REPORT

Geotechnical Investigation

Proposed Commercial and Residential Development

2451-2495 Danforth Avenue, Toronto, Ontario

Submitted to:

FCR Management Services LP

85 Hanna Avenue, Suite 400
Toronto, ON M6K 3S3

Attention: Mr. Albert Ho
Director, Environmental Programs

Submitted by:

WSP Canada Inc.

351 Steelcase Avenue West
Markham, Ontario, Canada L3R 4H9
+1 905 723 2727

22535291 (1000)

November 8, 2024

Distribution List

1 eCopy: FCR Management Services LP

1 eCopy: WSP Canada Inc.

Table of Contents

TABLES

APPENDICES

1.0 INTRODUCTION

WSP Canada Inc. (“WSP”), previously Golder Associates Ltd. (Golder), has been retained by FCR Management Services LP (“FCR”) to provide geotechnical, hydrogeological, and environmental engineering services in support of the design for the proposed development of the Site located at 2451-2495 Danforth Avenue in the City of Toronto, Ontario (the “Site”) at the location shown on the Key Plan, Figure 1 in ***Appendix B***. The terms of reference for the geotechnical consulting services are included in WSP’s proposal No. CX22535291 dated July 5, 2022. Authorization to proceed with the investigation was received in the form of the signed Authorization to Proceed on August 5, 2022.

The purpose of the investigation was to obtain information on the general subsurface soil and groundwater conditions at the site by means of a limited number of boreholes and laboratory tests. Based on an interpretation of the factual information available for this site, this report provides engineering comments, recommendations and parameters for the geotechnical design aspects of the project, including selected construction considerations which could influence design decisions. It should be noted that this report addresses only the geotechnical (physical) aspects of the subsurface conditions at the site. The geo-environmental (chemical) aspects, including the consequences of possible surface and/or subsurface contamination resulting from previous activities or uses of the site and/or resulting from the introduction onto the site of materials from off-site sources, are beyond the terms of reference for this assignment and are not addressed herein. The hydrogeological and environmental assessments for the proposed development will be submitted separately.

This report provides the results of the geotechnical investigation and should be read in conjunction with the *“Important Information and Limitations of This Report”* in ***Appendix A*** which forms an integral part of this document. The reader’s attention is specifically drawn to this information, as it is essential for the proper use and interpretation of this report. The factual data, interpretations and recommendations contained in this report pertain to a specific project as described in the report and are not applicable to any other project or site location. If the project is modified in concept, location or elevation, or if the project is not initiated within eighteen months of the date of the report, WSP should be given an opportunity to confirm that the recommendations in this report are still valid.

2.0 SITE AND PROJECT DESCRIPTION

The site is located at the southeast corner of Danforth Avenue and Westlake Avenue, in the City of Toronto, Ontario, as shown on the Key Plan and Borehole Location Plan, Figure 1 and Figure 2 in ***Appendix B***. The site is bordered by Danforth Avenue to the north, commercial buildings to the east, residential properties to the south and Westlake Avenue to the west. The project area is currently occupied by a commercial property (grocery store) located centrally on the subject property with associated paved parking areas located to the east and west of the building.

Based on the information and updated plans provided by the Client, it is understood that the existing building on the site will be demolished and redeveloped with two mixed-use buildings (Building A - 35 storeys and Building B - 13 storeys), with the remainder of the site to include a driveway along the south property limits. Two levels of underground parking are currently being considered for the development, anticipated to generally extend from lot-line to lot-line. Based on updated plans it is anticipated that two levels of underground parking will extend approximately 7 m below ground surface (mbgs), approximate Elevation of 124.2 masl. Footings and elevator shafts are expected to typically extend no more than 2 m below the finished floor grade of the lowest level (9 mbgs).

3.0 INVESTIGATION PROCEDURES

The combined geotechnical, hydrogeological and environmental field investigation for this assignment was carried out from September 11 to 12, September 14 to 17, and September 23, 2023, during which time seven boreholes (designated as MW23-1 to MW23-7) were advanced. The boreholes for the investigation were drilled using a standard track-mounted D-20 drill rig supplied and operated by Altech Drilling and Investigative Services Ltd. of Cambridge, Ontario, subcontracted to WSP. As part of the geotechnical investigation, Pressure Meter (PMT) testing was performed at two borehole locations, outlined in Table 1 below. The approximate borehole locations are shown on the Borehole Location Plan, Figure 2 in ***Appendix B***. The results of the subsurface investigation are presented on the Record of Borehole sheets in ***Appendix C*** and the results of geotechnical laboratory testing in ***Appendix D***.

Table 1: Drilling Program

Proposed Development	Borehole ID	Ground Surface Elevation	Borehole Depth (m)	Finished Elevation (masl)	Notes
Proposed Building B - 10 Storey Mixed-Use	MW23-1	131.1	18.90	112.20	50-millimetre (mm) diameter monitoring well installed. Screen Interval (16.8 m to 18.3 m)
	MW23-2	130.57	21.79	108.78	50-mm diameter monitoring well installed. Screen Interval (9.1 m to 12.2 m) Designated as **MW23-2S**
					Nested 50-mm diameter monitoring well installed. Screen Interval (19.8 m to 21.3 m) Designated as **MW23-2**
	MW23-3	131.19	21.62	109.57	50-mm diameter monitoring well installed. Screen Interval (19.8 m to 21.3 m)
	MW23-4	130.55	18.44	112.11	50-mm diameter monitoring well installed. Screen Interval (9.1 m to 12.2 m)
Proposed Building A - 10 Storey Mixed-Use	MW23-5	130.18	18.75	111.43	50-mm diameter monitoring well installed Screen Interval (9.1 m to 12.2 m) Pressure meter (PMT) Testing
	MW23-6	130.91	21.49	109.42	50-mm diameter monitoring well installed. Screen Interval (19.8 m to 21.3 m) Pressure meter (PMT) Testing

Proposed Development	Borehole ID	Ground Surface Elevation	Borehole Depth (m)	Finished Elevation (masl)	Notes
	MW23-7	130.48	18.69	111.79	50-mm diameter monitoring well installed Screen Interval (15.2 m to 18.3 m)

Standard Penetration Testing (SPT) and sampling were carried out at regular intervals of depth in the boreholes using conventional 38-millimetre (mm) internal diameter split spoon sampling equipment driven by an automatic hammer in accordance with the SPT procedures outlined in ASTM International standard D1586: "Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils". The split-spoon samplers used in the investigation limit the maximum particle size that can be sampled and tested to about 40 mm. Therefore, particles or objects that may exist within the soils that are larger than this dimension were not sampled and are not represented in the grain size distributions contained herein. The results of the in situ field tests (i.e., SPT "N"-values) as presented on the Record of Borehole sheets and in subsequent sections of this report are the values measured directly in the field and are unfactored.

The groundwater conditions were noted in the open boreholes during and upon completion of drilling and monitoring wells were installed in all boreholes (see Table 1) following the completion of drilling to allow for subsequent groundwater measurements, hydrogeological and environmental sampling and testing. Each monitoring well consists of a 50-mm diameter PVC riser pipe, with a slotted screen sealed at a selected depth within the borehole. A sand filter pack surrounded the screen, and above the screen the borehole and annulus surrounding the well pipe were backfilled to the surface with bentonite. The well installation details, and groundwater level readings are presented on the Record of Borehole sheets in ***Appendix C***.

The field work for this investigation was observed by members of WSP's technical staff, who located the boreholes in the field, arranged for the clearance of underground utilities, observed the boreholes drilling, sampling and in situ testing operations, logged the boreholes as well as examined and took custody of the recovered soil samples. The samples were identified in the field, placed in appropriate containers, labelled and transported to our Whitby geotechnical laboratory for further visual examination by the project engineer and laboratory testing.

Index and classification tests, consisting of water content determinations, gradation analyses and Atterberg Limits testing, were carried out on selected soil samples and the results are presented in ***Appendix D*** and also on the Record of Borehole sheets in ***Appendix C***.

In addition to the geotechnical laboratory testing, five composite soil samples (from MW23-1, MW23-2 and MW23-5 to MW23-7) were collected and submitted for corrosivity testing and the laboratory certificate of analysis for the corrosivity parameters is provided in ***Appendix E***.

Pressure meter (PMT) testing was performed at two borehole locations (MW23-5 and MW23-6) carried out by In-Depth Geotechnical Inc. The results are summarized below and included in **Appendix F.**

The geodetic ground surface elevations at the borehole locations were measured with a Trimble GPS and referenced from the topographic map provided by the Client, titled, "*Plan of Survey Showing Topographical Information of Lot 1 and part of Lot 2, Registered Plan 614 York and Part of Lot 13 South Side of Danforth*

Avenue, Registered Plan 90 York and Part of Lots 3,4,5,6,7 and 8, Registered Plan 580 York, City of Toronto", prepared by KRCMAR Surveyors Ltd., dated August 4, 2022, and as such, the elevations given on the Record of Borehole sheets and referred to herein should be considered to be approximate. The borehole locations were referenced to existing prominent site features and plotted on the plan provided in the preparation of Figure 2, Borehole Location Plan. As such, the borehole locations shown on Figure 2 in ***Appendix B*** should also be considered to be approximate.

4.0 SITE GEOLOGY AND STRATIGRAPHY

4.1 Regional Geology

The surficial geology aspects of the general site area are referenced from the following publication:

- Chapman, L.J., and Putnam, D.F., 2007, *"The Physiography of Southern Ontario"*; 4th Edition, Ontario Geological Survey.

Physiographic mapping in the area according to the above-noted reference indicates that the site lies within the physiographic region of southern Ontario known as the South Slope. The South Slope region slopes gradually downward towards Lake Ontario. The overburden immediately below ground surface within the South Slope generally consists of clayey silt till and silty clay till and at depth consists of alternating deposits of dense lacustrine sands and silts and overconsolidated lacustrine clays and clay tills overlying the bedrock.

The subsurface conditions encountered during the investigation are generally consistent with the physiographic mapping.

4.2 Subsurface Conditions

The detailed subsurface soil and groundwater conditions encountered in the boreholes advanced at the site for this report along with the results of geotechnical laboratory testing are shown on the Record of Borehole sheets in ***Appendix C***. WSP's "*Methods of Soil Classification*", "*Abbreviations and Terms Used on Records of Boreholes and Test Pits*" and "*List of Symbols*" are provided in ***Appendix C*** to assist in the interpretation of the Record of Borehole sheets. The detailed results of geotechnical laboratory testing on selected soil samples are presented in ***Appendix D***. The Pressure meter testing results are presented in ***Appendix F.***

The Record of Borehole sheets indicate the subsurface conditions at the borehole locations only. The stratigraphic boundaries shown on the borehole records are inferred from non-continuous sampling, observations of drilling progress as well as results of Standard Penetration Tests and, therefore, typically represent transitions between soil types rather than exact planes of geological/stratigraphic change. Subsurface soil conditions will vary between and beyond the borehole locations.

In general, the subsurface conditions encountered in the boreholes consisted of asphalt underlain by fill soils. The fill soils were further underlain by a thick non-cohesive deposit consisting of silty sand to sand and silt. Cohesive deposits of silty clay were encountered Interlayered within the non-cohesive deposits at boreholes MW23-1 and MW23-2.

The subsurface soil and groundwater conditions encountered in the boreholes drilled at the site are described in the following sections.

4.2.1 Asphalt

Asphalt ranging in thickness from about 100 mm to 130 mm was encountered at ground surface at all the borehole locations.

4.2.2 Non-Cohesive Fill

Non-cohesive fill was encountered underlying the surficial asphalt at all borehole locations. The non-cohesive fill, consisting of silty sand to sand and gravel, was encountered at depths of about 0.1 mbgs, or approximate Elevations of 130.1 masl to 131.1 masl, and extended to depths of about 1.5 mbgs to 4.5 mbgs (approximate Elevations of 125.7 masl to 129.7 masl).

SPT “N”-values, measured within the non-cohesive fill deposits, ranged from 2 blows to 32 blows per 0.3 m of penetration, indicating a very loose to dense state of compactness. The water contents measured on samples of the non-cohesive fill ranged from about 1 percent to 10 percent.

4.2.3 Non-Cohesive Deposit

Non-cohesive deposits of silty sand to sand and silt were encountered in all boreholes, underlying the surficial fill materials. The non-cohesive deposits were encountered at depths ranging from about 1.5 mbgs to 4.5 mbgs (approximate Elevations 125.7 masl to 129.7 masl) and extended to depths ranging from about 18.4 mbgs to 21.8 mbgs (approximate Elevations 108.8 masl to 112.2 masl). All the boreholes were terminated within the non-cohesive deposit.

SPT “N”-values measured within the non-cohesive deposits ranged from 6 blows per 0.3 m of penetration to 50 blows per 0.15 m of penetration, indicating a loose to very dense state of compactness. The natural water content measured on samples of the non-cohesive deposits ranged from approximately 1 percent to 24 percent.

4.2.4 Cohesive Deposits

Cohesive deposits were encountered at MW23-1 and MW23-2, interlayered within the non-cohesive deposits. The cohesive deposits, consisting of silty clay, were encountered at depths of 17.1 mbgs and 15.4 mbgs (approximate Elevations of 115.2 masl and 114.0 masl) in boreholes MW23-1 and MW23-2 respectively. The silty clay deposits extended to depths of 17.8 mbgs and 16.9 mbgs (Elevations 113.7 masl and 113.3 masl), in boreholes MW23-1 and MW23-2, respectively.

SPT “N”-values measured within the cohesive deposit ranged from 29 blows per 0.3 m of penetration to 89 blows per 0.25 m of penetration, suggesting a very stiff to hard consistency. The water contents measured on samples of the cohesive silty clay ranged from about 13 percent to 17 percent.

4.2.5 Pressuremeter Testing Results

The results of the Pressuremeter tests completed in boreholes MW23-6 and MW23-7 are summarized below in ***Table 2*** and are provided in detail in ***Appendix F***.

Table 2: Pressuremeter Results

Borehole	Test No.	Depth (m)	Pressuremeter Modulus E_{PMT} (MPa)	Limit Pressure p^*_L (kPa)	Young's Modulus E_{young} (MPa)	Soil Type
MW23-5	1	9.6	54.1	4,674	146	Very dense sand
	2	12.7	57.6	5,356	153	
	3	15.8	55.5	6,984	170	Very dense sandy silt
MW23-6	1	8.1	57.1	4,041	136	Very dense sand
	2	11.2	82.4	5,659	180	
	3	14.2	75.0	6,776	201	

4.2.6 Geotechnical Laboratory Testing

The results of an Atterberg limit test on a sample of the cohesive deposit is provided in **Appendix D**. A summary of the results is presented in **Table 3**, below. The results of grain size distribution analyses on selected samples of the non-cohesive deposits are provided in **Appendix D**. A summary of the results is presented in **Table 4**, below.

Table 3: Results of Atterberg Limits Testing

Borehole ID	Sample Number	Liquid Limit %	Plastic Limit %	Plasticity Index %	Soil Classification	
MW23-2	15A	23	16	7	CL	Silty Clay

Table 4: Results of Grain Size Distribution Analyses

Borehole ID	Sample Number	Depth (m)	Soil Classification	Notes
MW23-1	9	7.6 to 8.5	SP	Sand
MW23-1	15A	16.8 to 17.1	ML	Slit
MW23-2	8	6.1 to 6.7	SP	Sand
MW22-2	12	12.2 to 12.8		
MW22-3	15	16.8 to 17.1	ML	Silt
MW23-6	15	21.3 to 21.5	ML	Sandy silt
MW23-7	10	9.1 to 9.8	SM	Silty Sand

4.2.7 Groundwater Conditions

The groundwater conditions encountered in each of the boreholes during drilling and measured in the monitoring wells are shown in detail on the Record of Borehole sheets in ***Appendix B***. The groundwater levels were measured in the monitoring wells between late October 2023 and early January 2024, and are provided below in Table 4.

Table 5: Measured Groundwater Levels in Monitoring Wells

Borehole ID	Ground Surface (masl)	Measurement Date	Water Level (m bgs)	Water Level (masl)
MW23-1	131.10	24-Oct-23	11.66	119.44
		26-Oct-23	11.73	119.37
		13-Nov-23	11.77	119.33
		6-Dec-23	11.94	119.16
		19-Dec-23	11.81	119.30
		10-Jan-24	11.80	119.30
		21-Oct-24	11.70	119.4
MW23-2S	130.55	24-Oct-23	10.97	119.58
		26-Oct-23	11.03	119.52
		13-Nov-23	10.90	119.65
		6-Dec-23	10.96	119.59
		19-Dec-23	10.95	119.61
		10-Jan-24	10.99	119.56
		21-Oct-24	10.80	119.75
MW23-2	130.57	25-Oct-23	11.30	119.27
		26-Oct-23	11.45	119.12
		12-Nov-23	11.30	119.27
		6-Dec-23	11.53	119.04
		19-Dec-23	11.48	119.09
		10-Jan-24	11.62	118.95
		21-Oct-24	11.40	119.17
MW23-3	131.19	24-Oct-23	12.17	119.02
		26-Oct-23	12.28	118.91
		13-Nov-23	12.24	118.95
		6-Dec-23	12.36	118.83
		19-Dec-23	12.30	118.89
		10-Jan-24	12.40	118.79
		21-Oct-24	12.24	118.95

Borehole ID	Ground Surface (masl)	Measurement Date	Water Level (m bgs)	Water Level (masl)
MW23-4	130.55	24-Oct-23	10.81	119.74
		26-Oct-23	dry	-
		13-Nov-23	dry	-
		6-Dec-23	10.91	119.64
		19-Dec-23	10.91	119.64
		10-Jan-24	dry	-
		21-Oct-24	10.63	119.92
MW23-5	131.10	25-Oct-23	10.50	120.60
		26-Oct-23	10.48	120.62
		13-Nov-23	10.43	120.68
		6-Dec-23	10.57	120.53
		19-Dec-23	10.46	120.65
		10-Jan-24	10.54	120.56
		21-Oct-24	10.14	120.96
MW23-6	130.91	25-Oct-23	11.68	119.23
		26-Oct-23	11.78	119.13
		13-Nov-23	11.71	119.20
		6-Dec-23	11.80	119.11
		19-Dec-23	11.79	119.12
		10-Jan-24	11.83	119.08
		21-Oct-24	11.72	119.2
MW23-7	130.48	24-Oct-23	11.24	119.24
		26-Oct-23	11.42	119.06
		13-Nov-23	11.39	119.09
		6-Dec-23	11.46	119.02
		19-Dec-23	11.44	119.04
		10-Jan-24	11.52	118.96
		21-Oct-24	11.42	119.06

It should be noted that the encountered and measured groundwater levels reflect the groundwater conditions in the boreholes at the time of the field work from October 2023 to January 2024 and October 2024. Groundwater levels at the site are anticipated to vary between and beyond the borehole locations and to fluctuate with seasonal variations in precipitation and snowmelt.

5.0 DISCUSSION AND RECOMMENDATIONS

This section of the report provides engineering information on and recommendations for the preliminary geotechnical design aspects of the project based on our interpretation of the borehole information, the laboratory test data and our understanding of the project requirements. The information in this portion of the report is provided for planning and design purposes for the guidance of the design engineers and architects. Where comments are made on construction, they are provided only in order to highlight aspects of construction which could affect the design of the project. Contractors bidding on or undertaking any work at the site should examine the factual results of the investigation, satisfy themselves as to the adequacy of the information for construction and make their own independent interpretation of the factual data as it affects their proposed construction techniques, schedule, equipment capabilities, costs, sequencing and the like.

At the time of preparing this report, the preliminary conceptual information available for the site indicated that the proposed development will consist of two buildings, Building A (35-storeys) and Building B (13-storeys), which will have common underground parking anticipated to extend two levels below grade. With two levels of below grade parking, it is assumed that the lowest FFE will be about 7 m below the existing ground surface (124.2 masl). Footing bases and elevator shafts are anticipated to be about 1 m to 2 m below the finished basement floor (~9 m bgs).

Since the proposed development is at the conceptual stage, the recommendations in the following sections should be revised once the design of the proposed development has progressed further.

5.1 Geotechnical Recommendations

5.1.1 Foundation Design

Spread/Strip Footings

Consideration may be given to supporting the proposed buildings on conventional spread/strip footings founded in the competent, native and undisturbed deposits of very dense sand to silty sand or hard silty clay at the minimum depths and corresponding elevations as given in ***Table 6***. Alternative foundation types such as caissons may be considered if higher bearing capacity than provided below are required.

Table 6: Recommended Founding Depths/Elevations for Shallow Foundations

Borehole ID	Minimum Recommended Depth (m)	Maximum Footing Base Elevation (m)	Anticipated Founding Materials
MW23-1	7.6	119.1	Dense to Very dense sand to silty sand
MW23-2	7.6	116.9	
MW23-3	7.6	119.2	
MW23-4	7.6	118.6	
MW23-5	7.6	118.2	
MW23-6	7.6	118.9	

Borehole ID	Minimum Recommended Depth (m)	Maximum Footing Base Elevation (m)	Anticipated Founding Materials
MW23-7	7.6	115.3	

All fill, old foundations, other structures and any deleterious materials should be stripped/removed from the proposed development area. The spread/strip footings bearing at the depths/elevations provided above may be designed using the factored geotechnical resistance at Ultimate Limit States (ULS) and the geotechnical reaction at Serviceability Limit States (SLS) for 25 mm total settlement and 19 mm differential settlement provided in ***Table 7***.

Table 7: Recommended ULS and SLS for Shallow Foundations

Spread or Strip Footing Dimensions	Factored Geotechnical Resistance at ULS (kPa)	Geotechnical Reaction at SLS (for 25 mm of settlement) kPa
1 m x 1 m Spread	450	425
2 m x 2 m Spread	500	450
3 m x 3 m Spread	525	350
4 m x 4 m Spread	575	275
5 m x 5 m Spread	600	225
0.5 m Strip footing	300	250
1.0 m Strip footing		

All exterior footings and footings in unheated areas should be provided with at least 1.2 m of earth cover after final grading or equivalent insulation, in order to address the potential for damage due to frost action.

As the actual soil bearing resistances are related to the actual footing sizes, founding depths and to the proximity to the face of the slope, the foundations recommendations must be reviewed by WSP once the building details are finalized. Additionally, the soil resistance and reaction values presented in the above ***Table 7*** are calculated under the assumption that the founding elevations are at least 1 m below the finished slab elevation. Higher bearing resistances (both at ULS and SLS) could be available for greater footing embedment depths.

If stepped spread footings are constructed at different founding levels, the difference in elevation between individual footings should not be greater than one half the clear distance between the footings (2H:1V or gentler). Should this not be possible, WSP should be consulted to provide field inspection to ensure that the footings exceeding the above requirement are stable and the bearing and lateral support for the upper footing is not compromised. In addition, the lower footings should be constructed first so that if it is necessary to construct the lower footings at a greater depth than anticipated, the elevations of the upper footings can be adjusted accordingly. Stepped strip footings, if required, should be constructed in accordance with the latest edition of the Ontario Building Code (2015 OBC), Section 9.15.3.9.

Our foundation recommendations are subject to a key assumption that no former excavation, former or existing underground utility or structure is within or intercepts the zone of influence of the proposed footings. The zone of influence of the proposed footings can be defined as any line drawn from the underside edge of the footing down and away at a slope of 1 horizontal to 1 vertical. Complete removal of fill and any existing or remaining foundations from previous structures or any underground utilities, if present, or lowering the founding elevation (if appropriate) may be required subject to the inspection by WSP during the time of construction.

The founding materials are susceptible to disturbance by construction activity especially during wet weather and care should be taken to preserve the integrity of the materials as bearing strata. Prior to placing concrete for the footings, the foundation excavations must be inspected by WSP to confirm that the footings are located in a native, undisturbed and competent bearing stratum which has been cleaned of ponded water and loosened or softened material. If the concrete for the footings on the native soil cannot be placed immediately after excavation and inspection (i.e., within 24 hours of excavation and inspection), it is recommended that a working mat of lean concrete be placed in the excavation to protect the integrity of the bearing stratum. The bearing soil and fresh concrete must be protected from freezing during cold weather construction.

Raft Foundations

Raft foundations of relatively large dimensions may also be considered for design of the proposed buildings bearing on the very dense non-cohesive deposits.

The design of raft foundations is generally governed by settlement considerations rather than bearing capacity since the design bearing pressure is generally less than the allowable bearing capacity. Differential settlements may also occur along the length of the structure supported by a raft due to the variable soils at the base elevation. As such, if a raft is to be considered as a foundation option, once the details of the proposed raft design are available (including founding level and contact stresses at the underside of the raft), detailed settlement analyses would need to be carried out, from which values of modulus of subgrade reaction across the raft could be estimated.

The modulus of subgrade reaction or soil “spring constants” is a concept used in structural engineering; however, it is not related to fundamental soil properties. Because the values of “spring constants” are highly dependent upon the combination of the dimensions of loaded areas and the relative flexibility or stiffness of the structural system as well as fundamental soil properties (that can be dependent upon depth), spring constants for raft design can only be evaluated following a detailed settlement analysis and should be considered approximate only. If required, values of the modulus of subgrade reaction can be provided as the design progresses.

5.1.1 Slab-on-Grade Floor

It is anticipated that the lower floor slab can be designed as a concrete slab-on-grade. The soils at the basement subgrade level will generally consist of compact to very dense sand to silty sand.

The exposed subgrade should be proof rolled in conjunction with an inspection by WSP. Remedial work should be carried out on any softened, disturbed, wet or poorly performing zones as directed by WSP. Any low areas may then be brought up to within at least 200 mm of the underside of the floor slabs, as required, using Ontario Provincial Standard Specification (OPSS) Granular ‘B’, Type I material or other approved material, placed in maximum 200-mm thick loose lifts and uniformly compacted to at least 98 per cent of the material’s Standard Proctor Maximum Dry Density (SPMDD).

The final lift of granular fill beneath floor slabs should consist of a minimum thickness of 200 mm of OPSS Granular 'A' material, uniformly compacted to at least 100 per cent of the material's SPMDD, acting as a moisture barrier. Any filling operations should be inspected and tested by WSP. Additional Granular 'A' material may be needed to provide adequate pipe bedding and cover, depending on the requirements for an under-slab drainage system (see below).

The floor slabs should be structurally separate from the foundation walls and columns. Sawcut control joints should be provided at regular intervals and along column lines to control shrinkage cracking and to allow for any differential settlement of the floor slabs.

5.1.2 Permanent Drainage

Based on the current investigation, the groundwater depth at the site ranged from approximately 10.1 m to 12.4 m below ground surface (or approximate Elevations from 121.0 masl to 118.8 masl. The FFE is anticipated to be approximately 7.0 metres below ground surface, approximate elevation of about 124.2 masl. Considering the requirements under the Foundation Drainage Guidelines an allowance of 2.8 m should be applied to the highest measured groundwater level, corresponding to 7.3 m or Elevation 123.8 masl. As a result, the groundwater at the site was noted at about 0.5 m below the anticipated lowest floor slab. We note that groundwater levels can fluctuate due to seasonal variations. Additional water level monitoring is recommended during the spring to confirm seasonal high-water levels at the site.

As such, as a permanent drainage system is generally not feasible or permissible by the City of Toronto, the building can be constructed with a waterproofed basement that is also resistant to hydrostatic pressure, that is, with a "tanked" basement design.

5.1.3 Temporary Excavation and Support

Excavations for the construction of the foundations will extend through the near surface fill and into the underlying loose to very dense non-cohesive deposits. No unusual problems are anticipated in excavating in the overburden soil using conventional hydraulic excavating equipment. The contractor should be made aware of the potential presence of cobbles and/or boulders within the overburden soils. Further, excavations should not undermine any existing foundations for adjacent structures or existing infrastructure.

It is anticipated that temporary excavations above the groundwater table level will consist of conventional temporary open cuts with side slopes not steeper than 1H:1V for Type 3 soils as classified by the Ontario Health and Safety Act and Regulations for Construction Projects (OHSA). For Type 3 soils, the slope must be from the base of the excavation. If excavations extend below the measured groundwater elevations, adequate dewatering will be required to achieve a Type 3 soil classification. Saturated soils, below the groundwater level would be classified as Type 4 soils and, accordingly, side slope inclinations should not exceed 3H:1V. Where the side slopes consist of more than one soil type, the soil shall be classified as the type with the highest number among the types present. Please note that the soil type classifications indicated above are provisional and are subject to change based on field observations of the actual conditions at the time of exposure.

However, depending upon the construction procedures adopted by the contractor, actual groundwater seepage conditions, the success of the contractor's groundwater control methods and weather conditions at the time of construction, some flattening and/or blanketing of the slopes may be required. Care should be taken to direct surface runoff away from the open excavations. Stockpiles of excavated materials should be kept at least the same horizontal distance from the top edge of the excavation as the depth to not negatively impact excavation

slope stability, subject to confirmation by a geotechnical engineer in the field during construction. Care should also be taken to avoid overloading of any underground services / structures by stockpiles.

Where space is not available for unsupported open cut excavations, some form of temporary shoring will be needed to support the excavations for the proposed building. In general, there are three basic shoring methods that are commonly used in local practice: steel soldier piles and timber lagging, driven interlocking steel sheet piles and continuous concrete (secant pile or diaphragm) walls, each with appropriate lateral support.

Soldier piles and lagging is suitable where the objective is to maintain an essentially vertical excavation wall and the movements above and behind the wall need only be sufficiently limited that relatively flexible features (such as roadways) will not be adversely affected. As a result, steel soldier pile installed in pre-augered sockets, with timber lagging may be feasible at this site where excavations are adequately dewatered and are not located adjacent to settlement sensitive structures. A soldier pile and lagging system does not provide a groundwater cut-off. Where soldier pile and lagging shoring walls are used, these will require groundwater lowering (i.e., proactive dewatering) to be undertaken if the excavation extends into the non-cohesive deposits below the groundwater table prior to the excavation through these materials.

Continuous concrete (secant pile or diaphragm) walls with tie-back anchors and/or struts and dewatering inside the shoring walls could be considered to support excavation.

Design of the shoring should include an evaluation of base stability, soil squeezing stability and hydraulic uplift stability as defined in the Canadian Foundation Engineering Manual (CFEM, 2023). The shoring system should be designed to account for horizontal/lateral earth loads, surcharge loads, groundwater pressure and the effects of weather as well as the project requirements for controlling ground displacements. Lateral pressures for design of the temporary structures will depend on the temporary structure design and the nature of the lateral support provided. The distribution of lateral pressures on a shoring system depends greatly on the methods used, the stiffness, and the degree of lateral bracing. As such, the distribution of lateral earth pressures for such a bracing system is best left to the ultimate specialist designer of the shoring who can best account for such conditions. It is a common practice for a specialist contractor to design and install the excavation support system.

Although the design of the shoring will be completed by the contractor, the parameters in ***Table 8*** are provided to enable the structural designer to develop a conceptual design and assess the approximate construction costs for the shoring systems.

Table 8: Coefficients of Static Lateral Earth Pressure

Soil Description	Unit Weight	Internal Angle of Friction	Undrained Shear Strength	Coefficient of Earth Pressure[1]		
	(γ, kN/m^3)	(ϕ, degrees)	(kPa)	Active K_a	At Rest K_o	Passive K_p[2]
Very loose dense non-cohesive fill	18	28	-	0.36	0.53	2.77
Compact to very dense non-cohesive deposits	19	32	-	0.31	0.47	3.25

Soil Description	Unit Weight	Internal Angle of Friction	Undrained Shear Strength	Coefficient of Earth Pressure[1]		
	(γ, kN/m^3)	(ϕ, degrees)	(kPa)	Active K_a	At Rest K_o	Passive K_p[2]
Very stiff to hard cohesive deposits	18	32	100	0.31	0.47	3.25

1) The earth pressure coefficients noted above are based on a horizontal surface adjacent to the excavation. If sloped surfaces are present, the coefficient of earth pressure should be adjusted accordingly; and,
2) The total passive resistance below the base of the excavation (i.e., adjacent to the temporary protection system) may be calculated based on the values of K_p indicated above but reduced by an appropriate factor that considers the allowable wall movement to account for the fact that a large strain would be required for mobilization of the full passive resistance.

5.1.4 Lateral Earth Pressure for Below Grade Walls

The design of the foundation walls for the proposed buildings should take into account the horizontal soil loads, hydrostatic pressure, as well as surcharge loads that may occur during or after construction. The permanent below-grade wall is considered to be a rigid structure and should be designed to resist at-rest lateral earth pressures calculated as follows:

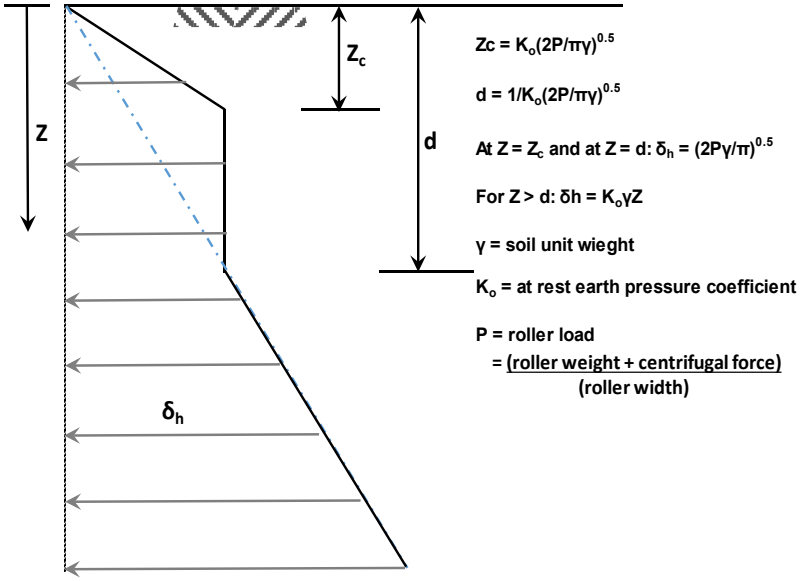
$$p = K(\gamma h + q)$$

where:

p = lateral earth pressure acting depth z, kPa
$K = K_o$ = at rest earth pressure coefficient, use 0.5 for the foundation wall
γ = unit weight of retained soil/backfill, a value of 21 kN/m^3 may be assumed
h = depth to point of interest in soil, m
q = equivalent value of surcharge on the ground surface, kPa

The above expression assumes that the perimeter drainage system prevents the build-up of any hydrostatic pressure behind the wall. Should hydrostatic pressures be considered to build-up behind the walls (such as in the case of a fully waterproofed or “tanked” basement), they must be included in calculating the lateral earth pressures and other measures to address possible buoyancy and waterproofing may need to be considered. The lateral earth pressures acting on the below-grade walls will depend on the type and method of placement of the backfill materials, the nature of the soils behind the wall, the magnitude of surcharge including construction loadings from equipment or materials, the freedom of lateral movement of the structure, and the drainage conditions behind the walls. Surcharge pressures from any adjacent foundations and/or roads should also be included in the design as indicated.

To account for lateral pressures induced by the compaction effort adjacent to foundation walls, small walk-behind compaction equipment should be used within the zone of influence of the wall, as defined by a line extending upwards and outwards from the base of the wall at an inclination of 1 horizontal to 1 vertical, and the design lateral earth pressure distribution should consist of a combined trapezoidal/triangular distribution as depicted below. Typical roller loads are provided for reference.



Typical Roller Loads

Roller Type	Weight (kN)	Cent. Force (kN)	Width (mm)	P (kN/m)
1-drum walk-behind	2.3	8.3	560	18.9
2-drum walk-behind	1.6	10.1	560	20.9
2-drum walk-behind	12.1	8.8	760	27.5
2-drum walk-behind	9.2	19.8	750	38.7

To avoid detrimental impacts from frost adhesion and heaving, the excavated areas behind foundation walls for the basement levels or any below grade foundation elements should be backfilled with non-frost susceptible granular material conforming to the requirements for OPSS.MUNI 1010 Granular “B” Type I material. In areas where pavement or other hard surfacing will abut the building, differential frost heaving could occur between the granular fill immediately adjacent to the building and the more frost susceptible native materials which exist beyond the wall backfill. To reduce the severity of this differential heaving, the backfill adjacent to the wall should be placed to form a frost taper. The frost taper should be brought up to pavement subgrade level from 1.2 m below finished exterior grade at a slope of 3 horizontal to 1 vertical, or flatter, away from the wall. The backfill materials should be placed evenly in lifts not exceeding 200 mm loose thickness. The layers should be uniformly compacted to at least 95 per cent of the material’s SPMDD. Light compaction equipment should be used immediately adjacent to the wall; otherwise, compaction stresses on the wall may be greater than that imposed by the backfill material. The upper 0.3 metres of backfill should consist of clayey material (where appropriate) to provide a relatively low-permeability cap and the exterior grade should also be shaped to slope away from the building.

The lateral earth pressure equation outlined above is given in an unfactored format and will need to be factored for Limit States Design purposes.

5.1.5 Site Classification for Seismic Site Response

Seismic hazard is defined in the 2012 Ontario Building Code (OBC) by uniform hazard spectra (UHS) at spectral coordinates of 0.2 second, 0.5 second, 1.0 second and 2.0 seconds and a probability of exceedance of 2% in 50 years. The OBC method uses a site classification system defined by the average soil/bedrock properties (e.g. shear wave velocity, Standard Penetration Test (SPT) resistance, undrained soil shear strength, etc.) in the 30 m below the foundation level. There are 6 site classes from A to F, decreasing in ground stiffness from A, hard

rock, to E, soft soil; with site class F used to denote problematic soils (e.g. sites underlain by thick peat deposits and/or liquefiable/collapsible soils). The site class is then used to obtain acceleration and velocity-based site coefficients F_a and F_v, respectively, used to modify the UHS to account for the effects of site-specific soil conditions in design.

The results of the borehole investigation indicate the average SPT "N"-value below the recommended founding depths (as discussed in ***Section 5.1.1***) is generally less than 50 blows per 0.3 m of penetration. Based on these results, **Site Class D** may be used for design. The site classification may be improved by site-specific testing such as multi-channel analysis of surface waves (MASW) testing.

5.2 Corrosivity

Five composite samples (from MW23-1 samples 8 to 9, MW23-7 samples 10 to 11, MW23-2 samples 9 to 11, MW23-5 samples 10 to 11 and BH23-6 samples 8 to 9) were submitted for corrosivity testing and the laboratory certificate of analysis for the corrosivity parameters is provided in ***Appendix E***. The corrosivity results were compared to the American Water Works Association (AWWA) C-105 (2005) Standard, "Polyethylene Encasement for Ductile-Iron Pipe Systems". Based on the results, the corrosivity potential is considered to be high in the areas of MW23-1, MW23-6 and MW23-7 and low in the areas of MW23-2 and MW23-5. Buried steel elements installed at the site will therefore need protection from corrosion in the general vicinity of MW23-1, MW23-6 and MW23-7 and protection will not be required protection in the general vicinity of MW23-2 and MW23-5. The analytical results at the locations tested indicate that the potential for sulphate attack is negligible and that concrete made with Type GU Portland cement should be acceptable for below grade concrete elements. These recommendations are based on a limited number of sample locations and are provided as guidance only; the civil engineer should take the results of the laboratory testing, the potential for corrosion and the ultimate selection of materials into consideration.

6.0 MONITORING WELL DECOMMISSIONING

As previously indicated, monitoring wells were installed in the boreholes to permit monitoring of the groundwater levels. Ontario Regulation (O.Reg.) 903 as amended, of the Ontario Water Resources Act, requires that wells are properly abandoned / decommissioned by qualified and licensed personnel. It is recommended that the decommissioning of the wells be carried out as part of the construction activities at the site so that additional water level measurements can be taken leading up to, and immediately prior to, construction. If requested, WSP could provide assistance to the owner in arranging for the decommissioning of the wells by a MECP-licensed water well drilling contractor.

7.0 ADDITIONAL CONSIDERATION

During construction, a sufficient degree of foundation inspections, subgrade inspections, and an adequate number of in situ density tests and materials testing should be carried out to confirm that the conditions exposed are consistent with those encountered in the boreholes, and to monitor conformance to the pertinent project specifications. Concrete testing should be carried out on both the plastic material in the field and of set cylinder samples in a CSA certified laboratory.

The soils at this site are sensitive to disturbance from ponded water, construction traffic and frost. All bearing surfaces must be inspected by WSP prior to filling or concreting to ensure that strata having adequate bearing capacity have been reached and that the bearing surfaces have been properly prepared.

8.0 CLOSURE

We trust that this report provides sufficient geotechnical engineering information to facilitate the preliminary design of this project. If you have any questions regarding the contents of this report or require additional information, please do not hesitate to contact this office.

Signature Page

WSP Canada Inc.

Alexander Dziedzic, P.Eng.,
Geotechnical Engineer

Nick la Posta, P.Eng.
Team Lead, Ground Engineering West

RM/AD/NLP/lb

https://wsponline.sharepoint.com/sites/gld-165095/project files/6 deliverables/geotech/22535291 (1000)-r-rev0-fcr-2451-2495 danforth avenue-08nov2024.docx

APPENDIX A

Important Information and Limitations of this Report

IMPORTANT INFORMATION AND LIMITATIONS OF THIS REPORT

Standard of Care: WSP Canada Inc. (WSP) has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practising under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report. No other warranty, expressed or implied is made.

Basis and Use of the Report: This report has been prepared for the specific site, design objective, development and purpose described to WSP by the Client. The factual data, interpretations and recommendations pertain to a specific project as described in this report and are not applicable to any other project or site location. Any change of site conditions, purpose, development plans or if the project is not initiated within eighteen months of the date of the report may alter the validity of the report. WSP cannot be responsible for use of this report, or portions thereof, unless WSP is requested to review and, if necessary, revise the report.

The information, recommendations and opinions expressed in this report are for the sole benefit of the Client. No other party may use or rely on this report or any portion thereof without Golder's express written consent. If the report was prepared to be included for a specific permit application process, then upon the reasonable request of the client, WSP may authorize in writing the use of this report by the regulatory agency as an Approved User for the specific and identified purpose of the applicable permit review process. Any other use of this report by others is prohibited and is without responsibility to WSP. The report, all plans, data, drawings and other documents as well as all electronic media prepared by WSP are considered its professional work product and shall remain the copyright property of WSP, who authorizes only the Client and Approved Users to make copies of the report, but only in such quantities as are reasonably necessary for the use of the report by those parties. The Client and Approved Users may not give, lend, sell, or otherwise make available the report or any portion thereof to any other party without the express written permission of WSP. The Client acknowledges that electronic media is susceptible to unauthorized modification, deterioration and incompatibility and therefore the Client can not rely upon the electronic media versions of Golder's report or other work products.

The report is of a summary nature and is not intended to stand alone without reference to the instructions given to WSP by the Client, communications between WSP and the Client, and to any other reports prepared by WSP for the Client relative to the specific site described in the report. In order to properly understand the suggestions, recommendations and opinions expressed in this report, reference must be made to the whole of the report. WSP can not be responsible for use of portions of the report without reference to the entire report.

Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the Client in the design of the specific project. The extent and detail of investigations, including the number of test holes, necessary to determine all of the relevant conditions which may affect construction costs would normally be greater than has been carried out for design purposes. Contractors bidding on, or undertaking the work, should rely on their own investigations, as well as their own interpretations of the factual data presented in the report, as to how subsurface conditions may affect their work, including but not limited to proposed construction techniques, schedule, safety and equipment capabilities.

Soil, Rock and Ground Water Conditions: Classification and identification of soils, rocks, and geologic units have been based on commonly accepted methods employed in the practice of geotechnical engineering and related disciplines. Classification and identification of the type and condition of these materials or units involves judgment, and boundaries between different soil, rock or geologic types or units may be transitional rather than abrupt. Accordingly, WSP does not warrant or guarantee the exactness of the descriptions.

Special risks occur whenever engineering or related disciplines are applied to identify subsurface conditions and even a comprehensive investigation, sampling and testing program may fail to detect all or certain subsurface conditions. The environmental, geologic, geotechnical, geochemical and hydrogeologic conditions that WSP interprets to exist between and beyond sampling points may differ from those that actually exist. In addition to soil variability, fill of variable physical and chemical composition can be present over portions of the site or on adjacent properties. The professional services retained for this project include only the geotechnical aspects of the subsurface conditions at the site, unless otherwise specifically stated and identified in the report. The presence or implication(s) of possible surface and/or subsurface contamination resulting from previous activities or uses of the site and/or resulting from the introduction onto the site of materials from off-site sources are outside the terms of reference for this project and have not been investigated or addressed.

Soil and groundwater conditions shown in the factual data and described in the report are the observed conditions at the time of their determination or measurement. Unless otherwise noted, those conditions form the basis of the recommendations in the report. Groundwater conditions may vary between and beyond reported locations and can be affected by annual, seasonal and meteorological conditions. The condition of the soil, rock and groundwater may be significantly altered by construction activities (traffic, excavation, groundwater level lowering, pile driving, blasting, etc.) on the site or on adjacent sites. Excavation may expose the soils to changes due to wetting, drying or frost. Unless otherwise indicated the soil must be protected from these changes during construction.

Sample Disposal: WSP will dispose of all uncontaminated soil and/or rock samples 90 days following issue of this report or, upon written request of the Client, will store uncontaminated samples and materials at the Client's expense. In the event that actual contaminated soils, fills or groundwater are encountered or are inferred to be present, all contaminated samples shall remain the property and responsibility of the Client for proper disposal.

Follow-Up and Construction Services: All details of the design were not known at the time of submission of Golder's report. WSP should be retained to review the final design, project plans and documents prior to construction, to confirm that they are consistent with the intent of Golder's report.

During construction, WSP should be retained to perform sufficient and timely observations of encountered conditions to confirm and document that the subsurface conditions do not materially differ from those interpreted conditions considered in the preparation of Golder's report and to confirm and document that construction activities do not adversely affect the suggestions, recommendations and opinions contained in Golder's report. Adequate field review, observation and testing during construction are necessary for WSP to be able to provide letters of assurance, in accordance with the requirements of many regulatory authorities. In cases where this recommendation is not followed, Golder's responsibility is limited to interpreting accurately the information encountered at the borehole locations, at the time of their initial determination or measurement during the preparation of the Report.

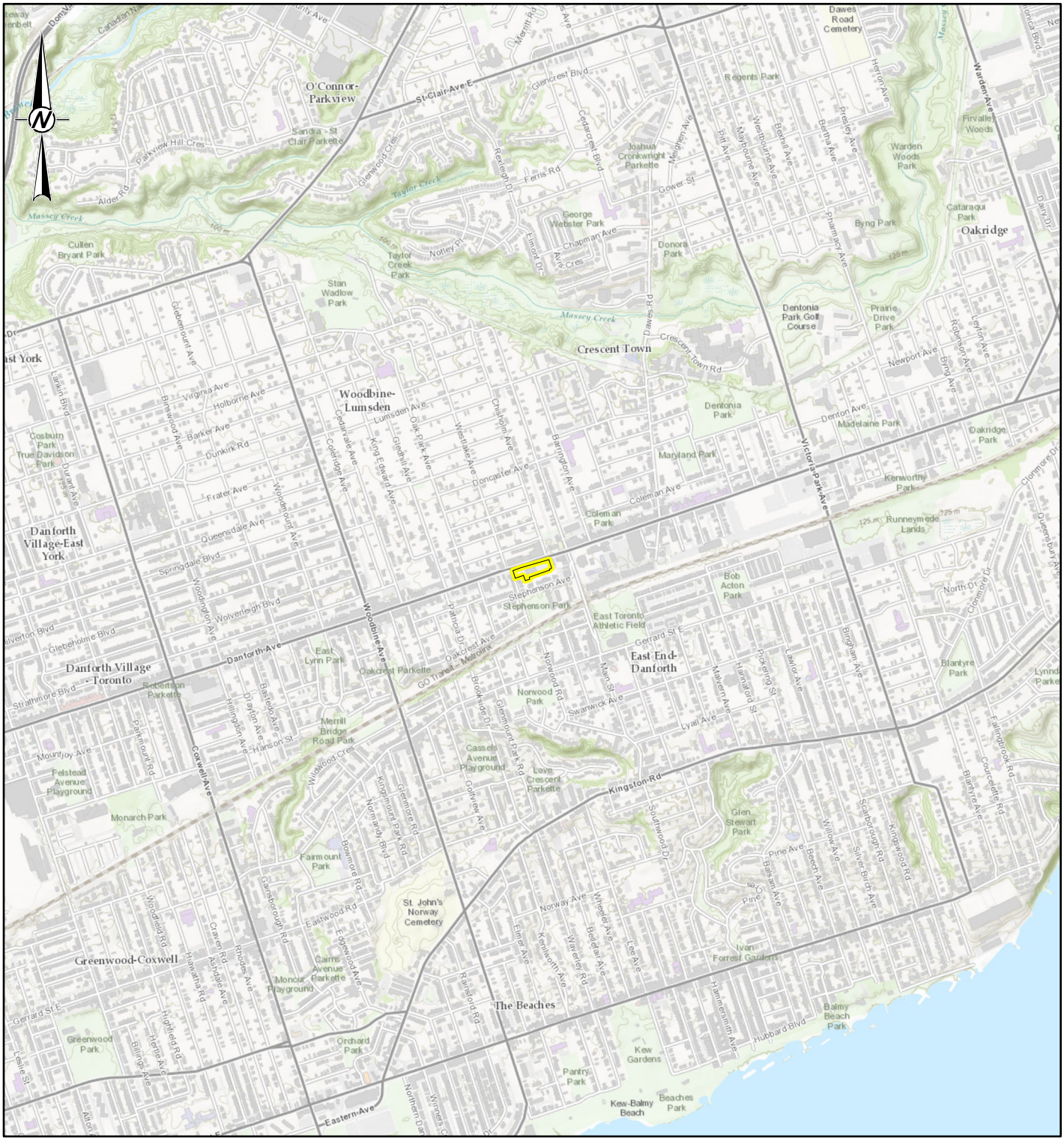
Changed Conditions and Drainage: Where conditions encountered at the site differ significantly from those anticipated in this report, either due to natural variability of subsurface conditions or construction activities, it is a condition of this report that WSP be notified of any changes and be provided with an opportunity to review or revise the recommendations within this report. Recognition of changed soil and rock conditions requires experience and it is recommended that WSP be employed to visit the site with sufficient frequency to detect if conditions have changed significantly.

Drainage of subsurface water is commonly required either for temporary or permanent installations for the project. Improper design or construction of drainage or dewatering can have serious consequences. WSP takes no responsibility for the effects of drainage unless specifically involved in the detailed design and construction monitoring of the system.

APPENDIX B

Figure 1 – Key Plan

Figure 2 – Borehole Location Plan: Existing Site Layout



LEGEND

SITE BOUNDARY

0 500 1,000

1:25,000 METRES

REFERENCE(S)

1. BASE MAP: YORK UNIVERSITY, CITY OF BRAMPTON, CITY OF TORONTO, REGION OF DURHAM, PROVINCE OF ONTARIO, ONTARIO MNR, ESRI CANADA, ESRI, HERE, GARMIN, INCREMENT P, USGS, METI/NASA, EPA, USDA, AAFC, NRCAN
2. PROJECTION: NAD 1983 UTM ZONE 17N, TRANSVERSE MERCATOR

CLIENT
FIRST CAPITAL ASSET MANAGEMENT LP

PROJECT
GEOTECHNICAL, HYDROGEOLOGICAL EXPLORATION, PHASE ONE AND TWO ENVIRONMENTAL SITE ASSESSMENTS, RISK ASSESSMENT AND RECORD OF SITE CONDITION
2451-2495 DANFORTH AVENUE, TORONTO, ONTARIO

TITLE
KEY PLAN

CONSULTANT

YYYY-MM-DD	2024-02-09
DESIGNED	---
PREPARED	JT
REVIEWED	AD
APPROVED	---

PROJECT NO.	CONTROL	REV.	FIGURE
22535291	0002	A	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

25mm

0

PATH: S:\Clients\First Capital\Toronto_Danforth Ave_2451to99_PROJ\22535291\40_PROD\0002_Geotech_Invest\22535291-0002-HS-0000.aprx PRINTED ON: AT 3:49:48 PM

LEGEND

- MONITORING WELL LOCATION
- SITE BOUNDARY
- PROPERTY BOUNDARY (CITY OF TORONTO)

0 25 50

1:750 METRES

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO.
2. BASE MAP: CITY OF TORONTO, ON, MAXAR, MICROSOFT
3. PROJECTION: NAD 1983 UTM ZONE 17N, TRANSVERSE MERCATOR

CLIENT

FIRST CAPITAL ASSET MANAGEMENT LP

PROJECT

GEOTECHNICAL, HYDROGEOLOGICAL EXPLORATION, PHASE ONE AND TWO ENVIRONMENTAL SITE ASSESSMENTS, RISK ASSESSMENT AND RECORD OF SITE CONDITION
2451-2495 DANFORTH AVENUE, TORONTO, ONTARIO

TITLE

MONITORING WELL LOCATION PLAN

CONSULTANT

wsp

YYYY-MM-DD	2024-02-09
DESIGNED	HA
PREPARED	JT
REVIEWED	AD
APPROVED	---

PROJECT NO.	CONTROL	REV.	FIGURE
22535291	0002	A	2

APPENDIX C

Method of Soil Classification

Symbols and Terms used on Records of Boreholes and Test Pits

List of Symbols

Record of Borehole Sheets

Boreholes MW23-1 to MW23-7

PROJECT: 22535291

LOCATION: N 4838546.34; E 636627.76

RECORD OF BOREHOLE: BH23-1

SHEET 1 OF 3

BORING DATE: September 11, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrichl D-20 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE		131.10						
		ASPHALT (~50 mm) thick		0.00						
		FILL - (SP) gravelly SAND, trace fines; light brown; non-cohesive, moist, very loose to compact		0.05	1	SS	13	ND		50 mm Dia. Monitoring Well
1					2	SS	12	ND		
2					3	SS	5	ND		
					4	SS	2	ND		
3					5	SS	3	ND		
				127.37						
		(SP) SAND, some fines; light brown to brown; non-cohesive, moist, loose to very dense		3.73	6	SS	21	ND		
4										
					7	SS	33	ND		Bentonite
5										
6					8	SS	28	ND		
7										
8					9	SS	40	ND		MH
9										
					10	SS	56	ND		
10		*CONTINUED NEXT PAGE*								

Diedrich D-20 Track Mount

200 mm O.D. Hollow Stem Auger

DEPTH SCALE

1 : 50

LOGGED: BN

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\TORONTO_DANFORTH_AVE_2451\02_DATA\GINT\1546820.GPJ GAL-MIS.GDT 2/8/24 RB

PROJECT: 22535291

RECORD OF BOREHOLE: BH23-1

SHEET 2 OF 3

LOCATION: N 4838546.34; E 636627.76

BORING DATE: September 11, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrichl D-20 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---								
10	Diedrich D-20 Track Mount; 200 mm O.D. Hollow Stem Auger	(SP) SAND, some fines; light brown to brown; non-cohesive, moist, loose to very dense								
11					11	SS	81	ND		
12					12	SS	32	ND		Jan. 10, 2024
13										Bentonite
14					13	SS	48	ND		
15										
16				114.79	14	SS	6	ND		
		(ML) SILT, some sand to sandy, slight plasticity; brown; non-cohesive, moist, compact		16.31						Sand
17				114.03	15A					
		(CL) SILTY CLAY, trace sand; grey; cohesive, w<PL, very stiff		17.07	15B	SS	29	ND	MH	Screen
18				113.27						
		(SP) SAND; brown; non-cohesive, moist, compact		17.83	16	SS	23			
19		END OF BOREHOLE		112.20 18.90						
20		*CONTINUED NEXT PAGE*								

DEPTH SCALE

1 : 50

LOGGED: BN

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\TORONTO_DANFORTH_AVE_2451\02_DATA\GINT\1546820.GPJ GAL-MIS.GDT 2/8/24 RB

PROJECT: 22535291

RECORD OF BOREHOLE: BH23-1

SHEET 3 OF 3

LOCATION: N 4838546.34; E 636627.76

BORING DATE: September 11, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrichl D-20 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected) 100 200 300 400 / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected) 100 200 300 400	HYDRAULIC CONDUCTIVITY, k, cm/s 10^{-6} 10^{-5} 10^{-4} 10^{-3} / WATER CONTENT PERCENT Wp W Wl 10 20 30 40	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20		*--- CONTINUED FROM PREVIOUS PAGE ---*								
		NOTE: 1. Groundwater level measurements in monitoring well as follows : Date Depth (m) Elev. (m) 24-Oct-23 11.66 119.44 26-Oct-23 11.73 119.37 13-Nov-23 11.77 119.33 06--Dec-23 11.94 119.16 19-Dec-23 11.81 119.30 10-Jan-24 11.80 119.30 21-Oct-24 11.70 119.40								
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

DEPTH SCALE

1 : 50

LOGGED: BN

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\TORONTO_DANFORTH_AVE_2451\02_DATA\GINT\1546820.GPJ GAL-MIS.GDT 2/8/24 RB

PROJECT: 22535291

LOCATION: N 4838561.49; E 63666244.00

RECORD OF BOREHOLE: BH23-2

SHEET 1 OF 3

BORING DATE: September 12, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrichl D-20 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		130.57						23-2 (S) 23-2 (D)
0	Diedrich D-20 Track Mount; 200 mm O.D. Hollow Stem Auger	ASPHALT (~100 mm) thick		0.00						
		FILL - (SM) SILTY SAND, some gravel; brown; non-cohesive, moist, very loose to compact		0.10	1	SS	10	ND		
1					2	SS	3	ND		
2				128.28	3	SS	2	ND		
		(SP) SAND, some fines; brown; non-cohesive, moist, loose to very dense		2.29	4	SS	8	ND		
3					5	SS	22	ND		
4					6	SS	29	ND		
5					7	SS	29	ND		
6					8	SS	52	ND		MH
7				123.41						
		(SM/SP) SILTY SAND to SAND; brown; non-cohesive, moist to wet, loose to very dense		7.16						
8					9	SS	60	ND		
9										
					10	SS	38	ND		
10		*CONTINUED NEXT PAGE*								

DEPTH SCALE

1 : 50

LOGGED: BN

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\TORONTO_DANFORTH_AVE_2451\02_DATA\GINT\1546820.GPJ GAL-MIS.GDT 2/8/24 RB

PROJECT: 22535291

RECORD OF BOREHOLE: BH23-2

SHEET 2 OF 3

LOCATION: N 4838561.49; E 63666244.00

BORING DATE: September 12, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrichl D-20 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---								23-2 (S) 23-2 (D)
10	Diedrich D-20 Track Mount; 200 mm O.D. Hollow Stem Auger	(SM/SP) SILTY SAND to SAND; brown; non-cohesive, moist to wet, loose to very dense								
11					11	SS	51	ND		(D)
12					12	SS	10	ND	MH	
13										
14					13	SS	64	ND		
15				115.18	14A	SS	82/ 0.28	ND		
		(CL) SILTY CLAY, trace sand; brown to grey; cohesive, w~PL, hard		15.39	14B					
16										
17				113.63	15A	SS	89/ 0.25	ND		
		(SM) SILTY SAND; brown; non-cohesive, moist to wet, very dense		16.94	15B					
18										
19					16	SS	75	ND		
20		*CONTINUED NEXT PAGE*								

DEPTH SCALE

1 : 50

LOGGED: BN

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\TORONTO_DANFORTH_AVE_2451\02_DATA\GINT\1546820.GPJ GAL-MIS.GDT 2/8/24 RB

PROJECT: 22535291

RECORD OF BOREHOLE: BH23-2

SHEET 3 OF 3

LOCATION: N 4838561.49; E 63666244.00

BORING DATE: September 12, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrichl D-20 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected (100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected (100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									23-2 (S) 23-2 (D)
20	Diedrich D-20 Track Mount; 200 mm O.D. Hollow Stem Auger	(SM) SILTY SAND; brown; non-cohesive, moist to wet, very dense		108.78	17	SS	88/ 0.28	ND	W		
21		END OF BOREHOLE		21.79							
22		NOTES:									
23		1.Groundwater level measurements in monitoring well BH23-2S as follows:									
24		Date / Depth (m) / Elev. (m) 24-Oct-23 10.97 119.58 26-Oct-23 11.03 119.52 13-Nov-23 10.90 119.65 06--Dec-23 10.96 119.59 19-Dec-23 10.95 119.61 10-Jan-24 10.99 119.56 21-Oct-24 10.80 119.75									
25		2. Groundwater level measurements in monitoring well BH23-2D as follows:									
26		Date / Depth (m) / Elev. (m) 25-Oct-23 11.30 119.27 26-Oct-23 11.45 119.12 12-Nov-23 11.30 119.27 06--Dec-23 11.53 119.04 19-Dec-23 11.48 119.09 10-Jan-24 11.62 118.95 21-Oct-21 11.40 119.17									
27											
28											
29											
30											

DEPTH SCALE

1 : 50

LOGGED: BN

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\TORONTO_DANFORTH_AVE_2451\02_DATA\GINT\1546820.GPJ GAL-MIS.GDT 2/8/24 RB

PROJECT: 22535291

RECORD OF BOREHOLE: BH23-3

SHEET 1 OF 3

LOCATION: N 4838527.70; E 636645.56

BORING DATE: September 15, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrichl D-20 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE		131.19						
		ASPHALT (~70 mm) thick		0.00						
		FILL - (SP) SAND, some gravel, trace fines; brown; non-cohesive, moist, very loose to loose		0.07	1	SS	10	ND		50 mm Dia. Monitoring Well
1					2	SS	4	ND		
				129.74						
		(SP) SAND, trace to some fines; light brown; non-cohesive, moist, compact to very dense		1.45	3	SS	14	ND		
2					4	SS	16	ND		
3					5	SS	23	ND		
4					6	SS	79	ND		
5					7	SS	41	ND		Bentonite
6					8	SS	38	ND		
7										
8					9	SS	51	ND		
9										
10					10	SS	87	ND		
		CONTINUED NEXT PAGE								

Diedrich D-20 Track Mount

200 mm O.D. Hollow Stem Auger

DEPTH SCALE

1 : 50

LOGGED: BN

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\TORONTO_DANFORTH_AVE_2451\02_DATA\GINT\1546820.GPJ GAL-MIS.GDT 2/8/24 RB

PROJECT: 22535291

RECORD OF BOREHOLE: BH23-3

SHEET 2 OF 3

LOCATION: N 4838527.70; E 636645.56

BORING DATE: September 15, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrichl D-20 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		*--- CONTINUED FROM PREVIOUS PAGE ---*								
10	Diedrich D-20 Track Mount; 200 mm O.D. Hollow Stem Auger	(SP) SAND, trace to some fines; light brown; non-cohesive, moist, compact to very dense								
11					11	SS	72	ND		
12					12	SS	72	ND		Jan. 10, 2024
13										
14					13	SS	85	ND		Bentonite
15					14	SS	79	ND		
16				114.89 / 16.30						
16		(ML) SILT, trace sand; brown; non-cohesive, moist, very dense			15	SS	50	ND	MH	
17				113.51 / 17.68						
18		(SP) SAND, trace fines; brown; non-cohesive, moist to wet, very dense			16	SS	85/0.28	ND		
19										Sand
20					17	SS	65			Screen
20		*CONTINUED NEXT PAGE*								

DEPTH SCALE

1 : 50

LOGGED: BN

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\TORONTO_DANFORTH_AVE_2451\02_DATA\GINT\1546820.GPJ GAL-MIS.GDT 2/8/24 RB

PROJECT: 22535291

RECORD OF BOREHOLE: BH23-3

SHEET 3 OF 3

LOCATION: N 4838527.70; E 636645.56

BORING DATE: September 15, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrichl D-20 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected (100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected (100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20		*--- CONTINUED FROM PREVIOUS PAGE ---*									
20	Diedrich D-20 Track Mount; 200 mm O.D. Hollow Stem Auger	(SP) SAND, trace fines; brown; non-cohesive, moist to wet, very dense			17	SS	65	⊕	○		Screen
21					18	SS	50/0.13	⊕ ND	○		
				109.57							
		END OF BOREHOLE		21.62							
22		NOTE:									
		1. Groundwater level measurements in monitoring well as follows :									
		Date / Depth (m) / Elev. (m)									
		24-Oct-23 / 12.17 / 119.02									
		26-Oct-23 / 12.28 / 118.91									
		13-Nov-23 / 12.24 / 118.95									
23		06--Dec-23 / 12.36 / 118.83									
		19-Dec-23 / 12.30 / 118.89									
		10-Jan-24 / 12.40 / 118.79									
		21-Oct-24 / 12.24 / 118.95									
24											
25											
26											
27											
28											
29											
30											

DEPTH SCALE

1 : 50

LOGGED: BN

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\TORONTO_DANFORTH_AVE_2451\02_DATA\GINT\1546820.GPJ GAL-MIS.GDT 2/8/24 RB

PROJECT: 22535291

LOCATION: N 4838576.99; E 636730.42

RECORD OF BOREHOLE: BH23-4

SHEET 1 OF 3

BORING DATE: September 23, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrichl D-20 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected (100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected (100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		130.55							
0		ASPHALT (~70 mm) thick		0.00							50 mm Dia. Monitoring Well
		FILL - (SP) SAND, trace gravel; brown; non-cohesive, moist, very loose to loose		0.07	1	SS	9	ND			
1					2	SS	4	ND			
				129.10							
		(SP) SAND; brown; non-cohesive, moist, loose to very dense		1.45	3	SS	10	ND			
2					4	SS	17	ND			
3					5	SS	21	ND			
4					6	SS	25	ND			Bentonite
					7	SS	64	ND			
5											
6					8	SS	46	ND			
7											
8					9	SS	81	ND			
9											Sand
					10	SS	79	ND			Screen
10		*CONTINUED NEXT PAGE*									

Diedrich D-20 Track Mount

200 mm O.D. Hollow Stem Auger

DEPTH SCALE

1 : 50

LOGGED: BN

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\TORONTO_DANFORTH_AVE_2451\02_DATA\GINT\1546820.GPJ GAL-MIS.GDT 2/8/24 RB

PROJECT: 22535291

RECORD OF BOREHOLE: BH23-4

SHEET 2 OF 3

LOCATION: N 4838576.99; E 636730.42

BORING DATE: September 23, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrichl D-20 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected (100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected (100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									
10	Diedrich D-20 Track Mount; 200 mm O.D. Hollow Stem Auger	(SP) SAND; brown; non-cohesive, moist, loose to very dense									
11					11	SS	85	ND			Screen
12					12	SS	80	ND			
13											
14					13	SS	60	ND			
15					14	SS	50/0.15	ND			
16		(SM) SILTY SAND; brown; non-cohesive, moist, very dense		114.40 / 16.15							
17					15	SS	85/0.28	ND			
18					16	SS	50/0.15				
		END OF BOREHOLE		112.11 / 18.44							
19											
20		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

LOGGED: BN

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\TORONTO_DANFORTH_AVE_2451\02_DATA\GINT\1546820.GPJ GAL-MIS.GDT 2/8/24 RB

PROJECT: 22535291

RECORD OF BOREHOLE: BH23-4

SHEET 3 OF 3

LOCATION: N 4838576.99; E 636730.42

BORING DATE: September 23, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrichl D-20 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20		*--- CONTINUED FROM PREVIOUS PAGE ---*									
		NOTE: 1. Groundwater level measurements in monitoring well as follows : Date — Depth (m) — Elev. (m) 24-Oct-23 — 10.81 — 119.74 26-Oct-23 — Dry — - 13-Nov-23 — Dry — - 06--Dec-23 — 10.91 — 119.64 19-Dec-23 — 10.91 — 119.64 10-Jan-24 — Dry 21-Oct-24 — 10.63									
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											

DEPTH SCALE

1 : 50

LOGGED: BN

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\TORONTO_DANFORTH_AVE_2451\02_DATA\GINT\1546820.GPJ GAL-MIS.GDT 2/8/24 RB

PROJECT: 22535291

RECORD OF BOREHOLE: BH23-5

SHEET 1 OF 3

LOCATION: N 4838589.30; E 636772.90

BORING DATE: September 16, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrichl D-20 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		130.18						
0	Diedrich D-20 Track Mount; 200 mm O.D. Hollow Stem Auger	ASPHALT (~70 mm) thick		0.00						
		FILL - (SP) SAND to gravelly SAND; brown; non-cohesive, moist, loose to dense		0.07	1	SS	5	ND		50 mm Dia. Monitoring Well
1					2	SS	7			
2					3	SS	14			
					4	SS	18			
3					5	SS	18			
4					6	SS	32			Bentonite
		(SP) SAND; brown; non-cohesive, moist, dense to very dense		125.68 4.50	7	SS	33	ND		
5										
6					8	SS	41			
7										
8					9	SS	74	ND		
9										Sand
					1	PMT	-			Screen
10		*CONTINUED NEXT PAGE*								

DEPTH SCALE

1 : 50

LOGGED: BN

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\TORONTO_DANFORTH_AVE_2451\02_DATA\GINT\1546820.GPJ GAL-MIS.GDT 2/8/24 RB

PROJECT: 22535291

RECORD OF BOREHOLE: BH23-5

SHEET 2 OF 3

LOCATION: N 4838589.30; E 636772.90

BORING DATE: September 16, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrichl D-20 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected (100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected (100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		*--- CONTINUED FROM PREVIOUS PAGE ---*									
10	Diedrich D-20 Track Mount; 200 mm O.D. Hollow Stem Auger	(SP) SAND; brown; non-cohesive, moist, dense to very dense			10	SS	74	ND	○		Jan.10, 2024 ▽
11											Screen
12					2	PMT	-				
13					11	SS	66	ND	○		
14											
15		(ML) Sandy SILT; brown; non-cohesive, moist, very dense		115.18 / 15.00	3	PMT	•				
16					12	SS	50/0.15	ND	○		
17											
18		(SP) SAND; brown; non-cohesive, moist, very dense		112.78 / 17.40	13	SS	71	ND	○		
19		END OF BOREHOLE		111.43 / 18.75							
20		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

LOGGED: BN

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\TORONTO_DANFORTH_AVE_2451\02_DATA\GINT\1546820.GPJ GAL-MIS.GDT 2/8/24 RB

PROJECT: 22535291

RECORD OF BOREHOLE: BH23-5

SHEET 3 OF 3

LOCATION: N 4838589.30; E 636772.90

BORING DATE: September 16, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrichl D-20 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	SOIL PROFILE: STRATA PLOT	SOIL PROFILE: ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected 100 200 300 400 / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected 100 200 300 400	HYDRAULIC CONDUCTIVITY, k, cm/s 10^{-6} 10^{-5} 10^{-4} 10^{-3} / WATER CONTENT PERCENT Wp W Wl 10 20 30 40	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20		*--- CONTINUED FROM PREVIOUS PAGE ---*									
		NOTE: 1. Groundwater level measurements in monitoring well as follows : Date Depth (m) Elev. (m) 25-Oct-23 10.50 120.60 26-Oct-23 10.48 120.62 13-Nov-23 10.43 120.68 06--Dec-23 10.57 120.53 19-Dec-23 10.46 120.65 10-Jan-24 10.54 120.56 21-Oct-24 10.14 120.96									
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											

DEPTH SCALE

1 : 50

LOGGED: BN

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\TORONTO_DANFORTH_AVE_2451\02_DATA\GINT\1546820.GPJ GAL-MIS.GDT 2/8/24 RB

PROJECT: 22535291

RECORD OF BOREHOLE: BH23-6

SHEET 1 OF 3

LOCATION: N 4838543.89; E 636736.50

BORING DATE: September 17, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrichl D-20 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE		130.91						
		ASPHALT (~70 mm) thick		0.00						
		FILL - (SP) SAND, trace to some gravel; brown; non-cohesive, moist		0.07	1	SS	23	ND		50 mm Dia. Monitoring Well
1					2	SS	10	ND		
				129.46						
		(SP) SAND; brown; non-cohesive, moist, compact to very dense		1.45	3	SS	15	ND		
2					4	SS	20	ND		
3					5	SS	18			
4					6	SS	26			
5	Diedrich D-20 Track Mount; 200 mm O.D. Hollow Stem Auger				7	SS	46			Bentonite
6					8	SS	51			
7										
8					PMT	1	-			
					9	SS	50/0.15	ND		
9										
10		*CONTINUED NEXT PAGE*								

DEPTH SCALE

1 : 50

LOGGED: BN

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\TORONTO_DANFORTH_AVE_2451\02_DATA\GINT\1546820.GPJ GAL-MIS.GDT 2/8/24 RB

PROJECT: 22535291

RECORD OF BOREHOLE: BH23-6

SHEET 2 OF 3

LOCATION: N 4838543.89; E 636736.50

BORING DATE: September 17, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrichl D-20 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected (100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected (100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		*--- CONTINUED FROM PREVIOUS PAGE ---*									
10	Diedrich D-20 Track Mount; 200 mm O.D. Hollow Stem Auger	(SP) SAND; brown; non-cohesive, moist, compact to very dense									
11					PMT	2	-				
12					10	SS	88	ND			Jan. 10, 2024
13											
14					PMT	3	-				
15					11	SS	50/0.15	ND			Bentonite
16											
17		(ML) Sandy SILT; brown; non-cohesive, moist, very dense		114.01 / 16.90	12	SS	50/0.13	ND			
18		(SP) SAND, trace fines; brown; non-cohesive, wet to moist, very dense		113.28 / 17.63							
19					13	SS	89/0.28	ND			
20					14	SS	50/0.15				Sand Screen
		CONTINUED NEXT PAGE									

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\TORONTO_DANFORTH_AVE_2451\02_DATA\GINT\1546820.GPJ GAL-MIS.GDT 2/8/24 RB

DEPTH SCALE

1 : 50

LOGGED: BN

CHECKED: AD

PROJECT: 22535291

RECORD OF BOREHOLE: BH23-6

SHEET 3 OF 3

LOCATION: N 4838543.89; E 636736.50

BORING DATE: September 17, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrichl D-20 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---								
20	Diedrich D-20 Track Mount; 200 mm O.D. Hollow Stem Auger	(SP) SAND, trace fines; brown; non-cohesive, wet to moist, very dense			14	SS		ND		Screen
				110.18						
21		(ML) Sandy SILT; brown; non-cohesive, moist, very dense		20.73						
				109.42	15	SS	50/ 0.15	ND	MH	
		END OF BOREHOLE		21.49						
22		NOTE:								
		1. Groundwater level measurements in monitoring well as follows :								
23		Date / Depth (m) / Elev. (m)								
		24-Oct-23 11.68 119.23								
		26-Oct-23 11.78 119.13								
24		13-Nov-23 11.71 119.20								
		06--Dec-23 11.80 119.11								
		19-Dec-23 11.79 119.12								
25		10-Jan-24 11.83 119.08								
		21-Oct-24 11.72 119.20								
26										
27										
28										
29										
30										

DEPTH SCALE

1 : 50

LOGGED: BN

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\TORONTO_DANFORTH_AVE_2451\02_DATA\GINT\1546820.GPJ GAL-MIS.GDT 2/8/24 RB

PROJECT: 22535291

LOCATION: N 4838542.33; E 636670.74

RECORD OF BOREHOLE: BH23-7

SHEET 1 OF 3

BORING DATE: September 14, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrichl D-20 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected (100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected (100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE		130.48							
		ASPHALT (~100 mm) thick		0.00							
		FILL - (SP) SAND, some gravel, trace fines; brown; non-cohesive, moist, loose		0.10	1	SS	9	ND			Concrete 50 mm Dia. Monitoring Well
1					2	SS	4	ND			
					3A	SS	9	ND			
		(SP) SAND, some fines; brown; non-cohesive, moist, loose to very dense		128.60 1.88	3B						
2					4	SS	29	ND			
3					5	SS	26	ND			
4					6	SS	34	ND			
5					7	SS	61	ND			Bentonite
6					8	SS	62	ND			
7				123.32							
		(SM) SILTY SAND; brown; moist to wet		7.16	9	SS	50/0.13	ND			
8											
9					10	SS	13	ND		MH	
10		*CONTINUED NEXT PAGE*									

Diedrich D-20 Track Mount

200 mm O.D. Hollow Stem Auger

DEPTH SCALE

1 : 50

LOGGED: BN

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\TORONTO_DANFORTH_AVE_2451\02_DATA\GINT\1546820.GPJ GAL-MIS.GDT 2/8/24 RB

PROJECT: 22535291

RECORD OF BOREHOLE: BH23-7

SHEET 2 OF 3

LOCATION: N 4838542.33; E 636670.74

BORING DATE: September 14, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrichl D-20 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected (100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected (100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									
10	Diedrich D-20 Track Mount; 200 mm O.D. Hollow Stem Auger	(SM) SILTY SAND; brown; moist to wet									
11					11	SS	12	ND			Jan.10, 2024
12					12	SS	14	ND			Bentonite
13											
14					13	SS	26	ND			
15		- Sandy SILT interlayers from 15.2 m to 16.9 m			14	SS	60	ND		MH	Sand
16											
17					15A / 15B	SS	50/0.10	ND			Screen
18											
				111.79	16	SS	46/0.25	ND			
		END OF BOREHOLE		18.69							
19											
20		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

LOGGED: BN

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\TORONTO_DANFORTH_AVE_2451\02_DATA\GINT\1546820.GPJ GAL-MIS.GDT 2/8/24 RB

PROJECT: 22535291

RECORD OF BOREHOLE: BH23-7

SHEET 3 OF 3

LOCATION: N 4838542.33; E 636670.74

BORING DATE: September 14, 2023

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Diedrichl D-20 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	SOIL PROFILE: STRATA PLOT	SOIL PROFILE: ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected 100 200 300 400 / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected 100 200 300 400	HYDRAULIC CONDUCTIVITY, k, cm/s 10^{-6} 10^{-5} 10^{-4} 10^{-3} / WATER CONTENT PERCENT Wp W Wl 10 20 30 40	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20		*--- CONTINUED FROM PREVIOUS PAGE ---*									
		NOTE: 1. Groundwater level measurements in monitoring well as follows : Date Depth (m) Elev. (m) 24-Oct-23 11.24 119.24 26-Oct-23 11.42 119.06 13-Nov-23 11.39 119.09 06--Dec-23 11.46 119.02 19-Dec-23 11.44 119.04 10-Jan-24 11.52 118.96 21-Oct-24 11.42 119.06									
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											

DEPTH SCALE

1 : 50

LOGGED: BN

CHECKED: AD

GTA-BHS 001 S:\CLIENTS\FIRST_CAPITAL\TORONTO_DANFORTH_AVE_2451\02_DATA\GINT\1546820.GPJ GAL-MIS.GDT 2/8/24 RB

APPENDIX D

Results of Geotechnical Laboratory Testing

WSP Canada Inc.
100 Scotia Court
Whitby, ON L1N 8Y6
905-723-2727

12/12/2023

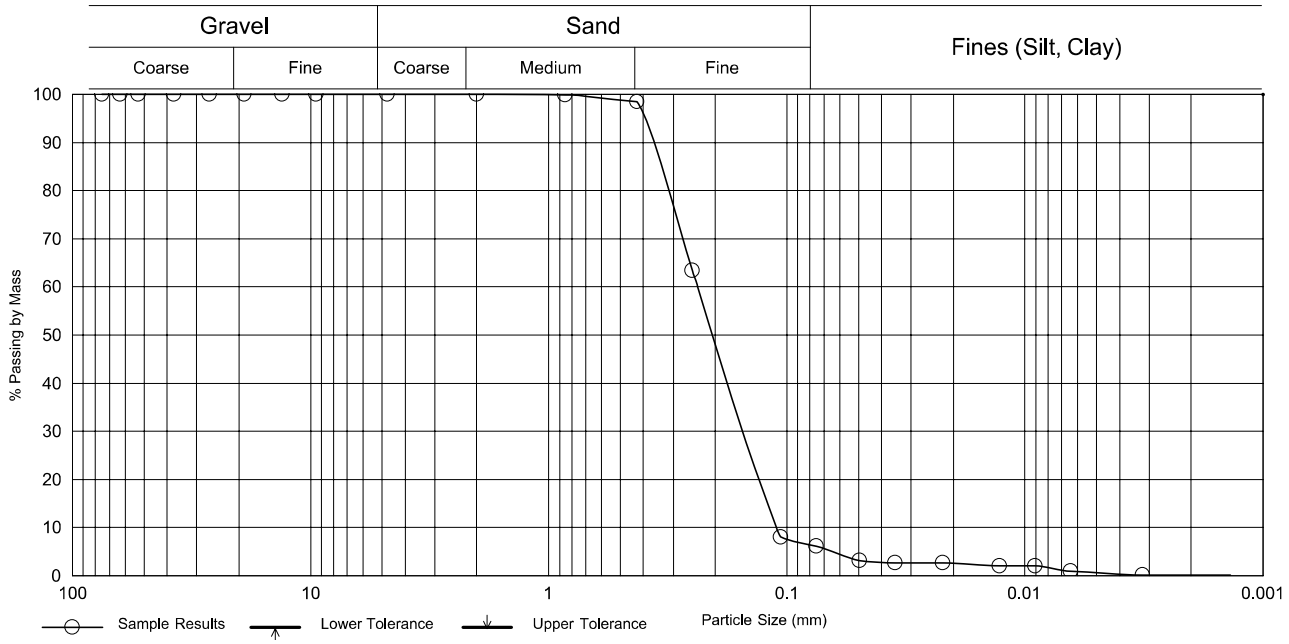
Particle Size Distribution of Soils

Testing Standard: MTO LS-702 (Rev. 37)

Testing Program #:	014114	Project Number:	22535291
Client:	WSP Canada Inc.	Project Location:	
Project Name:	2451-2495 Danforth Ave	Sample Location:	23-1
Source:	In-Situ	Borehole Type:	SS
Report Number:	WHB04678-23	Borehole Depth (m):	18.9 -
Sample Number:	9	WSP Lab Number:	WHB23-05454
Soil Description:	(SP) SAND, trace fines	Specimen Depth (m):	7.6 - 8.5
Soil Classification:		Date of Test:	11/30/2023
Specification:		Tested By:	Brown, Leah

Grain Size Distribution

93.8 **6.2**



Sieve		Hydrometer Sedimentation	
Sieve Size (mm)	% Passing	Particle Size mm	% Passing
		0.0494	3.2
		0.0350	2.7
		0.0221	2.7
		0.0128	2.1
		0.0090	2.1
		0.0064	1.0
75.0		0.0032	0.2
63.0		0.0014	-0.2
53.0		0.0000	0.0
37.5			
26.5			
19.0			
13.2			
9.5			
4.75		0.005mm	0.6
2.00	100.0	0.002mm	0.2
0.850	99.9	D60	0.237
0.425	98.5	D30	0.153
0.250	63.4	D10	0.110
0.106	8.0	Cu	2.151
0.075	6.2	Cc	0.90

Notes:

Disclaimer:

Notice: The test data given herein pertain to the sample provided and may not be applicable to other samples or to material from earlier or subsequent production. Reporting of these results constitutes a testing service only. Engineering interpretation and advice may be provided upon written request.

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature:

CERTIFIED BY CCIL

WSP Canada Inc.
100 Scotia Court
Whitby, ON L1N 8Y6
905-723-2727

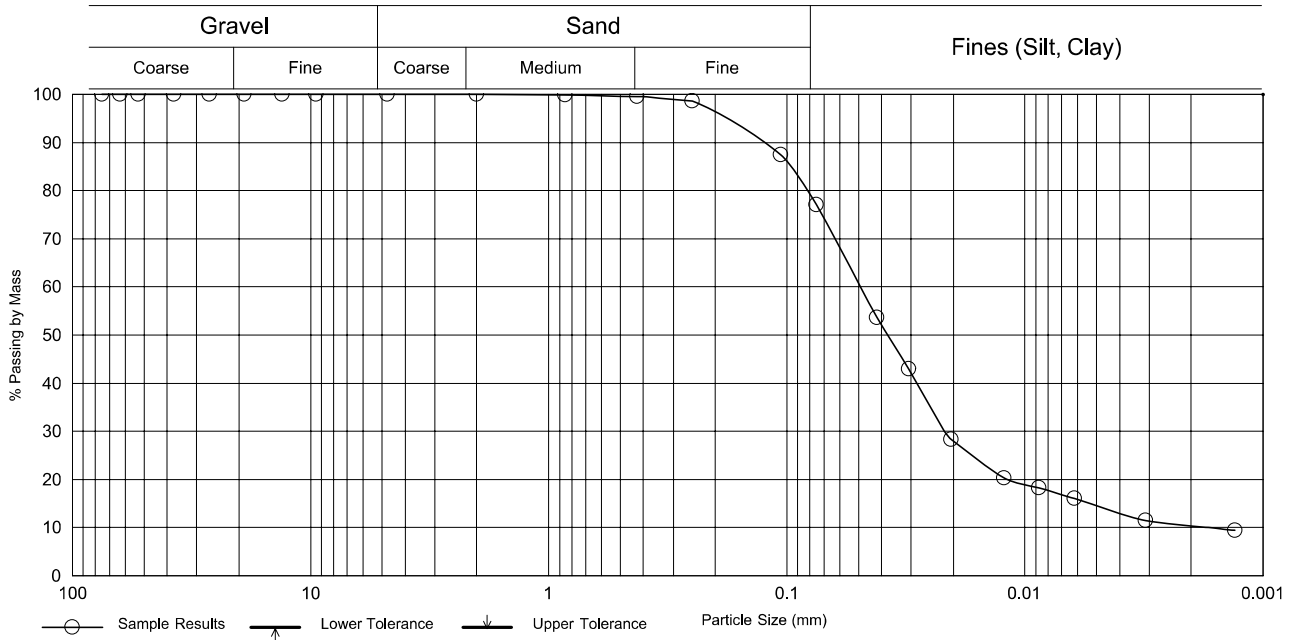
12/12/2023

Particle Size Distribution of Soils

Testing Standard: MTO LS-702 (Rev. 37)

Testing Program #:	014114	Project Number:	22535291
Client:	WSP Canada Inc.	Project Location:	
Project Name:	2451-2495 Danforth Ave	Sample Location:	23-1
Source:	In-Situ	Borehole Type:	SS
Report Number:	WHB04678-23	Borehole Depth (m):	18.9 -
Sample Number:	15A	WSP Lab Number:	WHB23-05460
Soil Description:	(ML) SILT, some sand to sandy	Specimen Depth (m):	16.8 - 17.1
Soil Classification:		Date of Test:	11/30/2023
Specification:		Tested By:	Brown, Leah

Grain Size Distribution **22.9** **77.1**



Sieve		Hydrometer Sedimentation	
Sieve Size (mm)	% Passing	Particle Size mm	% Passing
		0.0419	53.6
		0.0308	42.9
		0.0204	28.3
		0.0122	20.2
		0.0087	18.2
		0.0062	16.0
75.0		0.0031	11.5
63.0		0.0013	9.5
53.0		0.0000	0.0
37.5			
26.5			
19.0			
13.2			
9.5			
4.75		0.005mm	14.6
2.00	100.0	0.002mm	10.3
0.850	99.9	D60	0.049
0.425	99.6	D30	0.022
0.250	98.6	D10	0.002
0.106	87.5	Cu	28.173
0.075	77.1	Cc	5.50

Notes:

Disclaimer:

Notice: The test data given herein pertain to the sample provided and may not be applicable to other samples or to material from earlier or subsequent production. Reporting of these results constitutes a testing service only. Engineering interpretation and advice may be provided upon written request.

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature:

CERTIFIED BY CCIL

WSP Canada Inc.
100 Scotia Court
Whitby, ON L1N 8Y6
905-723-2727

12/12/2023

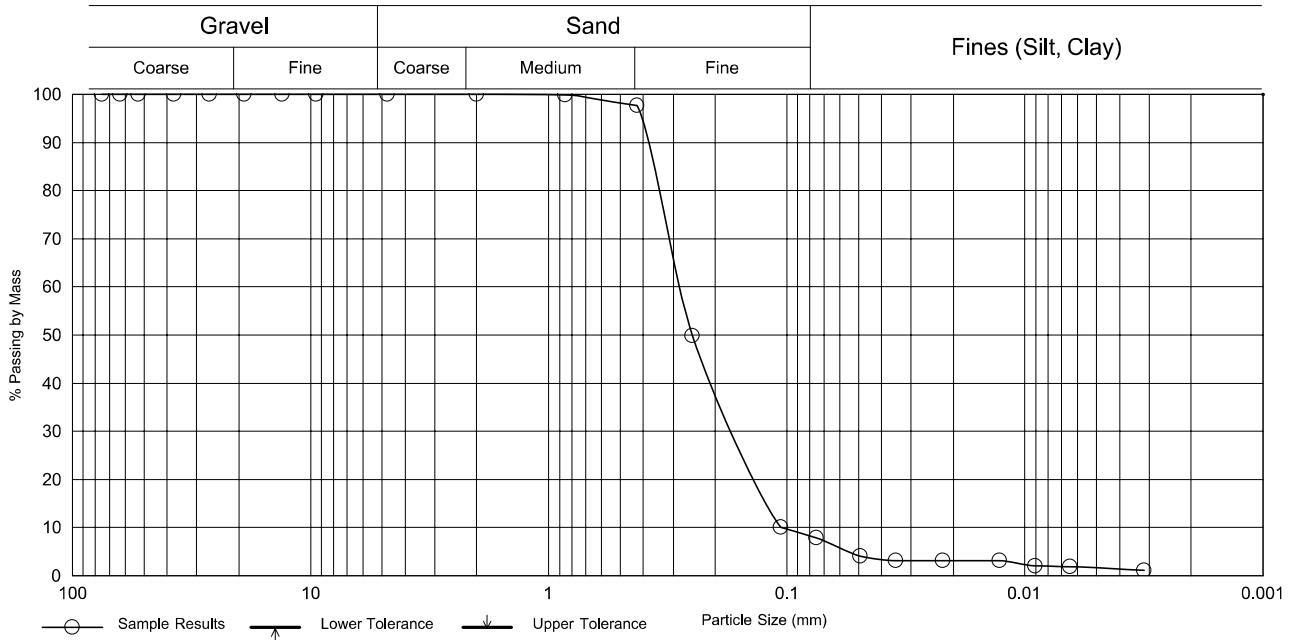
Particle Size Distribution of Soils

Testing Standard: MTO LS-702 (Rev. 37)

Testing Program #:	014115	Project Number:	22535291
Client:	WSP Canada Inc.	Project Location:	
Project Name:	2451-2495 Danforth Ave	Sample Location:	23-2
Source:	In-Situ	Borehole Type:	SS
Report Number:	WHB04680-23	Borehole Depth (m):	21.8 -
Sample Number:	8	WSP Lab Number:	WHB23-05470
Soil Description:		Specimen Depth (m):	6.1 - 6.7
Soil Classification:	(SP) SAND, trace fines	Date of Test:	11/30/2023
Specification:		Tested By:	Brown, Leah

Grain Size Distribution

92.1 **7.9**



Sieve		Hydrometer Sedimentation	
Sieve Size (mm)	% Passing	Particle Size mm	% Passing
		0.0491	4.1
		0.0349	3.1
		0.0221	3.1
		0.0128	3.1
		0.0090	2.1
		0.0065	1.9
75.0		0.0032	1.0
63.0		0.0000	-0.2
53.0		0.0000	0.0
37.5			
26.5			
19.0			
13.2			
9.5			
4.75		0.005mm	1.6
2.00	100.0	0.002mm	0.9
0.850	99.9	D60	0.282
0.425	97.6	D30	0.173
0.250	49.8	D10	0.106
0.106	10.0	Cu	2.664
0.075	7.9	Cc	1.00

Notes:

Disclaimer:

Notice: The test data given herein pertain to the sample provided and may not be applicable to other samples or to material from earlier or subsequent production. Reporting of these results constitutes a testing service only. Engineering interpretation and advice may be provided upon written request.

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature:

CERTIFIED BY CCIL

WSP Canada Inc.
100 Scotia Court
Whitby, ON L1N 8Y6
905-723-2727

12/12/2023

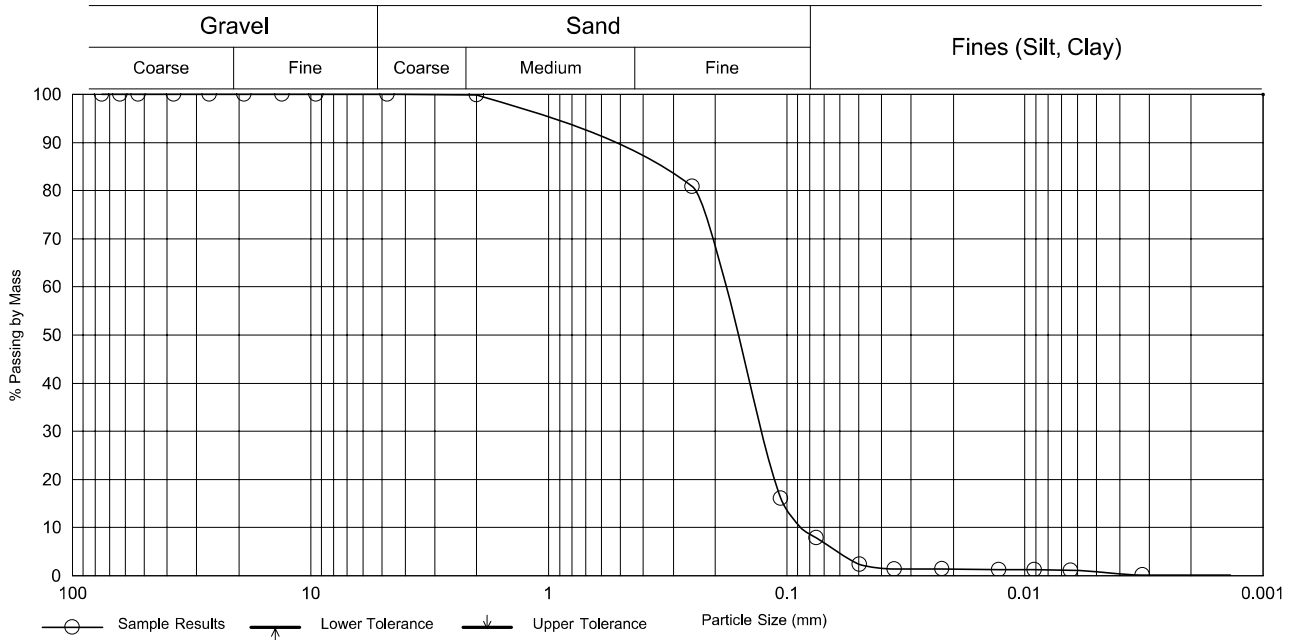
Particle Size Distribution of Soils

Testing Standard: MTO LS-702 (Rev. 37)

Testing Program #:	014115	Project Number:	22535291
Client:	WSP Canada Inc.	Project Location:	
Project Name:	2451-2495 Danforth Ave	Sample Location:	23-2
Source:	In-Situ	Borehole Type:	SS
Report Number:	WHB04680-23	Borehole Depth (m):	21.8 -
Sample Number:	12	WSP Lab Number:	WHB23-05474
Soil Description:		Specimen Depth (m):	12.2 - 12.8
Soil Classification:	(SP) SAND, trace fines	Date of Test:	11/30/2023
Specification:		Tested By:	Brown, Leah

Grain Size Distribution

92.2 **7.8**



Sieve		Hydrometer Sedimentation	
Sieve Size (mm)	% Passing	Particle Size mm	% Passing
		0.0496	2.3
		0.0353	1.4
		0.0223	1.4
		0.0129	1.3
		0.0091	1.2
		0.0064	1.1
75.0		0.0032	0.2
63.0		0.0014	-0.1
53.0		0.0000	0.0
37.5			
26.5			
19.0			
13.2			
9.5			
4.75	100.0	0.005mm	0.7
2.00	99.8	0.002mm	0.1
0.850	99.4	D60	0.179
0.425	98.6	D30	0.128
0.250	80.9	D10	0.088
0.106	16.1	Cu	2.045
0.075	7.8	Cc	1.04

Notes:

Disclaimer:

Notice: The test data given herein pertain to the sample provided and may not be applicable to other samples or to material from earlier or subsequent production. Reporting of these results constitutes a testing service only. Engineering interpretation and advice may be provided upon written request.

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature:

CERTIFIED BY CCIL

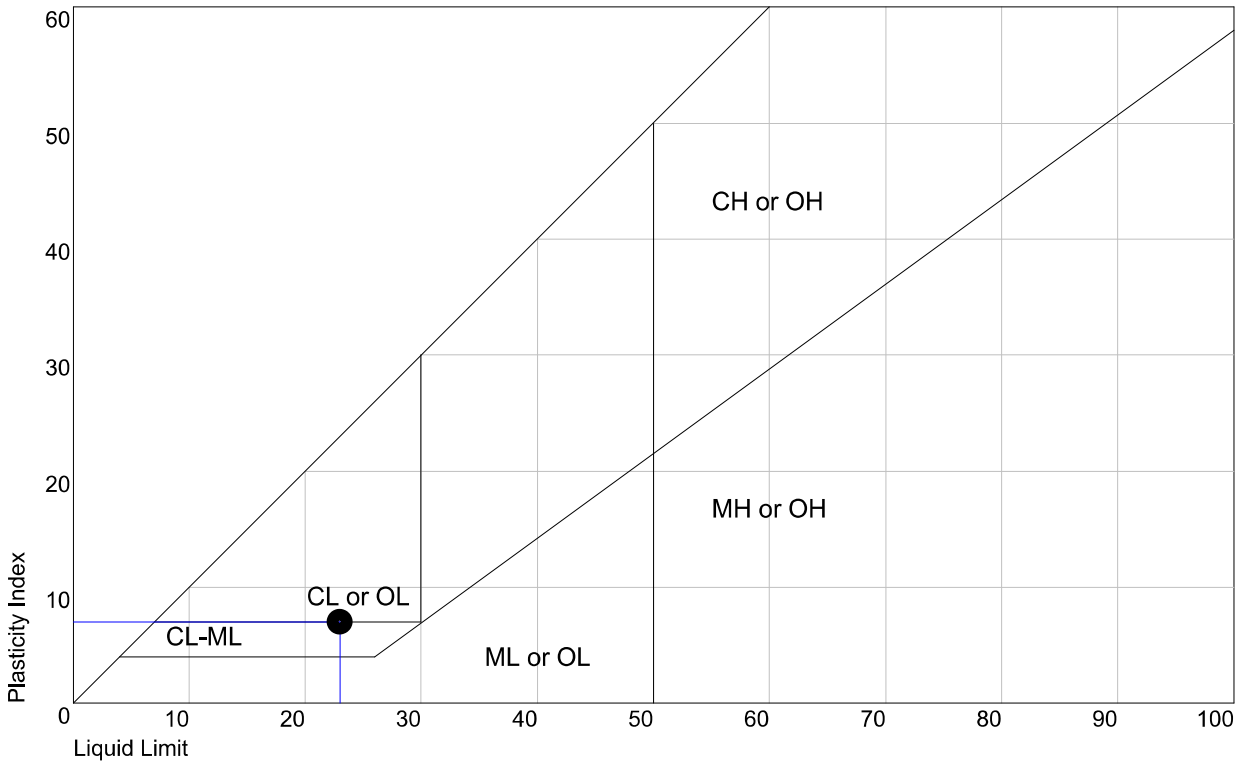
WSP Canada Inc.
100 Scotia Court
Whitby, ON L1N 8Y6
905-723-2727

12/12/2023

Liquid Limit, Plastic Limit and Plasticity Index

Testing Standard: ASTM D4318-17e1

Testing Program #:	014115	Project Number:	22535291
Client:	WSP Canada Inc.	Project Location:	
Project Name:	2451-2495 Danforth Ave	Sample Location	23-2
Source:	In-Situ	Borehole Type:	SS
Report Number:	WHB04680-23	Borehole Depth (m):	21.8 -
Sample Number:	15A	WSP Lab Number:	WHB23-05478
Soil Description:		Specimen Depth (m):	16.8 - 16.9
Soil Classification:	(CL) SILTY CLAY	Date of Test:	12/04/2023
		Tested By:	Jennie Timms



Sample Location	Sample Number	Top Depth (m)	Base Depth (m)	Percent Passing 425um Sieve	Natural Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index
23-2	15A	16.80	16.90		13.3	23	16	7	-0.39

NP = Non-Plastic
ND = Not Determined

Test Preparation
Lab Testing Comments / Deviations:
General Comments:

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature:

CERTIFIED BY CCIL

WSP Canada Inc.
100 Scotia Court
Whitby, ON L1N 8Y6
905-723-2727

12/12/2023

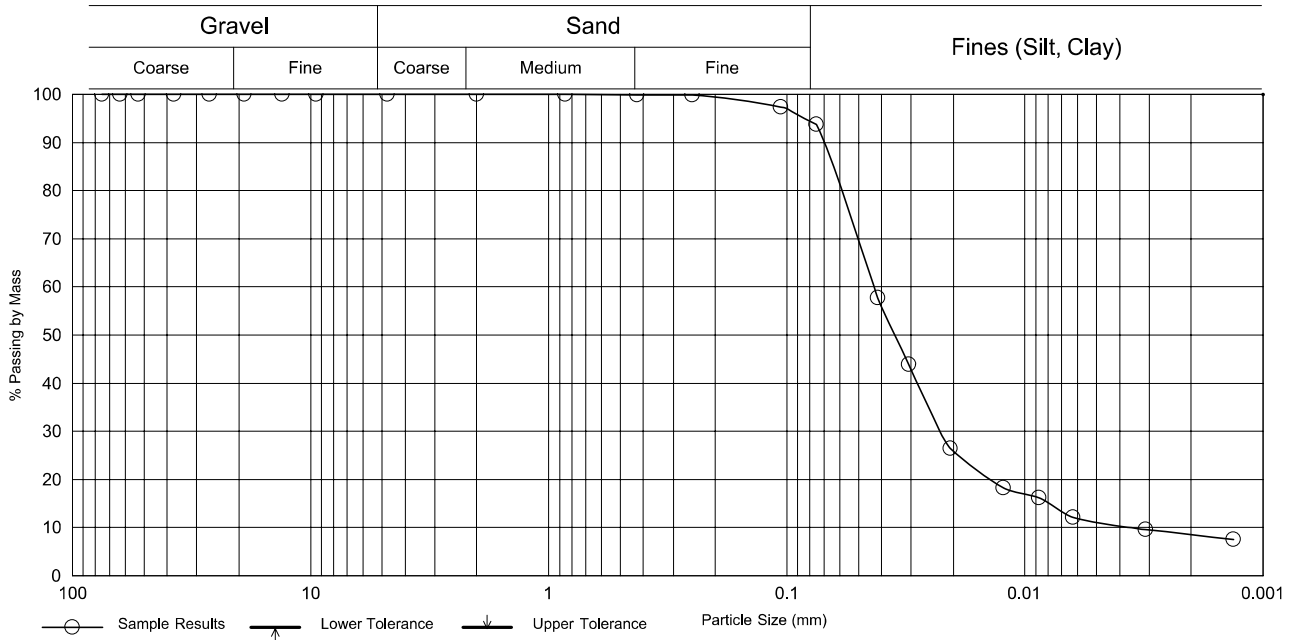
Particle Size Distribution of Soils

Testing Standard: MTO LS-702 (Rev. 37)

Testing Program #:	014117	Project Number:	22535291
Client:	WSP Canada Inc.	Project Location:	
Project Name:	2451-2495 Danforth Ave	Sample Location:	23-3
Source:	In-Situ	Borehole Type:	SS
Report Number:	WHB04681-23	Borehole Depth (m):	21.6 -
Sample Number:	15	WSP Lab Number:	WHB23-05497
Soil Description:		Specimen Depth (m):	16.8 - 17.1
Soil Classification:	(ML) SILT, trace sand	Date of Test:	11/30/2023
Specification:		Tested By:	Brown, Leah

Grain Size Distribution

6.3 **93.7**



Sieve		Hydrometer Sedimentation	
Sieve Size (mm)	% Passing	Particle Size mm	% Passing
		0.0414	57.6
		0.0307	43.9
		0.0206	26.3
		0.0123	18.2
		0.0087	16.2
		0.0063	12.1
75.0		0.0031	9.5
63.0		0.0013	7.6
53.0		0.0000	0.0
37.5			
26.5			
19.0			
13.2			
9.5			
4.75		0.005mm	11.0
2.00	100.0	0.002mm	8.4
0.850	100.0	D60	0.043
0.425	99.9	D30	0.023
0.250	99.8	D10	0.004
0.106	97.3	Cu	11.620
0.075	93.7	Cc	3.25

Notes:

Disclaimer:

Notice: The test data given herein pertain to the sample provided and may not be applicable to other samples or to material from earlier or subsequent production. Reporting of these results constitutes a testing service only. Engineering interpretation and advice may be provided upon written request.

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature:

CERTIFIED BY CCIL

WSP Canada Inc.
100 Scotia Court
Whitby, ON L1N 8Y6
905-723-2727

12/12/2023

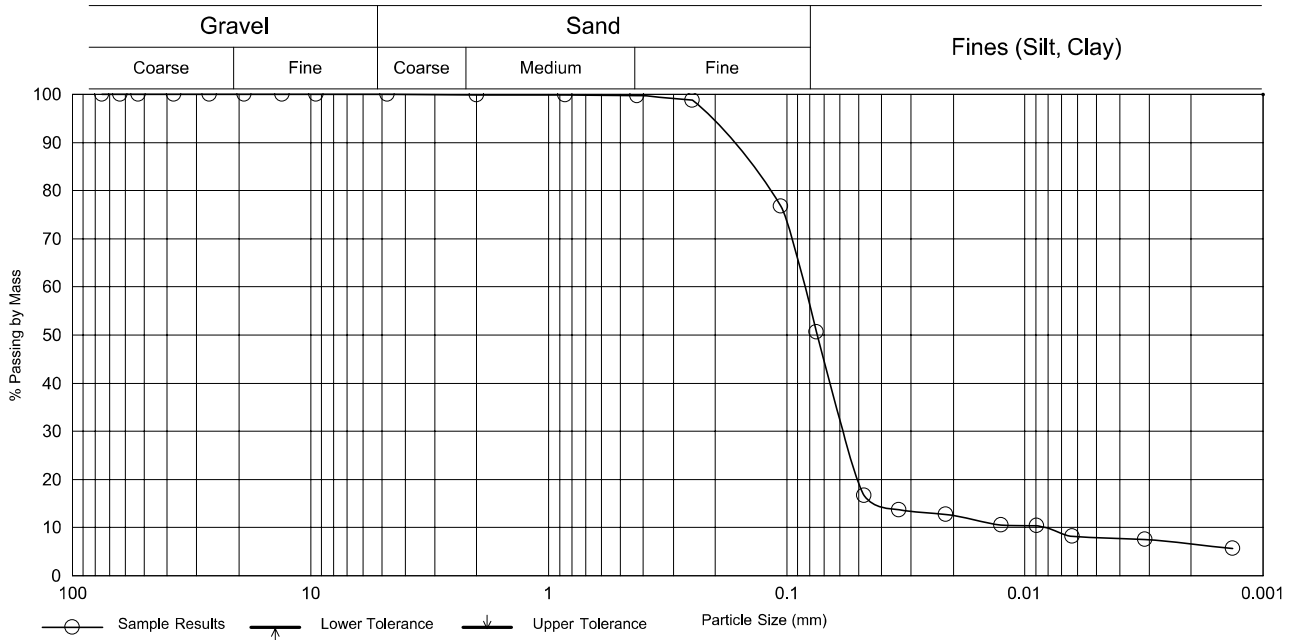
Particle Size Distribution of Soils

Testing Standard: MTO LS-702 (Rev. 37)

Testing Program #:	014122	Project Number:	22535291
Client:	WSP Canada Inc.	Project Location:	
Project Name:	2451-2495 Danforth Ave	Sample Location:	23-6
Source:	In-Situ	Borehole Type:	SS
Report Number:	WHB04684-23	Borehole Depth (m):	21.5 -
Sample Number:	15	WSP Lab Number:	WHB23-05655
Soil Description:		Specimen Depth (m):	21.3 - 21.5
Soil Classification:	(ML) sandy SILT	Date of Test:	11/30/2023
Specification:		Tested By:	Brown, Leah

Grain Size Distribution

49.4 **50.6**



Sieve		Hydrometer Sedimentation	
Sieve Size (mm)	% Passing	Particle Size mm	% Passing
		0.0474	16.7
		0.0339	13.7
		0.0215	12.7
		0.0126	10.6
		0.0089	10.4
		0.0063	8.2
75.0		0.0031	7.5
63.0		0.0013	5.7
53.0		0.0000	0.0
37.5			
26.5			
19.0			
13.2			
9.5			
4.75	100.0	0.005mm	7.9
2.00	99.9	0.002mm	6.5
0.850	99.9	D60	0.084
0.425	99.7	D30	0.058
0.250	98.8	D10	0.008
0.106	76.7	Cu	10.182
0.075	50.6	Cc	4.85

Notes:

Disclaimer:

Notice: The test data given herein pertain to the sample provided and may not be applicable to other samples or to material from earlier or subsequent production. Reporting of these results constitutes a testing service only. Engineering interpretation and advice may be provided upon written request.

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature:

CERTIFIED BY CCIL

WSP Canada Inc.
100 Scotia Court
Whitby, ON L1N 8Y6
905-723-2727

12/12/2023

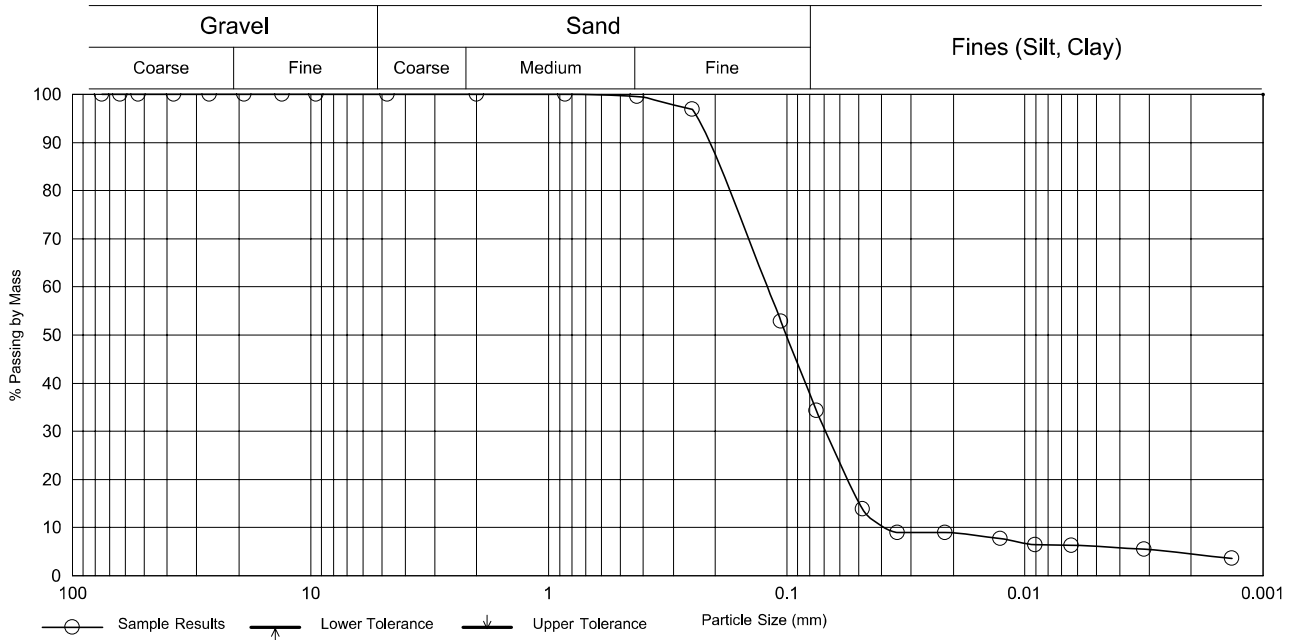
Particle Size Distribution of Soils

Testing Standard: MTO LS-702 (Rev. 37)

Testing Program #:	014124	Project Number:	22535291
Client:	WSP Canada Inc.	Project Location:	
Project Name:	2451-2495 Danforth Ave	Sample Location:	23-7
Source:	In-Situ	Borehole Type:	SS
Report Number:	WHB04686-23	Borehole Depth (m):	18.7 -
Sample Number:	10	WSP Lab Number:	WHB23-05558
Soil Description:		Specimen Depth (m):	9.1 - 9.8
Soil Classification:	(SM) SILTY SAND	Date of Test:	11/30/2023
Specification:		Tested By:	Brown, Leah

Grain Size Distribution

65.7 **34.3**



Sieve		Hydrometer Sedimentation	
Sieve Size (mm)	% Passing	Particle Size mm	% Passing
		0.0479	13.8
		0.0343	8.9
		0.0217	8.9
		0.0127	7.7
		0.0090	6.4
		0.0064	6.3
75.0		0.0032	5.4
63.0		0.0013	3.7
53.0		0.0000	0.0
37.5			
26.5			
19.0			
13.2			
9.5			
4.75		0.005mm	6.1
2.00	100.0	0.002mm	4.4
0.850	100.0	D60	0.121
0.425	99.6	D30	0.069
0.250	96.9	D10	0.039
0.106	52.9	Cu	3.090
0.075	34.3	Cc	1.00

Notes:

Disclaimer:

Notice: The test data given herein pertain to the sample provided and may not be applicable to other samples or to material from earlier or subsequent production. Reporting of these results constitutes a testing service only. Engineering interpretation and advice may be provided upon written request.

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature:

CERTIFIED BY CCIL

WSP Canada Inc.
100 Scotia Court
Whitby, ON L1N 8Y6
905-723-2727

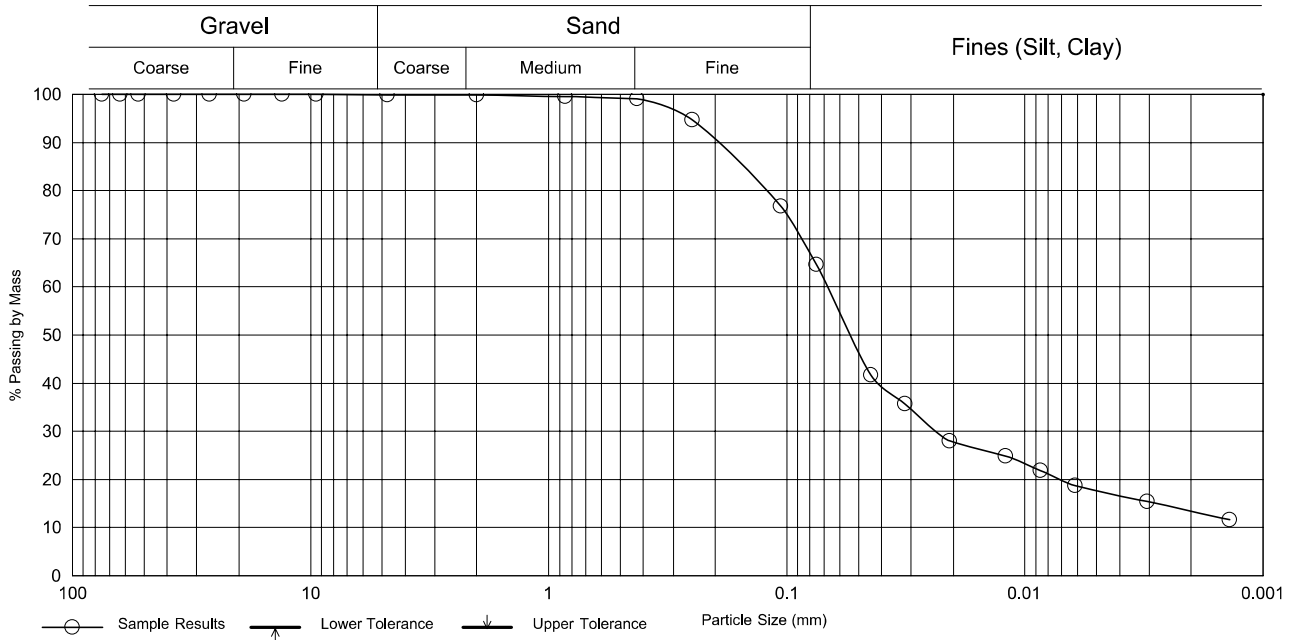
12/12/2023

Particle Size Distribution of Soils

Testing Standard: MTO LS-702 (Rev. 37)

Testing Program #:	014124	Project Number:	22535291
Client:	WSP Canada Inc.	Project Location:	
Project Name:	2451-2495 Danforth Ave	Sample Location:	23-7
Source:	In-Situ	Borehole Type:	SS
Report Number:	WHB04686-23	Borehole Depth (m):	18.7 -
Sample Number:	14	WSP Lab Number:	WHB23-05562
Soil Description:		Specimen Depth (m):	0 - 0
Soil Classification:	(ML) sandy SILT	Date of Test:	11/30/2023
Specification:		Tested By:	Brown, Leah

Grain Size Distribution **0.1** **35.2** **64.7**



Sieve		Hydrometer Sedimentation	
Sieve Size (mm)	% Passing	Particle Size mm	% Passing
		0.0443	41.6
		0.0319	35.7
		0.0207	27.9
		0.0121	24.8
		0.0086	21.8
		0.0061	18.8
75.0		0.0031	15.4
63.0		0.0014	11.6
53.0		0.0000	0.0
37.5			
26.5			
19.0			
13.2			
9.5	100.0		
4.75	99.9	0.005mm	17.6
2.00	99.8	0.002mm	13.2
0.850	99.6	D60	0.067
0.425	99.1	D30	0.024
0.250	94.7	D10	NA
0.106	76.7	Cu	NA
0.075	64.7	Cc	NA

Notes:

Disclaimer:

Notice: The test data given herein pertain to the sample provided and may not be applicable to other samples or to material from earlier or subsequent production. Reporting of these results constitutes a testing service only. Engineering interpretation and advice may be provided upon written request.

Reviewed By: John Taylor Title: Laboratory Team Lead

Signature:

CERTIFIED BY CCIL

APPENDIX E

Results of Corrosivity Testing

AGAT Laboratories

2910 12TH STREET NE
CALGARY, ALBERTA
CANADA T2E 7P7
TEL (403)735-2005
FAX (403)735-2771
http://www.agatlabs.com

CLIENT NAME: WSP CANADA INC.
6925 CENTURY AVE, SUITE#100
MISSISSAUGA, ON L5N7K2
(905) 567-4444

ATTENTION TO: Laura Burchell, Alex Dziedzic

PROJECT: 22535291

AGAT WORK ORDER: 23T072513

ROCK ANALYSIS REVIEWED BY: Heather Offord, Client Service Representative

SOIL ANALYSIS REVIEWED BY: Sukhwinder Randhawa, Lab Team Leader

TRACE ORGANICS REVIEWED BY: Radhika Chakraberty, Trace Organics Lab Manager

DATE REPORTED: Oct 03, 2023

PAGES (INCLUDING COVER): 8

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (403) 735-2005

*Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*
- *For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.*

AGAT Laboratories
2910 12TH STREET NE
CALGARY, ALBERTA
CANADA T2E 7P7
TEL (403)735-2005
FAX (403)735-2771
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23T072513

PROJECT: 22535291

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Laura Burchell, Alex Dziedzic

SAMPLING SITE:2451-2491 DANFORTH AVENUE, TORONTO, ON M4C 1L1

SAMPLED BY:BISWAJIT NANDI

(284-042) Sulfide (CGY)

DATE RECEIVED: 2023-09-22 **DATE REPORTED: 2023-10-03**

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: BH23-1-SA8-9 SAMPLE TYPE: Soil DATE SAMPLED: 2023-09-11 5310696	BH22-7-SA10-11 Soil 2023-09-14 5310698	BH23-2-SA9-10-11 Soil 2023-09-12 5310699	BH23-5-SA10-11-12 Soil 2023-09-16 5310700	BH23-6-SA7-8-9 Soil 2023-09-17 5310701
Sulfide	%		0.01	0.03	0.03	0.04	0.02	0.03

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5310696-5310701 Acid Soluble Sulfate Analysis completed at AGAT 2620 Calgary
Total Sulfur Analysis completed at AGAT 2215 Calgary

Analysis performed at AGAT Calgary (unless marked by *)

Certified By:

AGAT Laboratories

2910 12TH STREET NE
CALGARY, ALBERTA
CANADA T2E 7P7
TEL (403)735-2005
FAX (403)735-2771
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23T072513

PROJECT: 22535291

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Laura Burchell, Alex Dziedzic

SAMPLING SITE:2451-2491 DANFORTH AVENUE, TORONTO, ON M4C 1L1

SAMPLED BY:BISWAJIT NANDI

Corrosivity Package

DATE RECEIVED: 2023-09-22 **DATE REPORTED: 2023-10-03**

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: BH23-1-SA8-9 SAMPLE TYPE: Soil DATE SAMPLED: 2023-09-11 5310696	BH22-7-SA10-11 Soil 2023-09-14 5310698	BH23-2-SA9-10-11 Soil 2023-09-12 5310699	BH23-5-SA10-11-12 Soil 2023-09-16 5310700	BH23-6-SA7-8-9 Soil 2023-09-17 5310701
Chloride (2:1)	µg/g		2	169	337	326	246	276
Sulphate (2:1)	µg/g		2	10	41	45	34	46
pH (2:1)	pH Units		NA	10.2	9.77	9.23	9.50	9.74
Electrical Conductivity (2:1)	mS/cm		0.005	0.679	0.895	0.313	0.541	1.26
Resistivity (2:1) (Calculated)	ohm.cm		1	1470	1120	3190	1850	794
Redox Potential 1	mV		NA	270	295	278	279	282
Redox Potential 2	mV		NA	267	294	284	286	276
Redox Potential 3	mV		NA	265	296	288	292	272

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5310696-5310701 EC, pH, Chloride and Sulphate were determined on the extract obtained from the 2:1 leaching procedure (2 parts DI water: 1 part soil). Resistivity is a calculated parameter.
Redox potential measured on as received sample. Due to the potential for rapid change in sample equilibrium chemistry with exposure to oxidative/reduction conditions laboratory results may differ from field measured results.
Redox potential measurement in soil is quite variable and non reproducible due in part, to the general heterogeneity of a given soil. It is also related to the introduction of increased oxygen into the sample after extraction. The interpretation of soil redox potential should be considered in terms of its general range rather than as an absolute measurement.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

AGAT Laboratories
2910 12TH STREET NE
CALGARY, ALBERTA
CANADA T2E 7P7
TEL (403)735-2005
FAX (403)735-2771
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23T072513

PROJECT: 22535291

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Laura Burchell, Alex Dziedzic

SAMPLING SITE:2451-2491 DANFORTH AVENUE, TORONTO, ON M4C 1L1

SAMPLED BY:BISWAJIT NANDI

Moisture Content (Soil)

DATE RECEIVED: 2023-09-22 **DATE REPORTED: 2023-10-03**

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: BH23-1-SA8-9 SAMPLE TYPE: Soil DATE SAMPLED: 2023-09-11 5310696	BH22-7-SA10-11 Soil 2023-09-14 5310698	BH23-2-SA9-10-11 Soil 2023-09-12 5310699	BH23-5-SA10-11-12 Soil 2023-09-16 5310700	BH23-6-SA7-8-9 Soil 2023-09-17 5310701
Moisture Content	%		0.1	5.0	17.8	4.0	15.3	17.7

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: R. Chakraberty

AGAT Laboratories

2910 12TH STREET NE
CALGARY, ALBERTA
CANADA T2E 7P7
TEL (403)735-2005
FAX (403)735-2771
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 23T072513

PROJECT: 22535291

ATTENTION TO: Laura Burchell, Alex Dziedzic

SAMPLING SITE:2451-2491 DANFORTH AVENUE, TORONTO, ON M4C 1L1

SAMPLED BY:BISWAJIT NANDI

Rock Analysis

RPT Date: Oct 03, 2023			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
(284-042) Sulfide (CGY)															
Total Sulfur	5310696	5310696	0.03	0.03	0.0%	< 0.01	100%	80%	120%						
Sulfate	5283106	5283106	0.02	0.02	0.0%	< 0.01	100%	80%	120%						

Certified By:

AGAT Laboratories

2910 12TH STREET NE
CALGARY, ALBERTA
CANADA T2E 7P7
TEL (403)735-2005
FAX (403)735-2771
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 23T072513

PROJECT: 22535291

ATTENTION TO: Laura Burchell, Alex Dziedzic

SAMPLING SITE:2451-2491 DANFORTH AVENUE, TORONTO, ON M4C 1L1

SAMPLED BY:BISWAJIT NANDI

Soil Analysis

RPT Date: Oct 03, 2023			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															
Chloride (2:1)	5303800		10	10	0.0%	< 2	99%	70%	130%	100%	80%	120%	106%	70%	130%
Sulphate (2:1)	5303800		10	10	0.0%	< 2	99%	70%	130%	100%	80%	120%	100%	70%	130%
pH (2:1)	5310696	5310696	10.2	10.1	1.0%	NA	109%	80%	120%						
Electrical Conductivity (2:1)	5310696	5310696	0.679	0.691	1.8%	< 0.005	99%	80%	120%						
Redox Potential 1	5310696					NA	100%	90%	110%						

Comments: NA signifies Not Applicable.
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.

Duplicate NA: results are under 5X the RDL and will not be calculated.

Certified By:

AGAT Laboratories

2910 12TH STREET NE
CALGARY, ALBERTA
CANADA T2E 7P7
TEL (403)735-2005
FAX (403)735-2771
http://www.agatlabs.com

Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 23T072513

PROJECT: 22535291

ATTENTION TO: Laura Burchell, Alex Dziedzic

SAMPLING SITE:2451-2491 DANFORTH AVENUE, TORONTO, ON M4C 1L1

SAMPLED BY:BISWAJIT NANDI

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Chloride (2:1)	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate (2:1)	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
pH (2:1)	INOR 93-6031	modified from EPA 9045D and MCKEAGUE 3.11	PH METER
Electrical Conductivity (2:1)	INOR-93-6075	modified from MSA PART 3, CH 14 and SM 2510 B	PC TITRATE
Resistivity (2:1) (Calculated)	INOR-93-6036	McKeague 4.12, SM 2510 B,SSA #5 Part 3	CALCULATION
Redox Potential 1	INOR-93-6066	modified from G200-20, SM 2580 B	REDOX POTENTIAL ELECTRODE
Redox Potential 2	INOR-93-6066	modified from G200-20, SM 2580 B	REDOX POTENTIAL ELECTRODE
Redox Potential 3	INOR-93-6066	modified from G200-20, SM 2580 B	REDOX POTENTIAL ELECTRODE
Trace Organics Analysis			
Moisture Content	ORG-91-5009	modified from CCME Tier 1 Method	BALANCE

AGAT Laboratories
5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: WSP Canada Inc.
Contact: Laura Burchell, Alex Dziedzic
Address: 6925 Century Ave #100,
Mississauga, ON L5N 7K2
Phone: +1-905-301-6840 Fax:
Reports to be sent to:
1. Email: emily.casey@wsp.com,laura.burchell@wsp.com,hashim.al-hashmi@v
2. Email: alexander.dziedzic@wsp.com,biswajit.nandi@wsp.com

Project Information:

Project: 22535291
Site Location: 2451-2491 Danforth Ave, Toronto, ON M4C 1L1
Sampled By: Biswajit Nandi
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐
Company:
Contact:
Address:
Email:

Regulatory Requirements:

(Please check all applicable boxes)

☑ Regulation 153/04
Table (Indicate One): ☐ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One): ☐ Coarse ☑ Fine

☐ Excess Soils R406
Table (Indicate One)

☐ Regulation 558

☐ CCME

☐ Sewer Use ☐ Sanitary ☐ Storm
City of Toronto (Region)

☐ Prov. Water Quality Objectives (PWQO)

☐ Other (Indicate One)

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Laboratory Use Only

Work Order #: 23T072513
Cooler Quantity: 1 large
Arrival Temperatures: 7.4 | 7.6 | 7.9
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes: Bagged ice

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC (Y/N)	O. Reg 153: Metals & Inorganics	O. Reg 153: Metals - ☐ CrVI, ☐ Hg, ☐ HWSB	O. Reg 153: BTEX, F1-F4 PHCs	O. Reg 153: Analyze F4G if required ☐ Yes ☐ No	O. Reg 153: PAHs	O. Reg 153: PCBs	O. Reg 153: VOC	O. Reg 558: Landfill Disposal Characterization TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	O. Reg 406: Excess Soils SPLP Rainwater Leach SPLP: ☐ Metals ☐ VOCs ☐ SVOCs	O. Reg 406: Excess Soils Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Salt - EC/SAR	PHCs	Corrosivity + sulphate cor						Potentially Hazardous or High Concentration (Y/N)
BH23-1-SA8-9	11-Sept-23	AM PM	2	S															☑						
BH22-7-SA10-11	14-Sept-23	AM PM	2	S									☒						☑						
BH23-2-SA9-10-11	12-Sept-23	AM PM	2	S															☑						
BH23-5-SA10-11-12	16-Sept-23	AM PM	2	S															☑						
BH23-6-SA7-8-9	17-Sept-23	AM PM	2	S															☑						
		AM PM																							
		AM PM																							
		AM PM																							
		AM PM																							
		AM PM																							
		AM PM																							

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Biswajit Nandi	Sept 22, 2023	0900	Aniqa Tahir A	Sep 22, 2023	4pm
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time

Page 1 of 1
N°:

Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT

APPENDIX F

Pressuremeter Testing Results

In-Situ Pressuremeter Testing **Project No. IDG 230750**
2421 Danforth Avenue, Toronto
Borehole Nos. BH 23-5- and 23-6-PMT
October 4th, 2023

Prepared for:
Mr. Alex Dziedzic, EIT
WSP Golder
6925 Century Avenue, Suite # 100
Mississauga, Ontario
L5N 7K2

In-Depth Geotechnical Inc.
20 Ravenscliffe Avenue
Hamilton, Ontario
L8P 3M4
Phone: (905) 541 9937
Fax: (877) 624 0140

Table of Contents

1. Introduction

In-Depth Geotechnical Inc. was retained by WSP Golder to conduct Pressuremeter testing in relation to their Geotechnical Investigation for the site at the Sobeys Store, at 2421 Danforth Avenue, in Toronto, Ontario.

This report presents the results of pressuremeter testing (PMT) carried out at two borehole locations with the purpose of evaluating specific parameters related to a) shear strength; and b) deformation properties of the encountered soils.

This report includes data obtained by use of a pre-bored pressuremeter system. Inferred characteristics of the data are also presented including initial contact pressure, limit pressure, secant deformation modulus values during loading, unloading and reloading cycles, and yield pressure if and when justified by the data. Multiple methods are available for interpretation of this data to estimate engineering properties of soils but such methods are not discussed or included in this report except for the characteristics of the data plots as described above.

2. Field Testing Procedures

Pressuremeter testing was performed at two boreholes, on the above-mentioned site. Details of tested boring are:

Borehole	Number of Tests	Ground Elevation (m)	Water Depth (m)	Maximum Depth (m)
BH 23-5-PMT	3	assumed 100	4.0	16.0
BH 23-6-PMT	3	assumed 100	4.0	15.1

Field work was completed on September 16 and 17, 2023. Drilling procedures were undertaken by Altech Contractor. The boreholes were advanced using mud rotary drilling technique with a track-mounted Diedrich D120 drill rig. These borings were drilled for PMT testing only.

4-inch casing was installed to a depth of about 3.0 m below the ground surface to prevent soil collapse on the upper part of the boring (collar).

The test sections of the boring were drilled with a tricone bit. The bit was advanced using continuous circulation of drilling mud to flush soil cuttings, producing a controlled diameter hole for the pressuremeter probe. At the time of drilling and testing, it was noticed the loss of drilling mud/fluid. Prior to the drilling work, this site had been excavated and filled with heterogenous materials including soils, construction rubble. It is thought that the casing was not deep enough to prevent the loos of fluid.

In general, the drilling fluid had not remained at the top of casing.

Pre-boring pressuremeter testing was completed using a TEXAM unit. The testing procedure was in general accordance with Procedure B, volume-controlled loading, as outlined in the ASTM D 4719-00 Standard Test Method for Pre-bored Pressuremeter Testing of Soils. The testing equipment was calibrated for pressure and volume losses as indicated in the above-mentioned standard. The Records of Calibration for the PMT probes utilized in this job are attached on Appendix Three. The control unit was de-aired prior to every test. Also, checks were completed to ensure that the probe, tubing, and control unit assembly were fully saturated, and that the probe membrane was leakage-free at high pressures. Two readings were taken for each volume step, namely for time delays of 15, and 30 seconds.

As per WSP Golder instructions, test procedures also included completion of up to two unload-reload cycles per test, wherever possible.

3. Pressuremeter Test Results

3.1 PMT test parameters

Pressuremeter test data is presented in Appendix One, and the summary of test results are illustrated in Table Nos. 1a and 1b, below.

3.2 PMT-Inferred soil parameters

A general guideline to interpret and infer soil properties based on available PMT test data is attached to Appendix Two This guideline suggests accepted current procedures to estimate or infer shear strength, deformation properties, and other related soil parameters. These inferred properties are summarized in Table Nos. 2a and 2b, below.

It is recognized that the values of in-situ total horizontal stresses, σ_{h0}, presented in this report correspond to best possible estimates. These estimates were obtained using the *corrected pressure* versus *1/Volume* method, and are used in this report to infer values of the at-rest stress ratio k_0. The following subsurface soil conditions were assumed to apply:

- Ground Surface and Ground Water elevations: as indicated on the Table Nos. 2a and 2b, below
- Average wet and saturated unit weights: γ_{wet} = 20 kN/m^3 and γ_{sat} = 21 kN/m^3
- Total horizontal stresses taken as direct values of p_0 (PMT test results).

It is considered that stresses within the soil mass are defined by geostatic conditions, that is to say:

1. No surcharges are applied on the surface (structural loads from existing buildings nearby are negligible),
2. Static groundwater conditions (no seepage occurs),
3. Surface topography is horizontal (no slopes or excavations), and
4. Total vertical stresses are defined by the *wet* (unsaturated soils) and *saturated* (submerged soils) unit weights, γ_{wet} and γ_{sat}, respectively.

Using the *Pressiorama* and the associated *Pressiorama Cyclique Charts* inferred values of Young's Moduli (E_Y), Classification Index (I_c), and drained friction angle (ϕ') are also shown in Table Nos. 2a and 2b.

TABLE No. 1a	Summary of Pressuremeter Test Results												Boring No. BH 23-5-PMT			
Test No.	Surface Elevation (m): 100.00 (assumed)		Contact Pressure	PMT Modulus	Unload - Reload Cycles								Yield Pressure	Net Limit Pressure		
					$E_{Unload\ 1}$	$E_{Reload\ 1}$	Stresses			Strains $\Delta R/R_0$						
	Depth	Elevation	p_0	E_{PMT}	$E_{Unload\ 2}$	$E_{Reload\ 2}$	Point 1	Point 2	Point 3	Point 1	Point 2	Point 3	p_y	p^*_L	E_{PMT} / p^*_L	p^*_L / p_y
	[m]	[m]	[kPa]	[MPa]	[MPa]	[MPa]	[kPa]	[kPa]	[kPa]	[%]	[%]	[%]	[kPa]	[kPa]		
1	9.63	90.4	99	54.1	454.2	252.0	2085.9	860.5	2142.0	12.0	11.6	12.4	1575	4674	11.6	3.0
2	12.67	87.3	138	57.6	322.1	159.5	1448.8	406.6	1447.9	7.5	7.0	8.0	1160	5356	10.8	4.6
					380.2	202.8	2337.4	1214.0	2389.0	10.1	9.7	10.5				
3	15.75	84.3	188	55.5	371.9	156.2	1445.9	304.7	1341.5	7.5	7.1	8.0	1135	6984	7.9	6.2
					661.5	272.0	2444.5	917.1	2425.1	10.1	9.7	10.5				

TABLE No. 1b	Summary of Pressuremeter Test Results												Boring No. BH 23-6-PMT			
Test No.	Surface Elevation (m): 100.00 (assumed)		Contact Pressure	PMT Modulus	Unload - Reload Cycles								Yield Pressure	Net Limit Pressure		
					$E_{Unload\ 1}$	$E_{Reload\ 1}$	Stresses			Strains $\Delta R/R_0$						
	Depth	Elevation	p_0	E_{PMT}	$E_{Unload\ 2}$	$E_{Reload\ 2}$	Point 1	Point 2	Point 3	Point 1	Point 2	Point 3	p_y	p^*_L	E_{PMT} / p^*_L	p^*_L / p_y
	[m]	[m]	[kPa]	[MPa]	[MPa]	[MPa]	[kPa]	[kPa]	[kPa]	[%]	[%]	[%]	[kPa]	[kPa]		
1	8.13	91.9	93	57.1	399.8	232.6	1858.6	689.2	1918.7	9.3	8.8	9.7	1230	4041	14.1	3.3
					557.5	253.0	2488.2	1111.8	2491.3	11.9	11.5	12.3				
2	11.20	88.8	177	82.4	589.3	296.1	2510.5	1043.1	2568.1	8.2	7.8	8.6	2151	5659	14.6	2.6
					789.2	333.2	3324.1	1675.7	3336.2	10.8	10.5	11.2				
3	14.22	85.8	162	75.0	n/a	n/a							1652	6776	11.1	4.1
					507.4	303.4	2065.4	723.0	2211.0	9.2	8.9	9.7				

Table No. 2a PMT-Inferred Parameters Boring No. BH 23-5-PMT

PMT Test No.	z depth [m]	z_w water [m]	Hydrostatic Pressure [kPa]	Total Stresses Vertical [kPa]	Total Stresses Horizontal [kPa]	Effective Stresses Vertical [kPa]	Effective Stresses Horizontal [kPa]	Stress Ratio k_0	Young's Modulus α Menard's Parameter	Young's Modulus E_Y [MPa]	Shear Strength Undrained Cohesive Behavior c_u [kPa]	Shear Strength Drained Cohesionless Behavior ϕ' [degrees]	Classification Index I_c
1	9.63	5.63	55	198	99	143	44	**0.31**	0.37	146	375	44	3.06
2	12.67	8.67	85	262	138	177	53	**0.30**	0.38	153	416	43	2.99
3	15.75	11.75	115	327	188	212	73	**0.34**	0.33	170	507	44	3.02

Notes

1. Assumed Ground Elevation (m) 100.00 Assumed Water Elevation (m) 96.00 Assumed Water Depth (m) 4.00
2. Wet unit weight of soil 20.0 [kN/m^3] Saturated unit weight of soil 21.0 [kN/m^3]
3. Observations on Shear Strength Parameters (SSP):
   SSP are considered either for Undrained Conditions (Short Term) or Drained Conditions (Long Term). These two conditions are mutually exclusive.
   Undrained Conditions imply cohesion is c_u , and $\phi = 0$. ***Drained Conditions*** imply negligible cohesion or $c' = 0$, and $\phi = \phi'$
   Based on the Classification Index I_C (Soil Behavior Type), the suggested values of the SSP are highlighted in green (Thick box border)
4. The Classification Index parameter, I_C, is indicative of the soil type of behavior. It does not exactly relate to the Soil Classification types as those obtained via Grain-Size Distribution analyses. I_C varies from 1.0 to 4.5, from soft clays (cohesive) to dense coarse sands (frictional), correspondingly.

Table No. 2b PMT-Inferred Parameters Boring No. BH 23-6-PMT

PMT Test No.	z depth [m]	z_w water [m]	Hydrostatic Pressure [kPa]	Total Stresses Vertical [kPa]	Total Stresses Horizontal [kPa]	Effective Stresses Vertical [kPa]	Effective Stresses Horizontal [kPa]	Stress Ratio k_0	Young's Modulus α Menard's Parameter	Young's Modulus E_Y [MPa]	Shear Strength Undrained Cohesive Behavior c_u [kPa]	Shear Strength Drained Cohesionless Behavior ϕ' [degrees]	Classification Index I_c
1	8.13	4.13	40	167	93	126	53	**0.42**	0.42	136	337	42	3.00
2	11.20	7.20	71	231	177	161	106	**0.66**	0.46	180	433	40	2.86
3	14.22	10.22	100	295	162	194	62	**0.32**	0.37	201	496	43	3.02

Notes

1. Assumed Ground Elevation (m) 100.00 Assumed Water Elevation (m) 96.00 Assumed Water Depth (m) 4.00
2. Wet unit weight of soil 20.0 [kN/m^3] Saturated unit weight of soil 21.0 [kN/m^3]
3. Observations on Shear Strength Parameters (SSP):
   SSP are considered either for Undrained Conditions (Short Term) or Drained Conditions (Long Term). These two conditions are mutually exclusive.
   Undrained Conditions imply cohesion is c_u , and $\phi = 0$. ***Drained Conditions*** imply negligible cohesion or $c' = 0$, and $\phi = \phi'$
   Based on the Classification Index I_C (Soil Behavior Type), the suggested values of the SSP are highlighted in green (Thick box border)
4. The Classification Index parameter, I_C, is indicative of the soil type of behavior. It does not exactly relate to the Soil Classification types as those obtained via Grain-Size Distribution analyses. I_C varies from 1.0 to 4.5, from soft clays (cohesive) to dense coarse sands (frictional), correspondingly.

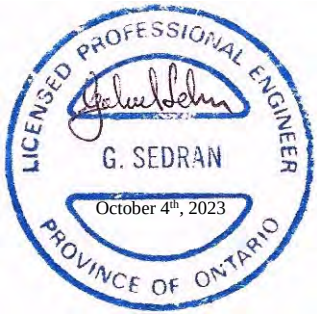
4. Closure

The subsoils data presented in this report is based on in-situ PMT testing and interpretation procedures. It should be noted that soil conditions may vary within the site and interpreted data may not be entirely representative of conditions at locations away from the tested borings. Therefore, care should be exercised when extrapolating or inferring subsoil conditions away from the borehole location.

We trust that the present report fulfills your requirements. Should you have any question, please feel free to contact the undersigned.

Sincerely,

In-Depth Geotechnical Inc.



Gabriel Sedran, P.Eng., Ph.D.
President

Appendix One

Pressuremeter Results - Data

Field Test Data (uncorrected)		
Volume	Pressure [bar]	
[cm³]	15 sec	30 sec
2	0.10	0.10
40	0.14	0.13
80	0.21	0.19
120	0.49	0.45
160	0.79	0.72
200	1.52	1.43
240	2.91	2.68
280	4.69	4.32
320	7.23	6.68
360	9.75	9.08
400	12.71	11.95
440	15.81	15.11
480	18.45	17.87
520	20.75	20.23
510	13.77	13.80
500	10.47	10.51
490	7.89	7.97
500	12.61	12.54
510	16.34	16.16
520	19.07	18.83
560	23.11	22.76
600	25.30	24.88
640	27.27	26.81
680	29.02	28.59
720	30.68	30.24

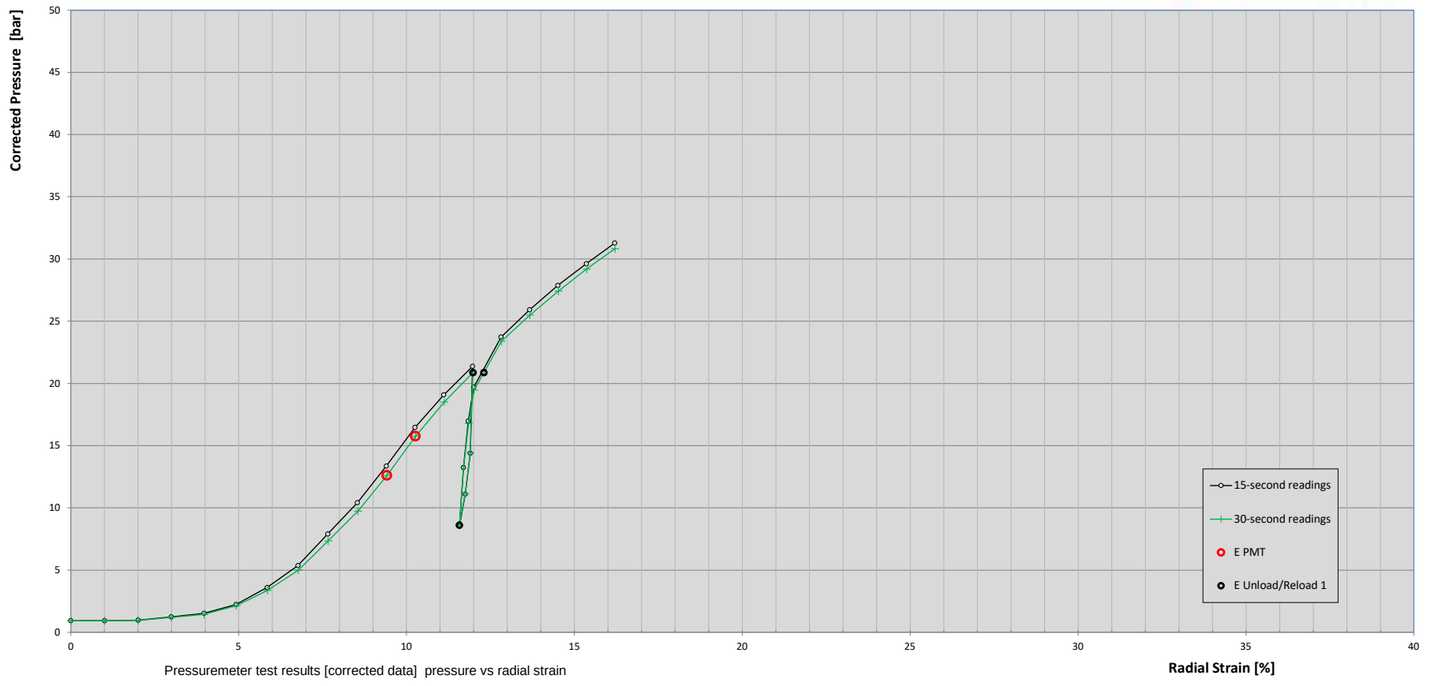
Corrected Test data						
15-second readings			30-second readings			
Pressure [bar]	Volume [cm³]	Δr/r₀ [%]	Pressure [bar]	Volume [cm³]	Δr/r₀ [%]
0.93	2	0.00	0.93	2	0.00
0.94	39.9	1.01	0.93	39.9	1.01
0.99	79.8	2.01	0.97	79.8	2.01
1.24	119.5	2.99	1.20	119.5	2.99
1.52	159.2	3.97	1.45	159.3	3.97
2.23	198.5	4.92	2.14	198.6	4.92
3.61	237.1	5.85	3.38	237.3	5.86
5.37	275.3	6.77	5.00	275.6	6.77
7.90	312.7	7.65	7.35	313.3	7.67
10.41	350.2	8.53	9.74	350.8	8.55
13.36	387.2	9.40	12.60	388.0	9.41
16.45	424.1	10.25	15.75	424.8	10.27
19.09	461.4	11.11	18.51	462.0	11.12
21.38	499.1	11.97	20.86	499.6	11.98
14.40	496.1	11.90	14.43	496.1	11.90
11.10	489.4	11.75	11.14	489.4	11.75
8.52	482.0	11.58	8.60	482.0	11.58
13.24	487.3	11.70	13.17	487.4	11.70
16.97	493.5	11.84	16.79	493.7	11.84
19.70	500.8	12.00	19.46	501.0	12.01
23.73	536.7	12.82	23.38	537.1	12.82
25.91	574.5	13.66	25.49	574.9	13.67
27.88	612.5	14.51	27.42	613.0	14.52
29.62	650.8	15.36	29.19	651.2	15.37
31.28	689.1	16.20	30.84	689.5	16.21

Creep	
Volume	$\Delta p_{30\text{-}15}$
[cm³]	[bar]
2	0.00
39.9	0.01
79.8	0.02
119.5	0.04
159.3	0.07
198.6	0.09
237.3	0.23
275.6	0.37
313.3	0.55
350.8	0.67
388.0	0.76
424.8	0.70
462.0	0.58
499.6	0.52
537.1	0.35
574.9	0.42
613.0	0.46
651.2	0.43
689.5	0.44

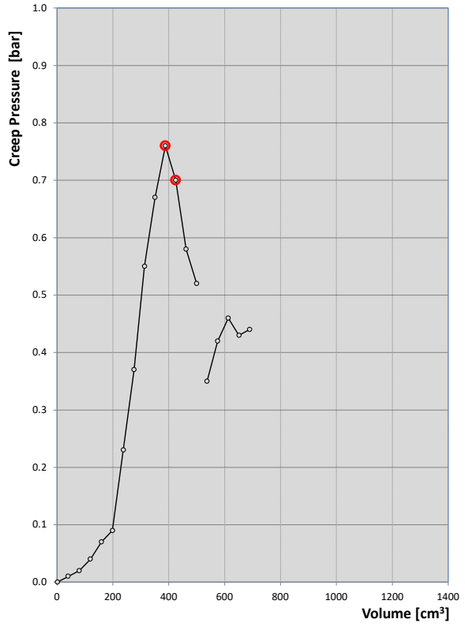
Auxiliary Data	
30 sec	
Pressure [bar]	1 / V
0.93	0.52653
0.93	0.02508
0.97	0.01253
1.20	0.00836
1.45	0.00628
2.14	0.00504
3.38	0.00421
5.00	0.00363
7.35	0.00319
9.74	0.00285
12.60	0.00258
15.75	0.00235
18.51	0.00216
20.86	0.00200
14.43	0.00202
11.14	0.00204
8.60	0.00207
13.17	0.00205
16.79	0.00203
19.46	0.00200
23.38	0.00186
25.49	0.00174
27.42	0.00163
29.19	0.00154
30.84	0.00145

Interpreted PMT Test Results

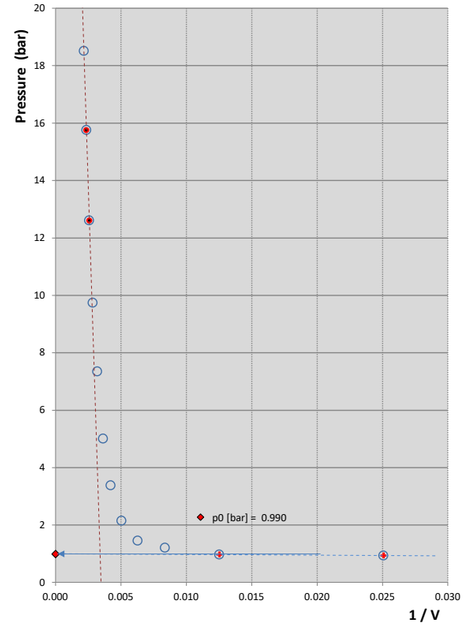
[30-second readings]			volume [cm³]	radial strain [%]	strain range [%]
p_0	0.99	[bar]	79.8	2.0	
p_L	47.73	[bar]			
p^*_L	46.74	[bar]			
p_Y	15.75	[bar]	425	10.3	
E_{PMT}	541	[bar]	388	9.4	{9.4 - 10.3 %}
E_{PMT} / p^*_L	11.6				
$E_{Unload\ 1}$	4542	[bar]	482	11.6	
$E_{Reload\ 1}$	2520	[bar]			



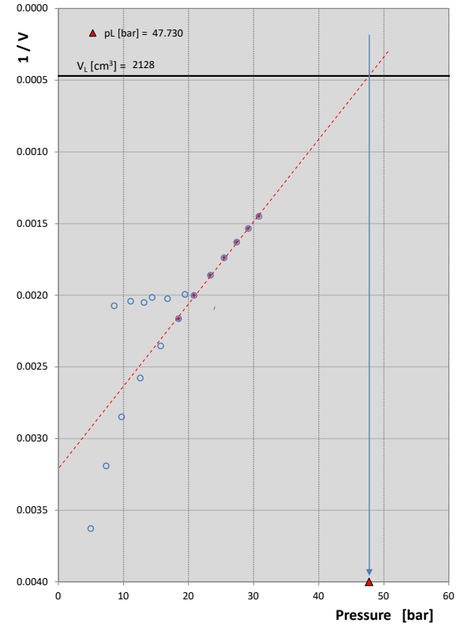
Pressuremeter test results [corrected data] pressure vs radial strain



Pressure difference from 15 to 30 sec. readings $\Delta p_{[15\text{-}30\ sec]}$



Determination of total contact pressure p_0



Determination of Limit Pressure p_L

Pressuremeter Equipment: TEXAM Model			Probe Designation : NX Probe (76 mm OD)		Drilling Method: Mud Rotary Drilling	Test Date: September 16, 2023	Project: 2421 Danforth Ave., Toronto
Volume-controlled test as per ASTM D4719 Method B			Probe No.: C 513		Drilling Bit: Tricone Bit		PMT TEST No.: 1
Volume increments:	40	cm³	Calibration Record No.: 1		Time elapsed from hole drilling to testing ~ 5 minutes	Test Depth [m]: 9.63 (center of the probe)	Client: WSP Golder
Maximum Volume:	1400	cm³	Tubing Length: 150	[ft]	Engineer: Gabriel Sedran, P.Eng., Ph.D.		Borehole No.: BH 23-5-PMT
Maximum Pressure:	100	bar	Probe Lenght: 0.46	[m]	Operator: Agustin Sedran-Enrici	Drilling Company: Altech Drilling	In-Depth Geotechnical Project No.: IDG 230750
			Probe Initial Volume: 1968	cm³			

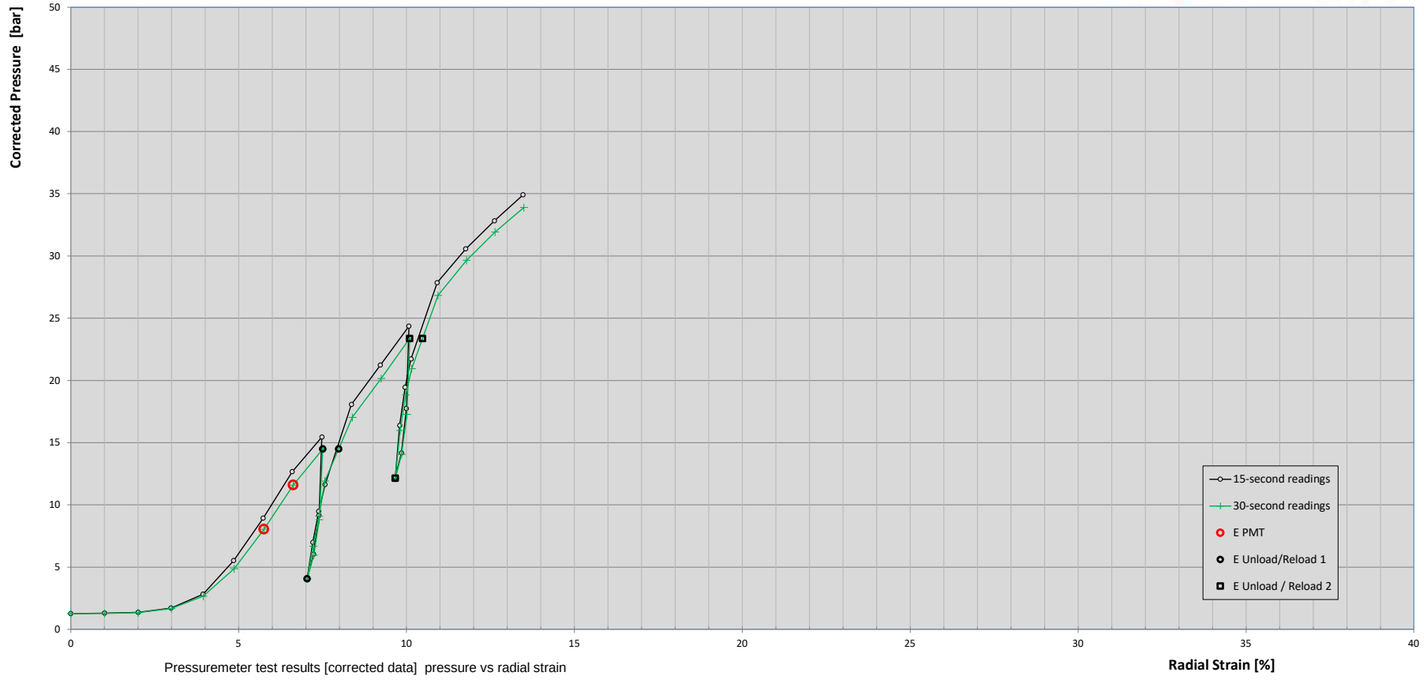
Field Test Data (uncorrected)		
Volume	Pressure [bar]	
[cm³]	15 sec	30 sec
2	0.14	0.14
40	0.19	0.18
80	0.29	0.27
120	0.66	0.62
160	1.80	1.64
200	4.51	3.87
240	7.94	7.05
280	11.69	10.62
320	14.48	13.52
310	8.19	7.85
300	5.06	4.98
290	3.10	3.09
300	6.01	5.72
310	8.52	8.12
320	10.66	10.95
360	17.10	16.08
400	20.28	19.20
440	23.42	22.43
430	16.79	16.32
420	13.23	13.12
410	11.25	11.19
420	15.44	15.03
430	18.51	17.89
440	20.78	20.00
480	26.92	25.90
520	29.64	28.73
560	31.90	31.01
600	34.00	32.98

Corrected Test data						
15-second readings			30-second readings			
Pressure	Volume	$\Delta r/r_0$	Pressure	Volume	$\Delta r/r_0$
[bar]	[cm³]	[%]	[bar]	[cm³]	[%]
1.27	2	0.00	1.27	2	0.00
1.29	39.8	1.01	1.28	39.8	1.01
1.37	79.7	2.01	1.35	79.7	2.01
1.71	119.3	2.99	1.67	119.4	2.99
2.83	158.2	3.94	2.67	158.3	3.95
5.52	195.5	4.85	4.88	196.1	4.86
8.94	232.0	5.73	8.05	232.9	5.75
12.67	268.2	6.60	11.60	269.3	6.62
15.45	305.4	7.48	14.49	306.4	7.50
9.16	301.7	7.39	8.82	302.1	7.40
6.03	294.9	7.23	5.95	295.0	7.23
4.08	286.9	7.04	4.07	286.9	7.04
6.98	293.9	7.21	6.69	294.2	7.22
9.49	301.4	7.39	9.09	301.8	7.40
11.63	309.3	7.57	11.92	309.0	7.56
18.06	342.8	8.36	17.04	343.8	8.38
21.23	379.6	9.22	20.15	380.6	9.25
24.36	416.4	10.07	23.37	417.4	10.10
17.74	413.1	10.00	17.27	413.6	10.01
14.18	406.7	9.85	14.07	406.8	9.85
12.20	398.7	9.66	12.14	398.7	9.66
16.39	404.4	9.80	15.98	404.9	9.81
19.46	411.3	9.96	18.84	412.0	9.97
21.72	419.1	10.13	20.94	419.8	10.15
27.86	452.9	10.91	26.84	453.9	10.94
30.57	490.1	11.76	29.66	491.0	11.78
32.82	527.9	12.62	31.93	528.7	12.64
34.91	565.7	13.47	33.89	566.8	13.49

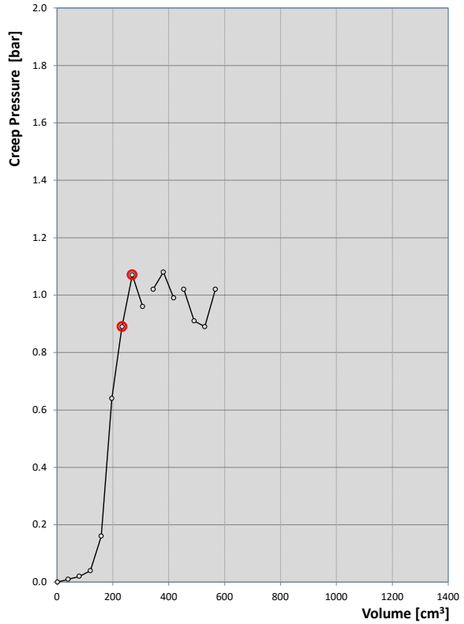
Creep	
Volume	$\Delta p_{30\text{-}15}$
[cm³]	[bar]
2	0.00
39.8	0.01
79.7	0.02
119.4	0.04
158.3	0.16
196.1	0.64
232.9	0.89
269.3	1.07
306.4	0.96
343.8	1.02
380.6	1.08
417.4	0.99
453.9	1.02
491.0	0.91
528.7	0.89
566.8	1.02

Auxiliary Data	
30 sec	
Pressure	1 / V
[bar]	
1.27	0.53795
1.28	0.02511
1.35	0.01254
1.67	0.00838
2.67	0.00632
4.88	0.00510
8.05	0.00429
11.60	0.00371
14.49	0.00326
8.82	0.00331
5.95	0.00339
4.07	0.00349
6.69	0.00340
9.09	0.00331
11.92	0.00324
17.04	0.00291
20.15	0.00263
23.37	0.00240
17.27	0.00242
14.07	0.00246
12.14	0.00251
15.98	0.00247
18.84	0.00243
20.94	0.00238
26.84	0.00220
29.66	0.00204
31.93	0.00189
33.89	0.00176

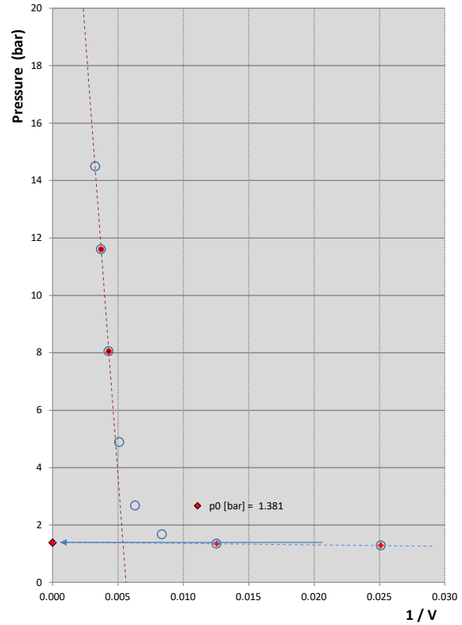
Interpreted PMT Test Results					
[30-second readings]			volume	radial strain	strain range
			[cm³]	[%]	[%]
p_0	1.38	[bar]	79.7	2.0	
p_L	54.94	[bar]			
p^*_L	53.56	[bar]			
p_Y	11.60	[bar]	269	6.6	
E_{PMT}	576	[bar]	233	5.8	{5.8 - 6.6 %}
E_{PMT} / p^*_L	10.8				
$E_{Unload\ 1}$	3221	[bar]	287	7.0	
$E_{Reload\ 1}$	1595	[bar]			
$E_{Unload\ 2}$	3802	[bar]	399	9.7	
$E_{Reload\ 2}$	2028	[bar]			



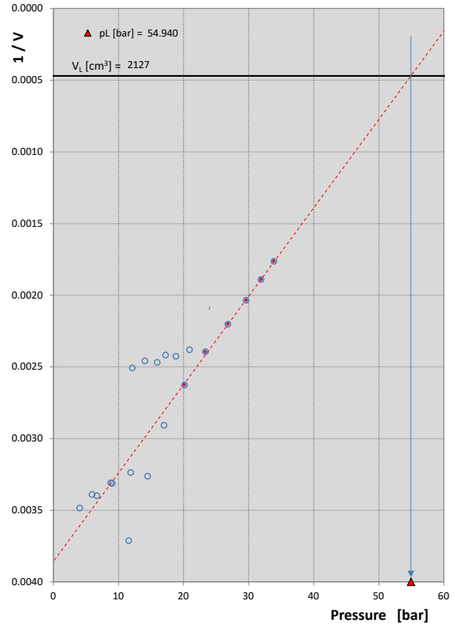
Pressuremeter test results [corrected data] pressure vs radial strain



Pressure difference from 15 to 30 sec. readings $\Delta p_{[15\text{-}30\ sec]}$



Determination of total contact pressure p_0



Determination of Limit Pressure p_L

Pressuremeter Equipment: TEXAM Model			Probe Designation : NX Probe (76 mm OD)		Drilling Method: Mud Rotary Drilling	Test Date: September 16, 2023	Project: 2421 Danforth Ave., Toronto
Volume-controlled test as per ASTM D4719 Method B			Probe No.: C 513		Drilling Bit: Tricone Bit		PMT TEST No.: 2
Volume increments:	40	cm³	Calibration Record No.: 1		Time elapsed from hole drilling to testing ~ 5 minutes	Test Depth [m]: 12.67 (center of the probe)	Client: WSP Golder
Maximum Volume:	1400	cm³	Tubing Length: 150	[ft]	Engineer: Gabriel Sedran, P.Eng., Ph.D.		Borehole No.: BH 23-5-PMT
Maximum Pressure:	100	bar	Probe Lenght: 0.46	[m]	Operator: Agustin Sedran-Enrici	Drilling Company: Altech Drilling	In-Depth Geotechnical Project No.: IDG 230750
			Probe Initial Volume: 1968	cm³			

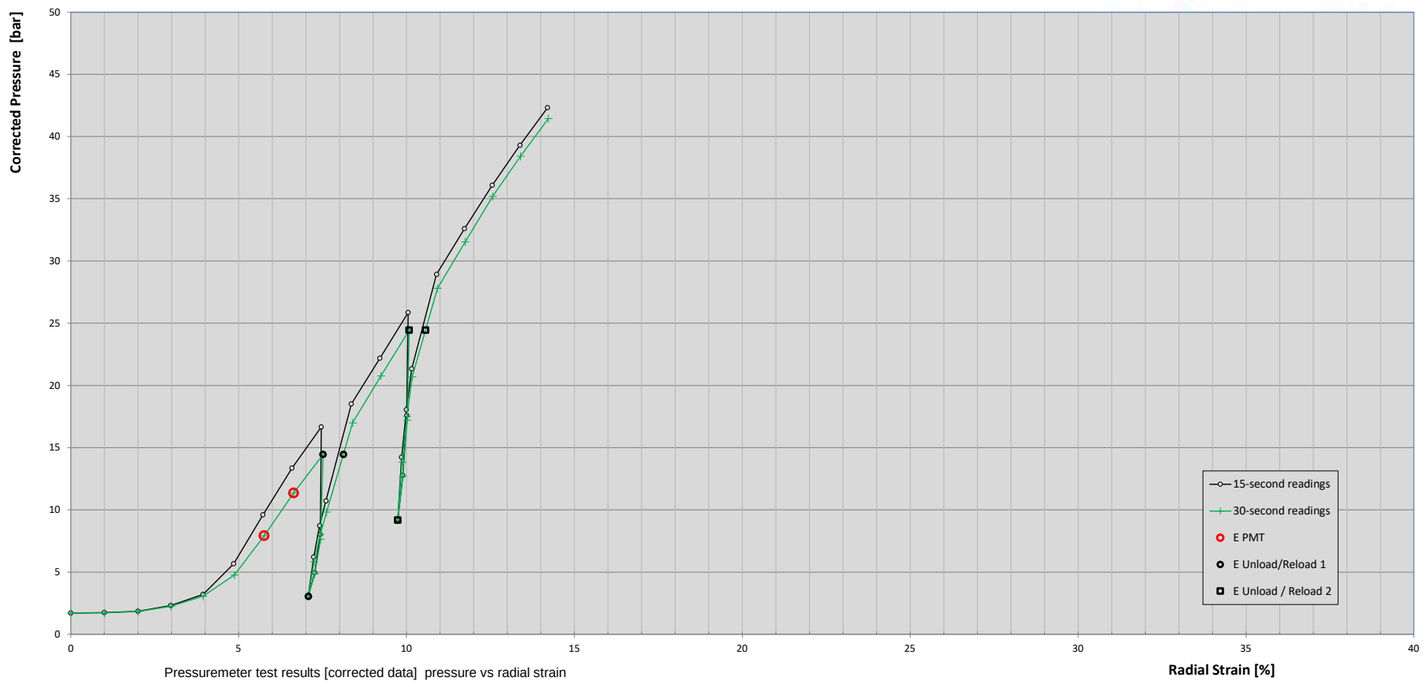
Field Test Data (uncorrected)		
Volume	Pressure [bar]	
[cm³]	15 sec	30 sec
2	0.27	0.27
40	0.34	0.33
80	0.48	0.45
120	0.97	0.91
160	1.88	1.73
200	4.35	3.47
240	8.30	6.62
280	12.08	10.07
320	15.40	13.19
310	6.75	6.36
300	3.69	3.58
290	1.77	1.77
300	4.95	4.55
310	7.46	6.76
320	9.45	8.56
360	17.25	15.74
400	20.93	19.51
440	24.61	23.20
430	16.34	15.97
420	11.53	11.46
410	7.96	7.92
420	12.99	12.59
430	16.79	16.27
440	20.08	19.45
480	27.69	26.57
520	31.36	30.31
560	34.86	33.98
600	38.08	37.21
640	41.11	40.23

Corrected Test data						
15-second readings			30-second readings		
Pressure	Volume	$\Delta r/r_0$	Pressure	Volume	$\Delta r/r_0$
[bar]	[cm³]	[%]	[bar]	[cm³]	[%]
1.70	2	0.00	1.70	2	0.00
1.74	39.7	1.00	1.73	39.7	1.00
1.86	79.5	2.00	1.83	79.5	2.00
2.32	119.0	2.98	2.26	119.1	2.98
3.21	158.1	3.94	3.06	158.3	3.94
5.66	195.6	4.85	4.78	196.5	4.87
9.60	231.6	5.72	7.92	233.3	5.76
13.36	267.8	6.59	11.35	269.9	6.64
16.67	304.5	7.46	14.46	306.7	7.51
8.02	303.2	7.43	7.63	303.6	7.44
4.96	296.3	7.26	4.85	296.4	7.27
3.05	288.2	7.07	3.05	288.2	7.07
6.22	295.0	7.23	5.82	295.4	7.24
8.73	302.5	7.41	8.03	303.2	7.43
10.72	310.5	7.60	9.83	311.4	7.62
18.51	342.6	8.36	17.00	344.1	8.39
22.18	378.9	9.20	20.76	380.3	9.24
25.85	415.2	10.05	24.44	416.6	10.08
17.59	413.5	10.01	17.22	413.9	10.02
12.78	408.4	9.89	12.71	408.5	9.89
9.21	402.0	9.74	9.17	402.0	9.74
14.24	406.9	9.85	13.84	407.3	9.86
18.04	413.1	10.00	17.52	413.6	10.01
21.32	419.8	10.15	20.69	420.4	10.17
28.93	452.1	10.89	27.81	453.2	10.92
32.59	488.4	11.72	31.54	489.5	11.75
36.08	524.9	12.55	35.20	525.8	12.57
39.29	561.6	13.38	38.42	562.5	13.40
42.32	598.6	14.20	41.44	599.5	14.22

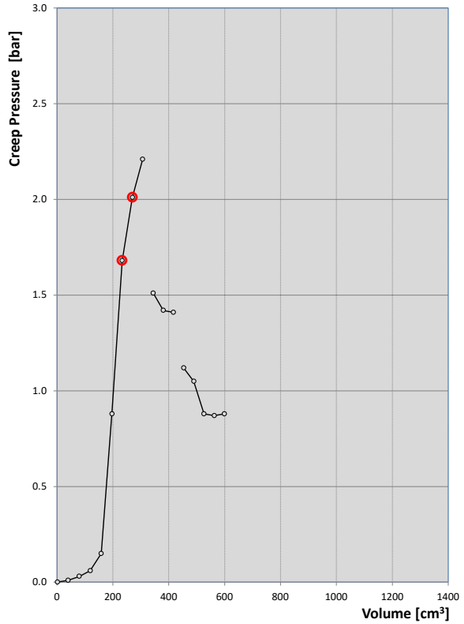
Creep	
Volume	$\Delta p_{30\text{-}15}$
[cm³]	[bar]
2	0.00
39.7	0.01
79.5	0.03
119.1	0.06
158.3	0.15
196.5	0.88
233.3	1.68
269.9	2.01
306.7	2.21
344.1	1.51
380.3	1.42
416.6	1.41
453.2	1.12
489.5	1.05
525.8	0.88
562.5	0.87
599.5	0.88

Auxiliary Data	
30 sec	
Pressure	1 / V
[bar]	
1.70	0.57874
1.73	0.02521
1.83	0.01257
2.26	0.00840
3.06	0.00632
4.78	0.00509
7.92	0.00429
11.35	0.00371
14.46	0.00326
7.63	0.00329
4.85	0.00337
3.05	0.00347
5.82	0.00339
8.03	0.00330
9.83	0.00321
17.00	0.00291
20.76	0.00263
24.44	0.00240
17.22	0.00242
12.71	0.00245
9.17	0.00249
13.84	0.00246
17.52	0.00242
20.69	0.00238
27.81	0.00221
31.54	0.00204
35.20	0.00190
38.42	0.00178
41.44	0.00167

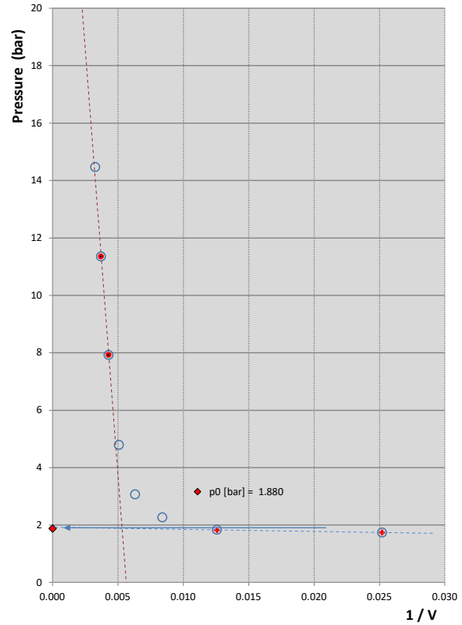
Interpreted PMT Test Results					
[30-second readings]			volume	radial strain	strain range
			[cm³]	[%]	[%]
p_0	1.88	[bar]	79.5	2.0	
p_L	71.72	[bar]			
p^*_L	69.84	[bar]			
p_Y	11.35	[bar]	270	6.6	
E_{PMT}	555	[bar]	233	5.8	{5.8 - 6.6 %}
E_{PMT} / p^*_L	7.9				
$E_{Unload\ 1}$	3719	[bar]	288	7.1	
$E_{Reload\ 1}$	1562	[bar]			
$E_{Unload\ 2}$	6615	[bar]	402	9.7	
$E_{Reload\ 2}$	2720	[bar]			



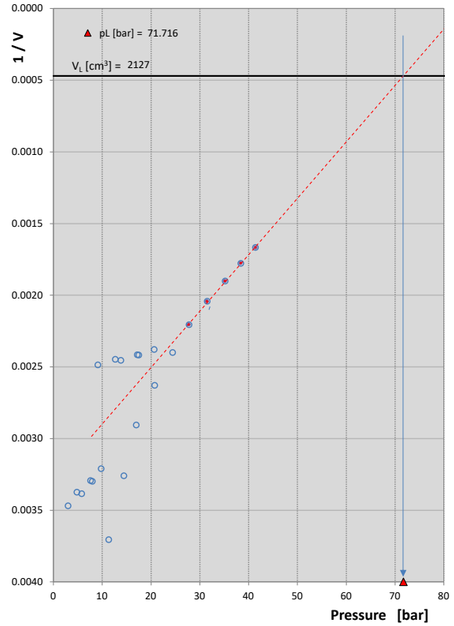
Pressuremeter test results [corrected data] pressure vs radial strain



Pressure difference from 15 to 30 sec. readings $\Delta p_{[15\text{-}30\ sec]}$



Determination of total contact pressure p_0



Determination of Limit Pressure p_L

Pressuremeter Equipment: TEXAM Model		
Volume-controlled test as per ASTM D4719 Method B		
Volume increments:	40	cm³
Maximum Volume:	1400	cm³
Maximum Pressure:	100	bar

Probe Designation : NX Probe (76 mm OD)		
Probe No.:	C 513	
Calibration Record No.:	1	
Tubing Length:	150	[ft]
Probe Lenght:	0.46	[m]
Probe Initial Volume:	1968	cm³

Drilling Method: Mud Rotary Drilling	
Drilling Bit: Tricone Bit	
Time elapsed from hole drilling to testing	~ 5 minutes
Engineer: Gabriel Sedran, P.Eng., Ph.D.	
Operator: Agustin Sedran-Enrici	

Test Date:	September 16, 2023
Test Depth [m]:	15.75 (center of the probe)
Drilling Company:	Altech Drilling

Project:	2421 Danforth Ave., Toronto
Client:	WSP Golder
In-Depth Geotechnical Project No.:	IDG 230750

PMT TEST No.: 3

Borehole No.: BH 23-5-PMT

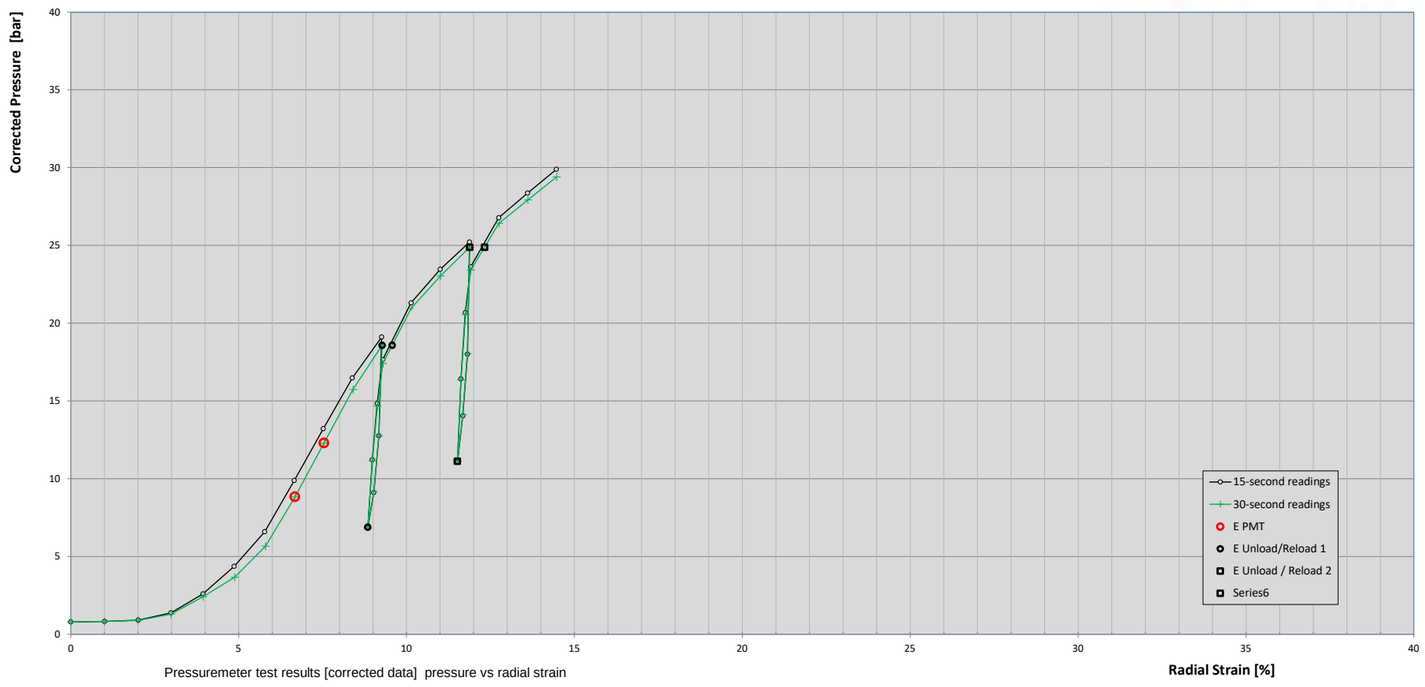
Field Test Data (uncorrected)		
Volume	Pressure [bar]	
[cm³]	15 sec	30 sec
2	0.12	0.12
40	0.18	0.17
80	0.29	0.26
120	0.78	0.70
160	2.01	1.84
200	3.80	3.10
240	6.05	5.12
280	9.35	8.30
320	12.69	11.78
360	15.97	15.22
400	18.61	18.08
390	12.25	12.25
380	8.61	8.67
370	6.32	6.38
380	10.72	10.64
390	14.33	14.15
400	17.15	16.91
440	20.81	20.46
480	22.97	22.55
520	24.73	24.40
510	17.52	17.55
500	13.56	13.64
490	10.57	10.63
500	15.93	15.88
510	20.20	20.07
520	23.15	22.93
560	26.30	25.94
600	27.90	27.46
640	29.44	28.95

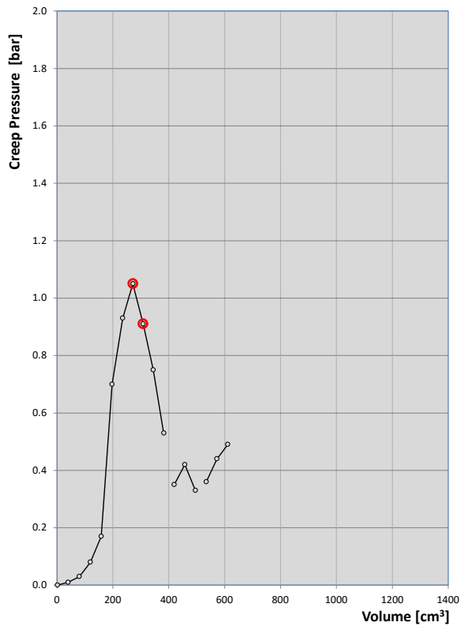
Corrected Test data						
15-second readings			30-second readings			
Pressure	Volume	Δr/r₀	Pressure	Volume	Δr/r₀
[bar]	[cm³]	[%]	[bar]	[cm³]	[%]
0.80	2	0.00	0.80	2	0.00
0.84	39.8	1.01	0.83	39.8	1.01
0.92	79.7	2.01	0.89	79.7	2.01
1.39	119.2	2.98	1.31	119.3	2.99
2.60	158.0	3.94	2.43	158.1	3.94
4.37	196.2	4.87	3.67	196.9	4.88
6.60	233.9	5.78	5.67	234.8	5.80
9.88	270.6	6.65	8.83	271.6	6.68
13.21	307.2	7.52	12.30	308.1	7.54
16.48	343.9	8.39	15.73	344.7	8.40
19.12	381.2	9.26	18.59	381.8	9.27
12.76	377.7	9.18	12.76	377.7	9.18
9.12	371.3	9.03	9.18	371.3	9.03
6.83	363.6	8.85	6.89	363.6	8.85
11.23	369.2	8.98	11.15	369.3	8.98
14.84	375.6	9.13	14.66	375.7	9.13
17.66	382.7	9.29	17.42	383.0	9.30
21.31	419.0	10.13	20.96	419.4	10.14
23.46	456.9	11.00	23.04	457.3	11.01
25.21	495.1	11.87	24.88	495.4	11.88
18.00	492.3	11.81	18.03	492.3	11.81
14.05	486.3	11.68	14.13	486.3	11.67
11.06	479.3	11.52	11.12	479.3	11.52
16.42	483.9	11.62	16.37	484.0	11.62
20.68	489.6	11.75	20.55	489.8	11.75
23.63	496.7	11.91	23.41	496.9	11.92
26.77	533.5	12.74	26.41	533.9	12.75
28.37	571.9	13.61	27.93	572.3	13.62
29.90	610.3	14.46	29.41	610.8	14.47

Creep		
Volume	$\Delta p_{30\text{-}15}$	
[cm³]	[bar]	
2	0.00	
39.8	0.01	
79.7	0.03	
119.3	0.08	
158.1	0.17	
196.9	0.70	
234.8	0.93	
271.6	1.05	
308.1	0.91	
344.7	0.75	
381.8	0.53	
419.4	0.35	
457.3	0.42	
495.4	0.33	
533.9	0.36	
572.3	0.44	
610.8	0.49	

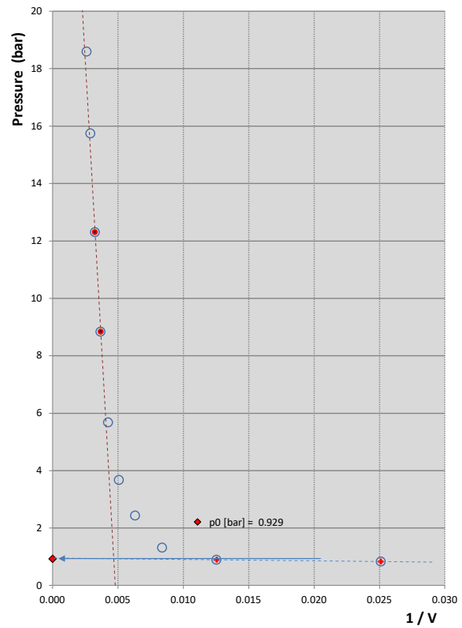
Auxiliary Data	
30 sec	
Pressure	1 / V
[bar]	
0.80	0.53218
0.83	0.02511
0.89	0.01254
1.31	0.00838
2.43	0.00632
3.67	0.00508
5.67	0.00426
8.83	0.00368
12.30	0.00325
15.73	0.00290
18.59	0.00262
12.76	0.00265
9.18	0.00269
6.89	0.00275
11.15	0.00271
14.66	0.00266
17.42	0.00261
20.96	0.00238
23.04	0.00219
24.88	0.00202
18.03	0.00203
14.13	0.00206
11.12	0.00209
16.37	0.00207
20.55	0.00204
23.41	0.00201
26.41	0.00187
27.93	0.00175
29.41	0.00164

Interpreted PMT Test Results					
[30-second readings]			volume	radial strain	strain range
			[cm³]	[%]	[%]
p_0	0.93	[bar]	79.7	2.0	
p_L	41.34	[bar]			
p^*_L	40.41	[bar]			
p_Y	12.30	[bar]	308	7.5	
E_{PMT}	571	[bar]	272	6.7	{6.7 - 7.5 %}
E_{PMT} / p^*_L	14.1				
$E_{Unload\ 1}$	3998	[bar]	364	8.8	
$E_{Reload\ 1}$	2326	[bar]			
$E_{Unload\ 2}$	5575	[bar]	479	11.5	
$E_{Reload\ 2}$	2530	[bar]			

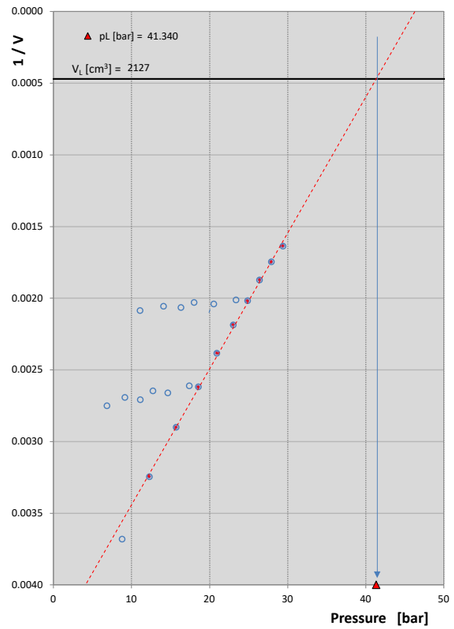




Pressure difference from 15 to 30 sec. readings $\Delta p_{[15\text{-}30\ sec]}$



Determination of total contact pressure p_0



Determination of Limit Pressure p_L

Pressuremeter Equipment: TEXAM Model			Probe Designation : NX Probe (76 mm OD)		Drilling Method: Mud Rotary Drilling	Test Date: September 17, 2023	Project: 2421 Danforth Ave., Toronto
Volume-controlled test as per ASTM D4719 Method B			Probe No.: C 513		Drilling Bit: Tricone Bit		PMT TEST No.: 1
Volume increments:	40	cm³	Calibration Record No.: 1		Time elapsed from hole drilling to testing ~ 5 minutes	Test Depth [m]: 8.13 (center of the probe)	Client: WSP Golder
Maximum Volume:	1400	cm³	Tubing Length: 150	[ft]	Engineer: Gabriel Sedran, P.Eng., Ph.D.		Borehole No.: BH 23-6-PMT
Maximum Pressure:	100	bar	Probe Lenght: 0.46	[m]	Operator: Agustin Sedran-Enrici	Drilling Company: Altech Drilling	In-Depth Geotechnical Project No.: IDG 230750
			Probe Initial Volume: 1968	cm³			

Field Test Data (uncorrected)		
Volume	Pressure [bar]	
[cm³]	15 sec	30 sec
2	0.16	0.16
40	0.25	0.23
80	0.67	0.62
120	1.68	1.59
160	3.34	3.18
200	6.84	6.63
240	11.59	11.27
280	16.78	15.84
320	21.88	20.69
360	25.38	24.29
350	17.09	17.02
340	12.73	12.69
330	9.59	9.61
340	14.89	14.64
350	19.42	19.18
360	22.76	22.47
400	28.18	27.27
440	30.75	30.22
480	33.03	32.45
470	24.66	24.55
460	19.79	19.73
450	15.97	15.96
460	22.53	22.19
470	27.69	27.30
480	31.44	30.99
520	35.13	34.16
560	36.94	36.35
600	38.86	38.24
640	40.65	39.97

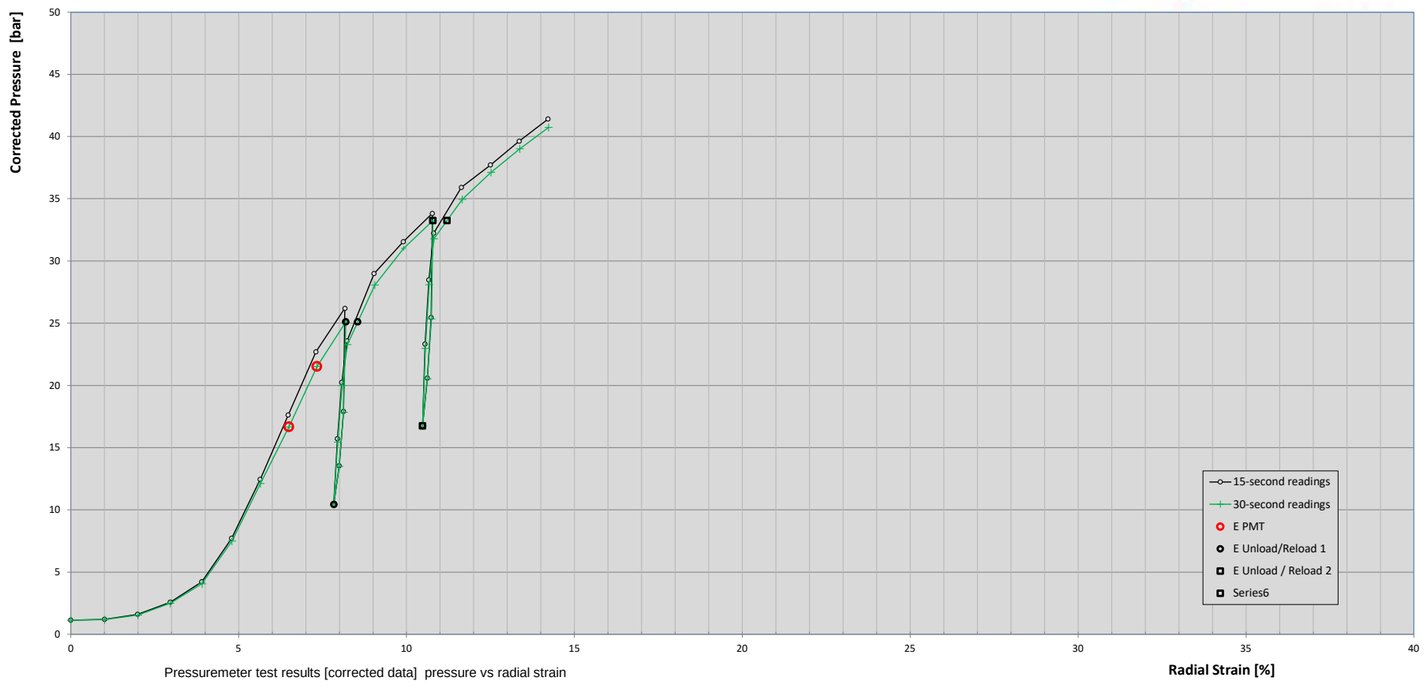
Corrected Test data						
15-second readings			30-second readings		
Pressure [bar]	Volume [cm³]	Δr/r₀ [%]	Pressure [bar]	Volume [cm³]	Δr/r₀ [%]
1.15	2	0.00	1.15	2	0.00
1.21	39.7	1.00	1.19	39.8	1.01
1.60	79.3	2.00	1.55	79.4	2.00
2.59	118.3	2.96	2.50	118.4	2.96
4.23	156.6	3.90	4.07	156.8	3.91
7.71	193.1	4.79	7.50	193.3	4.80
12.44	228.3	5.64	12.12	228.6	5.65
17.62	263.1	6.48	16.68	264.0	6.50
22.70	297.9	7.30	21.51	299.1	7.33
26.20	334.4	8.16	25.11	335.5	8.19
17.91	332.8	8.13	17.84	332.8	8.13
13.55	327.2	7.99	13.51	327.2	7.99
10.41	320.3	7.83	10.43	320.3	7.83
15.71	325.0	7.94	15.46	325.2	7.95
20.24	330.4	8.07	20.00	330.7	8.08
23.58	337.1	8.23	23.29	337.4	8.23
28.99	371.6	9.03	28.08	372.5	9.06
31.55	409.0	9.90	31.02	409.5	9.92
33.82	446.7	10.77	33.24	447.3	10.78
25.45	445.1	10.74	25.34	445.3	10.74
20.59	440.1	10.62	20.53	440.1	10.62
16.77	433.9	10.48	16.76	433.9	10.48
23.33	437.3	10.55	22.99	437.6	10.56
28.48	442.1	10.67	28.09	442.5	10.67
32.23	448.3	10.81	31.78	448.8	10.82
35.91	484.6	11.64	34.94	485.6	11.66
37.72	522.8	12.50	37.13	523.4	12.52
39.63	560.8	13.36	39.01	561.5	13.37
41.41	599.0	14.21	40.73	599.7	14.23

Creep	
Volume	$\Delta p_{30\text{-}15}$
[cm³]	[bar]
2	0.00
39.8	0.02
79.4	0.05
118.4	0.09
156.8	0.16
193.3	0.21
228.6	0.32
264.0	0.94
299.1	1.19
335.5	1.09
372.5	0.91
409.5	0.53
447.3	0.58
485.6	0.97
523.4	0.59
561.5	0.62
599.7	0.68

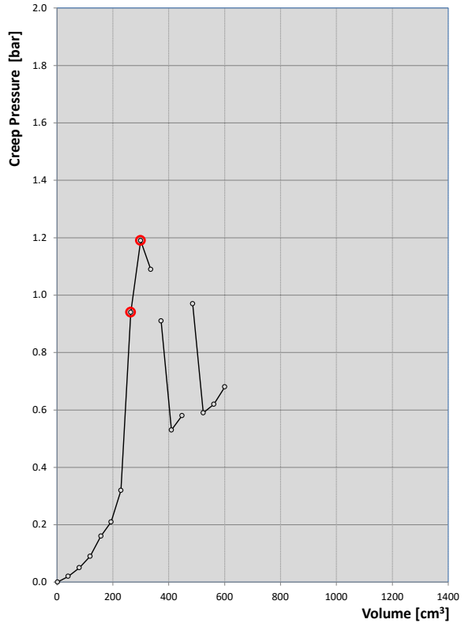
Auxiliary Data	
30 sec	
Pressure [bar]	1 / V
1.15	0.54385
1.19	0.02515
1.55	0.01260
2.50	0.00845
4.07	0.00638
7.50	0.00517
12.12	0.00437
16.68	0.00379
21.51	0.00334
25.11	0.00298
17.84	0.00300
13.51	0.00306
10.43	0.00312
15.46	0.00307
20.00	0.00302
23.29	0.00296
28.08	0.00268
31.02	0.00244
33.24	0.00224
25.34	0.00225
20.53	0.00227
16.76	0.00230
22.99	0.00229
28.09	0.00226
31.78	0.00223
34.94	0.00206
37.13	0.00191
39.01	0.00178
40.73	0.00167

Interpreted PMT Test Results

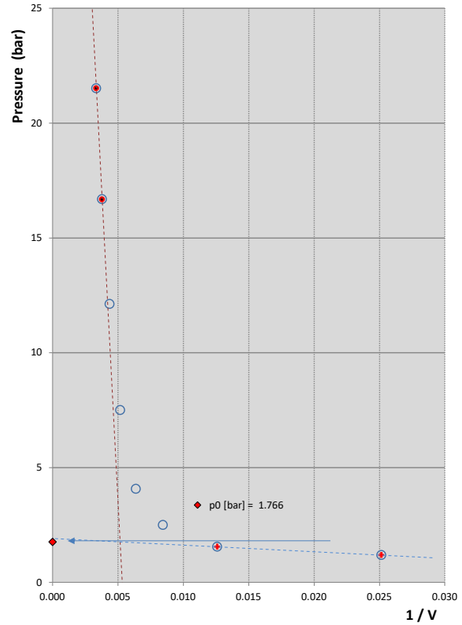
[30-second readings]			volume [cm³]	radial strain [%]	strain range [%]
p_0	1.77	[bar]	79.4	2.0	
p_L	58.36	[bar]			
p^*_L	56.59	[bar]			
p_V	21.51	[bar]	299	7.3	
E_{PMT}	824	[bar]	264	6.5	{6.5 - 7.3 %}
E_{PMT} / p^*_L	14.6				
$E_{Unload\ 1}$	5893	[bar]	320	7.8	
$E_{Reload\ 1}$	2961	[bar]			
$E_{Unload\ 2}$	7892	[bar]	434	10.5	
$E_{Reload\ 2}$	3332	[bar]			



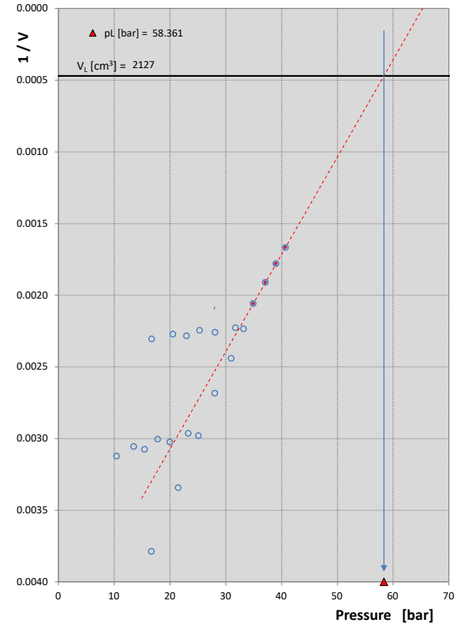
Pressuremeter test results [corrected data] pressure vs radial strain



Pressure difference from 15 to 30 sec. readings $\Delta p_{[15\text{-}30\ sec]}$



Determination of total contact pressure p_0



Determination of Limit Pressure p_L

Pressuremeter Equipment: TEXAM Model	Probe Designation : NX Probe (76 mm OD)		Drilling Method: Mud Rotary Drilling	Test Date: September 17, 2023	Project: 2421 Danforth Ave., Toronto
Volume-controlled test as per ASTM D4719 Method B	Probe No.: C 513		Drilling Bit: Tricone Bit		
Volume increments: 40 cm³	Calibration Record No.: 1		Time elapsed from hole drilling to testing ~ 5 minutes	Test Depth [m]: 11.20 (center of the probe)	Client: WSP Golder
Maximum Volume: 1400 cm³	Tubing Length: 150 [ft]		Engineer: Gabriel Sedran, P.Eng., Ph.D.		
Maximum Pressure: 100 bar	Probe Lenght: 0.46 [m]		Operator: Agustin Sedran-Enrici	Drilling Company: Altech Drilling	In-Depth Geotechnical Project No.: IDG 230750
	Probe Initial Volume: 1968 cm³				

PMT TEST No.: 2

Borehole No.: BH 23-6-PMT

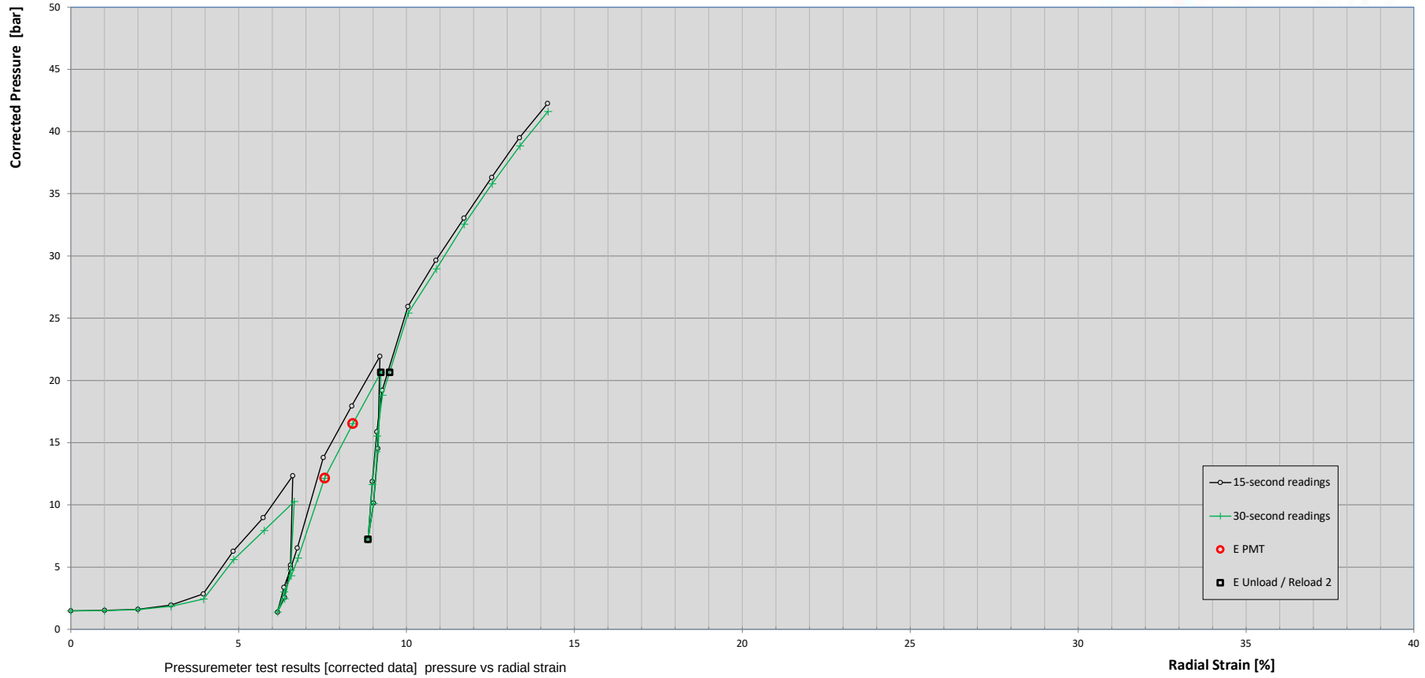
Field Test Data (uncorrected)		
Volume	Pressure [bar]	
[cm³]	15 sec	30 sec
2	0.20	0.20
40	0.28	0.26
80	0.38	0.35
120	0.75	0.64
160	1.66	1.26
200	5.12	4.45
240	7.82	6.80
280	11.22	9.15
270	4.03	3.61
260	1.43	1.33
250	0.25	0.24
260	2.23	1.87
270	3.77	3.18
280	5.41	4.59
320	12.68	11.03
360	16.83	15.41
400	20.84	19.55
390	13.43	13.16
380	9.04	9.00
370	6.09	6.12
380	10.76	10.53
390	14.77	14.42
400	18.10	17.71
440	24.85	24.31
480	28.56	27.88
520	31.97	31.47
560	35.25	34.74
600	38.44	37.79
640	41.19	40.56

Corrected Test data						
15-second readings			30-second readings			
Pressure	Volume	$\Delta r/r_0$	Pressure	Volume	$\Delta r/r_0$
[bar]	[cm³]	[%]	[bar]	[cm³]	[%]
1.48	2	0.00	1.48	2	0.00
1.54	39.7	1.00	1.52	39.7	1.00
1.61	79.6	2.00	1.58	79.6	2.00
1.95	119.2	2.99	1.84	119.4	2.99
2.84	158.3	3.95	2.44	158.7	3.96
6.28	194.8	4.83	5.61	195.5	4.85
8.97	232.1	5.73	7.95	233.1	5.76
12.35	268.7	6.61	10.28	270.8	6.66
5.17	265.9	6.54	4.75	266.4	6.55
2.57	258.6	6.37	2.47	258.7	6.37
1.39	249.7	6.16	1.38	249.8	6.16
3.37	257.8	6.35	3.01	258.1	6.36
4.91	266.2	6.55	4.32	266.8	6.56
6.54	274.5	6.75	5.72	275.4	6.77
13.80	307.2	7.52	12.15	308.9	7.56
17.94	343.0	8.37	16.52	344.5	8.40
21.94	379.0	9.21	20.65	380.3	9.24
14.54	376.5	9.15	14.27	376.7	9.15
10.15	370.9	9.02	10.11	370.9	9.02
7.20	363.9	8.85	7.23	363.8	8.85
11.87	369.2	8.98	11.64	369.4	8.98
15.88	375.1	9.12	15.53	375.5	9.12
19.20	381.8	9.27	18.81	382.2	9.28
25.95	415.0	10.04	25.41	415.5	10.05
29.65	451.2	10.87	28.97	451.9	10.89
33.05	487.8	11.71	32.55	488.3	11.72
36.32	524.5	12.54	35.81	525.0	12.55
39.50	561.3	13.37	38.85	561.9	13.38
42.25	598.5	14.20	41.62	599.1	14.21

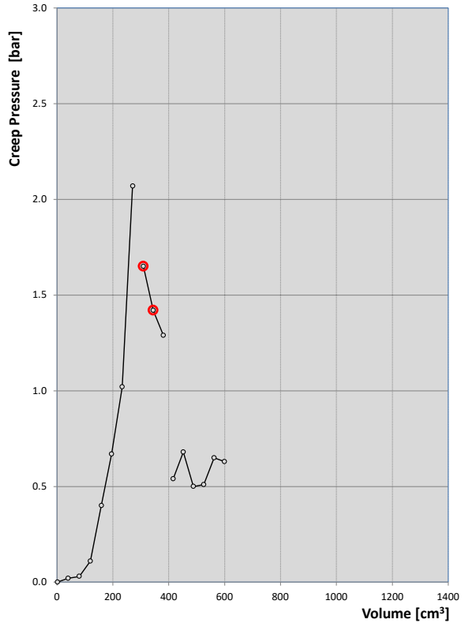
Creep		
Volume	$\Delta p_{30\text{-}15}$	
[cm³]	[bar]	
2	0.00	
39.7	0.02	
79.6	0.03	
119.4	0.11	
158.7	0.40	
195.5	0.67	
233.1	1.02	
270.8	2.07	
308.9	1.65	
344.5	1.42	
380.3	1.29	
415.5	0.54	
451.9	0.68	
488.3	0.50	
525.0	0.51	
561.9	0.65	
599.1	0.63	

Auxiliary Data	
30 sec	
Pressure	1 / V
[bar]	
1.48	0.55604
1.52	0.02516
1.58	0.01256
1.84	0.00838
2.44	0.00630
5.61	0.00511
7.95	0.00429
10.28	0.00369
4.75	0.00375
2.47	0.00387
1.38	0.00400
3.01	0.00387
4.32	0.00375
5.72	0.00363
12.15	0.00324
16.52	0.00290
20.65	0.00263
14.27	0.00265
10.11	0.00270
7.23	0.00275
11.64	0.00271
15.53	0.00266
18.81	0.00262
25.41	0.00241
28.97	0.00221
32.55	0.00205
35.81	0.00190
38.85	0.00178
41.62	0.00167

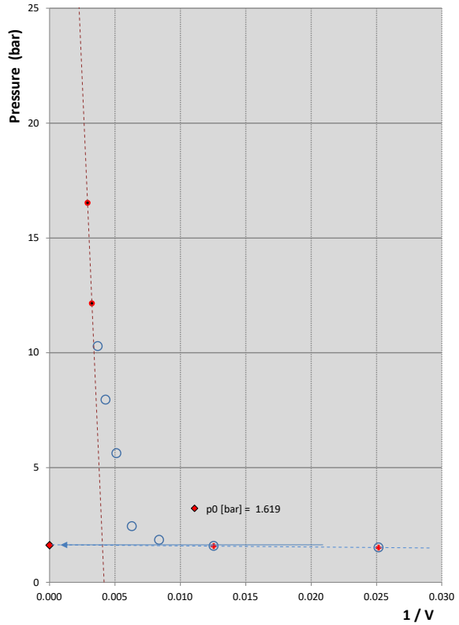
Interpreted PMT Test Results					
[30-second readings]			volume	radial strain	strain range
			[cm³]	[%]	[%]
p_0	1.62	[bar]	79.6	2.0	
p_L	69.38	[bar]			
p^*_L	67.76	[bar]			
p_V	16.52	[bar]	344	8.4	
E_{PMT}	750	[bar]	309	7.6	{7.6 - 8.4 %}
E_{PMT} / p^*_L	11.1				
$E_{Unload\ 2}$	5074	[bar]	364	8.9	
$E_{Reload\ 2}$	3034	[bar]			



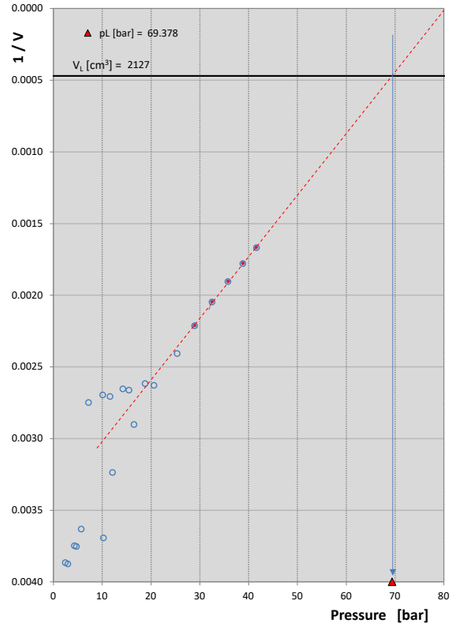
Pressuremeter test results [corrected data] pressure vs radial strain



Pressure difference from 15 to 30 sec. readings $\Delta p_{[15\text{-}30\ sec]}$



Determination of total contact pressure p_0



Determination of Limit Pressure p_L

Pressuremeter Equipment: TEXAM Model	Probe Designation : NX Probe (76 mm OD)	Drilling Method: Mud Rotary Drilling	Test Date: September 17, 2023
Volume-controlled test as per ASTM D4719 Method B	Probe No.: C 513	Drilling Bit: Tricone Bit	
Volume increments: 40 cm³	Calibration Record No.: 1	Time elapsed from hole drilling to testing ~ 5 minutes	Test Depth [m]: 14.22 (center of the probe)
Maximum Volume: 1400 cm³	Tubing Length: 150 [ft]	Engineer: Gabriel Sedran, P.Eng., Ph.D.	
Maximum Pressure: 100 bar	Probe Lenght: 0.46 [m]	Operator: Agustin Sedran-Enrici	Drilling Company: Altech Drilling
	Probe Initial Volume: 1968 cm³		

Project:	**2421 Danforth Ave., Toronto**
Client:	WSP Golder
In-Depth Geotechnical Project No.:	IDG 230750

PMT TEST No.:	**3**
Borehole No.:	**BH 23-6-PMT**

Appendix Two

Pressuremeter Data Interpretation

Interpretation of Pressuremeter Test Results

Prebored pressuremeter test results are expressed in terms of applied pressure versus radial strain. Both pressure and strain measurements must be corrected for pressure and volume loses using the corresponding probe and system calibration curves.

The typical pressure versus radial strain curve features up to four distinctive portions which characterize the stress-strain behaviour of the soil, namely:

a) The linear pseudo-elastic stress-strain portion of the deformation curve;
b) The departure from linear elastic conditions starting at the yield pressure p_y;
c) The unload-reload portion of the test (usually two cycles are performed); and
d) The development of soil failure, which is represented by the net limit pressure p^*_L.

Based on these test features the following soil parameters are determined or estimated:

1. **Contact Pressure p_o**:

When using the prebored TEXAM unit, the initial contact pressure is taken as the pressure at the intersection of the two lines representing the pseudo elastic and the initial expansion portions of the pressure vs. 1/V plot, as shown in the PMT data sheets, in Appendix One.

2. **Pressuremeter modulus E_{PMT}**:

The pressuremeter modulus is represented by the slope of the pressure versus radial strain curve along its linear portion, and may be calculated as follows:

$$E_{PMT} = (1+\upsilon)(p_2-p_1)\frac{\left(1+\left(\frac{\Delta R}{R_o}\right)_2\right)^2+\left(1+\left(\frac{\Delta R}{R_o}\right)_1\right)^2}{\left(1+\left(\frac{\Delta R}{R_o}\right)_2\right)^2-\left(1+\left(\frac{\Delta R}{R_o}\right)_1\right)^2}$$

where the sub-indices 1 and 2 indicate the beginning and the end of the linear portion of the curve, respectively. These two points are shown in pressuremeter curves with two red oversized circles. For the self-boring probe, the linear portion of the stress-strain response occurs between the very first data point (zero volume increase) and the subsequent two or three data points.

In this determination a value of the Poisson's ratio, typically $\nu = 0.33$ for most soils, must be assumed. For saturated clays a value of $\nu = 0.45$ is suggested.

3. **Yield Pressure** p_y:

The yield pressure indicates the end of the linear pseudo-elastic deformations and the onset of plasticity. This yield pressure is useful in indicating beyond which pressure significant creep deformations may occur.

4. **Unload-Reload Moduli** E_{Unload} and E_{Reload}

The unload and reload moduli are represented by the slope of the unload-reload loop, and they may be used to determine elastic soil deformations upon unloading or reloading conditions such as those typically encountered during excavations.

5. **Net Limit Pressure** p^*_L:

The net limit pressure is a measure of the strength of the soil (either under undrained conditions for cohesive soils, or drained conditions for non-cohesive soils). This parameter is defined as the pressure reached when the soil cavity has been extended to twice its original soil cavity volume V_c (minus the initial total contact pressure p_o).

The limit pressure is not always attained during testing. In such cases, the value of p_L is inferred by plotting pressure versus 1/V for the plastic phase of the deformations. This method of inferring p_L, known as the "upside down curve" method, is described in "*The Pressuremeter and Foundation Engineering*" textbook, by F. Baguelin, J.F. Jezequel, and D.H. Shields, published in 1978 by Trans Tech Publications, Section: Methods of extrapolating pressuremeter curves to p_L. See also ASTM D4719-00, Section 10.6.

It should be noted that radial strains are calculated from the volume of fluid (typically tap water) injected into the probe. In this regard, the radial strains shown in the results are related to the probe expansion, not the cavity's expansion. The cavity initial volume, V_c, is calculate by adding the probe initial volume, V_0, to the volume of water injected into the probe at the initial contact pressure p_0.

6. Some Additional PMT-based Parameters

In addition, two useful ratios, (E_{PMT} / p^*_L) and (p^*_L / p_y), may be used as a general guideline for soil identification, as follows:

for sands $\quad 7 < E_{PMT} / p^*_L < 12$

for clays $\quad 12 < E_{PMT} / p^*_L$

Many PMT tests completed in the glacial tills present in the geology of the Golden Shoe area (Ontario) registered much higher values than those listed above. In many cases, values for E_{PMT} / p^*_L in excess of 30 have been recorded.

The E_{PMT} / p^*_L value is known as the *mechanical ratio*, and it indicates whether a soil mass behaves in a ductile (high value) or brittle (low value) manner after yield stresses have been reached. This ration It is the PMT equivalent of the soil mechanic's Rigidity Index, e.g., G/σ_{max}.

Inferred Soil Parameters

7. Young's Modulus E_Y

The Pressuremeter modulus E_{PMT} corresponds to large strains, namely for radial strains in the 2 to 5 % range, and it is therefore considered to be a relatively low value of the elastic modulus. In practice, the Young's modulus E can be inferred from Pressuremeter testing using the empirical Menard α factor:

$E_Y = E_{PMT} / \alpha$

Typical values of the Menard α factor are suggested in the following Table:

Soil type	Peat		Clay		Silt		Sand		Sand and gravel	
	E/p_L^*	α	E/p_L^*	α	E/p_L^*	α	E/p_L^*	α	E/p_L^*	α
Over consolidated		1	> 16	1	> 14	2/3	> 12	1/2	> 10	1/3
Normally consolidated	For all values	1	9-16	2/3	8-14	1/2	7-12	1/3	6-10	1/4
Weathered and/or remoulded		1	7-9	1/2		1/2		1/3		1/4
Rock	Extremely fractured				Other				Slightly fractured or extremely weathered	
	α = 1/3				α = 1/2				α = 2/3	

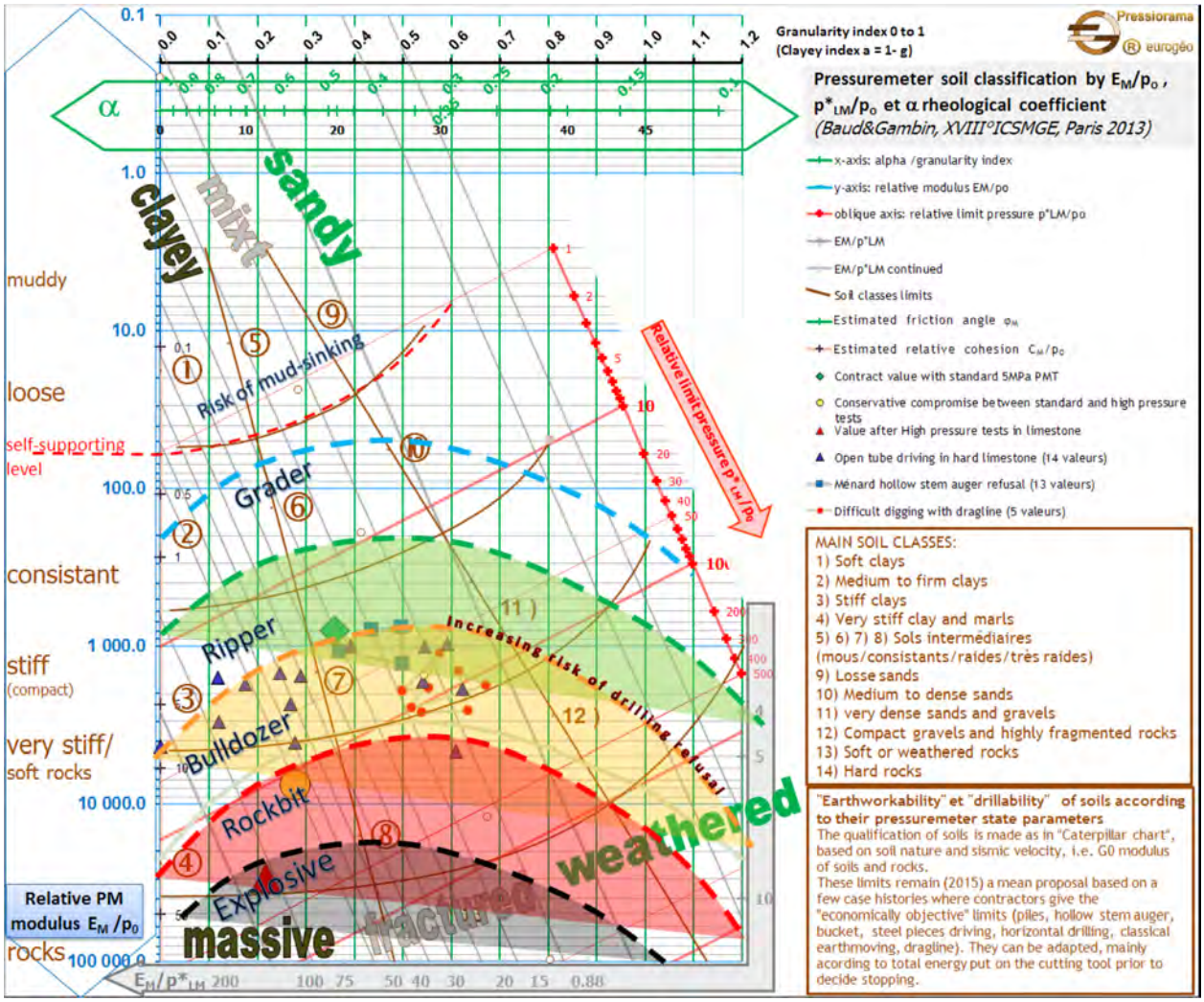
(from 'The Pressuremeter', J.L. Briaud. Balkema, 1992)

Alternatively, better-defined values of the Menard α parameter can be obtained using the following expression, as introduced by J.P. Baud

$$\alpha = \frac{\left(E_{PMT}/P_L^*\right)^{1/n}}{k_E \left(\frac{P_L^*}{p_0}\right)^{m/n}}$$

With $n = 2$; $m = 0.5$; and $k_E = 3.5$.

This expression is based on empirical correlations and may also be visualized in the Pressiorama Chart illustrated in the next page:



Baud J.P., and Gambin M. 2013. *"Détermination du coefficient rhéologique α de Ménard dans le diagramme Pressiorama"*. Proceedings of the 18th International Conference on Soil Mechanics and Geotechnical Engineering. Paris, 2013, Parallel Session ISP 6, International Symposium on the Pressuremeter.

8. Undrained Shear Strength for Cohesive Soil Materials

The undrained shear strength of cohesive soils, c_u or S_u, may be estimated as:

$$c_u = \frac{P_L'}{\beta}$$

where P'_L is the net Limit Pressurea, and a value of β = 6.5 is used in this report, after J.L. Briaud ('The Pressuremeter', Balkema, 1992).

9. Drained Friction Angle for Cohesionless Soil Materials

The drained friction angle of cohesionless soils (for *c'* = 0) may be estimated using the empirical correlations illustrated in the graph shown below. This approach is outlined by Baguelin et.al., in *"The Pressuremeter and Foundation Engineering"* (F. Baguelin; J.F. Jézéquel; and D.H. Shields. TransTech Publications. 1978), and it requires some knowledge on the state or conditions of the cohesionless material. This approach only provides a likely range of friction angles for recorded values of the limit pressure.

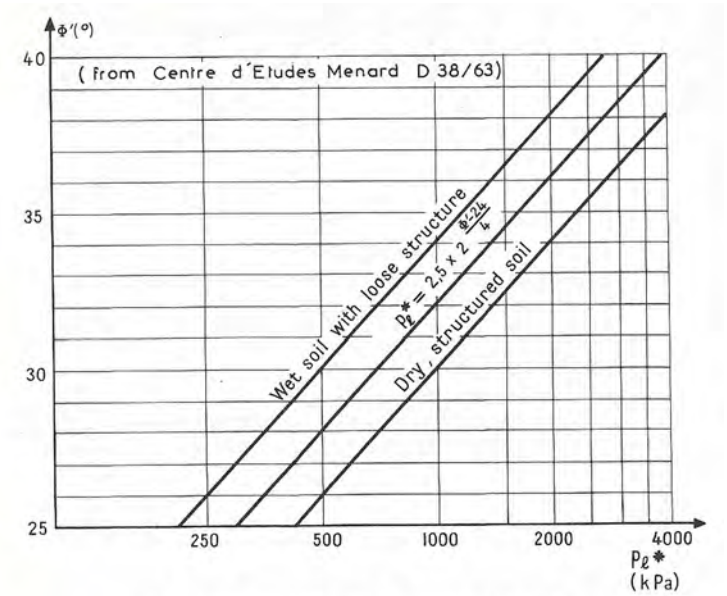


Fig. 6-86: MÉNARD's graph to determine Φ' from p_1^*.

Also alternatively, values of the drained friction angle ϕ' can be inferred using the modified Pressiorama Chart (*Pressiorama Cyclique, in French*) as introduced by Baud.

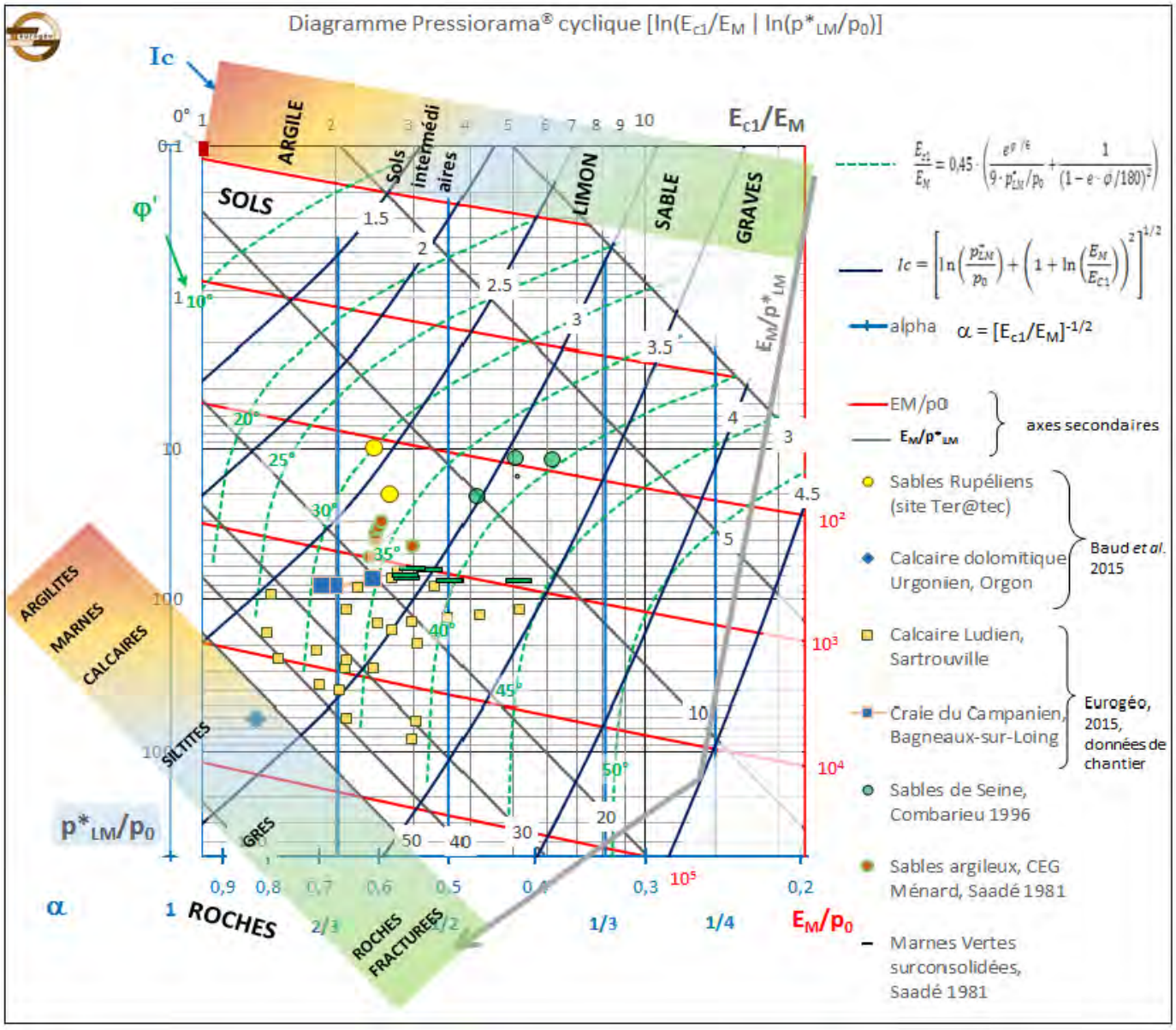


Figure 3. Diagramme Pressiorama® cyclique [ln(Ec1/EM | ln(p*LM/p0].

The values of ϕ' plotted in the modified Pressiorama Chart are calculated with the following expression:

$$\phi' = 5.5\, ln\left(\frac{9}{\alpha^2}\ \frac{P_L^*}{p_0}\right)$$

with values of α calculated/inferred from the modified Pressiorama Chart.

Where this expression provides values of effective friction angle greater than a 45°, a maximum value of 45° should be assumed.

This expression was presented by J.P. Baud, in his publication *"Apport de L'Essai Cyclique a la Classification Pressiométrique des Sols et des Roches"*, Journées Nationales de Geotechnique et de Géologie de l'Ingénieur, Nancy, 2016.

Shear strength parameters suggested in Table No. 3, are based on the guidelines provided by the *Pressiorama* and *Cyclique Pressiorama* charts. It should be noted that these guidelines are subject to changes, or improvements, as the correlations between pressuremeter parameters E_M, p'_L, and p_0 are being adjusted by ever increasing amount of field data. As such, care should be used when using these suggested parameters.

10. Soil Classification Index

Based on PMT testing procedures, soil behavior may be characterized as cohesive or frictional (cohesionless). Using the modified Pressiorama Chart, a Soil Classification Index, namely I_c, can be inferred with the following expression:

$$I_c = \left[\left(1 + log\left(P_L^*/p_0\right)\right)^2 + \left(1 - log(\alpha)\right)^2\right]^{½}$$

A minimum value of 1 would correspond to a cohesive soil, near its state of liquefaction. Whereas, a value of 4.5 would correspond to coarse gravel materials. A value of I_c = 2.7 would apply to a material which behaves mechanically as part frictional (drained for long-term loading conditions) and part cohesive (undrained for the short-term loading conditions). In general, Soil Type Behaviors corresponding to values of the Classification Index I_C are listed as:

1.0 to 1.5	Clays
1.5 to 2.5	Clay-Silt mixes
2.5 to 3.0	Silts
3.0 to 3.5	Sands
3.5 to 4.0	Gravels, and
4.0 to 4.5	Weathered Rocks

Appendix Three

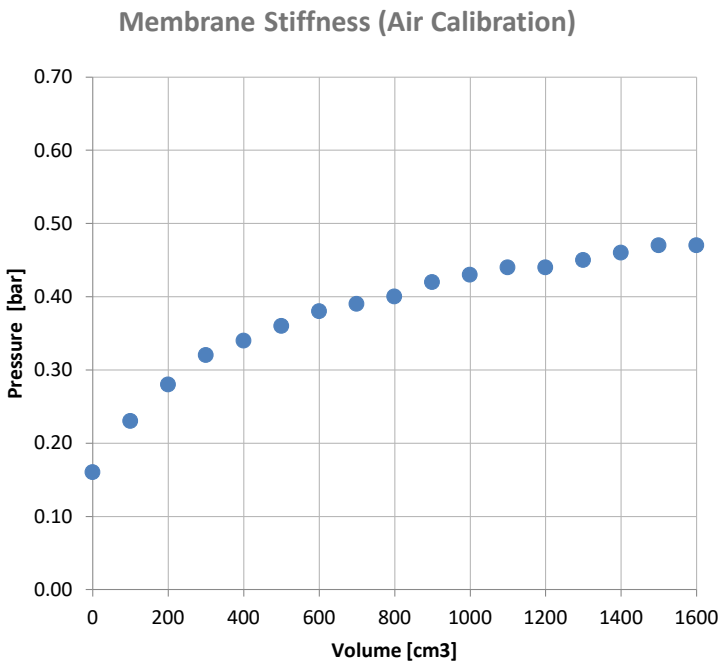
Calibration Data

Calibration Date:	August 21, 2023	
Probe Designation:	C 513	
Calibration Record No.:	I	
Length of Tubing:	150	feet
Calibrated by:	A.S.E.	

In-Depth Geotechnical Inc.

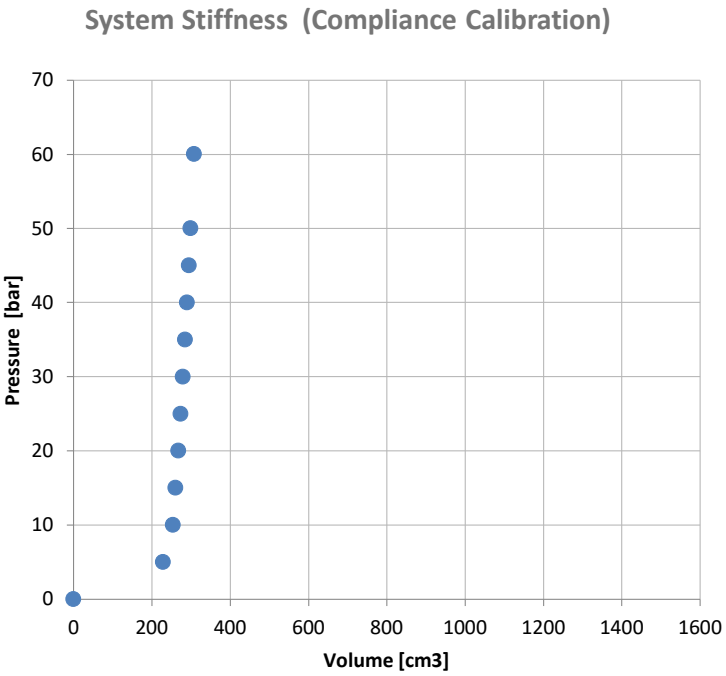
Membrane stiffness calibration

Pressure [bar]	Volume cm³
0.16	0
0.23	100
0.28	200
0.32	300
0.34	400
0.36	500
0.38	600
0.39	700
0.40	800
0.42	900
0.43	1000
0.44	1100
0.44	1200
0.45	1300
0.46	1400
0.47	1500
0.47	1600



Volume calibration

Pressure [bar]	Volume cm³
0	0.0
5	229.0
10	254.1
15	260.9
20	267.7
25	273.6
30	279.4
35	284.8
40	289.9
45	294.8
50	299.3
60	307.9
Reload Cal. Data	
25	277.7
50	300.1



wsp.com