Terraprobe

Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing

Geotechnical Investigation, Engineering, & Design

Shoring Design & Earth Retention Systems

Pavement Evaluation & Design

Environmental Assessment & Remediation Services

Hydrogeology

Building Systems & Sciences

Construction Materials Engineering Inspection & Testing

Earthworks, Design, Inspection & Compaction Testing

CCIL Certified Concrete Testing

CCIL Certified Aggregates & Asphalt Testing

CWB Certified Welding & Structural Steel

File No. 1-19-0603-46.1 (Rev. 1)
Brampton Office

November 5, 2021

Birch Equities Limited
1133 Yonge Street, Suite 601
Toronto, Ontario
M4T 2Y7

Attention: Mr. Jeff Corossing

RE: HYDROGEOLOGICAL REVIEW SUMMARY AND REPORT
1196-1210 YONGE STREET AND 2-8 BIRCH AVENUE
TORONTO, ONTARIO

Dear Mr. Jeff Corossing:

Terraprobe Inc. is pleased to provide Birch Equities Limited with the result of the hydrogeological assessment for 1196-1210 Yonge Street and 2-8 Birch Avenue, Toronto, Ontario. The following documents are provided as part of this package:

- City of Toronto Hydrogeological Review Summary Form
- Hydrogeological Assessment Report

The hydrogeological assessment report prepared to address the City of Toronto Terms of Reference (ToR) dated August 2018. It includes findings for groundwater monitoring program, groundwater quality assessment, and short-term construction dewatering flow rate estimation.

Further, the Toronto Water required that the water quality data must be collected within nine (9) months prior to the date of submission. If the submission is nine (9) months after the sample collection date noted in the report, new groundwater samples will have to be collected prior to submission.

If you have any questions or concerns regarding either of the documents, please do not hesitate to contact the undersigned.

Yours truly,
Terraprobe Inc.

Kossay Makhzoumi, BASc., EIT
Project Manager

Narjes Alijani, M.Sc., P.Geo.
Senior Hydrogeologist

August 2018

HYDROLOGICAL REVIEW SUMMARY

The form is to be completed by the Professional that prepared the Hydrological Review.
Use of the form by the City of Toronto is not to be construed as verification of engineering/hydrological content.

Refer to the Terms of Reference, Hydrological Review:
Link to Terms of Reference Hydrological Review

For City Staff Use Only:	
Name of ECS Case Manager (Please print)	
Date Review Summary provided to to TW, EM&P	

IF ANY OF THE REQUIREMENTS LISTED BELOW HAVE NOT BEEN INLCUDED IN THE HYDROLOGICAL REVIEW, THE REVIEW WILL BE CONSIDERED INCOMPLETE.
THE GREY SHADED BOXES WILL REQUIRE A CONSISTANCY CHECK BY THE ECS CASE MANAGER.

Summary of Key Information:

SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
Site Address	2-8 Birch Avenue, and 1196-1210 Yonge Street, Toronto, Ontario	Cover Page, Exec. Sum. pg. ii, Sec. 1.1 pg. 1	
Postal Code	M4T 1W1 and M4V 1C8	Cover Page	
Property Owner (on request for comments memo)	Birch Equities Limited	Exec. Sum. pg. ii, Sec. 1.1 pg. 1	
Proposed description of the project (if applicable) (point towers, number of podiums)	Developing a 14-storey building with 3 level underground structure.	Exec. Sum. pg. ii, Sec.1.1 page 1, Sec. 7.1 pg. 20.	
Land Use (ex. commercial, residential, mixed, institutional, industrial)	Residential and Commercial	Exec. Sum. pg. ii, Sec. 1.1 pg 1.	
Number of below grade levels for the proposed structure	3 levels.	Exec. Sum. pg. ii, Sec. 1.1 pg. 1, Sec. 7.1 pg. 20.	
HYDROLOGICAL REVIEW INFORMATION			
Date Hydrological Review was prepared:	November 5, 2021	Cover Page	
Who Performed the Hydrological Review (Consulting Firm)	Terraprobe Inc.	Exec. Sum. pg. ii, Sec. 1.1, pg. 1.	
Name of Author of Hydrological Review	Narjes Alijani, M.Sc., P.Geo. Kossay Makhzoumi, BASc., EIT	Sec. 9, pg. 25.	

August 2018

HYDROLOGICAL REVIEW SUMMARY

SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
Check the directories on the website for Professional Geoscientists and/or Professional Engineers of Ontario been checked to ensure that the Hydrological Report has been prepared by a qualified person who is a licensed Professional Geoscientist as set out in the Professional Geoscientist Act of Ontario or a Professional Engineer? PEO: Professional Engineers of Ontario APGO: Association of Professional Geoscientists of Ontario	✓ Yes	N/A	
Has the Hydrological Review been prepared in accordance with all the following: • Ontario Water Resources Act • Ontario Regulation 387/04 • Toronto Municipal Code Chapter 681-Sewers	✓ Yes	Section 1.2 page 3	
		Page # & Section # of every occurrence in the Review	**Review Includes this Information City Staff (Check)**

August 2018

HYDROLOGICAL REVIEW SUMMARY

SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
Total Volume (L/day) Short Term Discharge of groundwater (construction dewatering) **with safety factor included**	What safety factor was used? 2(Storm event is not included): 494,000 L/day Total Dewatering flow rate including groundwater seepage and storm event: 521,500 L/day	Executive Summary page iii Table VI, Section 7.4 page 21-22, Section 8 page 24.	
Total Volume (L/day) Short Term Discharge of groundwater (construction dewatering) **without safety factor included**	247,000 L/day (Storm event is not included)	Section 7.4 page 21-22, Section 8 page 24.	
Total Volume (L/day) Long Term drainage of groundwater (from foundation drainage, weeping tiles, sub slab drainage) **with safety factor included** If the development is part of a multiple tower complex, include total volume for each separate tower	A water-tight structure is proposed for post-development site. As such, long-term foundation drainage flow is not anticipated.	Executive Summary page iii Table VI, Section 7.5 page 22, Section 8 page 24.	
List the nearest surface water (river, creek, lake)	Yellow Creek is located approximately 650 m to the east of the Site.	Section 4.5 page 11	

August 2018

HYDROLOGICAL REVIEW SUMMARY

SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
Lowest basement elevation	113.32 masl	Executive Summary page ii, Section 7.1, page 20, Section 7.4, page 21.	
Foundation elevation	112.12 masl	Executive Summary page ii Table II, Section 7.3 page 20.	
Ground elevation	122.66 masl	Section 7.1 page 20.	
STUDY AREA MAP		**Page # & Section # of every occurrence in the Review**	**Review Includes this Information City Staff (Check)**
Study area map(s) have been included in the report.	✓**Yes**	Figures 1-8	
Study area map(s) been prepared according to the Hydrological Review Terms of Reference.	✓**Yes**	Figures 1-8	
WATER LEVEL AND WELLS		**Page # & Section # of every occurrence**	**Review Includes this Information (City Staff Initial)**

August 2018

HYDROLOGICAL REVIEW SUMMARY

SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
		in the Review	
The groundwater level has been monitored using all wells located on site (within property boundary).	✓**Yes**	Section 6.1 page 16, Appendix C.	
The static water level measurements have been monitored at all monitoring wells for a minimum of 3 months with samples taken every 2 weeks for a minimum of 6 samples. The intent is for the qualified professional to use professional judgement to estimate the seasonally high groundwater level.	✓**Yes**	Section 6.1 page 16, Appendix C.	
All water levels in the wells have been measured with respect to masl.	✓**Yes**	Section 6.1 page 16, Appendix C.	
A table of geology/soil stratigraphy for the property has been included.	✓**Yes**	Executive Summary page ii Table II.	
GEOLOGY AND PHYSICAL HYDROLOGY		**Page # & Section # of every occurrence in the Review**	**Review Includes this Information (City Staff Initial)**
The review has made reference to the soil materials including thickness, composition and texture, and bedrock environments.	✓**Yes**	Executive Summary page ii, Section 5, pages 14-15, Appendix A.	
Key aquifers and the site's proximity to nearby surface water has been identified.	✓**Yes**	Section 4.5 page 11 , Section 6.1, page 16.	

August 2018

HYDROLOGICAL REVIEW SUMMARY

SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
PUMP TEST/SLUG TEST/DRAWDOWN ANALYSIS		**Page # & Section # of every occurrence in the Review**	**Review Includes this Information City Staff (Check)**
A summary of the pumping test data and analysis is included in the review.	A pumping test was not conducted.	N/A	
The pump test been carried out for at least 24 hours if possible. If not, has a slug test been conducted?	A pump test was not conducted. In-situ hydraulic conductivity tests were conducted.	Executive Summary page ii, Table II, Section 6.3.1 page 17, Appendix D.	
Have the monitoring well(s) have been monitored using digital devices? If yes how frequently?	No. Water level measurements have been taken manually.	Section 6.1 page 16, Appendix C.	
If a slug or pump test has been conducted has the static groundwater level been monitored at all monitoring well(s) multiple times to measure recovery? -prior to the slug or pumping test(s)? -post slug or pumping test(s)?	✓**Yes** ✓**Yes** ✓**Yes**	Section 3.4 page 8, Section 6.3.1 page 17, Appendix D.	N/A
The above noted slug or pump tests have been included in the report.	✓**Yes**	Section 6.3.1 page 17, Appendix D.	
WATER QUALITY		**Page # & Section # of every occurrence in the Review**	**Review Includes this Information City Staff (Check)**

August 2018

HYDROLOGICAL REVIEW SUMMARY

SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
The report includes baseline water quality samples from a laboratory. The water quality must be analyzed for all parameters listed in Tables 1 and 2 of Chapter 681 Sewers of the Toronto Municipal Code (found in Appendix A) and the samples must have to be taken unfiltered within 9 months of the date of submission.	✓**Yes**	Executive Summary page iii Table V, Section 6.4 page 18, Appendix F	
The water quality data templates in Appendix A have been completed for each sample taken for both sanitary/combined and storm sewer limits.	For sanitary discharge- See the sanitary/combined sewer parameter limit template For storm discharge- See the storm sewer parameter limit template		
Qualified professional to list all sample parameters that have violated the Bylaw limits for each sample taken for the sanitary/combined Bylaw limits **If there are any sample parameter Exceedances the groundwater can't be discharged as is.**	Sanitary Sewer By-law: - No Exceedances	Executive summary page iii Table V, Section 6.4 page 18-19, Appendix F	
Qualified professional to list all sample parameters that have violated the Bylaw limits for each sample taken for the storm Bylaw limits. **If there are any sample parameter exceedances the groundwater can't be discharged as is.**	Storm Sewer By-law: - Total Suspended Solid (the result is 21.4 mg/L, the limit is 15 mg/L) - Total Manganese (the result is 0.320 mg/L and the limit is 0.05 mg/L)	Section 6.4 page 18-19, Appendix F	
The water quality samples have been analyzed by a Canadian laboratory accredited and licensed by Standards Council of Canada and/or Canadian Association for Laboratory Accreditation.	✓**Yes**	Section 3.6 page 9, Section 6.4 page 18-19.	N/A

TORONTO

August 2018

HYDROLOGICAL REVIEW SUMMARY

SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
List of Canadian accredited laboratories: Standards Council of Canada			
A chain of custody record for the samples is included with the report.	✓**Yes**	Appendix F	
Has the chain of custody reference any filtered sample? If yes, the report has to be amended and re-submitted to include only non-filtered samples.	⊗No	Appendix F	
List any of the sample parameters that exceed the Bylaw limits with the reporting detection limit (RDL) included.	Sanitary Sewer By-law: - No Exceedances were observed. Storm Sewer By-law: - Total Suspended Solid (the result is 21.4 mg/L, the limit is 15 mg/L and the RDL is 3 mg/L) - Total Manganese (the result is 0.0320 mg/L, the limit is 0.05 mg/L and the RDL is 0.0050 mg/L)	Appendix F	
A true copy of the Certificate of Analysis report, is included with the report.	✓**Yes**	Appendix F	
EVALUATION OF IMPACT		**Page # & Section # of every occurrence in the Review**	**Review Includes this Information City Staff (Check)**
Does the report recommend a back-up system or relief safety valve(s)? Does the associated Geotechnical report recommend a back-up system or relief safety valve(s)?	◯ **Yes** ⊗No ✓**Yes** ◯ No	N/A Geotecnical investigation report, Terraprobe, Oct. 21, 2021, Sec. 5.2 page 10-11.	
The taking and discharging of groundwater on site has been analyzed to ensure that no negative	✓**Yes**	Section 6.4, page 18, Section 7-7	N/A

impacts will occur to: the City sewage works in terms of quality and quantity (including existing infrastructure), the natural environment, and settlement issues.		page 22-23.	
Has it been determined that there will be a negative impact to the natural environment, City sewage works, or surrounding properties has the study identified the following: the extent of the negative impact, the detail of the precondition state of all the infrastructure, City sewage works, and natural environment within the effected zone and the proposed remediation and monitoring plan?	✓**Yes** **If yes, identify impact:** Groundwater quality exceeds the City's Storm Sewer Use By-Law.	Section 6.4, page 18, Section 7.7.1-7.7.5 page 22-23.	

Summary of Additional Information and Key Items (if applicable):

Appendix A:

SANITARY/COMBINED **Sample Location: Monitoring well BH2**

Inorganics		Sample Result	Sample Result with upper RDL included	
Parameter	mg/L			ug/L
BOD	300	3.9	3.9-2.0	300,000
Fluoride	10	<0.2	<0.2-0.2	10,000
TKN	100	0.70	0.70-0.50	100,000
pH	6.0 - 11.5	7.59	7.59-0.10	6.0 - 11.5
Phenolics 4AAP	1	0.0026	0.0026-0.0010	1,000
TSS	350	21.4	21.4-3.0	350,000
Total Cyanide	2	<0.002	<0.002-0.0020	2,000
Metals				
Chromium Hexavalent	2	<0.00050	<0.00050-0.00050	2,000
Mercury	0.01	<0.0000050	<0.0000050-0.0000050	10
Total Aluminum	50	0.868	0.868-0.050	50,000
Total Antimony	5	<0.0010	<0.0010-0.0010	5,000
Total Arsenic	1	<0.001	<0.001-0.0010	1,000
Total Cadmium	0.7	<0.000050	<0.000050-0.000050	700
Total Chromium	4	<0.0050	<0.0050-0.0050	4,000
Total Cobalt	5	<0.0010	<0.0010-0.0010	5,000
Total Copper	2	<0.0050	<0.0050-0.0050	2,000
Total Lead	1	0.00083	0.00083-0.00050	1,000
Total Manganese	5	0.320	0.320-0.0050	5,000
Total Molybdenum	5	0.00202	0.00202-0.00050	5,000
Total Nickel	2	<0.0050	<0.0050-0.0050	2,000
Total Phosphorus	10	0.050	0.050-0.030	10,000
Total Selenium	1	<0.00050	<0.00050-0.00050	1,000
Total Silver	5	<0.00050	<0.00050-0.00050	5,000
Total Tin	5	<0.0010	<0.0010-0.0010	5,000
Total Titanium	5	0.0063	0.0063-0.0030	5,000
Total Zinc	2	<0.03	<0.030-0.030	2,000
Animal/Vegetable Oil & Grease	150	<5.0	<5.0-5.0	150,000
Mineral/Synthetic Oil & Grease	15	<2.5	<2.5-2.5	15,000

HYDROLOGICAL REVIEW SUMMARY

Volatile Organics		**Sample Result**	**Sample Result with upper RDL included**	
Parameter	**mg/L**			**ug/L**
Benzene	0.01	<0.50	<0.50-0.50	10
Chloroform	0.04	<0.10	<0.10-0.10	40
1,2-Dichlorobenzene	0.05	<0.50	<0.50-0.50	50
1,4-Dichlorobenzene	0.08	<0.50	<0.50-0.50	80
Cis-1,2-Dichloroethylene	4	<0.50	<0.50-0.50	4,000
Trans-1,3-Dichloropropylene	0.14	<0.50	<0.50-0.50	140
Ethyl Benzene	0.16	<0.50	<0.50-0.50	160
Methylene Chloride	2	<0.20	<0.20-0.20	2,000
1,1,2,2-Tetrachloroethane	1.4	<0.50	<0.50-0.50	1,400
Tetrachloroethylene	1	<0.50	<0.50-0.50	1,000
Toluene	0.016	<0.50	<0.50-0.50	16
Trichloroethylene	0.4	<0.50	<0.50-0.50	400
Total Xylenes	1.4	<1.1	<1.1-1.1	1,400
Semi-Volatile **Organics**				
Di-n-butyl Phthalate	0.08	<1.0	<1.0-1.0	80
Bis (2-ethylhexyl) Phthalate	0.012	<2.0	<2.0-2.0	12
3,3'-Dichlorobenzidine	0.002	<0.40	<0.4-0.4	2
Pentachlorophenol	0.005	<0.50	<0.50-0.50	5
Total PAHs	0.005	<1.7	<1.7-1.7	5
Misc **Parameters**				
Nonylphenols	0.02	<1.0	<1.0-1.0	20
Nonylphenol Ethoxylates	0.2	<2.0	<2.0-2.0	200

Sample Collected: October 26, 2021
Temperature:10.6° C

HYDROLOGICAL REVIEW SUMMARY

STORM **Sample Location: Monitoring well BH2**

Inorganics		Sample Result	Sample Result with upper RDL included	
Parameter	mg/L			ug/L
pH	6.0 - 9.5	7.59	7.59-0.10	
BOD	15	3.9	3.9-2.0	15,000
Phenolics 4AAP	0.008	0.0026	0.0026-0.0010	8
TSS	15	21.4	21.4-3.0	15,000
Total Cyanide	0.02	<0.0020	<0.0020-0.0020	20
Metals				
Total Arsenic	0.02	<0.001	<0.001-0.0010	20
Total Cadmium	0.008	<0.000050	<0.000050-0.000050	8
Total Chromium	0.08	<0.0050	<0.0050-0.0050	80
Chromium Hexavalent	0.04	<0.00050	<0.00050-0.00050	40
Total Copper	0.04	<0.0050	<0.0050-0.0050	40
Total Lead	0.12	0.00083	0.00083-0.00050	120
Total Manganese	0.05	0.320	0.320-0.0050	50
Total Mercury	0.0004	<0.0000050	<0.0000050-0.0000050	0.4
Total Nickel	0.08	<0.0050	<0.0050-0.0050	80
Total Phosphorus	0.4	0.050	0.050-0.030	400
Total Selenium	0.02	<0.00050	<0.00050-0.00050	20
Total Silver	0.12	<0.00050	<0.00050-0.00050	120
Total Zinc	0.04	<0.03	<0.030-0.030	40
Microbiology				
E.coli	200	0	-	200,000
Volatile Organics				
Parameter	mg/L			ug/L
Benzene	0.002	<0.50	<0.50-0.50	2
Chloroform	0.002	<0.10	<0.10-0.10	2
1,2-Dichlorobenzene	0.0056	<0.50	<0.50-0.50	6
1,4-Dichlorobenzene	0.0068	<0.50	<0.50-0.50	7
Cis-1,2-Dichloroethylene	0.0056	<0.50	<0.50-0.50	6
Trans-1,3-Dichloropropylene	0.0056	<0.50	<0.50-0.50	6
Ethyl Benzene	0.002	<0.50	<0.50-0.50	2
Methylene Chloride	0.0052	<0.20	<0.20-0.20	5
1,1,2,2-Tetrachloroethane	0.017	<0.50	<0.50-0.50	17
Tetrachloroethylene	0.0044	<0.50	<0.50-0.50	4
Toluene	0.002	<0.50	<0.50-0.50	2
Trichloroethylene	0.0076	<0.50	<0.50-0.50	8
Total Xylenes	0.0044	<1.1	<1.1-1.1	4

TORONTO

August 2018

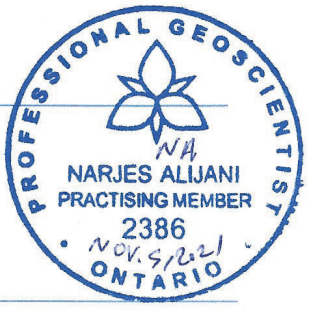
HYDROLOGICAL REVIEW SUMMARY

Semi-Volatile Organics		Sample Result	Sample Result with upper RDL included	
Di-n-butyl Phthalate	0.015	<1.0	<1.0-1.0	5
Bis (2-ethylhexyl) Phthalate	0.0088	<2.0	<2.0-2.0	8.8
3,3'-Dichlorobenzidine	0.0008	<0.40	<0.4-0.4	0.8
Pentachlorophenol	0.002	<0.50	<0.50-0.50	2
Total PAHs	0.002	<1.7	<1.7-1.0	2
PCBs	0.0004	<0.040	<0.040-0.040	0.4
Misc Parameters				
Nonylphenols	0.001	<1.0	<1.0-1.0	1
Nonylphenol Ethoxylates	0.01	<2.0	<2.0-2.0	10

Sample Collected: October 26, 2021
Temperature: 10.6° C

Consulting Firm that prepared Hydrological Report: Terraprobe Inc.

Qualified Professional who completed the report summary: Narjes Alijani, M. Sc., P.Geo.
Print Name



Qualified Professional who completed the report summary:
Signature

Date & Stamp

Terraprobe

Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing

HYDROGEOLOGICAL STUDY
1196 – 1210 YONGE STREET AND
2 – 8 BIRCH AVENUE
TORONTO, ONTARIO
M4T 1W1 and M4V 1C8

Prepared For: Birch Equities Limited
1133 Yonge Street, Suite 601
Toronto, Ontario
M4T 2Y7

File No. 1-19-0603-46.1 (REV.1)
November 5, 2021

Terraprobe Inc.

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EXECUTIVE SUMMARY

Terraprobe Inc. (Terraprobe) was retained by Birch Equities Limited to conduct a Hydrogeological Study for the Site located at 1196 – 1210 Yonge Street and 2 – 8 Birch Avenue, Toronto, Ontario (referred to collectively as the Site). A summary of Terraprobe's investigation's findings is as follows.

The Site is currently occupied with commercial and residential buildings. Surrounding land use includes commercial buildings to the north and west, Birch Street and commercial properties to the south, and Yonge Street and commercial properties to the east. **Table I** summarizes the existing conditions at the Site.

Table I: Existing Buildings Conditions

Current Development			
Buildings	**Land Use**	**Above Grade Levels**	**Below Grade Levels**
2-6 Birch Avenue	Residential	3	1 level Basement
8 Birch Avenue	Residential	2	No Basement
1196-1204 Yonge Street	Commercial and Residential	4	No Basement
1206-1210	Commercial and Residential	2	1 level Basement

Terraprobe understands that the future development of the Site will include a 14-storey residential and commercial building including mezzanine and mechanical penthouse, with 3 levels of underground parking. The proposed development details are summarized in **Table II.**

Table II: Proposed Development Details

Proposed Development						
Development Phase	**Above Grade Levels**	**Below Grade Levels**				**The Highest Groundwater Level Elevation (masl)**
		Underground Structure	**Lowest Finished Floor**		**Approximate Base of Footings (masl)**	
			Depth (m)	**Elevation (masl)**		
Mixed Use Residential and Commercial Building	14	3	9.34	113.32	112.12*	118.86

*Assuming 1.2 m below FFE of the proposed underground parking level 3.

In general, three (3) main local stratigraphic units were encountered beneath the Site. A summary of the units and the estimated hydraulic conductivity for each unite are summarized in **Table III**.

Table II: Summary of Subsoil Profile beneath the Site and estimated hydraulic conductivity

Stratum/Formation	**Depth Range (mbgs)**	**Elevation Range (masl)**	**Hydraulic Conductivity (m/s)**
Fill Material	0.8 to 2.3 m	122.2 to 123.4	$1.0 \times 10^{-6*}$
Silty Sand Till	2.3 to 6.1	118.1 to 119.0	$2.25 \times 10^{-6**}$
Sand and Silt to Silty Sand	6.1 to at least 23	118.1 to at least 101.4	1.20×10^{-5}

*Indicates conductivity was estimated using typical published values from Freeze and Cherry (1979)
**Indicates conductivity was calculated using Hazen equation

The groundwater elevation considered for the current short-term dewatering flow rate estimation and the anticipated conceptual zone of influence are presented in **Table IV**.

Table IV: Summary of Groundwater Conditions

The Highest Groundwater Elevation (masl)	118.86 (5.44 ± m below existing grade)
Zone of Influence (m)	The zone of influence for dewatering will be limited to the excavation box considering the impermeable shoring.

Details of the groundwater exceedances in comparison to the City of Toronto Sewer Use By-law limits are presented in **Table V**.

Table V: Summary of Groundwater Exceedances to the City of Toronto Sewer Use By-law limits

Sample ID	Untreated Sample (Yes/No)	Sample Collection Date	Sample Expiry Date	City of Toronto Storm Sewer Use By-Law Limits	City of Toronto Sanitary and Combined Sewer Use By-Law Limits
BH2	Yes	October 26, 2021	July 26, 2022	Exceeds for TSS and total manganese	No exceedances

Short-term construction dewatering flow rates were estimated considering the Site plans. The findings along with the anticipated requirements are summarized in **Table VI**.

Table VI: The water taking requirements for groundwater control

Groundwater Quantity: Short Term (Construction)						
Caisson Wall (Impermeable Shoring)	**Groundwater Seepage (Safety Factor of 2.0)**		**25mm Design Rainfall Event**		**Total Volume**	
	L/day	**L/min**	**L/day**	**L/min**	**L/day**	**L/min**
Mixed-Use Residential and Commercial Building	494,000	343.1	27,500	19.1	**521,500**	**362.2**
Groundwater Quantity: Long Term (Post-Construction)						
A water-tight structure is proposed for the future development. Long-term foundation drainage is not anticipated.						
Regulatory Requirements						
Environmental Activity and Sector Registry (EASR) Posting			Not Required			
Short-Term Permit to Take Water (PTTW)			Required			
Long-Term Permit to Take Water (PTTW)			Not Required (water-tight structure)			
Short-Term Discharge Agreement City of Toronto			Required			
Long-Term Discharge Agreement City of Toronto			Not Required (water-tight structure)			

TABLE OF CONTENTS

FIGURES:

APPENDICES:

TABLES:

1.0 INTRODUCTION

1.1 Site Location and Project Description

Terraprobe Inc. was retained by Birch Equities Limited, to conduct a Hydrogeological Study at the property located at 1196 – 1210 Yonge Street and 2 – 8 Birch Avenue, Toronto, Ontario (the Site).

The Site is located approximately 750 m southwest of the main intersection of Yonge Street and St. Clair Avenue West in the City of Toronto. Surrounding land use includes commercial buildings to the north and west, Birch Street and commercial properties to the south, and Yonge Street and commercial properties to the east. The Site is currently occupied with commercial and residential buildings.

It is understood that proposed development will include construction of 14-storey mixed use commercial and residential building including mezzanine and mechanical penthouse with three (3) levels of underground parking structures. Terraprobe understands that the underground structure of the proposed development will be waterproofed in the long-term. The location of the Site and proposed development are shown on **Figure 1**.

It is understood that future development will be serviced by municipal water and sanitary sewer systems. The study was undertaken to assess the hydrogeological conditions of the Site and to provide general information regarding the hydrogeological impact of the Site on the local groundwater function. The report addresses the following areas:

- Identifying the geological and hydrogeological setting of the Site;
- Confirming shallow groundwater level and shallow groundwater flow direction beneath the Site;
- Assessing groundwater quality in comparison with City of Toronto Sewer Use By-law limits;
- Evaluate potential short-term construction dewatering needs for the Site;
- Identifying potential impacts to the nearby groundwater receptors including water supply wells and natural heritage features pertaining the Site;
- Providing mitigation plan on the potential impacts to the groundwater receptors associated with the Site and its vicinity, if applicable;
- Providing recommendations on any needs for applying for a Permit to Take Water (PTTW) or posting on the Environmental Activity and Sector Registry (EASR) with the Ministry of the Environment, Conservation and Parks (MECP); and,

The City of Toronto requires that a hydrogeological assessment be completed in order to assess the potential dewatering needs and associated discharge plans. Additionally, associated potential impacts of the Site to the groundwater system and groundwater receptors should be evaluated.

1.2 Scope of Work

The scope of work for the study consisted of the following:

- Review of Geological and Hydrogeological Setting of the Site: A review of available background geological and Hydrogeological information for the Site was completed using Ontario Geological Survey (OGS) maps, Ministry of Environment Conservation and Parks (MECP), Oak Ridges Moraine Group (ORMGP), and Ministry of Natural Resources and Forestry (MNRF) databases.
- Review of City of Toronto Official Plans and Toronto and Region Conservation Authority (TRCA) Policy Areas: The City of Toronto official plans and TRCA maps were reviewed to understand the location of the Site and the proposed development within the policy areas.
- Site Inspection: A visual inspection of the Site and surrounding areas was conducted to determine local topography and drainage, and an assessment of hydrogeologically significant features.
- Groundwater Level Monitoring and Hydraulic Conductivity Testing: Groundwater level within the monitoring wells installed by Terraprobe were monitored to confirm groundwater level beneath the Site and to satisfy the City of Toronto Terms of Reference (ToR), dated August 2018. Hydraulic conductivity testing was conducted within the monitoring wells to confirm the hydraulic conductivity of the sub-soil profile within the screened intervals.
- Groundwater Quality Testing: Groundwater quality was assessed in comparison with the City of Toronto Sanitary and Combined and Storm Sewer Use By-Law limits to proposed potential short-term and long-term discharge options.
- Review of Proposed Site Development Concept: The proposed site development plans were reviewed to confirm the proposed invert elevation for developing underground structures.
- Construction Dewatering Flow Rate Estimate: Considering the proposed development plans, the construction dewatering flow rate (short-term dewatering) for developing the proposed underground structure was estimated using the stabilized groundwater level and estimated hydraulic conductivity measured at the Site.
- Long-term Foundation Drainage: Considering the proposed development plans, potential long-term foundation drainage was estimated.

- Mitigation Plans for Dewatering: A mitigation plan was recommended to mitigate potential short-term dewatering impacts to the nearby groundwater receptors and structures, if applicable.
- Potential Short-Term Dewatering and Long-Term Foundation Drainage Permits: Considering the estimated short-term construction dewatering flow rates, recommendations were provided on any need for applying for a PTTW or posting on the EASR, if required.

The above scope of work was undertaken in accordance with all of the following: Ontario Water Resources Act, Ontario Regulation 387/04 and Toronto Municipal Code Chapter 681-Sewers.

2.0 APPLICABLE REGULATION AND AGENCIES

The environmental regulations and policies relevant to this hydrogeological study are briefly discussed below.

2.1 TRCA Policies and Regulations (O.Reg. 166/06)

Under Section 28 of the Conservation Authorities Act, local conservation authorities are mandated to protect the health and integrity of the regional greenspace system, and to maintain or improve the hydrological and ecological functions performed by valley and stream corridors. The TRCA, through its regulatory mandate, is responsible for issuing permits under Ontario Regulation (O.Reg.) 166/06, Development, Interference with Wetlands and Alterations to Shorelines and Watercourses for development proposal or Site alteration work to shorelines and watercourses within the regulated areas.

The TRCA Regulated Area online map was reviewed of the current assessment on October 17, 2019. It is our understanding that the Site is not located within a TRCA Conceptual Regulated Area. As such, it is anticipated that a permit from the TRCA under O. Reg. 166/06 will not be required for the proposed development.

2.2 City of Toronto Official Plan

The City of Toronto's Official Plan sets up policies that deal with legislative and administrative concerns, guides physical growth, and address social, economic, and environmental concerns. The Official Plan provides land use planning designations and identifies areas of environmental significance where more stringent policies may apply for development applications.

City of Toronto Official Plans were reviewed on October 17, 2019 for the current study with the results summarized below:

- Map 12A (Environmentally Significant Areas) - A review of the map, dated February 2019, indicates that the Site is not located within an area designated as Environmentally Significant Areas.
- Map 12B (Provincially Significant Wetlands (PSW) and Area of Natural and Scientific Interest (ANSI)) - A review of the map, dated February 2019, indicates that the Site is not located within the above mentioned designated areas.
- Map 35 (Secondary Plan Areas) - A review of the map, dated November 2015, indicates that the Site is located within an area designated as Secondary Plan area 6, known as Yonge St. Clair.
- Map 17 (Land Use Plan) - A review of the map, dated February 2019, indicates that the Site is located within an area designated as Mixed Use Areas.

- Map 28 (Site and Area Specific Policies) - A review of the map, dated October 2016, shows that the Site is not located within the specific policies areas.

2.3 Permit To Take Water (PTTW) Section 34 of the Ontario Water Resource Act

For construction dewatering, water takings of more than 50,000 L/day but less than 400,000 L/day may be registered on the Environmental Activity and Sector Registry (EASR), while water takings of more than 400,000 L/day require a PTTW issued by the MECP. If it is identified that an EASR or PTTW is required for the Site, a hydrogeological report will need to be submitted in support of the application. Construction dewatering estimation was completed as a part of the scope of work for the current assessment.

2.4 Clean Water Act

The MECP mandates the protection of existing and future sources of drinking water under the Clean Water Act, 2006 (CWA). Initiatives under the CWA include the delineation of Wellhead Protection Areas (WHPAs), significant groundwater recharge areas (SGRAs) and Highly Vulnerable Aquifers (HVAs) as well as the assessment of drinking water quality and quantity threats within Source Protection Regions. Source Protection Plans are developed under the CWA and include the restriction and prohibition of certain types of activities and land uses within WHPAs.

A review of the Source Water Protection Information Atlas interactive mapping prepared my MECP on October 17, 2019 indicates that the Site is located within an area designated as a HVA.

2.5 City of Toronto Requirements for Hydrogeological Study (August 2018)

The City of Toronto requires a hydrogeological study report, completed in accordance with its August 2018 Terms of Reference (TOR), for zoning bylaw amendment, plans of subdivision, consent to service, and site plan control (Geotechnical Study/Hydrogeological Review).

Based on the TOR, a minimum of five (5) groundwater wells shall be installed at locations that represent the entire proximity of the Site. If the Site is larger than 30 m x 30 m, additional groundwater wells shall be installed and the qualified professional will use professional judgment to determine the number of additional wells required. It is required that the wells be installed with a minimum diameter of 3.8 cm and extend at least 2 meteres below the lowest elevation in the proposed building structure(s). Additionally, one well is to be drilled to a minimum depth of 10 m below the lowest elevation in the proposed building structure(s) or to bedrock, whichever is shallower.

Static groundwater levels should be confirmed and a monitoring program should be completed in accordance with the TOR. Based on the TOR, static groundwater level measurements shall be monitored at all wells located within the property for a minimum of 3 months with measurements taken every 2 weeks for a minimum of 6 measurements. The intent is for the qualified professional to use professional

judgment to estimate the seasonally high groundwater level. Water levels can be measured manually or by using pressure transducers and dataloggers, or similar instrumentation. All water levels shall be presented as geodetic elevations referenced to a City of Toronto or Canadian Geological Survey benchmark.

3.0 METHODOLOGY

3.1 Borehole Advancement and Monitoring Well Installation

Drilling boreholes and the construction of monitoring wells were conducted in conjunction with a geotechnical investigation between October 23 and 28, 2019 and on January 06, 2020 and January 28, 2020. The program consisted of the drilling of seven (7) boreholes (BH) and the installation of seven (7) monitoring wells including one (1) pair of nested monitoring wells; one in each of the boreholes advanced beneath the Site. The locations of the boreholes and monitoring wells are shown on **Figure 2**.

Borehole drilling and monitoring well construction were completed by a licensed water well contractor, Profile Drilling Inc., Land Shark Drilling and Strong Soil Search Inc., under the full-time supervision of a geotechnical technician from Terraprobe, who also logged the soil strata encountered during borehole advancement and collected representative soil samples for textural classification. The boreholes were drilled using continuous flight, hollow-stem augers. Detailed descriptions of the encountered subsoil and groundwater conditions are presented on the borehole log in **Appendix A**.

The monitoring wells were constructed using 50-mm diameter PVC riser pipes and screens, which were and installed in each of the selected geotechnical boreholes in accordance with the requirements of Ontario Regulation (O. Reg.) 903. All of the monitoring wells were provided with steel flush-mount protective casings at ground surface.

Borehole elevations and coordinates are provided relative to geodetic datum (NAD 83). The horizontal coordinates are reported relative to the Universal Transverse Mercator geographic coordinate system (UTM Zone 17T). The boreholes were surveyed for horizontal coordinates and geodetic elevations with a Trimble R10 Receiver connected to the Global Navigation Satellite System and the Can-Net Virtual Reference Station Network. The UTM coordinates and ground surface elevations at the monitoring wells locations, as well as the monitoring well construction details are presented on **Table 3-1**.

Table 3-1- Monitoring Well Installation Details

Well ID	Installation Date	UTM Coordinates (m)		Ground El. (masl)	Monitoring Well Depth (mbgs)	Screen Interval (mbgs)	Casing Dia. (mm)
		Easting	Northing				
BH 1	January 28, 2020	629619.4	4837746.6	123.65	10.60	7.55 - 10.60	50
BH 2	January 06, 2020	629626.4	4837750.1	124.15	13.70	10.65 – 13.70	50
BH 3	October 24, 2019	629618.8	4837748.5	124.30	13.7	10.65 – 13.70	50
BH 4D	October 23, 2019	629615.5	4837760.4	124.41	22.86	19.81 – 22.86	50
BH 4S	October 23, 2019	629615.1	4837761.5	124.40	7.60	4.55 – 7.60	50
BH 5	October 25, 2019	629615.1	4837766.7	124.58	13.70	10.65 – 13.70	50
BH 6	October 28, 2019	629618.7	4837769.0	124.66	13.75	10.70 – 13.75	50

Notes:
mbgs metres below ground surface
masl metres above sea level
S shallow nested monitoring well
D deep nested monitoring well

3.2 Groundwater Monitoring

All seven (7) installed monitoring wells were utilized to measure and monitor groundwater levels. The groundwater monitoring program will confirm the stabilized groundwater level beneath the Site. The groundwater monitoring is completed over six (6) monitoring events every two weeks starting February 7, 2020 so as to satisfy the City of Toronto Terms of Reference. The results are discussed in **Section 6.1**.

3.3 MECP Water Well Records Review

MECP Water Well Records (WWRs) were reviewed for the registered wells located at the Site and within a 500 m radius of the Site boundaries (Study Area). The findings of the MECP well records review are presented in **Section 4.6** of the current report

3.4 In-Situ Hydraulic Conductivity Testing

Monitoring wells BH1, BH2, BH3, BH4D, BH5 and BH6 were utilized to conduct hydraulic conductivity tests. The in-situ tests provide estimated hydraulic conductivities (K) for subsoil strata at the depths of the well screens. The monitoring wells were developed in advance of the test. Well development involves the purging and removal of groundwater from each monitoring well to remove remnants of clay, silt and other debris introduced into the monitoring well during construction, and to induce the flow of formation groundwater through the well screens, thereby improving the transmissivity of the subsoil strata formation at the well screen depths.

In-situ falling head hydraulic conductivity tests were completed for the Site. In-situ falling head tests involve the placement of a slug of known volume into the monitoring well, below the water level, to displace the groundwater level upward. The rate at which the water level recovers to static conditions (falling head) is tracked using a data logger/pressure transducer, and/or manually, using a water level tape. The rate at which the water table recovers to static conditions is used to estimate the K value for the water-bearing strata formation at the well screen depth. The findings for the hydraulic conductivity testing are presented in **Section 6.3.1** of the current report.

3.5 Hydraulic Conductivity Based on Grain Size Distribution Graphs

The Hazen equation estimation method was also used to estimate the hydraulic conductivity (K) for saturated subsoils at selected depths beneath the water table below the subject site. The method provides alternative hydraulic conductivity (K) estimates which are derived from the grain size diameter, whereby 10% by weight of the soil particles are finer and 90% are coarser (Freeze and Cherry, 1979). The soils chosen for Hazen estimation were selected primarily from above the well screen depths. Findings are presented in **Section 6.3.2**.

3.6 Groundwater Quality Assessment

Based on the City of Toronto ToR (August 2018), groundwater quality should be assessed in advance of earth work. As such, one (1) set of groundwater samples were collected from one (1) selected monitoring well (BH2) to characterize its quality for evaluation against the City of Toronto Sewer Use By-Law parameters. This was performed to assess whether any anticipated dewatering effluent can be disposed of into the City of Toronto sewer system during construction, or following site development for any long-term foundation drainage. Based on the results, recommendations for any pre-treatment for any dewatering/drainage effluent can be developed, if required.

The Selected monitoring well BH2 was developed and purged of multiple well casings volumes of groundwater prior to sample collection. The groundwater samples were collected using a Low Flow Sampling procedure, using a Bladder Pump. In accordance with City of Toronto Sewer Use By-law sampling protocols, one complete set of groundwater samples was not filtered during collection, prior to placement in the laboratory sample bottles. Upon sampling, all of the bottles were placed in ice and packed in a cooler at about 10.6 ± Cº for shipment to the analytical laboratory. Sample analysis was performed by ALS Environmental., which is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA). The results of the analysis are discussed in **Section 6.4**.

3.7 Review of Regional Data and Available Reports for the Site

The maps, data, and documents provided by the MECP, Ontario Geological Survey (OGS), Ministry of Natural Resource and Forestry (MNRF), and TRCA were reviewed. Oak Ridges Moraine Group (ORMGP) database was also reviewed for the current assessment. Additionally, available previously issued and concurrent geotechnical, and environment site assessment (ESA) reports were reviewed at the time of preparation of the current hydrogeological report, with the findings are summarized in **Section 4**.

4.0 REGIONAL AND LOCAL SITE SETTING

4.1 Regional Geology

The current understanding of the surface geological setting of the Site is based on scientific work conducted by the OGS (OGS, 2003). The Site and surrounding area are mapped as Unit 9C coarse-textured glaciolacustrine deposits consisting of sand, gravel along with minor silt and clay (OGS, 2003). A shore bluff located approximately 200 m to the north and west of the Site separates Unit 9c coarse-textured glaciolacustrine deposits from Unit 5b Till. **Figure 3** illustrates the mapped surficial geology for the Site and the surrounding area.

ORMGP produced a cross-sectional geological map to aid in the characterization of the general area. Considering the regional cross-section, it is understood that the overburden units prevalent in this area are as follows, with the youngest unit at the top:

- Thorncliffe Formation
- Sunnybrook Drift
- Scarborough Formation

Thorncliffe Formation: The Thorncliffe Formation consists of glaciofluvial and glaciolacustrine sand and silt deposited approximately 30,000 to 50,000 years ago. The Thorncliffe Formation shows a considerable variation in grain size and thickness, both locally and regionally. It acts as a regional aquifer. Based on the ORMGP cross-section, the top of the Thorncliffe Formation was interpreted to be contacted in close proximity to the ground surface with an approximate thickness of 9.0 m beneath the Site.

Sunnybrook Drift: The Sunnybrook Drift consists of silt to silty clay materials deposited 45,000 years ago and acts as a regional aquitard. The thickness of the Sunnybrook Drift is generally less than 10 m to 20 m. Based on the ORMGP cross-section; the surface of the Sunnybrook Drift has an approximate thickness of 4.0 m beneath the Site.

Scarborough Formation: The Scarborough Formation is composed of clay, silt, and sand sediments in a deltaic sequence. It acts as an aquifer of regional extent. This unit is mostly found within bedrock valleys and thins laterally away from the valleys. Based on the ORMGP cross-section, thickness of the Scarborough Formation could reach 20 m beneath the Site.

The underlying bedrock at the Site is the Georgian Bay Formation, which consists of shale and limestone (OGS, 2007). A review of the ORMGP cross-section indicates that the bedrock could be contacted at an approximate depth of 39 mbgs beneath the Site.

4.2 Regional Physiography

The Site is located within the physiographic region of Southern Ontario known as Iroquois the Plain. The Iroquois Plain within the vicinity of the Site consists of sand plains. A shore bluff separating South Slope from Iroquois Plain is located approximately 200 m to the north and west of the Site.

The Iroquois Plain occupies the lowlands around the western part of Lake Ontario, where it covers about a distance of 300.0 km, from the Niagara River to the Trent River. It has a width varying from about 100.0 m to over 10.0 km. When the last glacier (Wisconsin) was receding from Southern Ontario, the area was inundated by a body of water known as Lake Iroquois, which emptied eastward at Rome, New York State (Chapman and Putnam, 1984). **Figure 4** shows the location of the Site within the regional physiography map.

4.3 Regional Topography and Drainage

A review of a surface topography map for the Site and surrounding area indicates that the topography of the Site is located within a flat area. The ground surface elevation ranges from approximately 122 to 124 masl within the Site. Considering the topography map, ground surface at the Site and the vicinity of the Site slopes downwards towards the south. As such, it is anticipated that generated runoff (if it is not managed) will flow southwards. **Figure 5** illustrates the topography of the Site and surrounding area.

4.4 Watershed Setting

The TRCA's interactive watershed map was reviewed. The Site is located within the Lower Don River subwatershed of the Don River watershed, which falls with TRCA jurisdiction. The Don River Watershed covers an area of approximately 36,000 ha, including portions of the City of Toronto, the Cities of Vaughan, Markham, and Town of Richmond Hill in the Regional Municipality of York. The watershed drains southward from its heights along the Oak Ridges Moraine (ORM) in the north (at an elevation of 315) towards Lake Ontario in the south. Three (3) main geological features including the Bedrock Valley System, Oak Ridges Moraine, and areas of in-filling of eroded Quaternary sediments are present within the watershed (TRCA, 2009).

4.5 Local Surface Water and Natural Heritage Features

The MNRF database was reviewed for any natural heritage features including watercourses, bodies of water, wetland features, Area of Natural and Scientific Interest (ANSI) and wooded areas. Yellow Creek, a tributary of Don River West Branch, and associated wooded areas are located approximately 650 m to the east of the Site. Based on the review, there are no records for wetland features and ANSI in close proximity to the Site.

Record review indicates that wetland features, not evaluated as per Ontario Wetland Evaluation System (OWES), are scattered around the Site with the closest record located approximately 600 m to the east of the Site. The wetland feature is located along the tributary of Don River West Branch.

Record review indicates that there are no records for any natural heritage feature within or in close proximity to the Site. **Figure 6** shows the location of the Site and mapped natural heritage features, if applicable.

4.6 Ground Water Resources (MECP Well Records)

The MECP well record database was reviewed for records located within a radius of 500 m from the approximate Site boundary (Study Area). The locations of the well records are presented on **Figure 7** with the details for each well summarized in **Appendix B.** A total of 43 wells were located within the Study Area. A summary of data obtained from the records review is presented in **Table 4-1**.

Table 4-1- MECP Well Record Summary

Number of the Well Records	**43**
Well Type	
Drilled Well	37 (86%)
Dug Well	0 (0.0%)
Unknown	6 (14%)
Water Use (Final Status)	
Observation Well	13 (30%)
Test Hole	6 (14%)
Monitoring/Test Hole	16 (37%)
Unknown	8 (19%)
Reported Static Level	
0 to10 m (0 to 30 ft)	1 (2%)
Unknown	42 (98%)

The above summary indicates that most local wells registered as observation or monitoring/test hole wells. Based on the well records, there are no water supply wells within the Site and 500 m radius of the Site boundary.

The site is situated in a serviced area within the City of Toronto and there are no water supply wells at the Site or within the Study Area. As such, a door to door well survey is not required in advance of, during and after construction.

4.7 Active Permit to Take Water Records Review

The MECP website was reviewed for any active PTTW records within 1.0 km radius of the Site on October 17, 2019. The records review indicates three (3) records exist for the Study Area. Two (2) records are located at the southeast intersection of St. Clair Avenue West and Avenue Road, and one (1) record is

located at the northwest intersection of Davenport Road and Bedford Road. Details for each record are summarized in **Table 4.2**.

Table 4-2- Active PTTW Record Summary

Item	Permit Holder	Purpose	Maximum L/day	Source Type	Distance from the Site (Km)
1	Churchterrace Developments Inc.	Dewatering	500,000	Ground Water	0.55
2	2221 Yonge Holdings Inc.	Construction Dewatering	830,000	Ground Water	0.57
3	City of Toronto	Construction Dewatering	7,100,000	Ground Water	1.0

5.0 LOCAL GEOLOGY AND SUBSURFACE INVESTIGATION

The fieldwork consisted of drilling a total of seven (7) boreholes extending to maximum depth of 23.0 m below existing ground surface. The borehole logs and a geological cross-section are presented in **Appendix A**. The approximate locations of the boreholes are shown on **Figure 2**.

It should be noted that the subsurface conditions are confirmed at the borehole locations only, and may vary between and beyond the borehole locations. The boundaries between the various strata as shown on the logs are based on non-continuous sampling. These boundaries represent an inferred transition between the various strata, rather than a precise plane of geologic change.

The subsurface investigation was completed in conjunction with the geotechnical investigation. Based on the reviewed geotechnical report, the stratigraphy beneath the investigated areas of the property generally consists of the followings:

5.1 Surficial Layer

An asphalt pavement structure, consisting of 50 mm thick asphaltic concrete underlain by 200 mm thick granular base course was encountered in Boreholes 1 and 3 at the ground surface.

A 60 mm concrete paver underlain by 130 mm thick granular base course was encountered in Borehole 2 at the ground surface.

A 600 mm thick gravel surface course was encountered in Borehole 4 at the ground surface.

5.2 Earth Fill

Earth fill materials, consisting of clayey to sandy silt/ silty sand/ sand and gravel/silt, with trace amounts of organics were encountered beneath the surficial layer or at the ground surface in each borehole and extended to about 0.8 to 2.3 metres below ground surface (mbgs). It is very soft to firm in consistency, and the moisture content for the retrieved soil samples ranges from 3 to 19 percent by mass, indicating a moist condition.

5.3 Silty Sand Till

Silty sand till with varying amounts of clay (trace to some) and trace amounts of gravel were encountered beneath the earth fill zone in Boreholes 1, 3, 4 and 6 and beneath the silty sand layer in Borehole 2 and extended to 4.6 and 6.1 mbgs. It is compact to very dense in consistency, and the moisture content for the retrieved soil samples ranges from 5 to 18 percent by mass, indicating a moist condition.

5.4 Sand and Silt to Silty Sand

Sand and silt to silty sand with trace amounts of clay and gravel was encountered beneath the silty sand till deposit in Boreholes 1, 2, 3, 4 and 6 and beneath the earth fill zone in Borehole 5 and extended to the full depth of investigation. The unit is compact to very dense in consistency, and the moisture content for the retrieved soil samples ranges from 5 to 32 percent by mass, indicating a moist to wet condition.

5.5 Bedrock

Bedrock was not observed within the maximum termination depth of investigation at 23.0 mbgs. A nearby water well record report bedrock at a depth of 36 mbgs.

6.0 LOCAL HYDROGEOLOGICAL STUDY

6.1 Monitoring Well Development and Ground Water Level Monitoring

The groundwater monitoring program started on February 07, 2020 extending to mid-April 2020. Observations pertaining to the depth to water and caving were made in the open boreholes immediately after completion of drilling, and are reported on the borehole logs. The measured water levels along with other monitoring wells details and findings are presented in **Appendix C**.

The monitoring wells were developed and the groundwater levels were measured using an interface probe (Solinst Interface Meter Model 122). The following **Table 6-1** provides summary of groundwater level measurements.

Table 6-1- Summary of Groundwater Monitoring

Well ID		February 7, 2020	February 20, 2020	March 4, 2020	March 18, 2020	April 1, 2020	April 16, 2020
BH1	mbgs	4.99	4.96	4.95	4.97	4.97	5.00
	masl	118.66	118.69	118.70	118.68	118.68	118.65
BH2	mbgs	5.93	5.83	5.85	5.84	5.85	5.89
	masl	118.22	118.32	118.30	118.31	118.30	118.26
BH3	mbgs	5.51	5.44	5.44	5.47	5.47	5.49
	masl	118.79	118.86	118.86	118.83	118.83	118.81
BH4D	mbgs	6.99	6.94	6.95	6.97	6.96	7.02
	masl	117.42	117.47	117.46	117.44	117.45	117.39
BH4S	mbgs	5.66	5.67*	5.63	5.60	5.63	5.67
	masl	118.74	118.73	118.77	118.80	118.77	118.73
BH5	mbgs	NA	6.31*	6.17	6.20	6.21	6.25
	masl	NA	118.27	118.41	118.38	118.37	118.33
BH6	mbgs	6.26	6.23*	6.28	6.30	6.31	6.34
	masl	118.40	118.43	118.38	118.36	118.35	11.32

Notes:
mbgs metres below ground surface
masl metres above sea level
*Groundwater level was measured on February 27, 2020 due to snow cover

As shown in above Table, groundwater levels show slight fluctuations over the monitoring program. The highest shallow groundwater level was measured as El. 118.86 masl at monitoring well BH3. Groundwater at BH4D (deep nested monitoring well) is lower than the groundwater level measured at monitoring well BH4S (shallow nested monitoring well), indicating a downward vertical hydraulic gradient. Monitoring well BH4S was installed within the glacial till (Newmarket Till), which is considered as an aquitard, whereas monitoring well BH4D was installed within the sand and silt deposits of the Thorncliffe Formation (aquifer).

6.2 Groundwater Flow Pattern

The groundwater flow pattern was interpreted using groundwater levels measured on March 4, 2020 at monitoring well BHs 2, 3, 5 and 6. **Figure 8** presents the interpreted groundwater flow pattern. Based on the plan, shallow groundwater flows in a southeasterly direction towards Yellow Creek.

6.3 Hydraulic Conductivity Testing

6.3.1 In-Situ Hydraulic Conductivity Tests

Monitoring wells BH1, BH2, BH3, BH4D, BH5 and BH6 underwent single well response tests (SWRTs) to assess the hydraulic conductivity (K) for saturated shallow aquifer subsoils at the depths of the well screens. Each monitoring well was equipped with a digital pressure transducer to record the fluctuation made to complete the SWRT. The results of the SWRT tests are presented in **Appendix D**, with a summary of the findings provided in **Table 6-2**.

Table 6-2- Summary of Rising Head Hydraulic Conductivity Test

Well ID	Ground El. (masl)	Monitoring Well Depth (mbgs)	Screen Interval (mbgs)	Screened Soil Strata	Hydraulic Conductivity (K) (m/sec)	Test Method
BH1	123.65	10.60	7.55 - 10.60	Silt and Sand to Silty Sand	8.99×10^{-6}	Falling Head Test
BH2	124.15	13.70	10.65 – 13.70	Silt and Sand to Silty Sand	1.60×10^{-6}	Rising Head Test
BH3	124.30	13.7	10.65 – 13.70	Silt and Sand to Silty Sand	9.77×10^{-6}	Falling Head Test
BH4D	124.41	22.86	19.81 – 22.86	Silt and Sand to Silty Sand	1.94×10^{-6}	Falling Head Test
BH5	124.58	13.70	10.65 – 13.70	Silt and Sand to Silty Sand	1.20×10^{-5}	Falling Head Test
BH6	124.66	13.75	10.70 – 13.75	Silt and Sand to Silty Sand	9.78×10^{-6}	Falling Head Test

Notes:
mbgs metres below ground surface
masl metres above sea level

A review of the findings suggests a moderate to high hydraulic conductivity for the subsoil profile within the screened intervals.

6.3.2 Hydraulic Conductivity Using Grain Size Distribution Graphs

The Hazen Equation method was adopted to estimate the hydraulic conductivity (K) for different soil layers which may contain groundwater during the seasonal high water table (spring) period, or if they are not encountered within the screen intervals.

The Hazen Equation method relies on the interrelationship between hydraulic conductivity and effective grain size, d_{10}, in the soil media. This empirical relation predicts a power-law relation with K, as follow:

$$K = Ad_{10}^2$$

where;

d_{10}: Value of the soil grain size gradation curve as determined by sieve analysis, whereby 10% by weight of the soil particles are finer and 90% by weight of the soil particles are coarser.

A: Coefficient; it is equal to 1 when K in cm/sec and d_{10} is in mm

The Hazen Equation estimation provides an indication of the groundwater yield capacity for saturated soil strata at the depths where soils samples were selected for grain size analysis. The grain size distribution graphs prepared for the previous geotechnical investigation were used to the estimate the hydraulic conductivity, with the details are presented in **Appendix E**. The results of the Hazen Equation estimates are provided in **Table 6-3**, below.

Table 6-3 - Summary of Hydraulic Conductivity Using Hazen Equation

Monitoring Well ID	Soil Sample Depth (mbgs)	Soil Sample Elevation (masl)	Soil Strata	Hydraulic Conductivity (m/sec.)
BH1	9.3 (SS9)	114.3	Sand and silt	4.00×10^{-6}
BH2	10.8 (SS10)	113.4	Silty sand till	6.25×10^{-6}
BH3	3.3 (SS5)	121.0	Silty Sand, some gravel	1.00×10^{-6}
BH4	4.9 (SS7)	119.5	Silty sand till	2.25×10^{-6}
BH6	10.9 (SS10)	113.8	Silty sand till	1.00×10^{-6}

Notes:
mbgs metres below ground surface
masl metres above sea level

The K estimates determined using the Hazen method suggests a moderate hydraulic conductivity for the sand and silt and silty sand unit underlying the Site.

6.4 Groundwater Quality Assessment

As per the City of Toronto ToR, August 2018, a groundwater quality assessment should be completed for the Site to confirm groundwater quality in comparison with the City of Toronto Sanitary and Combined, and Storm Sewer Use By-law limits. As such, one (1) set of groundwater samples was collected by Terraprobe on October 26, 2021 and submitted to characterize groundwater quality for evaluation against the City of Toronto Sewer Use By-law limits. Groundwater samples were collected directly from monitoring well BH2.

BH2 was developed and one (1) set of unfiltered groundwater samples was collected in accordance with City of Toronto Sewer Use By-law sampling protocols. Upon sampling, all of the bottles were placed in ice and packed in a cooler at about 10.6° C for shipment to the analytical laboratory. Sample analysis was performed by ALS Environmental, a third party laboratory accredited by the Canadian Association for Laboratory Accreditation (CALA).

The groundwater quality test results and the certificate of analysis are presented in **Appendix F**. The samples were compared to the following:

- City of Toronto Municipal Code Chapter 681 Table 1 – Limits for Sanitary and Combined Sewers Discharge
- City of Toronto Municipal Code Chapter 681 Table 2 – Limits for Storm Sewer Discharge

The exceedances, together with the criteria, are presented in **Table 6-4**.

Table 6-4- Exceedance Table and Groundwater Quality Results

Parameter	BH2 Groundwater Quality Results (mg/L)	City of Toronto Sanitary Sewer Use Limits (mg/L)	City of Toronto Storm Sewer Use Limits (mg/L)
Total Suspended Solids (TSS)	21.4	350	**15**
Total Manganese	0.320	5	**0.05**

As shown above, exceedances were recorded for groundwater samples in comparison with the City of Toronto Sanitary and Combined, and Storm Sewer Use By-law limits. A review of the results shows that groundwater quality at monitoring well BH2 exceeds Storm Sewer Use Limits for Total Suspended Solid (TSS) and total manganese. The results review also indicates no exceedances of the Sanitary and combined Sewer Use Limits at BH2.

A review of the groundwater quality results suggests that short-term dewatering discharge could be directed to the City of Toronto sanitary sewer system. Furthermore, pre-treatment should be considered to treat the elevated TSS and total manganese if discharged groundwater is proposed to be directed to the City of Toronto storm sewer system.

Pre-treatment to lower TSS could involve use of settling weir tanks and/or filter bags during construction. The final design for any dewatering effluent pre-treatment system is the responsibility of the contractors undertaking construction.

7.0 DEWATERING FLOW RATE ESTIMATION

7.1 Site Plan Review

Architectural drawings prepared by KPMB Architects dated January 29, 2021, were reviewed for the current assessment. It is understood that proposed development will include construction of 14-storey mixed use commercial and residential building including mezzanine and mechanical penthouse with three (3) levels of underground parking structures. Based on the building sections (Drawing A6.001), three (3) levels of underground parking are proposed for the future development, where the base of the level 3 underground parking is proposed at a depth od 9.34 mbgs. Plan review also indicates that the ground surface is proposed at El. 122.66 masl. As such, the base of the proposed underground parking level 3 is interpreted at El. 113.32 masl.

A review of architectural drawings also shows that the Site is rectangular in shape and the length and width of the Site are approximately 35.4 m and 30.6 m, respectively; and footprint of the proposed underground parking extends to the entire Site boundary.

7.2 Review of the Geotechnical Report

A review of the geotechnical investigation report prepared by Terraprobe Inc., dated October 21, 2021 (File No. 1-19-0603-01) indicates:

- The water level must be kept at least 1.2 m below the lowest excavation elevation during construction. The installation of a skim coat of lean concrete (mud-slab) is recommended to preserve the subgrade integrity, and to provide a working platform. Additional dewatering activities will be required to remove any accumulated rainfall.
- Impermeable shoring (i.e., a continuous interlocking caisson wall) is to be used to support the excavation. The water table could be lowered before excavation begins or during excavation by advancing deep sumps and pumping water out from the sumps (depending on the flow rates). A caisson wall shoring system would also prevent any sloughing of weak soils and loss of ground during lagging installation.
- The sub-floor drainage system should consist of perforated pipes (minimum 100 mm diameter) located at a spacing of about 3.0 m centre to centre. The subdrain system should be outlet to a suitable discharge point under gravity flow, or connected to a sump located in the lowest level of the basement. The water from the sump must be pumped out to a suitable discharge point/positive outlet.

7.3 Summary of Hydrogeological Conditions of Site Development

The results of the study completed by Terraprobe indicate the following hydrogeological features for the Site.

- Boreholes encountered the earth fill zone beneath the surficial layer or at ground surface extending to 0.8 to 2.3 mbgs, generally underlain by the compact to very dense silty sand till, extending to 4.6 and 6.1 mbgs (El. 118.1 to 119.0 m), which was underlain, in turn, by the dense to very dense sand and silt to silty sand unit extending to the full depth of the investigation.
- The water table for design purposes should be considered to be El. 118.86 ± masl (5.44 mbgs) as measured at monitoring well BH3. As such, base of the excavation was considered at El. 112.35 masl.
- Based on a review of the estimated hydraulic conductivity of the sandy silt and silt unit, in which the excavation and construction will be completed, the hydraulic conductivity of 1.2 x 10^{-5} m/s is considered for dewatering calculations. Additionally, hydraulic conductivities of 2.25 x 10^{-6} m/s and 1.0 x 10^{-6} m/s were considered for the silty sand till and fill zone observed below the pavement structure, respectively.

7.4 Short-Term Groundwater Control Requirements (Construction Dewatering)

A review of the development plans indicates that three (3) levels of underground parking are proposed for the future development. Base of the level 3 underground parking is proposed at El. 113.32 masl. Proposed underground structure will be partially developed below the water level. The assumptions considered for the dewatering flow rate calculations are summarized in **Table 7-1**.

Table 7-1- Summary of Site Dimensions

Proposed Development Phase	Approximate Proposed Width (m)	Approximate Proposed Length (m)	Proposed Invert El. (masl)	Assumed Foundation El. (masl)	Assumed Base of Elevator Pit (masl)	Static Groundwater Level (masl)
16- Story residential and commercial Building	30.6	35.4	113.32	112.12	111.52	118.86

Notes:
mbgs metres below ground surface
masl metres above sea level

A numerical analysis was conducted utilizing computer software (Slide 7.014, released March 30, 2016, developed by Rocscience Inc.), utilizing the Finite Element Modelling (FEM) method. FEM for groundwater seepage indicates the short-term (construction) dewatering requirements as provided below. The finite element model results are presented in **Appendix G**.

Considering the thick layer of silt and sand unit contacted at boreholes locations drilled within the proposed development footprint, in which excavation and construction of the proposed underground parking will be completed, the installation of a caisson wall extending approximately 5 m below the proposed FFE was recommended by the geotechnical investigation team. As such, the construction dewatering flow rate was estimated considering this recommendation.

The estimated construction dewatering flow rate for developing the proposed building with 3-levels of underground structure is summarized below:

- 247,000 L/day, and it could reach to 494,000 L/day of groundwater seepage into the excavation considering a safety factor of 2.0.

- The above estimates do not take into account storm water management from rainfall events. The collection system should also account for a typical 2-year design storm event which will generate approximately 27,500 L/day. As such, the estimated short-term dewatering flow rate could reach to 521,500 L/day. The dewatering system should be designed to take into account removal of rainfall from the excavation. According to O. Reg. 63/16, a plan for discharge must consider the conveyance of storm water from a 100-year storm event, which translates to approximately 102,000 L/day.

The estimated short-term construction dewatering flow rates for construction exceeds the EASR upper threshold limit of 400,000 L/day. As such, applying for a PTTW from the MECP is recommended.

7.5 Long-Term Groundwater Control Requirements (Post-Construction)

It is understood that the proposed building will be water-tight. As such, long-term foundation drainage is not anticipated for the post-development Site.

Considering the proposed water-tight structure, applying for long-term discharge permit with the City of Toronto is not required.

7.6 Zone of Influence (ZOI) Groundwater

It is understood that caisson wall (impermeable shoring) is proposed in advance of construction. As such, it is anticipated that zone of influence for dewatering will be limited to the immediate vicinity of the Site.

7.7 Potential Dewatering Impacts and Mitigation Plan

7.7.1 Short-Term Discharge of Pumped Groundwater (Construction Dewatering)

The dewatering system must be appropriately filtered in order to prevent the pumping of fines and loss of ground during the dewatering activities.

The results of the groundwater quality assessment indicate that the short-term dewatering effluent could be discharged to the City of Toronto sanitary sewer if permission is obtained. The anticipated dewatering effluent will meet the City of Toronto storm sewer limits if pre-treatment to reduce elevated levels of TSS and total manganese is implemented.

7.7.2 Ground Settlement

Considering implementation of impermeable shoring, the estimated conceptual zone of influence for dewatering will be limited to the excavation box. As such, impacts to the nearby structures are not anticipated. However, considering the adjacent structures it is recommended a professional geotechnical engineer is consulted in advance of earthwork.

7.7.3 Surface Water, Wetlands and Areas of Natural Significance

There are no records for any surface water, wetland feature or any natural heritage feature located within the estimated conceptual zone of influence for dewatering. As such, no concern is anticipated regarding the proposed development.

7.7.4 Water Supply Wells and Zone of Influence

The Site is located in a serviced area of Toronto. A review of the MECP well records confirmed there are no records for any water supply wells or municipal wells on the Site or within a 500 m radius of the Site boundary. Additionally, it is assumed that an impermeable shoring system is proposed for excavation and construction on the Site. As such, no concerns are anticipated to groundwater users pertaining to the Site development.

7.7.5 Contamination Sources

Terraprobe is conducting Phase One and Phase Two Environmental Site Assessment reports for the Site. Details will be included in the above-mentioned reports.

8.0 CONCLUSIONS AND RECOMMENDATIONS

- The Site is mainly located within the physiographic region of Southern Ontario known as the Iroquois Plain.
- The Site is located within an area mapped as coarse-textured glaciolacustrine deposits (9c).
- The Site is located within the Don River watershed, which falls within TRCA jurisdiction. There are no records for natural heritage features including wetland, water bodies, watercourses and ANSI within or in close proximity to the Site
- The subsoil profile beneath the pavement structure and fill material consists mainly of silty sand till and, thick silty sand unit extending to the termination depth of investigation of 23 mbgs.
- The highest shallow groundwater level was measured at El. 118.86 masl over the groundwater monitoring program.
- Estimated hydraulic conductivities using single well response tests (SWRT) and the Hazen Equation are 1.20 x 10^{-5} m/s and 2.25 x 10^{-6} m/s for silt and sand, and silty sand till units, respectively.
- Groundwater quality for one (1) set of samples collected from monitoring well BH2 meets the City of Toronto's sanitary and storm sewer use limits, with an exception of exceedances for Total Suspended Solid (TSS) and total manganese compare to the City of Toronto's Storm Sewer Use By-Law limit.
- The short-term construction dewatering flow rate, considering a safety factor of 2.0 and a 2-year storm event, could reach 521,500 L/day. The estimated flow rate is based on considering impermeable shore installed approximately 5 m below proposed FFE.
- Considering the proposed water-tight structure, long-term foundation flow is not anticipated.
- The estimated conceptual zone of influence for dewatering will be limited to the excavation box due to implementation of an impermeable shoring system. As such, impacts to the nearby structures are not anticipated. However, considering the adjacent structures it is recommended a professional geotechnical engineer is consulted in advance of earthwork.

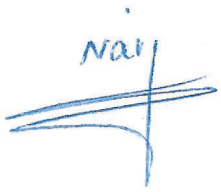
9.0 CLOSURE

We trust that the above-noted information is suitable for your review. If you have any questions regarding this information, please do not hesitate to contact the undersigned.

Yours truly,

Terraprobe Inc.

Kossay Makhzoumi, BASc., EIT
Project Manager



Narjes Alijani, M.Sc., P.Geo.
Senior Hydrogeologist

10.0 REFERENCES

1. Chapman, L.J. and D.F. Putnam, 1984. The Physiography of Southern Ontario. Ontario.

2. City of Toronto, 2019, Online Official Plans.

3. Freeze, A. and Cherry, J., 1979. Groundwater, Prentice-Hall Inc., New Jersey.

4. Geological Survey. Ontario Geological Survey (OGS), 2003. Surficial Geology of Southern Ontario. Miscellaneous Release – Data 128 – revised.

5. Geological Survey. Ontario Geological Survey (OGS), 2007. Bedrock Geology of Ontario. Miscellaneous Release – MRD 219.

6. Ministry of the Environment, Conservation and Parks, 2019, Source Protection Information Atlas Interactive Map.

7. Terraprobe Inc. "Geotechnical Investigation, 1196-1210 Yonge Street and 2-8 Birch Avenue, Toronto, Ontario", dated October 21, 2021. File No. 1-19-603-01

8. Toronto and Region Conservation Area, 2009, Don River Watershed Plan, Geology and Groundwater Resources- Report on Current Conditions.

9. Toronto and Region Conservation Authority, 2019, Online Regulated Area Map.

11.0 LIMITATIONS OF LIABILITY

This report was prepared at the request of, and for the exclusive use of Birch Equities Limited and its affiliates ("the Intended User") is intended to provide an assessment of the hydrogeological conditions of the Property located at 1196 – 1210 Yonge Street and 2 – 8 Birch Avenue in the City of Toronto, Ontario (the Site). No one other than the Intended User has the right to use and rely on the work without first obtaining the written authorization of Terraprobe Inc. and Birch Equities Limited.

Terraprobe Inc. expressly excludes liability to any party except the Intended User for any use of, and/or reliance upon, the work. 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. Terraprobe Inc. 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.

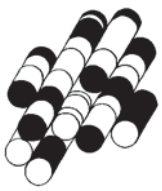
The assessment should not be considered a comprehensive audit that eliminates all risks of encountering hydrogeological problems. The information presented in this report is based on information collected during the completion of the hydrogeological study by Terraprobe Inc. It was based on the conditions on the Site at the time of the hydrogeological study by a review of historical information and field investigation to assess the hydrogeological conditions of the Site, as reported herein.

There is no warranty expressed or implied by this report regarding the hydrogeological conditions for the Site. Professional judgement was exercised in gathering and analyzing information collected by reviewing previous reports, data provided by government and are open to public and field work investigation. The conclusions presented are the product of professional care and competence, and cannot be construed as an absolute guarantee.

In the event that during future work new information regarding the hydrogeological conditions of the Site is encountered, or in the event that the outstanding responses from the regulatory agencies indicate outstanding issues on file with respect to the Site, Terraprobe Inc. should be notified in order that we may re-evaluate the findings of this assessment and provide amendments, as required.

FIGURES

TERRAPROBE INC.



Terraprobe Inc.
Consulting Geotechnical & Environmental Engineering
Construction Materials, Inspection & Testing

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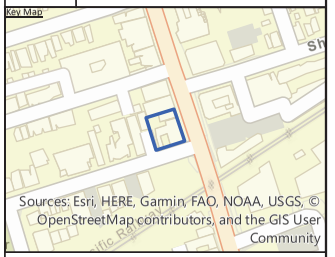

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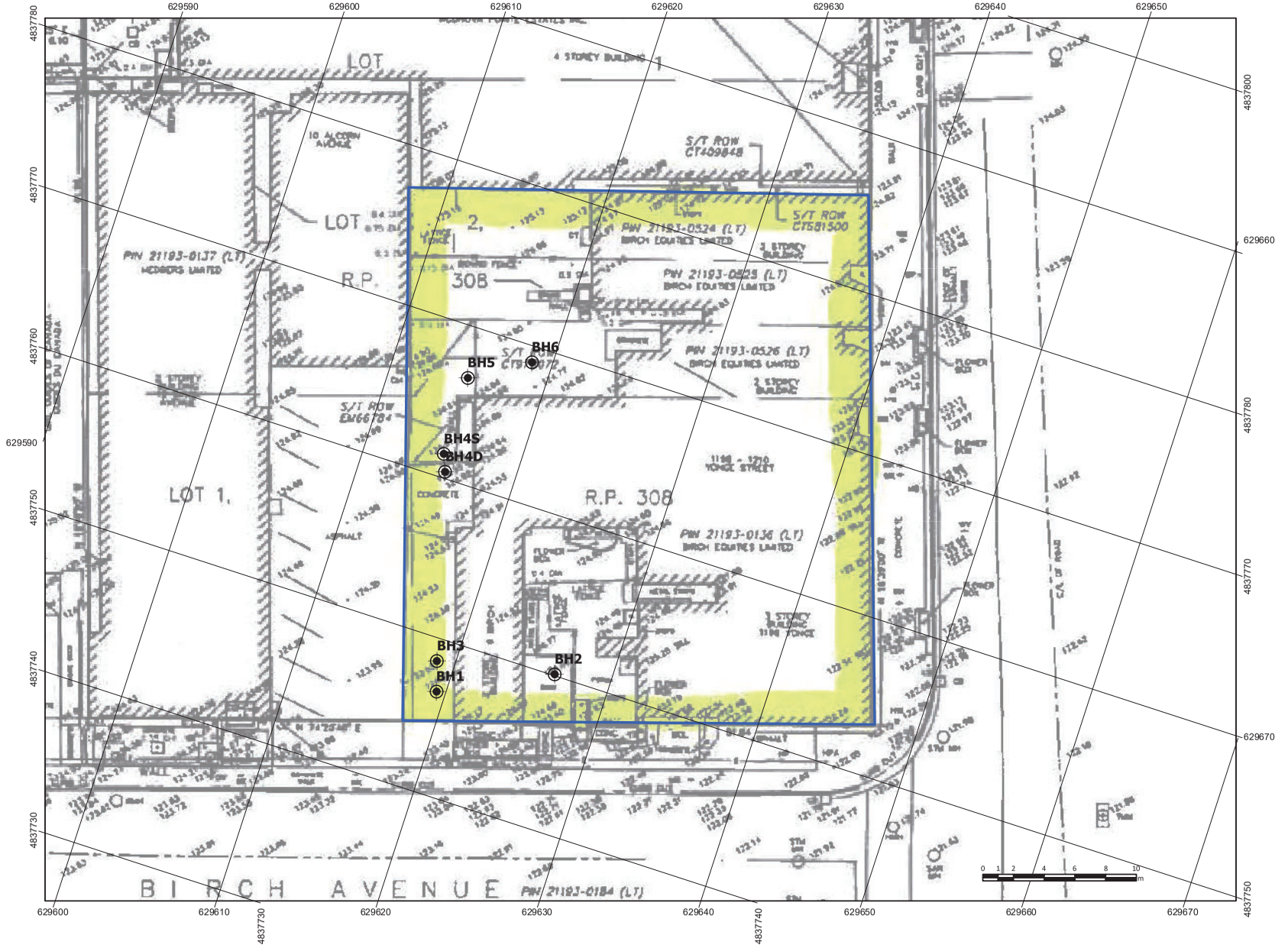
Approximate Site Location

Project Title:
Hydrogeological Assessment

Site Location:
1196-1210 Yonge St, 2-8 Birch Ave, Toronto

Figure Title:
Site Location Plan

Designed By: NA	*File No.:* 1-19-0603-46.1
Drawn By: SSK	*Scale:* As Shown
Reviewed By: BW	*Figure No.:* 1
Date: March 2020	



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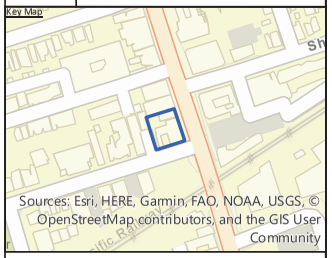
Construction Materials, Inspection & Testing

References:
Lot 1 And Part of Lots 2 & 3
Registered Plan 195
Lots 1 And 2 And Part of Lot 3
Registered Plan 308 Yorkville; City of Toronto
By: J.D Barnes

Key Map



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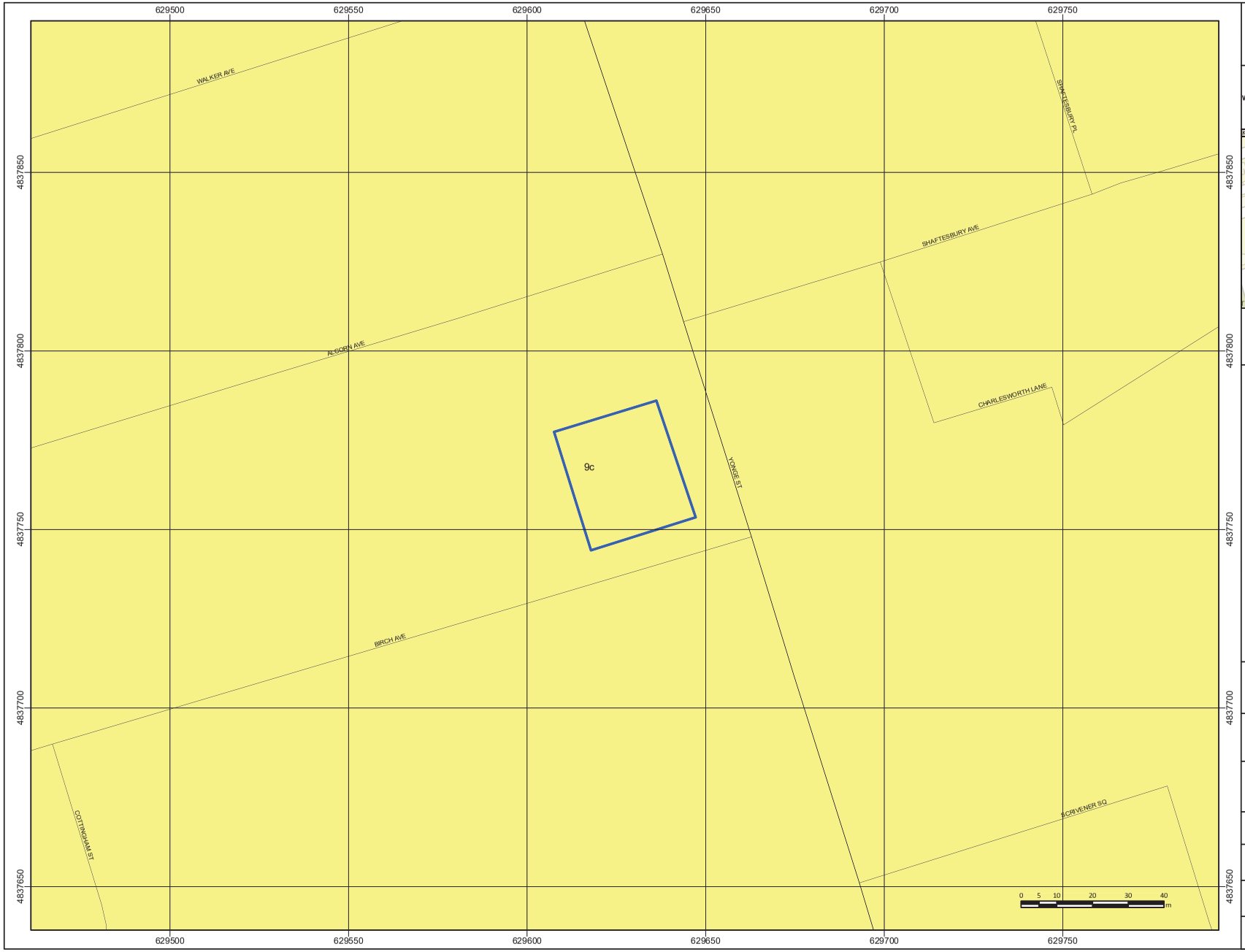
Approximate Site Location
Approximate Monitoring Well Location

Project Title:
Hydrogeological Assessment

Site Location:
1196-1210 Yonge St, 2-8 Birch Ave, Toronto

Figure Title:
Borehole and Monitoring Well Plan

Designed By: NA	*File No.:* 1-19-0603-46.1
Drawn By: SSK	*Scale:* As Shown
Reviewed By: BW	*Figure No.:* 2
Date: March 2020	



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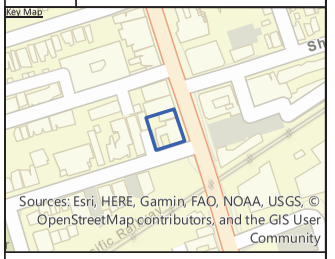

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- 9c: Foreshore-basinal deposits
- Collector
- Local / Street

Project Title:
Hydrogeological Assessment

Site Location:
1196-1210 Yonge St, 2-8 Birch Ave, Toronto

Figure Title:
Surficial Geology Map

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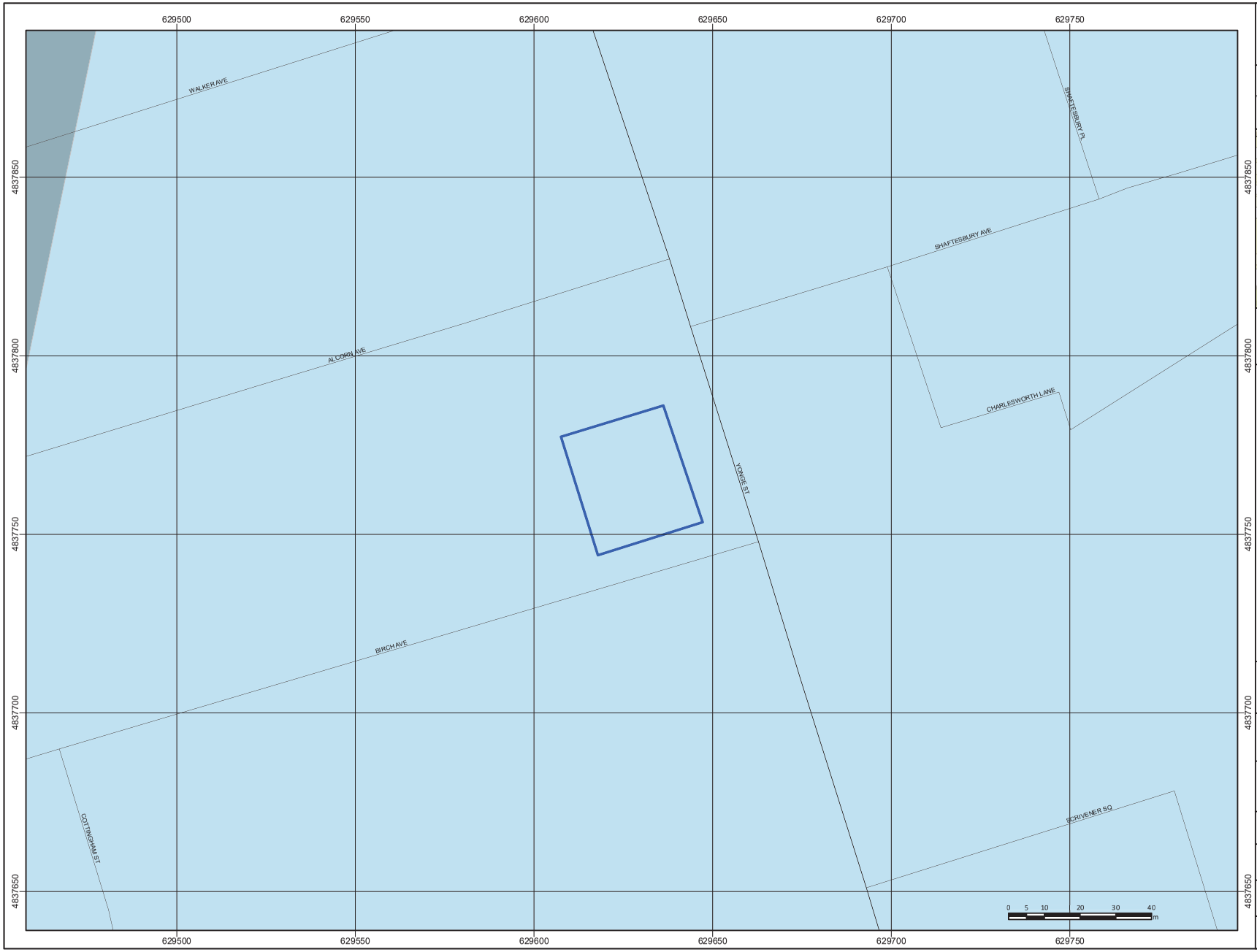
Reviewed By: BW	*Figure No.:* 3
Date: March 2020	



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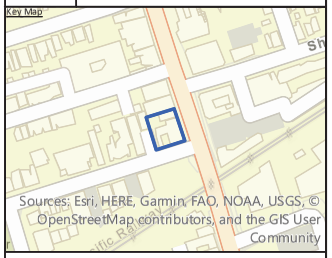

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- Approximate Site Location
- Collector
- Local / Street
- 32, South Slope
- 41, Iroquois Plain

Project Title:
Hydrogeological Assessment

Site Location:
1196-1210 Yonge St, 2-8 Birch Ave, Toronto

Figure Title:
Physiography Map

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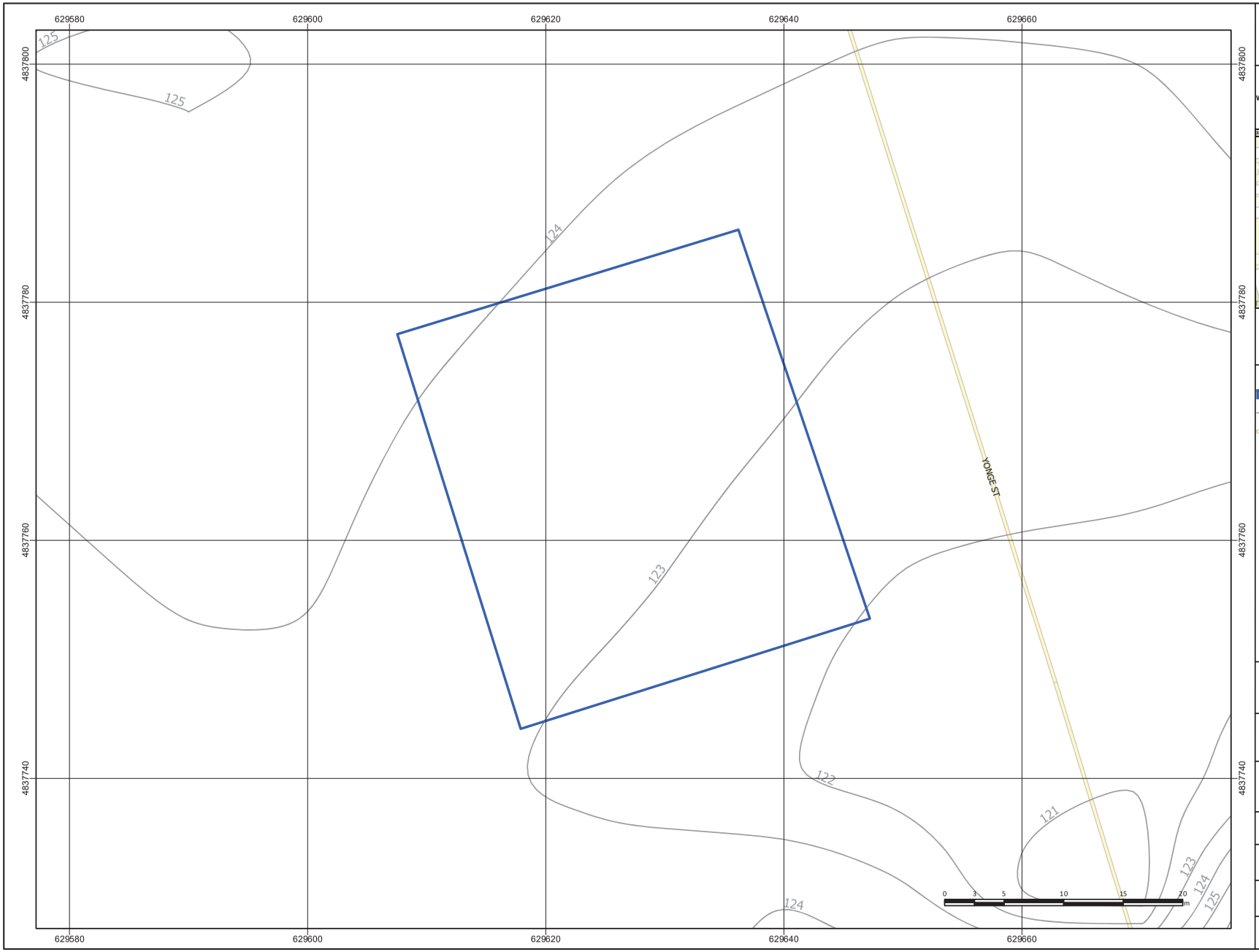

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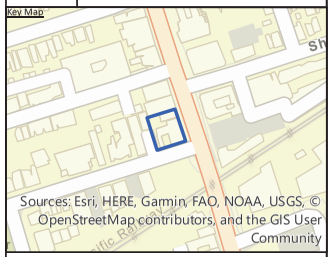

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- Approximate Site Location
- City of Toronto, Topographic Contours
- Collector

Project Title:
Hydrogeological Assessment

Site Location:
1196-1210 Yonge St, 2-8 Birch Ave, Toronto

Figure Title:
Topography Map

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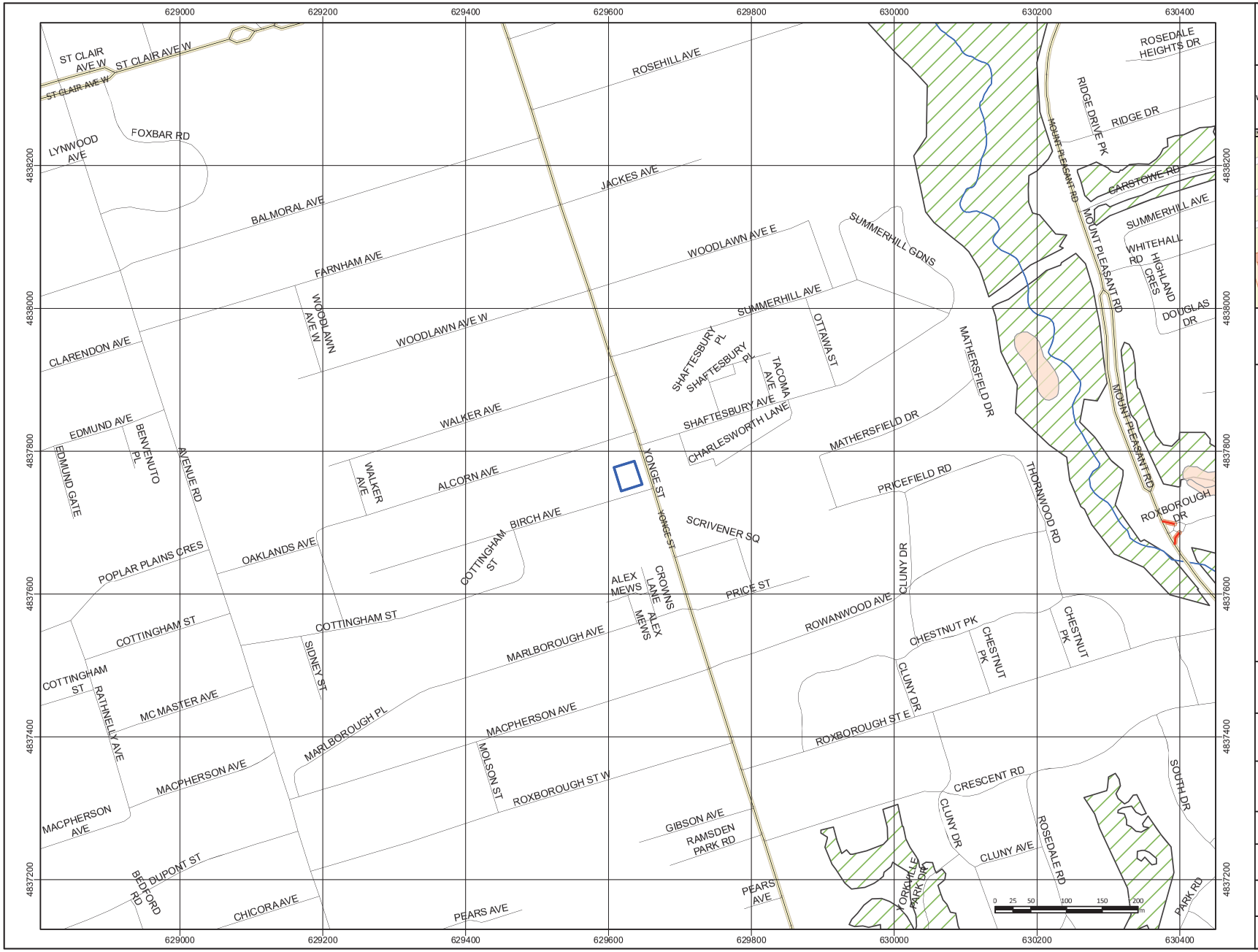
Drawn By: SSK	*Scale:* As Shown
Reviewed By: BW	*Figure No.:* 5
Date: March 2020	



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Construction Materials, Inspection & Testing

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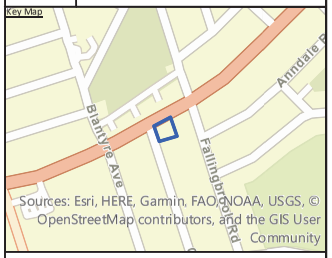

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- TYPE
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- Local / Street
- Ramp
- Water Course
- Wetland Significance
- Not evaluated per OWES
- Wooded Area

Project Title:
Hydrogeological Assessment

Site Location:
1196-1210 Yonge St, 2-8 Birch Ave, Toronto

Figure Title:
Natural Heritage Feature Map

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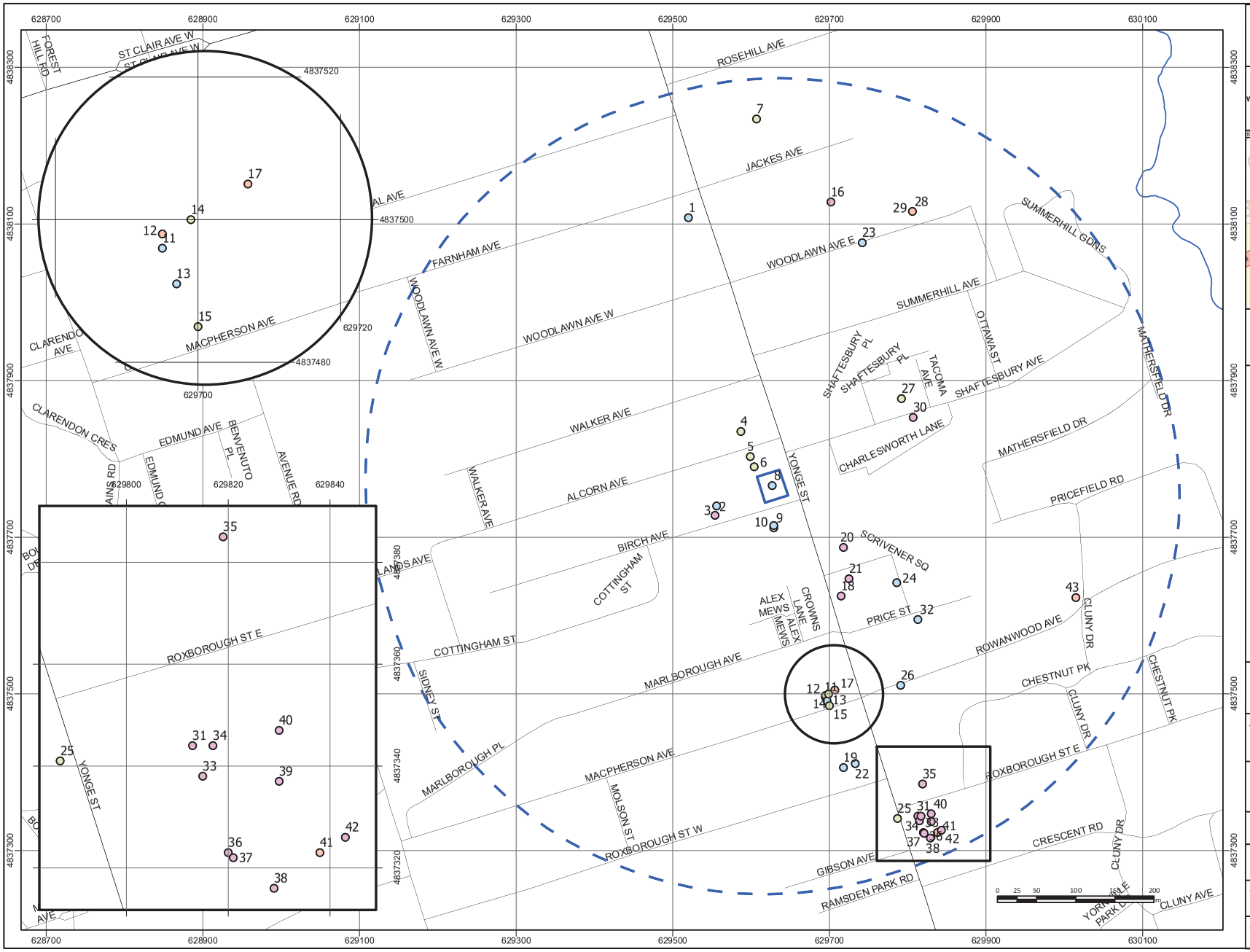
Date: March 2020	



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References:

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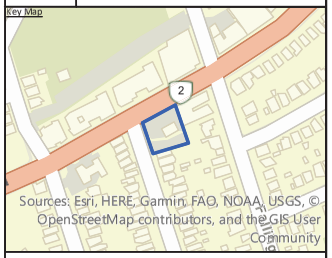

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- Approximate Study Area; 500m
- Water Course
- Collector
- Local / Street
- Unknown
- Monitoring and Test Hole
- Observation Wells
- Test Hole

Project Title:
Hydrogeological Assessment

Site Location:
1196-1210 Yonge St, 2-8 Birch Ave, Toronto

Figure Title:
MECP Well Records Map

Designed By: NA	*File No.:* 1-19-0603-46.1
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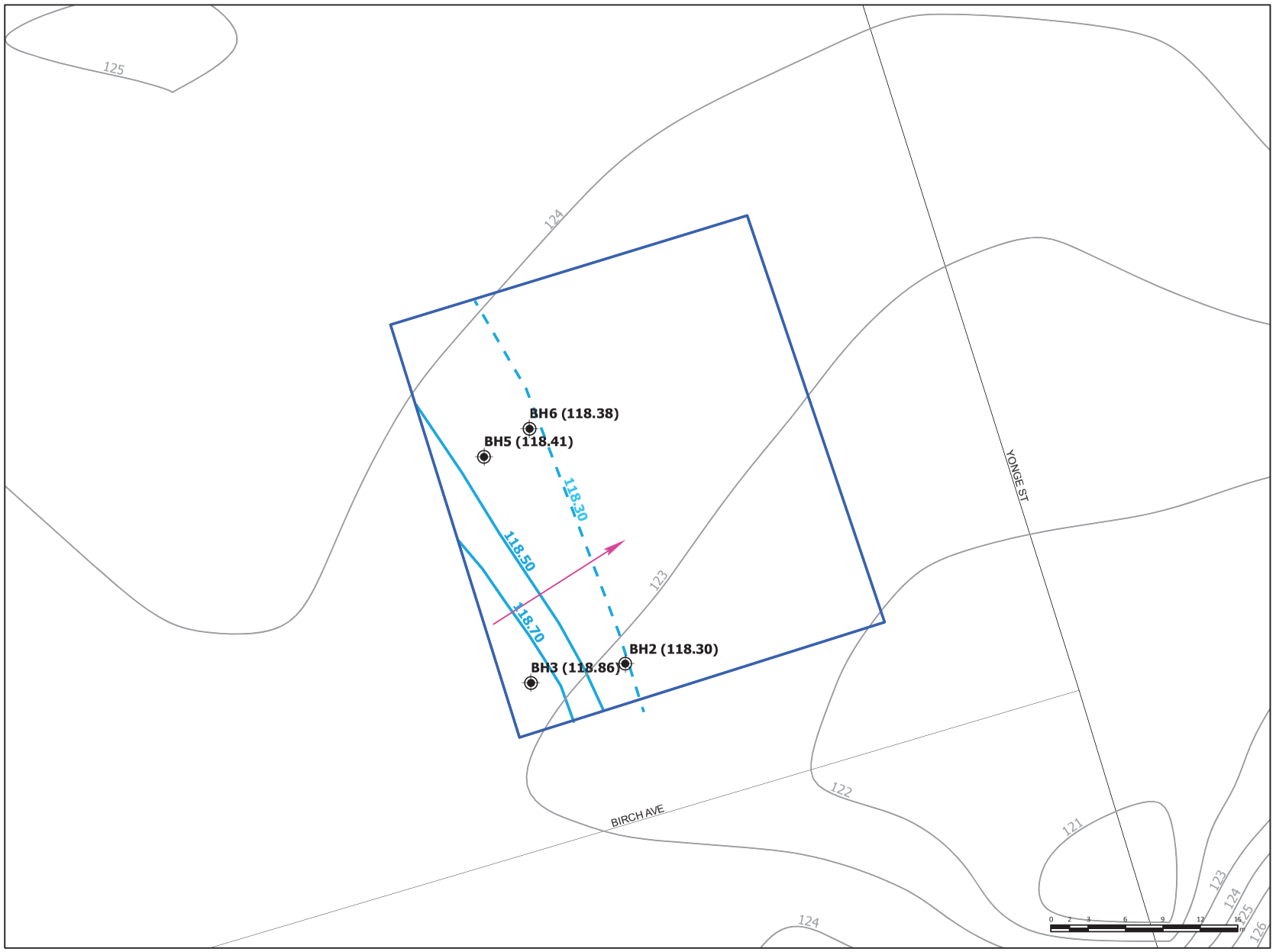
Reviewed By: BW	*Figure No.:* 7
Date: March 2020	



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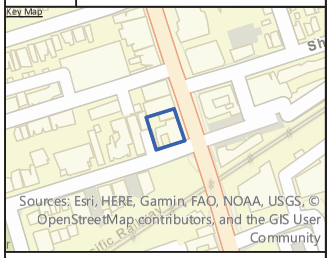
Key Map



Notes:

Legend:

- Approximate Site Location
- City of Toronto, Topographic Contours
- Approximate Monitoring Well Location
- Interpreted Ground Water Flow Direction
- Inferred Ground Water Contours
- Interpreted Ground Water Contours
- Collector
- Local / Street

Project Title:
Hydrogeological Assessment

Site Location:
1196-1210 Yonge St, 2-8 Birch Ave, Toronto

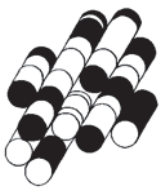
Figure Title:
Ground Water Flow Direction

Designed By: NA	*File No.:* 1-19-0603-46.1
Drawn By: SSK	*Scale:* As Shown
Reviewed By: BW	*Figure No.:* 8
Date: March 2020	

APPENDIX A

Boreholes and Monitoring Well Logs

TERRAPROBE INC.



Terraprobe

ABBREVIATIONS AND TERMINOLOGY

SAMPLING METHODS

AS	auger sample
CORE	cored sample
DP	direct push
FV	field vane
GS	grab sample
SS	split spoon
ST	shelby tube
WS	wash sample

PENETRATION RESISTANCE

Standard Penetration Test (SPT) resistance ('N' values) is defined as the number of blows by a hammer weighing 63.6 kg (140 lb.) falling freely for a distance of 0.76 m (30 in.) required to advance a standard 50 mm (2 in.) diameter split spoon sampler for a distance of 0.3 m (12 in.).

Dynamic Cone Test (DCT) resistance is defined as the number of blows by a hammer weighing 63.6 kg (140 lb.) falling freely for a distance of 0.76 m (30 in.) required to advance a conical steel point of 50 mm (2 in.) diameter and with 60° sides on 'A' size drill rods for a distance of 0.3 m (12 in.)."

COHESIONLESS SOILS

Compactness	'N' value
very loose	< 4
loose	4 – 10
compact	10 – 30
dense	30 – 50
very dense	> 50

COHESIVE SOILS

Consistency	'N' value	Undrained Shear Strength (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 (e.g)	% by weight
trace silt	< 10
some silt	10 – 20
silty	20 – 35
sand *and* silt	> 35

TESTS AND SYMBOLS

MH	mechanical sieve and hydrometer analysis
w, w_c	water content
w_L, LL	liquid limit
w_P, PL	plastic limit
I_P, PI	plasticity index
k	coefficient of permeability
γ	soil unit weight, bulk
G_s	specific gravity
φ'	internal friction angle
c'	effective cohesion
c_u	undrained shear strength

▽	Unstabilized water level
▼	1st water level measurement
▼	2nd water level measurement
▼	Most recent water level measurement
3.0 +	Undrained shear strength from field vane (with sensitivity)
C_c	compression index
c_v	coefficient of consolidation
m_v	coefficient of compressibility
e	void ratio
PID	photoionization detector
FID	flame ionization detector

FIELD MOISTURE DESCRIPTIONS

Damp	refers to a soil sample that does not exhibit any observable pore water from field/hand inspection.
Moist	refers to a soil sample that exhibits evidence of existing pore water (e.g. sample feels cool, cohesive soil is at plastic limit) but does not have visible pore water
Wet	refers to a soil sample that has visible pore water

LOG OF BOREHOLE 1

Terraprobe

Project No. : 1-19-0603-01	Client : Birch Equities Limited	Originated by : SM
Date started : January 28, 2020	Project : 1196 - 1210 Yonge St & 2 - 8 Birch Avenue	Compiled by : AR
Sheet No. : 1 of 2	Location : Toronto, Ontario	Checked by : SZ

Position : E: 629619, N: 4837747 (UTM 17T) Elevation Datum : Geodetic

Rig type : Truck-mounted Drilling Method : Hollow stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity (PL, MC, LL)	Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
0	**123.6**	**GROUND SURFACE**					123					
	123.4	50mm **ASPHALTIC CONCRETE**										
	0.2	200mm **AGGREGATE**		1	SS	12				PID: 0 FID: 0		
		FILL, sandy silt, some clay, trace gravel, compact, brown, moist										
	122.8											
1	0.8	**SILTY SAND**, trace to some clay, trace gravel, dense to very dense, brown, moist (GLACIAL TILL)		2	SS	36	122			PID: 0 FID: 0		SS2 Analysis: VOC, PHC
2				3	SS	85				PID: 30 FID: 1		
				4	SS	89 / 275mm	121			PID: 5 FID: 0		
3				5	SS	63				PID: 0 FID: 0		
4							120					
	119.0											
	4.6	**SILT AND SAND to SILTY SAND**, trace gravel, trace clay, very dense, grey, wet		6	SS	50 / 125mm	119			PID: 0 FID: 0		
5												
6		...some gravel		7	SS	79	118			PID: 10 FID: 1		SS7 Analysis: VOC, PHC
7							117					
				8	SS	50 / 150mm	116			PID: 0 FID: 1		
8							115					
9				9	SS	50 / 125mm				PID: 0 FID: 1		0 59 38 3
							114					

Penetration Test Values (Blows / 0.3m): Dynamic Cone; 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane; 40 80 120 160

Moisture / Plasticity: Plastic Limit, Natural Water Content, Liquid Limit; PL MC LL; 10 20 30

Unstabilized Water Level

Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

(continued next page)

LOG OF BOREHOLE 1

Project No. : 1-19-0603-01 | Client : Birch Equities Limited | Originated by : SM

Date started : January 28, 2020 | Project : 1196 - 1210 Yonge St & 2 - 8 Birch Avenue | Compiled by : AR

Sheet No. : 2 of 2 | Location : Toronto, Ontario | Checked by : SZ

Position : E: 629619, N: 4837747 (UTM 17T) | Elevation Datum : Geodetic

Rig type : Truck-mounted | Drilling Method : Hollow stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity (PL, MC, LL)	Headspace Vapour (ppm)	Instrument Details	Unstabilized Water Level	Lab Data and Comments
10		*(continued)*											
	112.7 10.9	**SILT AND SAND to SILTY SAND**, trace gravel, trace clay, very dense, grey, wet *(continued)*		10	SS	50 / 125mm	113			PID: 0 FID: 0			

END OF BOREHOLE

Borehole contained drill water upon completion of drilling. Unstabilized water level and cave not measured.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Feb 7, 2020	5.0	118.6
Feb 20, 2020	5.0	118.6

file: 1-19-0603-01 bh logs.gpj

LOG OF BOREHOLE 2

Terraprobe

Project No. : 1-19-0603-01	Client : Birch Equities Limited	Originated by : SM
Date started : January 6, 2020	Project : 1196 - 1210 Yonge St & 2 - 8 Birch Avenue	Compiled by : AR
Sheet No. : 1 of 2	Location : Toronto, Ontario	Checked by : SZ

Position : E: 629626, N: 4837750 (UTM 17T) Elevation Datum : Geodetic

Rig type : LAR drill rig w/ 70lb hammer Drilling Method : Tri-cone (mud rotary)

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT N' Value*	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity (PL, MC, LL)	Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
0	124.2	**GROUND SURFACE**					124					
		60mm **CONCRETE PAVERS**										
		FILL, clayey silt, trace sand, soft, dark brown, moist		1	SS	4				PID: 0 FID: 0		
	123.4											
1	0.8	**SANDY SILT**, some clay, trace gravel, compact, brown, moist		2	SS	14	123			PID: 0 FID: 0		
		...wet		3A	SS	16				PID: 0 FID: 0		
				3B						PID: 0 FID: 0		
	122.2											
2	2.0	**SILTY SAND**, trace to some clay, trace gravel, very dense, brown, moist (GLACIAL TILL)		4	SS	52 / 150mm	122			PID: 20 FID: 1		
				5	SS	50 / 150mm				PID: 20 FID: 1		
3							121					
4							120					
		...grey		6	SS	50 / 150mm				PID: 25 FID: 0		
5							119					
6	118.1											
	6.1	**SILT AND SAND to SILTY SAND**, trace gravel, trace clay, very dense, grey, wet		7	SS	50 / 75mm	118			PID: 5 FID: 0		
7							117					
				8	SS	50 / 125mm				PID: 75 FID: 0		
8							116					
9				9	SS	50 / 125mm	115			PID: 45 FID: 0		

Penetration Test Values (Blows / 0.3m): Dynamic Cone; 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane; 40 80 120 160

Moisture / Plasticity: Plastic Limit, Natural Water Content, Liquid Limit; PL MC LL; 10 20 30

Unstabilized Water Level

Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

(continued next page)

* SPT N-values corrected based on energy of 32 kg hammer dropped 760 mm

LOG OF BOREHOLE 2

Terraprobe

Project No. : 1-19-0603-01	Client : Birch Equities Limited	Originated by : SM
Date started : January 6, 2020	Project : 1196 - 1210 Yonge St & 2 - 8 Birch Avenue	Compiled by : AR
Sheet No. : 2 of 2	Location : Toronto, Ontario	Checked by : SZ

Position : E: 629626, N: 4837750 (UTM 17T) Elevation Datum : Geodetic

Rig type : LAR drill rig w/ 70lb hammer Drilling Method : Tri-cone (mud rotary)

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value*	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity (PL, MC, LL)	Headspace Vapour (ppm)	Instrument Details	Unstabilized Water Level	Lab Data and Comments (GR SA SI CL)
10		*(continued)*					114						
		SILT AND SAND to SILTY SAND, trace gravel, trace clay, very dense, grey, wet *(continued)*		10	SS	50 / 150mm				PID: 40 FID: 3			2 68 28 2
11							113						
12				11	SS	50 / 125mm	112			PID: 25 FID: 1			
13							111						
	110.4 13.8			12	SS	50 / 125mm				PID: 20 FID: 1			

END OF BOREHOLE

Borehole contained drill water upon completion of drilling. Unstabilized water level and cave not measured.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Feb 7, 2020	5.9	118.3
Feb 20, 2020	5.8	118.4

* SPT N-values corrected based on energy of 32 kg hammer dropped 760 mm

file: 1-19-0603-01 bh logs.gpj

LOG OF BOREHOLE 3

Terraprobe

Project No. : 1-19-0603-01	Client : Birch Equities Limited	Originated by : DH
Date started : October 24, 2019	Project : 1196 - 1210 Yonge St & 2 - 8 Birch Avenue	Compiled by : AR
Sheet No. : 1 of 2	Location : Toronto, Ontario	Checked by : SZ

Position : E: 629619, N: 4837749 (UTM 17T) — Elevation Datum : Geodetic

Rig type : Track-mounted — Drilling Method : Hollow stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity (PL, MC, LL)	Headspace Vapour (ppm)	Instrument Details	Unstabilized Water Level	Lab Data and Comments / GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
0	124.3	**GROUND SURFACE**					124						
	124.0	50mm **ASPHALTIC CONCRETE**		1	SS	7				PID: 0 FID: 0			
	0.3	200mm **AGGREGATE**											
		FILL, silt, some sand, trace brick fragments, loose, dark brown, moist											
	123.5						123						
1	0.8	**FILL**, sandy silt, some gravel, trace clay, compact to dense, brown, moist		2	SS	14				PID: 0 FID: 0			
		...stone fragments		3	SS	48				PID: 0 FID: 0			
2	122.2						122						
	2.1	**SILTY SAND**, trace to some clay, trace gravel, very dense, grey, moist (GLACIAL TILL)		4	SS	50 / 25mm				PID: 0 FID: 0			
3		...some gravel		5	SS	71	121			PID: 0 FID: 0			11 55 27 7
4							120						
				6	SS	84 / 275mm				PID: 0 FID: 0			
5							119						
6	118.2												
	6.1	**SILT AND SAND to SILTY SAND**, trace gravel, trace clay, dense to very dense, brown, moist		7	SS	72	118			PID: 0 FID: 0			
7							117						
		...wet below		8	SS	73				PID: 0 FID: 0			wet sampler
8							116						
				9	SS	41				PID: 0 FID: 0			
9							115						

(continued next page)

LOG OF BOREHOLE 3

Terraprobe

Project No. : 1-19-0603-01	Client : Birch Equities Limited	Originated by : DH
Date started : October 24, 2019	Project : 1196 - 1210 Yonge St & 2 - 8 Birch Avenue	Compiled by : AR
Sheet No. : 2 of 2	Location : Toronto, Ontario	Checked by : SZ

Position : E: 629619, N: 4837749 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Hollow stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity	Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
10		*(continued)*										
		SILT AND SAND to SILTY SAND, trace gravel, trace clay, dense to very dense, brown, moist *(continued)*					114					
11				10	SS	46				PID: 0 FID: 0		
							113					
12				11	SS	50 / 125mm	112			PID: 0 FID: 0		
13												
	110.3			12	SS	50 / 100mm	111			PID: 0 FID: 0		
	14.0	**END OF BOREHOLE**										

Penetration Test Values (Blows / 0.3m): Dynamic Cone; scale 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane; scale 40 80 120 160

Moisture / Plasticity: Plastic Limit, Natural Water Content, Liquid Limit; PL MC LL; scale 10 20 30

Unstabilized Water Level

Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Borehole contained drill water upon completion of drilling. Unstabilized water level and cave not measured.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Dec 10, 2019	5.7	118.6
Feb 7, 2020	5.5	118.8
Feb 20, 2020	5.4	118.9

file: 1-19-0603-01 bh logs.gpj

LOG OF BOREHOLE 4D

Terraprobe

Project No. : 1-19-0603-01	Client : Birch Equities Limited	Originated by : NK
Date started : October 23, 2019	Project : 1196 - 1210 Yonge St & 2 - 8 Birch Avenue	Compiled by : AR
Sheet No. : 1 of 3	Location : Toronto, Ontario	Checked by : SZ

Position : E: 629616, N: 4837760 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Hollow stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity (PL, MC, LL)	Headspace Vapour (ppm)	Instrument Details	Unstabilized Water Level	Lab Data and Comments (GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL)
0	124.4 GROUND SURFACE						124						
	123.8 0.6	600mm **AGGREGATE**		1	SS	9				PID: 0 FID: 0			
1	122.9 1.5	**FILL**, clayey silt, some sand, trace gravel, very soft, brown, moist		2	SS	2	123			PID: 0 FID: 0			
2	122.1 2.3	**FILL**, silty sand, trace clay, trace gravel, compact, brown, moist		3	SS	18				PID: 0 FID: 0			
		SILTY SAND, trace to some clay, trace gravel, very dense, greyish brown, moist (GLACIAL TILL)		4	SS	59	122			PID: 0 FID: 0			
3				5	SS	97 / 225mm				PID: 5 FID: 1			
							121						
4				6	SS	81 / 275mm				PID: 5 FID: 0			
							120						
5				7	SS	85				PID: 0 FID: 0			7 66 23 4
							119						
6	118.3 6.1			8	SS	75				PID: 5 FID: 0			
		SILT AND SAND to SILTY SAND, trace gravel, trace clay, dense to very dense, greyish brown, wet		9	SS	66	118			PID: 0 FID: 0			
7				10	SS	52				PID: 0 FID: 0			
							117						
8				11	SS	47				PID: 0 FID: 0			
							116						
9				12	SS	39				PID: 0 FID: 0			
				13	SS	79 / 275mm	115			PID: 0 FID: 0			

(continued next page)

LOG OF BOREHOLE 4D

Terraprobe

Project No. : 1-19-0603-01	Client : Birch Equities Limited	Originated by : NK
Date started : October 23, 2019	Project : 1196 - 1210 Yonge St & 2 - 8 Birch Avenue	Compiled by : AR
Sheet No. : 2 of 3	Location : Toronto, Ontario	Checked by : SZ

Position : E: 629616, N: 4837760 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Hollow stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity	Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
10		*(continued)*										
		SILT AND SAND to SILTY SAND, trace gravel, trace clay, dense to very dense, greyish brown, wet *(continued)*		14	SS	34	114			PID: 0 FID: 0		
11		...at 10.8 m, grey below		15	SS	38	113			PID: 0 FID: 0		
12				16	SS	46				PID: 0 FID: 0		
				17	SS	45	112			PID: 0 FID: 0		
13							111					
14				18	SS	50 / 125mm				PID: 0 FID: 0		
							110					
15				19	SS	50 / 125mm	109			PID: 0 FID: 0		
16												
							108					
17				20	SS	89 / 150mm						
							107					
18				21	SS	50 / 75mm	106					
19							105					
				22	SS	50 /						

Penetration Test Values (Blows / 0.3m): Dynamic Cone; 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane; 40 80 120 160

Moisture / Plasticity: Plastic Limit, Natural Water Content, Liquid Limit; PL MC LL; 10 20 30

Unstabilized Water Level

Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

(continued next page)

LOG OF BOREHOLE 4D

Project No. : 1-19-0603-01 | Client : Birch Equities Limited | Originated by : NK

Date started : October 23, 2019 | Project : 1196 - 1210 Yonge St & 2 - 8 Birch Avenue | Compiled by : AR

Sheet No. : 3 of 3 | Location : Toronto, Ontario | Checked by : SZ

Position : E: 629616, N: 4837760 (UTM 17T) | Elevation Datum : Geodetic

Rig type : Track-mounted | Drilling Method : Hollow stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
		(continued)				
20		**SILT AND SAND to SILTY SAND**, trace gravel, trace clay, dense to very dense, greyish brown, wet *(continued)*				75mm
21				23	SS	50 / 125mm
22						
	101.4 / 23.0			24	SS	50 / 100mm

Elevation Scale (m): 104, 103, 102

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane; 40 80 120 160

Moisture / Plasticity: Plastic Limit, Natural Water Content, Liquid Limit; PL MC LL; 10 20 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

END OF BOREHOLE

Borehole contained drill water upon completion of drilling. Unstabilized water level and cave not measured.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Dec 10, 2019	7.4	117.0
Feb 7, 2020	7.0	117.4
Feb 20, 2020	6.9	117.5

file: 1-19-0603-01 bh logs.gpj

LOG OF BOREHOLE 4S

Terraprobe

Project No. : 1-19-0603-01	Client : Birch Equities Limited	Originated by : NK
Date started : October 23, 2019	Project : 1196 - 1210 Yonge St & 2 - 8 Birch Avenue	Compiled by : AR
Sheet No. : 1 of 1	Location : Toronto, Ontario	Checked by : SZ

Position : E: 629615, N: 4837762 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Hollow stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0	124.4	**GROUND SURFACE**				
		Augered to 7.6m below ground surface without sampling.				
7	116.8					
	7.6	**END OF BOREHOLE**				

Elevation Scale (m): 124, 123, 122, 121, 120, 119, 118, 117

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane — 40 80 120 160

Moisture / Plasticity: Plastic Limit, Natural Water Content, Liquid Limit — PL MC LL — 10 20 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Borehole contained drill water upon completion of drilling. Unstabilized water level and cave not measured.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Dec 10, 2019	5.9	118.5
Feb 7, 2020	5.7	118.7

file: 1-19-0603-01 bh logs.gpj

LOG OF BOREHOLE 5

Terraprobe

Project No. : 1-19-0603-01	Client : Birch Equities Limited	Originated by : SD
Date started : October 25, 2019	Project : 1196 - 1210 Yonge St & 2 - 8 Birch Avenue	Compiled by : AR
Sheet No. : 1 of 2	Location : Toronto, Ontario	Checked by : SZ

Position : E: 629615, N: 4837767 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Hollow stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity (PL, MC, LL)	Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
0	**124.6**	**GROUND SURFACE**										
		FILL, sand and gravel, some silt, trace clay, loose, brown, moist		1	SS	8	124			PID: 0 FID: 0		
1				2	SS	9				PID: 0 FID: 0		
		...stone fragments		3	SS	50 / 125mm	123			PID: 0 FID: 0		
2	122.3 / 2.3											
		SILT AND SAND to SILTY SAND, trace gravel, trace clay, very dense, brown, moist		4	SS	76	122			PID: 0 FID: 0		
3				5	SS	87 / 275mm				PID: 0 FID: 0		
							121					
4												
				6	SS	84 / 275mm	120			PID: 0 FID: 0		
5												
							119					
6		...wet below		7	SS	77 / 275mm				PID: 0 FID: 0		
							118					
7												
		...grey below		8	SS	83 / 275mm	117			PID: 0 FID: 0		
8												
							116					
9				9	SS	91 / 250mm				PID: 0 FID: 0		
							115					

Penetration Test Values (Blows / 0.3m): Dynamic Cone; scale 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane; scale 40 80 120 160

Moisture / Plasticity: Plastic Limit, Natural Water Content, Liquid Limit; PL MC LL; scale 10 20 30

Unstabilized Water Level

Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

(continued next page)

LOG OF BOREHOLE 5

Terraprobe

Project No. : 1-19-0603-01	Client : Birch Equities Limited	Originated by : SD
Date started : October 25, 2019	Project : 1196 - 1210 Yonge St & 2 - 8 Birch Avenue	Compiled by : AR
Sheet No. : 2 of 2	Location : Toronto, Ontario	Checked by : SZ

Position : E: 629615, N: 4837767 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Hollow stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity	Headspace Vapour (ppm)	Instrument Details	Unstabilized Water Level	Lab Data and Comments
10		*(continued)*						Dynamic Cone 10 20 30 40; Unconfined, Pocket Penetrometer, Field Vane, Lab Vane 40 80 120 160	Plastic Limit, Natural Water Content, Liquid Limit PL MC LL 10 20 30				GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
		SILT AND SAND to SILTY SAND, trace gravel, trace clay, very dense, brown, moist *(continued)*											
				10	SS	64	114			PID: 15 FID: 0			
11													
							113						
12				11	SS	50 / 125mm				PID: 20 FID: 0			
							112						
13													
							111						
14	110.4			12	SS	58				PID: 0 FID: 0			
	14.2												

END OF BOREHOLE

Borehole contained drill water upon completion of drilling. Unstabilized water level and cave not measured.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Dec 10, 2019	6.4	118.2

file: 1-19-0603-01 bh logs.gpj

LOG OF BOREHOLE 6

Terraprobe

Project No. : 1-19-0603-01	Client : Birch Equities Limited	Originated by : SD
Date started : October 28, 2019	Project : 1196 - 1210 Yonge St & 2 - 8 Birch Avenue	Compiled by : AR
Sheet No. : 1 of 2	Location : Toronto, Ontario	Checked by : SZ

Position : E: 629619, N: 4837769 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Hollow stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity	Headspace Vapour (ppm)	Instrument Details	Unstabilized Water Level	Lab Data and Comments
0	124.7	**GROUND SURFACE**					124	Dynamic Cone 10 20 30 40; Unconfined, Pocket Penetrometer, Field Vane, Lab Vane 40 80 120 160	Plastic Limit, Natural Water Content, Liquid Limit PL MC LL 10 20 30				GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
		FILL, clayey silt, sandy, trace rootlets, firm, dark brown, moist		1	SS	5				PID: 15 FID: 0			
	123.9 / 0.8	**FILL**, sandy silt, trace clay, trace gravel, loose, brown, moist		2	SS	6	123			PID: 0 FID: 0			
1	123.2 / 1.5	**SILTY SAND**, trace to some clay, trace gravel, compact to very dense, greyish brown, moist (GLACIAL TILL)		3	SS	24				PID: 0 FID: 0			
				4	SS	72	122			PID: 0 FID: 0			
2				5	SS	89				PID: 0 FID: 0			
3							121						
4				6	SS	76	120			PID: 5 FID: 0			
5							119						
6	118.6 / 6.1	**SILT AND SAND to SILTY SAND**, trace gravel, trace clay, very dense, grey, wet		7	SS	55				PID: 5 FID: 0			
7							118						
8				8	SS	65	117			PID: 0 FID: 0			
9				9	SS	65	116			PID: 0 FID: 0			
							115						

(continued next page)

LOG OF BOREHOLE 6

Project No. : 1-19-0603-01 | Client : Birch Equities Limited | Originated by : SD

Date started : October 28, 2019 | Project : 1196 - 1210 Yonge St & 2 - 8 Birch Avenue | Compiled by : AR

Sheet No. : 2 of 2 | Location : Toronto, Ontario | Checked by : SZ

Position : E: 629619, N: 4837769 (UTM 17T) | Elevation Datum : Geodetic

Rig type : Track-mounted | Drilling Method : Hollow stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity	Headspace Vapour (ppm)	Instrument Details	Unstabilized Water Level	Lab Data and Comments
10		(continued)					114	Dynamic Cone 10 20 30 40; Unconfined, Pocket Penetrometer, Field Vane, Lab Vane 40 80 120 160	Plastic Limit, Natural Water Content, Liquid Limit; PL MC LL 10 20 30				GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
		SILT AND SAND to SILTY SAND, trace gravel, trace clay, very dense, grey, wet *(continued)*											
11				10	SS	41	113			PID: 0 FID: 0			2 67 28 3
12		...silt, some sand		11	SS	81	112			PID: 0 FID: 0			
13							111						
14	110.5 14.2			12	SS	86				PID: 0 FID: 0			

END OF BOREHOLE

Borehole contained drill water upon completion of drilling. Unstabilized water level and cave not measured.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

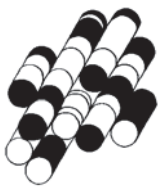
Date	Water Depth (m)	Elevation (m)
Dec 10, 2019	6.5	118.2

file: 1-19-0603-01 bh logs.gpj

APPENDIX B

MECP Well Records

TERRAPROBE INC.



MECP Well Records Summary

WELL ID	MECP* WWR ID	Construction Method	Well Depth (m)**	Well Usage		Water Found (m)**	Static Water Level (m)**	Top of Screen Depth (m)**	Bottom of Screen Depth (m)**	Date Completed
				Final Status	First Use					
1	7256353	Other Method	4.60	Observation Wells	Monitoring	-	-	3.10	4.60	2015-12-30
2	7295830	Direct Push	8.54	Monitoring and Test Hole	Test Hole	-	-	5.49	8.54	2017-08-24
3	6929668	Boring	9.10	Observation Wells	-	7.60	-	6.00	9.10	2005-09-29
4	7194696	-	-	-	-	-	-	-	-	2012-02-15
5	7172077	Direct Push	9.15	-	Monitoring	-	-	6.10	9.15	2011-10-20
6	7172078	Direct Push	7.63	-	Monitoring	-	-	4.58	7.63	2011-10-20
7	7270093	-	-	-	-	-	-	-	-	2016-07-21
8	6929886	Other Method	6.70	Observation Wells	Not Used	-	-	5.20	6.70	2006-02-15
9	7143611	Rotary (Convent.)	-	Observation Wells	-	11.60	-	-	-	2010-01-16
10	7143612	Rotary (Convent.)	33.50	Observation Wells	Monitoring	11.60	-	30.50	33.50	2010-01-15
11	7263564	Direct Push	6.10	Observation Wells	Commerical	-	-	3.05	6.10	2016-04-05
12	7263563	Direct Push	6.10	Test Hole	Monitoring and Test Hole	-	-	3.05	6.10	2016-04-08
13	7263565	Direct Push	6.10	Observation Wells	-	-	-	3.05	6.10	2016-04-05
14	7218676		-	-	-	-	-	-	-	2013-07-17
15	7238239	Rotary (Convent.)	9.76	-	Test Hole	-	-	11.29	9.76	2015-01-09
16	7235362	Direct Push	5.19	Monitoring and Test Hole	Monitoring and Test Hole	-	-	2.14	5.19	2014-12-09
17	7211366	-	2.14	Test Hole	Monitoring and Test Hole	-	-	4.58	2.14	2013-07-18
18	7284443	Rotary (Convent.)	13.73	Monitoring and Test Hole	Test Hole	4.58	-	10.68	13.73	2016-12-07
19	7120228	Rotary (Convent.)	-	Observation Wells	Monitoring	-	-	-	-	2008-07-15
20	7284445	Rotary (Convent.)	13.73	Monitoring and Test Hole	Test Hole	10.98	-	10.68	13.73	2016-12-19
21	7284444	Rotary (Convent.)	13.73	Monitoring and Test Hole	Test Hole	10.37	-	10.68	13.73	2016-12-09
22	7043604	Other Method	7.01	Observation Wells	-	-	-	2.44	7.01	2007-04-16
23	7225600	Boring	6.10	Observation Wells	Test Hole	-	-	9.15	6.10	-
24	7256183	Boring	9.15	Observation Wells	Monitoring	-	-	12.20	9.15	2015-11-03
25	7264373	-	-	-	-	-	-	-	-	2016-05-25
26	6928231	Boring	4.50	Observation Wells	-	1.00	-	3.00	4.50	2004-10-04
27	7284464	-		-	-	-	-	-	-	2016-07-11
28	7226934	Direct Push	6.41	Test Hole	Monitoring and Test Hole	-	-	3.36	6.41	2014-07-19

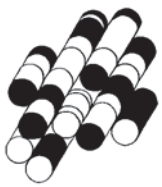
WELL ID	MECP* WWR ID	Construction Method	Well Depth (m)**	Well Usage		Water Found (m)**	Static Water Level (m)**	Top of Screen Depth (m)**	Bottom of Screen Depth (m)**	Date Completed
				Final Status	First Use					
29	7226934	Direct Push	6.41	Test Hole	Monitoring and Test Hole	-	-	3.36	6.41	2014-07-19
30	7208710	Direct Push	2.75	Monitoring and Test Hole	Monitoring and Test Hole	-	-	1.22	2.75	2013-08-28
31	7265162	Direct Push	6.10	Monitoring and Test Hole	Monitoring and Test Hole	-	-	4.58	6.10	2016-05-17
32	7206969	Rotary (Convent.)	12.20	Observation Wells	Monitoring	-	-	15.25	12.20	2013-07-14
33	7265161	Direct Push	4.58	Monitoring and Test Hole	Monitoring and Test Hole	-	-	3.05	4.58	2016-05-17
34	7265163	Direct Push	4.58	Monitoring and Test Hole	Monitoring and Test Hole	-	-	3.05	4.58	2016-05-17
35	7265166	Direct Push	6.10	Monitoring and Test Hole	Monitoring and Test Hole	-	-	4.58	6.10	2016-05-17
36	7265167	Direct Push	7.32	Monitoring and Test Hole	Monitoring and Test Hole	-	-	4.27	7.32	2016-05-18
37	7265168	Direct Push	5.80	Monitoring and Test Hole	Monitoring and Test Hole	-	-	4.27	5.80	2016-05-18
38	7265169	Direct Push	4.58	Monitoring and Test Hole	Monitoring and Test Hole	-	-	3.05	4.58	2016-05-18
39	7265165	Direct Push	4.58	Monitoring and Test Hole	Monitoring and Test Hole	-	-	3.05	4.58	2016-05-17
40	7265164	Direct Push	6.10	Monitoring and Test Hole	Monitoring and Test Hole	-	-	4.58	6.10	2016-05-17
41	7288943	Boring	7.02	Test Hole	Test Hole	-	-	3.97	7.02	2017-01-17
42	7265170	Direct Push	4.58	Monitoring and Test Hole	Monitoring and Test Hole	-	-	3.36	4.58	2016-05-18
43	6909224	Cable Tool	36.60	Test Hole	Not Used	6.10	9.76	27.15	36.60	1969-04-24

*MECP WWID: Ministry of the Environment , Conservation and Parks Water Well Records Identification
**metres below ground surface

APPENDIX C

Groundwater Monitoring Details

TERRAPROBE INC.



1196-1210 Yonge Street and 2-8 Birch Avenue, Toronto

Ground Water Depths (meter below ground surface)

Monitoring Well ID	Ground Surface Elevation (masl)	Stick up (m)	Well Depth (mbgs)	Top of the Well Screen Depth (mbgs)		1st GW Monitoring Event	2nd GW Monitoring Event	3rd GW Monitoring Event	4th GW Monitoring Event	5th GW Monitoring Event	6th GW Monitoring Event
					Depth to water December 10, 2019 (mbgs)	Depth to water February7, 2020 (mbgs)	Depth to water February 20, 2020 (mbgs)	Depth to water March 4, 2020 (mbgs)	Depth to water March 18, 2020 (mbgs)	Depth to water April 1, 2020 (mbgs)	Depth to water April 16, 2020 (mbgs)
BH1	123.65	0.00	10.60	7.55	WNI	4.99	4.96	4.95	4.97	4.97	5.00
BH2	124.15	0.00	13.70	10.65	WNI	5.93	5.83	5.85	5.84	5.85	5.89
BH3	124.30	0.00	13.70	10.65	5.66	5.51	5.44	5.44	5.47	5.47	5.49
BH4D	124.41	0.00	22.86	19.81	7.44	6.99	6.94	6.95	6.97	6.96	7.02
BH4S	124.40	0.00	7.60	4.55	5.87	5.66	5.67*	5.63	5.60	5.63	5.67
BH5	124.58	0.00	13.70	10.65	6.39	NA	6.31*	6.17	6.20	6.21	6.25
BH6	124.66	0.00	13.75	10.70	6.50	6.26	6.23*	6.28	6.30	6.31	6.34

Ground Water Elevations (meters above sea level)

Monitoring Well ID	Ground Surface Elevation (masl)	Top of the Riser Elevation (masl)	Well Screen Bottom Elevation (masl)	Top of the Well Screen Elevation (masl)		1st GW Monitoring Event	2nd GW Monitoring Event	3rd GW Monitoring Event	4th GW Monitoring Event	5th GW Monitoring Event	6th GW Monitoring Event
					Groundwater Level Elevation Dercember 10, 2019 (masl)	Groundwater Level Elevation February 7, 2020 (masl)	Groundwater Level Elevation February 20, 2020 (masl)	Groundwater Level Elevation March 4, 2020 (masl)	Groundwater Level Elevation March 18, 2020 (masl)	Groundwater Level Elevation April 1 2020 (masl)	Groundwater Level Elevation April 16, 2020 (masl)
BH1	123.65	123.65	113.05	116.10	WNI	118.66	118.69	118.70	118.68	118.68	118.65
BH2	124.15	124.15	110.45	113.50	WNI	118.22	118.32	118.30	118.31	118.30	118.26
BH3	124.30	124.30	101.44	113.65	118.64	118.79	118.86	118.86	118.83	118.83	118.81
BH4D	124.41	124.41	101.55	104.60	124.41	117.42	117.47	117.46	117.44	117.45	117.39
BH4S	124.40	124.40	116.80	119.85	118.53	118.74	118.73	118.77	118.80	118.77	118.73
BH5	124.58	124.58	110.88	113.93	118.19	NA	118.27	118.41	118.38	118.37	118.33
BH6	124.66	124.66	110.91	113.96	118.16	118.40	118.43	118.38	118.36	118.35	118.32

Note: mbgs - meters below ground surface

masl - meters above sea level

NA - not available (Covered by Ice and Snow)

NM - not measured

WNI - well not installed

*groundwater level was measured on February 27, 2020 due to snow cover

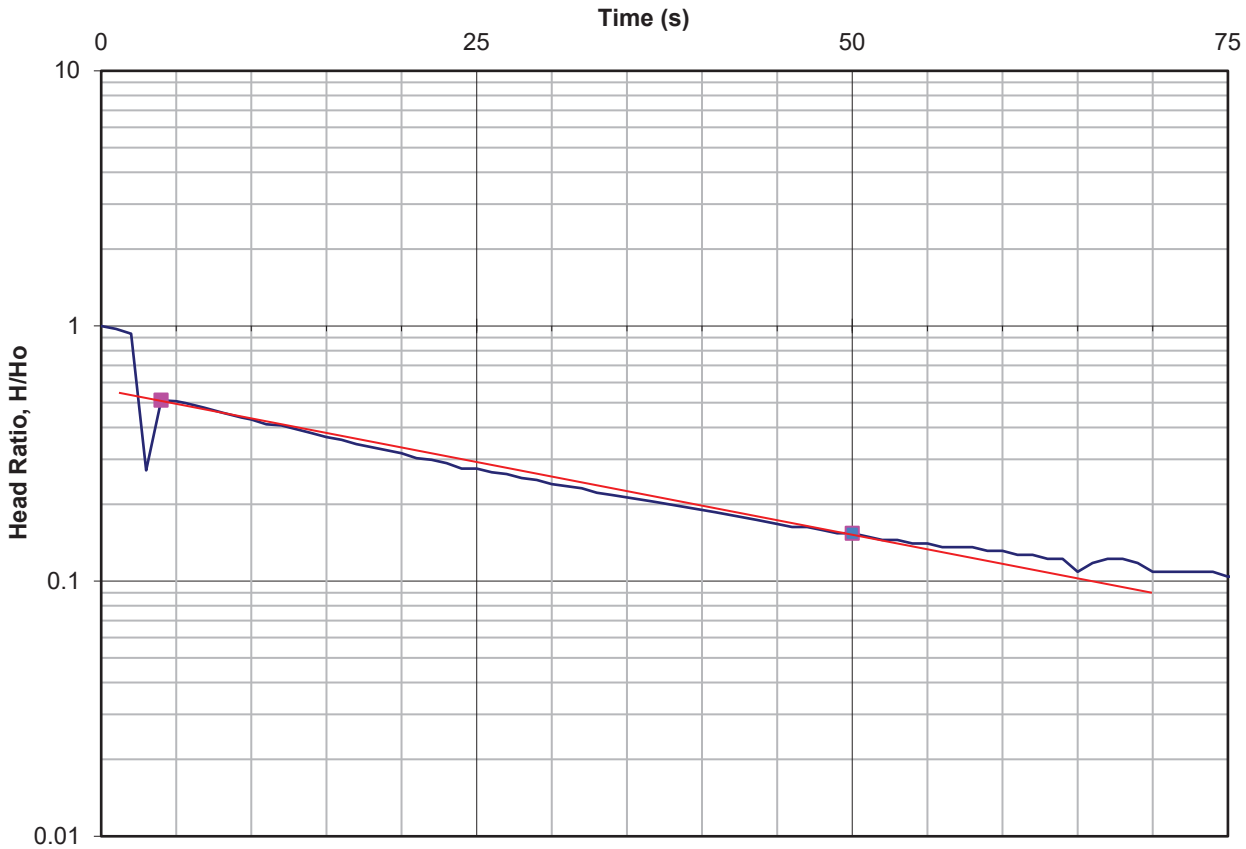
APPENDIX D

In-situ Hydraulic Conductivity Test Results

TERRAPROBE INC.

Terraprobe Inc.	**Hydraulic Conductivity Test Analysis Report**
	Projcet Reference No. 1-19-0603-46.1
	Client: Birch Equities Limited

Location: 1196-1210 Yonge Street, 2-8 Birch Avenue, Toronto	Monitoring Well: BH1
Test Conducted by: JB	Test Date: February 7, 2020
Analysis Performed by: NA	FHT
Aquifer Thickness: At least 6.3 m	



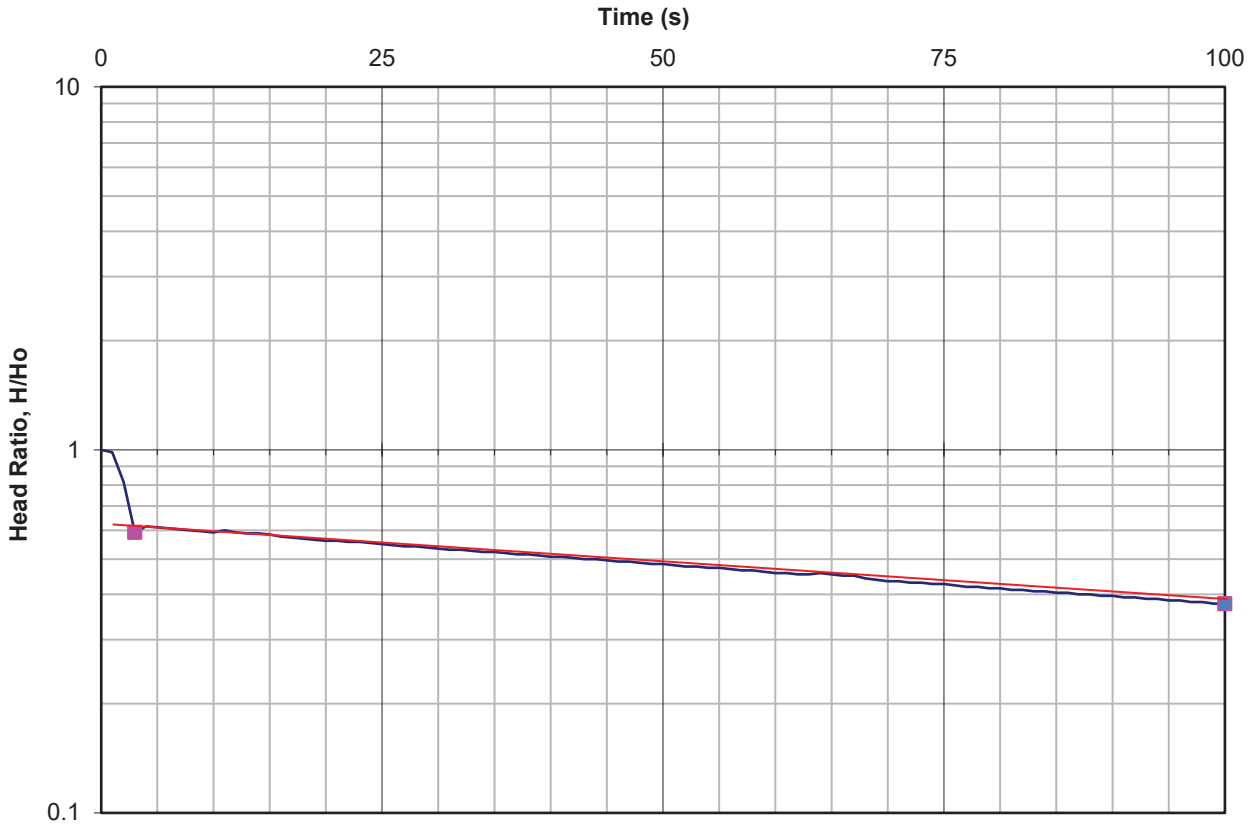
Calculation using Bouwer and Rice, 1976

Observation Well	Hydraulic Conductivity (m/s)	Soil
BH1	8.99E-06	Silt and Sand to Silty Sand

FHT: Falling Head Test

Terraprobe Inc.	**Hydraulic Conductivity Test Analysis Report**
	Projcet Reference No. 1-19-0603-46.1
	Client: Birch Equities Limited

Location: 1196-1210 Yonge Street, 2-8 Birch Avenue, Toronto	Monitoring Well: BH2
Test Conducted by: JB	Test Date: February 7, 2020
Analysis Performed by: NA	FHT
Aquifer Thickness: At least 7.7 m	



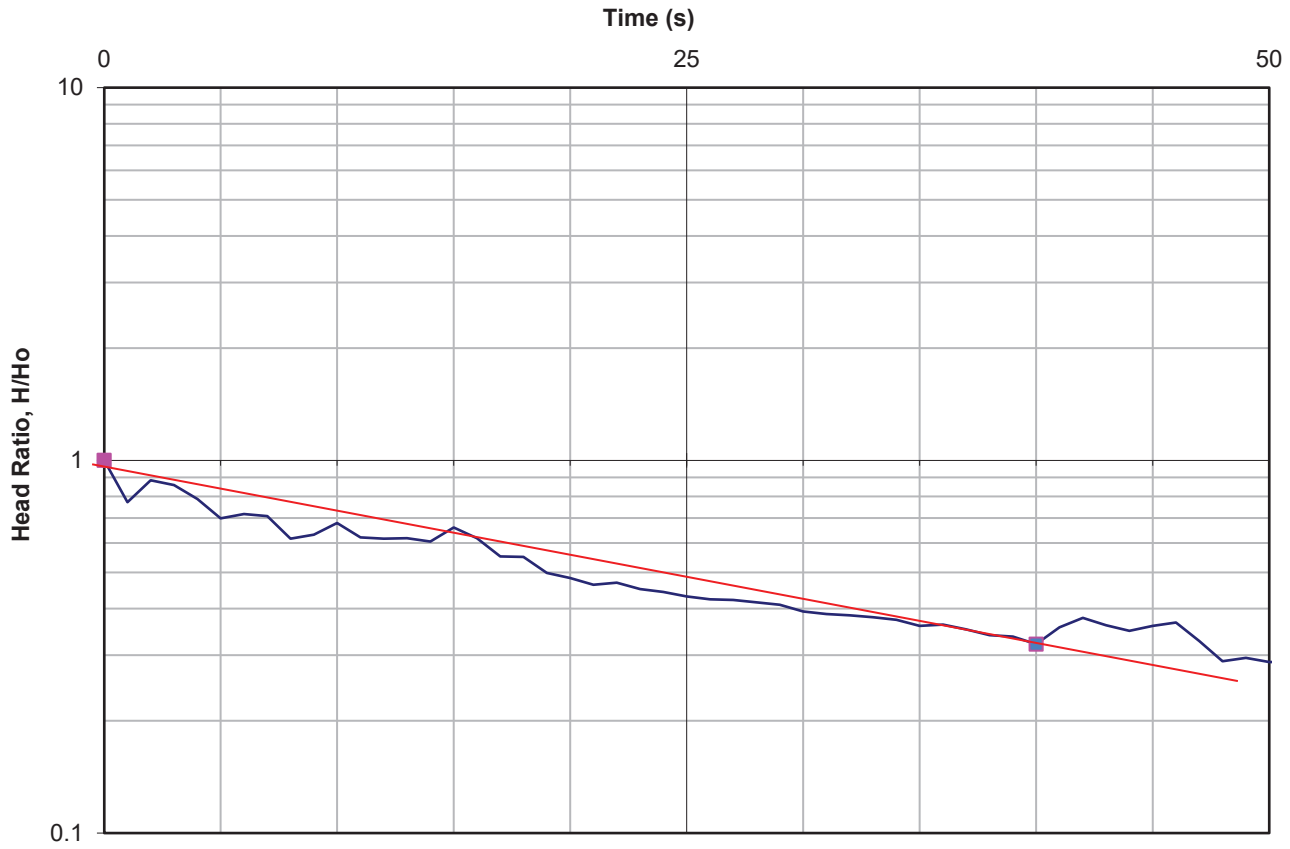
Calculation using Bouwer and Rice, 1976

Observation Well	Hydraulic Conductivity (m/s)	Soil
BH2	1.60E-06	Silt and Sand to Silty Sand

FHT: Falling Head Test

Terraprobe Inc.	**Hydraulic Conductivity Test Analysis Report**
	Projcet Reference No. 1-19-0603-46.1
	Client: Birch Equities Limited

Location: 1196-1210 Yonge Street, 2-8 Birch Avenue, Toronto	Monitoring Well: BH3
Test Conducted by: H.H	Test Date: November, 10, 2019
Analysis Performed by: NA	FHT
Aquifer Thickness: At least 7.9 m	



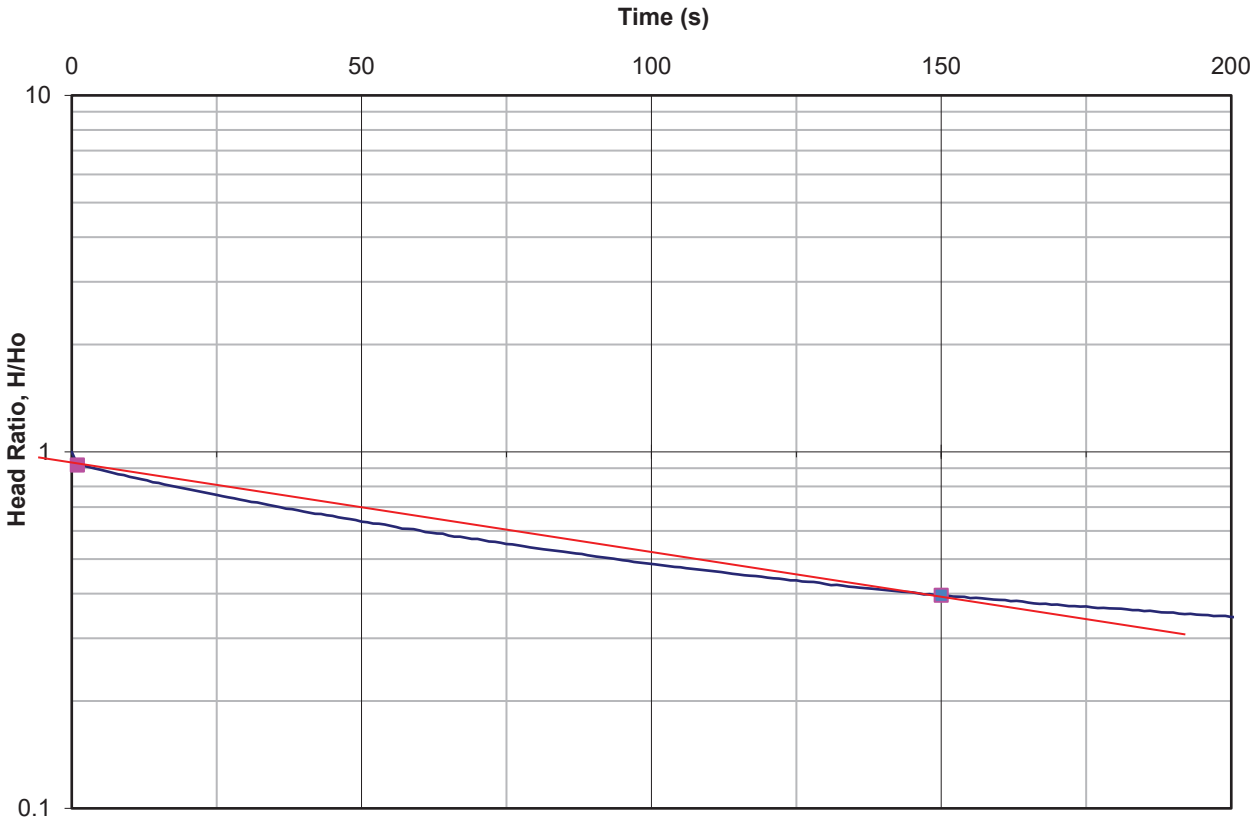
Calculation using Bouwer and Rice, 1976

Observation Well	Hydraulic Conductivity (m/s)	Soil
BH3	9.77E-06	Silt and Sand to Silty Sand

FHT: Falling Head Test

Terraprobe Inc.	**Hydraulic Conductivity Test Analysis Report**
	Projcet Reference No. 1-19-0603-46.1
	Client: Birch Equities Limited

Location: 1196-1210 Yonge Street, 2-8 Birch Avenue, Toronto	Monitoring Well: BH4D
Test Conducted by: H.H	Test Date: November, 10, 2019
Analysis Performed by: NA	FHT
Aquifer Thickness: At least 16.9 m	



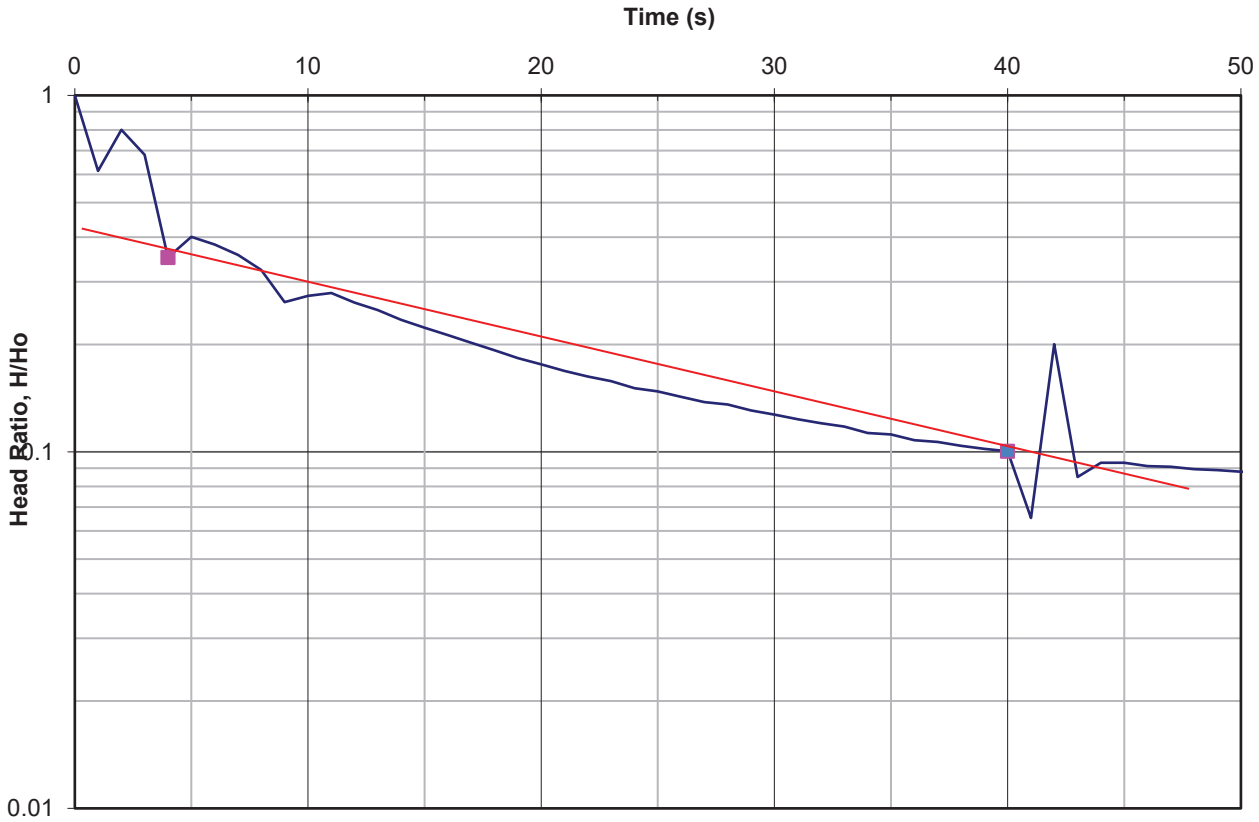
Calculation using Bouwer and Rice, 1976

Observation Well	Hydraulic Conductivity (m/s)	Soil
BH4D	1.94E-06	Silt and Sand to Silty Sand

FHT: Falling Head Test

Terraprobe Inc.	**Hydraulic Conductivity Test Analysis Report**
	Projcet Reference No. 1-19-0603-46.1
	Client: Birch Equities Limited

Location: 1196-1210 Yonge Street, 2-8 Birch Avenue, Toronto	Monitoring Well: BH5
Test Conducted by: H.H	Test Date: November, 10, 2019
Analysis Performed by: NA	FHT
Aquifer Thickness: At least 11.9 m	



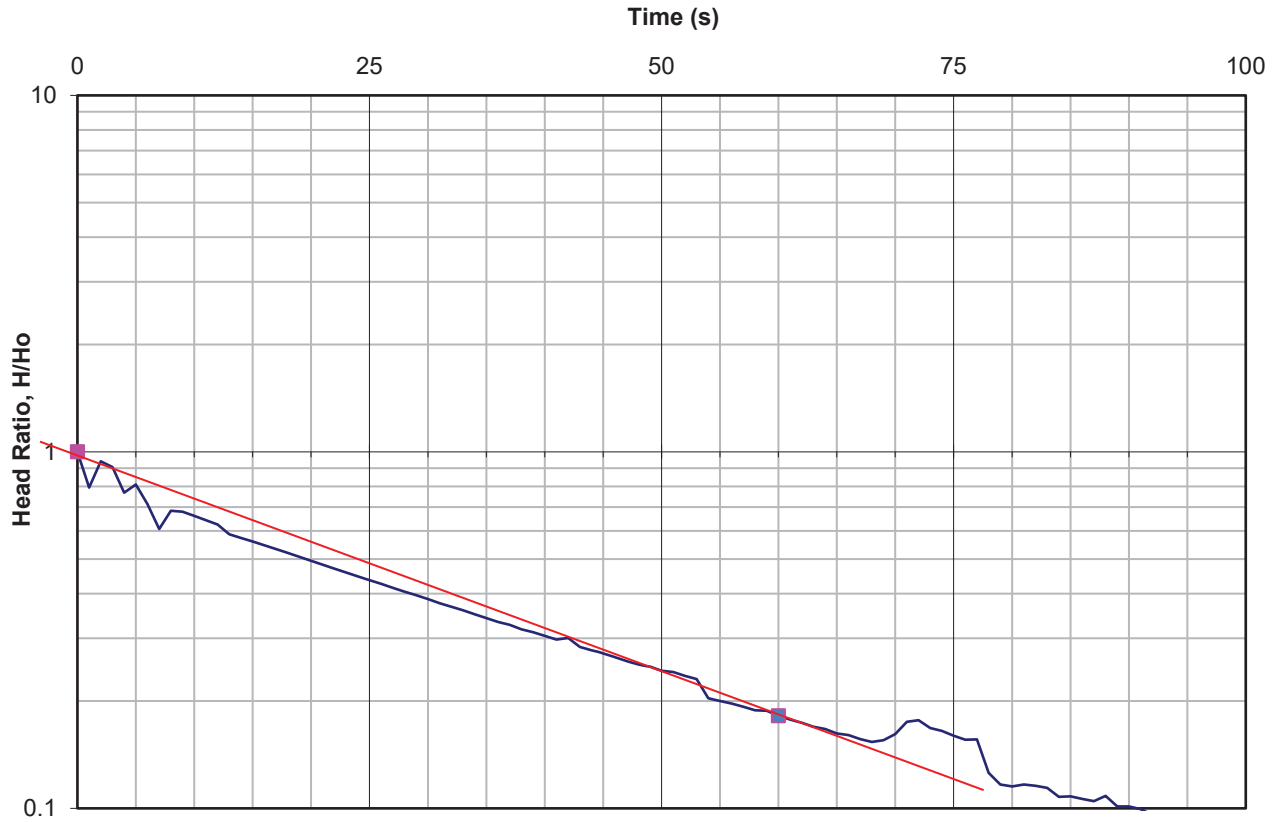
Calculation using Bouwer and Rice, 1976

Observation Well	Hydraulic Conductivity (m/s)	Soil
BH5	1.20E-05	Silt and Sand to Silty Sand

FHT: Falling Head Test

Terraprobe Inc.	**Hydraulic Conductivity Test Analysis Report**
	Projcet Reference No. 1-19-0603-46.1
	Client: Birch Equities Limited

Location: 1196-1210 Yonge Street, 2-8 Birch Avenue, Toronto	Monitoring Well: BH6
Test Conducted by: H.H	Test Date: November, 11, 2019
Analysis Performed by: NA	FHT
Aquifer Thickness: At least 8.1 m	



Calculation using Bouwer and Rice, 1976

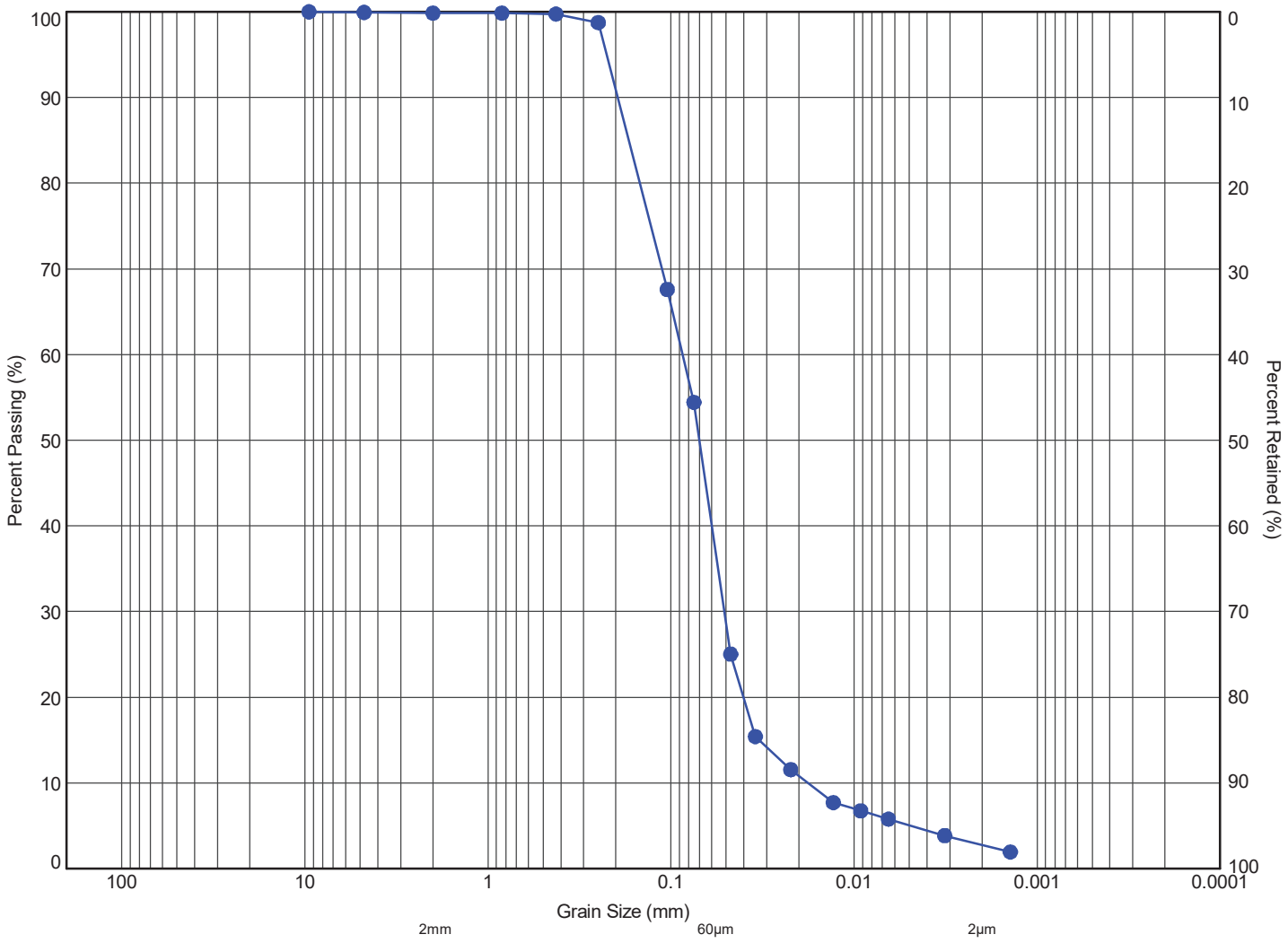
Observation Well	Hydraulic Conductivity (m/s)	soil
BH6	9.78E-06	Silt and Sand to Silty Sand

FHT: Falling Head Test

APPENDIX E

Grain Size Distribution Graphs at Infiltration Test Location

TERRAPROBE INC.



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

MIT SYSTEM

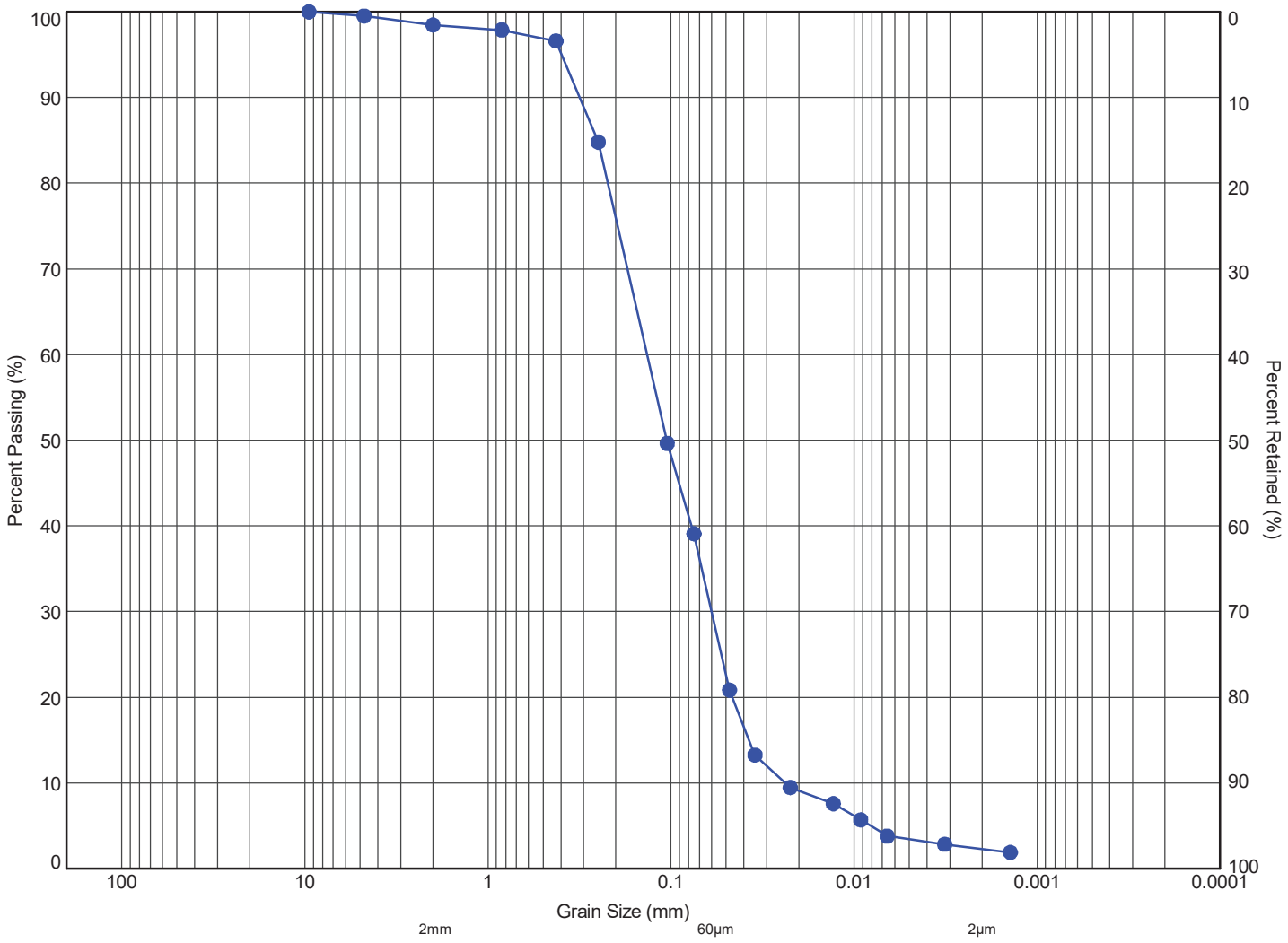
	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**1**	SS9	9.3	114.3	0	59	38	3	

Terraprobe
11 Indell Lane, Brampton Ontario L6T 3Y3
(905) 796-2650

Title:

GRAIN SIZE DISTRIBUTION
SAND AND SILT, TRACE CLAY

File No.: **1-19-0603-01**



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

MIT SYSTEM

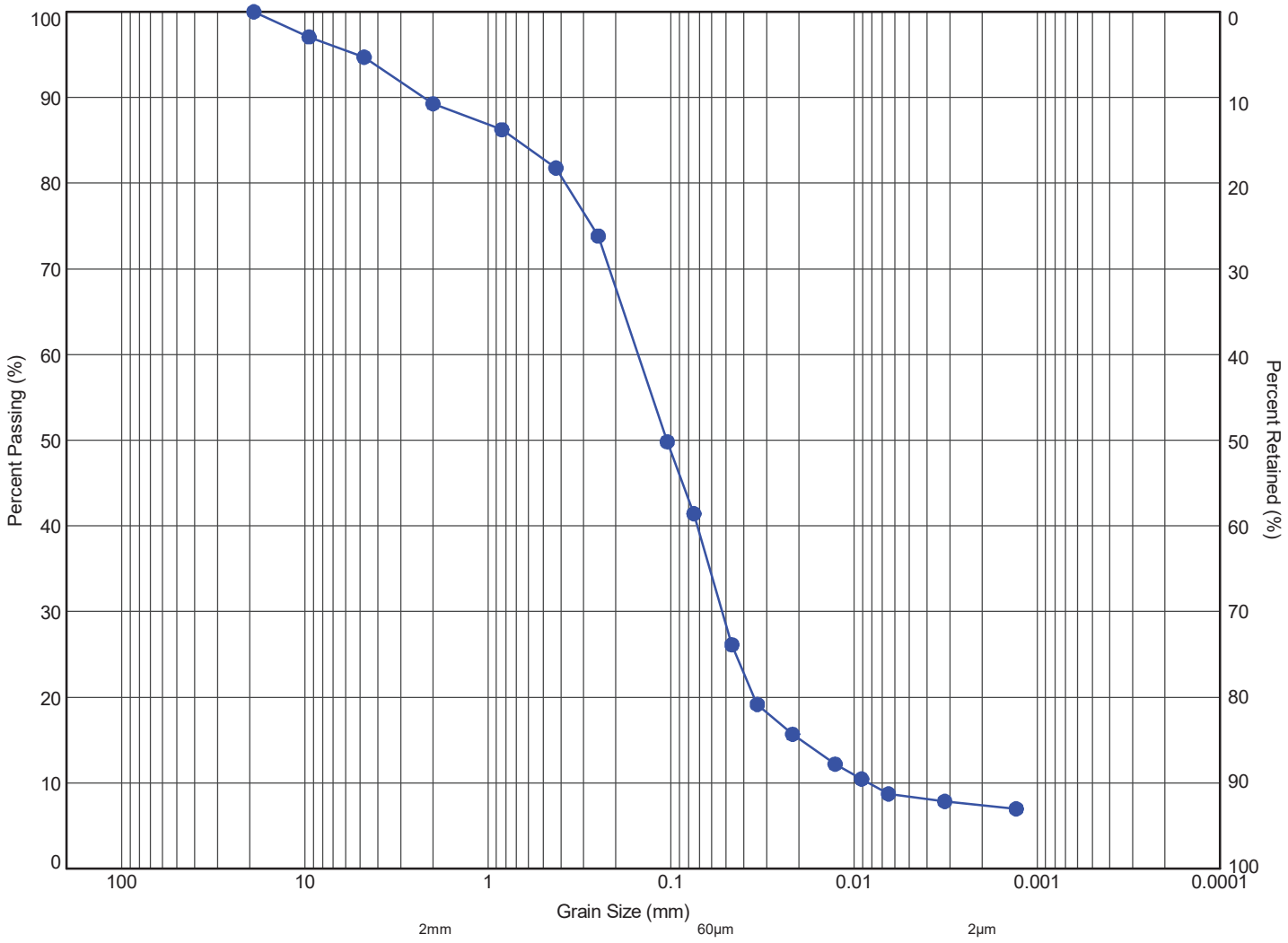
	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**2**	SS10	10.8	113.4	2	68	28	2	

Terraprobe
11 Indell Lane, Brampton Ontario L6T 3Y3
(905) 796-2650

Title:

GRAIN SIZE DISTRIBUTION
SILTY SAND, TRACE CLAY, TRACE GRAVEL

File No.: **1-19-0603-01**



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

MIT SYSTEM

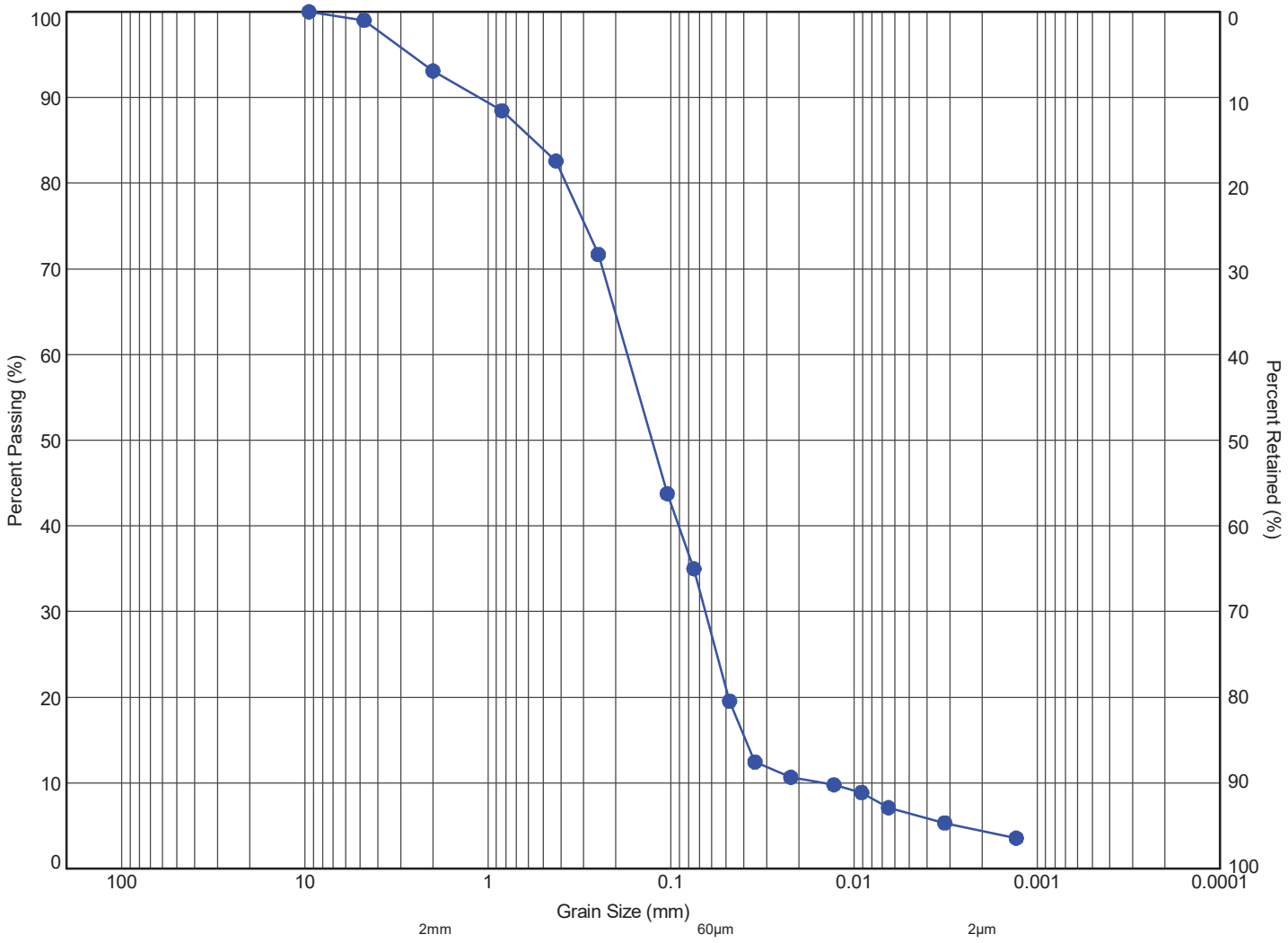
	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**3**	SS5	3.3	121.0	11	55	27	7	

Terraprobe
11 Indell Lane, Brampton Ontario L6T 3Y3
(905) 796-2650

Title:

GRAIN SIZE DISTRIBUTION
SILTY SAND, SOME GRAVEL, TRACE CLAY

File No.: **1-19-0603-01**



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

MIT SYSTEM

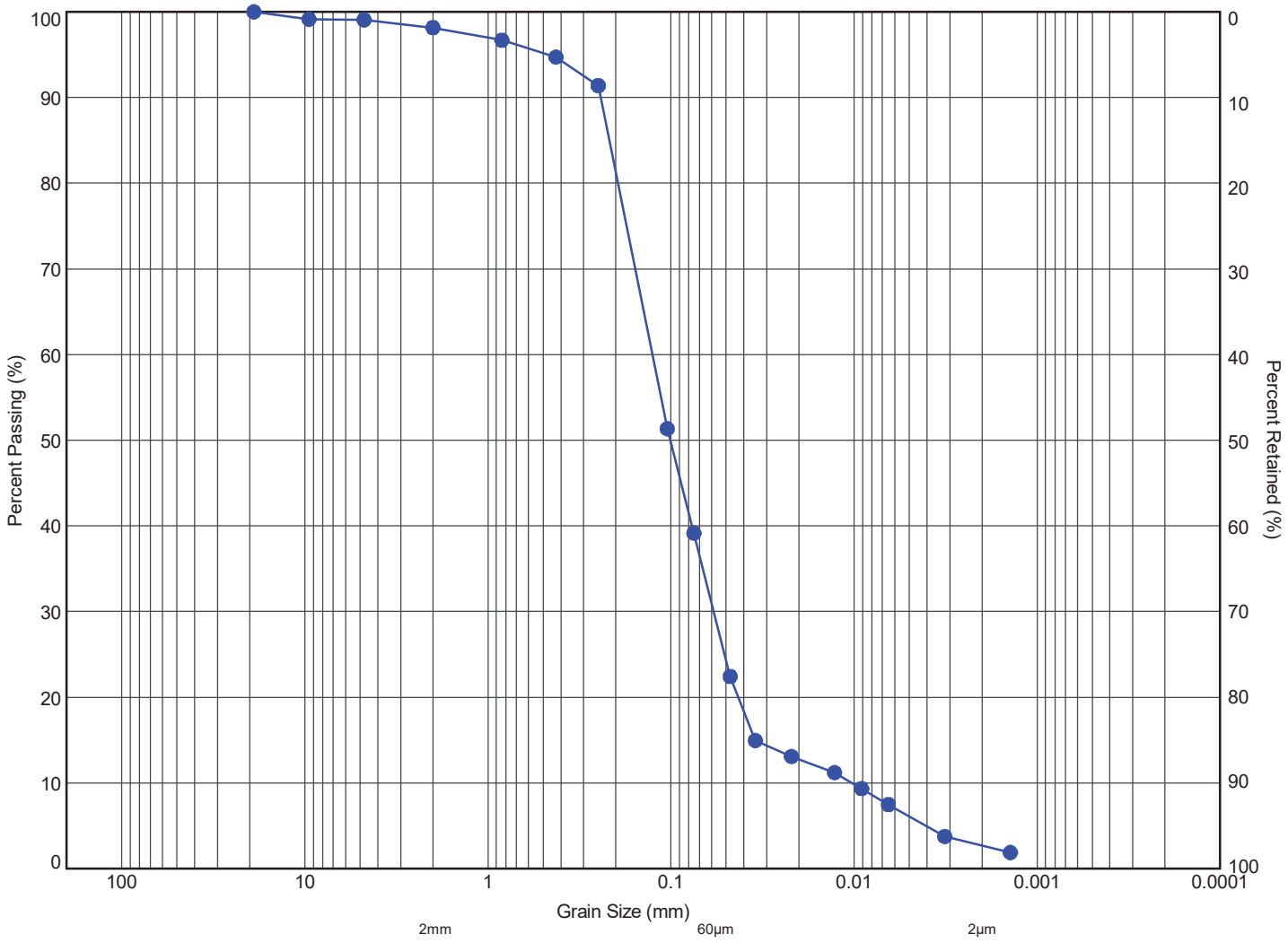
	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**4**	SS7	4.9	119.5	7	66	23	4	

Terraprobe
11 Indell Lane, Brampton Ontario L6T 3Y3
(905) 796-2650

Title:

GRAIN SIZE DISTRIBUTION
SILTY SAND, TRACE GRAVEL, TRACE CLAY

File No.: **1-19-0603-01**



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

MIT SYSTEM

	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**6**	SS10	10.9	113.8	2	67	28	3	

Terraprobe
11 Indell Lane, Brampton Ontario L6T 3Y3
(905) 796-2650

Title:

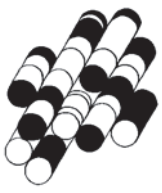
GRAIN SIZE DISTRIBUTION
SILTY SAND, TRACE CLAY, TRACE GRAVEL

File No.: **1-19-0603-01**

APPENDIX F

Groundwater Quality Test Results

TERRAPROBE INC.



TERRAPROBE-BRAMPTON
ATTN: Kossay Makhzoumi
11 Indell Lane
Brampton ON L6T 3Y3

Date Received: 27-OCT-21
Report Date: 04-NOV-21 14:40 (MT)
Version: FINAL

Client Phone: 905-796-2650

Certificate of Analysis

Lab Work Order #: L2656032
Project P.O. #: NOT SUBMITTED
Job Reference: 1-19-0603-46
C of C Numbers:
Legal Site Desc:

Emily Smith
Account Manager

Summary of Guideline Exceedances

ALS ID	Client ID	Grouping	Analyte	Result	Guideline Limit	Unit
Guideline						
Ontario Toronto Sanitary Discharge Sewer By-Law 100-2016 (FEB 4,2016) - Ontario Toronto Sanitary Discharge Sewer By-Law						
(No parameter exceedances)						
Ontario Toronto Sanitary Discharge Sewer By-Law 100-2016 (FEB 4,2016) - Ontario Toronto Storm Sewer By-Law						
L2656032-1	BH2	Physical Tests	Total Suspended Solids	21.4	15	mg/L
		Total Metals	Manganese (Mn)-Total	0.320	0.05	mg/L

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Physical Tests - WATER

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID: L2656032-1 Sample Date: 26-OCT-21 Sample ID: BH2
pH	pH units	6.00-11.5	6.0-9.5	7.59
Total Suspended Solids	mg/L	350	15	21.4

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Anions and Nutrients - WATER

		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
Lab ID				L2656032-1
Sample Date				26-OCT-21
Sample ID				BH2
Fluoride (F)	mg/L	10	-	<0.20 DLDS
Total Kjeldahl Nitrogen	mg/L	100	-	0.70 DLM
Phosphorus, Total	mg/L	10	0.4	0.050 DLM

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Cyanides - WATER

		Guide Limits		
Analyte	Unit	#1	#2	
Lab ID				L2656032-1
Sample Date				26-OCT-21
Sample ID				BH2
Cyanide, Total	mg/L	2	0.02	<0.0020

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Bacteriological Tests - WATER

			Lab ID	L2656032-1
			Sample Date	26-OCT-21
			Sample ID	BH2
		Guide Limits		
Analyte	Unit	#1	#2	
E. Coli	CFU/100mL	-	200	0

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Total Metals - WATER

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID: L2656032-1 Sample Date: 26-OCT-21 Sample ID: BH2
Aluminum (Al)-Total	mg/L	50	-	0.868 DLHC
Antimony (Sb)-Total	mg/L	5	-	<0.0010 DLHC
Arsenic (As)-Total	mg/L	1	0.02	<0.0010 DLHC
Cadmium (Cd)-Total	mg/L	0.7	0.008	<0.000050 DLHC
Chromium (Cr)-Total	mg/L	4	0.08	<0.0050 DLHC
Cobalt (Co)-Total	mg/L	5	-	<0.0010 DLHC
Copper (Cu)-Total	mg/L	2	0.04	<0.0050 DLHC
Lead (Pb)-Total	mg/L	1	0.12	0.00083 DLHC
Manganese (Mn)-Total	mg/L	5	0.05	0.320 DLHC
Mercury (Hg)-Total	mg/L	0.01	0.0004	<0.0000050
Molybdenum (Mo)-Total	mg/L	5	-	0.00202 DLHC
Nickel (Ni)-Total	mg/L	2	0.08	<0.0050 DLHC
Selenium (Se)-Total	mg/L	1	0.02	<0.00050 DLHC
Silver (Ag)-Total	mg/L	5	0.12	<0.00050 DLHC
Tin (Sn)-Total	mg/L	5	-	<0.0010 DLHC
Titanium (Ti)-Total	mg/L	5	-	0.0063 DLHC
Zinc (Zn)-Total	mg/L	2	0.04	<0.030 DLHC

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Speciated Metals - WATER

		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
Lab ID				L2656032-1
Sample Date				26-OCT-21
Sample ID				BH2
Chromium, Hexavalent	mg/L	2	0.04	<0.00050

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Aggregate Organics - WATER

			Lab ID	L2656032-1
			Sample Date	26-OCT-21
			Sample ID	BH2
		Guide Limits		
Analyte	Unit	#1	#2	
BOD	mg/L	300	15	3.9
Oil and Grease, Total	mg/L	-	-	<5.0
Animal/Veg Oil & Grease	mg/L	150	-	<5.0
Mineral Oil and Grease	mg/L	15	-	<2.5
Phenols (4AAP)	mg/L	1.0	0.008	0.0026

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Volatile Organic Compounds - WATER

			Lab ID	L2656032-1
			Sample Date	26-OCT-21
			Sample ID	BH2
		Guide Limits		
Analyte	Unit	#1	#2	
Benzene	ug/L	10	2	<0.50
Chloroform	ug/L	40	2	<1.0
1,2-Dichlorobenzene	ug/L	50	5.6	<0.50
1,4-Dichlorobenzene	ug/L	80	6.8	<0.50
cis-1,2-Dichloroethylene	ug/L	4000	5.6	<0.50
Dichloromethane	ug/L	2000	5.2	<2.0
trans-1,3-Dichloropropene	ug/L	140	-	<0.50
Ethylbenzene	ug/L	160	2	<0.50
1,1,2,2-Tetrachloroethane	ug/L	1400	17	<0.50
Tetrachloroethylene	ug/L	1000	4.4	<0.50
Toluene	ug/L	16	2	<0.50
Trichloroethylene	ug/L	400	7.6	<0.50
o-Xylene	ug/L	-	-	<0.50
m+p-Xylenes	ug/L	-	-	<1.0
Xylenes (Total)	ug/L	1400	4.4	<1.1
Surrogate: 4-Bromofluorobenzene	%	-	-	102.3
Surrogate: 1,4-Difluorobenzene	%	-	-	100.8

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Polycyclic Aromatic Hydrocarbons - WATER

			Lab ID	L2656032-1
			Sample Date	26-OCT-21
			Sample ID	BH2
		Guide Limits		
Analyte	Unit	#1	#2	
Acenaphthene	ug/L	-	-	<0.010
Anthracene	ug/L	-	-	<0.010
Benzo(a)anthracene	ug/L	-	-	<0.010
Benzo(a)pyrene	ug/L	-	-	<0.010
Benzo(b&j)fluoranthene	ug/L	-	-	<0.010
Benzo(e)pyrene	ug/L	-	-	<0.050
Benzo(ghi)perylene	ug/L	-	-	<0.010
Benzo(k)fluoranthene	ug/L	-	-	<0.010
Chrysene	ug/L	-	-	<0.010
Dibenz(a,h)acridine	ug/L	-	-	<0.050
Dibenz(a,j)acridine	ug/L	-	-	<0.050
Dibenz(a,h)anthracene	ug/L	-	-	<0.010
Dibenzo(a,i)pyrene	ug/L	-	-	<0.050
7H-Dibenzo(c,g)carbazole	ug/L	-	-	<0.050
1,3-Dinitropyrene	ug/L	-	-	<1.0
1,6-Dinitropyrene	ug/L	-	-	<1.0
1,8-Dinitropyrene	ug/L	-	-	<1.0
Fluoranthene	ug/L	-	-	0.011
Fluorene	ug/L	-	-	<0.010
Indeno(1,2,3-cd)pyrene	ug/L	-	-	<0.010
Naphthalene	ug/L	-	-	0.023
Perylene	ug/L	-	-	<0.010
Phenanthrene	ug/L	-	-	0.013
Pyrene	ug/L	-	-	0.013 R
Surrogate: 2-Fluorobiphenyl	%	-	-	74.7
Surrogate: D14-Terphenyl	%	-	-	82.1
Surrogate: d14-Terphenyl	%	-	-	82.0
Total PAHs	ug/L	5	2	<1.7

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Semi-Volatile Organics - WATER

			Lab ID	L2656032-1
			Sample Date	26-OCT-21
			Sample ID	BH2
		Guide Limits		
Analyte	Unit	#1	#2	
3,3-Dichlorobenzidine	ug/L	2	0.8	<0.40
Di-n-butylphthalate	ug/L	80	15	<1.0
Bis(2-ethylhexyl)phthalate	ug/L	12	8.8	<2.0
Pentachlorophenol	ug/L	5	2	<0.50
Surrogate: 2-Fluorobiphenyl	%	-	-	79.6
Surrogate: p-Terphenyl d14	%	-	-	70.5
Surrogate: 2,4,6-Tribromophenol	%	-	-	97.1

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Polychlorinated Biphenyls - WATER

			Lab ID	L2656032-1
			Sample Date	26-OCT-21
			Sample ID	BH2
		Guide Limits		
Analyte	Unit	#1	#2	
Aroclor 1242	ug/L	-	-	<0.020
Aroclor 1248	ug/L	-	-	<0.020
Aroclor 1254	ug/L	-	-	<0.020
Aroclor 1260	ug/L	-	-	<0.020
Surrogate: Decachlorobiphenyl	%	-	-	99.7
Total PCBs	ug/L	1	0.4	<0.040
Surrogate: Tetrachloro-m-xylene	%	-	-	88.8

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Organic Parameters - WATER

			Lab ID	L2656032-1
			Sample Date	26-OCT-21
			Sample ID	BH2
		Guide Limits		
Analyte	Unit	#1	#2	
Nonylphenol	ug/L	20	1	<1.0
Nonylphenol Diethoxylates	ug/L	-	-	<0.10
Total Nonylphenol Ethoxylates	ug/L	200	10	<2.0
Nonylphenol Monoethoxylates	ug/L	-	-	<2.0

Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law
Guide Limit #2: Ontario Toronto Storm Sewer By-Law

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Reference Information

Qualifiers for Individual Parameters Listed:

Qualifier	Description
R	The ion abundance ratio(s) did not meet the acceptance criteria. Value is an estimated maximum.
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
625-PAH-LOW-WT	Water	EPA 8270 PAH (Low Level)	SW846 8270
Aqueous samples are extracted and extracts are analyzed on GC/MSD. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.			
625-SAN-WT	Water	Ontario Sanitary Sewer SVOC Target List	SW-846 8270
Samples are extracted with solvent and then analyzed by GC/MS.			
BOD-WT	Water	BOD	APHA 5210 B
This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.			
CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2
Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex. When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference			
CR-CR6-IC-WT	Water	Chromium +6	EPA 7199
This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution. Chromium (III) is calculated as the difference between the total chromium and the chromium (VI) results. Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).			
EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.			
EC-WW-MF-WT	Water	E. Coli	SM 9222D
A 100 mL volume of sample is filtered through a membrane, the membrane is placed on mFC-BCIG agar and incubated at 44.5 –0 .2 □C for 24 – 2 h. Method ID: WT-TM-1200			
F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NP,NPE-LCMS-WT	Water	Nonylphenols and Ethoxylates by LC/MS-MS	J. Chrom A849 (1999) p.467-482

Water samples are filtered and analyzed on LCMS/MS by direct injection.

OGG-SPEC-CALC-WT	Water	Speciated Oil and Grease A/V Calc	CALCULATION

Sample is extracted with hexane, sample speciation into mineral and animal/vegetable fractions is achieved via silica gel separation and is then determined gravimetrically.

OGG-SPEC-WT	Water	Speciated Oil and Grease-Gravimetric	APHA 5520 B

The procedure involves an extraction of the entire water sample with hexane. Sample speciation into mineral and animal/vegetable fractions is achieved via silica gel separation and is then determined gravimetrically.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PAH-EXTRA-WT	Water	Sanitary Sewer Use By-Law Additional PAH	SW 846 8270
PAH-SUM-CALC-WT	Water	TOTAL PAH's	CALCULATION

Total PAH represents the sum of all PAH analytes reported for a given sample. Note that regulatory agencies and criteria differ in their definitions of Total PAH in terms of the individual PAH analytes to be included.

PCB-WT	Water	Polychlorinated Biphenyls	EPA 8082

PCBs are extracted from an aqueous sample at neutral pH with aliquots of dichloromethane using a modified separatory funnel technique. The extracts are analyzed by GC/MSD.

PH-WT	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days

PHENOLS-4AAP-WT	Water	Phenol (4AAP)	EPA 9066

An automated method is used to distill the sample. The distillate is then buffered to pH 9.4 which reacts with 4AAP and potassium ferricyanide to form a red complex which is measured colorimetrically.

SOLIDS-TSS-WT	Water	Suspended solids	APHA 2540 D-Gravimetric

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
		A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104–1□C for a minimum of four hours or until a constant weight is achieved.	
TKN-F-WT	Water	TKN in Water by Fluorescence	J. ENVIRON. MONIT., 2005,7,37-42,RSC
		Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection	
VOC-ROU-HS-WT	Water	Volatile Organic Compounds	SW846 8260
		Aqueous samples are analyzed by headspace-GC/MS.	
XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION
		Total xylenes represents the sum of o-xylene and m&p-xylene.	

**ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody Numbers:

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Client: TERRAPROBE-BRAMPTON
11 Indell Lane
Brampton ON L6T 3Y3
Contact: Kossay Makhzoumi

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-PAH-LOW-WT	**Water**							
Batch R5636005								
WG3651568-2 LCS								
Acenaphthene			80.7		%		50-130	04-NOV-21
Anthracene			82.4		%		60-130	04-NOV-21
Benzo(a)anthracene			95.0		%		60-140	04-NOV-21
Benzo(a)pyrene			75.2		%		60-130	04-NOV-21
Benzo(b&j)fluoranthene			84.7		%		60-130	04-NOV-21
Benzo(ghi)perylene			66.3		%		50-140	04-NOV-21
Benzo(k)fluoranthene			89.7		%		60-130	04-NOV-21
Chrysene			95.9		%		60-140	04-NOV-21
Dibenz(a,h)anthracene			73.9		%		60-130	04-NOV-21
Fluoranthene			95.5		%		60-130	04-NOV-21
Fluorene			83.2		%		60-130	04-NOV-21
Indeno(1,2,3-cd)pyrene			74.8		%		60-140	04-NOV-21
Naphthalene			79.8		%		50-130	04-NOV-21
Perylene			81.9		%		60-130	04-NOV-21
Phenanthrene			86.5		%		60-130	04-NOV-21
Pyrene			93.5		%		60-130	04-NOV-21
WG3651568-1 MB								
Acenaphthene			<0.010		ug/L		0.01	04-NOV-21
Anthracene			<0.010		ug/L		0.01	04-NOV-21
Benzo(a)anthracene			<0.010		ug/L		0.01	04-NOV-21
Benzo(a)pyrene			<0.010		ug/L		0.01	04-NOV-21
Benzo(b&j)fluoranthene			<0.010		ug/L		0.01	04-NOV-21
Benzo(ghi)perylene			<0.010		ug/L		0.01	04-NOV-21
Benzo(k)fluoranthene			<0.010		ug/L		0.01	04-NOV-21
Chrysene			<0.010		ug/L		0.01	04-NOV-21
Dibenz(a,h)anthracene			<0.010		ug/L		0.01	04-NOV-21
Fluoranthene			<0.010		ug/L		0.01	04-NOV-21
Fluorene			<0.010		ug/L		0.01	04-NOV-21
Indeno(1,2,3-cd)pyrene			<0.010		ug/L		0.01	04-NOV-21
Naphthalene			<0.010		ug/L		0.01	04-NOV-21
Perylene			<0.010		ug/L		0.01	04-NOV-21
Phenanthrene			<0.010		ug/L		0.01	04-NOV-21
Pyrene			<0.010		ug/L		0.01	04-NOV-21
Surrogate: 2-Fluorobiphenyl			74.9		%		40-130	04-NOV-21

Quality Control Report

Client: TERRAPROBE-BRAMPTON
11 Indell Lane
Brampton ON L6T 3Y3
Contact: Kossay Makhzoumi

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-PAH-LOW-WT	**Water**							
Batch R5636005								
WG3651568-1 MB								
Surrogate: D14-Terphenyl			100.4		%		40-130	04-NOV-21
625-SAN-WT	**Water**							
Batch R5635859								
WG3651568-2 LCS								
3,3-Dichlorobenzidine			10.2	RRQC	%		50-140	04-NOV-21
Bis(2-ethylhexyl)phthalate			78.4		%		50-140	04-NOV-21
Di-n-butylphthalate			85.4		%		50-140	04-NOV-21
Pentachlorophenol			122.4		%		50-140	04-NOV-21
COMMENTS: RRQC: Recovery is below ALS control limits. Reported non-detect results for associated samples have not been affected.								
WG3651568-1 MB								
3,3-Dichlorobenzidine			<0.40		ug/L		0.4	04-NOV-21
Bis(2-ethylhexyl)phthalate			<2.0		ug/L		2	04-NOV-21
Di-n-butylphthalate			<1.0		ug/L		1	04-NOV-21
Pentachlorophenol			<0.50		ug/L		0.5	04-NOV-21
Surrogate: 2-Fluorobiphenyl			81.2		%		40-130	04-NOV-21
Surrogate: 2,4,6-Tribromophenol			87.4		%		40-130	04-NOV-21
Surrogate: p-Terphenyl d14			103.8		%		40-130	04-NOV-21
BOD-WT	**Water**							
Batch R5634376								
WG3647061-6 DUP		**L2655439-2**						
BOD		<2.0	<2.0	RPD-NA	mg/L	N/A	30	27-OCT-21
WG3647061-7 LCS								
BOD			100.0		%		85-115	27-OCT-21
WG3647061-5 MB								
BOD			<2.0		mg/L		2	27-OCT-21
CN-TOT-WT	**Water**							
Batch R5631797								
WG3647766-15 DUP		**WG3647766-13**						
Cyanide, Total		0.0023	0.0023		mg/L	1.7	20	28-OCT-21
WG3647766-12 LCS								
Cyanide, Total			96.2		%		80-120	28-OCT-21
WG3647766-11 MB								
Cyanide, Total			<0.0020		mg/L		0.002	28-OCT-21
WG3647766-14 MS		**WG3647766-13**						
Cyanide, Total			91.8		%		70-130	28-OCT-21

Quality Control Report

Client: TERRAPROBE-BRAMPTON
11 Indell Lane
Brampton ON L6T 3Y3
Contact: Kossay Makhzoumi

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CR-CR6-IC-WT	**Water**							
Batch R5632337								
WG3647731-4 DUP		**WG3647731-3**						
Chromium, Hexavalent		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	28-OCT-21
WG3647731-2 LCS								
Chromium, Hexavalent			100.9		%		80-120	28-OCT-21
WG3647731-1 MB								
Chromium, Hexavalent			<0.00050		mg/L		0.0005	28-OCT-21
WG3647731-5 MS		**WG3647731-3**						
Chromium, Hexavalent			103.3		%		70-130	28-OCT-21
EC-WW-MF-WT	**Water**							
Batch R5633336								
WG3647640-3 DUP		**L2656187-1**						
E. Coli		0	<10	RPD-NA	CFU/100mL	N/A	65	28-OCT-21
WG3647640-1 MB								
E. Coli			0		CFU/100mL		1	28-OCT-21
F-IC-N-WT	**Water**							
Batch R5632492								
WG3647872-14 DUP		**WG3647872-13**						
Fluoride (F)		1.76	1.75		mg/L	0.2	20	28-OCT-21
WG3647872-12 LCS								
Fluoride (F)			102.8		%		90-110	28-OCT-21
WG3647872-11 MB								
Fluoride (F)			<0.020		mg/L		0.02	28-OCT-21
WG3647872-15 MS		**WG3647872-13**						
Fluoride (F)			N/A	MS-B	%		-	28-OCT-21
HG-T-CVAA-WT	**Water**							
Batch R5633634								
WG3648828-3 DUP		**L2645661-9**						
Mercury (Hg)-Total		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	01-NOV-21
WG3648828-2 LCS								
Mercury (Hg)-Total			96.0		%		80-120	01-NOV-21
WG3648828-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	01-NOV-21
WG3648828-4 MS		**L2654790-1**						
Mercury (Hg)-Total			95.0		%		70-130	01-NOV-21
MET-T-CCMS-WT	**Water**							

Quality Control Report

Client: TERRAPROBE-BRAMPTON
11 Indell Lane
Brampton ON L6T 3Y3
Contact: Kossay Makhzoumi

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R5631456								
WG3647231-4 DUP		**WG3647231-3**						
Aluminum (Al)-Total		0.365	0.358		mg/L	2.1	20	28-OCT-21
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-OCT-21
Arsenic (As)-Total		0.00048	0.00043		mg/L	9.6	20	28-OCT-21
Cadmium (Cd)-Total		0.0000215	0.0000190		mg/L	12	20	28-OCT-21
Chromium (Cr)-Total		0.00135	0.00127		mg/L	5.6	20	28-OCT-21
Cobalt (Co)-Total		0.00081	0.00076		mg/L	5.9	20	28-OCT-21
Copper (Cu)-Total		0.00191	0.00172		mg/L	11	20	28-OCT-21
Lead (Pb)-Total		0.000411	0.000405		mg/L	1.6	20	28-OCT-21
Manganese (Mn)-Total		0.0972	0.0966		mg/L	0.6	20	28-OCT-21
Molybdenum (Mo)-Total		0.000178	0.000167		mg/L	6.5	20	28-OCT-21
Nickel (Ni)-Total		0.00302	0.00281		mg/L	7.2	20	28-OCT-21
Selenium (Se)-Total		0.000118	0.000118		mg/L	0.6	20	28-OCT-21
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	28-OCT-21
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-OCT-21
Titanium (Ti)-Total		0.0138	0.0135		mg/L	2.2	20	28-OCT-21
Zinc (Zn)-Total		0.0046	0.0041		mg/L	12	20	28-OCT-21
WG3647231-2 LCS								
Aluminum (Al)-Total			107.8		%		80-120	28-OCT-21
Antimony (Sb)-Total			99.7		%		80-120	28-OCT-21
Arsenic (As)-Total			106.3		%		80-120	28-OCT-21
Cadmium (Cd)-Total			104.4		%		80-120	28-OCT-21
Chromium (Cr)-Total			106.2		%		80-120	28-OCT-21
Cobalt (Co)-Total			106.8		%		80-120	28-OCT-21
Copper (Cu)-Total			103.8		%		80-120	28-OCT-21
Lead (Pb)-Total			96.0		%		80-120	28-OCT-21
Manganese (Mn)-Total			105.4		%		80-120	28-OCT-21
Molybdenum (Mo)-Total			96.5		%		80-120	28-OCT-21
Nickel (Ni)-Total			103.1		%		80-120	28-OCT-21
Selenium (Se)-Total			101.6		%		80-120	28-OCT-21
Silver (Ag)-Total			96.7		%		80-120	28-OCT-21
Tin (Sn)-Total			97.8		%		80-120	28-OCT-21
Titanium (Ti)-Total			102.1		%		80-120	28-OCT-21
Zinc (Zn)-Total			101.2		%		80-120	28-OCT-21

Quality Control Report

Client: TERRAPROBE-BRAMPTON
11 Indell Lane
Brampton ON L6T 3Y3
Contact: Kossay Makhzoumi

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R5631456								
WG3647231-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	28-OCT-21
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	28-OCT-21
Arsenic (As)-Total			<0.00010		mg/L		0.0001	28-OCT-21
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	28-OCT-21
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	28-OCT-21
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	28-OCT-21
Copper (Cu)-Total			<0.00050		mg/L		0.0005	28-OCT-21
Lead (Pb)-Total			<0.000050		mg/L		0.00005	28-OCT-21
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	28-OCT-21
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	28-OCT-21
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	28-OCT-21
Selenium (Se)-Total			<0.000050		mg/L		0.00005	28-OCT-21
Silver (Ag)-Total			<0.000050		mg/L		0.00005	28-OCT-21
Tin (Sn)-Total			<0.00010		mg/L		0.0001	28-OCT-21
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	28-OCT-21
Zinc (Zn)-Total			<0.0030		mg/L		0.003	28-OCT-21
WG3647231-5 MS		**WG3647231-6**						
Aluminum (Al)-Total			103.7		%		70-130	28-OCT-21
Antimony (Sb)-Total			104.8		%		70-130	28-OCT-21
Arsenic (As)-Total			108.8		%		70-130	28-OCT-21
Cadmium (Cd)-Total			110.8		%		70-130	28-OCT-21
Chromium (Cr)-Total			107.5		%		70-130	28-OCT-21
Cobalt (Co)-Total			108.6		%		70-130	28-OCT-21
Copper (Cu)-Total			108.8		%		70-130	28-OCT-21
Lead (Pb)-Total			102.9		%		70-130	28-OCT-21
Manganese (Mn)-Total			N/A	MS-B	%		-	28-OCT-21
Molybdenum (Mo)-Total			101.7		%		70-130	28-OCT-21
Nickel (Ni)-Total			107.5		%		70-130	28-OCT-21
Selenium (Se)-Total			111.3		%		70-130	28-OCT-21
Silver (Ag)-Total			101.2		%		70-130	28-OCT-21
Tin (Sn)-Total			103.3		%		70-130	28-OCT-21
Titanium (Ti)-Total			107.4		%		70-130	28-OCT-21
Zinc (Zn)-Total			102.7		%		70-130	28-OCT-21
NP,NPE-LCMS-WT	**Water**							

Quality Control Report

Client: TERRAPROBE-BRAMPTON
11 Indell Lane
Brampton ON L6T 3Y3
Contact: Kossay Makhzoumi

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NP,NPE-LCMS-WT	**Water**							
Batch R5634640								
WG3649535-3 DUP		**L2655162-1**						
Nonylphenol		<1.0	<1.0	RPD-NA	ug/L	N/A	30	01-NOV-21
Nonylphenol Monoethoxylates		<2.0	<2.0	RPD-NA	ug/L	N/A	30	01-NOV-21
Nonylphenol Diethoxylates		<0.10	<0.10	RPD-NA	ug/L	N/A	30	01-NOV-21
WG3649535-2 LCS								
Nonylphenol			86.1		%		75-125	01-NOV-21
Nonylphenol Monoethoxylates			97.6		%		75-125	01-NOV-21
Nonylphenol Diethoxylates			95.0		%		75-125	01-NOV-21
WG3649535-1 MB								
Nonylphenol			<1.0		ug/L		1	01-NOV-21
Nonylphenol Monoethoxylates			<2.0		ug/L		2	01-NOV-21
Nonylphenol Diethoxylates			<0.10		ug/L		0.1	01-NOV-21
WG3649535-4 MS		**L2655162-1**						
Nonylphenol			83.3		%		60-140	01-NOV-21
Nonylphenol Monoethoxylates			138.1		%		60-140	01-NOV-21
Nonylphenol Diethoxylates			97.4		%		60-140	01-NOV-21
OGG-SPEC-WT	**Water**							
Batch R5629902								
WG3646870-2 LCS								
Oil and Grease, Total			86.3		%		70-130	27-OCT-21
Mineral Oil and Grease			80.6		%		70-130	27-OCT-21
WG3646870-1 MB								
Oil and Grease, Total			<5.0		mg/L		5	27-OCT-21
Mineral Oil and Grease			<2.5		mg/L		2.5	27-OCT-21
P-T-COL-WT	**Water**							
Batch R5632619								
WG3647211-3 DUP		**L2656285-2**						
Phosphorus, Total		0.0785	0.0793		mg/L	0.9	20	29-OCT-21
WG3647211-2 LCS								
Phosphorus, Total			98.8		%		80-120	29-OCT-21
WG3647211-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	29-OCT-21
WG3647211-4 MS		**L2656285-2**						
Phosphorus, Total			94.8		%		70-130	29-OCT-21
PAH-EXTRA-WT	**Water**							

Quality Control Report

Client: TERRAPROBE-BRAMPTON
11 Indell Lane
Brampton ON L6T 3Y3
Contact: Kossay Makhzoumi

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-EXTRA-WT	**Water**							
Batch R5635922								
WG3651568-2 LCS								
Benzo(e)pyrene			84.2		%		60-130	04-NOV-21
1,3-Dinitropyrene			118.4		%		60-130	04-NOV-21
1,6-Dinitropyrene			81.5		%		60-130	04-NOV-21
Dibenz(a,h)acridine			84.6		%		60-130	04-NOV-21
1,8-Dinitropyrene			98.2		%		60-130	04-NOV-21
Dibenz(a,j)acridine			84.4		%		60-130	04-NOV-21
7H-Dibenzo(c,g)carbazole			76.0		%		60-130	04-NOV-21
Dibenzo(a,i)pyrene			73.3		%		60-130	04-NOV-21
WG3651568-1 MB								
Benzo(e)pyrene			<0.050		ug/L		0.05	04-NOV-21
1,3-Dinitropyrene			<1.0		ug/L		1	04-NOV-21
1,6-Dinitropyrene			<1.0		ug/L		1	04-NOV-21
Dibenz(a,h)acridine			<0.050		ug/L		0.05	04-NOV-21
1,8-Dinitropyrene			<1.0		ug/L		1	04-NOV-21
Dibenz(a,j)acridine			<0.050		ug/L		0.05	04-NOV-21
7H-Dibenzo(c,g)carbazole			<0.050		ug/L		0.05	04-NOV-21
Dibenzo(a,i)pyrene			<0.050		ug/L		0.05	04-NOV-21
Surrogate: d14-Terphenyl			100.1		%		40-130	04-NOV-21
PCB-WT	**Water**							
Batch R5633715								
WG3649546-2 LCS								
Aroclor 1242			95.9		%		65-130	01-NOV-21
Aroclor 1248			89.3		%		65-130	01-NOV-21
Aroclor 1254			85.7		%		65-130	01-NOV-21
Aroclor 1260			87.3		%		65-130	01-NOV-21
WG3649546-1 MB								
Aroclor 1242			<0.020		ug/L		0.02	01-NOV-21
Aroclor 1248			<0.020		ug/L		0.02	01-NOV-21
Aroclor 1254			<0.020		ug/L		0.02	01-NOV-21
Aroclor 1260			<0.020		ug/L		0.02	01-NOV-21
Surrogate: Decachlorobiphenyl			106.6		%		50-150	01-NOV-21
Surrogate: Tetrachloro-m-xylene			80.5		%		50-150	01-NOV-21
PH-WT	**Water**							

Quality Control Report

Client: TERRAPROBE-BRAMPTON
11 Indell Lane
Brampton ON L6T 3Y3
Contact: Kossay Makhzoumi

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-WT	**Water**							
Batch R5632778								
WG3647530-4 DUP		**WG3647530-3**						
pH		8.41	8.39	J	pH units	0.02	0.2	28-OCT-21
WG3647530-2 LCS								
pH			7.00		pH units		6.9-7.1	28-OCT-21
PHENOLS-4AAP-WT	**Water**							
Batch R5633751								
WG3647216-3 DUP		**L2655162-3**						
Phenols (4AAP)		<0.0010	0.0010	RPD-NA	mg/L	N/A	20	29-OCT-21
WG3647216-2 LCS								
Phenols (4AAP)			99.9		%		85-115	29-OCT-21
WG3647216-1 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	29-OCT-21
WG3647216-4 MS		**L2655162-3**						
Phenols (4AAP)			93.4		%		75-125	29-OCT-21
SOLIDS-TSS-WT	**Water**							
Batch R5633587								
WG3649371-2 LCS								
Total Suspended Solids			91.0		%		85-115	01-NOV-21
WG3649371-1 MB								
Total Suspended Solids			<3.0		mg/L		3	01-NOV-21
TKN-F-WT	**Water**							
Batch R5632176								
WG3647287-3 DUP		**L2656279-2**						
Total Kjeldahl Nitrogen		0.750	0.860		mg/L	14	20	28-OCT-21
WG3647287-2 LCS								
Total Kjeldahl Nitrogen			97.8		%		75-125	28-OCT-21
WG3647287-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	28-OCT-21
WG3647287-4 MS		**L2656279-2**						
Total Kjeldahl Nitrogen			117.2		%		70-130	28-OCT-21
VOC-ROU-HS-WT	**Water**							
Batch R5633474								
WG3649395-4 DUP		**WG3649395-3**						
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-NOV-21
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-NOV-21
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-NOV-21
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-NOV-21

Quality Control Report

Client: TERRAPROBE-BRAMPTON
11 Indell Lane
Brampton ON L6T 3Y3
Contact: Kossay Makhzoumi

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ROU-HS-WT	**Water**							
Batch R5633474								
WG3649395-4 DUP		**WG3649395-3**						
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	01-NOV-21
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-NOV-21
Dichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	01-NOV-21
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-NOV-21
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	01-NOV-21
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	01-NOV-21
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-NOV-21
Toluene		<0.40	<0.40	RPD-NA	ug/L	N/A	30	01-NOV-21
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	01-NOV-21
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-NOV-21
WG3649395-1 LCS								
1,1,2,2-Tetrachloroethane			95.1		%		70-130	01-NOV-21
1,2-Dichlorobenzene			106.2		%		70-130	01-NOV-21
1,4-Dichlorobenzene			109.0		%		70-130	01-NOV-21
Benzene			102.2		%		70-130	01-NOV-21
Chloroform			104.4		%		70-130	01-NOV-21
cis-1,2-Dichloroethylene			106.0		%		70-130	01-NOV-21
Dichloromethane			102.5		%		70-130	01-NOV-21
Ethylbenzene			106.5		%		70-130	01-NOV-21
m+p-Xylenes			107.5		%		70-130	01-NOV-21
o-Xylene			104.5		%		70-130	01-NOV-21
Tetrachloroethylene			111.1		%		70-130	01-NOV-21
Toluene			103.9		%		70-130	01-NOV-21
trans-1,3-Dichloropropene			95.0		%		70-130	01-NOV-21
Trichloroethylene			109.4		%		70-130	01-NOV-21
WG3649395-2 MB								
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	01-NOV-21
1,2-Dichlorobenzene			<0.50		ug/L		0.5	01-NOV-21
1,4-Dichlorobenzene			<0.50		ug/L		0.5	01-NOV-21
Benzene			<0.50		ug/L		0.5	01-NOV-21
Chloroform			<1.0		ug/L		1	01-NOV-21
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	01-NOV-21
Dichloromethane			<2.0		ug/L		2	01-NOV-21
Ethylbenzene			<0.50		ug/L		0.5	01-NOV-21

Quality Control Report

Client: TERRAPROBE-BRAMPTON
11 Indell Lane
Brampton ON L6T 3Y3
Contact: Kossay Makhzoumi

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ROU-HS-WT	**Water**							
Batch R5633474								
WG3649395-2 MB								
m+p-Xylenes			<0.40		ug/L		0.4	01-NOV-21
o-Xylene			<0.30		ug/L		0.3	01-NOV-21
Tetrachloroethylene			<0.50		ug/L		0.5	01-NOV-21
Toluene			<0.40		ug/L		0.4	01-NOV-21
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	01-NOV-21
Trichloroethylene			<0.50		ug/L		0.5	01-NOV-21
Surrogate: 1,4-Difluorobenzene			101.4		%		70-130	01-NOV-21
Surrogate: 4-Bromofluorobenzene			102.5		%		70-130	01-NOV-21
WG3649395-5 MS		**WG3649395-3**						
1,1,2,2-Tetrachloroethane			97.1		%		50-150	01-NOV-21
1,2-Dichlorobenzene			103.2		%		50-150	01-NOV-21
1,4-Dichlorobenzene			104.4		%		50-150	01-NOV-21
Benzene			99.0		%		50-150	01-NOV-21
Chloroform			102.2		%		50-150	01-NOV-21
cis-1,2-Dichloroethylene			102.0		%		50-150	01-NOV-21
Dichloromethane			101.7		%		50-150	01-NOV-21
Ethylbenzene			99.3		%		50-150	01-NOV-21
m+p-Xylenes			100.9		%		50-150	01-NOV-21
o-Xylene			98.5		%		50-150	01-NOV-21
Tetrachloroethylene			103.9		%		50-150	01-NOV-21
Toluene			97.4		%		50-150	01-NOV-21
trans-1,3-Dichloropropene			92.2		%		50-150	01-NOV-21
Trichloroethylene			104.7		%		50-150	01-NOV-21

Quality Control Report

Workorder: L2656032 Report Date: 04-NOV-21

Client: TERRAPROBE-BRAMPTON
11 Indell Lane
Brampton ON L6T 3Y3
Contact: Kossay Makhzoumi

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.
RRQC	Refer to report remarks for information regarding this QC result.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Chain of Custody (COC) / Analytical Request Form

L2656032-COFC

COC Number: 15 -

Page of 2

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Report To	Contact and company name below will appear on the final report
Company:	Terraprobe
Contact:	Kossay Makhzoumi
Phone:	905-796-2650
	Company address below will appear on the final report
Street:	11 Indell Ln.
City/Province:	Brampton, ON
Postal Code:	L6T 3Y3
Invoice To	Same as Report To ☒ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	Terraprobe
Contact:	Lorena Rossi

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☐ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax kmakhzoumi@terraprobe.ca
Email 2
Email 3

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☑ FAX
Email 1 or Fax kmakhzoumi@terraprobe.ca
Email 2 lrossi@terraprobe.ca

Project Information

ALS Account # / Quote #: Q71850
Job #: 1-19-0603-46
PO / AFE: PO
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (lab use only): L2656032
ALS Contact: Emily Smith Sampler:

Select Service Level: n all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐
EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Tor Sewer Use (ON-SAN+STORM-TO-WT)	Number of Containers
	BH2	26-10-21	16:58	Water	X	
				Water		
				Water		
				Water		
				Water		
				Water		
				Water		
				Water		
				Water		
				Water		
				Water		
				Water		
				Water		

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO
Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

GLAND2QC_ON-SAN+STORM-TORONTO

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C		FINAL COOLER TEMPERATURES °C	
		10.9	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Ugo A	Date: 10/26/21	Time:	Received by:	Date:	Time:	Received by:	Date: 10/27/21	Time: 9:00

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

APPENDIX G

FEM Modeling

TERRAPROBE INC.

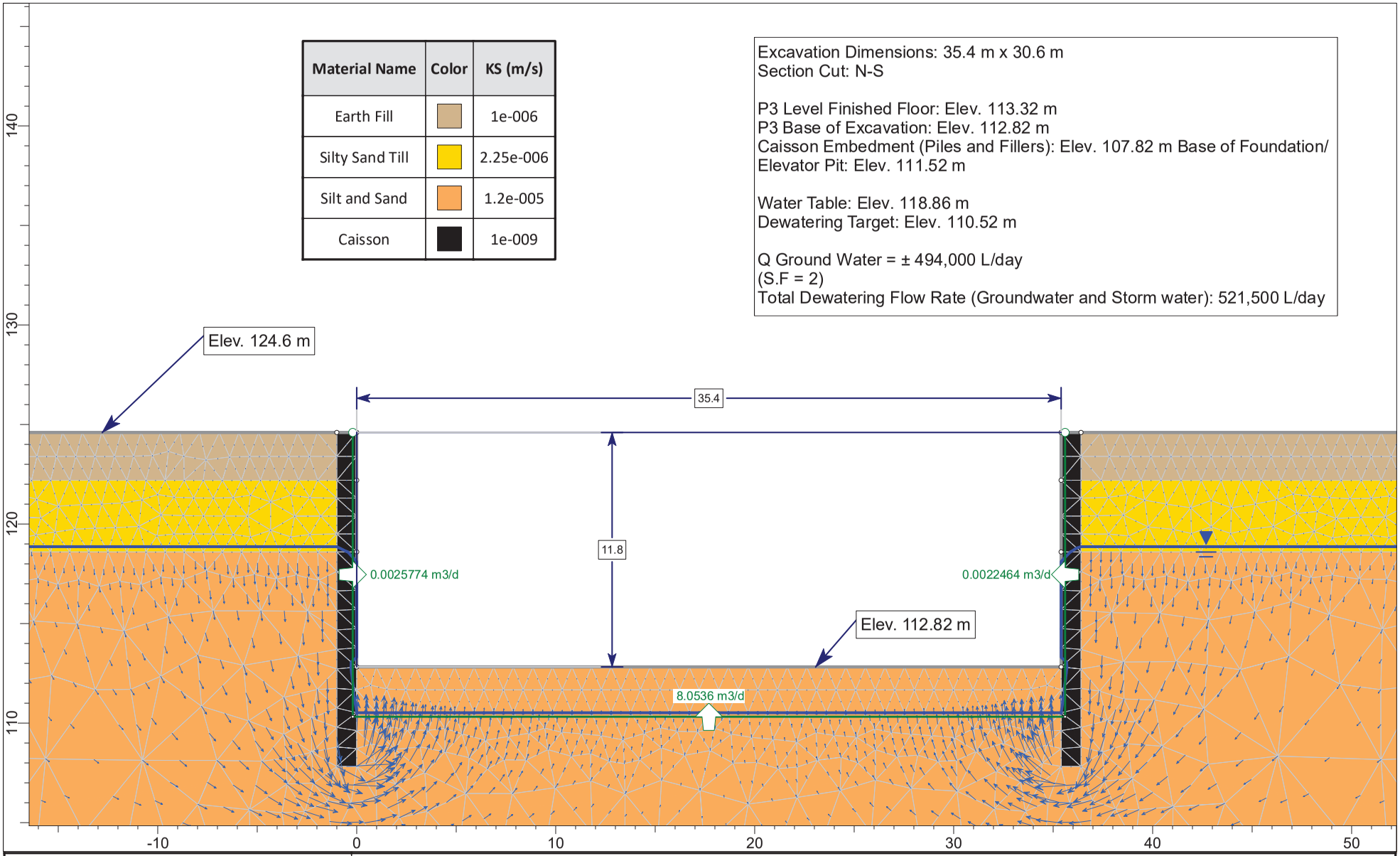
Material Name	Color	KS (m/s)
Earth Fill		1e-006
Silty Sand Till		2.25e-006
Silt and Sand		1.2e-005
Caisson		1e-009

Excavation Dimensions: 35.4 m x 30.6 m
Section Cut: N-S

P3 Level Finished Floor: Elev. 113.32 m
P3 Base of Excavation: Elev. 112.82 m
Caisson Embedment (Piles and Fillers): Elev. 107.82 m Base of Foundation/ Elevator Pit: Elev. 111.52 m

Water Table: Elev. 118.86 m
Dewatering Target: Elev. 110.52 m

Q Ground Water = ± 494,000 L/day
(S.F = 2)
Total Dewatering Flow Rate (Groundwater and Storm water): 521,500 L/day



Terraprobe
Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing

SLIDEINTERPRET 7.038

Project	**1196-1210 Yonge Street and 2-8 Birch Avenue, Toronto, Ontario**				
Analysis Description	1-19-0603-46.1 - Short - Term (Construction) Dewatering				
Drawn By	TS/KM	*Scale*	1:270	*Company*	Terraprobe
Date	2021-02-11, 3:05:57 PM			*File Name*	1-19-0603-46.1 DW ST 2021-02-11.slmd

Short-Term Construction Dewatering Flow Rate Estimate Details

Dewatering flow rate from Groundwater Source

Excavation Dimensions	
NS (m)	35.4
EW (m)	30.6
Area (m^2)	1083.24
Perimeter (m)	132

Q BASE		
Flow (m^3/day)	Length of Base (m)	Flow (L/day)
8.05E+00	30.6	246440.16

Q SIDES (m^3/day)		
Flow	Perimeter (m)	Flow (L/day)
2.58E-03	132	340.56

Q Total	L/day	246,780.72
Safety Factor		2
	L/day	493,561.44
	L/day	**494,000.00**

Dewatering Flow Rate from Rainfall Event

Rainfall Event		
Year	2	100
Hour	3	12
Depth (mm)	25	94
Depth (m)	0.025	0.094
2 Year Event (L/day)	**27,081**	27,500
100 Year Event (L/Day)	**101,825**	102,000

Estimated Short-Term Dewatering Flow Rate

L/day	521,500.00
L/min	362.15