design of the shoreline works including outfall protection will be undertaken by others and coordinated with future submissions.

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The proposed ROWs within the subject lands have been evaluated and will provide conveyance capacity for the major system flows (evaluated as the 100-year less 10-year storm flows). As shown on the Major System Flows sheet included in **Appendix D**, the conveyance capacity for Street B and the southern section of the proposed Mississauga Road right-of-way is not sufficient to convey the major system flows directed to these areas within the proposed paved area. In future submissions, the conveyance capacity for these sections may be amended by increasing pipe sizes to reduce the contributing overland flow, redirecting flows to other right-of-way areas, or with conveyance swales within the ROW. Example capacity calculations for these conceptual swales are included in **Appendix D** to address conveyance feasibility. Capturing enough to flow in the minor system to avoid the need for swales will require upsizing the final leg of the Mississauga Road storm sewer to a 900x3000mm box culvert and capturing the 100—year flow from Block K and Block P into the minor system. In future submissions, one of these alternative conveyance strategies may be pursued in order to ensure all of the proposed right-of-way's can convey the overland flow directed to them.

As shown on the storm design sheet included in **Appendix D**, the minor system storm sewers that contribute flows to Mississauga Road are over capacity. The drainage areas attributed to these areas were delineated in consultation with the City of Mississauga and are based on the grading and minor system network of the surrounding area. Despite the inability of the existing minor system storm sewers to convey the flows attributed to them in the design sheet, these contributing flows have not been reduced in order to account for any future works that may expand the capacity of the minor system flows.

Refer to Drawing STM-1, STM-2 and Appendix D for further details.

STORMWATER MANAGEMENT

Quantity Control

Due to the subject site's close proximity to Lake Ontario, quantity control is not required according to City and CVC guidelines. Major system flows in excess of the 10-year storm event will be conveyed within the site to the proposed storm sewer outfalls to Lake Ontario site via right-of-way's within the subject land. Major system flows will be captured upstream of the outfall pipes. The location and inlet capacity of the 100-year capture points are shown on **Drawing STM-2**. The outfalls beneath the Water Front Trail will be sized for the greater of the 100-year or Regional storm flows.

Quality Control

Although quantity control is not required for the development, the standard MOECC stormwater management quality criteria for TSS removal apply to this site. Controls will be designed to provide an Enhanced Level of water quality protection to ensure removal of 80% of suspended solids.

There is an opportunity to explore LID or other sustainable best management practices to provide water quality and erosion control since a conventional end-of-pipe facility is not required. A treatment train approach including possible LID measures and Oil Grit Separators (or other mechanical separators) will be implanted to provide quality control. The use of potential LID measures can also address the City's target infiltration volume (10mm), although it should be noted that opportunities for infiltration will be limited on the site plan areas due to underground parking structures. However, due to the nature of the soil removal and remediation required for the subject lands, there may be unconventional flexibility to specify the new soil type/composition for the development in the open space or ROW areas. Since most LID practices are limited or defined by soil characteristics, there may be a wider range of practices available to achieve the stormwater management and infiltration objectives for the site. Potential LID measures are illustrated on the **Drawing LID-1** and are described below.

Low-Impact Development – Applications and Analysis

LID BMP DRAINAGE STRATEGY

Low-Impact Development (LID) best management practices (BMPs) provide water quality improvements prior to drainage entering the storm sewer system. This 'first flush' conveys the vast majority of pollutants that accumulate on roadways and paved areas. LID BMPs provide treatment to overland flows. Consequently, discharge from the proposed LID BMPs shown on **Drawing LID-1** is intended to match the overland drainage paths shown on **Drawing STM-2**. LID BMP discharge will be captured into the minor system within each block and will not drain onto the surface of the proposed right-of-ways. This will prevent the treated drainage from being exposed to pollutants on the proposed right-of-ways and prevent the need to oversize quality control features intended for the treatment of right-of-way areas. Right-of-way areas will have a distinct treatment strategy that will provide 80% TSS removal for right-of-way drainage before it enters the minor system storm sewers.

LID BMPs within the site and, if necessary, selectively applied OGS units will be designed to provide 80% TSS removal to all drainage before it enters the minor system storm sewers in the proposed right-of-ways. This treatment strategy will make all right-of-way storm sewers 'clean' sewers that will not require additional treatment at connections to the storm sewers external to the site on Mississauga Road.

The footprint and quantity of LID BMPs shown on **Drawing LID-1** represents one possible LID BMP allocation plan that can provide 80% TSS removal for the site as a whole. The precise locations of the LID BMPs throughout the site may be adjusted in future submissions according to inputs from the consulting team and the City of Mississauga.

TREATMENT TRAIN ANALYSIS

LID BMP performance can be improved by incorporating each feature into a treatment train, where drainage from one feature is discharged into another feature. This configuration can compound the treatment provided. The ultimate TSS that results from a treatment train of LID BMPs can be represented by the following formula:

$$TSS_{final} = 1 - ((1 - \left(\frac{A_1}{A_t} * TSS_1\right) * (1 - \left(\frac{A_2}{A_t} * TSS_2\right) * (1 - \left(\frac{A_3}{A_t} * TSS_3\right)$$

TSS_n = % TSS removal from LID_n
A_1 = Contributing Area of First LID in the treatment train
A_t = Total contributing drainage area requiring treatment
A_2 = Area from A_1 that is also treated by LID_2
A_3 = Area from A_1 that is also treated by LID_3

This formula was used in the LID BMP tables in **Appendix D** only when drainage from one LID BMP drains directly to a second LID BMP.

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SITE PLAN LID BMPS

LID BMPs for the site plan areas were screened for potential feasibility based on the proposed land uses, site design, grading, and budgetary constraints. Drainage from each block will receive as much quality treatment as possible from LID BMPs within the block before being discharged into the right-of-way storm sewers. As shown in the LID BMP table included in **Appendix D,** drainage from each block may not receive 80% TSS removal prior to entering the minor system due to the constraints listed above. However, the weighted average TSS removal for the site as a whole will be 80% or greater.

In this functional servicing report, the following categories of LID BMPs have been allocated for the quality control within the Port Credit West Village site.

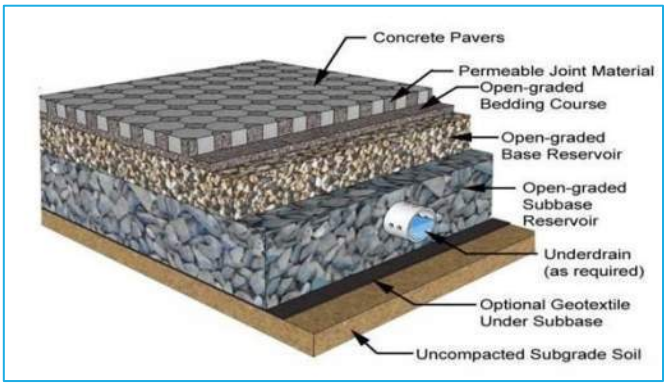
- Bio-Retention
- Bio-Swales
- Green Roofs
- Permeable Pavement

Each of these categories represents a range of possible technologies that fits a particular purpose. Bio-Retention facilities collect drainage in depressions and use vegetation to filter out particulates and hydrocarbons before discharging the drainage into the storm sewer system or to another LID BMP. Bio-Swales also provide vegetative filtration by conveying drainage through swales constructed from an engineered vegetative media. Permeable Pavements attenuate peak runoff flows by adsorbing and infiltrating surface runoff from the overlying and surrounding areas. Green Roofs can consist of a variety of vegetative options that can provide benefits including stormwater controls, recreational spaces, heat dissipation, and air quality improvements.

Aside from Green Roofs, each LID BMP is heavily dependent on detailed site grading, which dictates how much drainage is directed to the LID BMP. Different LID BMP categories have specific ratios of LID BMP footprint to contributing drainage area that the LID BMPs can provide full treatment for. In order to optimize the effectiveness of the LID BMPs allocated for the site, each block will have to be graded such that the correct amount of site drainage reaches each LID BMP feature. While preliminary grades have been produced, this finer level of detail will be achieved at the detailed design stage. Care will be taken during detailed design to orient the LID BMPs such that major overland flows will bypass the LID BMP in order to mitigate erosion of the feature.

For this functional servicing report, preliminary LID BMP locations and footprints have been determined based on municipal quality control criteria and the siting requirements of each LID BMP. These preliminary locations can be seen in **Drawing LID-1**. The calculations to determine the LID BMP footprints, and associated quality improvements within each block are included in **Appendix D**.

Green roof areas were allocated such that each roof will receive sunlight throughout the day. Only half of the available high rise areas have been allocated as green roofs due to the need for rooftop utilities and servicing. Green roofs have also been allocated to some mid-rise buildings on the site. The allocation of green roof areas within each block as shown in **Drawing LID-1** is preliminary and may change in future submissions, however the total green roof area throughout the site will likely remain the same.



Permeable Pavement areas have been allocated wherever they can be situated in the highest concentration to reduce installation costs and where vehicular traffic will be light to reduce compaction and future maintenance costs.

Bio-Swales have been located in areas with long and uninterrupted stretches of green space. Due to this space requirement, the majority of bio-swales are located along right-of-ways or on blocks allocated as public park land. While these swales will be helpful in collecting and conveying drainage within the park blocks, they will not provide significant water quality improvements for the overall site unless they can receive some roadway drainage from the adjacent private blocks.

Wherever possible, Bio-Retention facilities have been sized to provide full treatment for the block area. According to CVC/TRCA design criteria, Bio-Retention facilities can be designed to treat a contributing drainage area that is up to 15 times the size of the bio-retention footprint. Therefore, the bio-retention facilities have been sized to be 1/15th of the contributing block drainage area to maximize use of this particular BMP.

On the design sheet included in **Appendix D**, the contributing block drainage area is labelled C_{in}. The contributing block drainage area is not the entire area of the block. Areas such as rooftops and the LID footprint area do not require quality treatment and will therefore not be conveyed to the LID BMPs for quality control. The C_{in} area included in **Appendix D** is calculated as the total block area minus the sum of the LID area and the rooftop area which will be directed to rain barrels or cisterns for capture.

With conservative estimates of TSS removal efficiencies, nearly 80% TSS removal is possible. However this may need to be supplemented with OGS units in certain areas. At the detailed design stage, further refinement of the LID design and simulation of TSS removal will likely improve the treatment train efficiency and it is possible that the OGS units may not be required.

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LID BMPS FOR QUANTITY CONTROL

Two LID BMP systems are proposed to control the flows from rooftop areas within the site. As shown on **Drawing LID-1**, each row of townhouses will be outfitted with rain barrels on either end of the row. Rooftop flows will be directed to these rain barrels through gutter systems that extend across the townhouse row. High-rise buildings will be outfitted with cisterns that will be incorporated into the building foundations. Preliminary locations of these cisterns are shown on **Drawing LID-1**. Rooftop drainage from high-rises will be directed to the cisterns through internal conveyance systems. Drainage collected by these LID BMPs may be re-used for irrigation purposes.

Proposed LID BMPs will ensure that rooftop flows, which do not need quality control, are not directed onto roadways where they would require treatment. As mentioned in the previous section, the retention of rooftop drainage reduces the contributing drainage area to the LID BMPs that provide quality control to the site areas and the right-of-way areas. Details related to the design and capacity of the LID BMPs for quantity control are included in **Appendix D**.

LID BMPS FOR RIGHT-OF-WAY AREAS

The LID BMPs considered for the right-of-ways (ROWs) are different than those considered for site plan areas due to the space constraints inherent to ROWs. Some of the LID BMPs considered for right-of-way areas use the same mechanisms as site plan LID BMPs, such as bioretention, but are distinct technologies designed for right-of-way application. The proposed municipal (ROWs) included in the site plan will receive quality control through two distinct quality control treatment trains. Both treatment train regimes are designed to provide 80% TSS removal for the ROW area as per the MOECC 'Enhanced' water quality criteria. The right-of-way areas where each of these treatment trains will be applied are shown in **Drawing LID-1.**

Treatment Train 1

The right-of-ways in the northern portion of the site will be treated by Filterra bio-retention pits, vegetated swales, and catch-basin (CB) shields.

Drainage from the ROWs will be conveyed through curb cuts to bio-swales within the boulevard for preliminary treatment and conveyance. Swale drainage will be conveyed to Filterra bio-retention pits which consist of small trees planted within an engineered soil media which filters out finer particulates through a variety of media and filters and into an underdrain connected to the minor system storm sewers. The trees within the Filterra pits generally grow to a height of two to four meters. The Filterra pits will be sized to capture all of the first flush road drainage.

Finally, CB shields will be installed to capture the discharge from the Filterra pits before the drainage enters the public storm sewer system. CB shields will be placed on either side of the right-of-way and will be sized and spaced according to the optimal unit capacity that will ensure complete capture of the first flush road drainage.

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Treatment Train 2

The right-of-ways in the southern portion of the site will be treated with a treatment train that will utilize LID BMP systems that facilitate much larger tree growth than the Filterra bio-retention pits. The tree pits used in Treatment Train 2 will use load-bearing soil modules to allow for higher porosity soil and enhanced root propagation beneath paved surfaces without putting those paved surfaces at risk. The soil within these modules will also provide quality improvements beyond those of the Filterra pits, eliminating the need for CB shields.

As in Treatment Train 1, right-of-way drainage will be conveyed through curb cuts to bio-swales in the boulevard. These bio-swales will provide preliminary treatment and will convey drainage to enhanced tree pits. Treatment Train 2 has been applied to the right-of-ways that are expected to receive the most pedestrian traffic. The enhanced tree pits used in these areas will provide shading for pedestrians and habitats for birds, improve air quality in the surrounding area, and will eventually create a canopy over the right-of-way, adding valuable character and aesthetics to the streetscape.

Conceptual LID Measures for Illustrative Purposes Only

Refer to Drawing LID-1 and Appendix D for further details.

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EROSION AND SEDIMENT CONTROL

The erosion and sediment control plan for the site servicing program of the subject lands will be designed, approved, and implemented in conformance with the City of Mississauga, Credit Valley Conservation and MOECC recommendations.

Erosion and sediment control will be implemented for all construction activities including topsoil stripping, foundation excavation and stockpiling of materials. During construction, temporary sediment ponds may be required to treat pre-development drainage from stripped areas. The sediment control plan will be designed / coordinated with the soil remediation works.

The temporary ponds will be located at the low points of the site to detain sediment laden runoff and reduce peak flows and velocities prior to release into the receiving systems. The temporary silt ponds will maintain a permanent pool as per the MOE guidelines for temporary sediment control facilities. Forebay areas will be provided to enhance sediment removal.

The following erosion and sediment control measures will be installed and maintained during construction of the subdivision:

- A temporary sediment control fence will be placed prior to grading
- A construction plan will be implemented to limit the size of disturbed areas and to minimizing nonessential clearing
- Sediment traps will be provided
- Gravel mud mats will be provided at construction vehicle access points to minimize off-site tracking of sediments
- All temporary erosion and sediment control measures will be routinely inspected and repaired during construction. Temporary controls will not be removed until the areas they serve are restored and stable.

Recognizing that erosion and sediment control is a dynamic process, a detailed set of staging plans / construction sequencing will be required for the various stages of remediation, earthworks, servicing, site plan construction, and stabilization, coupled with the proposed development phasing.

CONCLUSIONS

The proposed Port Credit West Village Partners Inc. development can be adequately serviced through a combination of existing and proposed municipal infrastructure. In summary:

- Sanitary Servicing will be accomplished by the extension of a new municipal sanitary sewer from the existing Front Street SPS to the subject lands and the construction of local sanitary sewers.
- Water servicing for domestic potable and fire protection will be through connections to the existing system and the construction of local watermains. The Region of Peel's proposed 600mm watermain is not required to service the subject lands.
- Storm drainage will include the construction of local storm sewers designed to convey the 10 year flow. Sections of storm sewer in close proximity to Lake Ontario and along Mississauga Road will be designed for the 100-year peak flows.
- Stormwater quantity control is not required due to the closer proximity to Lake Ontario. Major system flows will be captured in sewers directly upstream of the outlet pipe.
- Quality control will be provided through a treatment train approach to be further explored as the concept develops.
- Grading will be in accordance with City of Mississauga requirements and minimize on site earthworks in order to maximize reuse of soils within the property and minimize the need for retaining walls.
- Erosion and Sediment Control measures will be designed in accordance with City of Mississauga, MOECC and CVCA requirements.

APPENDICES

Appendix A – Geotechnical Investigations (Stantec)
Appendix B – Sanitary Sewer Design Calculations
Appendix C – Hydraulic Modelling Analysis (AECOM)
Appendix D – Storm Servicing Design Calculations
Appendix E – Right-of-Way Cross Sections

Figures & Drawings:

Figure 1	*Site Location Plan*
Figure 2	*Concept Plan*
Figure 3	*Existing Conditions Plan*
Figure 4	*Draft Plan*
Figure 5	*Conceptual Phasing Plan*

Drawing GR-1	*Conceptual Grading Plan*
Drawing SAN-1	*Conceptual Sanitary Servicing Plan*
Drawing WM-1	*Conceptual Water Servicing Plan*
Drawing STM-1	*Conceptual Minor System Storm Servicing Plan*
Drawing STM-2	*Conceptual Major System Storm Servicing Plan*
Drawing LID-1	*Preliminary Low Impact Development Plan*

APPENDIX A

Geotechnical Investigations (Stantec)

- *Final Report - Geotechnical Feasibility Study (Stantec, 2018)*

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Final Report
Geotechnical Feasibility Study - Development of 70 Mississauga Road South, City of Mississauga, ON

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Project No. 122120255

March 1, 2018

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1.0 INTRODUCTION

Port Credit West Village Partners Inc. (PCWVP) is planning to re-develop the property located at 70 Mississauga Road South, in the City of Mississauga. It is understood that the proposed re-development will consist of a combination of residential, commercial and institutional land use.

Stantec Consulting Ltd. (Stantec) was retained by PCWVP to provide environmental, hydrogeological and geotechnical engineering services for the planned re-development. The geotechnical services were required to support the permitting requirements, provide an overview of the soil, groundwater and bedrock conditions, and provide technical input to support the feasibility and preliminary design process.

The geotechnical work was completed in accordance with the proposal submitted to PCWVP dated September 1, 2017 (Proposal No. 1221-20255) and subsequent approval provided on September 6, 2017.

An initial draft report dated December 14, 2017 was prepared based on the scope of development under consideration at that time. Since the issue of the initial draft report, the scope of development has been revised. This current version of the draft report considers the revised scope of development as described herein.

The results of the environmental investigation of the subject property and the hydrogeological assessment of the subject property are reported under separate cover. Comments with respect to the environmental and hydrogeological investigations are included in this geotechnical report but are limited and intended solely for reference and consideration as they apply to the geotechnical characterization of the subject property. The reader is referred to the environmental and hydrogeological reports for additional information. Limitations associated with this report and its contents are provided in the statement included in **Appendix A**.

2.0 SITE DESCRIPTION

The subject property is located at the municipal address of 70 Mississauga Road South. The location is illustrated on the key plan on Figure No. 1 in **Appendix B**.

The subject property is located immediately adjacent to Lake Ontario and consists of approximately 30 hectares of land. It is bound by Mississauga Road South to the east, Lakeshore Road to the north and residential properties on Pine Avenue South to the west. There is a City owned walking path along the shoreline of Lake Ontario to the south.

It is understood that the property was the site of a brickyard in 1888. Infrastructure on the property at that time included a brick pressing plant and a large boat slip located in the east

corner of the property. An excavation in the underlying shale bedrock (a portion of which remains to the current day) provided raw material for the manufacture of the bricks.

The property was the site of oil refining operations commencing around 1933. The infrastructure included large tank farms, settling ponds, separators, recovery trenches, a firehall, a dryer and machine house, as well as several office buildings and workshops. The boat slip located in the east corner of the site was filled in as was the west portion of the excavation referred to as the shale pit. The remaining portion of the shale pit was used for storm water management.

A gas station with a car wash building was located in the north corner of the site.

Based on aerial photos of the site taken in 1960 and 1965, it is also understood that there has been historic infilling of the lake along a portion of the southeast boundary of the property.

The bulk of the infrastructure associated with the brick yard and oil refinery has been demolished and/or decommissioned. However, as noted above, a portion of the original excavation for the shale pit remains in the southeast quadrant of the property as well as a decommissioned oil-water separator located in the south of the property.

In addition, the gas station kiosk and car wash buildings in the north corner of the property remain, however the gas station is no longer in operation. One of the buildings is currently being refurbished to function as a temporary meeting space for stakeholders during the planned re-development of the subject property.

Remaining development on the property is limited to the following:

- An existing building in the northeast quadrant, near the intersection with Bay Street. It is understood that this was the firehall building. The building dimensions are in the order of 9 m by 15 m.
- A small sea container adjacent the location of the former firehall.
- The floor slab for a small building in the east corner of the property. The slab is approximately 15 m by 30 m.

The private utility locates completed on the property for purposes of the subsurface investigation indicated the presence of the following buried utilities:

- Several watermains located at the site of the former gas station.
- A gas main located at the site of the former gas station (unknown if active).
- Several inactive electrical services at the site of the former gas station. These services could not be traced, but are noted to still be present in the ground.
- A watermain located parallel to the northwest and southwest sides of the property boundary, with several perpendicular laterals to the interior of the property, and one lateral from approximately the west corner that continues to the east across the property.

- A watermain located underneath the paved access road along the northeast side of the property.
- A hydro cable located parallel to the northeast side of the property, south adjacent to the paved access road. This cable turns south near the east corner of the property, and continues parallel to the southeast side to the south corner.
- An unknown cable conduit located parallel to the northeast side of the property, in the east corner.
- Several watermains, hydro cables and unknown cables extending to the northeast and southwest of the building located on the northeast side of the site.

The ground surface cover across the majority of the site consists of tall grass, shrubs and small trees though there are several paved access roads and one parking area at the site entrance from Mississauga Road South.

The ground surface topography on the subject property generally slopes down from northwest to southeast, however, there are many localized areas that are above or below the general site grade. It is presumed that these areas are the locations of former buildings and/or infrastructure that have been demolished or decommissioned. The ground surface elevations recorded at the borehole locations (discussed further in subsequent sections of this report) indicated a maximum grade difference of approximately 6 m from the north to the south.

3.0 ENVIRONMENTAL CONDITIONS

As stated in a preceding section, this report is focused on the geotechnical aspects of re-development of the property. Environmental aspects are addressed under separate cover. The following comments and information is provided for general reference in the context of conducting the geotechnical investigation and in providing geotechnical guidance on the project.

A report titled “Phase One Environmental Site Assessment (ESA), 70 Mississauga Road South, Port Credit, Ontario”, dated August 17, 2017, was prepared by Stantec for PCWVP. This report identified several areas of known soil and groundwater contamination on the subject property as well as several areas of potential environmental concern associated with the property’s historical use.

A Phase Two Environmental Site Assessment (ESA) was undertaken by Stantec. The report was titled “Summary of Phase Two Environmental Assessment and Conceptual Site Model, 70 Mississauga Road South, Mississauga, Ontario” and dated March 1, 2018.In consideration of the results of the Phase I and Phase II ESAs and the known and potential environmental contamination, an environmental remediation program is intended to be conducted in conjunction with site preparation activities for re-development of the property. The program will include excavation of impacted soil and bedrock and removal and treatment of impacted

groundwater. The program will include localized backfilling of some areas to support the scope of the planned re-development.

Geotechnical comments associated with the remediation program are included herein where appropriate. For reference, the area of known environmental contamination and intended remediation is shown in grey on Figure 1 in **Appendix B**.

4.0 PROPOSED DEVELOPMENT

4.1 INITIAL PROPOSED SCOPE OF DEVELOPMENT (2017 PLAN)

The following preliminary design drawings were reviewed in the course of developing the scope of the geotechnical investigation as described herein:

- Development plan dated July 10, 2017 prepared by Giannone Petricone Associates (GPA), project architects
- Drawing No. 5 – Parking, dated August 21, 2017 prepared by GPA
- Site Plan dated August 2017 prepared by GPA
- Drawing GR-1 – Preliminary Grading Plan dated August 2017 prepared by Urbantech Consulting (UrbanTech), project civil consultants

The drawings indicated that the residential development would consist of: one to three storey townhouses, three to eight storey mid-rise buildings and nine to fifteen storey towers; the commercial development would consist of one to three storey buildings; and, the institutional developments would consist of one to three storey buildings and nine to twenty-six storey residential towers.

The scope of development was broken into a number of building blocks. The designated building blocks and associated number of underground levels proposed in the 2017 plans is shown below in Table 4-1.

Table 4-1: Proposed Development Blocks & Number of Underground Levels (2017 Plan)

Building Block	Number of Underground Levels
A	Slab-on-grade
F1, F2, F3, I1, I2, O1, O2, D, K1, K2, L1, L2, Q2, M, R	1
C1, C2, H	1.5
B, U1, U2, T, O3, P	2
G, Q1	3
N, J, S	N/A

4.2 REVISED SCOPE OF DEVELOPMENT (FEBRUARY 2018 PLAN)

GPA subsequently released a revised scope of development and new plans were issued.

The following design drawings were reviewed for the purpose of revising the draft geotechnical report:

- West Village Lands, Master Site Plan Diagrams, dated February 21, 2018 prepared by GPA
- Preliminary Grading Plan, dated March, 2017 prepared by Urbantech

The 2018 plans indicate that the proposed re-development will still consist of a combination of residential, commercial and institutional land use. However, the residential development will consist of one to four storey townhouses, eight to fifteen storey mid-rise buildings and sixteen storey or greater high rise buildings; the commercial development will consist of two storey buildings and eight storey mixed-use buildings (commercial and residential); and the institutional developments will consist of eight to fifteen storey buildings. The 2018 plan also indicates areas of planned "open space" presumed to represent parkland or similar.

The number and limits of the proposed building blocks in the 2018 plans was slightly different than that under consideration at the time of the 2017 plans. The number of building blocks and respective underground levels and aboveground storeys currently proposed is shown below in Table 4-2.

Table 4-2: Proposed Development Blocks – Number of Underground Levels and Aboveground Storeys (2018 Plan)

Building Block	Number of Underground Levels	Building Type(s)	Number of Storeys
A	2	Low Rise	1 -4
B	2	Low Rise Mid Rise	2 2 - 8
C	1 (Specified)	Low Rise	2 – 3
D	Assumed 1 (Not Specified)	Low Rise	1 – 4
F	2	Low Rise	1 – 4
G	3	Mid Rise	2 – 8
H	3	Mid Rise	8
I	Assumed 1 (Not Specified)	Low Rise	1 – 4
K	3	Low Rise Mid Rise High Rise	1 – 4 2 – 8 18
L	Assumed 1 (Not Specified)	Low Rise	1 - 4
M	1 (Specified)	Low Rise	1 – 4
O	Assumed 1 (Not Specified)	Low Rise	1 – 4

Building Block	Number of Underground Levels	Building Type(s)	Number of Storeys
	2	Mid Rise	5 - 10
P	3	Mid Rise High Rise	2 – 8 22 – 26
Q	Assumed 1 (Not Specified) Assumed 1 (Not Specified) 2	Low Rise Mid Rise High Rise	1 – 4 6 22
R	1 (Specified)	Low Rise	1 – 4
T	2.5	Mid Rise	8 – 10
U	2.5	Low Rise Mid Rise	4 1 – 15
E, N, J, J2, S	NA	NA	NA

The location and limits of the building blocks and alignments of the associated roads are illustrated on Figure No. 1 in **Appendix B**.

5.0 SUBSURFACE CONDITIONS OVERVIEW

5.1 REGIONAL GEOLOGY

5.1.1 Sources of Information

The following resources were reviewed in consideration of the geotechnical conditions associated with site:

- The Physiography of Southern Ontario, by Chapman and Putnam (1984);
- The Quaternary Geology of Ontario, Southern Sheet, Map 2556, by Ministry of Northern Development and Mines (1991); and,
- The Bedrock Geology of Ontario, Southern Sheet, Map 2544, by Ministry of Northern Development and Mines (1991).

5.1.2 Overburden

The Physiography of Southern Ontario by Chapman and Putnam (1984) indicates that the site is situated in the physiographic region denoted as the Iroquois Plain. The overburden in the area is typically comprised of sand plains.

The Quaternary Geology of Ontario, Southern Sheet, Map 2556, issued by the Ministry of Northern Development and Mines, 1991, indicates that the region of the subject property is comprised of glaciolacustrine deposits consisting of sand, gravelly sand and gravel, and nearshore beach deposits.

Although the sources above indicate the presence of coarse grain (granular) soils in the immediate area of the subject property, Chapman and Putnam indicates the presence of till plains and Map 2566 indicates the presence of silt and clay glaciolacustrine deposits in proximity to the east.

5.1.3 Bedrock

The Bedrock Geology of Ontario, Southern Sheet, Map 2544, issued by the Ministry of Northern Development and Mines, 1991, indicates that the bedrock underlying the region comprises shale and limestone of the Georgian Bay Formation.

5.2 PREVIOUS INVESTIGATIONS

5.2.1 In the Area of the Subject Property

Several geotechnical investigation reports for locations within approximately 1 km of the subject property were reviewed to provide information regarding the anticipated subsurface conditions.

One report referenced the presence of asphalt and fill materials underlain by silty clay glacial till with bedrock (consisting of shale interbedded with calcareous shale, limestone and calcareous sandstone) encountered at depths ranging from 7.6 m to 9.1 m (elevations ranging from 71.5 m to 71.1 m).

Another report referenced the presence of fill materials underlain by a thin deposit of sand and silt, underlain by silt glacial till with bedrock consisting of shale interbedded with limestone, dolostone, shaley limestone and calcareous sandstone, encountered at depths ranging from 7.6 m to 9.1 m (elevations ranging from 71 m to 68 m). Groundwater was reported at elevations ranging from 74 m to 75 m, similar to the water level elevation of Lake Ontario.

Another report referenced the presence of fill materials underlain by surficial deposits of sand and silt, underlain by clayey silt till with bedrock consisting of shale interbedded with limestone, dolostone, shaley limestone and calcareous sandstone encountered at depths ranging from 6.9 m to 8.5 m (elevations ranging from 72 m to 68.8 m). Groundwater was reported at an elevation of approximately 75 m, similar to the water level elevation of Lake Ontario.

5.2.2 On the Subject Property

Environmental Site Assessments (ESAs) have been completed on the property. The ESAs included a large number of boreholes and test pits. A limited number of the boreholes included Standard Penetration Tests. There was no coring of the underlying bedrock included in the environmental work. Localized fill materials were encountered in many of the boreholes and test pits. The fill varied from sand and gravel to sand to silty sand and was typically no more than 3.5 m deep. However, a few exceptions were noted. At the location of the abandoned shale pit

the fill material was reported as being approximately 9 m deep, and towards Lake Ontario in the area of the shoreline infill the fill material was reported as being approximately 4 m to 5 m deep.

The overburden encountered in the boreholes and test pits consisted predominantly of brown and grey sandy silt with silty clay/clayey silt layers and localized (discontinuous) sand layers.

The overburden was underlain by weathered shale bedrock. Cross sections included in one of the reports indicated the depth to the bedrock was typically in the range of 1 m to 6 m (Elevations ranging from 83.6 m above mean sea level (AMSL) in the northwest corner of the property to 68.9 m AMSL in the southeast corner of the property) though the data set was incomplete. Another report stated that bedrock was encountered at depths ranging from 0.7 m to 11 m.

Groundwater was reported in the overburden and in the underlying bedrock. The average depth to groundwater in the overburden was 1.8 m below ground surface (BGS), with a maximum observed depth of 6.8 m BGS. The average depth to groundwater in the bedrock was 3.8 m BGS with a maximum depth of 11.4 m BGS.

6.0 GEOTECHNICAL INVESTIGATION

6.1 SCOPE OF FIELD PROGRAM

The purpose of the preliminary geotechnical investigation was to:

- Classify soils with consideration for:
  - Suitability for placing buildings on the soil strata;
  - Use as structural engineered fill (below building foundations); and,
  - Use as general compacted fill for other areas.
- Identify the depth to bedrock; and,
- Assess the quality of the bedrock.

The scope of the preliminary geotechnical investigation was developed in consideration of the scope of development set forth in the 2017 plans. The scope of the investigation considered the available background subsurface information and discussions with and input from the project design team, including requirements associated with the environmental investigation of the property. The general scope of the investigation undertaken is outlined in Table 6-1 below.

Table 6-1: Proposed Scope of Work

Category	No. of Boreholes	Borehole Labels	Maximum Depth	Overburden Sampling	Bedrock Coring
Building Blocks	30	BH17-027 to BH17-056	If foundation level is in overburden, advance borehole to bedrock contact surface. If foundation level is in bedrock, advance borehole 1.5 m to 3.0 m below the lowest underground parking level	No sampling in remediation zone[2] Auger grab sampling if garage FFE elevation < BR elevation and outside remediation zone SPT[3] if Garage FFE elevation > Bedrock elevation	Garage FFE[1] > Bedrock elevation None; Auger refusal Garage FFE < Bedrock elevation 1.5m below garage FFE (slab-on-grade) 1.5 m below garage FFE (for 1 level underground) 1.5 m below garage FFE (for 2 & 3 levels underground), but a minimum of 3 m total core
Roads	30	BH17-057 to BH17-086	Bedrock or 5 m Below grade (whichever is less)	No sampling in remediation zone[2] SPT outside remediation zone	None; Auger refusal
Services	5	BH17-087 to BH17-091	Bedrock or 7 m Below grade (whichever is less)	No sampling in remediation zone SPT outside remediation zone	None; Auger refusal

Notes:
1 Garage Finished Floor Elevation (FFE) – based on general ground surface topography minus the number of underground levels for the respective building block (1 level 3.6 m/ 1 1/2 - 2 levels 7 m/ 3 levels 9.9 m)
2 In consideration of the scope of the Phase 2 ESA and subsequent targeted environmental remediation program, full depth excavation and removal of the overburden will be undertaken in select areas of the site and therefore there was no geotechnical sampling of overburden in those areas.
3 Standard Penetration Test (SPT)

The number of boreholes proposed for the building blocks was based on advancing at least one (1) borehole for each block and/or to accommodate requests from the design team. The number of boreholes proposed for the roads was based on a general spacing of 50 m consistent with the City of Mississauga permitting requirements. An additional five (5) boreholes were advanced to confirm conditions where storm servicing was anticipated to be required.

Based on the 2018 plans, nine (9) of the boreholes initially intended for the roads are now in areas of proposed building blocks or open space. These boreholes include: BH17-065, BH17-066, BH17-070, BH17-071, BH17-073-D, BH17-075, BH17-076, BH17-077, and BH17-078. It is noted that the locations of these boreholes are within approximately 25 m of the new proposed road locations.

Following completion of the field investigation, a geotechnical laboratory testing program was to be conducted on representative samples of the predominant overburden strata and the underlying bedrock.

Following the completion of the field investigation and laboratory testing program, a geotechnical report was to be prepared that included the following:

- Description of the purpose of the investigation
- Site description
- Review of regional and/or local geological conditions based on referenced documents/reports as may be available
- Borehole records (produced using gINT or similar software)
- Rock Core Photo Logs for select boreholes
- Field investigation and laboratory testing program procedures
- Results of geotechnical laboratory testing
- Summary of engineering properties of the predominant native soil strata encountered in the boreholes addressing the frost susceptibility, natural moisture content, compaction characteristics, and bulk density/unit weight
- Comments and recommendations for:
  - Stripping and removals
  - Trench excavation
  - Stability of open cut excavation and requirements for temporary shoring
  - Presence of groundwater and requirements for temporary control during construction
  - Reuse of excavated materials including handling, placement and compaction procedures and specifications
  - Sub-grade preparation service bedding and trench backfill
  - Road restoration including pavement design consistent with City and Regional Standards
- Results of geotechnical chemical testing including comments and recommendations regarding:
  - Corrosion potential of predominant soil strata encountered
  - Potential for degradation of buried concrete in the presence of soluble sulphates and recommendations for cement type for use in buried concrete
- Appendices that would include:
  - Key plan showing the location of the project
  - Borehole Location plan
  - Borehole Records
  - Geotechnical laboratory test results

6.2 METHOD OF INVESTIGATION

6.2.1 Field Program

Prior to commencing the field investigation, the various public utility companies were consulted to identify where public utilities crossed the property boundaries. In addition, a private utility locating firm was retained to identify all private utilities on the property and clear the specific locations of the boreholes. Although it was anticipated that all services on the property were cut off and decommissioned, a number of active services were identified.

The boreholes were advanced during the period of September 18 to October 5, 2017. Eleven (11) groundwater monitoring wells were installed as a component of the investigation. The groundwater monitoring wells were installed in the underlying bedrock primarily for purposes associated with investigating the potential presence of environmental contamination. The locations of the boreholes and monitoring wells are shown on Figure 1 in **Appendix B**.

The boreholes were advanced using a track mounted drill rig equipped with 150 mm (outside diameter) hollow-stem augers. Stantec personnel recorded the conditions encountered in the boreholes.

In the thirty-five (35) boreholes located outside of the inferred limits of known contamination and intended remediation, samples of the overburden soils were recovered at regular intervals using a 50 mm (outside diameter) split-tube sampler by conducting Standard Penetration Tests (SPTs) in accordance with the procedures outlined in ASTM specification D1586, or grab samples were recovered from the augers at regular intervals. The SPTs permitted characterization of the compactness of the soils (coarse grained) or consistency of the soils (fine grained) in accordance with the framework described in the Canadian Foundation Engineering Manual (2006, 4th Edition).

In twelve (12) of the thirty (30) boreholes located in areas of known contamination and intended remediation, samples were obtained for purposes of environmental characterization. The remaining eighteen (18) boreholes included drilling to the bedrock contact surface but did not include any sampling.

All geotechnical soil samples recovered from the boreholes were placed in moisture-proof bags and returned to our laboratory for detailed geotechnical classification and testing as required.

The underlying bedrock was cored in building boreholes BH17-027 to BH17-047 and BH17-049 to MW17-055-D. The bedrock was also cored in road boreholes MW17-061-D, MW17-073-D, and MW17-075-D to permit installation of groundwater monitoring wells as a component of the environmental investigation.

It is noted that in some of the building boreholes with monitoring well installations, coring was not conducted from the contact surface of the bedrock as a telescopic casing was installed to

prevent migration of possible contamination into the underlying bedrock. Machine breaks and fracturing of the bedrock occurred during the casing installation process, and hence any data obtained from these core runs was not considered representative of the in-situ nature of the bedrock. This condition was encountered in boreholes MW17-032-D, MW17-034-D, MW17-040-D, MW017-44-D, MW17-045-D, MW17-046-D and MW17-055-D. The respective borehole records do indicate the depth/elevation of the contact surface with the shale bedrock, and provide the details on the augering/casing installation interval over which the bedrock condition could not be recorded.

Borehole BH17-051 in the west portion of Building Block Q was extended to a depth of 4.3 m below the estimated finished floor elevation. Although only conducted in one borehole, it was intended that this additional depth of drilling identify if there was a distinctive change in the bedrock quality below the general depth investigated via the other boreholes. This building block was originally selected for the deeper borehole because it was one of two building blocks intended to have three underground levels in accordance with the 2017 plans. The 2018 plans indicate that this block will now require only two underground levels.

The coring was conducted in HQ size (63.5 mm diameter core) in accordance with the procedures outlined in ASTM specification D2113. For each run, the Total Core Recovery (TCR), Solid Core Recovery (SCR), and Rock Quality Designation (RQD) were recorded (Explanations of these characteristics are provided on the Symbols and Terms Sheets in **Appendix C**).

The fracture index of the rock core was recorded in the field as the number of fractures per 0.3 m. These indices were used to classify each foot of rock as follows:

- <1: Slightly Fractured
- 1 – 3: Moderately Fractured
- 4 – 10: Intensely Fractured
- >10: Very Intensely Fractured

The rock was placed in core boxes, labeled and transported to our offices for visual inspection and laboratory testing on select samples.

Groundwater monitoring wells were installed in boreholes MW17-032-D, MW17-032-D, MW17-034-D, MW17-040-D, MW17-044-D, MW17-045-D, MW17-046-D, MW17-055-D, MW17-061-D, MW17-073-D, and MW-075-D. The monitoring wells consisted of 50 mm diameter PVC pipe screened over the inferred depth of the groundwater table or the depth of interest. The screened portion of the installation was backfilled with sand. Bentonite grout was placed above the sand to the ground surface to prevent infiltration of ground surface runoff. The standpipes will require decommissioning in accordance with Regulation 903. It is presumed that this can be carried out by the general contractor at the time of construction.

The boreholes without monitoring wells were backfilled with bentonite grout in accordance with the Ontario Ministry of the Environment and Climate Change (MOECC) Regulation 903.

6.2.2 Survey

The borehole locations were established in the field by an Ontario Land Surveyor. The borehole locations are referenced to the Universal Transverse Mercator (UTM) NAD 83 CSRS northing and easting coordinates and the ground surface elevations are referenced to Canadian Geodetic Vertical Datum (CGVD) 1929/1978 adjustment.

The ground surface elevations at the borehole locations are provided on Figure 1 in **Appendix B** and the Borehole Records included in **Appendix C**.

6.2.3 Laboratory Testing

All soil and bedrock samples returned to the laboratory were subjected to visual examination.

Representative samples of the predominant overburden strata and the underlying bedrock encountered in the boreholes were selected for laboratory analysis. The scope of testing and number of samples tested is shown in Table 6-3 below.

Table 6-2: Laboratory Testing Program

Laboratory Test	Estimated Number of Samples Proposed for Analysis at Time of Proposal	Number of Samples Tested
ASTM D2216 - Moisture Content	250	157
ASTM D422/D – Grain Size/Hydrometer	10	10
ASTM D4318 – Atterberg Limits	10	9
Resistivity, pH, Redox potential, sulfides, and chlorides[1]	22	11
Soluble Sulphates[2]	22	11
ASTM D2938 – Unconfined Compressive Strength for Intact Rock Core Specimens	6	8
ASTM D698 – Standard Proctor Compaction	0	3

Notes:

1 The testing noted is intended for use in assessing the general corrosiveness of the soils and not intended for purposes of environmental characterization associated with the presence or absence of contamination.

2 The testing noted is intended for use in assessing the potential for degradation of buried concrete in the presence of soluble sulphates and to identify the type of cement required to resist possible sulphate attack in accordance with CAN CSA A23.1/2. The testing is not intended for purposes of environmental characterization associated with the presence or absence of contamination.

The number of samples selected for testing differed from the number proposed, reflecting the conditions encountered in the field and the number of samples ultimately collected.

The core runs from six (6) boreholes (BH17-030, BH17-035, BH17-036, BH17-042, BH17-043 and BH17-051) were also tested in the laboratory for the presence of limestone in the bedrock stratigraphy. This testing involved the application of hydrochloric acid (at a concentration of 10%) to the rock

core; limestone effervesces under the application of the acid whereas shale does not. The limestone beds or seams identified through this testing are indicated on the Borehole Records in **Appendix C**.

All samples remaining after testing will be stored in our laboratory for a period of three months from the date of issue of this report.

The results of the laboratory tests are discussed in the text of this report and are provided on the Borehole Records in **Appendix C** and on the figures included in **Appendix D**.

7.0 RESULTS OF INVESTIGATION

7.1 SOIL AND BEDROCK DESCRIPTION AND CLASSIFICATION

The soils encountered in the boreholes advanced outside the limits of known contamination (33) and the boreholes advanced within the limits of known contamination that included SPTs (11) were classified in accordance with the Unified Soil Classification System (USCS). Stantec adopts minor modifications to the USCS Standard consistent with the methods of the Ontario Ministry of Transportation (MTO) including the removal of the descriptions “lean” and “fat” with reference to clay soils, and including a “Medium” category with respect to plasticity.

The soils encountered in the boreholes advanced within the limits of known contamination that did not include SPTs (18), were described based on visual observations of the auger spoils.

In the absence of SPTs in the eighteen (18) boreholes referenced immediately above, the thicknesses/depths of the soil strata encountered in these boreholes could not be accurately determined and is therefore not reported or discussed herein. The depth to the contact surface with the underlying bedrock was still obtained from these boreholes, however, based primarily on auger or sampler refusal and hence this depth is reported and discussed herein.

The bedrock encountered in the boreholes was classified in accordance with the International Society for Rock Mechanics (ISRM) 2007 publication “The Complete ISRM Suggested Methods for Rock Characterization, Testing and Monitoring, 1074-2006”.

With respect to weathering of the underlying shale bedrock, The Ontario Ministry of Transportation and Communication Document RR229, Evaluation of Shale for Construction Projects, includes a typical weathering profile of low durability shale, reproduced from Skempton, Davis, and Chandler. The profile differentiates the shale into three grades of weathering and four zones as described below in Table 7-1.

Table 7-1: Typical Weathering Profile of Low Durability Shale

	Zone	Description	Notes
Fully Weathered	IVb	soil like matrix only	indistinguishable from glacial drift deposits, slightly clayey, may be fissured
Partially Weathered	IVa	soil like matrix with occasional pellets of shale less than 3 mm diameter	little or no trace of rock structure, although matrix may contain relic fissures
	III	soil like matrix with frequent angular shale particles up to 25 mm diameter	moisture content of matrix greater than the shale particles
	II	angular blocks of unweathered shale with virtually no matrix separated by weaker chemically weathered but intact shale	spheroidal chemical weathering of shale pieces emanating from relic joints and fissures, and bedding planes
Unweathered	I	shale	regular fissuring

A summary of the physical properties of the Georgian Bay bedrock was also provided in the Ontario Ministry of Transportation and Communication publication RR229 – Evaluation of Shales for Construction Projects - An Ontario Shale Rating System, dated March 1983. Extracts of the physical properties are presented below in Table 7-2 for reference.

Table 7-2: Typical Physical Properties for the Georgian Bay Formation

	Unconfined Compressive Strength (MPa)	Young's Modulus (GPa)	Poisson's Ratio
Average	28	4	0.19
Range	8 to 41	0.5 to 12	0.10 to 0.25

Reference is also made in this report to the Canadian Foundation Engineering Manual (4th Edition – 2006) [CFEM] where used for purposes of description and classification.

The Georgian Bay formation is known to contain strong to very strong limestone and siltstone beds (e.g. stronger than the prevailing shale) and layers which are typically less than 100 mm thick although layers up to 600 mm thick have been reported. The literature also reports the presence of thin hard beds which, when closely-spaced, can collectively be 1 m thick. The Georgian Bay formation is known to possess “locked-in or residual” horizontal stresses. The magnitude of these stresses varies with depth, but the literature reports a maximum in the order of 25 MPa (Lo, 1987).The Georgian Bay formation is also known to have a tendency to swell on exposure and immersion. A review of literature references indicated that for the Georgian Bay Formation the swelling potential in the horizontal plane could be in the range of 0.01% to 0.43%

per log cycle of time and the swelling potential in the vertical plane could be in the range of 0.2% to 1.4% per log cycle of time. These ranges indicate the anisotropy associated with the formation and the differences to be expected in the vertical and horizontal directions.

7.2 OVERVIEW OF CONDITIONS

The subsurface conditions encountered in the boreholes and monitoring wells are shown on the Borehole and Monitoring Well Records provided in **Appendix C**.

An explanation of the symbols and terms used on the Borehole Records is also provided in the appendix.

In general, the overburden stratigraphy encountered in the boreholes consisted of:

- Ground surface cover consisting of organic ground surface cover with topsoil or asphalt; underlain by,
- Fill materials consisting of sand with gravel, sandy silt, sandy clay with gravel, clay with sand, or clay; underlain by,
- Native clay to clay with sand to clay with gravel.

Inferred shale bedrock (encountered during augering and/or SPT sampling but not cored) was encountered in thirty-two (32) of the boreholes. Confirmed shale bedrock (proven via coring) was encountered in thirty-one (31) of the boreholes. Bedrock was not encountered within the termination depth of two (2) boreholes.

As previously indicated, the groundwater monitoring wells installed for the investigation were screened in the underlying bedrock. The levels recorded ranged from approximately 1.3 m to 5.4 m below the existing ground surface (e.g. elevations ranging from 80.9 m to 75.3 m).

7.3 OVERBURDEN

7.3.1 Ground Surface Cover

Organics and Topsoil

Organics and a layer of topsoil was encountered at the ground surface at twenty-three (23) of the borehole locations. The thickness of the topsoil ranged from approximately 25 mm to 150 mm, with an average of approximately 75 mm.

Asphalt

Asphalt was present at the locations of boreholes BH17-027 and BH17-048. The thickness of the asphalt was approximately 65 mm and 25 mm, respectively.

7.3.2 Fill Materials

Sand with Gravel

Sand with gravel fill was encountered at the ground surface or underlying the ground surface cover described in the preceding section in eleven (11) boreholes. An isolated layer of sand and gravel fill was also encountered underlying the sandy silt fill (discussed below) in borehole BH17-072.

Where the sand with gravel fill was encountered at the ground surface or underlying the ground surface cover, the layer extended to depths ranging from 0.2 m to 2.3 m.

In borehole BH17-072 the sand and gravel were encountered at a depth of approximately 4.9 m and extended to a depth of 5.2 m.

The samples of the sand and gravel fill material obtained from the boreholes generally contained trace silt and clay and occasional cobbles.

N-values of 3 to 42 were obtained from the Standard Penetration Tests (SPTs) advanced in the sand with gravel fill. These values indicate a very loose to dense condition, though the majority of the N-values indicated a compact condition.

Based on visual and textural examination, the samples of the sand with gravel fill materials were generally assessed as dry, with occasional samples and/or zones assessed as wet. The laboratory test results indicated that the moisture content of the sand and gravel fill materials ranged from 2% to 9.2%.

A grain size analysis test was completed on one sample of the sand with gravel fill material. The results of the test are provided in Table 7-3 below.

Table 7-3: Gradation Analysis Test Results for Sand with Gravel Fill Material

Borehole Number	Sample Number	Median Depth (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
BH17-084	SS2	1.1	28	61	8	3

The results of the grain size distribution tests are shown on the Borehole Record sheet included in **Appendix C** and are illustrated on Figure 1 in **Appendix D**.

In accordance with the Unified Soil Classification System, the sample tested can be classified as SAND with GRAVEL (SP).

Sand with gravel fill materials were also inferred to be present at the ground surface of eight (8) borehole locations where no sampling was conducted, and underlying the sandy silt fill (described below) at one (1) borehole location where no sampling was conducted.

Sandy Silt

A layer of sandy silt fill was encountered underlying the ground surface cover or the sand with gravel fill described above, or at the ground surface at fifteen (15) borehole locations. This layer generally extended to depths ranging from 0.6 m to 2.3 m, with an average depth of 1.2 m. One exception is noted; at borehole BH17-072 the sandy silt fill extended to a depth of approximately 4.9 m.

The samples of the sandy silt fill obtained from the boreholes typically contained some clay and trace gravel.

N-values of 4 to 42 were obtained from the SPTs advanced in the sandy silt fill. These values indicate a very loose to dense condition, though the majority of the N-values indicated a compact condition.

Based on visual and textural examination, the samples of the sandy silt fill materials were assessed as dry to wet, though generally moist. The laboratory test results indicated that the moisture content of the sandy silt fill materials ranged from 6% to 18.9%.

A grain size analysis test was completed on one (1) sample of the sandy silt fill material. The results of the test are provided in Table 7-4 below.

Table 7-4: Gradation Analysis Test Results for Sandy Silt Fill Material

Borehole Number	Sample Number	Median Depth (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
BH17-072	SS7	4.1	4	40	39	17

The results of the grain size distribution test are shown on the Borehole Record sheet included in **Appendix C** and are illustrated on Figure 1 in **Appendix D**.

An Atterberg Limits Test was completed on a portion of the sample referenced above. The results of the test are shown in Table 7-5 below.

Table 7-5: Atterberg Limits Test Results for Sandy Silt Fill Material

Borehole Number	Sample Number	Depth (m)	Description	Liquid Limit	Plastic Limit	Plasticity Index
BH17-072	SS7	4.1	Sandy SILT (ML)	NP	NP	NP

The Non-Plastic (NP) result is indicated on the Borehole Record sheet in **Appendix C**. The result is also indicated on the Plasticity Chart in Figure 2 in **Appendix D**.

In accordance with the Unified Soil Classification System, the sample tested can be classified as SANDY SILT (ML).

Sandy silt fill materials were also inferred to be present at the ground surface or underlying the sand with gravel fill at five (5) borehole locations where no sampling was conducted.

Sandy Clay with Gravel to Clay with Sand to Clay

Sandy clay with gravel to clay with sand to clay fill materials were encountered at the ground surface, underlying the ground surface cover, the sand with gravel fill or the sandy silt fill at twenty-one (21) borehole locations. This layer extended to depths ranging from 0.7 m to 3.8 m, with an average depth of 2.0 m. One exception is noted; in borehole MW17-045-D this layer extended to a depth of 8.3 m. This borehole was located in the backfilled shale pit.

N-values of 3 to 35 were obtained from the SPTs advanced in the sandy clay with gravel to clay with sand to clay fill. These values indicate a soft to hard consistency, though the majority of the N—values indicated a firm consistency.

Based on visual and textural examination, the samples of the sandy clay with gravel to clay with sand to clay fill materials were assessed as dry to wet, generally moist. The laboratory test results indicated that the moisture content of the fill materials ranged from 5.2% to 57.2%.

A grain size analysis test was completed on a sample of the sandy clay with gravel fill material. The results of the test are provided in Table 7-6 below.

Table 7-6: Gradation Analysis Test Results for Sandy Clay with Gravel Fill Material

Borehole Number	Sample Number	Median Depth (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
BH17-028	Bulk	2.3	16	29	28	27

The results of the grain size distribution test are shown on the Borehole Record sheet included in **Appendix C** and are illustrated on Figure 1 in **Appendix D**.

An Atterberg Limits Test was completed on a portion of the sample referenced above. The results of the test are shown in Table 7-7 below.

Table 7-7: Atterberg Limits Test Results for Sandy Clay with Gravel Fill Material

Borehole Number	Sample Number	Depth (m)	Description	Liquid Limit	Plastic Limit	Plasticity Index
BH17-028	Bulk	2.3	Sandy CLAY with Gravel (CL)	34	18	16

The results of the Atterberg Limits test are shown on the Borehole Record sheet in **Appendix C**. The results are also indicated on the Plasticity Chart in Figure 2 in **Appendix D**.

In accordance with the Unified Soil Classification System, the sample tested can be classified as SANDY CLAY with GRAVEL (CL).

No laboratory tests were conducted on the clay with sand or clay fill materials. However, these descriptions were assigned based on visual and textural examination of samples in the field and in the laboratory and a comparison and contrast with the native soil strata described below.

Sandy clay with gravel to clay with sand to clay fill materials were also inferred to be present at the ground surface or underlying the sand with gravel fill or sandy silt fill at ten (10) borehole locations where no sampling was conducted.

One (1) Moisture Density Relations Test (Standard Proctor, ASTM D698 Method C) was completed on a portion of the sample of the sandy clay with gravel fill referenced above. The results of the test are shown in Table 7-8 below.

Table 7-8: Standard Proctor Test Result for Sandy Clay with Gravel Fill Material

Borehole Number	Sample Number	Depth (m)	Maximum Dry Density (kg/m^3)	Optimum Moisture Content (%)
BH17-028	Bulk	2.3	1,858	14.8

The results of the Moisture Density Relations Test are illustrated on the figure in **Appendix D**.

7.3.3 Clay to Clay with Sand to Clay with Gravel

A stratum of native clay to clay with sand to clay with gravel was encountered at the ground surface or underlying the ground surface cover or fill materials, in forty (40) borehole. This stratum typically extended to depths ranging from 1.2 m to 5.3 m, with an average depth of 2.5 m. A single exception to this typical range in depth was recorded in borehole MW17-045-D. In this borehole, the stratum extended to a depth of 11.0 m. As stated previously, this borehole was located on the perimeter of the abandoned shale pit in the portion of the pit that was subsequently backfilled. As such, it is suggested that this may be backfill that is well-consolidated.

N-values of 7 to more than 50 were obtained from the SPTs advanced in the clay to clay with sand to clay with gravel soil, though a more typical range was 10 to 40. The lower N-values were typically recorded near the contact surface with the overlying fill, and the higher N-values were typically recorded near the contact surface with the underlying shale bedrock. These values indicate a firm to hard condition.

Based on visual and textural examination, the samples of the clay to clay with sand to clay with gravel soils were assessed as dry to wet, generally being moist. The laboratory test results indicated that the moisture content of the native soil strata ranged from 6.8% to 21.4%.

Grain size analyses tests were completed on seven (7) samples of the clay to clay with sand to clay with gravel soils. The results of the tests are provided in Table 7-9 below.

Table 7-9: Gradation Analysis Test Results for Clay to Clay with Sand to Clay with Gravel Soils

Borehole Number	Sample Number	Median Depth (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
BH17-033	SS3	1.8	2	12	58	28
BH17-035	SS2	1.1	2	8	40	50
BH17-035	SS4	2.5	3	21	52	24
BH17-052	Bulk	2.3	7	22	44	27
BH17-074	SS3	1.8	9	8	57	26
BH17-088	SS2	1.1	1	15	42	42
BH17-090	Bulk	0.6	3	10	60	27

The results of the grain size distribution tests are shown on the Borehole Record sheets included in **Appendix C** and are illustrated on Figures 3 and 4 in **Appendix D**.

Atterberg Limits Test were completed on a portion of the samples referenced above. The results of the test are shown in Table 7-10 below.

Table 7-10: Atterberg Limits Test Results for Clay to Clay with Sand to Clay with Gravel Soils

Borehole Number	Sample Number	Depth (m)	Description	Liquid Limit	Plastic Limit	Plasticity Index
BH17-033	SS3	1.8	CLAY (CL)	38	24	14
BH17-035	SS2	1.1	CLAY (CL)	45	21	24
BH17-035	SS4	2.5	CLAY with SAND (CL)	31	19	12
BH17-052	Bulk	2.3	CLAY with SAND (CL)	35	20	15

Borehole Number	Sample Number	Depth (m)	Description	Liquid Limit	Plastic Limit	Plasticity Index
BH17-074	SS3	1.8	CLAY with GRAVEL (CL)	36	23	13
BH17-088	SS2	1.1	CLAY with SAND (CL)	42	23	19
BH17-090	Bulk	0.6	CLAY (CL)	27	17	10

The results of the Atterberg Limits tests are shown on the Borehole Record sheets in **Appendix C**. The results are also indicated on the Plasticity Chart Figure 5 in **Appendix D**.

In accordance with the Unified Soil Classification System, the samples tested can be classified as CLAY (CL) to CLAY with SAND (CL) to CLAY with GRAVEL (CL).

Clay to clay with sand to clay with gravel soils were also inferred to be present at the ground surface or underlying the fill materials or ground surface cover at thirteen (13) borehole locations where no sampling was conducted.

Moisture Density Relations Tests (Standard Proctor, ASTM D698 Method C) were completed on portions of two (2) of the samples of the clay to clay with sand samples referenced above. The results of the tests are shown in Table 7-11 below.

Table 7-11: Standard Proctor Test Results for Clay to Clay with Sand

Borehole Number	Sample Number	Depth (m)	Maximum Dry Density (kg/m^3)	Optimum Moisture Content (%)
BH17-052	Bulk	2.3	1,803	15.8
BH17-090	Bulk	0.6	1,855	14.9

The results of the Moisture Density Relations Tests are illustrated on the figure in **Appendix D**.

7.4 BEDROCK

Inferred shale bedrock was encountered in thirty-two (32) of the boreholes. Confirmed shale bedrock (proven via coring) was encountered in thirty-one (31) of the boreholes. Bedrock was not encountered within the termination depth of two (2) of the boreholes.

Completely to highly weathered shale bedrock was typically encountered at depths ranging from 1.2 m to 5.3 m (elevations ranging from 82.1 m to 75.8 m). This zone varied in thickness form 0 m to 1.6 m, with a median thickness of about 0.5 m. This highly weathered shale would be characterized as fully weathered to partially weathered in accordance with the MTO Document previously referenced.

Slightly weathered to fresh shale bedrock was encountered at depths ranging from 1.4 m to 5.7 m (elevations ranging from 81.5 m to 75.3 m). The depths recorded do not consider the seven (7) locations where coring commenced below the contact surface with the bedrock (e.g. for installation of the monitoring well casing). The slightly weathered to fresh shale bedrock would be characterized as unweathered in accordance with the MTO Document.

One exception to the general bedrock depths stated above is noted. At borehole MW17-045-D highly weathered shale was encountered at a depth of approximately 11 m below grade (Elevation 70.5 m). As stated previously, this borehole is in the backfilled portion of the excavation for the former shale pit.

The bedrock depths were used to develop the bedrock contour plan shown as Figure 2 in **Appendix B**.

The bedrock encountered was grey to black shale, with occasional grey limestone interbeds. Based on the Moh's hardness scale, the hardness of the shale generally ranged from 2 to 3, whereas the hardness of the limestone generally ranged from 4 to 6.

Table 7-12 below summarizes the data obtained from the boreholes where rock core samples were obtained.

Table 7-12: Bedrock Conditions Summary

Run	TCR (%) / SCR (%)[1]	RQD (%)[1]	Quality[1]	Fracture Index (Fractures/0.3 m)	Comments
1[2]	77 / 54	18	Very Poor	5	Intensely Fractured
2	98 / 82	47	Poor	4	Intensely Fractured
3	97 / 83	46	Poor	3	Moderately Fractured
4	98 / 89	66	Fair	3	Moderately Fractured
5	99 / 89	68	Fair	2	Moderately Fractured
6	100 / 97	87	Good	3	Moderately Fractured
7	99 / 98	70	Fair	3	Moderately Fractured
8	100 / 100	76	Good	3	Moderately Fractured

Notes:

[1] All values in the table represent calculated "medians" of the conditions recorded.
[2] Run 1 ranges from 0.3 m to 1.5 m in length. The subsequent runs are typically 1.4 m in length

Table 7-12 indicates that there is generally a 0.3 m to 1.2 m thick slightly weathered zone of shale bedrock underlying the completely to highly weathered shale zone. Below the slightly weathered zone there is generally a 3 m thick zone of slightly weathered to fresh shale, and underlying this the shale is generally fresh.

Eight (8) samples of the bedrock were selected for laboratory testing. The results of the unconfined compressive strength and unit weight tests conducted on these samples are shown in Table 7-13 below.

Table 7-13: Unconfined Compressive Strength and Unit Weight of Samples of Shale

Borehole Number	Depth Below Grade of Sample Tested (m)	Corresponding Elevation of Sample Tested (m)	Unconfined Compressive Strength (MPa)	Unit Weight (kN/m^3)
BH17-035	4.7	77.9	12.6	25.0
BH17-035	7.7	74.9	9.0	24.9
BH17-035	11.0	71.6	11.8	25.4
BH17-042	4.4	74.3	5.1	25.1
BH17-042	7.9	70.8	5.8	25.5
BH17-051	4.4	75.5	9.1	25.0
BH17-051	10.9	69.0	12.5	25.3
BH17-051	13.8	66.1	17.4	25.1

The results of the unconfined compressive strength and unit weight tests are shown on the figures in **Appendix D**.

In accordance with Table 3.5 in the Canadian Foundation Engineering Manual (2006 Edition), the results of the unconfined compressive strength tests indicate that the samples of the shale bedrock tested could generally be described as weak.

In accordance with Publication RR229 issued by the MTO, the unconfined compressive strength of the Georgian Bay Formation typically ranges from 8 MPa to 41 MPa. The results in Table 7-13 above are within this range, although nearer the lower end which is not atypical.

The results of the testing for limestone interbeds are summarized in Table 7-14 below.

Table 7-14: Depths and Thicknesses of Limestone Interbeds

Borehole Number	Median Depth of Limestone Interbed (m)	Thickness of Limestone Interbed (mm)	Limestone as % of TCR[1]
BH17-030	4.88	50.8	5
	5.46	76.2	
	5.89	31.8	
	6.50	31.8	
	9.40	101.6	
BH17-035	4.92	25.4	8

Borehole Number	Median Depth of Limestone Interbed (m)	Thickness of Limestone Interbed (mm)	Limestone as % of TCR[1]
	5.61	38.1	
	6.27	63.5	
	6.96	38.1	
	7.51	25.4	
	7.95	63.5	
	8.38	50.8	
	8.45	127.0	
	8.83	88.9	
	9.73	50.8	
	11.10	76.2	
	11.71	63.5	
	11.86	50.8	
	12.51	50.8	
BH17-036	NA	NA	0
BH17-042	3.38	127	8
	3.68	50.8	
	5.84	63.5	
	7.21	76.1	
BH17-043	4.56	139.7	8
	4.89	25.4	
BH17-051	2.80	139.7	5
	3.70	25.4	
	4.57	25.4	
	4.70	50.8	
	5.94	177.8	
	6.38	12.7	
	10.82	25.4	
	11.41	63.5	
	13.28	63.5	

Notes:
[1] Values rounded to the nearest full percentage point

Samples of the limestone bedrock were not specifically selected for laboratory testing. The unconfined compressive strength of the limestone bedrock is typically higher than the unconfined compressive strength of the shale bedrock, and as such, the strength of the shale typically governs the geotechnical design.

7.5 GROUNDWATER

The use of water to conduct the coring of the bedrock did not permit measurement of groundwater conditions during drilling of the building block boreholes or during drilling of a number of the road boreholes. In the remaining boreholes, the split spoons advanced at depths approaching the contact surface with the underlying bedrock were wet on retrieval, however there was no free groundwater observed in the open boreholes.

The groundwater levels recorded in the monitoring wells installed by Stantec for the current investigation are shown in Table 7-15 below. As noted, levels were obtained in September and October, 2017.

Table 7-15: Groundwater Levels

Monitoring Well ID	September 29, 2017		October 5, 2017		October 10, 2017	
	Water Level Depth (m)	Water Level Elevation (m)	Water Level Depth (m)	Water Level Elevation (m)	Water Level Depth (m)	Water Level Elevation (m)
MW17-031-D	1.3	79.1	NA	NA	2.1	78.3
MW17-032-D	3.7	79.3	NA	NA	4.0	79.0
MW17-034-D	3.8	79.8	NA	NA	3.8	79.8
MW17-040-D	3.3	75.9	3.6	75.5	3.5	75.6
MW17-044-D	4.8	76.5	NA	NA	4.9	76.3
MW17-045-D	3.9	77.6	NA	NA	4.3	77.2
MW17-046-D	1.5	77.9	NA	NA	1.6	77.8
MW17-055-D	NA	NA	4.3	75.9	4.5	75.7
MW17-061-D	2.5	78.9	NA	NA	2.8	78.6
MW17-073-D	5.0	76.5	NA	NA	5.4	76.1
MW17-075-D	NA	NA	5.4	75.3	5.2	75.4

NA – Not available because water level was not taken on this date.

As previously noted, the monitoring wells installed for the current investigation were screened in the underlying bedrock.

Additional water level data was collected from the monitoring wells installed for the previous investigations as referenced herein. Data was obtained for March 2015, January 2017, and September and October, 2017.

The data from the previous investigations and the current investigation was used to develop overburden and bedrock water level contour plans. A number of the monitoring wells were removed from the data sets for purposes of simplification and clarity of the plans. The plans were prepared for March of 2015, January of 2017, and September and October of 2017. The water level contour plans are provided as Figures 3a, 3b, 3c, 3d, 3e, and 3f in **Appendix B**.

The hydrogeological assessment of the subject property (reported under separate cover) provided the results of in-situ hydraulic response testing in both the overburden and the bedrock. The combined results from the previous investigations on the property and the current environmental investigation being conducted by Stantec indicated that the hydraulic conductivity of the overburden ranged from 6.4 X 10^{-6} m/s to 5.7 X 10^{-9} m/s and the hydraulic conductivity of the bedrock ranged from 3.2 X 10^{-5} m/s to 9.5 X 10^{-9} m/s. The hydrogeological assessment report stated that the results are generally representative of the values in the literature for similar overburden and bedrock conditions in the region.

8.0 DISCUSSION AND RECOMMENDATIONS

8.1 SUMMARY AND EVALUATION OF EXISTING CONDITIONS

The following bullets provide a general description and overview of the conditions encountered in the investigation as reported herein.

- Ground surface cover consisting of organic and topsoil or asphalt; underlain by,
- Fill materials consisting of sand with gravel, sandy silt, sandy clay with gravel, clay with sand, or clay; underlain by,
- Native clay to clay with sand to clay with gravel; underlain by,
- Shale bedrock.

With respect to the fill materials encountered, the presence, depth and material types varied considerably across the subject property. It is inferred that this is a function of the historical development of the lands for the purposes discussed in a preceding section, and the associated decommissioning of historic infrastructure and associated backfilling. Excluding the general random fills encountered, there are three areas of particular interest in this respect:

- The backfilled portion of the shale pit located in the middle of the property;
- The backfilled boat slip located in the east corner of the property; and,
- The area of infilling of the lake along the southeast side of the site.

The particular locations referenced above exhibit more extensive fill materials (both laterally and vertically) and there is a higher degree of variability in the types of materials placed and the condition of the materials as placed.

The contact with the highly weathered zone in the underlying bedrock was encountered at depths ranging from 1.2 m to 5.3 m (elevations ranging from 82.1 m to 75.8 m), with a median depth of approximately 2.3 m (elevation 77.8 m). The slightly weathered bedrock was encountered at depths ranging from 1.4 m to 5.7 m (elevations ranging from 81.5 m to 75.3 m), with a median depth of 2.9 m (elevation 77.2 m). The fresh (un-weathered) bedrock was present below these depths/elevations.

The groundwater levels recorded in the monitoring wells installed in the overburden for the previous investigations ranged from approximately 0 m to 6 m below grade (elevations ranging from approximately 83 m to 75 m), with a median depth of approximately 2 m (elevation 78.0 m).

The groundwater contour plans developed for the overburden indicate a general trend down and to the south in the direction of the lake. The groundwater level at the north end of the property (adjacent Lakeshore Road West) was in the order of 81 m to 82 m and the groundwater level at the south end of the property (adjacent the lake) was in the order of 75 m to 76 m, subject to time of year.

The groundwater levels recorded in the eleven (11) monitoring wells installed in the bedrock for the current investigation ranged from approximately 1.3 m to 5.4 m below grade (elevations ranging from 80.9 m to 75.3 m), with a median depth of approximately 3.8 m (elevation 77.6 m). When this data set was combined with the groundwater levels from the previous investigations, the results ranged from approximately 0.1 m to 16 m below grade (elevations ranging from approximately 80 m to 63 m), with a median depth of approximately 4 m (elevation 76 m).

The groundwater contour plans developed for the bedrock indicate the same general trend down and to the south in the direction of the lake. The groundwater level at the north end of the property was in the order of 79 m to 80 m and the groundwater level at the south end of the property was in the order of 74 m to 75 m.

For reference, the historic average water level in Lake Ontario is often taken as approximately 74.5 m. During the spring of 2017, the lake level was unusually high, exceeding 1 m above the historic average. Discharge to the St. Lawrence seaway was increased during this period to bring the level back down closer to the historic average. It is possible that the levels recorded in September and October, particularly for the wells closer to the lake, were affected by the unusual fluctuation in the lake level.

8.2 CONSTRAINTS DUE TO NATURAL ENVIRONMENT

8.2.1 Frost

8.2.1.1 Frost Depth

Based on OPSD 3090.101, Foundation Frost Depths for Southern Ontario, the inferred depth of frost penetration for Mississauga is 1.2 m.

8.2.1.2 Frost Susceptibility of Soils

The City of Mississauga Standard No. 2220.020 titled Standard Frost Suitability of Soils, provides a nomograph for evaluation of the frost susceptibility factor based on the grain size of soils. A value of 1 is the lowest and a value of 15 is the highest.

An assessment of the fill materials and native soils encountered in the boreholes with respect to the nomograph yielded the following frost susceptibility factors:

- Fill – Sand with Gravel (SP) **3**
- Fill – Sandy Silt (ML) **11**
- Fill – Sandy Clay with Gravel **11**
- Native Clay to Clay with Sand to Clay with Gravel (CL) **15**

Given the frost susceptibility factors shown, all fill materials and native soils (excepting the localized sand and gravel fill materials) encountered in the investigation should be considered moderately to highly frost susceptible.

8.2.2 Seismic Conditions

8.2.2.1 Seismic Site Classification

The evaluation of the Site Classification for Seismic Site Response is addressed in the Ontario Building Code, Section 4.1.8.4. The evaluation is based on the average subsurface properties encountered in the upper 30 m of the stratigraphy.

The evaluation was completed using the weighted average N-value approach in accordance with the Building Code.

Taking borehole BH17-080 as generally representative of the site, the following applies:

- Overburden (fill and/or native soils) 3 m N_{avg} = 20
- Bedrock (shale) 27 m N = 100 (as prescribed in the standard)

The average N-value for the full 30 m depth was calculated as 71. Based on Table 4.1.8.4 A in the Building Code, this yields Site Class C.

8.2.2.2 Seismic Hazard Calculation Data Sheet

A copy of the National Building Code (NBC) Seismic Hazard Calculation Data sheet prepared by Natural Resources Canada (NRC) is included in **Appendix F** for reference.

It should be noted that the spectral and peak ground acceleration (PGA) values tabulated in the NRC data sheet are applicable for Site Class C. Therefore, the values must be adjusted if an alternative Site Class is used in the design. The required adjustments should be undertaken in accordance with the factors provided in the Building Code.

8.3 SITE PREPARATION

8.3.1 Demolition and Decommissioning

It is assumed that the existing infrastructure on the property including the former firehall, the sea container, the remaining floor slab, and the oil-water separator will be demolished prior to construction. It is understood that the gas station in the north corner of the site is currently undergoing refurbishment to be used as a temporary meeting space for stakeholders during the planned re-development of the subject property.

Demolition and decommissioning should include all infrastructure extending below grade, including foundations and buried services. All materials associated with demolition and decommissioning should be disposed of at an approved off-site facility.

The excavations developed through the removal of these components should be backfilled. It is acknowledged that the backfill will likely be a temporary measure as the general extent of planned development across the bulk of the property will require excavation to depths below the level of any fill materials.

8.3.2 Stripping

Any existing asphalt will require removal. The thickness of the asphalt was found to be approximately 25mm to 65 mm at the two (2) borehole locations where it was present, however, it is considered likely that thicker zones of asphalt may exist on the property.

The existing organic ground surface cover and underlying topsoil will require removal. The thickness of topsoil encountered in the boreholes ranged from approximately 25 mm to 150 mm, with an average of 75 mm. It is considered likely that thicker zones of topsoil may exist on the property.

Subsequent to completing the stripping program, the exposed sub-grade surface will consist of fill materials and native soils. The exposed sub-grade surface should be inspected to confirm the removal of any additional organics and/or deleterious materials (debris, waste, or similar) that may be present. Where such materials are identified, they should be removed.

Following completion of the stripping, the exposed sub-grade surface should be proof-rolled and compacted using large, vibratory compaction equipment. Although large areas of the property will be excavated as a component of the required environmental remediation, proof-rolling and compacting the exposed sub-grade will reduce the potential for infiltration of precipitation and ground surface runoff which would otherwise lead to softening of the sub-grade that could impede construction traffic or would lead to increasing moisture content in the surficial soils making excavation and handling more difficult.

8.3.3 Environmental Remediation

As previously discussed, significant areas of the site are intended for excavation and disposal as a component of the planned environmental remediation program. These areas are illustrated on Figure 1 in **Appendix B**. Excavation, handling, and disposal of these soils is addressed in the environmental report provided under separate cover.

It is understood that portions of the existing fill materials and native soils will be stockpiled on site and sampled and tested to confirm if contamination is present. Where the results confirm that the soils are not contaminated, these stockpile materials would be considered for reuse on the property as backfill and/or engineered fill if and as required.

The combination of mass excavation and stockpiling will undoubtedly lead to mixing of the fill materials and native soils. The geotechnical laboratory testing conducted to date was limited to discrete samples of the various fill materials and native soils as reported herein. However, the results indicated that reuse would be practical with some caveats. Discussion of the reuse of the existing fill materials and native soils is provided in a subsequent section of this report.

8.3.4 Placement of Fill Materials

It is anticipated that there will be three (3) specific areas requiring the placement of fill materials:

- General backfill for the remediation excavations;
- Fill materials required to develop the design grades for the internal road network; and,
- Backfill of the existing shale pit where the limits coincide with the future parkland.

Given that the majority of the building blocks will entail mass excavation to considerable depth for the specified number of underground levels, there may not be a specific need to backfill the remediation excavations to restore the original/existing grade, beyond that which may be required for purposes of storm water management control during the intervening period (which it is understood may be several years). In this respect, it is recommended that where backfill is required to be placed, the material can be placed in 300 mm thick loose lifts and compacted to achieve 95% of the material's Standard Proctor Maximum Dry Density (SPMDD). Consistent with the comments provided in the preceding section, this will minimize the potential for infiltration of precipitation and ground surface runoff, permit construction traffic to travel over the surface (in good weather conditions), and support preparation of design grades for purposes of storm water management control.

Soil materials used to fill to the design sub-grade level for the internal road network should be placed in 200 mm thick loose lifts and each lift uniformly compacted to 98% of the material's SPMDD.

Soil materials used to backfill the existing shale pit can be placed in 300 mm thick loose lifts and compacted to 95% of the material's SPMDD. The use of excavated shale bedrock could also be

considered for this purpose, provided the backfilled area is intended solely as landscaped parkland and no infrastructure is intended for the area (this includes buried service piping, utilities, buildings of any size/type, roads, and similar). Recommendations for the appropriate reuse of the shale bedrock excavated as a component of the environmental remediation program or from the building blocks (in the future) would be a function of the nature of the rock (maximum size and shape of particles and gradation of rock) at the time of excavation. For preliminary consideration, reuse of the prevailing shale bedrock requires placement in thin lifts (in the order of 200 mm to 300 mm), the application of water to moisture condition the material, and considerable compaction effort to break down the material into a uniform mass.

The program for excavation and subsequent backfilling should be designed in advance, and carefully executed in consideration of the time of year of execution, prevailing weather conditions, construction storm-water management control, and associated issues and concerns, and the intended end-use of the subject property as described herein.

8.4 EXCAVATIONS

8.4.1 Planned Excavations

Excavations will be undertaken as a component of the environmental remediation program and/or for the construction of the internal road network and associated buried services and utilities along the road corridors. Additional excavations will be required in the future for the building blocks, though the majority of these will require temporary shoring for the intended number of underground levels.

With respect to open-cut excavations required at the early stages of re-development of the property, as will be the case with the environmental remediation program and the construction of the road, utilities and services, the excavations will encounter a combination of fill materials, native soils including clay to clay with sand to clay with gravel and the shale bedrock.

8.4.2 Excavation in Soils

Side slopes for temporary excavations in the fill materials and native soils should conform to the Occupational Health & Safety Act & Regulations (OH&S Act).

With respect to open-cut excavations, the soils encountered in the boreholes have been classified as follows with respect to the soil types described in the OH&S Act.

- All fill materials and isolated zones of native cohesionless soils (sand and gravel) encountered in this investigation should be classified as Type 3 soils. The maximum excavation side slope for a Type 3 soil is 1:1 (Horizontal: Vertical) in accordance with the OH&S Act.
- The native firm to hard clay to clay with sand to clay with gravel soils encountered in this investigation should be classified as Type 2 soils. The maximum excavation side slope for a

Type 2 soil is 1:1 (Horizontal: Vertical) and a 1.2 m vertical cut extending from the base of the excavation is permitted, in accordance with the OH&S Act.

- Where any of the fill materials and/or native cohesionless (sands and gravels) soils are excavated below the water table, these must be considered Type 4 soils. The OH&S Act requires that excavations in Type 4 soils be excavated to a maximum of 3:1 (Horizontal: Vertical) slope where workers enter the trench. Further comment with respect to the presence of groundwater is provided in a subsequent section below.
- Where the native firm to hard clay to clay with sand to clay with gravel soils are excavated below the water table, these soils can be considered Type 3 soils. As noted above, the maximum excavation side slope for a Type 3 soil is 1:1 (Horizontal: Vertical) in accordance with the OH&S Act.

Where Type 2, Type 3 and Type 4 soils are encountered, the maximum excavation side slope should be consistent with that of a Type 4 soil, in accordance with the OH&S Act.

The side slopes of the excavations in soils should be protected from exposure to precipitation and associated ground surface runoff, to prevent further softening and loss of strength of these fill materials and soils that could lead to additional sloughing and caving.

If the slopes referenced above cannot be achieved, or if the presence of existing infrastructure or geometry constraints do not allow for open-cuts that meet the requirements of the OH&S Act, minimum support system requirements for steeper excavations are stipulated in the OH&S Act, Sections 235 to 238 and Section 241 which include the provisions for timbering, shoring and moveable trench boxes.

8.4.3 Excavation in Bedrock

Bedrock is expected to be encountered in the excavations for the majority of the building blocks.

It is noted that in the case of building blocks C, K and M, and based on the limited number of boreholes advanced to date, the required cut elevation (coincident with the design Finished Floor Elevation) will be in the overburden. However, the contact surface with the underlying bedrock was encountered at approximately 1 m (or less) below the required cut elevation. Given the minimum number of boreholes advanced to date and the variations encountered in the boreholes, it should be anticipated that the required cut in these building blocks may encounter the underlying bedrock.

The bedrock is generally comprised of shale with limestone interbeds, as is typical of the Georgian Bay Foundation. The Georgian Bay Foundation is generally a rippable rock, particularly in the surficial weathered zone, and any rock removal required to a shallow depth can likely be accomplished using conventional excavation equipment. Below the weathered zone hydraulic rock breaking equipment (hoe-ramming) will likely be required. If layers of harder

limestone in the order of 200 mm and thicker are encountered, hydraulic rock breaking can still be used but will become more difficult and require considerable effort.

Side slopes of temporary excavations in the bedrock may be left near vertical. Consistent with the OH&S Act, the walls of an excavation in rock should be stripped of any loose rock or other material that could slide, fall, or roll upon a worker. Regular inspections by qualified geotechnical engineering personnel should be conducted for any excavation in the bedrock to confirm that conditions are safe and consistent with the requirements of the OH&S Act.

8.4.4 Dewatering/Unwatering Requirements

As discussed in a number of preceding sections, groundwater is present at relatively shallow depth in the overburden and in the underlying bedrock. However, the hydrogeological assessment indicates that both the native overburden and the bedrock have relatively low hydraulic conductivities. The fill materials, being considerably more variable, can be presumed to have a much higher hydraulic conductivity however.

With respect to the environmental remediation program and the construction of the roads and related services, dewatering in advance of construction is not likely to be required. Consistent with the order-of-magnitude of hydraulic conductivity obtained from the in-situ field tests, seepage from the native overburden soils and shale bedrock into open excavations is likely to be minor to moderate. Where silt, sand or gravel seams exist in the native soils (isolated locations as recorded in the boreholes), slightly higher seepage rates will be encountered. Similarly, the highly weathered zone at the contact surface with the underlying bedrock is known to have higher seepage rates than the underlying less weathered bedrock.

Generally, it is anticipated that the use of sump pits and contractor's pumps should be satisfactory for handling the volume of seepage and infiltration to open excavations for the purposes referenced above, provided that the excavations do not extend in close proximity to the lake.

The comments provided above will most certainly not apply to the following three (3) areas:

- The shale pit located in the middle of the property;
- The backfilled boat slip located in the east corner of the property; and,
- The area of infilling of the lake along the southeast side of the site.

The areas referenced above will have entirely different hydrogeological conditions given the extent of previous excavation, random (and predominantly unknown) conditions of the backfill placed to date, and the proximity to the lake.

The planned remediation and subsequent backfilling of the shale pit will require dewatering in advance of and during the work.

With respect to building blocks in the vicinity of the former boat slip and in proximity to the lake, dewatering is likely to be required. The use of secant cut-off walls will reduce the potential for infiltration of groundwater and/or lake flow into the excavations.

The portion of the excavations into the underlying bedrock will likely encounter variable conditions with respect to the presence of groundwater. Although static groundwater levels were recorded in the wells installed in the bedrock, the general hydraulic conductivity of the underlying intact bedrock is relatively low. The presence of groundwater in the bedrock and the associated infiltration into open excavations is more typically associated with the presence of horizontal fractures in the rock rather than the mass of the rock; these fractures can be random and may exist in some areas but not in others.

Where dewatering is undertaken, the design of the dewatering system would need to address the extent of dewatering required, the depth of intended excavation, and the soil and groundwater conditions that prevail at the intended excavation location(s). This is beyond the scope of this geotechnical investigation.

It is noted that under the current MOECC regulations, registration with the Environmental Sector and Activity Registry (ESAR) is required for dewatering at rates above 50,000 L/day but below 400,000 L/day. A Permit to Take Water is required for dewatering applications that require in excess of 400,000 L/day.

8.5 SERVICE TRENCH BEDDING AND BACKFILL

8.5.1 Bedding

Sanitary Sewer

The City of Mississauga Transportation and Works Department Development Requirements Manual, Section 2.0- Design Requirements, includes sanitary sewers under the heading of "Regional Services" and hence defers to the Region of Peel standards with respect to the design criteria and standards. The Region of Peel Public Works Design, Specifications & Procedures Manual Standard Drawing 2-3-1 indicates that Granular 'A' compacted to 100% of its Standard Proctor Maximum Dry Density (SPMDD) should be used as bedding for sanitary sewers, when overlying "poor soil" (e.g. existing fill materials), "earth" (e.g. undisturbed native soil) or "shale/rock". The drawing indicates that the thickness of the bedding should be minimum of 100 mm where underlain by "earth" and 150 mm where underlain by "poor soil" or "shale/rock".

Consideration could be given to the use of either 19 mm stone or 6 mm stone in lieu of the OPSS Granular A, if standing water is present in the excavations. Mississauga Standard Drawings 2112.110 and 2112.140, respectively, provide grain size envelopes for these two materials. Use of either of these alternative materials would require prior approval by the City of Mississauga. In very poor conditions, a geosynthetic wrap may be required to encapsulate the stone bedding material.

Storm Sewer

The City of Mississauga Transportation and Works Department Development Requirements Manual, Section 2 – Design Requirements, Sub-Section 2.01.01.02 entitled Storm Sewer Requirements provides detailed recommendations and guidance.

For pipe bedding, details are illustrated in the City of Mississauga Standard Drawing No. 2112.040. In general, the Type "B" bedding (crushed stone base with granular over the sewer) shall be used for storm sewers, and the type and classification of pipe will be selected to suit this bedding detail.

The use of City of Mississauga Standard No. 2112.110 “Sewer Bedding (6 mm Washed Crushed Gravel)” is allowed on a per project basis. The City of Mississauga requires approval in writing in advance before this material may be used. In very poor conditions, a geosynthetic wrap may be required to encapsulate the stone bedding material.

8.5.2 Backfill

The City of Mississauga Transportation and Works Department Development Requirements Manual (January 2009), Section 1 – General Requirements for Servicing Subdivisions states that sanitary sewers are to be designed in accordance with the Region of Peel Design Criteria and Development Procedures Manual. Region of Peel Standard Drawing No. 2-3-1 (March 2017) indicates that the engineered fill backfill is to be in accordance with the directions provided by the geotechnical engineer and that backfill above the bedding is not permitted to consist of native soils under paved portions.

The City of Mississauga Development Requirements Manual – Section 6 Design Requirements states that “the use of excavated inorganic native subsoil is generally permissible for trench backfilling purposes . . . “. It is inferred that this clause is intended to apply to new development as the Manual also states that “unshrinkable fill is to be utilized as the backfill material for service trench installation within all city road allowances. Clause 6.01.04 of the Manual states, in part, that “trench backfill for the storm and sanitary sewer and drain installations shall consist of native or granular material, free of organics and contaminants, placed and compacted in lifts as required to achieve a minimum compaction of 95% of the Standard Proctor Density (OPSS 514.07.08)”.

The City of Mississauga Transportation and Works Department Supplementary Specifications (August 2015), regarding Construction Specification for Pipe Sewer, Construction By Open Cut Method, references the application of OPSS 410. OPSS 410 defers to OPSS 401 Construction Specification for Trenching, Backfilling and Compacting (November 2010). This specification states that trench backfill can consist of OPSS Granular A, OPSS Granular B, or native material. The specification also states that the backfill should be placed in 300 mm thick lifts and compacted to 95% of the Standard Proctor Maximum Dry Density.

If there are deep services required, additional effort with regard to placement and compaction may be required to avoid potential distortion/settlement at the finished ground surface. This can occur when thicker fills are placed in too dry a condition or where trench boxes are used and there is an abrupt change between the adjacent subsurface conditions and the condition of the backfill placed in the trench. For deeper fills, particularly where native materials are used as backfill, it is recommended that the backfill be placed in 200 mm thick loose lifts and each lift compacted to 100% of the material's Standard Proctor Maximum Dry Density (SPMDD).

8.6 REUSE OF EXCAVATED MATERIALS

The required environmental remediation and subsequent development of the majority of the building blocks will include excavation of the overburden and/or underlying bedrock; the depth of the excavations being a function of the final depth of remediation and the number of levels of underground for a particular block. Portions of the excavated soil and bedrock could be considered for reuse subject to the discussion, limitations and restrictions outlined below.

For frame of reference, it is noted that the general intention would be to place the building foundations on the underlying bedrock and the lowest-level floor slabs on the bedrock, native soils or engineered fill. Although foundations could also be placed on engineered fill, placed and compacted in accordance with the recommendations provided herein, this use should be limited to lightly-loaded buildings (typically single story) which is not the predominant condition associated with the planned scope of development.

Environmental Remediation Zones

Figure 1 in **Appendix B** illustrates the location of the known areas of contamination identified in the ongoing environmental remediation program. It is acknowledged that the limits as shown may be revised/adjusted based on the conditions encountered in the field at the time of the remediation program.

All overburden material (fill materials, native soils and fractured/weathered bedrock) excavated during the remediation program will need to be removed and disposed of off-site in accordance with the recommendations provided in the Phase II ESA. Reuse of these materials is not permitted.

Sand with Gravel Fill Materials

The sand with gravel fills encountered in the investigation can be considered suitable for reuse as general fill to develop design grades and elevations or for engineered fill for lightly loaded infrastructure. Any deleterious materials observed (such as wood, topsoil, organics or similar materials) in these materials should be removed prior to reuse.

The results of the moisture content tests indicate that the sand with gravel fills should have moisture contents below the optimum required for handling, placing and compaction.

However, the moisture content of the granular fills will vary subject to the time of year of construction and the amount of precipitation leading up to the time of construction. As a result, some aerating and/or drying, or mixing with dryer soils, may be required to facilitate reuse.

Sandy Silt and Sandy Clay with Gravel to Clay with Sand to Clay Fill Materials

The sandy silt and sandy clay with gravel to clay with sand to clay fills encountered in the investigation may be considered suitable for reuse as general fill to develop design grades and elevations or as engineered fill for lightly loaded infrastructure, provided the materials are used at a depth below the 1.2 m frost penetration depth. Any deleterious materials observed (such as wood, topsoil, organics or similar materials) in these materials should be removed prior to reuse.

The results of the moisture content tests indicate that portions of these fills may have moisture contents above the optimum required, subject to the time of year of construction, and the amount of precipitation leading up to the time of construction. As a result, some aerating and/or drying, or mixing with dryer soils, may be required to facilitate reuse.

In addition, the predominantly fine grained and plastic nature of the sandy silt and sandy clay with gravel to clay with sand to clay fills makes these materials susceptible to softening and loss of strength in the presence of excess moisture originating from precipitation and/or ground surface runoff. As a result, some aerating and/or drying, or mixing with dryer soils, may be required to facilitate reuse.

Based on the results of the grain size tests completed on representative samples of the sandy silt and sandy clay with gravel fills, it is suggested that the soil has a moderate to high frost susceptibility. The sandy silt fills should therefore not be used as perimeter foundation backfill or for any applications where development of frost could jeopardize the serviceability of the planned development.

Native Clay to Clay with Sand to Clay with Gravel

The predominant soils encountered in the investigation comprised native clay to clay with sand to clay with gravel soils. These soils are considered suitable for reuse as general fill to develop design grades and elevations or for engineered fill for lightly loaded infrastructure. However, these soils are considered frost susceptible and reuse within 1.2 m of finished grade must consider the adverse effects of frost. These soils exhibit similar properties to those of the sandy silt, sandy clay with gravel, clay with sand, and clay fill materials, therefore the same conditions and procedures for reuse should be applied.

Stockpiled Soils

As stated previously, the mass excavation and stockpiling of soil during the environmental remediation program will lead to mixing of the fill materials and native soils. It is understood that

the combined materials will be temporarily stockpiled on site to await environmental characterization.

Provided the environmental test results confirm acceptability for reuse, samples can be submitted for testing that includes moisture content, grain size distribution, Atterberg Limits, and Standard Proctor Density. This information will confirm the handling, placement and compaction characteristics for any proposed reuse.

Subject to testing and confirmation, these soils should be suitable for reuse as general engineered fill to develop design grades and elevations or for structural fill for lightly loaded infrastructure.

If the combined soils are predominantly fine grained in nature, they will be moderately to highly susceptible to frost and use within 1.2 m of the finished grade must consider the adverse effects of frost. In this case, the same conditions and procedures for reuse as described above for the fine grained fills and native soils should be applied.

Shale Bedrock

Reuse of excavated shale bedrock is not recommended in any areas of planned development such as the building blocks, roads, or associated development. However, the shale bedrock may be considered suitable for reuse as backfill for the shale pit, provided the backfilled area is intended solely as landscaped parkland and no infrastructure is intended in the area.

For preliminary consideration, reuse of the shale bedrock typically requires separation and removal of the harder limestone slabs, placement in thin lifts (in the order of 200 mm to 300 mm), the application of water to moisture condition the material, and considerable compaction effort to break down the material into a uniform mass. Often, the shale is left to “weather” over a considerable period of time (and seasons) prior to reuse.

8.7 BUILDING FOUNDATIONS

8.7.1 Lowest Finished Floor Elevations & Founding Strata

The design Finished Floor Elevations (FFEs) at grade for the building blocks were provided on the Preliminary Grading Plan prepared by UrbanTech, dated March 2018. The cut depth for the underground levels was provided via email as follows: 3.7 m for the first underground level and 2.8 m for each of the second and third underground levels. Therefore, for purposes of this preliminary geotechnical report, the lowest finished floor elevations (e.g. required cut depths) for the building blocks were calculated from the FFEs at grade, minus 3.7 m for 1 underground level, 6.5 m for 2 underground levels, 7.9 m for 2 ½ underground levels and 9.3 m for 3 underground levels.

Table 8-1 below provides a summary of the estimated lowest finished floor elevations (required cut depth) for each building block, the inferred elevation of the bedrock for each building block based on the conditions encountered in the boreholes, and the resulting founding stratum anticipated at the lowest finished floor elevation (e.g. either bedrock or overburden).

Table 8-1: Estimated Finished Floor Elevations of Building Blocks

Building Block	Borehole Number	Lowest Finished Floor Elevation (m)[1]	Shale Elevation (m)	Founding Stratum	Building Block	Borehole Number	Lowest Finished Floor Elevation (m)[1]	Shale Elevation (m)	Founding Stratum
A	BH17-033	80.5	81.1	Bedrock	L	MW17-046-D	77.2	77.1	Overburden
B	MW17-032-D	79.6	80.5	Bedrock	L	BH17-047	77.3	77.9	Bedrock
C	BH17-027	78.3	75.2	Overburden	M	BH17-048	77.3	76.1	Overburden
C	BH17-028	77.8	76.6	Overburden	O	MW17-040-D	79.2	76.0	Overburden
C	BH17-030	78.8	77.6	Overburden	O	BH17-041	78.8	77.9	Overburden
D	BH17-029	77.6	76.3	Overburden	O	BH17-042	76.0	75.5	Overburden
F	MW17-034-D	80.0	81.4	Bedrock	O	BH17-043	76.0	77.3	Bedrock
G	BH17-035	74.0	79.9	Bedrock	P	BH17-052	73.5	77.8	Bedrock
H	MW17-031-D	72.9	77.8	Bedrock	Q	BH17-050	76.3	76.2	Overburden
I	BH17-036	80.1	80.4	Bedrock	Q	BH17-051	76.3	77.6	Bedrock
I	BH17-037	80.4	80.8	Bedrock	R	BH17-049	75.6	75.7	Bedrock
I	BH17-038	79.5	78.8	Overburden	S[2]	BH17-056	NA	76.0	NA
I	BH17-039	79.7	79.5	Bedrock	T	MW17-075-D[3]	74.1	76.7	Bedrock
K	MW17-044-D	73.3	80.0	Bedrock	U	BH17-053	71.6	75.9	Bedrock
K	MW17-045-D	73.3	70.3	Overburden	U	BH17-054	73.1	76.8	Bedrock

Notes:

1 Lowest Finished Floor Elevations calculated from FFE values at the borehole locations on the Preliminary Grading Plan (Urbantech, March, 2017) less: 3.7 m for 1 underground level; 6.5 m for 2 underground levels; 7.9 m for 2.5 underground levels; and 9.3 m for 3 underground levels.

2 Block S is labelled as "open space" on the 2018 plans and hence is presumed to be for parkland or similar use and will not have buildings or similar infrastructure.

3 Borehole MW17-055-D was located in Building Block T in the 2017 Plans but Borehole Mw17-075-D is closer to the block based on the 2018 Plans and therefore has been considered herein as indicated.

It is important to note that the information provided in the table was derived primarily from a single borehole on each of the building blocks. The contour plans developed for the bedrock surface illustrates, in part, the variation in the bedrock surface across the property.

In addition, the presence of the shale pit, presence of existing fill materials, and intended environmental remediation program will all have an influence on the conditions encountered at the lowest finished floor elevation and associated foundation levels for the building blocks, particularly for the buildings having only 1 level of underground parking.

8.7.2 Foundation Design Bearing Reactions & Resistances

8.7.2.1 Design Philosophy

The foundations for the building blocks would inherently be placed below the lowest finished floor elevations (FFEs), whether conventional spread/strip footings or drilled piers (caissons) are adopted.

For the low-rise and possibly the mid-rise development, conventional spread/strip footings founded in the bedrock will likely be preferred wherever practical. The placement of conventional spread/strip footing foundations in the overburden could also be considered for the low-rise development, and may be feasible for the mid-rise development subject to the specific loading conditions and required foundation capacities. For the high-rise development, drilled piers (caissons) founded in the underlying bedrock would be the preferred option.

With respect to the use of conventional spread-strip footing foundations, the following has been assumed in the context of this preliminary geotechnical investigation and report:

- For 1 and 2 levels underground: Foundations at 1.2 m below underside of lowest FFE
- For 3 levels underground: Foundations at 0.6 m below underside of lowest FFE

The 1.2 m depth is consistent with the required soil cover for adequate frost protection as referenced previously in Section 8.2.1.1.

The reduction in the depth of the foundations for the 3 levels of underground considers the typical industry approach that for 3 levels of underground, the ambient air temperature rarely goes below the freezing point. As a result, the soil cover required for adequate frost protection can be, and is often, reduced. The exception to this is any location where outside air is drawn into the underground, such as may be required for ventilation purposes.

8.7.2.2 Foundations on Bedrock

Table 8-1 indicates the following:

- The boreholes in **building blocks A, B, F, G, H, P, R, T and U** encountered the shale above the lowest FFE and as a result, the lowest finished floor and the underlying foundations will be on or in the shale bedrock for these blocks.
- One of the two boreholes in **building block L** and the single borehole in **building block Q** encountered the shale bedrock 100 mm below the lowest FFE. Given this small variation, it is anticipated that the lowest finished floor and the underlying foundations will be on or in the shale bedrock for these buildings as well.
- Two of the four boreholes in **building block I** encountered the bedrock above the lowest FFE; the remaining two boreholes encountered the bedrock at depths of 0.7 m and 0.2 m below the lowest FFE. Given this condition, and the need to provide 1.2 m soil cover for adequate frost protection (this block is presumed to have 1 level of underground), it is reasonable to anticipate that the foundations for this block will be placed in the bedrock.
- The single borehole in **building block D** encountered the bedrock 1.3 m below the lowest FFE and the single borehole in building block M encountered the bedrock 1.2 m below the lowest FFE. Although the 1.3 m depth is slightly greater than the minimum 1.2 m soil cover required for adequate frost protection (this block is presumed to have 1 level underground), it is reasonable to anticipate that the foundations for both these blocks will be placed on the bedrock.

For conventional spread/strip footing foundations placed in the shale bedrock, the following would apply with specific reference to the Serviceability States Condition [SLS] (e.g. designed to limit total settlements to a conventional limit of 25 mm):

- Conventional foundations placed on the surficial shale bedrock (weathered and fractured zone) can typically be designed for bearing reactions in the range of 500 kPa to 2,500 kPa.

If higher bearing reactions (and resistances) are required, the use of drilled piers (caissons) founded in the underlying un-weathered shale bedrock (typically taken as ranging from 1 m to 3 m below the weathered and fractured zone) can be used. These foundations are commonly designed using bearing resistances at Ultimate Limit States (ULS) rather than Serviceability Limit States (SLS) as settlement is not typically the governing factor in design.

- Caissons founded in the underlying un-weathered bedrock below the zone of fracturing/weathering are typically designed for a ULS resistance in the range of 5,000 kPa to 9,000 kPa (additional testing is often required to confirm the middle to higher end of this range).

8.7.3 Foundations in the Overburden

Table 8-1 indicates the following:

- The four boreholes in building block C encountered the bedrock 3.1 m, 1.2 m, 1.2 m and 1.2 m below the lowest FFE. Given that building block C is inferred to have 1 level underground, 1.2 m of soil cover will be required for adequate frost protection. As a result, the foundations can be placed on the underlying bedrock where bedrock was encountered 1.2 m below the lowest FFE. Where the bedrock was encountered 3.1 m below the lowest FFE, the foundations could consist of either circular footings (e.g. drilled piers advanced to shallow depth) founded in the underlying bedrock OR conventional spread/strip footings founded in the overburden. The preferred option would need to consider the extent of the area in which bedrock is deeper than 1.2 m and the applied loads from the building (this last to avoid potential differential settlement that could be incurred where different foundation types are combined for the same building).

- The single borehole in building block K encountered bedrock at 3 m below the lowest FFE. As indicated in the preceding bullet, the foundations could consist of either circular footings (e.g. drilled piers advanced to shallow depth) founded in the underlying bedrock OR conventional spread/strip footings founded in the overburden subject to the extent of the area in which bedrock is deeper than 1.2 m and the required foundation capacities.

- Three of the four boreholes in building block O encountered the bedrock 3.2 m, 0.9 m and 0.5 m below the lowest FFE; the fourth borehole encountered the bedrock above the lowest FFE. Given that building block O has 1 – 2 levels underground, 1.2 m of soil cover will be required for adequate frost protection. As a result, the foundations can be placed on the underlying bedrock where bedrock was encountered within 1.2 m below the lowest FFE. Where the bedrock was encountered 3.2 m below the lowest FFE, the foundations could consist of either circular footings (e.g. drilled piers advanced to shallow depth) founded in the underlying bedrock OR conventional spread/strip footings founded in the overburden. The preferred option would need to consider the extent of the area in which bedrock is deeper than 1.2 m and the applied loads from the building (this last to avoid potential differential settlement that could be incurred where different foundation types are combined for the same building).

Where the bedrock is moderately deeper than 1.2 m and sub-excavation and replacement with lean concrete or the use of circular footings (short drilled piers) extending to the underlying bedrock is not preferred, the placement of conventional spread/strip footings in the overburden could be considered (subject to the specific loading conditions and required foundation capacities). This would typically only apply for low-rise development, as the applied loads from mid-rise and high-rise development would likely necessitate placing foundations on the underlying bedrock.

For the use of conventional spread/strip footing foundations in the native very stiff to hard clay with sand (or similar) native soils, the following could be considered for use in preliminary design.

- Spread footing bearing reactions of 225 kPa at Serviceability Limit States and bearing resistances of 275 kPa at Ultimate Limit States; and,
- Strip footing bearing reactions of 200 kPa at Serviceability Limit States and bearing resistances at the same 200 kPa at Ultimate Limit States.

The bearing reactions and resistances provided are based on a minimum soil cover of 1.2 m (consistent with the required soil cover for adequate frost protection) and spread footing sizes in the order of 1 m to 2 m and strip footing widths in the order of 0.6 m.

8.8 FLOOR SLABS

Slab-on-grade floor slabs can be placed on the prepared surface of the bedrock, native soils or structural fill. Consistent with industry design practice, a granular base should be placed beneath the slab; this will provide a moisture/capillary break for those floor slabs constructed above the level of the prevailing groundwater table and will provide a uniform and compact surface for construction for those floor slabs constructed below the level of the prevailing groundwater table. The typical thickness of the granular base layer is 200 mm.

8.9 PERMANENT DRAINAGE

A number of the building blocks are to include underground levels that extend below the prevailing static groundwater table level.

A perimeter drain and underfloor drain system would typically be implemented to address this condition. However, in the interest of eliminating the need to provide suitable outfalls, and more importantly, to eliminate the long-term operation and maintenance that would be required to handle and treat potentially contaminated groundwater, “sealing” the basement level and designing for the hydrostatic uplift should be considered in the design.

8.10 PAVEMENT DESIGN

All roads associated with the proposed development are assumed to be local roads. The Mississauga Transportation and Works Standard Pavement and Road Base Design Requirements (Standard No. 2220.010) provides the minimum structural road depth for the various classes of road. Table 8-2 below provides the minimum structural road depth for local roads considered herein.

Table 8-2: Asphalt Pavement Design

Structural Road Component	Minimum Structural Road Depth (mm)[1]	
	Minor Residential Collector	Residential (Minor Local/Local)
Top Course Asphalt (mm)	40	40
Base Course Asphalt (mm)	100	100
Granular Base (mm)	200	200
Granular Sub-Base (mm)	400	250
Total Thickness (mm)	740	590

Notes:
1 Thicknesses of structural road components consistent with presence of high frost susceptible sub-grade (Mississauga Transportation and Works Frost Susceptibility Number 15) as outlined previously in this report

Consistent with the City of Mississauga standards, the finished sub-grade surface should have a minimum cross-fall of 3%.

City of Mississauga Standard Drawing No. 2220.010 provides additional details with respect to the materials and practices for construction of roads. This includes:

- Compaction sub-grade to a minimum of 98% Standard Proctor Density (not specifically required for this application presuming that unshrinkable fill is placed to the underside of the granular materials in the road structure); and,
- Use of HL8 base course asphalt (that may contain up to 25% RAP) and HL3 top course asphalt.

Also, as stated on Drawing No. 2220.010, sub-drains shall be installed “full-length” on all roads. Reference is made to Standard No. 2220.040 for details illustrating the sub-drain installation.

8.11 CEMENT TYPE FOR BURIED CONCRETE AND CORROSION POTENTIAL FOR BURIED STEEL

Representative samples of the predominant soils encountered in the boreholes were submitted to AGAT Laboratories in Mississauga, Ontario for testing of pH, chlorides, concentrations of water soluble sulphates and resistivity.

The testing was completed to determine the potential for degradation of the concrete in the presence of soluble sulphates and to provide general comment with respect to the potential for corrosion of exposed buried steel. The comments provided herein are not intended to be construed as a formal corrosion assessment.

The results of the testing are provided in Table 8-3 below.

Table 8-3: Results of Chemical Analysis

Borehole No.	Sample No.	Depth (m)	pH	Chlorides (µg/g)	Sulphates (µg/g)	Resistivity (Ohm-m)
BH17-088	SS3	1.8	8.20	6	37	51.0
BH17-090	Bulk	0.6	8.14	4	20	49.0
BH17-065	SS3	1.8	8.24	24	150	33.4
BH17-067	SS2	1.1	8.13	3	49	55.9
BH17-033	SS3	1.8	8.25	4	16	64.1
BH17-084	SS4	2.6	7.91	6	138	34.4
BH17-028	Bulk	2.3	8.56	15	118	34.0
BH17-035	SS2	1.1	8.33	3	25	75.8
BH17-035	SS4	2.5	8.34	3	25	67.6
BH17-052	Bulk	2.3	8.63	142	15	35.8
BH17-074	SS2	1.1	8.77	2	15	90.9

The concentration of soluble sulphates provides an indication of the degree of sulphate attack that is expected for concrete in contact with soil and groundwater at the sites. In general, soluble sulphate concentrations less than 1000 µg/g generally indicate that a low degree of sulphate attack is expected for concrete in contact with soil and groundwater. The maximum soluble sulphate concentration for all the samples tested was 150 µg/g (BH17-065/SS3). In accordance with CAN CSA A23.1 Clause 15, this represents a Low Degree of Exposure. Type GU (General Use) Portland Cement would therefore be suitable for use in buried concrete exposed to the soil and groundwater.

The soil pH was between 7.9 and 8.8, which is within what is considered the typical or normal range for soil pH of 5.5 to 9.0. in the absence of a high organic content, the pH levels of the tested soil do not indicate a highly corrosive environment.

The AASHTO LRFD Bridge Design Specifications provides some guidance on potential corrosion of buried steel, specifically piles in the AASHTO Specifications, that can also be used for general reference and guidance.

Given the range of resistivity values and chloride concentrations, the corrosion potential of the soils is considered low.

The test results provided in Table 8-4 may be used to aid in the selection of coatings and corrosion protection systems for buried steel objects, if and as required.

9.0 CLOSURE

Use of this report is subject to the Statement of General Conditions provided in **Appendix A**. It is the responsibility of Port Credit West Village Partners Inc. who is identified as "the Client" within the Statement of General Conditions, and its agents to review the conditions and to notify Stantec Consulting Ltd. should any of these not be satisfied. The Statement of General Conditions addresses the following:

- Use of the report;
- Basis of the report;
- Standard of care;
- Interpretation of site conditions;
- Varying or unexpected site conditions; and,
- Planning, design or construction.

Respectfully Submitted,

STANTEC CONSULTING LTD.

10.0 SIGN-OFF SHEET

Prepared by _____
(Signature)

Mollie Bowness, B.Eng.
Engineering Intern, Geotechnical Engineering

Checked by _____
(Signature)

John J. Brisbois, MScE., P. Eng.
Principal, Geotechnical Engineering

Reviewed by _____
(Signature)

Ron Howieson., P. Eng.
Senior Principal, Geotechnical Engineering

APPENDIX A

Statement of General Conditions

STATEMENT OF GENERAL CONDITIONS

USE OF THIS REPORT: This report has been prepared for the sole benefit of the Client or its agent and may not be used by any third party without the express written consent of Stantec Consulting Ltd. and the Client. Any use which a third party makes of this report is the responsibility of such third party.

BASIS OF THE REPORT: The information, opinions, and/or recommendations made in this report are in accordance with Stantec Consulting Ltd.'s present understanding of the site specific project as described by the Client. The applicability of these is restricted to the site conditions encountered at the time of the investigation or study. If the proposed site specific project differs or is modified from what is described in this report or if the site conditions are altered, this report is no longer valid unless Stantec Consulting Ltd. is requested by the Client to review and revise the report to reflect the differing or modified project specifics and/or the altered site conditions.

STANDARD OF CARE: Preparation of this report, and all associated work, was carried out in accordance with the normally accepted standard of care in the state or province of execution for the specific professional service provided to the Client. No other warranty is made.

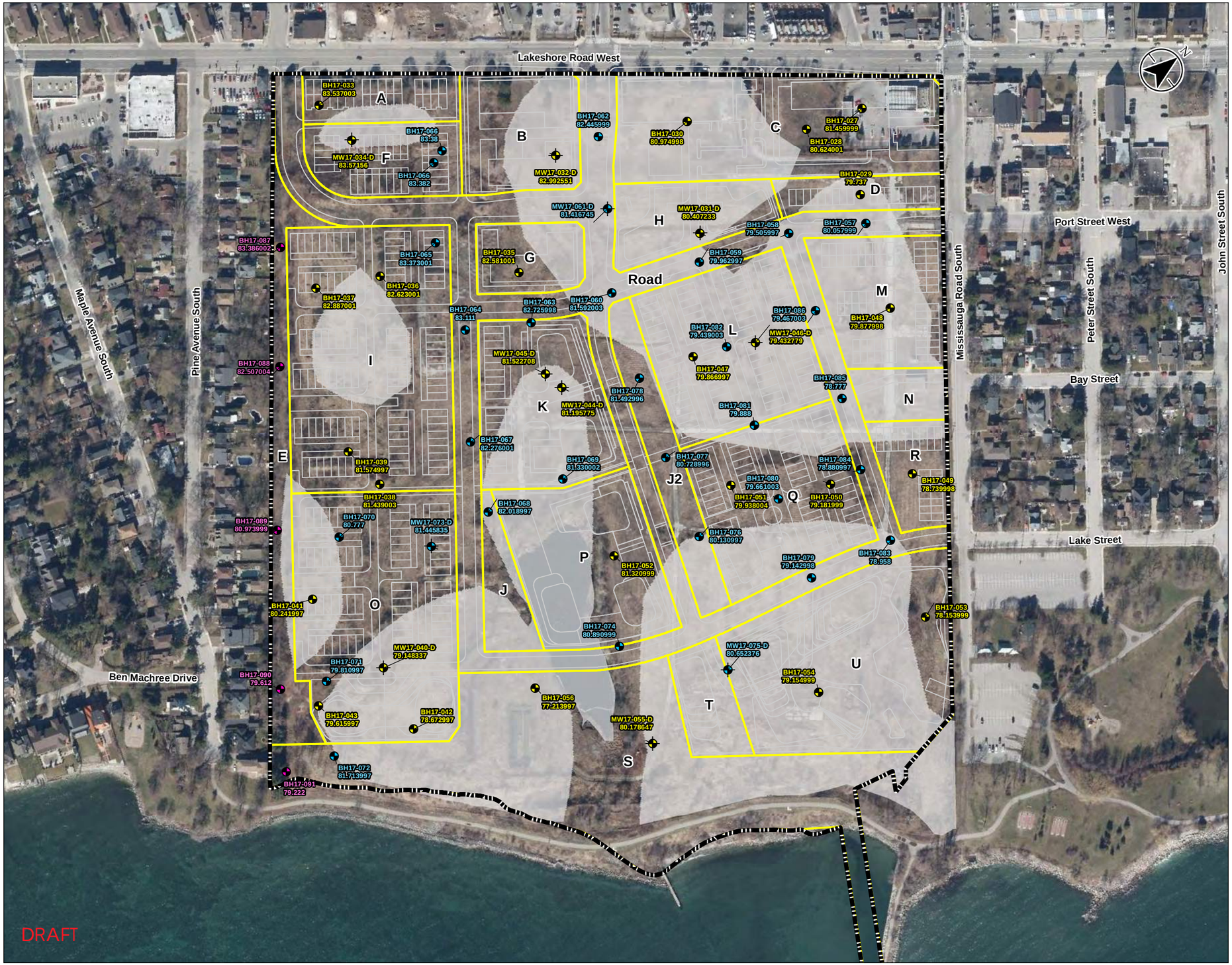
INTERPRETATION OF SITE CONDITIONS: Soil, rock, or other material descriptions, and statements regarding their condition, made in this report are based on site conditions encountered by Stantec Consulting Ltd. at the time of the work and at the specific testing and/or sampling locations. Classifications and statements of condition have been made in accordance with normally accepted practices which are judgmental in nature; no specific description should be considered exact, but rather reflective of the anticipated material behavior. Extrapolation of in situ conditions can only be made to some limited extent beyond the sampling or test points. The extent depends on variability of the soil, rock and groundwater conditions as influenced by geological processes, construction activity, and site use.

VARYING OR UNEXPECTED CONDITIONS: Should any site or subsurface conditions be encountered that are different from those described in this report or encountered at the test locations, Stantec Consulting Ltd. must be notified immediately to assess if the varying or unexpected conditions are substantial and if reassessments of the report conclusions or recommendations are required. Stantec Consulting Ltd. will not be responsible to any party for damages incurred as a result of failing to notify Stantec Consulting Ltd. that differing site or sub-surface conditions are present upon becoming aware of such conditions.

PLANNING, DESIGN, OR CONSTRUCTION: Development or design plans and specifications should be reviewed by Stantec Consulting Ltd., sufficiently ahead of initiating the next project stage (property acquisition, tender, construction, etc), to confirm that this report completely addresses the elaborated project specifics and that the contents of this report have been properly interpreted. Specialty quality assurance services (field observations and testing) during construction are a necessary part of the evaluation of sub-subsurface conditions and site preparation works. Site work relating to the recommendations included in this report should only be carried out in the presence of a qualified geotechnical engineer; Stantec Consulting Ltd. cannot be responsible for site work carried out without being present.

APPENDIX B

Drawings



Stantec

Legend

- Site Boundary
- Road Monitoring Well (Stantec, 2017)
- Building Block Monitoring Well (Stantec, 2017)
- Building Block Borehole (Stantec, 2017)
- Road Borehole (Stantec, 2017)
- Utility Borehole (Stantec, 2017)
- Block Plan
- Remediation - Source Removal
- Site Plan
- 79.73 Ground Surface Elevation (metres above sea level)

0 50 100 metres
1:3,000 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2018.
3. Orthoimagery © First Base Solutions, 2018. Imagery Date, 2016.
4. Development Plan provided by Giannone Petricone Associates, updated on February 9, 2018.

Project Location
Regional
Municipality of Peel

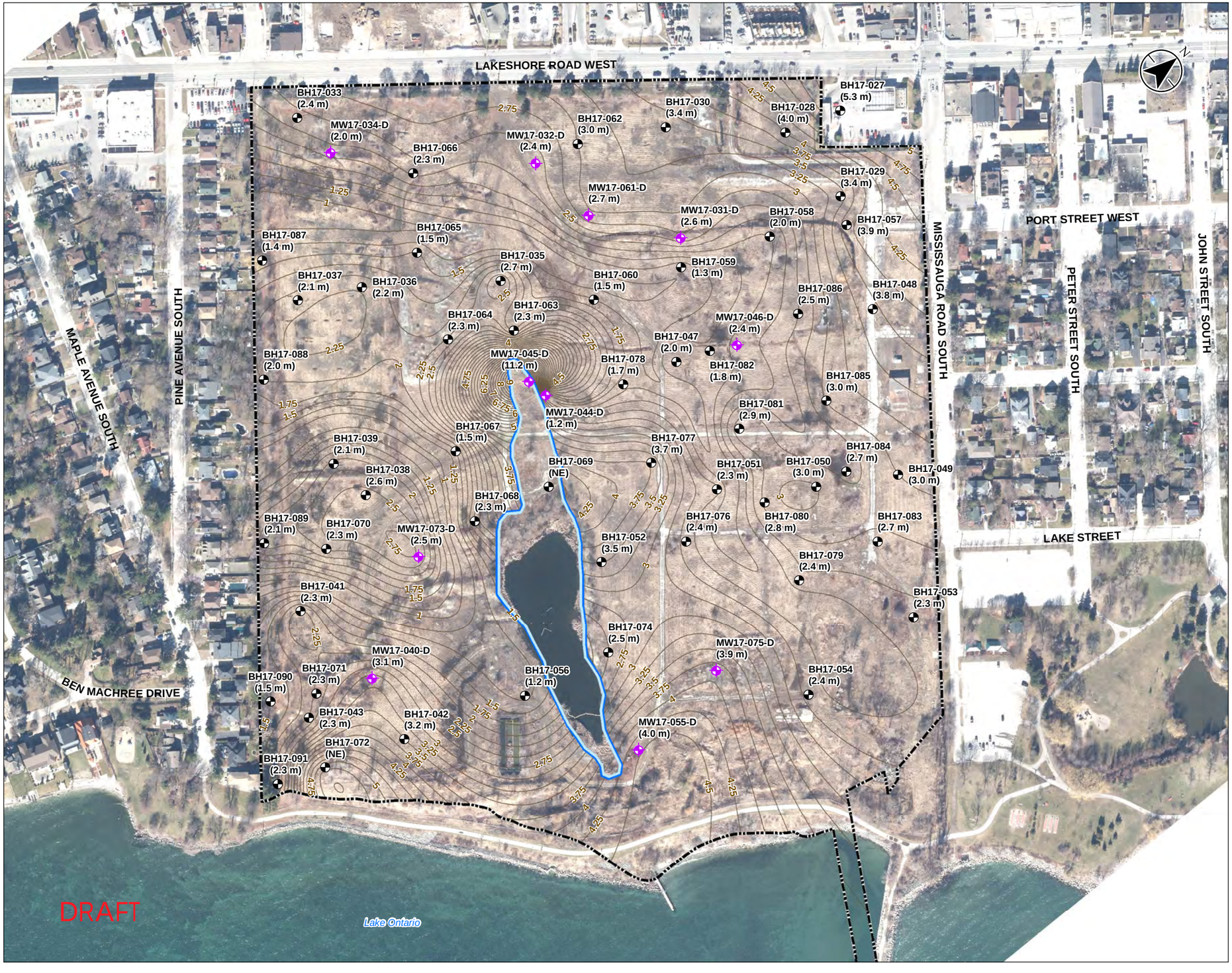
122120255 REVA
Prepared by KJ on 2018-02-12
Technical Review by ABC on yyyy-mm-dd
Independent Review by ABC on yyyy-mm-dd

Client/Project
Port Credit West Village Partners Inc.
70 Mississauga Road South, Mississauga, ON
Brownfield Redevelopment

Figure No.
1

DRAFT

Title
Geotechnical Borehole Locations



Stantec

- Site Boundary
- Bedrock Monitoring Well (Stantec, 2017)
- Overburden Monitoring Well (Stantec, 2017)
- Borehole (Stantec, 2017)
- Existing Monitoring Well (Bedrock)
- Existing Monitoring Well (Overburden)
- Monitoring Well Damaged or Could Not Be Found
- Depth to Bedrock Contour (metres below ground surface)
- Shale Pit Extent, 1910 FIP

DRAFT

0 75 150 metres

1:3,000 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2017.
3. Orthoimagery © First Base Solutions, 2017. Imagery taken in 2016.

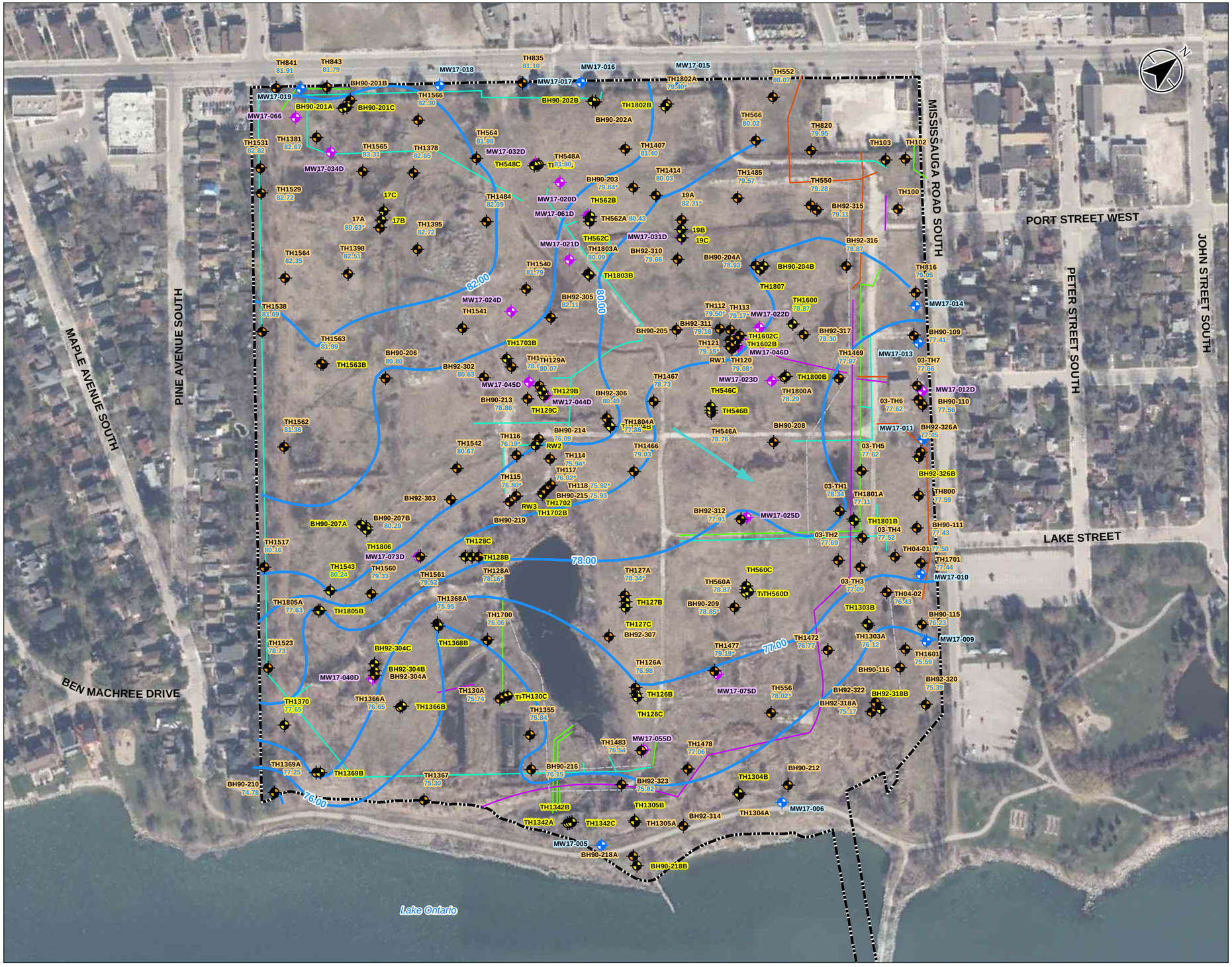
Project Location
Mississauga, Ontario

122120255
Prepared by KJ on 2017-11-23
Technical Review by NM on 2017-11-23

Client/Project
Port Credit West Village Partners Inc.
70 Mississauga Road South, Mississauga, ON
Brownfield Redevelopment

Figure No.
2

Title
Depth to Bedrock



Stantec

- Site Boundary
- Bedrock Monitoring Well (Stantec, 2017)
- Overburden Monitoring Well (Stantec, 2017)
- Existing Monitoring Well (Bedrock)
- Existing Monitoring Well (Overburden)
- Storm Sewer
- Water
- Hydro
- Telephone
- Unknown
- Groundwater Contour (m AMSL)
- Inferred Direction of Groundwater Flow
- 77.62 Groundwater Elevation (m AMSL)
- 77.62* Groundwater Elevation (m AMSL) Not Used in Contouring

0 75 150 metres

1:3,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
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3. Orthoimagery © First Base Solutions, 2017. Imagery taken in 2016.
4. Based on survey plan by J.D. Barnes Ltd. dated March 10, 2017.
5. m AMSL - meters above mean sea level

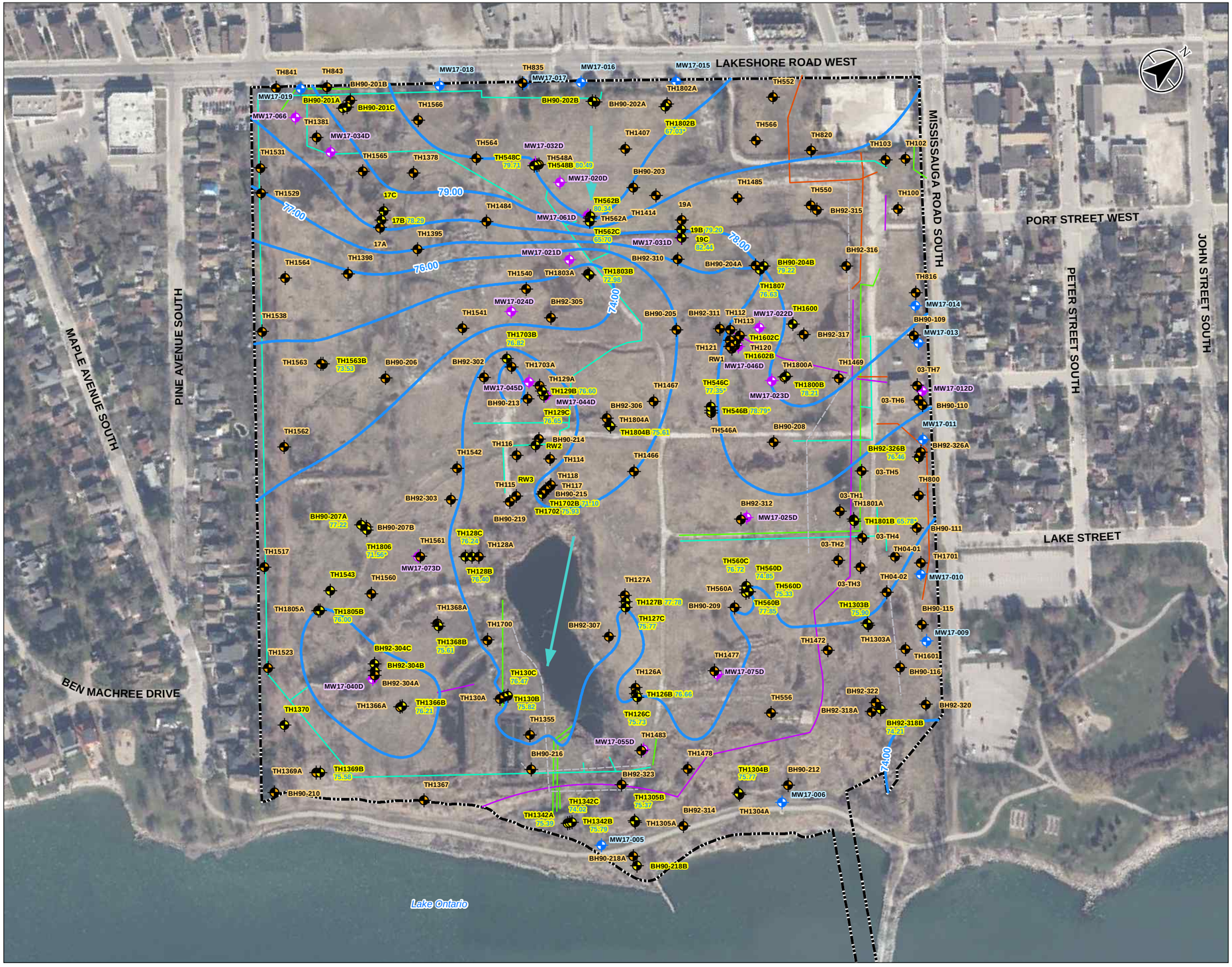
Project Location
Mississauga, Ontario

122120255
Prepared by KJ on 2018-02-22
Technical Review by NM on 2018-02-22

Client/Project
Port Credit West Village Partners Inc.
70 Mississauga Road South, Mississauga, ON
Brownfield Redeveloment

Figure No.
3a

Title
Groundwater Elevations in Overburden and Inferred Direction of Flow - March 2015



Stantec

- Site Boundary
- Bedrock Monitoring Well (Stantec, 2017)
- Overburden Monitoring Well (Stantec, 2017)
- Existing Monitoring Well (Bedrock)
- Existing Monitoring Well (Overburden)
- Storm Sewer
- Water
- Hydro
- Telephone
- Unknown
- Groundwater Contour (m AMSL)
- Inferred Direction of Groundwater Flow
- 77.62 Groundwater Elevation (m AMSL)
- 77.62* Groundwater Elevation (m AMSL) Not Used in Contouring

0 75 150 metres

1:3,000 (At original document size of 11x17)

Notes

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3. Orthoimagery © First Base Solutions, 2017. Imagery taken in 2016.
4. Based on survey plan by J.D. Barnes Ltd. dated March 10, 2017.
5. m AMSL - meters above mean sea level

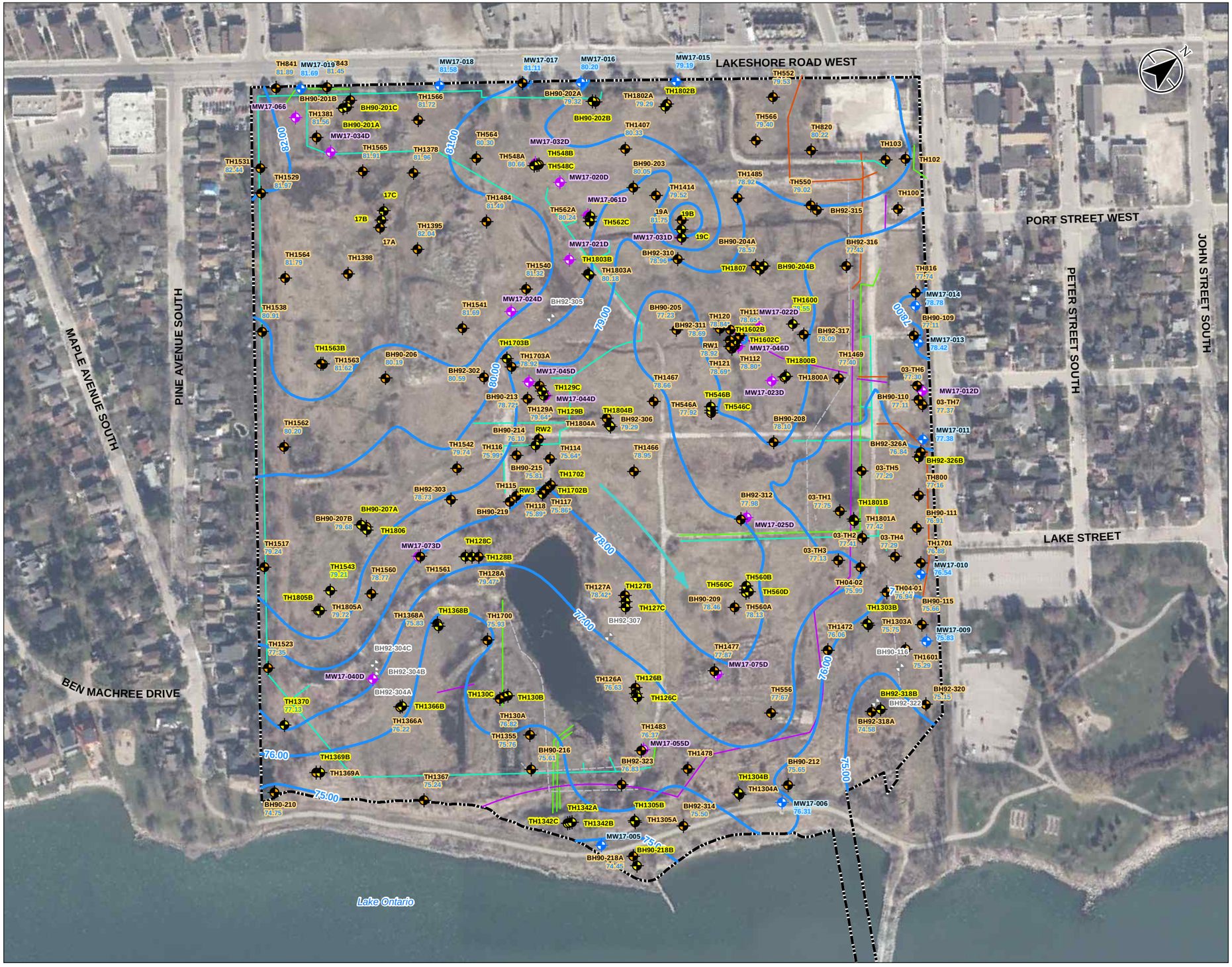
Project Location
Mississauga, Ontario

122120255
Prepared by KJ on 2018-02-22
Technical Review by NM on 2018-02-22

Client/Project
Port Credit West Village Partners Inc.
70 Mississauga Road South, Mississauga, ON
Brownfield Redevelopment

Figure No.
3b

Title
Groundwater Elevations in Bedrock and Inferred Direction of Flow - March 2015



Stantec

- Site Boundary
- Bedrock Monitoring Well (Stantec, 2017)
- Overburden Monitoring Well (Stantec, 2017)
- Existing Monitoring Well (Bedrock)
- Existing Monitoring Well (Overburden)
- Monitoring Well Damaged or Could Not Be Found in 2017
- Storm Sewer
- Water
- Hydro
- Telephone
- Unknown
- Groundwater Contour (m AMSL)
- Inferred Direction of Groundwater Flow
- 7762 Groundwater Elevation (m AMSL)
- 7762* Groundwater Elevation (m AMSL) Not Used in Contouring

0 75 150 metres
1:3,000 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2017.
3. Orthoimagery © First Base Solutions, 2017. Imagery taken in 2016.
4. Based on survey plan by J.D. Barnes Ltd. dated March 10, 2017.
5. m AMSL - meters above mean sea level

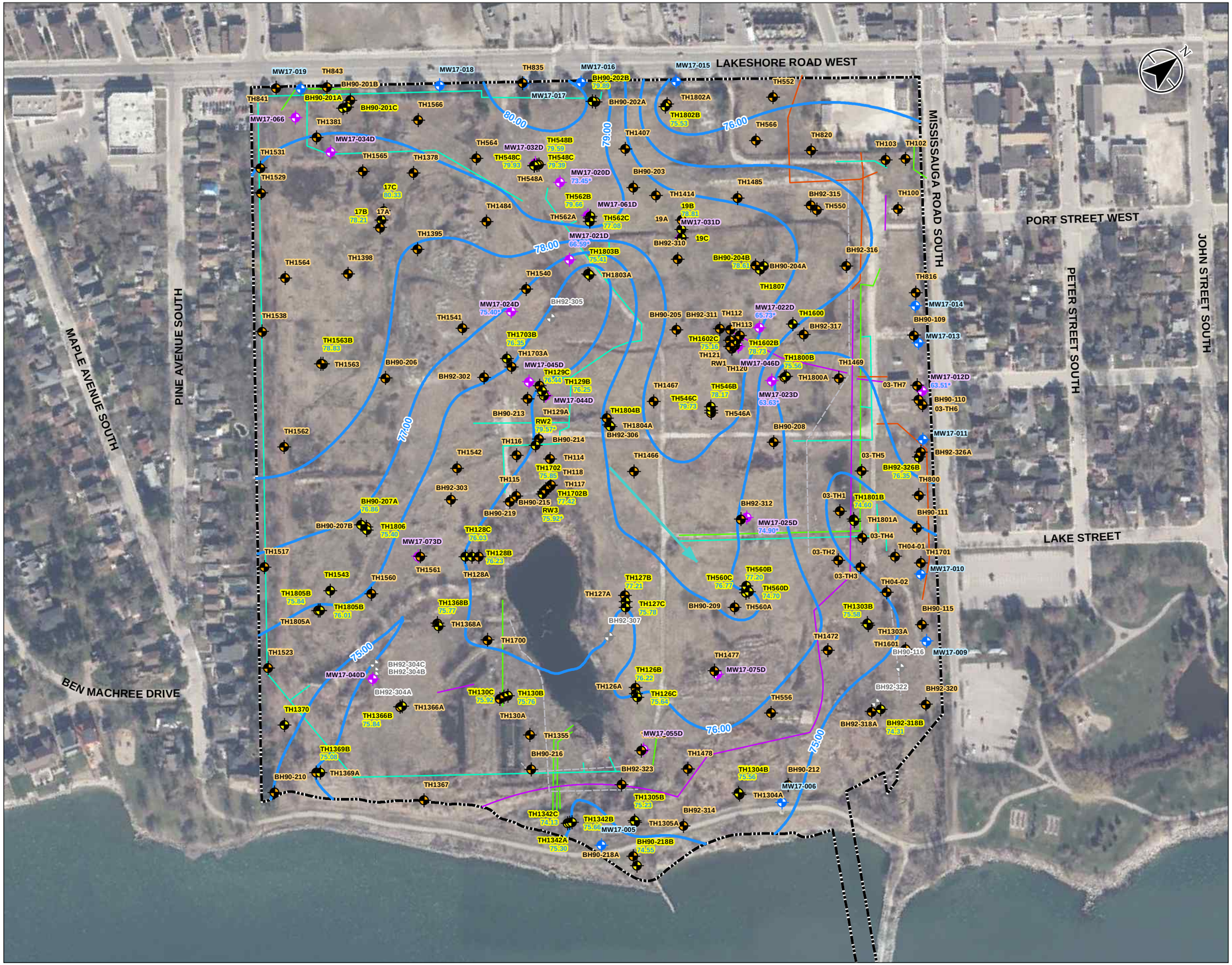
Project Location
Mississauga, Ontario

122120255
Prepared by KJ on 2018-02-22
Technical Review by NM on 2018-02-22

Client/Project
Port Credit West Village Partners Inc.
70 Mississauga Road South, Mississauga, ON
Brownfield Redevelopment

Figure No.
3c

Title
Groundwater Elevations in Overburden and Inferred Direction of Flow - January 2017



Stantec

- Site Boundary
- Bedrock Monitoring Well (Stantec, 2017)
- Overburden Monitoring Well (Stantec, 2017)
- Existing Monitoring Well (Bedrock)
- Existing Monitoring Well (Overburden)
- Monitoring Well Damaged or Could Not Be Found in 2017
- Storm Sewer
- Water
- Hydro
- Telephone
- Unknown
- Groundwater Contour (m AMSL)
- Inferred Direction of Groundwater Flow
- 7762 Groundwater Elevation (m AMSL)
- 7762* Groundwater Elevation (m AMSL) Not Used in Contouring

0 75 150 metres

1:3,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2017.
3. Orthoimagery © First Base Solutions, 2017. Imagery taken in 2016.
4. Based on survey plan by J.D. Barnes Ltd. dated March 10, 2017.
5. m AMSL - meters above mean sea level

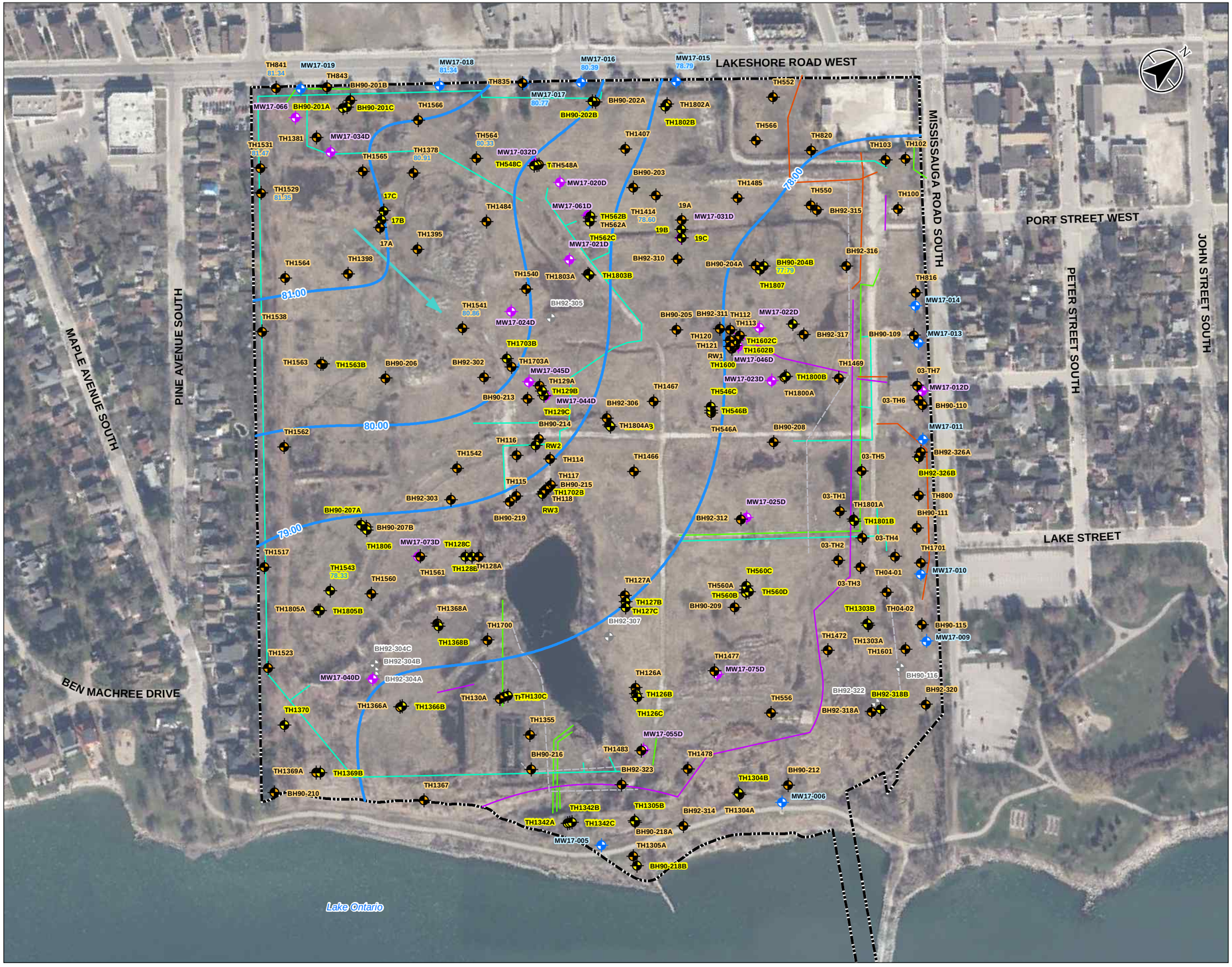
Project Location
Mississauga, Ontario

122120255
Prepared by KJ on 2018-02-22
Technical Review by NM on 2018-02-22

Client/Project
Port Credit West Village Partners Inc.
70 Mississauga Road South, Mississauga, ON
Brownfield Redevelopment

Figure No.
3d

Title
Groundwater Elevations in Bedrock and Inferred Direction of Flow - January 2017



Stantec

- Site Boundary
- Bedrock Monitoring Well (Stantec, 2017)
- Overburden Monitoring Well (Stantec, 2017)
- Existing Monitoring Well (Bedrock)
- Existing Monitoring Well (Overburden)
- Monitoring Well Damaged or Could Not Be Found in 2017
- Storm Sewer
- Water
- Hydro
- Telephone
- Unknown
- Groundwater Contour (m AMSL)
- Inferred Direction of Groundwater Flow
- 7762 Groundwater Elevation (m AMSL)

0 75 150 metres

1:3,000 (At original document size of 11x17)

Notes

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4. Based on survey plan by J.D. Barnes Ltd. dated March 10, 2017.
5. m AMSL - meters above mean sea level

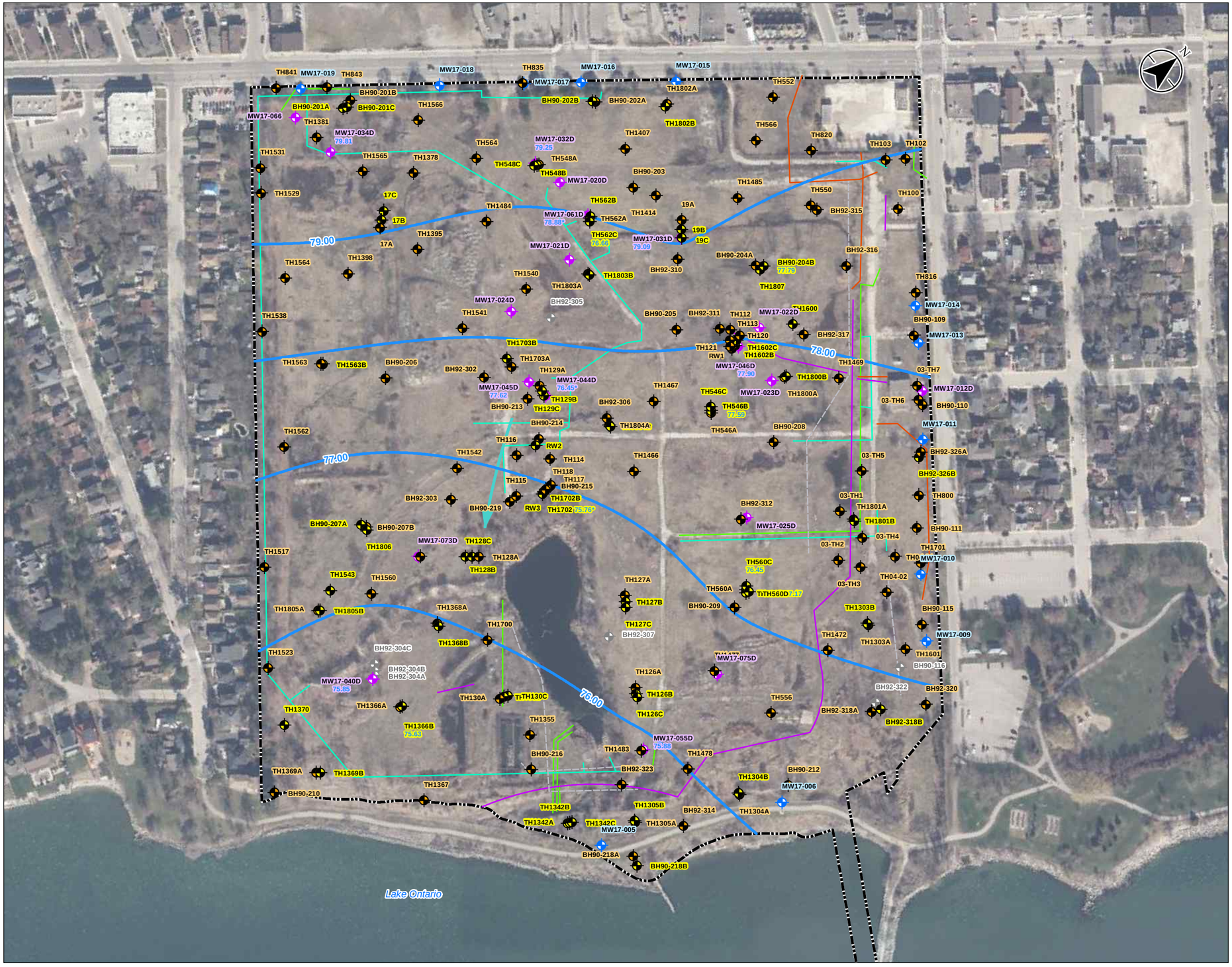
Project Location
Mississauga, Ontario

122120255
Prepared by KJ on 2018-02-22
Technical Review by NM on 2018-02-22

Client/Project
Port Credit West Village Partners Inc.
70 Mississauga Road South, Mississauga, ON
Brownfield Redevelopment

Figure No.
3e

Title
Groundwater Elevations in Overburden and Inferred Direction of Flow - September and October 2017



Stantec

- Site Boundary
- Bedrock Monitoring Well (Stantec, 2017)
- Overburden Monitoring Well (Stantec, 2017)
- Existing Monitoring Well (Bedrock)
- Existing Monitoring Well (Overburden)
- Monitoring Well Damaged or Could Not Be Found in 2017
- Storm Sewer
- Water
- Hydro
- Telephone
- Unknown
- Groundwater Contour (m AMSL)
- Inferred Direction of Groundwater Flow
- 77.62 Groundwater Elevation (m AMSL)
- 77.62* Groundwater Elevation (m AMSL) Not Used in Contouring

0 75 150 metres

1:3,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
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3. Orthoimagery © First Base Solutions, 2017. Imagery taken in 2016.
4. Based on survey plan by J.D. Barnes Ltd. dated March 10, 2017.
5. m AMSL - meters above mean sea level

Project Location
Mississauga, Ontario

122120255
Prepared by KJ on 2018-02-22
Technical Review by NM on 2018-02-22

Client/Project
Port Credit West Village Partners Inc.
70 Mississauga Road South, Mississauga, ON
Brownfield Redevelopment

Figure No.
3f

Title
Groundwater Elevations in Bedrock and Inferred Direction of Flow - September and October 2017

APPENDIX C

Symbols and Terms Used on the Borehole Record Sheets

Borehole Records

SYMBOLS AND TERMS USED ON BOREHOLE AND TEST PIT RECORDS

SOIL DESCRIPTION

Terminology describing common soil genesis:

Rootmat	- vegetation, roots and moss with organic matter and topsoil typically forming a mattress at the ground surface
Topsoil	- mixture of soil and humus capable of supporting vegetative growth
Peat	- mixture of visible and invisible fragments of decayed organic matter
Till	- unstratified glacial deposit which may range from clay to boulders
Fill	- material below the surface identified as placed by humans (excluding buried services)

Terminology describing soil structure:

Desiccated	- having visible signs of weathering by oxidization of clay minerals, shrinkage cracks, etc.
Fissured	- having cracks, and hence a blocky structure
Varved	- composed of regular alternating layers of silt and clay
Stratified	- composed of alternating successions of different soil types, e.g. silt and sand
Layer	- > 75 mm in thickness
Seam	- 2 mm to 75 mm in thickness
Parting	- < 2 mm in thickness

Terminology describing soil types:
The classification of soil types are made on the basis of grain size and plasticity in accordance with the Unified Soil Classification System (USCS) (ASTM D 2487 or D 2488) which excludes particles larger than 75 mm. For particles larger than 75 mm, and for defining percent clay fraction in hydrometer results, definitions proposed by Canadian Foundation Engineering Manual, 4th Edition are used. The USCS provides a group symbol (e.g. SM) and group name (e.g. silty sand) for identification.

Terminology describing cobbles, boulders, and non-matrix materials (organic matter or debris):
Terminology describing materials outside the USCS, (e.g. particles larger than 75 mm, visible organic matter, and construction debris) is based upon the proportion of these materials present:

Trace, or occasional	Less than 10%
Some	10-20%
Frequent	> 20%

Terminology describing compactness of cohesionless soils:
The standard terminology to describe cohesionless soils includes compactness (formerly "relative density"), as determined by the Standard Penetration Test (SPT) N-Value - also known as N-Index. The SPT N-Value is described further on page 3. A relationship between compactness condition and N-Value is shown in the following table.

Compactness Condition	SPT N-Value
Very Loose	<4
Loose	4-10
Compact	10-30
Dense	30-50
Very Dense	>50

Terminology describing consistency of cohesive soils:
The standard terminology to describe cohesive soils includes the consistency, which is based on undrained shear strength as measured by *in situ* vane tests, penetrometer tests, or unconfined compression tests. Consistency may be crudely estimated from SPT N-Value based on the correlation shown in the following table (Terzaghi and Peck, 1967). The correlation to SPT N-Value is used with caution as it is only very approximate.

Consistency	Undrained Shear Strength		Approximate SPT N-Value
	kips/sq.ft.	kPa	
Very Soft	<0.25	<12.5	<2
Soft	0.25 - 0.5	12.5 - 25	2-4
Firm	0.5 - 1.0	25 - 50	4-8
Stiff	1.0 - 2.0	50 – 100	8-15
Very Stiff	2.0 - 4.0	100 - 200	15-30
Hard	>4.0	>200	>30

ROCK DESCRIPTION

Except where specified below, terminology for describing rock is as defined by the International Society for Rock Mechanics (ISRM) 2007 publication "The Complete ISRM Suggested Methods for Rock Characterization, Testing and Monitoring: 1974-2006"

Terminology describing rock quality:

RQD	Rock Mass Quality
0-25	*Very Poor Quality*
25-50	*Poor Quality*
50-75	*Fair Quality*
75-90	*Good Quality*
90-100	*Excellent Quality*

Alternate (Colloquial) Rock Mass Quality	
Very Severely Fractured	*Crushed*
Severely Fractured	*Shattered or Very Blocky*
Fractured	*Blocky*
Moderately Jointed	*Sound*
Intact	*Very Sound*

RQD (Rock Quality Designation) denotes the percentage of intact and sound rock retrieved from a borehole of any orientation. All pieces of intact and sound rock core equal to or greater than 100 mm (4 in.) long are summed and divided by the total length of the core run. RQD is determined in accordance with ASTM D6032.

SCR (Solid Core Recovery) denotes the percentage of solid core (cylindrical) retrieved from a borehole of any orientation. All pieces of solid (cylindrical) core are summed and divided by the total length of the core run (It excludes all portions of core pieces that are not fully cylindrical as well as crushed or rubble zones).

Fracture Index (FI) is defined as the number of naturally occurring fractures within a given length of core. The Fracture Index is reported as a simple count of natural occurring fractures.

Terminology describing rock with respect to discontinuity and bedding spacing:

Spacing (mm)	Discontinuities	Bedding
>6000	*Extremely Wide*	-
2000-6000	*Very Wide*	*Very Thick*
600-2000	*Wide*	*Thick*
200-600	*Moderate*	*Medium*
60-200	*Close*	*Thin*
20-60	*Very Close*	*Very Thin*
<20	*Extremely Close*	*Laminated*
<6	-	*Thinly Laminated*

Terminology describing rock strength:

Strength Classification	Grade	Unconfined Compressive Strength (MPa)
Extremely Weak	R0	<1
Very Weak	R1	1 – 5
Weak	R2	5 – 25
Medium Strong	R3	25 – 50
Strong	R4	50 – 100
Very Strong	R5	100 – 250
Extremely Strong	R6	>250

Terminology describing rock weathering:

Term	Symbol	Description
Fresh	W1	No visible signs of rock weathering. Slight discoloration along major discontinuities
Slightly	W2	Discoloration indicates weathering of rock on discontinuity surfaces. All the rock material may be discolored.
Moderately	W3	Less than half the rock is decomposed and/or disintegrated into soil.
Highly	W4	More than half the rock is decomposed and/or disintegrated into soil.
Completely	W5	All the rock material is decomposed and/or disintegrated into soil. The original mass structure is still largely intact.
Residual Soil	W6	All the rock converted to soil. Structure and fabric destroyed.

STRATA PLOT

Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols. The dimensions within the strata symbols are not indicative of the particle size, layer thickness, etc.

Boulders Cobbles Gravel | Sand | Silt | Clay | Organics | Asphalt | Concrete | Fill | Igneous Bedrock | Meta-morphic Bedrock | Sedi-mentary Bedrock

SAMPLE TYPE

SS	Split spoon sample (obtained by performing the Standard Penetration Test)
ST	Shelby tube or thin wall tube
DP	Direct-Push sample (small diameter tube sampler hydraulically advanced)
PS	Piston sample
BS	Bulk sample
HQ, NQ, BQ, etc.	Rock core samples obtained with the use of standard size diamond coring bits.

WATER LEVEL MEASUREMENT

measured in standpipe, piezometer, or well

inferred

RECOVERY

For soil samples, the recovery is recorded as the length of the soil sample recovered. For rock core, recovery is defined as the total cumulative length of all core recovered in the core barrel divided by the length drilled and is recorded as a percentage on a per run basis.

N-VALUE

Numbers in this column are the field results of the Standard Penetration Test: the number of blows of a 140 pound (63.5 kg) hammer falling 30 inches (760 mm), required to drive a 2 inch (50.8 mm) O.D. split spoon sampler one foot (300 mm) into the soil. In accordance with ASTM D1586, the N-Value equals the sum of the number of blows (N) required to drive the sampler over the interval of 6 to 18 in. (150 to 450 mm). However, when a 24 in. (610 mm) sampler is used, the number of blows (N) required to drive the sampler over the interval of 12 to 24 in. (300 to 610 mm) may be reported if this value is lower. For split spoon samples where insufficient penetration was achieved and N-Values cannot be presented, the number of blows are reported over sampler penetration in millimetres (e.g. 50/75). Some design methods make use of N-values corrected for various factors such as overburden pressure, energy ratio, borehole diameter, etc. No corrections have been applied to the N-values presented on the log.

DYNAMIC CONE PENETRATION TEST (DCPT)

Dynamic cone penetration tests are performed using a standard 60 degree apex cone connected to 'A' size drill rods with the same standard fall height and weight as the Standard Penetration Test. The DCPT value is the number of blows of the hammer required to drive the cone one foot (300 mm) into the soil. The DCPT is used as a probe to assess soil variability.

OTHER TESTS

S	Sieve analysis
H	Hydrometer analysis
k	Laboratory permeability
γ	Unit weight
G_s	Specific gravity of soil particles
CD	Consolidated drained triaxial
CU	Consolidated undrained triaxial with pore pressure measurements
UU	Unconsolidated undrained triaxial
DS	Direct Shear
C	Consolidation
Q_u	Unconfined compression
I_p	Point Load Index (I_p on Borehole Record equals $I_p(50)$ in which the index is corrected to a reference diameter of 50 mm)

	Single packer permeability test; test interval from depth shown to bottom of borehole
	Double packer permeability test; test interval as indicated
	Falling head permeability test using casing
	Falling head permeability test using well point or piezometer

Stantec

BOREHOLE RECORD

BH17-027

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 565 E: 613 920 DATUM Geodetic

DATES: BORING October 5, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0	**81.5**	**Asphalt**	0					
		65 mm ASPHALT						
		FILL: brown, sand with gravel - dry	1	SS	1	280/610	23	
	80.6		2					
1		FILL: brown, sandy silt - some gravel - occasional red brick fragments - dry	3	SS	2	360/610	6	
			4					
			5					
2			6	SS	3	610/610	24	
	79.3		7					
		Very stiff to hard, grey, CLAY with SAND (CL) - trace gravel	8	SS	4	580/610	19	
3			9					
		- dry to moist - occasional silt seams and layers	10					
			11	SS	5	360/610	17	
			12					
4			13	SS	6	280/610	19	
			14					
			15					
5			16	SS	7	610/610	34	
	76.2		17					
		Highly weathered, grey, SHALE	18	SS	8	130/130	50/130	>>
	75.7		19					
6		Slightly weathered to fresh, grey to black, SHALE BEDROCK - occasional grey limestone interbeds - shale hardness 3, limestone hardnesss 4 to 6 - poor to fair quality - core run 1 very intensely fractured - core runs 2 and 3 moderately to intensely fractured - horizontal fractures; 0.5 mm to 5 mm aperture	20	HQ	1	71%/47%	34%	FI = NA, 2
			21					
			22					
7			23					
			24	HQ	2	100%/100%	66%	FI = 3, 4, 3, 2, 1
			25					
			26					
8			27					
			28	HQ	3	100%/97%	69%	FI = 2, 1, 4, 3
			29					
9	72.4							
		END OF BOREHOLE at approximately 9.1 m below existing grade.	30					
			31					
10			32					

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-027

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 565 E: 613 920 DATUM Geodetic

DATES: BORING October 5, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
	71.5								
10		Unable to observe groundwater condition in borehole due to use of water for coring.			33				
					34				
					35				
11					36				
					37				
					38				
					39				
12					40				
					41				
					42				
13					43				
					44				
					45				
14					46				
					47				
					48				
					49				
15					50				
					51				
					52				
16					53				
					54				
					55				
17					56				
					57				
					58				
18					59				
					60				
					61				
19					62				
					63				
					64				
					65				
20									

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-028

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 521 E: 613 907 DATUM Geodetic

DATES: BORING September 19, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0	80.6		0					
		FILL: brown to black, sand with gravel	1	SS	1	530/610	30	
	79.9	- some clay - trace silt - dry to damp	2					
1			3	SS	2	330/610	5	
	79.2	FILL: dark grey, clay with sand - trace gravel - odour noted - possible contamination - moist	4					
			5					
			6	SS	3	460/610	3	
2			7					Bulk Sample 16 29 28 27
		FILL: dark grey to brown, sandy clay with gravel - occasional rust dicoloration - moist with occasional wet pockets - bulk sample taken at 2.3 m	8	SS	4	430/610	6	
			9					
3			10					
			11	SS	5	100/610	6	
	76.9		12					
	76.7	Hard, grey, CLAY (CL) - damp to moist	13	SS	6	300/300	50/150	>>
4	76.4		14					
		Highly weathered, grey, SHALE	15	HQ	1	100%/41%	0%	FI = NA, 5
		Slightly weathered to fresh, grey to black, SHALE BEDROCK - occasional grey limestone interbeds - shale hardness 2 to 2.5, limestone hardness 4 - occasional to frequent clay seams - core run 1: very poor quality, very intensely fractured - core runs 2 to 4: poor to fair quality, slightly to intensely fractured - horizontal fractures - vertical fracture from 5.1 m to 5.3 m - poor to fair quality - slightly to intensely fractured	16					
5			17					
			18	HQ	2	97%/79%	48%	FI = 6, 3, 8, 0, 2
			19					
6			20					
			21					
			22					
			23	HQ	3	98%/91%	72%	FI = 5, 3, 2, 2, 1
7			24					
			25					
			26					
			27					
			28	HQ	4	98%/91%	50%	FI = 3, 5, 5, 5
8			29					
			30					
9	71.3							
		END OF BOREHOLE at approximately 9.3 m below existing grade.	31					
			32					
10								

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-028

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 521 E: 613 907 DATUM Geodetic

DATES: BORING September 19, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
10	70.6				33				
		Unable to observe groundwater condition in borehole due to use of water for coring.			34				
					35				
11					36				
					37				
					38				
12					39				
					40				
					41				
13					42				
					43				
					44				
14					45				
					46				
					47				
15					48				
					49				
					50				
16					51				
					52				
					53				
17					54				
					55				
					56				
18					57				
					58				
					59				
19					60				
					61				
					62				
20					63				
					64				
					65				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-029

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 524 E: 613 971 DATUM Geodetic

DATES: BORING October 4, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0	79.7				0					
		FILL: brown to black, clay with sand - some gravel - dry			1					
1					2					
					3					
2	77.5				4					
		Brown to black CLAY with SAND (CL) - trace gravel - staining noted - borehole in known area of contamination			5					
					6					
3	76.3				7					
	76.1	- dry			8					
		Highly weathered, black, SHALE			9					
		Slightly weathered to fresh, grey to black, SHALE BEDROCK - occasional grey limestone interbeds			10	SS	1	610/610	27	
4					11					
					12					
					13					
					14	HQ	1	73%/50%	8%	FI = NA, 8, 7, 2
5	74.6	- shale hardness 2 to 3, limestone hardness 6 - very poor quality - moderately to intensely fractured - horizontal fractures; clay in fractures throughout, 0.5 mm to 5 mm aperture			15					
					16					
					17					
					18					
6					19					
					20					
					21					
					22					
7		END OF BOREHOLE at approximately 5.1 m below existing grade. Unable to measure groundwater condition in borehole due to use of water for coring.			23					
					24					
					25					
					26					
8					27					
					28					
					29					
					30					
9					31					
					32					
10										

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-030

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 454 E: 613 846 DATUM Geodetic

DATES: BORING October 4, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	81.0				0				
		FILL: brown, clay with sand - trace gravel - dry			1				
1	79.5				2				
		FILL: grey, sandy clay with gravel - occasional cobbles - dry			3				
2	78.4				4				
		Very dense, grey CLAY (CL) - some sand and gravel - occasional shale fragments			5				
3	77.5	- dry			6				
		Slightly weathered to fresh, grey to black, SHALE BEDROCK - occasional grey limestone interbeds - shale hardness 3, limestone hardness 4 to 6 - core run 1: very poor quality - core runs 2 to 5: poor to excellent quality, moderately to intensely fractured - horizontal fractures; closed to 5 mm aperture - 50 mm limestone interbed at 4.9 m - 76 mm limestone interbed at 5.5 m - 32 mm limestone interbed at 5.9 m - 32 mm limestone interbed at 6.5 m			7				
4					8				
					9				
5					10	SS	1	180/410	50/100
					11	HQ	1	33%/19%	0%
					12				
					13				
6					14	HQ	2	100%/98%	71%
					15				
					16				
7					17				
					18				
					19	HQ	3	88%/78%	35%
					20				
					21				
8					22				
					23				
					24	HQ	4	100%/100%	93%
					25				
					26				
9					27				
					28				
					29	HQ	5	98%/94%	72%
					30				
	71.5				31				
		- 102 mm limestone interbed at 9.4 m			32				
10									

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

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

>>●

FI = 5, 5, 2, 2, 4

FI = 3, 4, 7, 7, 1

FI = 1, 3, 0, 2, 3

FI = 2, 2, 4, 3

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-030

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 454 E: 613 846 DATUM Geodetic

DATES: BORING October 4, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
	71.0								
10		END OF BOREHOLE at approximately 9.5 m below existing grade. Unable to observe groundwater condition in borehole due to use of water for coring.			33				
					34				
					35				
11					36				
					37				
					38				
					39				
12					40				
					41				
					42				
13					43				
					44				
					45				
14					46				
					47				
					48				
15					49				
					50				
					51				
					52				
16					53				
					54				
					55				
17					56				
					57				
					58				
18					59				
					60				
					61				
19					62				
					63				
					64				
20					65				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-033

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 241 E: 613 665 DATUM Geodetic

DATES: BORING September 29, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	83.5	50 mm TOPSOIL			0				
		Stiff to very stiff, brown CLAY (CL)			1	SS	1	480/610	11
		- some sand			2				
1		- grey			3	SS	2	480/610	20
		- trace gravel			4				
		- dry			5				
		- very stiff to hard			6	SS	3	560/610	40
2	81.1				7				
		Highly weathered, grey, SHALE			8	SS	4	250/250	50/100
	80.6				9				
3		Slightly weathered to fresh, grey to black, SHALE BEDROCK			10	HQ	1	95%/81%	21%
		- occasional grey limestone interbeds			11				
		- very poor to poor quality			12				
4		- moderately to intensely fractured			13				
		- horizontal fractures; 0.5 mm to 2 mm aperture width			14	HQ	2	99%/94%	50%
					15				
5	78.5				16				
		END OF BOREHOLE at approximately 5.0 m below existing grade.			17				
					18				
		Unable to observe groundwater condition in borehole due to use of water for coring.			19				
6					20				
					21				
					22				
7					23				
					24				
					25				
8					26				
					27				
					28				
9					29				
					30				
					31				
10					32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

REMARKS & GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL

2 12 58 28

FI = 6, 5

FI = 8, 5, 5, 3, 4

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-035

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 282 E: 613 858 DATUM Geodetic

DATES: BORING September 20, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	82.6		0				
		100 mm TOPSOIL					
		FILL: brown, black and red, sandy silt,	1	SS	1	530/610	29
	81.8	- some clay	2				
1		- some gravel	3	SS	2	410/610	16
		- damp to moist	4				
	81.1	Very stiff, brown, CLAY (CL)	5				
		- trace sand and gravel	6	SS	3	580/610	31
2		- dry to moist	7				
		Hard, brown, CLAY with SAND (CL)	8	SS	4	430/430	50/130
	79.8	- trace gravel	9				
		- dry to moist					
3		Slightly weathered to fresh, grey to black, SHALE BEDROCK	10	HQ	1	56%/27%	0%
		- occasional grey limestone interbeds	11				
		- shale hardness 2 to 2.5, limestone hardness 4 to 6	12				
4		- core runs 1 to 3: very poor to poor quality, moderately to very intensely fractured	13				
			14	HQ	2	100%/82%	47%
			15				
		- core runs 4 and 5: fair to good quality, moderately to intensely fractured	16				
5			17				
		- vertical fractures at 3.7 m and 4.2 m	18				
			19	HQ	3	98%/91%	34%
6		- occasional clay seams	20				
		- Uniaxial unconfined compressive strength at depths of approximately 4.7 m and 7.7 m are 12.6 MPa and 9.0 MPa respectively.	21				
			22				
7			23				
			24	HQ	4	100%/94%	79%
		- 25 mm and 38 mm limestone interbed at 4.9 m and 5.6 m respectively	25				
			26				
8		- 63 mm limestone interbed at 6.3 m	27				
			28				
		- clay seams	29	HQ	5	97%/80%	60%
		- 38 mm limestone interbed at 7.0 m	30				
9			31				
		- clay and gravel seams	32				
		- 25 mm and 63 mm limestone interbed at 7.5 m and 7.9 m					
10							

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

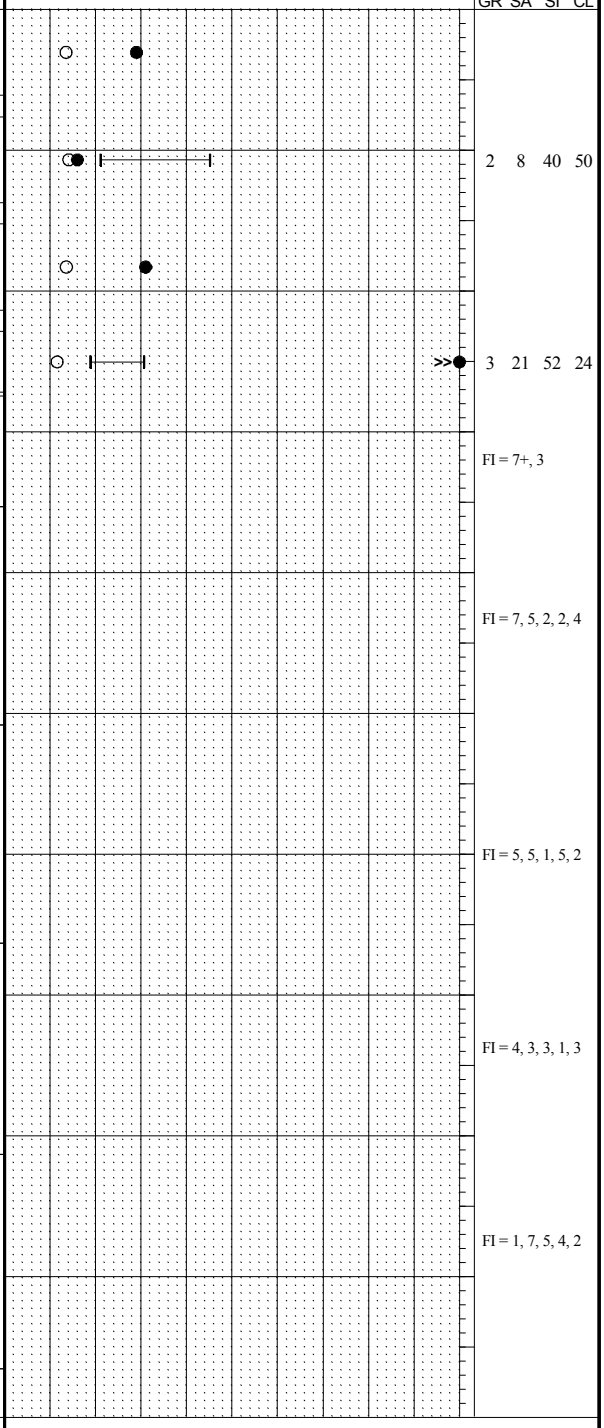
DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m

STANDARD PENETRATION TEST, BLOWS/0.3m

10 20 30 40 50 60 70 80 90 100

REMARKS & GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL



□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-035

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 282 E: 613 858 DATUM Geodetic

DATES: BORING September 20, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
10	72.6				33					
		respectively - vertical fracture at 7.9 m - 50 mm, 127 mm and 89 mm limestone interbed at 8.4 m; 8.5 and 8.8 m respectively - 51 mm limestone interbed at 9.7 m Slightly weathered to fresh, grey to black, SHALE BEDROCK - occasional grey limestone interbeds			34 35 36 37 38 39	HQ	6	100% 99%	90%	FI = 5, 5, 1, 5, 2
12	69.9	- core runs 6 and 7: good quality, moderately to intensely fractured - Uniaxial unconfined compressive strength at depth of approximately 11.0 m is 11.8 MPa - 76 mm, 63 mm and 51 mm limestone interbed at 11.1 m; 11.7 and 11.9 m respectively - vertical fracture from 11.7 m to 11.8 m - 51 mm limestone interbed at 12.5 m			40 41 42	HQ	7	100% 97%	75%	FI = 4, 3, 3, 1, 3
13					43 44 45					
14					46 47 48					
15					49 50 51					
16		END OF BOREHOLE at approximately 12.7 m below existing grade. Unable to observe groundwater condition in borehole due to use of water for coring.			52 53 54					
17					55 56 57					
18					58 59 60					
19					61 62 63					
20					64 65					

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-036

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 198 E: 613 796 DATUM Geodetic

DATES: BORING October 3, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	82.6				0				
		FILL: brown, clay with sand - dry			1	GS	1		
					2				
1					3				
	81.2				4	GS	2		
		Brown, CLAY with SAND (CL) - occasional weathered shale fragments			5				
					6	GS	3		
2	80.4				7				
		Highly weathered, grey, SHALE			8	SS	4		50/100
	79.7				9	GS	5		
3		Slightly weathered to fresh, grey to black, SHALE BEDROCK - shale hardness 2 to 3 - poor to fair quality - moderately to intensely fractured - horizontal fractures; 0.5 mm to 7 mm aperture			10	HQ	1	98% 78%	40%
					11				
					12				
4					13				
					14	HQ	2	100% 95%	66%
					15				
					16				
5	77.4				17				
		END OF BOREHOLE at approximately 5.2 m below existing grade. Unable to observe groundwater condition in borehole due to use of water for coring.			18				
					19				
6					20				
					21				
					22				
7					23				
					24				
					25				
8					26				
					27				
					28				
9					29				
					30				
					31				
10					32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m

STANDARD PENETRATION TEST, BLOWS/0.3m

10 20 30 40 50 60 70 80 90 100

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

FI = 6, 3, 2, 5

FI = 4, 3, 1, 3, 2

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-037

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 154 E: 613 773 DATUM Geodetic

DATES: BORING October 3, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	82.9				0				
		FILL: brown, clay with sand - dry			1	GS	1		
					2				
1					3	GS	2		
	81.4				4				
		Hard, brown, CLAY with SAND (CL) - occasional weathered shale fragments - dry			5				
2	80.8				6	SS	3	580/590	53
					7				
					8	GS	4		
	80.0	Highly weathered, grey, SHALE			9				
3		Slightly weathered to fresh, grey to black, SHALE BEDROCK - poor to good quality - moderately to intensely fractured - horizontal fractures; closed to 4 mm aperture			10	HQ	1	87%/74%	42%
					11				
					12				
4					13				
					14	HQ	2	100%/96%	84%
					15				
					16				
5	77.8				17				
		END OF BOREHOLE at approximately 5.1 m below existing grade. Unable to observe groundwater condition in borehole due to use of water for coring.			18				
					19				
6					20				
					21				
					22				
7					23				
					24				
					25				
8					26				
					27				
					28				
9					29				
					30				
					31				
10					32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

FI = 2, 4

FI = 3, 2, 3, 2, 2

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-038

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 100 E: 613 920 DATUM Geodetic

DATES: BORING October 4, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0	84.4				0					
		FILL: brown, clay with sand - dry			1	GS	1			
1					2					
					3	GS	2			
	82.9				4					
		Dense, brown to grey, CLAY with SAND (CL) - occasional weathered shale fragments			5					
2					6	SS	3	360/610	39	
	81.8	- dry			7					
					8	SS	4	380/380	50/76	
	81.5	Highly weathered, grey, SHALE			9					
3		Slightly weathered to fresh, grey to black, SHALE BEDROCK - occasional grey limestone interbeds - shale hardness 3, limestone hardness 4 - very poor to poor quality - moderately to intensely fractured - horizontal fractures; 0.5 mm to 4 mm aperture			10	HQ	1	93%/72%	0%	FI = 9, 6, 3
					11					
					12					
4					13					
					14	HQ	2	98%/67%	39%	
					15					FI = 7, 7, 6, 3, 4
					16					
5	79.3				17					
		END OF BOREHOLE at approximately 5.2 m below existing grade. Unable to observe groundwater condition in borehole due to use of water for coring.			18					
					19					
6					20					
					21					
					22					
7					23					
					24					
					25					
8					26					
					27					
					28					
9					29					
					30					
					31					
10					32					

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-039

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 096 E: 613 886 DATUM Geodetic

DATES: BORING October 3, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	81.6		0				
		FILL: brown, clay with sand - dry	1	GS	1		
			2				
1			3				
			4	GS	2		
	80.1		5				
		Dense, brown to grey, CLAY with SAND (CL) - occasional shale fragments - dry	6	SS	3	610/610	33
2	79.5		7				
		Highly weathered, grey, SHALE	8	SS	4	460/460	50/150
	78.6		9				
3		Slightly weathered to fresh, grey to black, SHALE BEDROCK - occasional grey limestone interbeds - shale hardness 3, limestone 4 - poor quality - moderately to intensely fractured - horizontal fractures; 1 mm to 10 mm aperture width	10	HQ	1	86%/80%	25%
			11				
			12				
4			13				
			14	HQ	2	100%/73%	37%
			15				
			16				
5	76.4		17				
		END OF BOREHOLE at approximately 5.2 m below existing grade. Unable to observe groundwater condition in borehole due to use of water for coring.	18				
			19				
6			20				
			21				
			22				
7			23				
			24				
			25				
8			26				
			27				
			28				
9			29				
			30				
			31				
10			32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

FI = 5, 5

FI = 8, 2, 6, 7, 3

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-041

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 006 E: 613 958 DATUM Geodetic

DATES: BORING October 4, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0	80.2				0					
		FILL: reddish brown, sandy silt - dry			1					
1	78.7				2					
		Grey, CLAY with SAND (CL) - occasional shale fragments			3					
2	78.0				4					
		Highly weathered, grey, SHALE - dry			5					
3	77.2				6					
		Slightly weathered to fresh, grey to black, SHALE BEDROCK - occasional grey limestone interbeds - shale hardness 2 to 3, limestone 4 - poor to fair quality, moderately to intensely fractured - 1 mm to 4 mm aperture - 1 mm to 4 mm aperture width			7	SS	1	250/250	50/100	
					8					
					9					
					10	HQ	1	90%/75%	38%	FI = 4, 5
					11					
					12					
					13					
4					14	HQ	2	100%/94%	54%	FI = 3, 2, 5, 5, 5
					15					
					16					
5	75.1				17					
		END OF BOREHOLE at approximately 5.2 m below existing grade. Unable to observe groundwater condition in borehole due to use of water for coring.			18					
					19					
6					20					
					21					
					22					
7					23					
					24					
					25					
8					26					
					27					
					28					
9					29					
					30					
					31					
10					32					

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

>>●

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-042

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 006 E: 614 083 DATUM Geodetic

DATES: BORING September 28, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)	UNDRAINED SHEAR STRENGTH (kPa) 50 100 150 200 / WATER CONTENT & ATTERBERG LIMITS W_P W W_L / DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m / STANDARD PENETRATION TEST, BLOWS/0.3m 10 20 30 40 50 60 70 80 90 100	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0	78.7				0						
		FILL: brown, sandy silt - dry			1						
1	77.1				2						
		FILL: grey, sand with gravel - moist - auger grinding at 1.8 m			3						
2	76.0				4						
		Hard, grey, CLAY (CL) - moist			5						
3	75.5				6						
		Slightly weathered to fresh, grey to black, SHALE BEDROCK - occasional grey limestone interbeds - shale hardness 3, limestone 4 to 5 - poor to good quality, moderately to intensely fractured - horizontal fractures; 0.5 mm to 5 mm aperture - 127 mm limestone interbed at 3.4 m - 51 mm limestone interbed at 3.7 m - Uniaxial unconfined compressive strength at depths of approximately 4.4 m and 7.9 m are 5.1 MPa and 5.8 MPa respectively. - 64 mm limestone interbed at 5.8 m - 76 mm limestone interbed at 7.2 m			7	SS 1	11 / 130	50/ 130	>>	FI = 4
					8	HQ 1	47% / 35%	0%			
4					9						
					10						
					11	HQ 2	58% / 68%	34%		FI = 9, 7, 1, 3, 4	
					12						
5					13						
					14						
					15	HQ 3	99% / 98%	89%		FI = 1, 2, 3, 0, 1	
					16						
6					17						
					18						
					19						
					20	HQ 4	93% / 86%	33%		FI = 8, 7, 4, 1, 2	
7					21						
					22						
					23						
					24						
					25						
8	70.6				26						
		END OF BOREHOLE at approximately 8.1 m below existing grade. Unable to obeserve groundwater condition in borehole due to use of water for coring.			27						
					28						
					29						
9					30						
					31						
					32						
10											

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-043

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 821 960 E: 614 024 DATUM Geodetic

DATES: BORING September 27, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	79.6		0				
		FILL: brown, sandy silt, - some clay - trace organics	1	GS	1		
	78.9	- dry	2				
1		Brown, CLAY with SAND (CL) - trace gravel - dry	3	GS	2		
			4				
			5				
2			6	GS	3		
	77.3		7				
		Highly weathered, grey, SHALE - dry	8	SS	4	460/460	50/150
	76.7		9				
3		Slightly weathered to fresh, grey to black, SHALE BEDROCK - occasional grey limestone interbeds - shale hardness 2 to 3, limestone 5 to 6 - poor quality, moderately to intensely fractured - horizontal fractures; closed to 7 mm aperture - 140 mm limestone interbed at 4.6 m - 25 mm limestone interbed at 4.9 m	10	HQ	1	96%/88%	49%
			11				
			12				
4			13				
			14	HQ	2	95%/85%	30%
			15				
			16				
5	74.6		17				
		END OF BOREHOLE at approximately 5.1 m below existing grade. Unable to observe groundwater condition in borehole due to use of water for coring.	18				
			19				
6			20				
			21				
			22				
7			23				
			24				
			25				
8			26				
			27				
			28				
9			29				
			30				
			31				
10			32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100 GR SA SI CL

FI = 2, 4

FI = 5, 3, 4, 6, 5

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-047

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 348 E: 613 990 DATUM Geodetic

DATES: BORING October 2, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0	79.9				0					
		FILL: brown, sand with gravel - trace silt - dry			1					
1	78.7				2					
		Very stiff, brown, CLAY (CL) - some silt - dry			3					
2	77.9				4					
	77.7	Highly weathered, grey, SHALE - dry			5					
		Slightly weathered to fresh, grey to black, SHALE BEDROCK - occasional grey limestone interbeds - shale hardness 3, limestone 4 to 5 - core run 1: very poor quality, moderately to very intensely fractured - core run 2: good quality, moderately to intensely fractured - horizontal fractures; 0.5 mm to 5 mm aperture			6	SS	1	610/610	26	
3					7					
					8					
					9					
					10	HQ	1	68%/55%	16%	FI = >10, 5, 4, 1 for 5"
					11					
					12					
4					13					
					14					
					15	HQ	2	100%/97%	76%	FI = 6, 2, 4, 1, 2, 2 for 5"
					16					
5	74.7				17					
		END OF BOREHOLE at approximately 5.1 m below existing grade. Unable to observe groundwater condition in borehole due to use of water for coring.			18					
					19					
6					20					
					21					
					22					
7					23					
					24					
					25					
8					26					
					27					
					28					
9					29					
					30					
					31					
10					32					

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

- □ Field Vane Test, kPa
- ■ Remoulded Vane Test, kPa
- △ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

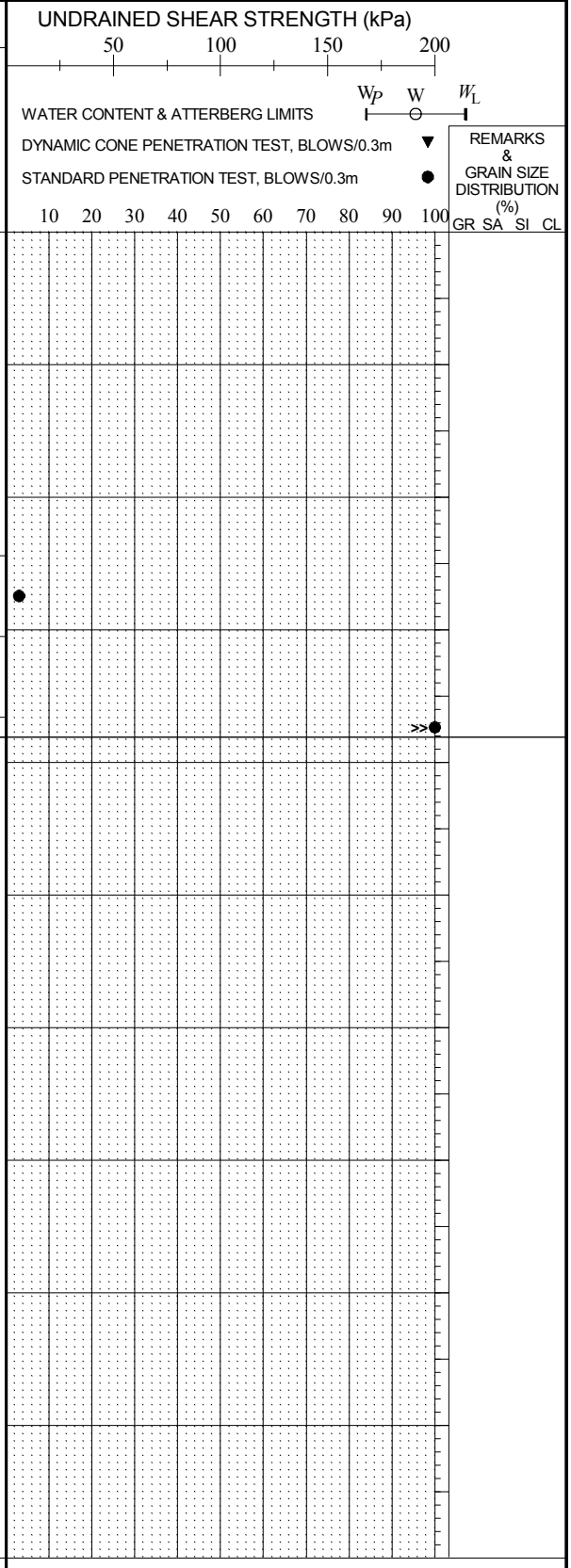
BH17-048

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 488 E: 614 053 DATUM Geodetic

DATES: BORING September 20, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
0	79.9	**Paved Road**			0				
		25 mm ASPHALT							
		FILL: brown, sand with gravel - trace silt - dry			1				
1	78.8	FILL: dark grey, clay with sand - moist			2				
					3				
2					4				
					5				
					6				
					7				
					8				
3	76.8				9	SS	1		3
		Hard, brown, CLAY (CL) - damp			10				
					11				
	76.1				12	SS	2		50/150
4		END OF BOREHOLE at approximately 3.8 m below existing grade due to refusal on inferred bedrock.			13				
					14				
		Borehole open and dry on completion of drilling.			15				
					16				
5					17				
					18				
					19				
6					20				
					21				
					22				
7					23				
					24				
					25				
8					26				
					27				
					28				
9					29				
					30				
					31				
10					32				



Stantec

BOREHOLE RECORD

BH17-049

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 425 E: 614 163 DATUM Geodetic

DATES: BORING September 21, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0	78.7				0					
		FILL: brown, sandy clay with gravel - trace organics - moist to wet			1					
1					2					
					3	GS	1			
					4					
					5					
2					6	GS	2			
	76.5				7					
		Brown, CLAY with SAND (CL) - trace gravel - wet			8					
					9	GS	3			
3	75.7				10					
		Slightly weathered to fresh, grey to black, SHALE BEDROCK - shale hardness 4 - very poor quality, moderately to intensely fractured - horizontal fractures; 0.5 mm to 5 mm aperture			11	HQ	1	22% 11%	0%	FI = NA
					12					
					13					
4					14	HQ	2	70% 60%	21%	FI = 8, 4, 6, 2
					15					
					16					
5	73.6				17					
		END OF BOREHOLE at approximately 5.1 m below existing grade. Unable to observe groundwater condition in borehole due to use of water for coring.			18					
					19					
6					20					
					21					
					22					
7					23					
					24					
					25					
8					26					
					27					
					28					
9					29					
					30					
					31					
10					32					

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-050

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 371 E: 614 131 DATUM Geodetic

DATES: BORING September 21, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	79.2				0				
		FILL: brown, sandy silt - some gravel - trace to some clay - trace organics - dry			1	GS	1		
	78.4				2				
1					3				
		FILL: brown, clay - some sand - dry			4	GS	2		
					5				
2					6	GS	3		
	76.9				7				
		Brown, CLAY with SAND (CL) - inferred cobbles due to auger grinding - dry			8				
					9	GS	4		
3	76.1				10	SS	1	150 / 150	50/ 150
		Highly weathered, grey, SHALE			11	HQ	1	33% 52%	31%
		Slightly weathered to fresh, grey to black, SHALE BEDROCK - shale hardness 4 - very poor to poor quality, moderately to intensely fractured - horizontal fractures; 2 mm to 10 mm aperture			12				
4					13				
					14	HQ	2	80% 68%	18%
					15				
					16				
5	74.1				17				
		END OF BOREHOLE at approximately 5.1 m below existing grade. Unable to observe groundwater condition in borehole due to use of water for coring.			18				
					19				
6					20				
					21				
					22				
7					23				
					24				
					25				
8					26				
					27				
					28				
9					29				
					30				
					31				
10					32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

FI = 2

FI = 7, 4, 6, 3

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-051

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 311 E: 614 085 DATUM Geodetic

DATES: BORING September 22, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	79.9				0				
		FILL: brown, sandy clay with gravel - some organics - dry to moist			1				
1	78.4				3	GS	1		
		Brown, CLAY with SAND (CL) - some gravel - moist			6	GS	2		
2	77.7				7				
		Highly weathered, grey, SHALE - dry			8	SS	3	360/350	50/51
	77.1				9				
		Slightly weathered to fresh, grey to black, SHALE BEDROCK - occasional grey limestone interbeds - shale hardness 3, limestone 5 to 6 - core runs 1 to 3: very poor to poor quality, slightly to very intensely fractured - core runs 4 and 5: good quality, slightly to intensely fractured - horizontal fractures; 0.5 mm to 7 mm aperture - 140 mm limestone interbed at 2.8 m - 25 mm limestone interbed at 3.7 m - Uniaxial unconfined compressive strength at depth of approximately 4.4 m m is 9.1 MPa. - 25 mm limestone interbed at 4.6 m - 51 mm limestone interbed at 4.7 m - 178 mm limestone interbed at 5.9 m - 13 mm limestone interbed at 6.4 m			10	HQ	1	89%/65%	20%
3					12	HQ	2	99%/93%	43%
4					15				
5					17	HQ	3	88%/79%	48%
6					20				
7					23	HQ	4	98%/96%	83%
8					26				
9					29	HQ	5	100%/100%	81%
10					32				

UNDRAINED SHEAR STRENGTH (kPa)
50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m

STANDARD PENETRATION TEST, BLOWS/0.3m

10 20 30 40 50 60 70 80 90 100

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

0'-5'

FI = 6, >10

FI = 7, 4, 3, 3, 4,

FI = 0, 4, 5, 6, 4

FI = 3, 2, 3, 2, 1

FI = 3, 1, 4, 0, 1

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-051

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 311 E: 614 085 DATUM Geodetic

DATES: BORING September 22, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
10	69.9				33					
		Slightly weathered to fresh, grey to black, SHALE BEDROCK - occasional grey limestone interbeds - shale hardness 3, limestone 5 - core runs 6 to 8: fair to good quality, slightly to intensely fractured - horizontal fractures; 1 mm to 5 mm aperture - 25 mm limestone interbed at 10.8 m - Uniaxial unconfined compressive strength at depths of approximately 10.9 m and 13.8 m are 12.5 MPa and 17.4 MPa respectively. - 64 mm limestone interbed at 11.4 m - 64 mm limestone interbed at 13.3 m			34	HQ	6	99% 95%	84%	FI = 3, 0, 0, 4, 2
11					35					
					36					
					37					
					38					
12					39	HQ	7	98% 98%	64%	FI = 5, 3, 2, 2, 1
					40					
					41					
					42					
13					43					
					44	HQ	8	100% 100%	76%	FI = 2, 3, 3, 2, 3
					45					
14	65.7				46					
		END OF BOREHOLE at approximately 14.2 m below existing grade. Unable to observe groundwater condition in borehole due to use of water for coring.			47					
					48					
					49					
15					50					
					51					
					52					
16					53					
					54					
					55					
					56					
17					57					
					58					
					59					
18					60					
					61					
					62					
19					63					
					64					
					65					
20										

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-052

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 208 E: 614 073 DATUM Geodetic

DATES: BORING September 25, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0	81.3				0					
0		Brown, CLAY with SAND (CL) - trace gravel - dry			1	GS	1			
					2					
1					3					
					4	GS	2			
					5					
2					6	GS	3			
					7					Bulk Sample 7 22 44 27
					8	GS	4			
3					9					
					10					
	77.8				11	GS	5			
		Highly weathered, grey, SHALE - dry			12					
4					13	SS	6	130/130	50/130	>>
	77.1				14					
		Slightly weathered to fresh, grey to black, SHALE BEDROCK - occasional grey limestone interbeds - shale hardness 3, limestone 4 to 6 - core run 1: very poor quality, intensely fractured - core runs 2 and 3: poor quality, moderately to intensely fractured - horizontal fractures; 1 mm to 7 mm aperture			15	HQ	1	66%/48%	0%	FI = 6, 6
5					16					
					17					
					18					
					19	HQ	2	92%/82%	30%	FI = 8, 3, 6, 6, 3
6					20					
					21					
					22					
					23					
7					24	HQ	3	98%/78%	33%	FI = 4, 3, 6, 7, 5
					25					
	73.2				26					
8		END OF BOREHOLE at approximately 8.1 m below existing grade. Unable to observe groundwater condition in borehole due to use of water for coring.			27					
					28					
					29					
9					30					
					31					
					32					
10										

UNDRAINED SHEAR STRENGTH (kPa)
50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-053

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 365 E: 614 254 DATUM Geodetic

DATES: BORING September 21, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	78.2				0				
		Brown, CLAY with SAND (CL) - trace gravel - dry			1	GS	1		
					2				
1					3	GS	2		
					4				
					5				
2					6	GS	3		
	75.9				7				
		Highly weathered, grey, SHALE - dry			8	SS	4	150/150	50/150
	75.3				9				
3		Slightly weathered to fresh, grey to black, SHALE BEDROCK - occasional grey limestone interbeds - shale hardness 4 - core runs 1 and 2: very poor to poor quality, moderately to intensely fractured - core runs 3 and 4: fair quality, slightly to intensely fractured - horizontal fractures; 1 mm to 5 mm aperture			10	HQ	1	66%/47%	0%
					11				
					12				
4					13				
					14	HQ	2	95%/81%	47%
					15				
					16				
5					17				
					18				
					19				
6					20	HQ	3	100%/99%	62%
					21				
					22				
7					23				
					24				
					25	HQ	4	88%/80%	68%
					26				
8	69.9				27				
		END OF BOREHOLE at approximately 8.2 m below existing grade. Unable to observe groundwater condition in borehole due to use of water for coring.			28				
					29				
9					30				
					31				
10					32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m

STANDARD PENETRATION TEST, BLOWS/0.3m

10 20 30 40 50 60 70 80 90 100

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

FI = 5, 2

FI = 8, 6, 3, 4, 2

FI = 4, 2, 4, 3, 2

FI = 4, 4, 2, 1, 3

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-054

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 267 E: 614 250 DATUM Geodetic

DATES: BORING September 25, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0	79.2				0					
		No sampling			1					
1					2					
2	76.7				3					
		Highly weathered, grey, SHALE			4					
	76.1				5					
3		Slightly weathered to fresh, grey to black, SHALE BEDROCK			6					
		- occasional grey limestone interbeds			7					
		- shale hardness 2 to 3, limestone 4 to 5			8	SS	1	610/610	69	
4		- core runs 1 to 3: very poor to poor quality, slightly to intensely fractured			9					
					10	HQ	1	81%/71%	19%	FI = 7, 3
		- core run 4: good quality, slighlty to moderately fractured			11					
					12					
5		- horizontal fractures; 0.5 mm to 5 mm aperture			13	HQ	2	95%/86%	43%	FI = 3, 4, 5, 1, 3
					14					
					15					
					16					
					17					
					18	HQ	3	92%/80%	41%	FI = 8, 5, 7, 2, 2
6					19					
					20					
					21					
					22					
					23					
7					24	HQ	4	100%/99%	89%	FI = 0, 3, 2, 1, 2
					25					
					26					
	71.0				27					
		END OF BOREHOLE at approximately 8.2 m below existing grade.			28					
8					29					
		Unable to observe groundwater condition in borehole due to use of water for coring.			30					
					31					
					32					
9										
10										

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-056

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 098 E: 614 115 DATUM Geodetic

DATES: BORING September 28, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES: TYPE	SAMPLES: NUMBER	SAMPLES: RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES: N-VALUE OR RQD(%)
0	77.2	FILL: brown, sand with gravel - auger grinding on inferred cobbles or concrete rubble - dry			0				
1	76.0				1				
	75.8	Highly weathered, grey, SHALE - dry			2				
		END OF BOREHOLE at approximately 1.4 m below existing grade. Borehole open and dry on completion of drilling.			3				
2					4				
					5				
					6				
					7				
					8				
3					9				
					10				
					11				
					12				
4					13				
					14				
					15				
					16				
5					17				
					18				
					19				
					20				
6					21				
					22				
					23				
					24				
7					25				
					26				
					27				
					28				
8					29				
					30				
					31				
9					32				
10									

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-057

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 514 E: 613 991 DATUM Geodetic

DATES: BORING October 2, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
0	80.1				0				
		FILL: brown, sand with gravel - trace silt			1				
	79.4	- dry			2				
1		FILL: brown, clay with sand - dry			3				
					4				
2					5				
					6				
					7				
		- odor and staining noted - borehole in area of known contamination			8				
					9				
3	77.0				10				
		Very stiff, brown to grey, CLAY with SAND (CL) - some gravel			11	SS	1	610/610	18
	76.1	- moist			12				
4					13	SS	2	410/410	50/100
	75.8	Highly weathered, grey, SHALE			14				
		END OF BOREHOLE at approximately 4.2 m below existing grade.			15				
					16				
5		Borehole open and dry on completion of drilling.			17				
					18				
					19				
					20				
6					21				
					22				
					23				
					24				
7					25				
					26				
					27				
					28				
8					29				
					30				
					31				
9					32				
10									

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-058

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 463 E: 613 961 DATUM Geodetic

DATES: BORING October 2, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
0	79.5				0				
		FILL: brown, sand with gravel - some silt - dry to moist			1				
	78.9				2				
1		FILL: brown, clay with sand - some gravel			3				
	78.0				4				
		Stiff, brown and grey, CLAY with SAND (CL) - some gravel - moist			5				
	77.5				6	SS	1	460/510	22
2		Highly weathered, grey, SHALE			7				
		END OF BOREHOLE at approximately 2.0 m below existing grade.			8				
					9				
3		Borehole open and dry on completion of drilling.			10				
					11				
					12				
4					13				
					14				
					15				
5					16				
					17				
					18				
6					19				
					20				
					21				
7					22				
					23				
					24				
8					25				
					26				
					27				
9					28				
					29				
					30				
10					31				
					32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

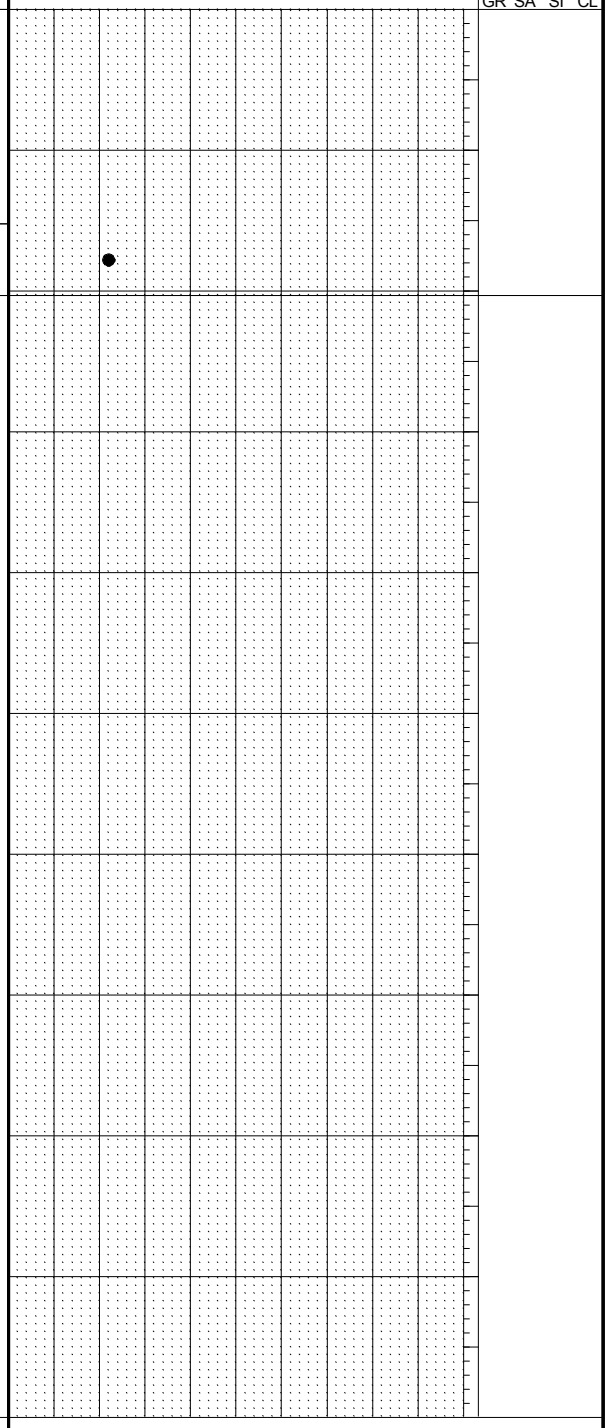
DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL



□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-059

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 396 E: 613 937 DATUM Geodetic

DATES: BORING September 27, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	80.0				0				
		100 mm TOPSOIL			1	SS	1	440/610	9
	79.4	FILL: brown, sandy silt - dry			2				
1		Hard, brown, CLAY with SAND (CL)			3	SS	2	610/610	41
	78.7	- dry			4				
	78.2	Highly weathered, grey, SHALE - dry			5	SS	3	280/280	50/130
2		END OF BOREHOLE at approximately 1.8 m below existing grade.			6				
		Borehole open and dry on completion of drilling.			7				
3					8				
					9				
					10				
4					11				
					12				
					13				
					14				
5					15				
					16				
					17				
					18				
6					19				
					20				
					21				
					22				
7					23				
					24				
					25				
					26				
8					27				
					28				
					29				
					30				
9					31				
					32				
10									

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100 GR SA SI CL

>>●

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-060

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 329 E: 613 914 DATUM Geodetic

DATES: BORING September 29, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
0	81.6				0				
		FILL: black, sandy silt - odor and colour noted - borehole in area of known contamination			1				
1	80.1				2				
		Completely weathered, grey, SHALE - dry			3				
2					4				
		- highly weathered			5				
	78.8				6				
					7				
					8	SS	1	510/510	58
3		END OF BOREHOLE at approximately 2.8 m below existing grade.			9				
					10				
		Borehole open and dry on completion of drilling.			11				
4					12				
					13				
					14				
					15				
5					16				
					17				
					18				
					19				
6					20				
					21				
					22				
					23				
7					24				
					25				
					26				
					27				
8					28				
					29				
					30				
					31				
9					32				
10									

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-062

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 394 E: 613 814 DATUM Geodetic

DATES: BORING September 29, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
0	82.5				0				
		FILL: brown, sand with gravel, - dry			1				
	81.7				2				
1		FILL: light brown, clay with sand - dry			3				
					4				
2					5				
					6				
	80.0				7				
		Brown, CLAY with SAND (CL)			8				
	79.5				9				
3	79.2	Highly weathered, grey, SHALE - dry			10	SS	1	200/200	50/51
		END OF BOREHOLE at approximately 3.3 m below existing grade.			11				
		Borehole open and dry on completion of drilling.			12				
4					13				
					14				
					15				
5					16				
					17				
					18				
6					19				
					20				
					21				
7					22				
					23				
					24				
					25				
8					26				
					27				
					28				
					29				
9					30				
					31				
					32				
10									

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100 GR SA SI CL

>>●

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-063

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 266 E: 613 894 DATUM Geodetic

DATES: BORING September 29, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	**82.7**				0				
	82.6	150 mm TOPSOIL							
		Stiff to very stiff, brown to grey, CLAY (CL) - trace sand - trace organics - petroleum hydrocarbon odour noted - possible contamination			1	SS	1	430/610	19
1					2				
					3	SS	2	610/610	14
					4				
					5				
2					6	SS	3	410/610	20
	80.4				7				
		Highly weathered, grey, SHALE			8	SS	4	580/590	50
	79.9				9				
3		END OF BOREHOLE at approximately 2.9 m below existing grade. Borehole open and dry on completion of drilling.			10				
					11				
					12				
4					13				
					14				
					15				
					16				
5					17				
					18				
					19				
6					20				
					21				
					22				
7					23				
					24				
					25				
8					26				
					27				
					28				
9					29				
					30				
					31				
10					32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-064

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 224 E: 613 868 DATUM Geodetic

DATES: BORING September 26, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
0	83.1	75 mm TOPSOIL			0				
		Stiff to very stiff, brown to grey, CLAY (CL) - some sand - occasional shale fragments - dry			1	SS	1	520/610	19
					2				
1					3	SS	2	610/610	12
					4				
					5				
2					6	SS	3	610/610	19
	80.8				7				
		Highly weathered, brown to grey, SHALE - dry			8	SS	4	580/590	62
	80.2				9				
3		END OF BOREHOLE at approximately 2.9 m below existing grade. Borehole open and dry on completion of drilling.			10				
					11				
					12				
4					13				
					14				
					15				
					16				
5					17				
					18				
					19				
6					20				
					21				
					22				
7					23				
					24				
					25				
8					26				
					27				
					28				
9					29				
					30				
					31				
10					32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

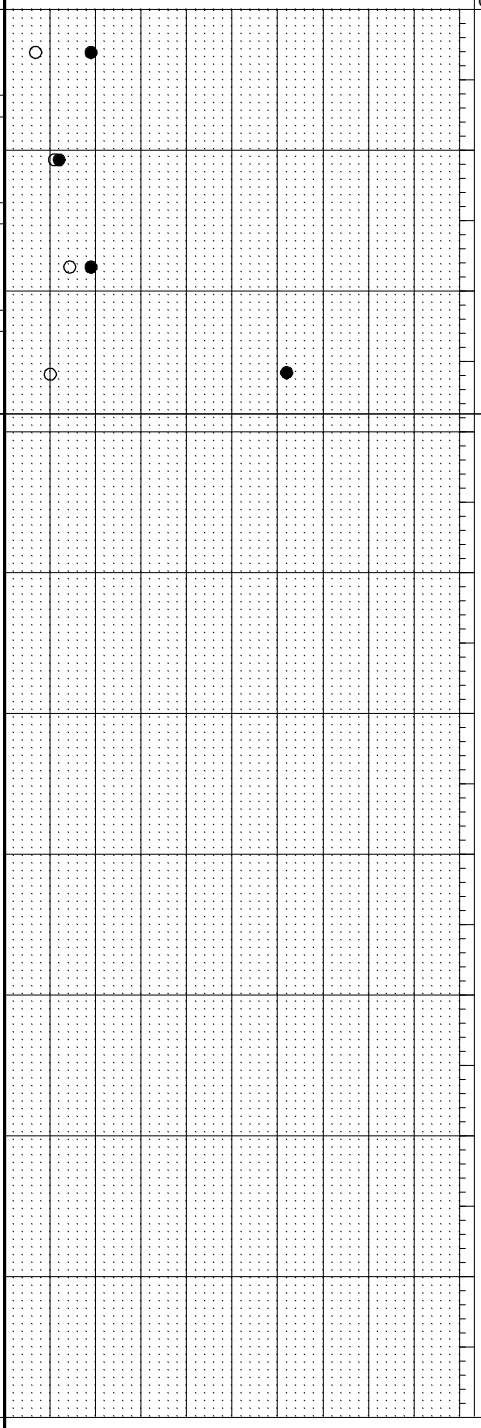
DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL



□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-065

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 247 E: 613 802 DATUM Geodetic

DATES: BORING September 26, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	83.4				0				
		75 mm TOPSOIL							
		FILL: brown clay with sand - occasional shale fragments - dry			1	SS	1	610/610	22
1					2				
					3	SS	2	610/610	18
	81.8				4				
		Completely weathered, grey, SHALE - dry			5				
2					6	SS	3	470/610	19
		- highly weathered			7				
	80.6				8	SS	4	460/460	50/150
		END OF BOREHOLE at approximately 2.7 m below existing grade. Borehole open and dry on completion of drilling.			9				
3					10				
					11				
					12				
4					13				
					14				
					15				
5					16				
					17				
					18				
6					19				
					20				
					21				
					22				
7					23				
					24				
					25				
8					26				
					27				
					28				
9					29				
					30				
					31				
10					32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

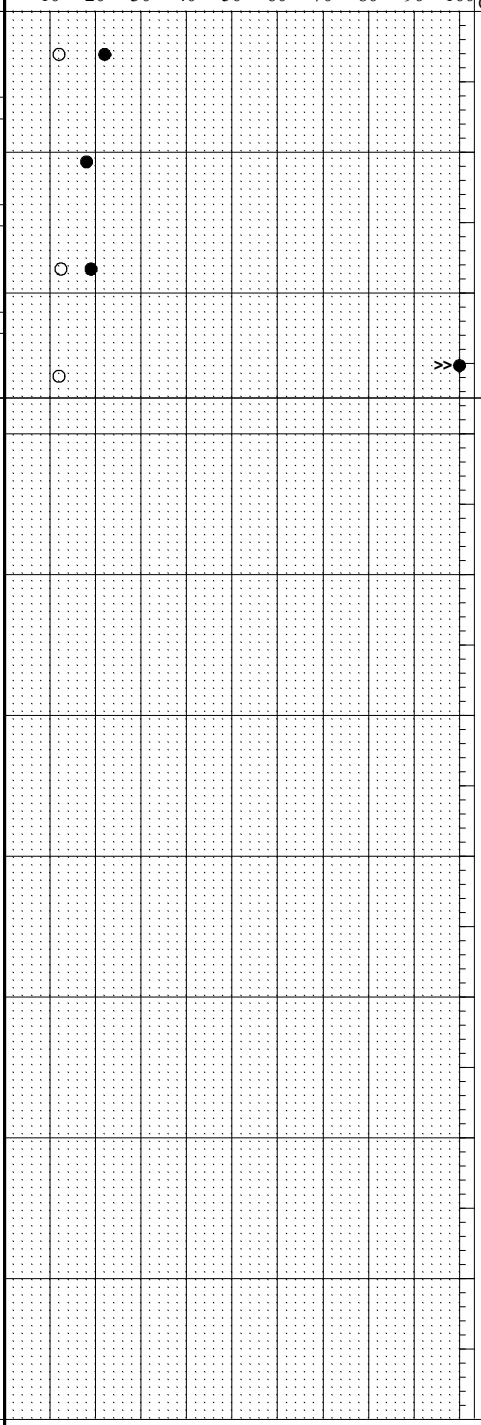
DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL



□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-066

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 293 E: 613 750 DATUM Geodetic

DATES: BORING September 26, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	83.4				0				
		65 mm TOPSOIL							
		FILL: brown, clay with sand - dry			1	SS	1	560/610	20
1	82.3				2				
		Stiff, brown to grey, CLAY (CL) - moist			3	SS	2A	580/300	13
					4	SS	2B		
					5				
2	81.1				6	SS	3	430/610	14
					7				
		Highly weathered, light brown to grey, SHALE - dry			8	SS	4	610/610	58
					9				
3		- grey			10				
	79.9				11	SS	5	410/430	50/130
		END OF BOREHOLE at approximately 3.5 m below existing grade. Borehole open and dry on completion of drilling.			12				
4					13				
					14				
					15				
					16				
5					17				
					18				
					19				
6					20				
					21				
					22				
7					23				
					24				
					25				
8					26				
					27				
					28				
9					29				
					30				
					31				
10					32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-067

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 175 E: 613 937 DATUM Geodetic

DATES: BORING September 26, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
0	82.3	50 mm TOPSOIL			0				
		Very stiff, brown CLAY with SAND (CL) - dry			1	SS	1	440/610	16
1					2				
					3	SS	2	560/610	24
	80.8				4				
		Highly weathered, brown to light grey, SHALE, - dry			5				
2	80.2				6	SS	3	580/590	52
		END OF BOREHOLE at approximately 2.1 m below existing grade.			7				
					8				
		Borehole open and dry on completion of drilling.			9				
3					10				
					11				
					12				
4					13				
					14				
					15				
					16				
5					17				
					18				
					19				
6					20				
					21				
					22				
7					23				
					24				
					25				
					26				
8					27				
					28				
					29				
9					30				
					31				
					32				
10									

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-068

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 152 E: 613 988 DATUM Geodetic

DATES: BORING September 26, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	82.0				0				
		40 mm TOPSOIL			1	SS	1	510/610	19
		Stiff to hard, brown to grey, CLAY with SAND (CL) - dry			2				
1					3	SS	2	460/610	13
					4				
					5				
2					6	SS	3	580/610	39
	79.7				7				
		Highly weathered, grey, SHALE - dry			8	SS	4	560/560	43
	79.2				9				
3		END OF BOREHOLE at approximately 2.8 m below existing grade.			10				
					11				
		Borehole open and dry on completion of drilling.			12				
4					13				
					14				
					15				
5					16				
					17				
					18				
6					19				
					20				
					21				
					22				
7					23				
					24				
					25				
8					26				
					27				
					28				
					29				
9					30				
					31				
					32				
10									

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

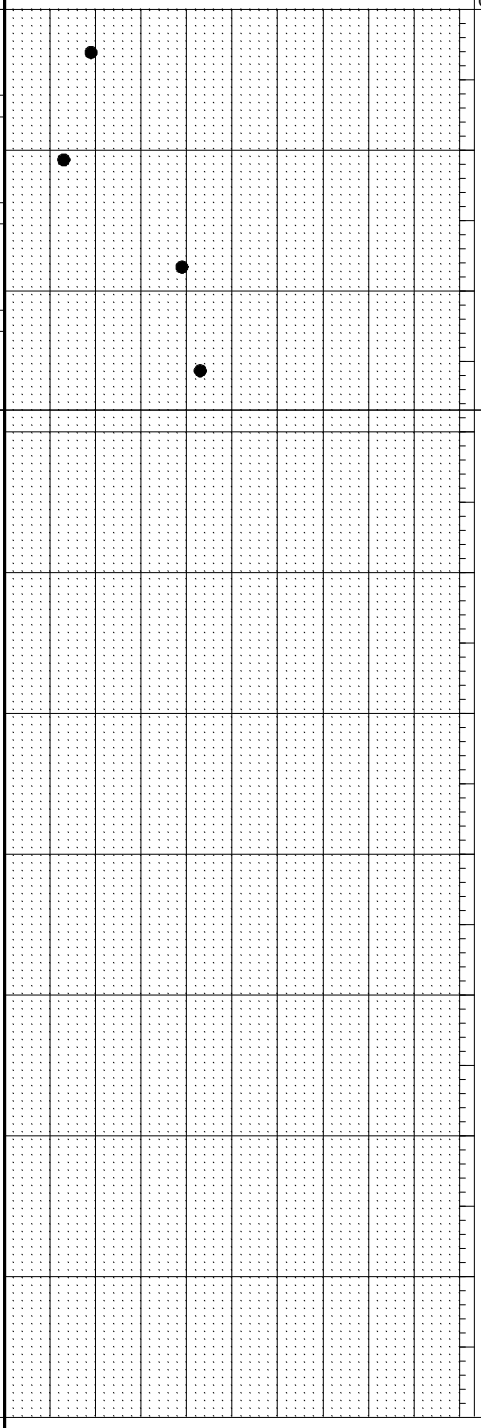
DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL



□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-069

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 213 E: 614 003 DATUM Geodetic

DATES: BORING September 29, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
0	81.3				0				
		FILL: brown, sand with gravel - auger grinding			1				
	80.6				2				
1		FILL: brown sandy silt - dry			3				
					4				
2					5				
	79.0				6				
		FILL: brown/grey, clay - some sand - moist			7				
	78.3				8				
3		FILL: grey, clay, - moist			9				
					10				
4					11				
	77.1				12				
		FILL: grey, sandy clay with gravel - occasional shale fragments - moist			13				
					14				
					15				
5	76.1	- odor noted - borehole in area of known contamination			16	SS	1		6
					17				
		END OF BOREHOLE at approximately 5.2 m below existing grade. Borehole open and dry on completion of drilling.			18				
					19				
6					20				
					21				
					22				
7					23				
					24				
					25				
8					26				
					27				
					28				
9					29				
					30				
					31				
10					32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-070

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 052 E: 613 933 DATUM Geodetic

DATES: BORING September 27, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	80.8				0				
		100 mm TOPSOIL							
		FILL: brown, sandy silt - trace organics - trace gravel - occasional shale fragments - dry			1	SS	1	460/610	13
1					3	SS	2	330/610	5
		- some clay			5				
2					6	SS	3	360/610	4
	78.5				7				
	78.2	Highly weathered, grey, SHALE - dry			8	SS	4	250/250	50/100
		END OF BOREHOLE at approximately 2.5 m below existing grade. Borehole open and dry on completion of drilling.			9				
3					10				
					11				
					12				
4					13				
					14				
					15				
5					16				
					17				
					18				
6					19				
					20				
					21				
7					22				
					23				
					24				
8					25				
					26				
					27				
9					28				
					29				
					30				
10					31				
					32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

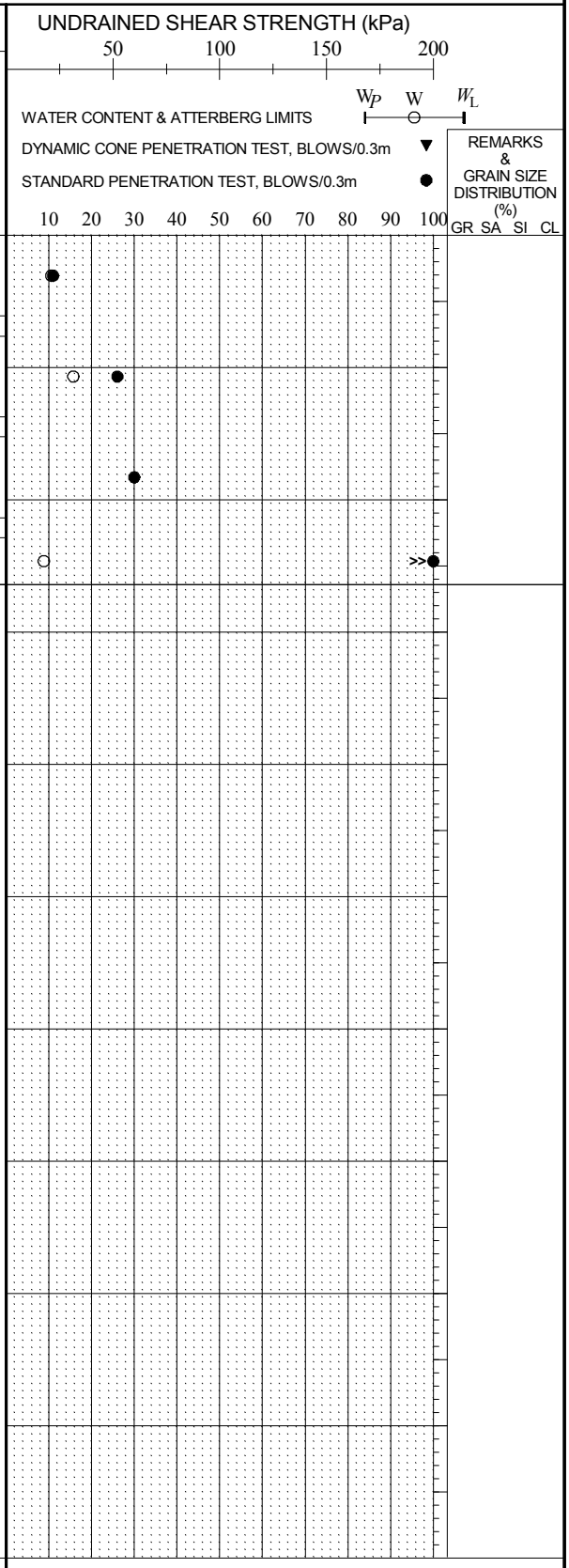
BH17-071

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 821 977 E: 614 014 DATUM Geodetic

DATES: BORING September 26, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
0	79.8				0				
		FILL: brown, sandy silt - some clay - trace organic			1	SS	1	500/610	11
	79.1	- dry			2				
1		Very stiff, brown, CLAY with SAND (CL) - trace gravel - dry			3	SS	2	560/610	26
					4				
					5				
2					6	SS	3	610/610	30
	77.5				7				
	77.2	Highly weathered, grey, SHALE - dry			8	SS	4	360/350	50/51
		END OF BOREHOLE at approximately 2.6 m below existing grade. Borehole open and dry on completion of drilling.			9				
3					10				
					11				
					12				
4					13				
					14				
					15				
5					16				
					17				
					18				
6					19				
					20				
					21				
					22				
7					23				
					24				
					25				
8					26				
					27				
					28				
					29				
9					30				
					31				
					32				
10									



□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-072

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 821 946 E: 614 062 DATUM Geodetic

DATES: BORING September 28, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	81.7	75 mm TOPSOIL			0				
		FILL: brown, sandy silt - trace to some clay - trace gravel - trace organic - moist			1	SS	1	580/610	14
					2				
1					3	SS	2	560/610	14
					4				
					5				
2					6	SS	3	610/610	9
					7				
					8	SS	4	560/610	7
					9				
3					10				
					11	SS	5	460/610	5
					12				
4					13	SS	6	460/610	7
					14				
					15				
	76.8				16	SS	7	510/610	38
5	76.5	FILL: brown, sand with gravel - moist			17				
		END OF BOREHOLE at approximately 5.2 m below existing grade. Borehole open and dry on completion of drilling.			18				
					19				
6					20				
					21				
					22				
7					23				
					24				
					25				
8					26				
					27				
					28				
9					29				
					30				
					31				
10					32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

REMARKS & GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL

Non Plastic

4 40 39 17

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-074

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 103 E: 613 982 DATUM Geodetic

DATES: BORING September 27, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	81.4	65 mm TOPSOIL			0				
		Stiff to hard, brown, CLAY (CL) - dry			1	SS	1	480/610	11
1					2				
					3	SS	2	510/610	32
	79.9				4				
		Hard, brown, CLAY with GRAVEL (CL) - trace sand - occasional shale fragments			5				
2					6	SS	3	610/610	53
	78.9	- dry			7				
	78.7	Highly weathered, grey, SHALE - dry			8	SS	4	430/430	50/130
3		END OF BOREHOLE at approximately 2.7 m below existing grade.			9				
					10				
		Borehole open and dry on completion of drilling.			11				
4					12				
					13				
					14				
					15				
5					16				
					17				
					18				
					19				
6					20				
					21				
					22				
					23				
7					24				
					25				
					26				
					27				
8					28				
					29				
					30				
					31				
9					32				
10									

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

REMARKS & GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL

9 8 57 26

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-076

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 267 E: 614 101 DATUM Geodetic

DATES: BORING September 27, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	80.1				0				
		100 mm TOPSOIL							
		FILL: brown, sandy silt - some clay - occasional sand seams and layers - dry			1	SS	1	610/610	29
1		- odor noted - borehole in area of known contamination			2				
	78.7				3	SS	2	610/610	6
		Stiff, brown CLAY with SAND (CL)			4				
					5				
2					6	SS	3	330/610	14
	77.7	- 130 mm sand seam at 2.3 m			7				
		Highly weathered, grey, SHALE - occasional sand layers - moist to dry			8	SS	4	530/610	12
					9				
3					10				
					11	SS	5	460/610	32
	76.3				12				
						SS	6	51/49	50/51
4		END OF BOREHOLE at approximately 3.8 m below existing grade.			13				
					14				
		Borehole open and dry on completion of drilling.			15				
5					16				
					17				
					18				
					19				
6					20				
					21				
					22				
					23				
7					24				
					25				
					26				
					27				
8					28				
					29				
					30				
					31				
9					32				
10									

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-077

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 284 E: 614 038 DATUM Geodetic

DATES: BORING September 27, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	80.7				0				
		75 mm TOPSOIL			1	SS	1	430/610	23
		FILL: brown sandy silt			2				
	80.0	- some clay			3	SS	2	580/610	8
1		- trace gravel			4				
		- trace organics			5				
		- dry			6	SS	3	360/610	6
2		FILL: brown, clay with sand			7				
		- moist			8	SS	4	270/610	3
		- odor noted - likely contamination			9				
		- grey			10				
		- moist to wet			11	SS	5	280/610	5
3					12				
	77.0								
	76.8	Highly weathered, grey, SHALE			13	SS	6	76/130	50/130
4		- wet			14				
		END OF BOREHOLE at approximately 3.9 m below existing grade.			15				
					16				
5		Borehole open and dry on completion of drilling.			17				
					18				
					19				
6					20				
					21				
					22				
7					23				
					24				
					25				
8					26				
					27				
					28				
9					29				
					30				
					31				
10					32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

>>

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-078

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 306 E: 613 978 DATUM Geodetic

DATES: BORING September 27, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	81.5	50 mm TOPSOIL			0				
		FILL: brown, clay with sand - occasional red brick fragments - dry to moist - odor noted - likely contamination			1	SS	1	560/610	15
	80.8				2				
1		FILL: brown, clay - dry to moist			3	SS	2	610/610	6
	79.8				4				
		Completely weathered, grey to black, SHALE - dry			5				
2					6	SS	3	610/610	18
					7				
					8	SS	4	580/590	34
	78.6				9				
3		END OF BOREHOLE at approximately 2.9 m below existing grade.			10				
					11				
		Borehole open and dry on completion of drilling.			12				
4					13				
					14				
					15				
5					16				
					17				
					18				
6					19				
					20				
					21				
7					22				
					23				
					24				
					25				
8					26				
					27				
					28				
					29				
9					30				
					31				
10					32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

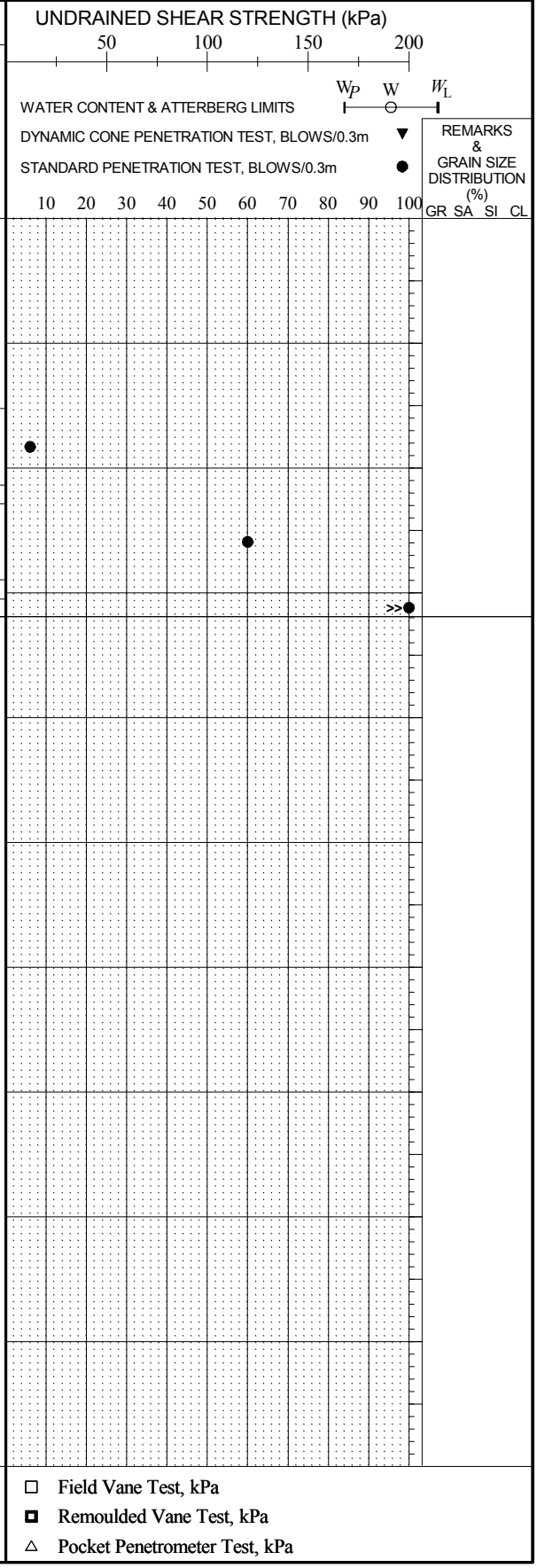
BH17-079

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 315 E: 614 178 DATUM Geodetic

DATES: BORING September 29, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
0	79.1				0				
		FILL: brown, clay with sand - dry to moist			1				
1					2				
					3				
					4				
					5				
2	77.0				6	SS	1	430/610	6
	76.7	Hard, brown, CLAY with SAND (CL) - some gravel - occasional shale fragments			7				
					8	SS	2	610/610	60
3					9				
	76.0	Highly weathered, brown to grey, SHALE - dry			10	SS	3	130/140	50/140
					11				
		END OF BOREHOLE at approximately 3.2 m below existing grade.			12				
4					13				
					14				
		Borehole open and dry on completion of drilling.			15				
					16				
5					17				
					18				
					19				
6					20				
					21				
					22				
7					23				
					24				
					25				
8					26				
					27				
					28				
9					29				
					30				
					31				
10					32				



Stantec

BOREHOLE RECORD

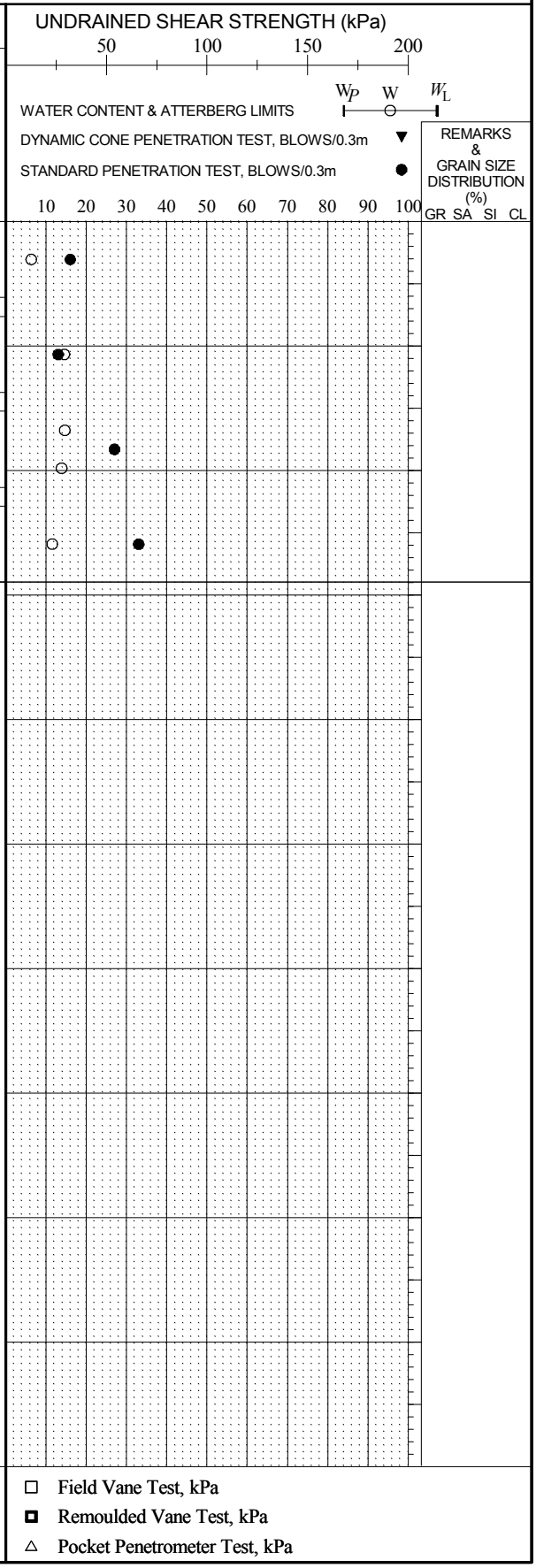
BH17-080

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 333 E: 614 115 DATUM Geodetic

DATES: BORING September 29, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	79.7	100 mm TOPSOIL	0				
		FILL: brown, sandy silt - some gravel - some clay - trace organics - occasional brick fragments	1	SS	1	610/610	16
1	78.2	- dry	2				
		Very stiff, brown, CLAY with SAND (CL)	3	SS	2	460/610	13
	77.5	- some gravel - moist	4				
2			5				
	76.9	Hard, brown, CLAY (CL) - some sand	6	SS	3	610/610	27
		Highly weathered, grey, SHALE - dry	7				
3			8				
		END OF BOREHOLE at approximately 2.9 m below existing grade.	9	SS	4	610/610	33
		Borehole open and dry on completion of drilling.	10				
4			11				
			12				
			13				
			14				
5			15				
			16				
			17				
			18				
6			19				
			20				
			21				
			22				
7			23				
			24				
			25				
			26				
8			27				
			28				
			29				
			30				
9			31				
			32				
10							



Stantec

BOREHOLE RECORD

BH17-081

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 353 E: 614 060 DATUM Geodetic

DATES: BORING September 20, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
0	79.9	FILL: brown sand with gravel - trace silt - dry			0				
1					1				
		- black			2				
	77.9				3				
2		Grey, CLAY (CL) - moist to wet - odor and staining noted - borehole			4				
					5				
					6				
					7				
					8				
	77.0	in area of known contamination			9				
3	76.8	- dry			10				
		Highly weathered, grey, SHALE			11				
		END OF BOREHOLE at approximately 3.0 m below existing grade.			12				
4					13				
					14				
		Borehole open and dry on completion of drilling.			15				
					16				
5					17				
					18				
					19				
6					20				
					21				
					22				
7					23				
					24				
					25				
8					26				
					27				
					28				
9					29				
					30				
					31				
10					32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-082

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 373 E: 614 000 DATUM Geodetic

DATES: BORING October 2, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
0	79.4				0				
		FILL: brown, sandy silt - moist to dry			1				
1	78.4	Hard, brown, CLAY (CL) - some sand			2				
					3				
					4				
					5				
	77.6				6	SS	1	460/460	50/150
2	77.5	Highly weathered, grey, SHALE - dry			7				
		END OF BOREHOLE at approximately 2.0 m below existing grade. Borehole open and dry on completion of drilling.			8				
					9				
3					10				
					11				
					12				
4					13				
					14				
					15				
					16				
5					17				
					18				
					19				
					20				
6					21				
					22				
					23				
					24				
7					25				
					26				
					27				
					28				
8					29				
					30				
					31				
					32				
9									
10									

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100 GR SA SI CL

>>●

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-083

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 380 E: 614 192 DATUM Geodetic

DATES: BORING September 27, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	79.0				0				
		75 mm TOPSOIL			1	SS	1	610/610	17
	78.3	FILL: brown, sand with gravel - dry			2				
1		FILL: brown, clay with sand - dry to moist			3	SS	2	480/610	5
					4				
					5				
2					6	SS	3	250/610	5
					7				
		- 340 mm sand layer			8	SS	4	440/610	30
	76.2	- wet			9				
3		Highly weathered, grey, SHALE - wet			10				
	75.5				11	SS	5	410/410	50/100
		END OF BOREHOLE at approximately 3.4 m below existing grade.			12				
4					13				
		Borehole open and dry on completion of drilling.			14				
					15				
					16				
5					17				
					18				
					19				
6					20				
					21				
					22				
7					23				
					24				
					25				
8					26				
					27				
					28				
9					29				
					30				
					31				
10					32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-084

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 396 E: 614 136 DATUM Geodetic

DATES: BORING September 27, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)	UNDRAINED SHEAR STRENGTH (kPa) 50 100 150 200 / WATER CONTENT & ATTERBERG LIMITS (W_P W W_L) / DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m / STANDARD PENETRATION TEST, BLOWS/0.3m	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0	78.9				0						
		25 mm TOPSOIL									
		FILL: brown, sand with gravel - trace silt - dry to moist			1	SS	1	610/610	20		
					2						
1					3	SS	2	410/610	15		28 61 8 3
					4						
					5						
					6	SS	3	100/610	3		
2	76.6				7						
	76.2	Very stiff, brown to grey, CLAY (CL) - moist			8	SS	4	610/610	21		
					9						
3		Highly weathered, brown, SHALE - wet			10						
	75.4				11	SS	5	430/430	50/130		>>
		END OF BOREHOLE at approximately 3.5 m below existing grade. Borehole open and dry on completion of drilling.			12						
4					13						
					14						
					15						
					16						
5					17						
					18						
					19						
					20						
6					21						
					22						
					23						
					24						
7					25						
					26						
					27						
					28						
8					29						
					30						
					31						
9					32						
10											

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-085

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 417 E: 614 085 DATUM Geodetic

DATES: BORING September 29, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
0	78.8				0				
		FILL: brown, clay with sand - some gravel - dry - odor noted - borehole in area of known contamination			1				
1	77.3				2				
		Grey, CLAY with SAND (CL) - moist			3				
2					4				
					5				
					6				
					7				
					8				
					9				
3	75.8				10				
	75.6	Highly weathered, grey, SHALE, - moist			11	SS	1	25/130	50/130
		END OF BOREHOLE at approximately 3.2 m below existing grade. Borehole open and dry on completion of drilling.			12				
4					13				
					14				
					15				
					16				
5					17				
					18				
					19				
					20				
					21				
					22				
6					23				
					24				
					25				
					26				
7					27				
					28				
					29				
					30				
8					31				
					32				
9									
10									

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

>>●

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-086

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 442 E: 614 020 DATUM Geodetic

DATES: BORING October 2, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
0	79.5	FILL: brown, clay with sand - dry to moist			0				
1					1				
					2				
					3				
					4				
		- grey			5				
2					6				
					7				
	77.0				8	SS	1	460/460	50/150
	76.7	Highly weathered, brown to grey, SHALE - dry			9				
3					10				
		END OF BOREHOLE at approximately 2.7 m below existing grade.			11				
					12				
		Borehole open and dry on completion of drilling.			13				
4					14				
					15				
					16				
5					17				
					18				
					19				
6					20				
					21				
					22				
7					23				
					24				
					25				
8					26				
					27				
					28				
9					29				
					30				
					31				
10					32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

>>●

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-087

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 152 E: 613 732 DATUM Geodetic

DATES: BORING September 29, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	**83.4**				0				
	83.1	FILL: brown, sand with gravel - trace organics - dry			1	SS	1A	460/300	38
					2	SS	1B		
1		Very stiff, brown, CLAY with SAND (CL) - moist to wet			3	SS	2	660/610	26
	82.1				4				
		Completely weathered, brown to grey, SHALE - dry			5				
2					6	SS	3	910/610	36
	80.8				7				
					8	SS	4	330/330	50/25
		END OF BOREHOLE at approximately 2.6 m below the existing grade. Borehole open and dry on completion of drilling.			9				
3					10				
					11				
					12				
4					13				
					14				
					15				
5					16				
					17				
					18				
6					19				
					20				
					21				
					22				
7					23				
					24				
					25				
8					26				
					27				
					28				
					29				
9					30				
					31				
					32				
10									

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-088

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 096 E: 613 803 DATUM Geodetic

DATES: BORING September 29, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	82.5	50 mm TOPSOIL	0				
		FILL: brown sand with gravel	1	SS	1	250/610	28
	81.7	- occasional rock fragments - dry	2				
1		Stiff, brown to grey, CLAY with SAND (CL) - trace gravel	3	SS	2	460/610	14
		- moist	4				
	80.5	Completely weathered, brown to grey, SHALE	5	SS	3	610/610	12
2		- dry	6				
	79.8	- highly weathered	7	SS	4	410/410	50/100
		END OF BOREHOLE at approximately 2.7 m below the existing grade.	8				
		Borehole open and dry on completion of drilling.	9				
3			10				
			11				
			12				
4			13				
			14				
			15				
			16				
5			17				
			18				
			19				
6			20				
			21				
			22				
7			23				
			24				
			25				
8			26				
			27				
			28				
			29				
9			30				
			31				
			32				
10							

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

REMARKS & GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL

1 15 42 42

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-089

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 018 E: 613 900 DATUM Geodetic

DATES: BORING September 28, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
0	**81.0**				0				
	80.8	FILL: brown, sand with gravel - dry			1	SS	1	560/610	11
	80.1	FILL: brown, clay with sand - moist			2				
1		FILL: grey to black, clay - trace organics - moist			3	SS	2	380/610	6
					4				
					5				
2	78.9				6	SS	3	430/610	4
		Moderately weathered, light brown to grey, SHALE			7				
	78.3	- dry			8	SS	4	360/350	50/51
		END OF BOREHOLE at approximately 2.6 m below the existing grade. Borehole open and dry on completion of drilling.			9				
3					10				
					11				
					12				
4					13				
					14				
					15				
5					16				
					17				
					18				
6					19				
					20				
					21				
					22				
7					23				
					24				
					25				
8					26				
					27				
					28				
					29				
9					30				
					31				
					32				
10									

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-090

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 821 946 E: 613 997 DATUM Geodetic

DATES: BORING September 28, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	79.6				0				
		100 mm TOPSOIL							
		Stiff, brown, CLAY (CL) - some sand - trace gravel - dry to moist			1	SS	1	530/610	12
1					2				
					3	SS	2	610/610	14
					4				
	78.0				5	SS	3	0.0/49	50/51
		END OF BOREHOLE at approximately 1.6 m below the existing grade.			6				
2					7				
		Borehole open and dry on completion of drilling.			8				
					9				
3					10				
					11				
					12				
4					13				
					14				
					15				
5					16				
					17				
					18				
6					19				
					20				
					21				
7					22				
					23				
					24				
8					25				
					26				
					27				
9					28				
					29				
					30				
10					31				
					32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

REMARKS & GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL

Bulk Sample 3 10 60 27

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

BH17-091

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 821 911 E: 614 049 DATUM Geodetic

DATES: BORING September 28, 2017 WATER LEVEL TPC ELEV.

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
0	**79.2**				0				
		50 mm TOPSOIL			1	SS	1	560/610	30
		FILL: brown, sandy silt			2				
	78.5	- some gravel - occasional rock fragments - trace gravel - dry			3	SS	2	610/610	12
1					4				
		Stiff to very stiff, brown CLAY (CL)			5				
		- some sand			6	SS	3	580/610	27
2	76.9	- trace gravel			7				
		Completely weathered, light brown, SHALE			8	SS	4	610/610	39
	76.3	- dry			9				
3		END OF BOREHOLE at approximately 2.9 m below the existing grade.			10				
					11				
		Borehole open and dry on completion of drilling.			12				
4					13				
					14				
					15				
					16				
5					17				
					18				
					19				
					20				
6					21				
					22				
					23				
					24				
7					25				
					26				
					27				
					28				
8					29				
					30				
					31				
9					32				
10									

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec BOREHOLE RECORD

MW17-031-D

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 410 E: 613 919 DATUM Geodetic

DATES: BORING September 22, 2017 WATER LEVEL September 29, 2017 TPC ELEV. 81.31

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0	80.4		0					
		FILL: brown sand with gravel - trace silt - trace organics - occasional brick fragments - moist	1	SS	1	480/610	17	
	79.7		2					
1		Stiff to hard, grey, CLAY with SAND (CL) - trace organics - occasional shale fragments - moist to wet	3	SS	2	330/610	12	
			4					
			5					
2			6	SS	3	410/610	16	
			7					
	77.8		8	SS	4	560/610	60	
		Highly weathered, grey, SHALE	9					
3			10					
	77.0		11					
		Slightly weathered to fresh, grey to black, SHALE BEDROCK - occasional grey limestone interbeds - core runs 1 and 2: poor quality, moderately to intensely fractured - core runs 3 and 4: good to excellent quality, slightly to moderately fractured - horizontal fractures; 2 mm to 10 mm aperture width	12	HQ	1	100%/68%	36%	FI = 6, 6, 2, 3,
4			13					
			14					
			15					
			16					
5			17	HQ	2	96%/69%	36%	FI = 4, 5, 7, 5, 3
			18					
			19					
			20					
6			21					
		- good to excellent quality - slightly to moderately fractured	22					
			23	HQ	3	100%/99%	93%	FI = 2, 3, 1, 1, 1
7			24					
			25					
			26					
8			27					
			28	HQ	4	99%/93%	89%	FI = 1, 2, 1, 2
			29					
9	71.3		30					
		END OF BOREHOLE at approximately 9.1 m below existing grade.	31					
			32					
10								

UNDRAINED SHEAR STRENGTH (kPa)
50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

MW17-031-D

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 410 E: 613 919 DATUM Geodetic

DATES: BORING September 22, 2017 WATER LEVEL September 29, 2017 TPC ELEV. 81.31

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
	70.4								
10		Groundwater monitoring well screened from 7.6 m to 9.1 m below grade. Groundwater level measured at 1.3 m and 2.1 m below grade on September 29, 2017 and October 10, 2017, respectively.			33				
					34				
					35				
11					36				
					37				
					38				
					39				
12					40				
					41				
					42				
13					43				
					44				
					45				
14					46				
					47				
					48				
15					49				
					50				
					51				
					52				
16					53				
					54				
					55				
17					56				
					57				
					58				
18					59				
					60				
					61				
19					62				
					63				
					64				
20					65				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

BOREHOLE RECORD

MW17-032-D

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 360 E: 613 806 DATUM Geodetic

DATES: BORING September 20, 2017 WATER LEVEL September 29, 2017 TPC ELEV. 83.98

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	**83.0**		0				
	82.7	FILL: brown, sand with gravel - trace silt - wet	1	SS	1	510/610	42
1	81.9	FILL: brown, sandy silt - trace gravel - moist to wet	3	SS	2	580/610	11
	81.5	FILL: grey, clay - trace gravel - wet	6	SS	3	430/610	7
2	80.6	Firm, grey, CLAY (CL) - trace gravel - wet	8	SS	4	610/610	40
3	79.9	Highly weathered, grey, SHALE - augered to 3.0 m - casing installed to 4.0 m - coring commenced at 4.0 m	10				
4	79.0	Slightly weathered to fresh, grey to black, SHALE BEDROCK - occasional grey limestone interbeds - poor to good quality - horizontal fractures	13	HQ	1	92%/94%	85%
5			17	HQ	2	95%/54%	31%
6			20				
7			21	HQ	3	89%/68%	59%
8			26	HQ	4	93%/83%	57%
9	73.8		30				
		END OF BOREHOLE at approximately 9.2 m below existing grade.	31				
10			32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

MW17-032-D

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 360 E: 613 806 DATUM Geodetic

DATES: BORING September 20, 2017 WATER LEVEL September 29, 2017 TPC ELEV. 83.98

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
	73.0								
10		Groundwater monitoring well screened from 4.6 m to 6.1 m below grade. Groundwater level measured at 3.7 m and 4.0 m below grade on September 29, 2017 and October 10, 2017, respectively.			33				
					34				
					35				
11					36				
					37				
					38				
					39				
12					40				
					41				
					42				
13					43				
					44				
					45				
14					46				
					47				
					48				
15					49				
					50				
					51				
16					52				
					53				
					54				
17					55				
					56				
					57				
18					58				
					59				
					60				
19					61				
					62				
					63				
					64				
20					65				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

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

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

MW17-034-D

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 244 E: 613 701 DATUM Geodetic

DATES: BORING September 26, 2017 WATER LEVEL October 10, 2017 TPC ELEV. 84.48

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	83.6		0				
		100 mm TOPSOIL					
		FILL: brown to grey, clay with sand	1	SS	1	410/610	11
	82.9	- trace gravel	2				
		- trace organics	3	SS	2	580/610	25
1		- moist	4				
		Very stiff to hard, brown grey, CLAY (CL)	5				
		- some sand	6	SS	3	530/610	46
	81.6	- moist to wet	7				
2	81.4	- occasional shale fragments	8				
		Highly weathered, grey, SHALE	9				
		- augered to 2.1 m	10				
3		- coring commenced at 4.2 m	11				
			12				
			13				
4	79.4		14				
		Slightly weathered to fresh, grey to black, SHALE BEDROCK	15	HQ	1	63%/38%	20%
		- occasional grey limestone interbeds	16				
5		- shale hardness 2 to 3, limestone hardness 4	17				
			18	HQ	2	100%/96%	71%
		- core run 1: very poor quality, intensely fractured	19				
6			20				
		- core runs 2 to 4: fair to good quality, moderately to intensely fractured	21				
			22				
7			23	HQ	3	100%/95%	69%
			24				
			25				
			26				
8			27				
			28	HQ	4	100%/92%	76%
			29				
9	74.4		30				
		END OF BOREHOLE at approximately 9.1 m below existing grade.	31				
			32				
10							

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

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

FI = 10, 0

FI = 6, 3, 2, 2, 2

FI = 1, 8, 2, 5, 3

FI = 4, 3, 3, 2

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

MW17-034-D

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 244 E: 613 701 DATUM Geodetic

DATES: BORING September 26, 2017 WATER LEVEL October 10, 2017 TPC ELEV. 84.48

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
	73.6								
10		Groundwater monitoring well screened from 7.6 m to 9.1 m below grade. Groundwater level measured at 3.8 m below grade on September 29, 2017 and October 10, 2017.			33				
					34				
					35				
11					36				
					37				
					38				
					39				
12					40				
					41				
					42				
13					43				
					44				
					45				
14					46				
					47				
					48				
15					49				
					50				
					51				
					52				
16					53				
					54				
					55				
17					56				
					57				
					58				
18					59				
					60				
					61				
19					62				
					63				
					64				
20					65				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec BOREHOLE RECORD

MW17-040-D

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 017 E: 614 032 DATUM Geodetic

DATES: BORING September 28, 2017 WATER LEVEL September 29, 2017 TPC ELEV. 80.08

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	79.2				0					
0		FILL: brown, clay with sand and silt - trace gravel - some rootlets - moist			1	SS	1	530/610	5	
1		- brown to grey			2					
	77.4				3	SS	2	510/610	5	
		Stiff to hard, brown, CLAY (CL) - some sand - trace gravel - wet			4					
2					5	SS	3	640/610	15	
					6					
					7	SS	4	530/610	9	
					8					
	76.0				9	SS	5	6.4/76	50/76	>>
3		- auger refusal at 3.1 m - casing installed to 5.9 m - coring commenced at 5.9 m		▼	10					
					11					
4					12					
					13					
					14					
					15					
5					16					
					17					
					18					
	73.2				19					
6		Slightly weathered to fresh, grey to black, SHALE BEDROCK - occasional grey limestone interbeds - core runs 1 and 2: poor to fair quality, moderately to intensely fractured - core run 3: excellent quality, moderately fractured - 1 mm to 8 mm aperture			20	HQ	1	66%/52%	52%	FI = 1
					21					
					22					
7					23	HQ	2	93%/76%	40%	FI = 2, 6, 2, 3, 1
					24					
					25					
					26					
8					27					
					28	HQ	3	100%/98%	98%	FI = 1, 1, 2, 1, 1
					29					
9					30					
	69.8				31					
		END OF BOREHOLE at approximately 9.4 m below existing grade.			32					
10										

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

MW17-040-D

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 017 E: 614 032 DATUM Geodetic

DATES: BORING September 28, 2017 WATER LEVEL September 29, 2017 TPC ELEV. 80.08

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
	69.1								
10		Groundwater monitoring well screened from 7.6 m to 9.1 m below grade. Groundwater level measured at 3.3 m, 3.6 m and 3.5 m below grade on September 29, 2017, October 5, 2017 and October 10, 2017.			33				
					34				
					35				
11					36				
					37				
					38				
					39				
12					40				
					41				
					42				
13					43				
					44				
					45				
14					46				
					47				
					48				
15					49				
					50				
					51				
16					52				
					53				
					54				
					55				
17					56				
					57				
					58				
18					59				
					60				
					61				
19					62				
					63				
					64				
20					65				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

MW17-044-D

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 255 E: 613 947 DATUM Geodetic

DATES: BORING September 26, 2017 WATER LEVEL September 29, 2017 TPC ELEV. 82.15

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0	81.2	50 mm TOPSOIL	0					
	80.6	FILL: brown sand with gravel - dry	1	SS	1	460/610	21	
1	80.0	Very stiff to hard, brown to grey, CLAY with SAND (CL) - occasional shale fragments - moist to wet	3	SS	2	610/610	52	
	79.8	Highly weathered, grey, SHALE - dry	4					
2		- augered to 1.4 m - casing installed to 3.9 m - coring commenced at 3.9 m	7					
3			10					
	77.2	Slightly weathered to fresh, grey, SHALE BEDROCK - occasional grey limestone interbeds - shale hardness 2 to 3, limestone 5 to 6 - poor to fair quality, moderately to intensely fractured - horizontal fractures - vertical fracture at 5.9 m	13	HQ	1	87%/98%	44%	FI = 3, 1
5			17	HQ	2	97%/82%	53%	FI = 4, 8, 3, 4, 2
6			20	HQ	3	97%/82%	53%	FI = 4, 4, 1
7	74.2	END OF BOREHOLE at approximately 7.0 m below existing grade. Groundwater monitoring well screened from 5.5 m to 7.0 m below grade. Groundwater level measured at 4.8 m and 4.9 m below grade on September 29, 2017 and October 10, 2017, respectively.	23					
8			26					
9			30					
10			32					

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

MW17-045-D

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 251 E: 613 931 DATUM Geodetic

DATES: BORING September 22, 2017 WATER LEVEL September 29, 2017 TPC ELEV. 82.50

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	81.5		0				
		FILL: brown, sandy silt - some organics - moist	1	SS	1	180/610	11
1	80.2		3	SS	2	200/610	5
		FILL: grey, clay - trace to some gravel - occasional brick fragments - petrolem hydrocarbon odour noted - borehole in area of known contamination - moist to wet	6	SS	3	300/610	4
2			8	SS	4	200/610	3
3			10	SS	5	330/610	4
4		▼	13	SS	6	300/610	4
		- occasional shale fragments	15	SS	7	430/610	6
5			17	SS	8	300/610	7
6			20	SS	9	480/610	7
7			22	SS	10	51/610	6
8	73.2		25	SS	11	460/610	6
		Stiff to very stiff, grey, CLAY (CL) - trace to some gravel - occasional shale fragments - petroleum hydrocarbon odour noted - borehole in area of known contamination - moist to wet	27	SS	12	250/610	20
9			30	SS	13	300/610	14
10			32				

UNDRAINED SHEAR STRENGTH (kPa)
50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)
10 20 30 40 50 60 70 80 90 100
GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

MW17-045-D

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 251 E: 613 931 DATUM Geodetic

DATES: BORING September 22, 2017 WATER LEVEL September 29, 2017 TPC ELEV. 82.50

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
10	71.5				33					
		Stiff to very stiff, grey, CLAY (CL) - trace to some gravel - ocassional shale fragments - petroleum hydrocarbon odour noted - borehole in area of known contamination - moist to wet			34	SS	14	230/610	17	
					35					
11	70.3				36	SS	15	360/590	21	
		Highly weathered, grey, SHALE - moist			37					
		- augered to 11.3 m - casing installed to 13.7 m - coring commenced at 13.7 m			38					
12					39					
					40					
					41					
13					42					
					43					
	67.8				44					
		Slightly weathered to fresh, grey, SHALE BEDROCK - occasional grey limestone interbeds - fair quality, slightly to intensely fractured - horizontal fractures; 1 mm to 10 mm aperture			45					
14					46					
					47					
					48	HQ	1	92%/85%	67%	FI = 0, 1, 0, 4, 3
15					49					
					50					
					51					
					52					
16					53	HQ	2	100%/89%	61%	FI = 2, 1, 3, 5, 1
					54					
	64.8				55					
		END OF BOREHOLE at approximately 16.8 m below existing grade. Groundwater monitoring screened from 15.3 m to 16.8 m below grade. Groundwater level measured at 3.9 m and 4.3 m below grade on September 29, 2017 and October 10, 2			56					
17					57					
					58					
					59					
18					60					
					61					
					62					
19					63					
					64					
					65					
20										

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

MW17-046-D

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 396 E: 614 010 DATUM Geodetic

DATES: BORING September 28, 2017 WATER LEVEL September 29, 2017 TPC ELEV. 80.39

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	79.4		0				
		FILL: brown, sand and gravel - some rootlets - moist	1	SS	1	480/610	22
1	78.4		2				
		Firm to hard, brown, CLAY (CL) - with silt - trace sand - occasional inferred cobbles and boulders - moist	3	SS	2	430/610	7
			4				
			5	SS	3	200/610	34
2	77.3		6				
	76.7	Highly weathered, grey, SHALE - moist - odor noted - borehole in area of known contamination	7				
			8	SS	4	360/430	50/130
3	76.0		9				
		- auger refusal at 2.1 m - casing installed to 3.7 m - coring commenced at 3.4 m	10				
			11				
		Slightly weathered to fresh, grey to black, SHALE BEDROCK - very poor to fair quality, slightly to intensely fractured - horizontal fractures; 1 mm to 15 mm aperture - clay seam at 3.4 m	12	HQ	1	72%/23%	0%
4			13				
			14				
			15				
			16	HQ	2	96%/76%	59%
5			17				
			18				
			19				
6	73.3		20				
		END OF BOREHOLE at approximately 6.1 m below existing grade. Groundwater monitoring well screened from 4.6 m to 6.1 m below grade. Groundwater level measured at 1.5 m and 1.6 m below grade on September 29, 2017 and October 10, 2017,	21				
7			22				
			23				
			24				
			25				
8			26				
			27				
			28				
			29				
9			30				
			31				
10			32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100 GR SA SI CL

>>

FI = 6, 9, 6, 1

FI = 5, 9, 0, 2, 0

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec BOREHOLE RECORD

MW17-055-D

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 143 E: 614 203 DATUM Geodetic

DATES: BORING October 2, 2017 WATER LEVEL October 5, 2017 TPC ELEV. 81.25

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	80.2				0				
		FILL: grey to brown, sandy clay with gravel - some organics - moist			1	SS	1	460/610	27
1					3	SS	2	130/610	35
					6	SS	3	100/610	7
2					8	SS	4	76/610	7
	77.3				9				
3		Hard, grey, CLAY with GRAVEL (CL) - occasional rock fragments - wet			10	SS	5	0.0/100	50/100
	76.2				13	SS	6	410/410	50/100
4	76.0	Highly weathered, grey SHALE - moist to wet		▼	14				
		- augered to 4.2 m - casing installed to 7.6 m - coring commenced at 5.9 m			19				
5	74.2				20	HQ	1	100%/79%	79%
6		Slightly weathered to fresh, grey to black, SHALE BEDROCK - occasional grey limestone interbeds - shale hardness 4, limestone 5 to 6 - core runs 1 to 3: poor to good quality, slightly to intensely fractured - horizontal fractures; 1 mm to 10 mm aperture			23	HQ	2	100%/57%	27%
7					27	HQ	3	100%/89%	79%
8					32			100%	
9									
10									

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

>> >>

FI = 3, 1

FI = 4, 7, 6, 3

FI = 1, 1, 2, 2, 2

FI = 2, 0, 4, 2, 2

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

MW17-055-D

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 143 E: 614 203 DATUM Geodetic

DATES: BORING October 2, 2017 WATER LEVEL October 5, 2017 TPC ELEV. 81.25

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
10	70.2				33				
		Slightly weathered to fresh, grey to black, SHALE BEDROCK - occasional grey limestone interbeds - core run 4: fair quality, slightly to intensely fractured			34	HQ	4	86%	63%
	69.5				35				
11		END OF BOREHOLE at approximately 10.6 m below existing grade. Groundwater monitoring well screened from 9.1 m to 10.6 m below grade. Groundwater level measured at 4.3 m and 4.5 m below grade on October 5, 2017 and October 10, 2017,			36				
					37				
					38				
12					39				
					40				
					41				
13					42				
					43				
					44				
14					45				
					46				
					47				
15					48				
					49				
					50				
16					51				
					52				
					53				
17					54				
					55				
					56				
18					57				
					58				
					59				
19					60				
					61				
					62				
20					63				
					64				
					65				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

MW17-061-D

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 366 E: 613 861 DATUM Geodetic

DATES: BORING September 19, 2017 WATER LEVEL September 29, 2017 TPC ELEV. 82.38

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	81.4		0				
		FILL: brown, sandy silt - some gravel - trace clay and organics - moist	1	SS	1	560/610	29
1			3	SS	2	510/610	14
		- trace odor noted - borehole in area of known contamination	5				
2			6	SS	3	300/610	9
	79.2	- some wood fragments - wet	7				
	78.7	Very stiff, brown to grey, CLAY - occasional shale fragments	8	SS	4	560/610	18
3	78.4	- moist to wet	9				
		Highly weathered, grey, SHALE	10				
		- core from 3.0 m to 6.1 m - core discarded	11				
4			13				
5			16				
			17				
6	75.3		19				
		END OF BOREHOLE at approximately 6.1 m below existing grade. Groundwater monitoring well installed to 6.1 m, screened from 4.6 m to 6.1 m below grade. Groundwater level measured at 2.5 m and 2.8 m below grade on September 29, 2017 and October 10, 2017, respectively.	20				
7			23				
			24				
			25				
8			26				
			27				
			28				
9			30				
			31				
10			32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

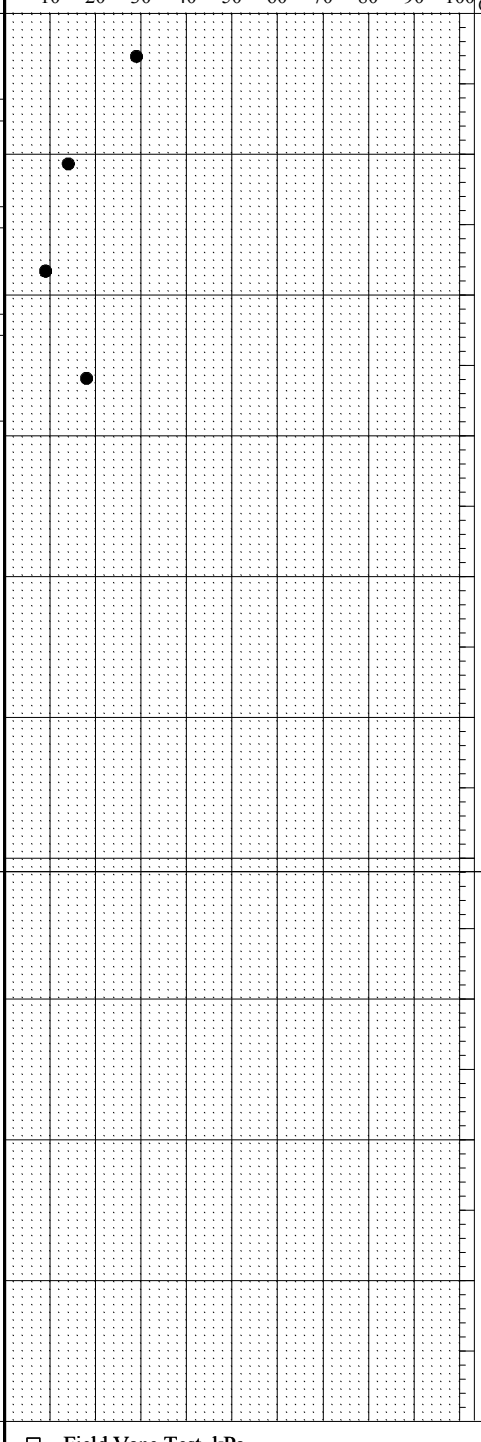
DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL



□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

MW17-073-D

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 103 E: 613 981 DATUM Geodetic

DATES: BORING September 27, 2017 WATER LEVEL September 29, 2017 TPC ELEV. 82.39

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	81.5		0				
		FILL: brown, clay - trace gravel and organics - moist	1	SS	1	460/610	15
	80.6		2				
1		Hard, grey, CLAY (CL) - occasional shale fragments - wet	3	SS	2	560/610	30
			4				
			5				
2			6	SS	3	610/610	44
			7				
	78.9		8	SS	4	430/430	50/130
	78.7	Highly weathered, grey, SHALE - moist	9				
3		- augered to 2.7 m - casing installed to 6.1 m - coring commenced at 6.1 m	10				
			11				
			12				
4			13				
			14				
			15				
5		▼	16				
			17				
			18				
			19				
6	75.4		20	HQ	1	73%/41%	0%
		Slightly weathered to fresh, grey, SHALE BEDROCK - occasional grey limestone interbeds - shale hardness 3, limestone 5 - core run 1: very poor quality, moderately fractured - core runs 2 and 3: fair quality, moderately to intensely fractured - horizontal fractures; 2 mm to 10 mm aperture	21				
			22				
7			23	HQ	2	98%/83%	64%
			24				
			25				
8			26				
			27				
			28	HQ	3	98%/84%	54%
			29				
9	72.1		30				
		END OF BOREHOLE at approximately 9.4 m below existing grade.	31				
10			32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

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

FI = 3

FI = 4, 3, 3, 2, 2

FI = 3, 2, 4, 3, 4

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

MW17-073-D

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 103 E: 613 981 DATUM Geodetic

DATES: BORING September 27, 2017 WATER LEVEL September 29, 2017 TPC ELEV. 82.39

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
10	71.4				33				
		Groundwater monitoring well screened from 7.6 m to 9.1 m below grade. Groundwater level measured at 5.0 m and 5.4 m below grade on September 29, 2017 and October 10, 2017,			34				
					35				
11					36				
					37				
					38				
12					39				
					40				
					41				
					42				
13					43				
					44				
					45				
14					46				
					47				
					48				
15					49				
					50				
					51				
					52				
16					53				
					54				
					55				
17					56				
					57				
					58				
18					59				
					60				
					61				
19					62				
					63				
					64				
20					65				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

MW17-075-D

CLIENT Port Credit West Village Partners Inc.

PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 223 E: 614 192

DATUM Geodetic

DATES: BORING October 3, 2017

WATER LEVEL October 10, 2017

TPC ELEV. 81.62

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0	80.7				0					
		FILL: brown, clay - some gravel - trace sand - occasional concrete fragments - moist			1	SS	1	250/610	8	
1					2					
					3	SS	2	51/610	18	
					4					
					5					
2					6	SS	3	360/610	6	
					7					
					8	SS	4	280/610	6	
		- 130 mm sand seam			9					
3	77.6	- wet			10					
		Stiff, brown, CLAY (CL) - occasional shale fragments - moist to wet			11	SS	5	330/610	14	
	76.7				12					
4		Highly weathered, grey, SHALE - moist			13	SS	6	580/590	44	
	76.3				14					
		- augered to 4.4 m - casing installed to 7.4 m - coring commenced at 7.4 m		▼	15					
5					16					
					17					
					18					
					19					
6					20					
					21					
					22					
7					23					
					24					
	73.3				25	HQ	1	45%/23%	0%	FI = NA
		Slightly weathered to fresh, grey, SHALE BEDROCK - occasional grey limestone interbeds - shale hardness 2 to 3, limestone 4 - core runs 1 and 2: very poor to poor quality, moderately to very intensely fractured - horizontal fractures - clay seam - vertical fracture at 9.7 m			26					
8					27					
					28	HQ	2	92%/79%	30%	FI = 7, >10, 3, 2, 3
					29					
9					30					
					31					
					32			99%		FI = 3, 1, 4, 3, 2
10										

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

MW17-075-D

CLIENT Port Credit West Village Partners Inc. PROJECT No. 122120255

LOCATION 70 Mississauga Road South, Mississauga, N: 4 822 223 E: 614 192 DATUM Geodetic

DATES: BORING October 3, 2017 WATER LEVEL October 10, 2017 TPC ELEV. 81.62

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
10	70.6				33				
		Slightly weathered to fresh, grey to black, SHALE BEDROCK - occasional grey limestone interbeds - core run 3: fair quality, moderately to intensely fractured - vertical fracture at 10.6 m			34	HQ	3	94%	73%
	70.0				35				
11					36				
					37				
					38				
					39				
12		END OF BOREHOLE at approximately 10.7 m below existing grade.			40				
					41				
		Groundwater monitoring well installed screened from 9.1 m to 10.6 m below grade. Groundwater level measured at 5.4 m and 5.2 m below grade on October 5, 2017 and October 10, 2017,			42				
13					43				
					44				
					45				
					46				
14					47				
					48				
					49				
					50				
15					51				
					52				
					53				
					54				
16					55				
					56				
					57				
					58				
17					59				
					60				
					61				
					62				
18					63				
					64				
					65				
19									
20									

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

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

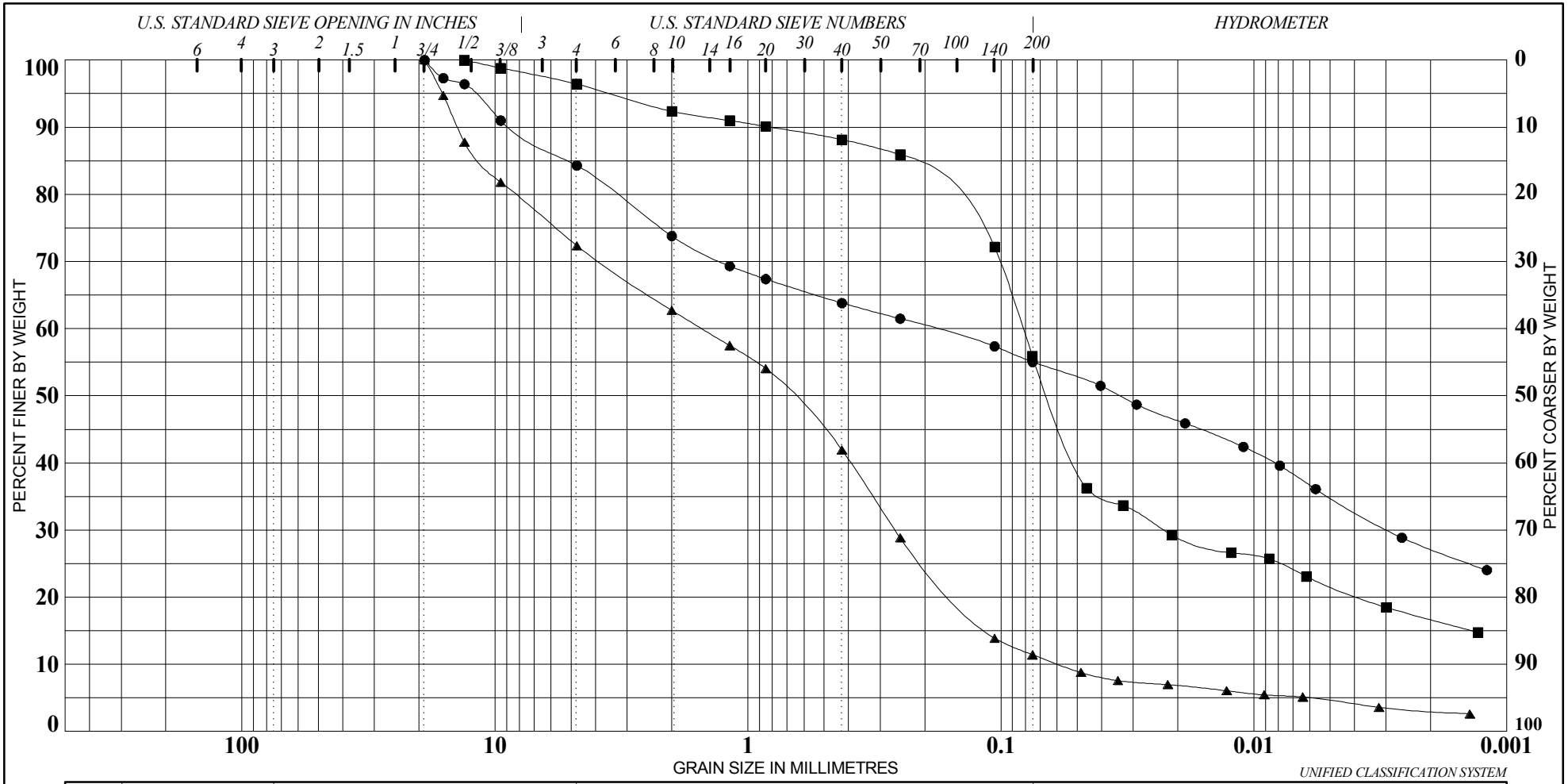
□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

APPENDIX D

Geotechnical Laboratory Test Results



UNIFIED CLASSIFICATION SYSTEM

BLDs	COBBLES	GRAVEL		SAND			SILT & CLAY	
		coarse	fine	coarse	medium	fine	SILT	CLAY

Sample	Depth (m)	Description	W%	W_L	W_P	I_P	%Gravel	%Sand	%Silt	%Clay
● BH17-028	2.3	FILL: sandy clay with gravel	14	34	18	16	16	29	28	27
■ BH17-072	4.1	FILL: sandy silt	14	NP	NP	NP	4	40	39	17
▲ BH17-084	1.1	FILL: sand with gravel	4				28	61	8	3

Stantec

Project: Development of 70 Mississauga Road South

Location: 70 Mississauga Road South, Mississauga

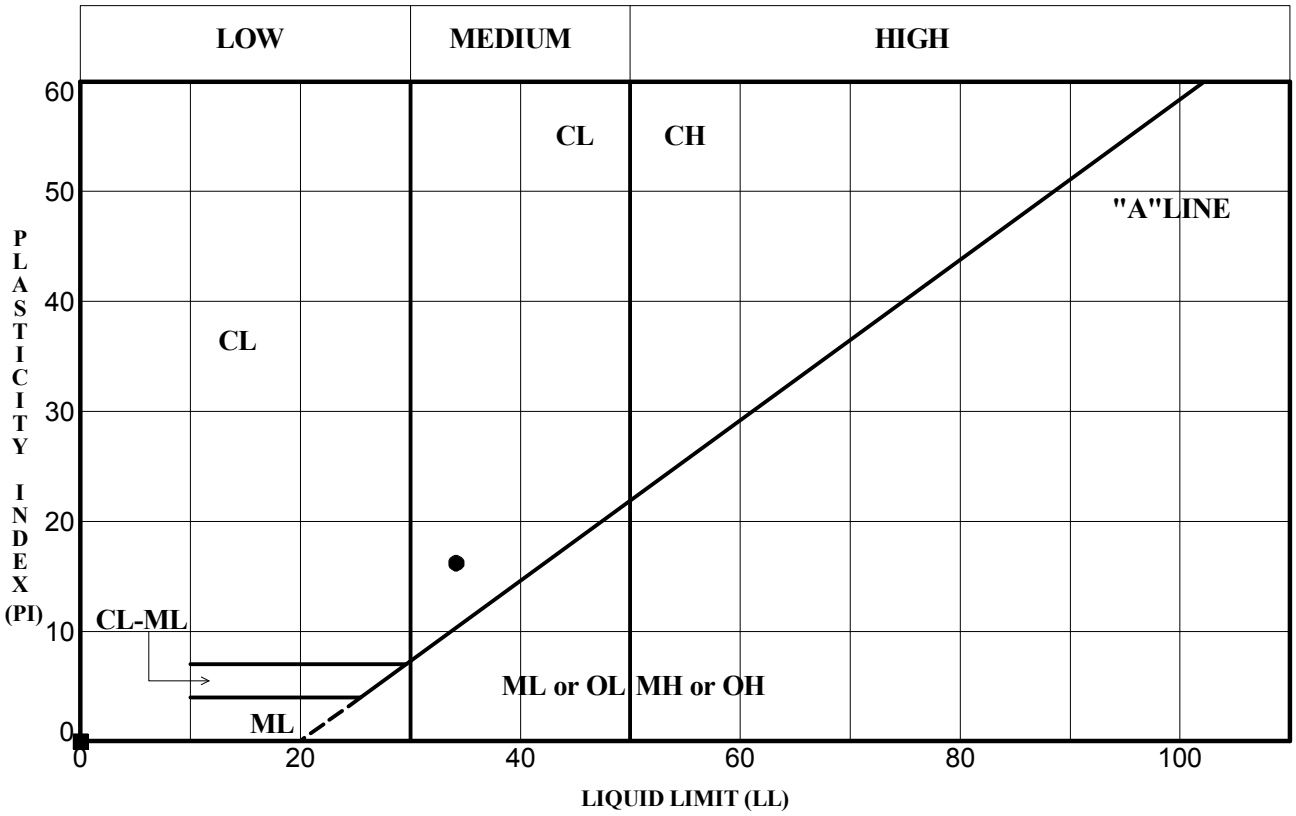
Project No.: 122120255

GRADATION CURVE (ASTM D422)

Figure: 1

Remarks:

PLASTICITY CHART



	Specimen	Depth (m)	LL	PL	PI	Fines	W%	Classification
●	BH17-028	2.3	34	18	16	55	14	FILL: sandy clay with gravel
■	BH17-072	4.1	NP	NP	NP	56	14	FILL: sandy silt

Stantec

Project: Development of 70 Mississauga Road South

Location: 70 Mississauga Road South, Mississauga

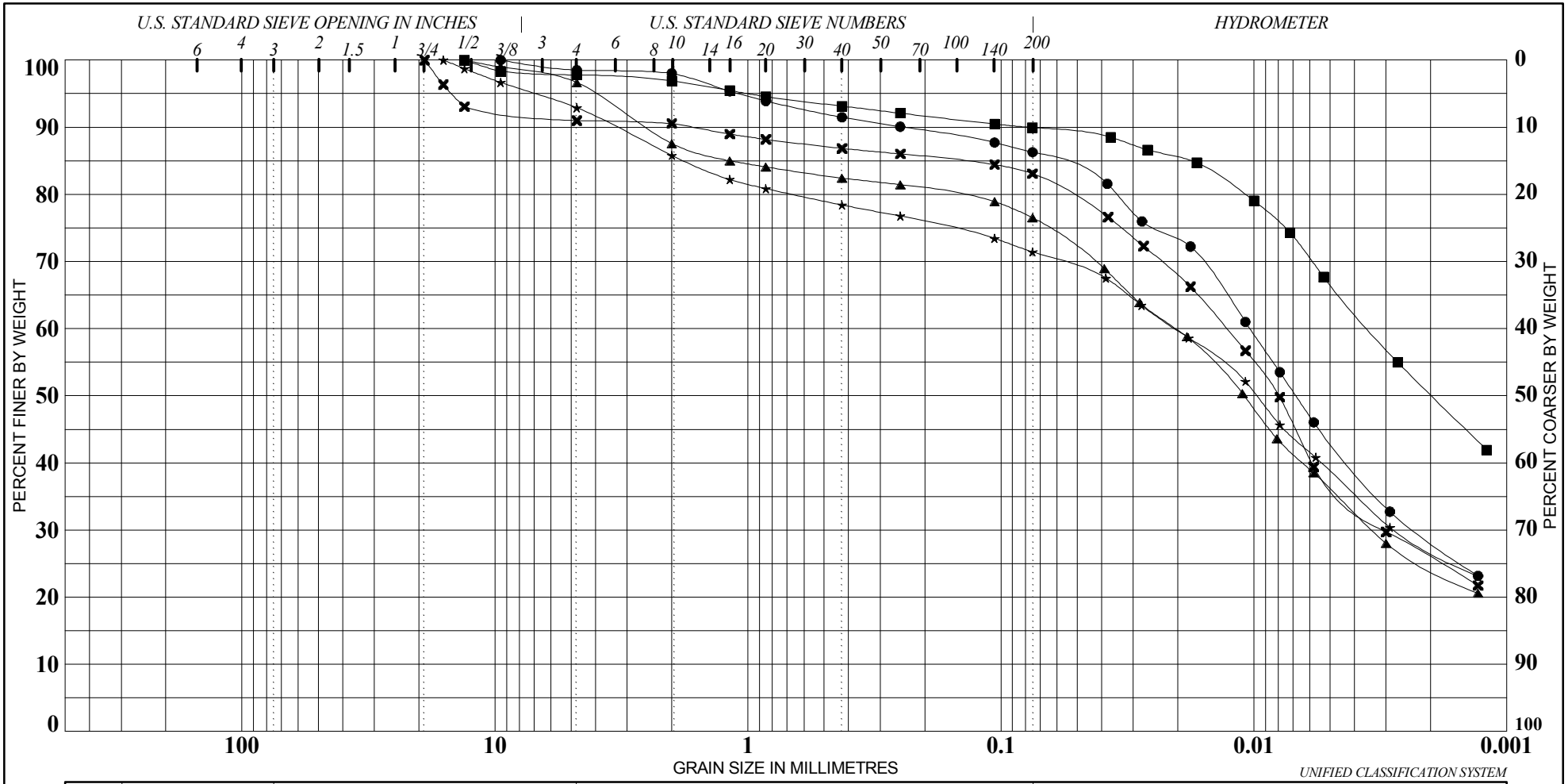
Project No.: 122120255

ATTERBERG LIMITS
(ASTM D4318)

Figure: 2

Remarks:

STN13-ATTERBERG 122120255.500.200.GPJ MM.GDT 11/22/17



UNIFIED CLASSIFICATION SYSTEM

BLDs	COBBLES	GRAVEL		SAND			SILT & CLAY	
		coarse	fine	coarse	medium	fine	SILT	CLAY

Sample	Depth (m)	Description	W%	W_L	W_P	I_P	%Gravel	%Sand	%Silt	%Clay
● BH17-033	1.8	CLAY (CL)	12	38	24	14	2	12	58	28
■ BH17-035	1.1	CLAY (CL)	14	45	21	24	2	8	40	50
▲ BH17-035	2.5	CLAY with SAND (CL)	12	31	19	12	3	21	52	24
★ BH17-052	2.3	CLAY with SAND (CL)	12	35	20	15	7	22	44	27
✖ BH17-074	1.8	CLAY with GRAVEL (CL)	10	36	23	13	9	8	57	26

Stantec

Project: Development of 70 Mississauga Road South

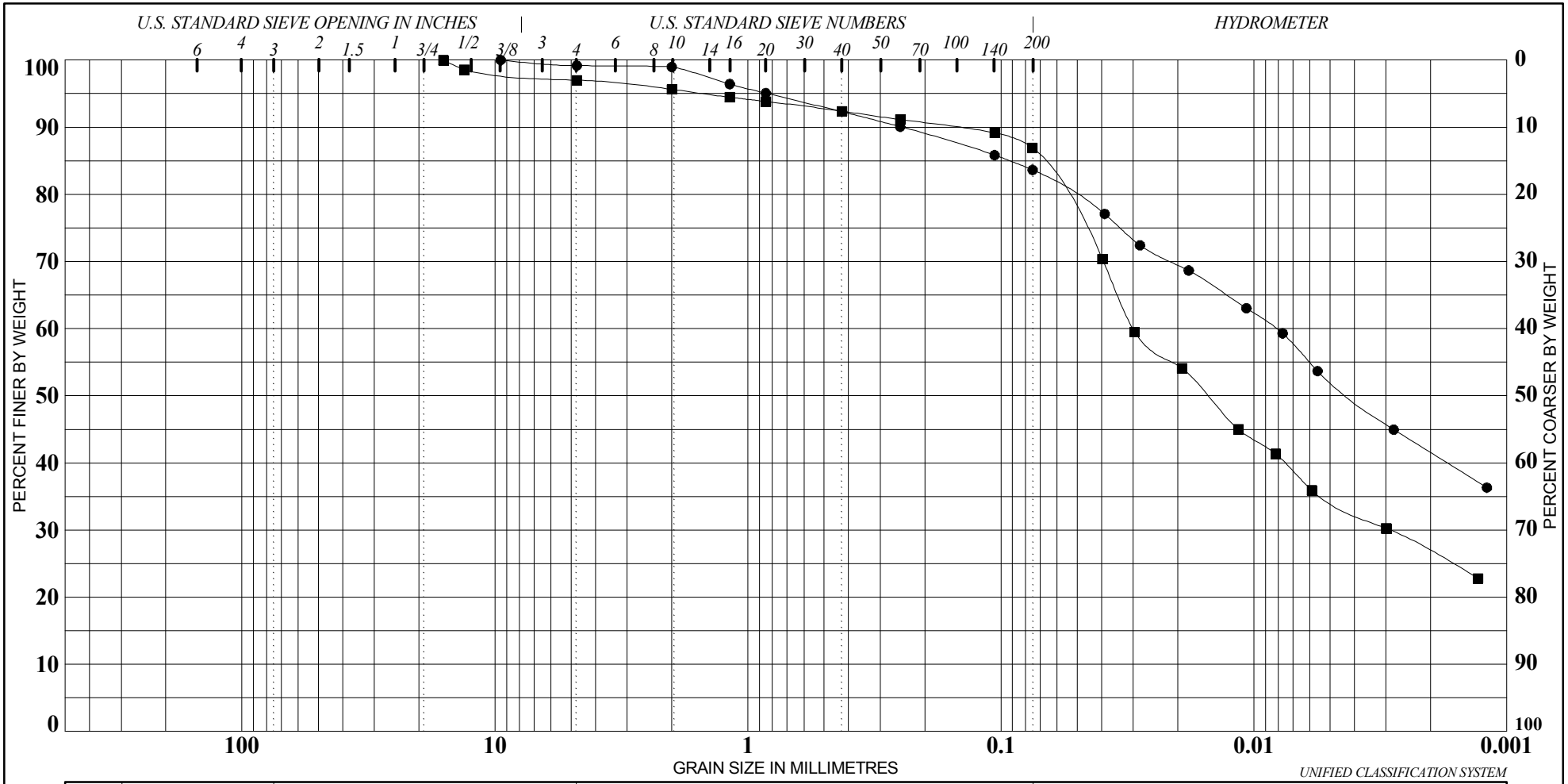
Location: 70 Mississauga Road South, Mississauga

Project No.: 122120255

GRADATION CURVE (ASTM D422)

Figure: 3

Remarks:



UNIFIED CLASSIFICATION SYSTEM

BLDs	COBBLES	GRAVEL		SAND			SILT & CLAY	
		coarse	fine	coarse	medium	fine	SILT	CLAY

Sample	Depth (m)	Description	W%	W_L	W_P	I_P	%Gravel	%Sand	%Silt	%Clay
● BH17-088	1.1	CLAY with SAND (CL)	18	42	23	19	1	15	42	42
■ BH17-090	0.6	CLAY (CL)	16	27	17	10	3	10	60	27

Stantec

Project: Development of 70 Mississauga Road South

Location: 70 Mississauga Road South, Mississauga

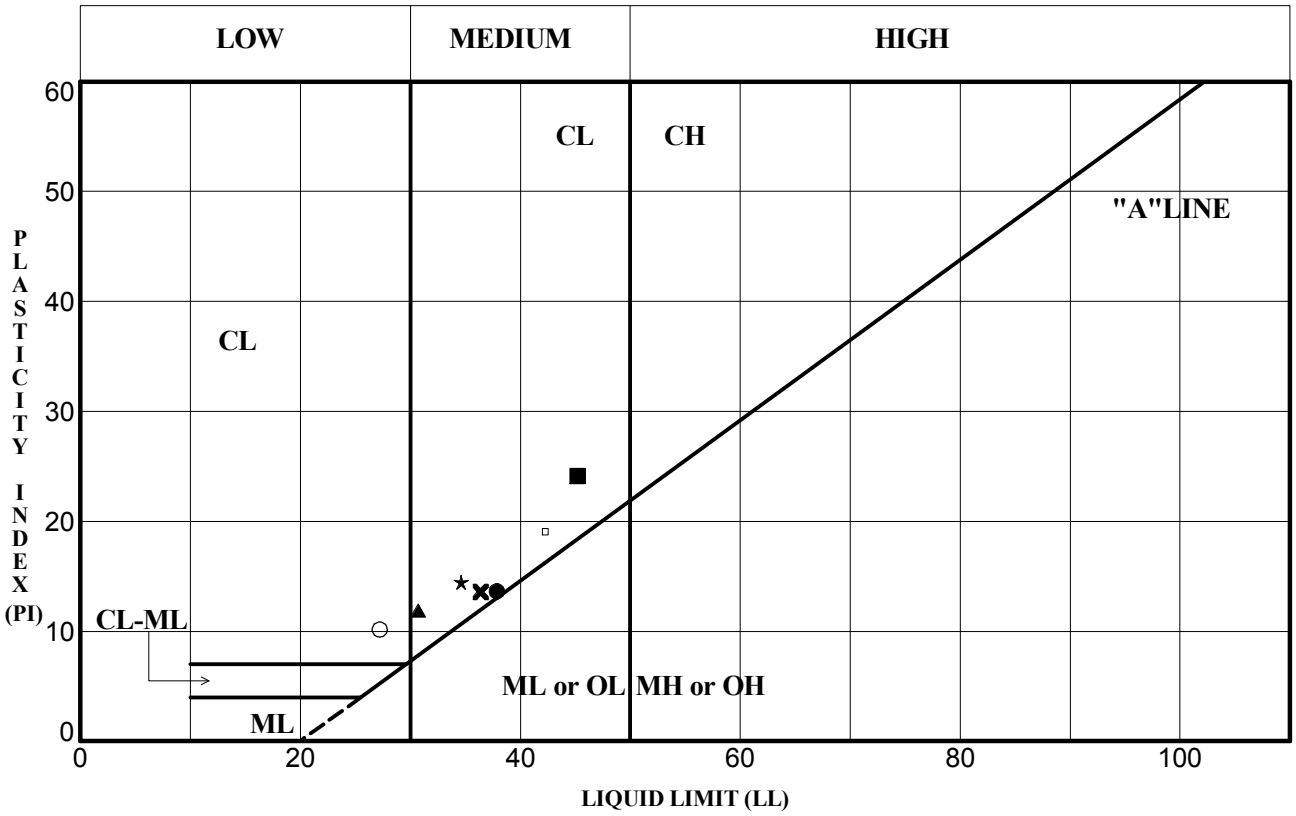
Project No.: 122120255

GRADATION CURVE (ASTM D422)

Figure: 4

Remarks:

PLASTICITY CHART



	Specimen	Depth (m)	LL	PL	PI	Fines	W%	Classification
●	BH17-033	1.8	38	24	14	86	12	CLAY (CL)
■	BH17-035	1.1	45	21	24	90	14	CLAY (CL)
▲	BH17-035	2.5	31	19	12	77	12	CLAY with SAND (CL)
★	BH17-052	2.3	35	20	15	71	12	CLAY with SAND (CL)
✖	BH17-074	1.8	36	23	13	83	10	CLAY with GRAVEL (CL)
▫	BH17-088	1.1	42	23	19	84	18	CLAY with SAND (CL)
○	BH17-090	0.6	27	17	10	87	16	CLAY (CL)

Stantec

Project: Development of 70 Mississauga Road South

Location: 70 Mississauga Road South, Mississauga

Project No.: 122120255

ATTERBERG LIMITS
(ASTM D4318)

Figure: 5

Remarks:

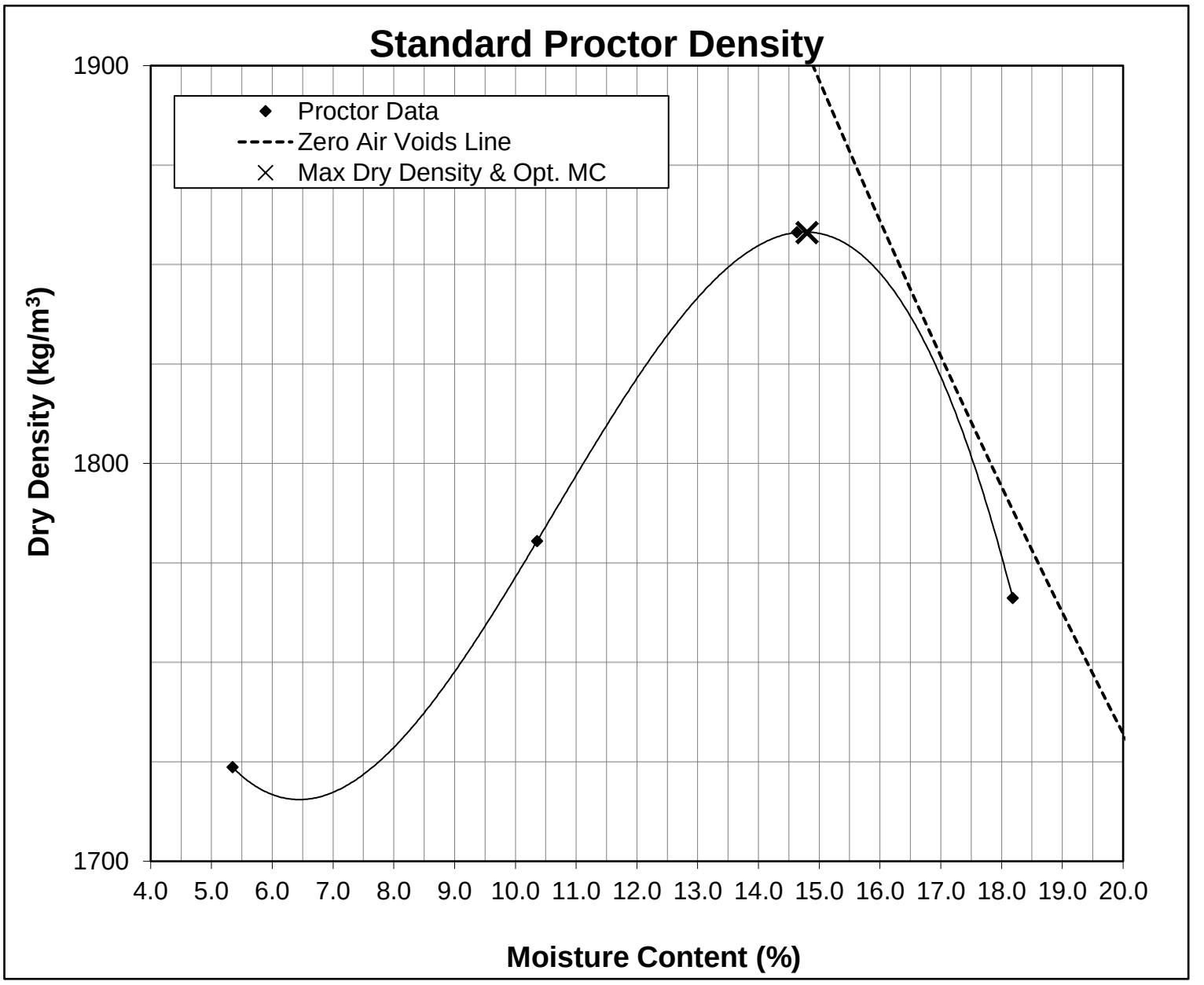
STN13-ATTERBERG 122120255.500.200.GPJ MM.GDT 11/22/17

Laboratory Compaction Standard Effort Report
ASTM D698

Project Name:	Port Credit	Project & Task No.:	122120255.500.200
Client:	Port Credit West Village Partners	Date Sampled:	September 28, 2017
General Contractor:	N/A	Proposed Use:	N/A
Inspector / Technician:	N/A	Material Type:	Fill: sandy clay with gravel
Supplier:	Existing Material	Lab No.:	233/237
Sample Location:	BH17-028 5'-10'		

Test Results

Corrected Maximum Density (kg/m^3):	**1,873**	**Maximum Dry Density (kg/m^3):**	**1,858**
Corrected Optimum Moisture Content (%):	**13.7**	**Optimum Moisture Content (%):**	**14.8**



Remarks:

Tested By:	Mirza Khan		October 6, 2017
	Name		Date
Reviewed By:	Nabeel Basheer		October 12, 2017
	Name		Date

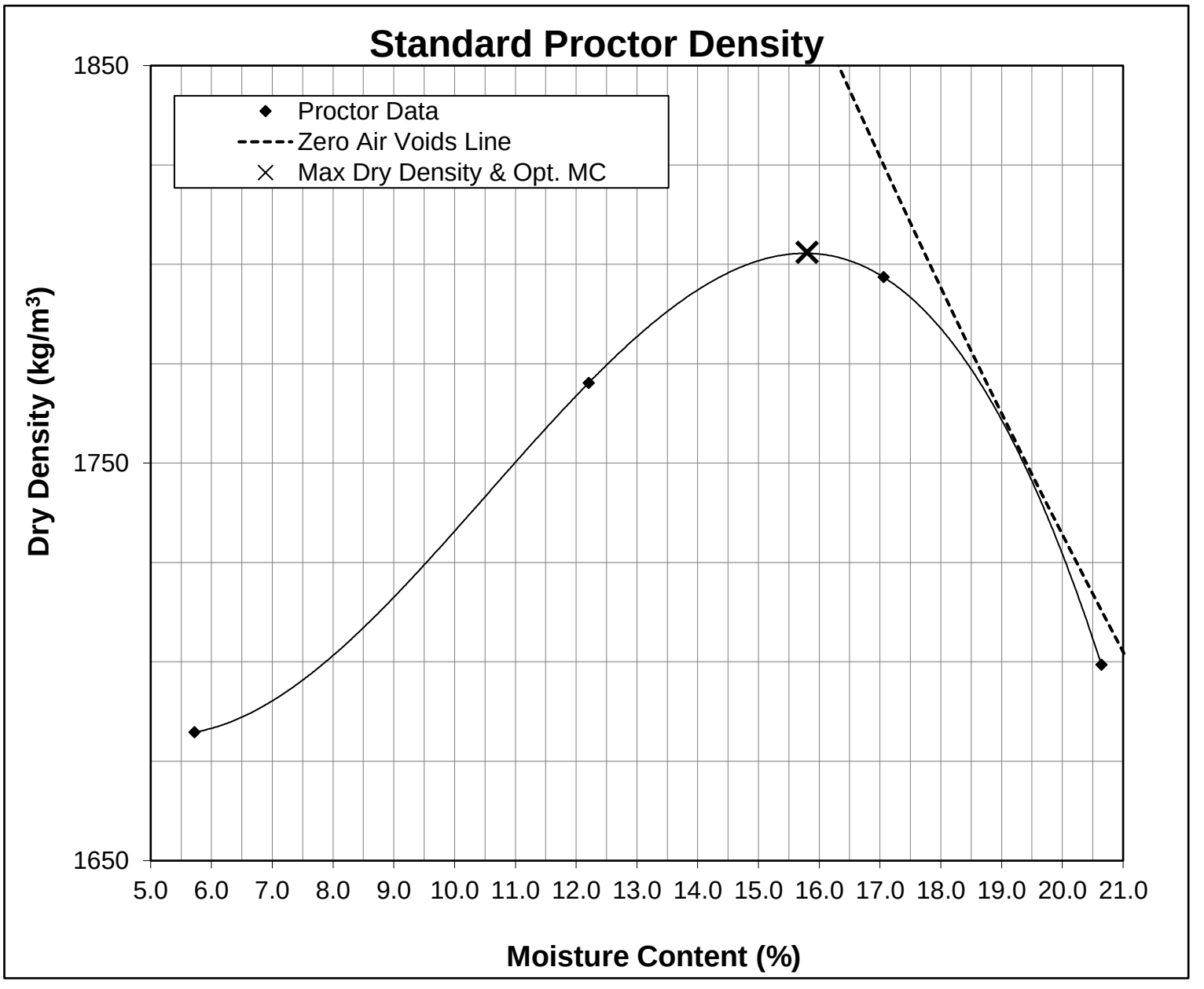
Barrie: (705) 719-1813 15 Cedar Pointe Drive
Kitchener: (519) 579-4410 49 Frederick Street
London: (519) 645-2007 171 Queens Avenue
Markham: (905) 944-7777 300 - 675 Cochrane Drive
Ottawa: (613) 722-4420 400 - 1331 Clyde Avenue

Laboratory Compaction Standard Effort Report
ASTM D698

Project Name:	Port Credit	Project & Task No.:	122120255.500.200
Client:	Port Credit West Village Partners	Date Sampled:	September 28, 2017
General Contractor:	N/A	Proposed Use:	N/A
Inspector / Technician:	N/A	Material Type:	Clay with Sand
Supplier:	Existing Material	Lab No.:	233/237
Sample Location:	BH17-052 5'-10'		

Test Results

Corrected Maximum Density (kg/m^3):	**1,837**	**Maximum Dry Density (kg/m^3):**	**1,803**
Corrected Optimum Moisture Content (%):	**14.3**	**Optimum Moisture Content (%):**	**15.8**



Remarks:

Tested By:	Mirza Khan		October 5, 2017
	Name		Date
Reviewed By:	Nabeel Basheer		October 12, 2017
	Name		Date

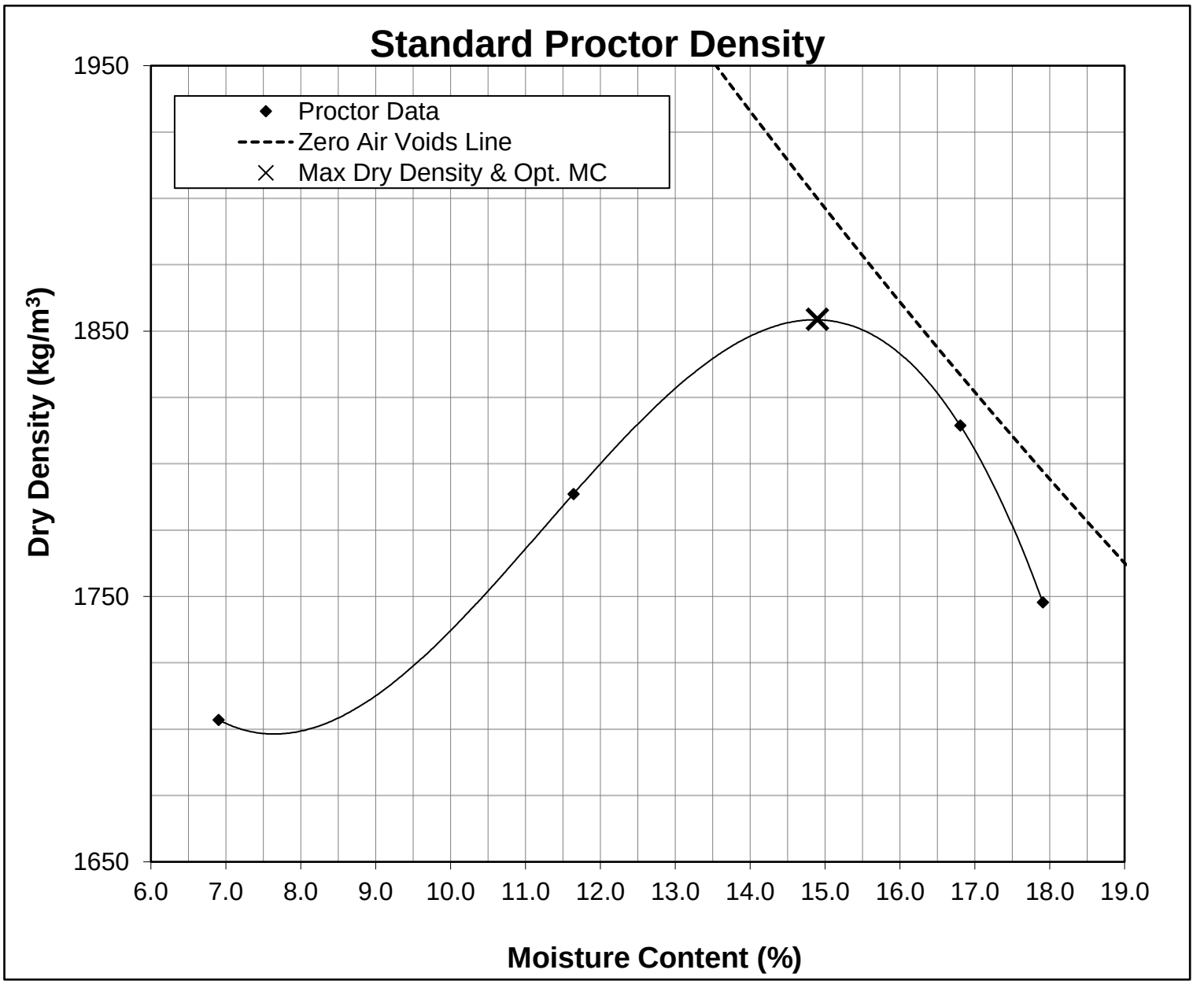
Laboratory Compaction Standard Effort Report

ASTM D698

Project Name:	Port Credit	Project & Task No.:	122120255.500.200
Client:	Port Credit West Village Partners	Date Sampled:	October 4, 2017
General Contractor:	N/A	Proposed Use:	N/A
Inspector / Technician:	N/A	Material Type:	Clay
Supplier:	Existing Material	Lab No.:	233/237
Sample Location:	BH 17-090		

Test Results

Corrected Maximum Density (kg/m^3):	**N/A**	**Maximum Dry Density (kg/m^3):**	**1,855**
Corrected Optimum Moisture Content (%):	**N/A**	**Optimum Moisture Content (%):**	**14.9**



Remarks:

Tested By:	Jessica MacInnis	October 16, 2017
	Name	Date
Reviewed By:	Nabeel Basheer	October 18, 2017
	Name	Date

Stantec

ROCK CORE COMPRESSIVE STRENGTH

Project Name:	**Port Credit**	**Project No.:**	**122120255**
Client:	**Port Credit West Village Partners**	**Lab No.:**	**233**
Material Description:	**Shale Cores (weak)**	**Tested By:**	**NNH**
Location:	**70 Mississauga Road South, Mississauga**	**Date Tested:**	**October 5, 2017**

BH17-035	HQ3	35'8"-36'3"
		Average
LENGTH (mm)	139.43	143.2
	143.44	
	146.65	
DIAMETER (mm)	63.25	63.3
	63.32	
	63.34	
L/D	2.26	
Area m^2	0.00314574	
WEIGHT (kg)	1.167	
Volume (m^3)	0.00045039	
Unit Weight (kg/m^3)	2591	
LOAD	(lb)	8346
	N	37124.7
	MPa	11.8

BH17-035	HQ1	15'5"-15'10"
LENGTH (mm)	134.37	134.8
	137.81	
	132.17	
DIAMETER (mm)	63.01	63.0
	62.87	
	63	
L/D	2.14	
Area m^2	0.0031117	
WEIGHT (kg)	1.068	
Volume (m^3)	0.0004194	
Unit Weight (kg/m^3)	2546	
LOAD	(lb)	8814
	N	39206.4
	MPa	12.6

BH17-035	HQ2	25'2"-25'10"
		Average
LENGTH (mm)	138.47	135.4
	134.25	
	133.61	
DIAMETER (mm)	63.15	63.2
	63.18	
	63.13	
L/D	2.14	
Area m^2	0.0031308	
WEIGHT (g)	1.077	
Volume (m3)	0.0004241	
Unit Weight (kg/m3)	2540	
LOAD	(lb)	6342
	N	28210.5
	MPa	9.0

Stantec

ROCK CORE COMPRESSIVE STRENGTH

Project Name:	**Port Credit**	**Project No.:**	**122120255**
Client:	**Port Credit West Village Partners**	**Lab No.:**	**233/237**
Material Description:	**Shale Cores (weak)**	**Tested By:**	**NNH**
Location:	**70 Mississauga Road South, Mississauga**	**Date Tested:**	**October 18, 2017**

BH17-042	HQ1 (R2)	14'2"-14'10"
		Average
LENGTH (mm)	130.89	133.1
	132.83	
	135.57	
DIAMETER (mm)	63.09	63.1
	63.12	
	63.11	
L/D	2.11	
Area m^2	0.00312622	
WEIGHT (kg)	1.067	
Volume (m^3)	0.00041609	
Unit Weight (kg/m^3)	2563	
LOAD	(lb)	3599
	N	16009.1
	MPa	5.1

BH17-042	HQ2 (R4)	25'6"-26'3"
LENGTH (mm)	141.99	141.8
	141.05	
	142.34	
DIAMETER (mm)	63.14	63.1
	63.16	
	63.13	
L/D	2.25	
Area m^2	0.0031299	
WEIGHT (kg)	1.152	
Volume (m^3)	0.0004438	
Unit Weight (kg/m^3)	2596	
LOAD	(lb)	4083
	N	18162.0
	MPa	5.8

		Average
LENGTH (mm)		#DIV/0!
DIAMETER (mm)		#DIV/0!
L/D	#DIV/0!	
Area m^2	#DIV/0!	
WEIGHT (g)		
Volume (m3)	#DIV/0!	
Unit Weight (kg/m3)	#DIV/0!	
LOAD	(lb)	
	N	0.0
	MPa	#DIV/0!

Stantec

ROCK CORE COMPRESSIVE STRENGTH

Project Name:	**Port Credit**	**Project No.:**	**122120255**
Client:	**Port Credit West Village Partners**	**Lab No.:**	**233/237**
Material Description:	**Shale Cores (weak)**	**Tested By:**	**NNH**
Location:	**70 Mississauga Road South, Mississauga**	**Date Tested:**	**October 6, 2017**

BH17-051	HQ1 (R2)	14'3"-14'11"
		Average
LENGTH (mm)	125.07	123.5
	121.63	
	123.81	
DIAMETER (mm)	63.07	63.0
	63.01	
	63.06	
L/D	1.96	
Area m^2	0.00312028	
WEIGHT (kg)	0.981	
Volume (m^3)	0.00038537	
Unit Weight (kg/m^3)	2545	
LOAD	(lb)	6360
	N	28290.6
	MPa	9.1

BH17-051	HQ2 (R6)	35'6"-36'2"
LENGTH (mm)	126.33	126.4
	126.98	
	125.99	
DIAMETER (mm)	63.12	63.1
	63.07	
	63.05	
L/D	2.00	
Area m^2	0.0031236	
WEIGHT (kg)	1.019	
Volume (m^3)	0.0003949	
Unit Weight (kg/m^3)	2579	
LOAD	(lb)	8808
	N	39179.8
	MPa	12.5

BH17-051	HQ3 (R8)	45'3"-45'10"
		Average
LENGTH (mm)	123.66	123.9
	124.21	
	123.84	
DIAMETER (mm)	62.84	62.9
	62.91	
	62.85	
L/D	1.97	
Area m^2	0.0031025	
WEIGHT (g)	0.984	
Volume (m3)	0.0003844	
Unit Weight (kg/m3)	2559	
LOAD	(lb)	12163
	N	54103.5
	MPa	17.4

AGAT Laboratories

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http://www.agatlabs.com

CLIENT NAME: STANTEC CONSULTING LTD.
300-675 Cochrane Drive
MARKHAM, ON L3R0B8
(905) 444-7777

ATTENTION TO: Nabeel Basheer

PROJECT: 122120255.500.200

AGAT WORK ORDER: 17T272117

SOIL ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Coordinator

DATE REPORTED: Oct 21, 2017

PAGES (INCLUDING COVER): 5

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17T272117

PROJECT: 122120255.500.200

CLIENT NAME: STANTEC CONSULTING LTD.

ATTENTION TO: Nabeel Basheer

SAMPLING SITE:

SAMPLED BY:

Corrosivity Package

DATE RECEIVED: 2017-10-16

DATE REPORTED: 2017-10-21

		SAMPLE DESCRIPTION:		U2 SS-3	U4 Bulk	R9 SS-3	R11 SS-2	B7 SS-3	R28 SS-4A	B2 Bulk	B9 SS-2
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:									
Parameter	Unit	G / S	RDL	8823319	8823322	8823323	8823325	8823326	8823327	8823329	8823336
Sulfide (S2-)	%		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chloride (2:1)	µg/g		2	6	4	24	3	4	6	15	3
Sulphate (2:1)	µg/g		2	37	20	150	49	16	138	118	25
pH (2:1)	pH Units		NA	8.20	8.14	8.24	8.13	8.25	7.91	8.56	8.33
Electrical Conductivity (2:1)	mS/cm		0.005	0.196	0.204	0.299	0.179	0.156	0.291	0.294	0.132
Resistivity (2:1)	ohm.cm		1	5100	4900	3340	5590	6410	3440	3400	7580
Redox Potential (2:1)	mV		5	229	130	141	140	138	156	126	142

		SAMPLE DESCRIPTION:		B9 SS-4	B26 Bulk	R18 SS-2
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:				
Parameter	Unit	G / S	RDL	8823340	8823341	8823343
Sulfide (S2-)	%		0.05	<0.05	0.13	<0.05
Chloride (2:1)	µg/g		2	3	142	2
Sulphate (2:1)	µg/g		2	25	15	15
pH (2:1)	pH Units		NA	8.34	8.63	8.77
Electrical Conductivity (2:1)	mS/cm		0.005	0.148	0.279	0.110
Resistivity (2:1)	ohm.cm		1	6760	3580	9090
Redox Potential (2:1)	mV		5	146	145	131

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8823319-8823343 EC/Resistivity, pH, Chloride, Sulphate and Redox Potential were determined on the extract obtained from the 2:1 leaching procedure (2 parts DI water: 1 part soil).

*Sulphide analyzed at AGAT 5623 McAdam

Sampling dates were not mentioned on COC.

Certified By: Amanjot Bhela

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
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Quality Assurance

CLIENT NAME: STANTEC CONSULTING LTD.

AGAT WORK ORDER: 17T272117

PROJECT: 122120255.500.200

ATTENTION TO: Nabeel Basheer

SAMPLING SITE:

SAMPLED BY:

Soil Analysis

RPT Date: Oct 21, 2017			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Corrosivity Package															
Sulfide (S2-)	8823326	8823326	<0.05	<0.05	NA	< 0.05	98%	80%	120%						
Chloride (2:1)	8823322	8823322	4	4	NA	< 2	108%	80%	120%	109%	80%	120%	109%	70%	130%
Sulphate (2:1)	8823322	8823322	20	21	4.9%	< 2	104%	80%	120%	107%	80%	120%	105%	70%	130%
pH (2:1)	8823322	8823322	8.14	8.09	0.6%	NA	101%	90%	110%	NA			NA		
Electrical Conductivity (2:1)	8823322	8823322	0.204	0.211	3.4%	< 0.005	97%	90%	110%	NA			NA		
Redox Potential (2:1)	8823322	8823322	130	131	0.8%	< 5	101%	70%	130%	NA			NA		

Comments: NA signifies Not Applicable.
Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By: Amanjot Bhela

AGAT Laboratories

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Method Summary

CLIENT NAME: STANTEC CONSULTING LTD.

AGAT WORK ORDER: 17T272117

PROJECT: 122120255.500.200

ATTENTION TO: Nabeel Basheer

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Sulfide (S2-)	MIN-200-12025	ASTM E1915-09	GRAVIMETRIC
Chloride (2:1)	INOR-93-6004	McKeague 4.12 & SM 4110 B	ION CHROMATOGRAPH
Sulphate (2:1)	INOR-93-6004	McKeague 4.12 & SM 4110 B	ION CHROMATOGRAPH
pH (2:1)	INOR 93-6031	MSA part 3 & SM 4500-H+ B	PH METER
Electrical Conductivity (2:1)	INOR-93-6036	McKeague 4.12, SM 2510 B	EC METER
Resistivity (2:1)	INOR-93-6036	McKeague 4.12, SM 2510 B,SSA #5 Part 3	CALCULATION
Redox Potential (2:1)		McKeague 4.12 & SM 2510 B	REDOX POTENTIAL ELECTRODE

17T272117

AGAT Laboratories

18x

5835 Coopers Avenue
Mississauga, Ontario
L4Z 1Y2
www.agatlabs.com · webearth.agatlabs.com
Ph.: 905.712.5100 · Fax: 905.712.5122 · Toll Free: 800.856.6261

Chain of Custody Record

Laboratory Use Only
Arrival Temperature:
AGAT WO #:
Lab Temperature: 8 6 7 9 8 4
Notes:

Client Information:

Company: Stantec Consulting Ltd.
Contact:
Address: 300-675 Cochran Drive West Tower
Phone: Fax: 905-944-9889
Project: 122120255 500 200 PO:
AGAT Quotation #:
Please note, if quotation number is not provided, client will be billed full price for analysis.

Regulatory Requirements:

☐ Regulation 153/09 (reg. 511 Amend.)
Table ____ Indicate one
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture (check one)
☐ Coarse ☐ Fine

☐ Sewer Use
Region ____ Indicate one
☐ Sanitary
☐ Storm

☐ Regulation 558
☐ CCME
☐ Other (specify)
☐ Prov. Water Quality Objectives (PWQO)
☐ None

Turnaround Time Required (TAT) Required*

Regular TAT
☑ 5 to 7 Working Days
Rush TAT (please provide prior notification)
Rush Surcharges Apply
☐ 3 Working Days
☐ 2 Working Days
☐ 1 Working Day
OR
Date Required (Rush surcharges may apply):
*TAT is exclusive of weekends and statutory holidays

Invoice To:

Same: Yes [✓] No [ ]
Company:
Contact:
Address:

Is this a drinking water sample? (potable water intended for human consumption) ☐ Yes ☐ No
If "Yes", please use the *Drinking Water Chain of Custody Form*

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Legend Matrix

GW Ground Water O Oil
SW Surface Water P Paint
SD Sediment S Soil

Report Information – reports to be sent to:

1. Name: Nabeel Basheer
   Email: nabeel.basheer@stantec.com
2. Name: Mollie Bowness
   Email: mollie bowness@stantec com

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments Site/Sample Information	Metals and Inorganics	Metal Scan	Hydride Forming Metals	Client Custom Metals	ORPs: ☐ B-HWS ☐ EC ☐ NO_3/NO_2 ☐ CN- ☐ F- ☐ FOC ☐ SAR ☐ N-Total ☐ Hg ☐ pH	Nutrients: ☐ TP ☐ NO_3 ☐ NH_3 ☐ NO_2 ☐ TKN ☐ NO_3/NO_2	VOC: ☐ VOC ☐ THM ☐ BTEX	CCME Fractions 1 to 4	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	TCLP:	Sewer Use	Corrosivity Pckg (pH, Redox Potential)	sulphates and sulphides contents,	chlorides contents and resistivity)
U2 SS-3				1	5'-7'																	X	
U4 BULK				1	FILL																	X	
R9 SS-3				1	5'-7'																	X	
R11 SS-2				1	2'6"-4'6"																	X	
B7 SS-3				1	5'-7'																	X	
R28 SS-4A				1	7'6"-9'6"																	X	
B2 BULK				1	FILL																	X	
B9 SS-2				1	2'6"-4'6"																	X	
B9 SS-4				1	7'6"-9'6"																	X	
B26 BULK				1	5'-10'																	X	
R18 SS-2				1	2'6"-4'6"																	X	

Samples Relinquished by (print name & sign):	Date/Time	Samples Received by (Print name & sign):	Date/Time
		Sina Z	17/10/16 945
Samples Relinquished by (print name & sign):	Date/Time	Samples Received by (Print name & sign):	Date/Time

Pink Copy – Client
Yellow + Golden Copy – AGAT
White Copy – AGAT

Page ____ of ____
NO:

Document ID: DIV 78 1511 006

Date Issued: July 20, 2011

APPENDIX E

Rock Core Photographs

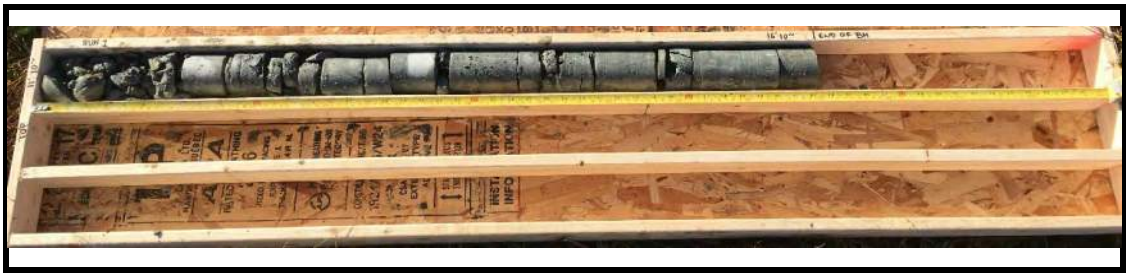
Project:	Development of 70 Mississauga Road South		
Project Number:	122120255		
Location:	70 Mississauga Road South, Mississauga		
Borehole:	BH17-027	**Depth (m):**	5.72 - 9.09

5.72m	RUN 1 →	RUN 2 → 7.39m
7.39m	RUN 2 →	RUN 3 → 8.61m
8.61m	RUN 3 →	9.09m

Project:	Development of 70 Mississauga Road South			
Project Number:	122120255			
Location:	70 Mississauga Road South, Mississauga			
Borehole:	BH17-028	**Depth (m):**	4.27 - 8.83	

4.27m	RUN 1	RUN 2	5.79m
5.79m	RUN 2	RUN 3	7.31m
7.31m	RUN 3	RUN 4	8.83m

Project:	Development of 70 Mississauga Road South			
Project Number:	122120255			
Location:	70 Mississauga Road South, Mississauga			
Borehole:	BH17-029	**Depth (m):**	3.61 - 5.13	



3.61m — RUN 1 — 5.13m

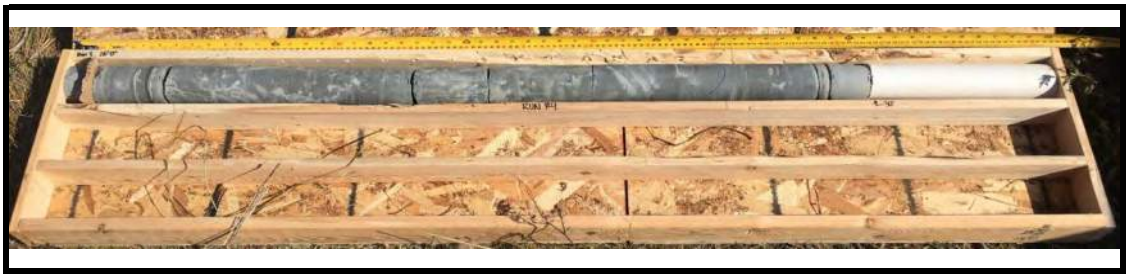
Project:	Development of 70 Mississauga Road South			
Project Number:	122120255			
Location:	70 Mississauga Road South, Mississauga			
Borehole:	BH17-030	**Depth (m):**	3.05 - 9.50	

3.05m	RUN 1 →	RUN 2	4.88m
4.88m	RUN 2 →	RUN 3	6.55m
6.55m	→	RUN 4	7.96m

7.69m	RUN 4 →	RUN 5 →	9.50m

Project:	Development of 70 Mississauga Road South			
Project Number:	122120255			
Location:	70 Mississauga Road South, Mississauga			
Borehole:	MW17-031-D	**Depth (m):**	3.45 - 9.14	

3.45m	RUN 1	4.82m
4.82m	RUN 2	6.40m
6.40m	RUN 3	7.92m



7.92m	RUN 4	9.14m

Project:	Development of 70 Mississauga Road South			
Project Number:	122120255			
Location:	70 Mississauga Road South, Mississauga			
Borehole:	MW17-032-D	**Depth (m):**	3.96 - 9.17	

3.96m	RUN 1	RUN 2	5.48m
5.48m	RUN 2	RUN 3	6.83m
6.83m	RUN 3	RUN 4	8.35m

8.35m	RUN 4		9.17m

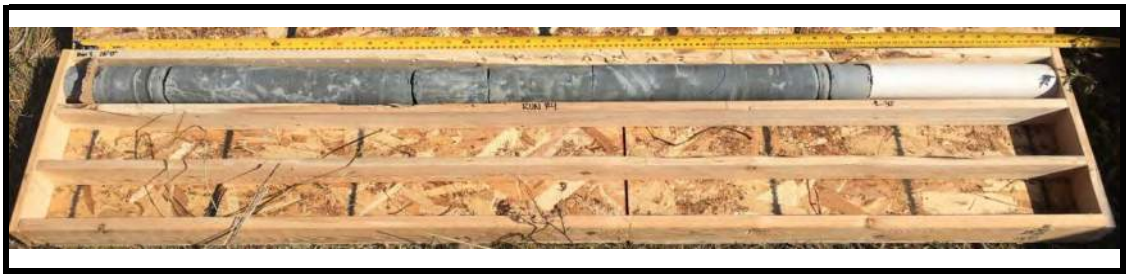
Project:	Development of 70 Mississauga Road South			
Project Number:	122120255			
Location:	70 Mississauga Road South, Mississauga			
Borehole:	BH17-033	**Depth (m):**	2.87 - 5.00	

2.87m — RUN 1 → | RUN 2 — 4.39m

4.39m — RUN 2 → | 5.00m

Project:	Development of 70 Mississauga Road South			
Project Number:	122120255			
Location:	70 Mississauga Road South, Mississauga			
Borehole:	MW17-031-D	**Depth (m):**	3.45 - 9.14	

3.45m	RUN 1	4.82m
4.82m	RUN 2	6.40m
6.40m	RUN 3	7.92m



7.92m	RUN 4	9.14m

Project:	Development of 70 Mississauga Road South		
Project Number:	122120255		
Location:	70 Mississauga Road South, Mississauga		
Borehole:	BH17-035	**Depth (m):**	2.74 - 12.70

2.74m	RUN 1 →	RUN 2 → 4.50m
4.50m	RUN 2 →	RUN 3 → 6.02m
6.02m	RUN 3 →	RUN 4 → 7.54m

7.54m	RUN 4 →	RUN 5 → 9.06m
9.06m	RUN 5 →	RUN 6 → 10.18m
10.18m	RUN 6 →	RUN 7 → 11.70m

11.70m	RUN 7 →	12.70m

Project:	Development of 70 Mississauga Road South			
Project Number:	122120255			
Location:	70 Mississauga Road South, Mississauga			
Borehole:	BH17-036	**Depth (m):**	2.92 - 5.18	

2.92 m — RUN 1 → 3.66 m

3.66 m — RUN 2 → 5.18 m

Project:	Development of 70 Mississauga Road South			
Project Number:	122120255			
Location:	70 Mississauga Road South, Mississauga			
Borehole:	BH17-037	**Depth (m):**	2.92 - 5.12	

2.92 m — RUN 1 → 3.58 m

3.58 m — RUN 2 → 5.12 m

Project:	Development of 70 Mississauga Road South			
Project Number:	122120255			
Location:	70 Mississauga Road South, Mississauga			
Borehole:	BH17-038	**Depth (m):**	2.95 - 5.18	

2.95m — RUN 1 → 3.66m

3.66m — RUN 2 → 5.18m

Project:	Development of 70 Mississauga Road South			
Project Number:	122120255			
Location:	70 Mississauga Road South, Mississauga			
Borehole:	BH17-039	**Depth (m):**	2.95 - 5.18	

2.95m — RUN 1 → 3.66m

3.66m — RUN 2 → 5.18m

Project:	Development of 70 Mississauga Road South			
Project Number:	122120255			
Location:	70 Mississauga Road South, Mississauga			
Borehole:	MW17-040-D	**Depth (m):**	5.94 - 9.22	

5.94m	RUN 1 →	6.35m
6.35m	RUN 2 →	7.87m
7.87m	RUN 3 →	9.22m

Project:	Development of 70 Mississauga Road South			
Project Number:	122120255			
Location:	70 Mississauga Road South, Mississauga			
Borehole:	BH17-041	**Depth (m):**	3.00 - 5.13	

3.00m — RUN 1 → 3.66m

3.66m — RUN 2 → 5.13m

Project:	Development of 70 Mississauga Road South			
Project Number:	122120255			
Location:	70 Mississauga Road South, Mississauga			
Borehole:	BH17-042	**Depth (m):**	3.05 - 8.08	

3.05m	RUN 1 →	RUN 2 →	4.85m
4.85m	RUN 2 →	RUN 3 →	6.35m
6.35m	RUN 3 →	RUN 4 →	8.08m

Project:	Development of 70 Mississauga Road South			
Project Number:	122120255			
Location:	70 Mississauga Road South, Mississauga			
Borehole:	BH17-043	**Depth (m):**	2.90 - 5.05	

2.90m	RUN 1 →	→ RUN 2 → 4.37m
4.85m	RUN 2 →	5.05m

Project:	Development of 70 Mississauga Road South			
Project Number:	122120255			
Location:	70 Mississauga Road South, Mississauga			
Borehole:	MW17-044-D	**Depth (m):**	3.96 - 7.03	

3.96m	RUN 1 →	RUN 2 →	5.56m
5.56m	RUN 2 →	RUN 3 →	7.03m

Project:	Development of 70 Mississauga Road South		
Project Number:	122120255		
Location:	70 Mississauga Road South, Mississauga		
Borehole:	MW17-045-D	**Depth (m):**	13.72 - 17.04

13.72m	RUN 1	15.39m
15.39m	RUN 2	17.04m

Project:	Development of 70 Mississauga Road South			
Project Number:	122120255			
Location:	70 Mississauga Road South, Mississauga			
Borehole:	MW17-046-D	**Depth (m):**	3.40 - 6.10	

3.40m — RUN 1 → 4.72m

4.72m — RUN 2 → 6.10m

Project:	Development of 70 Mississauga Road South			
Project Number:	122120255			
Location:	70 Mississauga Road South, Mississauga			
Borehole:	BH17-047	**Depth (m):**	2.08 - 5.18	

2.08m	RUN 1 →	3.61m
3.61m	RUN 2 →	5.13m
5.13m	RUN2	5.18m

Project:	Development of 70 Mississauga Road South			
Project Number:	122120255			
Location:	70 Mississauga Road South, Mississauga			
Borehole:	BH17-049	**Depth (m):**	3.05 - 5.13	

3.05m RUN 1 → RUN 2 → 5.13m

Project:	Development of 70 Mississauga Road South			
Project Number:	122120255			
Location:	70 Mississauga Road South, Mississauga			
Borehole:	BH17-050	**Depth (m):**	3.12 - 5.05	

3.12 m — RUN 1 → | RUN 2 → — 5.05 m

Project:	Development of 70 Mississauga Road South		
Project Number:	122120255		
Location:	70 Mississauga Road South, Mississauga		
Borehole:	BH17-051	**Depth (m):**	2.80 - 14.23

2.80 m	RUN 1	RUN 2	4.37 m
4.37 m	RUN 2	RUN 3	6.02 m
6.02 m	RUN 3	RUN 4	7.47 m

7.47 m	RUN 4	RUN 5	8.97 m
8.97 m	RUN 5	RUN 6	10.26m
10.26 m	RUN 6	RUN 7	11.76m

11.76 m	RUN 7	RUN 8	13.16m
13.16m	RUN 8		14.23m

Project:	Development of 70 Mississauga Road South		
Project Number:	122120255		
Location:	70 Mississauga Road South, Mississauga		
Borehole:	BH17-052	**Depth (m):**	4.27 - 8.10

4.27 m	RUN 1 →	RUN 2 →	6.02 m
4.37 m	RUN 2 →	RUN 3 →	7.58 m
7.58 m	RUN 3 →		8.10 m

Project:	Development of 70 Mississauga Road South			
Project Number:	122120255			
Location:	70 Mississauga Road South, Mississauga			
Borehole:	BH17-053	**Depth (m):**	2.90 - 8.23	

2.90 m	RUN 1	RUN 2	4.72 m
4.72 m	RUN 2	RUN 3	6.17 m
6.17 m	RUN 3	RUN 4	7.77 m

7.77 m	RUN 4		8.23 m

Project:	Development of 70 Mississauga Road South			
Project Number:	122120255			
Location:	70 Mississauga Road South, Mississauga			
Borehole:	BH17-054	**Depth (m):**	3.05 - 8.21	

3.05 m	RUN 1 →	RUN 2 →	4.44 m
4.44 m	RUN 2 →	RUN 3 →	6.12 m
6.12 m	RUN 3 →	RUN 4 →	7.62 m

7.62 m	RUN 4 →	8.21 m

Project:	Development of 70 Mississauga Road South			
Project Number:	122120255			
Location:	70 Mississauga Road South, Mississauga			
Borehole:	MW17-055-D	**Depth (m):**	5.94 - 10.67	

5.94 m	RUN 1 →	6.40 m
6.40 m	RUN 2 →	7.62 m

7.62 m	RUN 3 →	9.02 m
9.02 m	RUN 3 → RUN 4 →	10.46m
10.46 m	RUN 4	10.67m

Project:	Development of 70 Mississauga Road South			
Project Number:	122120255			
Location:	70 Mississauga Road South, Mississauga			
Borehole:	MW17-073-D	**Depth (m):**	6.10 - 9.37	

6.10 m	RUN 1 →	6.38 m
6.38 m	RUN 2 →	7.87 m
7.87 m	RUN 3 →	9.37 m

Project:	Development of 70 Mississauga Road South			
Project Number:	122120255			
Location:	70 Mississauga Road South, Mississauga			
Borehole:	MW17-075-D	**Depth (m):**	6.10 - 9.37	

7.39 m	RUN 1 →	RUN 2 →	8.76 m
8.76 m	RUN 2 →	RUN 3 →	10.24m
10.24m	RUN 3		10.67m

APPENDIX F

Seismic Hazard Calculation Data Sheet

2015 National Building Code Seismic Hazard Calculation

INFORMATION: Eastern Canada English (613) 995-5548 français (613) 995-0600 Facsimile (613) 992-8836
Western Canada English (250) 363-6500 Facsimile (250) 363-6565

November 22, 2017

Site: 43.545 N, 79.5877 W User File Reference: 70 Mississauga Road South

Requested by: , Stantec Consulting Ltd.

National Building Code ground motions: 2% probability of exceedance in 50 years (0.000404 per annum)

Sa(0.05)	Sa(0.1)	**Sa(0.2)**	Sa(0.3)	**Sa(0.5)**	**Sa(1.0)**	**Sa(2.0)**	**Sa(5.0)**	**Sa(10.0)**	**PGA (g)**	**PGV (m/s)**
0.254	0.303	**0.250**	0.185	**0.126**	**0.062**	**0.029**	**0.0069**	**0.0028**	**0.161**	**0.100**

Notes. Spectral (Sa(T), where T is the period in seconds) and peak ground acceleration (PGA) values are given in units of g (9.81 m/s^2). Peak ground velocity is given in m/s. Values are for "firm ground" (NBCC 2015 Site Class C, average shear wave velocity 450 m/s). NBCC2015 and CSAS6-14 values are specified in **bold** font. Three additional periods are provided - their use is discussed in the NBCC2015 Commentary. Only 2 significant figures are to be used. ***These values have been interpolated from a 10-km-spaced grid of points. Depending on the gradient of the nearby points, values at this location calculated directly from the hazard program may vary. More than 95 percent of interpolated values are within 2 percent of the directly calculated values.***

Ground motions for other probabilities:

Probability of exceedance per annum	0.010	0.0021	0.001
Probability of exceedance in 50 years	40%	10%	5%
Sa(0.05)	0.012	0.061	0.121
Sa(0.1)	0.018	0.082	0.152
Sa(0.2)	0.020	0.073	0.130
Sa(0.3)	0.018	0.058	0.099
Sa(0.5)	0.014	0.043	0.071
Sa(1.0)	0.0067	0.024	0.037
Sa(2.0)	0.0028	0.011	0.017
Sa(5.0)	0.0006	0.0024	0.0040
Sa(10.0)	0.0004	0.0010	0.0016
PGA	0.010	0.044	0.082
PGV	0.0083	0.032	0.054

References

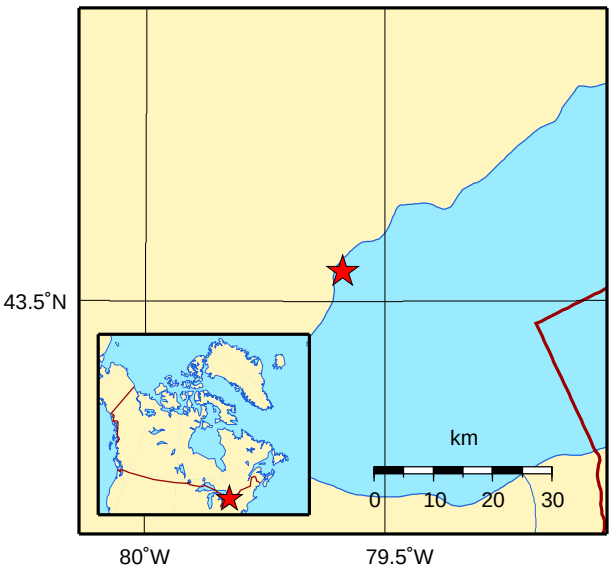
National Building Code of Canada 2015 NRCC no. 56190;
Appendix C: Table C-3, Seismic Design Data for Selected Locations in Canada

User's Guide - NBC 2015, Structural Commentaries NRCC no. xxxxxx (in preparation)
Commentary J: Design for Seismic Effects

Geological Survey of Canada Open File 7893 Fifth Generation Seismic Hazard Model for Canada: Grid values of mean hazard to be used with the 2015 National Building Code of Canada

See the websites *www.EarthquakesCanada.ca* and *www.nationalcodes.ca* for more information

Aussi disponible en français



Natural Resources Canada Ressources naturelles Canada

Canada

- *Sanitary Sewer Design Sheets*
- *Population Estimates by Block*
- *Port Street Preliminary Profile - Proposed 450 mm Sanitary Sewer*

APPENDIX B

Sanitary Sewer Design Calculations

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SANITARY SEWER DESIGN SHEET

Port Credit

CITY OF MISSISSAUGA, REGION OF PEEL

PROJECT DETAILS

Project No: 16-489
Date: 1-Mar-18
Designed by: N.S.
Checked by: R.B.T.M.

DESIGN CRITERIA

Min. Flow =	13	l/s		
Min Diameter =	250	mm	Avg. Domestic Flow =	302.8 l/c/d
Mannings 'n'=	0.013		Infiltration =	0.200 l/s/ha
Min. Velocity =	0.75	m/s	Max. Peaking Factor =	4.00
Max. Velocity =	3.50	m/s	Min. Peaking Factor=	1.50
			Domestic Sewage flow for < 1000 ppl = 0.013m^3/s	
Factor of Safety =	40	%	(Region of Peel Std. 2-5-2)	

NOMINAL PIPE SIZE USED

STREET	FROM MH	TO MH	RESIDENTIAL							COMMERCIAL/INDUSTRIAL/INSTITUTIONAL						FLOW CALCULATIONS								PIPE DATA					
			AREA (ha)	ACC. AREA (ha)	UNITS (#)	DENISTY (P/ha)	DENSITY (P/unit)	POP	ACCUM. RES. POP.	AREA (ha)	ACC. AREA (ha)	EQUIV. POP. (p/ha)	FLOW RATE (l/s/ha)	EQUIV. POP.	ACCUM. EQUIV. POP.	INFILTRATION (l/s)	TOTAL ACCUM. POP.	PEAKING FACTOR	RES. FLOW (l/s)	MIN. RES. FLOW (l/s)	COMM. FLOW (l/s)	ACCUM. COMM. FLOW (l/s)	TOTAL FLOW (l/s)	SLOPE (%)	PIPE DIAMETER (mm)	FULL FLOW CAPACITY (l/s)	FULL FLOW VELOCITY (m/s)	ACTUAL VELOCITY (m/s)	PERCENT FULL (%)
	BLOCK A	100A	0.45	0.45		175		79	79							0.1	79	4.00	1.1	13.0			13.1		250				
	100A	313		0.45					79							0.1	79	4.00	1.1	13.0			13.1	0.50	250	42.0	0.86	0.75	31%
	313	314		0.45					79							0.1	79	4.00	1.1	13.0			13.1	0.50	250	42.0	0.86	0.75	31%
	314	3A	0.47	0.92					79							0.2	79	4.00	1.1	13.0			13.2	0.50	250	42.0	0.86	0.75	31%
	BLOCK F	3A	0.64	0.64		175		112	112							0.1	112	4.00	1.6	13.0			13.1		250				
	3A	4A	0.13	1.69					191							0.3	191	4.00	2.7	13.0			13.3	0.50	250	42.0	0.86	0.75	32%
	17A	16A	0.59	0.59												0.1							0.1	0.50	250	42.0	0.86	0.22	0%
	BLOCK I	9A	2.50	2.50		175		438	438							0.5	438	4.00	6.1	13.0			13.5		250				
	BLOCK O	9A	2.29	2.29				574	574							0.5	574	3.94	7.9	13.0			13.5		250				
	9A	16A		4.79					1012							1.0	1012	3.80	13.5	13.5			14.4	0.50	250	42.0	0.86	0.75	34%
	16A	18A	0.27	5.65					1012							1.1	1012	3.80	13.5	13.5			14.6	0.50	250	42.0	0.86	0.77	35%
	18A	4A		5.65					1012							1.1	1012	3.80	13.5	13.5			14.6	0.50	250	42.0	0.86	0.77	35%
	4A	19A	0.19	7.53					1203							1.5	1203	3.75	15.8	15.8			17.3	0.35	250	35.2	0.72	0.69	49%
	BLOCK G	19A	0.42	0.42				431	431							0.1	431	4.00	6.0	13.0			13.1		250				
	19A	20A		7.95					1634							1.6	1634	3.65	20.9	20.9			22.5	0.35	250	35.2	0.72	0.74	64%
	BLOCK B	29A	0.81	0.81				411	411							0.2	411	4.00	5.8	13.0			13.2		250				
	BLOCK C1	29A	1.00	1.00		50		50	50							0.2	50	4.00	0.7	13.0			13.2		250				
	29A	30A	0.27	2.08					461							0.4	461	3.99	6.4	13.0			13.4	1.00	250	59.5	1.21	0.96	23%
	30A	20A	0.13	2.21					461							0.4	461	3.99	6.4	13.0			13.4	0.50	250	42.0	0.86	0.75	32%
	BLOCK U	21A	2.54	2.54				1379	1379							0.5	1379	3.71	17.9	17.9			18.4		250				
	BLOCK Q1	21A	0.73	0.73				524	524							0.1	524	3.96	7.3	13.0			13.1		250				
	21A	22A	0.33	3.60					1903							0.7	1903	3.60	24.0	24.0			24.7	0.50	250	42.0	0.86	0.87	59%
	22A	23A	0.28	3.88					1903							0.8	1903	3.60	24.0	24.0			24.8	0.50	250	42.0	0.86	0.87	59%
	BLOCK P	23A	1.34	1.34				1758	1758							0.3	1758	3.63	22.4	22.4			22.6		250				
	23A	24A	0.25	5.47					3661							1.1	3661	3.37	43.2	43.2			44.3	0.50	300	68.4	0.97	1.02	65%
	24A	28A	0.50	5.97					3661							1.2	3661	3.37	43.2	43.2			44.4	0.50	300	68.4	0.97	1.02	65%
	BLOCK K	28A	1.21	1.21				1439	1439							0.2	1439	3.69	18.6	18.6			18.9		250				
	28A	20A		7.18					5100							1.4	5100	3.24	57.9	57.9			59.3	0.50	375	124.0	1.12	1.08	48%
	20A	31A		17.34					7195							3.5	7195	3.10	78.0	78.0			81.5	0.35	450	168.7	1.06	1.02	48%
	BLOCK L	33A	1.48	1.48		175		259	259							0.3	259	4.00	3.6	13.0			13.3		250				
	33A	31A		1.48					259							0.3	259	4.00	3.6	13.0			13.3	0.50	250	42.0	0.86	0.75	32%
	BLOCK H	31A	0.62	0.62				658	658							0.1	658	3.91	9.0	13.0			13.1		250				
	31A	34A	0.29	19.73					8112							3.9	8112	3.04	86.5	86.5			90.5	0.35	450	168.7	1.06	1.05	54%
	BLOCK R	38A	0.41	0.41				86	86							0.1	86	4.00	1.2	13.0			13.1		250				
	38A	37A	0.43	0.84					86							0.2	86	4.00	1.2	13.0			13.2	0.50	250	42.0	0.86	0.75	31%
	BLOCK Q2	35A	0.71	0.71		175		125	125							0.1	125	4.00	1.8	13.0			13.1		250				
	35A	36A		0.71					125							0.1	125	4.00	1.8	13.0			13.1	0.50	250	42.0	0.86	0.75	31%
	36A	37A		0.71					125							0.1	125	4.00	1.8	13.0			13.1	0.50	250	42.0	0.86	0.75	31%
	37A	39A		1.55					211							0.3	211	4.00	3.0	13.0			13.3	0.50	250	42.0	0.86	0.75	32%
	39A	34A		1.55					211							0.3	211	4.00	3.0	13.0			13.3	0.50	250	42.0	0.86	0.75	32%
	34A	40A		21.28					8323							4.3	8323	3.03	88.5	88.5			92.7	0.35	450	168.7	1.06	1.07	55%
	40A	41A	0.23	21.51					8323							4.3	8323	3.03	88.5	88.5			92.8	0.35	450	168.7	1.06	1.07	55%
	BLOCK D	41A	0.33	0.33	36			97	97							0.1	97	4.00	1.4	13.0			13.1		250				
	BLOCK M	41A	0.91	0.91	78			211	211							0.2	211	4.00	3.0	13.0			13.2		250				
	41A	42A		22.75					8631							4.6	8631	3.02	91.3	91.3			95.8	0.35	450	168.7	1.06	1.07	57%
	BLOCK C2	420A	0.96	0.96		50		48	48							0.2	48	4.00	0.7	13.0			13.2		250				
	420A	42A		0.96					48							0.2	48	4.00	0.7	13.0			13.2	1.00	250	59.5	1.21	0.96	22%
	42A	43A		23.71					8679							4.7	8679	3.02	91.7	91.7			96.5	0.35	450	168.7	1.06	1.07	57%
	43A	44A		23.71					8679							4.7	8679	3.02	91.7	91.7			96.5	0.35	450	168.7	1.06	1.07	57%
	44A	45A		23.71					8679							4.7	8679	3.02	91.7	91.7			96.5	0.35	450	168.7	1.06	1.07	57%
	45A	46A		23.71					8679							4.7	8679	3.02	91.7	91.7			96.5	0.35	450	168.7	1.06	1.07	57%
PUMP STN	46A	73C		23.71					8679							4.7	8679	3.02	91.7	91.7			96.5	0.35	450	168.7	1.06	1.07	57%

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Project Details
Project No: **16-489**
Date: **01-Mar-18**

Port Credit West Village Population Projections*
By Unit Count

Block A	15 Towns				
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)				0.09	
Units	15.00				
Population	40.50		0.00	4.50	45.00

Block B	2st+8st				
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)				0.55	
Units			142.00		
Population	0.00		383.40	27.50	411.00

Block C1	Commercial				
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)				1.00	
Units					
Population	0.00		0.00	50.00	50.00

Block C2	Commercial				
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)				0.96	
Units					
Population	0.00		0.00	48.00	48.00

Block D	Stcks&Backs				
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units		36.00			
Population	0.00	97.20	0.00	0.00	97.00

Block E	Trail and Park				
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units		0.00			
Population	0.00	0.00	0.00	0.00	0.00

Block F					
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units	29.00				
Population	78.30		0.00	0.00	78.00

Block G	8st				
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)				0.08	
Units			158.00		
Population	0.00	0.00	426.60	4.00	431.00

Block H	8st x 2				
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)				0.10	
Units			242.00		
Population	0.00	0.00	653.40	5.00	658.00

Port Credit West Village Population Projections*
By Regional Standards

Block A					
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)	0.45				
Units					
Population	78.75		0.00	0.00	79.00

Block B					
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)			0.81		
Units					
Population			384.75	0.00	385.00

Block C1					
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)				1.00	
Units					
Population	0.00		0.00	50.00	50.00

Block C2					
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)				0.96	
Units					
Population	0.00		0.00	48.00	48.00

Block D					
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)		0.33			
Units					
Population	0.00	57.75	0.00	0.00	58.00

Block E	Trail and Park				
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units		0.00			
Population	0.00	0.00	0.00	0.00	0.00

Block F					
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)	0.64				
Units					
Population	112.00		0.00	0.00	112.00

Block G	8st				
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)			0.42		
Units					
Population	0.00	0.00	201.78	0.00	202.00

Block H	8st x 2				
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)			0.62		
Units					
Population	0.00	0.00	294.50	0.00	295.00

Port Credit West Village Population Projections*
Finalized Population Estimation

Block A					
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)	0.45				
Units					
Population	78.75		0.00	0.00	79.00

Block B	2st+8st				
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)				0.55	
Units			142.00		
Population	0.00		383.40	27.50	411.00

Block C1					
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)				1.00	
Units					
Population	0.00		0.00	50.00	50.00

Block C2					
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)				0.96	
Units					
Population	0.00		0.00	48.00	48.00

Block D	Stcks&Backs				
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units		36.00			
Population	0.00	97.20	0.00	0.00	97.00

Block E	Trail and Park				
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units		0.00			
Population	0.00	0.00	0.00	0.00	0.00

Block F					
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)	0.64				
Units					
Population	112.00		0.00	0.00	112.00

Block G	8st				
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)				0.08	
Units			158.00		
Population	0.00	0.00	426.60	4.00	431.00

Block H	8st x 2				
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)				0.10	
Units			242.00		
Population	0.00	0.00	653.40	5.00	658.00

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Block I

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units	104.00				
Population	280.80	0.00	0.00	0.00	281.00

Block J - Park

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units					
Population	0.00	0.00	0.00	0.00	0.00

Block K 18st x 2 + towns

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units	19.00		514.00		
Population	51.30	0.00	1387.80	0.00	1439.00

Block L

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units	74.00				
Population	199.80	0.00	0.00	0.00	200.00

Block M

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units		78.00			
Population	0.00	210.60	0.00	0.00	211.00

Block N - Park

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units					
Population	0.00	0.00	0.00	0.00	0.00

Block O

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units	65.00		131.00		
Population	175.50	0.00	353.70	0.00	529.00

Block P 22st, 22st, 26st

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units			651.00		
Population	0.00	0.00	1757.70	0.00	1758.00

Block Q1

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units	18.00		176.00		
Population	48.60	0.00	475.20	0.00	524.00

Block Q2

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units	35.00				
Population	94.50	0.00	0.00	0.00	95.00

Block I

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)	2.50				
Units					
Population	437.50	0.00	0.00	0.00	438.00

Block J - Park

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units					
Population	0.00	0.00	0.00	0.00	0.00

Block K 18st x 2

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)	1.21				
Units					
Population	574.75	0.00	0.00	0.00	575.00

Block L

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)	1.48				
Units					
Population	259.00	0.00	0.00	0.00	259.00

Block M

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)		0.91			
Units					
Population	0.00	159.34	0.00	0.00	159.00

Block N - Park

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units					
Population	0.00	0.00	0.00	0.00	0.00

Block O

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)	1.71		0.58		
Units					
Population	299.83	0.00	273.89	0.00	574.00

Block P 22st, 22st, 26st

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)			1.34		
Units					
Population	0.00	0.00	637.02	0.00	637.00

Block Q1 22st, towns

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)	0.34		0.39		
Units					
Population	59.57	0.00	185.25	0.00	245.00

Block Q2

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)	0.71				
Units					
Population	124.25	0.00	0.00	0.00	124.00

Block I

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)	2.50				
Units					
Population	437.50	0.00	0.00	0.00	438.00

Block J - Park

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units					
Population	0.00	0.00	0.00	0.00	0.00

Block K 18st x 2 + towns

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units	19.00		514.00		
Population	51.30	0.00	1387.80	0.00	1439.00

Block L

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)	1.48				
Units					
Population	259.00	0.00	0.00	0.00	259.00

Block M

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units		78.00			
Population	0.00	210.60	0.00	0.00	211.00

Block N - Park

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units					
Population	0.00	0.00	0.00	0.00	0.00

Block O

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)	1.7133		0.5766		
Units					
Population	299.8275	0	273.885	0	574

Block P 22st, 22st, 26st

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units			651		
Population	0	0	1757.7	0	1758

Block Q1

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units	18		176		
Population	48.6	0	475.2	0	524

Block Q2

	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)	0.71				
Units					
Population	124.25	0	0	0	124

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Block R					
	Towns	Semis	Apartments	Commercial/Retail	Total
Area (ha)					
Units		32.00			
Population	0.00	86.40	0.00	0.00	86.00

Block S - Park					
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units					
Population	0.00	0.00	0.00	0.00	0.00

Block T	Campus 12st				
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units			96.00	0.68	
Population	0.00	0.00	259.20	34.00	293.00

Block U	12st, 15st, 12st, YMCA				
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)				1.38	
Units			355.00		
Population	0.00		958.50	69.00	1028.00

Block R					
	Towns	Semis	Apartments	Commercial/Retail	Total
Area (ha)		0.41			
Units					
Population	0.00	28.70	0.00	0.00	29.00

Block S - Park					
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units					
Population	0.00	0.00	0.00	0.00	0.00

Block T	Campus 12st				
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)			0.37		
Units				0.43	
Population	0.00	0.00	175.75	21.50	197.00

Block U	12st, 15st, 12st, YMCA				
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)			2.14	1.38	
Units					
Population	0.00		1016.50	69.00	1086.00

Block R					
	Towns	Semis	Apartments	Commercial/Retail	Total
Area (ha)					
Units		32			
Population	0	86.4	0	0	86

Block S - Park					
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units					
Population	0	0	0	0	0

Block T	Campus 12st				
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)					
Units			96	0.68	
Population	0	0	259.2	34	293

Block U	12st, 15st, 12st, YMCA				
	Towns	Stks &Backs	Apartments	Commercial/Retail	Total
Area (ha)			2.14	1.38	
Units					
Population	0		1016.5	69	1086

Total: 8678

* Based on Site Statistics received from Giannone Petricone Associates on 28-Feb-18

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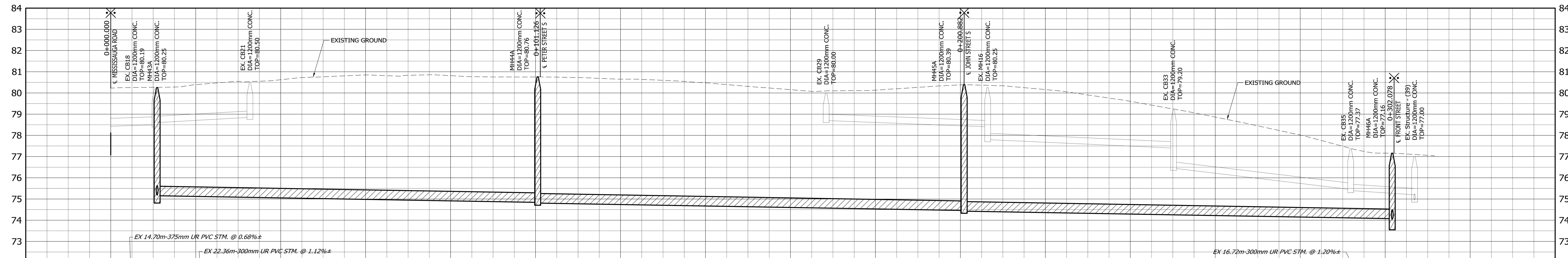
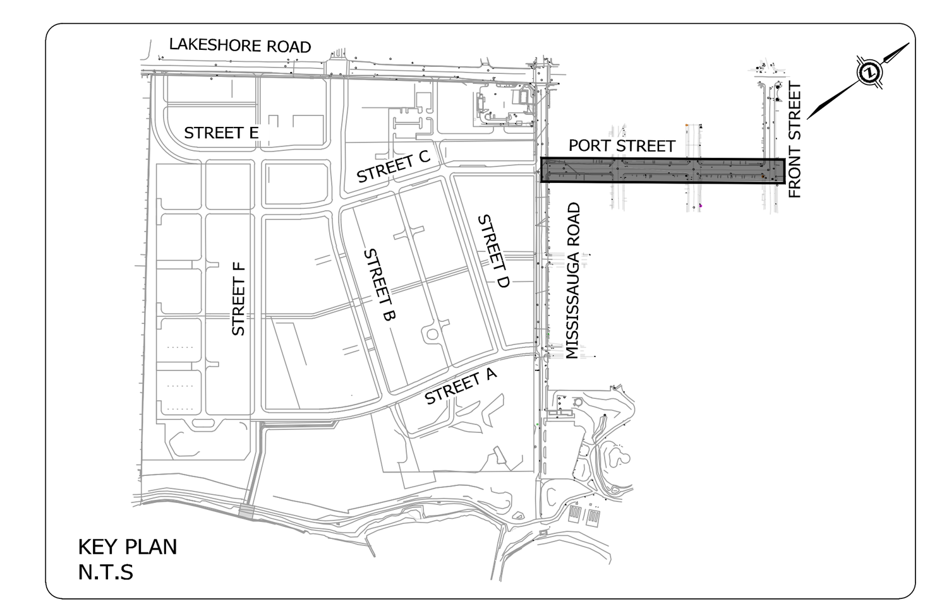


SANITARY SEWER INVERT	SW75.183 / NE75.153; 89.58m-450mm PVC SAN. PVC @ 0.35% (CLASS 'B' BEDDING PER R.S.D. 2-3-1); SW74.839 / NE74.809; 100.38m-450mm PVC SAN. PVC @ 0.35% (CLASS 'B' BEDDING PER R.S.D. 2-3-1); NE74.428 / SW74.458; 100.77m-450mm PVC SAN. PVC @ 0.35% (CLASS 'B' BEDDING PER R.S.D. 2-3-1); SW74.075 / NW74.045
EX.STORM SEWER INVERT	NE78.600± / SW78.500±; SW78.850±; NE78.700±; EX 38.00m-300mm UR PVC STM. @ 0.79%±; SW78.400± / NE77.800±; EX 43.79m-300mm UR PVC STM. @ 0.91%±; SW77.400± / NE76.450±; EX 41.69m-300mm UR PVC STM. @ 2.40%±; SW75.450± / N75.400±; SE74.950±

PROPOSED/EXISTING CENTERLINE ELEVATION	CENTERLINE CHAINAGE
	0+020
80.232 / 80.232	0+000
80.390 / 80.390	0+020
80.623 / 80.623	0+040
80.849 / 80.849	0+060
80.815 / 80.815	0+080
80.751 / 80.751	0+100
80.650 / 80.650	0+120
80.477 / 80.477	0+140
80.155 / 80.155	0+160
80.132 / 80.132	0+180
80.382 / 80.382	0+200
80.159 / 80.159	0+220
79.606 / 79.606	0+240
78.862 / 78.862	0+260
78.016 / 78.016	0+280
77.163 / 77.163	0+300
	0+320
	0+340



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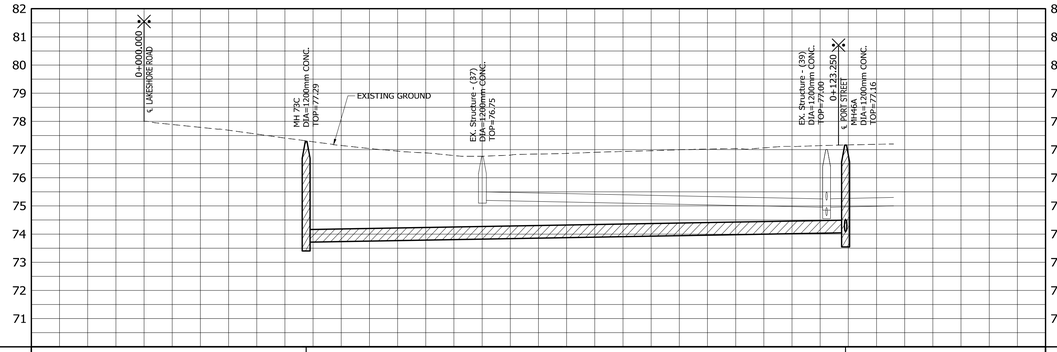
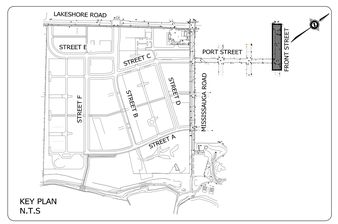
WEST VILLAGE PARTNERS
CITY OF MISSISSAUGA

PORT STREET PROFILE
(EAST OF MISSISSAUGA ROAD)

PROJECT No.	DATE	SCALE	DWG No.
16-489	MAR 2017	H=1:500 V=1:100	407



SANITARY SEWER INVERT			SE73.710	95.75m-450mm PVC SAN. PVC @ 0.35% (CLASS 'B' BEDDING PER R.S.D. 2-3-1)			SW74.075 NW74.045	*EX 67.00m-300mm UR PVC STM. @ 0.45%±*	SANITARY SEWER INVERT
EX.STORM SEWER INVERT			SE75.200±	*EX 61.09m-300mm UR PVC STM. @ 0.41%±*			S75.200± NE74.650± NW74.650±		EX.STORM SEWER INVERT
PROPOSED/EXISTING CENTERLINE ELEVATION		*78.089* 78.000	*77.550* 77.550	*77.039* 77.039	*76.763* 76.763	*76.902* 76.902	*77.019* 77.019	*77.189* 77.139		PROPOSED/EXISTING CENTERLINE ELEVATION
CENTERLINE CHAINAGE	0+020	0+000	0+020	0+040	0+060	0+080	0+100	0+120	0+140	0+160	CENTERLINE CHAINAGE



KEY PLAN
N.T.S

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WEST VILLAGE PARTNERS
CITY OF MISSISSAUGA

FRONT STREET PROFILE

PROJECT No.	DATE	SCALE	DWG No.
16-489	MAR 2017	H=1:500 V=1:100	408

- *Hydraulic Modelling Analysis – Imperial Oil, Region of Peel (March 7th, 2018)*

APPENDIX C

Hydraulic Modelling Analysis (AECOM)

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	Urbantech	Page	11
CC			
Subject	Hydraulic Modelling Analysis – Imperial Oil, Region of Peel		
From	Benny Wan, P.Eng., Sogol Bandehali (EIT)		
Date	March 7, 2018	Project Number	60538792

INTRODUCTION

AECOM was retained to perform hydraulic analysis for determining the water infrastructure requirements for providing sustainable water service to the development located at the southwest corner of Mississauga Road and Lakeshore Drive West under the desired growth conditions. The purpose of this report is to summarize the findings of this analysis and confirm that the planning area may be serviced through the existing and future watermains, the sizing of the proposed watermains within the development and there are no significant off-site constraints, which may prohibit development.

Imperial Oil development includes 2,969 residential units and net site area of about 193,149 m^2 (19 ha) located at the southwest corner of Mississauga Road and Lakeshore Drive West, Region of Peel. Figure 1 shows the location of the study area.

Figure 1 - Study Area

MODELLING PARAMETERS, CRITERIA, AND ASSUMPTIONS

AECOM received the necessary information provided by Urbantech on July 31, 2017. After a thorough review of the Peel water model and the information provided by Urbantech, the following subsections detailed the design criteria and the modelling methodology used for this analysis for requested design year of 2021, 2026, 2027 and 2041.

Connection to Existing Network

Based on the information provided, it was identified that the subdivision will obtain water service from the existing 300 mm watermain connecting to 150 mm watermain on Mississauga Road and Lake from east side of the development and to 300 mm watermain on Lakeshore Drive West from north side of the development. 300 mm watermain is used to simulate this development and the adequacy of this size can be confirmed under different condition such as fireflow.

The layout within the development is shown in Figure **2** based on topographical drawings provided by Urbantech. The modelling junctions that represented the Imperial Oil development are also shown in Figure **2**. The elevation for these junctions was updated in the hydraulic model based on the topology drawing.

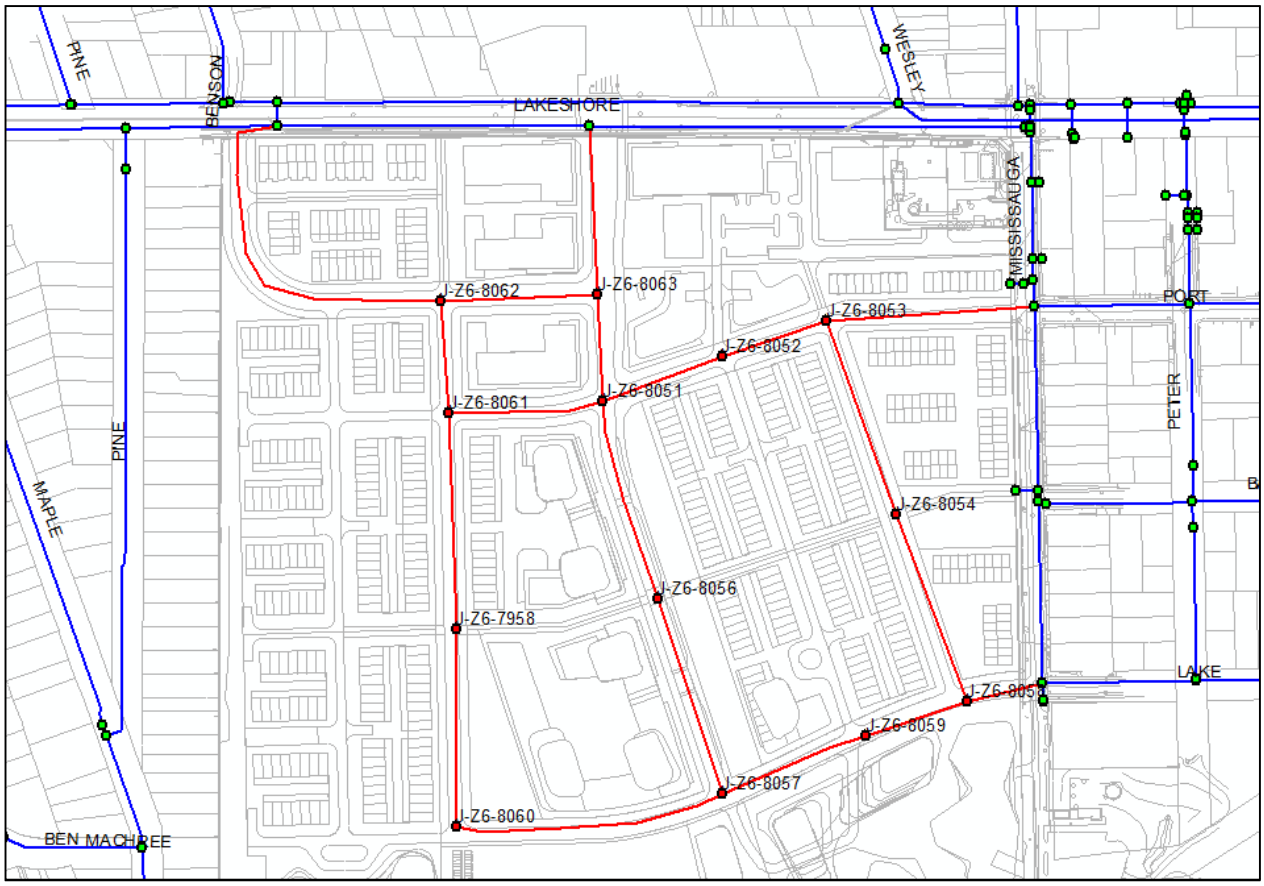

Figure 2 - Pipe Network in the study area

Design Criteria

The following design criteria and population information were used for the analysis.

Table 1 Region of Peel Masterplan Design Criteria

Criteria	Residential Population	Employment Force
Average Day Demand (ADD)(L/cap.day)	270	250
Maximum Day Factor (MDF)	1.8	1.4
Peak Hour Factor (PHF)	3	3

Table 2 Imperial Oil Population based on phasing

Design Year	Total Population
2021	2204
2026	8753
2027	9248

Water Demand

The total area of development is 19 ha; this is divided in 77% residential and 23% employment according to the master site plan drawing. The demand was calculated based on the population, which varied for each design year, and residential vs employment ratio. Subsequently, the demand was allocated to the assumed modelling junctions. Table 3 summarizes the estimated population growth for the proposed development and Tables 4 to 7 present the calculated water demands for each development phasing.

Table 3 Population Summary

Design Year	Residential Population	Employment Population	Total Equivalent Population
2021	1692	512	2204
2026	6720	2033	8753
2027	7100	2148	9248
2041	7100	2148	9248

Table 4 Demand Allocation for 2021

2021			
	Residential Demand(L/s)	Employment Demand(L/s)	Total Demand(L/s)
Average Day Demand (ADD) (L/s)	5.3	1.5	6.8
Maximum Day Demand (MDD) (L/s)	9.5	2.1	11.6
Peak Hour Demand (PHD) (L/s)	15.9	4.4	20.3

Table 5 Demand Allocation for 2026

2026			
	Residential Demand(L/s)	Employment Demand(L/s)	Total Demand(L/s)
Average Day Demand (ADD) (L/s)	21.0	5.9	26.9
Maximum Day Demand (MDD) (L/s)	37.8	8.2	46.0
Peak Hour Demand (PHD) (L/s)	63.0	17.6	80.6

Table 6 Demand Allocation for 2027

2027			
	Residential Demand(L/s)	Employment Demand(L/s)	Total Demand(L/s)
Average Day Demand (ADD) (L/s)	22.2	6.2	28.4
Maximum Day Demand (MDD) (L/s)	39.9	8.7	48.6
Peak Hour Demand (PHD) (L/s)	66.6	18.6	85.2

Table 7 Demand Allocation for 2041

2041			
	Residential Demand(L/s)	Employment Demand(L/s)	Total Demand(L/s)
Average Day Demand (ADD) (L/s)	22.2	6.2	28.4
Maximum Day Demand (MDD) (L/s)	39.9	8.7	48.6
Peak Hour Demand (PHD) (L/s)	66.6	18.6	85.2

*The same demands calculated for 2027MDD within the development area was added to 2041MDD scenario which included the Region of Peel demands for the rest of the Region and it was assumed that there was no additional growth to the Imperial Oil lands Port Credit (West Village) area between 2027 and 2041.

The modelling results were analyzed based on the following criteria:

- Minimum acceptable pressure - 275 kPa (40 psi) (*Ministry of the Environment Design Guidelines for Drinking-Water Systems and Region of Peel Water System Design Criteria*)
- Maximum acceptable pressure - 700 kPa (100 psi) (*Ministry of the Environment Design Guidelines for Drinking-Water Systems and Region of Peel Water System Design Criteria)*
- Maximum acceptable velocity – 2 m/s (*Ministry of the Environment Design Guidelines for Drinking-Water Systems)*
- Fire demands – 25,020 L/min (417 L/s) (Region of Peel Public Works Watermain Design Criteria)
- Minimum pressure under maximum day demand plus fire flow - 140 kPa (20 psi) (*Ministry of the Environment Design Guidelines for Drinking-Water Systems and Region of Peel Water System Design Criteria*)

Scenarios

The following scenarios were used for the analysis

- **2021**
  - 2021 ADD/ MDD/ PHD / MDD + Fire Flow without the proposed 600 mm main on Lakeshore Road
- **2026**
  - 2026 ADD/ MDD/ PHD / MDD + Fire Flow without the proposed 600 mm main on Lakeshore Road
- **2027**
  - 2027 ADD/ MDD/ PHD / MDD + Fire Flow without the proposed 600 mm main on Lakeshore Road
- **2041**
  - 2041 MDD/ MDD + Fire Flow without the proposed 600 mm main on Lakeshore Road

The modelling analysis was completed based on the Region's all pipe water model. For each scenario, the minimum pressure for the areas that are within the vicinity of the development was reviewed under extended period simulation (EPS).

ANALYSIS OF MODELLING RESULTS

The following sections detail the results of the analysis completed for evaluating the impact of the Imperial Oil development on the Region's water system. According to the hydraulic modelling results, no serviceability issue within the development was indicated and there appeared to be no negative impact to the surrounding system after the growth. Under all scenarios, the development shows acceptable pressure and velocity using the 300 mm watermains within the development.

Serviceability to the Proposed Development

Table 8 demonstrates the average pressure at the junction representing the growth under all scenarios. Pressure within the development ranges between 74 psi and 87 psi; which is well within the 40 psi – 100 psi allowable range indicated that the development gets service using the 300mm main connecting to existing system and there will be no complication in velocity and pressure in this area.

Table 8 - Minimum Pressure Comparison in Different Scenarios within the Imperial Oil Development

Without 600 mm watermain on Lakeshore Drive West		
Scenarios		Minimum Pressure (psi)
2021	**ADD**	83.1
	MDD	80.5
	PHD	85.8
2026	**ADD**	81.1
	MDD	83.9
	PHD	80.4
2027	**ADD**	80.7
	MDD	83.8
	PHD	80.1
2041	**MDD**	84.4

Hydraulic Implications to the Region's Water System

The following section summarizes the hydraulic implications in Zone 1 with the inclusion of the proposed development. Figure 3 displays modelling junctions in Zone 1, which the pressure was assessed during the analysis:

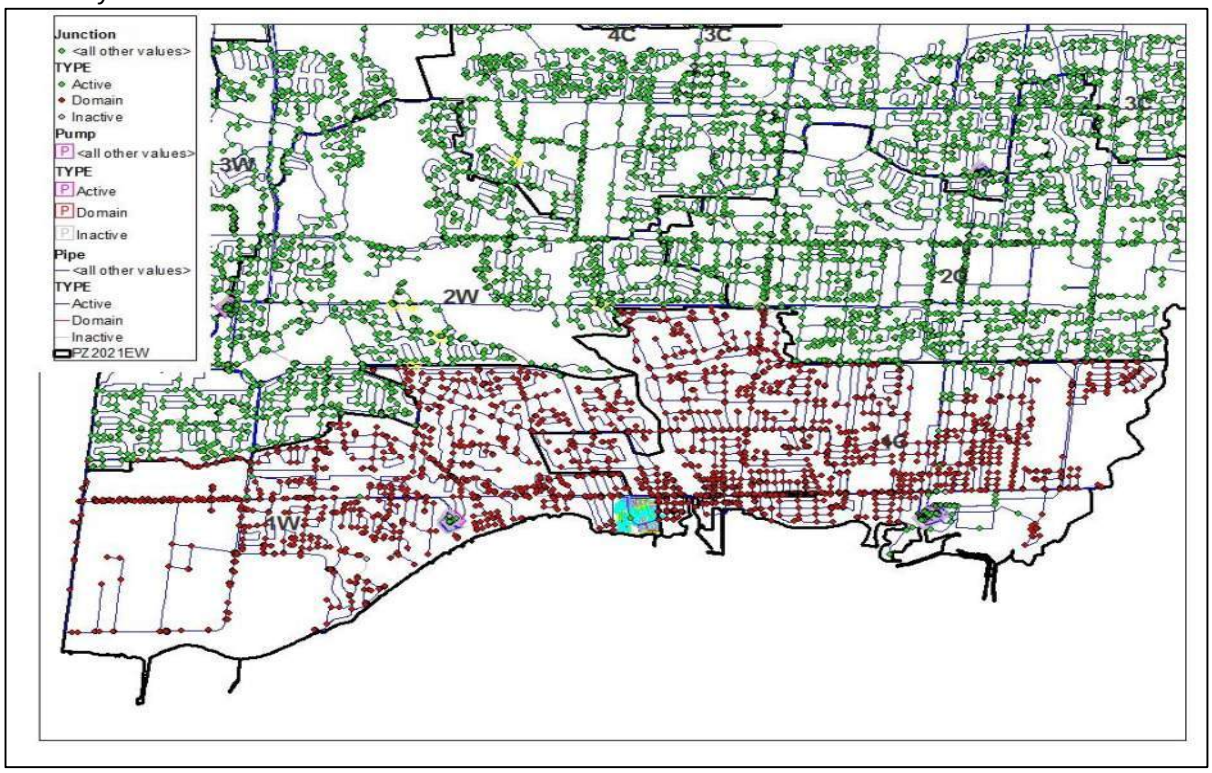

Figure 3 - Region of Peel Zone 1 Junctions

Table 9 - Minimum Pressure comparison in Different Scenarios for zone 1 Junctions

		BASE Scenario Minimum Pressure without Proposed Development & without proposed 600 mm on Lakeshore Road (psi)	Minimum Pressure with Proposed Development (psi) (without 600 watermain on Lakeshore)
2021	ADD	42.7	42.3
	MDD	37.9	37.8
	PHD	44.1	44.1
2026	ADD	39.8	39.5
	MDD	41.7	41.4
	PHD	39.6	39.1
2027	ADD	39.8	39.3
	MDD	41.7	41.4
	PHD	39.6	39.0
2041	MDD	44.9	43.1

According to the results stated in the above table, the growth has minimal effect on the minimum pressure (+/- 0.5 psi) in all of the scenarios in zone 1.

Fire Flow Analysis

Fire Flow analysis was completed to ensure the surrounding area of the development meets sufficient pressure and velocity during a fire event with the assumed size of 300 mm watermain within the development. The modelling results show that the assumed sizing of the watermains within the proposed development is sufficient to provide adequate supply during fire in this area. Table 10 summarizes the fire flow analysis results for the proposed development.

According to the fire flow analysis summary results, the Region's water system would provide adequate fire flow to proposed development while maintaining the minimum pressure at above 20 psi. In addition, the velocity in 300 mm watermains within the proposed development did not exceed the Region's design criteria of 2.0m/s.

Table 10 – Summary of Fireflow Results

Junction Within the Development	2021 MDD		2026 MDD		2027 MDD		2041 MDD	
	Residual Pressure (psi)	Available Flow at Hydrant (L/s)	Residual Pressure (psi)	Available Flow at Hydrant (L/s)	Residual Pressure (psi)	Available Flow at Hydrant (L/s)	Residual Pressure (psi)	Available Flow at Hydrant (L/s)
J-Z6-7958	81.9	677.5	85.9	698.2	85.9	695.2	88.1	717.6
J-Z6-8051	84.4	890.8	88.4	920.3	88.4	916.4	90.5	940.7
J-Z6-8052	86.7	848.4	90.8	874.3	90.7	870.6	92.9	895.5
J-Z6-8053	87.1	892.2	91.1	916.8	91.1	913.1	93.3	937.5
J-Z6-8054	88.3	794.7	92.3	823.0	92.3	819.6	94.5	844.6
J-Z6-8056	84.7	743.7	88.8	768.5	88.7	765.1	90.9	787.8
J-Z6-8057	86.9	804.2	91.0	826.4	90.9	822.7	93.1	847.3
J-Z6-8058	88.3	881.1	92.4	910.9	92.3	907.1	94.5	931.3
J-Z6-8059	87.7	809.5	91.8	833.0	91.7	829.3	93.9	854.1
J-Z6-8060	86.1	696.7	90.1	710.5	90.1	707.0	92.3	727.6
J-Z6-8061	83.0	823.4	87.0	855.9	87.0	851.5	89.2	872.3
J-Z6-8062	82.0	833.2	86.1	864.8	86.0	860.6	88.2	880.7
J-Z6-8063	84.1	882.3	88.2	916.0	88.1	911.7	90.3	933.3

CONCLUSIONS

The hydraulic modelling results lead to the following conclusions:

- The hydraulic modelling results show that the Imperial Oil development can receive sufficient water service without 600 mm main on Lakeshore Drive West even under 2041 maximum day demand conditions.
- This development has minimal effect on the pressure in Zone 1 of the Region of Peel system and the Imperial Oil Development does not cause any negative impacts to the existing system.
- The assumed size for the watermains within the development is adequate to maintain the same level of service in Zone 1 area and the development can get adequate supply with a 300 mm watermain connecting to the existing system.
- Although the model used for this analysis was calibrated within the Region's acceptable accuracy, AECOM recommends hydrant flow test to be undertaken in order to further validate the hydraulic modelling results presented herein.

APPENDIX D

Storm Servicing Design Calculations

- *Storm Sewer Design Sheet*
- *100-year Capture Calculations*
- *ROW and Swale Contributing Drainage and Capacity's*
- *Proposed Capacity Calculations*
  - *Street A (10m road on 16m ROW)*
  - *Street B*
  - *Street B Swale*
  - *Street C*
  - *Street D*
  - *Street F (6m road on 20m ROW)*
  - *Block E*
  - *Mississauga Road*
  - *Mississauga Road Swale*
- *Interim 100-year Channel Calculations*
- *LID Analysis Calculations*

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STORM SEWER DESIGN SHEET

10 Year Storm

Port Credit West Village Partners

City of Mississauga

PROJECT DETAILS

Project No: 16-489
Date: 1-Mar-18
Designed by: NM
Checked by: NM

JAN 6/16

DESIGN CRITERIA

Min. Diameter = 250 mm
Mannings 'n'= 0.013
Starting Tc = 15 min
Factor of Safety = 10 %

Rainfall Intensity = $\frac{A}{(Tc+B)^c}$

A = 1010
B = 4.6
c = 0.78

NOMINAL PIPE SIZE USED

STREET	FROM MH	TO MH	AREA (ha)	RUNOFF COEFFICIENT "R"	'AR'	ACCUM. 'AR'	RAINFALL INTENSITY (mm/hr)	FLOW (m3/s)	CONSTANT FLOW (m3/s)	ACCUM. CONSTANT FLOW (m3/s)	TOTAL FLOW (m3/s)	LENGTH (m)	SLOPE (%)	PIPE DIAMETER (mm)	FULL FLOW CAPACITY (m3/s)	FULL FLOW VELOCITY (m/s)	INITIAL Tc (min)	TIME OF CONCENTRATION (min)	ACC. TIME OF CONCENTRATION (min)	PERCENT FULL (%)
	BLOCK A	101	0.45	0.60	0.27	0.27	99.2	0.074			0.074	10.0	0.50	375	0.124	1.12	15.00	0.15	15.15	60%
STREET E	101	102	0.30	0.90	0.27	0.54	98.6	0.148			0.148	52.0	0.50	450	0.202	1.27	15.15	0.68	15.83	73%
STREET E	102	103				0.54	96.0	0.144			0.144	41.0	0.50	450	0.202	1.27	15.83	0.54	16.37	71%
STREET E	103	104	0.19	0.90	0.17	0.71	94.1	0.186			0.186	85.0	0.50	525	0.304	1.40	16.37	1.01	17.38	61%
	BLOCK F	104	0.64	0.60	0.38	0.38	99.2	0.106			0.106	10.0	0.50	375	0.124	1.12	15.00	0.15	15.15	85%
STREET F	104	106	0.19	0.75	0.14	1.24	90.7	0.312			0.312	73.0	0.50	600	0.434	1.54	17.38	0.79	18.17	72%
	BLOCK B	107	0.81	0.75	0.61	0.61	99.2	0.167			0.167	10.0	0.50	450	0.202	1.27	15.00	0.13	15.13	83%
STREET B	107	108	0.24	0.90	0.22	0.82	98.6	0.226	0.029	0.029	0.255	90.0	0.50	525	0.304	1.40	15.13	1.07	16.20	84%
STREET B	108	109	0.37	0.90	0.33	1.16	94.7	0.304		0.029	0.333	73.0	0.50	600	0.434	1.54	16.20	0.79	16.99	77%
	110	109	0.43	0.75	0.32	0.32	99.2	0.089			0.089	62.0	0.50	375	0.124	1.12	15.00	0.92	15.92	72%
	BLOCK G	111	0.12	0.90	0.11	0.11	99.2	0.030			0.030	10.0	0.50	300	0.068	0.97	15.00	0.17	15.17	44%
STREET C	109	111	0.20	0.90	0.18	1.66	92.0	0.424		0.029	0.453	36.0	0.50	675	0.594	1.66	16.99	0.36	17.35	76%
STREET C	111	106				1.77	90.8	0.446		0.029	0.475	70.0	0.50	675	0.594	1.66	17.35	0.70	18.06	80%
PRIVATE	112	113	0.24	0.60	0.14	0.14	99.2	0.040	0.030	0.030	0.070	48.0	0.50	375	0.124	1.12	15.00	0.71	15.71	56%
PRIVATE	113	114	0.30	0.60	0.18	0.32	96.4	0.087		0.030	0.117	37.0	0.50	450	0.202	1.27	15.71	0.49	16.20	58%
PRIVATE	115	116	0.17	0.60	0.10	0.10	99.2	0.028	0.021	0.021	0.049	48.0	0.50	300	0.068	0.97	15.00	0.83	15.83	72%
PRIVATE	116	114	0.54	0.60	0.32	0.43	96.0	0.114		0.021	0.135	35.0	0.50	450	0.202	1.27	15.83	0.46	16.29	67%
PRIVATE	114	117				0.75	94.4	0.197		0.051	0.248	37.0	0.50	525	0.304	1.40	16.29	0.44	16.73	81%
PRIVATE	118	117	0.17	0.60	0.10	0.10	99.2	0.028	0.021	0.021	0.049	40.0	0.50	300	0.068	0.97	15.00	0.69	15.69	72%
PRIVATE	117	106	0.09	0.60	0.05	0.91	92.8	0.234		0.072	0.306	39.0	0.50	600	0.434	1.54	16.73	0.42	17.15	70%
STREET F	106	119	0.20	0.75	0.15	4.06	88.2	0.995		0.101	1.096	70.0	0.25	1050	1.365	1.58	18.17	0.74	18.91	80%
STREET F	119	120	0.20	0.75	0.15	4.21	86.0	1.006		0.101	1.107	68.0	0.25	1050	1.365	1.58	18.91	0.72	19.63	81%
PRIVATE	121	122	0.17	0.60	0.10	0.10	99.2	0.028	0.021	0.021	0.049	46.0	0.50	300	0.068	0.97	15.00	0.79	15.79	72%
PRIVATE	122	123	0.48	0.60	0.29	0.39	96.1	0.104		0.021	0.125	37.0	0.50	450	0.202	1.27	15.79	0.49	16.28	62%
PRIVATE	123	124				0.39	94.4	0.102		0.021	0.123	36.0	0.50	450	0.202	1.27	16.28	0.47	16.75	61%
PRIVATE	125	124	0.35	0.60	0.21	0.21	99.2	0.058	0.043	0.043	0.101	117.0	0.50	375	0.124	1.12	15.00	1.74	16.74	81%
PRIVATE	124	120				0.60	92.8	0.155		0.064	0.219	40.0	0.50	525	0.304	1.40	16.75	0.47	17.23	72%
STREET F	120	126	0.39	0.75	0.29	5.10	84.0	1.191		0.165	1.356	131.0	0.25	1200	1.949	1.72	19.63	1.27	20.90	70%
	BLOCK K	129	1.22	0.75	0.92	0.92	99.2	0.252			0.252	20.0	0.50	525	0.304	1.40	15.00	0.24	15.24	83%
STREET B	130	129	0.25	0.90	0.23	0.23	99.2	0.062			0.062	56.0	0.50	300	0.068	0.97	15.00	0.96	15.96	91%
	BLOCK J1	126	0.32	0.30	0.10	0.10	99.2	0.026			0.026	20.0	0.50	250	0.042	0.86	15.00	0.39	15.39	63%

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STORM SEWER DESIGN SHEET

10 Year Storm

Port Credit West Village Partners

City of Mississauga

PROJECT DETAILS

Project No: 16-489
Date: 1-Mar-18
Designed by: NM
Checked by: NM

JAN 6/16

DESIGN CRITERIA

Min. Diameter =	250	mm	Rainfall Intensity =	A / (Tc+B)^c
Mannings 'n'=	0.013			
Starting Tc =	15	min	A =	1010
			B =	4.6
Factor of Safety =	10	%	c =	0.78

NOMINAL PIPE SIZE USED

STREET	FROM MH	TO MH	AREA (ha)	RUNOFF COEFFICIENT "R"	'AR'	ACCUM. 'AR'	RAINFALL INTENSITY (mm/hr)	FLOW (m3/s)	CONSTANT FLOW (m3/s)	ACCUM. CONSTANT FLOW (m3/s)	TOTAL FLOW (m3/s)	LENGTH (m)	SLOPE (%)	PIPE DIAMETER (mm)	FULL FLOW CAPACITY (m3/s)	FULL FLOW VELOCITY (m/s)	INITIAL Tc (min)	TIME OF CONCENTRATION (min)	ACC. TIME OF CONCENTRATION (min)	PERCENT FULL (%)
STREET B	129	131	0.26	0.90	0.23	1.37	95.5	0.365			0.365	136.0	0.60	600	0.476	1.68	15.96	1.35	17.31	77%
	BLOCK P	132	1.34	0.75	1.01	1.01	99.2	0.277			0.277	20.0	0.50	600	0.434	1.54	15.00	0.22	15.22	64%
	BLOCK J2	131	0.50	0.30	0.15	0.15	99.2	0.041			0.041	20.0	0.50	300	0.068	0.97	15.00	0.34	15.34	60%
	BLOCK T	131	0.37	0.75	0.28	0.28	99.2	0.076			0.076	20.0	0.50	375	0.124	1.12	15.00	0.30	15.30	62%
STREET A	131	132	0.32	0.90	0.29	2.09	90.9	0.528			0.528	68.0	0.60	675	0.651	1.82	17.31	0.62	17.94	81%
STREET A	132	126				3.09	88.9	0.764			0.764	102.0	0.60	750	0.862	1.95	17.94	0.87	18.81	89%
PRIVATE	133	134	0.17	0.60	0.10	0.10	99.2	0.028	0.021	0.021	0.049	46.0	0.50	300	0.068	0.97	15.00	0.79	15.79	72%
PRIVATE	134	135	0.51	0.60	0.31	0.41	96.1	0.109		0.021	0.130	67.0	0.50	450	0.202	1.27	15.79	0.88	16.67	64%
PRIVATE	136	135	0.17	0.60	0.10	0.10	99.2	0.028	0.021	0.021	0.049	45.0	0.50	300	0.068	0.97	15.00	0.78	15.78	72%
PRIVATE	135	137				0.51	93.0	0.132		0.042	0.174	33.0	0.50	450	0.202	1.27	16.67	0.43	17.11	86%
PRIVATE	137	138	0.77	0.60	0.46	0.97	91.6	0.247		0.042	0.289	37.0	0.50	600	0.434	1.54	17.11	0.40	17.51	67%
PRIVATE	139	138	0.34	0.60	0.20	0.20	99.2	0.056	0.041	0.041	0.097	114.0	0.50	375	0.124	1.12	15.00	1.69	16.69	78%
PRIVATE	138	126				1.18	90.3	0.295		0.083	0.378	40.0	0.50	600	0.434	1.54	17.51	0.43	17.94	87%
	126	HW WEST				9.47	80.8	2.125		0.248	2.373	138.0	0.82	1200	3.530	3.12	20.90	0.74	21.63	67%
														0						
LAKESHORE ROAD	1L	2L	0.26	0.90	0.23	0.23	99.2	0.064	0.000	0.000	0.064	50.4	0.50	375	0.124	1.12	15.00	0.75	15.75	52%
LAKESHORE ROAD	2L	3L	0.29	0.90	0.26	0.50	96.3	0.132	0.000	0.000	0.132	9.5	0.50	450	0.202	1.27	15.75	0.12	15.87	66%
LAKESHORE ROAD	3L	4L	0.17	0.90	0.15	0.65	95.9	0.173	0.000	0.000	0.173	75.6	0.50	525	0.304	1.40	15.87	0.90	16.77	57%
LAKESHORE ROAD	4L	5L	0.24	0.90	0.22	0.86	92.7	0.222	0.000	0.000	0.222	9.7	0.50	600	0.434	1.54	16.77	0.11	16.88	51%
LAKESHORE ROAD	Ext. 1	5L	3.79	0.60	2.27	2.27	99.2	0.626	0.000	0.000	0.626	304.0	0.50	450	0.202	1.27	15.00	4.00	19.00	311%
LAKESHORE ROAD	5L	6L	0.30	0.90	0.27	3.41	85.8	0.812	0.000	0.000	0.812	80.4	0.50	675	0.594	1.66	19.00	0.81	19.80	137%
LAKESHORE ROAD	Ext. 2	6L	2.41	0.60	1.45	1.45	99.2	0.398	0.000	0.000	0.398	220.0	0.50	375	0.124	1.12	15.00	3.27	18.27	321%
MISSISSUAGA ROAD	6L	202	0.15	0.90	0.14	4.99	83.6	1.158	0.000	0.000	1.158	88.0	0.50	975	1.585	2.12	19.80	0.69	20.49	73%
	BLOCK C	202	1.96	0.75	1.47	1.47	99.2	0.405			0.405	20.0	0.50	675	0.594	1.66	15.00	0.20	15.20	68%
MISSISSUAGA ROAD	202	206	0.09	0.90	0.08	6.54	98.4	1.787	0.000	0.000	1.787	40.0	0.50	1200	2.757	2.44	15.20	0.27	15.47	65%
	BLOCK H	204	0.62	0.75	0.47	0.47	99.2	0.128			0.128	20.0	0.50	450	0.202	1.27	15.00	0.26	15.26	64%
STREET C	204	203	0.16	0.90	0.14	0.61	98.1	0.166			0.166	64.0	0.50	450	0.202	1.27	15.26	0.84	16.10	82%
STREET C	203	205	0.24	0.90	0.22	0.83	95.0	0.218			0.218	24.0	0.50	525	0.304	1.40	16.10	0.28	16.39	72%
	BLOCK D	206	0.33	0.60	0.20	0.20	99.2	0.055			0.055	20.0	0.50	300	0.068	0.97	15.00	0.34	15.34	80%
STREET C	205	206	0.24	0.90	0.22	1.04	94.0	0.272			0.272	98.0	0.50	525	0.304	1.40	16.39	1.16	17.55	89%
LAKE STREET-EXT	EXT. 2	206	0.97	0.60	0.58	0.58	99.2	0.160	0.000	0.000	0.160	76.0	0.50	375	0.124	1.12	15.00	1.13	16.13	129%
	BLOCK M	218	0.91	0.60	0.55	0.55	99.2	0.150			0.150	20.0	0.50	450	0.202	1.27	15.00	0.26	15.26	75%
MISSISSUAGA ROAD	206	207	0.27	0.90	0.24	8.60	90.1	2.154	0.000	0.000	2.154	123.0	0.48	1200	2.701	2.39	17.55	0.86	18.41	80%
	BLOCK N	207	0.28	0.30	0.08	0.08	99.2	0.023			0.023	20.0	0.50	250	0.042	0.86	15.00	0.39	15.39	55%
BAY STREET-EXT	EXT. 3	207	0.97	0.60	0.58	0.58	99.2	0.160	0.000	0.000	0.160	52.6	0.50	375	0.124	1.12	15.00	0.78	15.78	129%
MISSISSUAGA ROAD	207	208	0.21	0.60	0.13	9.40	87.5	2.284	0.000	0.000	2.284	115.0	0.22	900x1800 (BOX)	2.619	1.62	18.41	1.19	19.60	87%

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STORM SEWER DESIGN SHEET

10 Year Storm

Port Credit West Village Partners

City of Mississauga

PROJECT DETAILS

Project No: 16-489
Date: 1-Mar-18
Designed by: NM
Checked by: NM

JAN 6/16

DESIGN CRITERIA

Min. Diameter =	250	mm	Rainfall Intensity =	A / (Tc+B)^c
Mannings 'n'=	0.013			
Starting Tc =	15	min	A =	1010
			B =	4.6
Factor of Safety =	10	%	c =	0.78

NOMINAL PIPE SIZE USED

STREET	FROM MH	TO MH	AREA (ha)	RUNOFF COEFFICIENT "R"	'AR'	ACCUM. 'AR'	RAINFALL INTENSITY (mm/hr)	FLOW (m3/s)	CONSTANT FLOW (m3/s)	ACCUM. CONSTANT FLOW (m3/s)	TOTAL FLOW (m3/s)	LENGTH (m)	SLOPE (%)	PIPE DIAMETER (mm)	FULL FLOW CAPACITY (m3/s)	FULL FLOW VELOCITY (m/s)	INITIAL Tc (min)	TIME OF CONCENTRATION (min)	ACC. TIME OF CONCENTRATION (min)	PERCENT FULL (%)
	BLOCK R	208	0.41	0.60	0.25	0.25	99.2	0.068			0.068	20.0	0.50	375	0.124	1.12	15.00	0.30	15.30	55%
STREET A-EXT	EXT. 4	208	0.97	0.60	0.58	0.58	99.2	0.160	0.000	0.000	0.160	31.0	0.50	375	0.124	1.12	15.00	0.46	15.46	129%
PRIVATE	209	210	0.52	0.60	0.31	0.31	99.2	0.086	0.041	0.041	0.127	110.0	0.30	450	0.156	0.98	15.00	1.87	16.87	81%
PRIVATE	210	212				0.31	92.4	0.080		0.041	0.121	35.5	0.30	450	0.156	0.98	16.87	0.60	17.47	78%
PRIVATE	213	212	0.44	0.60	0.26	0.26	99.2	0.073			0.073	115.0	0.50	375	0.124	1.12	15.00	1.71	16.71	59%
PRIVATE	216	215	0.38	0.60	0.23	0.23	99.2	0.063	0.041	0.041	0.104	109.0	0.50	375	0.124	1.12	15.00	1.62	16.62	84%
PRIVATE	212	215				0.58	90.4	0.145		0.041	0.186	32.0	0.30	525	0.236	1.09	17.47	0.49	17.96	79%
PRIVATE	215	217				0.80	88.9	0.198		0.082	0.280	34.0	0.30	600	0.336	1.19	17.96	0.48	18.44	83%
STREET D	218	217	0.37	0.70	0.26	0.81	98.1	0.219			0.219	113.0	0.50	525	0.304	1.40	15.26	1.34	16.60	72%
STREET D	217	219	0.35	0.70	0.25	1.85	87.4	0.450		0.082	0.532	122.0	0.30	750	0.610	1.38	18.44	1.47	19.91	87%
PETER STREET-EXT	EXT. 5	208	1.16	0.90	1.04	1.04	99.2	0.288	0.000	0.000	0.288	200.0	0.50	450	0.202	1.27	15.00	2.63	17.63	143%
STREET A	220	221	0.21	0.90	0.19	0.19	99.2	0.052			0.052	48.0	0.50	300	0.068	0.97	15.00	0.83	15.83	76%
PRIVATE-BLOCK Q1	214	221	0.95	0.60	0.57	0.57	99.2	0.157			0.157	111.0	0.50	450	0.202	1.27	15.00	1.46	16.46	78%
STREET A	221	222				0.76	93.8	0.198			0.198	35.0	0.50	525	0.304	1.40	16.46	0.42	16.87	65%
PRIVATE-BLOCK Q2	223	222	0.34	0.60	0.20	0.20	99.2	0.056	0.041	0.041	0.097	115.0	0.50	375	0.124	1.12	15.00	1.71	16.71	78%
STREET A	222	219				0.96	92.3	0.247		0.041	0.288	33.0	0.50	600	0.434	1.54	16.87	0.36	17.23	66%
STREET A	219	208	0.07			2.82	83.3	0.652		0.123	0.775	47.0	0.30	900	0.992	1.56	19.91	0.50	20.41	78%
MISSISSUAGA ROAD	208	224	0.28	0.90	0.25	14.34	82.0	3.265	0.000	0.123	3.388	138.0	0.20	900x2400 (BOX)	3.529	1.63	20.41	1.41	21.82	96%
MISSISSUAGA ROAD	BLOCK U	224	2.17	0.75	1.63	1.63	99.2	0.448	0.328	0.328	0.776	20.0	0.50	825	1.015	1.90	15.00	0.18	15.18	76%
MISSISSUAGA ROAD	224	HW EAST	0.00	0.00	0.00	15.96	78.6	3.484	0.986	1.437	4.921	102.0	0.31	900x2400 (BOX)	4.393	2.03	21.82	0.84	22.66	112%
0	=	Mississauga Road Storm Sewers																		
	=	External Storm Sewers																		
PRIVATE	=	Private Storm Sewers																		

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PROJECT DETAILS

Title1:	**STORM SEWER DESIGN SHEET**
Title2:	**Constant Flow (100yr Minor System Capture)**
Project Name:	**Port Credit West Village Partners**
Municipality:	**City of Mississauga**
Project No:	**16-489**
Date:	**1-Mar-18**
Designed by:	**NM**
Checked by:	**NM**

IDF Parameters			
		10-yr	100-yr
$I=A/(T+b)^c$	A	1010	1450
	B	4.6	4.9
	C	0.78	0.78

CAPTURE LOCATION	AREA ID	CAPTURE POINT	Area ha	R 100-year	R 10-year	AR 100-year	AR 10-year	Flow Length m	Velocity m/s	Tc* min	I10 mm/hr	I100 mm/hr	Q10 m3/s	Q100 m3/s	Q100-Q10 m3/s	Const. flow m3/s
Block B	1	MH107	0.21	1.00	0.90	0.21	0.19	65.00	1.50	15.72	96.4	136.8	0.051	0.080	0.029	0.029
Block I	2	MH112	0.24	0.75	0.60	0.18	0.14	40.00	1.50	15.44	97.4	138.3	0.039	0.069	0.030	0.030
Block I	3	MH115	0.17	0.75	0.60	0.13	0.10	40.00	1.50	15.44	97.4	138.3	0.028	0.049	0.021	0.021
Block I	4	MH118	0.17	0.75	0.60	0.13	0.10	40.00	1.50	15.44	97.4	138.3	0.028	0.049	0.021	0.021
Block I	5	MH121	0.17	0.75	0.60	0.13	0.10	40.00	1.50	15.44	97.4	138.3	0.028	0.049	0.021	0.021
Block I	6	MH125	0.35	0.75	0.60	0.26	0.21	117.00	1.50	16.30	94.3	133.9	0.055	0.098	0.043	0.043
Block O	7	MH133	0.17	0.75	0.60	0.13	0.10	40.00	1.50	15.44	97.4	138.3	0.028	0.049	0.021	0.021
Block O	8	MH136	0.17	0.75	0.60	0.13	0.10	40.00	1.50	15.44	97.4	138.3	0.028	0.049	0.021	0.021
Block O	9	MH139	0.34	0.75	0.60	0.26	0.20	115.00	1.50	16.28	94.4	134.0	0.053	0.095	0.041	0.041
Street F	10	MH126	6.54	0.89	0.71	5.80	4.64	725.00	1.50	23.06	75.8	107.9	0.976	1.738	0.761	0.761
Street A	11	MH126	5.40	0.89	0.71	4.79	3.83	725.00	1.50	23.06	75.8	107.9	0.806	1.435	0.628	0.628
Block L	12	MH209	0.34	0.75	0.60	0.26	0.20	115.00	1.50	16.28	94.4	134.0	0.053	0.095	0.041	0.041
Block L	13	MH216	0.34	0.75	0.60	0.26	0.20	115.00	1.50	16.28	94.4	134.0	0.053	0.095	0.041	0.041
Block Q	14	MH223	0.34	0.75	0.60	0.26	0.20	115.00	1.50	16.28	94.4	134.0	0.053	0.095	0.041	0.041
Mississauga Road	15	MH224	2.11	0.94	0.75	1.98	1.58	65.00	1.50	15.72	96.4	136.8	0.424	0.752	0.328	0.328
Mississauga Road	16	MH224	7.40	0.94	0.75	6.96	5.56	486.00	1.50	20.40	82.0	116.7	1.268	2.254	0.986	0.986

*Where available, Tc is calculated from design sheet or overland flow calculation

Tc calcs *where Tc = starting Tc + flow length/velocity*
(starting Tc = 15min)

Assumed Velocities for Calculation of time of Concentration

Pipe Flow Velocity=	2.0 m/s
OLF Velocity=	1.5 m/s
External Flow Velocity=	0.25 m/s

PROJECT DETAILS	
Title1:	PORT CREDIT WEST VILLAGE RIGHT-OF-WAY CAPACITY
Title2:	Major System Flows (100yr - 10yr)
Project Name:	Port Credit West Village Partners
Municipality:	City of Mississauga
Project No:	16-489
Date:	1-Mar-18
Designed by:	NM
Checked by:	NM

IDF Parameters			
$I=A/(T+b)^c$		10-yr	100-yr
	A	1010	1450
	B	4.6	4.9
	C	0.78	0.78

= Drainage to Mississauga Road

CAPTURE LOCATION	AREA ID	CAPTURE POINT	Area ha	R 100-year	R 10-year	AR 100-year	AR 10-year	Flow Length m	Velocity m/s	Tc* min	I10 mm/hr	I100 mm/hr	Q10 m3/s	Q100 m3/s	Q100-Q10 m3/s	Const. flow m3/s	Available Capacity m3/s
Street A		-	7.77	0.93	0.74	7.19	5.75	723	1.50	23.03	75.9	108.0	1.212	2.156	0.944	0.944	1.387
Street D		-	2.98	0.75	0.60	2.24	1.79	348	1.50	18.87	86.2	122.5	0.428	0.760	0.332	0.332	1.416
Street C		-	0.63	1.00	0.80	0.63	0.50	106	1.50	16.18	94.8	134.5	0.133	0.235	0.103	0.103	1.589
Street B		-	7.08	0.91	0.73	6.46	5.17	655	1.50	22.28	77.5	110.3	1.113	1.980	0.867	0.867	0.641
Street B Swale																	0.227
Street E		-	2.76	0.93	0.74	2.55	2.04	322	1.50	18.58	87.0	123.7	0.494	0.877	0.383	0.383	1.387
Street F		-	2.30	0.83	0.66	1.90	1.52	446	1.50	19.96	83.2	118.3	0.351	0.623	0.273	0.273	1.437
Mississauga Road	16	MH224	7.40	0.94	0.75	6.96	5.56	486.00	1.50	20.40	82.0	116.7	1.268	2.254	0.986	0.986	
External Major System Flows																	
External	Lakeshore	MH202	7.63	0.81	0.65	6.20	4.96	404.00	1.50	19.49	84.4	120.0	1.163	2.067	0.904	0.904	
External	Port Street	MH206	0.97	0.75	0.6	0.73	0.58	76.00	1.50	15.84	96.0	136.2	0.155	0.275	0.120	0.120	
External	Bay Street	MH207	0.97	0.75	0.6	0.73	0.58	52.60	1.50	15.58	96.9	137.5	0.157	0.278	0.121	0.121	
External	Lake Street	MH208	2.56	0.75	0.6	1.92	1.54	31.00	1.50	15.34	97.8	138.8	0.417	0.740	0.323	0.323	

Total Overland Drainage to Mississauga Road	2.455 m^3/s
Max Capacity of Proposed Southern Portion of Mississauga Road (12.5m Pavement) m^3/s	2.364
Capacity of Proposed Swale along Southern Portion of Mississauga Road (m^3/s)	0.091
Total Capacity of Southern Portion of Mississauga Road (m^3/s)	2.455

*Where available, Tc is calculated from design sheet or overland flow calculation
*See Appendix D for design calculations regarding right-of-way and swale capacity

Tc calcs *where Tc = starting Tc + flow length/velocity*
(starting Tc = 15min)

Assumed Velocities for Calculation of time of Concentration
Pipe Flow Velocity= 2.0 m/s
OLF Velocity= 1.5 m/s
External Flow Velocity= 0.25 m/s

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Mar 7 2018

Street A - 10.0m Road on 16m ROW

User-defined

Invert Elev (m)	= 99.7960
Slope (%)	= 1.0000
N-Value	= Composite

Calculations

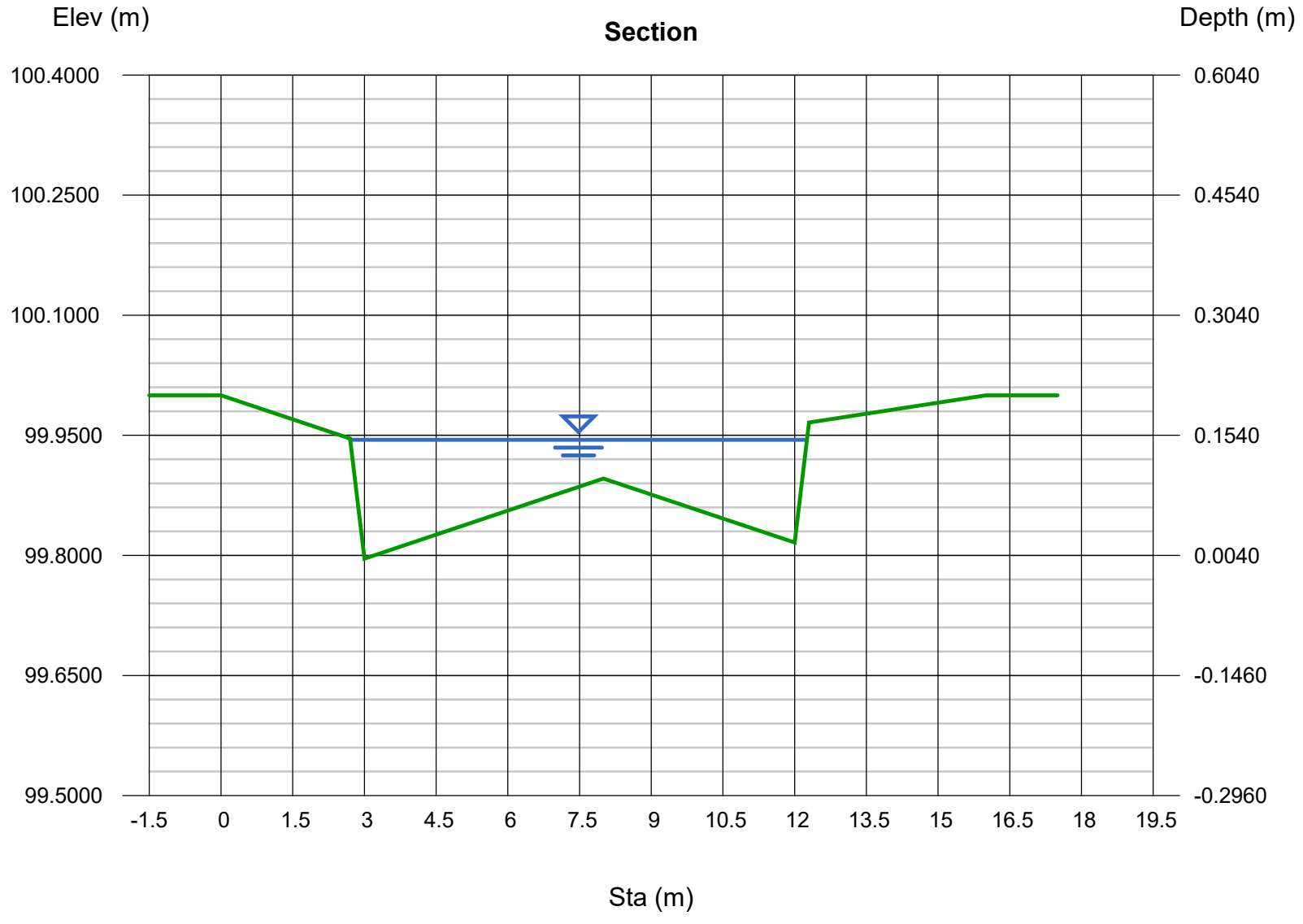
Compute by:	Q vs Depth
No. Increments	= 22

Highlighted

Depth (m)	= 0.1484
Q (cms)	= 1.3866
Area (sqm)	= 0.8838
Velocity (m/s)	= 1.5689
Wetted Perim (m)	= 9.6206
Crit Depth, Yc (m)	= 0.1981
Top Width (m)	= 9.5535
EGL (m)	= 0.2739

(Sta, El, n)-(Sta, El, n)...

(0.0000, 100.0000)-(2.7000, 99.9460, 0.025)-(3.0000, 99.7960, 0.013)-(8.0000, 99.8960, 0.013)-(12.0000, 99.8160, 0.013)-(12.3000, 99.9660, 0.013)-(16.0000, 100



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, Mar 8 2018

Street B - 7m Road on 16m ROW

User-defined

Invert Elev (m)	= 99.6600
Slope (%)	= 1.0000
N-Value	= Composite

Calculations

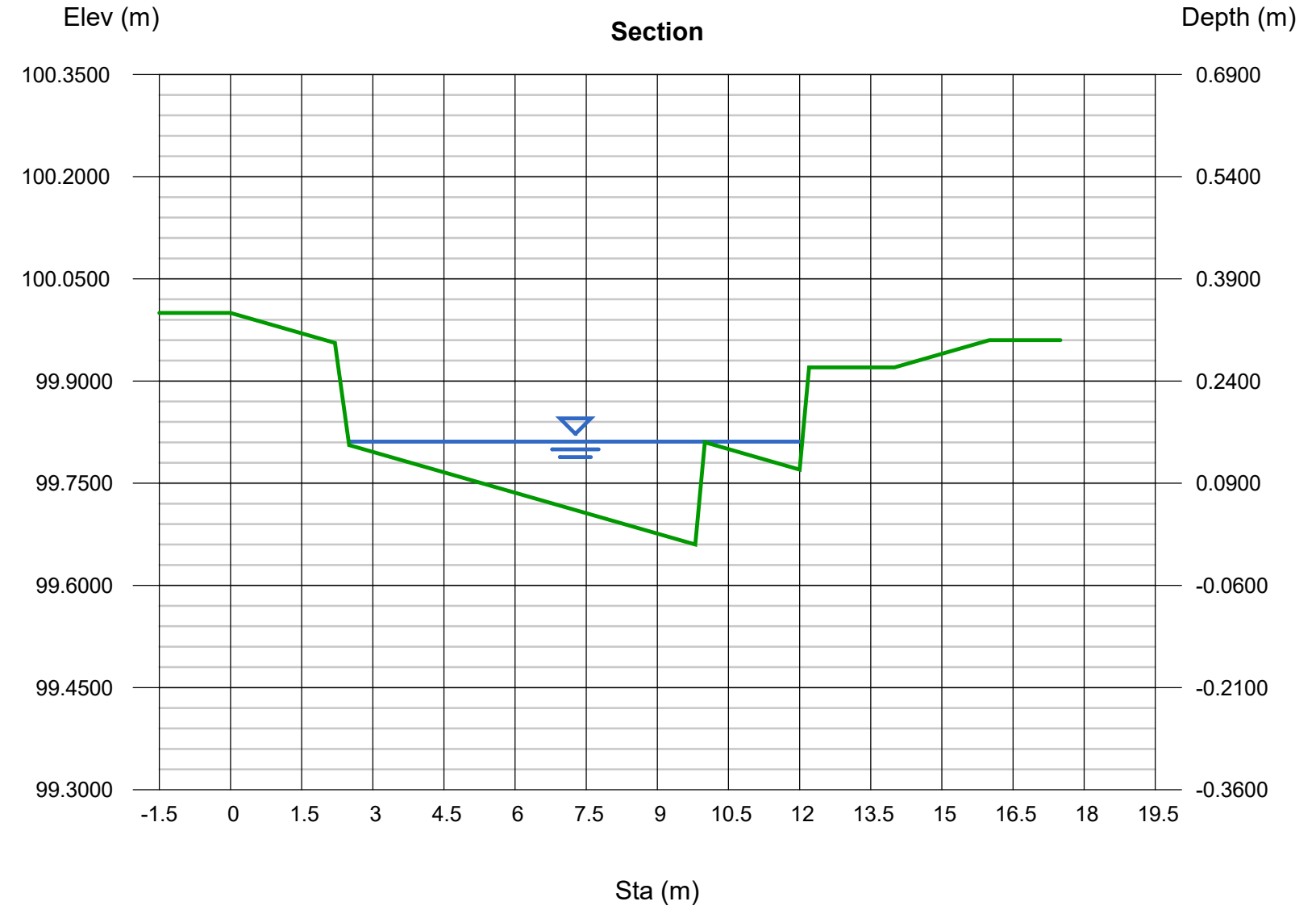
Compute by:	Q vs Depth
No. Increments	= 18

Highlighted

Depth (m)	= 0.1511
Q (cms)	= 0.6405
Area (sqm)	= 0.6288
Velocity (m/s)	= 1.0186
Wetted Perim (m)	= 9.6318
Crit Depth, Yc (m)	= 0.1646
Top Width (m)	= 9.5650
EGL (m)	= 0.2040

(Sta, El, n)-(Sta, El, n)...

(0.0000, 100.0000)-(2.2000, 99.9560, 0.025)-(2.5000, 99.8060, 0.013)-(6.0000, 99.7360, 0.013)-(8.0000, 99.6960, 0.013)-(9.8000, 99.6600, 0.013)-(10.0000, 99.810
-(12.0000, 99.7700, 0.025)-(12.2000, 99.9200, 0.025)-(14.0000, 99.9200, 0.030)-(16.0000, 99.9600, 0.025)



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, Mar 8 2018

Street B Swale

Trapezoidal

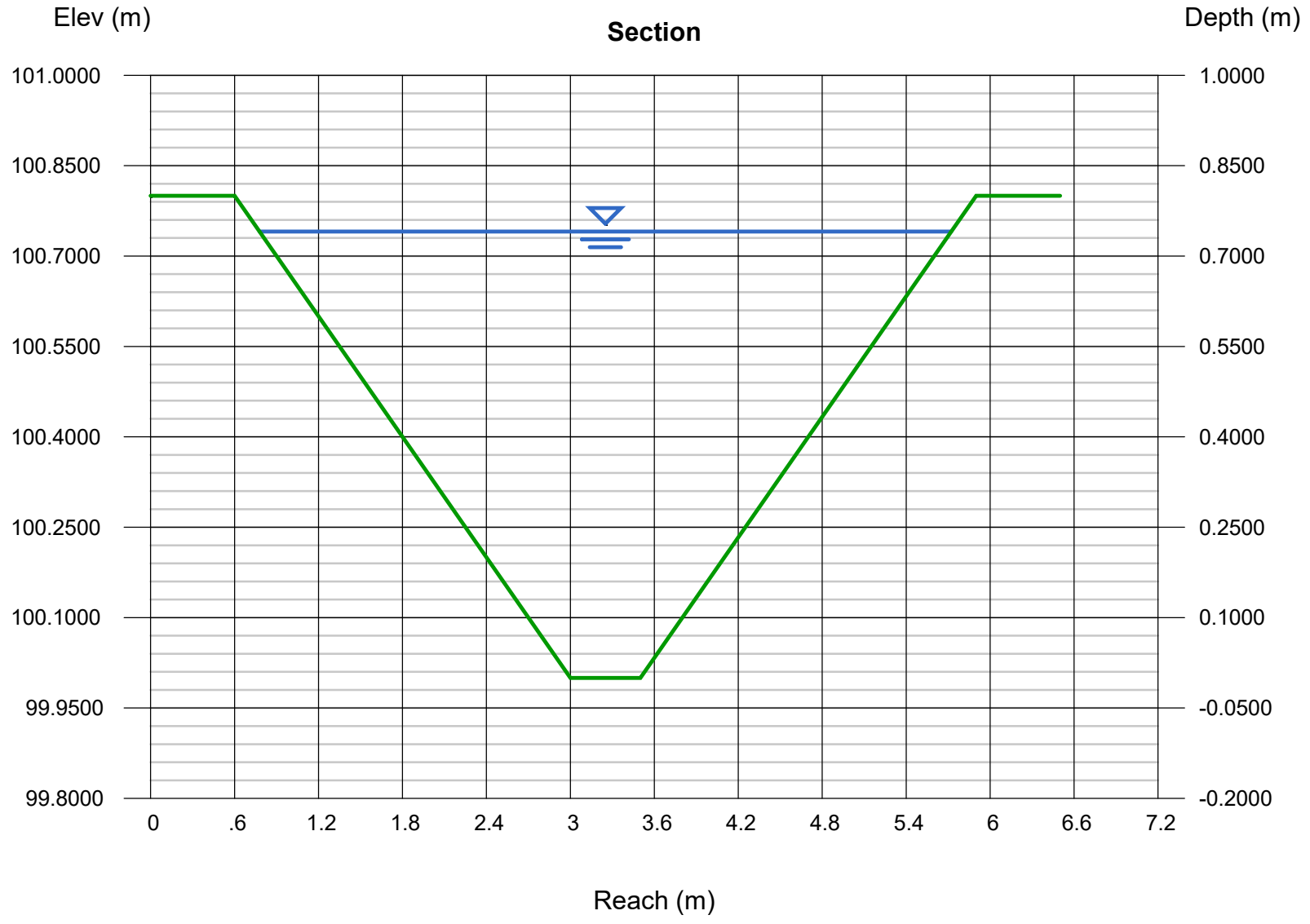
Bottom Width (m)	= 0.5000
Side Slopes (z:1)	= 3.0000, 3.0000
Total Depth (m)	= 0.8000
Invert Elev (m)	= 100.0000
Slope (%)	= 0.5700
N-Value	= 0.350

Calculations

Compute by:	Known Q
Known Q (cms)	= 0.2300

Highlighted

Depth (m)	= 0.7407
Q (cms)	= 0.230
Area (sqm)	= 2.0161
Velocity (m/s)	= 0.1141
Wetted Perim (m)	= 5.1844
Crit Depth, Yc (m)	= 0.1951
Top Width (m)	= 4.9440
EGL (m)	= 0.7413



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Mar 7 2018

Street C - 9.0m Road on 20m ROW

User-defined

Invert Elev (m)	= 99.7600
Slope (%)	= 1.0000
N-Value	= Composite

Calculations

Compute by:	Q vs Depth
No. Increments	= 24

Highlighted

Depth (m)	= 0.1500
Q (cms)	= 1.5892
Area (sqm)	= 0.9128
Velocity (m/s)	= 1.7410
Wetted Perim (m)	= 8.5016
Crit Depth, Yc (m)	= 0.2073
Top Width (m)	= 8.4000
EGL (m)	= 0.3046

(Sta, El, n)-(Sta, El, n)...

(0.0000, 100.0000)-(3.4300, 100.0000, 0.030)-(7.7300, 99.9100, 0.025)-(7.9300, 99.7600, 0.013)-(10.0000, 99.8000, 0.013)-(11.9300, 99.8400, 0.013)-(15.9300, 99
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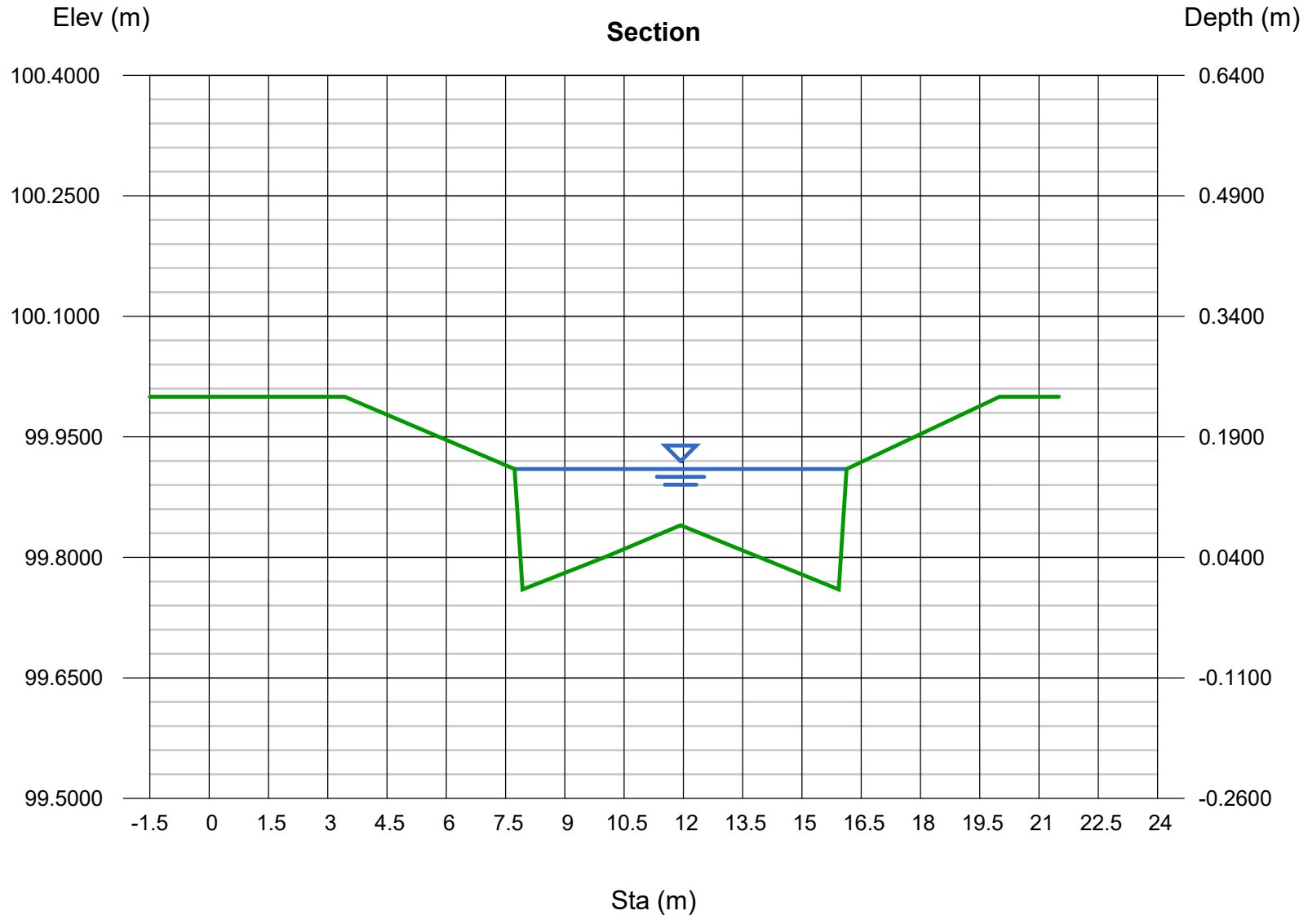


Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, Mar 8 2018

Street D - 6m Road on 18m ROW

User-defined

Invert Elev (m)	= 99.7400
Slope (%)	= 1.0000
N-Value	= Composite

Calculations

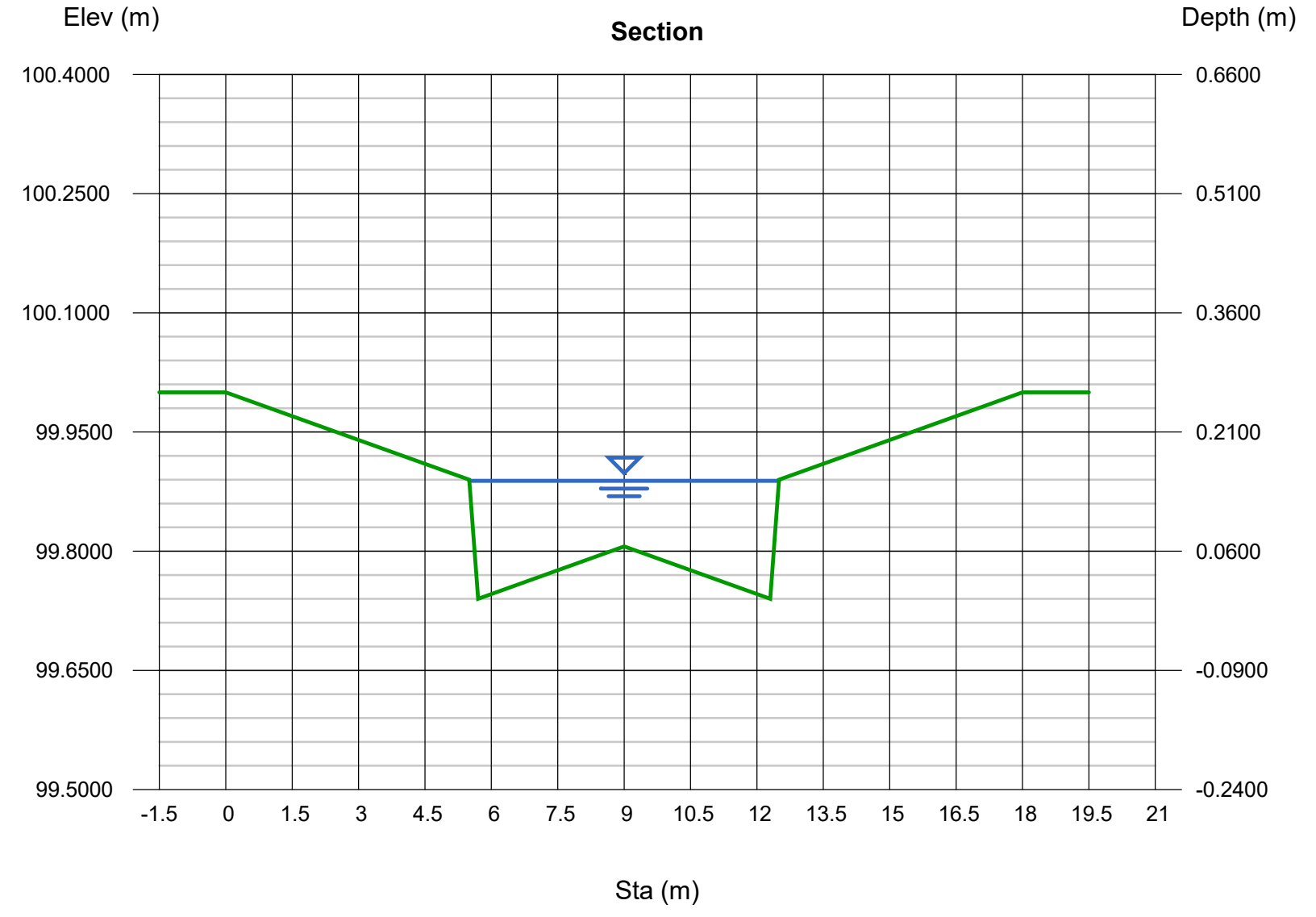
Compute by:	Q vs Depth
No. Increments	= 28

Highlighted

Depth (m)	= 0.1486
Q (cms)	= 1.4156
Area (sqm)	= 0.7922
Velocity (m/s)	= 1.7868
Wetted Perim (m)	= 7.0966
Crit Depth, Yc (m)	= 0.2103
Top Width (m)	= 6.9962
EGL (m)	= 0.3114

(Sta, El, n)-(Sta, El, n)...

(0.0000, 100.0000)-(5.5000, 99.8900, 0.025)-(5.7000, 99.7400, 0.013)-(9.0000, 99.8060, 0.013)-(12.3000, 99.7400, 0.013)-(12.5000, 99.8900, 0.013)-(18.0000, 100



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, Mar 8 2018

Street F - 6.0m Road on 20m ROW

User-defined

Invert Elev (m)	= 99.6600
Slope (%)	= 1.0000
N-Value	= Composite

Calculations

Compute by:	Q vs Depth
No. Increments	= 25

Highlighted

Depth (m)	= 0.1496
Q (cms)	= 1.4366
Area (sqm)	= 0.7994
Velocity (m/s)	= 1.7970
Wetted Perim (m)	= 7.1000
Crit Depth, Yc (m)	= 0.2073
Top Width (m)	= 6.9989
EGL (m)	= 0.3143

(Sta, El, n)-(Sta, El, n)...

(0.0000, 100.0000)-(9.5000, 99.8100, 0.025)-(9.7000, 99.6600, 0.013)-(13.0000, 99.7260, 0.013)-(16.3000, 99.6600, 0.013)-(16.5000, 99.8100, 0.013)-(18.0000, 99
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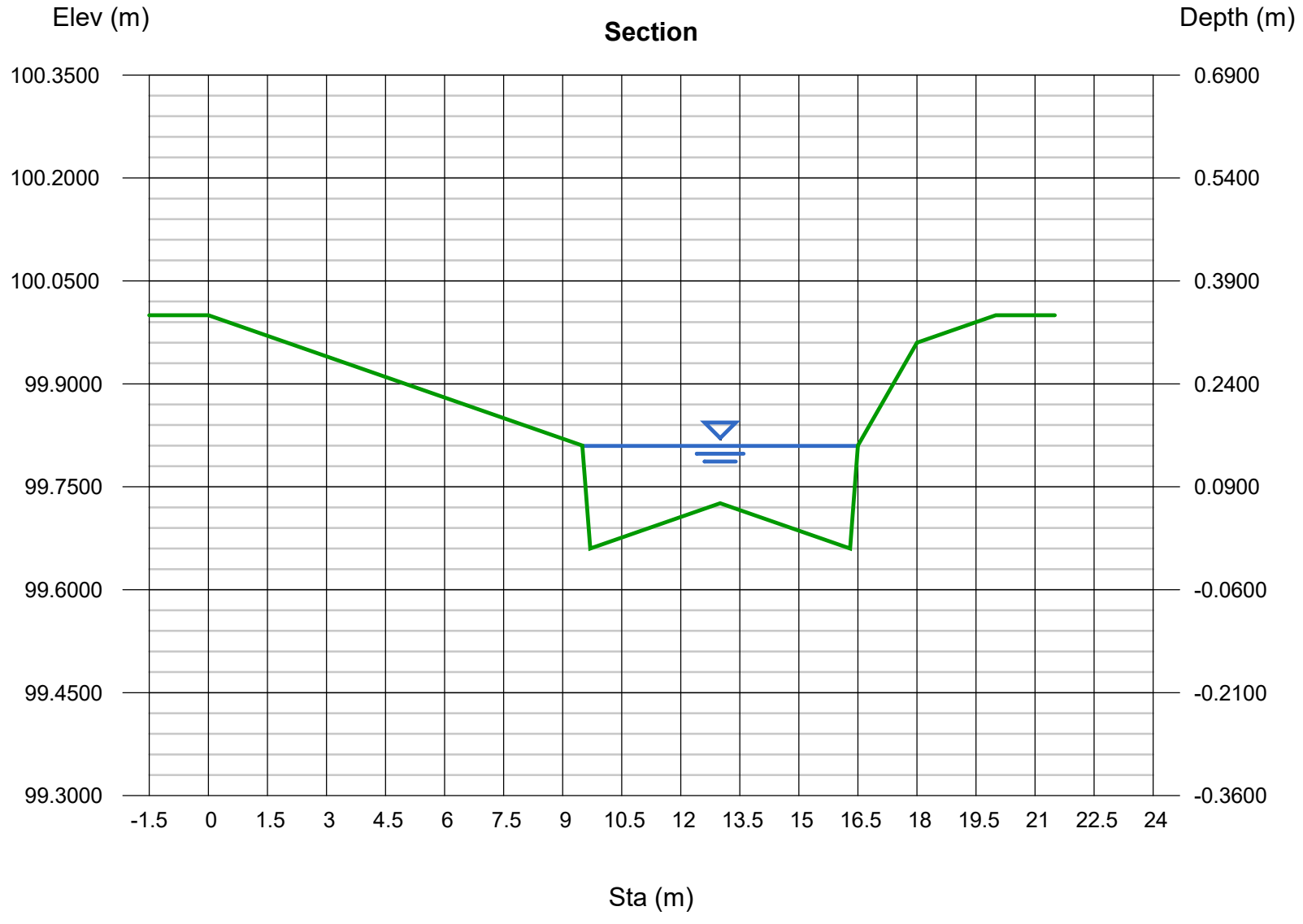


Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Tuesday, Mar 6 2018

Block E Channel

Trapezoidal

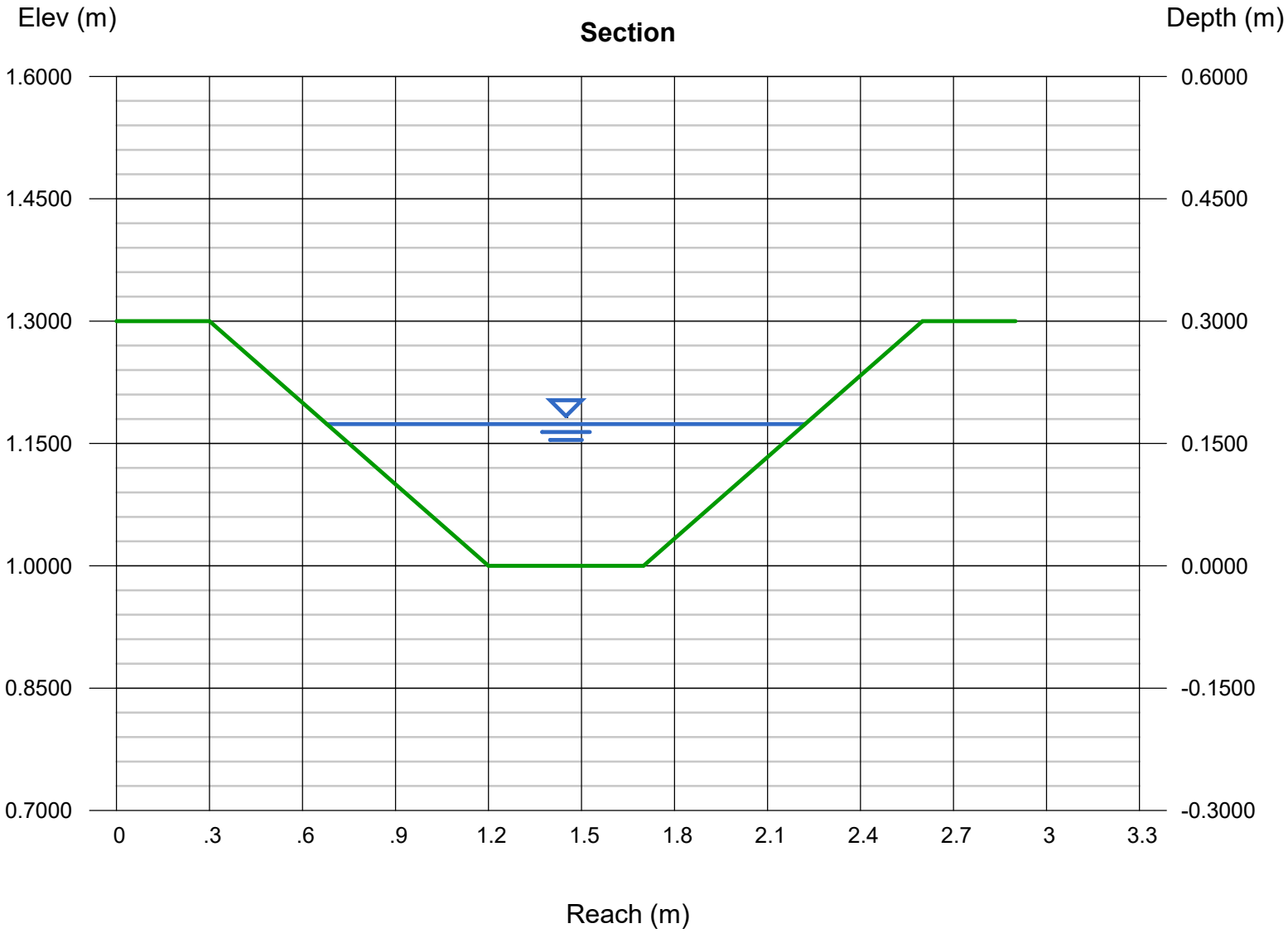
Bottom Width (m)	= 0.5000
Side Slopes (z:1)	= 3.0000, 3.0000
Total Depth (m)	= 0.3000
Invert Elev (m)	= 1.0000
Slope (%)	= 0.7000
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cms)	= 0.0970

Highlighted

Depth (m)	= 0.1737
Q (cms)	= 0.097
Area (sqm)	= 0.1774
Velocity (m/s)	= 0.5467
Wetted Perim (m)	= 1.5988
Crit Depth, Yc (m)	= 0.1250
Top Width (m)	= 1.5424
EGL (m)	= 0.1890



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Monday, Mar 5 2018

Mississauga Road - 7m Road on 20m ROW

User-defined

Invert Elev (m)	= 99.7600
Slope (%)	= 1.0000
N-Value	= Composite

Calculations

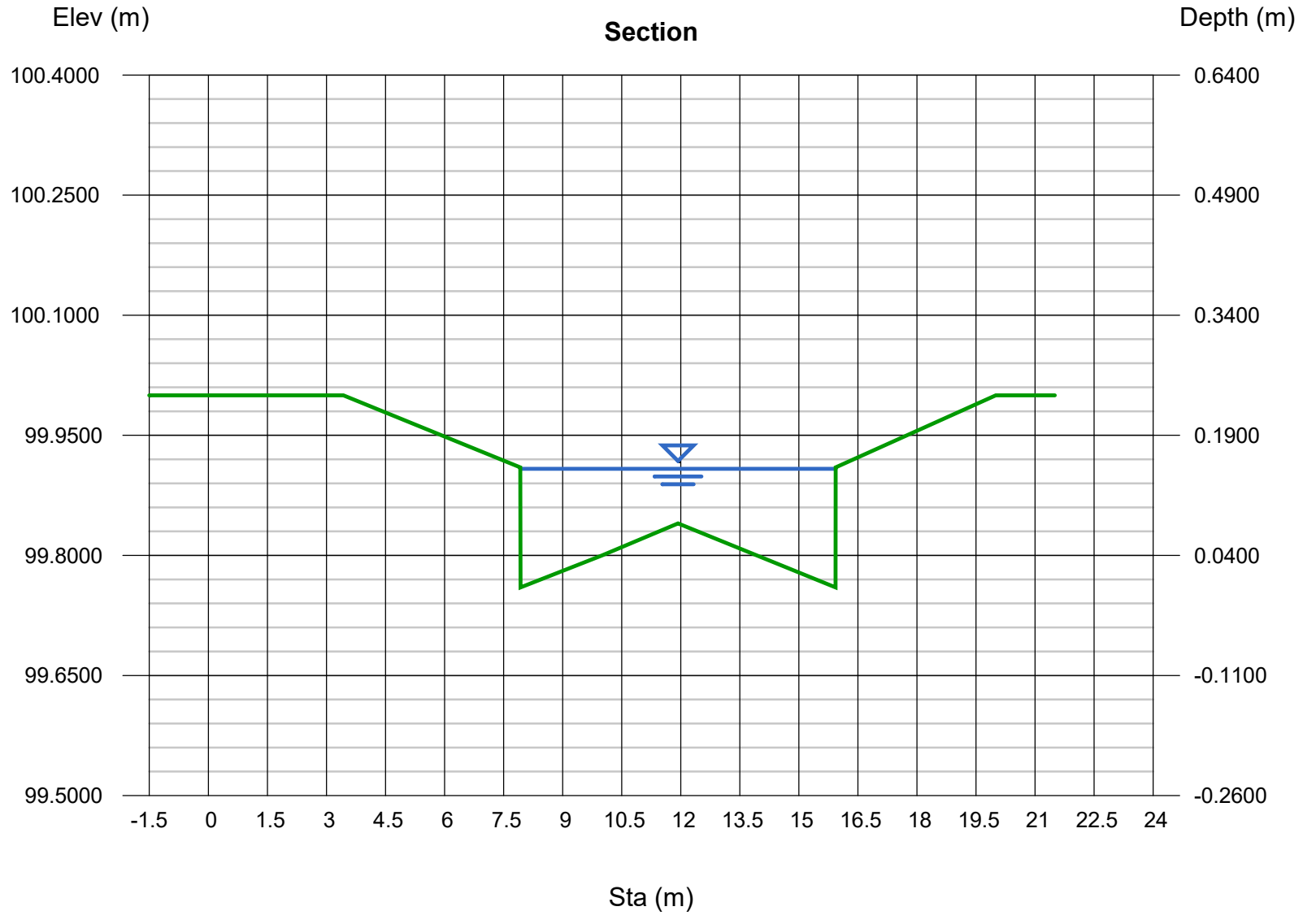
Compute by:	Q vs Depth
No. Increments	= 34

Highlighted

Depth (m)	= 0.1482
Q (cms)	= 1.4895
Area (sqm)	= 0.8696
Velocity (m/s)	= 1.7129
Wetted Perim (m)	= 8.2983
Crit Depth, Yc (m)	= 0.2042
Top Width (m)	= 8.0119
EGL (m)	= 0.2979

(Sta, El, n)-(Sta, El, n)...

(0.0000, 100.0000)-(3.4300, 100.0000, 0.030)-(7.9240, 99.9100, 0.025)-(7.9300, 99.7600, 0.013)-(10.0000, 99.8000, 0.013)-(11.9300, 99.8400, 0.013)-(15.9300, 99
-(15.9360, 99.9100, 0.013)-(20.0000, 100.0000, 0.025)



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Mar 7 2018

Mississauga Road - 24m ROW Capacity (12m pavement)

User-defined

Invert Elev (m)	= 99.7400
Slope (%)	= 1.0000
N-Value	= Composite

Calculations

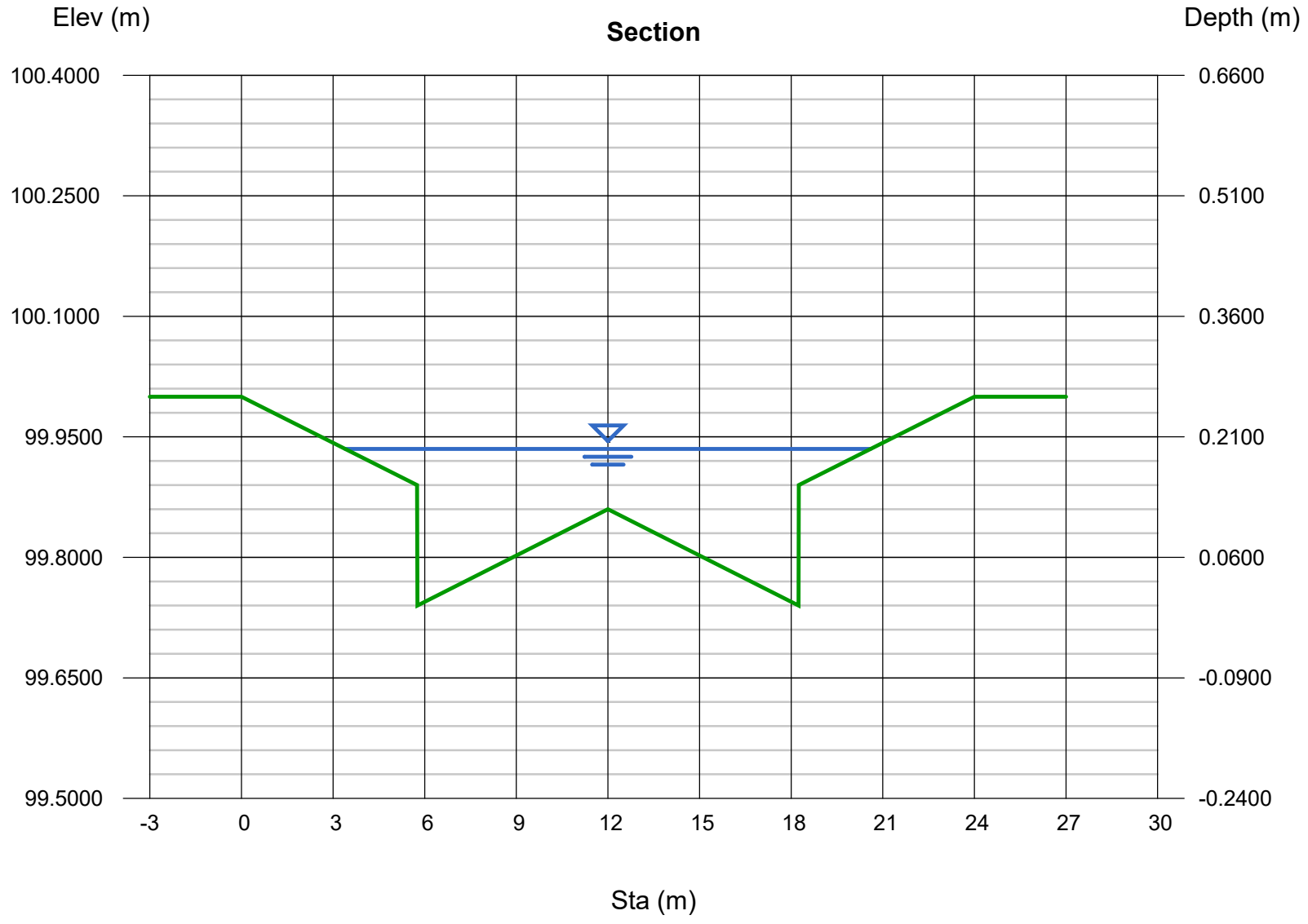
Compute by:	Q vs Depth
No. Increments	= 20

Highlighted

Depth (m)	= 0.1950
Q (cms)	= 2.3643
Area (sqm)	= 1.7931
Velocity (m/s)	= 1.3186
Wetted Perim (m)	= 17.4885
Crit Depth, Yc (m)	= 0.2195
Top Width (m)	= 17.2046
EGL (m)	= 0.2837

(Sta, El, n)-(Sta, El, n)...

(0.0000, 100.0000)-(5.7500, 99.8900, 0.025)-(5.7600, 99.7400, 0.013)-(12.0000, 99.8600, 0.013)-(18.2400, 99.7400, 0.013)-(18.2500, 99.8900, 0.013)-(24.0000, 10



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, Mar 7 2018

Mississauga Road Swale

Trapezoidal

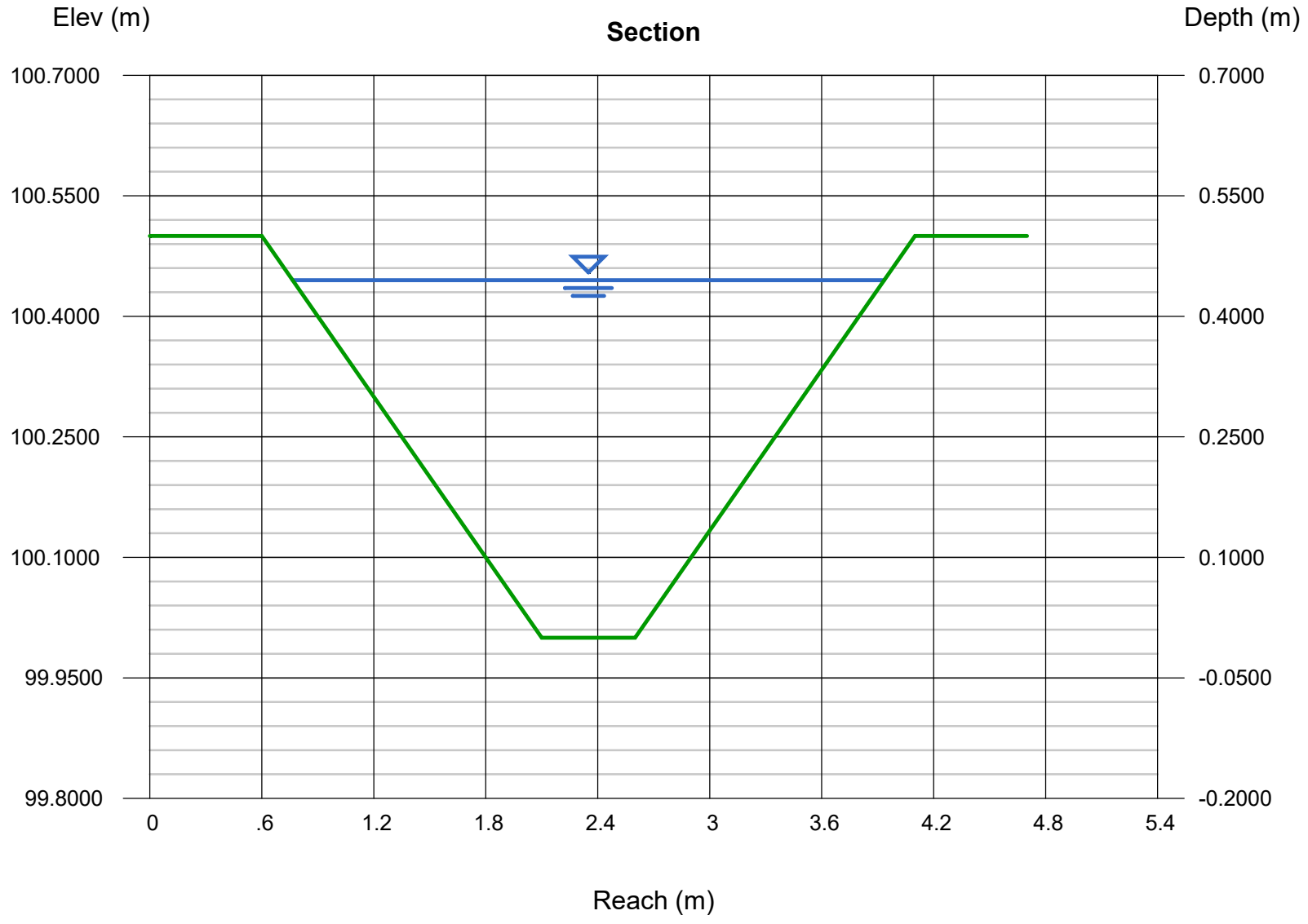
Bottom Width (m)	= 0.5000
Side Slopes (z:1)	= 3.0000, 3.0000
Total Depth (m)	= 0.5000
Invert Elev (m)	= 100.0000
Slope (%)	= 1.0000
N-Value	= 0.350

Calculations

Compute by:	Known Q
Known Q (cms)	= 0.0910

Highlighted

Depth (m)	= 0.4450
Q (cms)	= 0.091
Area (sqm)	= 0.8166
Velocity (m/s)	= 0.1114
Wetted Perim (m)	= 3.3145
Crit Depth, Yc (m)	= 0.1189
Top Width (m)	= 3.1700
EGL (m)	= 0.4456



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Tuesday, Mar 6 2018

Interim 100-year Channel

Trapezoidal

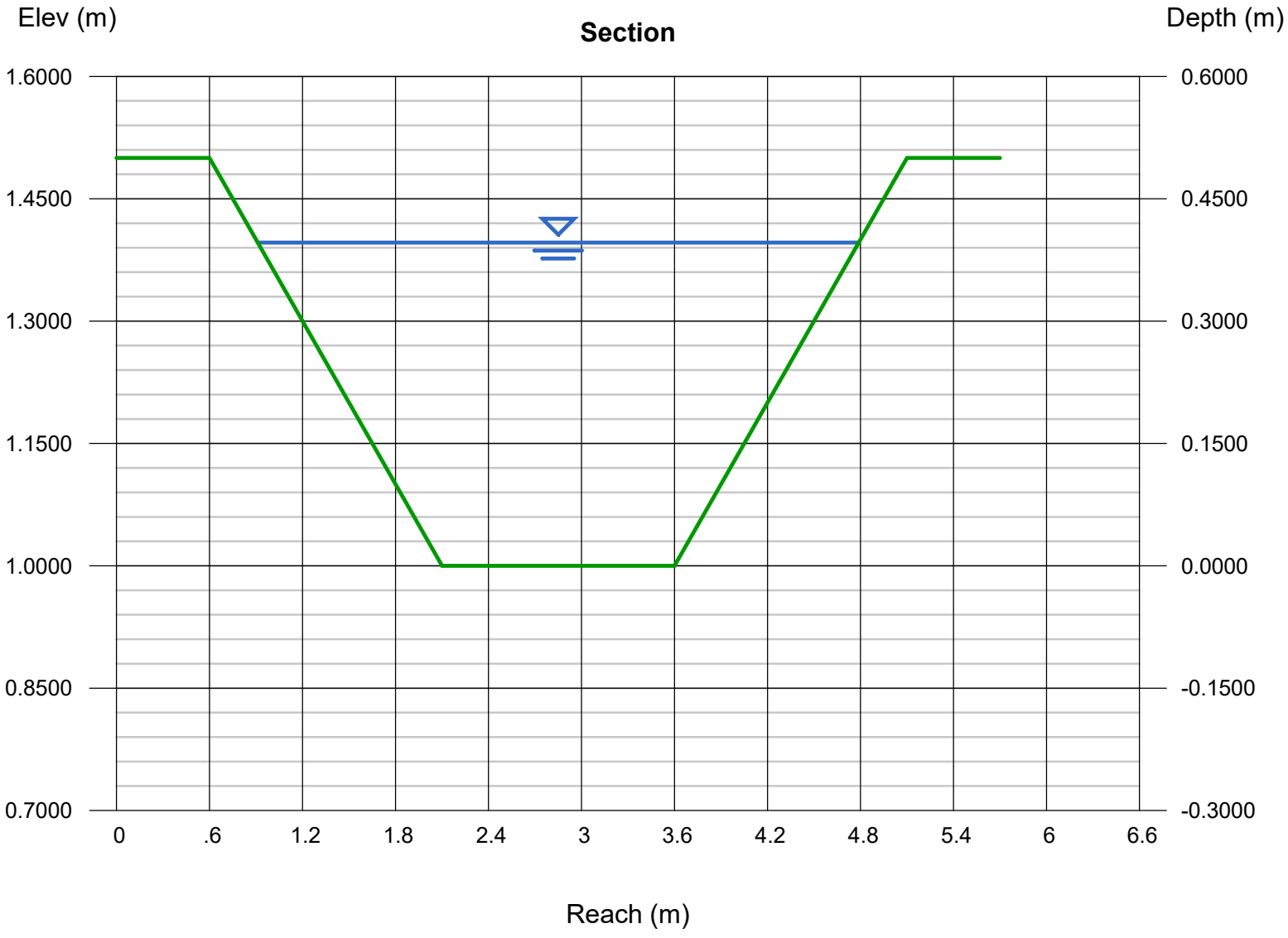
Bottom Width (m)	= 1.5000
Side Slopes (z:1)	= 3.0000, 3.0000
Total Depth (m)	= 0.5000
Invert Elev (m)	= 1.0000
Slope (%)	= 1.2500
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cms)	= 1.3890

Highlighted

Depth (m)	= 0.3962
Q (cms)	= 1.3890
Area (sqm)	= 1.0654
Velocity (m/s)	= 1.3038
Wetted Perim (m)	= 4.0060
Crit Depth, Yc (m)	= 0.3505
Top Width (m)	= 3.8774
EGL (m)	= 0.4829



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Tuesday, Mar 6 2018

Interim 100-year Channel-Inlet 2

Trapezoidal

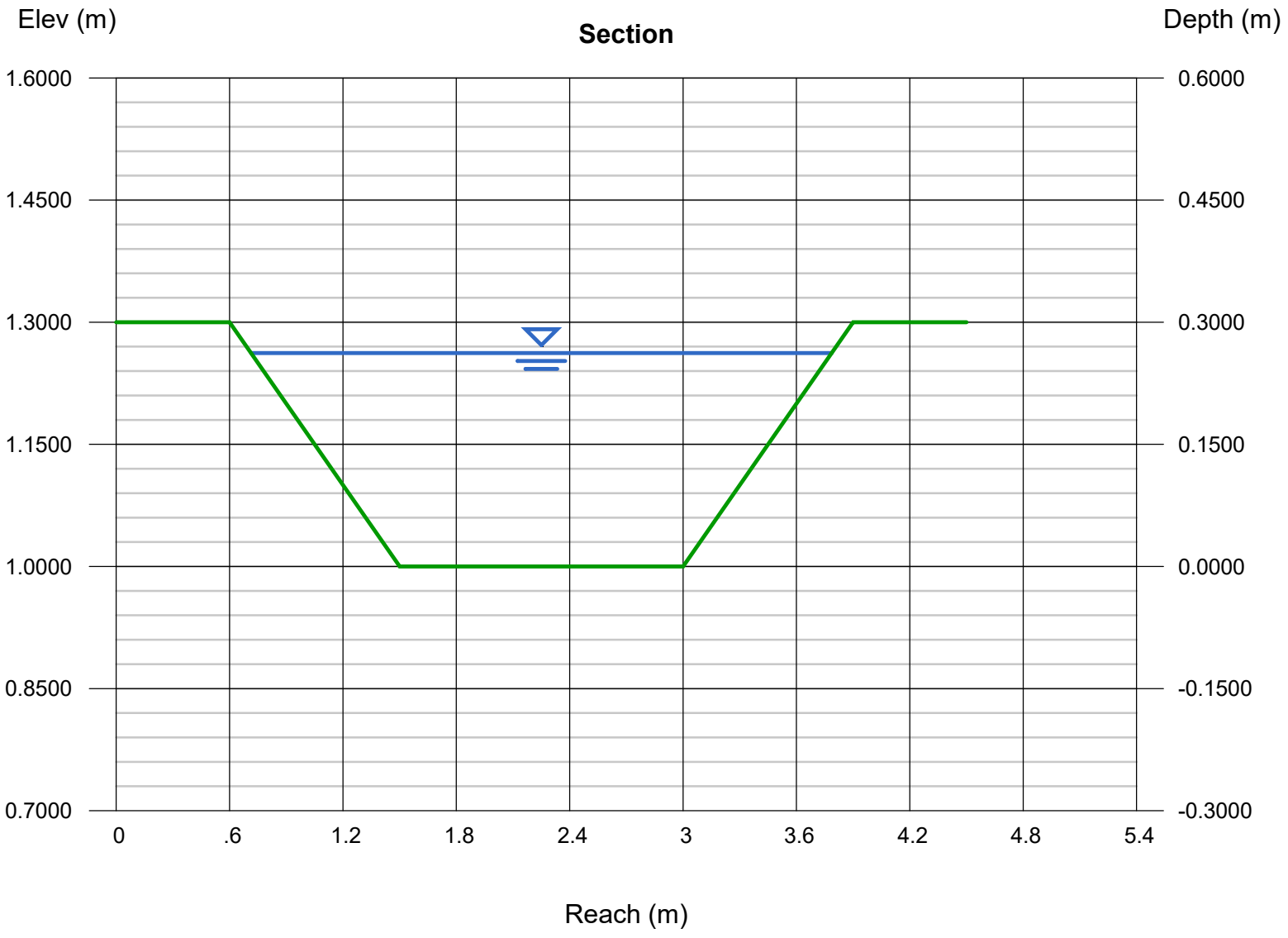
Bottom Width (m)	= 1.5000
Side Slopes (z:1)	= 3.0000, 3.0000
Total Depth (m)	= 0.3000
Invert Elev (m)	= 1.0000
Slope (%)	= 1.2500
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cms)	= 0.6280

Highlighted

Depth (m)	= 0.2621
Q (cms)	= 0.6280
Area (sqm)	= 0.5993
Velocity (m/s)	= 1.0478
Wetted Perim (m)	= 3.1578
Crit Depth, Yc (m)	= 0.2256
Top Width (m)	= 3.0728
EGL (m)	= 0.3181



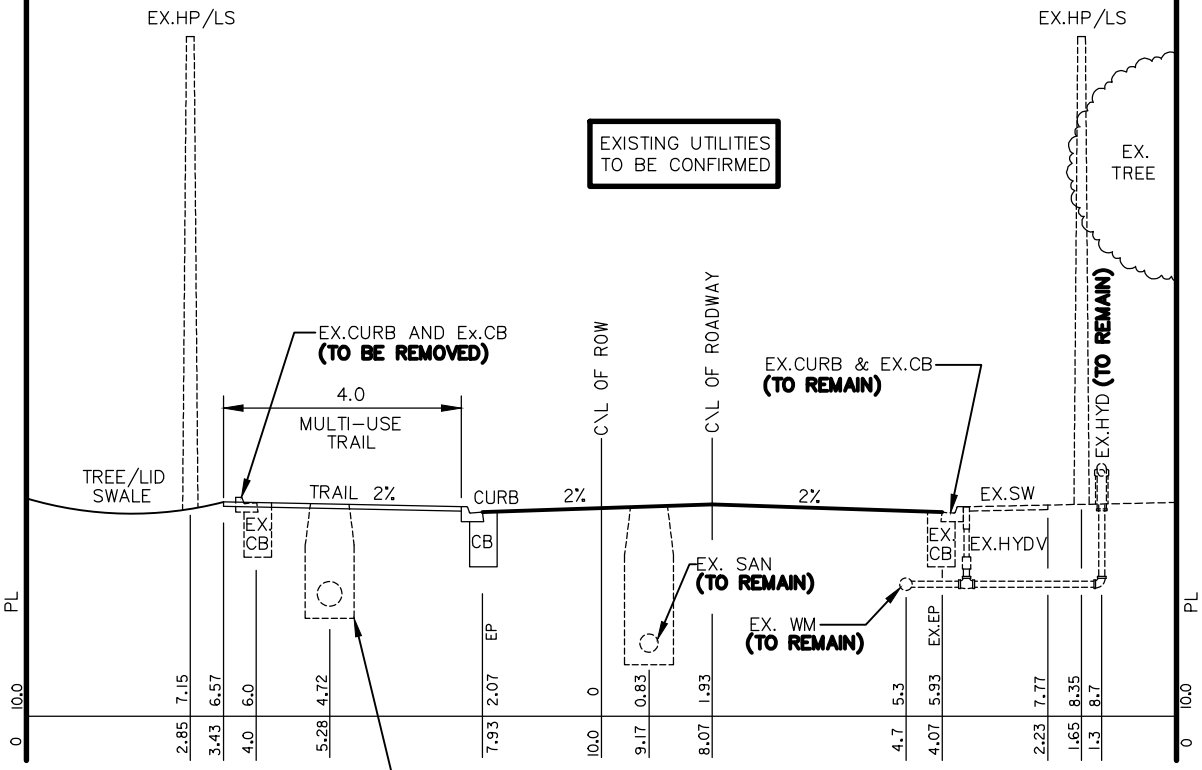
APPENDIX E

Proposed Right-of-Way cross-sections

- *Mississauga Road*
- *Street B*
- *Street F*
- *Street A*
- *Street C*

Urbantech Consulting, A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301 Markham, Ontario L3R 3T7
TEL: 905.946.9461 FAX: 905.946.9595
www.urbantech.com

MISSISSAUGA ROAD



METRIC
ALL DIMENSIONS IN METRES

NOTES

1. HYDRO, TELECOMMUNICATION PROVIDER, GAS AND SL CORRIDOR TO HAVE A MINIMUM COVER OF 0.965m.
2. WATERMAIN TO HAVE A MINIMUM COVER OF 1.7m.
3. IF UTILITIES CANNOT BE INSTALLED ACCORDING TO THIS STANDARD THEY ARE TO BE INSTALLED AS CLOSE AS POSSIBLE TO THE PRESCRIBED LOCATION SUBJECT TO THE APPROVAL OF THE TRANSPORTATION AND WORKS DEPARTMENT OF THE CITY OF MISSISSAUGA.
4. A 0.4m-0.6m CLEARANCE MUST BE MAINTAINED BETWEEN CABLES AND HYDRANTS.
5. A 0.3m CLEARANCE MUST BE MAINTAINED BETWEEN WATERMAINS AND UTILITY POLES.

LEGEND

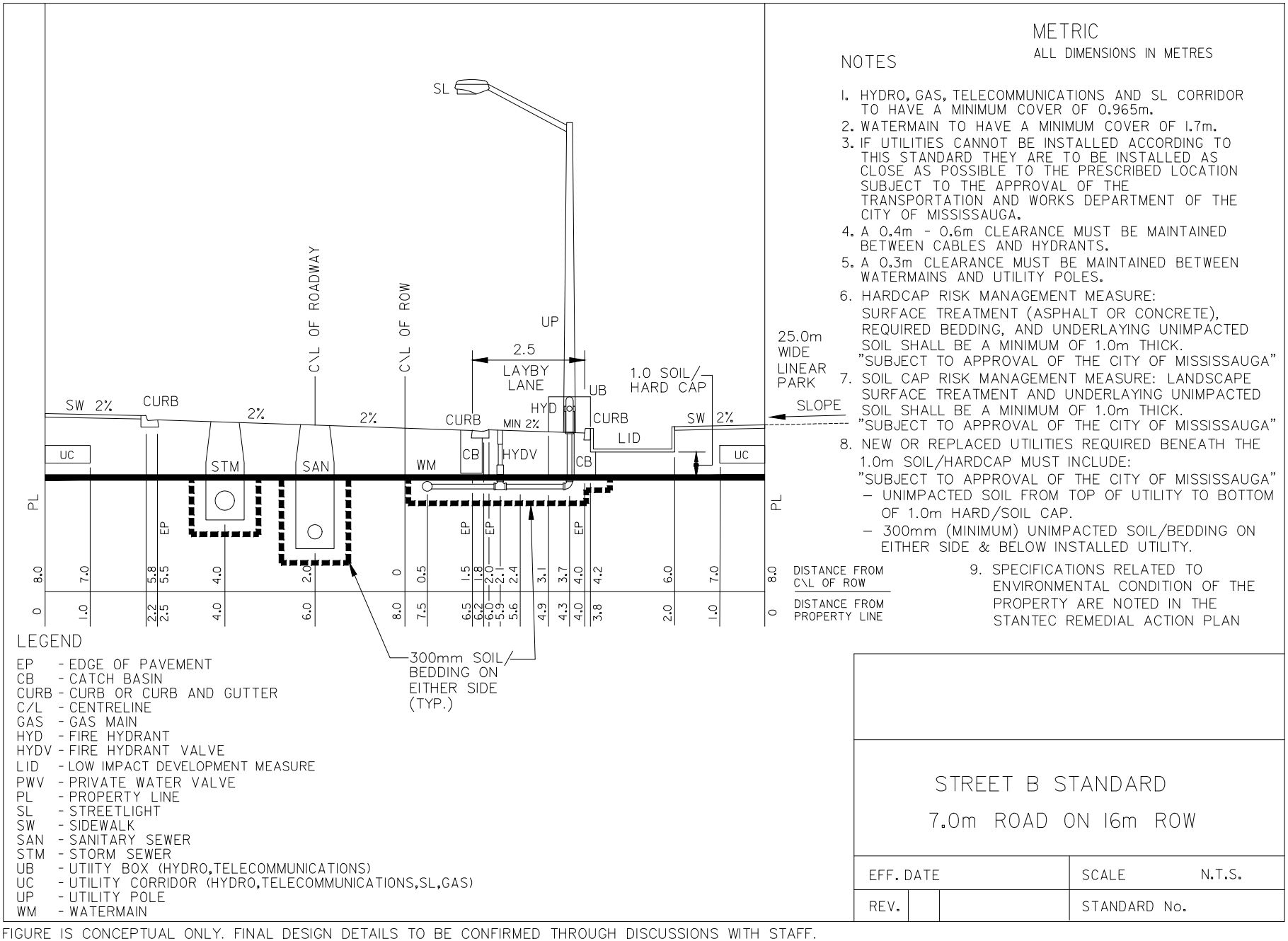
EP - EDGE OF PAVEMENT
CB - CATCH BASIN
CURB - CURB OR CURB AND GUTTER
C/L - CENTRELINE
HYD - FIRE HYDRANT
HYDV - FIRE HYDRANT VALVE
LID - LOW IMPACT DEVELOPMENT MEASURE
PWV - PRIVATE WATER VALVE
PL - PROPERTY LINE
SL - STREETLIGHT
SW - SIDEWALK
SAN - SANITARY SEWER
STM - STORM SEWER
UB - UTIITY BOX (HYDRO,TELECOMMUNICATIONS)
UC - UTILITY CORRIDOR (HYDRO,TELECOMMUNICATIONS,GAS,SL)
UP - UTILITY POLE
WM - WATERMAIN

MISSISSAUGA ROAD STANDARD
7.0m ROAD ON 20m ROW

EFF. DATE			SCALE N.T.S.
REV.			STANDARD No.

FIGURE IS CONCEPTUAL ONLY. FINAL DESIGN DETAILS TO BE CONFIRMED THROUGH DISCUSSIONS WITH STAFF.

STREET B



METRIC

ALL DIMENSIONS IN METRES

NOTES

1. HYDRO, GAS, TELECOMMUNICATIONS AND SL CORRIDOR TO HAVE A MINIMUM COVER OF 0.965m.
2. WATERMAIN TO HAVE A MINIMUM COVER OF 1.7m.
3. IF UTILITIES CANNOT BE INSTALLED ACCORDING TO THIS STANDARD THEY ARE TO BE INSTALLED AS CLOSE AS POSSIBLE TO THE PRESCRIBED LOCATION SUBJECT TO THE APPROVAL OF THE TRANSPORTATION AND WORKS DEPARTMENT OF THE CITY OF MISSISSAUGA.
4. A 0.4m - 0.6m CLEARANCE MUST BE MAINTAINED BETWEEN CABLES AND HYDRANTS.
5. A 0.3m CLEARANCE MUST BE MAINTAINED BETWEEN WATERMAINS AND UTILITY POLES.
6. HARDCAP RISK MANAGEMENT MEASURE: SURFACE TREATMENT (ASPHALT OR CONCRETE), REQUIRED BEDDING, AND UNDERLAYING UNIMPACTED SOIL SHALL BE A MINIMUM OF 1.0m THICK. "SUBJECT TO APPROVAL OF THE CITY OF MISSISSAUGA"
7. SOIL CAP RISK MANAGEMENT MEASURE: LANDSCAPE SURFACE TREATMENT AND UNDERLAYING UNIMPACTED SOIL SHALL BE A MINIMUM OF 1.0m THICK. "SUBJECT TO APPROVAL OF THE CITY OF MISSISSAUGA"
8. NEW OR REPLACED UTILITIES REQUIRED BENEATH THE 1.0m SOIL/HARDCAP MUST INCLUDE: "SUBJECT TO APPROVAL OF THE CITY OF MISSISSAUGA"
   - UNIMPACTED SOIL FROM TOP OF UTILITY TO BOTTOM OF 1.0m HARD/SOIL CAP.
   - 300mm (MINIMUM) UNIMPACTED SOIL/BEDDING ON EITHER SIDE & BELOW INSTALLED UTILITY.
9. SPECIFICATIONS RELATED TO ENVIRONMENTAL CONDITION OF THE PROPERTY ARE NOTED IN THE STANTEC REMEDIAL ACTION PLAN

LEGEND

EP - EDGE OF PAVEMENT
CB - CATCH BASIN
CURB - CURB OR CURB AND GUTTER
C/L - CENTRELINE
GAS - GAS MAIN
HYD - FIRE HYDRANT
HYDV - FIRE HYDRANT VALVE
LID - LOW IMPACT DEVELOPMENT MEASURE
PWV - PRIVATE WATER VALVE
PL - PROPERTY LINE
SL - STREETLIGHT
SW - SIDEWALK
SAN - SANITARY SEWER
STM - STORM SEWER
UB - UTIITY BOX (HYDRO,TELECOMMUNICATIONS)
UC - UTILITY CORRIDOR (HYDRO,TELECOMMUNICATIONS,SL,GAS)
UP - UTILITY POLE
WM - WATERMAIN

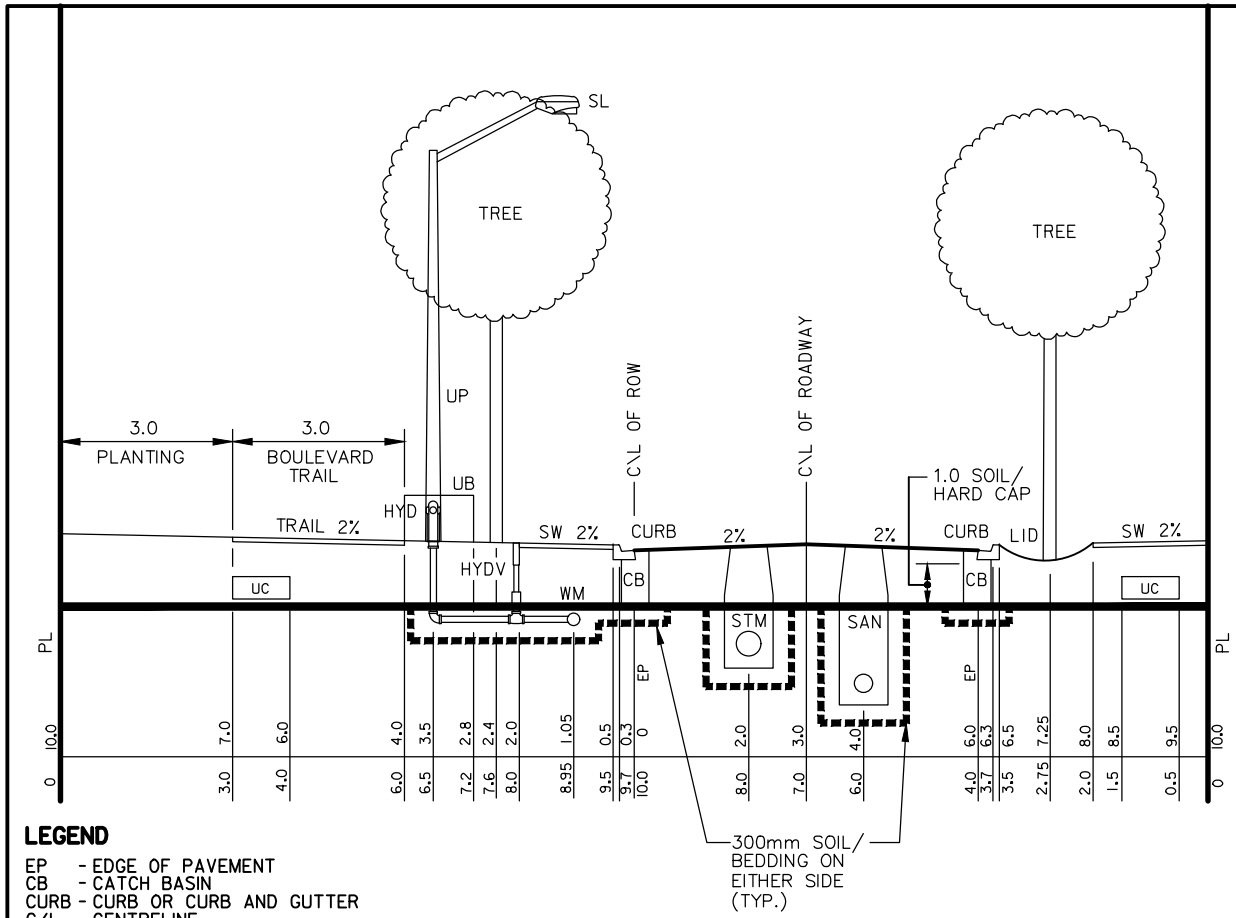
STREET B STANDARD

7.0m ROAD ON 16m ROW

EFF. DATE			SCALE N.T.S.
REV.			STANDARD No.

FIGURE IS CONCEPTUAL ONLY. FINAL DESIGN DETAILS TO BE CONFIRMED THROUGH DISCUSSIONS WITH STAFF.

STREET F



METRIC

ALL DIMENSIONS IN METRES

NOTES

1. HYDRO, TELECOMMUNICATION PROVIDER, GAS AND SL CORRIDOR TO HAVE A MINIMUM COVER OF 0.965m.
2. WATERMAIN TO HAVE A MINIMUM COVER OF 1.7m.
3. IF UTILITIES CANNOT BE INSTALLED ACCORDING TO THIS STANDARD THEY ARE TO BE INSTALLED AS CLOSE AS POSSIBLE TO THE PRESCRIBED LOCATION SUBJECT TO THE APPROVAL OF THE TRANSPORTATION AND WORKS DEPARTMENT OF THE CITY OF MISSISSAUGA.
4. A 0.4m-0.6m CLEARANCE MUST BE MAINTAINED BETWEEN CABLES AND HYDRANTS.
5. A 0.3m CLEARANCE MUST BE MAINTAINED BETWEEN WATERMAINS AND UTILITY POLES.
6. HARDCAP RISK MANAGEMENT MEASURE:
   SURFACE TREATMENT (ASPHALT OR CONCRETE), REQUIRED BEDDING, AND UNDERLAYING UNIMPACTED SOIL SHALL BE A MINIMUM OF 1.0m THICK.
   "SUBJECT TO APPROVAL OF THE CITY OF MISSISSAUGA"
7. SOIL CAP RISK MANAGEMENT MEASURE: LANDSCAPE SURFACE TREATMENT AND UNDERLAYING UNIMPACTED SOIL SHALL BE A MINIMUM OF 1.0m THICK.
   "SUBJECT TO APPROVAL OF THE CITY OF MISSISSAUGA"
8. NEW OR REPLACED UTILITIES REQUIRED BENEATH THE 1.0m SOIL/HARDCAP MUST INCLUDE:
   "SUBJECT TO APPROVAL OF THE CITY OF MISSISSAUGA"
   - UNIMPACTED SOIL FROM TOP OF UTILITY TO BOTTOM OF 1.0m HARD/SOIL CAP.
   - 300mm (MINIMUM) UNIMPACTED SOIL/BEDDING ON EITHER SIDE & BELOW INSTALLED UTILITY.
9. SPECIFICATIONS RELATED TO ENVIRONMENTAL CONDITION OF THE PROPERTY ARE NOTED IN THE STANTEC REMEDIAL ACTION PLAN

LEGEND

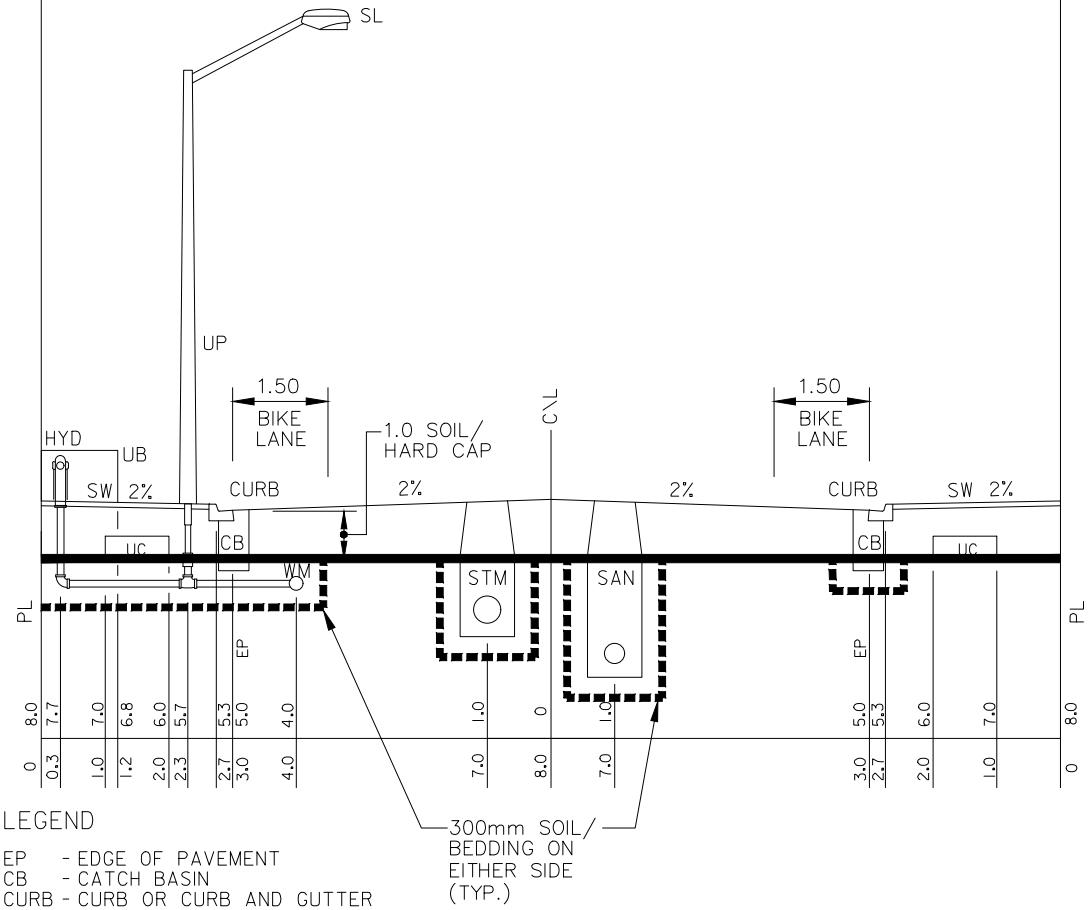
EP - EDGE OF PAVEMENT
CB - CATCH BASIN
CURB - CURB OR CURB AND GUTTER
C/L - CENTRELINE
HYD - FIRE HYDRANT
HYDV - FIRE HYDRANT VALVE
LID - LOW IMPACT DEVELOPMENT MEASURE
PWV - PRIVATE WATER VALVE
PL - PROPERTY LINE
SL - STREETLIGHT
SW - SIDEWALK
SAN - SANITARY SEWER
STM - STORM SEWER
UB - UTIITY BOX (HYDRO,TELECOMMUNICATIONS)
UC - UTILITY CORRIDOR (HYDRO,TELECOMMUNICATIONS,GAS,SL)
UP - UTILITY POLE
WM - WATERMAIN

STREET F STANDARD
6.0m ROAD ON 20m ROW

EFF. DATE			SCALE N.T.S.
REV.			STANDARD No.

FIGURE IS CONCEPTUAL ONLY. FINAL DESIGN DETAILS TO BE CONFIRMED THROUGH DISCUSSIONS WITH STAFF.

STREET A



LEGEND

EP - EDGE OF PAVEMENT
CB - CATCH BASIN
CURB - CURB OR CURB AND GUTTER
C/L - CENTRELINE
GAS - GAS MAIN
HYD - FIRE HYDRANT
HYDV - FIRE HYDRANT VALVE
PWV - PRIVATE WATER VALVE
PL - PROPERTY LINE
SL - STREETLIGHT
SW - SIDEWALK
SAN - SANITARY SEWER
STM - STORM SEWER
UB - UTIITY BOX (HYDRO,TELECOMMUNICATIONS)
UC - UTILITY CORRIDOR (HYDRO,TELECOMMUNICATIONS,SL,GAS)
UP - UTILITY POLE
WM - WATERMAIN

METRIC
ALL DIMENSIONS IN METRES

NOTES

1. HYDRO, GAS, TELECOMMUNICATIONS AND SL CORRIDOR TO HAVE A MINIMUM COVER OF 0.965m.
2. WATERMAIN TO HAVE A MINIMUM COVER OF 1.7m.
3. IF UTILITIES CANNOT BE INSTALLED ACCORDING TO THIS STANDARD THEY ARE TO BE INSTALLED AS CLOSE AS POSSIBLE TO THE PRESCRIBED LOCATION SUBJECT TO THE APPROVAL OF THE TRANSPORTATION AND WORKS DEPARTMENT OF THE CITY OF MISSISSAUGA.
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   - 300mm (MINIMUM) UNIMPACTED SOIL/BEDDING ON EITHER SIDE & BELOW INSTALLED UTILITY.

DISTANCE FROM C\L OF ROW
DISTANCE FROM PROPERTY LINE

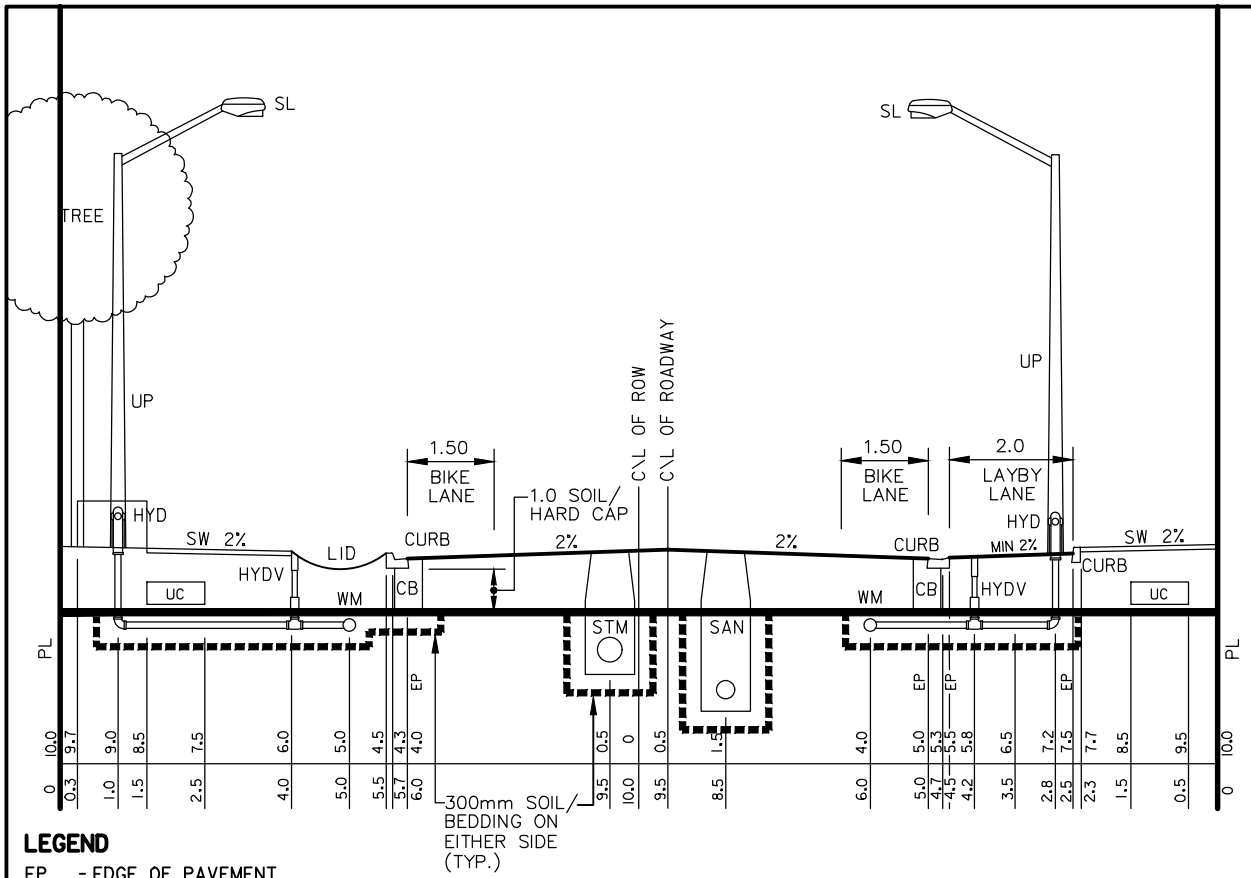
9. SPECIFICATIONS RELATED TO ENVIRONMENTAL CONDITION OF THE PROPERTY ARE NOTED IN THE STANTEC REMEDIAL ACTION PLAN

STREET A STANDARD
10.0m ROAD ON 16m ROW

EFF. DATE	SCALE N.T.S.
REV.	STANDARD No.

FIGURE IS CONCEPTUAL ONLY. FINAL DESIGN DETAILS TO BE CONFIRMED THROUGH DISCUSSIONS WITH STAFF.

STREET C



LEGEND

EP - EDGE OF PAVEMENT
CB - CATCH BASIN
CURB - CURB OR CURB AND GUTTER
C/L - CENTRELINE
HYD - FIRE HYDRANT
HYDV - FIRE HYDRANT VALVE
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UB - UTIITY BOX (HYDRO,TELECOMMUNICATIONS)
UC - UTILITY CORRIDOR (HYDRO,TELECOMMUNICATIONS,GAS,SL)
UP - UTILITY POLE
WM - WATERMAIN

METRIC

ALL DIMENSIONS IN METRES

NOTES

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   - 300mm (MINIMUM) UNIMPACTED SOIL/BEDDING ON EITHER SIDE & BELOW INSTALLED UTILITY.

DISTANCE FROM C\L OF ROW

DISTANCE FROM PROPERTY LINE

9. SPECIFICATIONS RELATED TO ENVIRONMENTAL CONDITION OF THE PROPERTY ARE NOTED IN THE STANTEC REMEDIAL ACTION PLAN

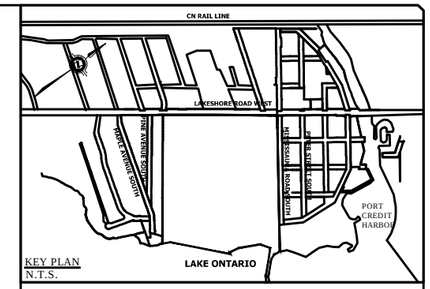
STREET C STANDARD

9.0m ROAD ON 20m ROW

EFF. DATE			SCALE N.T.S.
REV.			STANDARD No.

FIGURE IS CONCEPTUAL ONLY. FINAL DESIGN DETAILS TO BE CONFIRMED THROUGH DISCUSSIONS WITH STAFF.

FIGURES & DRAWINGS



KEY PLAN
N.T.S.

LEGEND

PROPOSED SITE AREA

REFERENCE DRAWINGS

DRAFT PLAN: J.D. BARNES, ALL OF LOT 10, PART OF LOTS 9 AND 11 AND WATER LOCATION IN FRONT OF LOT 9, BROKEN FRONT RANGE CREDIT INDIAN RESERVE. REFERENCE NO. 17-70-041-03-20-4. DATE: AUGUST 11, 2017
SURVEY: MACKAY, MACKAY & PETERS LTD., PROJECT No. 14-152. DATE: JUNE 1ST, 2015

BENCHMARK

BEARINGS ARE UTM GRID, DERIVED FROM SPECIFIC CONTROL POINTS 00919711310 & 00919711151, U.T.M ZONE 17, NAD83 (ORIGINAL).

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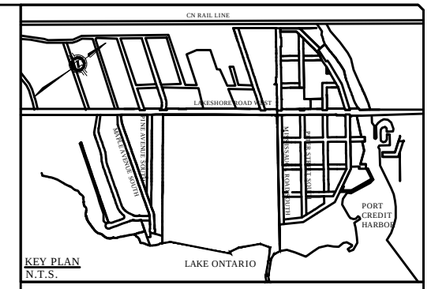
www.urbantech.com

SITE LOCATION PLAN

PROJECT No.:	16-489	DATE:	AUGUST 2017	DRAWING No.:
SCALE: H 1:5000	40.0m 20.0m 0m 20.0m 40.0m			FIGURE 1



KEY PLAN
N.T.S.

LEGEND

- PROPOSED BOUNDARY
- PROPOSED TREES
- PROPOSED PAVING
- PROPOSED GRASS
- CVC HAZARD REGULATION LIMIT

REFERENCE DRAWINGS

DRAFT PLAN: J.D. BARNES, ALL OF LOT 10, PART OF LOTS 9 AND 11 AND WATER LOCATION IN FRONT OF LOT 9, BROKEN FRONT RANGE CREDIT INDIAN RESERVE, REFERENCE NO. 17-30-041-02-01-A, DATE: AUGUST 11, 2017
SURVEY: MACKAY, MACKAY & PETERS LTD., PROJECT No. 14-102, DATE: JUNE 1ST, 2015

BENCHMARK

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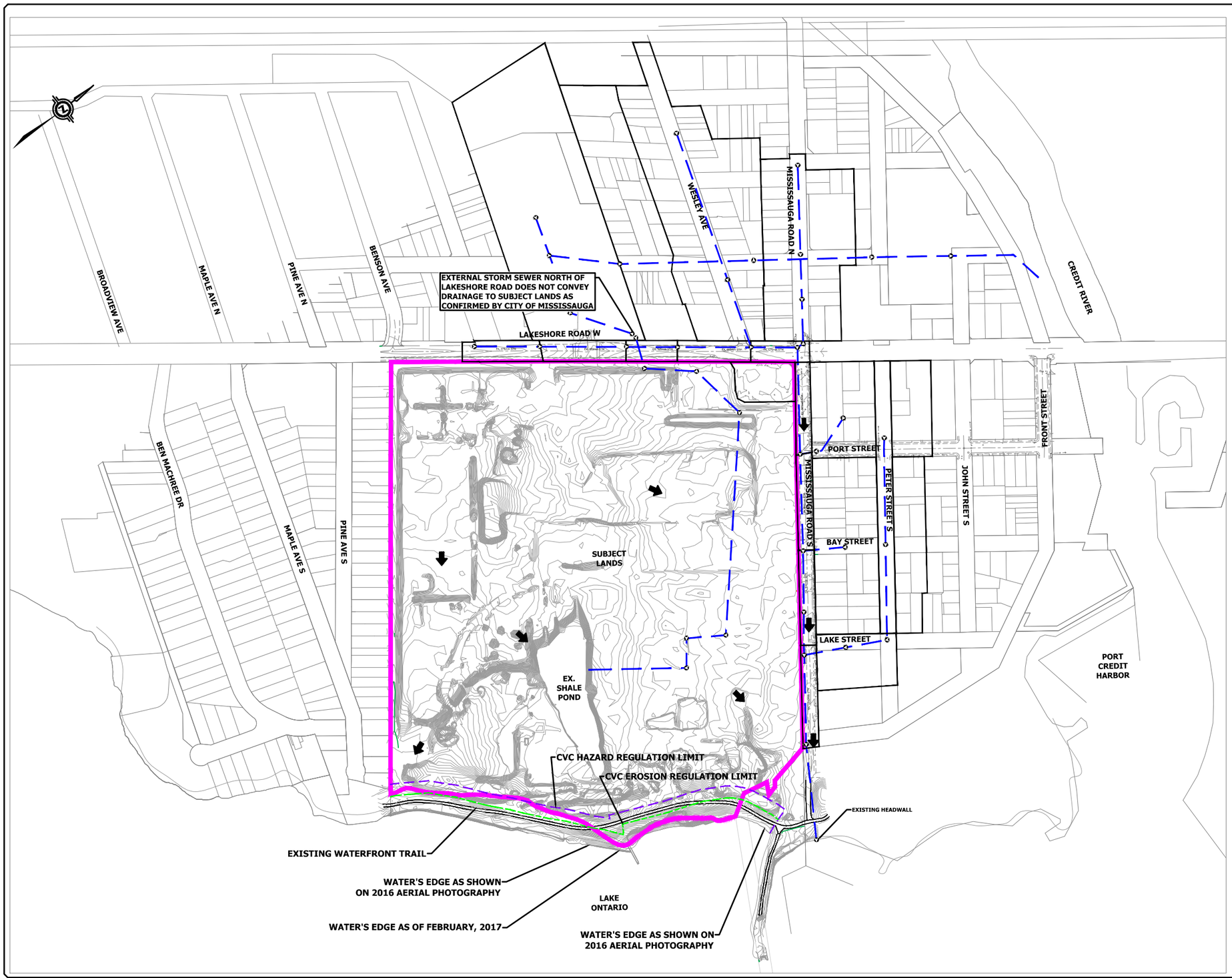
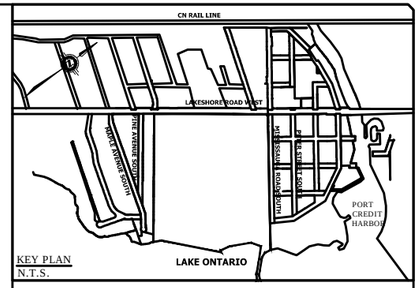
CONCEPT PLAN

PROJECT No.:	16-489	DATE:	AUGUST 2017	DRAWING No.:
SCALE: H 1:3000	40m 20m 0m 20m 40m			FIGURE 2





KEY PLAN
N.T.S.

LEGEND

- PROPERTY BOUNDARY
- EXISTING OVERLAND FLOW
- EXTERNAL DRAINAGE BOUNDARY
- CVC EROSION REGULATION LIMIT
- CVC HAZARD REGULATION LIMIT
- EXISTING STORM SEWER

REFERENCE DRAWINGS

DRAFT PLAN: S.D. BARNES, ALL OF LOT 10, PART OF LOTS 9 AND 11 AND WATER LOCATION IN FRONT OF LOT 9, BROKEN FRONT RANGE CREDIT INDIAN RESERVE. REFERENCE NO. 17-20-0041-03-DP-A. DATE: AUGUST 11, 2017
SURVEY: MACKAY, MACKAY & PETERS LTD., PROJECT No. 14-032, DATE: JUNE 1ST, 2015

BENCHMARK

BEARINGS ARE UTM GRID, DERIVED FROM SPECIFIC CONTROL POINTS 00919711150 & 00919711151, U.T.M ZONE 17, NAD83 (ORIGINAL).

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EXISTING CONDITIONS PLAN

PROJECT No.:	16-489	DATE:	AUGUST 2017	DRAWING No.:
SCALE:	N.T.S.			FIGURE 3

LAKESHORE ROAD W

PINE AVE S

MAPLE AVE S

MISSISSAUGA ROAD S

PORT STREET

BAY STREET

PETER STREET S

JOHN STREET S

LAKE STREET

BLOCK A

BLOCK B

BLOCK C

BLOCK D

BLOCK E

BLOCK F

BLOCK G

BLOCK H

BLOCK I

BLOCK J1

BLOCK J2

BLOCK K

BLOCK L

BLOCK M

BLOCK N

BLOCK O

BLOCK P

BLOCK Q

BLOCK R

BLOCK S

BLOCK T

BLOCK U

STREET A

STREET B

STREET C

STREET D

STREET E

STREET F

EXISTING WATERFRONT TRAIL

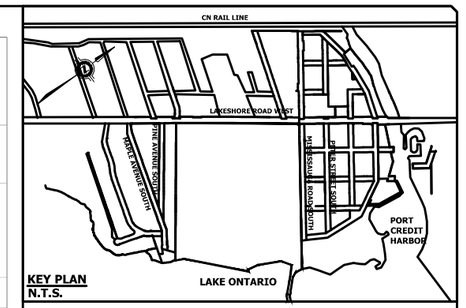
CVC HAZARD REGULATION LIMIT

CVC EROSION REGULATION LIMIT

WATER'S EDGE AS SHOWN
ON 2016 AERIAL PHOTOGRAPHY

LAKE
ONTARIO

WATER'S EDGE AS OF FEBRUARY, 2017



KEY PLAN
N.T.S.

LEGEND

- SITE BOUNDARY
- PROPOSED LOT BOUNDARIES
- UNDERGROUND PARKING
- CVC EROSION REGULATION LIMIT
- CVC HAZARD REGULATION LIMIT

REFERENCE DRAWINGS

DRAFT PLAN: J.D. BARNES, ALL OF LOT 10, PART OF LOTS 9 AND 11 AND WATER LOCATION IN FRONT OF LOT 9, BROKEN FRONT RANGE CREDIT INDIAN RESERVE, REFERENCE NO, 17-30-041-03-DP-A, DATE: AUGUST 11, 2017
SURVEY: MACKAY, MACKAY & PETERS LTD., PROJECT No. 14-102, DATE: JUNE 1ST, 2015

BENCHMARK

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00919711150 & 00919711151, U.T.M ZONE 17, NAD83 (ORIGINAL).

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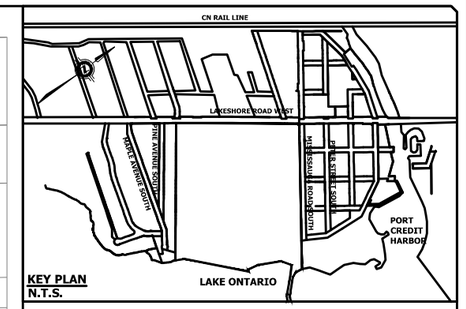
PROPOSED DRAFT PLAN

PROJECT No.:	16-489	DATE:	AUGUST 2017	DRAWING No.:
SCALE: H 1:3000	40m 20m 0m 20m 40m			FIGURE 5



KEY PLAN
N.T.S.

LEGEND

- PROPOSED PHASING BOUNDARY
- CVC EROSION REGULATION LIMIT
- CVC HAZARD REGULATION LIMIT

REFERENCE DRAWINGS

DRAFT PLAN: J.D. BARNES, ALL OF LOT 10, PART OF LOTS 9 AND 11 AND WATER LOCATION IN FRONT OF LOT 9, BROKEN FRONT RANGE CREDIT INDIAN RESERVE, REFERENCE NO. 17-30-041-03-DP-A, DATE: AUGUST 11, 2017
SURVEY: MACKAY, MACKAY & PETERS LTD., PROJECT No. 14-332, DATE: JUNE 1ST, 2015

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CONCEPTUAL PHASING

PROJECT No.:	16-489	DATE:	AUGUST 2017	DRAWING No.:
SCALE: H 1:3000	40m 20m 0m 20m 40m			FIGURE 5

LEGEND

- 242.00 — EXISTING CONTOUR AND ELEVATION
- +240.71 — PROPOSED ELEVATION
- +169.99 — EXISTING ELEVATION
- ---- — UNDERGROUND PARKING

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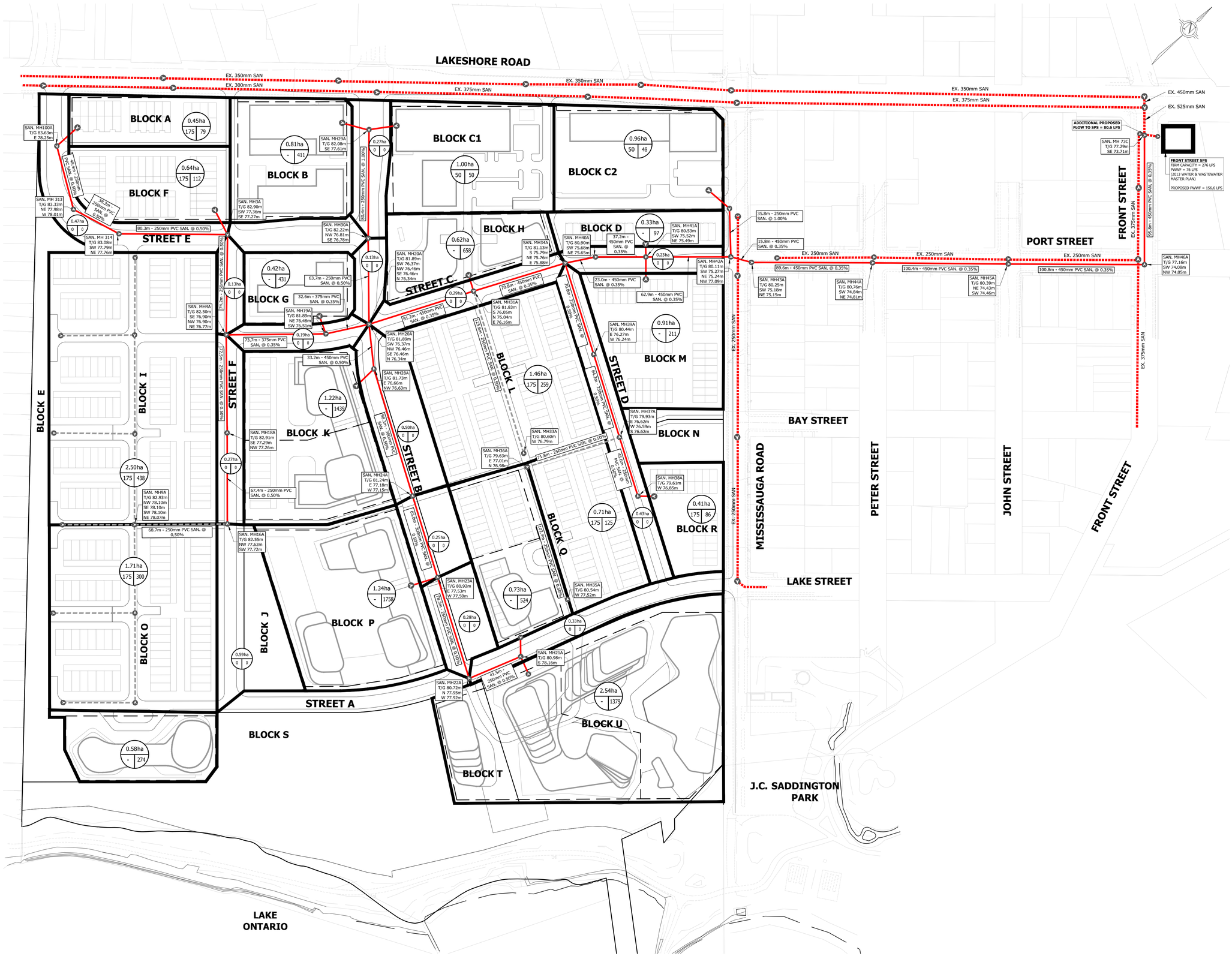
WEST VILLAGE PARTNERS
CITY OF MISSISSAUGA

PRELIMINARY GRADING PLAN

PROJECT No.	DATE	SCALE	DWG No.
16-489	MAR 2017	1:1250	GR-1

File: C:\Users\sriemer\Documents\Drawing1.dwg - Revised by <SRIEMER> - Wed, Mar 08 2017 - 2:59pm



LEGEND

- SANITARY DRAINAGE AREA BOUNDARY
- PROPOSED SANITARY SEWER
- EXISTING SANITARY SEWER
- UNDERGROUND PARKING

0.10ha • DRAINAGE AREA (ha)
70 | 7 • POPULATION
DENSITY (P/Ha)
(WHERE NOT SHOWN, POPULATION IS BASED ON 2.7 PEOPLE PER UNIT FOR HIGH RISES AND 175 P/Ha FOR TOWNHOMES)

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WEST VILLAGE PARTNERS
CITY OF MISSISSAUGA

PRELIMINARY SANITARY SERVICING PLAN

PROJECT No.	DATE	SCALE	DWG No.
16-489	MAR 2017	1:1250	SAN-1

File: P:\Projects\16-489\Reports\FSR\Drawings\16-489-FSR-SAN-1.dwg - Revised by <XREFNEB> - Wed, Mar 08 2017 - 9:04am

LEGEND

- PROPOSED 300mm WATERMAIN
- EXISTING WATERMAIN
- FUTURE WATERMAIN

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WEST VILLAGE PARTNERS
CITY OF MISSISSAUGA

PRELIMINARY WATER SERVICING PLAN

PROJECT No.	DATE	SCALE	DWG No.
16-489	MAR 2017	1:1250	WM-1

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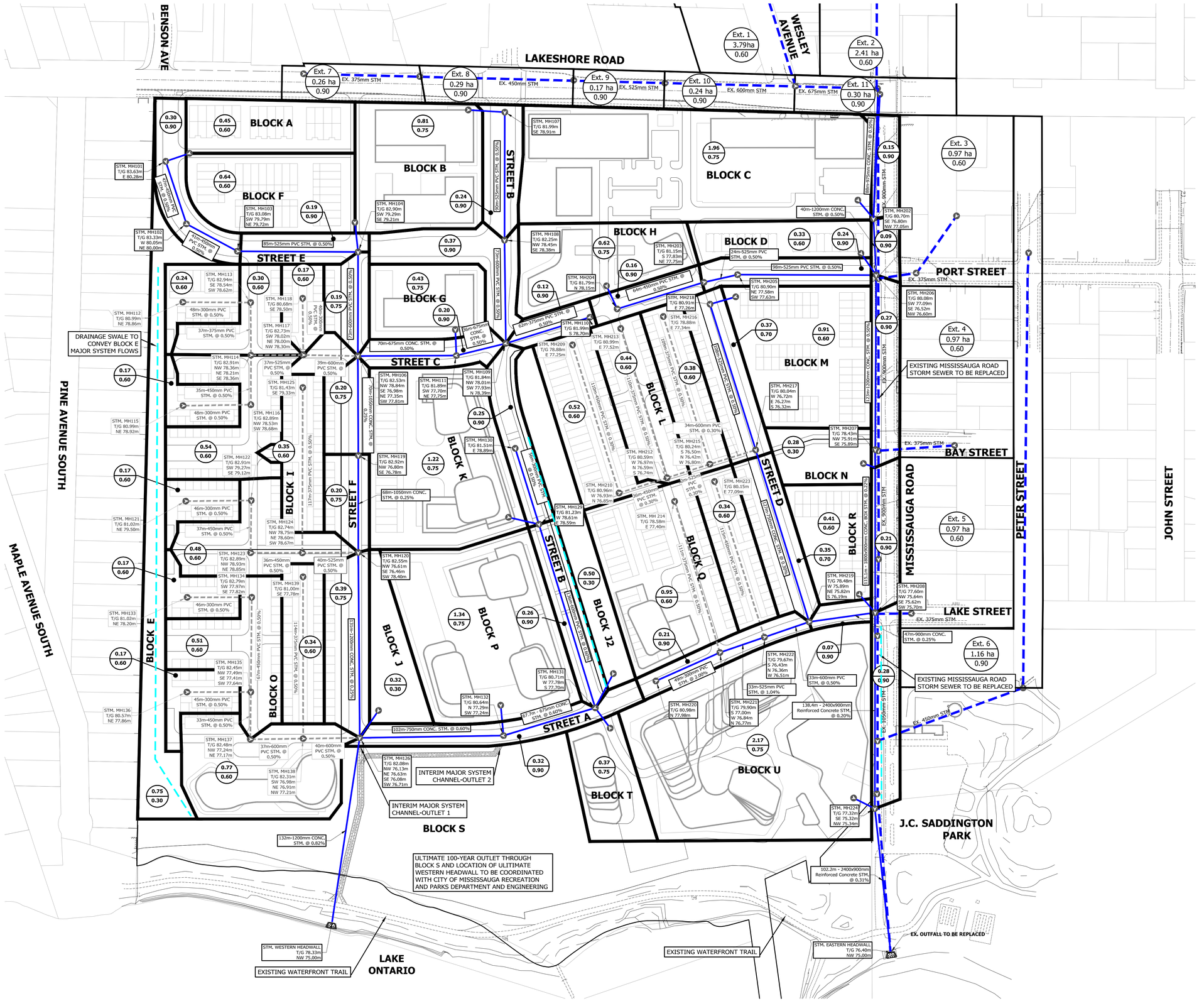

LEGEND

- STORM DRAINAGE AREA BOUNDARY
- PROPOSED PUBLIC STORM SEWER
- PROPOSED PRIVATE STORM SEWER
- PROPOSED SWALE
- EXISTING STORM SEWER

8.34 / 0.25 — AREA (ha) / RUN-OFF COEFFICIENT

Ext. 3 / 0.97 ha / 0.60 — EXTERNAL CATCHMENT I.D. / EXTERNAL CATCHMENT AREA / RUNOFF COEFFICIENT

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WEST VILLAGE PARTNERS
CITY OF MISSISSAUGA

PRELIMINARY MINOR SYSTEM STORM SERVICING PLAN

PROJECT No.	DATE	SCALE	DWG No.
16-489	MAR 2017	1:1250	STM-1

File: P:\Projects\16-489\Reports\FSR\Drawings\16-489-FSR-STM-1.dwg - Revised by <SRSTMER> - Tue, Mar 07 2017 - 6:01pm

LEGEND

- 100-YEAR CAPTURE STORM DRAINAGE AREA BOUNDARY
- PROPOSED PUBLIC STORM SEWER
- PROPOSED PRIVATE STORM SEWER
- EXISTING STORM SEWER
- BLOCK BOUNDARY
- UNDERGROUND PARKING AREA
- 100YR-16 / 1.35 ha / 0.132 cms — CAPTURE POINT; AREA (ha); 100-YEAR FLOW
- PROPOSED SWALE
- OVERLAND FLOW
- 7.46 ha / 0.65 / 1.198 m³/s — CONTRIBUTING EXTERNAL MAJOR SYSTEM AREA (ha); RUN-OFF COEFFICIENT; CONTRIBUTING EXTERNAL MAJOR SYSTEM FLOWS
- MAJOR SYSTEM DRAINAGE TO MISSISSAUGA ROAD (TO RECEIVE 100-YEAR CAPTURE AT MH224)
- LOCAL 100-YEAR CAPTURE AREAS DRAINING TO HW EAST
- MAJOR SYSTEM DRAINAGE TO INTERIM 100-YEAR CHANNEL INLET 1
- MAJOR SYSTEM DRAINAGE TO INTERIM 100-YEAR CHANNEL INLET 2
- LOCAL 100-YEAR CAPTURE AREAS DRAINING TO HW WEST

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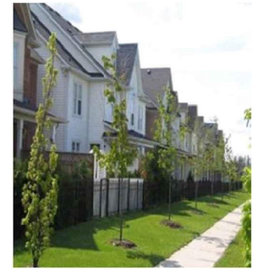
WEST VILLAGE PARTNERS
CITY OF MISSISSAUGA

PRELIMINARY MAJOR SYSTEM STORM DRAINAGE PLAN

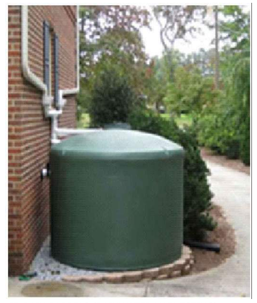
PROJECT No.	DATE	SCALE	DWG No.
16-489	MAR 2017	1:1250	STM-2

File: P:\Projects\16-489\Reports\FSR\Drawings\16-489-FSR-STM-1.dwg - Revised by <SRIEMER> - Tue, Mar 07 2017 - 6:01pm

ALLOCATION OF LID AREAS IS PRELIMINARY AND SUBJECT TO CHANGE. FINAL DESIGN DETAILS TO BE CONFIRMED THROUGH DISCUSSIONS WITH STAFF.


LID TREE PITS


LID GREEN ROOF


LID RAIN BARRELS (RAINWATER HARVESTING)

LID GREEN STREET BOULEVARD (RAIN GARDENS)


LID PERMEABLE PAVEMENT


LID SWALE ALONG PEDESTRIAN PATH

ALL LID ILLUSTRATIONS ARE CONCEPTUAL AND FOR ILLUSTRATIVE PURPOSES ONLY

LEGEND

- BIO-RETENTION AREAS
- CONCEPTUAL PERMEABLE PAVEMENT AREA (FOR ILLUSTRATIVE PURPOSES ONLY)
- CONCEPTUAL GREEN ROOF AREA (FOR ILLUSTRATIVE PURPOSES)
- BIO-SWALE
- BIO-SWALE FOR PRIVATE BLOCK TREATMENT
- OIL/GRIT SEPARATOR
- CISTERN
- RAIN BARRELS
- FILTERRA TREES
- TREE PITS
- UNDERGROUND PARKING
- BLOCK BOUNDARIES
- LID RIGHT OF WAY TREATMENT STRATEGY 1 (CB SHIELDS, FILTERRA TREES AND BIO-SWALES)
- LID RIGHT OF WAY TREATMENT STRATEGY 2 (TREE PITS AND BIO-SWALES)

FOR DISCUSSION ONLY

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WEST VILLAGE PARTNERS
CITY OF MISSISSAUGA

PRELIMINARY LOW IMPACT DEVELOPMENT PLAN

PROJECT No.	DATE	SCALE	DWG No.
16-489	MAR 2017	1:1250	LID-1

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