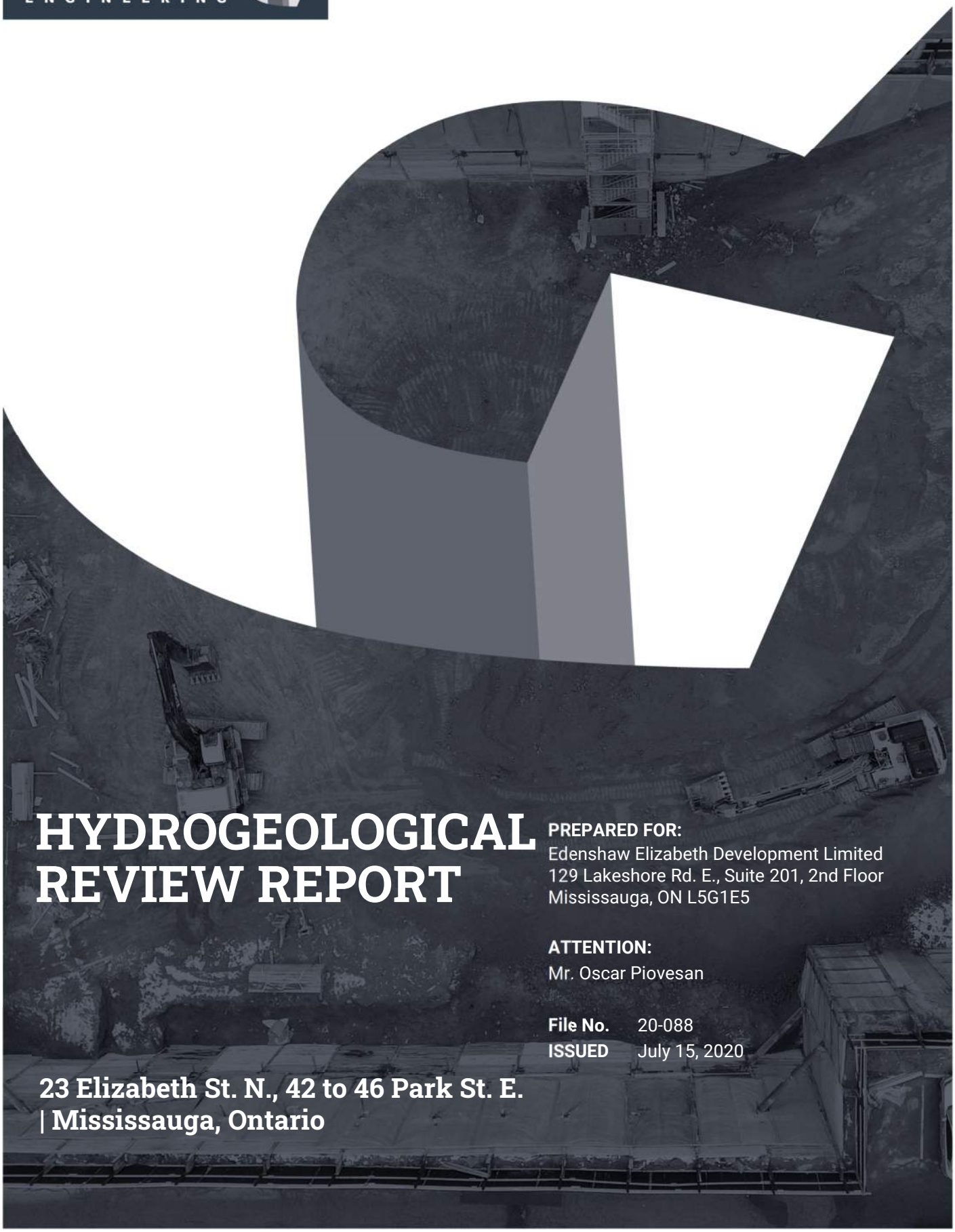

HYDROGEOLOGICAL REVIEW REPORT

PREPARED FOR:
Edenshaw Elizabeth Development Limited
129 Lakeshore Rd. E., Suite 201, 2nd Floor
Mississauga, ON L5G1E5

ATTENTION:
Mr. Oscar Piovesan

File No. 20-088
ISSUED July 15, 2020

23 Elizabeth St. N., 42 to 46 Park St. E. | Mississauga, Ontario

EXECUTIVE SUMMARY

Grounded Engineering Inc. (Grounded) was retained by Edenshaw Elizabeth Developments Limited to conduct a Hydrogeological Review for the proposed redevelopment of 23 Elizabeth St. N., 42 to 46 Park St. E. in Toronto, Ontario (Site). The conclusions of the investigation are summarized as follows:

Development Information

Current Development		
Existing Buildings/Features	**Above Grade Levels**	**Use**
23 Elizabeth St. N	2	Residential Building
42 Park St. E.	2	
44 Park St. E.	2	
46 Park St. E.	2	

Proposed Development					
Proposed Buildings/Features	**Above Grade Levels**	**Below Grade Levels**			
		Level #	**Lowest Finished Floor**		**Approximate Base of Excavation (masl)**
			Depth (m)	**Elevation (masl)**	
High-Rise Residential Tower	22	6	20±	61±	60.5

Site Conditions

Site Stratigraphy					
Stratum/Formation	**Aquifer or Aquitard**	**Depth Range (mbgs)**	**Elevation Range (masl)**	**Calculation Method**	**Hydraulic Conductivity (m/s)**
Earth Fill	Aquifer	0 to 1.1	83.5 to 80.3	Published Values*	1×10^{-6}
Silty Sand	Aquifer	0.8 to 7.6	82.7 to 75.9	Published Values*	1×10^{-7}
Silty Clay (Glacial Till)	Aquitard	3.0 to 7.6	78.2 to 75.7	Slug Test	3.1×10^{-8}
Silty Sand to Sandy Silt (Glacial Till)	Aquitard	4.6 to 8.7	76.6 to 72.9	Slug Test	9.39×10^{-8}
Georgian Bay Shale (Bedrock)	Aquitard	9.1 and below	74.2 and below	Slug Test	3.20×10^{-7}

** Indicates conductivity was estimated using typical published values from Freeze and Cherry (1979) or the Toronto Region Conservation Authority (TRCA)*

Maximum Groundwater Elevation			
Consultant	**Monitoring Well ID**	**Depth Below Grade (m)**	**Elevation (masl)**
Grounded Engineering	BH1	4.8	76.3
	BH2	4.9	76.5
	BH3	3.3	80.2
	BH4	2.9	80.5

NA – Monitoring wells could not be located or monitored

Groundwater Quality			
Sample ID	**Sample Date**	**City of Mississauga Storm Sewer Limits**	**Region of Peel Sanitary Sewer Limits**
SW-UF-BH1	June 12, 2020	Exceeds	Exceeds

Groundwater Control

Stored Groundwater (pre-excavation/dewatering)				
Proposed Development	**Volume of Excavation (m^3)**	**Volume of Excavation Below Water Table (m^3)**	**Volume of Storage Groundwater (m^3)**	**Volume of Storage Groundwater (L)**
P6-Underground	36,736	35,840	10,752	46,592

Short Term (Construction) Groundwater Quantity – Safety Factor of 1.5 Used						
Proposed Development	**Ground Water Seepage**		**Design Rainfall Event (25mm)**		**Total Daily Water Takings**	
	L/day	**L/min**	**L/day**	**L/min**	**L/day**	**L/min**
P6-Underground	42,000	29.2	46,000	31.9	88,000	61.1

Long Term (Permanent) Groundwater Quantity – Safety Factor of 1.5 Used						
Proposed Development	**Ground Water Seepage**		**Infiltration Design Rainfall Event (25mm)**		**Total Daily Water Takings**	
	L/day	**L/min**	**L/day**	**L/min**	**L/day**	**L/min**
P6 – Underground	42,000	29.2	2,000	1.4	44,000	30.6

Zone of Influence	
Zone of Influence (m)	Potential Settlement (mm)
±7	11 – edge of the excavation

Regulatory Requirements	P6-Underground
Environmental Activity and Sector Registry (EASR) Posting	Required
Short Term Permit to Take Water (PTTW)	Not Required
Long Term Permit to Take Water (PTTW)	Not Required
Short Term Discharge Agreement City of Mississauga/Region of Peel	Required
Long Term Discharge Agreement City of Mississauga/Region of Peel	Required

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FIGURES

APPENDICES

1 Introduction

Edenshaw Elizabeth Developments Limited has retained Grounded Engineering Inc. (“Grounded”) to provide geotechnical engineering design advice for their proposed development at 23 Elizabeth St. N., 42 to 46 Park St. E., L5G 2Z4, in Mississauga, Ontario.

Property Information	
Location of Property	23 Elizabeth St. N., 42 to 46 Park St. E.
Ownership of Property	Private individuals and Edenshaw Elizabeth Developments Limited
Property Dimensions (m)	Approximately 34 m EW x 53 NS
Property Area (m^2)	1,792.1 m^2

Existing Development	
Number of Building Structures	4 residential buildings (with two garages and two sheds)
Number of Above Grade Levels	2 (each building has 2-storey)
Number of Underground Levels	1 (each building has a basement)
Sub-Grade Depth of Development (m)	~3 ±m
Sub-Grade Area (m^2)	N/A
Land Use Classification	Residential

Proposed Development	
Number of Building Structures	1
Number of Above Grade Levels	22 above grade levels
Number of Underground Levels	Proposed 6 underground levels
Sub-Grade Depth of Development (m)	P6 - 20± m
Sub-Grade Area (m^2)	~1,792.1 m^2
Land Use Classification	Residential
Qualified Person and Hydrogeological Review Information	

Proposed Development	
Qualified Person	Mat Bielaski, P.Eng. QP_{RA-ESA}
Consulting Firm	Grounded Engineering Inc.
Date of Hydrogeological Review	July 15, 2020
Scope of Work	▪ Review of MECP Water Well Records for the area ▪ Review of geological information for the area ▪ Review of topographic information for the area ▪ Advancement of 4 borehole to depths ranging from a maximum depth 8.6 - 23.2 m, which were instrumented with monitoring wells ▪ Completion of slug tests in all installed monitoring wells ▪ Ground water elevation monitoring once after drilling and once at least three months after to capture seasonal fluctuations ▪ Ground water sampling and analysis to the City of Mississauga and Region of Peel Sewer Use Limits ▪ Assessment of ground water controls and potential impacts ▪ Report preparation in accordance with Ontario Water Resources Act, Ontario Regulation 387/04 and Toronto Municipal Code Chapter 681

General Hydrogeological Characterization	
Property Topography	The site has an approximate ground surface elevation of 83 to 81± masl (north to south).
Local Physiographic Features	The site is composed of silty sand to silty clay till and sandy silt till deposits.
Regional Physiographic Features	The West St Lawrence Lowland consists of a limestone plain (elevation 200–250 masl) that is separated by a broad, shale lowland from a broader dolomite and limestone plateau west of Lake Ontario. This plateau is bounded by the Niagara Escarpment. From the escarpment the plateau slopes gently southwest to lakes Huron and Erie (elevation 173 masl). Glaciation has mantled this region with several layers of glacial till (i.e., an unsorted mixture of clay, sand, etc.), the youngest forming extensive, undulating till plains, often enclosing rolling drumlin fields.
Surface Drainage	Surface water is expected to flow to the catch basins on Park Street East located adjacent to the south of the Site.

2 Study Area Map

A map has been enclosed which shows the following information:

- All monitoring wells identified on-site
- All monitoring wells identified off-site within the study area
- All boreholes identified on-site
- All buildings identified on Site and within the study area
- The property boundaries of the Site
- Any watercourses and drainage features within the study area.

3 Geology and Physical Hydrogeology

The Site stratigraphy, including soil materials, composition and texture are presented in detail on the borehole logs provided in Appendix A. A summary of stratigraphic units that were encountered at the Site are as follows:

Site Stratigraphy					
Stratum/Formation	**Aquifer or Aquitard**	**Depth Range (mbgs)**	**Elevation Range (masl)**	**Calculation Method**	**Hydraulic Conductivity (m/s)**
Earth Fill	Aquifer	0 to 1.1	83.5 to 80.3	Published Values*	1×10^{-6}
Silty Sand	Aquifer	0.8 to 7.6	82.7 to 75.9	Published Values*	1×10^{-7}
Silty Clay (Glacial Till)	Aquitard	3.0 to 7.6	78.2 to 75.7	Slug Test	3.1×10^{-8}
Silty Sand to Sandy Silt (Glacial Till)	Aquitard	4.6 to 8.7	76.6 to 72.9	Slug Test	9.39×10^{-8}

** Indicates conductivity was estimated using typical published values from Freeze and Cherry (1979) or the Toronto Region Conservation Authority (TRCA)*

Bedrock			
Stratum	**Depth Range (mbgs)**	**Elevation Range (masl)**	**Hydraulic Conductivity (m/s)**
Weathered	9.1 to 10.4	74.2 to 70.8	$3.20 \times 10^{-7**}$
Sound	Below 10.4	Below 70.8	$3.20 \times 10^{-7**}$

***Indicates conductivity was calculated by pump test/slug test*

Surface Water		
Surface Water Body	**Distance from site (m)**	**Hydraulically Connected to Property (yes/no)**
Marry Fix Creek	150 m west	no

4 Monitoring Well Information

Consultant	Well ID	Well Dia (mm)	Ground Surface (masl)	Top of Screen (masl)	Bottom of Screen (masl)	Screened Geological Unit
Grounded Engineering	BH1	50.8	81.2	61.0	58.0	Bedrock
	BH2	50.8	81.4	75.9	72.9	Glacial Till (Silty Clay to Sandy Silt)
	BH3	50.8	83.5	77.8	74.8	Silty Sand to Glacial Till (Sandy Silt)
	BH4	50.8	83.3	77.7	74.7	Silty Sand to Glacial Till (Silty Clay to Silty Sand)

5 Ground Water Elevations

Groundwater monitoring events were conducted in June, 2020 by Grounded Engineering. A total of four (4) monitoring events were conducted and are presented in Appendix C.

For design purposes, the ground water level at the site is taken at Elev. 80.5± m which accounts for the natural elevation of the water table. Adjacent building drains or dewatering systems and seasonal fluctuations may cause significant changes to the depth of the ground water table over time.

6 Aquifer Testing

6.1 Single Well Response Test (Slug Test)

The hydraulic conductivities from the monitoring wells were determined based on slug tests (single-well response tests). These tests involve rapid removal of water or addition of a “slug” which displaces a known volume of water from a single well, and then monitoring the water level in the well until it recovers. The results of the slug tests were analyzed for all three monitoring wells (BH1 to BH4) using the Hvorslev method (1951).

The hydraulic properties of the strata applicable to the site are as follows:

Well ID	Well Screen Elevation (masl)	Screened Geological Unit	Hydraulic Conductivity (m/s)
BH1	61.0-58.0	Bedrock	3.20×10^{-7}
BH2	75.9-72.9	Glacial Till (Silty Clay to Sandy Silt)	9.39×10^{-8}
BH3	77.8-74.8	Silty Sand to Glacial Till (Sand Silt)	7.21×10^{-9}
BH4	77.7-74.7	Glacial Till (Silty Clay to Silty Sand)	3.10×10^{-8}

6.2 Soil Grain Size Distribution

The hydraulic conductivities of various soil types can also be estimated from grain size analyses. An assessment of the grain sizes was conducted using the excel-based tool, HydrogeoSieve XL (*HydrogeoSieve XL ver.2.2, J.F. Devlin, University of Kansas, 2015*). HydrogeoSieve XL compares the results of the grain size analyses against fifteen (15) different analytical methods.

Given our experience in the area as well as published literature, some of the geometric means provided for the soil were biased low by one or more methods. In these instances, the values determined by these methods were excluded from the mean. The table below illustrates the hydraulic conductivity values estimated from the mean of the analytical methods where the soil met the applicable analysis criteria. The result of the analysis is also presented in Appendix B.

Sample ID	Soil Description	Applicable Analysis Methods	Hydraulic Conductivity (m/s)
BH1 SS6	Glacial Till (Silty Sand)	Sauerbrei, Barr, Alyamani and Sen, Krumbein and Monk	1.0×10^{-7}
BH2 SS7	Glacial Till (Sandy Silt)	Sauerbrei, Barr, Alyamani and Sen	8.1×10^{-9}
BH4 SS8	Glacial Till (Silty Sand)	Sauerbrei, Barr, Alyamani and Sen, Krumbein and Monk	6.5×10^{-8}

6.3 Literature

According to Freeze and Cherry (1979), the typical hydraulic conductivity of the strata investigated at the site are:

Stratum/Formation	Hydraulic Conductivity(m/s)
Earth Fill	10^{-4} to 10^{-8}
Silty Sand	10^{-3} to 10^{-7}
Glacial Till (Silty Clay)	10^{-7} to 10^{-10}
Glacial Till (Silty Sand to Sandy Silt)	10^{-5} to 10^{-10}
Bedrock (Georgian Bay Formation)	10^{-3} to 10^{-8}

7 Water Quality

One (1) unfiltered ground water sample was collected and analyzed by a Canadian laboratory accredited and licensed by Standards Council of Canada and or Canadian Association for Laboratory Accreditation.

The sample was collected directly from monitoring well BH1 on June 12, 2020. The sample was analyzed for the following parameters:

- City of Mississauga Storm Sewer By-Law 259-05 – Limits for Storm Sewers Discharge
- Region of Peel By-Law 53-2010 Table 1 – Limits for Sanitary Sewer Discharge

The ground water sample exceeded the Limits for Storm Sewer Discharge for the following parameters:

- Total Suspended Solids (Limit 15 mg/L, Result 261 mg/L)
- Total Kjeldahl Nitrogen (Limit 1 mg/L, Result 22.9 mg/L)
- Aluminum (Limit 1 mg/L, Result 2.1 mg/L)
- Manganese (Limit 0.05 mg/L, Result 5.15 mg/L)
- Phosphorus (Limit 0.4 mg/L, Result 0.5 mg/L)
- Zinc (Limit 0.04 mg/L, Result <0.2 mg/L)

The ground water sample exceed the Limits for Sanitary Sewer Discharge for the following parameters:

- Manganese (Limit 5 mg/L, Result 5.15 mg/L)

A true copy of the analysis report, Certificate of Analysis and a chain of custody record for the sample are enclosed.

8 Proposed Construction Method

The proposed shoring at the site is likely consist of conventional soldier piling and lagging.

9 Private Water Drainage System (PWDS)

If the proposed development is not a leak tight structure, then a private water drainage system will be required. The total sub floor drain area will be approximately 1,792 m^2 based on the drawings which have been provided by IBI Group Architects.

If the development is designed with a private water drainage system, the drainage system is a critical structural element, since it keeps water pressure from acting on the basement walls and floor slab. As such, the sump that ensures the performance of this system must have a duplexed pump arrangement for 100% pumping redundancy and these pumps must be on emergency power. The size of the sump should be adequate to accommodate the estimated groundwater

seepage. It is anticipated that the groundwater seepage can be controlled with typical, widely available, commercial/residential sump pumps.

If the proposed development is designed as a leak tight structure, then a private water drainage system will not be required. However, the structure must then be designed to resist hydrostatic pressure and uplift forces.

10 Groundwater Extraction and Discharge

Numerical analyses were conducted for both short-term and long-term dewatering scenarios. The modeling was conducted using computer software, which deploys the finite element modelling method. The Finite Element Model (FEM) for groundwater seepage indicates the short-term (construction) and long-term (permanent) dewatering requirements as provided below. The finite element model results are presented in Appendix E.

The groundwater seepage estimates, which have been provided, represent the steady state ground water seepage. There will be an initial drawdown of the groundwater before a steady state condition is reached. The rate of the initial drawdown, and therefore discharge, is dependent on the dewatering contractor and how the groundwater is being dealt with at the site. An estimate initial volume of stored groundwater which will require removal before steady state is reached has been provided below.

Please note that if excavation is exposed to the elements, storm water will have to be managed. The short-term control of groundwater should consider stormwater management from rainfall events. A dewatering system should be designed to consider the removal of rainfall from excavation. A design storm of 25 mm has been used in the quantity estimates.

As required by Ontario Regulation 63/16, a plan for discharge must consider the conveyance of storm water from a 100-year storm. The additional volume that will be generated in the occurrence of a 100-year storm event is approximately 170,000 L.

Stored Groundwater (pre-excavation/dewatering)				
Proposed Development	**Volume of Excavation (m^3)**	**Volume of Excavation Below Water Table (m^3)**	**Volume of Storage Groundwater (m^3)**	**Volume of Storage Groundwater (L)**
P6-Underground	36,736	35,840	10,752	46,592

Short Term (Construction) Groundwater Quantity – Safety Factor of 1.5 Used						
Proposed Development	Ground Water Seepage		Design Rainfall Event (25mm)		Total Daily Water Takings	
	L/day	L/min	L/day	L/min	L/day	L/min
P6 - Underground	42,000	29.2	46,000	31.9	88,000	61.1

Long Term (Permanent) Groundwater Quantity – Safety Factor of 1.5 Used						
Proposed Development	Ground Water Seepage		Infiltration Design Rainfall Event (25mm)		Total Daily Water Takings	
	L/day	L/min	L/day	L/min	L/day	L/min
P6 - Underground	42,000	29.2	2,000	1.4	44,000	30.6

Regulatory Requirements	P6-Underground
Environmental Activity and Sector Registry (EASR) Posting	Required
Short Term Permit to Take Water (PTTW)	Not Required
Long Term Permit to Take Water (PTTW)	Not Required
Short Term Discharge Agreement City of Mississauga/ Region of Peel	Required
Long Term Discharge Agreement City of Mississauga/ Region of Peel	Required

Please note:

- As the development will be founded on bedrock, dewatering below the base of the excavation will not be required to preserve the in-situ integrity of the founding elevation.
- Groundwater seepage from fractures in the bedrock must be pumped out of and away from localized protrusions such as excavations for footings, elevator cores, and sump pits.
- It is anticipated that the groundwater will rise to the elevation of the subfloor drainage in the event of a drained structure or the waterproofing in the event of a leak tight structure.
- The proposed pump schedule for short-term construction dewatering has not been completed. As such the actual peak short-term discharge rate is not available at the time

of writing this report. The pump schedule must be specified by either the dewatering contractor retained or the mechanical consultant. This is typically calculated at the time of construction.

- The proposed pump schedule for long-term permanent drainage has not been completed. As such the actual peak long-term discharge rate is not available at the time writing of this report. The pump schedule must be specified by the mechanical consultant. This schedule is typically prepared at the time of construction.
- Leak tight structure (structure that has not included a private water drainage system) has not been considered as part of the proposed development at this time.
- On-site containment (infiltration gallery/dry well etc.) has not been considered as part of the proposed development at this time. If this option is considered additional work will have to be conducted (i.e. infiltration testing).

11 Evaluation of Impact

11.1 Zone of Influence (ZOI)

The Zone of Influence (ZOI) with respect to ground water was calculated based on the estimated ground water taking rate and the hydraulic conductivity of the unit which water will be taken at the Property. The ZOI was calculated for approximate drawdown within the overburden soils only. There will be no ZOI generated within the bedrock.

The ZOI was calculated using the Sichart equation below.

Equation: $R_0 = 3000*dH*K^{0.5}$

Where:

dH is the dewatering thickness (m)

K is the hydraulic conductivity (m/s)

Calculation:

The ZOI with respect to groundwater seepage at the Site for the building with P6-Underground is:

$R_0 = 3000*7.6\ m*(1 \times 10^{-7})^{0.5}\ m/s$

$R_0 = \pm 7\ m$

11.2 Land Stability

The impacts to land stability of the proposed short term and long term dewatering at the site on adjacent structures based the proposed on the P6-Underground development are summarized as follows:

- The proposed dewatering at the subject site locally lowers the ground water table within the ZOI by a maximum of 7.6± m. This has the potential imply an increase of effective stress of approximately 76 kPa in the native soils.
- Based on the change in effective stress and the compressibility of the soil subjected to that change, the proposed dewatering activities will induce a maximum 11± mm of additional settlement in the adjacent soils.
- The maximum induced settlement occurs directly adjacent to the proposed excavation and decreases in a nonlinear fashion with distance away from the excavation.
- For the structures within the public realm greater than 2 m from the excavation, the dewatering-induced settlement is calculated to be less than 5± mm, therefore dewatering-induced impacts are not anticipated.
- This settlement will only impact on structures founded above the water table. Structures founded on bedrock will not be impacted.

The estimate of dewatering impacts is made based on preliminary conservative estimates of soil stiffness. On this basis, the impact of the proposed dewatering on the existing adjacent structures is considered by Grounded to be within acceptable limits.

11.3 City's Sewage Works

Negative impacts to City's sewage works may occur in terms of the quantity or quality of the groundwater discharged. This report provided the estimated quantity of the water discharge. However, this report does not speak to the sewer capacities. The sewer capacity analysis is provided under a separate cover by the civil consultant.

The quality of the proposed groundwater discharge is provided in previous Sections. As noted in that section the ground water sample exceeded the Limits for the City of Mississauga's Storm Sewer Discharge and the Limits for Region of Peel's Sanitary Sewer Discharge.

As such additional treatment will be required before the water can be discharge to the Storm Sewer and/or the Sanitary Sewer, to avoid impacts to the City's sewage works cause by ground water quality.

11.4 Natural Environment

There are no natural waterbodies within the ZOI that will be caused by the proposed construction dewatering or permanent drainage. Any groundwater which will be taken from the site will be discharged (if required) into the City's sewer systems and not into any natural water body. As such, there will be no impact to the natural environment caused by the water takings at the site.

11.5 Local Drinking Water Wells

The site is located within the municipal boundaries of the City of Mississauga. The site and surrounding area are provided with municipal piped water and sewer supply. There is no use of the ground water for water supply in this area of Mississauga. As such, there will be no impact to drinking water wells

11.6 Contamination Source

The site and immediately surrounding area currently consist mostly of residential and commercial areas. These land uses are not anticipated to be a source of potential contamination and are not expected to provide an Area of Potential Environmental Concern for the site. As such, the pumping of groundwater at the site is not anticipated to facilitate the movement of contaminants onto the site. Evaluation of the environmental condition of the site has been completed under a separate cover.

12 Proposed Mitigation Measures and Monitoring Plan

The extent of the negative impact identified in pervious sections will be limited to the ZOI caused by the groundwater taking at the site.

As a result of dewatering and draining the soil, changes in ground water level have the potential to cause settlement based on the change in the effective stresses within the ZOI. Given the minor ZOI for the site, anticipated impacts are negligible.

If adjacent buildings or municipal infrastructure are within the ZOI and will undergo settlement that may be considered unacceptable as identified the Land Stability Section, consideration should be given to implement a monitoring and mitigation program during dewatering activities.

Both the temporary construction dewatering system and the permanent building drainage system must be properly installed and screened to ensure sediments and fines will not be removed, which is typically a primary cause of dewatering related settlement.

13 Limitations

Natural occurrences, the passage of time, local construction, and other human activity all have the potential to directly or indirectly alter the subsurface conditions at or near the project site. Contractual obligations related to groundwater or stormwater control must be considered with attention and care as they relate this potential site alteration.

The hydrogeological engineering advice provided in this report is based on the factual observations made from the site investigations as reported. It is intended for use by the owner and their retained design team. If there are changes to the features of the development or to the scope, the interpreted subsurface information, geotechnical engineering design parameters,

advice, and discussion on construction considerations may not be relevant or complete for the project. Grounded should be retained to review the implications of such changes with respect to the contents of this report.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Grounded accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report, including consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

13.1 Report Use

The authorized users of this report are Edenshaw Elizabeth Developments Limited and their design team, for whom this report has been prepared. Grounded Engineering Inc. maintains the copyright and ownership of this document. Reproduction of this report in any format or medium requires explicit prior authorization from Grounded Engineering Inc. The City of Mississauga may also make use of and rely upon this report, subject to the limitations as stated.

14 Closure

If there are any questions regarding the discussion and advice provided, please do not hesitate to contact our office. We trust that this report meets your requirements at present.

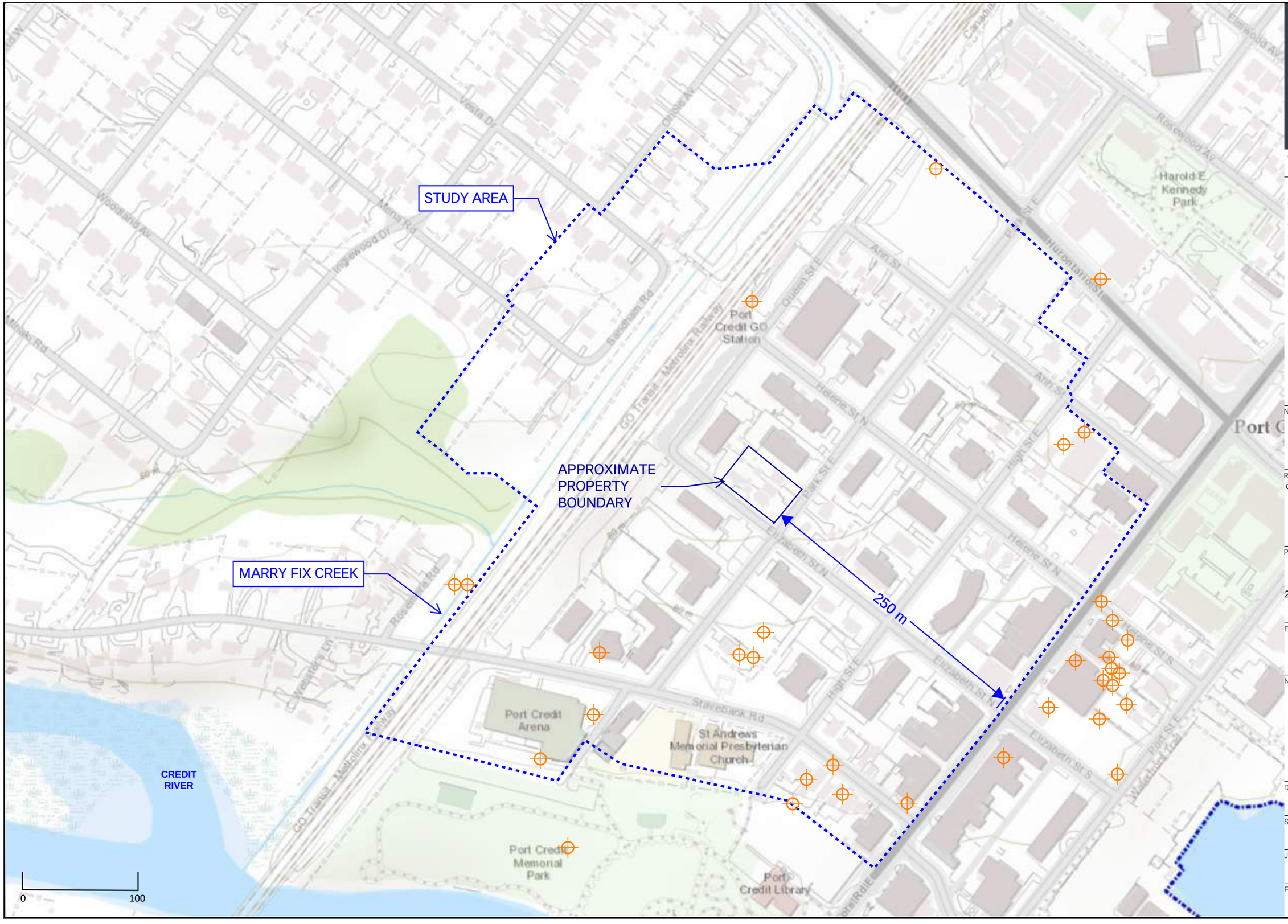
For and on behalf of our team,

GROUNDED ENGINEERING

Jessie Hui Chung Wu, M.Env.Sc.

Matthew Bielaski, P.Eng., QP_{ESA-RA}
Principal

FIGURES



GROUNDED ENGINEERING

12 Banigan Drive, Toronto, Ont., M4H 1E9
www.groundedeng.ca

LEGEND

- PROPERTY BOUNDARY
- STUDY AREA
- MECP WELLS IN STUDY AREA

Note

Reference
City of Mississauga Interactive Map

Project
HYDROGEOLOGICAL REVIEW REPORT
23 ELIZABETH ST. N., 42, 44, 46 PARK ST. E., MISSISSAUGA ONTARIO, L5G 2Z4

Figure Title
STUDY AREA MAP

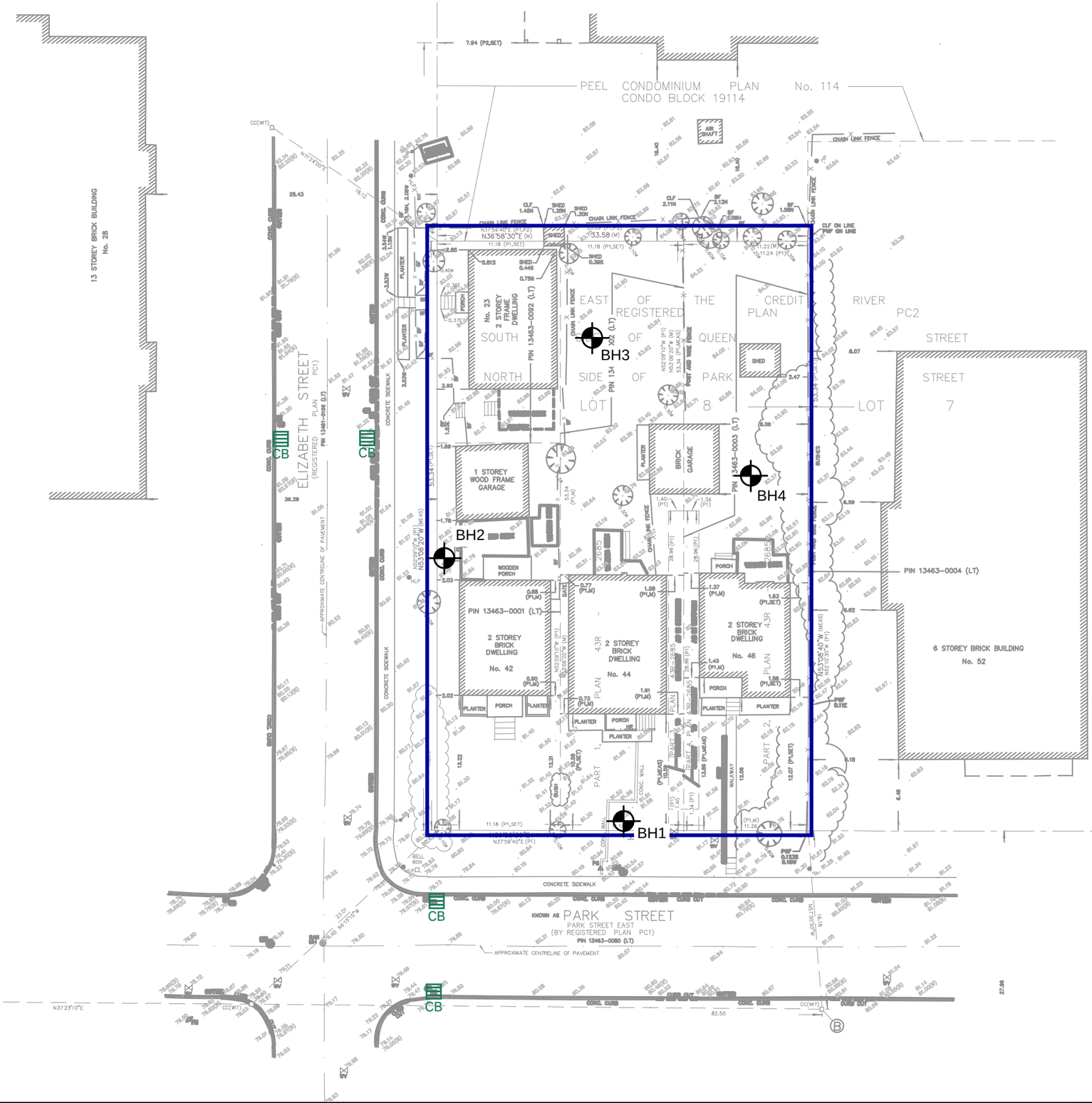
North
TRUE
PROJECT

Date
JULY, 2020

Scale
AS INDICATED

Job No
20-088

Figure No
FIGURE 1



GROUNDED ENGINEERING
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LEGEND

- PROPERTY BOUNDARY
- GROUNDED BOREHOLE WITH MONITORING WELLS (2020)
- CB — CATCH BASIN

Note

Reference

Survey Drawing No. 3296-0T.DWG Project No. 3296-0
Certificate date: July 23, 2019. Prepared by R. Avis Surveying Inc. Received on July 3, 2020 as part of the ROWE package prepared by IBI Group Architects

Project

HYDROGEOLOGICAL REVIEW REPORT

23 ELIZABETH ST. N., 42, 44, 46 PARK ST. E., MISSISSAUGA ONTARIO, L5G 2Z4

Figure Title

BOREHOLE AND MONITORING WELL LOCATION PLAN

North

TRUE
PROJECT

Date

JULY, 2020

Scale

1 : 200

Job No

20-088

Figure No

FIGURE 2

Alignment: From E:614140, N:4823403, to E:614181, N:4823388

Elevation (m)

BH 3

BH 2

BH 4

BH 1

PROPOSED GF
Elev. 81± m

GWT Elev.
80.5± m

Inferred Bedrock
Elev. 73.1± m

Inferred Bedrock
Elev. 72.9± m

Inferred Bedrock
Elev. 74.2± m

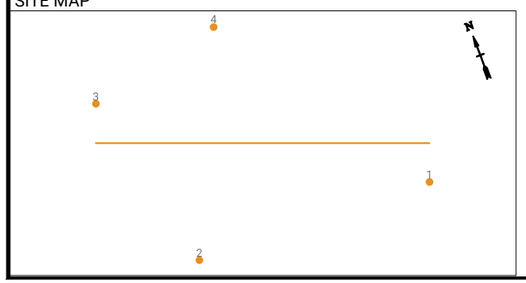
Zone II Bedrock
Elev. 73.6± m

Sound Bedrock Elev. 70.8± m
(Borehole 1 only)

P6 FFE 61± m

Distance Along Baseline (m)

SITE MAP



water level, unstabilized
water level, stabilized

LITHOLOGY GRAPHIC LEGEND

Asphalt
Aggregate
Fill
Sandy Silt
Silty Clay Till
Sand and Silt Till
Bedrock
Bedrock (cored)
Topsoil
Silty Sand
Sandy Silt Till
Silt and Sand

GROUNDED ENGINEERING
12 Banigan Drive, Toronto, Ont., M4H 1E9
www.groundedeng.ca

LEGEND

- FILL
- GRAVELS (gravel to gravelly sand)
- SILT TO SAND (not till)
- COHESIONLESS TILLS
- COHESIVE SOILS (clayey silt to clay, incl. tills)
- DISTURBED/REWORKED SOILS

Note

Reference

Project
HYDROGEOLOGICAL REVIEW REPORT
23 Elizabeth St. N., 42, 44, 46 Park St. E.,MISSISSAUGA ONTARIO, L5G 2Z4

Figure Title
HYDROLOGICAL CROSS-SECTION

North

Date
JULY 2020

Scale
AS INDICATED

Job No
20-088

Figure No
FIGURE 3

APPENDIX

APPENDIX A

BOREHOLE LOG TERMINOLOGY

GROUNDED ENGINEERING

SAMPLING/TESTING METHODS

SS: split spoon sample

AS: auger sample

GS: grab sample

FV: shear vane

DP: direct push

PMT: pressuremeter test

ST: shelby tube

CORE: soil coring

RUN: rock coring

SYMBOLS & ABBREVIATIONS

MC: moisture content

LL: liquid limit

PL: plastic limit

PI: plasticity index

γ: soil unit weight (bulk)

G_s: specific gravity

S_u: undrained shear strength

▽ unstabilized water level

▼ 1st water level measurement

▼ 2nd water level measurement most recent

▼ water level measurement

ENVIRONMENTAL SAMPLES

M&I: metals and inorganic parameters

PAH: polycyclic aromatic hydrocarbon

PCB: polychlorinated biphenyl

VOC: volatile organic compound

PHC: petroleum hydrocarbon

BTEX: benzene, toluene, ethylbenzene and xylene

PPM: parts per million

FIELD MOISTURE (based on tactile inspection)

DRY: no observable pore water

MOIST: inferred pore water, not observable (i.e. grey, cool, etc.)

WET: visible pore water

COHESIONLESS

Relative Density	N-Value
Very Loose	<4
Loose	4 - 10
Compact	10 - 30
Dense	30 - 50
Very Dense	>50

COHESIVE

Consistency	N-Value	Su (kPa)
Very Soft	<2	<12
Soft	2 - 4	12 - 25
Firm	4 - 8	25 - 50
Stiff	8 - 15	50 - 100
Very Stiff	15 - 30	100 - 200
Hard	>30	>200

COMPOSITION

Term	% by weight
trace silt	<10
some silt	10 - 20
silt***y***	20 - 35
sand ***and*** silt	>35

ASTM STANDARDS

ASTM D1586 Standard Penetration Test (SPT)
Driving a 51 mm O.D. split-barrel sampler ("split spoon") into soil with a 63.5 kg weight free falling 760 mm. The blows required to drive the split spoon 300 mm ("bpf") after an initial penetration of 150 mm is referred to as the N-Value.

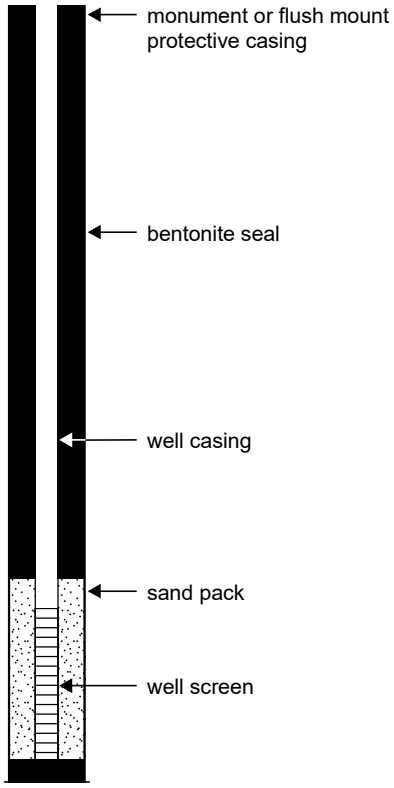
ASTM D3441 Cone Penetration Test (CPT)
Pushing an internal still rod with a outer hollow rod ("sleeve") tipped with a cone with an apex angle of 60° and a cross-sectional area of 1000 mm^2 into soil. The resistance is measured in the sleeve and at the tip to determine the skin friction and the tip resistance.

ASTM D2573 Field Vane Test (FVT)
Pushing a four blade vane into soil and rotating it from the surface to determine the torque required to shear a cylindrical surface with the vane. The torque is converted to the shear strength of the soil using a limit equilibrium analysis.

ASTM D1587 Shelby Tubes (ST)
Pushing a thin-walled metal tube into the in-situ soil at the bottom of a borehole, removing the tube and sealing the ends to prevent soil movement or changes in moisture content for the purposes of extracting a relatively undisturbed sample.

ASTM D4719 Pressuremeter Test (PMT)
Place an inflatable cylindrical probe into a pre-drilled hole and expanding it while measuring the change in volume and pressure in the probe. It is inflated under either equal pressure increments or equal volume increments. This provides the stress-strain response of the soil.

WELL LEGEND



ROCK CORE TERMINOLOGY (MTO SHALE)

TCR **Total Core Recovery** the total length of recovery (soil or rock) per run, as a percentage of the drilled length
SCR **Solid Core Recovery** the total length of sound full-diameter rock core pieces per run, as a percentage of the drilled length
RQD **Rock Quality Designation** the sum of all pieces of sound rock core in a run which are 10 cm or greater in length, as a percentage of the drilled length

Natural Fracture Frequency (typically per 0.3 m) The number of natural discontinuities (joints, faults, etc.) which are present per 0.3m. Ignores mechanical or drill-induced breaks, and closed discontinuities (e.g. bedding planes).

LOGGING DISCONTINUITIES

Discontinuity Type

BP bedding parting
CL cleavage
CS crushed seam
FZ fracture zone
MB mechanical break
IS infilled seam
JT Joint
SS shear surface
SZ shear zone
VN vein
VO void

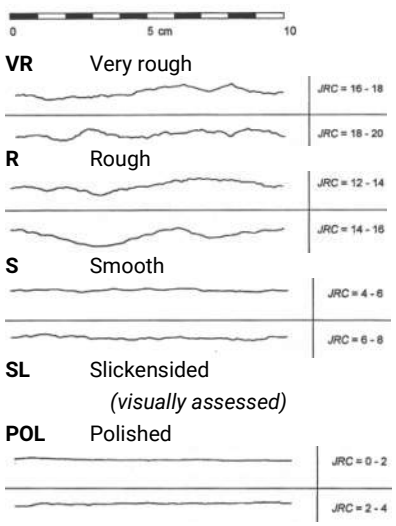
Coating

CN Clean
SN Stained
OX Oxidized
VN Veneer
CT Coating (>1 mm)

Dip Inclination

H	horizontal/flat	0 - 20°
D	dipping	20 - 50°
SV	sub-vertical	50 - 90°
V	vertical	90±°

Roughness (Barton et al.)



VR Very rough
R Rough
S Smooth
SL Slickensided *(visually assessed)*
POL Polished

Spacing in Discontinuity Sets (*ISRM 1981*)

VC	very close	< 60 mm
C	close	60 – 200 mm
M	mod. close	0.2 to 0.6 m
W	wide	0.6 to 2 m
VW	very wide	> 2 m

Aperture Size

T	closed / tight	< 0.5 mm
GA	gapped	0.5 to 10 mm
OP	open	> 10 mm

Planarity

PR	Planar
UN	Undulating
ST	Stepped
IR	Irregular
DIS	Discontinuous
CU	Curved

GENERAL

Degree of Weathering (*after MTO, RR229 Evaluation of Shales for Construction Projects*)

Zone	Degree	Description
Z1	unweathered	shale, regular jointing
Z2	partially weathered	angular blocks of unweathered shale, no matrix, with chemically weathered but intact shale
Z3		soil-like matrix with frequent angular shale fragments < 25mm diameter
Z4a		soil-like matrix with occasional shale fragments < 3mm diameter
Z4b	fully weathered	soil-like matrix only

Strength classification (*after Marinos and Hoek, 2001; ISRM 1981b*)

Grade		UCS (MPa)	Field Estimate (Description)
R6	extremely strong	> 250	can only be chipped by geological hammer
R5	very strong	100 - 250	requires many blows from geological hammer
R4	strong	50 - 100	requires more than one blow from geological hammer
R3	medium strong	25 - 50	can't be scraped, breaks under one blow from geological hammer
R2	weak	5 - 25	can be peeled / scraped with knife with difficulty
R1	very weak	1 - 5	easily scraped / peeled, crumbles under firm blow of geo. hammer
R0	extremely weak	< 1	indented by thumbnail

Bedding Thickness (*Q. J. Eng. Geology, Vol 3, 1970*)

Very thickly bedded	> 2 m
Thickly bedded	0.6 – 2m
Medium bedded	200 – 600mm
Thinly bedded	60 – 200mm
Very thinly bedded	20 – 60mm
Laminated	6 – 20mm
Thinly Laminated	< 6mm

GROUNDED ENGINEERING

Date Started : Jun 2, 2020
Position : E: 614179, N: 4823383 (UTM 17T)
Elev. Datum : Geodetic

BOREHOLE LOG 1

File No. : 20-088 **Project** : 23 Elizabeth Street North, Mississauga **Client** : Edenshaw Elizabeth Developments Limited

drill method : *Truck-mounted rig*

elev depth (m)	description	graphic log	samples: number	type	SPT N-value
81.2	**GROUND SURFACE**				
81.0 / 0.2	25mm **ASPHALTIC CONCRETE** 150mm **AGGREGATE**		1	SS	15
80.4 / 0.8	**FILL**, silty sand, trace gravel, trace asphalt, compact, brown, moist				
	SANDY SILT, trace gravel, loose to compact, orangey brown and grey, moist		2	SS	7
	...at 1.5 m, moist to wet		3	SS	14
	...at 2.3 m, grey		4	SS	16
78.2 / 3.0	**SILTY CLAY**, trace sand, trace gravel, very soft, grey, wet (GLACIAL TILL)		5	SS	0
76.6 / 4.6	**SILTY SAND**, some clay, some gravel, hard, grey, moist to wet (GLACIAL TILL)		6	SS	35
			7	SS	34
73.6 / 7.6	**INFERRED BEDROCK**, shale and limestone fragments, grey		8	SS	50 / 75mm
			9	SS	50 / 75mm
71.0 / 10.2	**GEORGIAN BAY FORMATION** (See rock core log for details)		1	RUN	
			2	RUN	
			3	RUN	
			4	RUN	

hollow stem augers OD=215 mm

mud rotary med OD=125 mm

Rock coring (HQ) OD=96 mm

depth scale (m): 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

well details

elevation (m): 81 80 79 78 77 76 75 74 73 72 71 70 69 68 67

undrained shear strength (kPa)
○ unconfined + field vane
● pocket penetrometer ■ Lab Vane
40 80 120 160

SPT N-values (bpf)
× dynamic cone
10 20 30 40

headspace vapour (ppm)
× hexane □ isobutylene
100 200 300

moisture / plasticity
PL MC LL
10 20 30

unstabilized water level

lab data and comments

grain size distribution (%) (MIT)
GR SA SI CL

SS2: M&I, BTEX, PHC

SS3: M&I

SS5: BTEX, PHC

17 36 32 15

7.3m: Grinding

10.4m: Transition to sound bedrock

(continued next page)

file: 20-088.gpj

Tech : JN | **PM** : JW | **Rev** : MD

GROUNDED ENGINEERING

Date Started : Jun 2, 2020
Position : E: 614179, N: 4823383 (UTM 17T)
Elev. Datum : Geodetic

BOREHOLE LOG 1

File No. : 20-088 **Project** : 23 Elizabeth Street North, Mississauga **Client** : Edenshaw Elizabeth Developments Limited

drill method : *Truck-mounted rig*
Rock coring (HQ) OD=96 mm

elev depth (m)	description	graphic log	number	type	SPT N-value
	(continued)				
	GEORGIAN BAY FORMATION (See rock core log for details) *(continued)*		4	RUN	
			5	RUN	
			6	RUN	
			7	RUN	
			8	RUN	
			9	RUN	
58.0 23.2					

depth scale (m): 15, 16, 17, 18, 19, 20, 21, 22, 23
elevation (m): 66, 65, 64, 63, 62, 61, 60, 59

undrained shear strength (kPa): unconfined, field vane, pocket penetrometer, Lab Vane; 40, 80, 120, 160
SPT N-values (bpf): dynamic cone; 10, 20, 30, 40
headspace vapour (ppm): hexane, isobutylene; 100, 200, 300
moisture / plasticity: PL, MC, LL; 10, 20, 30
unstabilized water level
lab data and comments
grain size distribution (%) (MIT): GR SA SI CL

END OF BOREHOLE

Filled with drill water upon completion of drilling.

50 mm dia. monitoring well installed.
No. 10 screen

GROUNDWATER LEVELS

Date	Water Depth (m)	Elevation (m)
Jun 5, 2020	4.8	76.4
Jun 10, 2020	7.7	73.5
Jun 12, 2020	12.7	68.5
Jun 18, 2020	12.7	68.5

file: 20-088.gpj

Tech : JN | **PM** : JW | **Rev** : MD

GROUNDED ENGINEERING

Date Started : Jun 2, 2020
Position : E: 614179, N: 4823383 (UTM 17T)
Elev. Datum : Geodetic

ROCK CORE LOG 1

File No. : 20-088 **Project** : 23 Elizabeth Street North, Mississauga **Client** : Edenshaw Elizabeth Developments Limited

Rock coring started at 10.2m below grade

GEORGIAN BAY FORMATION
Shale, grey, thinly bedded, weak; joints are horizontal, gapped to open;

interbedded with **limestone**, light grey, thinly bedded, medium strong

Overall shale: 90%, limestone: 10%

Run 1 : 12% limestone, 88% shale
Run 2 : 6% limestone, 94% shale
Run 3 : 5% limestone, 95% shale
Run 4 : 7% limestone, 93% shale
Run 5 : 11% limestone, 89% shale
Run 6 : 19% limestone, 81% shale
Run 7 : 10% limestone, 90% shale

Run	elev / depth (m)	recovery
	71.0	
R1	10.2 – 70.1	TCR = **58**% SCR = **42**% RQD = **11**%
R2	11.1 – 68.6	TCR = **95**% SCR = **90**% RQD = **80**%
R3	12.6 – 67.1	TCR = **100**% SCR = **92**% RQD = **92**%
R4	14.1 – 65.7	TCR = **100**% SCR = **95**% RQD = **92**%
R5	15.5 – 64.1	TCR = **100**% SCR = **100**% RQD = **100**%
R6	17.1 – 62.5	TCR = **100**% SCR = **98**% RQD = **93**%
R7	18.7 – 61.0	TCR = **100**% SCR = **100**% RQD = **100**%

notes and comments

10.4 / 70.8m: Transition to sound bedrock

10.7 / 70.5m: 15" lost core at the end of the run

Tech : JN | **PM** : JW | **Rev** : MD

file: 20-088.gpj

GROUNDED ENGINEERING

Date Started : Jun 2, 2020
Position : E: 614179, N: 4823383 (UTM 17T)
Elev. Datum : Geodetic

ROCK CORE LOG 1

File No. : 20-088 **Project** : 23 Elizabeth Street North, Mississauga **Client** : Edenshaw Elizabeth Developments Limited

depth (m)	graphic log	stratigraphy	Run elev / depth (m)	recovery	elevation (m)	shale weathering zones (Z1 Z2 Z3 Z4)	UCS (MPa) 5 25 50 100 250 / estimated strength (R1 R2 R3 R4 R5 R6)	natural fracture frequency	laboratory testing	notes and comments	elevation (m)
		71.0			61						
		GEORGIAN BAY FORMATION **Shale**, grey, thinly bedded, weak; joints are horizontal, gapped to open;						0			
		interbedded with **limestone**, light grey, thinly bedded, medium strong						0			
21		*Overall shale: 90%, limestone: 10%*	R8 20.2	TCR = **100**% SCR = **100**% RQD = **100**%				2			
		Run 8 : 7% limestone 93% shale			60			0			60
			59.6					0			
			21.6					0			
22			R9	TCR = **97**% SCR = **97**% RQD = **86**%	59			1			59
								0			
								0			
23		Run 9 : 10% limestone 90% shale	58.0					2			
		23.2m									
		END OF COREHOLE									

file: 20-088.gpj

Tech : JN | **PM** : JW | **Rev** : MD

BOREHOLE LOG 2

Date Started : Jun 2, 2020
Position : E: 614147, N: 4823384 (UTM 17T)
Elev. Datum : Geodetic

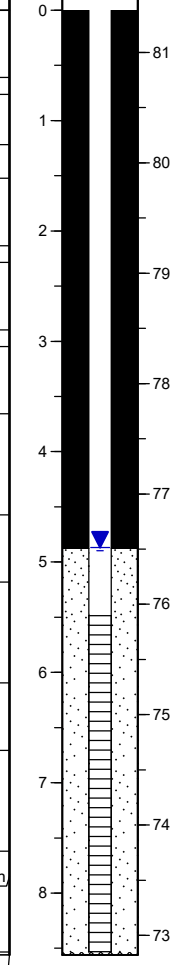
File No. : 20-088 **Project** : 23 Elizabeth Street North, Mississauga **Client** : Edenshaw Elizabeth Developments Limited

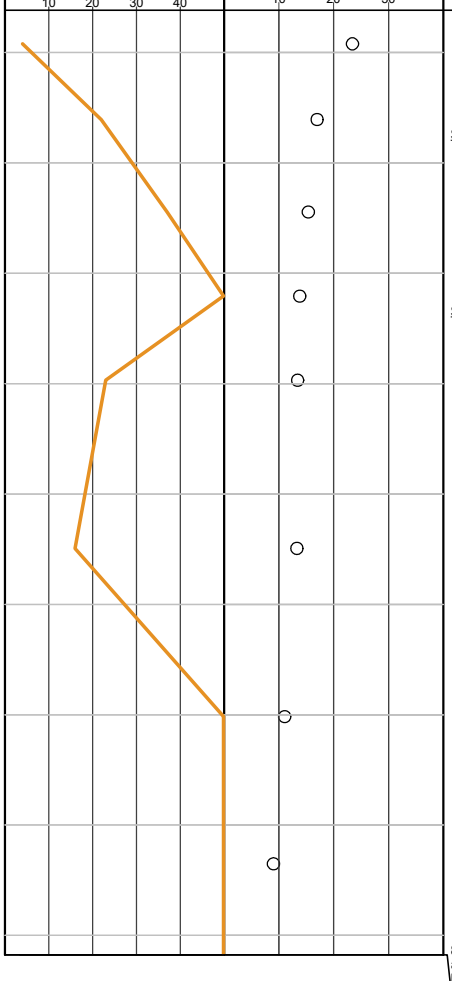
drill method : *Mini Mole*

elev depth (m)	description	graphic log	number	type	SPT N-value
81.4	**GROUND SURFACE**				
	100mm **TOPSOIL**		1	SS	4
80.6	**FILL**, silty sand, trace gravel, trace rootlets, organic odour, very loose, dark brown, moist				
0.8			2	SS	22
80.3	**FILL**, silty sand, trace slag, compact, dark brown, moist				
1.1	**SILTY SAND**, trace clay, compact, orangey brown, moist		3	SS	37
	...at 1.5 m, dense				
	...at 2.3 m, some clay, very dense		4	SS	53
	...at 3.0 m, grey compact		5	SS	23
76.8					
4.6	**SILTY CLAY**, some gravel, trace sand, very stiff, grey, moist to wet (GLACIAL TILL)		6	SS	16
75.3					
6.1	**SANDY SILT**, some clay, some gravel, very dense, grey, moist (GLACIAL TILL)		7	SS	54
			8	SS	50 / 75mm
72.9					
72.8	**INFERRED BEDROCK**		9	SS	50 / 25mm
8.6					

solid stem augers OD=150 mm

depth scale (m) | well details | elevation (m)





unstabilized water level

lab data and comments

grain size distribution (%) (MIT)
GR SA SI CL

SS2: M&I, BTEX, PHC

SS4: M&I, BTEX, PHC

12 30 37 21

8.5m: Auger grinding for approximatetly 3 mins, spoon bouncing

END OF BOREHOLE
Auger refusal

Dry and open upon completion of drilling.

50 mm dia. monitoring well installed.
No. 10 screen

GROUNDWATER LEVELS

Date	Water Depth (m)	Elevation (m)
Jun 5, 2020	5.0	76.4
Jun 10, 2020	5.0	76.4
Jun 12, 2020	4.9	76.5
Jun 18, 2020	4.9	76.5

file: 20-088.gpj

Tech : RF | **PM** : JW | **Rev** : MD

GROUNDED ENGINEERING

Date Started : May 25, 2020
Position : E: 614142, N: 4823408 (UTM 17T)
Elev. Datum : Geodetic

BOREHOLE LOG 3

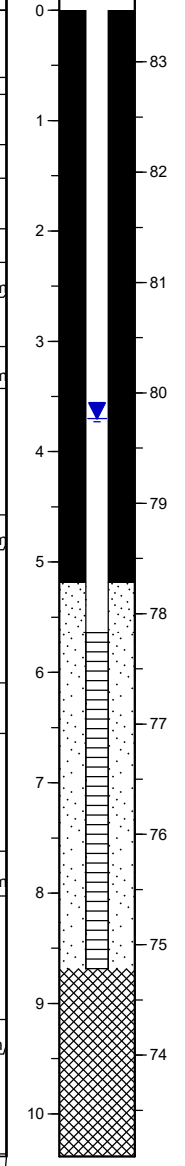
File No. : 20-088 **Project** : 23 Elizabeth Street North, Mississauga **Client** : Edenshaw Elizabeth Developments Limited

drill method : *Mini Mole*

elev depth (m)	description	graphic log	number	type	SPT N-value
83.5	**GROUND SURFACE**				
	100mm **TOPSOIL**		1	SS	5
82.7	**FILL**, silty sand, trace gravel, trace rootlets, organic odour, loose, dark brown, moist				
0.8	**SILTY SAND**, trace clay, trace rootlets, compact, orangey brown, moist		2	SS	15
	...at 1.5 m, very dense		3	SS	69
			4	SS	50 / 125mm
	...at 3.0 m, greyish brown		5	SS	98 / 225mm
	...at 4.6 m, grey		6	SS	50 / 100mm
			7	SS	83
75.9					
7.6	**SANDY SILT**, some clay, some gravel, very dense, grey, moist (GLACIAL TILL)		8	SS	84 / 250mm
			9	SS	50 / 75mm
73.1					
73.1	**INFERRED BEDROCK**, shale and limestone fragment, grey		10	SS	50 / 25mm
10.4	**END OF BOREHOLE** Auger refusal				

solid stem augers OD=150 mm

depth scale (m) | well details | elevation (m)

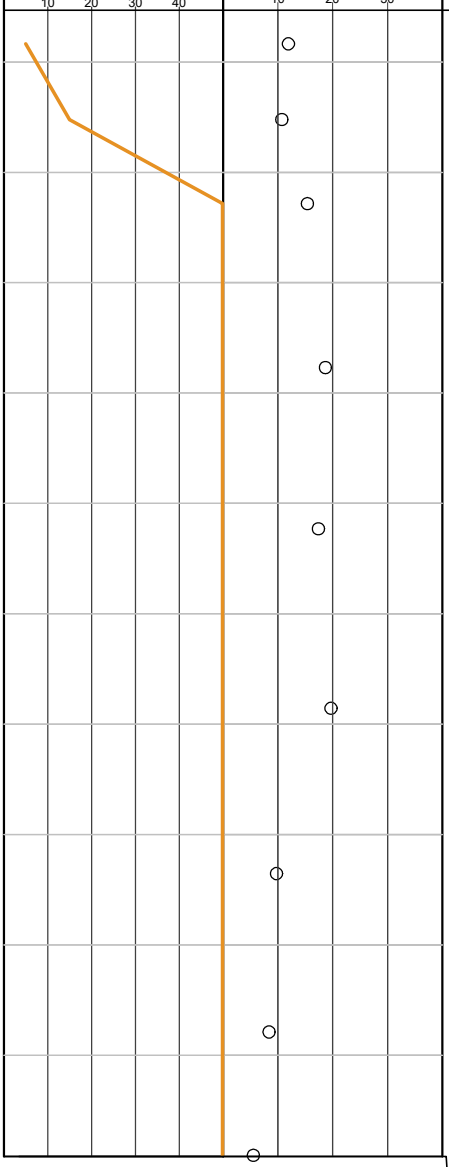


undrained shear strength (kPa)
○ unconfined + field vane
● pocket penetrometer ■ Lab Vane
40 80 120 160

SPT N-values (bpf)
× dynamic cone
10 20 30 40

headspace vapour (ppm)
× hexane □ isobutylene
100 200 300

moisture / plasticity
PL MC LL
10 20 30



unstabilized water level

lab data and comments

grain size distribution (%) (MIT)
GR SA SI CL

SS4: M&I, BTEX, PHC

SS6: M&I, BTEX, PHC

10.4m: Auger grinding for approximately 5 mins, spoon bouncing, bedrock confirmation spoon filled with caving sands, unable to extract 2nd bedrock sample

Unstabilized water level measured at 6.1 m below ground surface; caved to 8.7 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.
No. 10 screen

GROUNDWATER LEVELS

Date	Water Depth (m)	Elevation (m)
Jun 5, 2020	3.3	80.2
Jun 10, 2020	3.7	79.7
Jun 12, 2020	4.0	79.4
Jun 18, 2020	3.7	79.8

file: 20-088.gpj

Tech : JN | **PM** : JW | **Rev** : MD

BOREHOLE LOG 4

Date Started : May 25, 2020
Position : E: 614160, N: 4823412 (UTM 17T)
Elev. Datum : Geodetic

File No. : 20-088 **Project** : 23 Elizabeth Street North, Mississauga **Client** : Edenshaw Elizabeth Developments Limited

drill method : *Mini Mole*

elev / depth (m)	description	graphic log	number	type	SPT N-value
83.3	**GROUND SURFACE**				
	100mm **TOPSOIL**		1	SS	3
82.5	**FILL**, silty sand, trace gravel, trace rootlets, very loose, orangey brown, moist				
0.8	**SILT SAND**, trace clay, trace rootlets, compact, orangey brown, moist		2	SS	18
	...at 1.5 m, silty sand, greyish brown, very dense		3	SS	55
			4	SS	63
			5	SS	80 / 275mm
	...at 4.6 m, grey		6	SS	42
77.2					
6.1	**SILTY CLAY**, some sand, trace gravel, hard, grey, moist (GLACIAL TILL)		7	SS	32
75.7					
7.6	**SILTY SAND**, some clay, some gravel, very dense, grey, moist (GLACIAL TILL)		8	SS	88 / 275mm
74.2					
9.1	**INFERRED BEDROCK**, shale and limestone fragment, grey		9	SS	89 / 200mm
73.8					
9.5					

solid stem augers OD=150 mm

depth scale (m): 0 1 2 3 4 5 6 7 8 9

well details

elevation (m): 83 82 81 80 79 78 77 76 75 74

undrained shear strength (kPa)
○ unconfined + field vane
● pocket penetrometer ■ Lab Vane
40 80 120 160

SPT N-values (bpf)
× dynamic cone
10 20 30 40

headspace vapour (ppm)
× hexane □ isobutylene
100 200 300

moisture / plasticity
PL MC LL
10 20 30

unstabilized water level

lab data and comments

grain size distribution (%) (MIT)
GR SA SI CL

SS5: M&I, BTEX, PHC

15 36 33 16

SS8: M&I, BTEX, PHC

9.4m: Auger grinding for approximately 5 mins
9.5m: Spoon refusal, bedrock confirmation spoon filled with caving sands, unable to extract 2nd bedrock sample

END OF BOREHOLE
Auger refusal

Unstabilized water level measured at 4.6 m below ground surface; caved to 8.7 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.
No. 10 screen

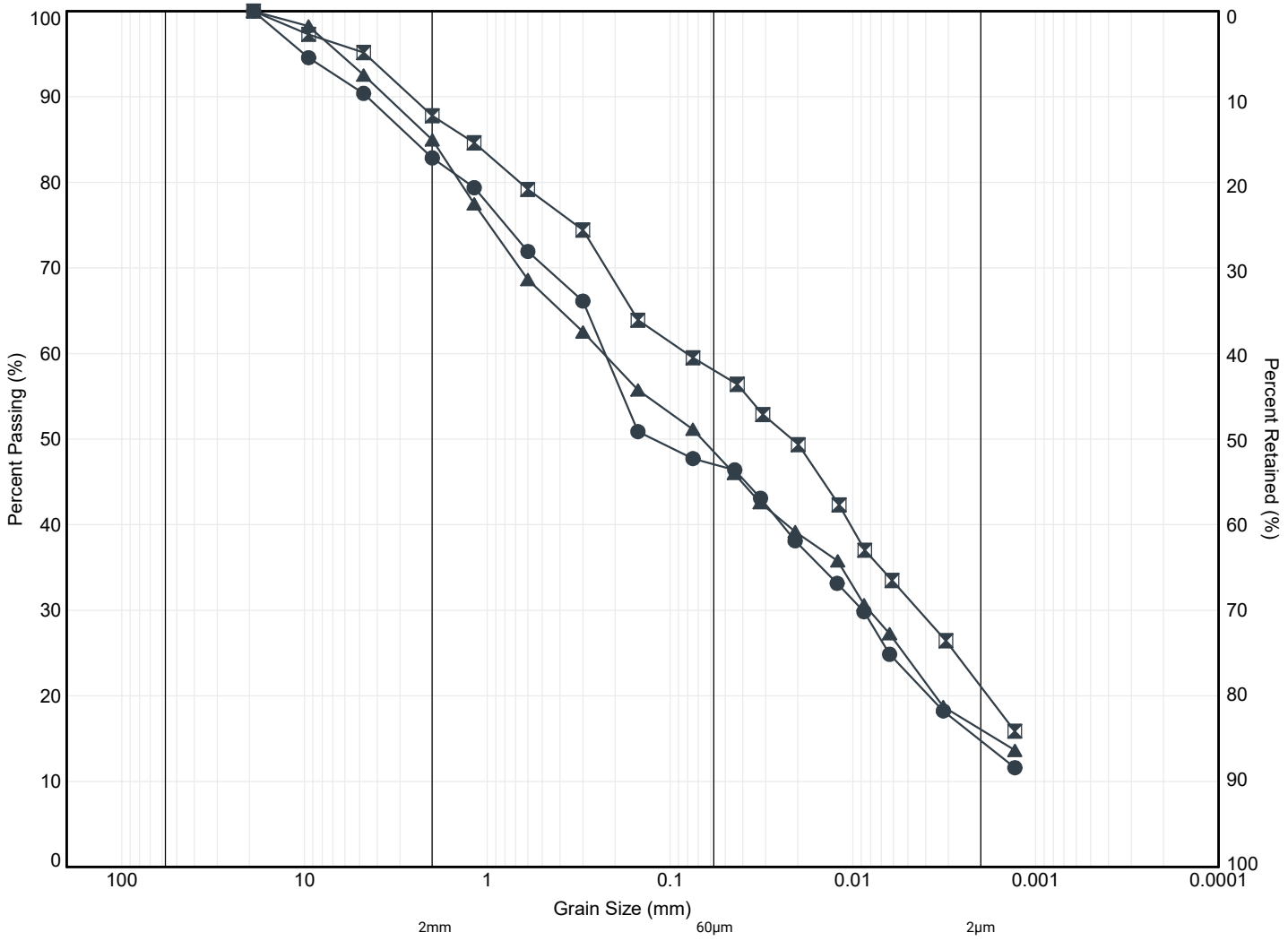
GROUNDWATER LEVELS

Date	Water Depth (m)	Elevation (m)
Jun 5, 2020	2.9	80.5
Jun 10, 2020	2.9	80.4
Jun 12, 2020	3.0	80.4
Jun 18, 2020	3.0	80.3

file: 20-088.gpj

Tech : JN | **PM** : JW | **Rev** : MD

APPENDIX B



MIT SYSTEM	COBBLES	GRAVEL			SAND			SILT	CLAY
		COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		

MIT SYSTEM

	Borehole	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
●	**1**	SS6	4.9	76.3	17	36	32	15
⊠	**2**	SS7	6.4	75.0	12	30	37	21
▲	**4**	SS8	7.8	75.5	15	36	33	16

GROUNDED ENGINEERING

Title: **GRAIN SIZE DISTRIBUTION**
SILT TILL

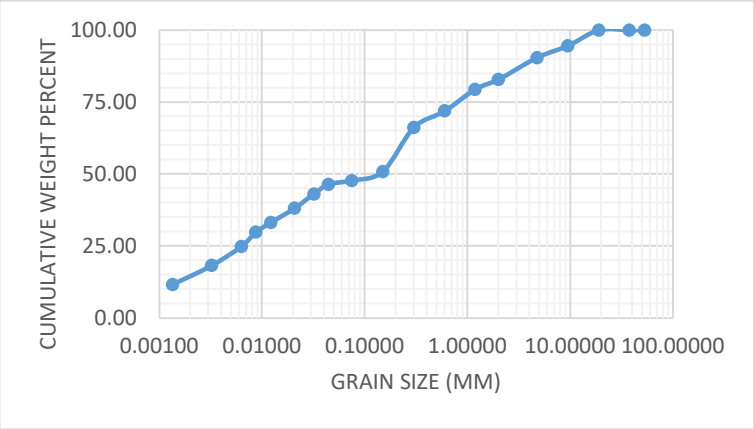
File No.: **20-088**

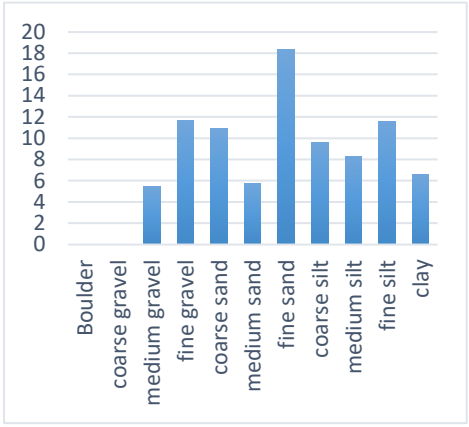
Grain Size Analysis Report Date: 2020-07-02

Sample Name: BH1 SS6

Mass Sample (g): 100 T (oC) 20

Poorly sorted gravelly sand with fines





Sieve opening (ps) di (mm)	Mass of retained (mr) (g)	mass fraction (mf)	Percent Passing (pp)
53	0	0	100
37.5	0	0	100
19	0	0	100
9.5	5.440901	0.054409	94.5591
4.75	4.165103	0.041651	90.394
2	7.542214	0.075422	82.85178
1.18	3.479775	0.034798	79.37201
0.6	7.45666	0.074567	71.91535
0.3	5.799625	0.057996	66.11572
0.15	15.24473	0.152447	50.87099
0.075	3.148368	0.031484	47.72263
0.044256	1.328722	0.013287	46.3939
0.032004	3.31385	0.033139	43.08005
0.020681	4.970776	0.049708	38.10928
0.012188	4.970776	0.049708	33.1385
0.008734	3.31385	0.033139	29.82465
0.006296	4.970776	0.049708	24.85388
0.003226	6.627701	0.066277	18.22618
0.001348	6.627701	0.066277	11.59848

Effective Grain Diameters (mm)	
d10	0.001
d17	0.003
d20	0.004
d50	0.129
d60	0.240
de (Kruger)	0.017
de (Kozeny)	0.007
de (Zunker)	0.007
de (Zamarin)	0.008
Io (Alyameni)	-0.031

Other Useful Parameters	
Uniformity Coef.	206.30
n computed	0.26
g (cm/s^2)	980.00
ρ (g/cm^3)	0.9981
μ (g/cm s)	0.0098
ρg/μ (1/cm s)	9.9327E+04
tau (Sauerbrei)	1.053
$d_{geometric\ mean}$	0.174
σ_ϕ	4.604

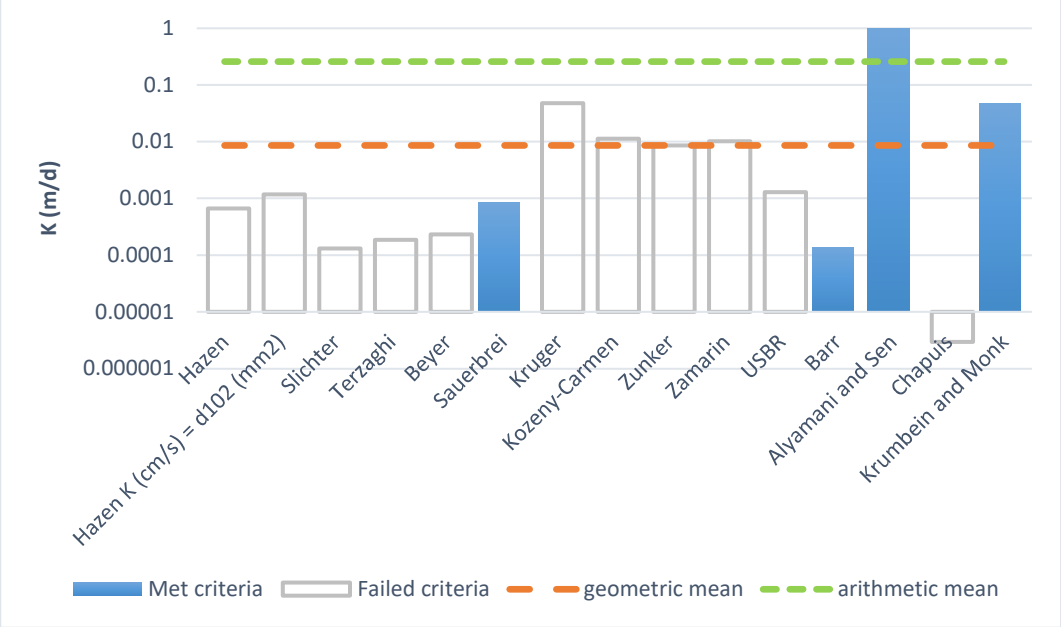
mm	0	% in sample
>64	Boulder	
16 - 64	coarse gravel	0
8 - 16	medium gravel	5.440900563
2 - 8	fine gravel	11.70731707
0.5 - 2	coarse sand	10.93643527
0.25 - 0.5	medium sand	5.799624765
0.063 - 0.25	fine sand	18.39309568
0.016 - 0.063	coarse silt	9.613347542
0.008 - 0.016	medium silt	8.284625891
0.002 - 0.008	fine silt	11.59847625
<0.002	clay	6.627700713

K from Grain Size Analysis Report Date: 2020-07-02

Sample Name: BH1 SS6

Mass Sample (g): 100 T (oC) 20

Poorly sorted gravelly sand with fines



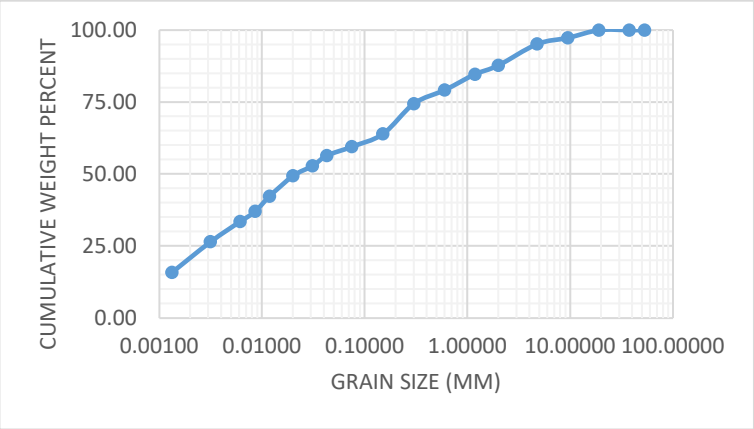
Estimation of Hydraulic Conductivity	cm/s	m/s	m/d	de
Hazen	7.7E-07	7.7E-09	0.00	
Hazen K (cm/s) = d_{10} (mm)	1.4E-06	1.4E-08	0.00	
Slichter	1.5E-07	1.5E-09	0.00	
Terzaghi	2.1E-07	2.1E-09	0.00	
Beyer	2.7E-07	2.7E-09	0.00	
Sauerbrei	9.7E-07	9.7E-09	0.00	
Kruger	5.5E-05	5.5E-07	0.05	
Kozeny-Carmen	1.3E-05	1.3E-07	0.01	
Zunker	9.9E-06	9.9E-08	0.01	
Zamarin	1.2E-05	1.2E-07	0.01	
USBR	1.5E-06	1.5E-08	0.00	
Barr	1.6E-07	1.6E-09	0.00	
Alyamani and Sen	1.2E-03	1.2E-05	0.99	
Chapuis	3.4E-09	3.4E-11	0.00	
Krumbein and Monk	5.4E-05	5.4E-07	0.05	
geometric mean	1.0E-05	1.0E-07	0.01	
arithmetic mean	3.0E-04	3.0E-06	0.26	

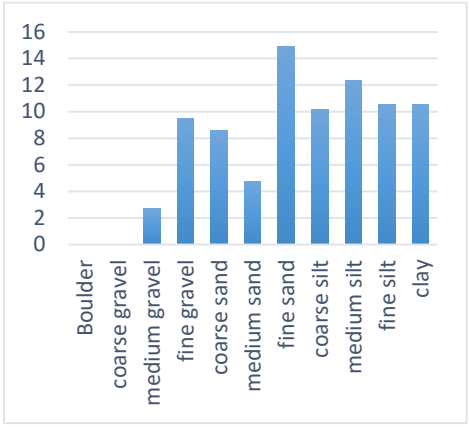
Grain Size Analysis Report Date: 2020-07-02

Sample Name: BH2 SS7

Mass Sample (g): 100 T (oC) 20

Poorly sorted sandy gravelly silt with fines





Sieve opening (ps) di (mm)	Mass of retained (mr) (g)	mass fraction (mf)	Percent Passing (pp)
53	0	0	100
37.5	0	0	100
19	0	0	100
9.5	2.707424	0.027074	97.29258
4.75	2.125182	0.021252	95.16739
2	7.394469	0.073945	87.77293
1.18	3.159825	0.031598	84.6131
0.6	5.441921	0.054419	79.17118
0.3	4.739738	0.047397	74.43144
0.15	10.53275	0.105328	63.89869
0.075	4.388646	0.043886	59.51004
0.042881	3.114283	0.031143	56.39576
0.031054	3.524735	0.035247	52.87103
0.019943	3.524735	0.035247	49.34629
0.011856	7.04947	0.070495	42.29682
0.00856	5.287103	0.052871	37.00972
0.006135	3.524735	0.035247	33.48498
0.003148	7.04947	0.070495	26.43551
0.001333	10.57421	0.105742	15.86131

Effective Grain Diameters (mm)		Other Useful Parameters	
d10	0.001	Uniformity Coef.	99.22
d17	0.002	n computed	0.26
d20	0.002	g (cm/s^2)	980.00
d50	0.022	ρ (g/cm^3)	0.9981
d60	0.083	μ (g/cm s)	0.0098
de (Kruger)	0.012	ρg/μ (1/cm s)	9.9327E+04
de (Kozeny)	0.005	tau (Sauerbrei)	1.053
de (Zunker)	0.005	$d_{geometric\ mean}$	0.112
de (Zamarin)	0.006	σ_ϕ	4.458
lo (Alyameni)	-0.004		

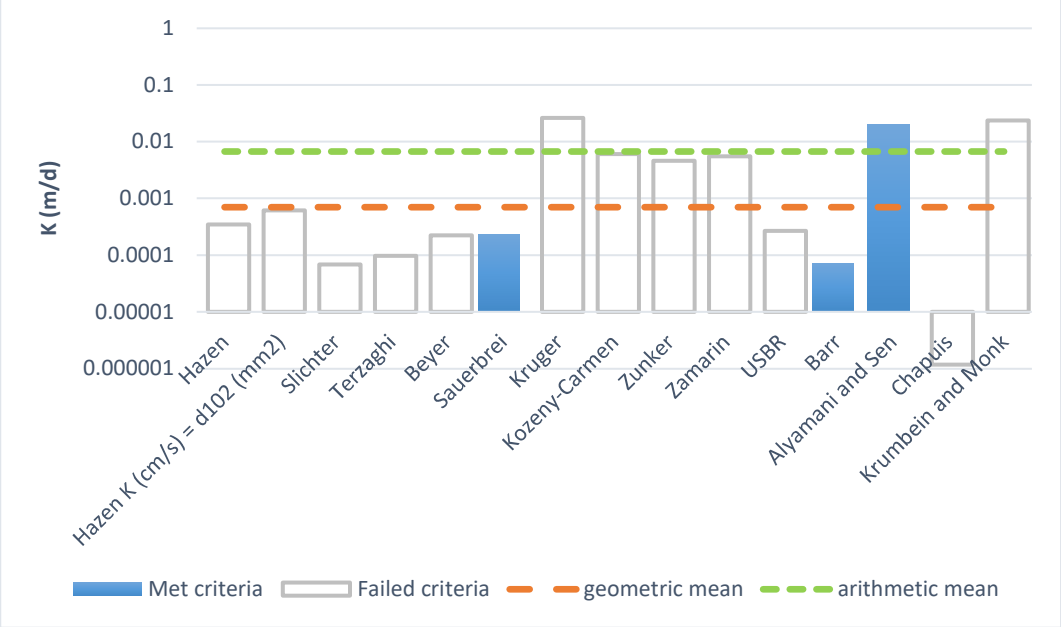
mm	0	% in sample
>64	Boulder	
16 - 64	coarse gravel	0
8 - 16	medium gravel	2.707423581
2 - 8	fine gravel	9.519650655
0.5 - 2	coarse sand	8.601746725
0.25 - 0.5	medium sand	4.739737991
0.063 - 0.25	fine sand	14.92139738
0.016 - 0.063	coarse silt	10.1637527
0.008 - 0.016	medium silt	12.33657274
0.002 - 0.008	fine silt	10.57420521
<0.002	clay	10.57420521

K from Grain Size Analysis Report Date: 2020-07-02

Sample Name: BH2 SS7

Mass Sample (g): 100 T (oC) 20

Poorly sorted sandy gravelly silt with fines



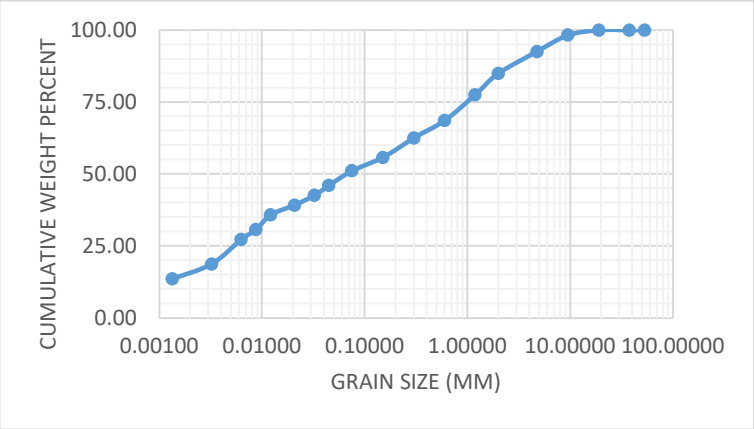
Estimation of Hydraulic Conductivity	cm/s	m/s	m/d	de
Hazen	4.0E-07	4.0E-09	0.00	
Hazen K (cm/s) = d_{10} (mm)	7.1E-07	7.1E-09	0.00	
Slichter	7.9E-08	7.9E-10	0.00	
Terzaghi	1.1E-07	1.1E-09	0.00	
Beyer	2.6E-07	2.6E-09	0.00	
Sauerbrei	2.7E-07	2.7E-09	0.00	
Kruger	3.0E-05	3.0E-07	0.03	
Kozeny-Carmen	7.0E-06	7.0E-08	0.01	
Zunker	5.3E-06	5.3E-08	0.00	
Zamarin	6.3E-06	6.3E-08	0.01	
USBR	3.1E-07	3.1E-09	0.00	
Barr	8.4E-08	8.4E-10	0.00	
Alyamani and Sen	2.3E-05	2.3E-07	0.02	
Chapuis	1.4E-09	1.4E-11	0.00	
Krumbein and Monk	2.7E-05	2.7E-07	0.02	
geometric mean	8.1E-07	8.1E-09	0.00	
arithmetic mean	7.8E-06	7.8E-08	0.01	

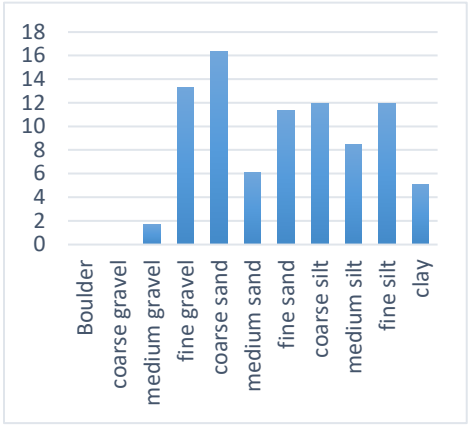
Grain Size Analysis Report Date: 2020-07-02

Sample Name: BH4 SS8

Mass Sample (g): 100 T (oC) 20

Poorly sorted gravelly sand with fines





Sieve opening (ps) di (mm)	Mass of retained (mr) (g)	mass fraction (mf)	Percent Passing (pp)
53	0	0	100
37.5	0	0	100
19	0	0	100
9.5	1.744186	0.017442	98.25581
4.75	5.711354	0.057114	92.54446
2	7.592339	0.075923	84.95212
1.18	7.475787	0.074758	77.47633
0.6	8.835021	0.08835	68.64131
0.3	6.116553	0.061166	62.52476
0.15	6.79617	0.067962	55.72859
0.075	4.587415	0.045874	51.14118
0.044594	5.147193	0.051472	45.99398
0.032237	3.406962	0.03407	42.58702
0.020681	3.406962	0.03407	39.18006
0.012106	3.406962	0.03407	35.7731
0.008734	5.110443	0.051104	30.66266
0.006256	3.406962	0.03407	27.25569
0.003226	8.517404	0.085174	18.73829
0.001341	5.110443	0.051104	13.62785

Effective Grain Diameters (mm)	
d10	0.001
d17	0.003
d20	0.004
d50	0.068
d60	0.244
de (Kruger)	0.018
de (Kozeny)	0.007
de (Zunker)	0.007
de (Zamarin)	0.007
Io (Alyameni)	-0.016

Other Useful Parameters	
Uniformity Coef.	248.32
n computed	0.26
g (cm/s^2)	980.00
ρ (g/cm^3)	0.9981
μ (g/cm s)	0.0098
ρg/μ (1/cm s)	9.9327E+04
tau (Sauerbrei)	1.053
$d_{geometric\ mean}$	0.182
σ_ϕ	4.519

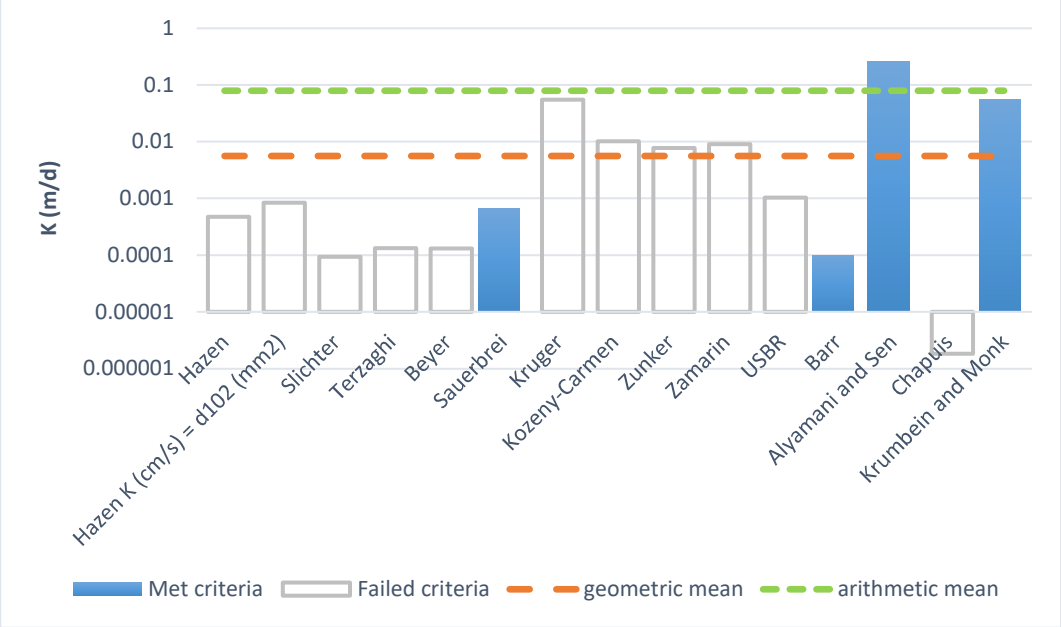
mm	0	% in sample
>64	Boulder	
16 - 64	coarse gravel	0
8 - 16	medium gravel	1.744186047
2 - 8	fine gravel	13.30369357
0.5 - 2	coarse sand	16.31080711
0.25 - 0.5	medium sand	6.116552668
0.063 - 0.25	fine sand	11.38358413
0.016 - 0.063	coarse silt	11.96111675
0.008 - 0.016	medium silt	8.517404286
0.002 - 0.008	fine silt	11.924366
<0.002	clay	5.110442572

K from Grain Size Analysis Report Date: 2020-07-02

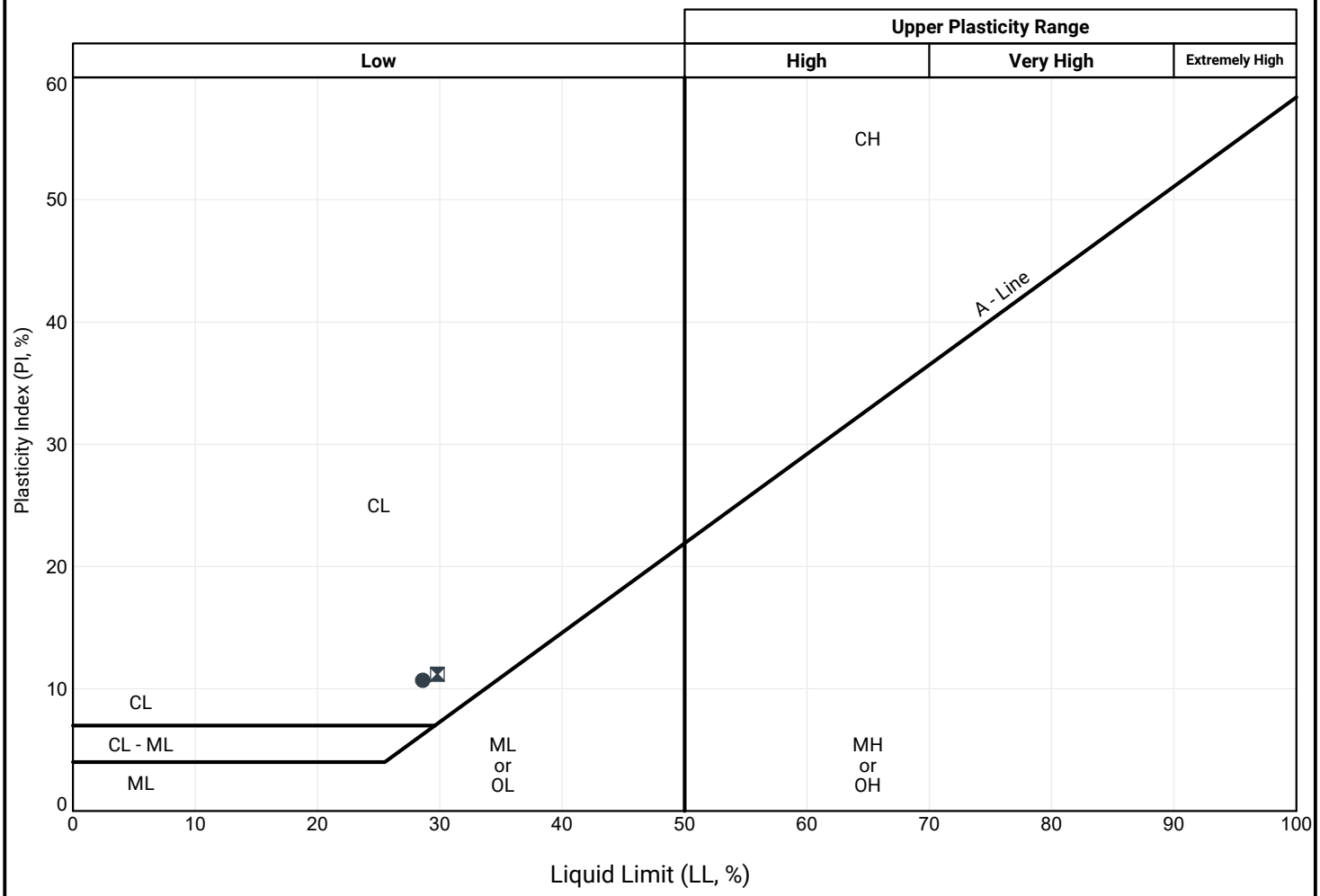
Sample Name: BH4 SS8

Mass Sample (g): 100 T (oC) 20

Poorly sorted gravelly sand with fines



Estimation of Hydraulic Conductivity	cm/s	m/s	m/d	de
Hazen	5.5E-07	5.5E-09	0.00	
Hazen K (cm/s) = d_{10} (mm)	9.7E-07	9.7E-09	0.00	
Slichter	1.1E-07	1.1E-09	0.00	
Terzaghi	1.5E-07	1.5E-09	0.00	
Beyer	1.5E-07	1.5E-09	0.00	
Sauerbrei	7.8E-07	7.8E-09	0.00	
Kruger	6.3E-05	6.3E-07	0.05	
Kozeny-Carmen	1.2E-05	1.2E-07	0.01	
Zunker	8.9E-06	8.9E-08	0.01	
Zamarin	1.0E-05	1.0E-07	0.01	
USBR	1.2E-06	1.2E-08	0.00	
Barr	1.2E-07	1.2E-09	0.00	
Alyamani and Sen	3.0E-04	3.0E-06	0.26	
Chapuis	2.1E-09	2.1E-11	0.00	
Krumbein and Monk	6.6E-05	6.6E-07	0.06	
geometric mean	6.5E-06	6.5E-08	0.01	
arithmetic mean	9.2E-05	9.2E-07	0.08	



	Borehole	Sample	Depth (m)	Elev. (m)	LL (%)	PL (%)	PI (%)
●	1	SS6	4.9	76.3	29	18	11
⊠	4	SS8	7.8	75.5	30	19	11

GROUNDED ENGINEERING

Title: **ATTERBERG LIMITS CHART**

File No.: **20-088**

APPENDIX C

APPENDIX C: GROUNDWATER ELEVATION

Consultant	Monitoring Well ID	05-Jun-20	10-Jun-20	12-Jun-20	18-Jun-20
		GW Elevation (masl)	GW Elevation (masl)	GW Elevation (masl)	GW Elevation (masl)
Grounded Engineering	BH1	76.3	73.4	68.4	68.5
	BH2	76.4	76.4	76.5	76.5
	BH3	80.2	79.7	79.4	79.8
	BH4	80.5	80.4	80.4	80.3

NA – Monitoring wells could not be located or monitored

NM – Not Measured

APPENDIX D

GROUNDED ENGINEERING

Slug Test - Water Level Data

Project: 23 Elizabeth St. N

Number: 20-088

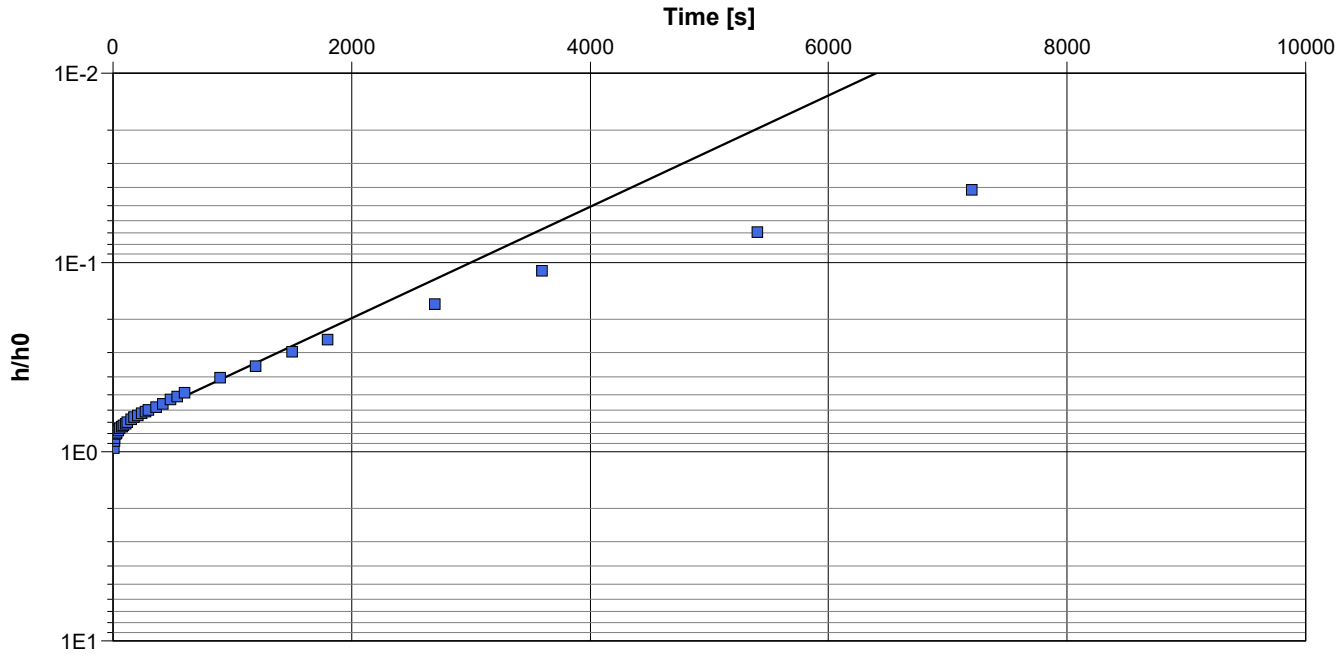
Client: Edenshaw Elizabeth Developments Limited

Location: Mississauga	Slug Test: Slug Test 1: BH1	Test Well: BH1
Test Conducted by: KS	Test Date: 2020-06-18	
Water level at t=0 [m]: 14.12	Static Water Level [m]: 12.67	Water level change at t=0 [m]: 1.45

	Time [s]	Water Level [m]	WL Change [m]
1	5	14.06	1.39
2	10	13.95	1.28
3	15	13.90	1.23
4	20	13.83	1.16
5	25	13.83	1.16
6	30	13.82	1.15
7	45	13.79	1.12
8	60	13.76	1.09
9	75	13.74	1.07
10	90	13.72	1.05
11	105	13.70	1.03
12	120	13.68	1.01
13	150	13.65	0.98
14	180	13.62	0.95
15	210	13.60	0.93
16	240	13.58	0.91
17	270	13.56	0.89
18	300	13.54	0.87
19	360	13.51	0.84
20	420	13.48	0.81
21	480	13.44	0.77
22	540	13.41	0.74
23	600	13.38	0.71
24	900	13.26	0.59
25	1200	13.18	0.51
26	1500	13.10	0.43
27	1800	13.04	0.37
28	2700	12.91	0.24
29	3600	12.83	0.16
30	5400	12.77	0.10
31	7200	12.73	0.06

GROUNDED ENGINEERING	**Slug Test Analysis Report**
	Project: 23 Elizabeth St. N
	Number: 20-088
	Client: Edenshaw Elizabeth Developments Limited

Location: Mississauga	Slug Test: Slug Test 1: BH1	Test Well: BH1
Test Conducted by: KS		Test Date: 2020-06-18
Analysis Performed by: JW	Rising Head Test 1	Analysis Date: 2020-07-02
Aquifer Thickness: 14.10 m		



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH1	3.20×10^{-7}	

GROUNDED ENGINEERING

Slug Test - Water Level Data

Project: 23 Elizabeth St. N

Number: 20-088

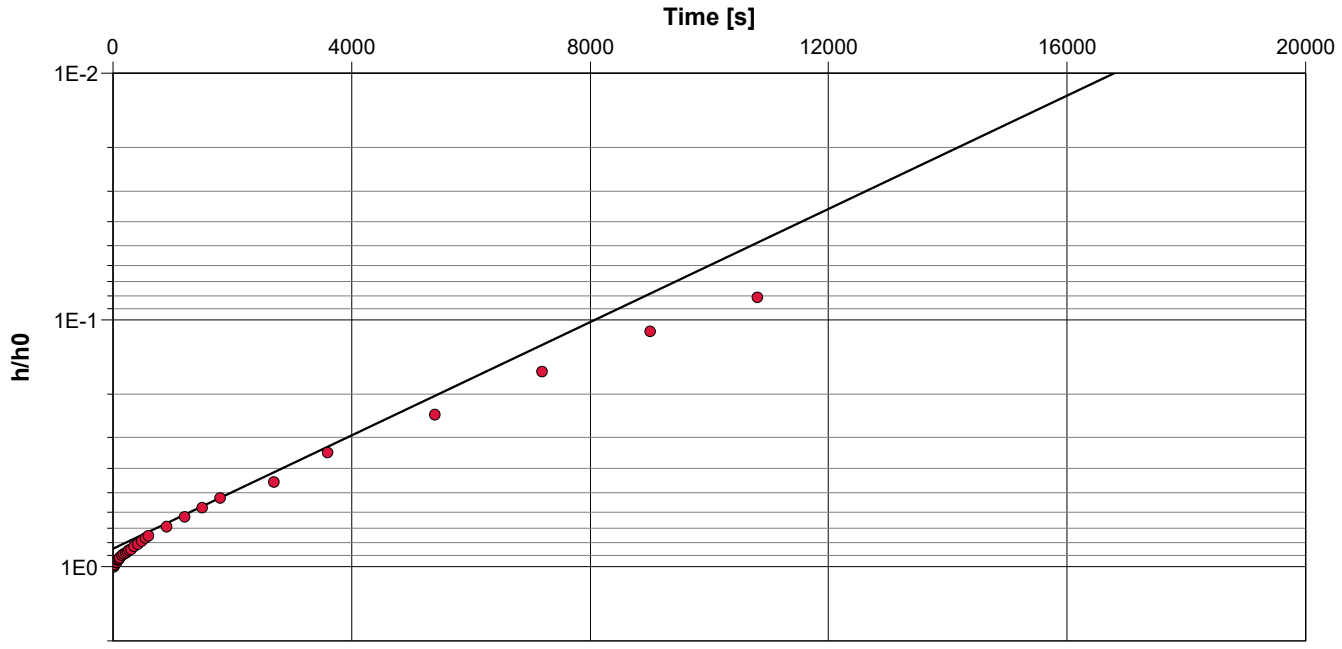
Client: Edenshaw Elizabeth Developments Limited

Location: Mississauga	Slug Test: Slug Test 2: BH2	Test Well: BH2
Test Conducted by: KS	Test Date: 2020-06-18	
Water level at t=0 [m]: 5.86	Static Water Level [m]: 4.87	Water level change at t=0 [m]: 0.99

	Time [s]	Water Level [m]	WL Change [m]
1	5	5.86	0.99
2	10	5.86	0.99
3	15	5.85	0.98
4	20	5.85	0.98
5	25	5.84	0.97
6	30	5.84	0.97
7	45	5.82	0.95
8	60	5.82	0.95
9	75	5.80	0.93
10	90	5.79	0.92
11	105	5.79	0.92
12	120	5.78	0.91
13	150	5.76	0.89
14	180	5.75	0.88
15	210	5.74	0.87
16	240	5.73	0.86
17	270	5.72	0.85
18	300	5.71	0.84
19	360	5.69	0.82
20	420	5.67	0.80
21	480	5.65	0.78
22	540	5.63	0.76
23	600	5.61	0.74
24	900	5.55	0.68
25	1200	5.49	0.62
26	1500	5.44	0.57
27	1800	5.39	0.52
28	2700	5.32	0.45
29	3600	5.21	0.34
30	5400	5.11	0.24
31	7200	5.03	0.16
32	9000	4.98	0.11
33	10800	4.95	0.08

GROUNDED ENGINEERING	**Slug Test Analysis Report**
	Project: 23 Elizabeth St. N
	Number: 20-088
	Client: Edenshaw Elizabeth Developments Limited

Location: Mississauga	Slug Test: Slug Test 2: BH2	Test Well: BH2
Test Conducted by: KS		Test Date: 2020-06-18
Analysis Performed by: JW	Rising Head Test 2	Analysis Date: 2020-07-02
Aquifer Thickness: 14.10 m		



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH2	9.39×10^{-8}	

GROUNDED ENGINEERING

Slug Test - Water Level Data

Project: 23 Elizabeth St. N

Number: 20-088

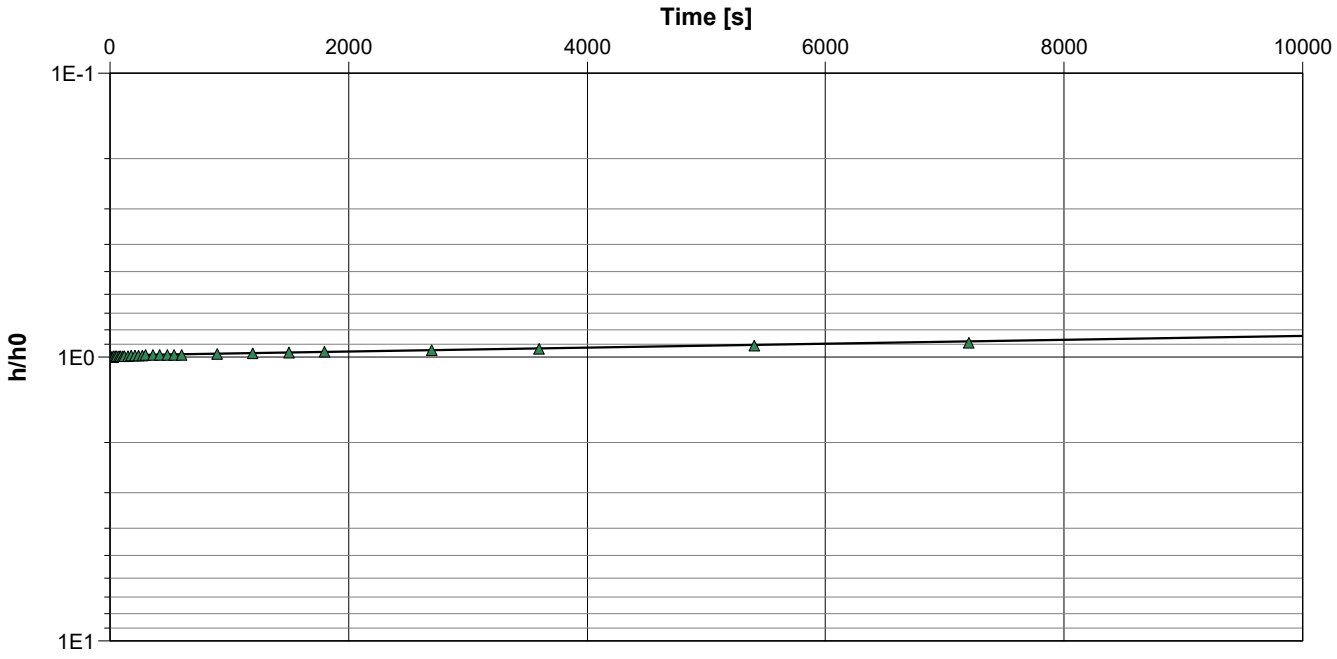
Client: Edenshaw Elizabeth Developments Limited

Location: Mississauga	Slug Test: Slug Test 3: BH3	Test Well: BH3
Test Conducted by: KS	Test Date: 2020-06-18	
Water level at t=0 [m]: 5.62	Static Water Level [m]: 3.70	Water level change at t=0 [m]: 1.92

	Time [s]	Water Level [m]	WL Change [m]
1	5	5.62	1.92
2	10	5.62	1.92
3	15	5.62	1.92
4	20	5.62	1.92
5	25	5.62	1.92
6	30	5.61	1.91
7	45	5.61	1.91
8	60	5.61	1.91
9	75	5.61	1.91
10	90	5.61	1.91
11	105	5.61	1.91
12	120	5.61	1.91
13	150	5.61	1.91
14	180	5.60	1.90
15	210	5.60	1.90
16	240	5.60	1.90
17	270	5.60	1.90
18	300	5.59	1.89
19	360	5.59	1.89
20	420	5.59	1.89
21	480	5.59	1.89
22	540	5.58	1.88
23	600	5.58	1.88
24	900	5.57	1.87
25	1200	5.56	1.86
26	1500	5.55	1.85
27	1800	5.54	1.84
28	2700	5.52	1.82
29	3600	5.50	1.80
30	5400	5.45	1.75
31	7200	5.41	1.71

GROUNDED ENGINEERING	**Slug Test Analysis Report**
	Project: 23 Elizabeth St. N
	Number: 20-088
	Client: Edenshaw Elizabeth Developments Limited

Location: Mississauga	Slug Test: Slug Test 3: BH3	Test Well: BH3
Test Conducted by: KS		Test Date: 2020-06-18
Analysis Performed by: JW	Rising Head Test 3	Analysis Date: 2020-07-02
Aquifer Thickness: 8.80 m		



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH3	7.21×10^{-9}	

GROUNDED ENGINEERING

Slug Test - Water Level Data

Project: 23 Elizabeth St. N

Number: 20-088

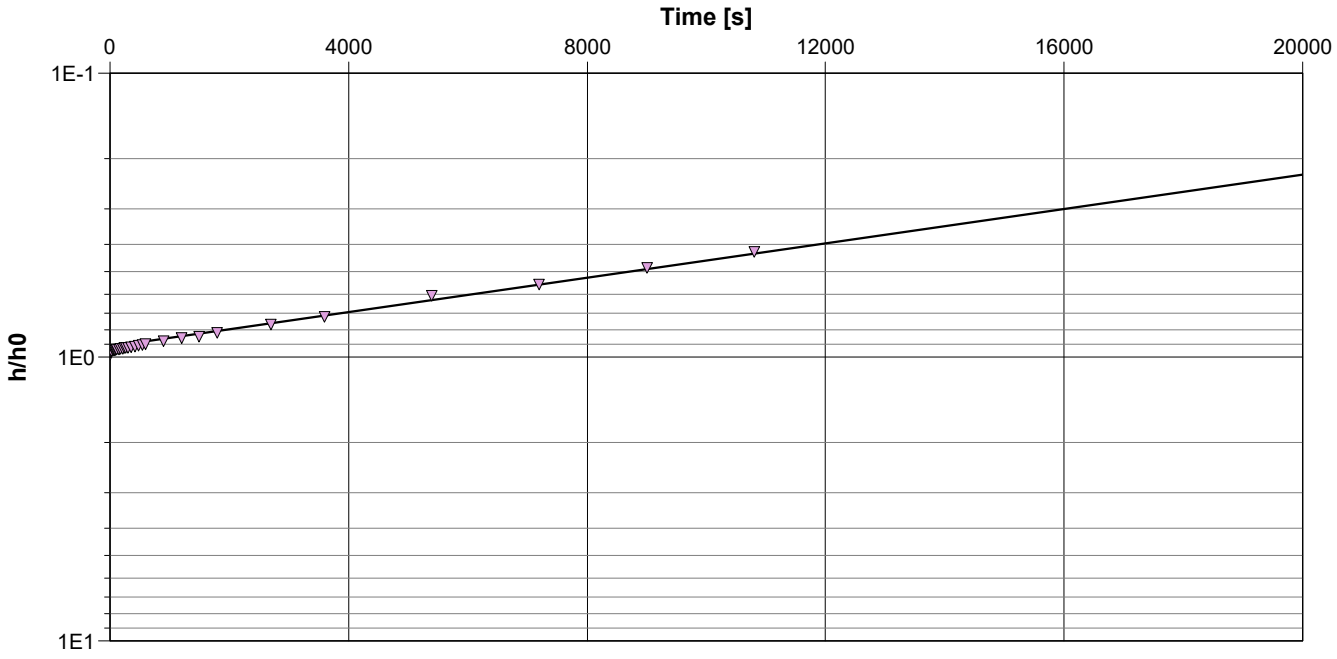
Client: Edenshaw Elizabeth Developments Limited

Location: Mississauga	Slug Test: Slug Test 4: BH4	Test Well: BH4
Test Conducted by: KS	Test Date: 2020-06-18	
Water level at t=0 [m]: 4.72	Static Water Level [m]: 3.03	Water level change at t=0 [m]: 1.69

	Time [s]	Water Level [m]	WL Change [m]
1	5	4.69	1.66
2	10	4.66	1.63
3	15	4.64	1.61
4	20	4.64	1.61
5	25	4.64	1.61
6	30	4.64	1.61
7	45	4.63	1.60
8	60	4.63	1.60
9	75	4.63	1.60
10	90	4.63	1.60
11	105	4.62	1.59
12	120	4.62	1.59
13	150	4.62	1.59
14	180	4.61	1.58
15	210	4.61	1.58
16	240	4.60	1.57
17	270	4.60	1.57
18	300	4.60	1.57
19	360	4.59	1.56
20	420	4.58	1.55
21	480	4.57	1.54
22	540	4.56	1.53
23	600	4.55	1.52
24	900	4.52	1.49
25	1200	4.48	1.45
26	1500	4.46	1.43
27	1800	4.42	1.39
28	2700	4.33	1.30
29	3600	4.25	1.22
30	5400	4.06	1.03
31	7200	3.97	0.94
32	9000	3.85	0.82
33	10800	3.75	0.72

GROUNDED ENGINEERING	**Slug Test Analysis Report**
	Project: 23 Elizabeth St. N
	Number: 20-088
	Client: Edenshaw Elizabeth Developments Limited

Location: Mississauga	Slug Test: Slug Test 4: BH4	Test Well: BH4
Test Conducted by: KS		Test Date: 2020-06-18
Analysis Performed by: JW	Rising Head Test 4	Analysis Date: 2020-07-02
Aquifer Thickness: 8.80 m		



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH4	3.10×10^{-8}	

APPENDIX E

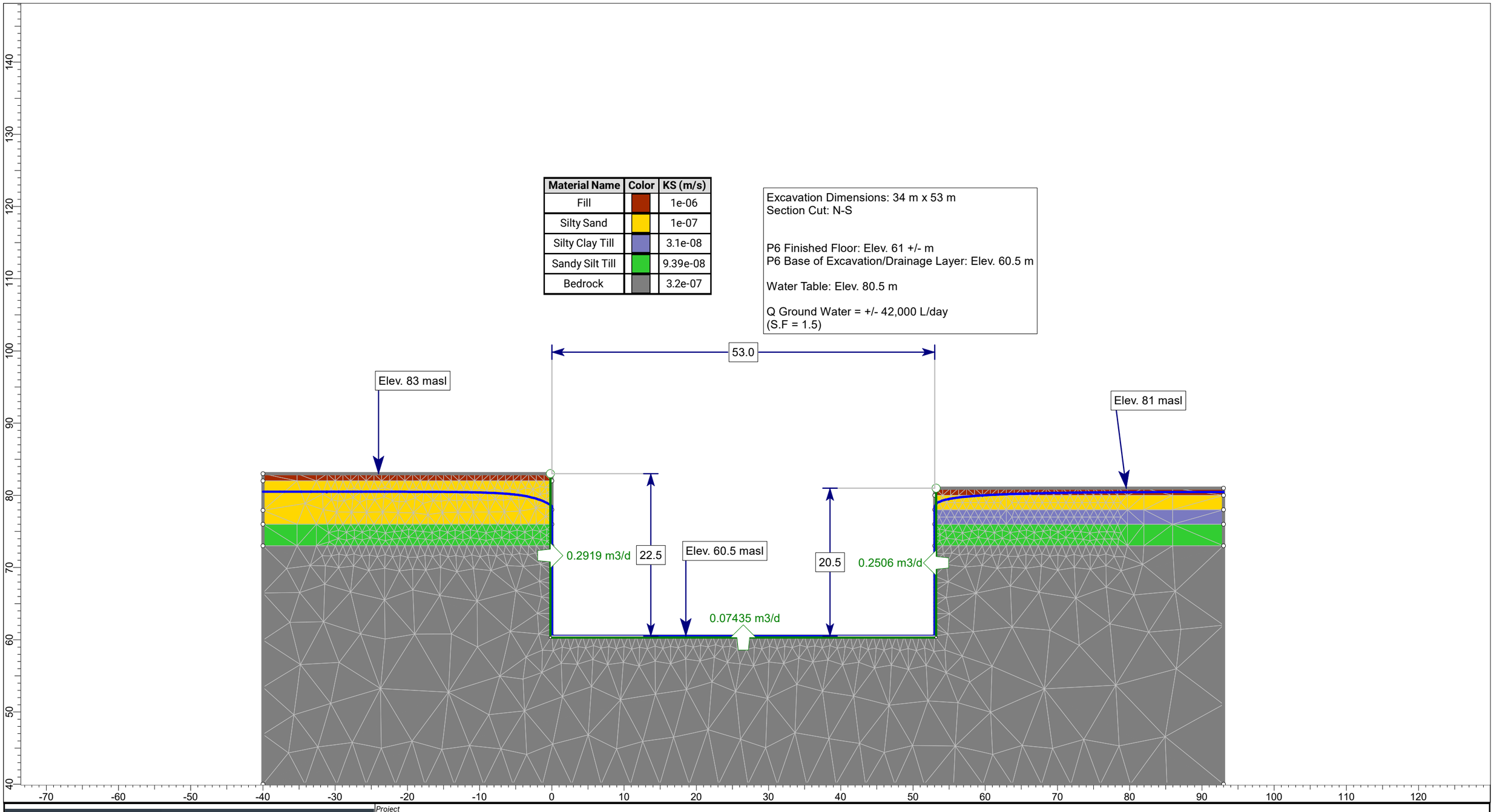
Material Name	Color	KS (m/s)
Fill		1e-06
Silty Sand		1e-07
Silty Clay Till		3.1e-08
Sandy Silt Till		9.39e-08
Bedrock		3.2e-07

Excavation Dimensions: 34 m x 53 m
Section Cut: N-S

P6 Finished Floor: Elev. 61 +/- m
P6 Base of Excavation/Drainage Layer: Elev. 60.5 m

Water Table: Elev. 80.5 m

Q Ground Water = +/- 42,000 L/day
(S.F = 1.5)



GROUNDED ENGINEERING

SLIDEINTERPRET 9.008

Project	20-088 I 23 Elizabeth St. N. 42, 44, 46 Park St. E.				
Analysis Description	FEA P6 Level Dewatering			*Model*	Short Term & Long Term | Horizontal
Drawn By	JW	*Scale*	1:500	*Date*	2020-07-10
Source	A4.01 Issued for Rezoning Submission 2020.05.01 IBI Group Architects			*File Name*	20-088 FEM.slmd

APPENDIX F

FINAL REPORT

CA14201-JUN20 R1

20-088-206, 23 Elizabeth St N

Prepared for

Grounded Engineering Inc.

FINAL REPORT

CA14201-JUN20 R1

First Page

CLIENT DETAILS

Client	Grounded Engineering Inc.
Address	12 Banigan Drive Toronto, Ontario M4H1E9. Canada
Contact	Jessie Wu
Telephone	647-264-7909
Facsimile	
Email	jwu@groundedeng.ca
Project	20-088-206, 23 Elizabeth St N
Order Number	
Samples	Ground Water (1)

LABORATORY DETAILS

Project Specialist	Brad Moore Hon. B.Sc
Laboratory	SGS Canada Inc.
Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-652-2143
Facsimile	705-652-6365
Email	brad.moore@sgs.com
SGS Reference	CA14201-JUN20
Received	06/12/2020
Approved	06/22/2020
Report Number	CA14201-JUN20 R1
Date Reported	06/22/2020

COMMENTS

RL - SGS Reporting Limit
Temperature of Sample upon Receipt: 9 degrees C
Cooling Agent Present:Yes
Custody Seal Present:Yes

Chain of Custody Number:013956

metals limits raised 100x due to sample matrix

tkn changed to dig due to sample matrix

SIGNATORIES

Brad Moore Hon. B.Sc

TABLE OF CONTENTS

Client: Grounded Engineering Inc.
Project: 20-088-206, 23 Elizabeth St N
Project Manager: Jessie Wu
Samplers: Matthew Garcia

PACKAGE: **SANSEW - General Chemistry** (WATER)

L1 = SANSEW / WATER / - - Mississauga - Storm Sewer - BL_259_05
L2 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

Sample Number	8
Sample Name	SW-UF-BH1
Sample Matrix	Ground Water
Sample Date	12/06/2020

General Chemistry

Parameter	Units	RL	L1	L2	Result
Biochemical Oxygen Demand (BOD5)	mg/L	2	15	300	< 4 ↑
Total Suspended Solids	mg/L	2	15	350	261
Total Kjeldahl Nitrogen	as N mg/L	0.5	1	100	22.9

PACKAGE: **SANSEW - Metals and Inorganics** (WATER)

L1 = SANSEW / WATER / - - Mississauga - Storm Sewer - BL_259_05
L2 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

Sample Number	8
Sample Name	SW-UF-BH1
Sample Matrix	Ground Water
Sample Date	12/06/2020

Metals and Inorganics

Parameter	Units	RL	L1	L2	Result
Residual chlorine	mg/L	0.02			0.08
Fluoride	mg/L	0.06		10	0.27
Cyanide (total)	mg/L	0.01	0.02	2	< 0.01
Sulphate	mg/L	2		1500	1500
Aluminum (total)	mg/L	0.1	1	50	2.1
Antimony (total)	mg/L	0.09		5	< 0.09
Arsenic (total)	mg/L	0.02	0.02	1	< 0.02
Cadmium (total)	mg/L	0.0003	0.008	0.7	0.0003
Chromium (total)	mg/L	0.008	0.08	5	0.009
Copper (total)	mg/L	0.02	0.04	3	< 0.02
Cobalt (total)	mg/L	0.0004		5	0.0018
Lead (total)	mg/L	0.001	0.12	3	0.004

Client: Grounded Engineering Inc.
Project: 20-088-206, 23 Elizabeth St N
Project Manager: Jessie Wu
Samplers: Matthew Garcia

PACKAGE: **SANSEW - Metals and Inorganics**
(WATER)

L1 = SANSEW / WATER / - - Mississauga - Storm Sewer - BL_259_05
L2 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

Sample Number	8
Sample Name	SW-UF-BH1
Sample Matrix	Ground Water
Sample Date	12/06/2020

Metals and Inorganics (continued)

Parameter	Units	RL	L1	L2	Result
Manganese (total)	mg/L	0.001	0.05	5	**5.15**
Molybdenum (total)	mg/L	0.004		5	< 0.004
Nickel (total)	mg/L	0.01	0.08	3	< 0.01
Phosphorus (total)	mg/L	0.3	0.4	10	**0.5**
Selenium (total)	mg/L	0.004	0.02	1	< 0.004
Silver (total)	mg/L	0.005	0.12	5	< 0.005
Tin (total)	mg/L	0.006		5	< 0.006
Titanium (total)	mg/L	0.005		5	0.046
Zinc (total)	mg/L	0.2	0.04	3	**< 0.2**

PACKAGE: **SANSEW - Microbiology** (WATER)

L1 = SANSEW / WATER / - - Mississauga - Storm Sewer - BL_259_05

L2 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

Sample Number	8
Sample Name	SW-UF-BH1
Sample Matrix	Ground Water
Sample Date	12/06/2020

Parameter	Units	RL	L1	L2	Result
Microbiology					
E. Coli	cfu/100mL	-	200		< 2 ↑

PACKAGE: **SANSEW - Nonylphenol and Ethoxylates** (WATER)

L1 = SANSEW / WATER / - - Mississauga - Storm Sewer - BL_259_05

L2 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

Sample Number	8
Sample Name	SW-UF-BH1
Sample Matrix	Ground Water
Sample Date	12/06/2020

Parameter	Units	RL	L1	L2	Result
Nonylphenol and Ethoxylates					
Nonylphenol	mg/L	0.001		0.02	< 0.001
Nonylphenol Ethoxylates	mg/L	0.01		0.2	< 0.01
Nonylphenol diethoxylate	mg/L	0.01			< 0.01
Nonylphenol monoethoxylate	mg/L	0.01			< 0.01

PACKAGE: **SANSEW - Oil and Grease** (WATER)

L1 = SANSEW / WATER / - - Mississauga - Storm Sewer - BL_259_05

L2 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

Sample Number	8
Sample Name	SW-UF-BH1
Sample Matrix	Ground Water
Sample Date	12/06/2020

Parameter	Units	RL	L1	L2	Result
Oil and Grease					
Oil & Grease (total)	mg/L	2			< 2
Oil & Grease (animal/vegetable)	mg/L	4		150	< 4
Oil & Grease (mineral/synthetic)	mg/L	4		15	< 4

Client: Grounded Engineering Inc.
Project: 20-088-206, 23 Elizabeth St N
Project Manager: Jessie Wu
Samplers: Matthew Garcia

PACKAGE: **SANSEW - Other (ORP)** (WATER)

L1 = SANSEW / WATER / - - Mississauga - Storm Sewer - BL_259_05
L2 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

Sample Number	8
Sample Name	SW-UF-BH1
Sample Matrix	Ground Water
Sample Date	12/06/2020

Parameter	Units	RL	L1	L2	Result
Other (ORP)					
Chromium VI	µg/L	0.2	40		< 0.2
pH	no unit	0.05	9	10	6.91
Mercury (total)	mg/L	0.00001	0.0004	0.01	< 0.00001

PACKAGE: **SANSEW - PAHs** (WATER)

L1 = SANSEW / WATER / - - Mississauga - Storm Sewer - BL_259_05
L2 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

Sample Number	8
Sample Name	SW-UF-BH1
Sample Matrix	Ground Water
Sample Date	12/06/2020

Parameter	Units	RL	L1	L2	Result
PAHs					
Benzo(b+j)fluoranthene	mg/L	0.0001			< 0.0001

PACKAGE: **SANSEW - PCBs** (WATER)

L1 = SANSEW / WATER / - - Mississauga - Storm Sewer - BL_259_05
L2 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

Sample Number	8
Sample Name	SW-UF-BH1
Sample Matrix	Ground Water
Sample Date	12/06/2020

Parameter	Units	RL	L1	L2	Result
PCBs					
Polychlorinated Biphenyls (PCBs) - Total	mg/L	0.0001		0.001	< 0.0001

PACKAGE: **SANSEW - Phenols** (WATER)

Sample Number	8
Sample Name	SW-UF-BH1
Sample Matrix	Ground Water
Sample Date	12/06/2020

L1 = SANSEW / WATER / - - Mississauga - Storm Sewer - BL_259_05

L2 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

Parameter	Units	RL	L1	L2	Result
Phenols					
4AAP-Phenolics	mg/L	0.002	0.008	1	0.002

PACKAGE: **SANSEW - SVOCs** (WATER)

Sample Number	8
Sample Name	SW-UF-BH1
Sample Matrix	Ground Water
Sample Date	12/06/2020

L1 = SANSEW / WATER / - - Mississauga - Storm Sewer - BL_259_05

L2 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

Parameter	Units	RL	L1	L2	Result
SVOCs					
di-n-Butyl Phthalate	mg/L	0.002		0.08	< 0.002
Bis(2-ethylhexyl)phthalate	mg/L	0.002		0.012	< 0.002
PAHs (Total)	mg/L	-	0.002		< 0.001
Perylene	mg/L	0.0005			< 0.0005

PACKAGE: **SANSEW - SVOCs - PAHs** (WATER)

Sample Number	8
Sample Name	SW-UF-BH1
Sample Matrix	Ground Water
Sample Date	12/06/2020

L1 = SANSEW / WATER / - - Mississauga - Storm Sewer - BL_259_05

L2 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

Parameter	Units	RL	L1	L2	Result
SVOCs - PAHs					
7Hdibenzo(c,g)carbazole	mg/L	0.0001			< 0.0001
Anthracene	mg/L	0.0001			< 0.0001
Benzo(a)anthracene	mg/L	0.0001			< 0.0001
Benzo(a)pyrene	mg/L	0.0001			< 0.0001

Client: Grounded Engineering Inc.

Project: 20-088-206, 23 Elizabeth St N

Project Manager: Jessie Wu

Samplers: Matthew Garcia

PACKAGE: **SANSEW - SVOCs - PAHs** (WATER)

L1 = SANSEW / WATER / - - Mississauga - Storm Sewer - BL_259_05

L2 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

Sample Number	8
Sample Name	SW-UF-BH1
Sample Matrix	Ground Water
Sample Date	12/06/2020

SVOCs - PAHs (continued)

Parameter	Units	RL	L1	L2	Result
Benzo(e)pyrene	mg/L	0.0001			< 0.0001
Benzo(ghi)perylene	mg/L	0.0002			< 0.0002
Benzo(k)fluoranthene	mg/L	0.0001			< 0.0001
Chrysene	mg/L	0.0001			< 0.0001
Dibenzo(a,h)anthracene	mg/L	0.0001			< 0.0001
Dibenzo(a,i)pyrene	mg/L	0.0001			< 0.0001
Dibenzo(a,j)acridine	mg/L	0.0001			< 0.0001
Fluoranthene	mg/L	0.0001			< 0.0001
Indeno(1,2,3-cd)pyrene	mg/L	0.0002			< 0.0002
Phenanthrene	mg/L	0.0001			< 0.0001
Pyrene	mg/L	0.0001			< 0.0001

Client: Grounded Engineering Inc.
Project: 20-088-206, 23 Elizabeth St N
Project Manager: Jessie Wu
Samplers: Matthew Garcia

PACKAGE: **SANSEW - VOCs** (WATER)

L1 = SANSEW / WATER / - - Mississauga - Storm Sewer - BL_259_05

L2 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

Sample Number	8
Sample Name	SW-UF-BH1
Sample Matrix	Ground Water
Sample Date	12/06/2020

VOCs

Parameter	Units	RL	L1	L2	Result
Chloroform	mg/L	0.0005		0.04	< 0.0005
1,2-Dichlorobenzene	mg/L	0.0005		0.05	< 0.0005
1,4-Dichlorobenzene	mg/L	0.0005		0.08	< 0.0005
cis-1,2-Dichloroethene	mg/L	0.0005		4	< 0.0005
trans-1,3-Dichloropropene	mg/L	0.0005		0.14	< 0.0005
Methylene Chloride	mg/L	0.0005		2	< 0.0005
1,1,2,2-Tetrachloroethane	mg/L	0.0005		1.4	< 0.0005
Methyl ethyl ketone	mg/L	0.02		8	< 0.02
Styrene	mg/L	0.0005		0.2	< 0.0005
Tetrachloroethylene (perchloroethylene)	mg/L	0.0005		1	< 0.0005
Trichloroethylene	mg/L	0.0005		0.4	< 0.0005

Client: Grounded Engineering Inc.

Project: 20-088-206, 23 Elizabeth St N

Project Manager: Jessie Wu

Samplers: Matthew Garcia

PACKAGE: **SANSEW - VOCs - BTEX** (WATER)

L1 = SANSEW / WATER / - - Mississauga - Storm Sewer - BL_259_05

L2 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

Sample Number	8
Sample Name	SW-UF-BH1
Sample Matrix	Ground Water
Sample Date	12/06/2020

VOCs - BTEX

Parameter	Units	RL	L1	L2	Result
Benzene	mg/L	0.0005	0.002	0.01	0.0007
Ethylbenzene	mg/L	0.0005	0.002	0.16	< 0.0005
Toluene	mg/L	0.0005	0.002	0.27	< 0.0005
Xylene (total)	mg/L	0.0005	0.0044	1.4	< 0.0005
m-p-xylene	mg/L	0.0005			< 0.0005
o-xylene	mg/L	0.0005			< 0.0005

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	SANSEW / WATER / - - Mississauga - Storm Sewer - BL_259_05 L1	SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010 L2
SW-UF-BH1					
Total Suspended Solids	SM 2540D	mg/L	261	15	
Aluminum	SM 3030/EPA 200.8	mg/L	2.1	1	
Manganese	SM 3030/EPA 200.8	mg/L	5.15	0.05	5
Phosphorus	SM 3030/EPA 200.8	mg/L	0.5	0.4	
Zinc	SM 3030/EPA 200.8	mg/L	< 0.2	0.04	
Total Kjeldahl Nitrogen	SM 4500-N C/4500-NO3- F	mg/L	22.9	1	

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 375.4 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Sulphate	DIO0384-JUN20	mg/L	2	<2	ND	20	95	80	120	95	75	125
Sulphate	DIO0389-JUN20	mg/L	2	<2	ND	20	95	80	120	103	75	125

Biochemical Oxygen Demand

Method: SM 5210 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Biochemical Oxygen Demand (BOD5)	BOD0024-JUN20	mg/L	2	< 2	NV	30	86	70	130	NV	70	130

Chlorine

Method: SM 4500 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-008

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Residual chlorine	EWL0259-JUN20	mg/L	0.02	< 0.02	0	20				NA		

QC SUMMARY

Cyanide by SFA

Method: SM 4500 I Internal ref.: ME-CA-IENVISFA-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Cyanide (total)	SKA0146-JUN20	mg/L	0.01	<0.01	ND	10	98	90	110	NV	75	125

Fluoride by Specific Ion Electrode

Method: SM 4500 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-014

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Fluoride	EWL0280-JUN20	mg/L	0.06	<0.06	ND	10	107	90	110	103	75	125

Hexavalent Chromium by SFA

Method: EPA218.6/EPA3060A I Internal ref.: ME-CA-IENVISKA-LAK-AN-012

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chromium VI	SKA0148-JUN20	ug/L	0.2	<0.2	ND	20	103	80	120	82	75	125
Chromium VI	SKA0161-JUN20	ug/L	0.2	<0.2	11	20	103	80	120	NV	75	125

QC SUMMARY

Mercury by CVAAS

Method: EPA 7471A/SM 3112B | Internal ref.: ME-CA-[ENVISPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury (total)	EHG0011-JUN20	mg/L	0.00001	< 0.00001	ND	20	88	80	120	95	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (total)	EMS0072-JUN20	mg/L	0.005	<0.00005	ND	20	100	90	110	102	70	130
Aluminum (total)	EMS0072-JUN20	mg/L	0.1	<0.001	0	20	103	90	110	104	70	130
Arsenic (total)	EMS0072-JUN20	mg/L	0.02	<0.0002	3	20	102	90	110	97	70	130
Cadmium (total)	EMS0072-JUN20	mg/L	0.0003	<0.000003	0	20	101	90	110	107	70	130
Cobalt (total)	EMS0072-JUN20	mg/L	0.0004	<0.000004	1	20	101	90	110	98	70	130
Chromium (total)	EMS0072-JUN20	mg/L	0.008	<0.00008	4	20	103	90	110	105	70	130
Copper (total)	EMS0072-JUN20	mg/L	0.02	<0.0002	2	20	101	90	110	98	70	130
Manganese (total)	EMS0072-JUN20	mg/L	0.001	<0.00001	1	20	104	90	110	103	70	130
Molybdenum (total)	EMS0072-JUN20	mg/L	0.004	<0.00004	1	20	105	90	110	104	70	130
Nickel (total)	EMS0072-JUN20	mg/L	0.01	<0.0001	0	20	100	90	110	97	70	130
Lead (total)	EMS0072-JUN20	mg/L	0.001	<0.00001	1	20	99	90	110	103	70	130
Phosphorus (total)	EMS0072-JUN20	mg/L	0.3	<0.003	4	20	96	90	110	NV	70	130
Antimony (total)	EMS0072-JUN20	mg/L	0.09	<0.0009	1	20	105	90	110	119	70	130
Selenium (total)	EMS0072-JUN20	mg/L	0.004	<0.00004	14	20	98	90	110	101	70	130
Tin (total)	EMS0072-JUN20	mg/L	0.006	<0.00006	0	20	101	90	110	NV	70	130
Titanium (total)	EMS0072-JUN20	mg/L	0.005	<0.00005	1	20	106	90	110	NV	70	130
Zinc (total)	EMS0072-JUN20	mg/L	0.2	<0.002	1	20	102	90	110	97	70	130
Silver (total)	EMS9003-JUN20	mg/L	0.005	<0.00005	ND	20	100	90	110	91	70	130
Aluminum (total)	EMS9003-JUN20	mg/L	0.1	<0.001	9	20	95	90	110	100	70	130
Arsenic (total)	EMS9003-JUN20	mg/L	0.02	<0.0002	4	20	102	90	110	101	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS (continued)

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Cadmium (total)	EMS9003-JUN20	mg/L	0.0003	<0.000003	6	20	101	90	110	106	70	130
Cobalt (total)	EMS9003-JUN20	mg/L	0.0004	<0.000004	0	20	99	90	110	100	70	130
Chromium (total)	EMS9003-JUN20	mg/L	0.008	<0.00008	10	20	100	90	110	110	70	130
Copper (total)	EMS9003-JUN20	mg/L	0.02	<0.0002	3	20	101	90	110	105	70	130
Manganese (total)	EMS9003-JUN20	mg/L	0.001	<0.00001	0	20	100	90	110	102	70	130
Molybdenum (total)	EMS9003-JUN20	mg/L	0.004	<0.00004	0	20	98	90	110	100	70	130
Nickel (total)	EMS9003-JUN20	mg/L	0.01	<0.0001	2	20	99	90	110	102	70	130
Lead (total)	EMS9003-JUN20	mg/L	0.001	<0.00001	ND	20	99	90	110	98	70	130
Phosphorus (total)	EMS9003-JUN20	mg/L	0.3	<0.003	18	20	102	90	110	NV	70	130
Antimony (total)	EMS9003-JUN20	mg/L	0.09	<0.0009	2	20	104	90	110	NV	70	130
Selenium (total)	EMS9003-JUN20	mg/L	0.004	<0.00004	5	20	101	90	110	99	70	130
Tin (total)	EMS9003-JUN20	mg/L	0.006	<0.00006	10	20	99	90	110	NV	70	130
Titanium (total)	EMS9003-JUN20	mg/L	0.005	<0.00005	19	20	100	90	110	NV	70	130
Zinc (total)	EMS9003-JUN20	mg/L	0.2	<0.002	4	20	100	90	110	NV	70	130

QC SUMMARY

Microbiology

Method: SM 9222D | Internal ref.: ME-CA-IENVIMIC-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
E. Coli	BAC9264-JUN20	cfu/100mL	-	ACCEPTED	ACCEPTED							

Nonylphenol and Ethoxylates

Method: ASTM D7065-06 | Internal ref.: ME-CA-IENVIGC-LAK-AN-015

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nonylphenol diethoxylate	GCM0278-JUN20	mg/L	0.01	< 0.01			87	55	120			
Nonylphenol Ethoxylates	GCM0278-JUN20	mg/L	0.01	< 0.01								
Nonylphenol monoethoxylate	GCM0278-JUN20	mg/L	0.01	< 0.01			98	55	120			
Nonylphenol	GCM0278-JUN20	mg/L	0.001	< 0.001			103	55	120			

QC SUMMARY

Oil & Grease

Method: MOE E3401 | Internal ref.: ME-CA-[ENV]GC-LAK-AN-019

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Oil & Grease (total)	GCM0241-JUN20	mg/L	2	<2	NSS	20	104	75	125			

Oil & Grease-AV/MS

Method: MOE E3401/SM 5520F | Internal ref.: ME-CA-[ENV]GC-LAK-AN-019

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Oil & Grease (animal/vegetable)	GCM0241-JUN20	mg/L	4	< 4	NSS	20	NA	70	130			
Oil & Grease (mineral/synthetic)	GCM0241-JUN20	mg/L	4	< 4	NSS	20	NA	70	130			

pH

Method: SM 4500 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0265-JUN20	no unit	0.05	NA	1		100			NA		

QC SUMMARY

Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0162-JUN20	mg/L	0.002	<0.002	ND	10	104	80	120	95	75	125
4AAP-Phenolics	SKA0191-JUN20	mg/L	0.002	<0.002	ND	10	109	80	120	112	75	125

Polychlorinated Biphenyls

Method: MOE E3400/EPA 8082A | Internal ref.: ME-CA-[ENV]GC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Polychlorinated Biphenyls (PCBs) - Total	GCM0276-JUN20	mg/L	0.0001	<0.0001	ND	30	88	60	140	NSS	60	140

QC SUMMARY

Semi-Volatile Organics

Method: EPA 3510C/8270D | Internal ref.: ME-CA-[ENV]GC-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
7Hdibenzo(c,g)carbazole	GCM0273-JUN20	mg/L	0.0001	< 0.0001	NSS	30	106	50	140	NSS	50	140
Anthracene	GCM0273-JUN20	mg/L	0.0001	< 0.0001	NSS	30	81	50	140	NSS	50	140
Benzo(a)anthracene	GCM0273-JUN20	mg/L	0.0001	< 0.0001	NSS	30	93	50	140	NSS	50	140
Benzo(a)pyrene	GCM0273-JUN20	mg/L	0.0001	< 0.0001	NSS	30	94	50	140	NSS	50	140
Benzo(b+j)fluoranthene	GCM0273-JUN20	mg/L	0.0001	< 0.0001	NSS	30	104	50	140	NSS	50	140
Benzo(e)pyrene	GCM0273-JUN20	mg/L	0.0001	< 0.0001	NSS	30	83	50	140	NSS	50	140
Benzo(ghi)perylene	GCM0273-JUN20	mg/L	0.0002	< 0.0002	NSS	30	95	50	140	NSS	50	140
Benzo(k)fluoranthene	GCM0273-JUN20	mg/L	0.0001	< 0.0001	NSS	30	91	50	140	NSS	50	140
Bis(2-ethylhexyl)phthalate	GCM0273-JUN20	mg/L	0.002	< 0.002	NSS	30	103	50	140	NSS	50	140
Chrysene	GCM0273-JUN20	mg/L	0.0001	< 0.0001	NSS	30	95	50	140	NSS	50	140
di-n-Butyl Phthalate	GCM0273-JUN20	mg/L	0.002	< 0.002	NSS	30	104	50	140	NSS	50	140
Dibenzo(a,h)anthracene	GCM0273-JUN20	mg/L	0.0001	< 0.0001	NSS	30	96	50	140	NSS	50	140
Dibenzo(a,i)pyrene	GCM0273-JUN20	mg/L	0.0001	< 0.0001	NSS	30	96	50	140	NSS	50	140
Dibenzo(a,j)acridine	GCM0273-JUN20	mg/L	0.0001	< 0.0001	NSS	30	102	50	140	NSS	50	140
Fluoranthene	GCM0273-JUN20	mg/L	0.0001	< 0.0001	NSS	30	89	50	140	NSS	50	140
Indeno(1,2,3-cd)pyrene	GCM0273-JUN20	mg/L	0.0002	< 0.0002	NSS	30	96	50	140	NSS	50	140
Perylene	GCM0273-JUN20	mg/L	0.0005	< 0.0005	NSS	30	85	50	140	NSS	50	140
Phenanthrene	GCM0273-JUN20	mg/L	0.0001	< 0.0001	NSS	30	80	50	140	NSS	50	140
Pyrene	GCM0273-JUN20	mg/L	0.0001	< 0.0001	NSS	30	88	50	140	NSS	50	140

QC SUMMARY

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0263-JUN20	mg/L	2	< 2	2	10	99	90	110	NA		

Total Kjeldahl Nitrogen by SFA

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen	SKA5068-JUN20	as N mg/L	0.5	<0.5	1	20	95	80	120	97	75	125

QC SUMMARY

Volatile Organics

Method: EPA 5030B/8260C | Internal ref.: ME-CA-[ENVIGC-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
1,1,2,2-Tetrachloroethane	GCM0239-JUN20	mg/L	0.0005	<0.0005	ND	30	97	60	130	102	50	140
1,2-Dichlorobenzene	GCM0239-JUN20	mg/L	0.0005	<0.0005	ND	30	96	60	130	100	50	140
1,4-Dichlorobenzene	GCM0239-JUN20	mg/L	0.0005	<0.0005	ND	30	99	60	130	101	50	140
Benzene	GCM0239-JUN20	mg/L	0.0005	<0.0005	ND	30	99	60	130	100	50	140
Chloroform	GCM0239-JUN20	mg/L	0.0005	<0.0005	ND	30	98	60	130	97	50	140
cis-1,2-Dichloroethene	GCM0239-JUN20	mg/L	0.0005	<0.0005	ND	30	98	60	130	98	50	140
Ethylbenzene	GCM0239-JUN20	mg/L	0.0005	<0.0005	ND	30	99	60	130	102	50	140
m-p-xylene	GCM0239-JUN20	mg/L	0.0005	<0.0005	ND	30	100	60	130	102	50	140
Methyl ethyl ketone	GCM0239-JUN20	mg/L	0.02	<0.02	ND	30	103	50	140	106	50	140
Methylene Chloride	GCM0239-JUN20	mg/L	0.0005	<0.0005	ND	30	98	60	130	101	50	140
o-xylene	GCM0239-JUN20	mg/L	0.0005	<0.0005	ND	30	99	60	130	103	50	140
Styrene	GCM0239-JUN20	mg/L	0.0005	<0.0005	ND	30	100	60	130	102	50	140
Tetrachloroethylene (perchloroethylene)	GCM0239-JUN20	mg/L	0.0005	<0.0005	ND	30	101	60	130	101	50	140
Toluene	GCM0239-JUN20	mg/L	0.0005	<0.0005	ND	30	99	60	130	98	50	140
trans-1,3-Dichloropropene	GCM0239-JUN20	mg/L	0.0005	<0.0005	ND	30	103	60	130	95	50	140
Trichloroethylene	GCM0239-JUN20	mg/L	0.0005	<0.0005	ND	30	101	60	130	95	50	140

QC SUMMARY

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RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

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Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS	Insufficient sample for analysis.
RL	Reporting Limit.
↑	Reporting limit raised.
↓	Reporting limit lowered.
NA	The sample was not analysed for this analyte
ND	Non Detect

Samples analysed as received. Solid samples expressed on a dry weight basis. "Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act" published by the Ministry and dated March 9, 2004 as amended.

-- End of Analytical Report --

Request for Laboratory Services and CHAIN OF CUSTODY

SGS Environment, Health & Safety - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Fax: 705-652-6365 Web: www.sgs.com/environment
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361

No: 013956 Page ____ of ____

Laboratory Information Section - Lab use only

Received By: Sw R
Received Date: 06/12/2020 (mm/dd/yy)
Received Time: 17:00 (hr:min)
Received By (signature):
Custody Seal Present: Yes ☐ No ☐
Custody Seal Intact: Yes ☐ No ☐
Cooling Agent Present: Yes ☑ No ☐ Type: ice
Temperature Upon Receipt (°C) 9.0 x 3
LAB LIMS #: CA 14201-JUN20

REPORT INFORMATION

Company: Grounded Engineering Inc.
Contact: Jessie Wu
Address: 12 Barigan Drive, Toronto, ON, M4H 1E9
Phone: 647-832-9401
Fax:
Email: jwu@groundedeng.ca

INVOICE INFORMATION

☒ (same as Report Information)
Company:
Contact:
Address:
Phone:
Email:

Quotation #:
P.O. #:
Project #: 20-088-206
Site Location/ID: 23 Elizabeth St. N

TURNAROUND TIME (TAT) REQUIRED

☒ Regular TAT (5-7days)

TAT's are quoted in business days (exclude statutory holidays & weekends). Samples received after 6pm or on weekends: TAT begins next business day

RUSH TAT (Additional Charges May Apply): ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days

PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

Specify Due Date:

NOTE: DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

REGULATIONS

Regulation 153/04:
☐ Table 1 ☐ Res/Park Soil Texture:
☐ Table 2 ☐ Ind/Com ☐ Coarse
☐ Table 3 ☐ Agri/Other ☐ Medium
☐ Table ____ ☐ Fine

Other Regulations:
☐ Reg 347/558 (3 Day min TAT)
☐ PWQO ☐ MMER
☐ CCME ☐ Other:
☐ MISA

Sewer By-Law:
☒ Sanitary
☒ Storm
Municipality: Mississauga / Peel

RECORD OF SITE CONDITION (RSC) ☐ YES ☐ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	Field Filtered (Y/N)	M&I: Metals & Inorganics (Incl CrVI, CN, Hg; pH,(B(HWS)),EC,SAR–soil) (Cl, Na–water)	M&I: Full Metals Suite (ICP: metals plus B(HWS-soil only) Hg, CrVI	M&I: ICP Metals only (Sb,As,Ba,Be,B,Cd,Cr,Co,Cu,Pb,Mo,Ni, Se,Ag,Tl,U,V,Zn	SVOC: PAHs only	SVOC: SVOCs all Incl PAHs, ABNs, CPs	PCB: PCBs Total ☐ Aroclor ☐	PHC: F1-F4 + BTEX	PHC: F1-F4 only no BTEX	VOC: VOCs all Incl BTEX	VOC: BTEX only	Pest: Pesticides Organochlorine or specify other	Other (please specify)	Other (please specify)	Other (please specify)	Other (please specify)	Other (please specify)	Other: Sewer Use: Combined (Specify pkg)	Other: Water Characterization Pkg ☐ General ☐ Extended	TCLP: Specify TCLP tests ☐M&I ☐VOC ☐PCB ☐B(a)P ☐ABN ☐Ignit.	COMMENTS:
1	SW-UF-BH1	06/12/20	12:15	20	GW	N																X			
2																									
3																									
4																									
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									

Observations/Comments/Special Instructions

Sampled By (NAME): Matthew Garcia Signature: Date: 06, 12, 20 (mm/dd/yy)
Relinquished by (NAME): Matthew Garcia Signature: Date: 06, 12, 20 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

Revision #: 1.2
Date of Issue: 09 Sept. 2019

FINAL REPORT

CA14502-JUN20 R1

20-088-206

Prepared for

Grounded Engineering Inc.

FINAL REPORT

First Page

CLIENT DETAILS

Client	Grounded Engineering Inc.
Address	12 Banigan Drive, Toronto Canada, M4H1E9 Phone: 647-264-7909. Fax:
Contact	Jessie Wu
Telephone	647-264-7909
Facsimile	
Email	jwu@groundedeng.ca
Project	20-088-206
Order Number	
Samples	Ground Water (1)

LABORATORY DETAILS

Project Specialist	Brad Moore Hon. B.Sc
Laboratory	SGS Canada Inc.
Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-652-2143
Facsimile	705-652-6365
Email	brad.moore@sgs.com
SGS Reference	CA14502-JUN20
Received	06/23/2020
Approved	06/29/2020
Report Number	CA14502-JUN20 R1
Date Reported	06/29/2020

COMMENTS

RL - SGS Reporting Limit
Temperature of Sample upon Receipt: 9 degrees C
Cooling Agent Present:Yes
Custody Seal Present:Yes

Chain of Custody Number:013956

SIGNATORIES

Brad Moore Hon. B.Sc

TABLE OF CONTENTS

FINAL REPORT

CA14502-JUN20 R1

Client: Grounded Engineering Inc.
Project: 20-088-206
Project Manager: Jessie Wu
Samplers: Matthew Garcia

PACKAGE: **SANSEW - Metals and Inorganics**
(WATER)

L1 = SANSEW / WATER / - - Mississauga - Storm Sewer - BL_259_05

L2 = SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010

Sample Number	8
Sample Name	SW-UF-BH1
Sample Matrix	Ground Water
Sample Date	12/06/2020

Parameter	Units	RL	L1	L2	Result
Metals and Inorganics					
Manganese (total)	mg/L	0.00001	0.05	5	5.35

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	SANSEW / WATER / - - Mississauga - Storm Sewer - BL_259_05 L1	SANSEW / WATER / - - Peel Table 1 - Sanitary Sewer Discharge - BL_53_2010 L2
SW-UF-BH1					
Manganese	SM 3030/EPA 200.8	mg/L	5.35	0.05	5

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Manganese (total)	EMS0121-JUN20	mg/L	0.00001	<0.00001	5	20	99	90	110	101	70	130
Manganese (total)	EMS0151-JUN20	mg/L	0.00001	<0.00001	1	20	99	90	110	99	70	130

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LEGEND

FOOTNOTES

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↑	Reporting limit raised.
↓	Reporting limit lowered.
NA	The sample was not analysed for this analyte
ND	Non Detect

Samples analysed as received. Solid samples expressed on a dry weight basis. "Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act" published by the Ministry and dated March 9, 2004 as amended.

-- End of Analytical Report --